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OFFICIAL GAZETTE of the
UNITED STATES PATENT and TRADEMARK OFFICE

June 7, 1977 Volume 959 Number 1

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PATENT AND TRADEMARK OFFICE NOTICES

Addition of U.S. Classification to the List of Patentees Indices

In the past the List of Patentees Index in the OFFICIAL GAZETTE and the Annual Index of Patents listed the U.S. patent classification by class and subclass following the name of only the first or sole patentee.

Effective with the July 5, 1977 issue of the patent OFFICIAL GAZETTE and the 1977 Annual Index of Patents, the U.S. classification information will also appear following the name of all joint patentees.

RICHARD J. SHAKMAN,
May 17, 1977. *Assistant Commissioner for Administration.*

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

2,919,990, Podlesak, Kraft and Miller, METHOD OF CONTINUOUSLY PRODUCING PACKAGED UNITS, filed June 13, 1974, D.C., N.D. Ill. (Chicago) Doc. 74c1624, *Kraftco Corporation* v. *Falbo Cheese Company.* Cause dismissed with prejudice and without costs pursuant to stipulation of parties, July 2, 1975.

2,972,349, R. A. DeWall, CAPILLARY OXEGENATOR; **3,228,876,** H. I. Mahon, PERMEABILITY SEPARATORY APPARATUS, PERMEABILITY SEPARATORY MEMBRANE ELEMENT, METHOD OF MAKING THE SAME AND PROCESS UTILIZING THE SAME; **3,548,209,** B. J. Lipps, Jr. PROCESS FOR THE FABRICATION OF A CELLULOSE HOLLOW FIBER SEPARATORY CELL, filed Mar. 6, 1975, D.C. Del. (Wilmington) Doc. 75–67, *Cobe Laboratories, Inc. and Abcor, Inc.* v. *The Dow Chemical Co., Cordis Dow Corp. and The Regents of the University of Minnesota.* It is hereby stipulated by counsel for parties that the portion of the complaint for declaratory judgment herein shall be dismissed without prejudice, Jan. 21, 1977.

3,047,196, Levine and Phillips, GARMENT HANGER, filed November 1976, D.C., S.D.N.Y., Doc. 76–C–5241DBB. *A & E Warbern Inc.* v. *Carter Industries.*

3,055,988, B. B. Bauer, MAGNETIC PHONOGRAPH PICKUP; **3,077,521,** Ahrens, Kuhn and Richter, STEREOPHONIC MOVING MAGNET PHONOGRAPH PICKUP; **3,077,522,** Gunter and Anderson, STEREOPHONIC PICKUP CARTRIDGE, filed May 10, 1976, D.C. Colo. (Denver) Doc. 76–0493, *Shure Brothers Inc.* v. *Music Discount.* Consent judgment, defendant is restrained from further infringement upon above patents, entered Aug. 16, 1976.

3,068,457, Bittner and Gnass, FOOT EXERCISER SANDALS, filed Aug. 14, 1974, D.C., N.D. Ill. (Chicago) Doc. 74c2302, *Scholl, Inc.* v. *S. S. Kresge Company.* Judgment, the counterclaim of the defendant is hereby denied and dismissed. The Court enters final judgment in favor of the plaintiff and against the defendant on the question of liability. Defendant is enjoined from directly or indirectly infringing said patent, Jan. 20, 1977. **Same, filed** Feb. 26, 1975, D.C., N.D. Ill. (Chicago) Doc. 75c622, *Scholl, Inc.* v. *Modern Shoe Co. and Glory Products Trading Co. Ltd.* Judgment, final judgment is in favor of the plaintiff and against the defendant on the question of liability. Defendant is enjoined and restrained from directly or indirectly infringing said patent, Jan. 20, 1977.

3,077,521. (See 3,055,988.)

3,077,522. (See 3,055,988.)

3,078,471, L. H. Knibb, LIQUID DISPENSING APPARATUS; **3,190,502,** same, APPARATUS FOR DISPENSING LIQUID SHAMPOO; **3,322,349,** same, APPARATUS AND SYSTEM FOR DISPENSING HAIR PREPARATIONS; **3,386,664,** same, BOTTLE CLOSURE ASSEMBLY FOR AN ATOMIZER; **3,491,951,** same, ATOMIZING HEAD AND BOTTLE COMBINATION FOR A LIQUID HAIR SPRAY OR THE LIKE, filed Sept. 22, 1976, D.C., N.D. Calif. (San Francisco) Doc. C76–2041–RFP, *Leroy H. Knibb, Sr.* v. *Revlon Co. Inc. et al.*

3,190,502. (See 3,078,471.)

3,228,876. (See 2,972,349.)

3,322,349. (See 3,078,471.)

3,328,676, S. I. Slater, CONTINUOUSLY VARIABLE DIMMER SWITCH; **Re. 26,119,** Same; **Re. 26,287,** B. H. Matthews, ELECTRICAL SWITCH WITH CAMMING BRIDGING CONTACT, filed July 11, 1968, D.C., N.D. Ill. (Chicago), Doc. 68c1290, *Skil Corporation* v. *Lucerne Products Inc.* Cause transferred to the District Court for the Northern District of Ohio, Sept. 24, 1970.

3,346,391, Miller and Flodin, PROCESS OF REMOVING AND RECOVERING OIL FROM DEEP-FRIED PRODUCTS, filed Sept. 9, 1976, D.C., E.D. Wash. (Spokane) Doc. C76–245, *Agri-Temp, Inc.* v. *Twin City Foods.*

3,386,664. (See 3,078,471.)

3,475,234, Kerwin, Klein, and Sarace, METHOD FOR MAKING MIS STRUCTURES; **3,544,399,** H. G. Dill, INSULATED GATE FIELD-EFFECT TRANSITION (IGFET) WITH SEMICONDUCTOR GATE ELECTRODE; **3,576,478,** Watkins and Selser, IGFET COMPRISING N-TYPE SILICON SUBSTRATE, SILICON OXIDE GATE INSULATOR AND P-TYPE POLYCRYSTALLINE SILICON GATE ELECTRODE, filed Nov. 11, 1974, D.C. Del. (Wilmington) Doc. 74–238, *Bell Telephone Laboratories, Inc.* v. *Hughes Aircraft Company and General Instrument Corporation.* Final judgment, judgment on priority of invention pursuant to 35 U.S.C. 291, Nov. 16, 1976.

3,491,951. (See 3,078,471.)

3,544,399. (See 3,475,234.)

3,546,209. (See 3,972,349.)

3,576,478. (See 3,475,234.)

3,659,284, W. T. Rusch, TELEVISION GAMING APPARATUS; **3,659,285,** R. H Baer, TELEVISION GAMING APPARATUS AND METHOD; **3,708,480,** same, TELEVISION GAMING AND TRAINING APPARATUS; **Re. 28,507,** W. T. Rusch, TELEVISION GAMING APPARATUS; **Re. 28,598,** same, filed Dec. 9, 1976, D.C., S.D. Fla. (Fort Lauderdale) Doc. 76–2221–C–NCR, *The Magnavox Company and Sanders Associates, Inc.* v. *Allied Leisure Industries and Tandy Corporation.*

3,659,285. (See 3,659,284.)

3,708,967, Geist and Ballas, ROTARY CUTTING ASSEMBLY; **3,826,068,** same; **3,859,776,** same, filed July 16, 1976, D.C., N.D. Tex. (Fort Worth) Doc. CA4–76–201, *K & S Industries, Inc.* v. *Weed Eater, Inc.*

3,728,480. (See 3,659,284.)

3,749,974, W. R. Kissel, ELECTRONIC IGNITION CONTROLLER, filed Mar. 24, 1975, D.C. Kans. (Wichita) Doc. 75–64–C6, *Chrysler Corporation* v. *Automotive Controls Corp. and The Echlin Manufacturing Co., Inc.*

3,826,068, Ballas and Geist, ROTARY CUTTING ASSEMBLY; **3,859,776,** same, filed July 9, 1976, D.C., S.D. Tex. (Houston) Doc. 76–H–1159, *Weed Eater, Inc.* v. *K & S Mfg. Co. et al.* **Same,** filed July 11, 1975, D.C. Kans. (Kansas City) Doc. 75–146–C2, *Weed Eater, Inc.* v. *Allied Industries of Kansas, Inc.*

3,826,068. (See 3,708,967.)

3,859,776. (See 3,708,967.)

3,859,776. (See 3,826,068.)

Re. 26,119. (See 3,328,676.)

Re. 26,287. (See 3,328,676.)

Re. 28,507. (See 3,659,284.)

Re. 28,598. (See 3,659,284.)

PATENT NOTICES

Certificates of Correction for the Week of June 7, 1977

D. 241,577	3,980,889	3,999,054	4,011,291
D. 242,221	3,981,652	3,999,379	4,011,577
3,583,984	3,981,842	3,999,723	4,011,839
3,615,931	3,982,687	3,999,846	4,011,841
3,703,334	3,983,084	4,000,023	4,011,862
3,766,386	3,983,539	4,000,336	4,011,952
3,793,223	3,984,215	4,002,748	4,012,111
3,800,483	3,984,408	4,002,752	4,012,112
3,809,043	3,984,438	4,003,163	4,012,332
3,849,895	3,985,231	4,003,423	4,012,441
3,860,849	3,985,433	4,003,514	4,012,483
3,862,351	3,985,811	4,003,715	4,012,525
3,866,086	3,985,821	4,003,937	4,012,566
3,883,946	3,987,324	4,004,242	4,012,593
3,886,072	3,987,705	4,004,685	4,012,670
3,920,359	3,988,606	4,005,373	4,012,887
3,922,468	3,989,009	4,005,921	4,013,160
3,931,573	3,990,062	4,006,076	4,013,293
3,932,725	3,990,274	4,006,319	4,013,526
3,934,696	3,990,297	4,006,324	4,013,527
3,938,748	3,990,727	4,007,299	4,013,570
3,940,473	3,991,073	4,007,407	4,014,495
3,947,709	3,991,094	4,007,547	4,014,870
3,949,476	3,992,198	4,008,265	4,015,011
3,956,872	3,992,402	4,008,646	4,015,032
3,958,153	3,992,480	4,008,690	4,015,388
3,958,246	3,993,426	4,008,791	4,015,537
3,963,001	3,994,553	4,008,980	4,015,869
3,963,651	3,995,003	4,009,024	4,015,968
3,967,393	3,997,198	4,009,208	4,016,287
3,968,829	3,997,360	4,009,238	4,016,400
3,975,191	3,997,549	4,009,439	4,016,492
3,976,527	3,997,875	4,009,550	4,016,528
3,976,722	3,997,890	4,009,745	4,016,969
3,976,758	3,997,956	4,010,021	4,019,952
3,976,929	3,998,197	4,010,563	
3,979,461	3,998,204	4,010,709	
3,979,594	3,998,712	4,011,011	

Disclaimers

Design No. 215,259.—*Martelle J. Syverson,* Albert Lea, Minn. BEVERAGE DISPENSER. Patent dated Sept. 16, 1969. Disclaimer filed Feb. 17, 1977, by the assignee, *Fountain Industries, Inc.*

Hereby enters this disclaimer to the sole claim of said patent.

3,801,530.—*William T. Free,* Madison, N.J. STABILIZED POLYALKYLENE RESIN COMPOSITION AND PROCESS FOR MAKING SAME. Patent dated Apr. 2, 1974. Disclaimer filed Apr. 6, 1977, by the assignee, *Celanese Corporation.*

Hereby enters this disclaimer to claims 1 through 30 inclusive of said patent.

Dedications

3,686,623.—*John P. Nijman,* Scarborough, Ontario, Canada. COAXIAL CABLE CONNECTOR PLUG. Patent dated Aug. 22, 1972. Dedication filed Mar. 14, 1977, by the assignee, *Bunker Ramo Corporation.*

Hereby dedicates to the Public the entire term of said patent.

3,865,082.—*David D. Levitz,* Short Hills, N.J., and *Ness Eastman,* Rego Park, and *William H. Davidson,* Katonah, N.Y. SMALL ANIMAL PLAYGROUND. Patent dated Feb. 11, 1975. Dedication filed Mar. 14, 1977, by the assignee, *The Hartz Mountain Corporation.*

Hereby dedicates to the Public the entire term of said patent.

3,872,685.—*Alan A. Matthies,* Milwaukee, Wis. EVAPORATOR TEMPERATURE CONTROL FOR REFRIGERATION SYSTEMS. Patent dated Mar. 25, 1975. Dedication filed Apr. 13, 1977, by the assignee, *The Singer Company.*

Hereby dedicates to the Public the entire term of said patent.

Disclaimer and Dedication

3,786,678.—*Peter Kunz,* Meilen, Switzerland. FORCE MEASURING APPARATUS INCLUDING ELECTROMAGNETIC LOAD COMPENSATION. Patent dated Jan. 22, 1974. Disclaimer filed Apr. 13, 1977, by the assignee, *Mettler Instrumente AG.*

Hereby disclaims and dedicates to the Public claims 1–10 of said patent.

Use of Certificate of Correction Forms

The purpose of this notice is, to once again, remind patentees and their attorneys and agents to submit the text of any correction under 37 CFR 1.322 and 1.323 on the Certificate of Correction form, PTO–1050, which is available free of charge from the Patent and Trademark Office. The presentation of all corrections on this form permits its use as camera copy for prompt, direct offset printing of the Certificate of Correction.

Instructions for use of form PTO–1050 are printed on the top portion thereof, and are also set forth, in further detail, in Section 1402.02 of the Manual of Patent Examining Procedures. It is especially important that the typing be clean and clear. Both thin, light type and heavy, smudged type should be avoided. Changes and corrections are preferably made by use of white opaque correction fluid.

The typing should be within the borders printed on the form and a two-inch blank space should be left at the bottom of the last page of the form for the placement of the signature of the Attesting Officer.

Both sheets of the printed form should be forwarded to the Office. The copies should be stapled together only at the upper left-hand margin at the indicated location.

Copies of form PTO–1050 may be obtained, as needed, from either the Correspondence and Mail Division in Building 2, or from the receptionist in the lobby of Building 3, Crystal Plaza, Arlington, Va.

RICHARD J. SHAKMAN,
May 10, 1977. *Assistant Commissioner for Administration.*

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner
WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF MAY 7, 1977

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	8-2-76
GENERAL OROANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	7-26-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	5-4-76
COATINO AND LAMINATING, BLEACHINO, DYEINO AND PHOTOGRAPHY, OROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	8-27-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERINO, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	7-12-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	11-26-75
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	3-15-76
INFORMATION TRANSMISSION, STORAOE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	6-1-76
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	11-22-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	5-3-76
DESIONS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	10-28-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, OROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	5-24-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	9-10-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	6-1-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	6-11-76
OENERAL CONSTRUCTIONS, TEXTILES AND MININO, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	10-12-76

Expiration of patents: The patents within the range of numbers indicated below expire during May 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,934,766 to 2,939,144, inclusive
Plant Patents..... Numbers 1,938 to 1,948, inclusive

DEFENSIVE PUBLICATIONS

PUBLISHED JUNE 7, 1977

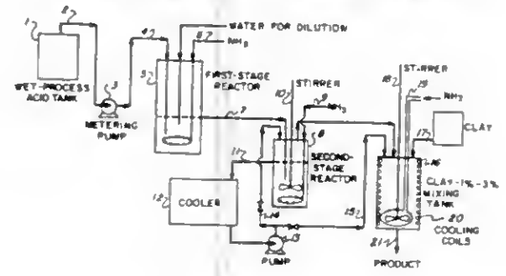
Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O.G. 637. The abstracts of Defensive Publication applications are identified by distinctly numbered series and are arranged chronologically. The heading of each abstract indicates the number of pages of specification, including claims and sheets of drawings contained in the application as originally filed. The files of these applications are available to the public for inspection and reproduction may be purchased for 30 cents a sheet.

Defensive Publication applications have not been examined as to the merits of alleged invention. The Patent and Trademark Office makes no assertion as to the novelty of the disclosed subject matter.

T959,001
PRODUCTION OF SUSPENSION FERTILIZERS FROM WET-PROCESS ORTHOPHOSPHORIC ACIDS

Thomas M. Jones, Sheffield, Ala., assignor to Tennessee Valley Authority

Filed July 2, 1976, Ser. No. 702,209
Int. Cl.³ C05B 7/00
U.S. Cl. 71—34
3 Sheets Drawing. 27 Pages Specification



A process for preparing concentrated, high-grade, nitrogen-phosphate ($N—P_2O_5$) base suspension fertilizer from wet-process or other impure orthophosphoric acids. The process involves a new procedure for the direct ammoniation of ortho-phosphoric acid in stages for production of fluid, high-analysis, $N—P_2O_5$ suspension fertilizer with good physical properties. The new process contains a novel method for prevention of settling of crystals in the suspension during vibration, such as that which occurs during shipment. Settling is avoided by producing small, thin crystals of diammonium phosphate through control of the $N:P_2O_5$ ratio and temperature in the second and third ammoniation stages.

T959,002
SPINNERET

Robert Ellis Clark, 611 Northgate Ave., Waynesboro, Va. 22980

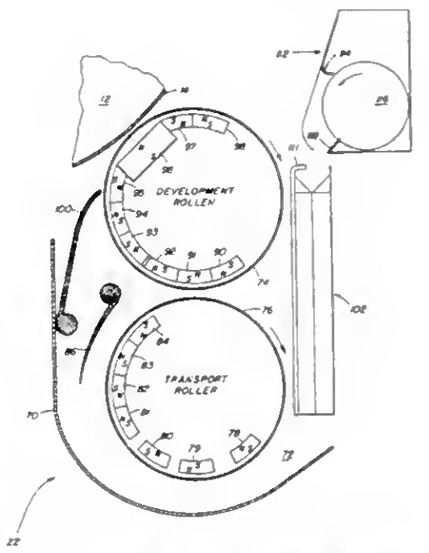
Filed Oct. 27, 1976, Ser. No. 735,993
Int. Cl.³ C22C 38/22
U.S. Cl. 75—126 C
No Drawing. 9 Pages Specification

Spinnerets made of a stainless steel alloy containing 28% to 30% chromium, 3.5% to 4.2% molybdenum, and a maximum of 0.15% nickel have unexpectedly good resistance to corrosion when subjected to a $KNO_3/NaNO_3/NaNO_3$ salt bath at about 427° C (about 800° F) for cleaning, as well as unusually good resistance to corrosion when exposed to acrylontrile polymer spinning solution. The overall corrosion rate, resulting from repeated cycles of spinning followed by salt bath cleaning, is surprisingly low, leading to a long expected wear life. The spinnerets have high strength, with good resistance to bulging in use.

T959,003
ELECTROSTATIC PROCESS DEVELOPMENT APPARATUS

Joan Helen Hull, Elmgrove Plant, Rochester, N. Y. 14550

Filed Oct. 5, 1976, Ser. No. 729,623
Int. Cl.³ G03G 15/09
U.S. Cl. 118—658
4 Sheets Drawing. 20 Pages Specification

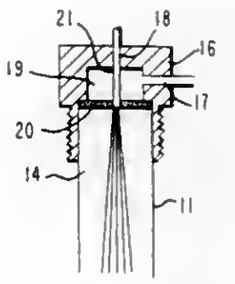


Apparatus for developing a latent image in electrophotographic or electrostatic processes includes a magnet assembly for forming a magnetic developing brush which can be supplied with and carry a developer mix in a development region. The magnet assembly includes a plurality of curved, sector shaped magnets for carrying the mix to and from the development region and a rectangular cross-sectional magnet of greater magnetic force at the development region.

T959,004
CHROMATOGRAPHIC LIQUID DISPENSING INLET AND METHOD

Joseph Jack Kirkland, Wilmington, and Charles Heritage Dilks, Jr., Newark, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 26, 1976, Ser. No. 690,314
Int. Cl.³ B01D 15/08
U.S. Cl. 210—31 C
1 Sheet Drawing. 14 Pages Specification



The chromatographic separation efficiency of a sample liquid injected into a resolving zone and eluted through the resolving

zone with a liquid carrier or mobile phase is improved if the sample is injected at a point located centrally on the inlet end of the resolving zone and the eluting carrier liquid is applied uniformly across substantially the entire inlet end of the resolving zone surrounding the sample injection point.

To accomplish this, the present invention provides a liquid dispensing inlet for a liquid chromatographic column comprising: a housing having formed therein a recess and first and second channels; each channel connecting the recess to the external surface of the housing, and a dispensing tube for dispensing liquid to a point at the inlet end of the column, the dispensing tube being disposed within the recess with one end connected to the second channel of the housing and the second end being disposed adjacent to the inlet end of the column, the inlet further comprises a dispensing member, in the form of a screen or a porous plate, dispose between the inlet end of the column and the recess in the housing.

T959,005

METHOD OF DETERMINING YIELD LOSS DUE TO A COMBINATION OF DEFECTS IN MANUFACTURING METHOD UTILIZING SAME

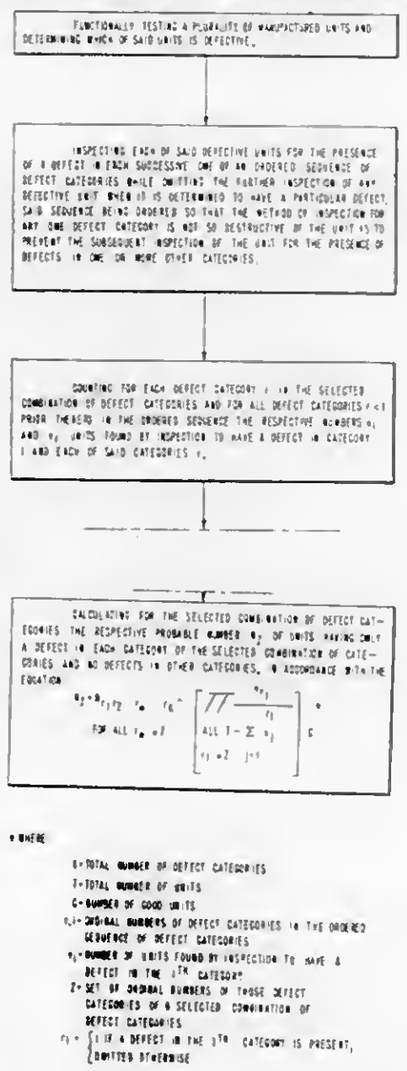
Howard A. Froot, Bykenhulle Road, Hopewell Junction, N.Y. 12533, and Vijendra P. Singh, Lakeview Road, Poughkeepsie, N.Y. 12603

Continuation of Ser. No. 441,728, Feb. 11, 1974, abandoned, which is a continuation of Ser. No. 268,382, July 3, 1972, abandoned. This application Oct. 15, 1976, Ser. No. 732,565

Int. Cl.² G06F *15/46*

U.S. Cl. 235—151.13

No Drawing. 33 Pages Specification


FUNCTIONALLY TESTING A PLURALITY OF MANUFACTURED UNITS AND DETERMINING WHICH OF SAID UNITS IS DEFECTIVE.
INSPECTING EACH OF SAID DEFECTIVE UNITS FOR THE PRESENCE OF A DEFECT IN EACH SUCCESSIVE ONE OF AN ORDERED SEQUENCE OF DEFECT CATEGORIES WHILE OMITTING THE FURTHER INSPECTION OF ANY DEFECTIVE UNIT WHEN IT IS DETERMINED TO HAVE A PARTICULAR DEFECT, SAID SEQUENCE BEING ORDERED SO THAT THE METHOD OF INSPECTION FOR ANY ONE DEFECT CATEGORY IS NOT SO DESTRUCTIVE OF THE UNIT AS TO PREVENT THE SUBSEQUENT INSPECTION OF THE UNIT FOR THE PRESENCE OF DEFECTS IN ONE OR MORE OTHER CATEGORIES.
COUNTING FOR EACH DEFECT CATEGORY i IN THE SELECTED COMBINATION OF DEFECT CATEGORIES AND FOR ALL DEFECT CATEGORIES r<i PRIOR THERETO IN THE ORDERED SEQUENCE THE RESPECTIVE NUMBERS n_i AND n_{ij} UNITS FOUND BY INSPECTION TO HAVE A DEFECT IN CATEGORY i AND EACH OF SAID CATEGORIES r_j
CALCULATING FOR THE SELECTED COMBINATION OF DEFECT CATEGORIES THE RESPECTIVE PROBABLE NUMBER n_{ij} OF UNITS HAVING ONLY A DEFECT IN EACH CATEGORY OF THE SELECTED COMBINATION OF CATEGORIES AND NO DEFECTS IN OTHER CATEGORIES, IN ACCORDANCE WITH THE EQUATION
FOR ALL r_j ≠ i

WHERE

N = TOTAL NUMBER OF DEFECT CATEGORIES

T = TOTAL NUMBER OF UNITS

G = NUMBER OF GOOD UNITS

r_j = ORDINAL NUMBERS OF DEFECT CATEGORIES IN THE ORDERED SEQUENCE OF DEFECT CATEGORIES

n_j = NUMBER OF UNITS FOUND BY INSPECTION TO HAVE A DEFECT IN THE j^TH CATEGORY

Z = SET OF ORDINAL NUMBERS OF THOSE DEFECT CATEGORIES OF A SELECTED COMBINATION OF DEFECT CATEGORIES

$r_j = \begin{cases} 1 \text{ IF A DEFECT IN THE } j^{TH} \text{ CATEGORY IS PRESENT,} \\ 0 \text{ OTHERWISE} \end{cases}$

A method of inspecting defective manufactured units and determining for any selected combination of defect categories the respective probable number of units having only a defect in each category of the selected combination of categories, and also the yield loss due to the selected combination of categories. The defect categories are arranged in an ordered sequence. Each unit of a sample of the manufactured units is inspected for the presence of a defect in each successive one of the ordered sequence of defect categories. As soon as it is determined that an inspected unit has a defect in a particular category, all further inspection of the unit is omitted and the unit is not inspected for the presence of defects in the subsequent categories of the sequence. From the resulting data there is determined for the selected combination of defect categories the respective probable number of units having only a defect in each category of the selected combination of categories and no defect in other categories. There is also determined for the selected combination of categories of defects the yield increase that may be expected by a change in the manufacturing process to eliminate the manufacture of any units having defects in the selected combination of categories. A manufacturing method utilizing this inspection method and the yield determinations is also disclosed.

T959,006

CURING SYSTEM FOR UNSATURATED MATERIALS

James L. Suggs, Rte. 12, Greeneville, Tenn. 37743, and William W. Blount, Jr., 1129 Oak Leaf Drive, Kingsport, Tenn. 37663

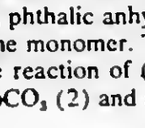
Filed June 30, 1976, Ser. No. 701,254

Int. Cl.² C08F *4/26*

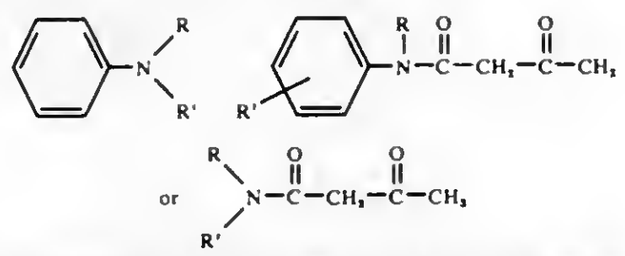
U.S. Cl. 526—14

No Drawing. 11 Pages Specification

This invention concerns novel curing systems useful for curing unsaturated polyester/monomer mixtures such as the polyester of propylene glycol, phthalic anhydride and maleic anhydride, with styrene as the monomer. The curing system is the complex formed by the reaction of (1) a cobalt compound, such as $Co(OH)_2$ or $CoCO_3$ (2) and acid of the formula



wherein **R** is a straight or branched alkyl of **1–20** carbons which may be monosubstituted with hydroxyl, aryl of **6–10** ring carbons and cycloaliphatic of **6–10** ring carbons, and (3) a nitrogen component of the formula



wherein **R** and **R'** are independently selected from straight and branched alkyl of **1–10** carbon atoms which may be monosubstituted with hydroxyl. The acid residue in the complex comprises from about **0.2** to about **20.0%** by weight of said complex, the cobalt compound, as percent cobalt metal, from about **0.1** to about **10.0%** by weight, and the nitrogen compound residue from about **65** to about **90%** by weight. The complex is prepared, for example, by mixing the components and heating for at least about one hour from about **100°** C to about **200°** C.

T959,007

COATING COMPOSITIONS

Robert R. Sanders, 4526 Ronald Drive, Kingsport, Tenn. 37664

Filed Sept. 27, 1976, Ser. No. 726,902

Int. Cl.² C08L *1/14*

U.S. Cl. 260—16

No Drawing. 30 Pages Specification

Compositions comprising an organic cellulose ester, an oil-modified alkyd resin, and a solvent blend useful for coating

substrates such as wood for protection and appearance are disclosed. The solvent blend contains a component which is a solvent for the organic cellulose ester and a component which is a solvent for the oil-modified alkyd resin. The solvents are chosen from aromatic hydrocarbons, alcohols, aliphatic hydrocarbons, esters and ketones. The solvents and the quantities thereof are chosen using their evaporation rates as guidelines, such that the evaporation time of the solvent component for the organic cellulose ester and the evaporation time for the oil-modified alkyd resin are about equal. It is found that selection of solvents on this basis eliminates or significantly decreases haze and in most cases improves other physical properties in film of coating thickness formed from these compositions.

T959,008

METHOD OF TREATING POLYMER LATICES

Bala Perampalam Chandra, Huntingdon, England, assignor to Imperial Chemical Industries Limited, London, England

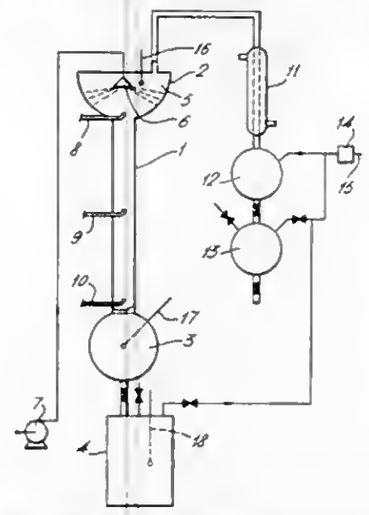
Filed Oct. 4, 1976, Ser. No. 728,919

Claims priority, application United Kingdom, Oct. 13, 1975, 41847/75

Int. Cl.² C08F *27/00*

U.S. Cl. 528—500

1 Sheet Drawing. 14 Pages Specification



A method of continuously treating an aqueous latex of a synthetic polymer which contains unreacted residual monomer from the polymerization reaction used for the production of the polymer, which method comprises feeding the aqueous latex as a spray into the top of a vertical column so that it forms a liquid film on the inner surface thereof which film then flows down the column, and contacting the spray and the descending film with an upward flow of a hot inert gas or vapor whereby residual monomer is separated from the latex and is removed with the flow of inert gas or vapor leaving the column. Apparatus for carrying out the method is also claimed. The method is advantageously employed for the removal of residual vinyl chloride monomer from a latex of a vinyl chloride polymer.

T959,009

PROCESS FOR POWDERING SEMI-CRYSTALLINE POLYESTER PELLETS

Richard Leon McConnell, 421 Manderley Road, Kingsport, Tenn. 37660, and Doyle Allen Weemes, 1603 Moore Ave., Greeneville, Tenn. 37743

Filed Dec. 16, 1976, Ser. No. 751,787

Int. Cl.² C08G *63/74*

U.S. Cl. 260—75 T

No Drawing. 13 Pages Specification

Process for converting semi-crystalline polyester pellets into powder without cryogenically grinding, the polyester pellets being derived from polyester polymers having a melting point of about 80°-140° C. and a ΔH_f of ≤ 10, by heating the polyester pellets to a temperature of about 130° C. to about 200° C. in an admixture of about 200 to about 1,000 parts of water based on 100 parts of polymer, of about 15 to about 150 parts of organic solvent selected from aromatic and chlorinated solvents such as toluene, xylene, benzene, chloroform, methylene chloride, and about 5 to about 25 parts of a wetting agent comprising a block copolymer of ethylene oxide and propylene oxide having a molecular weight of about 8,000 to about 13,500; the admixture is cooled to ambient temperature while stirring; then the admixture is filtered to remove the water and the solvent from the resulting polyester powder; and finally the filtered powder is washed to remove the wetting agent.

T959,010

PRINTING INK RESIN COMPOSITION

David R. Hansen, 15918 Red Willow, Houston, Tex. 77043

Filed Aug. 19, 1976, Ser. No. 715,953

Int. Cl.² C08L *45/00, 53/00*

U.S. Cl. 260—829

No Drawing. 8 Pages Specification

A resin composition for use in printing ink compositions comprises (a) a block copolymer having at least two polymer end blocks A and at least one polymer mid block B, each block A being a non-elastomeric polymer block of a monoalkenyl arene and each block B being an elastomeric hydrogenated polymer block of a conjugated diene; and (b) an end block compatible resin having a softening point above about 100° C, said end block compatible resin being selected from the group consisting of coumarone-indene resins, vinyl toluene-alphamethyl styrene copolymers, alphamethyl styrene homopolymers, polyindene resins and polystyrene resins. The above resin composition when employed in printing ink compositions results in a much improved adhesion of the printing ink to certain wire coatings comprising the above block copolymer along with various fillers, extending oils, polymeric alpha-olefins, and fire retardants.

T959,011

TRANSPARENT HIGH-IMPACT POLYSTYRENE RESINS AND THEIR MANUFACTURE

Robert Clarence Smith, 1737 Hollywood St., Warren, Ohio 44483

Continuation of Ser. No. 558,039, March 13, 1975, abandoned, which is a continuation of Ser. No. 429,332, Dec. 28, 1973, abandoned. This application May 14, 1976, Ser. No. 686,626

Int. Cl.² C08L *53/00*

U.S. Cl. 260—876 B

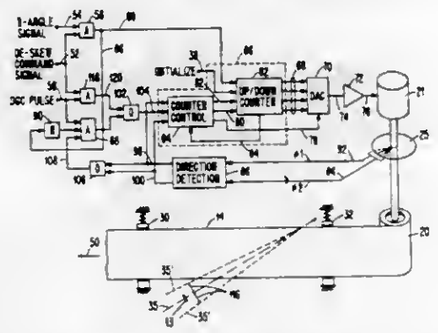
No Drawing. 18 Pages Specification

A transparent, high impact resin is produced by blending from 15 to 50 parts by weight of an impact modifier with from 85 to 50 parts by weight of clear crystal polystyrene. The impact modifier is a copolymer of a conjugated diene of from 4 to 6 carbon atoms and styrene, containing from 50 to 80 parts of styrene and from 20 to 50 parts of the conjugated diene. Further, the impact modifier consists of randomized copolymers or multiblock copolymers, and the polydiene blocks contained therein are of substantially 40,000 to 60,000 molecular weight. Higher molecular weights than 60,000 in the polydiene blocks give resins which are not transparent, while lower molecular weights than 40,000 give impact resistance which is lower than desired. Blending can be done in any convenient manner, either in solvent solution or otherwise. The transparent products can be used in packaging applications requiring varying thicknesses, from films to rigid molded or cast containers.

T959,012
DYNAMIC DESKEWING FOR A ROTATING HEAD RECORDING DEVICE

Nelson Kay Arter, 8687 Morton Rod, Longmont, Colo. 80501; Thomas Franklin Eichhorn, 8555 Hollyhock Lane, Lafayette, Colo. 80026, and Howard Carl Jackson, 808 E. Cty. Road, No. 4, Berthoud, Colo. 80513

Filed May 3, 1976, Ser. No. 682,549
Int. Cl.² G11B *21/10*
U.S. Cl. 360—76
2 Sheets Drawing. 36 Pages Specification



In a rotating head magnetic media transport device, skew between data tracks recorded on the magnetic media and a magnetic transducer is corrected, dynamically, by a closed loop controlled servo system. When the magnetic transducer is not in transducing relationship with magnetic media 14 (that is, the magnetic transducer is not under the tape), an offset number is placed into stop/lock counting means 66. The stop/lock counting means is positioned within the closed loop of the servo system. The stop/lock counting means outputs a series of pulses as the offset number is decremented to zero. The pulses are converted to analog voltages which in turn energize a motor which rotates a take-up spool (capstan) on which the media is wound while passing said magnetic transducer. Due to lateral translation of said media, whenever the count in the stop/lock counting means is zero the magnetic transducer is positioned in registry with the selected data track on the magnetic media.

When the magnetic transducer is in transducing relationship with the media (i.e. under the media) a relatively low value digital number, for example, "one" is loaded into the stop/lock counting means. In like fashion, the "one" is decremented to zero. This process (i.e. the loading/decrementing) continues for a selected number of times or until the magnetic transducer exits the magnetic media. As the stop/lock counting means is loaded and decremented, a pulse is outputted which controls the take-up spool motor to continually step the media a finite distance, which in effect, continually alters the effective angle at which data is transduced from the magnetic media. This continual motion generates a new head/tape trajectory which brings the magnetic transducer into registry with the skew data stripe on said media.

REISSUES

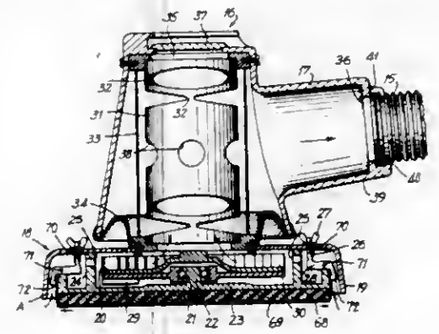
JUNE 7, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,247
SURFACE TREATING ATTACHMENT DEVICE

Lars Gunnar Kilstrom, Taby, and Goran Arvid Henning Ridderstrom, Stockholm, both of Sweden, assignors to Aktiebolaget Electrolux, Stockholm, Sweden

Original No. 3,864,784, dated Feb. 11, 1975, Ser. No. 338,370, Mar. 5, 1973. Application for reissue May 5, 1976, Ser. No. 651,478
Claims priority, application Sweden, Feb. 7, 1973, 7301671; Mar. 7, 1972, 2834/72
Int. Cl.² A47L *5/30, 9/24*
U.S. Cl. 15—380 **15 Claims**



1. A surface treating attachment device adapted to be connected to a source of at least a partial vacuum comprising: an air flow channel extending from a location adjacent to the surface to be treated to said vacuum source, a rotatable fan wheel in said air flow channel, a handle-shaped part, said fan wheel having a weight placed outside the axis of rotation thereof whereby movement of the fan wheel by the air striking the vanes of the fan wheel generates an oscillating motion, a surface engaging working member operatively connected to said fan wheel whereby the oscillating motion generated by the fan wheel is transmitted to the working member which in turn oscillates in a plane that is generally parallel to the work surface, and energy absorbing means for operatively connecting said handle-shaped part to said working member which absorbs the movement of the working member in two directions that are generally perpendicular to each other.

Re. 29,248
CONTAINER

Wayne Congleton, Walnut, Calif., assignor to Dolco Packaging Corporation, Burbank, Calif.

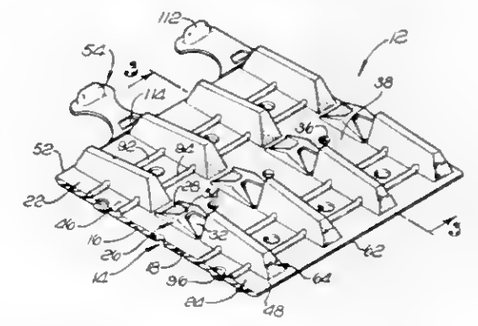
Original No. 3,868,054, dated Feb. 25, 1975, Ser. No. 343,605, Mar. 21, 1973. Continuation-in-part of Ser. No. 273,558, July 20, 1972, Pat. No. 3,834,609. Application for reissue Mar. 20, 1975, Ser. No. 560,436
Int. Cl.² B65D *85/52;* **A01G** *9/10*
U.S. Cl. 47—77 **12 Claims**

14. An improved container assembly for containing plants, seeds or seedlings in soil for shipment, comprising:

an integral one-piece member which when unassembled is in a generally planar configuration and has first and second side edges;

a plurality of hinge lines formed in said member each along the axis of said container from said first side edge to said second side edge for enabling said member to be folded into a predetermined shape and for dividing the member into a first section, a second section and a central section, said central section interconnecting said first and second sections, said first, second and central sections constituting at least the major surface areas of said container;

each of said sections being formed with a plurality of hollow ribs formed by indentations therein spaced inwardly from the side edges and spaced one from another along the axis of said container, said ribs interacting when said member is folded along said hinge lines so as to form a structure of generally U-shaped cross-sectional configuration, the interaction of the ribs formed in said side sections being along substantially their entire lengths so as to divide said container into a plurality of discrete compartments, said structure having a pair of free edges spaced apart from the other a distance defined by the interacting ribs of said side sections, said free edges defining the ends of said U-shaped configuration;

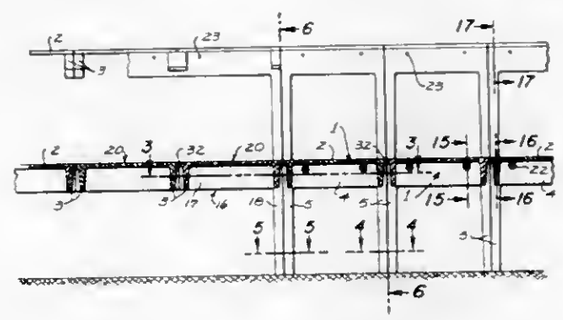


a tab member having a first end integrally formed with one of said edges, and a free end adapted to be positioned adjacent the other of said edges for retaining said assembly in said U-shaped cross-sectional configuration.

Re. 29,249
PRECAST CONCRETE BUILDING CONSTRUCTION

Edward K. Rice, Los Angeles, Calif., assignor to Unicon Parking Structures, Inc., Van Nuys, Calif.

Original No. 3,744,200, dated July 10, 1973, Ser. No. 837,986, June 2, 1969. Application for reissue Aug. 26, 1974, Ser. No. 500,650
Int. Cl.² E04B *1/343;* **E04C** *3/20*
U.S. Cl. 52—227 **24 Claims**



1. A multiple story garage structure, comprising:

a. a first set of precast concrete building units, each unit thereof including an elongated rectangular slab and legs at the ends thereof, the slabs *having substantially continuous upper and lower surfaces except for vertical tendon passages at said legs and* being arranged *coplanar* in side-by-side and end-to-end relation and the legs disposed in rows under the ends of the slabs, the rows of legs defining therebetween rows of parking spaces adjacent the legs and access lanes between the parking spaces;

b. a second set of precast concrete building units, each unit

of the second set including a beam and a leg at each end thereof, the members of the second set of building units being disposed in longitudinal alignment with the rows of legs of the first set at the ends thereof to define transversely extending corridors connecting the access lanes;

c. a third set of precast concrete building units, each unit of the third set including a slab and at least one beam thereunder, the ends of the members of the third set of building units resting on the beams of the second set of building units and continuing in *coplanar* side-by-side and end-to-end relation from the slabs of the first set of building units;

d. and means securing the sets of building units in their assembled relation.

Re. 29,250

DIGITAL ELECTRONIC WATCH HAVING CALENDAR DISPLAY ARRANGEMENT

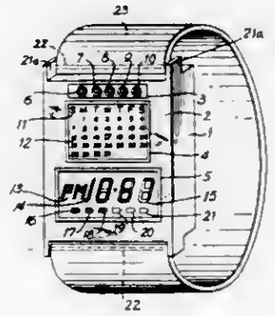
Kojiro Tanaka, Tokyo, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Original No. 3,738,099, dated June 12, 1973, Ser. No. 260,685, June 7, 1972. Application for reissue Feb. 5, 1975, Ser. No. 547,308

Claims priority, application Japan, June 6, 1971, 46-40713

Int. Cl.² G04B *19/24*

U.S. Cl. 58—58 **19 Claims**



1. A digital electronic watch comprising a time standard oscillator for producing a high frequency time standard signal; circuit means for dividing said high frequency time standard signal into at least minute and hour display driving signals; liquid crystal display means for displaying time in response to said minute and hour driving signals; further circuit means for producing signals having a frequency of 1 pulse per day and 1 pulse per week from said first-mentioned circuit means; calendar display means including a matrix of liquid crystal elements having at least seven columns and a plurality of rows and means for sequentially actuating selected ones of said liquid crystal elements located at the intersection of an actuated row and an actuated column by sequentially actuating said columns in response to said signal having a frequency of 1 pulse per day and for sequentially actuating said rows in response to said signal having a frequency of 1 pulse per week.

Re. 29,251

MEANS FOR CONTINUOUS DYEING OF PILE WARP TEXTILES ESPECIALLY OF CARPETS

Valentin Appenzeller, Kempen, and Johannes Kutz, Krefeld, both of Germany, assignors to Eduard Küesters Maschinenfabrik, Krefeld, Germany

Original No. 3,541,815, dated Nov. 24, 1970, Ser. No. 650,450, June 30, 1967. Continuation of Ser. No. 308,710, Nov. 22, 1972, abandoned. Application for reissue Dec. 18, 1974, Ser. No. 534,128

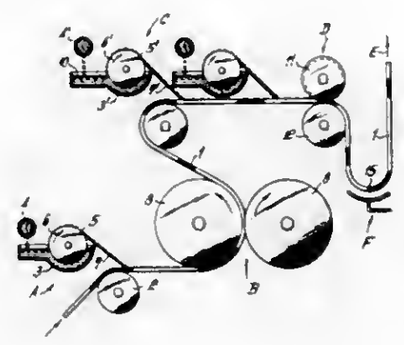
Int. Cl.² D06B *1/06*

U.S. Cl. 68—22 R **20 Claims**

9. Apparatus for dyeing a continuously moving pile warp textile web which comprises:

(A) means to apply a wetting agent to said web;

(B) means to apply uniform pressure to said web to improve the penetration of said wetting agent; and



(C) at least one means to apply a uniform, continuous dye film to the pile warp of said web, wherein each of said means is positioned in the sequence (A), (B), and (C) along the direction of movement of said web.

Re. 29,252

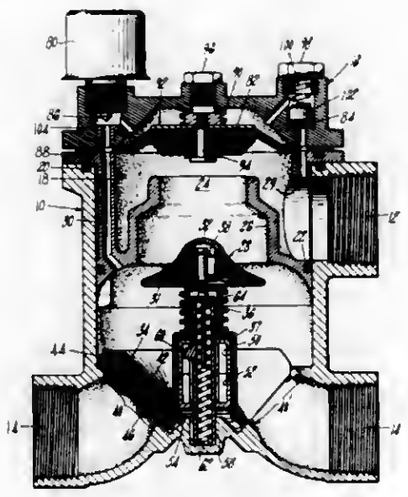
SEQUENCING VALVE

Bob C. Miller, 272 River Drive, Tequesta, Fla. 33458

Original No. 3,785,391, dated Jan. 15, 1974, Ser. No. 324,236, Jan. 16, 1973. Application for reissue Jan. 15, 1976, Ser. No. 649,452

Int. Cl.³ F16K *21/00*

U.S. Cl. 137—119 **20 Claims**



18. A sequencing valve comprising:

housing means, said housing means defining an inlet and a plurality of outlet ports displaced from said inlet, said housing means further defining an internal flow passage whereby fluid communication may be established between said inlet and said outlet ports;

valve means disposed in said housing means, said valve means being reciprocal in response to fluid flow through the valve and rotatable and cooperating with said outlet ports to perform a valving function, said valve means having at least a first apening therein whereby communication between at least one of said outlet ports and said flow passage will be established at all times;

pressure responsive means disposed in said housing means, said pressure responsive means being operatively coupled to said valve means for mavement therewith and also being movable relative to said valve means in response to flow through the valve to form a variable restriction in said flow passage upstream of said valve means; and

cam means disposed in said housing means for causing stepwise rotation af said valve means in response to reciprocation thereof.

Re. 29,253

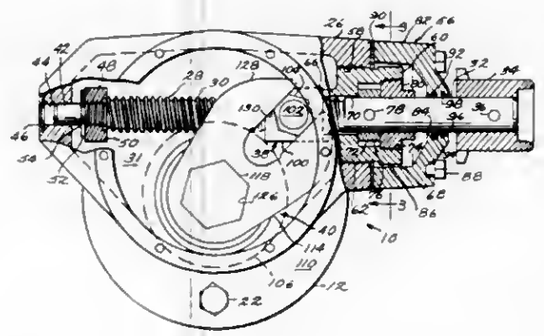
VALVE OPERATOR FOR BUTTERFLY VALVES OR THE LIKE

Joseph L. Daghe, Decatur, Ill., and Richard A. Stultz, Franklin, Ohio, assignors to Mueller Co., Decatur, Ill.

Original No. 3,877,677, dated Apr. 15, 1975, Ser. No. 448,715, Mar. 6, 1974. Application for reissue Apr. 12, 1976, Ser. No. 676,343

Int. Cl.² F16L *27/02*

U.S. Cl. 251—228 **24 Claims**



1. A valve operator for controlling the movement of and adjustably controlling the limits of such movement of a valve member carried by a rotatable valve shaft of a valve, said valve operator comprising:

a housing member associated with the valve and defining an enclosed chamber;

an operating shaft having one end portion extending through said housing and having threads on a second portion of the same within the housing;

means for supporting said operating shaft in an adjusted axial position and for rotatable movement, said means including an adjustable collar threadedly received in said housing and having an exterior non-circular configuration on a portion extending exteriorly of said housing, a stem bushing fixed to said operating shaft and a stem retainer nut carried by said adjustment collar and retaining said stem bushing axially fixed with respect to the adjustment collar;

an operating nut carried on the threaded portion of said operating shaft and movable axially on said operating shaft when said operating shaft is rotated;

stop means on said adjustment collar for engaging said operating nut and limiting its movement in one direction and a second stop means carried by said operating shaft for engaging said operating nut and limiting movement in an opposite direction;

means coupling the operating nut to the valve shaft for rotating the valve shaft;

and an adjustment cap having a non-circular interior configuration complementary to the non-circular exterior configuration of said adjustment collar and covering the same with an end portion of said operating shaft extending through the cap, said adjustment cap being bolted to said housing and having a slight lost motion play with said adjustment collar whereby said adjustment cap can be unbolted from said housing and rotated in one direction or the other to cause rotation of said adjustment collar to simultaneously adjust said first and second stop means and then rotated in reverse direction for rebolting without affecting the adjustment.

Re. 29,254

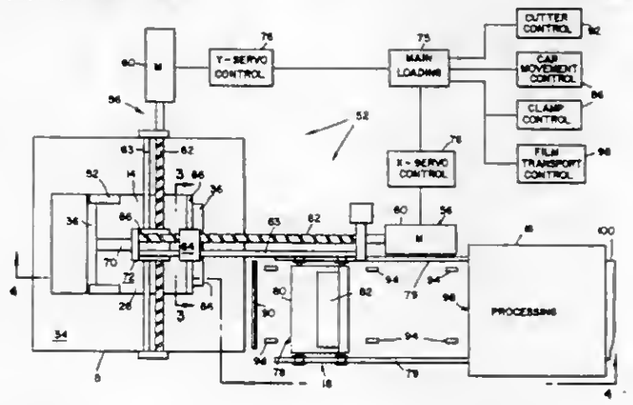
MICROFICHE RECORDER AND PROCESSOR

Rolf D. Kahle, Saratoga; David K. Studley, Santa Clara, and James D. Bryson, Sunnyvale, all of Calif., assignors to Quantor Corporation, Mountain View, Calif.

Original No. 3,746,444, dated July 17, 1973, Ser. No. 201,642, Nov. 24, 1971. Continuation of Ser. No. 456,332, March 29, 1974, abandoned. Application for reissue July 14, 1975, Ser. No. 595,457

Int. Cl.² G03B *29/00, 27/44, 27/60*

U.S. Cl. 355—28 **19 Claims**



16. An optical recording system for recording projected images on a film camprising: a platen assembly having a flat side and means for maintaining a film section flat on the side to assure high resolution recording, means for projecting small images onto the film section, means permitting movement of the assembly parallel to the film sa that substantially every portion of the film sectian can be exposed to an image focused on the film, means for moving the assembly in X and Y directions, means for intermittently withdrawing exposed film sections from the side to thereby simultaneously advance a fresh, unexposed film section to the side, and means for severing the exposed section before the fresh section has been fully exposed.

Re. 29,255

PHOTOGRAPHIC LAYERS CONTAINING PERFLUORO COMPOUNDS AND COATING THEREOF

Maurice James McDowell, Media, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

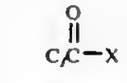
Original No. 3,589,906, dated June 29, 1971, Ser. No. 768,169, Oct. 16, 1968. Application for reissue May 25, 1973, Ser. No. 364,146

Int. Cl.² G03C *1/38, 1/33*

U.S. Cl. 96—87 R **16 Claims**

1. A coated photographic element comprising a support bearing a hydrophobic polymer layer carrying a macromolecular water-permeable organic colloid layer characterized by containing a perfluorocarbon compound [having an intralinear carbonyl or sulfonyl group and] capable of reducing the surface tension of water to 15–20 dynes. per [square] centimeter, said perfluoro compound being [selected from the group:

(1) perfluorocompounds derived from perfluorocarboxylic acids having the general structure



where C_f is a fully fluorinated (perfluoro) saturated chain consisting of five or more carbon atoms which may or may not be an oxygen-interrupted carbon chain; X=OY or an amino group, where Y is H, alkali metal or an ammonium group, and

(2) perfluoro compounds] derived from perfluorosulfonic and perfluorosulfuric acids having the general structure

where C_f is a fully fluorinated *(perfluoro) saturated* carbon chain [as defined in paragraph (1)] *having six or more carbon atoms which may or may not be an oxygen-interrupted carbon chain*; C_H is the saturated hydrocarbon portion of the same chain; X is SO_2 or SO_3; Z is an amino or hydroxyl group, alkali metal or an ammonium group; [x=6 or greater; Y=2 or more;] *y=0 or more;* said element having radiation-sensitive silver halide in intimate association with said colloid layer.

Re. 29,256

DIGESTIVE PHARMACEUTICAL COMPOSITION COMPRISING S-CARBOXYMETHYL CYSTEINE FOR REDUCING VISCOSITY OF RESPIRATORY TRACT SECRETIONS, AND METHOD OF TREATING THEREWITH

Maurice L. Joullié, Yvelines; Gabriel Maillard, Paris; Lucien Lakah, Paris; Pierre Muller, Paris, and Vu-Ngoc Huyen, Yvelines, all of France, assignors to Recherches Pharmaceutiques et Scientifiques, Paris, France

Original No. 3,891,749, dated June 24, 1975, Ser. No. 389,325, Aug. 17, 1973. Continuation of Ser. No. 10,999, Feb. 12, 1970, abandoned. Application for reissue June 2, 1976, Ser. No. 692,031

Claims priority, application France, Oct. 7, 1969, 69.34139

Int. Cl.² A61U *31/22, 31/195*

U.S. Cl. 424—311 18 Claims

19. A pharmaceutical preparation in dosage unit form adapted for administration by the digestive route and for the reduction of viscosity of secretions of the respiratory tract, selected from the group consisting of a suppository, syrup, pill, capsule, or tablet and comprising, per dosage unit, an effective amount of S-carboxymethyl cysteine to accomplish said reduction, and a pharmaceutical diluent.

Re. 29,257

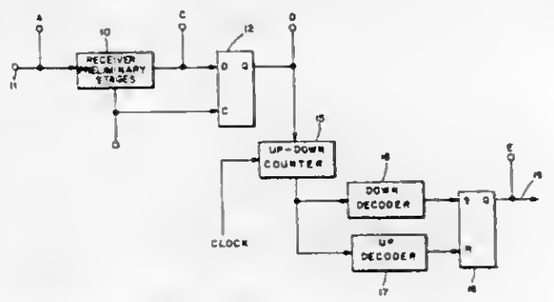
DIGITAL FILTER FOR A DIGITAL DEMODULATION RECEIVER

Harold G. Nash, Tempe, Ariz., and Michael F. Wiles, Round Rock, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Original No. 3,814,918, dated June 4, 1974, Ser. No. 374,613, June 28, 1973. Application for reissue Nov. 20, 1975, Ser. No. 633,725

Int. Cl.² H04B *1/16*

U.S. Cl. 235—152 7 Claims



1. In a digital demodulation receiver for receiving an input periodic oscillation signal of a first frequency, designated a binary 1, and of a second frequency, designated a binary 0, and for providing indicia signals representative of whether the signals are of the 1 or 0 frequency, a digital filter comprising:

a. clock pulse means for producing pulses at a prescribed frequency;

b. storage means, receiving the indicia signals, for providing a first output signal substantially continuously in the presence of 1 input signal, and a second output signal substantially continuously in the presence of a 0 input signal; and

c. up-down counting means connected to the clock pulse means and to the storage means, for receiving pulses from the clock pulse means as conditioned by the first output signal from the storage means to count in one direction to a first threshold count, and as conditioned by the second *output signal from the* storage means to count in the other direction to a second threshold count.

Re. 29,258

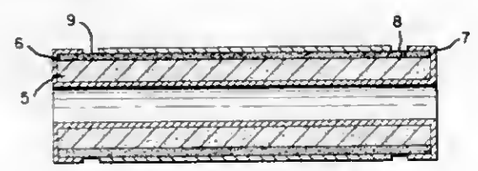
COATED FERRITE RF FILTERS

William Baird Fritz, Hershey, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Original No. 3,743,978, dated July 3, 1973, Ser. No. 88,042, Nov. 9, 1970. Continuation-in-part of Ser. No. 883,501, Dec. 9, 1969, abandoned. Application for reissue Jan. 22, 1975, Ser. No. 543,097

Int. Cl.² H03H *7/04, 13/00, 7/14;* H01G *4/42*

U.S. Cl. 333—70 S 14 Claims



1. A [unitary] *composite ceramic* low pass filter element for mounting on a conductor of a low frequency transmission line to attenuate high frequencies thereon comprising,

a conductive tubular member for receiving a conductor therein,

a semiconductive substrate in the form of a sleeve secured to the outer surface of the tubular member in intimate engagement therewith,

a *ceramic dielectric* layer [of dielectric material] covering the outer surface of the sleeve in direct intimate contact therewith,

and an outer conductive layer disposed about and secured to the dielectric [material] *layer* substantially the length thereof for connecting the unitary filter element to ground.

Re. 29,259

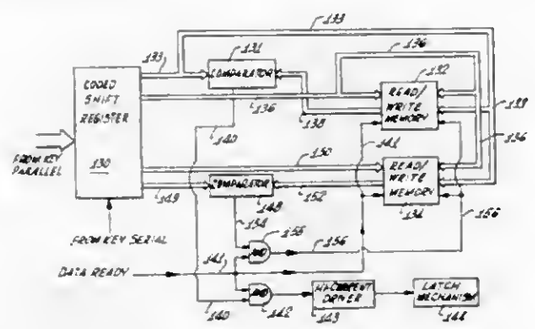
SELF RE-KEYING SECURITY DEVICE

Daniel M. Sabsay, 329 Harvard St., No. 31, Cambridge, Mass. 02139

Original No. 3,821,704, dated June 28, 1974, Ser. No. 351,298, Apr. 16, 1973. Application for reissue June 28, 1965, Ser. No. 700,554

Int. Cl.² H04Q *3/00*

U.S. Cl. 340—149 A 21 Claims



1. The method of operating security device, comprising the steps of

entering into said security device a key number and an authorization number,

comparing the key number with a combination number previously stored in said security device,

operating said security device, if the compared numbers are found to match,

comparing the authorization number with the combination number previously stored in said security device, if the key number was found not to match the combination number,

causing the key number to be stored in said security device in place of the previously stored combination number, if the authorization number was found to match the combination number, and,

operating said security device, if the authorization number was found to match the combination number.

Re. 29,260

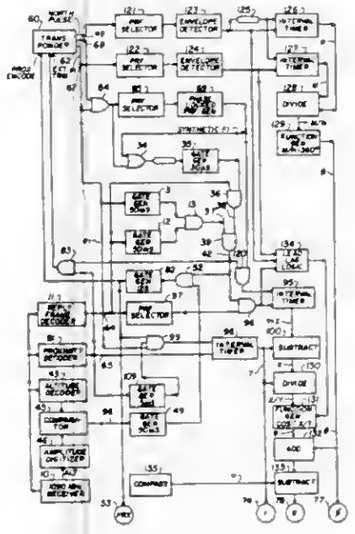
PROXIMITY INDICATION WITH RANGE AND BEARING MEASUREMENTS

George B. Litchlord, Northport, N.Y., assignor to Litchstreet Co., Northport, N.Y.

Original No. 3,858,211, dated Dec. 31, 1974, Ser. No. 371,839, June 20, 1973. Division of Ser. No. 180,578, Sept. 15, 1971, Pat. No. 3,757,324. Application for reissue Apr. 15, 1975, Ser. No. 568,270

Int. Cl.² G01S *9/56*

U.S. Cl. 343—16 R 8 Claims



2. Apparatus for determining at an own transponder station the bearing angle ϕ of said own station from a selected [azimuthally scanning radar that omnidirectionally transmits a] *one of a plurality of secondary surveillance radars (SSR) that transmit directional interrogation signals of the same frequency and that omniazimuthally transmit* reference [signal when its directional beam points in a standard] *signals as the main radar beams thereof sweep through a standardized* reference direction, such as *magnetic* North, said apparatus comprising:

(a) means for receiving said reference [signal] *signals* and for receiving the [normal] interrogation transmission signals of said *radars* as the radar [beam sweeps] *beams sweep* by the own location,

(b) [a first interval timer for measuring the interval between successive reception of one of said reference and said normal transmission signals and producing a quantitative representation N of said interval,] *means for selecting the reference ond interrogation signals received from one of said secondary surveillance radars,*

(c) [a second interval timer for measuring and producing quantitative representation M of the interval between reception of a reference signal and a normal transmission signal,] *a first interval timer for measuring the interval between successive reception of one of said selected reference and said selected interrogation signals and producing a quantitative representation N of said interval,*

(d) [divider means for computing the quotient M/N, and] *a second interval timer for measuring and producing a quantitative second representation M of the time interval between reception of one of said selected reference and said selected interrogation signals and the next subsequently received other one of said signals,*

(e) [means for producing a quantitative representation ϕ of said quotient.] *divider means for computing the quotient M/N, and*

(f) means for producing a quantitative representation ϕ of said quotient.

Re. 29,261

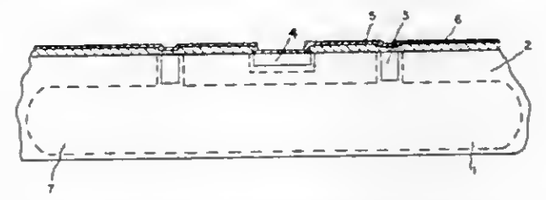
GATED SILICON DIODE ARRAY CAMERA TUBE

Joze Kostelec, Stamford, Conn., assignor to North American Philips Corporation, New York, N.Y.

Original No. 3,916,429, dated Oct. 28, 1975, Ser. No. 433,286, Jan. 14, 1974. Continuation of Ser. No. 209,533, Dec. 20, 1971, abandoned. Application for reissue Apr. 9, 1976, Ser. No. 675,646

Int. Cl.² H01L *27/14*

U.S. Cl. 357—31 9 Claims



1. A device for converting light into an electrical signal comprising a semiconductive wafer having a light-receiving surface through which the light enters the wafer and produces photogenerated carriers in response to absorbed light, the wafer having adjacent one surface thereof remote from the light-receiving surface a first array of discrete rectifying barriers for collecting a flow of photo carriers in response to the absorbed light surrounded by regions free of rectifying barriers, insulating means coating said surface selectively at portions overlying regions free of rectifying barriers and leaving exposed portions overlying the rectifying barriers, and a second array of rectifying barriers interposed between those of said first array adjacent said surface and covered by said insulating means, and means to bias the rectifying barriers of said second array independently of said first array of rectifying barriers to direct at least a portion of the flow of photogenerated carriers from the first array to the second array.

PATENTS

GRANTED JUNE 7, 1977

ERRATA

For CLASS	See PATENT NO.
428-623	4,027,366
428-652	4,027,367
040-310	4,027,426
053-112 B	4,027,450
403-353	4,027,453
073-049.8	4,027,513
073-057	4,027,513
118-002	4,027,607
123-025 P	4,027,630
134-010	4,027,685
134-033	4,027,686
198-618	4,027,792
198-719	4,027,793
206-395	4,027,794
206-409	4,027,795
206-507	4,027,796
209-074 R	4,027,797
211-004	4,027,798
211-013	4,027,799
212-014	4,027,800
212-145	4,027,801
214-001 SW	4,027,802
214-001 H	4,027,803
214-001 BV	4,027,804
214-006 G	4,027,805
214-016 R	4,027,806
214-075 R	4,027,807
214-313	4,027,808
214-353	4,027,809
277-188 R	4,027,816
214-038 CA	4,027,823
297-284	4,027,888
280-746	4,027,905
280-751	4,027,906
303-109	4,027,926
350-096 C	4,027,938
425-133.1	4,028,024
428-558	4,028,062
075-233	4,028,061
075-233	4,028,063
428-675	4,028,064
062-101	4,028,078
062-335	4,028,079
071-094	4,028,084
096-114.1	4,028,129
029-623.2	4,028,138
252-313 R	4,028,216

ERRATA – Continued

260–314	4,028,217
252–321	4,028,218
250–359	4,028,267
235–089 R	4,028,529
235–144 HC	4,028,530
250–531	4,028,551
361–076	4,028,555
361–220	4,028,590
361–011	4,028,591
361–016	4,028,592
361–027	4,028,593
307–326	4,028,594
361–328	4,028,595
361–235	4,028,596
323–075 B	4,028,642
303–006 C	4,028,658

PATENTS

GRANTED JUNE 7, 1977

GENERAL AND MECHANICAL

4,027,339
HOCKEY GLOVE WITH IMPROVED PALM CONSTRUCTION

Ben B. Brucker, 240 N. Crescent St., Beverly Hills, Calif. 90210

Filed June 17, 1976, Ser. No. 696,985
Int. Cl.² A41D *13/10*
U.S. Cl. 2—16 **5 Claims**

1. In a padded hockey glove comprising: a hollow flexible hand receiving body member formed of seam joined palm and back flexible sheet material portionns including integral thumb and finger stalls at least partially formed by said seamed back and palm sheet material portions, padding carried by said glove body member on the outsdie of the back sheet material including the thumb and finger stall area, the improvement wherein: said palm sheet material portion is formed of waterproofed top grain boar hide, and the thumb stall is formed by a stall back wall waterproofed top grain boar hide strip folded at the middle and stitched at its edges to respective edges of said back sheet material portion and the palm sheet material portion of said glove body member, one end of said folded stall back wall strip being sewn to the thumb stall section of said palm sheet material portion at a point longitudinally inward of the end of that section and the other end of said stall back wall strip being stitched commonly to the end of said thumb stall section of said palm sheet material portion to form a gap between the padded portion of said thumb and the thumb stall to permit the wearer's thumb to flex inwardly and to permit ready grasping of the hockey stick carried thereby.

4,027,340
FACE MASK

Frederick B. Hadtke, New Providence, N.J., assignor to Robert Haln Associates, Inc., Scotch Plains, N.J.

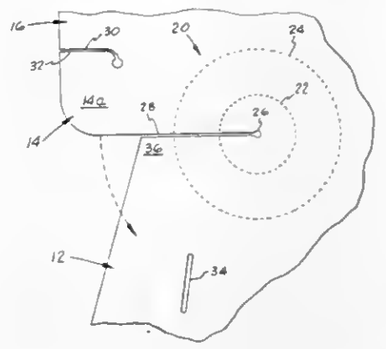
Filed Mar. 15, 1976, Ser. No. 667,267
Int. Cl.² A42B *1/00*
U.S. Cl. 2—206 **17 Claims**

1. A face mask blank comprising:

a flexible sheet material;

lines scored into the surface of said flexible sheet material, outlining thereon two concentric geometric figures of similar shape and outline but of dissimilar size and area in one part of said flexible sheet and two other concentric geometric figures in an adjacent part of said flexible sheet;

and a slit cut into said flexible sheet material from the edge thereof to the common center of said concentric geometric figures, permitting a portion of said concentric geometric figures to be angularly rotated with said common center as a center of rotation to overlap another portion of said concentric geometric figures, the area of a smaller of said concentric geometric figures extending as a cone painting in one direction from said flexible sheet material and the area of a larger of said concentric geometric figures surrounding the area of said smaller concentric

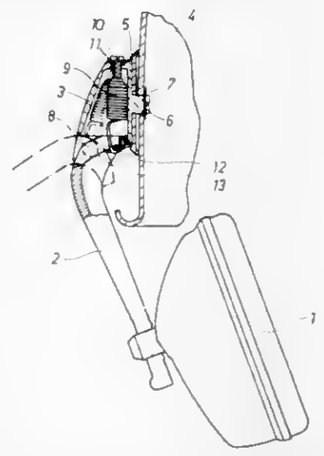


geometric figure extending as a truncated cone pointing in the opposite direction from said flexible sheet material, whereby the flexible sheet material face mask blank is transformed into a three-dimensional configuration having three-dimensional facial characteristic contours.

4,027,341
JUNCTURE ARRANGEMENT BETWEEN THE BOW OF A HEARING PROTECTION MEANS AND A PROTECTIVE HELMET

Matti Patteri, Vantaa, Finland, assignor to Exel OY, Helsinki, Finland

Filed Feb. 12, 1976, Ser No. 657,699
Claims priority, application Finland, Feb. 14, 1975, 750410
Int. Cl.² A42B *3/00*
U.S. Cl. 2—423 **4 Claims**



1. A hearing protection device comprising a protective helmet to be worn by the user of the device, an ear hood, an elongated bow member connecting said ear hood to said protective helmet, a fixing part, a first pivot means provided on said fixing part for pivotally securing said protective helmet for forward and rearward pivotal movement with respect thereto, a second pivot means provided on said fixing part, the upper end of said bow member being mounted on said pivot means to provide lateral movement of said ear hood toward and away from the ear of the user, the upper end of said bow member being provided with an elongated sliding surface extending at a substantial angle to the principal axis of said bow member, a resilient member secured at one end to said

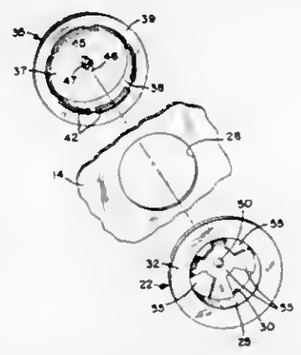
fixing part, a pin mounted on the other end of said resilient member for sliding engagement on the sliding surface of said bow member, whereby when said bow member is pivoted laterally away from the ear of the user, the angle of the sliding surface of said bow member alters with respect to said resilient member causing said pin, under force of said resilient member, to slide over said sliding surface, said pivot means being located between the ends of the sliding surface so that said pin moves from one side to the other of said pivot means and said bow member is resiliently urged to its outer lateral position.

4,027,342

GOGGLE VENTILATOR

Jack B. Hirschmann, Jr., Inc., Buzzards Bay, Mass., assignor to H. L. Bouton, Company, Buzzards Bay, Mass.

Filed July 9, 1975, Ser. No. 594,610
Int. Cl.² A61F 9/02
U.S. Cl. 2—436 **8 Claims**



1. A goggle ventilator for use in a safety goggle frame including an impervious wall having at least one aperture therethrough for receiving the ventilator, said ventilator including an inner part having an air passage therethrough and a separate outer part, both of said parts being cup-shaped and each including a tubular side wall and an end wall, means forming a pair of axially spaced inner and outer annular flanges mounted, respectively, on said inner and outer ventilator parts, said flanges being received one each on each side of the goggle wall at said aperture to support said inner and outer parts directly on the goggle wall in sealing relation with the wall and with said end walls of said parts in generally parallel and aligned relation, and means in said outer part defining at least one ventilating opening therethrough for providing an air passage connecting through the inner part air passage into the interior of the goggle, improved means for securing said ventilator inner and outer parts together, comprising:

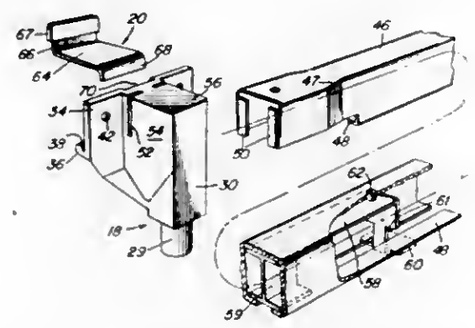
a. a solid pin on said end wall of one of said ventilator parts,
b. means including a pin-receiving opening in said end wall of the other of said ventilator parts dimensioned to receive and hold said pin therethrough in interlocked relation to hold said ventilator parts together, said pin and pin-receiving opening providing for ready assembly of said ventilator onto the goggle with said ventilator flanges clamped firmly thereon and providing resistance against separation of said ventilator inner and outer parts,
c. said parts being proportioned to position said end walls thereof in spaced relation in the assembled position of said ventilator, and
d. one of said end walls being resilient to act as a spring maintaining said flanges in clamping relation with the goggle wall with a force controlled by the degree to which said pin is inserted through said pin-receiving opening.

4,027,343

BED FRAME WITH DETACHABLE AND INTERCHANGEABLE COMPONENTS

Joe B. Hooker, Linwood, N.C., assignor to Metal Bed Rail Company, division of Leggett & Platt, Inc., Linwood, N.C.

Filed Apr. 10, 1975, Ser. No. 567,019
Int. Cl.² A47C 19/00
U.S. Cl. 5—200 R **18 Claims**



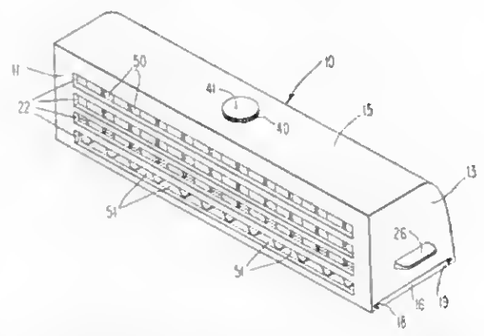
1. A bed frame comprising a pair of generally parallel side rails and a pair of generally parallel cross rails oriented in perpendicularrelation to the side rails, a supporting leg assembly adjacent the extremities of the frame, and means detachably connecting the ends of the cross rails to the side rails, said detachable means comprising a pair of laterally extending, spaced, opposed vertical flanges on the end of the cross rail, said supporting leg assembly including a body having a pair of laterally opening, vertically disposed grooves having open upper ends vertically slidably receiving said flanges for rigidly and detachably connecting the cross rail with the side rail.

4,027,344

ENERGY CONSERVING BED WARMING DEVICE

Kyoungsik Pak, 221 Holly Drive, King of Prussia, Pa. 19406

Filed Feb. 23, 1976, Ser. No. 660,064
Int. Cl.² A47G 23/00
U.S. Cl. 5—347 **9 Claims**



1. A portable energy conserving warming device for use in a bed comprising:

a. a hollow container of heat conductive material to provide a closed reservoir of heated fluid,
b. said hollow container having spaced front and rear walls and spaced top and bottom walls, and spaced side walls each connected to said front, rear, top and bottom walls,
c. an opening in the container to permit heatable fluid to be deposited in and removed from the container,
d. a closure for the opening,
e. a hollow casing of heat insulating material for snugly enclosing the container.
f. said casing including spaced front and rear walls connected by spaced side walls, and having a lid,
g. the front, rear and side walls of the casing being disposed, respectively, proximate of the front, rear and side walls of the container, when the container is enclosed within the casing,
h. a plurality of openings disposed in one wall of the casing for permitting heat to radiate gradually from heated fluid in the container to the ambient atmosphere and
i. a plurality of spaced indentations formed in at least one wall of the container, to enhance the radiation of heat from the heated fluid in the container to the casing wall openings,
j. said indentations being disposed adjacent said casing wall openings.

4,027,345

TRANSFER PRINTING

Michio Fujisawa; Hatsuo Matsumoto; Shuzo Sawada; Kiyoshi Yamane, all of Otsu; Hideo Kato, Kashiwara; Takayuki Shimizu, Habikino, and Shigeo Kato, Kashiwara, all of Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Filed June 12, 1975, Ser. No. 586,281
Claims priority, application Japan, June 14, 1974, 49-68439
Int. Cl.² D06P 5/00; C08L 1/32, 91/00
U.S. Cl. 8—2.5 R **12 Claims**

1. In a method of transfer printing which comprises forming a release layer on a temporary support; printing a pattern on said release layer with an ink containing coloring matter therein to obtain a transfer sheet; superposing an article to be transfer-printed on the printed surface of said transfer sheet; heating the superposed aggregate under pressure to transfer the release layer with the pattern onto said article to be transfer-printed; fixing the coloring matter to said article, and then soaping said article to remove the release layer; the improvement wherein the release layer consists essentially of

1. 10 to 90 weight percent of one or more thermoplastic polymers having excellent film-forming properties, water-solubility or alkaline water-solubility and organic solvent-solubility and having a softening point of between 60° and 200° C, said polymers being selected from the group consisting of hydroxypropyl cellulose, hydroxypropyl-hydroxyethyl cellulose, hydroxypropyl-methyl cellulose phthalate, hydroxypropyl-hydroxyethyl cellulose phthalate and vinyl copolymers consisting of an ethylenically unsaturated mono- or dicarboxylic acid and another ethylenically unsaturated monomer copolymerizable therewith and,

2 90 to 10 weight percent of one or more water-soluble or alkaline water-soluble and organic solvent-soluble oxycarboxylic acids and derivatives as plasticizers having a melting point between 30° and 120° C, said plasticizer being selected from the group consisting of 12-hydroxystearic acid, 2-hydroxypalmitic acid, 11-hydroxypalmitic acid, 14-hydroxypalmitic acid, 16-hydroxypalmitic acid, 2-hydroxytetradecanoic acid, 11-hydroxytetradecanoic acid, 2-hydroxydodecanoic acid, ω-hydroxylauric acid, 3,11-dihydroxytetradecanoic acid and 9,10-dihydroxyundecanoic acid.

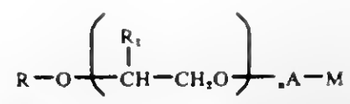
4,027,346

POLYESTER FIBER TREATED WITH ANIONIC POLYALKYLENE OXIDE EMULSIFIED POLYESTER POLYETHER FINISH

Masahiro Wada, Moriguchi, and Masakazu Date, Takatsuki, both of Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Filed Apr. 23, 1975, Ser. No. 570,962
Claims priority, application Japan, Aug. 21, 1974, 49-96570
Int. Cl.² D06P 1/613
U.S. Cl. 8—30 **19 Claims**

1. A method for modifying polyester synthetic fiber products, comprising the steps of dipping said fiber products in a treating liquor having an aggregation initiating temperature in the range of 65°–125° C and then heating said treating liquor to 100° C to 140° C and to temperatures at least 1° C higher than its aggregation initiating temperature to thereby heat said fiber products, said treating liquor being prepared by adding to an aqueous dispersed liquid of a polyester polyether block copolymer, which is prepared from an aromatic dicarboxylic acid or a lower alkyl ester thereof, a lower alkylene glycol and a polyalkylene glycol, (a) an emulsifying amount of a surface active agent as expressed by the following general formula (I):



(I)

where; R is an alkyl, alkenyl or alkylaryl group; R_1 is a hydrogen atom or a methyl group; A is a $-SO_2$, $-(CH_2)_mSO_3$ or PO_3, m is an integer of 2 or 3; M is a hydrogen atom or an ammonium, substituted ammonium or lower alkyl group or an alkali metal; n is an integer in the range of 4–20 and (b) a member selected from the group consisting of at least one acid or latent acid which forms an acid upon being hydrolyzed, at least one water-soluble salt and mixtures thereof, said salt being made up of cations selected from the group consisting of NH_4^+, Na^+, Li^+, K^+ and Mg^{++} and anions selected from the group consisting of SO_4^{--}, CH_3COO^-, Cl^- and Br^-, said member being used in an amount to increase the affinity and sorption power of said block copolymer to the polyester synthetic fiber products, and in cases wherein a water-soluble salt is used, said salt being also used in salting out proportions.

4,027,347

SWIMMING GLOVE

Haruto Sato, Daini Sakuraso, 49-10 Nishikubo 1-Chome, Musashino, Tokyo, Japan

Filed Aug. 4, 1976, Ser. No. 711,696
Claims priority, application Japan, May 21, 1976, 51-64790[U]
Int. Cl.² A63B 31/04
U.S. Cl. 9—308 **5 Claims**

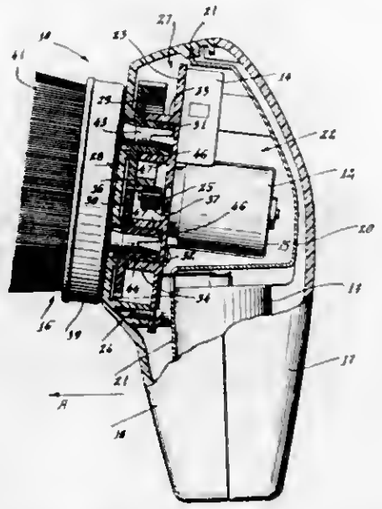
1. A swimming glove comprising an elastic and sealable hollow main body which integrally includes a hollow palm portion, a plurality of spaced hollow finger portions extending radially and outwardly of said palm portion and plurality of foldable finger-webs each extending between adjacent ones of said finger portions; a binding member applied about the carpus end of said palm portion for sealingly tightening the glove to one hand of the wearer; a plurality of spaced rockable water resisting pieces secured on one side to one side of said palm portion and one of said hollow finger portions; a first plurality of spaced rigid restraining pieces disposed adjacent to one side of said water resisting pieces for limiting the movement of said resisting pieces in one direction; and a second plurality of spaced rigid restraining pieces disposed adjacent to the other side of said water resisting pieces for limiting the movement of said water resisting pieces in the other direction.

4,027,348

SKIN TREATMENT APPLIANCE

Theodore Robert Flowers, New Haven, and Hermann Reinhold Schaefer, Bridgeport, both of Conn., assignors to Sperry Rand Corporation, Bridgeport, Coon.

Filed Jan. 12, 1976, Ser. No. 648,508
Int. Cl.² A46B *13/02*
U.S. Cl. 15—22 R **13 Claims**



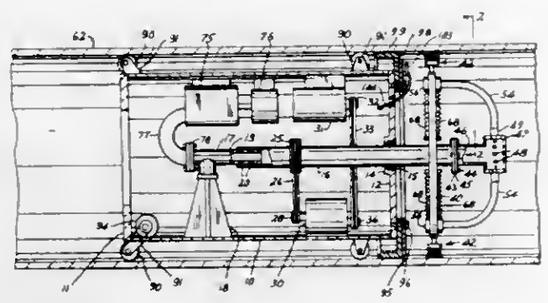
1. A skin treatment attachment for a portable electrical skin treatment appliance having a motor and rotary drive means for operating the attachment, the attachment comprising;
a. a casing containing skin treatment output means,
b. means detachably connecting said casing to the appliance,
c. rotable cam means within the casing,
d. means for connecting said cam means to the appliance drive means,
e. means for directing movement of the casing upon operation of the rotary drive means, and
f. means within the casing for converting motion of the rotatable cam means to orbital motion of the skin treatment output means.

4,027,349

APPARATUS FOR BRUSH-CLEANING THE INTERIORS OF PIPES

Edward Albert Clavin, Houston, Tex., assignor to Midcon Pipeline Equipment Co., Houston, Tex.

Filed Mar. 12, 1976, Ser. No. 619,702
Int. Cl.² B08B *9/02*
U.S. Cl. 15—104.12 **31 Claims**



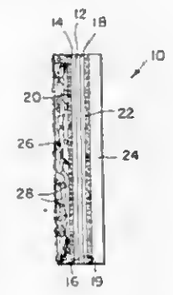
1. Apparatus for brush cleaning the inner side of the wall of a pipe, comprising body means adapted to be received in a pipe, rotative means supported by said body means adapted for rotation coaxially of said pipe, a plurality of brushes circularly spaced around the outer periphery of said rotative means and mounted for rotation about an axis directed toward the wall of the pipe, gas motor means for rotating each said brush about its said axis, said rotative means having flow passage means for delivering gas from a non-rotative source carried by said body means to said gas motor means to operate said gas motor means, said axis of each said brush being disposed at a small forward angle from a direction radially of said rotative means with respect to the direction of rotation of said rotative means whereby the leading edge of each said brush bears against the pipe wall with less pressure than the trailing edge of the brush and thereby reducing brush wear, and including means for biasing each brush toward the pipe wall.

4,027,350

CLEANING PAD

Ervin Kotche, Orlando, Fla., assignor to Ervin H. Kotche, Orlando, Fla.

Filed Apr. 29, 1976, Ser. No. 681,391
Int. Cl.² A47L *13/17*
U.S. Cl. 15—104.93 **2 Claims**



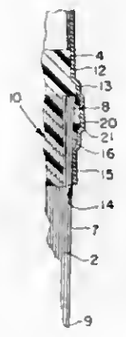
1. A buffing pad, which comprises:
a. a steel wool layer;
b. a layer of polyethylene having a front and a rear surface;
c. a first paper layer mechanically bonded to said front surface of said polyethylene layer, said first paper layer adhesively secured to said steel wool layer;
d. a solution of crude drying oil and essence of lemon, said solution impregnated into said steel wool layer;
e. a second paper layer mechanically bonded to said rear surface of said polyethylene; and
f. a dust cloth layer, said dust cloth adhesively secured to said second paper layer.

4,027,351

BRUSH CONSTRUCTION

Frank Marino, Baldwin, N.Y., assignor to The Wooster Brush Company, Wooster, Ohio

Filed Feb. 9, 1976, Ser. No. 656,531
Int. Cl.² A46B *3/02*
U.S. Cl. 15—192 **6 Claims**



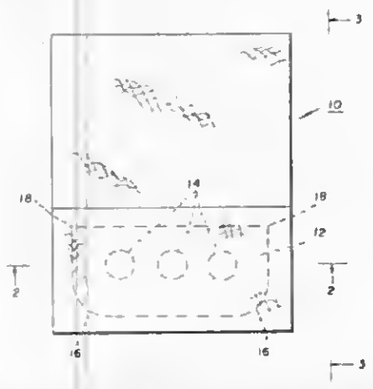
1. A brush, comprising:
bristle-like means for applying fluid-like material or the like to a surface, said bristle-like means having opposite end portions;
a longitudinally extending ferrule having a generally tubular wall extending substantially parallel to the longitudinal axis of said brush and terminating at opposite ends, a raised generally annular bead extending peripherally and circumferentially about said ferrule in said tubular wall at a location between said ends and generally perpendicularly to the longitudinal extent of said ferrule, said bead having a generally rectangular cross-sectional profile, one wall of said bead being generally parallel to the longitudinal extent of said ferrule, said ferrule including a generally tubular skirt portion between said bead and one of said ends thereof;
one end portion of said bristle-like means providing a hold which is positioned within the volume in said ferrule circumscribed at least in part by said skirt portion and part of said bead, the inner extremities of said hold terminating intermediate the longitudinal ends of said bead, and the remainder of said bristle-like means extending externally of said ferrule beyond said one end thereof,
said bead having a sufficiently large cross-sectional profile and circumscribing a volume having a cross-sectional area sufficiently larger than the cross-sectional area of the volume circumscribed by said skirt portion to permit expansion of the part of said hold located within such larger cross-sectional area volume partially filling the volume of said bead thereby increasing the effective porosity of said bristle-like means at said hold to permit liquid adhesive means to more thoroughly permeate said hold; and
hardenable adhesive means in said ferrule appreciably permeating into engagement with said hold and substantially filling the remaining available volume circumscribed by said bead for securing said bristle-like means to said ferrule, said hardenable adhesive means permeating between said hold and the interior wall of said bead to form an annular flange of hardened adhesive means within said annular bead to lock said hold in place.

4,027,352

SCOURING PAD WITH RETAINED CONTOURED STIFFENER

Walter Wagner, 2 Spring Drive, Dumont, N.J. 07628

Filed July 22, 1976, Ser. No. 707,638
Int. Cl.² A47L *17/08*
U.S. Cl. 15—209 C **7 Claims**



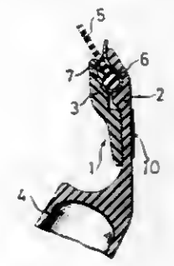
1. A plastic scouring pad for pots, pans and the like in which the pad is made of a size sufficiently small to be easily folded for hand manipulation, the outer surface of the pad being sufficiently open and abrasive to clean unwanted debris from the surfaces of said pots, pans and the like, said scouring pad including: (a) an outer member of a selected thickness of at least ⅛ inch and of a generally rectangular configuration and of a plastic, non-woven, fibrous open construction for the scouring of the surface of said pots, pans and the like, and (b) an insert of stiff plastic sheet material which is at least one-sixteenth of an inch thick and is impervious to the effect of water and detergents during its period of use, the insert being generally rectangular and having at least one corner formed with a radius and at least one of the other corners formed with a substantially 90 degree sharp configuration, said insert secured as an internal member within a fixed foldover end portion of the outer member to provide a double thickness, said end portion of the outer member completely enclosing the faces and all edges of the insert to provide at least three-sixteenths of an inch border of the outer member around the insert, the outer member also being constructed so as to provide an attached free end portion extending for at least one and one-third times the length of the double thickness portion of the outer member, the attached free end providing means for said free end to be brought to and around the double thickness to provide an additional thickness of scouring material at the edges and corners of the insert.

4,027,353

CLEANING APPARATUS, PARTICULARLY FOR CLEANING WINDOW PANES

Henry Morton Unger, No. 9, Lotharstrasse, 565 Solingen, Germany

Filed June 4, 1976, Ser. No. 692,716
Claims priority, application Germany, June 6, 1975, 2525201; Dec. 20, 1975, 2557768
Int. Cl.² A47L *1/06*
U.S. Cl. 15—245 **2 Claims**



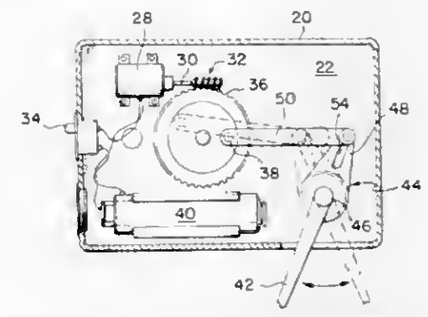
1. A cleaning apparatus, particularly for cleaning window panes, fitted with a replaceable strip-shaped rubber wiping element (5) having front, rear and side edges, a U-section holding sheath (6) accommodating the rear edge of the wiping element and, at the forward end of a handle for holding the cleaning apparatus, two clamping plates (2, 3) of which one is detachable and secures the wiping element in its holding sheath, the detachable clamping plate being formed at its transverse front edge with an inwardly and rearwardly directed tapering lip (7) which curls over the front edge of one side of the holding sheath and bears against the wiping element, and which is provided on its outside flank with rib-like teeth (8) extending transversely to the longitudinal axis of the lip, the teeth biting into the wiping element.

4,027,354

DETACHABLE WINDSHIELD WIPER ASSEMBLY FOR HELMET

Louis W. Burpee, Spencer Road, Whitefield, N.H. 03598

Filed Dec. 1, 1975, Ser. No. 636,819
Int. Cl.² B60S *1/24*
U.S. Cl. 15—250.3 **9 Claims**



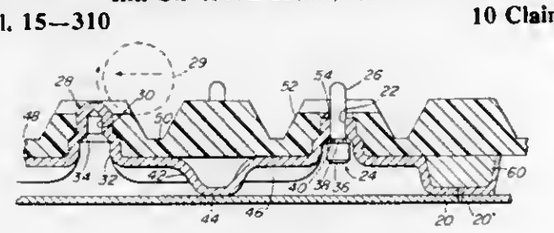
1. A detachable windshield wiper assembly for a helmet having a front visor comprising:
a housing including a rear wall contoured so as to be

brought into detachable close engagement with the front wall of a helmet, said rear housing wall having fastening means associated therewith for detachable connection with cooperable fastening means on the front wall of the helmet;
motor means positioned within said housing including an output shaft;
a worm gear carried by the output shaft of said motor means;
a pinion mounted within said housing drivable by said worm gear;
a pivotable element mounted within said housing including a shaft and a radially extending lever arm carried thereon having a radially extending elongated slot therein, said pivotable element being drivable by said pinion to be oscillated thereby through a predetermined arc;
a connecting rod pivotably connected at one end thereof to said pinion and at the other end thereof to said lever arm so as to slide within said slot;
an oscillatable wiper arm connected integrally to said pivotable element and projecting through an opening in a lower portion of said housing, said oscillatable wiper arm carrying thereon a windshield wiper blade;
and means carried by said housing for selectively powering said motor means.

4,027,355
PNEUMATIC CLEANING MAT AND METHOD OF MAKING SAME

George N. J. Mead, 22 Emerald Acres, Dover, N.H. 03820, and Philip R. Cornellusen, Black Pond Road, Hillsboro, N.H. 03244

Continuation-in-part of Ser. No. 425,543, Dec. 17, 1973, abandoned. This application Jan. 27, 1975, Ser. No. 544,563
Int. Cl.² A47L *23/22, 5/38*
U.S. Cl. 15—310 **10 Claims**

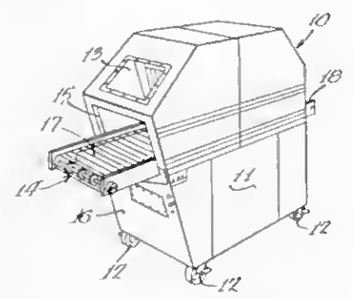


1. A pneumatic cleaning mat, comprising
a. a generally flat, shallow tank having closely spaced top and bottom walls,
b. said top wall being formed with a plurality of spaced openings therein in a first horizontal plane,
c. a valve movably mounted in each of said openings for normally closing said openings,
d. a tread stratum disposed over said top wall and formed with a plurality of openings in registration with said top wall openings, said stratum including a tread surface disposed in a second horizontal plane above said first plane,
e. means connecting said tank to a source of compressed air for pressurizing said tank, and,
f. each of said valves including individual actuating means disposed in spaced relation over said top wall,
g. said actuating means being responsive to applied pressure whereby the valves directly under a foot applied to said mat will open to release jets of compressed air against the sole of said foot,
h. said actuating means including an upright flexible stem connected to each valve and extending through said top wall and said stratum openings,
i. the upper end of said stem being substantially flush with the upper surface of said stratum and a second stratum of relatively soft resilient material disposed between the first stratum and said top wall and adapted to yield under applied weight.

4,027,356
MEAT TENDERIZER

Richard C. Wagner, Frankfort, and Ronald A. Banike, Orland Park, both of Ill., assignors to Hollymatic Corporation, Park Forest, Ill.

Filed Oct. 29, 1975, Ser. No. 626,757
Int. Cl.² A22C *9/00*
U.S. Cl. 17—25 **11 Claims**

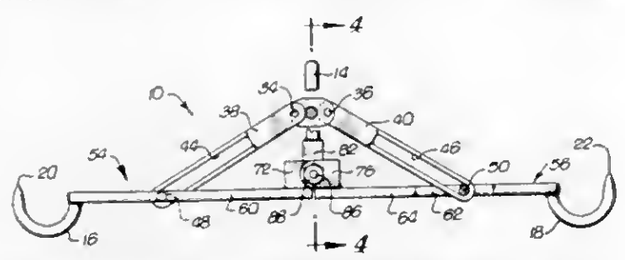


1. Apparatus for tenderizing meat, comprising: a conveyor for the meat; a plurality of knives each comprising an elongated blade having opposite ends one of which comprises a sharp cutting end for penetrating the meat and severing toughening fibers and tissues in the meat into short pieces; means for reciprocating said knives for projecting and withdrawing said blades into and from meat on said conveyor, each blade being subject to lateral bending between said ends under stress of the type resulting from resistance to said penetrating; a meat retaining means engaging the top of the meat and through which said blades extend; locking means for locking said retaining means against the meat during said withdrawing; means for thereafter releasing said locking means and thus said retaining means from said meat; a blade stabilizer means in addition to said meat retaining means comprising a stabilizer member engaging each of said blades intermediate said blade ends and above said retaining means at the beginning of said penetrating for supporting said blades against said lateral bending; means for positioning said stabilizer member at said intermediate position and at a selected distance from said blade cutting ends and said retaining means at said beginning of said penetrating; means for moving said stabilizer member simultaneously with said knives toward said meat during said beginning of said penetrating; and means for halting said moving of said stabilizer member for projecting said blades further beyond said stabilizer member during completion of said penetrating.

4,027,357
COLLAPSIBLE DRESSING HOOK FOR ANIMALS

Florin V. Morris, Taft, Calif., assignor to Howard E. Caywood, Taft, Calif., a part interest

Filed Jan. 19, 1976, Ser. No. 650,506
Int. Cl.² A22B *1/00;* **A22C** *15/00*
U.S. Cl. 17—44 **8 Claims**



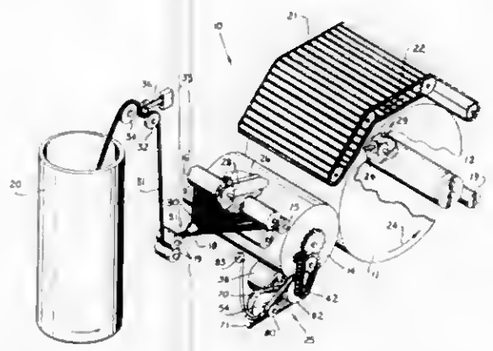
1. A collapsible dressing hook for animals comprising:

a member adapted to be engaged and supported to hang vertically from above,
a pair of oppositely outwardly extending arms having inner and outer ends,
the arms being hinged to said member adjacent their inner ends,
said arms being adapted to be hingedly moved on said member from an outwardly extending position to a substantially vertical collapsed position,
animal impaling hooks on the outer ends of said arms, and
an arm support for each arm, each arm support having outer and inner ends,
each arm support being pivotally connected adjacent its inner end to said member above the inner ends of said arms,
each arm support being connected adjacent its outer end to a respective arm intermediate its ends to support the arm in the outwardly extending position,
the connection of each arm support to the respective arm being slidable to permit the arms to move to their collapsed substantially vertical position from the extended position.

4,027,358
VARIABLE SPEED DRIVE SYSTEM FOR CARDING MACHINE

Lorenzo Llach, Marietta, and Arturo Picas, Athens, both of Ga., assignors to Canton Textile Mills, Inc., Canton, Ga.

Continuation-in-part of Ser. No. 545,195, Jan. 29, 1975, Pat. No. 3,982,301. This application Aug. 18, 1975, Ser. No. 605,635
Int. Cl.² D01G *15/46*
U.S. Cl. 19—106 R **5 Claims**

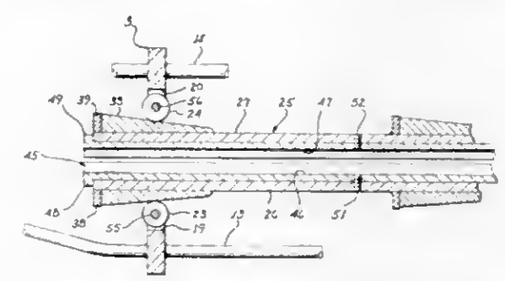


1. In a textile card system for working and forming cotton into a sliver including a rotatable main cylinder, a motor for rotating the main cylinder, a rotatable feed cylinder and a rotatable licker-in for feeding cotton to the main cylinder, a rotatable doffer cylinder for removing the cotton from the main cylinder, means for forming the cotton into a sliver, means for receiving the sliver, and a drive connection between said feed cylinder and said doffer cylinder to rotate said feed cylinder and doffer cylinder at a fixed speed ratio, the combination therewith of a variable speed drive system including a motor, a variable pitch drive pulley driven by said motor, a variable pitch driven pulley in driving connection with said doffer cylinder, a V-belt extending about said drive pulley and said driven pulley, means for varying the pitch of one of said pulleys and for varying the pitch of the other of said pulleys at a pitch inversely proportional to the pitch of said one of said pulleys, limiting means for variably limiting the pitch of said pulleys to variably limit the speed of said doffer cylinder and said feed cylinder and control means for sensing the sliver between the card system and the sliver receiving means for stopping the rotation of said doffer cylinder and said feed cylinder in response to the absence of a sliver being delivered from said card system to the sliver receiving means and for actuating said means for varying the pitch of one of said pulleys to increase the rotational speed of said doffer cylinder and said feed cylinder in response to the delivery of a sliver from said card system for a predetermined time at a slower speed.

4,027,359
WIRE COME-ALONG

Kenneth Dale Tinker, P.O. Box 1123, Flagstaff, Ariz. 86001

Filed Oct. 28, 1975, Ser. No. 626,087
Int. Cl.² F16G *11/00;* **F16B** *11/00*
U.S. Cl. 24—115 R **10 Claims**

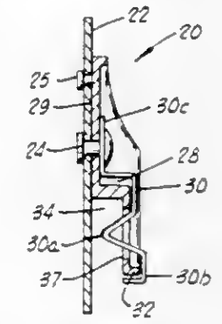


1. A wire come-along for applying tension to a cable, said wire come-along comprising:
a. a split sleeve having a pair of hinged sleeve sections for encirclingly receiving the cable;
b. a frame for receiving said split sleeve;
c. a plurality of pairs of opposed bearing surfaces attached to said frame for accommodating relative movement of said frame with respect to said split sleeve; and
d. a plurality of pairs of opposed wedges extending from said split sleeve and bearing against respective ones of said bearing surfaces for generating a clamping force upon the cable disposed within said split sleeve in response to relative longitudinal movement between said frame and said split sleeve; whereby, a longitudinally directed force applied to said frame causes the cable to become clamped within said split sleeve and places the cable in tension.

4,027,360
TIE DOWN BRACKETS FOR SECURING BIGHTS OF FLEXIBLE MEMBERS

Willard W. Moser, P.O. Box 1503, Guymon, Okla. 73942

Continuation-in-part of Ser. No. 431,205, Jan. 7, 1974, Pat. No. 3,889,321, and a continuation-in-part of Ser. No. 564,806, April 3, 1975, Pat. No. 3,973,298. This application Apr. 27, 1976, Ser. No. 680,761
Int. Cl.² A43C *3/00;* **B21D** *53/46*
U.S. Cl. 24—146 **6 Claims**



1. A tie down bracket, comprising:
a base plate;
a spring-supporting body secured to said base plate and including:
a flat back surface abutting said base plate;
a dished-out portion;
a central portion; and
an apertured retainer finger projecting as a cantilever from said central portion or the opposite side thereof from said dished-out portion and extending parallel to said base plate and spaced therefrom; and

an elongated spring plate having:
- a first end secured to said spring supporting body in the dished-out portion thereof and on the opposite side thereof from said flat back surface;
- a second end hooked over the free end of said retainer finger; and
- a V-shaped portion between said ends projecting through the aperture in said retainer finger and defming with said base plate and with the central portion of said spring supporting body, a retainer space for retaining the bight of a flexible member.

4,027,361

SLIDING CLASP FASTENER

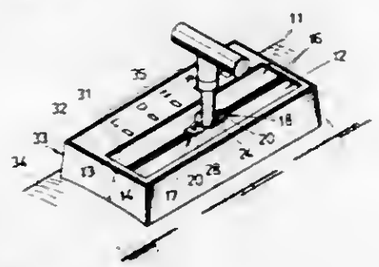
Kiyoo Yoneya, Kurobe, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Japan

Filed Feb. 11, 1976, Ser. No. 657,181

Claims priority, application Japan, Feb. 21, 1975, 50-24712[U]

Int. Cl.² A44B *19/26*

U.S. Cl. 24—205 R **1 Claim**



1. In combination, a base means having a slot; a sliding clasp fastener connected to said base means to cover said slot, said sliding clasp fastener having interengageable rows of fastener elements and a pair of sliders moveable along said rows of fastener elements to engage and disengage same to establish a limited length moveable open gap in the sliding clasp fastener along which gap the fastener elements are disengaged, and beyond said gap the fastener elements being engaged, each of said sliders having an open bail; a retainer loop member extending through the bail of each slider to keep said sliders in a spaced-apart relation to determine the size of said gap, but allow limited relative movement of said sliders; and a moveable bar member extending through said gap and retainer loop member, said bar member being moveable along the direction of said rows of fastener elements and disposed for engagement with a contact surface on at least one of said loop member and sliders to correspondingly establish the location of said gap.

4,027,362

BUCKLES FOR VEHICLE SAFETY BELTS

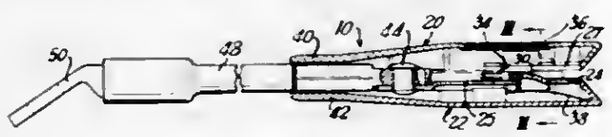
John Michael Hart, and James Shadrach Varah, both of Carlisle, England, assignors to Kangol Magnet Limited, London, England

Filed May 2, 1975, Ser. No. 574,108

Claims priority, application United Kingdom, May 2, 1974, 19425/74

Int. Cl.² A44B *11/26, 17/00*

U.S. Cl. 24—230 AL **7 Claims**



1. A buckle for a vehicle seat belt system, the buckle comprising a tongue portion having a latch formation, a socket portion, wall means in said socket portion defining a socket having a mouth through which said tongue portion can be inserted into said socket, an aperture in said wall means, and a latch means having a latch portion, the latch means extending around said wall means and being movable relative thereto between a latching position in which said latch portion extends into said socket through said aperture for engagement with said latch formation when said tongue portion is received in the socket, whereby the tongue portion is retained within the socket, and a release position in which the tongue portion can be withdrawn from the socket, means biasing said latch means into the latching position, surfaces formed on said wall means, the surfaces extending transversely of the direction of movement of said tongue and facing away from said mouth, surfaces on said latch means extending transversely of the direction of movement of said tongue for engagement with said wall means surface, said wall means comprising a plate having the aperture, and integral side walls curving upwardly from respective opposed edges of the plate and then towards each other to define the socket, cut-outs in said side walls providing said surfaces.

4,027,363

METHODS OF MAKING INCANDESCENT LAMPS

Donald J. Belknap, P.O. Box 325, Mountain Home, N.C. 28758

Division of Ser. No. 372,535, June 22, 1973, Pat. No. 3,914,640, which is a division of Ser. No. 147,747, May 28, 1971, Pat. No. 3,762,900. This application Aug. 8, 1975, Ser. No. 603,158

Int. Cl.² H01K *1/18*

U.S. Cl. 29—25.15 **4 Claims**

1. A method of making incandescent lamps, comprising providing a tubular envelope having aligned conductive tubular terminal sections at opposite ends of the envelope, providing a filament unit having a coil of filament wire wound about an axis with turns at opposite ends of the coil secured to corresponding leads that are substantially more massive than the filament wire and that are aligned with said axis, inserting said filament unit axially into said envelope through one of said terminal sections until the coil is within a central portion of said envelope and said massive leads are in said terminal sections respectively, and mechanically pinching off said terminal sections through said leads to seal the envelope and to grip the leads of the filament unit, said leads being tubular and said filament unit being provided by inserting a plurality of turns at each end of said coil of filament wire into a corresponding end of a tubular lead and mechanically deforming each lead laterally inward toward said axis sufficiently to indent the tubular lead at a localized region thereof and compress the adjacent turns until the lead and the coil are joined mechanically and electrically.

4,027,364

METHOD OF MAKING A CHAIR LEG BASE

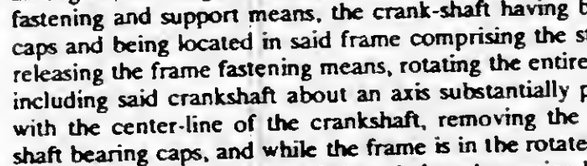
Charles W. Sasan, Ohio City, Ohio, assignor to Harter Corporation, Sturgis, Mich.

Filed Apr. 5, 1976, Ser. No. 673,312

Int. Cl.² B21D *51/16*

U.S. Cl. 29—150 **4 Claims**

1. The method of making a tapered tubular chair leg, comprising the steps of providing a preformed tube of uniform cross section througout its length having top, bottom and side walls, deforming said bottom wall and adjoining side wall portions inwardly and angularly of said tube to produce a longitudinally tapered tube having one end smaller than the other and an interior rib which is inclined with respect to the longitudial axis of the tube, and forming a closed end wall at the smaller end of said tube.



4,027,365

METHOD FOR REMOVING AND RE-INSTALLING THE CRANK-SHAFT OF AN INTERNAL COMBUSTION ENGINE AND DEVICE FOR CARRYING OUT THE SAID METHOD

Jacques Ernest Maurice Froeliger, Le Blanc Mesnil, France, assignor to Societe d'Etudes de Machines Thermiques, Saint Denis, France

Filed Aug. 15, 1975, Ser. No. 605,078

Claims priority, application France, Aug. 26, 1974, 74.29163

Int. Cl.² B23P *15/00, 7/00;* **F02F** *7/00*

U.S. Cl. 29—156.4 R **6 Claims**

1. A method for removing or reinstalling the crankshaft of an engine, said engine having a frame mounted on a base by fastening and support means, the crank-shaft having bearing caps and being located in said frame comprising the steps of releasing the frame fastening means, rotating the entire frame including said crankshaft about an axis substantially parallel with the center-line of the crankshaft, removing the crankshaft bearing caps, and while the frame is in the rotated position, extracting the crankshaft from below the engine by supporting the crank-shaft and allowing the crankshaft to be moved by gravity along a slanted guiding means until the crankshaft reaches the level of the base.

4,027,366

MULTILAYER COATED SUBSTRATE

John M. Millar, Joppa, and William F. Moran, Randallstown, both of Md., assignors to Beatrice Foods Co., Chicago, Ill.

Continuation of Ser. No. 384,895, Aug. 2, 1973, abandoned, which is a division of Ser. No. 107,559, Jan. 18, 1971, Pat. No. 3,770,482. This application May 9, 1975, Ser. No. 576,111

Int. Cl.² B23P *3/00;* **B32B** *7/02, 15/08*

U.S. Cl. 428—623 **10 Claims**

1. An article of manufacture consisting essentially of a conductive substrate and, adjacent and overlying said conductive substrate, a coating comprising a plurality of superimposed, distinct layers,

the layer next to the conductive substrate consisting essentially of a layer of conductive metal selected from the group consisting of iron, stainless steel, zinc, copper, nickel, tin, chromium, brass, titanium, zirconium, lead and alloys of these metals,

at least one of said layers consisting essentially of at least one first film-forming non-conductive organic or inorganic polymer,

the specific gravity of said conductive metal being at least three times that of said first polymer,

said coating being applied to said conductive substrate in one step by electrostatically applying an admixture of powders, said admixture including powders having average particle sizes less than 50 microns of said conductive metal and powders having average particle sizes of about 10 to 300 microns of said first polymer, whereby said powders stratify into distinct, overlying layers, and thereafter curing or fusing at least one of said powders,

whereby the superimposed layers of the coating exhibit improved adhesion as compared to similar articles wherein the coating layers are separately applied and cured or fused.

4,027,367

SPRAY BONDING OF NICKEL ALUMINUM AND NICKEL TITANIUM ALLOYS

Henry S. Rondeau, 2865 Coventry Road, Shaker Heights, Ohio 44120

Filed July 24, 1975, Ser. No. 598,822

Int. Cl.² B05D *1/08;* **B32B** *15/04, 15/20*

U.S. Cl. 428—652 **17 Claims**

1. A method of thermal spraying a substrate to deposit a self-bonding coating on such substrate, comprising supplying an electric arc thermal spray gun with a wire feed comprising an alloy of nickel and aluminum or titanium, and using such electric arc thermal spray gun, spraying said wire feed onto such substrate to coat the same thereby to establish a diffusion bond between such coating and such substrate to provide a self-bonding coating on such substrate.

4,027,368

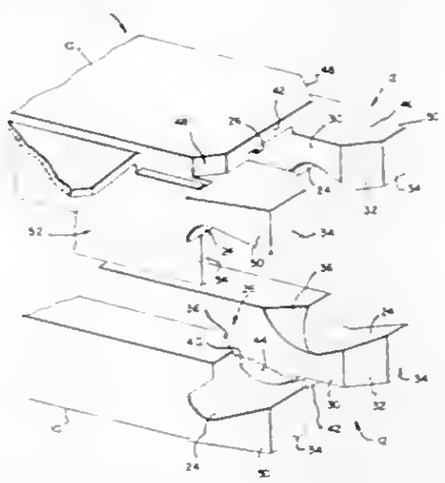
FORCEPS TOOL FOR WIRE INSERTION

John Carl Asick, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed June 22, 1976, Ser. No. 698,670

Int. Cl.² H01R *43/04*

U.S. Cl. 29—751 **4 Claims**



1. A forceps insertion tool, comprising:

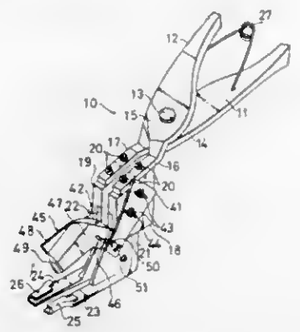
a pair of leaf spring arms connected together at respective one ends and diverging toward respective free ends which are provided thereon with wire gripping jaws, inner surfaces of the jaws having wire gripping surfaces for gripping a wire therebetween, said wire gripping surfaces being bifurcated by corresponding channels which receive therein a slotted plate type electrical contact for

connection with a wire gripped between said jaws, said jaws having curviform recesses at the intersection of said said channels with said wire gripping surfaces providing clearances for a curviform portion of said wire resulting from deformation of said wire upon insertion of said wire into said contact.

4,027,369
ELEMENT ROWS COUPLING TOOL FOR A CONCEALED SLIDE FASTENER

Akiyoshi Kando, Uozu, and Ryoichi Kindai, Toyama, both of Japan, assignors to Yoshida Kogyo Kabushiki Kaisha, Japan

Filed Oct. 15, 1976, Ser. No. 732,854
Claims priority, application Japan, Oct. 23, 1975, 50-127679
Int. Cl.² B23P *19/04*
U.S. Cl. 29—766 **7 Claims**



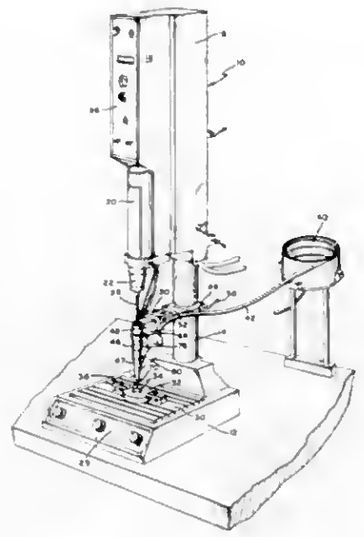
1. A tool for interengaging a pair of element rows in a concealed type slide fastener, comprising:
a. a pair of blocks movable toward and away from each other and normally urged apart;
b. a pair of slider body halves mounted on said blocks, respectively, said slider halves being matable to provide a slider body when said blocks are moved toward each other;
c. a pivotable member operatively connected to said blocks and having centrally on its bottom surface an element guide, said pivotable member being movable pivotally into a position in which said element guide and said slider body halves are put together and jointly provide a slider when said blocks are moved toward each other; and
d. means between said blocks and said pivotable member for converting motion of said blocks into pivotal motion of said pivotable member.

4,027,370
HIGH FREQUENCY VIBRATION INSERTION APPARATUS

John J. Bachar, Danbury, Conn., assignor to Branson Ultrasonics Corporation, New Canaan, Conn.

Filed Oct. 21, 1976, Ser. No. 734,616
Int. Cl.² B23Q *7/10*
U.S. Cl. 29—818 **11 Claims**

1. A high frequency vibration insertion apparatus for inserting an element into a body comprising:
a guide having an axial bore;
feed means for feeding an element into said bore toward a body engaging end of said guide;
means disposed in said bore for retaining an element fed from said feed means in said bore and in proximity to said body engaging end;
a resonator dimensioned to be resonant as a half wavelength resonator at a predetermined high frequency disposed for reciprocating motion within said bore and to engage with one end surface thereof an element fed into said bore and retained therein;
electroacoustic converter means coupled to the other end surface of said resonator for causing, when said converter means is energized, said resonator to be resonant, and
force means coupled for causing an element retained in said

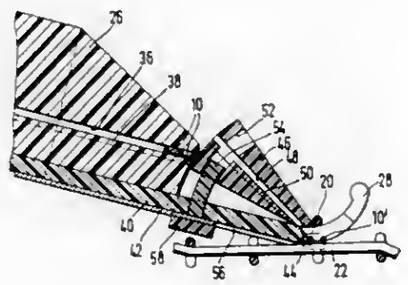


bore to be forced out of said bore and driven into a body disposed opposite said body engaging end responsive to said resonator being resonant and said one resonator end surface being in forced engagement with such element.

4,027,371
DEVICE FOR THE INSERTION OF AN INTERMEDIATE MEMBER BETWEEN TWO CROSSING STRINGS OF A TENNIS RACQUET

Gebhard Dischinger, Wollenweiler, Germany, assignor to Babolat-Maillot-Witt, Lyon, France and Lipa Lizenz-und Patentverwertungs-ansalt, Vaduz, Liechtenstein

Filed May 12, 1976, Ser. No. 686,225
Claims priority, application Germany, May 16, 1975, 2521855
Int. Cl.² B23Q *7/10*
U.S. Cl. 29—811 **25 Claims**

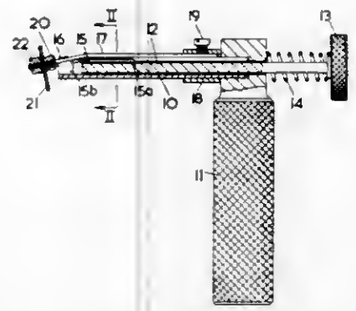


1. A device for the insertion of a plurality of intermediate members between respective pluralities of cross-over locations of strings of a tennis racket wherein each of the intermediate members in a cross-over guidance member formed with first and second pairs of projecting members disposed at right angles to one another, each of said pairs partly surrounding one of the strings, comprising:
a frame having a handle portion and supply-storage means for the intermediate members, said frame having a front end and two fork-shaped prongs disposed on said front end for separating the crossing strings, including a location between said prongs;
positioning means for positioning the intermediate members;
a guidance channel formed in said frame and having a plurality of segments, said supply-storage means communicating with said location through said positioning means and through said guidance channel;
a supply member pivotably attached to said frame and formed with an opening, and a bore perpendicular to said opening, said opening being the last segment of said guidance channel and bordering said prongs, said bore traversing said guidance channel; and
a locking member rigid with said frame and engageable in said bore.

4,027,372
SEAL EMPLACEMENT TOOLS

Gordon Charles Mitchell, 82, Hollows Close, Harnham Wiltshire, Salisbury, England

Filed Sept. 3, 1975, Ser. No. 610,056
Claims priority, application United Kingdom, Sept. 3, 1974, 38476/74
Int. Cl.² B25B *27/14*; **B23P** *19/02*
U.S. Cl. 29—235 **11 Claims**



1. An internal seal emplacement tool for internally emplacing flexible ring seals and including a tube having an open end and for accommodating a folded seal, a plunger in said tube for ejecting the seal from the open end, and a guide externally of and so spaced from said open end as in use to deflect a seal radially outwards from the plunger axis, wherein the guide includes cam means radially deflectable by said plunger towards the end of an ejection stroke thereof, whereby in use a portion of the guide may be located in the designated position for the seal prior to and during most of the ejection of the seal and lifted away from the said designated position just prior to location therein of a final portion of the seal.

4,027,373
FLANGE SPREADER

Theodore Emil Kwast, Anaheim, and Gordon Marlon Smith, La Habra Heights, both of Calif., assignors to The Singer Company, New York, N.Y.

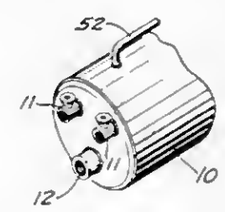
Filed July 20, 1976, Ser. No. 707,134
Int. Cl.² B23P *19/04*
U.S. Cl. 29—256 **4 Claims**

1. A flange spreader used for removal of a flow control device mounted between two opposing flanges of a pipeline, the flanges being clamped together by a plurality of studs, a pair of the flange spreaders to clamp the opposing flanges in axially aligned position as replacements for two of the studs and whereby all of the studs will be loosened and some of the studs will be removed to give access to the flow control device, the flange spreader comprising:
a. a pair of members including a jackscrew and a base interconnected to each other to be axially expandable or contractable, and to initially hold the opposing flanges from axial expansion,
b. the jackscrew threadedly connected to a base intermediate the opposing flanges,
c. the base having a portion abutting the inner face of one of the flanges,
d. the base having a threaded shank which extends through the said one flange,
e. a base nut threadedly connected to the shank at the outer face of the said one flange,
f. a jackscrew stop appended to the jackscrew to abut the inner face of the other flange, and
g. a head formed on the jackscrew disposed at the outer face of the said other flange whereby rotation of the jackscrew in one direction will clamp the external faces of the flanges between the head and the base nut thereof to cause axial contraction of the opposing flanges, and rotation in the opposite direction will clamp the inner faces of the flanges between the base and the jackscrew stop to cause axial expansion of the opposing flanges.

4,027,374
TANK BOTTOM ASSEMBLY APPARATUS

Harry Wayne Rutherford, 1661 Molina Lane, Gardena, Calif. 90247

Division of Ser. No. 484,817, July 1, 1974, Pat. No. 3,914,904. This application Aug. 7, 1975, Ser. No. 602,826
Int. Cl.² B23P *19/04*
U.S. Cl. 29—256 **1 Claim**



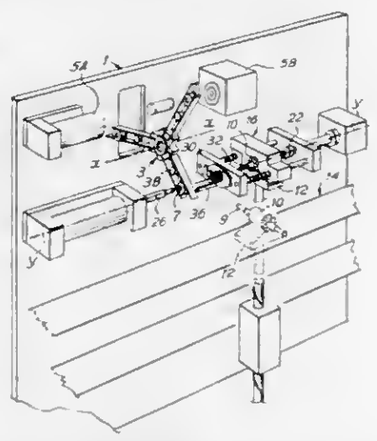
1. An apparatus for installing a concave dish into the end of a cylindrical body, said apparatus comprising:
a first pair of cross members and a second pair of cross members, spaced from each other,
brace means connecting both pairs together to form a frame,
a plate disposed between the members of said first pair,
a bar extending from one member to the other member of said second pair,
a crank mounted in threaded relationship on said bar,
one end of said bar being mounted on said one member to pivot on an horizontal axis,
a multioperative apertured member fixed to said other member,
said other end of said bar having a bolt hole adapted so that a bolt can be inserted therethrough to engage one of the apertures in said member to accommodate for different size bodies,
means for mounting said crank on said bar to allow adjustment of said crank, and
means for indicating when said dish has sufficiently entered said body.

4,027,375

DEVICE FOR ANGULARLY CENTERING A MEMBER HAVING AN ANNULAR TOOTHED FORMATION

Antonio Magni, Lucca, Italy, assignor to Axis S.p.A., Florence, Italy

Filed July 19, 1976, Ser. No. 706,201
Claims priority, application Italy, Aug. 8, 1975, 9513/75
Int. Cl.² B21D *39/04*
U.S. Cl. 29—282 **4 Claims**



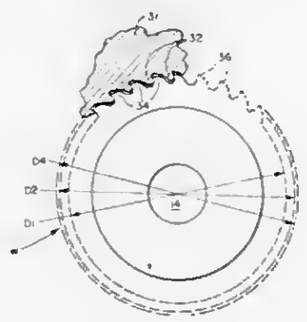
1. A device for angularly centering a member having a toothed formation, said device comprising means defining a grooved seat for slidably receiving the member, and centering means for angularly orientating the member during relative movement between the member and the seat so that the toothed formation can enter the seat, said centering means comprising means defining a ramp, means defining a first profile for centering a tooth which engages the profile, and means defining a second profile for centering a tooth which has engaged the said ramp, the centering means being resiliently deflected by a said tooth engaging the ramp.

4,027,376

METHOD FOR PRODUCING SPARKING WHEELS

Earl W. Brinkman, Rochester, N.Y., assignor to Davenport Machine Tool, Rochester, N.Y.

Filed Apr. 8, 1976, Ser. No. 675,147
Int. Cl.² B23P *17/00*
U.S. Cl. 29—417 **5 Claims**



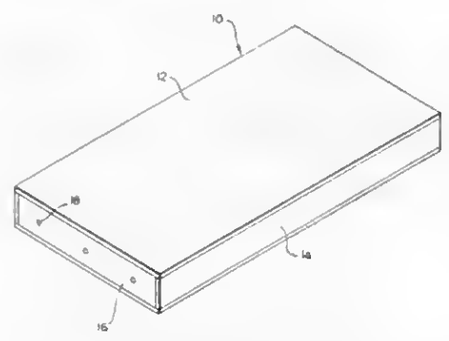
1. A method of producing sparking wheels, comprising
forming on the periphery of a circular wheel blank a plurality of spaced, helical lands which extend diagonally between opposite sides of the blank,
forming the lands on said blank into a plurality of axially and angularly spaced teeth by forcing the blank at least once coaxially into the bore of a broaching tool having angularly spaced cutting surfaces which cut spaced notches transversely across said lands, and
while the blank is still in the bore of said broaching tool and engaged with the cutting surfaces thereof, effecting a slight relative rotation between said blank and said tool so that said cutting surfaces upset the teeth formed in the lands between said notches.

4,027,377

PRODUCTION OF NEUTRON SHIELDING MATERIAL

John J. Roszler, Lincoln Park, Mich., assignor to Brooks & Perkins, Incorporated, Southfield, Mich.

Filed June 25, 1975, Ser. No. 590,206
Int. Cl.² B22F *3/24*
U.S. Cl. 29—420.5 **13 Claims**



1. The method of making rigid neutron absorbing sheet material which comprises
forming an open-ended rectangular metal box by continuously welding together the edges of rectangular top and bottom forming plates, side forming strips, and one end forming strip,
mixing together finely divided neutron absorbing boron compound and a finely divided metal powder to produce a substantially uniformly dispersed mixture thereof,
positioning the box with its open end up,
completely filling the box with material from the uniform mixture,
jarring the filled box repeatedly to cause the finely divided mixture to settle to eliminate voids or air pockets in the box,
adding material from the mixture as required to ensure that the box is filled,
applying the other end forming strip to the box in solid abutment against the powdered material and providing a continuous weld around its edges to the adjacent end edges of said top and bottom forming plates and side forming strips to produce a composite ingot suitable for rolling,
soaking the ingot to bring it to an elevated temperature of 800°–850° F., and hot rolling the ingot at substantially the aforesaid temperature in repeated passes to reduce its thickness to form a thin rigid neutron absorbing sheet material in which the particles of finely divided neutron absorbing material and metal powder are molecularly bonded together and to the inner surfaces of the thin metal outer plies produced from the top and bottom forming plates.

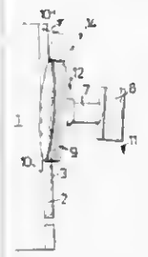
4,027,378

REMOVING DEPOSITED MATERIAL FROM THE EDGE PORTIONS OF A PLATE

Olov Carl Gustav Wennberg, 16, Champ du Vert Chasseur, B-1180 Brussels, Belgium, and Nils Harald Runfeldt, Lorensbergsgatan 11, S-654 68 Karlstad, Sweden

Division of Ser. No. 438,715, Feb. 1, 1974, abandoned. This application Nov. 10, 1975, Ser. No. 630,727
Claims priority, application Sweden, Feb. 8, 1973, 7301756
Int. Cl.² B23P *19/02*
U.S. Cl. 29—427 **2 Claims**

1. A method of removing deposited material in the form of a strip from an edge of a plate, comprising positioning against said edge of the plate the periphery of a roller that has corrugations along its periphery, the corrugations having sharp edges that extend all the way around the periphery of the roller, said edge of the plate being disposed at an acute angle to the axis of the roller at least at the point of contact of said roller with said edge, rotating the roller about its axis in a



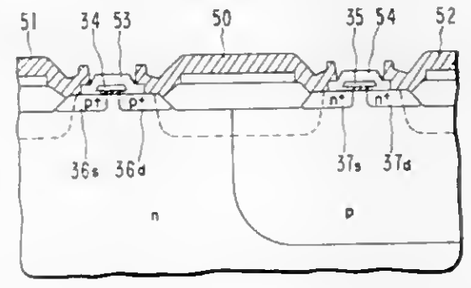
direction to remove material from the edge of the plate in a direction edgewise away from the plate, and moving the roller along the plate in a direction parallel to the edge of the plate while maintaining the periphery of the roller in contact with the edge of the plate.

4,027,380

COMPLEMENTARY INSULATED GATE FIELD EFFECT TRANSISTOR STRUCTURE AND PROCESS FOR FABRICATING THE STRUCTURE

Bruce E. Deal, Palo Alto, and Daniel C. Hu, San Jose, both of Calif., assignors to Fairchild Camera and Instrument Corporation, Mountain View, Calif.

Division of Ser. No. 475,358, June 3, 1974, abandoned. This application Jan. 16, 1976, Ser. No. 649,957
Int. Cl.² B01J *17/00*
U.S. Cl. 29—571 **3 Claims**



1. A process for fabricating a complementary insulated gate field effect transistor structure wherein p-channel and n-channel devices are formed within the same semiconductor substrate, comprising:
a. applying a thermal oxidation masking material to a layer of n-type silicon including depositing a layer of silicon dioxide and depositing a layer of silicon nitride on said layer of silicon oxide;
b. defining said thermal oxidation material to establish protected active device regions and to open up isoplanar isolation regions;
c introducing a lightly doped n-type impurity in the substrate in isoplanar isolation regions;
d. heating said semiconductor substrate in the presence of an oxidizing agent to form isolation islands of silicon dioxide;
e. removing said thermal oxidation masking material;
f. predepositing n-type and p-type impurities in at least one active device region;
g. heating said substrate in an atmosphere containing less than 5 percent of an oxidizing agent to drive said n-type and p-type impurities into said substrate to form a composite conductivity well, the relative concentration of said n-type and p-type impurities producing a low net p-type concentration near the surface of said well and high net p-type concentration deep within said well;
h. thermally growing a thin layer of silicon dioxide in said active device regions;
i. depositing a conductive layer of polycrystalline silicon;
j. defining said layers of silicon dioxide and polycrystalline silicon to produce insulated gate electrodes for the p-channel and n-channel devices;
k. predepositing boron adjacent both sides of a defined gate electrode in an active device region formed in said layer of n-type silicon to form the source/drain regions of a p-channel field effect device;
l. predepositing phosphorus adjacent both sides of a defined gate electrode in an active device region formed in said composite well to produce the source/drain regions of an n-channel field effect device;
m. thermally driving in said impurities predeposited in said source/drain regions of said p-channel and n-channel devices;
n. forming a further layer of electrical insulation over said isolation islands; and
o. applying a conductive layer and defining said conductive layer to connect one of said source-drain regions of said p-channel field effect device and one of said source/drain regions of said n-channel field effect device and to effect external electrical coupling with the remaining source/-

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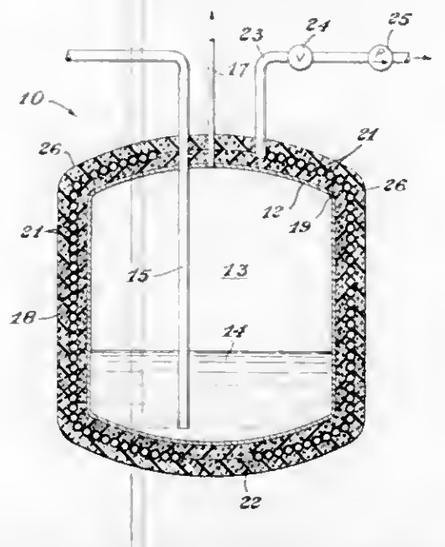
4,027,379

METHOD OF INSULATING CRYOGENIC VESSELS

Chin Huan Cheng, and Burton D. Brubaker, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 370,242, June 15, 1973, abandoned. This application Dec. 23, 1974, Ser. No. 535,248
Int. Cl.² B21D *39/00*; **B23P** *19/04*
U.S. Cl. 29—455 R **6 Claims**



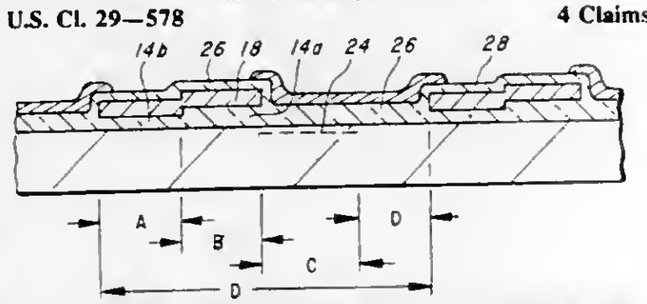
1. A method for the formation of a cryogenic vessel, the steps of the method comprising providing a vessel, applying thermal insulation thereto, the improvement which comprises incorporating tubing within at least a portion of the insulation, the tubing containing a gas at an absolute pressure not greater than about one millimeter of mercury absolute, the tubing containing the gas thereby providing improved thermal insulation of the vessel.

drain regions of said n-channel and p-channel field effect devices.

4,027,381
SILICON GATE CCD STRUCTURE

Al F. Tasch, Jr., Richardson, and Robert C. Frye, Plano, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 598,316, July 23, 1975, abandoned. This application June 1, 1976, Ser. No. 691,656
Int. Cl.² B01J 17/00
U.S. Cl. 29—578 **4 Claims**

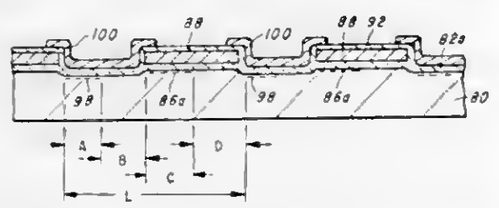


1. In a method of fabricating a charge coupled device having adjacent overlapping phase electrodes separated from each other and from an underlying semiconductor substrate surface by a single insulator material, the steps of:
forming spaced polycrystalline semiconductor strips on a layer of insulating material overlying said surface of the semiconductor substrate such that first and second portions of each polycrystalline semiconductor material strip are respectively separated from the said surface by relatively thin and thick areas of said insulating material, and exposed regions of said semiconductor surface occupy spaces between said strips;
covering first portions of said exposed regions with masking material such that second portions of said exposed regions remain exposed, said second portions respectively defined by an edge of said masking material and an edge of a polycrystalline semiconductor strip;
implanting dopant ions into said remaining exposed regions to modify the surface potential at said semiconductor surface in said remaining exposed regions;
removing said masking material and forming a further layer of said insulating material over said exposed surface regions to the thickness of adjacent areas of insulating material beneath said polycrystalline semiconductor strips and to cover said polycrystalline semiconductor strips; and
forming conductive electrodes over said further insulating material between said polycrystalline strips, said conductive electrodes having marginal portions overlapping adjacent polycrystalline strips.

4,027,382
SILICON GATE CCD STRUCTURE

Al F. Tasch, Jr., Richardson, and Robert C. Frye, Plano, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 598,316, July 23, 1975, abandoned. This application June 1, 1976, Ser. No. 691,657
Int. Cl.² B01J 17/00
U.S. Cl. 29—578 **5 Claims**

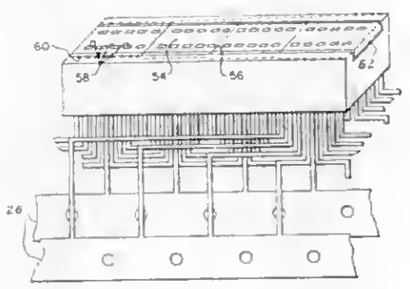


1. In a method of fabricating a charge coupled device structure having adjacent overlapping phase electrodes extending transversally over a channel formed in a semiconductor substrate, said phase electrodes separated from each other and from the underlying semiconductor substrate by a single insulator material, the steps of:
ion implanting spaced apart first surface potential modified regions in said semiconductor substrate and extending across said channel, said regions located beneath a surface of said substrate covered by a uniform thickness insulating material,
forming spaced apart polycrystalline semiconductor electrode strips extending across said channel and partly overlying portions of said doped regions,
removing insulating material between said polycrystalline semiconductor strips and replacing said removed insulating material by a layer of said same insulating material to said uniform thickness and to cover said polycrystalline semiconductor strips using a process causing significant diffusion of dopant impurities into said insulating material from semiconductor surface areas not overlaid by said polycrystalline semiconductor strips;
forming mask material over portions of said insulation material between said polycrystalline strips and ion implanting second modified surface potential regions in said semiconductor surface beneath areas of said insulating material between said polycrystalline semiconductor strips and respectively bounded by an edge of said mask material and an edge portion of a polycrystalline strip covered by insulating material beneath which there is no implanted first modified surface potential region, said first and second modified surface potential regions being formed by implanted dopant ions of the same conductivity type; and
forming conductive electrodes over said insulation material between said polycrystalline strips to overlap marginal portions of said polycrystalline strips.

4,027,383
INTEGRATED CIRCUIT PACKAGING

Terry O. Herndon, Carlisle, and Jack I. Raffel, Lexington, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation of Ser. No. 436,299, Jan. 24, 1974, abandoned. This application July 16, 1975, Ser. No. 596,472
Int. Cl.² B01J 17/00
U.S. Cl. 29—577 **15 Claims**



1. Integrated circuit production method comprising,
forming an elongated channel or dielectric material having at least one leg and a base, each extending in the same direction to define an axis, the planes of said leg and base being orthogonal,
implanting in said leg a plurality of high density arrays of lead-in conductors extending orthogonally to said base through said leg and terminating with exposed ends in a plane parallel to the base, each array being axially displaced from each other to be non-overlapping and each array comprising a plurality of lead-in conductors,
each of said lead-in conductor arrays comprising a low density lead-out conductor array connected thereto, said lead-out arrays being axially displaced from each other to be partially overlapping,

adhering to said base an elongated semiconductor ribbon containing a plurality of circuit means each on a die and each containing multiple pads, the pads being in the same plane as said lead-in conductor ends,
each array of lead-in conductors being no longer than the length of each die along said axis, each die being laterally displaced and axially aligned with an array of lead-in conductors,
said dies being separated by laterally extending boundary lines,
forming electrical interconnections between an each array of lead-in conductor exposed ends and laterally displaced circuit pads of each of the axially aligned lead-in conductor arrays and circuit means, respectively,
and dividing the channel-ribbon assembly along said boundary lines to define discrete packages each containing a circuit means die with a circuit therein and an array of lead-out conductors therefor interconnected with the circuit by its connected array of lead-in conductors.

4,027,384
MICROWAVE ABSORBERS

Thomas M. Connolly, Canton, and Elno J. Luoma, Norwood, both of Mass., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

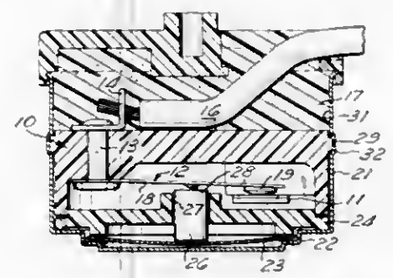
Division of Ser. No. 602,168, Aug. 5, 1975. This application Nov. 19, 1976, Ser. No. 743,430
Int. Cl.² H01S 4/00
U.S. Cl. 29—592 **4 Claims**

1. A process for fabricating a Jaumann microwave absorber of the type including a plurality of partially conductive lossy layers, separated by intermediate dielectric spacing layers all bonded together to form the absorber, which comprises, to form the lossy layers, applying to a base a film forming emulsion of pulverulent carbon, orienting and placing the pulverulent carbon on application to form a film having a homogeneity and isotropy such that average admittance values determined at a plurality of points in one degree of orientation do not differ from average values determined in another degree of orientation by more than ±0.02, bonding the lossy layer to an adjacent spacing layer having a dielectric constant of 1.03 and a loss tangent of 0.0001 by bonding means not disruptive to the pulverulent carbon conductance, orientation and film homogeneity, and maintaining a spacing layer thickness not greater than one-fourth of the wavelength at the highest frequency, such that the total thickness of the absorber is at least one-half of the wavelength at the lowest frequency of the range to be absorbed.

4,027,385
METHOD OF MANUFACTURING SEALED THERMOSTATS

Bernard S. Deubel, Mansfield, Ohio, assignor to Therm-O-Disc Incorporated, Mansfield, Ohio

Filed Jan. 26, 1976, Ser. No. 652,242
Int. Cl.² H01H 11/00
U.S. Cl. 29—622 **14 Claims**

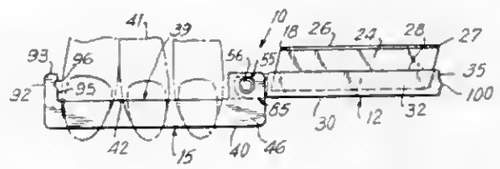


1. A method of manufacturing sealed thermal responsive devices in which said seal is maintained over a predetermined temperature range and the seal is established between a male member and a female member comprising sizing said members to provide a minimum interference fit, and assembling said male member within said female member to produce an interference fit seal, and interference during assembly being selected so that it is greater than the difference in coefficients of thermal expansion and contraction of said members times the difference in temperature between the temperature of assembly and the most adverse seal temperature within said predetermined temperature range times the linear dimension of said seal, said members also being selected so that the maximum elastic deformation within said predetermined temperature range is greater than said difference in coefficients in thermal expansion and contraction times the difference between the maximum and the minimum temperatures of said predetermined temperature range times said linear dimension.

4,027,386
CUTTING IMPLEMENT

Dominic J. Spinosa, Wantagh, and Edward R. Camillucci, Commack, both of N.Y., assignors to East/West Industries, Inc., Farmingdale, N.Y.

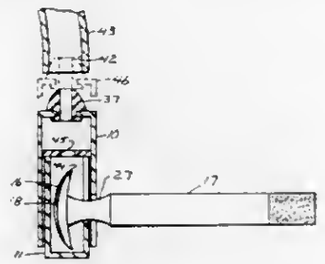
Filed Oct. 22, 1975, Ser. No. 624,718
Int. Cl.² B26B 21/10, 5/00
U.S. Cl. 30—53 **24 Claims**



1. A cutting implement, comprising:
A. supporting means including an elongated body portion,
B. an elongated blade with a cutting edge extending along one edge thereof,
C. mounting means for maintaining said blade in fixed position relative to said supporting means with an exposed portion of said blade extending beyond said supporting means the complete length of said edge and extending in a plane substantially parallel to a surface of said supporting means, said mounting means including a pair of tongues extending transversely through said blade in said supporting means,
D. handle means including an elongated body portion,
E. chamber means extending longitudinally in said handle means and adapted to contain the exposed portion of said blade in the closed position of the implement,
F. securing means pivotally connecting said supporting means to said handle means at substantially one end thereof so as to provide relative angular displacement of said supporting means relative to said handle means from a closed position in which the front surfaces of said supporting means and said handle means extend in overlapping abutting relation to each other with the exposed portion of said blade extending within said handle means, to an open position wherein the complete length of said cutting edge is exposed for use thereof with said body portion extending in a plane below said cutting edge, said securing means including a fastener extending transversely through said supporting means and said handle means, and said fastener retains the overlapping surfaces of said supporting means and said handle means under compression,
G. stopping means extending relative to said supporting means and said handle means for limiting the travel of the supporting means relative to the handle means from its closed to open position,
H. locking means associated with said handle means and said supporting means to retain the latter in a releasable fixed position in the closed position of the implement, and
I. gripping means on said handle means to permit a firm grip by the user, said gripping means including a recess having

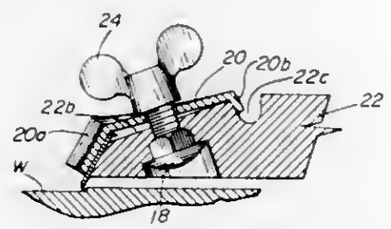
a front surface extending in a substantially horizontal plane relative to said cutting edge with spaced apart end walls to receive the fingers of the user therebetween, such that a firm grip of the cutting implement is obtainable during use thereof.

4,027,387
RAZOR BLADE CONDITIONING DEVICE
Harry Garfield Kellis, Rte. 5, Box 500, Ocala, Fla. 32670
Filed Oct. 16, 1975, Ser. No. 622,869
Int. Cl.² A45D *27/46*
U.S. Cl. 30—90 **1 Claim**



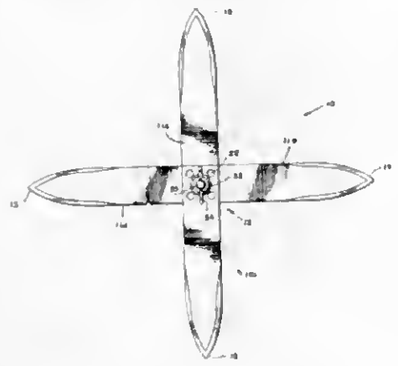
1. A device for use in conditioning a used safety razor blade for further use comprising a receptacle having side walls which are spaced apart and define a compartment with an open top portion that is arranged to accomodate reception of a blade containing head of a safety razor into the compartment, a component manipulatable to a covering position with respect to the open top portion of the receptacle and having a chamber for receiving a pressurized fluid, said component being arranged to telescopically fit onto said receptacle and having depending side walls that lap the side walls of the receptacle in said covering position, and means for coupling a household water faucet outlet to the chamber which is mounted on the component and arranged to define a fluid inlet to the chamber; said component having fluid distributor means which overlies the open top portion and separates the compartment and chamber in the covering position for the components, said distributor means having at least one passage for the discharge of fluid from the chamber into the compartment, and one of the side walls of said receptacle having an upwardly opening slot that is arranged to receive the neck of the safety razor when the head thereof is received in said compartment.

4,027,388
SCRAPER
Arthur T. Fletcher, Bristol, Conn., assignor to The Fletcher-Terry Company, Farmington, Conn.
Filed Oct. 14, 1975, Ser. No. 621,946
Int. Cl.² A47L *13/08*
U.S. Cl. 30—171 **1 Claim**



1. A scraper comprising a generally rectangular flat blade having at last two sharpened and rolled or burnished scraping edges defined along the opposed rectilinear longer sides, means for retaining said blade in an arcuate stressed configuration with one of said edges exposed and having an intermediate segment adapted to contact a flat surface to be scraped before the blades end portions, said blade retaining means including an elongated handle with a concave blade receiving receptacle at one end said receptacle having a relieved portion to accommodate the edge opposite said exposed edge, a clamping member of generally U-shaped configuration and defining a convex surface defined on the inner face of one leg of the U for engaging said blade, and an upper marginal portion defined by the web of the U, and the other leg of the U received in a locating groove defined in the handle, and a screw fastener extending through aligned openings in said clamping member and said handle to clamp said blade in said arcuate configuration, said blade being oriented at an obtuse angle with respect to the handle axis.

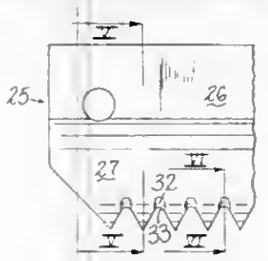
4,027,389
MULTIPLE BLADE FOLDABLE THROWING KNIFE
Maxwell G. Atchisson, 55 Old Yellow Springs Road, Apt. H, Fairborn, Ohio 45324
Filed May 24, 1976, Ser. No. 689,577
Int. Cl.² B26B *1/04;* **A63B** *65/00*
U.S. Cl. 30—303 **6 Claims**



1. A multiple blade foldable throwing knife comprising:
a plurality of blades, each of said blades having a pointed distal end and a proximal end;
means interconnecting the proximal ends of each of said blades to selectably permit said blades to pivot about an axis; and
complementary engaging means at the proximal ends of each said blade, said engaging means being operative to retain said blades in either a folded position, wherein all said blades are stacked on each other, or in a throwing position, wherein said blades maintain a predetermined angular spacing in radial relation about said interconnecting means;
said engaging means comprising a plurality of projections extending outwardly from the proximal end of each blade on a first side thereof;
a plurality of recesses extending inwardly into each said proximal end on a second side thereof; and
said plural projections and plural recesses being of mutually complementary shape and location so that said projections removably enter into said recesses to retain said blades in either of said folded position and said throwing position.

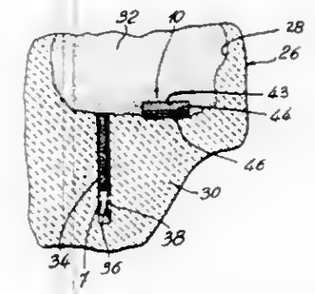
4,027,390
SAW BLADE
Leo J. Kendzior, Meriden, Conn., assignor to Jarvis Products Corporation, Middletown, Conn.
Continuation-in-part of Ser. No. 520,056, Nov. 1, 1974, abandoned. This application Feb. 17, 1976, Ser. No. 658,282
Int. Cl.² B26B *9/02;* **B27B** *23/00*
U.S. Cl. 30—355 **3 Claims**

1. A straight saw blade adapted for reciprocation without tension in a carcass splitting saw, comprising a back portion having a back edge and an integral transversely tapering portion integral with the back portion and having a cutting edge parallel to the back edge, the back portion having a substantially uniform thickness, the tapering portion having its greatest thickness at its line of junction with the back portion and being hollow ground with its least thickness along a line



slightly spaced from its cutting edge, saw teeth being formed in said cutting edge, each said tooth being adapted to remove a portion of the material being sawed, and the width of the back portion being no greater than about half of the distance from the back edge to the base of the teeth.

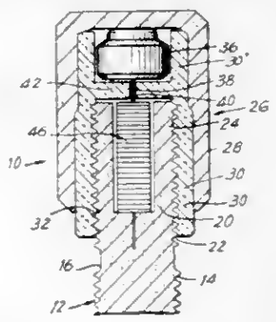
4,027,391
POSITIVE IDENTIFICATION METHOD AND STRUCTURE
Philip Lawrence Samis, 35 Brynmor Avenue, Montreal West, Quebec, Canada
Filed Mar. 21, 1975, Ser. No. 560,616
Claims priority, application United Kingdom, Mar. 26, 1974, 13353/74
Int. Cl.² A61C *19/00*
U.S. Cl. 32—1 **27 Claims**



1. An identification means adapted for use in living bodies and more particularly to be embedded in a cavity in a highly mineralized portion of the body comprising a carrier made up of a substrate of relatively hard inert material having a high melting point at least as high as the highly mineralized portion of the body into which it is to be embedded; an etchable layer of an inert material on said substrate and including identifying intelligence etched thereon, said identification means including locating means.

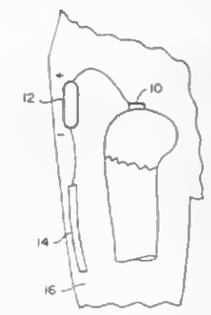
4,027,392
ENDOSTEAL BIONIC TOOTH AND IMPLANTATION METHOD
Philip Nicholas Sawyer, and Boguslaw Stanczewski, both of Brooklyn, N.Y., assignors to Interface Biomedical Laboratories Corporation, Brooklyn, N.Y.
Filed May 10, 1976, Ser. No. 684,767
Int. Cl.² A61C *13/00*
U.S. Cl. 32—10 A **18 Claims**

1. An endosteal bionic tooth comprising:
an implant socket portion for implantation into bone, a crown portion attached to said lower socket portion and extending therefrom and means for supplying energy to



said implant socket portion for inducing the formation of callus and for preventing infection.

4,027,393
METHOD OF IN VIVO STERILIZATION OF SURGICAL IMPLANTABLES
Franklin H. Ellis, and Stephen W. Andrews, both of Rochester, N.Y., assignors to Sybron Corporation, Rochester, N.Y.
Filed Sept. 19, 1975, Ser. No. 614,911
Int. Cl.² A61C *13/00*
U.S. Cl. 32—10 A **2 Claims**

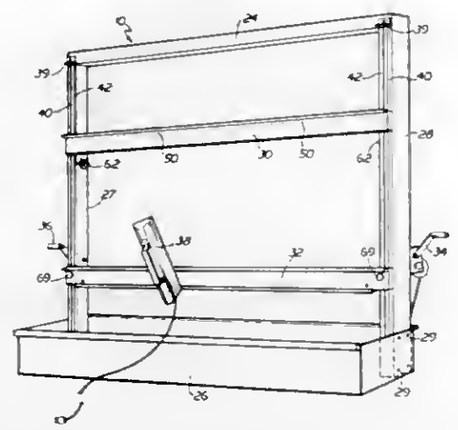


1. A method to sterilize exposed root canals of teeth during endodontic procedures, comprising of the steps of:
inserting a silver post into the root canal to the tip of said root canal; and
applying positive current to said post at a level of approximately one-half to two microamperes for a time sufficient to affect sterilization.

4,027,394
DRAPERY LENGTH MARKING DEVICE
Herbert Morantz, 1444 Wistar Drive, Wyncote, Pa. 19095, and Stanley Morantz, 425 Larkspur St., Philadelphia, Pa. 19116
Filed Nov. 12, 1975, Ser. No. 631,019
Int. Cl.² B43L *13/00*
U.S. Cl. 33—18 R **10 Claims**

1. A drapery length marking device comprising a pair of uprights extending upwardly from a base, a ceiling bar and drapery length indicator adjustably secured to said uprights, means to move said drapery length indicator vertically with reference to said uprights, second means to move said ceiling bar vertically with reference to said uprights, with upward movement of said ceiling bar being limited by a stop adjacent the top of at least one of said uprights, said ceiling bar having a plurality of pin means to receive and hold a drapery, said drapery length indicator including a projecting outer marking ledge that is generally horizontally disposed, said drapery length indicator further possessing holding means adjustable at each end of said drapery length indicator adjacent said uprights, said holding means adjustably securing said drapery length indicator to said uprights to permit said drapery length

indicator to be held in a desired position for purposes of marking a lower edge of a drapery corresponding to an area to be covered by the completed drapery whereby said drapery passes about the marking ledge of said drapery length indicator and a marking device for marking a line on said drapery by abutment of the marking device on said drapery and said marking ledge as the marking device is moved across the drapery.



4,027,395

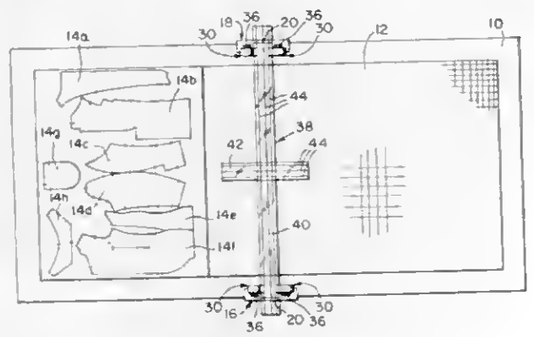
APPARATUS FOR ALIGNMENT OF PLAID FABRIC ON A CUTTING TABLE

Peter J. Vlahakis, 802 W. 181st St., New York, N.Y. 10033

Continuation-in-part of Ser. No. 602,459, Aug. 6, 1975, abandoned. This application Aug. 30, 1976, Ser. No. 718,542

Int. Cl.² B43L *5/02*

U.S. Cl. 33—80 **5 Claims**



1. Apparatus for the alignment of plaid fabric on a cutting table comprising in combination:

a pair of datum elements detachably fastenable to opposed sides of a cutting table, each of said datum elements having a transverse recess therein defined by parallel vertical faces thereof, and each of said datum elements having first and second upstanding guide members one on either side of said recess and respective slide clamp members carried slidably on said guide members, said slide clamp members being positionable vertically along said guide members and clampable at a desired elevation;

and a fabric alignment member including a first elongated element made of rigid transparent material and dimensioned to slide snugly within the opposed recesses of said pair of datum elements and a second elongated element made of rigid transparent material connected operably to said first elongated element and extending perpendicularly thereof, said first elongated element being provided with a plurality of guide lines extending lengthwise thereof and parallel with the longitudinal side edges thereof, and said second elongated element being provided with a plurality of guide lines extending lengthwise thereof and parallel with the side edges thereof;

whereby upon fastening of said pair of datum elements to the opposed sides of a cutting table and positioning said first elongated element of said fabric alignment member within the recesses of said datum elements and the fabric alignment member over a plaid fabric the said side clamp members are lowerable so as to clamp the fabric alignment member and the underlying fabric in place in proper alignment for cutting of the plaid fabric.

4,027,396

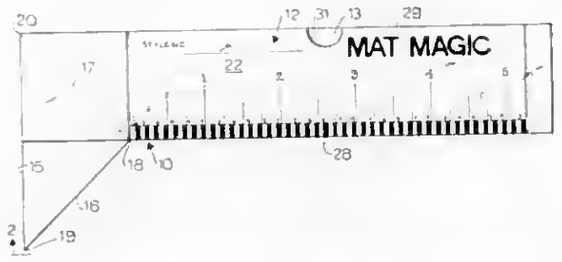
MARKING GAUGE FOR MEASURING AND MARKING FRENCH MATS

Donald Cameron Pierce, 59 Reposa Vista, Novato, Calif. 94947

Filed Apr. 1, 1976, Ser. No. 672,795

Int. Cl.² B43L *7/00*

U.S. Cl. 33—96 **7 Claims**



1. A marking gauge for measuring and marking desired distances on such things as French mats having a rectangular cutout area with right-angle corners, where it is desired to surround said cutout area with ruled lines and the like, comprising:

a sheet shaped to provide a right-angle vertex for engagement with a said right-angle corner, in order to align said gauge,

an elongated member secured to and overlying said sheet, having a long rectilinear edge passing through said vertex and bisecting said ring angle,

said elongated member including a lower portion overlying and secured to said sheet, an upper transparent face member, and spacing means for joining said lower portion to said face member and for providing therewith a pocket open along said rectilinear edge and closed at each end, one end being located precisely directly above said vertex, and

a marker scale in said pocket and having index markings along said rectilinear edge.

4,027,397

MOBILE TRACK SURVEYING APPARATUS

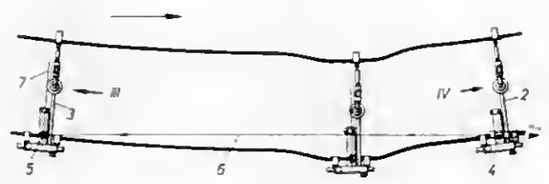
Josef Theurer, and Klaus Riessberger, both of Vienna, Austria, assignors to Franz Plasser Bahnbaumaschinen-Industrie-Gesellschaft m.b.H., Vienna, Austria

Filed Oct. 24, 1975, Ser. No. 625,486

Claims priority, application Austria, Dec. 9, 1974, 9831/74

Int. Cl.² E01B *35/08*

U.S. Cl. 33—287 **12 Claims**



1. A mobile track surveying apparatus comprising

1. only two bogies, the bogies being spaced apart along the track elongation and mounted on rollers for mobility on the track, each bogie including a vertically adjustable carrier plate,

2. means for measuring the grade and means for measuring the lateral alignment of the track mounted on the carrier plates, the track grade measuring means and alignment measuring means including

a. a theodolite mounted on the carrier plate of one of the bogies and

b. a target mounted on the carrier plate of the other bogie, the theodolite and target defining an optical reference line determining the grade and the alignment of the track, and

3. means for measuring the gage and means for measuring the superclevation of the track mounted on the bogies.

4,027,398

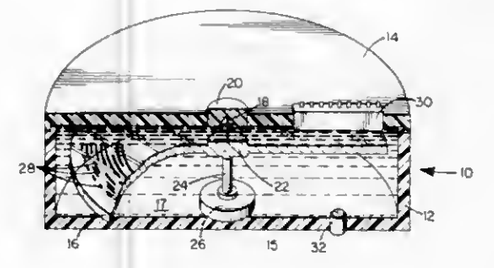
SINGLE PIVOT REMOTE READING COMPASS

John T. Fowler, Winthrop, Mass., and Donald R. Furey, Metairie, La., assignors to The Laitram Corporation, Harahan, La.

Filed June 17, 1975, Ser. No. 587,720

Int. Cl.² G01C *17/26*

U.S. Cl. 33—363 K **11 Claims**



1. A remote reading magnetic compass comprising:

a housing filled with a damping liquid;

a rotatable compass disc assembly within said housing including:

a disc having coded representations of compass headings provided on a surface thereof and buoyant in said damping liquid;

a single pivot bearing coupling said disc to an upper portion of said housing and providing rotation of said disc about a normally vertical axis; and

magnet means disposed below said disc and spaced therefrom and affixed to said disc for rotation therewith;

said rotatable assembly being buoyant with respect to said damping liquid and supported by said single pivot bearing at a level in said dampling liquid below the normal level of buoyancy and having a center of gravity below the center of buoyancy to maintain said compass disc in intended horizontal dispostion;

said single pivot bearing being constructed to permit tilting of said housing with respect to a horizontal axis by a selected amount; and

means in said housing for photoelectrically sensing the coded representations on said compass disc to provide electrical output signals representative of compass heading.

4,027,399

POSITIONAL SENSING

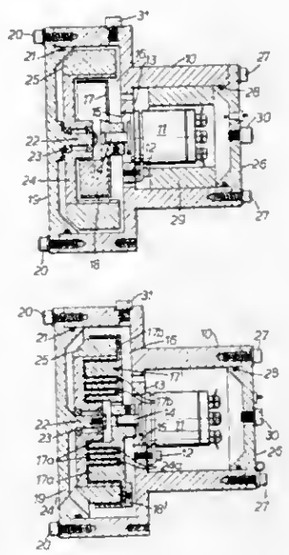
Robert James Armstrong, and Boyd Stanley Cook, both of Bracknell, England, assignors to BP Trading Limited, London, England

Filed Jan. 7, 1976, Ser. No. 646,985

Claims priority, application United Kingdom, Jan. 27, 1975, 3494/75; Apr. 9, 1975, 14513/75

Int. Cl.² G01C *9/06*

U.S. Cl. 33—366 **17 Claims**



1. An angular positional sensor comprising:

a. a housing;

b. a rotary sensing device, the rotary sensing device having a freely rotatable shaft and being mounted in the housing, said sensing device being operative to produce a signal representative of the relative angular movement between the device and said shaft;

c. a pendulum, the pendulum being mounted on the shaft of the rotary sensing device in the housing and having low inertia;

d. a balanced member, the balanced member having high inertia relative to said pendulum inertia and being rotatably mounted within the housing adjacent the pendulum;

e. a liquid, the liquid being contained in at least the part of the housing containing the pendulum and the balanced member to provide a viscous coupling between the pendulum and the balanced member, the arrangement being such, that in use, angular movement of the housing about the longitudinal axis of the shaft causes movement of the rotary sensing device relative to the shaft which is retained stationary by the pendulum which in turn is damped by the balanced member, whereby a signal representative of such angular movement is produced by the rotary sensing device.

4,027,400

FLUID REMOVAL IN FOOD PROCESSING, METHOD AND APPARATUS

David R. Erickson, Downers Grove, Ill., assignor to Swift and Company Limited, Chicago, Ill.

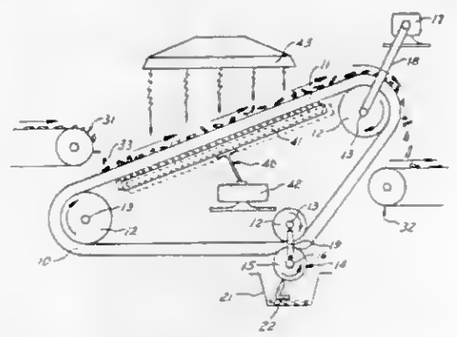
Filed Jan. 6, 1975, Ser. No. 538,564

Int. Cl.² F26B *7/00*

U.S. Cl. 34—17 **12 Claims**

1. An improved method for removing fluid from commercially processed food items, comprising the steps of: maintaining a substantially continuous stream of absorbent material along an inclined run; supplying food items having a fluid residue at a location above the lower portion of said inclined run; passing said food items along said inclined run; mechanically vibrating said inclined run from below; radiantly heating said food items from above to promote flowability of said fluid

residue while simultaneously vibrationally tumbling said food items and contacting substantially the entire surface thereof with said stream of absorbent material; transmitting the fluid



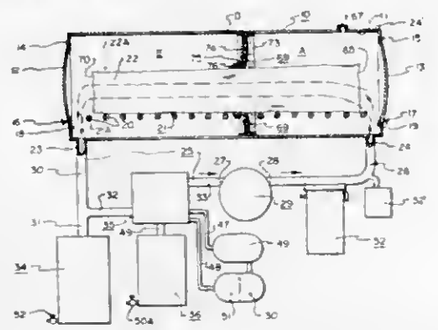
residue of increased flowability from said food items to the absorbent material; thereafter transferring said food items to a location below the upper portion of said inclined run; and removing said fluid from the absorbent material.

4,027,401

METHOD AND STRUCTURE FOR CURING AND/OR TREATING WOOD

John B. Fairbanks, Jr., 3927 S. 3030 East, Salt Lake City, Utah 84111

Filed June 23, 1975, Ser. No. 589,069
Int. Cl.² F26B *5/04*
U.S. Cl. 34—16.5 **20 Claims**



19. A process for during wood including the steps of: vacuum-pulling a fluid through a provided wood item in the direction of from a small pore cross-section to a large pore cross-section thereof; and collecting said fluid and any wood moistures carried thereby.

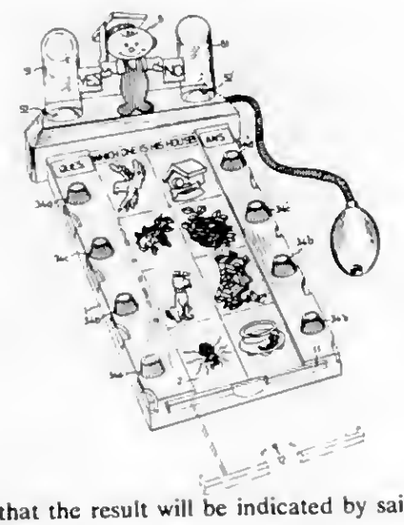
4,027,402

NOVEL EDUCATIONAL TOY

Hsing-ching Liu, and Lan-dih Liu, both of 3F, No. 213, Chung Ching North Rd., Sec. 4, Taipei, China /Taiwan

Filed Apr. 2, 1976, Ser. No. 673,085
Int. Cl.² G09B *3/02*
U.S. Cl. 35—9 R **8 Claims**

1. An educational toy comprising a case, a plurality of changeable question and answer combination cards having notches in various depths from both longitudinal sides thereof, a series of question setting means with respective releasable fixing means, a series of answer setting means with respective releasable fixing means, an indication mechanism to indicate either an affirmative or a negative answer is made, a pair of ropes extending along the longitudinal direction between a card and said question setting means as well as said answer setting means, respectively, and connecting to said indication mechanism, thereby the said ropes will be separately pressed by said question setting means and answer setting against both said notched sides of said card to determine the answer either affirmative or negative in accordance with corresponding depths of said notches pressed against from said both setting



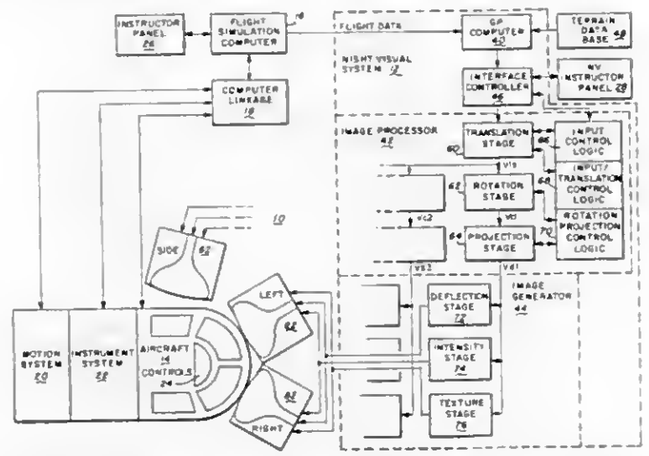
means, so that the result will be indicated by said indication mechanism.

4,027,403

REAL-TIME SIMULATION OF POINT SYSTEM HAVING MULTIDIRECTIONAL POINTS AS VIEWED BY A MOVING OBSERVER

David Raymond Marsh, Los Altos, and Raymond C. Osofsky, Santa Clara, both of Calif., assignors to The Singer Company, Binghamton, N.Y.

Filed Mar. 12, 1975, Ser. No. 557,714
Int. Cl.² G09B *9/08;* **B64G** *7/00;* **H04N** *7/18*
U.S. Cl. 35—10.2 **21 Claims**



1. A data processor responsive to observer position and orientation data and to object point data to simulate an image display of the visual relationship between an observer in a moving coordinate system and the object points in at least one object coordinate system;

at least one object data source for providing object point digital position data, and directional data for object points having characteristics which vary as a function of the direction in which the object is viewed;

computer means for receiving object point data and adapted to receive observer position and orientation data, responsive to the received data for providing a predetermined image digital data format having dedicated code bits for identifying classes of data;

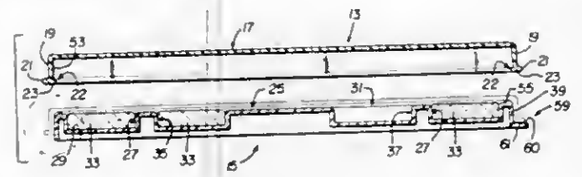
a hard-wired image circuit which receives the image data format and is responsive to the code bits for processing the data, and responsive to the observer position data for translating the object point data into the observer coordinate system, and responsive to the orientation data for rotating the object point data to accommodate the observer's axis of viewing, and which is adapted to forward the object point data to the image display device for providing a scene of the object point data in the observer perspective; and

a hard-wired direction circuit which compares the observer position data with the object point data of each object point for determining the specific direction of the observer position relative to each object point, and which selects specific directional data for each object point based on the determined direction.

4,027,404

PAINT SET AND TEACHING AID

Robert D. Brant, Roseville, Mich., assignor to Palmer Paint Products, Inc., Troy, Mich.

Filed May 20, 1976, Ser. No. 688,196
Int. Cl.² G09B *11/10*
U.S. Cl. 35—28.5 **7 Claims**

1. A color pigment paint teaching set comprising a base including a generally flat, circular central portion having a circular array of equi-angularly spaced, flat-bottomed recesses adapted to receive replaceable compressed pads containing pigments, said circular array of recesses normally receiving pads of progressively different colors in the color spectrum, said base being continuously bounded by an integral circumferential flange extending rearwardly from the plane of said central portion and having a plurality of substantially flat, individual tab members generally parallel to the plane of said central portion, integral with said flange and extending radially outward therefrom; and a resiliently firm cover having a transparent, circular central window portion rotatively overlaying said central portion so as to be parallel to but displaced forwardly thereof, said cover further having a rearwardly extending cylindrical flange adapted to be slideably received over said base flange and to be frictionally engaged thereby, said cylindrical flange including a relatively flat annular lip portion disposed adjacent the end thereof, said lip portion being substantially parallel to said window portion and being adapted to be slideably disposed against said tab members for rotation thereover, the cylindrical flange and annular lip portion of said cover cooperably engaging the rearwardly extending flange and tab members of said base such that said cover is normally retainably received over said base for rotation with respect thereto while simultaneously being frictionally retained thereover but such that said cover may be separated from said base and removed therefrom by the simultaneous application of manual force to said lip portion in a first direction generally toward said window portion and to at least one of said tab members in the opposite direction so as to overcome the frictional attachment and effect separation, said window portion of said cover including predetermined sets of distinctively and differently lined visible selector indicia viewable from above in juxtaposition relative to the differently colored pads for aiding in selecting, combining and balancing the colors of the spectrum.

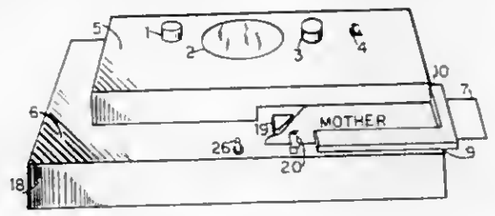
4,027,405

RECORD-REPRODUCE DEVICE FOR FLASH CARDS

Alden Schloss, P.O. Box 4862, North Hollywood, Calif. 91607

Filed Jan. 26, 1976, Ser. No. 652,091
Int. Cl.² G09B *5/04;* **G11B** *21/02, 25/04*
U.S. Cl. 35—35 C **7 Claims**

1. A recording-reproducing device for flash cards, utilizing a magnetic head, driven reciprocally on rods over magnetic tape, which is affixed to insertable-removable stationary cards, all of which are conventional and known, wherein the improvement comprises; a recording-reproducing device utilizing magnetic tape, affixed to insertable-removable means, which remain stationary during record and reproduce operation; the combination of a record-reproduce magnetic head, in bracket mounted slideably on parallel rods, said rods being also set parallel to, above and in alignment with the magnetic tape on insertable-removable means; guide, guide-stop and spring-holder, guide and allow entrance of insertable means to proper position in the device, and maintain such position; mechanical drive means to provide uniform head motion reciprocally on said rods, consists of a connecting rod, pinned at one end to the magnetic head bracket, said pin allowing rotational freedom of said connecting rod in a plane parallel to the plane of the magnetic tape; said connecting rod pinned at its other end in a socket affixed to a movable, endless belt, said other pin allowing rotational freedom of the rod in same plane as above mentioned; said movable, endless belt girds two pulleys, one an idler pulley, free rotationally on its axis; the



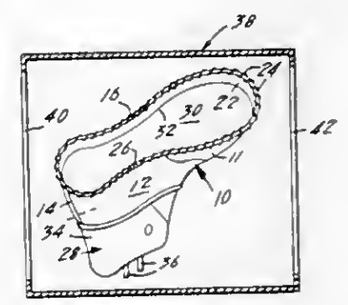
other wheel pulley is attached axially coincident to a wheel, edged with relatively frictonal material, said wheel being free to rotate on its axis; a spring-mounted motor, bearing its shaft with sufficient normal force against the wheel edge, said motor shaft being essentially parallel to the axis of the wheel, imparts rotational motion to said wheel; switch means with attached actuating arm, in position to come in contact with the socket on belt, said switch means thus acting to control the motor; a momentary switch electrically in parallel with above switch means, which when manually depressed, starts said motor, a third switch with actuating arm attached, positioned to come in contact with connecting rod on its return run, serves to disconnect said head from circuit; a resilient undersupport, mounted in position to correspond to magnetic tape on inserted, insertable-removable means, said insertable-removable means flexibly holding the magnetic tape; means to provide proper longitudinal tension to magnetic tape and said rods positioned at such height above magnetic tape, as to have magnetic head depress magnetic tape into resilient undersupport, as it passes over the magnetic tape.

4,027,406

METHOD OF LASTING SHOE UPPERS TO A LAST AND LASTED SHOE UPPERS AND ARTICLES OF FOOTWEAR PRODUCED THEREBY

Michael Salvatore, 68 Birch Lane, Greenwich, Conn. 06830

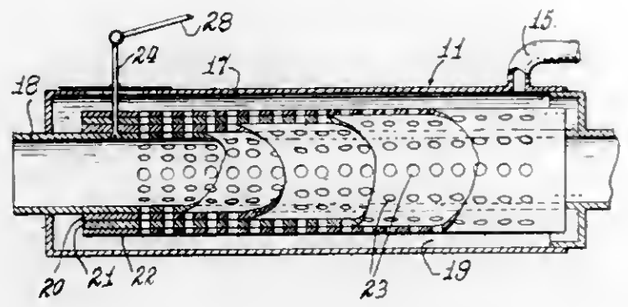
Filed May 13, 1976, Ser. No. 686,126
Int. Cl.² A43D *21/00;* **A43B** *00/00*
U.S. Cl. 36—83 **35 Claims**



1. A method of lasting a shoe upper having a lasting margin, to a last, which comprises:

attaching a lasting piece made of shrinkable polymeric material to the shoe upper lasting margin,
shrinking the polymeric material, and
utilizing the shrinkage of the polymeric material to last the shoe upper to the last.

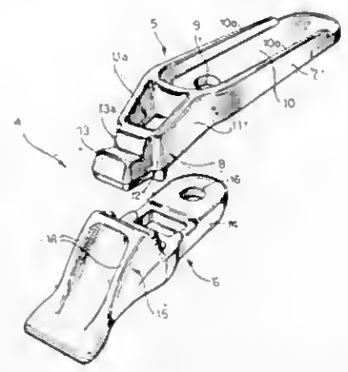
4,027,407
JET FLOW ALTERNATOR
Sandor G. Kiss, 236 E. Sunset Ave., Lombard, Ill. 60148
Filed Nov. 24, 1975, Ser. No. 634,550
Int. Cl.² E02F *3/92*; **F04F** *5/00*, *5/42*; **B63H** *11/00*
U.S. Cl. 37—61 **8 Claims**



1. A jet flow alternator for directing the flow of a fluid substance in a select direction comprising, in combination, an outer cylindrical shell, a pipe of lesser diameter than said shell extending axially through said shell and through which a substance flows, means at the ends of said shell closing the space between the shell and pipe to provide a cylindrical chamber between them, a plurality of superposed tubes mounted around said pipe, said tubes being shiftable with respect to each other and said pipe, a plurality of circumferentially and axially spaced apertures in said tubes and pipe, said apertures being aligned normally to provide fluid passageways, means to deliver pressurized fluid of greater pressure than in said pipe into said chamber for passage through said passageways into the interior of the pipe, and means to shift the tubes relative to the pipe and to each other to offset the apertures in the tubes with respect to the apertures in the pipe to direct the pressurized fluid entering the pipe through said passageways towards a selected end of the alternator.

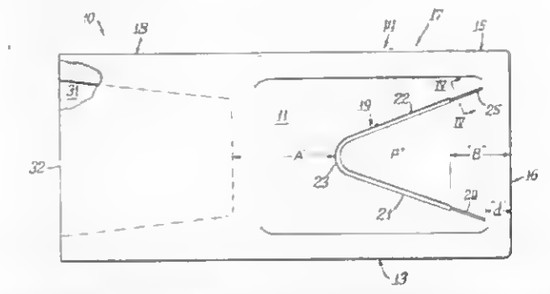
4,027,408
DIGGER TEETH WITH INTERLOCKING TOOTH ELEMENTS
Ferdinando Ramella, Via La Salle 72; Pier Vincenzo Ramella, and Arnaldo Ramella, both of Via Generale Perotti 102, all of Grugliasco, Turin, Italy
Filed Jan. 21, 1976, Ser. No. 651,319
Claims priority, application Italy, Jan. 28, 1975, 67195/75
Int. Cl.² E02F *9/28*
U.S. Cl. 37—141 T **3 Claims**

1. A tooth for the scoop of an earth-moving machine, to be assembled onto the free edge of the bottom wall of said scoop, said tooth comprising:
a first tooth element having,
an elongate portion shaped to fit onto one face of said bottom wall of said scoop, and
a shaped projecting portion which extends forwardly of said free edge of said bottom wall of said scoop when said first tooth element is fitted thereto,
a second tooth element having,
an elongate portion shaped to fit onto the other face of said bottom wall of said scoop directly opposite said elongate portion of said first tooth element, and
an enlarged wedge-shaped projecting portion, said wedge-shaped projecting portion extending forwardly from the free edge of said bottom wall when said second tooth element is mounted thereon, said wedge-shaped projecting portion of said second tooth element having a rear surface and two inclined surfaces which diverge rearwardly to said rear surface,
means defining an aperture in said rear surface, said aperture communicating with an interior cavity within said wedge-shaped projecting portion,
one of said two inclined surfaces of said wedge-shaped projecting portion being generally continuous with that



surface of said elongate portion of said second element which is remote from said bottom wall of the scoop upon assembly of the tooth thereto,
the edge of said aperture in said rear surface of said wedge-shaped projecting portion remote from said elongate portion of said second element being undercut to form a lip under which engages the end of said shaped projecting portion of said first tooth element, and
means defining a transverse groove in said end of said shaped projecting portion of said first tooth element, said transverse groove receiving said lip upon assembly of said two tooth elements whereby said first and second tooth elements are interengaged and locked together to resist relative separating movement in a direction transverse the length of said elongate portions of said first and second tooth elements.

4,027,409
GROUND ENGAGING ELEMENT HAVING A CONTROLLED CUTTING EDGE
Visvaldis A. Stepe, Willow Springs, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.
Filed July 2, 1976, Ser. No. 702,170
Int. Cl.² E02F *9/28*
U.S. Cl. 37—142 R **11 Claims**

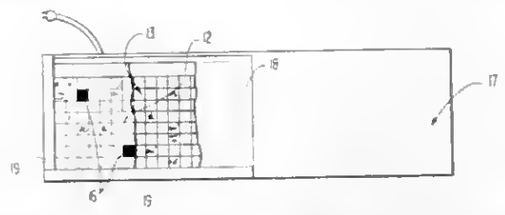


1. A ground engaging element having first and second opposed surfaces, first and second edges, a forward end portion, a middle portion and a rearward end portion, said first and second surfaces converging from the rearward toward the forward portion to form a relatively sharp forward edge for penetrating the earth, said middle portion having at least one slot extending through the element from the first to the second surfaces and extending along the middle portion, said slot being of general "U" configuration having leg portions of the slot spaced from the first and second edge portions and extending outwardly from a curvilinear middle portion of the slot, said curvilinear portion being positioned a preselected distance from the rearward end portion and said leg portions terminating a preselected distance from the forward edge for controlled breakaway of a central portion of the element in response to forces subjected on the element after the forward end portion has been worn away a preselected amount.

4,027,410
PLANT STAKE
Philip T. Wheeler, Dewitt, Mich., assignor to The John Henry Company, Lansing, Mich.
Filed Mar. 18, 1976, Ser. No. 668,212
Int. Cl.² G09F *3/18*
U.S. Cl. 40—10 C **5 Claims**

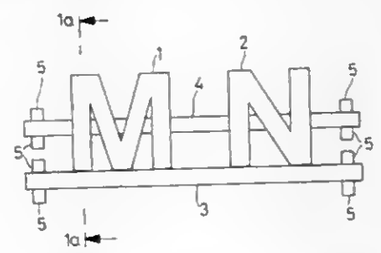
1. An identifying stake for insertion into a soil mixture and which is formable from a thin, flexible material yet sufficiently rigid to permit insertion and also capable of reisiting removal from the soil, said stake comprising:
a generally planar body member;
a planar shaft-like member having a width substantially greater than its thickness, integral with said body member and extending outwardly therefrom, said body member having a rectangular shape and a transverse dimension substantially greater than the transverse dimension of said shaft-like member;
a generally triangular-shaped, planar head portion integral with said shaft-like member and extending outwardly therefrom opposite said body member, the base of said head portion being dimensioned greater than the transverse dimension of said shaft-like member to thereby define a barb, said head portion, said body member and said shaft-like member being generally curved in cross-section to thereby increase the rigidity of said stake; and
a plurality of indentations extending longitudinally of said head portion, said shaft-like member and said body member for at least a portion thereof, said generally planar body member further defining a pair of opposed inwardly directed notches in the lateral edges thereof spaced from the end of said planar member opposite said head portion, said notches providing convenient points for the securement of string and the like.

4,027,411
MICROFICHE MARKING SYSTEM
Joseph Foldessy, Jr., 18430 NW. 38 Court, Opa Locka, Fla. 33055
Filed Feb. 19, 1976, Ser. No. 659,444
Int. Cl.² G09F *13/10*
U.S. Cl. 40—106.1 **4 Claims**



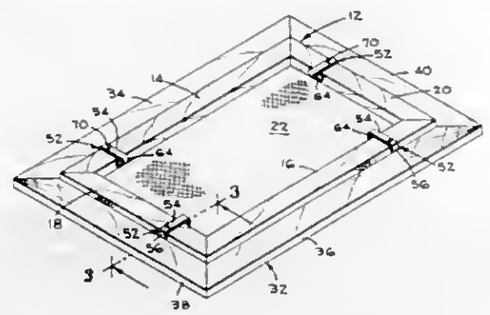
1. A microfiche marking system comprising in combination an illuminated viewer having a translucent viewing panel and a pair of right angular guide elements defining one corner of said panel, an encoded transparent coordinate grid element of rectangular shape for placement on said panel with a square corner thereof engaged with said guide elements, and a translucent microfiche element of rectangular form for placement directly on the grid element in registration therewith while a square corner of the microfiche element is engaged with the guide elements, whereby areas of the illuminated microfiche element may be accurately marked with translucent or opaque ink to indicate to a subsequent reader that certain stored data is updated, changed or deleted, the encoded indicia of the grid element being viewable through the translucent microfiche element while both elements are positioned in registration on said illuminated panel.

4,027,412
ADVERTISING LETTERING AND SUPPORT THEREFOR
Eugen Hoerner, Neuer Weg 2, D-7101 Eberstadt, Germany
Filed Aug. 11, 1975, Ser. No. 603,258
Claims priority, application Germany, Aug. 12, 1974, 2438609
Int. Cl.² G09F *7/00*
U.S. Cl. 40—125 R **5 Claims**



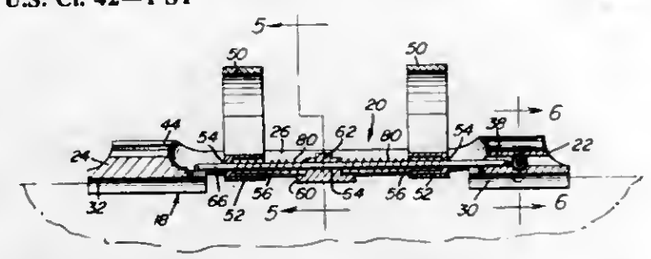
1. An advertising sign assembly comprising a horizontally extending U-shaped channel having a vertical back portion, an upper limb portion extending horizontally forwardly from said back portion and having at its forward edge a vertical marginal portion and a lower limb portion extending horizontally from said back portion a greater distance than said upper limb portion to provide a marginal portion projecting beyond said marginal portion of said upper limb portion of the channel, and a plurality of three dimentional characters mounted on and supported by said channel, said characters resting on and being secured to said projecting marginal portion of said lower limb portion of said channel and resting against and being secured to said vertical marginal portion of said upper limb portion of said channel.

4,027,413
CLIP FOR RETAINING A CANVAS STRETCHER FRAME IN A DECORATIVE PICTURE FRAME
Earl J. Moede, San Jose, Calif., assignor to McNeill Favia Co., Mountain View, Calif.
Filed June 18, 1976, Ser. No. 697,313
Int. Cl.² G09F 1/12
U.S. Cl. 40—156 9 Claims



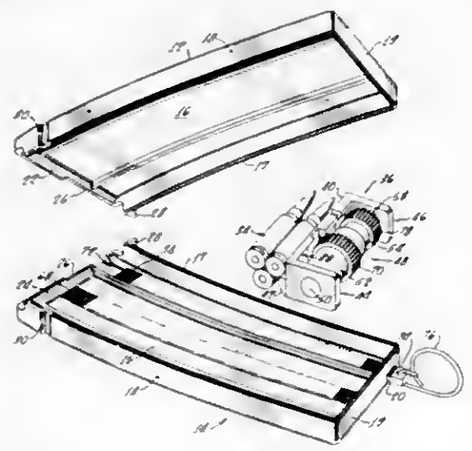
1. An article of manufacture comprising a strip of resilient material having an elongate main body, a first leg extending from one end of the body and a second leg extending from the opposite end of the body, said first leg being generally normal to said main body and having at the distal end thereof at least one point extending outward therefrom in general parallelism with said main body, the material having sufficient strength that the point is substantially immovable relative to said first leg, said second leg having a resiliently deformable portion for effecting frictional engagement with a surface of a rigid bar disposed intermediate said first and second legs, said article of manufacture affording installation of a first polygonal canvas stretcher frame into a second decorative frame which has a rabbet groove for receiving said first frame thereinto, said second frame being proportioned so that a clearance space is defined between the outer edge of said first frame and a surface of said rabbet groove which clearance space is less than the extent of said point, said first frame being formed of stretcher bars having a width greater than the distance between said first leg and said resiliently deformable portion and a thickness greater than the length of said first and second legs so that said point can be introduced into said clearance space and the article can be rotated to cause said point to be pierced into a portion of said second frame defining said rabbet groove and to bring said main body against the rear surface of said stretcher bar there to be retained by frictional engagement between said resiliently deformable portion on said second leg and an edge surface of said stretcher bar remote from said rabbet groove.

4,027,414
RIFLE SCOPE MOUNT
Thomas R. Felix, 163 Bunker Ave., Meriden, Conn. 06450
Filed Jan. 5, 1976, Ser. No. 646,588
Int. Cl.² F41G 1/38
U.S. Cl. 42—1 ST 12 Claims



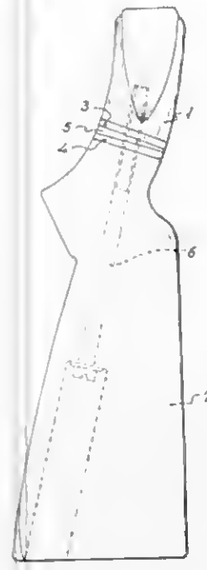
1. In combination, a scope mount including an elongated base for mounting on a gun barrel with the base extending longitudinally of said barrel, said base including opposite end portions and a longitudinally slotted mid-portion extending therebetween, a pair of scope mounting rings seatable against said base on one side thereof through which said slot opens and including outstanding mounting lug portions projecting into and slidable along said slot, said mounting lug portions including aligned bores extending therethrough longitudinally of said slot, an elongated shaft disposed in said slot, extending therealong and received through said bores, an abutment member opposing the opposite side of said base through which said slot also opens, said abutment member including an anchor lug projecting into said slot between said lug portions and having a bore formed therethrough through which said shaft is received, and resilient means connected between said abutment member and said base yieldingly biasing said abutment member in a direction extending outwardly of said opposite side of said base.

4,027,415
AMMUNITION MAGAZINE
Eugene M. Stoner, Stuart, Fla., assignor to Ares, Inc., Port Clinton, Ohio
Filed Sept. 2, 1975, Ser. No. 609,356
Int. Cl.² F41C 25/04
U.S. Cl. 42—50 6 Claims



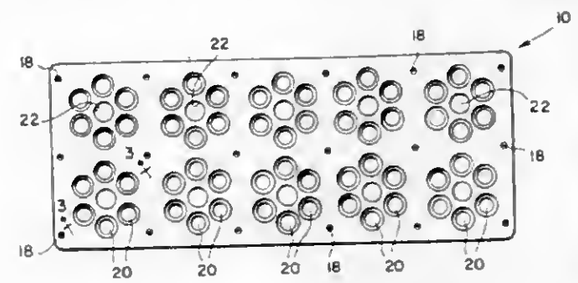
1. An ammunition magazine adapted to be pre-loaded and stored for extended periods of time comprising, in combination:
an elongated sector-shaped hollow housing having top and bottom ends and having an ammunition feed opening at the top end;
the housing having opposite side walls, and front and rear edge walls joining said side walls;
a plurality of stacked ammunition rounds substantially filling said housing, the rounds of ammunition in the stack being disposed approximately parallel to said side walls;
a gear rack extending longitudinally of the housing along the interior of one of said side walls;
an ammunition follower moveable along the interior of said housing and disposed adjacent the bottom end thereof in engagement with the stack of ammunition rounds;
a spring motor mounted on said ammunition follower for movement therewith along the interior of the housing;
said spring motor including a rotary drive gear engaged with said gear rack for urging the ammunition follower along with the ammunition toward said ammunition feed opening;
said spring motor being disposed in an operationally unstressed condition;
said spring motor including a separate rotary energizing member, and means limiting rotation of the energizing member to the direction which places the spring motor in an operationally stressed condition; and,
means manually engageable from the exterior of the housing for rotating said energizing member to energize said spring motor to an operationally stressed condition.

4,027,416
ARTICULATION DEVICE FOR GUNSTOCKS OF LONG FIREARMS
Jose Luis Alfonso Berbegal, 5-7 Oviedo St., Zaragoza, Spain
Filed Nov. 11, 1975, Ser. No. 631,179
Claims priority, application Spain, Nov. 19, 1974, 207609[U]
Int. Cl.² F41C 23/00
U.S. Cl. 42—73 9 Claims



1. Articulation device for a gunstock: said gunstock comprising an elongated body which is divided into two sections, including a first section attachable to the firearms supported by said gunstock and a second section emplaceable against the body of the user; each said section of said gunstock having a surface facing toward a cooperating surface on the other said section of said gunstock, which said cooperating surfaces are securable together for forming a unitary gunstock; said gunstock having at least first and second opposite sides;
between said gunstock sections and in engagement with the cooperating surfaces thereof is positioned a plurality of insert pieces placed one next to the other in a line, which together are of a thickness sufficient to change the length of said gunstock when said sections of said gunstock are fastened together with said insert pieces therebetween;
a first said insert piece having respective third and fourth opposite, outwardly facing sides with said third side facing toward said gunstock first section and said fourth side facing toward said gunstock second section; one of said third and fourth sides having a first peripheral rim extending thereabout and projecting therefrom and the other of said third and fourth sides having a first peripheral recess defined therein;
a second said insert piece positioned between said first insert piece and said gunstock first section; said second insert piece having a fifth side facing toward said first insert piece;
a third insert piece positioned between said first insert piece and said gunstock second section; said third insert piece having a sixth side facing toward said first insert piece;
the one of said fifth and said sixth sides facing toward said first peripheral rim having a second peripheral recess shaped and positioned to receive said first peripheral rim in tongue in groove fashion; the other of said fifth and said sixth sides facing toward said first peripheral recess having a second peripheral rim shaped and positioned to project into and be received in said first peripheral recess in tongue-in-groove fashion, thereby aligning all said insert pieces;
fastening means extending between said gunstock sections for holding same securely together.

4,027,417
CARTRIDGE LOADING TRAY
Rudolf W. Swatek, 32 Channing Drive, Ringwood, N.J. 07456
Filed Aug. 24, 1976, Ser. No. 716,991
Int. Cl.² F42B 39/06
U.S. Cl. 42—87 6 Claims



1. A cartridge loading tray for use with speed loaders comprising in combination:
an assembly including upper and lower superposed rigid boards and a layer of resilient material therebetween;
a plurality of groups of apertures formed in said upper board extending therethrough, each of said groups being arrange in a circular pattern;
a plurality of groups of apertures formed in said layer of resilient material equal in number to and in alignment with the apertures of the groups in said upper board, and the diameter of the apertures in said resilient layer being less than that of the apertures in said upper board; and
a plurality of groups of apertures formed in said lower board equal in number to and in alignment with the apertures of the groups in said upper board and intermediate resilient layer, the diameter of the apertures in said lower board being equal to those of said upper board, and the apertures in said lower board extending from the interface between same and said resilient layer and terminating therewithin.

4,027,418
RESILIENT TUBING-POWERED GIG FOR SPEARING FISH
Daniel Gerard Baldi, 36 Crestfield Drive, Brockton, Mass. 02402, and James Allen Baldi, 120 Sumner St., Newton Centre, Mass. 02159
Filed Mar. 4, 1976, Ser. No. 663,977
Int. Cl.² A01K 81/04
U.S. Cl. 43—6 1 Claim

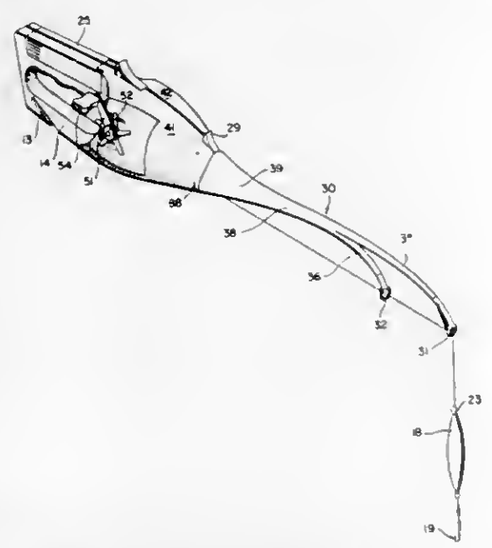
1. A fish spearing gig comprising, in combination, (1) a handgrip; (2) a spear shaft with a kerf around it, slidably mounted in a bore, longer in its vertical axis than in its horizontal axis, running longitudinally through the handgrip; (3) a pin transversing the bore near the roof of said bore in the handgrip to engage the kerf in the slidably mounted spear shaft; (4) a loop formed of resilient tubing to power the spear shaft, attached to the rearward end of the spear shaft and to the handgrip in a hole that has a slot in its wall and that transverses the handgrip under the bore; (5) an end cap with a hole transversing it so that the cut ends of the resilient tubing pass through it in opposite directions to complete the loop, said resilient tubing being stretched tight as the spear shaft is moved backward through the bore in the handgrip, causing the spear to incline upward to allow the engagement of the pin by the kerf in the spear shaft so that the spear is ready to be fired by pushing the front of the spear shaft downward, thus

disengaging the kerf from the pin and allowing the spear to move forward as the resilient tubing contracts.

4,027,419
FISHING RIG

Samuel J. Popeil, Chicago, Ill., assignor to Popeil Brothers, Inc., Chicago, Ill.

Continuation of Ser. No. 474,661, May 30, 1974, abandoned, which is a continuation of Ser. No. 269,815, July 7, 1972, abandoned. This application Oct. 20, 1975, Ser. No. 623,604
Int. Cl.² A01K 87/00
U.S. Cl. 43—18 R 33 Claims

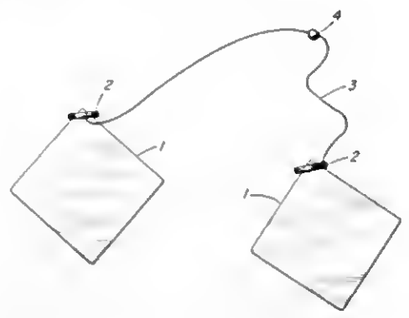


1. A fishing rig comprising, in combination,
a reel housing portion,
a fishing reel and line encased in said housing portion,
guide means for said line in the housing portion,
a handle portion at one end of said reel housing portion positioned to one side of a horizontal plane passing through said line guide means,
a rod pivotally secured by pivotal support means to one end of said reel housing portion opposite said handle portion,
engaging means spaced from said pivotal support means on said end opposite the handle portion for releasably and lockably securing said rod to said reel housing portion in an operative position,
an elongate upwardly opening tackle box within one portion of the handle which receives the fishing lure, hook, and related fish catching elements secured to the remote portion of the line,
pivotal rearwardly opening cover means for said tackle box,
fishing line guide means provided in the handle between the retracted position of the remote end of the rod and the tackle box for storing the fishing apparatus,
said rod and said housing having a substantially complementary silhouette,
whereby the rod, upon release of the engaging means, is foldable against the reel housing portion in a retracted position between its opposed ends with the rod being in close proximity to that portion of the housing and handle on the opposite side of said horizontal plane from the handle and along substantially the length of the rod.

4,027,420
AIR DROPPED BAIT DISPENSERS FOR ATTRACTING AND KILLING THE COTTON BOLL WEEVIL

Gerald H. McKibben, and Theodore B. Davich, both of Starkville, Miss., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Sept. 19, 1975, Ser. No. 615,035
Int. Cl.² A01M 1/20
U.S. Cl. 43—124 7 Claims

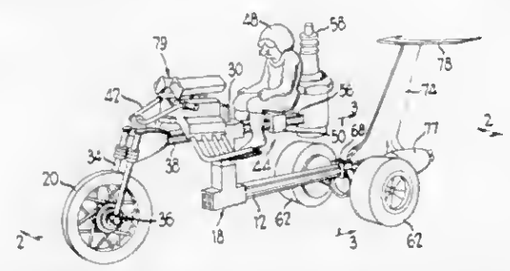


1. An apparatus capable of being dropped from an airplane used to attract and kill boll weevils comprising in combination
a. two base members;
b. means for connecting together said base members such that the maximum distance between said base members is sufficient to give the apparatus aerodynamic balance when said apparatus is dropped from an airplane;
c. a grandlure mixture serving as an attractant affixed to said means;
d. a bait means affixed to each base member, said bait means impregnated with a toxic material.

4,027,421
WHEELED VEHICLE CONSTRUCTION KIT

Robert K. Allen, Hinsdale, Ill., assignor to Marvin Glass & Associates, Chicago, Ill.

Filed Jan. 28, 1976, Ser. No. 653,262
Int. Cl.² A63H 17/00
U.S. Cl. 46—17 15 Claims

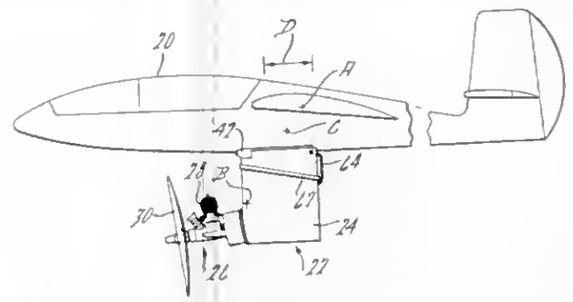


1. A construction kit in the form of a wheeled toy vehicle, comprising:
a front-to-rear elongated frame;
front wheel means removably mountable generally at the front of said frame;
rear wheel means removably mountable generally at the rear of said frame; and
a plurality of different vehicle components removably mountable at various selected positions along the frame in front of said front wheel means, between the front and rear wheel means, and behind said rear wheel means so as to permit changing the characteristic appearance of the vehicle by choice selection of the particular positions of the vehicle components.

4,027,422
MODEL AIRCRAFT PROPULSION

Lloyd A. Schroeder, 5391 Robinwood Drive, North Street, Mich. 48049

Continuation-in-part of Ser. No. 617,790, Sept. 29, 1975, Pat. No. 3,999,328, which is a continuation-in-part of Ser. No. 422,688, Dec. 7, 1973, Pat. No. 3,908,305. This application Mar. 22, 1976, Ser. No. 668,828
Int. Cl.² A63H 27/00, 33/20
U.S. Cl. 46—78 10 Claims

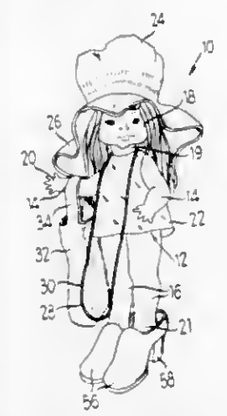


1. A power pod for an aircraft having a fuselage, propulsion means on said pod to provide forward thrust to said glider plane, coupling means for releasably securing said pod to said fuselage, means causing the release and separation of said pod from said coupling means, a parachute within the pod, a supporting cord connected to the coupling means and fuselage, and a friction member on the supporting cord defining a portion which has friction engagement with the parachute sufficient to withdraw the parachute from the pod and permit the pod and propulsion means to pull the parachute from the friction member and separate it from the glider plane.

4,027,423
DOLL WITH OVERSIZE SHOES AND SECURING MEANS THEREFOR

Gordon A. Barlow, Skokie, and Allison W. Katzman, Chicago, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed June 2, 1975, Ser. No. 583,120
Int. Cl.² A63H 3/36
U.S. Cl. 46—116 4 Claims

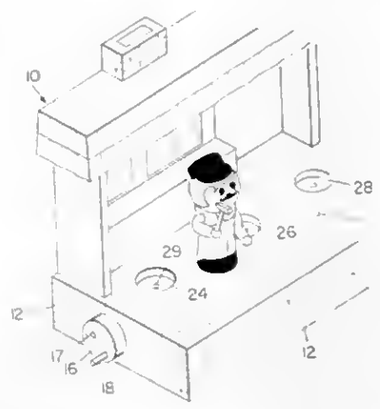


1. A user participation toy, comprising:
a figure toy in the form of a doll having a torso portion and appendages including a pair of arms, a pair of legs, a head portion mounted to the torso portion, and a pair of feet mounted at the base of said legs; and
a pair of shoes for use with and positionable on said doll, said shoes being of oversized proportions relative to the feet at the ends of said doll legs, each of said shoes including a sole, a back portion with an inwardly facing surface and means for securing said feet to the relatively larger shoes in a position spaced forwardly from said back portion and in an elevated position relative to the sole of the shoes.

4,027,424
MULTI-STRUCTURE ANIMATED AMUSEMENT DEVICE

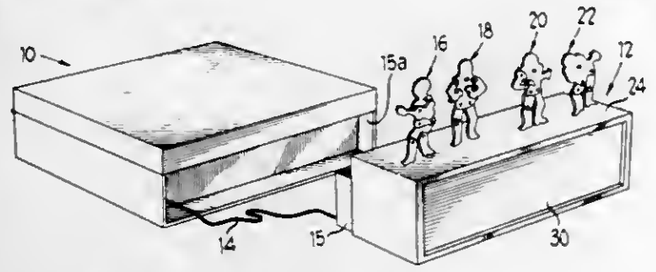
Eugene Joseph Kilroy, Jr., Inglewood; Philip Warren Crain, Redondo Beach, and James Frank Woods, Yettem, all of Calif., assignors to Mattel, Inc., Hawthorne, Calif.

Filed Jan. 26, 1976, Ser. No. 652,003
Int. Cl.² A63H 13/04
U.S. Cl. 46—116 4 Claims



1. An animated amusement device comprising in combination:
at least a first and second simulted building structure, each of said simulated building structures having a floor;
a foundation for supporting said floor, and at least one cavity recessed in said floor adapted to receive the base of an animated figurine for seating an animated figurine, said cavity including a bottom surface and a small plunger-receiving opening in said bottom surface forming a passage to the space underlying said floor adapted to receive a plunger depending from the base of such animated figurine, each said structure further including a crankshaft located under said floor, said crankshaft containing a cam means located underlying said small passage in said cavity for engaging any plunger inserted through said passage;
a first and a second crank means of substantially identical structure, each of said crank means including a crank wheel having an axis of rotation, a crank handle of small cylindrical geometry coupled to and orthogonally projecting from said wheel at a predetermined radial distance from said wheel axis, and a crank handle-receiving opening located in said wheel diametrically opposite said crank handle and at the same radial distance from said wheel axis;
said first crank wheel located on one side of said simulated structure and operatively coupled to said crankshaft for joint rotational movement therewith and said second crankwheel located on the opposite side of said simulated structure and operatively coupled to said crankshaft for joint rotational movement therewith, said wheels being mounted for rotation about the wheel axis and with the wheel axis of each being located on a common axis located a predetermined distance above the bottom of said building foundation;
whereby each one of said crank means drives said cam means to reciprocate any plunger of a figurine protruding through said cavity opening and drives the other one of said crankwheels, and whereby, when said crank wheel of said one of said structures is coupled to the crank wheel of the other of said structures by engagement of the crank handles of one crank wheel into the crank handle-receiving means in the crank wheel of the adjoining simulted structure the cam means of said second simulated structure is simultaneously driven.

4,027,425
SOUND ACTUATED FIGURE TOYS
Howard J. Morrison, 1250 Deer Park Lane, Deerfield, Ill. 60015, and Albert G. Keller, 3820 W. 59th St., Chicago, Ill. 60629
Filed Aug. 13, 1975, Ser. No. 604,425
Int. Cl.² A63H *13/00*
U.S. Cl. 46—264 **1 Claim**



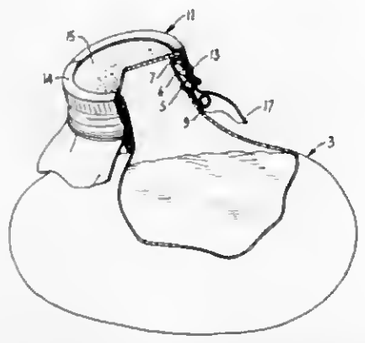
1. An amusement device, comprising:
a phonograph device including an amplifier;
a simulated dance band mechanism including a support structure mounted on said phonograph device and a plurality of articulated figure toys movably mounted on said support structure;
rotary drive means mounted in said support structure including cam means for moving said figure toys in a cyclic, generally vertical reciprocating manner relative to said support structure; and
signal responsive control means connecting said drive means and said amplifier for energizing the drive means by a signal provided from the output of said amplifier and thereby moving said figure toys in response to a predetermined amplitude signal from said amplifier, said control means including a gated controlled rectifier in series with said drive means and a low pass filter connected between the amplifier and the gate of said controlled rectifier so that the drive means is energized by only low frequency signals at said predetermined amplitude.

4,027,426
PRE-LABELLED COATED CONTAINER
Wayne A. Wallding, Horseheads, and Roy S. Arrandale, Elmira, both of N.Y., assignors to Dart Industries Inc., Los Angeles, Calif.
Division of Ser. No. 466,333, May 2, 1974, abandoned. This application Jan. 15, 1975, Ser. No. 541,903
Int. Cl.² G09F *3/10*
U.S. Cl. 40—310 **5 Claims**

1. A pre-labelled container having glass sidewalls substantially covered with an undercoating of a polymer of ethylenically unsaturated carboxylic acid;
a label of heat insulative material having a lesser areal extent than said undercoating, said label being bonded to said undercoating with an adhesive consisting of a polymer of ethylenically unsaturated carboxylic acid; and,
a continuous plastic outercoating over said label and said polymer film, said outercoating being permanently bonded to said undercoating.

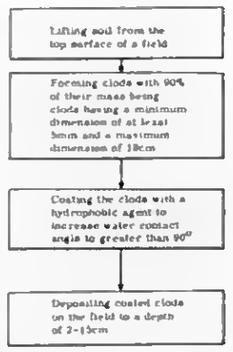
4,027,427
METHOD AND APPARATUS FOR THE PRODUCTION OF SPAWN
Benjamin B. Stoller, 1211 Fair Ave., Santa Cruz, Calif. 95061, and John C. Azzolini, Jr., 411 Chatham St., Avondale, Pa. 19311
Filed July 16, 1976, Ser. No. 706,063
Int. Cl.² A01G *1/04*
U.S. Cl. 47—1.1 **4 Claims**

2. The method of growing micro-organisms, tissues and mycelium comprising the following steps:
a. providing a threaded collar having an open top and bottom and with an inturned top rim;
b. providing a cap for said collar, said cap having a largely open top portion with an inturned lip mating with said rim;
c. providing a filter porous to air but not porus to microbes, said filter fitting between said rim and said lip;
d. providing a plastic bag, said bag being made of a transparent, heat-sterilizable moisture impervious material;
e. passing the open mouth of said bag upwardly through said collar and down over the outside thereof;



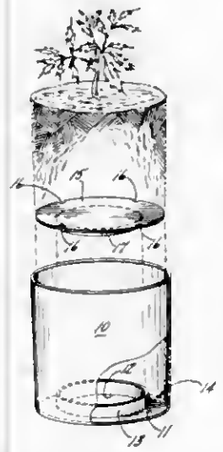
f. placing a suitable substrate in said plastic bag and placing said filter on the top rim of said collar and screwing said cap over both the filter and top of the plastic bag;
g. sterilizing and inoculating the contents of said bag;
h. growing a member selected from the group consisting of organisms, tissues and mycelia on said substrate;
i. removing said collar and said cap from said bag to provide a plastic bag containing said micro-organisms, tissues or mycelium and closing the top of said bag.

4,027,428
METHOD AND APPARATUS FOR CONSERVING SOIL WATER
Daniel I. Hillel, Rte. 1, Box 191-A, Barboursville, Va. 22923
Filed July 1, 1975, Ser. No. 592,246
Int. Cl.² A01N *7/02*
U.S. Cl. 47—58 **17 Claims**


Lifting soil from the top surface of a field
Forming clods with 90% of their mass being clods having a minimum dimension of at least 5mm and a maximum dimension of 10cm
Coating the clods with a hydrophobic agent to increase water contact angle to greater than 90°
Depositing coated clods on the field to a depth of 2-15cm

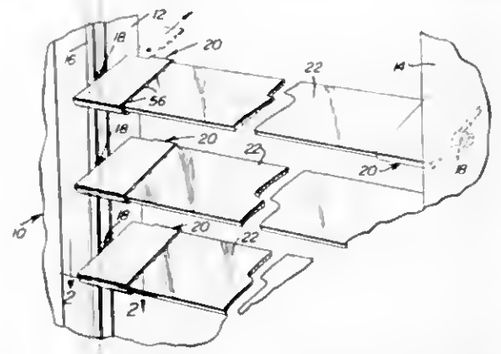
1. A process of conserving soil moisture in arid and semi-arid regions comprising the steps of:
a. forming the top soil said regions into a layer of independent clods, said layer having a depth in the range of 2 to 15 centimeters, at least 90% of the mass of said layer being clods ranging in size from 5 millimeters in minimum dimension to ten centimeters in maximum dimension;
b. coating the exposed grain surfaces of each clod with a hydrophobic agent to increase the contact angle of water on the grain surface to an angle greater than 90°.

4,027,429
PLASTIC STARTER POT
Walter L. Georgi, 427 E. Judd St., Woodstock, Ill. 60098
Filed Mar. 11, 1976, Ser. No. 666,008
Int. Cl.² A01G *9/10*
U.S. Cl. 47—73 **5 Claims**



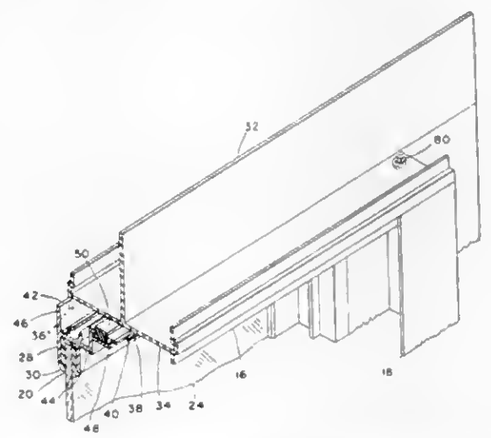
1. A starter pot for plants comprising the combination of
a pot having an aperture in the bottom wall, said aperture being spaced from the side walls of the pot and having an upturned lip around the periphery of the aperture so as to form an annular water reservoir space at the bottom of the pot,
means to prevent water from passing through said aperture comprising
bottom member covering said aperture and said reservoir space and detachable from the pot so that said bottom member can be pushed upwardly through the pot to remove a rooted plant therefrom without disturbing the soil in which the plant is rooted, said bottom member having at least one drain port to permit water to drain from the soil into said reservoir space,
and a continuous annular rim depending from said bottom member for fluid tight interfitting engagement with said upturned lip around the entire periphery thereof to block the escape of water from said reservoir space through the aperture in the bottom of the pot.

4,027,430
LOCKING JALOUSIE FRAME
Minoru Sakamoto, 3911 Nioi Place, Honolulu, Hawaii 96816
Filed Apr. 27, 1976, Ser. No. 680,798
Int. Cl.² E06B *7/084*
U.S. Cl. 49—403 **8 Claims**



1. A locking jalousie frame, comprising, in combination:
a. a pair of longitudinally extending, spaced, substantially parallel side rails;
b. a cover assembly attached to one of the side rails and including a sheath provided with a socket, the socket being provided with an end wall disposed adjacent the associated side rail, an open end forming an entrance to the socket, a pair of edge walls extending substantially perpendicularly from the end wall to the open end, and a pair of substantially planar side walls connected to the end wall and edge walls;
c. a slat having a pair of longitudinally spaced ends with one of the ends being disposed in the socket provided in the sheath for retention by the sheath; and
d. a filler member removably disposed in the socket provided in the sheath between the one of the ends of the slat and the associated side rail for spacing the slat from the side rail, the sheath being further provided with a cut-out portion on one of the edge walls, with the cut-out portion extending from the end wall toward the open end and forming a passage for inserting the filler member into and out of the socket provided in the sheath when the end of the slat is disposed in the socket so as to block the open end of the socket.

4,027,431
SINGLE HUNG WINDOW WITH REMOVABLE FIXED LITE
Troy D. Rackard, Lexington, N.C., assignor to National Gypsum Company, Buffalo, N.Y.
Filed Nov. 10, 1975, Ser. No. 630,739
Int. Cl.² E05D *15/16*
U.S. Cl. 49—458 **10 Claims**

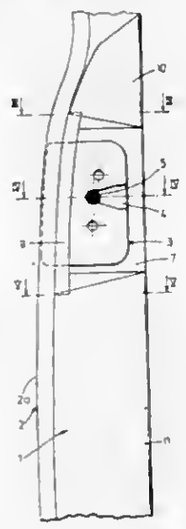


1. A window comprising a rectangular frame and an upper sash and a lower sash mounted in said frame, said upper sash being mounted above and outwardly of said lower sash, said frame consisting of a horizontal head member, a horizontal sill member, a pair of vertical jamb members and being free of any horizontal member between said head member and said sill member, said lower sash being removably mounted in said pair of vertical jamb members for vertical sliding movement relative to said vertical jamb members, said upper sash being removably mounted on said pair of vertical jamb members and said head member, said upper sash having a top horizontal member, said upper sash top horizontal member and said head member having cooperative interlocking members adapted to vertically hold said upper sash against said head member when said upper sash is vertically mounted in said frame and adapted to permit relative vertical movement of said upper sash when said upper sash is tilted by moving the bottom of said upper sash inwardly, a fastener disposed at the lower portion of each vertical member of said upper sash connecting and holding said lower portion of each vertical member in fixed position relative to the respective adjacent vertical jamb member, said fastener being adapted for readily disconnecting of said lower portion of each vertical member from said respective vertical jamb member, and cooperative means on the lower horizontal member of said upper sash and on the upper horizontal member of said lower sash for sealing the juncture of said sashes when said slidable lower sash is fully lowered.

4,027,432
DOOR ARRANGEMENT FOR A VEHICLE

Horst Klebba, Weyhausen, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed June 2, 1975, Ser. No. 582,582
Claims priority, application Germany, July 15, 1974, 2433895
Int. Cl.² E06B 3/14
U.S. Cl. 49—503 **4 Claims**

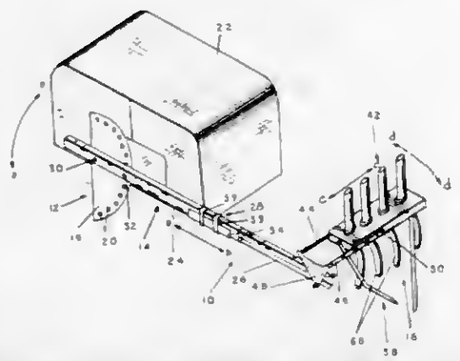


1. A vehicle door arrangement including a door, a door frame and a lock assembly, with one part of the lock assembly attached to one of the edge faces of the door and the other part of the lock assembly attached to a zone of an edge face of the door frame that confronts the one edge face of the door when it is closed, the one door edge face and the confronting door frame edge face forming a door gap when the door is closed, and the lock components pertaining to the diverse parts of the lock assembly facing each other at certain distances when the door is closed, characterized in that, means for dimensioning the door arrangement in the region of the zone of the door frame are provided so that the minimum width of the door gap, at least outside said zone of the door frame edge face and measured in horizontal planes approximately parallel to the door plane, is smaller than the minimum distances between the lock components measured in the same directions.

4,027,433
SAND BLASTING APPARATUS

Wayne Hockett, 1905 N. 43rd, Tampa, Fla. 33605

Filed Sept. 17, 1975, Ser. No. 614,191
Int. Cl.² B24C 3/32
U.S. Cl. 51—410 **6 Claims**

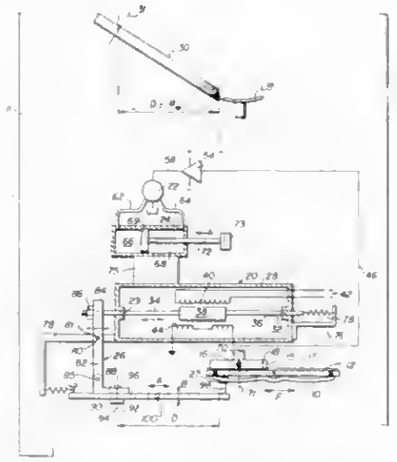


1. An abrasive cleaning apparatus configured for use in combination with fluid medium pressure source, said abrasive cleaning apparatus comprising a base means for mounting said abrasive cleaning apparatus on a platform, an adjustable nozzle support means interconnected to said base means by interconnecting boom means, said adjustable nozzle support means including a first positioning means to pivotally adjust said adjustable nozzle support means in a first plane relative to said base means and a second positioning means coupled to said first positioning means to pivotally adjust said adjustable nozzle support means in a second plane relative to said base means, said first positioning means comprising a first and second element held in fixed relationship relative to one another by a pair of end members disposed at opposite ends thereof, said first positioning means being pivotally attached to the outer portion of said interconnecting boom means, said second positioning means comprises a frame including a plurality of apertures formed therein to receive a corresponding plurality of nozzles to fix said nozzles in fixed spaced relationship relative to one another, said second positioning means being coupled at substantially the mid-point thereof to the outer end member of said first positioning means to permit pivotal movement relative to one another, said second positioning means further includes a handle means fixedly attached thereto such that the weight of said nozzles is supported by said interconnecting boom means to permit movement of said adjustable nozzle support means in said first and second planes.

4,027,434
EDGING APPARATUS FOR OPHTHALMIC LENS

Fred A. Haddock, Muskogee, Okla., assignor to Coburn Optical Industries, Inc., Muskogee, Okla.

Continuation of Ser. No. 364,287, May 29, 1973, abandoned. This application July 15, 1975, Ser. No. 598,491
Int. Cl.² B24B 13/00
U.S. Cl. 51—101 LG **13 Claims**



1. An automatic lens grinder for forming the edge of an ophthalmic lens to be received inside an eyeglass frame socket comprising,

a frame follower pivotally mounted at a point for tracking the inside contour of said eyeglass frame socket as said frame is rotated,

an electronic sensor for detecting the movement of said frame follower and for converting said movement into electrical signals proportional to the displacement of said frame follower,

an electrically operated valve responsive to said electrical signals for controlling a fluid output,

an actuator responsive to said fluid output,

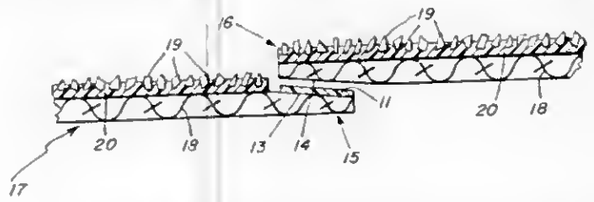
a grinding wheel for shaping the peripheral contour of said ophthalmic lens, and

means to rotate said lens with said socket and second means causing said follower to follow in said socket the corresponding point of contact that said lens makes with said grinding wheel.

4,027,435
COATED ABRASIVE ARTICLE CONTAINING A POLYURETHANE ADHESIVE SPLICE

John F. Malloy, Albany, N.Y., assignor to Norton Company, Worcester, Mass.

Continuation-in-part of Ser. No. 630,653, Nov. 10, 1975, abandoned, which is a continuation of Ser. No. 369,482, June 13, 1973, abandoned, which is a continuation-in-part of Ser. No. 253,570, May 15, 1972, Pat. No. 3,872,629, which is a continuation-in-part of Ser. Nos. 34,105, May 4, 1970, abandoned, and Ser. No. 233,572, March 10, 1972, Pat. No. 3,763,604, which is a continuation-in-part of Ser. No. 103,148, Dec. 31, 1970, abandoned, and Ser. No. 822,934, May 8, 1969, abandoned. This application June 14, 1976, Ser. No. 695,381
Int. Cl.² B24D 11/06
U.S. Cl. 51—295 **1 Claim**



1. Coated abrasive article comprising a backing member and having abrasive grain adhered thereto by an adhesive bond, said article having two ends thereof joined together by means of a layer of an adhesive composition which in its initial state is a preformed adhesive film which has been at least partially cured but which can still be activated at a temperature suitable for splicing said ends together, said adhesive film being the reaction product of an adhesive composition comprising in admixture:

a. a hydroxy terminated polyurethane-polyester having a hydroxyl number of from about 2 to about 15;

b. an active hydrogen component containing at least difunctional active hydrogen and having an active hydrogen equivalent weight in the range of from 27 to less than about 500;

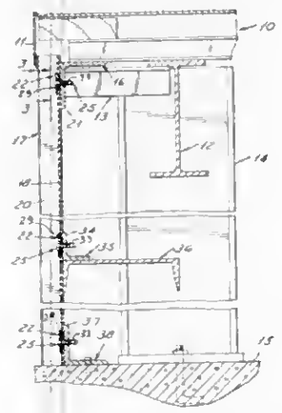
c. a component having available free isocyanate groups; and

d. a component selected from the group consisting of chlorinated aliphatic hydrocarbon, chlorinated aromatic hydrocarbon, alkylated polystyrene, and mixtures thereof, said component being miscible with components (a), (b) and (c).

4,027,436
EXPLOSION VENTING WALL STRUCTURE WITH RELEASABLE FASTENER MEANS

Edwin A. Daly, Southfield, Mich., assignor to Walcon Corporation, Ecorse, Mich.

Filed Mar. 15, 1976, Ser. No. 666,926
Int. Cl.² E04H 9/02, 9/14
U.S. Cl. 52—1 **10 Claims**



1. In a building structure, the combination comprising:

a. a fixed building structure having an opening in the exterior of the building;

b. a releasable venting wall panel for enclosing said opening in the fixed building structure and being provided with a plurality of attachment holes;

c. a plurality of releasable fastener means solely attaching said releasable venting wall panel to said fixed building structure and including;

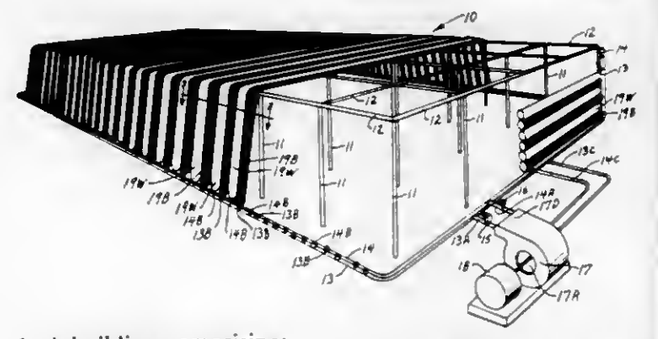
b. a fastener member disposed at each of said holes in said releasable venting wall panel on the exterior side thereof and having arm means extending radially outward and overlapping the exterior edge of the adjacent hole; and,

b. retainer means for each of said fastener members extended through the adjacent hole in the releasable venting wall panel and attached to the fixed building structure, whereby when an internal explosion occurs inside the fixed building structure and generates a predetermined force of the releasable wall venting panel, the releasable venting wall paner will be forced outward away from the fixed building structure and the arm means on all of the fastener member will be folded over simultaneously to permit each fastener member to pass through the adjacent hole in the releasable venting wall panel and completely detach the releasable venting wall panel from the fixed building structure.

4,027,437
INFLATABLE BUILDING

Jeffrey N. Monsky, Louisville, and Glen Combs, La Grange, both of Ky., assignors to The McMiah Corporation, Louisville, Ky.

Filed Nov. 26, 1975, Ser. No. 635,718
Int. Cl.² E04B 1/345
U.S. Cl. 52—2 **10 Claims**



1. A building comprising:

a. support frame means including a plurality of spaced-apart upright first frame means having their lower ends anchored to base means and having their upper ends interconnected to a grid formed of plural speed-apart second frame members;

b. first and second manifold means mounted adjacent to the periphery of said support frame means and each having an inlet and plural outlets, with their inlets being respectively fluid-connected to a source of pressurized fluid through separate first and second control valve means and with the plural outlets of said first manifold means being offset from the plural outlets of the second manifold means; and

c. covering means for covering said support frame means including two groups of plural inflatable hollow tubular members which extend across said frame means generally parallel to one another, with all members of a first group of said two groups being substantially opaque about their entire tubular peripheries and fluid-connected to the outlets of said first manifold means and all members of a second group of said two groups being substantially translucent and fluid-connected to the outlets of said second manifold means and with one member of each of said groups being located contiguous to one member of the other of said groups such that the amount of light that can

be transmitted through said covering means can be selectively varied through operation of said valve means.

4,027,438

TRANSVERSE FRAME OF INDUSTRIAL BUILDING CARCASS

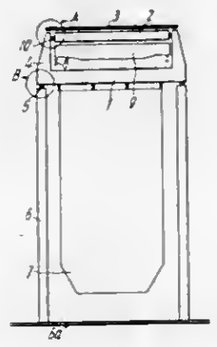
Alexandr Tikhonovich Shemonaev, Ochakovskoe shosse 13, korpus 2, kv. 17; Dmitry Grigorievich Cherny, Nizhnyaya Krasnoselskaya, 45, kv. 116; Semen Naumovich Genis, Krjukovskaya ulitsa, 23, kv. 33, and Igor Konstantinovich Vishnitsky, Festivalnaya ulitsa, 19, kv. 71, all of Moscow, U.S.S.R.

Filed June 11, 1975, Ser. No. 585,825

Claims priority, application U.S.S.R., June 13, 1974, 2037025

Int. Cl.² B66C *5/02*

U.S. Cl. 52—27 **3 Claims**



1. A transverse frame of an industrial building carcass comprising: lower columns, upper columns, a crossbar mounted on said lower columns; a supporting member of the building roof mounted on said upper columns above said crossbar wherein the upper columns located above the crossbar are rigidly connected with the said crossbar, forming a U-shaped frame which is fixed through hinges to the lower columns located below the crossbar and the supporting member of the roof is thrust tightly between the free ends of said U-shaped frame.

4,027,439

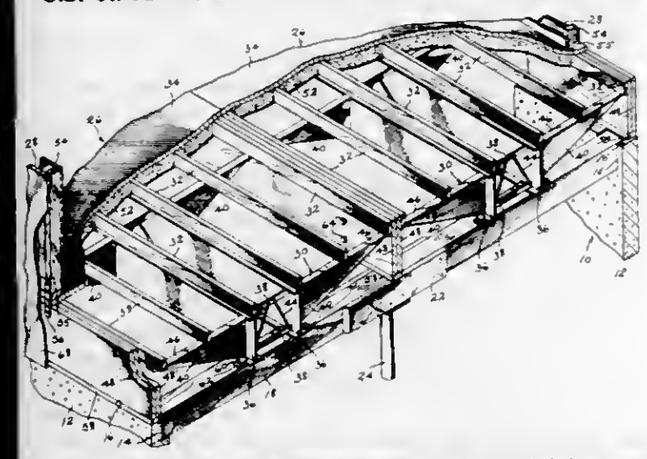
FLOOR SUPPORT FOR SECTIONALIZED BUILDINGS

Robert Willard, 56044 Riverdale Drive, Elkhart, Ind. 46514

Filed Aug. 10, 1976, Ser. No. 713,297

Int. Cl.² E04B *5/14*; E04C *3/292*

U.S. Cl. 52—79.1 **5 Claims**



1. In a sectionalized building having two joining components, each component including a floor section and side walls, a ground supported foundation, each building component carried upon said foundation, the improvement wherein said foundation includes side walls, a plurality of parallel spaced cross beams each carried by and extending from one said foundation wall to the other, each floor section including:

a girder extending longitudinally of the floor section, said girder including a center beam part and a plurality of longitudinally spaced cantilevered transverse gussets extending from opposite sides of said beam part and terminating at reduced end portions, spaced joists carried upon said gussets paralleling the beam part of said girder and having upper surfaces lying in approximately the same plane, a pair of spaced board supports each paralleling said joists at the end portions of said girder gussets, each board support extending from the plane of said joist upper surfaces to approximately the level of the bottom of said girders, flooring applied over said joists and board supports,

said floor section of one component and said floor section of the other component positioned side by side with the respective girders of each section resting upon said cross beams, one board support of one floor section and one board support of the other floor section being juxtaposed, said juxtaposed board supports carried by said cross beams, the other of said board supports of the floor sections carried by said foundation walls.

4,027,440

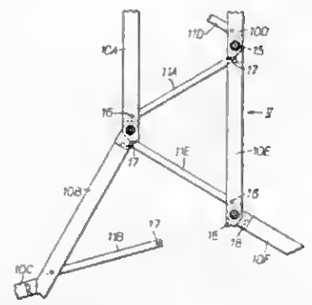
EXTENSIBLE INTERLOCKING STRUCTURE OF MULTI-LATERAL CROSS-SECTION

Leslie Frank Hamblin, Shrewsbury, England, assignor to Alan Salisbury Lamburn, Kencott, England, a part interest

Filed July 22, 1975, Ser. No. 598,039

Int. Cl.² E04H *12/18*

U.S. Cl. 52—108 **10 Claims**



1. An extensible interlocking structure of multi-lateral cross-section comprising

two sets of main members, at least one set consisting of generally rectangular rigid frames which lie in a first plane spaced apart from a second plane in which the members of the other set lie, the main members of each set engaging one another in end-to-end relation when the structure is extended,

at least one set of tie members, said tie members being pivoted about a pivot axis to said main members of at least one set, and said tie members having, before extension of the main members, free ends remote from said pivot axis,

said main members of the set opposed to said tie members being formed with depressions to afford jaws to receive the free ends of said tie members,

extension of said sets of main members causing said jaws to close to grip said tie members, whereby to form a rigid structure with said sets of main members held in spaced-apart relationship by said tie members extending diagonally therebetween,

and a member interconnecting the free ends of both sets of main members.

4,027,441

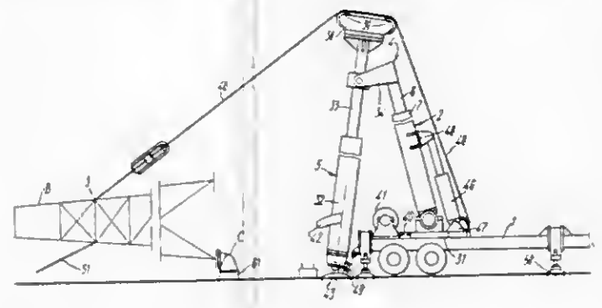
ARRANGEMENT FOR ERECTING AND DISMOUNTING AN ELONGATE OBJECT HAVING ONE END ARTICULATED TO A FOUNDATION

Grigory Vasilievich Pitelyaev, Moskovskoi oblasti, shosse Entuziastov 37, kv. 49, Balashikha; Evdokim Semenovich Telpukhovsky, Sadovo-Samotechnaya ulitsa 7, kv. 75, Moscow; Boris Iosifovich Ravin, Scheikovskoe shosse 65, kv. 15, Moscow, and Alexei Grigorievich Gladkov, Chongarsky bulvar 1, kor. 2, kv. 153, Moscow, all of U.S.S.R.

Filed Oct. 2, 1975, Ser. No. 619,031

Int. Cl.² E04H *12/34*

U.S. Cl. 52—116 **11 Claims**



1. An arrangement for erecting and dismounting an elongated heavy object having one end articulated to a foundation, comprising: a chassis which is stationary during the reaction or dismounting of an object; a boom having two ends, one end being a distal end and the other end being articulated to said chassis; a load gripping member mounted for displacement towards the distal end of said boom during the installation of an object; an additional boom support for supporting said boom, said additional boom support being articulated to the distal end of the boom and being placed on the ground during the installation of an object; means for effecting said displacement of the load gripping member.

4,027,442

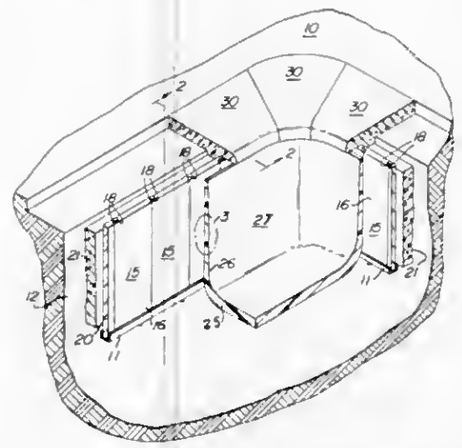
METHOD OF CONSTRUCTING SWIMMING POOLS

Herman Silverman, Doylestown, Pa., assignor to KDI Sylvan Pools, Inc., Doylestown, Pa.

Continuation-in-part of Ser. No. 511,533, Oct. 3, 1974, abandoned. This application Feb. 18, 1976, Ser. No. 659,032

Int. Cl.² E04H *3/16*; E04G *23/00*

U.S. Cl. 52—309.4 **5 Claims**



1. The method of constructing a swimming pool which comprises

assembling a static structure comprising a plurality of metallic components having flat vertically disposed interior faces providing an interior exposed wall surface around the perimeter of the pool with a potentiality for water leakage therethrough,

spraying a foamable synthetic plastic material in liquid form towards said wall surface for adherence thereto of at least on layer of stabilized foam with a hardened exterior skin, and

applying an ultraviolet protective material to the exterior skin.

4,027,443

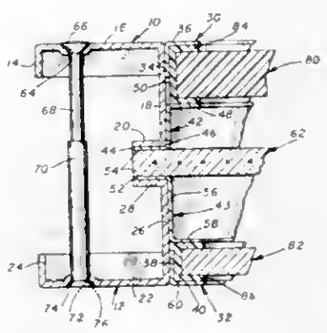
FIRE AND IMPACT RESISTANT WINDOW ASSEMBLY

Robert L. Briggs, Anaheim, Calif., assignor to Aneomstat Products Division, Dynamics Corporation of America, Scranton, Pa.

Filed Oct. 14, 1975, Ser. No. 621,664

Int. Cl.² E04C *2/54*; E06B *3/26*

U.S. Cl. 52—202 **4 Claims**



1. A fire, impact resistant and tamper proof window assembly comprising a multi-part centrally open marginal frame, said frame including part interconnecting means operable with the frame assembled to preclude frame disassembly from one side thereof and said frame having spaced apart first, second and third inwardly facing grooves disposed respectively in outer, inner and outer relationship with the frame assembled, a pane of fire glass with marginal portions secured in said inner groove and extending across the frame central opening, a first pane of deflectable impact resistant substantially transparent plastic with marginal portions secured in one outer groove and extending across said central opening, a second pane of deflectable impact resistant substantially transparent plastic with marginal portions secured in said other outer groove, said plastic panes being at least one fourth (¼) of an inch in thickness and being spaced from said fire glass pane a distance of at least one fourth (¼) of an inch whereby to avoid breakage of said fire glass pane on impact and resulting inward deflection of said plastic panes toward the fire glass, and said plastic panes being formed of a material with high impact resistance characteristics at least similar to that of polycarbonate so that impact on either of said panes may deflect the pane but not rupture the fire glass, and said material having a relatively low melting point such that fire on one side may melt or deform the plastic on said one side but leave the opposite plastic pane intact due to the protection of the fire glass.

4,027,444

FIRE-RESISTANT WALLS FOR USE IN SHIPBUILDING

Adolf Berg, Niendorfer Hohe 9, 2000 Hamburg 61, Germany

Continuation of Ser. No. 515,981, Oct. 18, 1974, abandoned. This application Dec. 17, 1975, Ser. No. 641,556

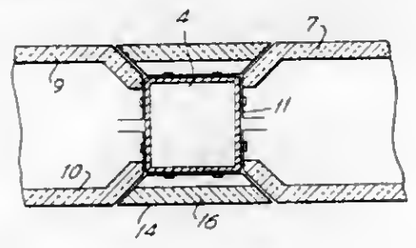
Claims priority, application Germany, Oct. 19, 1973, 2352444

Int. Cl.² E04H *1/00*

U.S. Cl. 52—240 **6 Claims**

1. A fire-resistant wall for ships and assemblable from construction components comprising, in combination, wall plate means having two covering panels; fire-resistant means be-

tween said covering panels, said covering panels having vertical edges shaped into integral profiles and having slits; vertical support means for supporting said wall plate means, said vertical support means being substantially less in width than said wall plate means, said profile shaped vertical edges being angularly bent and directed inward toward the interior of said wall plate means for contacting directly corners of said vertical support means, said angularly directed vertical edges for contacting said vertical support means being spaced by a distance substantially equal to the width of said vertical support means; hook means on said vertical support means and inserted into said slits, said vertical support means comprising multi-cornered pipe-shaped means, each surface of said pipe-shaped means having a predetermined number of said hook

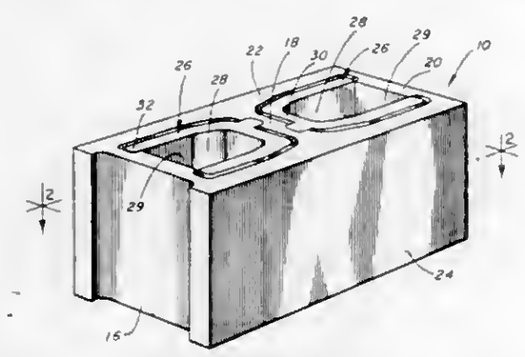


means, said wall plate means being erectable at varying angles to a neighboring wall plate means, the central axis of all said wall plate means intersecting at the center point of said multi-cornered pipe-shaped means; said fire-resistant means surrounding substantially said vertical pipe-shaped means; profile rail means open on one side and covering the free edges of said vertical support means; said rail means being spaced from said vertical support means and spanning the space between angularly inward directed vertical edges of adjacent covering panels, the outer surface of said rail means being substantially flush with the outer surface of said covering panels; said rail means forming an internal space with said angularly inward directed vertical edges and said vertical support means; said fire-resistant material filling said internal space.

4,027,445
INSULATED BLOCK

David L. Nickerson, Wilbraham, Mass., assignor to Korfil, Incorporated, Chicopee, Mass.

Filed Dec. 4, 1975, Ser. No. 637,641
Int. Cl.² E04B *1/88, 2/08*
U.S. Cl. 52—405 **6 Claims**

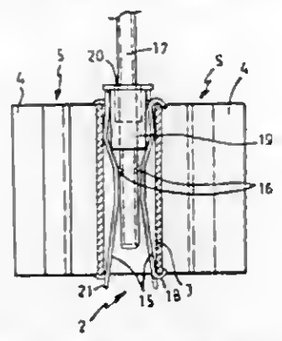


1. The combination of a preformed building block of concrete and at least one preformed generally U-shaped open ended insulating insert therefor; said block having generally parallel and planar top and bottom surfaces with at least one top-to-bottom through cavity of generally rectangular cross section, said block also having opposite generally parallel side sections and at least two transverse webs of substantially uniform thickness extending between said side sections, integral at opposite ends with the side sections and defining said cavity in cooperation with said side sections, the said generally rectangular cross sectional configuration and dimensions of said cavity being subject to variation within a significant range during manufacture, said insert being of a light weight cellular heat insulating and fire retardant material and having an external configuration which is generally rectangular and adapted to enter said cavity in the block, the insert when so entered having its connecting portion extending along and engaging one of said webs, its opposite legs extending along and respectively engaging said opposite side sections of the block, and its open end and the end surfaces of its legs adjacent the opposite web, the insert thus being disposed with top and bottom surfaces of its legs and connecting portion adjacent and substantially parallel respectively with said block top and bottom surfaces and defining a second and somewhat smaller top-to-bottom through cavity within itself, and the dimension between said top and bottom insert surfaces being equal to or less than the corresponding dimension between the block top and bottom surfaces such that neither of said surfaces projects beyond the adjacent block top and bottom surface, and said insert being cross sectionally compressible with its legs slightly flexible transversely so as to accommodate said cross sectional variation in said block cavity and to provide for slight compression and firm engagement of insert external surfaces with the cavity wall and for secure frictional retention of the insert in the block cavity, said transverse block web adjacent said end surfaces of the insert and its open end having a pair of similar top-to-bottom through slots extending respectively adjacent said leg end surfaces, and said insert legs being sufficiently long and flexible respectively to enter said slots, said transverse block web adjacent said connecting web also having a top-to-bottom through slot, said insert having an integral external top-to-bottom extending projection on its said connecting portion entering said slot, and each of said slots having a depth at least one fourth (¼) the thickness of its web, so as to locally reduce the web thickness, a width at least three fourths (¾) of an inch, and a total volume equal to at least one fourth (¼) the volume found by multiplying web thickness times web height times the width at the mouth of the slot.

4,027,446
SUSPENDED SCREEN CEILING

Johannes Antonius Henricus Brugman, Rotterdam, Netherlands, assignor to Hunter Douglas International N.V., Willemstad, Curacao, Netherlands Antilles

Division of Ser. No. 459,805, April 10, 1974, Pat. No. 3,950,909. This application Dec. 10, 1975, Ser. No. 639,476
Claims priority, application Netherlands, Apr. 13, 1973, 7305185
Int. Cl.² E04B *5/52;* **E06B** *3/54*
U.S. Cl. 52—484 **5 Claims**



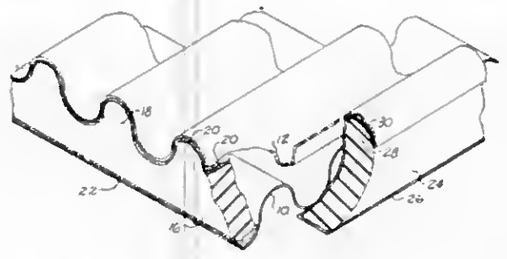
1. A screen ceiling comprising a plurality of elongated panels, a plurality of gusset joints, each of said gusset joints having a central wall portion, said central wall portion defining an elongated open ended tube each gusset joint having a panel support for each panel to be supported thereby, each of said panel supports being integral with and extending outwardly from the wall portion of its associated gusset joint, each of said panels having a portion adjacent an end thereof lying against a panel support, an opening in said portion of each of said panels and intermediate the length thereof that lies against said support, a projection integral with each of said supports and extending laterally of their associated support

from intermediate the length thereof, each said projection extending through the opening of a panel lying against said associated support, a locking member for each of said openings, said locking members each being engaged with a projection on the opposite side of a panel from the panel's associated support and bearing against a face of said panel for securing said panel between said panel support and said locking member, each of said locking members having a locking element for positively locking said member in place other than solely by friction, said gusset joints being suspended from an overlying fixed support by means in engagement with said tube and secured to said fixed support, said means being generally elongated, the longitudinal axis of said means being substantially in alignment with the axis of said tube, and the axes of said means and said tube being generally parallel with the major planes of said panels.

4,027,447
SOLAR PANEL

Floyd Randolph Granger, 24 Heard Drive, and Michael Gerard Granger, 10 Delores St., both of Greenville, S.C. 29605

Filed July 1, 1976, Ser. No. 701,899
Int. Cl.² E04B *2/28*
U.S. Cl. 52—618 **3 Claims**



1. A panel structure for being mounted on the roof of a building for permitting solar energy to pass therethrough into said building, said structure comprising:

a. a first translucent panel having sinusoidal corrugations running continuously across said panel in a first direction;

b. a second translucent panel having sinusoidal corrugations running continuously across said second panel substantially perpendicular to said first direction, said second panel being positioned on top of said first translucent panel;

c. means for securing said panels together;

d. first sealing members interposed between said first and said second panel, upper surfaces of said sealing members being complementary in shape with said corrugations for mating with said panel and producing a seal between said panels along two edges thereof;

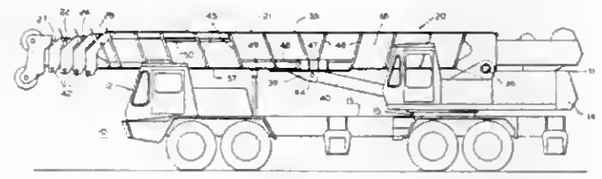
e. second sealing members sealing the other two edges of said panels thus producing a structurally strong and lightweight panel that can be readily mounted on a roof of a building for permitting energy from the sun to pass therethrough.

4,027,448
CRANE BOOM WITH ANGULAR SIDE FRAME REINFORCEMENTS

Bohdan Tymclurak, Naperville, Ill., assignor to Clark Equipment Company, Buchanan, Mich.

Filed June 16, 1975, Ser. No. 587,523
Int. Cl.² E04G *25/00;* **E04H** *12/34*
U.S. Cl. 52—632 **6 Claims**

1. For a large material handling apparatus comprising a telescoping crane boom assembly having two or more extensible and retractable sections, each section comprising a longitudinal top plate, a pair of side webs extending downwardly from opposite longitudinal edges of the top plate and appropriately secured thereto, a bottom plate appropriately secured to the lower edges of the side webs to provide a lower or compression flange and to close the boom section, and web stiffeners rigidly secured to the side webs in longitudinally spaced relation and extending between the top and bottom plates of the boom section, an arrangement of web stiffeners mounted on each side web of each extensible and retractable boom section, the arrangement comprising first and second pluralities of web stiffeners, each stiffener of the first plurality of web stiffeners being mounted on the web at a first angle of tilt in longitudinally spaced relation and directed toward the front of the boom section, each stiffener of the second plural-

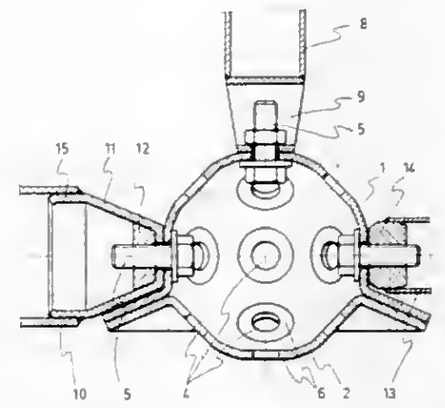


ity of web stiffeners being mounted on the web at a second angle of tilt in longitudinally spaced relation and being directed toward the rear of the boom section, with the innermost stiffener of each of the first and second pluralities of stiffeners intersecting at a changeover point generally provided at a midpoint of the boom section, the apex of the intersecting stiffeners being directed to the compression or lower flange of the boom section, the changeover point generally corresponding to the changeover from positive to the negative shear in a movable boom section under cantilever end loading.

4,027,449
SYSTEM FOR CONSTRUCTING SPATIAL STRUCTURES

Francisco-Javier Alcalde Cilvetl, Plaza Conde Rodezno,, 8-4° Pamplona (Navarna), Spain

Continuation of Ser. No. 328,078, Jan. 30, 1973, abandoned. This application May 13, 1976, Ser. No. 686,233
Int. Cl.² E04H *12/06*
U.S. Cl. 52—648 **6 Claims**



1. In a spatial structure including a plurality of hollow hubs or nuclei joined by a plurality of struts or tubes attached at the opposite ends thereof to adjacent of said nuclei, the improvement comprising:

each of said nuclei being substantially sperically shaped;

each of said nuclei being formed of a first hollow partial spherical piece having an opening and a second hollow partial spherical piece having an opening, said first piece having a height different from that of said second piece, each of said pieces having annular fins extending outwardly from said respective openings in a radial direction from the center of said nucleus;

said pieces being aligned with said respective fins abutted together to form the respective substantially spherical nucleus having a completely hollow and empty interior,

said abutted fins being rigidly fixed together by screw means, said thus abutted and fixed fins forming flange means for stiffening said nucleus against deformation stresses;

each of said pieces of each of said nuclei having therein a plurality of fastening holes, said nuclei each having on the exterior thereof, around each of said fastening holes, a flat annular surface formed in said nuclei;

bolt fastening means for rigidly attaching each of said tubes at both said ends thereof to said nuclei at said fastening holes in said pieces thereof, each said bolt fastening means having an integral head and threaded stem formed of a single element, said head having a planar surface abutting against and contacting the inner surface of the respective said nucleus at positions surrounding the respective said fastening hole, said threaded stem extending through said respective fastening hole and rigidly fastening to an end of the respective said tube; and

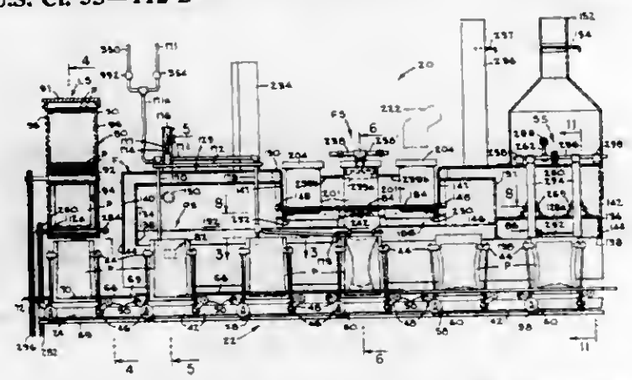
said tubes each extending radially from the centers of each of the nuclei attached thereto.

4,027,450

POUCH FILLING UNDER AIR EXCLUSION

Tony T. Chiu, Los Gatos, and Jurgen H. Strasser, Mountain View, both of Calif., assignors to FMC Corporation, San Jose, Calif.

Filed Jan. 19, 1976, Ser. No. 650,348
Int. Cl.² B65B *31/04*
U.S. Cl. 53—112 B **18 Claims**



1. An apparatus for removing air from and filling a substantially air-free product into a pouch having an open end comprising: a steam tunnel, means for circulating steam at atmospheric pressure through said tunnel from one end to the other, a magazine for supporting a stack of empty pouches, conveying means for advancing said pouches through said tunnel past a plurality of processing stations, pouch carrying means on said conveying means for supporting said pouches means for feeding an empty flat pouch into said conveying means, said means for feeding the empty pouch into said pouch carrying means including a pair of pinch rollers for firmly squeezing the pouch and moving the pouch into the carrying means while squeezing additional headspace air out of the open end thereof, means for maintaining said empty pouch fed to said feeding means closed until after advancement into the tunnel, means for opening said pouch on said conveying means after said pouch has entered said steam tunnel, filling means for discharging a substantially air-free product into said open pouch, and means within said steam tunnel for sealing said pouch.

4,027,451

FREE FLOW GRATING

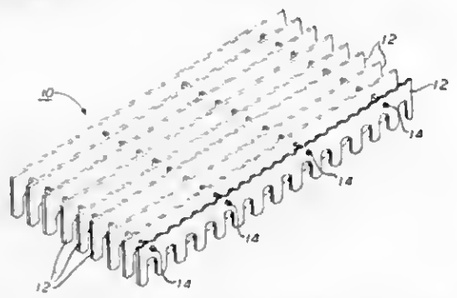
Leopold Bustin, Emmans Road, Flanders, N.J. 07836

Filed Mar. 30, 1976, Ser. No. 671,833
Int. Cl.² E04C *2/42*
U.S. Cl. 52—664 **3 Claims**

1. A free flow grating comprising:

a plurality of longitudinally extending grating strips, each of said grating strips including an upper longitudinally extending edge and a lower longitudinally extending edge spaced from and generally parallel to said upper longitudinally extending edge, a first end edge generally normal to and extending between said upper and lower longitudinally extending edges, a second end edge, spaced from and generally parallel to said first end edge and extending between said uper and lower longitudinally extending edges, first and second generally parallel side surfaces, the perimeter of said side surfaces generally being defined by said upper and lower longitudinally extending edges and said first and second end edges;

a plurality of relieved areas formed in each said strip and longitudinally spaced along said upper longitudinally extending edge;



a plurality of relieved areas formed in each said strip and longitudinally spaced along said lower longitudinally extending edge, said relieved areas in said lower edge of each said strip being uniformly longitudinally spaced and substantially identical in shape to each adjacent relieved area, said relieved areas along each said lower longitudinally extending edge extending deeper into said strip than the depth of the relieved areas in said upper longitudinally extending edge of each said strip;

said plurality of grating strips positioned longitudinally such that the relieved areas in the lower longitudinally extending edge of adjacent grating strips are not in alignment; and

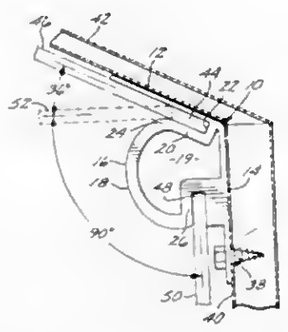
securing means for rigidly securing said plurality of grating strips together and in general parallel relationship.

4,027,452

EXTRUDED INTERIOR MOLDING

James W. Donnell, 945 W. 190th St., Gardena, Calif. 90247

Filed Apr. 19, 1976, Ser. No. 677,978
Int. Cl.² E04F *19/02, 13/00*
U.S. Cl. 52—716 **8 Claims**



1. An inside corner molding formed by tubular extrusion comprising:

a first flat flange member;

a second flat flange member coextensive therewith at an included angle thereto of from 90° to about 130°;

a bulbous, hollow-form section formed with a curvilinear wall, coextensively carried on said first flange and having a tangential side wall parallel to and opposite said second flange contiguous with said curvilinear wall and spaced apart therefrom to define a longitudinal channel therebetween having a curvilinear, diverging entrance;

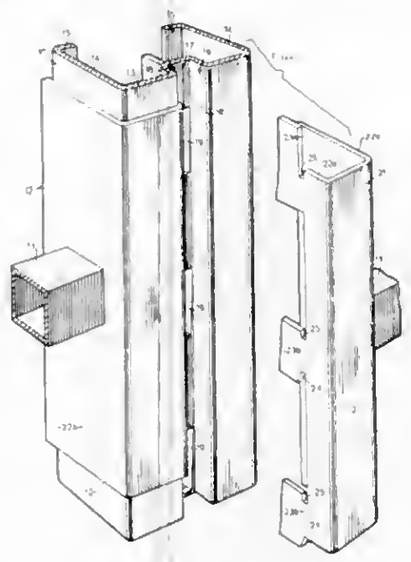
a longitudinal rabbet groove in the opposite side wall of said bulbous, hollow-form section coextensive with, parallel to and spaced apart from said first flange member.

4,027,453

JOINT CONSTRUCTION FOR CONNECTING TOGETHER TWO FRAME MEMBERS

Donald John Henry Bridge, Birmingham, England, assignor to Finspa Engineering Co. Limited, West Bromwich, England

Filed Oct. 9, 1973, Ser. No. 404,588
Claims priority, application United Kingdom, Nov. 23, 1972, 54276/72
Int. Cl.² A47F *5/10*; **F16B** *2/00*
U.S. Cl. 403—353 **2 Claims**



1. A joint construction for connecting together two frame members wherein:

a. a first of said frame members has opposite side limbs connected by a base so that the side limbs and base collectively define a trough-like shape,

b. said first frame member base having formed therein a re-entrant trough-shaped recess which extends longitudinally of the first frame member,

c. said recess including a base having a plurality of slots spaced longitudinally along the recess thereof, and contact elements disposed at the margins of the slots and projecting from the recess base in a direction away from a mouth of a re-entrant trough-shaped recess,

d. the second of said frame members being of trough-shape and having a limb which comprises a plurality of hook-shaped tongue elements spaced longitudinally from one another,

e. said slots in the base of the re-entrant trough-shaped recess have mutually-inclined lateral margins so that each slot is wider at one end than at the other end thereof, said contact elements are similarly mutually inclined,

f. at least one of the tongue elements of the second frame member is inclined to a longitudinal axis of the second frame member,

g. the second trough-shaped frame member having an effective size to embrace the outer surface of one side limb, a part of the base of the first frame member and one side of the re-entrant trough-shaped recess formed therein,

h. said tongue elements are engaged in said slots with one of the tongue elements being in face-to-face wedging engagement with a respective one of said contact elements,

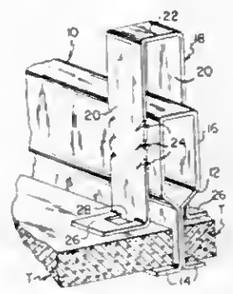
i. said wedging engagement being effective to hold the second frame member firmly in contact with the outer surface of said one side limb of the first frame member and to support the second frame member against downward movement relative to the first frame member.

4,027,454

HOLD DOWN CLIP FOR CEILING TILE IN GRID-TYPE CEILING

Jerome T. Schuplin, Parma Heights, Ohio, assignor to Fastway Fasteners, Inc., Lorain, Ohio

Filed Feb. 27, 1976, Ser. No. 662,101
Int. Cl.² E04B *5/57*
U.S. Cl. 52—714 **13 Claims**



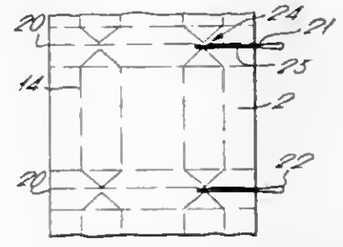
1. A hold down clip for use with a grid-type ceiling embodying tile supporting members of inverted T cross section, said clip comprising a generally U-shaped clip body having spaced legs for engaging opposite sides of the vertical rib of an associated inverted T member, a foot portion on at least one of said legs adapted to overlie an underlying tile and hold the latter, tab means on said foot portion depending therefrom and substantially normal thereto for coaction with the tile to aid in maintaining the latter in position, and wherein said tab means terminates in a sharpened point means adapted to dig into an underlying tile for maintaining the tile in place.

4,027,455

PACKING CONTAINERS WITH RIPPING THREAD OPENING AND PACKING MATERIAL WEBS FOR THE MANUFACTURE OF THE PACKING CONTAINERS

Ruben Rausing, Rome, Italy; Gert Nedstedt, Malmo, Sweden; Hakan Holmstrom, Loberod, Sweden; Lars-Erik Palm, Staffanstorp, Sweden, and Stjepan Stefan, Dalby, Sweden, assignors to Tetra Pak Developpement SA, Lausanne, Switzerland

Division of Ser. No. 331,886, Feb. 12, 1973, abandoned. This application Apr. 28, 1975, Ser. No. 572,092
Claims priority, application Switzerland, Mar. 14, 1972, 3691/72
Int. Cl.² B65B *61/18*
U.S. Cl. 53—14 **8 Claims**



1. In a method of continuously producing containers from a web of carton forming material having a layer of thermoplastic material on that side which will form the inside of the container, which includes forming the web into a longitudinal tube-like member, sealing together the longitudinal edges thereof, filling the tube-like member with a filling material, forming spaced face-to-face seals transversely of the length of the tube-like member to form a plurality of interconnected containers and cutting through the transverse seals longitudi-

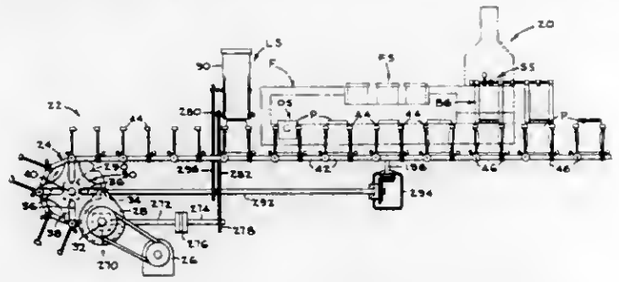
nally thereof to separate the packages from one another, the improvement comprising securing the substantially parallel legs of each of a plurality of substantially U-shaped tear threads to the layer of thermoplastic material at spaced locations along the length of the web and transversely thereof, the spaced locations of the parallel legs of each tear thread being juxtaposed the inner edge of the location where the transverse face-to-face seal is to be formed, the loop-like portion of each tear thread extending beyone one marginal edge of the web so that the inner portions of the parallel legs pass transversely through the longitudinal seal when sealing the edges of the web to form the tube-like member, folding the extended loop-like portions back against the side of the web which will form the outside of the container and away from the location where the transverse seal is to be formed and releasably securing the folded loop-like portions to the web so that each tear thread and extended loop-like portion thereof for each container will remain intact when cutting the transverse seals to separate the containers, the extended loop-like portions of each tear thread forming an external grip for pulling the thread to open the container by separating at least a portion of the adjacent face-to-face transverse seal to provide access to the filling material therein.

4,027,456

AIR-FREE POUCH PACKAGING METHOD

Donald C. Wilson, San Jose, Calif., assignor to FMC Corporation, San Jose, Calif.

Filed Jan. 19, 1976, Ser. No. 650,347
Int. Cl.² B65B *31/04*
U.S. Cl. 53—22 B **6 Claims**



1. A method of packaging a product in a substantially air-free pouch while moving the pouch through a plurality of processing stations in a tunnel comprising the steps of: receiving an empty pouch and maintaining the empty pouch closed, applying pressure to the pouch for flattening and squeezing headspace air out of the pouch, applying a vacuum about the pouch while pressure is being applied to the pouch to flatten the pouch, moving the closed pouch into the tunnel, maintaining an atmosphere of substantially air-free gas in the tunnel, opening the pouch when in said air-free atmosphere, filling the pouch with a product while in said air-free atmosphere, sealing the pouch when in said atmosphere, inducing said air-free gas to flow through the tunnel, and discharging the sealed pouch from said atomsphere.

4,027,457

FILM COVERED CUT ITEM AND PROCESS

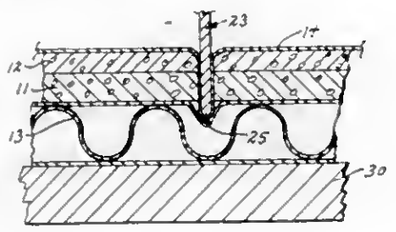
James J. Johnson, and David Y. Loeber, both of Louisville, Ky., assignors to David Y. Loeber and Harry B. O'Donnell, III, both of Louisville, Ky.

Continuation of Ser. No. 251,204, May 8, 1972, abandoned. This application May 2, 1974, Ser. No. 466,137
Int. Cl.² B65B *63/00;* **B26D** *4/02*
U.S. Cl. 53—23 **10 Claims**

1. A process for cutting a film covered item without piercing its covering film comprising the steps of:

a. mounting an item on a compressible base and covering said mounted item and at least a portion of said base with resilient film and fastening said film to said portion of said base, and, thereafter,

b. contacting said mounted film covered item and said base



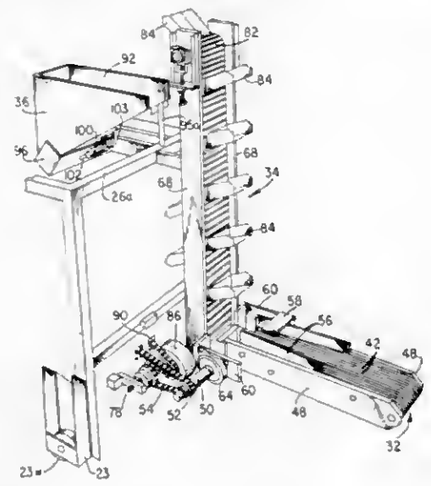
with cutter means under pressure and thus causing said item to be cut and said base to be compressed by said cutter means without said covering film being pierced by said cutter means.

4,027,458

AUTOMATIC PACKAGING APPARATUS

James A. Goodman, 9347 Springfield, Evanston, Ill. 60022

Filed Dec. 22, 1975, Ser. No. 643,257
Int. Cl.² B65B *57/06, 57/12*
U.S. Cl. 53—55 **28 Claims**



1. An automatic packaging apparatus for packaging a product into a container, said apparatus comprising:

a horizontal feeder system for conveying a product thereon;

a vertical flite conveyor system coupled to the horizontal feeder system and positioned relative thereto for receiving the product therefrom;

a hopper coupled to the vertical flite conveyor and positioned relative thereto for receiving the product therefrom, the product being deposited into the container via said hopper;

an input conveyor system coupled to the vertical flite conveyor system and positioned so as to enable a container traversing said input conveyor system to be positioned under the hopper; and

electrical synchronizing means coupled to the vertical flite conveyor system and the horizontal feeder system enabling the synchronization of product flowing from the horizontal feeder system to the vertical flite conveyor system;

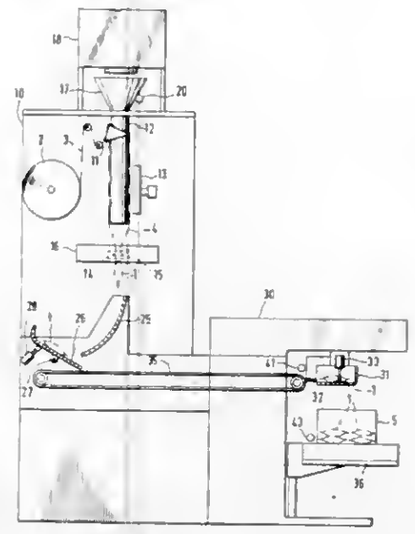
wherein the product arrives at the vertical flite conveyor system at a time when the vertical flite conveyor system is in a position to carry the product from the horizontal feeder system into the hopper.

4,027,459

SEALING MACHINE

Antonius Nieskens, Nederweert; Petrus Slenders, Ospel, and Christian Palmkoeck, Weert, all of Netherlands, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Apr. 29, 1976, Ser. No. 681,481
Claims priority, application Germany, May 2, 1975, 2519645
Int. Cl.² B65B *57/20*
U.S. Cl. 53—59 R **2 Claims**



1. A packaging machine comprising a system for continuously fabricating packages and of a device for introducing the same sequentially by means of a positioning and deposition head into a shipping case and of a conveyor system for bringing these packages spaced from each other from the packaging machine to a shipping case loading machine,

characterized in that a barrier member is mounted adjacent to the starting end of said conveyor system from the packaging machine to the shipping case loading machine, said barrier member being brought into a substantially horizontal package retaining position whenever a given number of packages has passed a counter associated with the shipping case loading machine, said counter further effecting shut-down of the operation of the packaging machine and interrupting operation of the positioning and deposition head that loads packages into the shipping case.

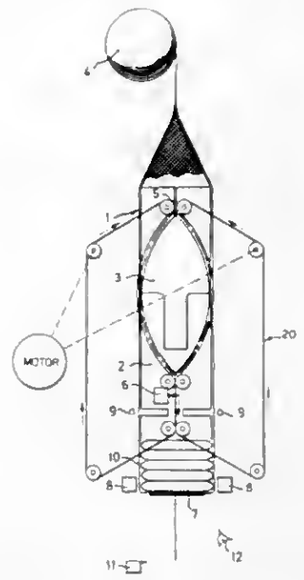
4,027,460

COMMODITY PACKAGING SYSTEM

Brian Orr, Hoghton, near Preston, England, assignor to F. B. Mercer, Limited, England

Filed Jan. 20, 1976, Ser. No. 650,777
Claims priority, application United Kingdom, Jan. 21, 1975, 2616/75
Int. Cl.² B65B *5/02, 9/10, 35/50*
U.S. Cl. 53—162 **2 Claims**

1. In an apparatus for forming commodity packages comprising an elongate vertically extending mandrel having a hollow feed portion with a product opening leading to the mandrel interior and a lower discharge end, drive means for passing a tubular flexible packaging material axially and downwardly along the mandrel while allowing commodities to be inserted into the mandrel interior through the product opening and transverse sealing means below the discharge end of the mandrel for forming transverse seals in the packaging tube, the improvement comprising a platform provided below the mandrel for lifting movement into an upper position in which the platform is situated within the hollow portion of the mandrel to lift a previously transversely sealed end portion of the packaging tube depending from the discharge end of the mandrel into the hollow portion of the mandrel and to allow a commodity or a stack of commodities inserted into the hollow portion through the product opening to be supported by the platform on an internal surface of said previously sealed end portion and for lowering movement to withdraw from the mandrel to release the previously sealed end portion of the packaging tube with the included commodity or commodities from within the mandrel for subsequent transverse sealing of the tube above the commodity or commodities to form a package and means to move said platform upwardly into said mandrel and downwardly to withdraw from said mandrel.

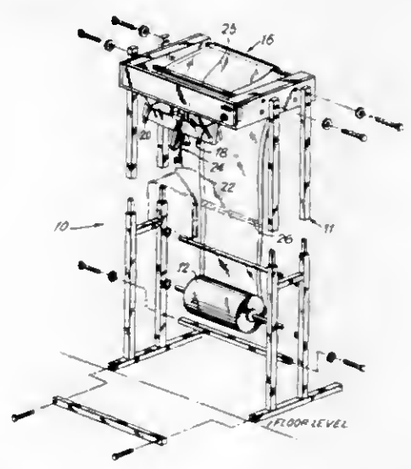


4,027,461

FLOATING HOOK ARRANGEMENT FOR AN APPARATUS FOR BAGGING GARMENTS

Murray Jelling, Roslyn Heights; Alexander Kahn, Massapequa; Ernest George Moore, East Meadow, and Michael Friedman, Brooklyn, all of N.Y., assignors to U.S. Dynamics Corporation, Amityville, N.Y., a part interest

Filed July 22, 1976, Ser. No. 707,653
Int. Cl.² B65B *43/26, 67/04*
U.S. Cl. 53—241 **13 Claims**



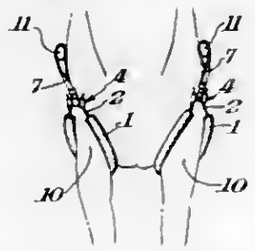
1. A floating hook arrangement for use in an apparatus for bagging garments, said apparatus having means for supporting said floating hook arrangement, said arrangement comprising a central elongated shaft having a first end and a second end spaced from said first end; a hook mounted on said central elongated shaft at said first end for supporting a garment thereon; means at said second end for mounting said central elongated shaft on said means for supporting said floating hook arrangement; and a spreader unit on said shaft and having a first end adjacent said means for mounting said cen-

tral shaft, and a second end spaced from the latter said first end toward said first end of said central elongated shaft and engaged with said central elongated shaft.

4,027,462
APPARATUS AND METHOD FOR INCREASING SPEED OF HORSES

Kenneth James Shand, 418 N. Union St., Wilmington, Del. 19805

Filed Oct. 29, 1975, Ser. No. 626,768
Claims priority, application Australia, Oct. 30, 1974, 9421/74; May 19, 1975, 81314/75
Int. Cl.² B68B *1/00*
U.S. Cl. 54—71 7 Claims



1. A leg spreader for spreading forelegs of a quadruped animal having a xiphoid region, to cause the unweighted forelegs of the animal while trotting or pacing, with which it is associated, to move transversely outwardly of the animal to prevent knee knock, said spreader comprising for each foreleg, in combination:

a. anchoring means carried by the animal operatively mounted above the forelegs of the animal,

b. a resilient loop member having an upper end portion adapted to be arranged and disposed outboard and closely adjacent the animal, said loop member being positioned around the upper inside portion of the foreleg, and

c. vertical urging biasing means located within the loop member operatively associated with the end portion of the loop member and the anchoring means to bias the loop member to urge the loop member upwardly to provide leg spreading to prevent knee knock, said loop member having a sufficient size and bulk to cause the unweighted forelegs of said animal to swing over and outwardly of said loop member when moving rearwardly to provide leg spreading and decrease knee knocking.

4,027,463
LAWN MOWER

Katsuhiko Takahashi, Tokorozawa, and Hachiro Doi, Kamifukuoka, both of Japan, assignors to Fuso Keigokin Co., Ltd., Tokyo, Japan

Filed Sept. 4, 1975, Ser. No. 610,222
Claims priority, application Japan, May 30, 1975, 50-65963
Int. Cl.² A01D *55/26*
U.S. Cl. 56—13.6 6 Claims

1. A lawn mower comprising:

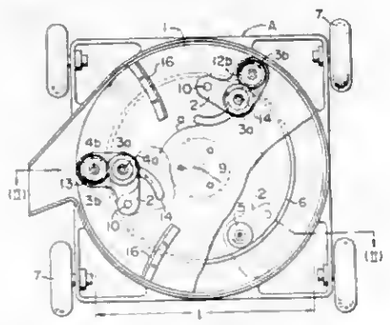
a frame with means to support said frame on the ground,

a motor driven rotary disc supported by and disposed within said frame,

a pair of coacting blades carried by said rotary disc,

frictional means for driving said blades under the influence of centrifugal force, comprising a stationary ring carried by said frame, and a frictional roller mounted upon said disc and being capable of pivotal movement relative to said disc so that when said disc rotates, said frictional roller pivots into contact with said ring under the influence of centrifugal force; and

means operatively connected to said frictional roller for

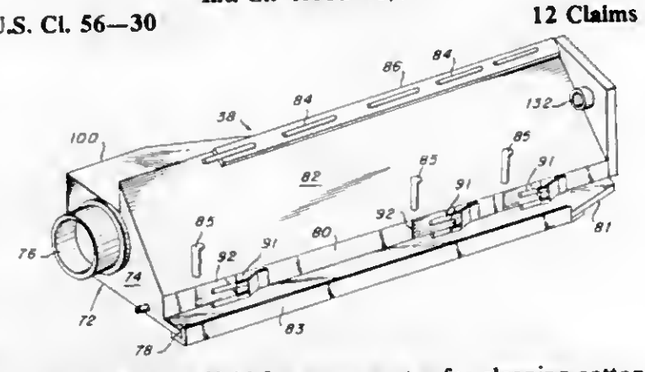


positively rotating both of said blades relative to each other.

4,027,464
COTTON HARVESTING MACHINE

G W (Charles) Stone, Dyess, Ark., assignor to Agriculture Research Incorporated, Williamsburg, Va.

Continuation-in-part of Ser. No. 581,696, May 28, 1975, Pat. No. 3,964,242. This application June 21, 1976, Ser. No. 698,275
Int. Cl.² A01D *46/10*
U.S. Cl. 56—30 12 Claims



1. An intake manifold for an apparatus for gleaning cotton comprising:

a floor member,

a frontward end wall and a rearward end wall fixed to opposite ends of the floor member,

an outside wall fixed to an outside edge of the floor member and to the frontward and rearward end walls,

an inside wall having a height significantly less than the outside wall, the inside wall fixed to the floor member parallel to, but some distance from, a running edge of the floor member, the inside wall having a plurality of apertures, each aperture opening into a forwardly- and upwardly-inclined duct,

a downfall sheet fixed to a top edge of the outside wall, the frontward and rearward end walls, and the inside wall so as to be spaced from and inclined with respect to the floor member, the downfall sheet having a plurality of longitudinal slots, each slot being located so as to connect with one of the forwardly-and upwardly-inclined ducts.

4,027,465
ROUND HAY BALER APPARATUS

Vernon J. Lundell, P.O. Box 171, Cherokee, Iowa 51012

Filed July 28, 1975, Ser. No. 599,336
Int. Cl.² A01D *39/00*
U.S. Cl. 56—341 9 Claims

1. A baler for picking up cut hay from a field and forming it into a cylindrical bale, said baler comprising:

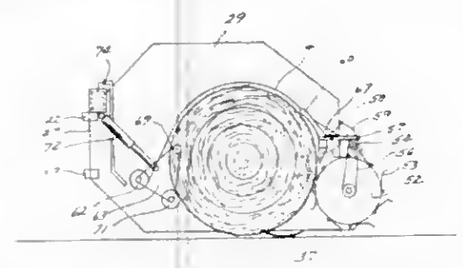
portable frame means having a forward end and a rearward end;

upright spaced sidewalls mounted to said frame;

drum means rotatably mounted within said frame means proximate said rear end, said drum means having pickup means mounted thereon for picking up the hay and for rolling the hay into a cylindrical bale and for rolling the bale;

spring biased band means mounted above the ground in said frame means and extending from proximate said drum means to proximate said forward end, said band means provided to compact the hay in the bale as it is formed between the ground and said band means;

power means operably connected to said drum means for rotating said drum means; and

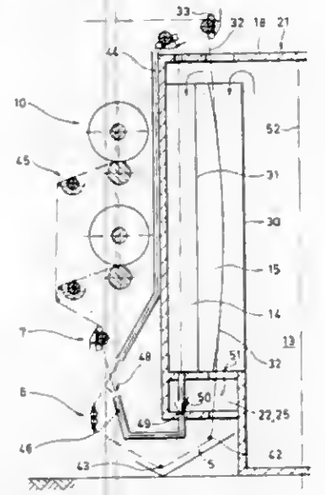


said band means includes a cross member extending between said sidewalls above said drum means, a band roller rotatably mounted between said sidewalls proximate said forward end, at least one band having one end secured to said cross member and having the other end wrapped around said roller, spring means interconnected between said sidewalls and said roller to bias said roller in a position wherein said band extends in a first position directly between said roller and said cross member, said band movable from said first position to a second position wherein it forms an arc between said cross member and said roller as it engages the bale being formed thereunder.

4,027,466
PROCESS FOR CONTINUOUSLY TREATING THERMOPLASTIC YARNS

Gustav Brehm, Wattwil, Switzerland, assignor to Heberlein Maschinenfabrik AG, Wattwil, Switzerland

Filed May 25, 1976, Ser. No. 689,919
Claims priority, application Switzerland, June 17, 1975, 7883/75
Int. Cl.² D02J *13/00*; D01H *13/28*
U.S. Cl. 57—34 HS 15 Claims



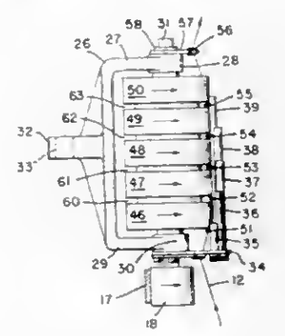
1. An installation for continuously treating thermoplastic yarn comprising an assembly of heat-insulated walls defining a substantially closed chamber and including an upper wall formed with an aperture for the passage of yarn therethrough and a lower wall formed with an aperture for the passage of yarn therethrough, a heat treatment unit mounted in said chamber for heating yarn passing into said chamber through one of said apertures, then through said heat treatment unit and out of said chamber through the other of said apertures,

means outside said chamber for mechanically deforming the yarn, a winding-up station for yarn outside said chamber, means for feeding heated yarn leaving said chamber through said yarn deforming means to said winding-up station, means for supplying heated air into said chamber, means for withdrawing air out of said chamber so as to cause air to flow through said chamber and means for directing such air over said heating unit to add to the heating effect thereof.

4,027,467
UNIROLL FALSE TWIST DEVICE AND METHOD

Joseph F. Smith, 1901 E. Wendover Ave., Greensboro, N.C. 27405

Filed June 4, 1976, Ser. No. 692,650
Int. Cl.² D02G *1/04*; D01H *7/92*
U.S. Cl. 57—77.4 12 Claims



1. A uniroll device for false twisting a continuously traveling yarn comprising; a rotatably bearingly supported driven member for engaging and twisting a continuously traveling yarn, said yarn-engaging and twisting member having a plurality of spaced-apart circular segments, said member having yarn guide means receiving recesses therebetween, yarn guide means including a series of adjustably positioned yarn-engaging spaced-apart members projecting inwardly and spaced from said circular segments in juxtaposition to and cooperatively aligned with said yarn guide receiving recesses and cooperatively supported for engaging and retaining a continuously traveling yarn along a predetermined substantially rectilinear path of contacting travel against said plurality of spaced-apart circular segments and maintaining said traveling yarn outside said recesses whereby a false twist is imparted to the continuously traveling yarn upon rotation of said driven member.

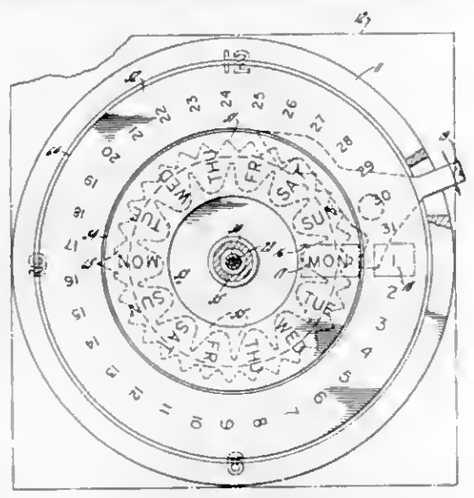
4,027,468
DAY-DATE MECHANISM FOR TRAVEL CLOCK

John T. Felty, Tonica, and Francis J. Ellerbrock, Peru, both of Ill., assignors to General Time Corporation, Mesa, Ariz.

Filed Oct. 31, 1975, Ser. No. 627,595
Int. Cl.² G04B *19/24*
U.S. Cl. 58—4 R 4 Claims

1. In a clock mechanism having provision for display of day and date, the combination comprising a frame, a drive train having a motor and terminating in minutes and hours shafts, a day ring having "day" indicia and a circle of pointed drive teeth in register therewith, a separate date ring having "date" indicia and a circle of pointed drive teeth in register therewith, the two rings being concentric and of different radius with the indicia thereon progressing the same direction and having a viewing window for display of day and date side by side, a 12-hour wheel coupled to the hours shaft and having a drive pawl thereon, a star wheel having arms in the path of movement of the drive pawl, a detent spring cooperating with the star wheel for causing the same to complete a step of forward indexing when movement is initiated by the drive pawl, an index pawl on the star wheel having arms in a 1:2 ratio with the latter for effecting driving of the index pawl on a 24-hour

cycle, the index pawl being positioned to engage the drive teeth on the rings for moving both of the rings forwardly simultaneously followed by movement of the pawl clear of the drive teeth, detent springs for the respective rings anchored in



the frame and cooperating with the drive teeth to complete a step of forward indexing when movement is initiated by the index pawl, and reset means alternately engageable with the respective rings for manually indexing the rings forwardly step by step with one another into set positions.

4,027,469

DATING MECHANISM FOR CALENDAR CLOCKS

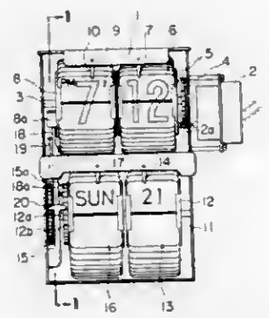
Jusuke Yagulnuma, Koriyami, Japan, assignor to Copal Company Limited, Tokyo, Japan

Filed Sept. 30, 1975, Ser. No. 618,240

Claims priority, application Japan, Sept. 30, 1974, 49-118084

Int. Cl.² G04B *19/24, 19/02*

U.S. Cl. 58—6 R **6 Claims**



1. A dating mechanism for leaf-type calendar clocks comprising a body frame, a minute indicating drum and hour indicating drum respectively rotatably adjacently arranged on a first axis mounted on said body frame, a date indicating drum and week day indicating drum respectively rotatably adjacently arranged on a second axis parallel with said first axis, said minute and hour indicating drums being arranged parallelly above said date and week day indicating drums, a first ratchet wheel provided concentrically and integrally with said date indicating drum on one side surface of said date indicating drum, a second ratchet wheel provided concentrically and integrally with said week day indicating drum on one side surface of said week day indicating drum and opposed to said first ratchet wheel, an operating member provided integrally with said hour indicating drum on one side surface of said hour indicating drum, and a feeding lever engageable with said operating member and having a ratchet portion thereon engaging with said first and second ratchet wheels, said date indicating drum and week day indicating drum being intermittently rotated by a predetermined angle through said feeding lever at intervals of one rotation of said hour indicating drum.

4,027,470

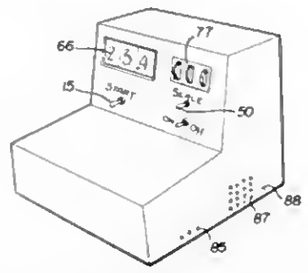
DIGITAL TIMER CIRCUIT

Eliot I. Friedman, 1175 Wendy Road, Ann Arbor, Mich. 48103

Filed Apr. 4, 1975, Ser. No. 565,233

Int. Cl.² G04F *3/02, 8/20;* **G06F** *7/38;* **G01R** *23/02*

U.S. Cl. 58—39.5 **15 Claims**



1. In a method of operating a digital timer on line currents of different frequencies, including half-wave rectifying the line current for converting the line current into square wave pulses, counting timing pulses in counters at a frequency different from the line current frequency by incrementing the counters, and comparing the value in the counters with the desired timing interval to generate an output signal when the values in the counters equals the desired timing interval, and actuating a starting switch to clear the counters, the improvement comprising:

initiating and synchronizing the incrementing of the counters by clearing the counters in response to the next square wave pulse and enabling all successive square pulses thereafter to be converted into timing pulses;

then determining the frequency of the line current by determining the frequency of the square wave pulses;

simultaneously modifying square wave pulses on parallel paths to provide output pulses at different frequencies, one of which equals the timing pulse frequency; and

enabling only output pulses at the timing pulse frequency to increment the counters.

4,027,471

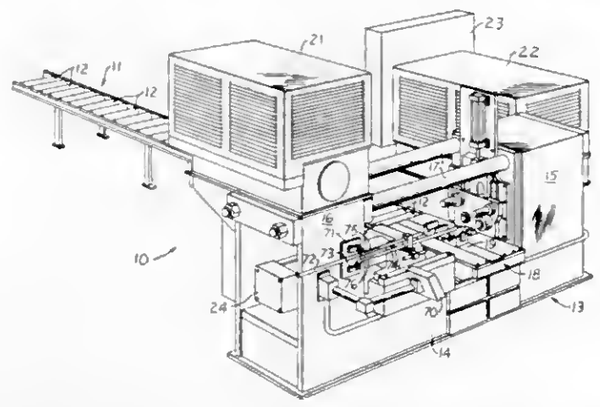
METHOD OF AND APPARATUS FOR SEMI-AUTOMATIC ASSEMBLY OF TRACK-TYPE CHAIN

Charles E. Lipp, Morton, and Teddy R. Young, E. Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Jan. 16, 1976, Ser. No. 649,872

Int. Cl.² B21L *9/00*

U.S. Cl. 59—7 **9 Claims**



1. The method of assembling chain comprising a plurality of links each consisting of a pair of spaced interconnected link

sides articulately joined by coacting, concentrically disposed pin and bushing means; said method comprising the steps of:

a. positioning a first one of said pin and bushing means in a given horizontal plane and supporting said pin and bushing means for slidable endwise movement in said plane;

b. supporting a first pair of said link sides on opposite sides of said pin and bushing means in spaced relation thereto but otherwise positioned for interconnection with the bushing thereof in their normal position as assembled into said chain;

c. moving said first pair of link sides toward each other until a first one of said first pair of link sides has reached a given point in space;

d. rigidly locking said first one of said first pair of said link sides at given point in space against movement away from the second one of said first pair of link sides while continuing to move said second one of said first pair of link sides toward said first one thereof and into operative contact with said bushing of said first one of said pin and bushing means until a press-fit assembly of said link sides with said bushing of said pin and bushing means is complete, and

e. indexing said first pair of link sides assembled with said first one of said pin and bushing means in said given plane and perpendicular to the axis of the pin of said first one of said pin and bushing means.

4,027,472

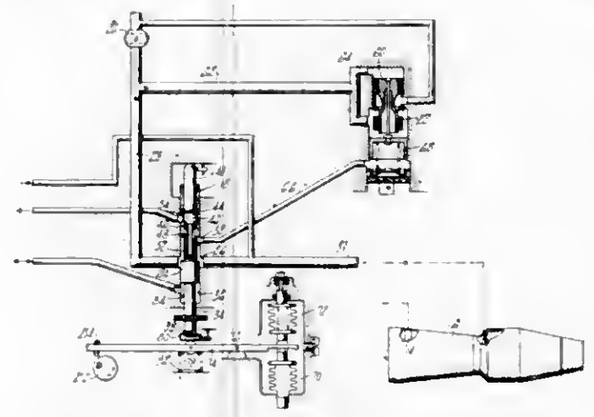
FUEL CONTROL

Charles F. Stearns, East Longmeadow, Mass., assignor to United Technologies Corporation, Hartford, Conn.

Division of Ser. No. 559,458, March 18, 1975, Pat. No. 3,975,903. This application Mar. 5, 1976, Ser. No. 664,132

Int. Cl.² F02C *9/08*

U.S. Cl. 60—39.28 R **4 Claims**



1. A fuel control for a turbine type power plant having a compressor, said fuel control responding to compressor inlet temperature and compressor speed for providing an acceleration schedule and compressor speed and power lever position for providing a steady state schedule, means responsive to said acceleration schedule and steady state schedule for producing a signal indicative of a ratio of fuel flow to compressor pressure providing an input signal, means producing a signal as a function of actual compressor pressure as an additional input signal, means for multiplying said input signal and said additional input signal, said means including a throttle valve disposed in a cylinder and having a reaction surface and a land adjusting the area of serially connected orifices formed in said cylinder, a pilot valve having a pair of serially connected contoured orifices formed therein, hydraulic means leading pressurized fluid from a pressure source through one of said contoured orifices and through said other contoured orifices and downstream of said throttle valve and a fluid connection interconnecting said reaction surface and said hydraulic means at a point between said pair of serially connected contoured orifices for positioning said throttle valve and means responsive to said additional input means for further positioning said throttle valve.

4,027,473

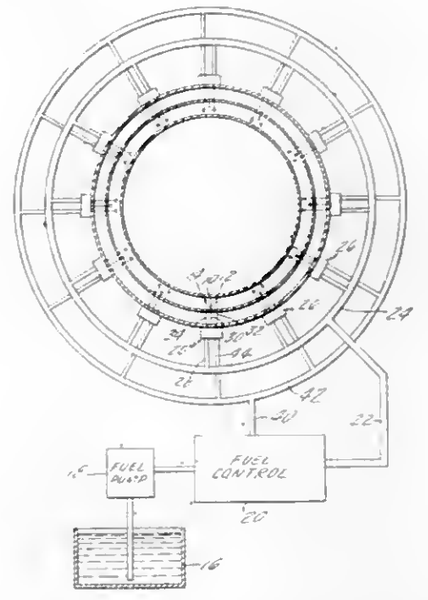
FUEL DISTRIBUTION VALVE

Joseph R. Baker, Vernon, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Mar. 5, 1976, Ser. No. 664,130

Int. Cl.² F02C *9/08*

U.S. Cl. 60—39.28 R **10 Claims**



1. A distribution system for a primary and secondary fuel nozzle system for a combustor of a turbine type power plant comprising at least one distributor valve having a first movable means for exposing a fuel opening in said first movable means communicating with said primary nozzle in a first and second position thereof and another fuel opening in said first movable means communicating with said secondary nozzle solely in the said second position thereof, a second movable means movable relative to said first movable means for regulating flow of fuel through both of said fuel openings, and means responsive to the pressure drop across at least one of said openings for regulating the position of said second movable means, whereby the flow through each of said openings bears a given relationship to each other for each pressure drop value.

4,027,474

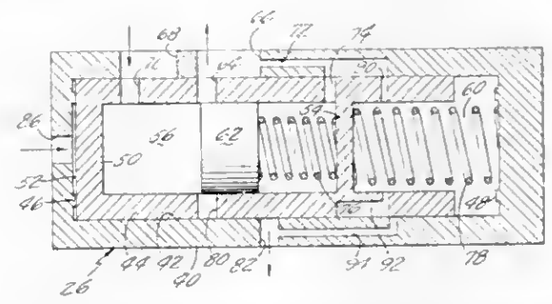
FUEL PREFILL AND DISTRIBUTOR VALVE CONSTRUCTION

John P. Demase, Colchester, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Mar. 5, 1976, Ser. No. 664,131

Int. Cl.² F02C *9/08*

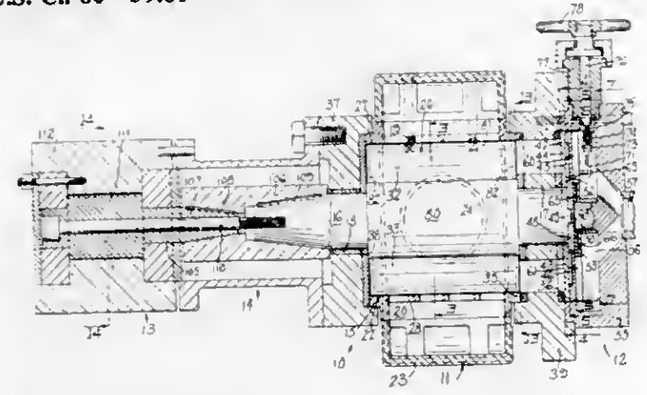
U.S. Cl. 60—39.28 R **13 Claims**



1. A distribution system for a primary and secondary fuel

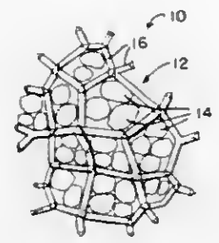
nozzle system for a combustor of a turbine type power plant comprising at least one distributor valve having a first movable means for exposing a fuel opening in said first movable means communicating with said primary nozzle in a first and second position thereof and another fuel opening in said first movable means communicating with said secondary nozzle solely in the said second position thereof, a second movable means movable relative to said first movable means for regulating flow of fuel through both of said fuel openings, said second movable means having means for proportioning the flow through said fuel openings being responsive to the pressure drop across at least one of said openings, and said first movable means including means to prefill the secondary nozzles and its associated communicating connections with fuel immediately preceding said second position.

4,027,475
POWER SYSTEMS
Lawrence R. Folsom, Charlotte, Vt., assignor to Advanced Power Systems, North Haven, Conn.
Continuation of Ser. No. 518,633, Oct. 29, 1974, abandoned, which is a division of Ser. No. 371,742, June 20, 1973, abandoned. This application May 24, 1976, Ser. No. 689,460
Int. Cl.² F02G *3/00*
U.S. Cl. 60—39.61 **26 Claims**



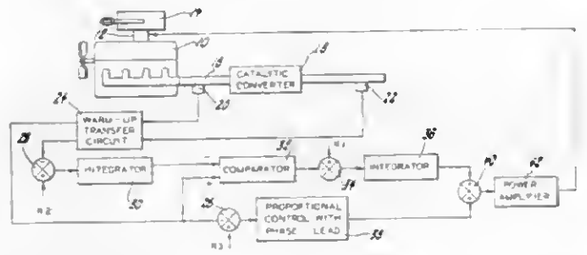
1. A drive system comprising an engine of the type having a housing, a rotor reversely rotatable between two extremities in said housing where the rotor has at least one radial vane extending into at least one chamber defined by said extremities, means for varying the magnitude of the angular strokes and the speed of said rotor, and an energy conversion device coupled to said rotor to convert the oscillatory mechanical energy of said rotor to unidirectional energy of another form.

4,027,476
COMPOSITE CATALYST BED AND METHOD FOR MAKING THE SAME
Eckart W. Schmidt, Bellevue, Wash., assignor to Rocket Research Corporation, Redmond, Wash.
Continuation of Ser. No. 406,700, Oct. 15, 1973, abandoned. This application Oct. 15, 1975, Ser. No. 622,607
Int. Cl.² C06D *5/04;* **B01J** *8/00, 35/04*
U.S. Cl. 60—218 **46 Claims**



1. A composite catalyst bed comprising:
a. a three dimensional, structurally rigid foam metal matrix, comprising a network of interconnected ligaments which define a plurality of interconnected pores, and
b. a plurality of separate pellet-like catalyst carrying particles, each comprising a supporting carrier material that carries a catalyst material, and positioned in and filling the pores of such matrix, with relative movement of said particles being restrained by said matrix.

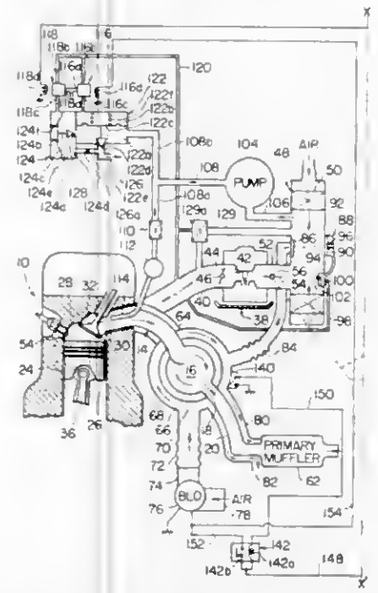
4,027,477
DUAL SENSOR CLOSED LOOP FUEL CONTROL SYSTEM HAVING SIGNAL TRANSFER BETWEEN SENSORS DURING WARMUP
Edwin C. Storey, Rochester, N.Y., assignor to General Motors Corporation, Detroit, Mich.
Filed Apr. 29, 1976, Ser. No. 681,533
Int. Cl.² F02B *3/00*
U.S. Cl. 60—276 **2 Claims**



1. For use with an internal combustion engine including means effective to supply air and fuel thereto in variable ratio and exhaust means including a catalytic converter effective, when supplied with exhaust gases containing air and fuel in a certain ratio, to accelerate simultaneously the oxidation of unburned fuel and the reduction of nitrogen oxides, apparatus for controlling the ratio of air and fuel in the exhaust system to the certain ratio, the apparatus comprising in combination:
a first air-fuel ratio sensor exposed to the exhaust gases in the exhaust means upstream from the catalytic converter, the first air-fuel ratio sensor having a negative temperature coefficient of resistance and being effective to generate a voltage thereacross when heated to a specified operating temperature that represents the air-fuel ratio in the exhaust gases upstream from the catalytic converter, the first air-fuel ratio sensor being quickly heated to the specified operating temperature by the exhaust gases after operation of the internal combustion engine is initiated;
a second air-fuel ratio sensor exposed to the exhaust gases in the exhaust means downstream from the catalytic converter, the second air-fuel ratio sensor having a negative temperature coefficient of resistance and being effective to generate a voltage thereacross when heated to the specified operating temperature that represents the air-fuel ratio of exhaust gases downstream from the catalytic converter, the second air-fuel ratio sensor being heated to the specified operating temperature by the exhaust gases after operation of the internal combustion engine is initiated a catalytic converter imposed time delay after the first air-fuel ratio sensor is heated to the specified operating temperature;
a resistor having a resistance much less than the impedance of the second air-fuel ratio sensor prior to initiation of operation of the internal combustion engine and subsequent heating of the second air-fuel ratio sensor;
means effective to couple the voltage generated by the first air-fuel ratio sensor across the series combination of the second air-fuel ratio sensor and the resistor, the voltage across the second air-fuel ratio sensor being influenced by the voltage generated by the first air-fuel ratio sensor in decreasing relationship with increasing temperature of the second air-fuel ratio sensor; and
means responsive to the voltage across the first and second

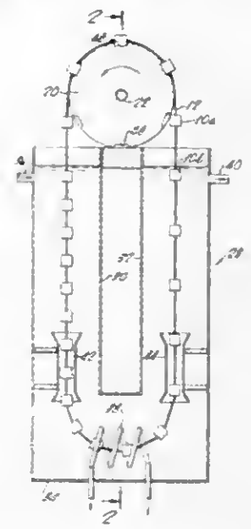
air-fuel ratio sensors effective to continually adjust the fuel and air supply means to vary the ratio of fuel and air supplied to the engine in a sense to reduce the deviation of the ratio of fuel and air in the exhaust means from the certain ratio.

4,027,478
MULTIPLE-CYLINDER INTERNAL COMBUSTION ENGINE
Kenji Masaki, Yokohama, and Naomi Tokura, Yokosuka, both of Japan, assignors to Nissan Motor Co., Ltd., Japan
Filed Oct. 1, 1975, Ser. No. 618,406
Claims priority, application Japan, Oct. 3, 1974, 49-114175
Int. Cl.² F01N *3/10;* **F02B** *75/10*
U.S. Cl. 60—285 **13 Claims**



1. A spark-ignition multiple-cylinder internal combustion engine for an automotive vehicle, comprising in combination first and second sets of cylinders, a mixture induction system for supplying an air-fuel mixture richer than a stoichiometric mixture to said first set of cylinders and an air-fuel mixture leaner than the stoichiometric mixture to said second set of cylinders, an air-intake system for supplying air to said mixture induction system, an exhaust system to which said cylinders are jointly connected, an exhaust re-combustion chamber incorporated into said exhaust system for mixing and re-combusting exhaust gases from said cylinders, first heat-exchange means associated with said exhaust re-combustion chamber and responsive to the temperature of the exhaust re-combustion chamber for absorbing heat from the re-combustion chamber in a heated condition, second heat-exchange means associated with said air-intake system and responsive to medium to low load operating conditions of the engine for warming up air in the air-intake system during the medium to low load operating conditions, secondary-air supply means responsive to the temperature of said exhaust re-combustion chamber and to cold driving condition of the engine for supplying secondary air to the exhaust gases entering the exhaust re-combustion chamber at a rate varying with engine load during the medium to low load operating conditions and peaking up during the cold driving condition, a spark ignition system responsive to the cold driving condition of the engine for retarding the ignition timings of at least said first set of cylinders, said first heat-exchange means including an air jacket having a portion enclosing said exhaust re-combustion chamber and having a first air outlet port directly open to the atmosphere and a second air outlet port communicating with said second heat-exchange means, an electrically-operated positive-displacement air-feed unit for feeding air into said air jacket when energized, and an electric control circuit responsive to the temperature of said exhaust re-combustion chamber and operative to energize said air-feed unit when the temperature of the exhaust re-combustion chamber rises to a predetermined level.

4,027,479
VARIABLE DENSITY HEAT ENGINE
John S. Cory, 1436 View Point, Escondido, Calif. 92025
Filed May 6, 1976, Ser. No. 684,066
Int. Cl.² F03G *7/06*
U.S. Cl. 60—527 **38 Claims**

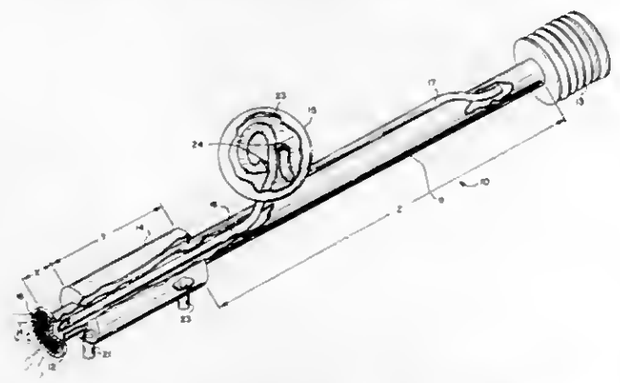


14. A thermal energy converter comprising,
an endless loop including,
a plurality of reactive elements that tend to move in a force field,
a shape memory material having different low and high temperature configurations, and
means for interconnecting said elements and material to position said elements in a first density when said material is in said low temperature configuration and in a second density when said material is in said high temperature configuration,
a force field,
means for guiding said loop along a closed path having a first section in said force field,
means for causing said loop to have an increased temperature in said path section whereby said elements are in said second density as the loop traverses said path section, and
means for cooling and deforming said material in sections of said path following said first section.

4,027,480
HYDRAULIC ENGINE
William A. Rhodes, 4421 N. 13th Place, Phoenix, Ariz. 85014
Filed Dec. 29, 1975, Ser. No. 644,542
Int. Cl.² F01K *25/10;* **F03G** *7/02*
U.S. Cl. 60—531 **15 Claims**

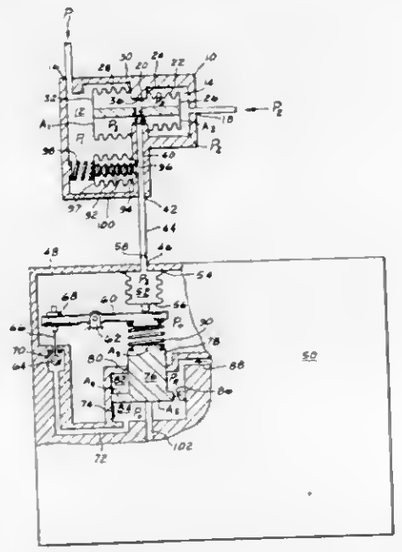
1. A method of absorbing thermal energy and transforming it into an oscillating mechanical function comprising the steps of:
confining a liquid in a column closed at one end by a thermal absorbing head and at the other end by a flexible means,
directing concentrated thermal energy onto said head to raise the temperature in the column until it reaches a point at which nucleate boiling of the liquid begins,
said boiling of the liquid causing a violent displacement of liquid transferred to its fluid stage to actuate said flexible means,
said fluid cooling and condensing on its expansion and displacement movement just before expansion of said flexible means,
said contracting effect combined with the reactive forces of

the flexible means connected to a load drives the spent condensed fluid back toward said head,
the returning fluid condensed to liquid encountering a new cycle of nucleate boiling liquid which initiates an ensuing



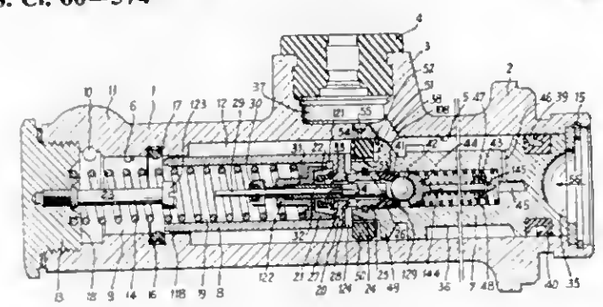
cycle, thereby providing oscillatory mechanical movement of said flexible means, and
cooling the liquid confined in said column at said thermal absorbing head end of said column.

4,027,481
FLUID PRESSURE RESPONSIVE TRANSDUCER APPARATUS
Paulmer D. Hunt, South Bend, Ind., assignor to The Bendix Corporation, South Bend, Ind.
Filed Dec. 11, 1975, Ser. No. 639,946
Int. Cl.² F15B 7/00
U.S. Cl. 60—533 **10 Claims**



1. Fluid pressure responsive transducer apparatus comprising:
a first input bellows exteriorly exposed and responsive to a first pressurized fluid and having a first predetermined internal volume;
a second input bellows exteriorly exposed and responsive to a second pressurized fluid and having a second predetermined internal volume;
an output bellows vented interiorly to the interior of said first and second bellows and together therewith defining a sealed volume of fluid;
a strut member fixedly secured at opposite ends to movable ends of said first and second bellows for maintaining the same in fixed spaced apart relationship;
said first and second predetermined internal volumes being of different capacity and simultaneously variable in response to pressure variations of at least one of said first and second pressurized fluids to thereby internally pressurize said output bellows as a predetermined function of said first and second pressurized fluids.

4,027,482
VARIABLE RATIO HYDRAULIC MASTER-CYLINDER
Ferruccio Manzini, Crema (CR), Italy, assignor to Abred Establishment, Italy
Filed May 27, 1975, Ser. No. 581,242
Claims priority, application Italy, June 17, 1974, 68887/74
Int. Cl.² F15B 7/04
U.S. Cl. 60—574 **9 Claims**

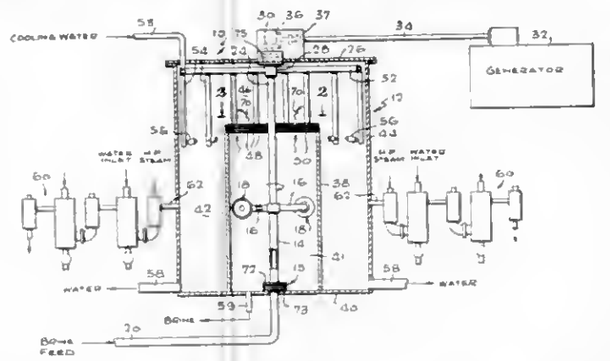


1. A variable ratio hydraulic master-cylinder including a housing having a stepped bore, with a smaller diameter section and larger diameter section, a stepped piston slidably mounted in the stepped bore to define in said smaller diameter section a high pressure chamber adapted to be connected to a utilizing circuit and in said larger diameter section an annular low pressure chamber and a relief compartment adapted to be connected to a hydraulic fluid reservoir, a first passage in the said piston to connect through a first valve the low pressure chamber to the high pressure chamber, said first valve allowing fluid to flow from said low pressure chamber into said high pressure chamber but impeding fluid flow in the reverse direction, a second passage in the said piston to connect through a spring-biased second valve the low pressure chamber to the relief compartment, said second valve being moved in its opened position when the differential of pressures between the low pressure chamber and the relief compartment is above a predetermined level, characterized in further including a third valve for interrupting fluid flow from said low pressure chamber into said reservoir and control means for operating said third valve into its closed position when the stroke of the stepped piston from its rest position is increased above a predetermined length due to an insufficiency of hydraulic fluid in said high pressure chamber to pressurize said utilizing circuit, said third valve means remaining in its closed position when the stepped piston moves through a stroke less than the predetermined length, but sufficient to generate a pressure level capable of actuating the vehicle brakes.

4,027,483
DEVICE FOR CONVERTING INTERNAL ENERGY OF HOT FLUIDS TO SHAFT WORK
Edward F. Wahl, III, Claremont, Calif., assignor to Occidental Petroleum Corporation, Los Angeles, Calif.
Filed Aug. 18, 1975, Ser. No. 605,289
Int. Cl.² F03G 7/00; F01K 25/00; F01D 1/18
U.S. Cl. 60—641 **47 Claims**

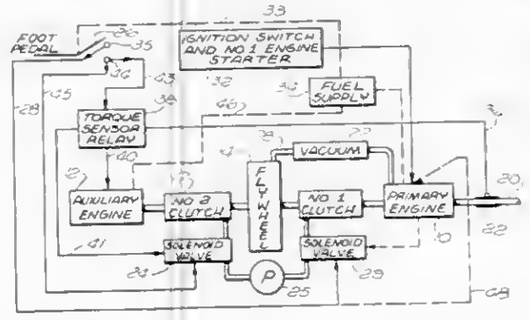
1. A device for converting the internal energy of hot fluids to mechanical work, which comprises a container, hollow rotatable shaft means mounted within said container, conduit means communicating with one end of said shaft means for feeding a hot liquid into said hollow shaft means, means connecting said conduit means and said one end of said shaft means, fluid expansion means mounted on said rotatable shaft means and capable of rotating said shaft means, means for feeding hot liquid from said hollow shaft means to said fluid expansion means, passage of said hot liquid through said expansion means and discharge therefrom being capable of

delivering a rotary thrust to said hollow shaft means and causing rotation thereof, transmitting means for transmitting the work generated by said rotatable shaft means to a machine,



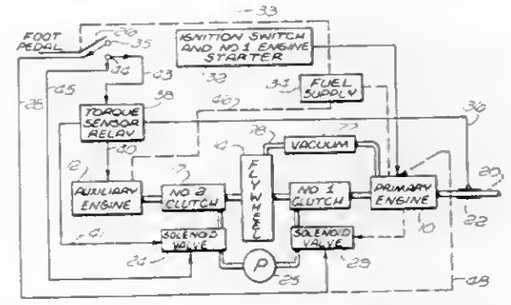
said transmitting means connected to said shaft means, and means for removing fluid discharged from said expansion means, from said container.

4,027,484
MODULAR ENGINE ASSEMBLY
Marvin E. Wallis, 5535 Longfellow Road, Santa Barbara, Calif. 93111
Continuation of Ser. No. 557,746, March 12, 1975, Pat. No. 3,949,556. This application Jan. 19, 1976, Ser. No. 650,374
The portion of the term of this patent subsequent to Apr. 13, 1993, has been disclaimed.
Int. Cl.² F01B 21/00
U.S. Cl. 60—709 **12 Claims**



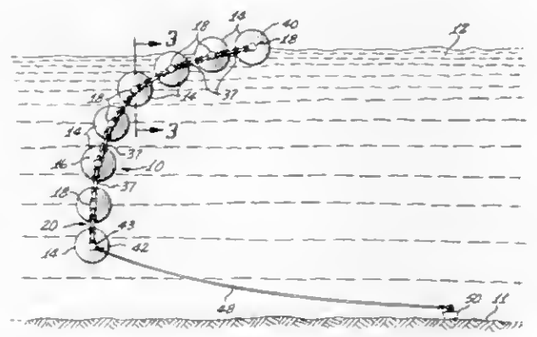
1. A modular engine assembly for connection with a transmission driven thereby comprising:
a primary engine,
means for starting said primary engine,
means for connecting said primary engine to the transmission for driving the latter by said primary engine,
an auxiliary engine,
means for selectively coupling and decoupling said auxiliary engine and said primary engine one to the other for driving the transmission selectively by said primary engine or both said primary engine and said auxiliary engine,
and means for starting said auxiliary engine including means for storing kinetic energy developed by said primary engine and applying said kinetic energy to said auxiliary engine to assist in starting said auxiliary engine.

4,027,485
MODULAR ENGINE ASSEMBLY
Marvin E. Wallis, 5535 Longfellow Road, Santa Barbara, Calif. 93111
Continuation-in-part of Ser. No. 557,746, March 12, 1975, Pat. No. 3,949,556. This application Jan. 26, 1976, Ser. No. 652,326
The portion of the term of this patent subsequent to Apr. 13, 1993, has been disclaimed.
Int. Cl.² F01B 21/00
U.S. Cl. 60—709 **46 Claims**



1. A modular engine assembly for connection with a transmission driven thereby comprising:
a primary rotary engine,
means for starting said primary rotary engine,
means for connecting said primary engine to the transmission for driving the latter by said primary engine,
an auxiliary rotary engine,
means for selectively coupling and decoupling said auxiliary rotary engine and said primary rotary engine one to the other for driving the transmission selectively by said primary engine or both said primary engine and said auxiliary engine, and
means for starting said auxiliary engine including means for storing kinetic energy developed by said primary engine and applying said kinetic energy to said auxiliary engine to assist in starting said auxiliary engine.

4,027,486
ADJUSTABLY SUBMERSIBLE BREAKWATER
Earle T. Dougherty, 3420 N. 71st Ave., Phoenix, Ariz. 85033
Filed Mar. 2, 1976, Ser. No. 663,097
Int. Cl.² E02B 3/06
U.S. Cl. 61—5 **6 Claims**



1. An adjustably submersible breakwater assembly comprising:
a. at least a pair of elongated hermetically sealed hollow tanks disposed in substantially parallel relationship with respect to each other and having their ends in substantial alignment;
b. each of said tanks having a pair of spool members each of which is axially affixed to a different one of the opposite ends of said tank;

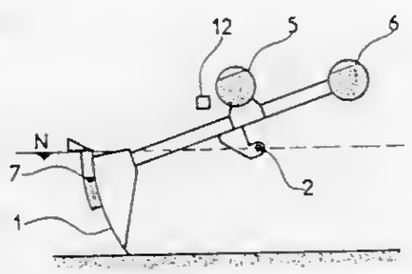
c. interconnection means extending between the aligned ends of said tanks and coupled to the ones of said spool members mounted thereon for interconnection of said pair of tanks, said interconnection means pivotably connected to said spool members to allow said tanks to freely rotate about their respective axes and freely swing relative to each other;
d. means on each of said tanks for individual adjustment of the buoyancy thereof; and
e. means connected to at least one of said tanks for anchoring thereof.

4,027,487

METHOD FOR ADJUSTING AN AUTOMATIC SLUICE WITH A VIEW TO ENSURING A DETERMINED LEVEL

Philippe Alexandre, La Tronche, France, assignor to Societe Generale de Constructions Electriques et Mecaniques (Alsthom), Paris Cedex, France

Filed Oct. 30, 1975, Ser. No. 627,041
Claims priority, application France, Oct. 30, 1974, 74.36231
Int. Cl.² E02B 7/42
U.S. Cl. 61—25 **3 Claims**



1. A method for adjusting an automatic sluice so that it ensures a constant upstream level of a liquid at a determined level mark above or below an axis of rotation of the sluice, the sluice being constituted by a frame pivotably mounted on said axis of rotation and including a sector-shaped gate positioned on said frame on one side of said axis of rotation and centered on said axis of rotation, a hollow sector-shaped float centered on the same axis of rotation and protruding at the upstream face of the said gate, and first and second regulable counterweights integral with the frame, the first counterweight being vertically disposed with respect to said axis in one position of said gate and remaining on one side of said axis in travel of the gate to the other position, the second counterweight being disposed on the frame on the opposite side of the axis from said gate, the assembly oscillating about said axis, the sluice further comprising an opening stop, said method comprising introducing a certain quantity of water in the float, effecting balancing of the sluice by adjusting the counterweights such that the regulated level of the liquid passes through the axis of oscillation of the sluice, adding or withdrawing water in the float to cause, by weight change thereof, a shift in height of the previously regulated level, and adjusting the position of the opening stop to fix the travel limit for the corresponding opening at the new regulated level.

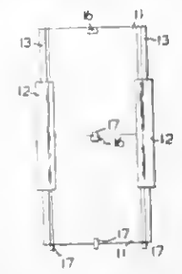
4,027,488

SHAFT LINER ASSEMBLY

Radovan Preradovich, 191 Cadillac Avenue, Val d'Or, Quebec, Canada

Filed Feb. 4, 1975, Ser. No. 547,094
Claims priority, application Canada, Feb. 8, 1974, 192105
Int. Cl.² E21D 5/06
U.S. Cl. 61—41 R **2 Claims**

1. A shaft liner assembly for a manhole adapted for easy assembly and disassembly on site in the ground for retaining when assembled the ground thereabout, said assembly comprising a plurality of vertically adjacent layers of arcuate segments, said segments in each layer forming a circle, each segment having two horizontally disposed arcuate edge portions, one edge portion defining the top edge of said segment and the other defining the bottom edge thereof with the top edges of the segments in a lower one of said layers being in juxtaposition with the bottom edges of the segments in a layer which is vertically adjacent thereto, each segment further having two vertically disposed substantially straight side edges, each vertically disposed side edge being outwardly



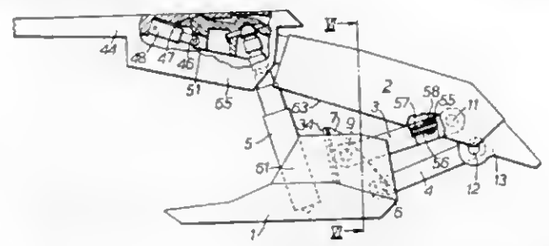
reversely bent, and a series of connecting brackets, each bracket having a longitudinally extending base portion with wing portions extending from opposite sides thereof and inclined toward one another, each bracket being in vertical sliding engagement with adjacent reversely bent portions of respective laterally adjacent segments in two vertically adjacent layers of segments, the wing portions of each connecting bracket being on the opposite side of the respective reversely bent portions of the segments to the base portion to secure both laterally and vertically adjacent segments together.

4,027,489

MINE ROOF SUPPORT

John Hirst Walker, Winchcombe; James Anthony Sutton, Stoke Orchard, and John Henry Waters, Up Hatherley, all of England, assignors to Dowty Mining Equipment Limited, Tewkesbury, England

Filed Apr. 12, 1976, Ser. No. 675,804
Claims priority, application United Kingdom, Apr. 17, 1975, 15798/75
Int. Cl.² E21D 15/44
U.S. Cl. 61—45 D **10 Claims**



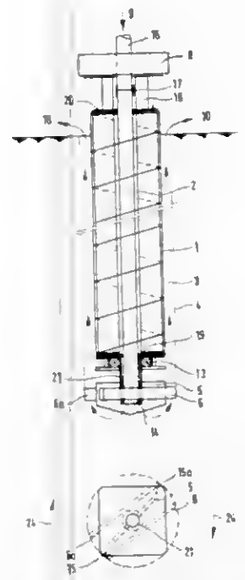
1. A mine roof support comprising a floor engaging means, a roof engageable means above the floor engaging means, and interconnection between the floor engaging means and the roof engageable means, the interconnection including two shields in side-by-side relationship, a part of each shield being pivotally associated at the roof engageable means and being capable of movement in a heightwise direction relative to the corresponding part of the other shield, spring means for urging the shields into their side-by-side relation in which the said shield parts have the same height setting, and jack means adjustable in length to vary the height of the roof engageable means over the floor engaging means.

4,027,490

SELF-SINKING, AXIAL PASSAGE FOUNDATION PILE AND METHOD

Heinrich Stade, Heide, Holstein, and Klaus David, Kiel, both of Germany, assignors to Heinrich Stade, Heide, Holstein, Germany

Filed Sept. 10, 1975, Ser. No. 612,196
Int. Cl.² E02D 7/28
U.S. Cl. 61—53.5 **9 Claims**



1. A self-sinking pre-fabricated concrete foundation pile assembly comprising:
a. a generally elongate rigid steel reinforced concrete pile having a centrally disposed axial bore opening on first and second ends of the pile;
b. rotatable shaft means rotatably disposed within the axial bore and extending from both the first and second ends of the pile for transmission of rotational torque through the pile, wherein said shaft means are removable from said axial bore;
c. drill bit means coupled to the portion of the shaft means extending from the second end of the pile for drilling a sinking hole for the pile;
d. securing means for preventing rotation of the pile; and
e. rotatable driving means coupled to the portion of the shaft means extending from the first end of the pile for rotation of the shaft means and the drill bit means, wherein said drill bit means is releasably coupled to said shaft means and rotatably supported by the pile and includes expandable cutting means for selective widening of the drilling radius beyond that utilized in drilling the sinking hole, said expandable cutting means having two primary cutting blades which are alternatively selectable by reversing the rotational direction of the said drill bit means by changing the rotational direction of said shaft means and wherein said rotatable shaft means is generally hollow and capable of transmitting liquids and wet concrete from said first end to said second end of said pile.

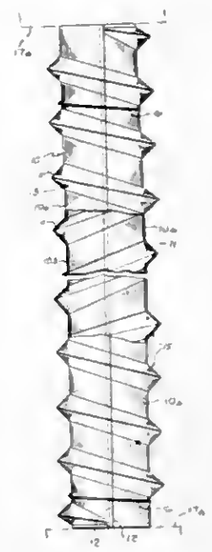
4,027,491

COMPOSITE EARTH DRILLING AUGER AND METHOD OF INSTALLING SAME IN SITU

Lee A. Turzillo, 2078 Glengary Road, Akron, Ohio 44313

Continuation of Ser. No. 441,079, Feb. 11, 1974, abandoned. This application Jan. 27, 1975, Ser. No. 544,402
Int. Cl.² E02D 5/30, 5/32
U.S. Cl. 61—53.56 **26 Claims**

1. A device for producing a pile in an earth situs comprising; an elongated tubular shell of self-supportingly rigid material, formed with outwardly protruding hollow spiral flighting along the same; said shell, including said hollow flighting, being adapted to be filled with solid load-supporting material, whereby the filled tubular shell can be drilled into an earth situs and retained therein as a solid load supporting pile, said formed tubular shell including complementally connecting



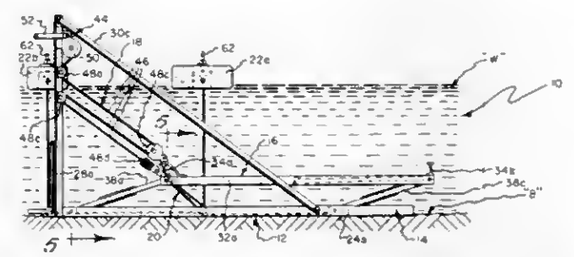
half shell parts adapted to be produced in quantity for nesting like half shell parts compactly stacked one within another for subsequent assembly and use for producing piles.

4,027,492

TRANSPORTABLE BOAT LIFT

Charles R. Carpenter, Jamestown, N.Y., assignor to Metallic Ladder Manufacturing Corporation, Randolph, N.Y.

Filed June 10, 1976, Ser. No. 694,557
Int. Cl.² B63C 1/02
U.S. Cl. 61—65 **9 Claims**

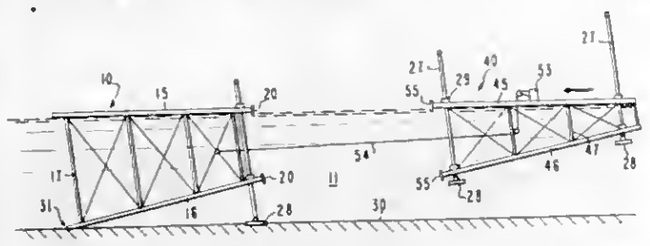


1. A transportable boat lift comprising in combination:
a framework including a base portion for supporting said framework by bottom engagement within a body of water and a boat support portion mounted on said base portion for vertical movement relative thereto between boat supporting and non-supporting positions;
operator control means for controlling movement of said boat support portion between said positions;
flotation means; and
means for movably attaching said flotation means to said base and boat support portions for lowering and raising said framework to removably position said base portion for bottom engagement within said body of water incident to vertical movements of said boat support portion between said positions.

4,027,493
METHOD AND APPARATUS FOR CONNECTING TWO OR MORE COMPONENTS OF AN OFFSHORE PLATFORM

Arthur L. Guy, Jr., Houston, Tex., assignor to Exxon Production Research Company, Houston, Tex.

Filed Apr. 15, 1976, Ser. No. 677,345
Int. Cl.² E02D *21/00*
U.S. Cl. 61—96 **18 Claims**

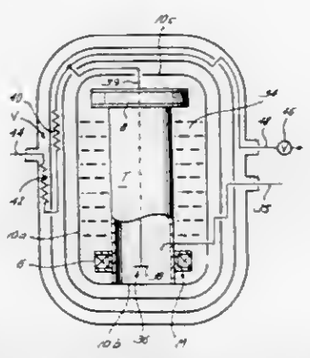


1. A method for connecting two sections of an offshore jacket of an offshore platform, each section having at least three legs, each leg of one of said seetions having a companion leg on the other of said sections comprising:
floating one of said sections in water with sufficient positive buoyancy to maintain said one section with at least one leg at or above the water's surface and the remaining leg or legs submerged to a selected shore site;
grounding said submerged leg or legs of said one section and making said one section negatively buoyant at said selected shore site;
floating said other section in said water with sufficient positive buoyancy to maintain said other section with at least one leg at or above the water's surface and the remaining leg or legs submerged to said selected shore site; and
joining the companion legs of said sections to unitize said jacket.

4,027,494
LOW GRAVITY PHASE SEPARATOR

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of George F. Smoot, Berkeley; William L. Pope, Walnut Creek, and Lawrence Smith, Santa Clara, all of Calif.

Filed Sept. 12, 1975, Ser. No. 612,966
Int. Cl.² F17C *7/02*
U.S. Cl. 62—50 **2 Claims**

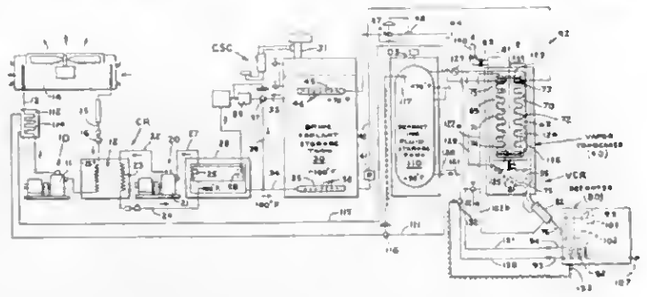


1. In a superconducting magnetic spectrometer adpated for operation in a low gravity or zero gravity spaee environment for measuring cosmic rays and like effects, an apparatus for separating the gas and liquid phases of a diamagnetic cryogen under low gravity conditions to reduce venting of the liquid phase of the cryogen, said apparatus comprising:
a. cryostat means for containing the cryogen,
b. vent means for venting the gaseous phase of the cryogen from said cryostat means; and
c. magnet means mounted in said cryostat means adjacent said vent means for repelling the liquid phase of the diamagnetic cryogen from said vent means to reduce venting of the liquid phase of the cryogen, said magnet means comprising a first superconducting toroidal coil disposed adjacent the spectrometer for providing a deflecting magnetic field in the spectrometer and a second superconducting coil disposed remote from said spectrometer in substantially coaxial relation with said first coil and providing an opposing magnetic field to that of said first coil.

4,027,495
VAPOR RECOVERY SYSTEM FOR VOLATILE LIQUIDS AND VAPOR CONDENSING APPARATUS FOR USE THEREIN

Ray C. Edwards, Kinnelon, N.J., assignor to Edwards Engineering Corporation, Pompton Plains, N.J.

Filed July 22, 1975, Ser. No. 598,004
Int. Cl.² F17C *7/02*
U.S. Cl. 62—54 **17 Claims**



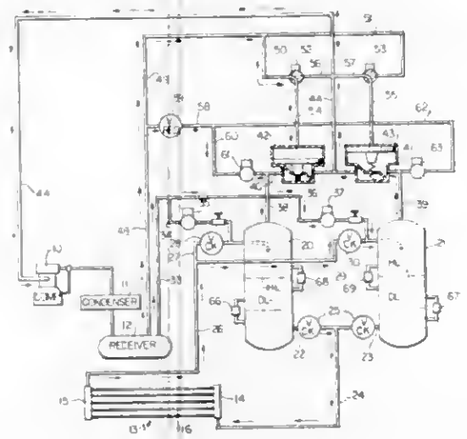
1. In a Vapor Recovery System;
a. a refrigerant cooling means,
b. a storage tank having a cooling medium therein operatively connected to said refrigerant cooling means to maintain said cooling medium at a predetermined reduced temperature, and means for circulating said cooling medium to and from said storage tank,
c. at least one vapor condenser means having, a plurality of finned type cooling coils, said finned typed cooling coils having an inlet connected to said means for circulating said cooling medium to permit cooling medium to be passed to said finned type cooling coils, and an outlet on said finned type cooling coils connected to said circulating means for returning said cooling medium to said storage tank,
d. each vapor condenser having, an inlet means connected to a source of vapor to be condensed, and an outlet port for air, non-condensable gases and uncondensed vapors from said source, and a discharge outlet for the condensate mixture having condensed vapors therein.
e. the finned type cooling coils in each vapor condenser having means to prevent ice forming thereon to block the flow of vapor across said finned type cooling coils,
f. a decanter for separating the liquid components of said condensate, and
g. means connecting the decanter to the discharge outlet for condensate on said vapor condensing means.

4,027,496
DUAL LIQUID DELIVERY AND SEPARATION APPARATUS AND PROCESS

Milton W. Garland, Waynesboro, Pa., assignor to Frick Company, Waynesboro, Pa.

Filed June 22, 1976, Ser. No. 698,641
Int. Cl.² F25B *5/00, 41/00, 39/02*
U.S. Cl. 62—117 **9 Claims**

1. In a refrigeration system having a compressor, condenser, receiver and evaporator, the improvement comprising a pair of pumping tank means, said tank means alternately receiving refrigerant liquid and vapor from said evaporator at evaporator pressure, means for discharging refrigerant vapor from said tank means to said compressor, means for alternately pressurizing said tank means for discharging refrigerant liquid at evaporator temperature from said tanks to said evaporator, said pressurizing means receiving vapor under condenser

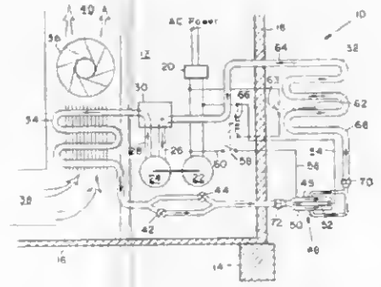


pressure from said receiver, and means for reducing the pressure of the pressurizing vapor to a level less than condenser pressure but greater than evaporator pressure.

4,027,497
FREEZE-UP PREVENTION DEVICE FOR A HEAT PUMP

Merrell E. Thurman, 6301 Fox Run, San Antonio, Tex. 78233

Filed Feb. 26, 1976, Ser. No. 661,728
Int. Cl.² F25D *21/06*
U.S. Cl. 62—156 **9 Claims**

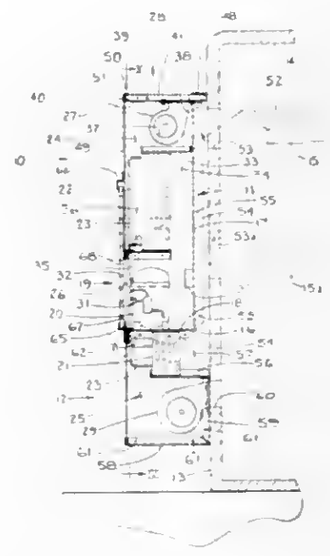


1. A heat pump system for alternately heating and cooling a given space, said system comprising:
a source of power;
a compressor driven by the source of power, said compressor having an inlet and outlet;
valve means connecting to said inlet and outlet;
inside coil located within said given space;
outside coil located outside said given space; said valve means connecting said inlet to said inside coil and said outlet to said outside coil for cooling, and alternatively connecting said inlet to said outside coil and said outlet to said inside coil for heating, said inside and outside coils being adapted to receive a refrigerant from said compressor;
expansion valve means connected to said inside coil for allowing said refrigerant to flow therethrough, said refrigerant being at a high pressure liquid state on one side of said expansion valve means and at a low pressure liquid state after flowing through said expansion means;
sensing means for sensing freeze-up conditions on said outside coil;
freeze-up prevention means disposed between said expansion valve means and said outside coil for receiving said refrigerant therethrough, said freeze-up prevention being responsive to said sensing means upon sensing said freeze-up conditions to connect a heating element to said source of power for adding heat to said refrigerant if ice begins to accumulate on said outside coil during heating of said given space, said heating element being generally pie-shaped and sandwiched between parallel, generally pie-shaped conduit means from said expansion valve means for maximum heat transfer thereto.

4,027,498
AIR CONDITIONER

Herman Sylvester Fessler, Coon Rapids, Minn., assignor to McLean Engineering Midwest, Maple Grove, Minn.

Filed Apr. 2, 1976, Ser. No. 673,068
Int. Cl.² F25D *23/12*
U.S. Cl. 62—263 **25 Claims**



1. An air conditioner for attachment to the exterior wall of an enclosure box for controlling the temperature within the enclosure box, comprising:
a. an outer cabinet wrap having
1. A pair of side panels attached to a pair of end panels and forming a rectangular shaped wrap having an open front and back, there being a peripheral edge around the back having means for mounting of the air conditioner to the wall of an enclosure box,
2. a first fan mounted to the inside of the wrap adjacent to a first one of the ends, the fan being ducted for exhausting air from within the wrap, and
3. a second fan mounted to the inside of the wrap adjacent to the second end, the second fan being ducted for blowing air from within the wrap out the back of the wrap and into an inlet in the enclosure wall;
b. a refrigeration chassis having
1. a frame having first and second legs forming an L-shape,
2. an operable refrigeration system mounted on the frame with a compressor and a condenser coil mounted on a first side of the L-shaped frame and an evaporator coil mounted on a second side of the L-shaped frame,
3. the chassis being mounted in the wrap with a first leg of the L-shaped frame being adjacent and parallel to the back and the second leg extending between the wrap front and the back, the frame being attached to each side of the wrap and dviding the wrap into first and second chambers with the compressor, condenser coil and first fan being in the first chamber and the evaporator coil and second fan being in the second chamber;
c. a baffle positioned between the evaporator coil and the wrap back and baffling the second chamber into an air inlet from the wrap back to the evaporator coil and into an air outlet from the evaporator coil to the second fan;

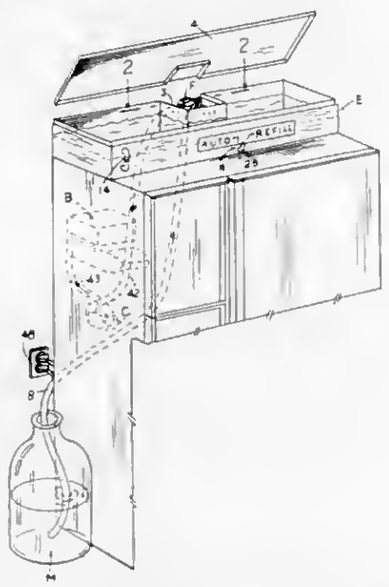
d. an air inlet to the first chamber; and
e. a cabinet front cover removably fastened to the wrap and forming in the first chamber a path of air flow from the inlet through the condenser coil and then to the first fan, and also closing the front of the second chamber.

4,027,499

REFRIGERATOR WATER RESERVOIR ASSEMBLY FOR AUTOMATICALLY SUPPLYING WATER TO THE ICE MAKER FROM THE RESERVOIR

Robert W. Barto, 2019 Duval Lane, Hayward, Calif. 94545, and Leonard A. Brown, 20045 Elfin Forrest Road, Escondido, Calif. 92025

Filed Apr. 12, 1976, Ser. No. 675,919
Int. Cl.² F25C *1/00*
U.S. Cl. 62—340 **3 Claims**



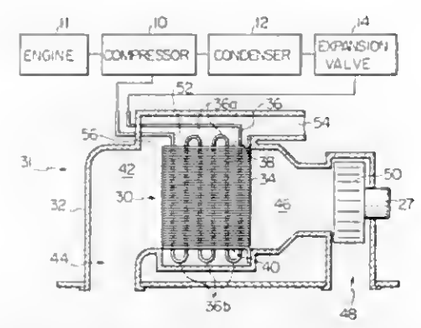
1. A refrigerator having an automatic ice maker unit with a first water conveying conduit communicating with said unit and having a solenoid valve for controlling the water flow through said conduit;
a. a water reservoir containing water; b. a motor driven pump that has a water inlet communicating with the water in said reservoir, said pump having a water outlet second conduit communicating with said solenoid valve; and
c. said automatic ice maker having means for closing an electric circuit when the ice maker requires a supply of water, this electric circuit connecting the motor of said pump to a source of electricity for starting the motor and for opening said solenoid valve;
d. whereby when said automatic ice maker needs water and causes said means to close the electric circuit to start the motor for the pump and open said solenoid valve for feeding water under pressure from said reservoir through said pump and said water outlet second conduit through said valve and said first water conveying conduit to said automatic ice maker, the water flow continuing until said automatic ice maker unit completes its cycle and said means opens the electric circuit to the motor and will stop both the motor and the pump.

4,027,500

AUTOMOBILE AIR CONDITIONER EVAPORATOR

Kazuo Utsugi, Kawagoe, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed July 14, 1975, Ser. No. 595,988
Claims priority, application Japan, July 19, 1974, 49-85795[U]
Int. Cl.² F25B *39/02*
U.S. Cl. 62—519 **5 Claims**



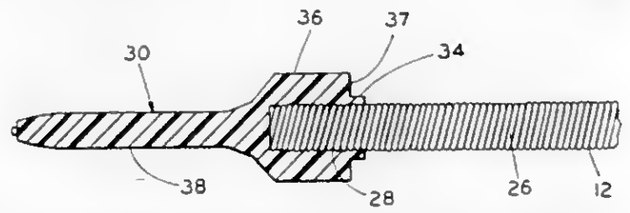
1. An air conditioner evaporator comprising:
a fin assembly having a plurality of parallel fins;
a refrigerant tube which is doubled back on itself a plurality of times and perpendicularly extends through and is connected to each of the fins at a plurality of different locations, the doubled over ends of the refrigerant tube extending external of the ends of the fin assembly;
a housing to fixedly retain the fin assembly and refrigerant tube therein, the housing having a main air inlet communicating with one side of the fin assembly parallel to the fins and an air outlet communicating with another side of the fin assembly parallel to the fins;
a fan mounted in the housing to force air therethrough; and
a precooling chamber defined by the housing and one of the ends of the fin assembly and having a secondary air inlet and an outlet communicating with at least one of the main air inlet and air outlet , said doubled over ends of the refrigerant tube protruding into the precooling chamber.

4,027,501

METHOD FOR JOINING A TIP FOR A FLEXIBLE SHAFT AND ASSEMBLY THEREOF

Paul N. Hanebuth, Hendersonville, N.C., assignor to Stewart-Warner Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 370,989, June 18, 1973, abandoned. This application Nov. 25, 1974, Ser. No. 526,878
Int. Cl.² F16C *1/10, 1/02, 1/08*
U.S. Cl. 64—4 **5 Claims**



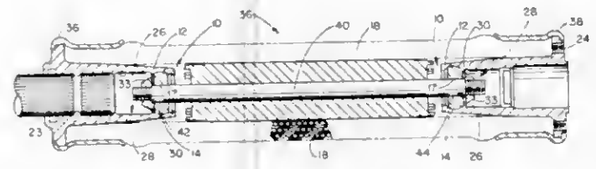
1. A method for ensuring concentricity between a flexible shaft and a coupling, for transmitting rotary moton from said shaft to a magnet shaft rotatably positoned in a speedometer boss, including the steps of forming a flexible shaft, forming a casing for carrying said flexible shaft, forming a ferrule adapted to be fixed to one end of said boss, fixing said ferrule to said boss, forming a noncircular axial passageway in said magnet shaft, and a rigid thrust washer secured in said ferrule, molding a plastic coupling coaxially to one end of said flexible shaft but separate therefrom, simultaneously molding an integral rigid bearing boss on said coupling at one end for rotatable support in said washer, simultaneously molding an integral rigid radial shoulder on said coupling for engagement with said washer to limit movement of said coupling toward said casing, and simultaneously forming a noncircular coaxial projection on said coupling for engagement in said noncircular magnet shaft passageway for rotating said magnet shaft in response to rotation of said flexible shaft.

4,027,502

CENTERING DEVICE FOR TUBULAR FLEXIBLE ELEMENT COUPLINGS

Robert E. Stuemky, Elizabeth, Colo., assignor to The Gates Rubber Company, Denver, Colo.

Filed Feb. 17, 1976, Ser. No. 658,634
Int. Cl.² F16D *3/02*
U.S. Cl. 64—8 **5 Claims**



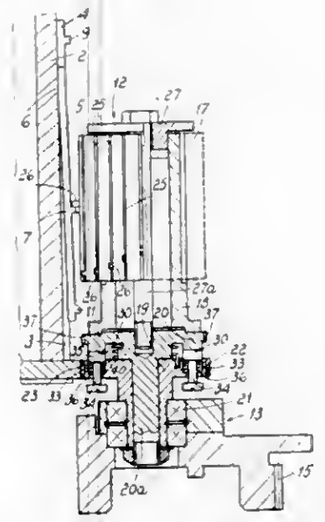
1. A centering device for tubularly shaped flexible element couplings comprising:
a socket;
a ball retained in the socket, the ball having an axial aperture;
means for connecting the socket to a first end of the flexible element;
pin means with a first and extending axially through the axial aperture of the ball;
adjustable stop means with a radial extension that is greater than the diameter of the axial aperture secured to the first end of the pin means for preventing the pin means from extracting from the aperture; and
means for connecting a second end of the pin means to a second end of the flexible element.

4,027,503

PATTERN DRUM WITH PATTERN SIZE INCREASING APPARATUS

Riccardo Tenconi, Via Tallera, 19, Bobbiate-Varese, Italy

Filed July 19, 1974, Ser. No. 490,162
Claims priority, application Italy, July 25, 1973, 27084/73
Int. Cl.² D04B *15/74*
U.S. Cl. 66—50 B **3 Claims**



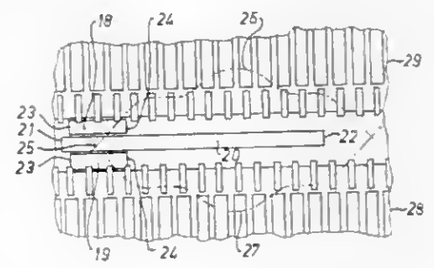
1. A circular knitting machine for manufacturing knitted fabrics having a pattern thereon, comprising a needle cylinder having longitudinal grooves and needles and selector jacks slidable within a number of said grooves, thereby difining a needle fitted out portion of said needle cylinder and a needle free portion thereof, said selector jacks being grouped in groups around the needle cylinder and each having a butt, the butts of adjacent selector jacks of each group being arranged at different heights, at least one pattern drum disposed peripherally with respect to said needle cylinder and provided with a plurality of pattern teeth for engagement with said butts to cause selection of the needles according to the pattern to be reproduced on the fabric, said at least one pattern drum having said pattern teeth disposed along vertical lines spaced by an extent equal to the distance between two adjacent needles of said needle cylinder, a support structure rotatably arranged around said needle cylinder and rotatably supporting said at least one pattern drum, means for rotating said support sturcture, means for causing said at least one pattern drum to revolve relative to said needle clinder during rotation of said support structure around said needle cylinder, means at said needle free portion of said needle cylinder for partially rotating said at least one pattern drum relative to said needle cylinder after a relative revolution of said at least one pattern drum about the circumferential extent of said needle fitted out portion of said needle cylinder so as to cause a given pattern tooth of said at least one pattern drum engaging a selector jack at a given time to become phase displaced with respect to said selector jack by an extent at least once the distance hetween two adjacent needles after a complete relative revolution of said at least one pattern drum about the whole circumferential extent of said needle cylinder, and means for resetting said at least one pattern drum and said needle cylinder in the condition in which said given selector jack newly engages said pattern tooth after a determined number of relative revolutions of said at least one pattern drum about said needle cylinder.

4,027,504

STITCH PRESSER FOR KNITTING MACHINE

Robert Dietschy, Grand'rue 14, and Georges Hexel, Rue du Progres 13, both of 2108 Couvet, Switzerland

Filed July 12, 1976, Ser. No. 704,171
Int. Cl.² D04B *7/04*
U.S. Cl. 66—64 **10 Claims**



1. An improved stitch presser for a knitting machine equipped with the following:
at least two needle beds arranged in an inverted V-shape;
needles capable of intersecting during their upward movement;
a carriage movable above the needle beds;
a system for control of the needles during their displacement in alternate directions;
a stitch presser which acts between the two needle beds on the stitches held by the needles; and
means for alternate control of the stitch presser in a position adequate for the movement of said stitch presser along a row of needles and in another position adequate for the movement in the opposite direction;
wherein the stitch presser comprises a slide thread for pressing the knitwear and a supplementary means for pressing the stitches against the needle beds, the field of action of the supplementary means being at least partially superimposed over the field of action of the slide thread and

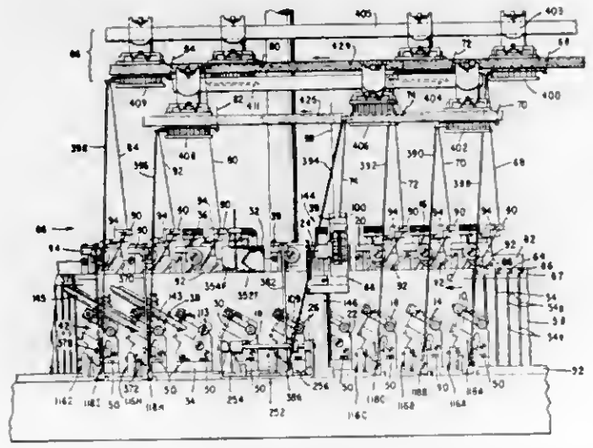
whose field of action starts ahead of the first point of crossing of the needles, seen in the moving direction of the carriage.

4,027,505

CIRCULAR KNITTING MACHINE WITH DISENGAGING POSITIVE YARN FEEDING MEANS

Lester Mishcon, Miami Beach, Fla., and John Christopolous, Charlotte, N.C., assignors to The Singer Company, New York, N.Y.

Division of Ser. No. 564,020, April 1, 1975. This application Feb. 24, 1976, Ser. No. 660,732
Int. Cl.² D04B *15/48*
U.S. Cl. 66—125 R **5 Claims**



1. In a circular knitting machine a plurality of needle actuating cam means each including an adjustable cam, needles at each cam means, a yarn for the needles at each of the cam means, means for positively feeding such yarns, means operable for moving each adjustable cam into a position wherein the adjustable cam causes needles to be moved to a knit position and for withdrawing such adjustable cam from said position to enable the needles to assume other than the knit position, and means for disengaging the positive feed means from a yarn feed for needles at a cam means when the included adjustable cam is moved from the position for moving needles to the knit position, the disengaging means including mechanical connections extending from the adjustable cams to the positive feed means.

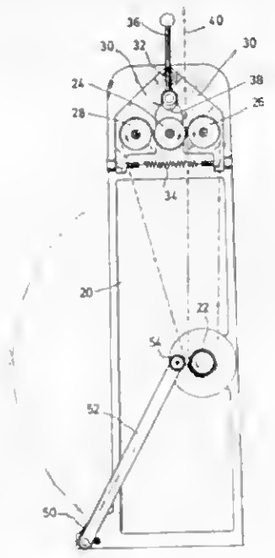
4,027,506

DRAW-OFF AND TAKE-UP ARRANGEMENT FOR CIRCULAR KNITTING MACHINES

Hans Eugen Bitzer, Schorndorf, Germany, assigoor to Firma C. Terrot Sohne, Stuttgart, Germany

Filed Oct. 14, 1975, Ser. No. 621,755
Int. Cl.² D04B *15/88*
U.S. Cl. 66—149 R **3 Claims**

1. A knitted fabric draw-off and take-up arrangement for circular knitting machines, comprising in combination,
- a support structure;
- an idle take-up roller rotatably mounted in said support structure;
- at least one draw-off roller rotatably mounted in said support structure, the axes of said take-up roller and draw-off roller being parallel;
- driving means operatively connected to said draw-off roller for drivingly rotating the latter;
- said arrangement being adapted to withdraw tubular knitted fabric from a circular knitting machine and to guide it as least partially around the draw-off roller and then at least partially around the take-up roller and then again at least partially around the draw-off roller and then is wound on



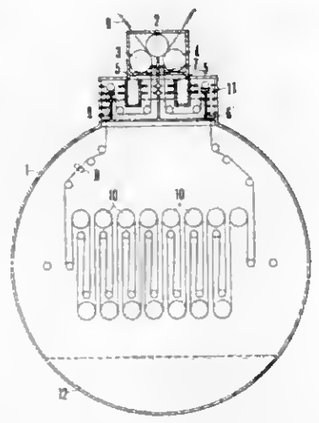
the take-up roller, so that the tubular knitted fabric drives the idle take-up roller.

4,027,507

AIR-AND-LIQUID COMBINED SEALING DEVICE FOR HIGH PRESSURE STEAMER

Yoshikazu Sando, and Hiroshi Ishidoshiro, both of Wakayama, Japan, assignors to Sando Iron Works Co., Ltd., Wakayama, Japan

Filed Oct. 3, 1975, Ser. No. 619,457
Claims priority, application Japan, Oct. 7, 1974, 49-115301; Feb. 27, 1975, 50-24293
Int. Cl.² D06B *23/18*
U.S. Cl. 68—5 E **2 Claims**



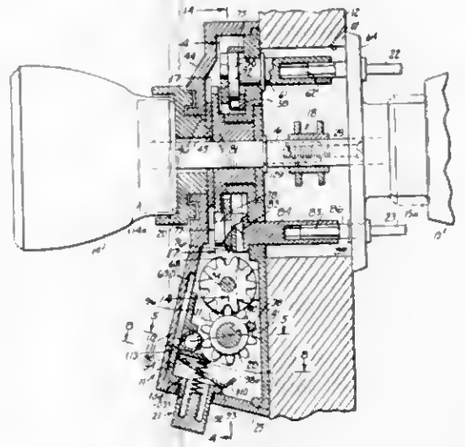
1. An air-and-liquid combined sealing device comprising a high pressure steamer, wall means mounted on said high pressure steamer, said wall means defining an enclosed passageway and having a textile product inlet into said passageway and a textile product outlet from said passageway into said steamer, seal rolls located at the inlet into said passageway and forming a seal for the passageway, said wall means comprising an air chamber adjacent said inlet, a second chamber at the outlet from said passageway into said steamer, and a liquid treating chamber located between and communicating with said air chamber and said second chamber, and said passageway extending serially through said air chamber, said liquid treating chamber and said second chamber for conveying a textile product from said inlet to said outlet and into said steamer.

4,027,508

PUSH-BUTTON COMBINATION LOCK

Thomas K. McGourty, 1640 Cox Road, Aptos, Calif. 95003

Filed Nov. 20, 1975, Ser. No. 633,638
Int. Cl.² E05B *37/02, 37/16*
U.S. Cl. 70—214 **14 Claims**



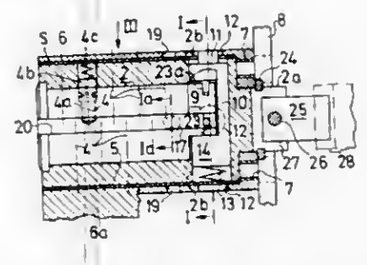
1. A combination lock comprising
- a locking device movable from a first position to a second position,
- a plurality of rotatable locking elements in the path of said device,
- each of said elements having a notch therein for permitting movement of said device to said second position when all said notches are in predetermined positions,
- a plurality of push buttons for corresponding ones of said locking elements,
- setting means operable by each of said push buttons upon actuation thereof for incrementally rotating all of said elements except the said element corresponding to the actuated push button,
- an additional rotatable locking element in the path of said device,
- said additional element having a notch therein for permitting movement of said device to said second position when said last mentioned notch is in a predetermined position, and
- means operable by each of said push buttons upon actuation thereof for invariably incrementally rotating said additional element.

4,027,509

CYLINDER LOCK FOR ROTARY SWITCHES

Adolf Funk, and Heinz Kuster, both of Wetzikon, Switzerland, assignors to Bauer Kaba AG. Sicherheits-Schliessysteme, Switzerland

Filed June 23, 1976, Ser. No. 698,918
Claims priority, application Switzerland, July 2, 1975, 8606/75
Int. Cl.² E05B *17/04*
U.S. Cl. 70—379 R **13 Claims**



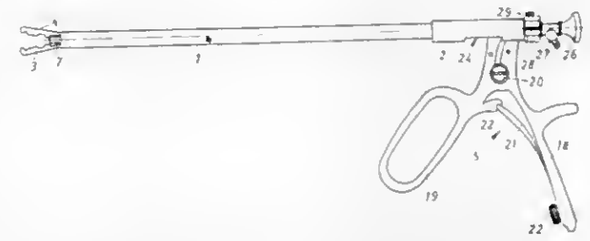
1. A cylinder lock for a rotary switch of the type having a stationary part and a movable part rotatable to any one of a predetermined number of positions, the lock comprising the combination of
- a stationary housing coupled to the stationary part of said switch,
- a stator mounted for rotary motion in said housing and coupled to the movable part of said switch;
- means for restraining said stator against axial motion relative to said housing;
- a rotor mounted in said stator for rotary motion relative thereto,
  - said rotor having an operator link attached thereto and rotatable therewith, and
  - a key slot to permit insertion and removal of a key in any one of a plurality of rotational positions of said rotor, the positions of said key slot providing a visible indication of switch position;
- tumbler means in said rotor and stator for preventing relative motion therebetween in the absence of a key in said slot;
- a locking bolt coupled to said link,
  - said stationary housing having means defining a plurality of locking openings corresponding to the number of switch positions for receiving an end of said bolt,
  - said locking bolt being transversely movable between a first portion in which said bolt engages one of said locking openings in said housing and a second position in which said bolt is disengaged from said openings,
  - said bolt being movable toward said second position by said link upon rotation of said rotor;
- spring means for urging said bolt toward said first position;
- said stator being locked against rotation by said bolt when said bolt is in said first position,
- said stator, said rotor and said bolt being rotatable relative to said housing when said bolt is in said second position to move said switch to a new position,
- the number of said locking openings being selectable independently of the number and arrangement of tumbler means in the cylinder lock.

4,027,510

FORCEPS

Siegfried Hiltebrandt, August-Lammle-Strasse 16, 7134 Knittlingen, Germany

Filed May 15, 1974, Ser. No. 470,176
Int. Cl.² A61B *1/06, 17/42*
U.S. Cl. 72—37 **1 Claim**



1. A forceps instrument comprising in combination,
- a. an outer sleeve member,
- b. a guiding viewing-tube support, tubular in shape, and mounted concentrically within said outer sleeve,
- c. a tubular barrel mounted within said outer sleeve substantially concentrically around and axially slidable along said guiding viewing-tube support,
- d. optical viewing means including a viewing tube immoveably mounted on and substantially concentrically within said guiding viewing-tube support and extending substantially centrally therethrough such that an uninterrupted line-of-sight is provided therethrough,
- e. a pair of separately pivotally mounted opposing jaws mounted on a distal end of said guiding viewing-tube support and being pivotal apart from and toward one another on opposite sides of said uninterrupted line-of-

sight, said jaws being adapted, in an open state, for receiving a tantalum clip therebetween, each of said opposing jaws being further provided with a longitudinally extending jaw limb which is releasably mounted in a correspondingly-shaped, longitudinally extending recess in the outer periphery of said guiding viewing-tube support at its distal end,

f. locking means for retaining said jaw limbs in said logitudinal recesses, said locking means comprising a locking ring mounted in an annular groove provided in the outer periphery of said guiding viewing-tube support in surrounding relationship to said jaw limbs, and

g. hand-operated jaw actuation means comprising a first lever element fixedly mounted on a proximal end of said outer sleeve, and a second lever element pivotally mounted on said first lever at an intermediate point thereon, said levers being further interconnected by spring means which biases them into an open position, said second lever being provided at one end with a U-shaped projection which extends through a cut-out in said proximal end of said outer sleeve and said projection is permanently attached to a proximal end of said tubular barrel so that, upon pivotal actuation of said second lever toward said first lever against the bias of said spring means, said tubular barrel is moved along said guiding viewing-tube support in a distal direction to close said jaws and thereby crimp said tantalum clip positioned therebetween, and upon release of said lever, said spring means biases and thereby moves said tubular barrel in a proximal direction along said guiding viewing-tube support and thereby opens said jaws, and the entire crimping operation of the jaws is viewed through said optical means.

4,027,511

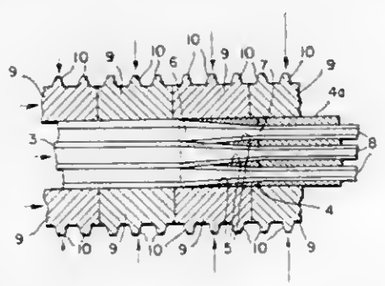
APPARATUS FOR PRODUCING MULTIPLE ELONGATED PRODUCTS SUCH AS WIRES

Francis Joseph Fuchs, Jr., Princeton Junction, N.J., assignor to Western Electric Company, Inc., New York, N.Y.

Division of Ser. No. 523,401, Nov. 13, 1974, Pat. No. 3,964,283. This application Mar. 31, 1976, Ser. No. 672,564

Int. Cl.² B21C *23/08, 23/32*

U.S. Cl. 72—41 **8 Claims**



I. Apparatus for simultaneously producing a plurality of elongated products from a plurality of elongated billets, said apparatus comprising:

first means for assembling said plurality of elongated billets in the form of a bundle with effective surface engagement between adjacent elongated billets included in said bundle;

a die having an entrance end for receiving said bundle and having a plurality of laterally spaced die apertures extending therethrough, each die aperture being so disposed as to register with a different one of said elongated billets in the bundle; and

second means for applying a frictional drag force along the outer periphery of said bundle of billets in the direction of the entrance end of the die such that said effective surface engagement between adjacent elongated billets included in said bundle will cause each of the billets to advance toward its respective die aperture as a part of said bundle and then to pass through said respective die aperture, whereby a plurality of elongated products will be produced simultaneously.

4,027,512

LUBRICANT-COOLANT EMULSION ADDITIVE FOR METAL WORKING OPERATIONS

Lyle G. Treat, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed May 4, 1976, Ser. No. 683,122

Int. Cl.² C10M *1/06, 1/08*

U.S. Cl. 72—42 **36 Claims**

I. A method for adding a substantially water-immiscible fatty acid-type lubricity agent to the discontinuous neat oil phase of a neat oil-in-water lubricant-coolant emulsion for use in metalworking operations wherein a workpiece is contacted by a tool, comprising adding a solution to the emulsion, said solution comprising

A. at least one free fatty acid and

B. a liquid in which said Component (A) is readily soluble, selected from the group consisting of (i) at least one polyoxyalkylene glycerol, (ii) at least one monoalkyl ether of a polyoxyalkylene glycol where the alkyl group has at least four carbon atoms and the alkylene group has at least two repeating units, and (iii) diethylene glycol di-t-butyl ether, said liquid being further characterized in that it is compatible with the emulsion, with the workpiece, and with the tool,

the concentration of Component (A) in the solution and the amount of solution added to the emulsion being mutually selected so that sufficient fatty acid-type lubricity agent is added to the oil phase of the emulsion to attain a preselected concentration of the fatty acid-type lubricity agent in the oil phase of the emulsion without adversely affecting the emulsion.

4,027,513

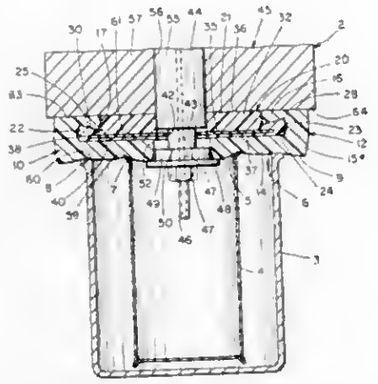
SEALING DEVICE FOR CAN TESTING MACHINES

Robert B. De Ment, Steger, and William D. Simms, Chicago, both of Ill., assignors to Kastalon Inc., Alsip, Ill.

Filed Mar. 31, 1976, Ser. No. 672,111

Int. Cl.² G01M *3/32*

U.S. Cl. 73—49.8 **10 Claims**



I. A sealing assembly suitable for use in a can body testing machine of the type adapted to pass fluid through the can, said assembly comprising an interior support and an exterior elastomerie pad sleeved thereon for positioning over the rim of a can, said pad and support having opposing interfaces and one of said interfaces presenting a peripheral annular apical axially directed edge portion and the other interface having a surface deformable against said edge portion attendant to compaction of the support and pad between a can body and an opposing machine surface to a shape conforming to said one interface to provide a leak-proof seal therebetween, said pad being resilient along the surface thereof engageable with the rim of the can so as to establish a hermetic seal therewith.

4,027,514

DEVICE FOR CONTINUOUS EXTRUSION

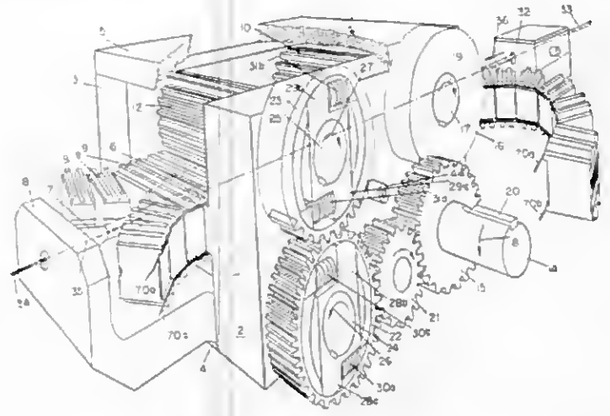
Marc Moreau, Asnieres, France, assignor to Trefimetaux, Argenteuil, France

Filed Sept. 1, 1976, Ser. No. 719,522

Claims priority, application France, Dec. 12, 1975, 75.39401

Int. Cl.² B21D *15/06;* **B65H** *17/34*

U.S. Cl. 72—60 **9 Claims**



1. A device for the continuous extrusion of an object of indefinite length into another object of indefinite length and of smaller cross section, the object in the process of treatment deforming under the effect of two forces, one resulting from a high pressure prevailing in an elongated pressure cylinder in which the object in the course of treatment moves, the other resulting from the movement of movable elements delimiting between them the pressure cylinder, this movement developing, in a fluid under pressure surrounding the object in its passage in the pressure cylinder, a force directed in the direction of movement of the object and forcing the object through a die; the said device having a resistant body including an upstream entrance and a downstream exit, said resistant body being capable of resisting a high pressure, the resistant body having an internal cross-section with elongated machined surfaces therein in the direction of its length; movable elements moving in the resistant body from upstream to downstream thereof and describing outside it a return path which brings them back upstream, said movable elements being constituted by two lateral series of elements which, associated in opposed twos, have an external cross section corresponding to the internal cross section of the resistant body and delimit in the longitudinal axis of the device a pressure cylinder having a cross section slightly greater than that of the object to be extruded, said pressure cylinder being formed by recesses hollowed out on the internal face of each of two associated movable elements, each movable element having, toward the top and toward the bottom of its lateral surface, a machined surface slidable without friction and without play along the corresponding machined surface of the resistant body, the movable elements having lower and upper surfaces with teeth thereon orientated perpendicular to the direction of their movement, the opposite lateral faces of the movable elements and of the resistant body delimiting a space termed a pressure chamber which receives a fluid under pressure which, exerting a force perpendicular to the longitudinal axis of the device presses one movable element against the associated movable element, two drive pinions driving the movable elements introduced into the resistant body toward the downstream end of the latter, one drive pinion acting on the teeth of the upper face of the movable elements, the other on the teeth of the lower face of these elements, brake means braking the movable elements downstream of the resistant body, said brake means comprising two shaft mounted resistant pinions, one engaged with and being driven by the teeth of the upper face of the movable elements, the other engaged with and being driven by the teeth of the lower face of these elements, loose crowns fitted onto the shaft of these pinions, means developing an elastic torque between each loose crown and its shaft, and means driving each loose crown in a movement identical in direction and speed to the shaft which carries it; and a die located at the downstream exit of the resistant body and blocking the pressure cylinder.

4,027,515

DEVICE FOR ELECTRICAL DISCHARGE FORMING

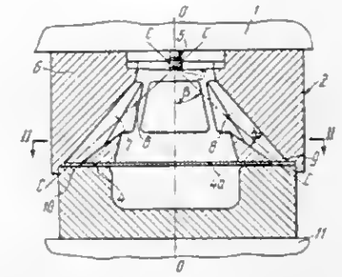
Viktor Nikolaevich Chachin, bulvar Lunacharskogo, 8, kv. 21; Gennady Nikolaevich Zdor, ulitsa V.Khoruzhei, 19, kv. 14; Alexandr Julyanovich Zhuravsky, Partizansky prospekt, 28, korpus 2, kv. 135; Elena Yakovlevna Golovkina, ulitsa Kakhovskaya, 37, kv. 42, and Vladimir Leontievich Shaduya, ulitsa Pervomaiskaya, 8, kv. 7, all of Minsk, U.S.S.R.

Filed May 3, 1976, Ser. No. 682,471

Claims priority, application U.S.S.R., May 11, 1975, 2132196

Int. Cl.² B21D *26/02*

U.S. Cl. 72—56 **3 Claims**



1. A device for electrical discharge forming comprising: a fixed plate; an explosion chamber mounted on said fixed plate; an appliance for creating an explosion; a work-holding die pressed against said explosion chamber in the process of forming; an appliance for pressing said die against said explosion chamber; at least two channels whose cross section changes gradually over their length, said channels being made in the wall of said explosion chamber; said channels arranged at an acute angle to the geometrical axis of said explosion chamber so that their wider ends are directed into said explosion chamber and are in essence equispaced around its perimeter and so that the other, narrower ends of said channels are directed to said die and are in essence equispaced around its perimeter near the zone of the work so that the impact wave created by the explosion passes through said channels and acts on the face surfaces of the work in the course of its shaping.

4,027,516

VISCOMETER SYSTEM

Samuel Steven Ochodnicky, Dearborn Heights, and Frank Joseph Bianchi, Jr., Redford Township, both of Mich., assignors to Gam Rad, Inc., Detroit, Mich.

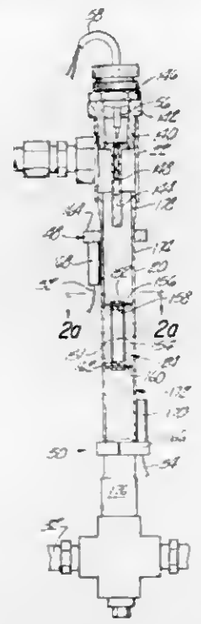
Filed Mar. 16, 1976, Ser. No. 667,528

Int. Cl.² G01N *11/12*

U.S. Cl. 73—57 **9 Claims**

1. A viscometer system operable with a process line carrying a fluid to be measured and comprising a vertically mounted fall tube, a slug located in said fall tube for movement therein between upper and lower positions, pump means for pumping fluid into said fall tube, valve means operable to a plurality of conditions for directing flow of fluid from said fall tube, conduit means connecting said pump means, said valve means, said fall tube and the process line, actuating means operably connected with said fall tube, said pump means, said valve means and said conduit means for automatically, sequentially placing the system in the following phases of operation: (a) purge phase in which said valve means is

conditioned such that fluid is pumped by said pump means from the process line, through said fall tube, and through said valve means back to the process line, (b) recirculate phase in which said valve means is conditioned such that fluid flow to the process li[illegible]uid is recirculated in a fluid circuit compri[illegible] tube, said valve means, said conduit means and said pump means, and (c) measure phase in which said pump means is deactuated while the remaining



portions of the system are in said recirculate phase and said slug can fall, and timing means for providing a voltage output having a magnitude varying in accordance with the variations in the elapsed time for said slug to fall a selected distance, said timing means comprising a pair of magnetically actuated switches connected to said fall tube, each of said switches being independently movably mounted and capable of variation in both vertical and circumferential location.

4,027,517

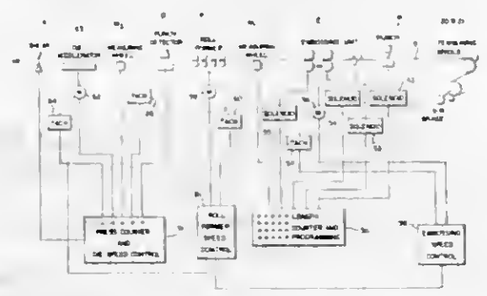
METHOD AND APPARATUS FOR EMBOSSING SHEET METAL STRIP AND SHEET METAL PANEL

Ernest Robert Bodnar, R.R. No. 1 Kingsworth Road, Kingscross Estates, King City, Canada

Continuation-in-part of Ser. No. 431,098, Jan. 7, 1974, abandoned. This application May 27, 1975, Ser. No. 580,709

Int. Cl.² B21D *21/00*

U.S. Cl. 72—177 **23 Claims**



1. The method of cold forming a continuously moving strip of sheet metal to form successive transverse indentations in a central portion thereof and longitudinal formations down the two side portions thereof said method comprising;

forming a series of transverse indentations in a central portion of said strip by the closing action of continuously moving die means at a forming station while said strip sheet metal is moving along a predetermined path, and while simultaneously holding said strip in tension between two spaced points on opposite sides of said forming station whereby to prevent distortion of said strip during formation of said transverse indentations;

subsequently roll forming continuous longitudinal formations in said side portions of said sheet metal strip which remain free of said transverse indentations, said longitudinal formations extending continuously along both said side portions of said strip, and,

intermittently discontinuing said formation of said transverse indentations at predetermined spaced intervals along said sheet metal strip, whereby to leave lengths of said central portion between said continuous longitudinal formations which are flat and planar and free of said transverse indentations at spaced intervals therealong.

4,027,518

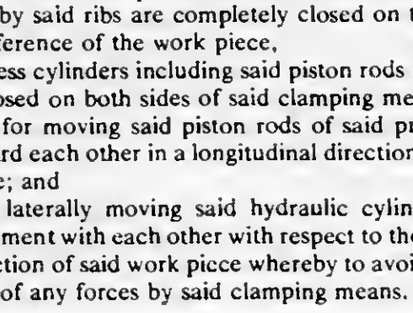
HYDRAULIC PRESS

Erich Ribback, Maximiner Acht 39, 55 Trier, Germany

Filed Apr. 23, 1975, Ser. No. 570,697

Int. Cl.² B21D *19/00*

U.S. Cl. 72—306 **3 Claims**



1. A hydraulic press for metal working of end portions of rod-like or pipe-like metallic work pieces, comprising:

a central clamping means for arresting the work piece including two oppositely disposed horizontal hydraulic cylinders having piston rods, clamping jaws mounted on said front facing ends of said piston rods of said hydraulic cylinders, the latter constituting clamping cylinders, said clamping jaws being adjusted to the form of a center section of said work piece solely for the support thereof without absorption of any pressure forces therefrom and including round shoulders for supporting a ring-like center section of said work piece whereby to avoid collapse of the ring-like center section thereof;

two oppositely disposed hydraulic press cylinders having piston rods which move toward the work piece;

individual working tools disposed on said piston rods of said press cylinders, said individual tools having a shape of a conical draw-in ring having a small conical angle at a range of an inlet opening for said work pieces, and in a center section having a plurality of radially inwardly extending ribs, and in an end section having a second conical angle larger than said small conical angle, said inlet opening having a diameter at least 1.3 times greater than the diameter of said outlet opening to provide a deformation ratio greater than 1.3, said ribs including radial extensions adjusted to and coordinated with the smallest diameter of said end section of said draw-in ring, whereby folds which are created on the outer circumference of the work piece in said end section of the draw-in ring by said ribs are completely closed on the outer circumference of the work piece,

said press cylinders including said piston rods thereof being disposed on both sides of said clamping means;

means for moving said piston rods of said press cylinders toward each other in a longitudinal direction of said work piece; and

means laterally moving said hydraulic cylinders in axial alignment with each other with respect to the longitudinal direction of said work piece whereby to avoid the absorption of any forces by said clamping means.

4,027,519

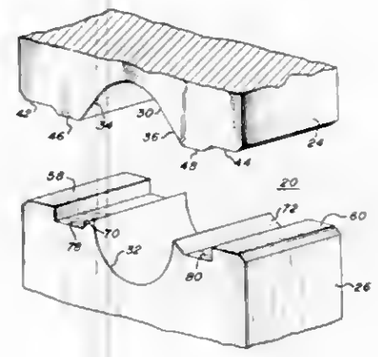
MEANS AND METHOD FOR REDUCING THE PERIMETER OF A HOLLOW THIN WALLED MEMBER

Walter Bachle, Harwinton, Conn., assignor to Thomas & Betts Corporation, Elizabeth, N.J.

Filed Sept. 22, 1976, Ser. No. 725,627

Int. Cl.² B21D *37/10*

U.S. Cl. 72—367 **12 Claims**



9. A method of reducing the perimeter of a hollow thin walled member comprising the steps of: pinching a longitudinal portion of the wall of a hollow thin walled member between a pair of selectively spaced, parallel surfaces so located adjacent the periphery of said hollow thin walled member that a central plane lying between and parallel to said parallel surfaces is oriented parallel to the longitudinal axis of said hollow thin walled member and oblique to a radial axis extending from the center of said hollow thin walled member to said central plane to form an obliquely angled fin thereat; and applying an inwardly directed radial force to said fin to cause said fin to fold inwardly against the outer surface of said hollow thin walled member.

4,027,520

BLIND RIVETER WITH AUTOMATIC RIVET FEED

Günter Klein, Walldorf, Hessen, Germany, assignor to GESIPA Blindniettechnik Gesellschaft mit beschrankter Haftung, Frankfurt, Germany

Filed Sept. 2, 1975, Ser. No. 609,536

Claims priority, application Germany, Aug. 30, 1974, 2441707; Aug. 30, 1974, 7429354[U]

Int. Cl.² B21J *15/34*

U.S. Cl. 72—391 **13 Claims**

1. A blind riveter comprising:

a housing having a front end and formed adjacent said end with a chamber,

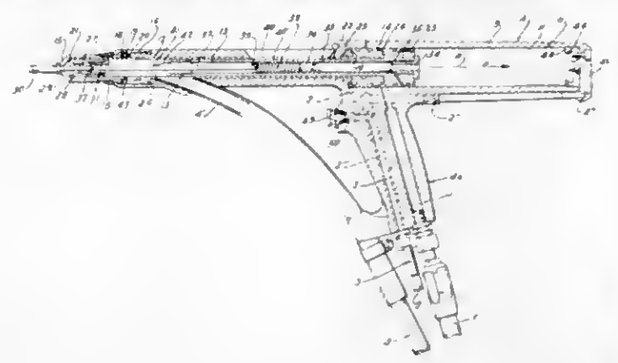
a plurality of outwardly deflectable holding elements at said front end normally defining a forwardly opening aperture dimensioned to fit around the mandrel of a blind rivet;

a chuck in said chamber locking engageable with a blind rivet mandrel;

actuating means in said housing connected to said chuck for displacing same between a front position lockingly engaged around a mandrel extending back into said chamber through said aperture from a blind rivet having a head resting against said holding elements and a back position spaced from said aperture by a distance greater than the length of a blind rivet with its mandrel, whereby displacement from said front to said back position with said chuck gripping a mandrel pulls the mandrel back in its rivet and upsets the rivet;

a rivet feed duct opening into said chamber in back of said aperture and forwardly of said chuck in said back position, said duct extending backwardly from said front end;

means for holding a supply of blind rivets and for separating individual rivets from said supply and feeding one rivet through said duct to said chamber each time said chuck is displaced into said back position, whereby displacement



of said chuck from said back to said front position after introduction of a rivet into said chamber engages said chuck around the rivet mandrel and pushes the rivet through said aperture by outwardly deflecting said elements and

pneumatic means for operating said actuating means and said means for feeding and triggerable for each operation cycle to displace said chuck to upset a rivet, dislodge a broken-off mandrel therefrom and position a new rivet in said chuck automatically for a single stroke of said actuating means.

4,027,521

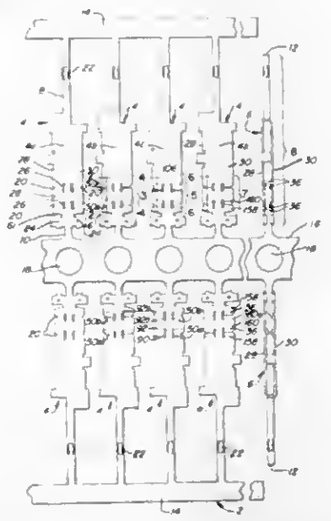
APPARATUS FOR MAKING TERMINAL CONNECTORS

William H. McKee, West Covina, Calif., and Anthony E. Schubert, Viila Park, Ill., assignors to TRW Inc., Elk Grove Village, Ill.

Division of Ser. No. 545,353, Jan. 30, 1975, abandoned. This application Jan. 9, 1976, Ser. No. 647,799

Int. Cl.² B21D *13/02*

U.S. Cl. 72—404 **2 Claims**



1. A set of progressive dies for forming resiliently biased wire contacting jaws in an electrical terminal comprising:

a first ribbed die face including a plurality of first valleys intermediate the ribs,

a first mating die face for engagement upon the first ribbed die face, said first mating die face including a plurality of ribs disposed for engagement into the first valleys on the first ribbed die face,

a second ribbed die face including a plurality of second valleys thereon narrower and deeper than said first valleys on the first ribbed die face and first shoulder ribs along the outer edges of the outermost second valleys,

a second mating die face for engagement upon the second ribbed die face, said second mating die face including a plurality of second ribs narrower and higher than the ribs on said first mating die face and disposed for engagement into the second valleys on the second ribbed die face, said second mating die face also including a plurality of first shoulder receiving grooves for engagement onto the first shoulder ribs of the second ribbed die face,

a third ribbed die face including a plurality of third valleys thereon narrower and deeper than said second valleys and second shoulder ribs of less height than and of lesser radius than the first shoulder ribs in said second die face, and

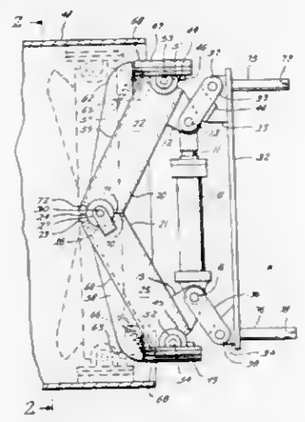
a third mating die face for engagement upon the third ribbed die face, said third mating die face including a plurality of third ribs narrower and higher than the second ribs on said second mating die face and disposed for engagement into the third valleys on the third ribbed die face, said third mating die face also including a plurality of second shoulder receiving grooves for engagement onto the second shoulder ribs of the third ribbed die face.

4,027,522

INTERNAL MANDREL FOR USE IN BENDING THE ENDS OF PIPES

Edward A. Clavin, Houston, Tex., assignor to Midcon Pipeline Equipment Co., Houston, Tex.

Filed Nov. 14, 1975, Ser. No. 631,883
Int. Cl.² B21B 25/00; B21D 9/00
U.S. Cl. 72—466 19 Claims



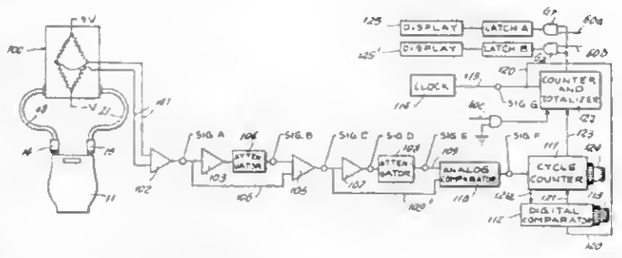
1. Internal mandrel for use in bending pipes adjacent their ends, comprising a pair of arms each having pipe engagement means at its outer end, said arms being pivotally connected together at their inner ends and each having a laterally offset portion spaced from its inner end and said arms being movable between in line extended positions and retracted equal angular positions to one side of said in line positions, and actuator means connected between said laterally offset portions of said arms for moving said arms between said extended and retracted positions.

4,027,523

METHODS AND APPARATUS FOR PROOF TESTING GAS METERS

Theodore A. St. Clair, Fairfield, Conn., assignor to Textron, Inc., Providence, R.I.

Filed Nov. 12, 1975, Ser. No. 631,498
The portion of the term of this patent subsequent to Feb. 10, 1993, has been disclaimed.
Int. Cl.² G01F 25/00
U.S. Cl. 73—3 7 Claims



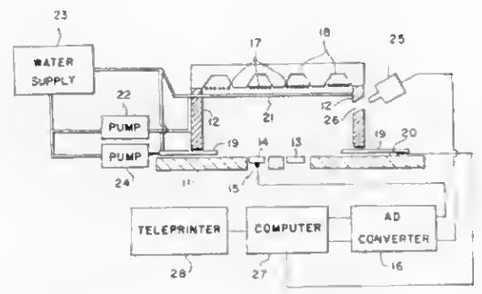
7. Apparatus as defined in claim 3 in which there are means for displaying the volume of test gas which has passed through the meter during said test run so that it can be compared with the known volume of test gas which the meter was designed to pass during said predetermined number of cycles of operation of the valve mechanism.

4,027,524

APPARATUS FOR DETERMINING THERMOPHYSICAL PROPERTIES OF TEST SPECIMENS

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Theodore R. Creel, Jr., Yorktown; Robert A. Jones, Newport News, both of Va.; Richard R. Corwin, Xenia, and Joseph S. Kramer, Dayton, both of Ohio

Filed Feb. 27, 1976, Ser. No. 662,175
Int. Cl.² G01N 25/18
U.S. Cl. 73—15 R 7 Claims



1. Apparatus for directly measuring the quatity $\sqrt{\rho ck}$ of a test specimen where ρ is the density, c is the specific heat and k is the thermal conductivity of the specimen comprising:

a reference specimen;

a heat source;

means for simultaneously subjecting said test specimen and said reference specimen to said heat source;

means attached to said reference specimen for producing a first electrical analog signal proportional to the heating rate $\dot{Q}$ that said test specimen is subjected to;

infrared radiometer means aimed at said test specimen for producing a second electrical analog signal proportional to the surface temperature T of said specimen; and

computer means receiving said first and second analog signals for calculating $\sqrt{\rho ck}$ in accordance with the equation:

$$\sqrt{\rho ck} = \frac{\dot{Q}}{T - T_i} \frac{2}{\sqrt{\pi}} \sqrt{t}$$

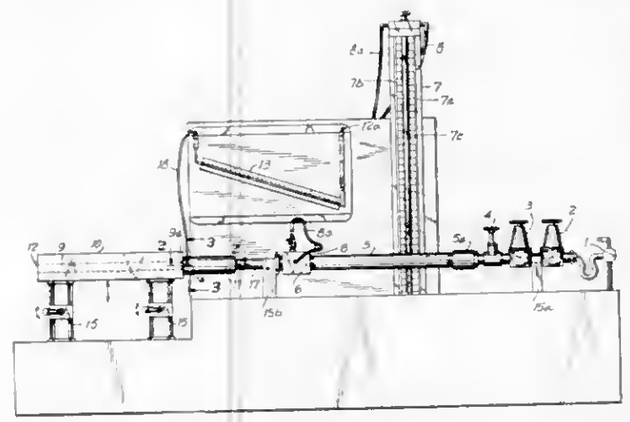
where T_i is the initial test specimen temperature and t is the elapsed time from the time that the specimens are subjected to the heat source.

4,027,525

METHOD AND APPARATUS FOR DETERMINING THE RELATIVE ROUGHNESS OF HOLES IN REFRACTORY COMPOSITIONS

Richard T. Mull, Augusta, Ga., assignor to Great Lakes Carbon Corporation, New York, N.Y.

Filed May 21, 1975, Ser. No. 579,493
Int. Cl.² G01M 13/00
U.S. Cl. 73—37 4 Claims



1. An apparatus for determining the frictional resistance to a flow of gas through an internal passage extending through a solid body of extended length which comprises:

a source of gas at shop pressure;

a gas tight fluid circuit connected between said source and the inlet to said passage operative to provide a flow of predetermined characteristics through said passage to the atmosphere including:

a three stage pressure regulating means including a first pressure regulator connected to said source, a second pressure regulator connected to the outlet of said first pressure regulator and a valve connected to the outlet of said second pressure regulator, said pressure regulators and said valve cooperating to minimize undesireable pressure fluctuation from said source;

a velocity orifice plate in fluid communication with said pressure regulating means and downstream thereof for maintaining a flow rate in said circuit of sufficiennt quantity to provide a fully developed turbulent flow in said circuit downstream of said velocity orifice plate;

first and second pressure sensing means connected into said circuit at said velocity plate inlet and outlet respectively and adapted to provide measurements of the flow pressure at said plate inlet and outlet;

an inlet adapter in said circuit for transporting said flow from said orifice plate outlet to said passage substantially without further pressure drop, said adapter partially insertable by press fitting in said passage;

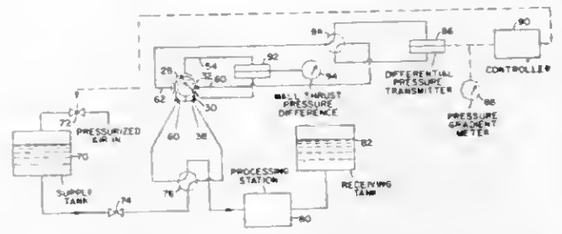
means for measuring the pressure drop of said flow through said passage from the passage inlet to the atmosphere and thereby determining the frictional resistance to said flow through said passage.

4,027,526

METHOD AND APPARATUS FOR MAKING MEASUREMENTS RELATED TO THE FIRST NORMAL STRESS FUNCTION OF VISCOELASTIC FLUID MATERIAL

Herman R. Osmers, Pittsford, N.Y., assignor to University of Rochester, Rochester, N.Y.

Filed July 8, 1976, Ser. No. 703,483
Int. Cl.² G01N 11/04
U.S. Cl. 73—54 13 Claims



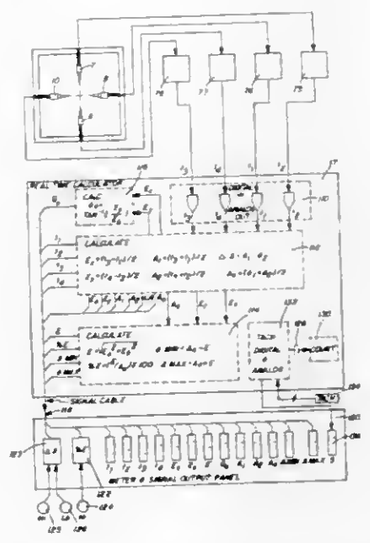
5. Apparatus for making measurements related to the first normal stress function of a viscoelastic fluid material which comprises first and second members having opposed walls which define an annular channel defining an angular path extending circumferentially about said first member, means for introducing said fluid medium under pressure into said channel to flow through said channel along said angular path, and means for measuring the thrusts exerted by said liquid against each of said walls whereby to provide said measurements.

4,027,527

SYSTEM FOR DETERMINING TUBE ECCENTRICITY

Robert F. Bennett, Leechburg; Nicholaas L. Brouwer, Apollo, and David M. Stricker, Lower Burrell, all of Pa., assignors to Aluminum Company of America, Alcoa Center, Pa.

Filed Apr. 1, 1975, Ser. No. 564,056
Int. Cl.² G01B 17/02
U.S. Cl. 73—67.8 S 14 Claims



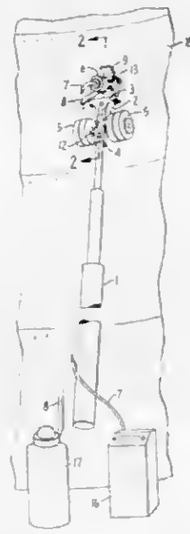
1. A system for determining eccentricity characteristics of a tube comprising,

a frame,

sensing means mounted on said frame for sensing the thickness of a wall of a tube, said sensing means including at least three thickness sensors supported in sensing position with respect to said tube at predetermined angularly spaced locations with respect to each other and with the axes of the sensors intersecting at substantially the same

point for producing output signals which are related to the thickness of the tube wall at the locations sensed and, signal processing means for receiving the output signals from said sensors and translating these output signals into vector components of the eccentricity of the tube, and for summing said vector components to provide an eccentricity signal related to the magnitude and angular location of the tube eccentricity.

4,027,528
APPARATUS FOR ULTRASONIC INSPECTION OF FERROMAGNETIC MATERIALS
Bill D. Tyree, 3997 Bellwood Court, Concord, Calif. 94520
Filed Dec. 15, 1975, Ser. No. 640,726
Int. Cl.² G01N 29/04
U.S. Cl. 73—67.8 S **1 Claim**



1. Apparatus for non-destructive inspection of vertical ferromagnetic wall members comprising:

A. a carriage, said carriage comprising

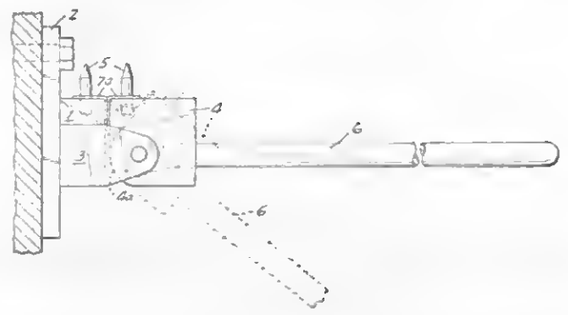
1. a mounting frame having one pair of arms extending upwardly and a second pair of arms extending downwardly,
2. a deep plate member fitted between the downwardly extending arms of the mounting frame and a shaft passing through said arms and said plate member,
3. a shaft passing through the upwardly extending arms of the mounting frame and a support member mounted on said shaft in rocking engagement with said shaft,
4. an ultrasonic transducer mounted on said support member,
5. a fender member mounted on the lower surface of said support member,
6. a shaft passing through said plate member and a wheel formed from strongly permanent magnetic material mounted on each end of said shaft,

B. an electric current carrying cable in electric connection with said transducer,

C. a waterline having an open end adjacent the face of the transducer, and

D. a telescopic pole member supporting said carriage attached to the deep plate member and so aligned that it is perpendicular to the shaft on which the magnetic wheels are mounted.

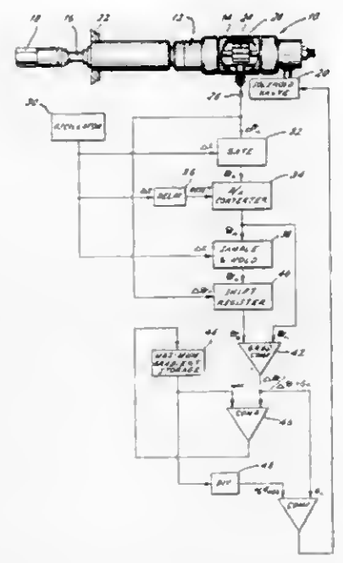
4,027,529
METHOD AND APPARATUS FOR TESTING SPOT WELDS
Robert A. Olsen, 140 Hartman Circle NE., Fridley, Minn. 55432
Filed Mar. 24, 1976, Ser. No. 669,829
Int. Cl.² G01N 3/00
U.S. Cl. 73—88 B **3 Claims**



3. The method for testing the integrity of a spot weld produced by a welding without destruction of the manufactured sheet metal parts, said method comprising

producing a T-shaped test speciman having a depending web portion and a cross portion of the "T" by spot welding together a pair of angle elements constructed from the same sheet material as the manufactured parts being produced to provide a pair of laterally extending attachment portions forming the cross of the "T" and the welded together portions forming the depending web thereof, applying pivotally directed tension to the attachment portions to peel apart the depending welded together portions and thus determine the integrity of the weld therebetween.

4,027,530
SIMPLIFIED APPARATUS FOR AND METHOD OF TIGHTENING FASTENERS
Angelo L. Tambini, Rathfarnham, Ireland, and Paul W. Wallace, Warrington, Pa., assignors to Standard Pressed Steel Co., Jenkintown, Pa.
Filed Mar. 31, 1976, Ser. No. 672,093
Int. Cl.² G01N 3/22
U.S. Cl. 73—88 F **23 Claims**



1. Apparatus for tightening an assembly including a fastener member to a predetermined tightened condition comprising:

means for imparting angular motion to said fastener member;

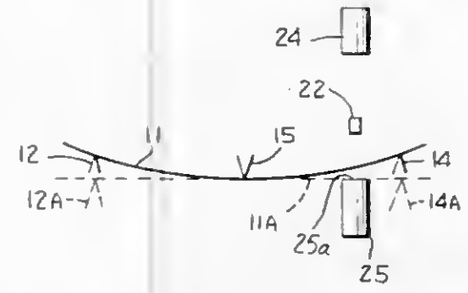
means for measuring the angular displacement of said fastener member and providing a signal indicative thereof;

means for providing a signal indicative of the angular speed of said fastener member;

gradient calculating means receiving said angular displacement signal and said angular speed signal for developing a signal representative of the instantaneous gradient of the angular speed vs. angular displacement curve through which said assembly is being tightened; and

control means responsive to said gradient signal for determining the yield point or other similar significant point indicative of a significant change in slope on said curve and for developing a control signal when said assembly is tightened to said point.

4,027,531
METHOD AND MACHINE FOR LOCATING VARIATIONS IN TENSION IN A SAW BLADE
Chester H. Dawson, Danbury, Conn., assignor to Remington Arms Company, Inc., Bridgeport, Conn.
Division of Ser. No. 555,155, March 4, 1975, Pat. No. 3,964,348. This application Nov. 28, 1975, Ser. No. 635,962
Int. Cl.² G01N 3/20
U.S. Cl. 73—100 **11 Claims**



3. A machine for locating variations in tension in a circular saw blade having a major axis, said machine comprising:

carriage means constructed and arranged for mounting and elastically bowing a saw blade having a normally-planar major surface to deflect said surface toward the locus of a segment of the surface of a curved geometric solid having a specifically preselected contour, to which said blade surface would conform if the blade is properly tensioned and straightened;

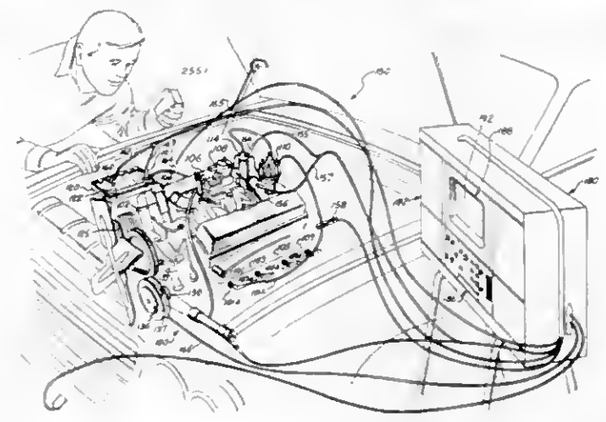
sensor means constructed and arranged for detecting local deviations of said blade surface from said locus only in a limited local area of the blade surface at a time;

and means supporting said sensor means and said carriage means in operative relation for detection of said local deviations by said sensor means, said supporting means being constructed and arranged to support said carriage means and said sensor means for relative reciprocatory movement therebetween, and including means for rotating said saw blade about said major axis, to cause said sensor means to locate said local deviations in a larger area of said blade surface sequentially.

4,027,532
COMPRESSION TESTING APPARATUS
Gerald C. Trussell, Park Ridge, and Robert W. Arnston, Schaumburg, both of Ill., assignors to Sun Electric Corporation, Chicago, Ill.
Filed Apr. 20, 1976, Ser. No. 678,670
Int. Cl.² G01M 15/00
U.S. Cl. 73—117.2 **34 Claims**

26. Apparatus, for automatically determining the number of chambers in an internal combustion engine in which ignition signals are used to sequentially ignite fuel-air mixtures in the chambers, said apparatus comprising:

means for generating a synchronizing signal in response to each ignition signal used to ignite the fuel-air mixture in a first one of the chambers;

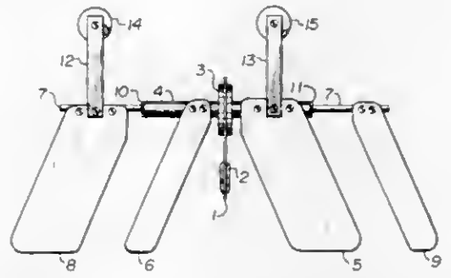


counting means for counting a synchronizing signal and each ignition signal occurring between two successive synchronizing signals;

memory means for storing digital data; and

processing means for transferring the contents of the counting means to the memory means after the number of chambers has been counted.

4,027,533
ANGLE OF ATTACK INDICATING DEVICE
John Pretto, 624 S. Belmont, Arlington Heights, Ill. 60005
Filed June 23, 1976, Ser. No. 698,840
Int. Cl.² C01W 1/00; B63H 9/04
U.S. Cl. 73—188 **10 Claims**

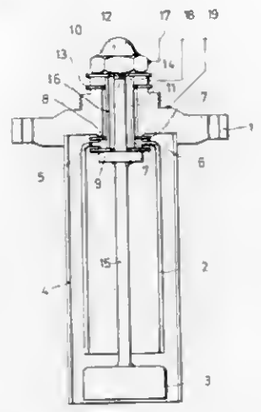


1. Apparatus for indicating the optimum attack angle for a moving fluid foil with respect to the fluid through which the foil is moving, said apparatus comprising: a first rotatable shaft connected to and positioned perpendicular to said foil; first sensing means connected to said first shaft and positioned adjacent to a first side of said foil; first indicating means connected to said first shaft and positioned adjacent to a second side of said foil; said first sensing means and said first indicating means located in the same plane; a second rotatable shaft connected to and positioned perpendicular to said foil; second sensing means connected to said second shaft and positioned adjacent to said second side of said foil; second indicating means connected to said first shaft and positioned adjacent to said second side of said foil; said second sensing means and said second indicating means located in the same plane; whereby the optimum angle of attack of said foil is indicated by parallel positioning of said first indicating means to said second sensing means, and parallel positioning of said second indicating means to said first sensing means.

4,027,534
ELECTRODE DEVICE FOR MONITORING LIQUID LEVELS

Heino Zimmermann, Bremen, Germany, assignor to Gustav F. Gerdts KG, Bremen, Germany

Filed Jan. 5, 1976, Ser. No. 646,699
Int. Cl.² G01F *23/24*
U.S. Cl. 73—304 R **10 Claims**



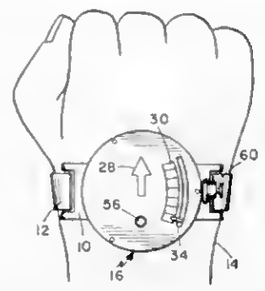
1. An electrode device for use in monitoring conductive liquids comprising:
a mounting having a central opening;
a first electrode having a tie rod portion disposed through the central opening of said mounting and insulated therefrom;
a clamping collar secured to said tie rod adjacent to one side of said mounting, said first electrode including an extending end portion connected to the clamping collar;
a second electrode in the form of a tubular sleeve coaxially surrounding said first electrode and insulated therefrom, said second electrode including an end flange at one end, and having a central opening surrounding said first electrode between its collar and said one side of said mounting, the opposite end of said second electrode being open to permit the free end of said extending end portion of said first electrode to extend from said opening;
a counter electrode in the form of a tubular sleeve and coaxially surrounding said first and second electrodes, said counter electrode having one end secured and electrically connected to said mounting;
a pair of insulated washers disposed on each side of the end flange of said second electrode coaxial to its central opening for insulating said second electrode from said mounting and the clamping collar of said first electrode;
a contact sleeve disposed through the central opening of said mounting and coaxially surrounding the rod portion of said first electrode, said sleeve disposed through one of said washer pair and supported on a second of said washer pair adjacent said clamping collar, said contact sleeve being disposed through the central opening and electrically secured to the end flange of said second electrode; and
means engaging one end of said tie rod portion for securing said first electrode to the opposite side of said mounting and for securing the end flange of said second electrode and its washer pair between said side of said mounting and said clamping collar.

4,027,535
MANUAL THRUST GAUGE

Erik Swanson, 15939 NW. 40 Court, Opa Locka, Fla. 33054

Filed Feb. 2, 1976, Ser. No. 654,713
Int. Cl.² G01L *5/06*; **G01P** *15/02*
U.S. Cl. 73—381 **8 Claims**

1. A manual thrust gauge comprising:
a. a frame;
b. means mounted on said frame for engagement on a human extremity;
c. two cooperating gauging members comprising a scale member and an indicator member both mounted on said frame, one of said members being weighted and having one portion anchored to said frame and another portion movable relative to the other of said members such that said indicator is registerable at different positions along said scale;

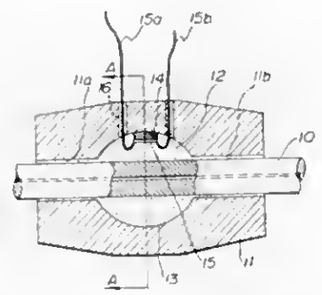


d. bias means urging said one member in one direction relative to the other of said members;
e. a releasable detent for detaining said one member against said bias means at a plurality of selectable positions relative to the other of said members, whereby upon engaging said thrust gauge on a human extremity and striking out with same, said one member will be moved relative to said other member and be releasably engaged at a position relative thereto such that the indicator will point out on said scale member the relative striking force.

4,027,536
TRANSDUCER FOR ENGINE FUEL INJECTION MONITORING

William S. Heggie, Bells Corners, Canada, assignor to Canadian Patents and Development Limited, Ottawa, Canada

Continuation-in-part of Ser. No. 624,114, Oct. 20, 1975, abandoned. This application May 21, 1976, Ser. No. 688,908
The portion of the term of this patent subsequent to Feb. 10, 1993, has been disclaimed.
Int. Cl.² G01L *9/04*
U.S. Cl. 73—398 AR **8 Claims**

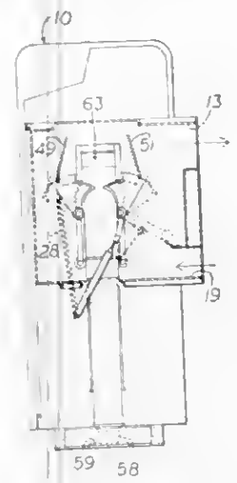


1. A fuel injection monitoring transducer for mounting on the fuel injection lines of engines comprising:
a. a barrel-shaped housing made of a strong metal material encompassing the fuel line tube and fixedly attached to the tube circumferentially at outer positions and defining an enclosed annular volume between tube and housing,
b. a pressure measuring element positioned in the said volume away from the fuel tube and adjacent the inner wall of the housing,
c. a solid cold flowing material completely filling the said volume, and
d. electrical leads from the element to the exterior of the housing.

4,027,537
APPARATUS FOR SAMPLING A STREAM OF FIBERS AND THE LIKE

Donald W. Van Doorn, Columbus, and Donald R. Lloyd, Midland, both of Ga., assignors to Lummus Industries, Inc., Columbus, Ga.

Filed June 21, 1976, Ser. No. 698,108
Int. Cl.² G01N *1/04*
U.S. Cl. 73—421 R **22 Claims**



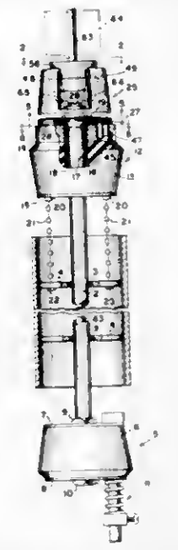
1. In apparatus adapted to sample fiber-like material while in an airborne stream,
a. a sample collecting chamber,
b. said chamber having at least one wall pervious to air and substantially impervious to the material to be collected,
c. means to admit the airborne material to the chamber comprising a movable wall section of the collecting chamber disposed in one position to direct the airborne stream into the chamber and in another position to close the chamber, whereby the airborne stream may be selectively passed into or caused to by-pass the collecting chamber.
d. a reciprocating platen in the chamber, and
e. means to remove the material from the apparatus as a compacted sample.

4,027,538
LATCH RELEASING MECHANISM FOR WATER SAMPLERS

Robert P. Snyder, Bay City, and Edmund P. Deja, Saginaw, both of Mich., assignors to Trippensee Corporation, Saginaw, Mich.

Filed Feb. 9, 1976, Ser. No. 656,535
Int. Cl.² G01N *1/10*
U.S. Cl. 73—425.4 R **18 Claims**

1. Latch releasing mechanism for a water sampler or the like having a latch member movable between latched and unlatched positions, said mechanism comprising a pair of clasp members; means mounting said clasp members for movements in directions into and out of latching position; motion transmitting means carried by each of said clasp members for effecting movement of the latter, said motion transmitting means being spaced apart to form a chamber therebetween; operating means; and means supporting said operating means in said chamber for movement along a path transverse to the directions of movement of said clasp members, said motion transmitting means and said operating means being so configured that movement in one direction along said path of

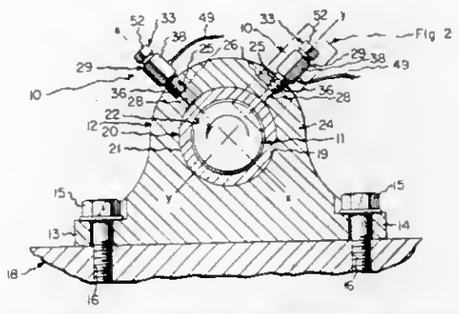


said operating means effects movement of said clasp members from said latched position toward said unlatched position.

4,027,539
APPARATUS FOR, AND METHOD OF, MEASURING DYNAMIC FORCES

John D. Halloran, 208 Chasewood Lane, East Amherst, N.Y. 14051

Filed Apr. 9, 1976, Ser. No. 675,589
Int. Cl.² G01M *1/22*
U.S. Cl. 73—465 **8 Claims**



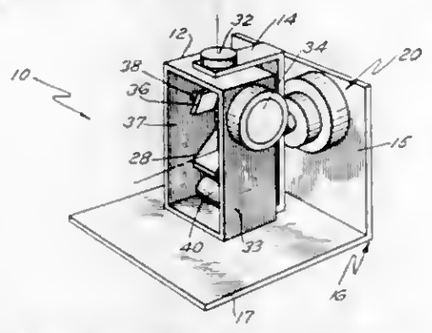
1. The method of measuring the amplitude and frequency of a component of dynamic force exerted by a rotating member on an adjacent bearing shell in a first direction, said bearing shell being mounted within a non-rotating member, comprising the following steps:
sensing between said bearing shell and non-rotating member the frequency and a proportional amount of the amplitude of such force component exerted by said rotating member on said bearing shell at only one point in said first direction;
converting such sensed frequency and amplitude in said first direction into a first electrical signal; and
adjusting said first electrical signal to calibrate the sensed value of amplitude to its actual value;
thereby to produce an adjusted first electrical signal representing the actual values of frequency and amplitude of said force component in said first direction.

4,027,540

INERTIAL OPTICAL STABILIZER

Frederick C. Allard, Mystic, Conn., assignor to The United States of America as represented ' the Secretary of the Navy, Washington, D.C.

Filed Mar. 21, 1975, Ser. No. 561,017
Int. Cl.² G01C *19/24*
U.S. Cl. 74—5.1 **2 Claims**



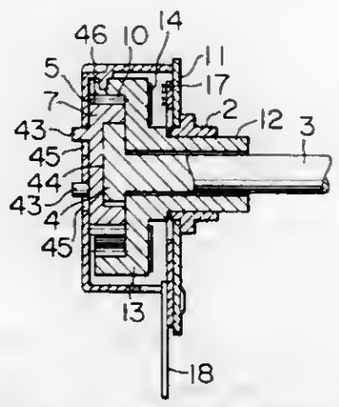
1. A line-of-sight stabilization system comprising:
a platform;
an outer gimbal comprising a U-shaped element with said element rotatably connected at a point equidistant from its ends to said platform;
an inner gimbal rotatably connected to said outer gimbal, said inner gimbal having a first wall connected to said outer gimbal, a second wall parallel to and spaced from said first wall, said second wall being connected to said outer gimbal, a third wall connected to said first and second walls, and a fourth wall containing an aperture, said fourth wall being spaced from and parallel to said third wall, said fourth wall connected to said first and second walls;
a first mirror fixedly connected to said outer gimbal so as to rotate with said outer gimbal, said first mirror being connected at an angle of substantially 45° with the inner gimbal axis;
a second mirror fixedly connected to said third wall of said inner gimbal so as to rotate with said inner gimbal, said second mirror being connected at an angle of substantially 45° with the outer gimbal axis; and
a rotor connected to said inner gimbal for stabilizing each of said inner and o ter gimbals in a fixed direction.

4,027,541

ELECTRONIC COMPONENT HAVING A FINE ADJUSTMENT MECHANISM

Matsuo Nishioka, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed May 12, 1975, Ser. No. 576,379
Claims priority, application Japan, May 14, 1974, 49-54238; June 28, 1974, 49-76880[U]
Int. Cl.² F16H *35/18, 1/28*
U.S. Cl. 74—10.54 **14 Claims**



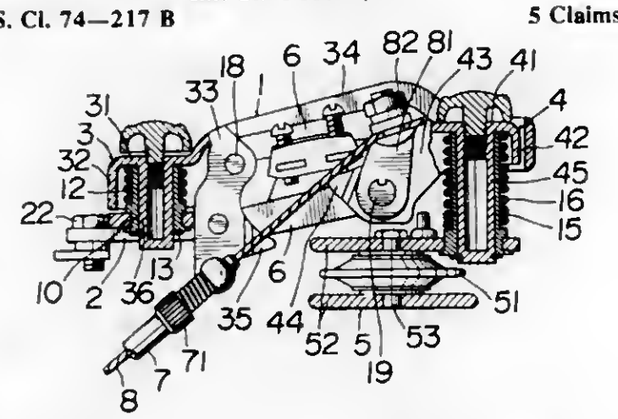
1. An electronic component having a fine adjustment mechanism comprising
a case including a side wall having a plurality of bores therein,
a drive shaft having an eccentric cam formed on a portion thereof, said drive shaft extending from said case,
a ring-shaped intermediate reduction member having a plurality of projections and a gear portion formed on the outer periphery thereof coupled to the eccentric cam on said drive shaft said plurality of projections fitting loosely into the plurality of bores in said casing thereby preventing rotation of said intermediate reduction member while permitting eccentric movement thereof,
a reduction rotating member having a gear portion formed on the inner periphery thereof coupled to a portion of the gear portion of said intermediate reduction member, the gear portion on said reduction rotating member having a diameter different from that of said intermediate reduction member, and,
an actuating member coupled to said reduction rotating member.

4,027,542

DERAILLEUR FOR BICYCLE

Masashi Nagano, Sakai, Japan, assignor to Shimano Industrial Company, Limited, Osaka, Japan

Filed Sept. 23, 1975, Ser. No. 615,920
Claims priority, application Japan, Oct. 4, 1974, 49-114983; Oct. 4, 1974, 49-114984; Oct. 4, 1974, 49-114985; Oct. 4, 1974, 49-114986
Int. Cl.² F16H *7/22*
U.S. Cl. 74—217 B **5 Claims**



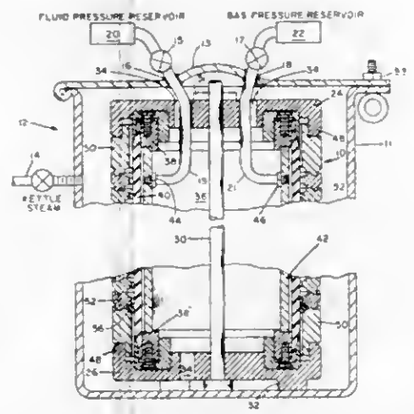
1. A derailleur for a bicycle having a frame member, said derailleur comprising:
a bracket fixed to the frame member of the bicycle,
a support mounted to said bracket and rotatable relative thereto through a given range,
two parallel links, one end of each of said links being pivotally connected to said support,
a movable member pivotally connected to the other end of each of said links,
a chain change-over frame having two chain-guide sprocket wheels,
said frame being mounted to said movable member and rotatable relative thereto through a given range,
said bracket having a base and a forked end,
mounting means connected to the base for rotatably carrying said support thereon,
said support and said movable member each comprising a front wall parallel to said bracket, a side wall extending toward said bracket adjacent to said front wall, and mounting walls opposite to each other and extending adjacent to said side wall,
a first tubular member integral with and extending from a central portion of said front wall of the support said first tubular member being rotatably sleeved to said mounting means connected to the base of said bracket to thereby rotatably support said support,
said chain change-over frame comprising two guide plates rotatably carrying two chain-guide sprocket wheels therewith, one of said two guide plates having mounting means for being rotatably supported on said movable member, and
a second tubular member integral with said front wall of the movable member and extending from said front wall of the movable member toward said one of said guide plates, said second tubular member being rotatably sleeved to said mounting means of said one of said guide plates so that said guide plates may be rotatably supported on said movable member.

4,027,543

METHOD FOR CURING ELASTOMERIC ARTICLES

Jonathan A. Johnston, Denver, Colo., assignor to The Gates Rubber Company, Denver, Colo.

Filed Oct. 17, 1974, Ser. No. 515,759
Int. Cl.² B29H *5/01, 7/22*
U.S. Cl. 74—231 R **16 Claims**



1. A method for curing reinforced vulcanizable elastomeric power transmission belting disposed between a mold surface and a pressure chamber, comprising the steps of:
delivering into the chamber a hot fluid of relatively high heat capacity and pressurizing the fluid to a first pressure;
maintaining the fluid in the chamber at the first pressure for a residence period sufficient to at least partially soften the elastomeric belting but insufficient to significantly vulcanize the elastomeric belting;
while the elastomeric belting is in a softened state delivering into the chamber in admixture with the fluid a gas of low heat capacity relative to the hot fluid;
pressurizing the gas and fluid in the chamber to a second pressure from about 300 to about 520 psi thereby causing the elastomeric belting to flow into conformance with the mold surface; and thereafter
vulcanizing the elastomer belting by heating said mold surface.

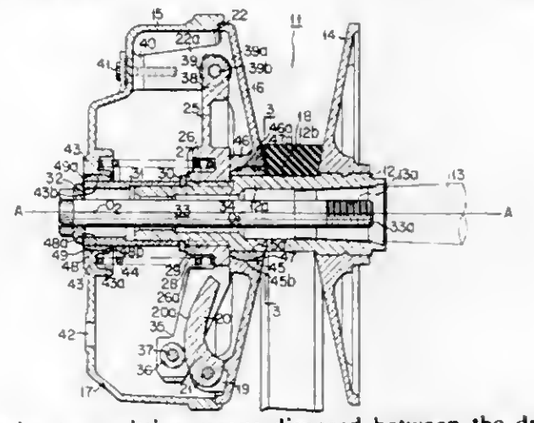
4,027,544

V-BELT VARIABLE-SPEED DRIVE

Takashi Kobayashi, Hamamatsu, Japan, assignor to Yamaha Hatsudoki Kabushiki Kaisha, Japan

Filed Apr. 23, 1976, Ser. No. 679,746
Claims priority, application Japan, June 19, 1975, 50-82668[U]
Int. Cl.² F16L *55/52*
U.S. Cl. 74—230.17 E **7 Claims**

1. A V-belt variable-speed drive comprising:
a driving shaft;
a stationary sheave concentrically fixed to said driving shaft;
sliding sheave means having a sliding sheave facing the stationary sheave and supported by at least two central portions penetrated by the driving shaft, said central portions having a spherical inner surface;
at least two bearings mounted on the driving shaft and being slideable axially thereof, each of the bearings having a cylindrical inner surface which contacts the outer surface of the driving shaft and each of the bearings having a spherical outer surface shaped complementary to the inner surfaces of said central portions of the sliding sheave means, the complementary spherical outer surface of the respective bearings being concentered as the spherical surfaces of said central portions of the sliding sheave means, and said bearings being inserted into the corresponding central portions of the sliding sheave means with the sperical outer surface of said bearings being contacted by the spherical inner surface of the corresponding central portions;
an endless belt passing between the stationary sheave and the sliding sheave;



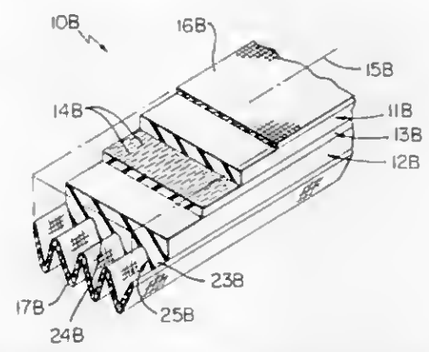
rotation-transmitting means disposed between the driving shaft and the sliding sheave means to transmit the rotation of the driving shaft to the siding sheave;
displacing means disposed between the driving shaft rotation-transmitting means and the sliding sheave means to draw the sliding sheave nearer to the stationary sheave as the driving shaft is rotated at a more accelerated speed; and
urging means for urging the sliding sheave in the direction in which the sliding sheave is separated from the stationary sheave.

4,027,545

ENDLESS POWER TRANSMISSION BELT AND METHOD OF MAKING SAME

Jack D. White, Jr., Springfield, Mo., assignor to Dayco Corporation, Dayton, Ohio

Filed Mar. 19, 1976, Ser. No. 668,544
Int. Cl.² F16G *5/16, 1/00;* **B29H** *7/22*
U.S. Cl. 74—233 **12 Claims**



1. An endless power transmission belt for operation in an endless path comprising, a tension section, a compression section, and a load-carrying section, said load-carrying section being a flat strip of rubber bonded between said tension and compression sections and having a plurality of elongated discrete fibers embedded therein, said compression section comprising a fiber-loaded platform layer providing transverse rigidity for said belt.

4,027,546

SPEED CHANGING DEVICE FOR TOOLS HAVING A GEAR ASSEMBLY WITH A VARIABLE GEAR RATIO

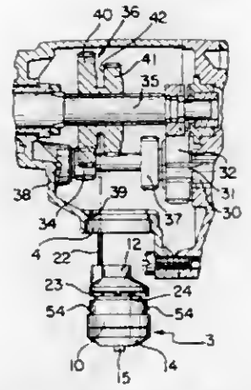
Lorenzo Ercole Alessio, Cairoli, Italy, assignor to The Black and Decker Manufacturing Company, Towson, Md.

Filed June 2, 1976, Ser. No. 692,212

Claims priority, application Italy, June 12, 1975, 24324/75; June 12, 1975, 21672/75

Int. Cl.² F16H *1/12, 3/08;* **B60K** *20/10*

U.S. Cl. 74—325 **27 Claims**



1. In a tool having an output shaft, a gear-box housing having an opening formed therein, a gear assembly disposed in the gear-box housing and having gear means movable between at least two positions for changing the gear ratio of the gear assembly, a motor for driving the output shaft through the gear assembly, and a device for moving the gear means to change the gear ratio, the device comprising:

an annular guide member fixedly mounted to the gear-box housing in said opening thereof;

a cylindrical member rotatably mounted in said annular guide member, said cylindrical member having one end extending outside of the gear-box housing to facilitate manually moving said cylindrical member relative to said guide member;

eccentric means arranged at the other end of said cylindrical member for engaging the gear means to move the same from one of said positions to the other one of said positions in response to the manual actuation of said cylinder member;

seal means formed on said cylindrical member and said annular guide member for sealing the gear-box housing with respect to the ambient; and,

resilient means for applying resilient pressure to said seal means whereby an effective seal between said members is established to prevent lubricating liquid from flowing out between said members from the gear-box housing.

4,027,547

SINGLE LEVER CONTROL

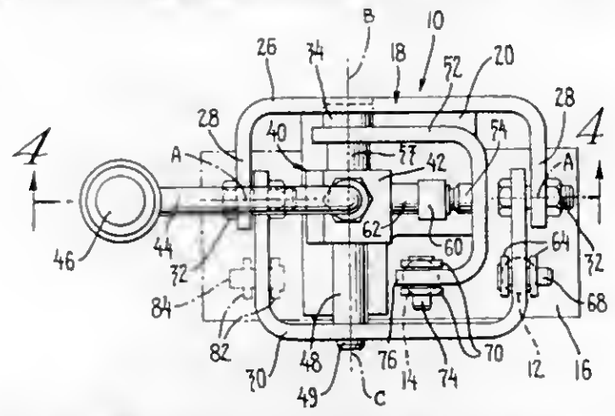
Habibur Rahman, Detroit, and Gerald L. Joslyn, Auburn Heights, both of Mich., assignors to Massey-Ferguson Inc., Detroit, Mich.

Filed Dec. 17, 1975, Ser. No. 641,707

Int. Cl.² G05G *9/00, 9/04*

U.S. Cl. 74—471 XY **11 Claims**

1. A single lever control for operating two separate mechanisms comprising; a base structure adapted to be supported adjacent said mechanisms, a first arm member mounted on said base structure for pivotal movement about a first axis disposed in fixed relation to said base structure, a second arm member mounted on said base structure for pivotal movement about a second axis disposed in fixed relation to said base structure and intersecting said first axis, a shaft forming a third member having one end supported at the intersection of the first and second axes and the other end supported on said first arm member for rotational movement about a third axis, a control lever rigidly connected to said shaft member for rotational movement of the latter on the third axis and for angular displacement of said shaft member about the first axis during movement of said control lever from a neutral position in which said first, second and third members are disposed in a common plane, means connecting said control lever to said second arm member to move the latter to selected positions about the second axis upon movement of said control lever about the third axis, said second arm member remaining in its



selected position upon movement of said first arm member about the first axis, first and second connecting means mounted on said first and second arm members, respectively, for movement in generally parallel paths in a plane parallel to said first axis and being adapted for connection to said mechanisms for selective or simultaneous movement upon movement of said control lever about the first and third axes.

4,027,548

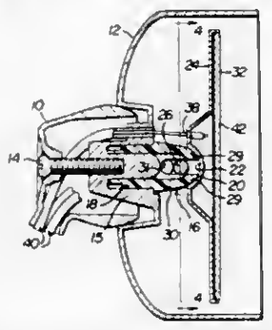
REMOTE CONTROL MIRROR

James M. Cummins, Warren, Mich., assignor to Mirrex, Incorporated, Warren, Mich.

Filed May 1, 1975, Ser. No. 573,685

Int. Cl.² G01P *3/20*

U.S. Cl. 74—501 M **27 Claims**



1. In a remotely controlled mirror system of the type including a mirror anchored to a mirror backing plate whose position is adjustable relative to a mirror housing by means of a cable linkage interconnecting the mirror backing plate with a control unit, the improved means for mounting the mirror backing plate to the mirror housing, comprising:

a joint comprising a semi-spherical head on a first element and a semi-spherical head-receiving socket on a second element, one of said cooperating head and socket elements forming a part of the housing, and the other of said cooperating elements forming a part of the mirror backing plate, said elements being held in abutting but relatively pivotal contact by the tension of the cable linkage exerting a force pulling the mirror backing plate toward and against the cooperating element of the housing;

a slot traversing said semi-spherical head of said first element and opening towards said head-receiving socket of said second element;

and a stabilizing pin secured to the one of said backing plate and housing of which said socket element forms a part, said stabilizing pin being received in said slot;

said pin and slot being so oriented that rotation of the mirror about a first axis substantially parallel to the cable linkage at its attachment point to the mirror backing plate is restricted by the resultant interference between said pin and the side surfaces of said slot, while leaving the mirror

free to rotate about a second axis mutually perpendicular to said first axis.

4,027,549

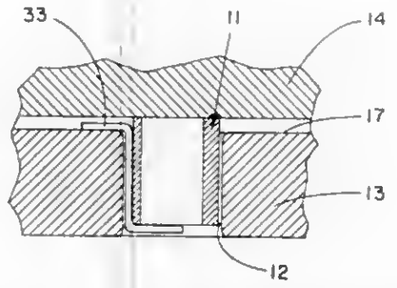
PLUG-TYPE COUNTERWEIGHT AND LOCK

Vincent Colletti, Rocky Hill, Conn., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 16, 1975, Ser. No. 623,139

Int. Cl.² F16F *15/22*

U.S. Cl. 74—573 R **10 Claims**



1. A balancing device adapted for rapid change of weight within a constant outer weight configuration comprising:

a rotatable body adapted to be balanced by a cylindrical weight,

a generally cylindrical weight having a constant outer configuration and replaceable by substitution of weights having selected amounts of internal mass removed,

a hole in said body formed to accommodate said weight and an elongate locking strip for holding said weight in place in said hole,

said locking strip foldable at least 90° at selected transverse positions and adapted when folded to support said weight at one end,

said body having a recess for receiving one end portion of said locking strip,

said one end portion folded at an angle of substantially 90° to the remainder of said locking strip,

said weight having an outer longitudinally extending recess for receiving an intermediate portion of said locking strip,

said weight shorter in length than the depth of said hole and said locking strip folded at its end remote from said one end at an opposite angle to the fold of said one end for supporting said weight,

whereby said weight may be applied by folding said strip at said one end, inserting the strip in said recess in said rotatable body, inserting said weight in said hole with said intermediate strip portion in said longitudinal recess, and folding said other end of said strip across the exposed surface of said weight.

4,027,550

RATCHET CLAW

Jusuke Yagulnuma, Tokyo, Japan, assignor to Copal Company Limited, Tokyo, Japan

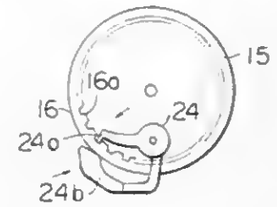
Filed June 2, 1976, Ser. No. 692,238

Claims priority, application Japan, June 5, 1975, 50-75300[U]

Int. Cl.² F16D *41/12*

U.S. Cl. 74—577 S **2 Claims**

1. Construction of a ratchet claw adapted to be resiliently urged against ratchet teeth formed on an annular portion of a rotatable member supported by a shaft on a stationary member for rotation relative thereto, the improvement wherein said ratchet claw is pivotally supported on a stationary member at its proximal end while its free distal claw portion is adapted to be engaged with said ratchet teeth and said ratchet claw is formed with a resilient ratchet biasing arm extending from a portion of said ratchet claw adjacent to said proximal end toward said free distal claw portion with a distance held therebetween, said ratchet biasing arm being so arranged relative to said free distal claw portion that said annular portion of said rotatable member is resiliently clamped between said free distal claw portion and said ratchet biasing arm so as



to cancel each other the biasing forces of said claw portion and said biasing arm applied to said annular portion of said rotatable member thereby positively preventing any radial force from being applied to said shaft by the engagement of said ratchet claw with said rotatable member.

4,027,551

SPEED CHANGE GEAR SYSTEM

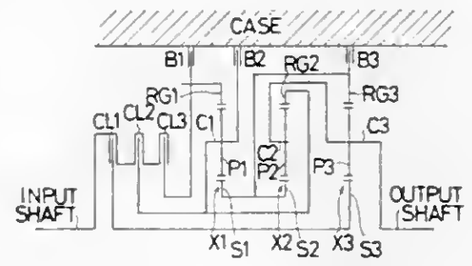
Noboru Murakami, Nagoya; Koichiro Hirosawa, Kariya; Kazuo Ohara, and Koichi Matsuo, both of Toyota, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed May 27, 1975, Ser. No. 580,790

Claims priority, application Japan, June 27, 1974, 49-74137

Int. Cl.² F16H *57/10*

U.S. Cl. 74—759 **10 Claims**



1. A speed change gear system comprising:

a casing;

an input shaft;

an output shaft;

a first planetary gear set including a first sun gear, a first planetary gear engaged with said first sun gear, a first ring gear meshed with said first planetary gear, and a first carrier rotatably supporting said first planetary gear;

a second planetary gear set including a second sun gear connected to said first sun gear, a second planetary gear meshed with said second sun gear, a second ring gear meshed with said second planetary gear and connected to said first carrier, and a second carrier rotatably supporting said second planetary gear;

a third planetary gear set including a third sun gear; a third planetary gear meshed with said third sun gear, a third ring gear meshed with said third planetary gear and connected to said first and second sun gears, and a third carrier rotatably supporting said third planetary gear and connected to said second carrier and said output shaft;

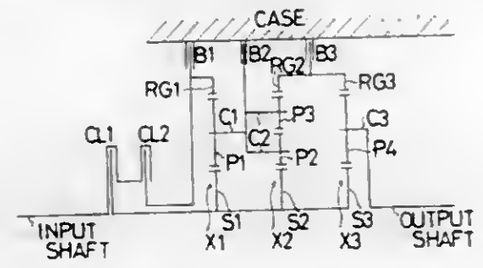
a first clutch for engaging or disengaging said input shaft and said third sun gear;

a second clutch for engaging or disengaging said input shaft and said first carrier and said second ring gear;

a third clutch for engaging or disengaging said input shaft and said first ring gear;

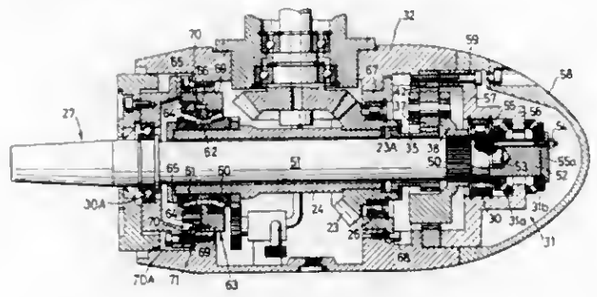
a first brake for fixedly mounting said first carrier and said second ring gear on said casing; and
a second brake for fixedly mounting said first and second sun gears and said third ring gear on said casing.

4,027,552
SPEED CHANGE GEAR SYSTEM
Noboru Murakami, Nagoya; Koichiro Hirosawa, Kariya; Kazuo Ohara, and Koichi Matsuo, both of Toyota, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan
Filed Apr. 22, 1975, Ser. No. 571,019
Claims priority, application Japan, May 7, 1974, 49-50594
Int. Cl.² F16H *57/10*
U.S. Cl. 74—765 **5 Claims**



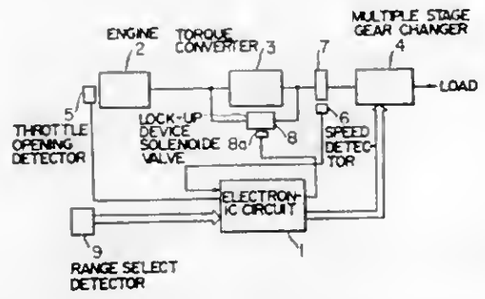
1. A speed change gear system comprising:
an input shaft;
a first sun gear;
first planetary pinion gears engaged with said first sun gear;
a first ring gear engaged with said first planetary pinion gear;
a first carrier rotatably supporting said first planetary pinion gears;
a second sun gear;
second planetary pinion gears engaged with said second sun gears;
third planetary pinion gears engaged with said second planetary pinion gears;
a second ring gear engaged with said third planetary pinion gears;
a second carrier rotatably supporting said second and third planetary pinion gears;
said second carrier being drivingly connected with said first carrier;
a third ring gear drivingly connected with said second ring gear;
fourth planetary pinion gears engaged with said third ring gear;
a third sun gear engaged with said fourth planetary pinion gears and being drivingly connected with said second sun gear;
a third carrier rotatably supporting said fourth planetary pinion gears;
a first clutch for simultaneously coupling or uncoupling said first, second, and third sun gears to or from said input shaft;
a second clutch for coupling or uncoupling said first ring gear to or from said input shaft;
an output shaft dynamically and intergrally connected to said third carrier;
a first brake means capable of being actuated for locking said first ring gear to said transmission case, a second brake means capable of being actuated for simultaneously locking said first and second carriers to said case, and a third brake means capable of being actuated for simultaneously locking said second and third ring gears to said case.

4,027,553
ANGLE GEAR DRIVE ARRANGEMENT
Johann Eichinger, Putzbrunn, and Wilhelm Schwibach, Munich, both of Germany, assignors to Carl Hurth Maschinen- und Zahnradfabrik, Munich, Germany
Filed June 4, 1976, Ser. No. 692,865
Claims priority, application Germany, July 25, 1975, 2533305; July 25, 1975, 2533306
Int. Cl.² F16H *1/28, 1/14, 1/20*
U.S. Cl. 74—801 **4 Claims**



1. In an angle gear drive arrangement, in particular for high performances, for example for a steerable propeller or the like for watercraft, in which a driven shaft is supported in a gear housing and can be driven through a bevel-gear pair, the improvement comprising the driven bevel gear of the bevel gear-pair is arranged on a hollow shaft, which is supported independently from the driven shaft and encircling same and is coupled with the driven shaft, and wherein the hollow shaft is supported at one end with two head-on arranged combined radial-axial-bearings, for example two tapered-roller bearings, of which the one is installed in such a manner that it absorbs both radial and also axial forces, while the other bearing is mounted with radial play, so that is absorbs only axial forces.

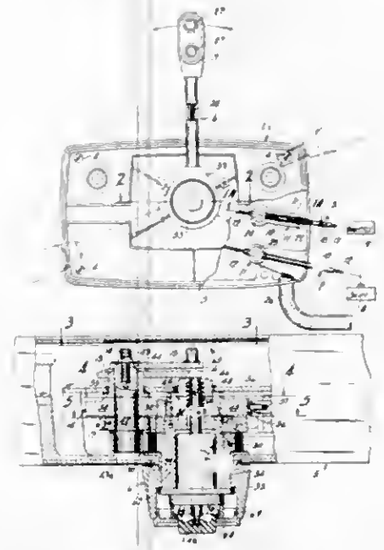
4,027,554
ELECTRONIC CONTROL APPARATUS OF AN AUTOMATIC SPEED CHANGING APPARATUS
Terukazu Ito, Isehara; Kiyoharu Nakao, Hiratsuka; Teruo Minami, Yokohama, and Masaru Uenoyama, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan
Filed July 24, 1974, Ser. No. 491,359
Claims priority, application Japan, July 30, 1973, 48-85698
Int. Cl.² B60K *41/18*
U.S. Cl. 74—866 **8 Claims**



1. In an electronic control apparatus of an automatic speed changing apparatus for use in an internal combustion engine of the type wherein said engine is connected with a load through a fluid type torque converter and a multiple stage gear changer, the improvement with comprises means for locking-up said torque converter when the speed of the output shaft of said torque converter exceeds a first predetermined speed, means for shifting up said gear changer to a higher stage when the spaced of said outut shaft of said torque converter exceeds a second predetermined speed which is higher than said first predetermined speed, and means for shifting down said gear changer to a lower stage when the speed of said output shaft

of said torque converter decreases below a third predetermined speed which is lower than said first predetermined speed.

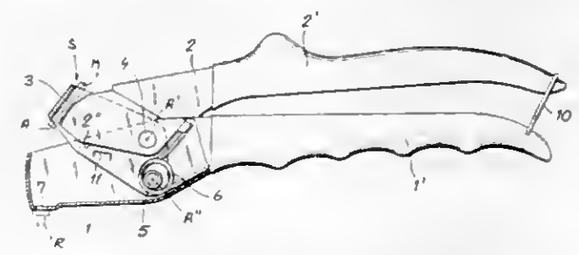
4,027,555
ENGINE TRANSMISSION AND SPEED CONTROL WITH WARM-UP INTERLOCK APPARATUS
Roy J. Rauchle, and John L. Vandenberg, both of Oshkosh, Wis., assignors to Brunswick Corporation, Skokie, Ill.
Filed July 12, 1974, Ser. No. 488,028
Int. Cl.² B60K *41/04*
U.S. Cl. 74—878 **23 Claims**



1. In a drive control apparatus for an engine driven marine propulsion unit having a speed control means and directional drive control means, a supporting enclosure, a speed setting means, a directional drive setting means, a movable selection input means, a direction coupling means between said input means and said setting means and having a first coupling position to transmit the position of the input means to the directional drive setting means and a second lost motion coupling position transmitting the motion of the input means to the directional drive setting means only after a selected movement of the input means, and a warm-up control means coupled to the direction coupling means and having interlock means moved by said warm-up control means into immobilizing engagement with said directional drive setting means to restrict the movement thereof in response to movement of said direction coupling means to establish said second coupling position.

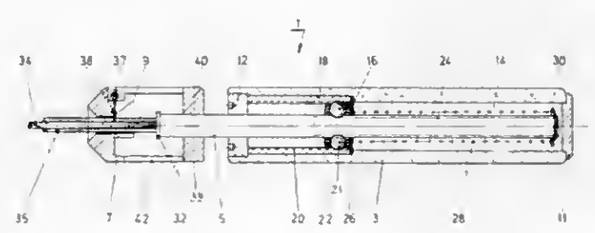
4,027,556
MANUAL BLIND RIVETING TOOL
Gunther Klein, and Karl Spohr, both of Walldorf, Hessen, Germany, assignors to GESIPA Blindniettechnik Gesellschaft mit beschrankter Haftung, Frankfurt am Main, Germany
Filed Oct. 15, 1975, Ser. No. 622,499
Claims priority, application Germany, Oct. 7, 1975, 7531806[U]
Int. Cl.² B21J *15/34*
U.S. Cl. 81—3 R **8 Claims**

1. A blind riveting tool comprising:
an elongated holding member having a rearwardly extending handle and a front end;
an elongated displaceable member pivoted at said front end and having a rearwardly extending handle displaceable toward and away from said handle of said holding member and a forwardly directed jaw; and
a clamping element pivoted on said displaceable member adjacent said jaw and formed with a seat adjacent and turned toward said jaw, whereby a blind-rivet mandrel can be clamped between said jaw and said seat and displaced relative to said front end on pivoting of said handles relative to each other, said holding member being formed with a hole dimensioned to receive a blind rivet mandrel and alignable with said seat, the pivot for said element on said holding member lying between the pivot



of said displaceable member on said clamping element and said hole, said clamping element being generally U-shaped and has a pair of elongated sides flanking said jaw and a bight interconnecting said sides and forming said seat, said pivots being formed on the free ends of said sides.

4,027,557
STRIPPING DEVICE FOR WIRE, OR THE LIKE
Jiri Stepan, Stafa, Switzerland, assignor to K. Loepfe Automation AG, Hombrechtikon, Switzerland
Filed Sept. 2, 1976, Ser. No. 720,092
Claims priority, application Switzerland, Apr. 26, 1976, 5196/76
Int. Cl.² H02G *1/12*
U.S. Cl. 81—9.5 R **13 Claims**

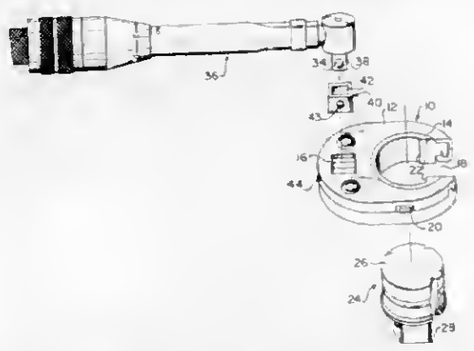


1. A stripping device for stripping insulating from wire, or the like purposes, said device comprising:
a spindle housing; a spindle rotatable in and longitudinally movable through said housing;
a stripping head secured to said spindle for moving therewith; a passage into said head for receiving the wire, or the like, to be stripped;
a knife in said head positionable to intersect said passage, thereby to engage and cut any object in said passage;
spindle support means in said housing for causing rotation of said spindle as it is moved longitudinally of said housing, thereby to rotate said spindle and said knife with respect to the wire, or the like, being stripped.

4,027,558
RATCHET-TYPE TORQUE WRENCHES WITH EXTENDED TORQUE RANGE
Herbert L. Fish, 6525 Kerns Road, Falls Church, Va. 22044
Filed June 18, 1975, Ser. No. 587,899
Int. Cl.² B25D *23/142*
U.S. Cl. 81—52.4 R **1 Claim**

1. A torque wrench assembly comprising a ratchet head and a pair of torque wrench handles adapted to drive said head, said head including a substantially flat elongated body with a ratchet wheel rotatably mounted adjacent to one end of the body and with a square drive opening adjacent to the opposite end of the body, said ratchet wheel having means for engaging and turning a member to be driven, one of said handles having

a square drive stud fitting said drive opening the other of said handles having a square drive stud substantially smaller than said drive opening, an adapter sleeve having outer cross-dimensions fitting said drive opening and having inner cross-dimensions fitting the drive stud of said other handle, the cross-dimensions of said drive opening being selected from the group consisting of about ⅜ inch, about ½ inch, and about ¾ inch, and the inner cross-dimensions of the corresponding adapter sleeve being selected, respectively, from the group consisting of about ¼ inch, about ⅜ inch, and about ½ inch, and means for detachably securing said adapter sleeve in said drive opening, the drive studs of said one handle and said other handle each having a detent and said body and said



adapter sleeve each having a recess for receiving the detents of said drive studs, respectively, whereby said handles may be releasably coupled to said body and to said adapter sleeve, respectively, said drive opening extending comletely through said body so that said drive studs may be inserted into said drive opening and said adapter sleeve, respectively, from either end thereof, the torque range rating of said one handle being substantially higher than the torque range rating of said other handle, and the maximum torque rating of said ratchet head being substantially higher than the maximum torque rating of said other handle and at least as high as the maximum torque rating of said one handle, whereby said ratches head in conjunction with both said handles and said adapter sleeve can operate over a substantially increased torque range.

4,027,559

DEVICE FOR ACTUATING SCREW-THREADED BOLTS

Günter Wallrafen, Erkelenz-Kuckhoven, Germany, assignor to Maschinen- und Bohrgerate-Fabrik Alfred Wirth & Co., K.G., Erkelenz, Germany

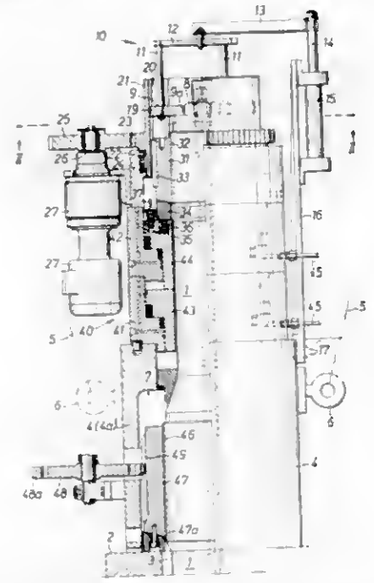
Filed Aug. 27, 1975, Ser. No. 608,254

Claims priority, application Germany, Sept. 6, 1974, 2442798

Int. Cl.² B25B *29/02*

U.S. Cl. 81—57.38 **14 Claims**

1. Device for tensioning screw bolts, which can be screwed into a receptor screw threading and on to which fastening nuts can be screwed to form screw connections on flanges, lids, closures and the like, especially in pressure vessels, reactor vessels or the like, the device including a support member the bottom end of which can be placed on a base, said support member having at least one opening for receiving at least one screw bolt end and having at least one cylinder with a piston slidable within the latter, which piston is adapted to act on an abutment nut, the device being further provided with motor means for rotating the said abutment nut, so as to screw or unscrew the latter on to or from the screw bolt, wherein the said motor means for rotating the abutment nut serves further as a motor drive for a spanner element provided on the support member or on a part associated therewith, said spanner element being movable to be brought into and out of torque-transmitting connection with spanner flats of the screw bolt and being adapted to be rotated by said motor means for



screwing the screw bolt into or out of the said receptor screw threading.

4,027,560

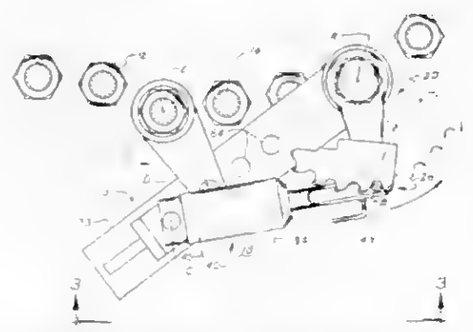
POWER WRENCHES WITH TWO POINT REACTION MEANS

Kenneth Wade Parker, Houston, Tex., assignor to N-S-W Corporation, Houston, Tex.

Continuation of Ser. No. 506,915, Sept. 17, 1974, abandoned. This application Sept. 15, 1975, Ser. No. 613,394

Int. Cl.² B25B *13/46*

U.S. Cl. 81—57.39 **6 Claims**



1. A power tool for rotating one of a plurality of threaded members, said tool comprising:

a. a wrench positionable over one threaded member for transmitting a torque thereto, said wrench having a head;

b. a beam having a hollow sleeve loosely receiving said wrench therethrough for free relative rotation therebetween in the clockwise and counter-clockwise directions;

c. a fluid-operated cylinder mounted over and being pivotally coupled to said beam, said cylinder having a reciprocating rod coupled to said head for transmitting a force thereto;

d. an anchor anchorable only over another threaded member;

e. means coupling said anchor to said beam; and

f. said tool being anchorable solely to said one and said another threaded members for transmitting a torque to said one threaded member in both clockwise and counterclockwise directions, depending on the direction of the power stroke exerted by said rod.

4,027,561

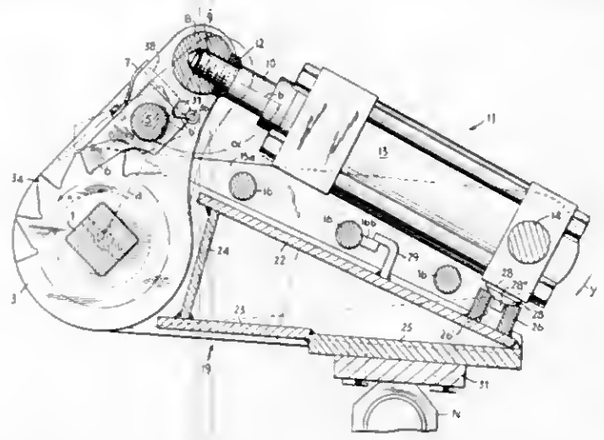
HYDRAULIC WRENCH

John K. Junkers, 7 Arrowhead Lane, Saddle River, N.J. 07458

Filed Nov. 19, 1975, Ser. No. 633,249

Int. Cl.² B25B *13/46*

U.S. Cl. 81—57.39 **13 Claims**



1. A hydraulic wrench comprising shaft means having an axis; at least one ratchet wheel fixed to said shaft means for rotation with the same about the axis thereof; frame means located substantially in a plane normal to the axis of said shaft means and comprising first lever means pivotally connected at one end to said shaft means, second lever means pivotally connected at one end to said shaft means and including an angle with said first lever means, and fluid operated expandable and contractable cylinder-and-piston means pivotally connected at opposite ends to the other ends of said first lever and second lever means, respectively; at least one ratchet pawl pivotally carried out by said first lever means intermediate the ends of the latter and engaging the teeth of said ratchet wheel for turning the ratchet wheel and the shaft means connected thereto; exchangeable socket means mounted at one end of said shaft means for engaging a polygonal head of a threaded connector for turning the latter, whereby during such turning of the threaded connector in one direction a force is created tending to turn said frame means about the axis of said shaft means in the opposite direction; and means pivotally attached at one end to said shaft means and in the region of the other end operatively connected to said frame means and adapted to engage a fixed abutment adjacent to the threaded connector to be turned for counteracting said force.

4,027,562

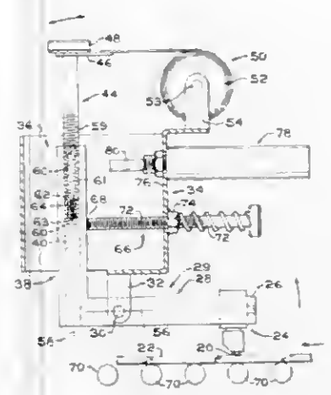
FORCE APPLYING DEVICE FOR SCORING WHEELS

Robert M. Bonaddio, Monroeville, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Mar. 23, 1976, Ser. No. 669,560

Int. Cl.² B26D *3/08*

U.S. Cl. 83—8 **23 Claims**



1. A device for applying a force to a tool means comprising:

lever arm means having an end;

means for mounting the tool means adjacent an end of said lever arm means;

means for pivotally mounting said lever arm means to move the tool means through an oscillatory path;

force applying means secured to said lever arm means to bias the tool means in a first direction along the oscillatory path; and

means mounting said lever arm means for dimensionally altering said lever arm means to apply a predetermined resultant force on the tool means.

4,027,563

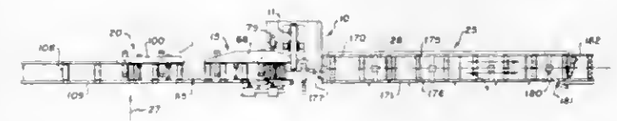
CONTROLLED TRANSVERSELY MOVABLE GUIDE MEANS FOR LUMBER

Jack Weavell, Coquitlam, Canada, assignor to CAE Machinery Ltd., Vancouver, Canada

Filed June 1, 1976, Ser. No. 691,308

Int. Cl.² B27B *27/02, 27/10*

U.S. Cl. 83—106 **7 Claims**



1. Apparatus for longitudinally sawing lengths of wood, comprising supporting means for supporting lengths of wood in a path of travel in which a saw is located, means for moving the wood lengths along the path to be cut longitudinally by the saw, relatively long guide means extending along and parallel with the path and mounted for movement transversely of said path and being selectively movable back and forth across the path by setworks connected thereto, a closed hydraulic system comprising a plurality of piston-cylinder units with a unit near each of opposite ends of the guide means, one end of each cylinder unit being fixed against movement and the opposite end of said each cylinder unit being connected to the adjacent end of the guide means, and pipe means so interconnecting said cylinder units that when the guide means is moved, hydraulic fluid is transfered from an end of one of said units to an opposite end of another of said units to ensure the ends of the guide means moving in unison exactly the same distance.

4,027,564

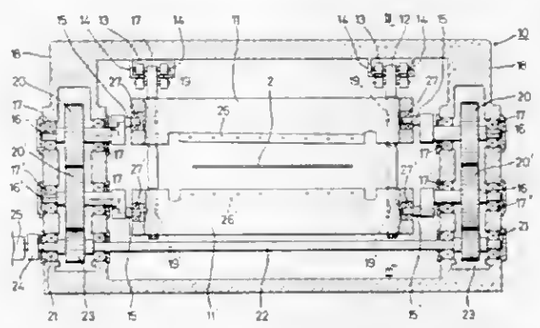
MACHINE FOR CUTTING A MOVING STRIP OF MATERIAL

Satoshi Yahara, Daito, Japan, assignor to Kabushiki Kaisha Token Kikai Seisakusho, Daito, Japan

Filed June 23, 1976, Ser. No. 699,052

Int. Cl.² B23D *25/02*

U.S. Cl. 83—328 **2 Claims**



1. A machine for cutting a moving strip of material into regular sizes by intermittently rotating two cutting blades at a speed synchronized with the speed at which the material to be

cut is being fed, said machine comprising: a frame constructed for the material to be cut to pass through the center thereof,

two opposed pairs of driving shafts laterally mounted through the side walls of said frame, one pair above the other,

two opposed pairs of eccentric shafts eccentrically coupled to said driving shafts,

an opposed pair of cutting blade holders each laterally supported by said pair of eccentric shafts at the opposite ends thereof so as to impart a substantially circular motion to said cutting blades as said driving shafts rotate,

an opposed pair of cutting blades each fixedly mounted on said cutting blade holders with their cutting edges facing each other,

means for driving said two pairs of driving shafts at the same time but in opposite directions, and

a pair of vertical guide suspended from the top wall of said frame for longitudinal movement and loosely fitted in two vertical through holes formed in said cutting blade holders in alignment with said eccentric shafts, whereby putting said cutting blades into cutting engagement with the material at the same time and at the same cutting angle.

4,027,565

REVOLVING SHEARS FOR HIGH SPEED SEVERING

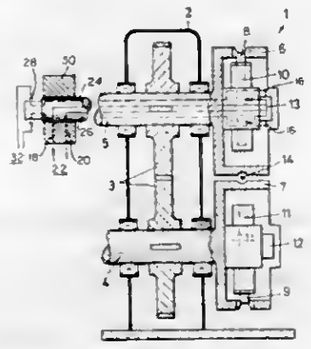
Wolfgang Elsner, Ratingen; Jorn Moslener, Angermund, and Alfons Langenstuck, Duisburg, all of Germany, assignors to Demag Aktiengesellschaft, Duisburg, Germany

Filed Nov. 21, 1975, Ser. No. 634,165

Claims priority, application Germany, Nov. 29, 1974, 2456431

Int. Cl.² B26D *3/22*

U.S. Cl. 83—337 **3 Claims**



1. A shearing device for cutting rolled material, such as wire moving at high linear speeds into lengths comprising a pair of cooperating rotating guides for guiding said rolled material linearly, and a radially displaceable cutting blade in each said guide for cooperating movement into and out of the path of said rolled material, characterized by

a. an hydraulic reversible fluid pressure piston and cylinder unit disposed in each said rotating guide and rotatable therewith;

b. the piston of each said unit connected directly to said radially movable cutting blade in its respective rotating guide;

c. servo-control means connected to each said piston and cylinder units for the cooperative actuation thereof to cut said rolled material into lengths; and

d. said servo-control means for each said reversible piston and cylinder unit is mounted on said rotating guides adjacent their respective reversible unit.

4,027,566

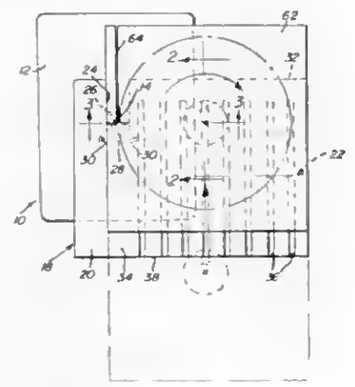
CIRCLE CUTTING ATTACHMENT FOR BAND SAW

Thomas D. Harrill, Rte. 1, Mabank, Tex. 75147

Filed May 13, 1976, Ser. No. 686,672

Int. Cl.² B27B *13/04*

U.S. Cl. 83—411 R **7 Claims**



1. In combination with a cutting tool including a cutting element toward which a workpiece may be advanced along a predetermined path for cutting of said workpiece by said element, a base including a plurality of side by side parallel guides paralleling said path, a follower selectively removably engageable with any one of said guides for predetermined lateral adjustment of said follower relative to said path and guided movement of said follower along the selected guide in parallel relation relative to said path, a workpiece support rotatably supported from said follower for angular displacement about an axis substantially normal to a plane containing a pair of said guides, and support means supporting said base relative to said tool with said guides at least substantially paralleling said path.

4,027,567

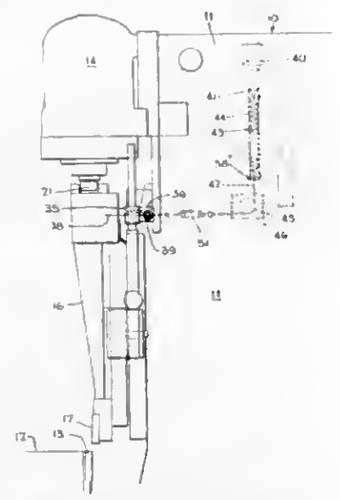
RAKE ANGLE CONTROL FOR SHEARS AND THE LIKE

Clarence O. Jones, Jr., Eggertsville, N.Y., assignor to Niagara Machine & Tool Works, Buffalo, N.Y.

Filed Oct. 4, 1976, Ser. No. 728,929

Int. Cl.² B26D *5/12*

U.S. Cl. 83—624 **8 Claims**



1. In a power squaring shear having a frame and a reciprocable ram provided with a shear knife and a pair of hydraulic motor devices adjacent to opposite ends of said frame and connected with said ram for effecting working and return strokes thereof; slope control mechanism comprising an upright member normally extending parallel to the direction of reciprocation of said ram and pivoted at one end thereto for angular adjustment in a plane generally parallel to the plane of reciprocation of said shear knife, fluid circuit means for reciprocating said hydraulic motor devices, means for adjusting said upright member on said pivot to vary the angle between said member and said shear knife, fluid means for variably transferring operating fluid to and from said circuit means to advance or retract one of said motor devices relative to the other to adjust the angular disposition of said shear knife, valve means mounted on said frame for controlling said fluid transfer means, a member slidable on said upright member and means restraining the same against vertical movement relative to said frame whereby said slidable member moves horizontally by and upon angular adjustment of said upright member, a cable extending from said valve, and means guiding said cable from said valve to a point of horizontal connection with said slidable member, said valve being in neutral position when said upright member is in a normal position parallel to the direction of reciprocation of said ram.

4,027,568

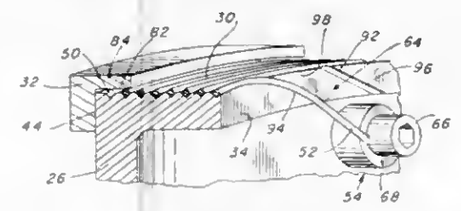
REPLACEABLE SURFACE BAND WHEEL

Charles E. Cleland, Naples, Fla., assignor to Continental Machines, Inc., Savage, Minn.

Filed May 24, 1976, Ser. No. 689,512

Int. Cl.² B23D *55/06*; **B27B** *13/06*

U.S. Cl. 83—788 **41 Claims**



1. A replaceable surface band wheel for a band saw comprising:

a rotatably mounted disk shaped body having an essentially cylindrical peripheral surface, a front face and a rear edge, said peripheral surface having formed therein at least one groove;

at least one elongated member having first and second ends and positioned on said peripheral surface to lie in said at least one groove;

a flange extending radially outwardly from said rear edge of said disk shaped body and partially overlying said peripheral surface thereby slidably retaining said second end of said at least one elongated member;

anchoring means for securing said first end of said at least one elongated member, said flange and said anchoring means for holding said at least one elongated member in said at least one groove on said peripheral surface.

4,027,569

KEYBOARD FOR AN ELECTRONIC MUSICAL INSTRUMENT EMPLOYING VARIABLE CAPACITORS

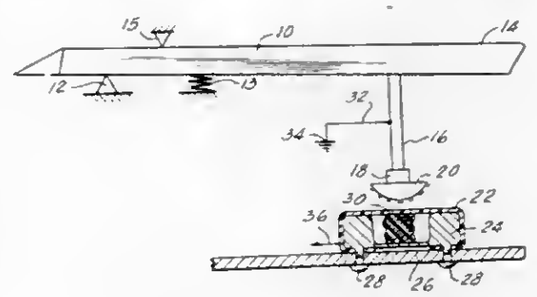
David A. Luce, Clarence Center, and Anthony Marchese, Cheektowaga, both of N.Y., assignors to Norlin Music, Inc., Lincolnwood, Ill.

Filed June 19, 1975, Ser. No. 588,320

Int. Cl.² G10H *1/02*

U.S. Cl. 84—1.1 **17 Claims**

1. For use with an electronic musical instrument having a keyboard for selecting sounds to be audibly produced, said keyboard having a plurality of pivotal keys, the combination comprising a variable capacitor associated with a key of said keyboard, said variable capacitor having a first conductor, and a second conductor in the form of a resilient conductive member, one of said conductors being shaped relative to the other so that relative movement of said conductors deforms said resilient member from its normal shape, and including a layer of insulation between said first and second conductors, one of said first . ..d second conductors being fixed in position and the other being connected to said key, for movement relative to each other in response to operation of said key of said keyboard, for selectively varying the capacitance of said capacitor in accordance with the amount of movement of said key.



4,027,570

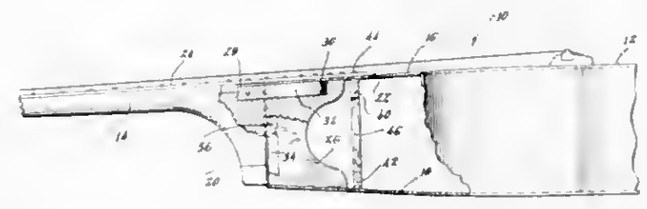
NECK-BODY JOINT FOR GUITAR-LIKE INSTRUMENTS

Stanley E. Rendell, and Richard Schneider, both of Kalamazoo, Mich., assignors to Norlin Music, Inc., Lincolnwood, Ill.

Filed May 12, 1975, Ser. No. 576,326

Int. Cl.² G10D *3/01*, *1/08*, *3/00*

U.S. Cl. 84—293 **13 Claims**



1. In a guitar-like musical instrument having a body with a soundboard forming its upper surface and a headblock secured in the back end thereof and a neck extending from the back of the body, a neck-body joint including:

a tongue extending from the upper portion of the end of the neck which end is in contact with the body; a recess formed in the upper surface of the head block at a position opposite said tongue, said recess being sized to permit said tongue to fit snugly therein, said tongue being firmly secured in said recess when said neck and body are fully assembled; a dovetail projection extending from the end of said neck adjacent to the body; and a dovetail channel formed in said headblock, said channel being positioned opposite the projection of said neck and being sized to have said projection fit snugly therein when said neck and body are assembled.

4,027,571

MUSICAL HORN CONSTRUCTION

Mark S. Veneklasen, 12338 Montana Ave. Apt. 11, Los Angeles, Calif. 90049

Division of Ser. No. 412,334, Nov. 2, 1973, Pat. No. 3,933,078. This application Jan. 12, 1976, Ser. No. 648,174

Int. Cl.² G10D *9/04*

U.S. Cl. 84—380 R **3 Claims**

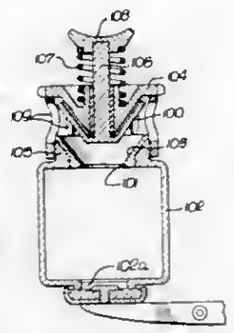
1. A tone hole for a woodwind musical instrument comprising:

a woodwind instrument body having an interior surface;

a tone hole defining seat mounted on said body, the interior surface of said seat being a portion of a cone expanding outwardly from said interior surface of said body to form said tone hole;

a tone hole stopper having an exterior surface of a conical shape complementary to said seat interior surface, said stopper having an inner end which is substantially flush

with said body interior surface when said stopper is in contact with said seat; and



means mounting said stopper for movement toward and away from said seat.

4,027,572

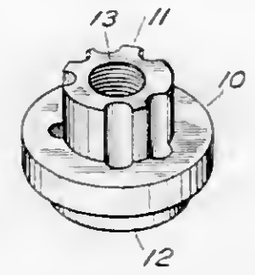
THEFT-PREVENTION SCREW FASTENINGS

William G. Burge, 955 Seven Hills Ranch Road, Walnut Creek, Calif. 94596

Filed May 13, 1974, Ser. No. 469,246

Int. Cl.² B25B *15/00*; **F16B** *23/00*

U.S. Cl. 85—32 R **5 Claims**



3. A theft-prevention screw fastening device having a special tool-engaging portion, and further means adapted to prevent its removal by the use of conventional tools, wherein the improvement consists of a tool-engaging portion having the following described structure; a cylindrical body having a plurality of spline ways of uniform transverse cross section spaced around, and extending longitudinally, throughout the length of the curved surfaces thereof, and being of random pattern relative to the angularity of their spacing, and a concentric flange at the lower end of said cylindrical body extending outwardly therefrom, and having apertures in axial alignment therewith, and being complimentary to, both in form and dimension, the spline ways of said cylindrical body, whereby only a specially designed tool can be utilized for the application or removal of the device, the actuating elements of the tool being subjected to transverse shear by their insertion in said apertures, and being further subjected to longitudinal shear by the action of said spline ways.

4,027,573

SELF-TAPPING SCREW FASTENER WITH IMPROVED THREAD CONSTRUCTION

Richard C. Laverty, Palatine, Ill., assignor to Interior Fasteners, Inc., Elk Grove Village, Ill.

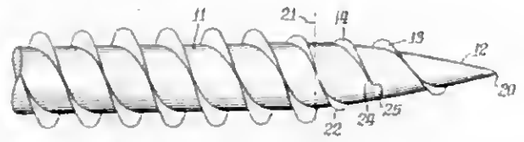
Filed June 20, 1975, Ser. No. 588,964

Int. Cl.² F16B *33/02*

U.S. Cl. 85—46 **3 Claims**

1. A screw fastener element having an integral elongate shank portion formed with a driving head at one end and a conical point portion at the other end and adapted to provide a stage penetration into a work-piece, the improved thread construction comprising:

a first raised helical thread formed on the exterior of the conical point and shank portions and having a generally uniform thread height throughout the length of said shank portion, and having a leading edge extending from near the tip of the conical point and a gradually increasing thread height throughout a portion of the axial length of the conical point; and



said thread height on said conical point decreasing in elevation relative to the increasing diameter of the conical point and diminishing substantially to zero elevation adjacent the juncture of said shank and conical point portions.

4,027,574

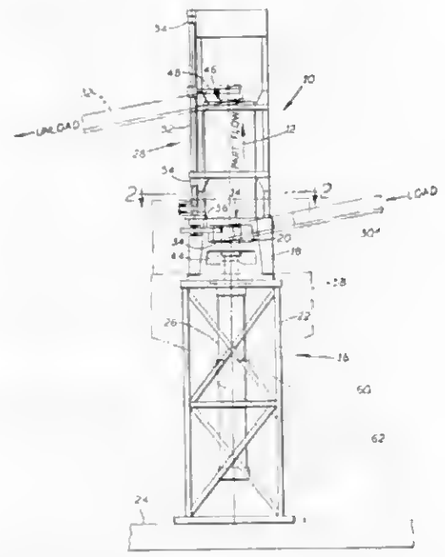
POT BROACHING MACHINE

John Xavier Russell, Troy, Mich., assignor to The Babcock & Wilcox Company, New York, N.Y.

Filed Aug. 28, 1975, Ser. No. 608,803

Int. Cl.² B23F *9/04*; **B21D** *41/06*

U.S. Cl. 90—10 **7 Claims**



1. A pot broaching machine having an integrated workpiece transfer mechanism comprising:

a mounting member;

a pot broach mounted to said mounting member and having a rough workpiece inlet at one end and a finished workpiece outlet at an opposite end;

a rough workpiece loading arm mounted proximately to the inlet of said pot broach operative to move a rough workpiece to a position aligning the rough workpieces with the inlet of said pot broach;

means operative to transfer the rough workpiece through said pot broach to produce a finished workpiece at the outlet of said pot broach;

a finished workpiece unloading arm mounted proximately to the outlet of said pot broach operative to move the finished workpiece away from the outlet of said pot broach; and

means operative to mechanically link said loading arm to said unloading arm to allow said unloading arm to move the finished workpiece away from the outlet of said pot broach whenever said loading arm moves a rough workpiece to the inlet of said pot broach.

4,027,575

ROUTER FOR TRIMMING LAMINATE PLASTICS

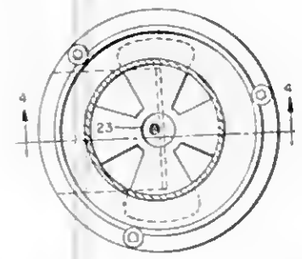
Kenneth N. White, 12650 90th Ave., Palos Park, Ill. 60464

Filed Sept. 27, 1974, Ser. No. 510,013

The portion of the term of this patent subsequent to Sept. 21, 1993, has been disclaimed.

Int. Cl.² B27C *5/10*

U.S. Cl. 90—12 D **3 Claims**



1. A router for trimming adjacent coplanar laminate materials comprising:

a housing having a base;

a power unit within said housing for rotatably driving a cutting blade about a first axis perpendicular to said base;

said cutting blade extending beyond said base;

means for adjusting the amount of said cutting blade extending beyond said base;

a template follower having guide means substantially disposed about a first side of said cutting blade for following the contour of the surface of a template material positioned along said first side; and

a clearance space between said base and said template follower which exposes said cutting blade to a second side substantially opposite said first side for insertion of a second laminate material adjacent said second side for trimming thereupon by said router;

said guide means including a template abutment extending in a plane substantially tangent to the circumference of said blade.

4,027,576

PUMP OR MOTOR HAVING SEALED CHAMBERS

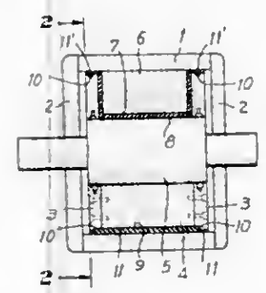
Chifuru Nomura, Chino, Japan, assignor to Kitazawa Shoji Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 5, 1975, Ser. No. 629,136

Claims priority, application Japan, Nov. 11, 1974, 49-136441[U]

Int. Cl.² F01C *9/00*; **F01B** *15/06*

U.S. Cl. 91—339 **4 Claims**



1. In a device, such as a pump or motor, for operating with a fluid under pressure, an elongated shaft member having a longitudinal axis and an elongated cylinder member coaxially surrounding said shaft member and having an inner cylindrical surface of circular cross section directed toward said shaft member, elongated shaft vane means fixed to and extending longitudinally along said shaft member parallel to said axis thereof, said shaft vane means projecting radially from said shaft member toward said cylinder member and having an outer edge region situated next to said inner cylindrical surface of said cylinder member, said shaft vane means having opposed ends and said shaft member carrying at said opposed ends of said shaft vane means a pair of circular flanges which are respectively situated in planes normal to said axis, which extend from said shaft member toward said cylinder member, and which have outer circular edge regions next to said inner cylindrical surface of said cylinder member, said flanges being fixed to said opposed ends of said shaft vane means, axial sealing means extending along said outer edge region of said shaft vane means between the latter and said inner cylindrical surface of said cylinder member and annular sealing means extending along said outer edge regions of said flanges and situated between the latter and said inner surface of said cylinder member, said axial and annular sealing means being joined to each other and providing for slidable fluid-tight engagement between said inner cylinder surface of said cylinder member and said outer edge regions of said shaft vane means and circular flanges, cylinder vane means also extending parallel to said axis, said cylinder vane means being fixed to said cylinder member and extending from said inner surface thereof toward said shaft member, said cylinder vane means being situated between said flanges and having opposed ends respectively adjacent said flanges, and said cylinder vane means having an inner region situated next to said shaft member, so that said cylinder vane means and shaft vane means define between themselves chambers extending longitudinally between said flanges and circumferentially between said cylinder and shaft vane means, and substantially U-shaped sealing means extending longitudinally along said inner region of said cylinder vane means between the latter and said shaft member and along the opposed ends of said cylinder vane means between the latter and said flanges for providing a slidable fluid-tight engagement between said cylinder vane means on the one hand and said flanges and shaft member on the other hand, so that when the device operates as a motor and fluid under pressure is supplied to a chamber situated circumferentially on one side of said shaft vane means between the latter and said cylinder vane means while the chamber which is circumferentially on the other side of said shaft vane means is at a pressure lower than the pressure of said fluid, one of said members will be driven in rotation with respect to the other in one angular direction, while when fluid under pressure is supplied to the chamber at said other side of said shaft vane means between the latter and said cylinder vane means while the chamber on said one side of said shaft vane means is at a pressure less than the pressure of the fluid, said one member will be driven in rotation in an opposite angular direction with respect to the other member, all of said vanes defining between themselves four chambers distributed circumferentially between said vanes about said axis, said cylinder member having means for placing a pair of said chambers which are respectively situated on opposite sides of said one shaft vane alternately in communication with a source of fluid under pressure, one of said flanges being formed with a passage means placing one of said chambers on one side of said one shaft vane in communication with a diametrically opposed chamber and the other of said flanges carrying a passage means placing the other of said chambers on the other side of said one shaft vane in communication with the chamber diametrically opposed to said chamber on said other side of said one shaft vane.

4,027,577

BAG-MAKING APPARATUS AND PROCESS FOR MAKING PORTED BAGS

John A. Thompson, Berkeley, and Robert V. Torres, Pinole, both of Calif., assignors to Cutter Laboratories, Inc., Berkeley, Calif.

Filed July 25, 1975, Ser. No. 599,303

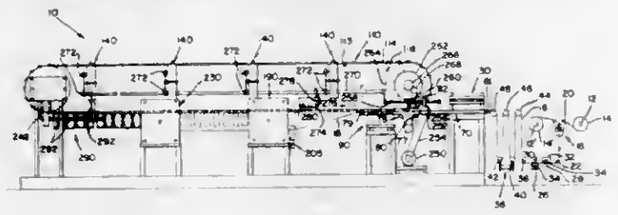
Int. Cl.² B31B *1/84*, *23/74*

U.S. Cl. 93—35 PC **13 Claims**

13. In a process for fabricating flexible plastic bags from a

continuous sheet of film, each bag having at least one port sealed thereto, the improvement comprising sequentially

1. pressing the film onto a film retaining conveyor,
2. actuating the conveyor to cause the film to progress to a port sealing unit,
3. aligning a series of flanged tubular ports above a fold line of the film at the port sealing unit, said ports being retained by port retaining means whereby the flanges of the ports are in close proximity to the film,
4. actuating the port sealing unit to cause the film to contact and seal to the flanges of the ports,
5. removing the film from the film retaining conveyor and allowing the film to drape vertically into two plies and be



suspended by the sealed ports which are retained by the port retaining means,

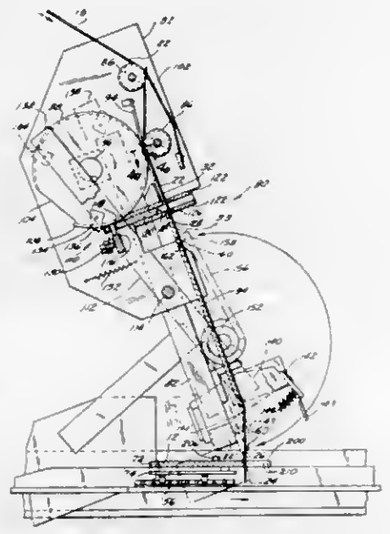
6. actuating the port retaining means to positon the draped film between film smoothing means and two bag sealing plates,
7. actuating the film smoothing means and subsequently actuating the bag sealing plates to smooth the two plies and seal portions of the two plies together to form connected bags,
8. actuating the port retainer means to move the connected bags and position them between cutting plates, and
9. actuating the cutting plates to cause at least a portion of the film between the connected bags to be severed.

4,027,578

DEVICE FOR ATTACHING BOX HANDLES

Leroy M. Varga, Dover, and Robert B. Fitch, Montville, both of N.J., assignors to Rockaway Corporation, Rockaway, N.J.

Filed Apr. 8, 1976, Ser. No. 674,971
Int. Cl.² B31B *1/86*
U.S. Cl. 93—36.7 **29 Claims**



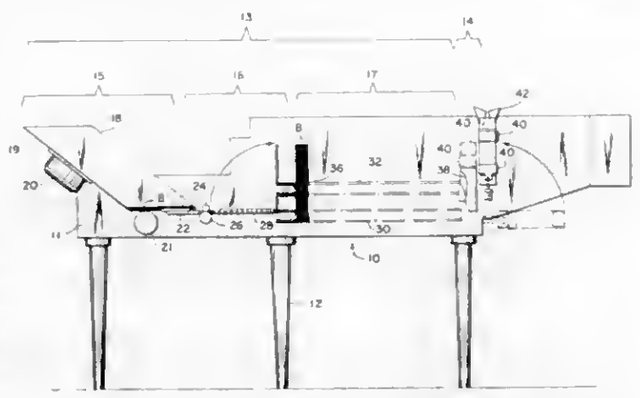
1. A device for securing a web handle to a blank comprising a conveyor, a feed station including means for storing a supply of blanks, said conveyor including means for removing individual blanks from said feed station and carrying the blanks therewith, with one edge of the blanks facing in the direction of travel of the conveyor; a web handle supply station downstream of said feed station in the direction of travel of said conveyor including means for supplying and positioning a web handle of predetermined length to a blank immediately therebelow with the ends of said web handle located in front of said one edge of the blank; and means for securing said web to the blank.

4,027,579

METHOD AND APPARATUS FOR OPENING FOLDED BOX BLANKS

William Leasure; Luis Garcia; Charles Reifel, and Jack Shelton, all of Houston, Tex., assignors to Mira-Pak, Inc., Houston, Tex.

Filed Apr. 22, 1975, Ser. No. 570,504
Int. Cl.² B31B *1/78*
U.S. Cl. 93—53 M **16 Claims**



14. A method of mechanically opening folded blanks having a plurality of folded edges comprising the steps of:

supplying a plurality of blanks to a rotatably mounted screw means for axially advancing the blanks upon the rotation thereof;

rotating said screw means so as to directly present the box blanks one at a time to an opening means comprising a cam and a holding means;

engaging a first folded edge of the blank with said cam;

engaging a second folded edge of the blank with said holding means for holding the second edge of the blank;

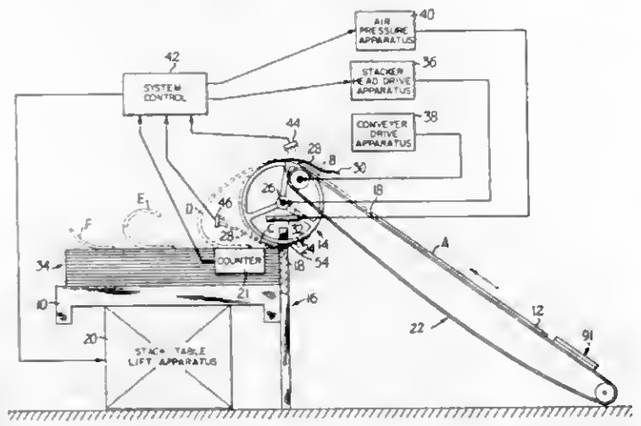
and rotating said cam whereby the folded box is increasing compressed at one folded edge with the rotation of said cam and held at the other folded edge, thereby opening said blank.

4,027,580

PAD STACKER

George Holger Sundin, Duluth, Minn., assignor to Conwed Corporation, St. Paul, Minn.

Filed Nov. 21, 1975, Ser. No. 634,021
Int. Cl.² B31B *1/94*
U.S. Cl. 93—93 M **33 Claims**



1. A method for stacking flexible pads of low density fibrous materials in at least one aligned stack, which comprises the steps of:

a. receiving and securing the leading edge of at least one pad to be stacked above said at least one stack near one end thereof;

b. rotating said leading edge approximately 180° reversing the relative positioning of the top and bottom of the leading edge and forming a belly in said pad;

c. holding said reverse positioned leading edge at the top of said at least one stack against an index indexing at the said one end thereof;

d. directing an air stream into the said belly thereby assisting the portion of the pad trailing said leading edge to reverse its upper and lower positions along and on said at least one stack; and

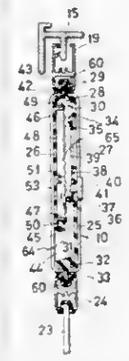
e. terminating the holding of said leading edge.

4,027,581

VENTILATOR

Yukio Yamamoto, Kurobe, and Yukio Sado, Shimoniikawa, both of Japan, assignors to Yoshida Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 16, 1975, Ser. No. 568,709
Claims priority, application Japan, Apr. 25, 1974, 49-47316[U]; Apr. 25, 1974, 49-47317[U]
Int. Cl.² F24F *13/18*
U.S. Cl. 98—98 **10 Claims**



1. A ventilator for use as a component in a window assembly, door assembly or other building hardware, comprising:

a. an inner plate having air vent means formed therein, and having upper and lower flanges extending outwardly;

b. an outer plate engaging said upper flange of said inner plate and secured thereto, said outer plate being spaced from said inner plate in the transverse direction of the ventilator, and providing an air-intake opening vertically displaced from said air vent means;

c. a pair of side caps fitting around the vertical marginal portions of said plates and in vertically surrounding relation to said flanges;

d. a filter fixedly positioned between said plates in spaced relation to both of said plates; and

e. partition means secured to one of said plates and abutting said filter for directing air flow therethrouh remotely from the partition means at least twice.

4,027,582

ART OF BREWING INDIVIDUAL SERVINGS OF COFFEE IN A CUP

Gerard Peter O'Connell, 10 Bemis Road, Holyoke, Mass. 01040

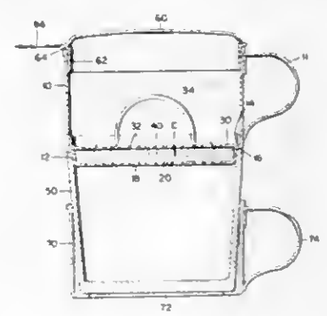
Filed Jan. 19, 1976, Ser. No. 650,556
Int. Cl.² A47J *31/00*
U.S. Cl. 99—306 **1 Claim**

1. An individual coffee maker comprising:

a cylindrical body having a handle and a perforated bottom and having its lower end portion reduced in diameter for the reception of a beverage producing substance,

a perforated partition seatable in spaced relation to the perforated bottom over the lower end portion of the body,

a cover removably seated on the body, a handle on the cover, a beverage cup positionable below the body for receiving the beverage dripped through the lower perforated bottom wall of the body and supporting the body,



a supporting cup having a handle and adapted to receive the beverage cup therein,

the body, partition, and cover being removable from the beverage cup by grasping the handle on the body,

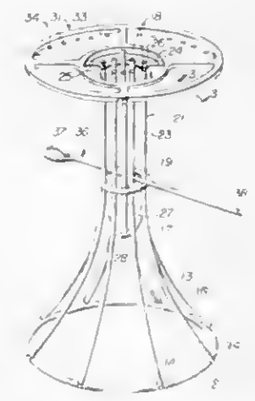
and the cover being adapted to be removed from the body, inverted, and disposed below the supporting cup in the manner of a saucer, the handle on the cover facilitating such removal and inversion.

4,027,583

RACK FOR SUPPORTING POULTRY AND MEAT DURING ROASTING

George Spanek, 212 Eaton Road, San Mateo, Calif. 94402, and Denis C. Spanek, 19135 Brooklane, Saratoga, Calif. 95070

Filed June 28, 1976, Ser. No. 700,566
Int. Cl.² A47J *37/04*
U.S. Cl. 99—421 H **4 Claims**



1. A rack for supporting food products during cooking comprising a lower member and an upper member fitting telescopically into the upper end of said lower member, said lower member comprising a base ring, a plurality of bottom rods spaced around the circumference of said base ring and secured thereto, each said bottom rod curving inwardly and upwardly from said base ring in a plane normal to the plane of said base ring, the upper stretch of said bottom rod being substantially vertical for an extended portion of its length, a first ring fixed to said bottom rods at about the midpoints of their lengths and a second ring fixed to the upper ends of said bottom rods; said upper member comprising an outer ring of a size about equal to said base ring, a plurality of top rods spaced around the circumference of said outer ring and secured thereto, each said top rod extending substantially hori-

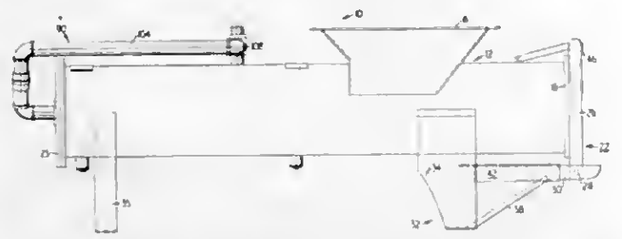
zontally inward from said outer ring and then curving downward to fit inside said second ring and between the upper ends of said bottom rods, the lower ends of opposed pairs of top rods being joined together in lower bends; and a detachable, perforated trough fitting on top of said upper member shaped to receive liquid which drips through the perforations in said trough to baste said food products.

4,027,584

WATER ACTUATED GARBAGE COMPACTOR

Howard M. Sly, 685 Gardiners Road, Kingston, Ontario, Canada

Filed June 12, 1975, Ser. No. 586,343
Claims priority, application Canada, July 5, 1974, 204235
Int. Cl.² B30B *15/32, 1/32*
U.S. Cl. 100—218 **1 Claim**



1. A compacting apparatus operable by a low pressure source of water comprising:

an elongated compression chamber having an inlet feed means including an opening for introducing material to be compacted in said chamber, and a closable opening spaced along said chamber from said inlet feed opening for permitting removal of a slug of compacted material;

a closed hollow press member closely received and slidably supported in said compression chamber for axial movement therealong between an advanced compacting position and a retracted position for permitting introduction of the material into the chamber via said feed means, said press member having one end thereof operable as a ram for compacting said material, said one end having a beveled flange extending in the axial direction about the periphery of said end to scrape said material from the sides of said chamber, and the other end thereof having a wall with two openings therein, said press member being arranged to close off said inlet feed opening as said press member is advanced to effect compaction of said material to thereby prevent escape of material being compacted;

a stationary piston disposed within said hollow press member, said piston including peripheral sealing means slidably engaging said press member at the interior thereof to divide the interior of said press member into two sections;

means for securing said piston against axial movement relative to said compression chamber, said securing means including a pair of tubular pipes extending through said openings in said other end of said press member, said openings in said other end of said press member having sealing means to seal against the pipes while allowing said axially directed motion of said press member within said compression chamber, said tubular pipes being fixedly secured to said piston at one end thereof and being fixed to said compression chamber at the other end thereof, said tubular pipes being adapted to be in fuid communication with a supply of water under relatively low pressure;

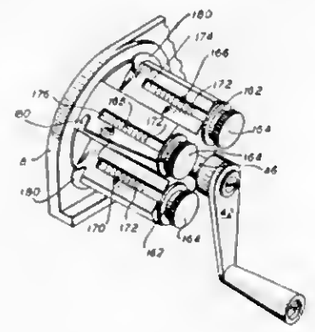
means including said pair of tubular pipes for defining a fluid circuit in flow communication with each of said sections of said press member at the interior thereof and being adapted for connection to a supply of water under pressure, and valve means in said fluid circuit means operable selectively to introduce water under pressure into one of the other of said sections for advancing and retracting the movable press member relative to said elongated compression chamber, wherein said press member is constructed such that one of said sections which is pressurizable by said water to cause advancement of said press member and compaction of material ahead of said press member has a cross-sectional area against which said pressurized water is effective in acting to develop compaction forces which is substantially equal to the cross-sectional area interiorly of the compression chamber.

4,027,585

DOCUMENT IMPRINTER

Myron D. Goldman, Clifton, N.J., assignor to Litton Business Systems, Inc., Belleville, N.J.

Filed Nov. 11, 1974, Ser. No. 522,956
Int. Cl.² B41L *47/46*
U.S. Cl. 101—91 **9 Claims**



1. In a document imprinter having a rotary printing unit rotatable about an axis of rotation, said rotary printing unit including a plurality of banks of selectively settable printing members, said respective banks of printing members being disposed around said rotary printing unit at different angular positions relative to said axis of rotation of said unit; said rotary printing unit further including a corresponding plurality of setting mechanisms for said plurality of banks of printing members, there being one such setting mechanism for an corresponding to and cooperable with each one of said banks of printing members, said respective setting mechanisms being disposed around said rotary printing unit at different angular positions relative to said axis of rotation of said unit, each of said setting mechanisms including display means for displaying the settings of said printing members; said display means for each setting mechanism comprising a bank of display indicia, separate from the corresponding bank of printing members, for displaying in conventional reading orientation the settings of said last-mentioned corresponding bank of printing members; said setting mechanisms further including a plurality of respective viewing window means through which the display indicia of said respective banks of display indicia are viewable, said respective viewing window means being disposed around said rotary printing unit at different angular positions relative to said axis of rotation of said printing unit:

said plurality of viewing window means being so disposed and arranged that all the corresponding banks of display indicia are simultaneously readable through said plurality of viewing window means in one angular rotated position of said rotary printing unit by a person viewing said rotary printing unit along a single line of sight directed towards said plurality of viewing window means;

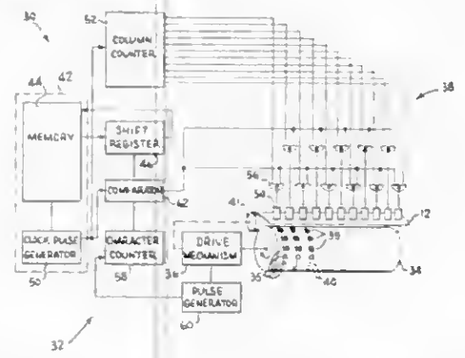
the angular displacement between adjacent ones of said plurality of viewing window means relative to said axis of rotation of said printing unit being less than the angular displacement between the corresponding banks of printing members relative to said axis of rotation.

4,027,586

METHOD FOR PRINTING A MANUALLY SCANNABLE BAR CODE AND ARTICLES CARRYING A VERTICALLY EXTENDED BAR CODE

David W. Hubbard, Stamford, Conn., assignor to Pitney-Bowes, Inc., Stamford, Conn.

Continuation-in-part of Ser. No. 327,508, Jan. 29, 1973, abandoned. This application Dec. 14, 1973, Ser. No. 416,937
Int. Cl.² B41J *1/32*
U.S. Cl. 101—93.01 **3 Claims**



3. In a method of printing lines of vertically oriented readable optical bar codes on a ticket with an automatic high speed bar code printer which prints the bar codes along horizontal vertically spaced lines, the improvement comprising:

printing a first horizontal line of vertically oriented code bars on a ticket; and

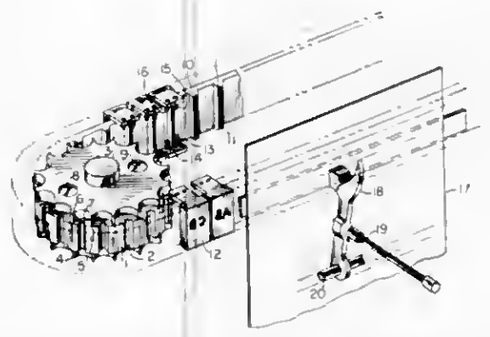
printing a second identical horizontal line of vertically oriented code bars on said ticket in registration with the first horizontal line of bar codes and with the ends of the respective code bars of said second line being in vertical registry and ovelapped relationship with the ends of the respectively adjacent code bars of said first horizontal line whereby a single line of a bar code pattern having an accumulated height that is greater than the height of either of said first and second horizontal lines is thereby formed on the ticket.

4,027,587

PULLEY CONSTRUCTION FOR HIGH SPEED PRINTER BELT

John Tschinkel, Great Neck, and Raymond A. Ballweg, Smithtown, both of N.Y., assignors to Potter Instrument Company, Inc., Plainview, N.Y.

Filed Sept. 8, 1975, Ser. No. 611,020
Int. Cl.² B41J *1/20*
U.S. Cl. 101—111 **1 Claim**



1. In a high speed chain printer, the combination of;

an elastomeric endless timing belt having an elongated rectangular cross-section, a smooth outer surface and carrying teeth extending from top to bottom across the width of the belt and equally spaced along its inner surface;

a plurality of character bearing printing slugs attached along the outer surface of said belt and held in place by a pair of pins at the top and bottom of said slug and embracing the top and bottom of one of said teeth while leaving a clear center portion of said teeth;

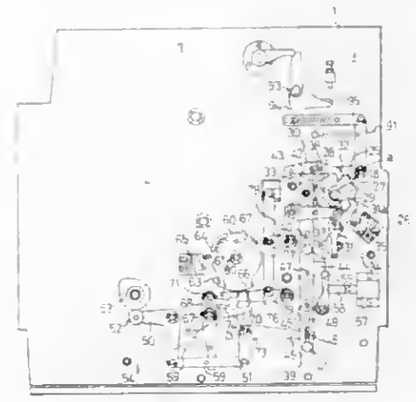
a pulley for driving said belt along a predetermined path, said pulley including equally spaced peripheral slots matching said clear center portions of said teeth upper and lower clearances for said pins and including ribs between said slots and clearances equal in height to the width of said belt for supporting said belt to its full width in the area between said teeth.

4,027,588

CONTROL MECHANISM FOR AN OFFSET PRINTING MACHINE

Tomoyuki Tasaka, and Yoshinori Honkawa, both of Hiroshima, Japan, assignors to Ryobi, Ltd., Hiroshima, Japan

Continuation-in-part of Ser. No. 429,360, Dec. 28, 1973, abandoned. This application Jan. 22, 1976, Ser. No. 651,464
Int. Cl.² B41F *7/24, 7/06, 7/26*
U.S. Cl. 101—144 **16 Claims**



1. An improvement in a control mechanism for an offset printing machine having:

a machine frame and a drive motor;

a master cylinder adapted to hold a plate thereon, a blanket cylinder, cooperating with said master cylinder and an impression cylinder cooperating with said blanket cylinder, said cylinders being rotatably mounted on said frame;

inking and dampening means cooperating with said master cylinder and coupled to said frame;

a control shaft rotatably mounted on said frame;

a plurality of cams supported by said control shaft;

means for moving said master cylinder and said inking and dampening means, into and out of cooperation with their respective cylinders, said means for moving being coupled to respective ones of said plurality of cams; and

a control knob coupled to said shaft in order to rotate said shaft, said knob having at least neutral, printing and blanket cleaning positions;

said improvement comprising:

means for controlling the rotating movement of said control shaft comprising a first ratchet coaxially mounted on said shaft, a stop pin planted on and projecting from a side face of said first ratchet, first and second stoppers pivotally mounted on said frame and swingably engageable with said stop pin, said first stopper preventing said control shaft from manually operated reverse rotation and said second stopper preventing said shaft from manually operated progressive rotation, a star-like cam coaxially mounted on said control shaft so as to integrally rotate with said ratchet and having indented portions formed on its circumference, and a stop arm pivotally mounted to said frame and having a roller at one end thereof, said roller being in engagement with said indented portions of said star-like cam;

transmission means for transmitting the cyclical output of said drive motor of the machine to said first ratchet, and comprising an output cam, a vertically movable link having a claw pivoted thereon so as to engage with the teeth of said first ratchet and to rotate the first ratchet by an amount corresponding to one of said teeth at a time and also having a projection formed on its middle portion, and a first link mechanism for connecting said output cam to said movable link;

means for controlling said transmission means, comprising a clutch pivotally coupled to said frame and swingably engageable with said projection of said movable link, microswitches, and a solenoid energized by a preselected combination of conditions of said microswitches and connected to disengage said clutch;

means for setting the time of blanket cleaning, comprising a ratchet tooth feeding arm pivotally coupled to said frame and swinging in association with said first link mechanism, a feed claw pivotally coupled to one end portion of said ratchet tooth feeding arm, a stop claw pivotally mounted to said ratchet tooth feeding arm, a second ratchet pivotally mounted to said frame and engageable with said feed claw and said stop claw to rotate said second ratchet, and a switch plate mounted on said second ratchet and engageable with one of said microswitches; and

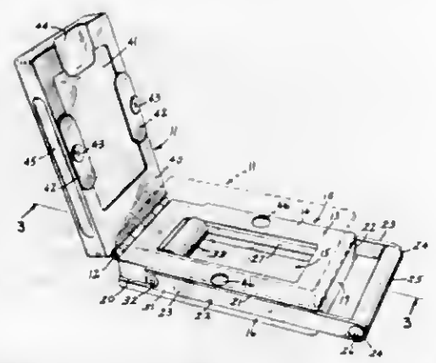
means for controlling blanket cleaning, comprising a further cam for actuating blanket cleaning coaxially mounted on said control shaft, a claw releasing arm pivotally coupled to said frame and having an engaging pin at one end thereof for controlling the engagement of said feed claw and said stop claw with said second ratchet, and a second link mechanism for connecting said blanket cleaning cam to said claw releasing arm, thereby the first link mechanism actuated by the output cam controls both the rotation of the control shaft and the time of blanket cleaning.

4,027,589

PORTABLE IMPRINTER

David G. Timm, St. Paul, Minn., assignor to Timmco, Incorporated, St. Paul, Minn.

Filed May 12, 1975, Ser. No. 576,476
Int. Cl.² B41F *3/04*
U.S. Cl. 101—269 **2 Claims**



1. A portable imprinter adapted for hand-held operation and including a frame member and a carrier member hinged together for relative pivotal movement between an open position, and a closed position maintained by manual force of the operator,

said carrier member comprising means for securing a flat object having raised characters in a predetermined position and supporting said object against pressure applied against said characters;

and said frame member including

a. a rigid housing comprising a flat surface surrounding an opening, and a wall depending therefrom including a pair of ends and a pair of parallel sides having guideway grooves extending parallel to said surface, said opening being so located that in said closed position it is in apposition with an object secured to said carrier member

b. a rigid actuator comprising a pair of elongated arms in sliding engagement longitudinally with said grooves, a first cross member extending between and secured to said arms at locations near first ends thereof, and a second cross member extending between said arms, at locations thereon remote from said first ends thereof, to lie parallel to and displaced from said surface, the lengths of said cross members being such as to retain said arms in engagement with said grooves, said wall being provided with apertures traversed by portions of said actuator so that as said actuator is moved in said grooves said first cross member remains outside the housing and said second cross member remains within said housing, and

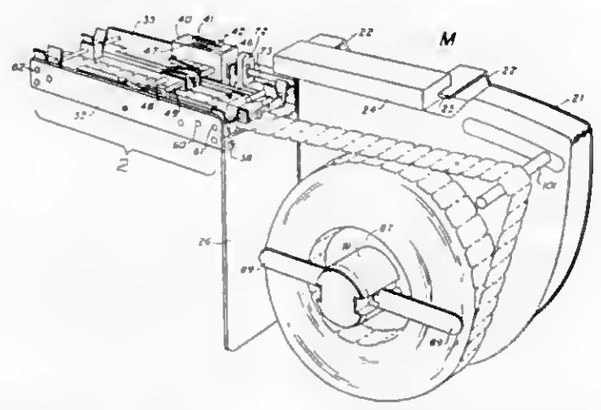
c. a pressure member carried by said second cross member to project into said opening, for movement with said actuator across said opening, the pressure exerted by said pressure member against a flat object on said carrier member being determined by the force applied to hold said frame and carrier members in said closed position.

4,027,590

LABEL, TICKET AND TAG PRINTING MACHINE WITH INTERCHANGEABLE TAPE SUPPLY AND FEEDER MAGAZINES

Maximilian R. Seidl, Munich; Joachim Seidl, Eching, both of Germany, and Walton M. Henry, Rydal, Pa., assignors to Avery International Corporation, San Marino, Calif.

Division of Ser. No. 377,830, July 9, 1973, Pat. No. 3,908,544.
This application Mar. 5, 1975, Ser. No. 555,343
Int. Cl.² B41F *13/64*
U.S. Cl. 101—288 **12 Claims**



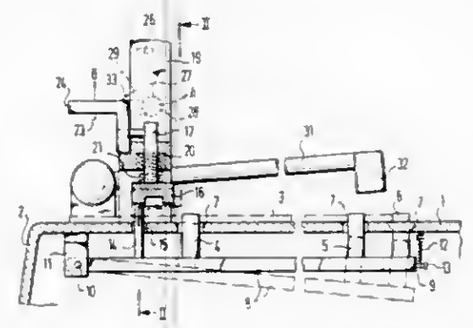
1. A unitary ticket-supply-and-feeder magazine for optionally holding a supply of any one of several different kinds of tickets and for intermittently feeding tickets from said supply and for interchangeable attachment to and detachment from a unitary cyclical ticket-printer having a print-impression platen and having a type-holder carrying printing-type-elements for imprinting the desired printed matter on successive tickets and having cyclical type-pressing means for pressing the printing-type and the print-impression platen towards each other so as to imprint tickets successively disposed between the printing-type and the print-impression platen and for separating the printing-type and the print-impression platen from each other after each imprinting and having mechanical ticket-feeder drive-means for driving the ticket-feeder of the magazine in synchronism with the cycles of the ticket-printer when the magazine is attached to the ticket-printer, said type-pressing means and ticket-feeder drive-means of the ticket-printer not being removed from but remaining a part of the ticket-printer when the magazine is detached from the ticket-printer, said magazine including a ticket-supply-holder and ticket-feeder-means including reciprocable ticket-advancing means arranged to advance a ticket from the ticket-supply-holder towards the print-impression platen of the ticket-printer and including means for selectively accommodating different kinds of tickets, and said ticket-advancing means including a driven member arranged mechanicaly to interengage with the ticket-feeder drive-means of the ticket-printer when the magazine is attached to the ticket-printer, whereby said ticket-feeder drive-means of the ticket-printer is adapted to cause the ticket-feeder of the magazine intermittently to feed tickets from the ticket-supply-holder of the magazine to the ticket-printer in synchronism with the cycles of the ticket-printer, whereby the ticket-printer may be caused optionally to print differnt kinds of tickets by attaching thereto the magazine loaded with the particular kind of ticket to be imprinted.

4,027,591

APPARATUS FOR POSITIONING A PAD OR BOOK OF SHEETS ON THE WORK TABLE OF PRINTING APPARATUS

Hans Gubela, Hackenstrasse 8, 8211 Rottau, Germany

Filed Mar. 26, 1975, Ser. No. 562,050
Int. Cl.² B41F *1/28;* **B65H** *9/08;* **B26D** *7/16*
U.S. Cl. 101—407 BP **3 Claims**



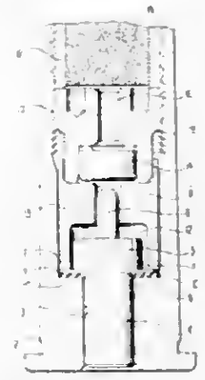
1. Apparatus for the positioning of a loose leaf or bound pad or book on the work table of an apparatus for printing the individual leaves of the pad or book comprising a holder member which cross-section is of an inverted channel configuration, said holder member being disposed to extend traversely of the work table and located along one end of the work table and movable in a plane normal to the upper surface of the work table by being guided for upward and downward movement in a substantially vertical stand between a raised inoperative position which allows introduction of a pad or book between the holder and the work table and a lowered operative position in which said holder member can contact and hold the pad or book securely in its position on the work table, in which the work holder is acted upon by a spring, one end of which bears on the upper face of the work holder while its other end is braced on the bottom of a recess provided in the stand, the work holder being urged downwardly by the spring into the operative position, a reciprocating actuating lever for moving said holder mounted for traverse movement in the front of the stand, said lever being displaceable against the action of said spring to move the work holder upwardly into its inoperative position, in which position said lever is held by means of a locking lever which cooperates with the actuating lever, said actuating lever having at one end an actuating grip while its other end, which is on the other side of the hinging point of the lever on the stand, is activated on a guide pin connected to the work holder, and a plurality of moveable positioning studs for locating the position of the pad or book on the table, said studs being disposed both on a line extending longitudinally of the work table as well as on a line extending traversely of the work table and located to one side of the work holder, the positioning studs so co-operating with the work holder that in the operative position of the work holder they are disposed in a downwardly depressed inoperative position, while when the work holder is in its inoperative position, they are in their operative position in which they project upwardly from the work table to position a pad or book in the correct position on the work table.

4,027,592

PROPELLANT CHARGE IGNITER WITH STRIKER ELEMENT

Günter Hübsch, Kalchreuth; Hellmut Bendler, Stein; Rudolf Stahlmann, Furth, and Heinz Gawlick, Vagen, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Filed Feb. 4, 1976, Ser. No. 655,219
Claims priority, application Germany, Feb. 6, 1975, 2504907
Int. Cl.² F42C *1/02*
U.S. Cl. 102—70 R **23 Claims**



1. A propellant charge igniter having a striker means including a rearward shank portion extending through a bottom piece of the propellant charge igniter, a forward headpiece connected with the shank portion and having an enlarged cross sectional dimension with respect to the shank portion, the striker element means being supported on a shoulder of the bottom piece and further including a separable collar member held by a counter member extending over the headpiece, the separable collar member being constructed as a tear collar member at the headpiece and having a forward and rearward end face, the tear collar member being clamped in a form-fitting manner by contacting at its forward end face the counter member extending over the headpiece and being supported at its rearward end face by the shoulder of the bottom piece.

4,027,593

MULTI-DIRECTIONAL SYSTEM FOR ELECTRICAL BOMB FUZES

Carl J. Campagnuolo, Potomac, Md.; Earl T. Smith, Ft. Walton Beach, and Ronald L. Dale, Destin, both of Fla., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 12, 1976, Ser. No. 657,417
Int. Cl.² F42C *11/00*
U.S. Cl. 102—70.2 G **3 Claims**

1. A charging device for an electrically fuzed bomb, said charging device capable of being mounted in a first or a second orientation approximately 180° rotated with respect to one another, comprising:

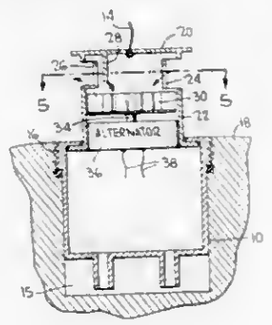
a lanyard-operated pop-up cover including a cylindrical side wall and a flat top plate;

inlet port means and outlet port means oppositely located in said cylindrical side wall for respectively receiving and exhausting slipstream air when said device is mounted on said bomb in said first orientation, the position of said outlet in said second orientation coinciding with the position of said inlet in said first orientation, whereby said inlet and outlet port means serve to respectively exhaust and receive slipstream air when said charging device is mounted in said bomb in said second orientation:

energy converting means for converting slipstream air energy to electrical energy housed in said pop-up cover, said energy converting means comprising a rotatable turbine having a plurality of vanes positioned thereon, said vanes being rotatable by said slipstream air passing between said inlet port means and said outlet port means;

said inlet port means includes means for directing slipstream air onto said rotatable turbine at an angle substantially transverse to the rotational plane of said turbine when said charging device is mounted in said first orientation; and

said outlet port means includes means for directing slipstream air onto said rotatable turbine at an angle of approximately 45° with respect to the rotational plane of said turbine when said charging device is mounted in said second orientation.



4,027,594

DISINTEGRATING LEAD SHOT

John Merrill Olin, St. Louis, Mo., and Venkataramaraj Subbaraj Urs, Godfrey, Ill., assignors to Olin Corporation, New Haven, Conn.

Filed June 21, 1976, Ser. No. 698,440

Int. Cl.² F42B *7/00*

U.S. Cl. 102—92.4 **15 Claims**

1. A pellet formed from finely divided lead particles adhered together into a pellet by a minor amount of a binder, said binder being decomposable in an acid environment such as found in the gizzard of a duck but substantially permanently stable in a more neutral moist environment.

4,027,595

HYDRAULIC APPARATUS

Earl E. Frank, Tallman, N.Y., and Bing S. Yee, Paramus, N.J., assignors to Abex Corporation, New York, N.Y.

Filed Nov. 10, 1975, Ser. No. 630,155

Int. Cl.² B61B *1/00*

U.S. Cl. 104—26 A **22 Claims**

1. In a railroad classification yard having hydraulically operated retarders installed at selected positions along the classification track system, apparatus for furnishing hydraulic fluid to operate the retarders and comprising:

A. a plurality of motor-driven pumps,

at least one to be a normally active pump

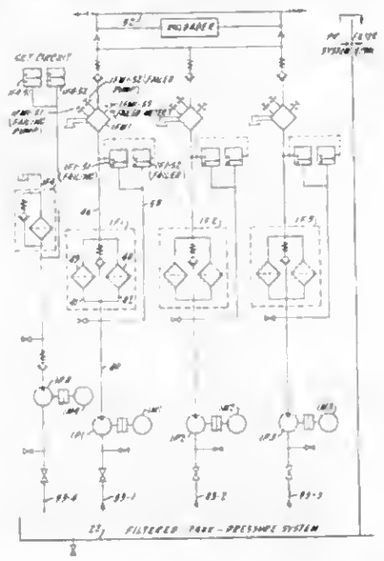
and one to be a normally inactive reserve pump;

B. a plurality of filter units, one for each pump, and through which the related

pump moves fluid under pressure;

C. means to sense the pressure drop across each filter unit and to activate the reserve pump while deactivating the active pump in the event the pressure drop exceeds a predetermined value characterizing unacceptable filter efficiency; and

D. means to sense the pressure drop across each filter unit



and to generate a signal when the pressure drop indicates a filter unit is approaching unacceptable efficiency.

4,027,596

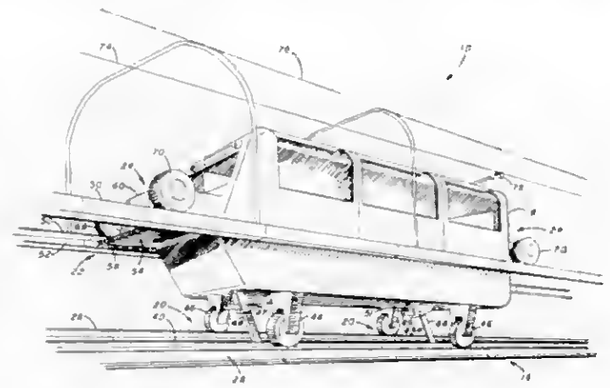
RAPID TRANSIT SYSTEM

Michael A. Nardozzi, Jr., 255 Rushland Drive, Pittsburgh, Pa. 15235

Filed Oct. 17, 1975, Ser. No. 623,495

Int. Cl.² B61B *13/10*

U.S. Cl. 104—138 R **11 Claims**



1. A rapid transit system for the mass transportation of passengers comprising,

a roadway,

a superstructure for supporting said roadway at grade level and at elevations above grade level,

a plurality of vehicles for transporting passengers between selected points on said roadway, said vehicles each supported for movement on said roadway and having a body portion with a lateral portion being secured to and extending therearound,

stabilizing means secured to said superstructure and positioned above said roadway for maintaining said vehicles on said roadway by movably supporting said lateral portion of said body portion of each of said vehicles,

guidance means including a guide plate secured to and extending downwardly from said vehicle body portion and a recessed means mounted on said roadway for receiving said guide plate for controlling movement of said vehicles on said roadway,

propelling means mounted on said vehicles and having means for engaging said stabilizing means for generating movement of each of said vehicles on said roadway, and

braking means connected to each of said vehicles and operable to move into and out of frictional engagement with a portion of said stabilizing means to control the rate of movement of said vehicles on said roadway.

4,027,597

LINEAR INDUCTION MOTOR WITH DAMPING CAGE

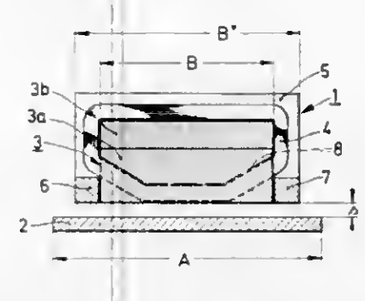
Andreas Lang, Dachau, Germany, assignor to Krauss-Maffei Aktiengesellschaft, Munich, Germany

Filed Oct. 2, 1975, Ser. No. 618,924

Claims priority, application Germany, Oct. 3, 1974, 2447183

Int. Cl.² H02K *41/02*

U.S. Cl. 104—148 MS **8 Claims**



1. A linear induction motor comprising a longitudinally extending reaction rail having an active face; and an elongated stator juxtaposed with said face of said rail, said stator comprising a core formed from at least one lamination stack and having a side confronting said face and formed with a plurality of transverse slots spaced apart in the longitudinal direction, said slots diverging outwardly to their ends away from said reaction rail, respective longitudinally spaced polygonal coils extending around said core and having portions received in said slots and diverging outwardly away from said rail, and a damping cage including a pluarlity of damping bars extending partly around said core and a pair of longitudinally extending conductors flanking said core and electrically connecting said damping bars.

4,027,598

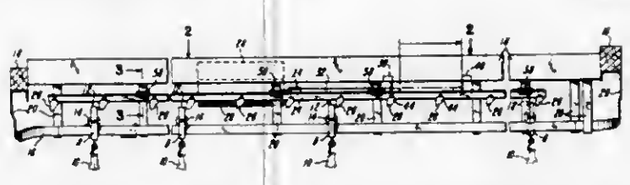
STEPPING CONVEYOR

Wilson H. Swilley, Richmond, Calif., assignor to The Cincinnati Butchers' Supply Company, Cincinnati, Ohio

Filed Oct. 3, 1973, Ser. No. 403,227

Int. Cl.² B61B *13/00*

U.S. Cl. 104—162 **1 Claim**



1. In a stepping conveyor of the type including a plurality of trolley rail hangers each having a substantially vertically disposed surface secured at one end to a ceiling structure and depending therefrom and secured at their other end to a horizontal trolley rail supporting the trolley rail is spaced relation to the ceiling structure, a plurality of work supporting trolleys supported on the trolley rail for movement therealong, and a reciprocating walking beam supported in substantially parallel relationship above the trolley rail and having a plurality of trolley engaging pushers for advancing and spacing trolleys in stepping manner along the trolley rail, the improvement comprising: a horizontally reciprocable walking beam of T-shaped cross-sectional configuration having a vertical web and a pair of substantially flat, coplanar flanges extending in opposite directions laterally from opposite sides of the upper edge of the web; and support means for the walking beam comprising a plurality of stationary walking beam support brackets each including a generally rectangularly shaped base bolted to and in parallel relationship with the vertical surface of the trolley rail hangers, a substantially horizontal, generally rectangularly shaped walking beam support plate welded at one edge thereof to said base and extending substantially perpendicularly therefrom, a pair of substantially flat, coplanar, laterally spaced apart bearing plates releasably secured relative to the underside of the support plate by bolts, a distance greater than the thickness of the flanges of the walking beam to preclude contact of the upper surfaces of said flanges with the lower surface of the support plate, and having coplanar upper bearing areas spaced below the support plate, spacers secured between the undersurface of the support plate and the bearing plates, and a strip of inherently slippery self-lubricating material on the bearing areas slidably supporting the undersurface of the flanges of the walking beam thereon with the web of the walking beam received in the space between the bearing plates, said strip including a first horizontal portion overlying the upper surface of a bearing plate and extended between the bearing plate and spacer associated therewith, a vertical portion extended downwardly across the inner edge of the bearing plate, and a second horizontal portion extended a limited distance rearwardly beneath the bearing plate, bolt means extended through the bearing plates, strips of slippery material, spacers and support plates, securing them together, and means associated with the walking beam to reciprocate it to advance trolleys along the trolley rail in stepping manner and in a common direction.

4,027,599

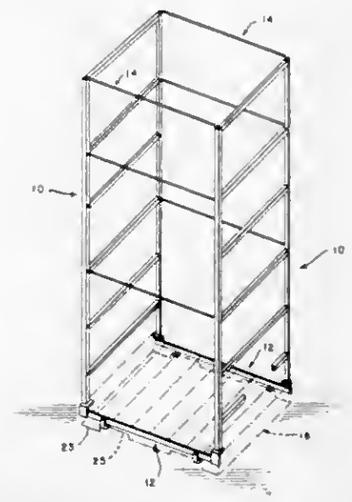
UNITIZING FRAME FOR A PALLET

Lawrence G. Sapp, 621 Lone Palm Drive; James F. Slappey, Tillman Road, both of Lakeland, Fla. 33801, and C. Bart Nixon, 125 NW. 15th St., Oklahoma City, Okla. 73103

Filed Oct. 22, 1975, Ser. No. 624,888

Int. Cl.² B65D *19/44*

U.S. Cl. 108—55.1 **7 Claims**



1. A unitizing frame for a four-way entry pallet, the pallet having an upper surface and including a pair of stringers extending along the sides of the pallet, the stringers having aligned cutout portions in the lower surfaces thereof to provide the four-way entry, and said pallet having an open area across its lateral dimension between the stringers, the unitizing frame comprising:

a pair of like panels having a width substantially equal to the lateral dimension of the pallet, said panels including side members extending the length of the panel;

means for unassistedly supporting said panels vertically on said pallet without obstructing the open area, said supporting means including a pair of bars each having a length substantially equal to the length of the stringers and a plurality of planar members including an upper plate at each end of each bar integral with each said bar and extending inwardly over the upper surface of the

pallet, a side of each upper plate being subtantially flush with an end of the pallet, and at least a pair of lower plates integral with each said bar and extending inwardly of said pallet in individual frictional contact with a portion of the lower surfaces stringers above the cutout of the portions and means on said upper plates for stably, but removably, engaging the lower ends of said side members, said pair of panels interlocking said bars on said pallet; and

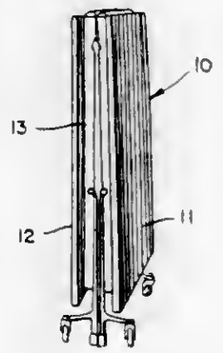
at least one pair of rod members for disengagingly interlocking each side member of one of said pair of panels to the opposing side member of the other of said panels when said panels are held vertically on said pallet by said supporting means.

4,027,600

COMBINATION SAFETY STOP AND DOWN LOCK FOR FOLDING TABLES

Floyd F. Mueller, Two Rivers, Wis., assignor to American Hospital Supply Corporation, Evanston, Ill.

Filed June 17, 1976, Ser. No. 697,208
Int. Cl.² A47B *3/00*
U.S. Cl. 108—113 **9 Claims**



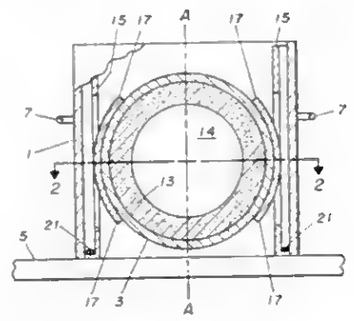
1. In a folding table having a frame and a pair of table tops mounted on the frame, the table tops being movable between an unfolded position in which the table tops extend generally horizontally and a folded position in which the table tops extend generally vertically, a first hinge member secured to one of the table tops, and a second hinge member secured to the other table top, the first and second hinge members being pivotally connected for pivoting movement as the table tops move between their folded and unfolded positions, the first hinge member being provided with an opening therethrough and the second hinge member being provided with an opening which is aligned with the opening in the first hinge member when the table tops are in their unfolded position, a rod reciprocably mounted on the second hinge member and extending through the aligned openings of the first and second hinge members when the table tops are in their unfolded position whereby the hinge members are prevented from pivoting and the table tops are prevented from moving from their unfolded position, the rod extending through the opening of the second hinge member when the table tops are in their folded position and being engageable by the first hinge member as the table tops move toward their unfolded position and as the opening in the first hinge member and the opening in the second hinge member pivot toward each other to prevent further pivoting movement of the hinge member and to prevent the table tops from reaching their unfolded positions, the rod being withdrawable from engagement with the first hinge member so that the table tops can move to their unfolded positions, the rod being insertable into the aligned openings of the first and second hinge members when the table tops reaeh their unfolded positions.

4,027,601

CONTAINER FOR EXPLOSIVE DEVICE

Frederick R. Hickerson, Newton, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 19, 1976, Ser. No. 678,009
Int. Cl.² F42D *5/04*
U.S. Cl. 109—1 R **6 Claims**



1. A bomb container comprising:

a first open-ended hollow member of high-strength, tough material, adapted to rest either on one end or the side: and

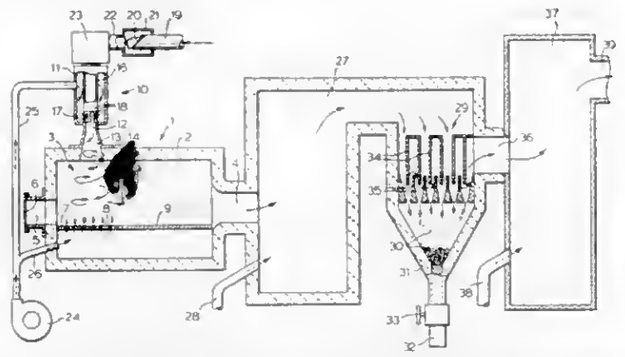
a second open-ended hollow member of similar material positioned completely within said first member with the longitudinal axes of the two members substantially perpendicular to each other, the ends of said second member being contoured to the inner wall of said first member with only a small clearance therebetween: whereby the fragments and blast pressure from the explosion of a bomb within said second member are safely contained.

4,027,602

COMBUSTION SYSTEM

James R. Mott, 1028 Royal York Road, Toronto, Ontario, Canada

Filed Feb. 13, 1976, Ser. No. 657,924
Int. Cl.² F23G *7/00*
U.S. Cl. 110—7 R **9 Claims**



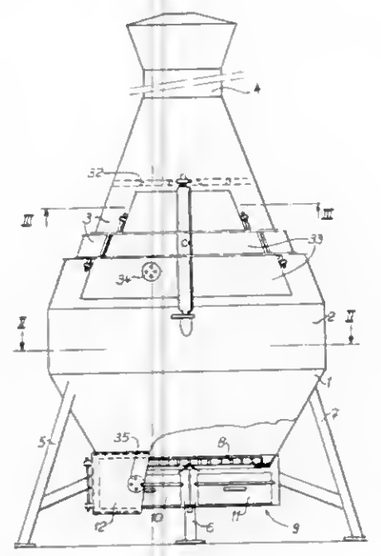
1. A combustion chamber capable of being directly fueled with green bark, green sawdust and the like material, said chamber being generally elongated and having a feed end and a discharge end, the interior of said chamber being formed of refractory material, said chamber having a grate therein at the feed end thereof disposed towards the bottom of the chamber, means for delivering particles of fuel material generally downwardly towards said grate while separating and enveloping the particles with pressurized swirling air; means for directing air upwardly through the grate against the downwardly directed air enveloped fuel particles in sufficient volume and with sufficient pressure and velocity to effect turbulent suspension of a substantial proportion of said fuel particles above the grate, the ratio of air to fuel introduced into said combustion chamber being at least about 7 to 1, said discharge end of said chamber forming a restriction, and said chamber being air tight apart from said fuel and air input feeds and said outlet whereby said chamber is adapted to operate on a positive pressure with respect to the external ambient pressure.

4,027,603

REFUSE INCINERATOR

Jacques Lohner, 17, avenue de Chailly, 1012 Lausanne, Switzerland

Filed Jan. 15, 1976, Ser. No. 649,233
Claims priority, application Switzerland, Jan. 21, 1975, 696/75
Int. Cl.² F23G *5/00*; F23L *1/00, 9/02*
U.S. Cl. 110—18 R **4 Claims**



1. A refuse incinerator, comprising;

means defining an enclosed, generally vertical combustion chamber, having a grate in a bottom part thereof, and a chimney in a top portion of the chamber;

means for delivering primary air into a lower part of the combustion chamber at several levels of the lower part;

means for delivering preheated secondary air into an upper part of the combustion chamber at several levels of the upper part; and

an elongate conduit extending in the combustion chamber, having an air inlet in the lower part of the combustion chamber and having an outlet in the proximity of the grate for delivering preheated primary air to the lower part of the combustion chamber and for thereby promoting incineration, including the incineration of humid refuse.

4,027,604

MEANS FOR GOVERNING THE AIR SUPPLY TO A FURNACE

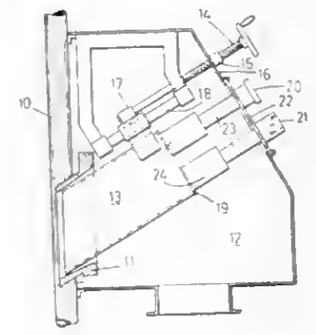
Stig Jansson, Goteborg, Sweden, assignor to Gotaverken Angteknik AB, Goteborg, Sweden

Filed Sept. 29, 1975, Ser. No. 617,672
Claims priority, application Sweden, Oct. 7, 1974, 7412568
Int. Cl.² F23L *5/00*
U.S. Cl. 110—182.5 **4 Claims**

1. In a device for governing the air supply to a furnace defined by side walls and having a number of air passage ports in at least one of said side walls, a plenum chamber communicating with said air passage ports, said plenum chamber being located outside said side wall, said plenum chamber including a back wall remote from said furnace side wall, at least one sleeve for cooperation with one of said passage ports, said sleeve having an inward end and an outward end, means for axially reciprocating said sleeve move the inward end towards and away from the passage port to adjust an effective air flow passage outside of said sleeve, the improvement of

at least one tubular member projecting cantileverwise inwards from the back wall of said plenum chamber,

a head at the free end of said tubular member,



means for mounting said head at the tubular member so as to permit a displacement of the head in a plane perpendicular to the longitudinal axis of said tubular member, and

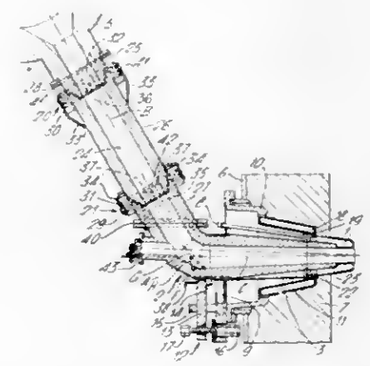
means at the inward end of said sleeve for sealingly and telescopically receiving said head.

4,027,605

IMPROVED TUYERE FEED DEVICE

Edouard Legille, Luxembourg, Luxembourg, assignor to S.A. des Anciens Etablissements Paul Wurth, Luxembourg, Luxembourg

Filed Mar. 6, 1973, Ser. No. 339,117
Claims priority, application Luxembourg, Mar. 6, 1972, 064911
Int. Cl.² F23L *1/00*; C21B *7/16*
U.S. Cl. 110—182.5 **15 Claims**



1. In a tuyere stock for use in the delivery of a heated gas from a source to a nozzle, said tuyere stock including a plurality of serially connected tubular members, the improvement comprising:

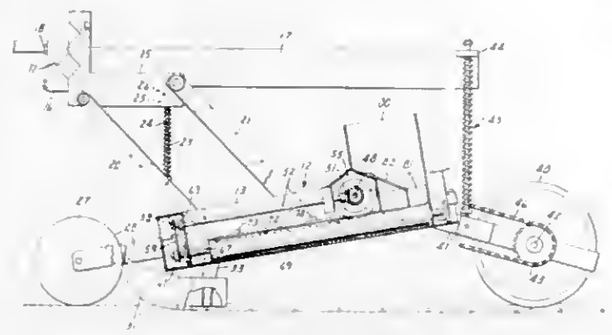
means rigidly connecting said nozzle to a first end of said tuyere stock; and

guide means for supporting said first end of said tuyere stock whereby said nozzle will be maintained in a preselected position, said guide means permitting movement of said stock axially of the desired orientation of the nozzle axis.

4,027,606
PLANTER APPARATUS

Philip B. Knapp, Lynbrook, N.Y., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Nov. 28, 1975, Ser. No. 636,112
Int. Cl.² A01C *5/00, 7/18, 7/04*
U.S. Cl. 111—77 **5 Claims**



1. A planter module for sowing a row of seed disks which disks comprise a readily crushable material compacted around a seed, said planter module comprising an elongated generally rectangular chassis, and adjustable support wheel connected to said chassis at the leading end thereof to support the leading end a predetermined height above the ground, a pivotally connected rear packing member attached to the trailing end of said chassis, a parallel linkage attached to the leading end of said chassis and including attaching means for attachment to a tractor mounting bar to position said chassis at an incline from the trailing end downward toward the lead end, spring means for resiliently applying a downward force on said linkage and on said packing member from said mounting bar, a pair of parallel spaced knurled rollers disposed lengthwise of said chassis and positioned to be inclined with said chassis, said knurled rollers being disposed side by side and defining therebetween an elongated vertical open slot, the transverse dimension of said space between said rollers being smaller however than the height or axial dimension of the seed disks, means driving said rollers for rotation about their longitudinal axis in the same direction, a hopper positioned on said chassis above the trailing end thereof and having a trough-shaped open bottom for dispensing seed disks edgewise onto said rollers, singulating means affording movement of the seed disks in a file along said rollers from said hopper, furrow opening means trailing said support wheel for forming a furrow, a seed chute positioned at the leading end of said chassis beneath the leading end of said rollers to transfer seeds from the leading end of said rollers to deposit the same in said furrow, one of said rollers having a helical rib means on said leading end for positively engaging and displacing individual seed disks from the slot between the rollers and into said seed chute.

4,027,607
PULSED POWDER APPLICATION SYSTEM

Peter N. Y. Pan, Country Club Hills, and Rafael J. Hernandez, Chicago, both of Ill., assignors to Continental Can Company, Inc., Chicago, Ill.

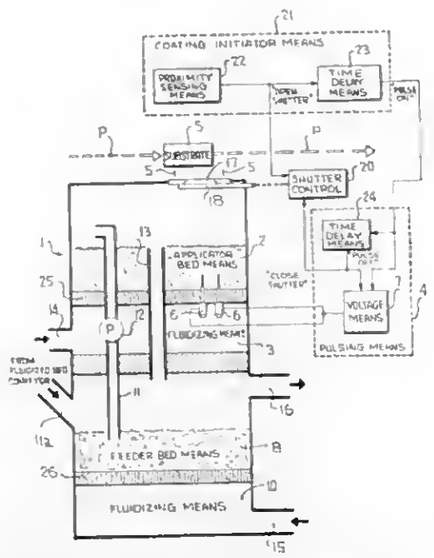
Filed Apr. 20, 1976, Ser. No. 678,676
Int. Cl.² B05B *5/02*
U.S. Cl. 118—2 **38 Claims**

1. An aparatus for electrostatically powder-coating a substrate occupying a coating position adjacent thereto, comprising in combination:

applicator bed means positioned in the vicinity of said coating position for holding electrostatic powder particles, and carrying a pair of electrodes;

fluidizing means adjacent to and operatively associated with said applicator bed means for acting on said electrostatic powder to endow it with fluid-like characteristics; and

pulsing means connected to said pair of electrodes and having a first state for applying a high voltage pulse to said electrodes for a predetermined coating time so as to effect ionization of said electrostatic powder particles whereby to cause the establishment of an electric field attracting said electrostatic powder particles to said substrate, and having a second state for removing said high



voltage pulse from said pair of electrodes whereby to cause the establishment of a reverse electric field attracting said ionized electrostatic powder particles away from said substrate.

4,027,608
SUTURING DEVICE

Norman B. Arbuckle, Costa Mesa, Calif., assignor to Raymond Kelder, Newport Beach, Calif., a part interest

Filed Feb. 20, 1976, Ser. No. 659,743
Int. Cl.² D05B *1/00*
U.S. Cl. 112—169 **15 Claims**

1. A suturing device comprising in combination,

a housing,

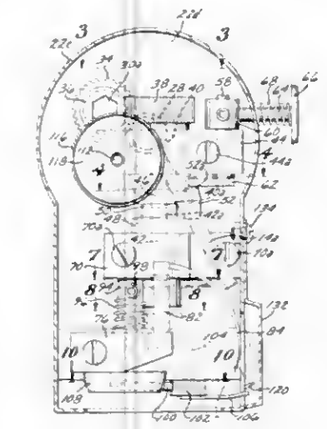
a motor in said housing having a rotatable drive shaft,

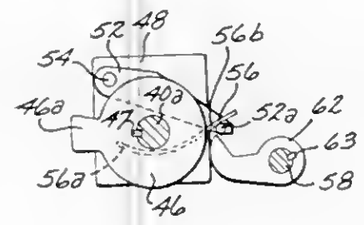
suturing apparatus including a movably mounted suturing needle and a source of suturing thread therefor, and a rotatably mounted driven shaft for moving said needle,

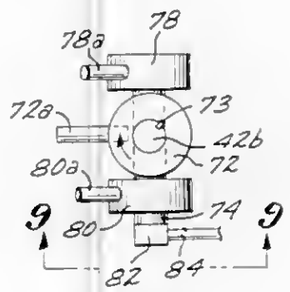
and clutch means interposed between said drive and driven shafts comprising a continually rotating lug on said drive shaft and a catch member movably mounted relative to said driven shaft and biased into a position to be engaged by said lug,

said clutch means further including a cam member movably mounted relative to said housing and having a cam surface normally positioned to move said catch member against its bias to position it out of said first mentioned position for engagement by said lug to thereby prevent rotation of said driven shaft by said drive shaft,

said cam member being movable to a position where said cam surface is prevented from overcoming said bias and disengaging said catch member from said lug to thereby permit said lug to engage said catch member and effect rotation of said driven shaft by said drive shaft.



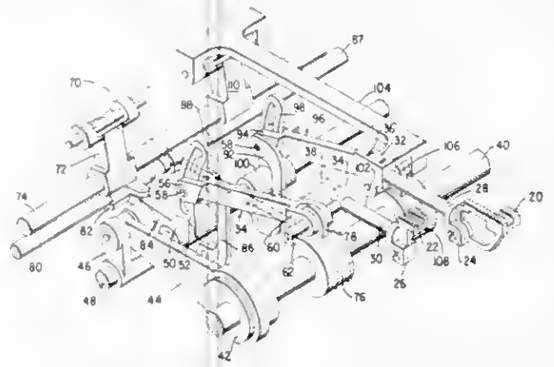




4,027,609
FEED MECHANISM FOR SEWING MACHINES

Alexander Fraser Kerr, Dumbarton, Scotland, assignor to The Singer Company, New York, N.Y.

Claims priority, application United Kingdom, May 5, 1976, 18460/76
Filed June 25, 1976, Ser. No. 699,764
Int. Cl.² D05B *27/08*
U.S. Cl. 112—209 **7 Claims**

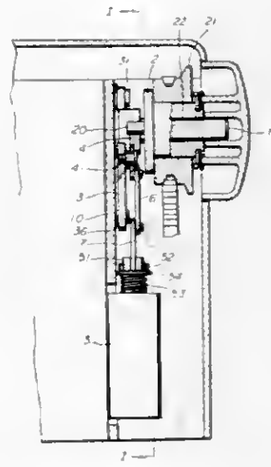


1. A feed mechanism for a sewing machine having a casing and a feed mechanism supported therein, said feed mechanism including feed dog means for advancing fabric through said sewing machine for sewing stitches therein, feed dog advance means for imparting a reciprocatory advance motion to said feed dog means including, a driven shaft, first eccentric means connected to said driven shaft and a feed advance shaft for imparting oscillating motion to said feed dog means, said feed dog means including a feed dog member and a feed dog support means for supporting said feed dog member, link means operably connecting said feed dog support means to said feed advance shaft, feed dog lift means for initiating lift motion to said feed dog member in a direction substantially perpendicular to the reciprocatory advance motion of said feed dog means, said feed dog lift means including second eccentric means connected to said driven shaft and being operably connected to said feed dog support means, and said second eccentric means and said link means having a common connection with said feed dog support means.

4,027,610
INTERMITTENT STITCHING DEVICE FOR SEWING MACHINES

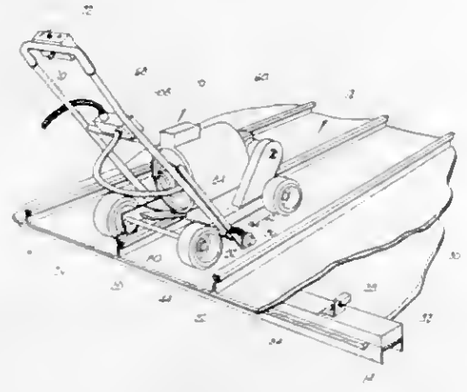
Masakatsu Niikura, Kokubunji, Japan, assignor to Janome Sewing Machine Co. Ltd., Tokyo, Japan

Filed June 23, 1975, Ser. No. 589,533
Claims priority, application Japan, June 26, 1974, 49-72233
Int. Cl.² D05B *69/10*
U.S. Cl. 112—275 **13 Claims**



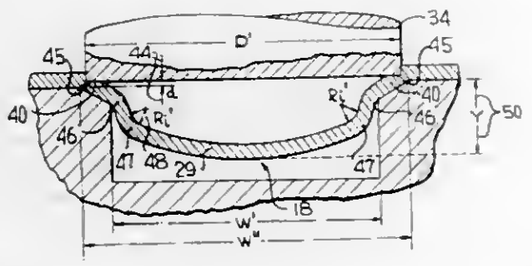
1. A sewing machine comprising, in combination, a housing; a drive shaft rotatably journalled in said housing; an electric motor for rotating said drive shaft and thereby to vertically reciprocate a needle bar; and an intermittent stitching device, said intermittent stitching device comprising engaging means mounted on said shaft for rotation therewith, arresting means normally positioned in an inoperative position permitting the operation of said motor, and moved to an operative position interrupting the operation of said motor when rotation of said engaging means is blocked, blocking means supported on said arresting means and movable between a first position remote from and a second position in the path of the rotation of said engaging means for blocking the rotation of said engaging means when in said second position where the blocking means transmits the movement of said engaging means to said arresting means to move said arresting means from said inoperative position to said operative position interrupting the operation of said motor, and actuating means for moving said blocking means from said first to said second position and from said second to said first position in response to an externally applied start signal, said actuating means comprising a solenoid having an armature, and a control circuit means including a power source, foot controller switch means connected to said power source and externally operable to furnish said start signal, and start switch means for connecting said motor and the solenoid to said power source upon receipt of said start signal.

4,027,611
SEAM FORMING APPARATUS
Donald H. Ward, Middletown, and John K. Buffenbarger, Monroe, both of Ohio, assignors to Armco Steel Corporation, Middletown, Ohio
Filed Apr. 22, 1976, Ser. No. 679,451
Int. Cl.² B21D *37/00*
U.S. Cl. 113—54 R 10 Claims



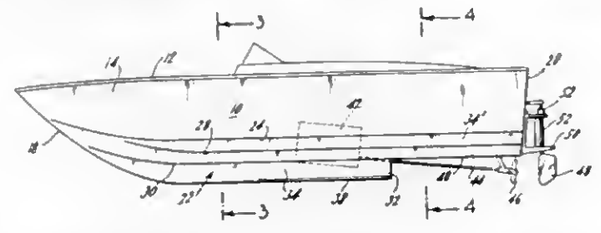
1. A seam forming apparatus for forming standing seams to interconnect pairs of adjacent metallic panels, which comprises:
a. a wheeled carriage;
b. a horizontal drive shaft rotatably mounted to the underside of said carriage;
c. a drive roller, said drive roller having a surface to frictionally engage the underside of said standing seam being formed;
d. a forming roller, said forming roller having a peripheral configuration to perform said forming, said drive and forming rollers being coaxial and mounted nonrotatably on an end of said drive shaft but axially shiftable thereon;
e. means to shift said drive shaft axially, whereby said drive and forming rollers are stripped from said drive shaft when said drive shaft is moved axially and withdrawn from said drive and forming rollers;
f. means for driving said drive roller;
g. a pressure roller mounted on a shaft substantially parallel to said drive shaft directly above said drive roll so that during the operation of said apparatus, that portion of said standing seam to be formed that is not formed is squeezed between said pressure and drive rollers;
h. means to release said pressure roller; and
i. means for guiding said carriage along said standing seam.

4,027,612
METHOD FOR FORMING CONTAINER SCORED METAL FLAP AREAS
Edward J. Herbst, Posen, Ill., assignor to Continental Can Company, Inc., New York, N.Y.
Filed July 16, 1975, Ser. No. 596,502
Int. Cl.² B21D *51/38*
U.S. Cl. 113—121 C 2 Claims



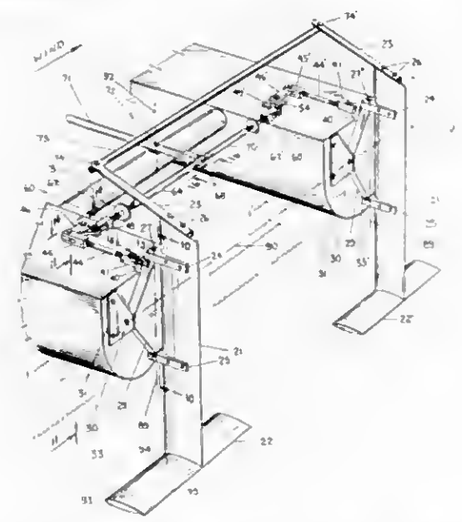
1. A method of forming an easy opening end unit for a container, which end unit is resistant to blowout pressure from within said container, said method comprising the steps of providing a sheet material blank having an interior side; drawing an inner portion of the blank into a convex configuration, relative to said interior side, of a predetermined depth and bounded by a surrounding region having a predetermined thickness; and compressing said surrounding region to reduce its predetermined thickness, whereby to form a web of reduced thickness bounding said inner portion, and to increase the predetermined depth of said convex configuration.

4,027,613
PLANING BOAT HULL
Donald L. Wollard, 105 Bayview Drive, Islamorada, Fla. 33036
Filed Dec. 10, 1975, Ser. No. 639,372
Int. Cl.² B63B *1/18*
U.S. Cl. 114—291 9 Claims



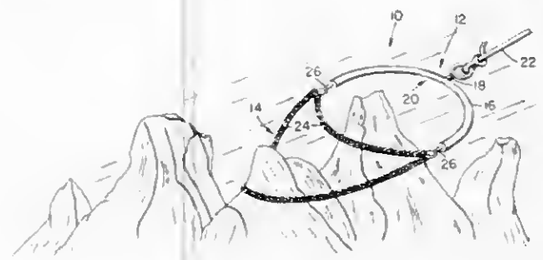
1. In a planing boat, a hull including a bow, a transom, top sidewalls and a bottom extending from said bow to said transom, said bottom including a V-shaped forward bottom section extending from said bow to aft of amidships, said V-shaped forward bottom section including a pair of bottom sidewalls which join at a keel, a vertically extending shoulder extending across the bottom and joining said bottom sidewalls and defining the rearmost end of said V-shaped bottom section and a rearward bottom section including a transverse wall extending from said shoulder to said transom and a continuation of the upper portion of said bottom sidewalls joined to said transverse wall and extending upwardly and outwardly therefrom.

4,027,614
SAILBOAT CONSTRUCTION
Clyde B. Jones, 3531 Alginet Drive, Encino, Calif. 91436
Filed Apr. 7, 1975, Ser. No. 565,348
Int. Cl.² B63H *25/06*
U.S. Cl. 114—163 8 Claims



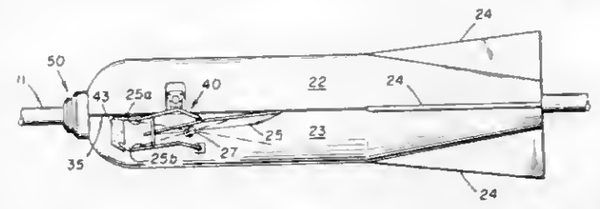
1. In combination with a sailboat having at least one sail, at least one mast, a vertical reference line passing through the center of gravity of said sailboat when in level position, a hull assembly, said hull assembly comprising at least one hull; antiheel structure comprising:
rudder means comprising a first rudder and a second rudder spaced apart from each other, said first and said second rudders being hingedly connected to said hull assembly with each hinge axis oriented in the general direction of said vertical reference line;
stabilizer means comprising a first stabilizer and a second stabilizer, each said stabilizer being airfoil-like in shape and having a leading edge and a trailing edge, each said stabilizer having a chord plane, said chord plane being defined by three points, two of said points being located on any portion of said leading edge and the third of said points being located on any portion of said trailing edge of said stabilizer, said first stabilizer being supported by said first rudder such that said first stabilizer's chord plane is oriented in a generally perpendicular position relative to said sailboat vertical reference line, said second stabilizer being supported by said second rudder such that said second stabilizer's chord plane is oriented in a generally perpendicular position relative to said sailboat vertical reference line, each said stabilizer being adapted to move under the surface of a body of water upon which said sailboat is located;
pivot means connecting said stabilizer means to said hull assembly, whereby said stabilizer's chord planes are capable of assuming various selected angles with respect to the said sailboat vertical reference line;
first actuating means connected to said rudder means for moving both said first and said second rudders and their respective said stabilizers;
second actuating means for pivotly moving simultaneously each said stabilizer about the axis of said pivot means, said first stabilizer's chord plane pivots opposite to said second stabilizer's chord plane; and
said second actuating means includes a linkage assembly, an actuating member assembly capable of being manually controlled being connected to said linkage assembly, upon movement of said actuating member assembly in a single direction said linkage assembly includes means for causing said first stabilizer's chord plane to pivot opposite to said second stabilizer's chord plane.

4,027,615
BOAT ANCHOR
Roland F. Cribbs, 86 Bahama Circle, Tampa, Fla. 33606
Continuation of Ser. No. 513,239, Oct. 9, 1974, abandoned. This application Oct. 23, 1975, Ser. No. 625,004
Int. Cl.² B63B *21/24*
U.S. Cl. 114—311 4 Claims



1. A drag type boat anchor for use with a boat specifically configured to facilitate anohoring engagement and disengagement with objects lodged on the bottom of a body of water; said boat anchor comprising a substantially rigid unitary elongated body member having an attachment formed thereon, said attachment means for attaching a line to said substantially rigid unitary body member, said line extending between said boat anchor and the boat, said attachment means being formed at substantially the mid-portion of said substantially rigid unitary elongated body member to maintain said substantially rigid unitary body member on the substantially horizontal position, anchoring means including at least one substantially flexible anchoring element to engage objects lodged on the bottom of the body of water, said substantially flexible anchoring element being fixedly attached to opposite ends of said substantially rigid unitary elongated body member such that said boat anchor engages and disengages objects lodged on the bottom of a body of water by the horizontal position of said anchor relative to the objects.

4,027,616
PROTECTION MEANS FOR DEPTH CONTROL DEVICE
Robert O. Guenther, Irving; Donald F. Huffhines, Richardson; James W. Krall, Irving, and Charles D. Ray, Dallas, all of Tex., assignors to Mobil Oil Corporation, New York, N.Y.
Filed Dec. 10, 1975, Ser. No. 639,534
Int. Cl.² B63B *21/00*
U.S. Cl. 114—244 8 Claims

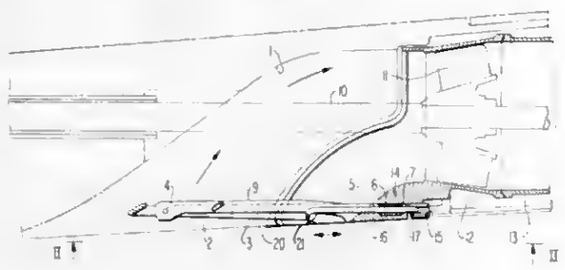


1. A depth control device for a marine seismic cable or the like, said device comprising:
a hull adapted to be positioned onto said cable;
a pair of wing members pivotably mounted on said hull;
a pair of protective means, each of said protective means attached to said hull adjacent each of said wing members, respectively, to prevent an obstacle such as a buoy line or the like from becoming fouled in the gap normally existing between a wing member and said hull, each of said protective means comprising:
a pair of elements, one of said elements being attached to said hull at a point above said wing member and the other of said elements attached to said hull below said wing member, both of said elements extending from a point on said hull forward of said wing member to a point over and below, respectively, said wing member, said elements extending outward from said hull at an angle greater than the angle formed by the leading edge of a respective wing member with said hull whereby said elements form an unbroken path between said hull and said leading edge of said wing member which directs said obstacle away from said hull and off said wing member.

4,027,617
GRATING APPARATUS FOR PROTECTING THE DRAFT PORT OF A WATER-JET PROPULSION SYSTEM
Tsunemi Ikeda, and Tamotsu Sezaki, both of Akashi, Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan
Filed Mar. 16, 1976, Ser. No. 667,313
Claims priority, application Japan, Mar. 27, 1975, 50-42570[U]
Int. Cl.² B63H *11/04*
U.S. Cl. 115—14 5 Claims

1. Apparatus for protecting the inlet water port of a water-jet propulsion apparatus, comprising,
a fixed bracket positioned at the mouth of said inlet port and having an opening therein sufficiently large to permit manual access therethrough, a grate rotatably attached to said bracket to permit said grate to be rotated to first and second positions to prevent manual access through said bracket and to permit manual access through said bracket respectively, and a pin spring biased to connect said grate to said bracket to hold said grate in said first position, whereby said spring biasing can be manually overcome to disconnect said grate from said bracket

said pin being spring biased in the direction of flow of water in said water-jet propulsion system, whereby the force of



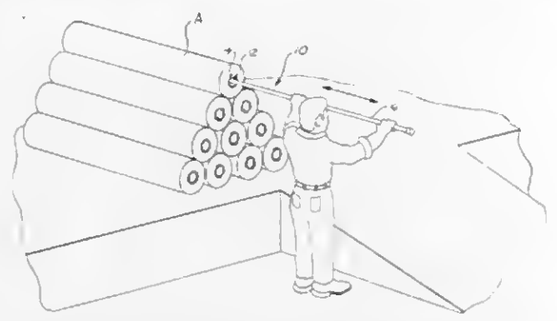
water pushing against said pin during normal operation will not oppose the spring biasing force.

4,027,618

PUNCTURE DETECTING DEVICE

Hugh Cunningham, Jr., 104 Plano Drive, Greenville, S.C. 29609

Filed Nov. 10, 1976, Ser. No. 740,555
Int. Cl.² G01B 5/12; G01D 21/00
U.S. Cl. 116—114 G **6 Claims**



1. A handtool device for detecting puncture openings in an interior bore surface of a tubular carrier member upon which carpet and the like is rolled for transportation comprising:

an elongated adjustable length rigid handle member for moving said device through said tubular bore;

an adapter body member carried adjacent one end of said handle member;

a plurality of resilient bendable prong elements carried by said adapter member inclined to the axis of said handle member extending outwardly therefrom; and

said prong elements having free ends biased against said interior bore surface when inserted therein for engaging within a puncture opening when detected during movement through said bore.

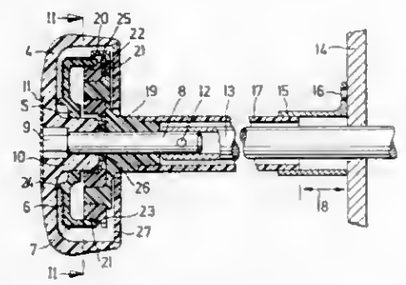
4,027,619

INDICATION OF ROTARY SPINDLE ADJUSTMENT

Klaus Sturhan, Lemgo, and Gerd Lange, Minden, both of Germany, assignors to Gebr. Isringhausen, Lemgo, Germany

Filed Aug. 27, 1975, Ser. No. 608,332
Claims priority, application Germany, Aug. 27, 1974, 2440979; Dec. 2, 1974, 2456828; Mar. 22, 1975, 2512736,
Int. Cl.² G12B 11/04
U.S. Cl. 116—124 A **29 Claims**

1. An adjustment indicator for a rotary spindle, comprising a hollow and at least partly transparent handwheel for operating the rotary spindle, and an indicator device disposed in said handwheel whose reading is controlled as a function of the revolutions of the rotary spindle, said handwheel being constructed with a transparent front and peripheral surface, and an indicating dial being rotatably mounted coaxially in the handwheel, reading scales being located on the front face and on a broadened peripheral edge of said indicating dial, a planetary gearing mounted in said handwheel and being operatively connected to said indicating dial for producing 360° rotation thereof, a holding device mounted on a stationary bearing wall of the rotary spindle mounting and cooperating



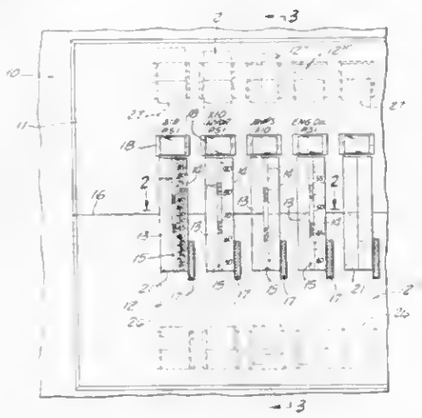
with said planetary gearing to locate a fixed point of said planetary gearing, said planetary gearing including a sun wheel that is mounted on the inner hub of said handwheel and a web of said planetary gearing being formed in said handwheel.

4,027,620

INSTRUMENT PANEL

Lawrence J. Kirsch, 1847 Preuss Road, Los Angeles, Calif. 90035

Filed Jan. 5, 1976, Ser. No. 646,474
Int. Cl.² G09F 9/00
U.S. Cl. 116—129 T **4 Claims**



1. An instrument panel, comprising:

a panel having a threshold line on a surface thereof; and

a plurality of instruments mounted to said panel in spaced arrangement along said threshold line, each of said instruments including a movable bandlike registering means, an enumerated band adjacent said registering means, a coded means indicating the acceptable reading range of said registering means, and a finger operated wheel for shifting the registering means, enumerated band and coded means as a unit relative to said threshold line;

each of said instruments being commonly oriented with respect to the threshold line so that movements of the bandlike registering means are all transverse to the threshold line.

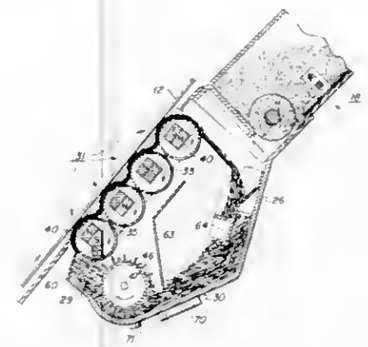
4,027,621

DEVELOPING SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINES

Thomas J. Kane, Rochester, and Richard H. Dennie, Macedon, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Mar. 14, 1975, Ser. No. 558,596
Int. Cl.² G03G 15/08
U.S. Cl. 118—5 **7 Claims**

1. In a developing apparatus for an electrostatic reproduction machine adapted to produce copies of an original and having a photosensitive member on which latent electrostatic images of the original are formed, with means to bring relatively dry particulate developing material into developing relationship with the machine photosensitive member to develop the images on the photosensitive member, the improvement comprising:



means to control humidity conditions of said developing material whereby to assure optimum development of said images despite changes in relative humidity,

said humidity control means including a heater for heating said developing material, means for actuating said heater on a predetermined low temperature of said material, and

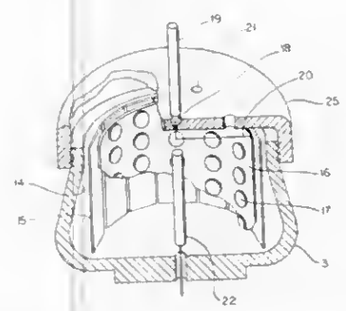
timing means for restricting actuation of said heater to preset time intervals.

4,027,622

APPARATUS FOR DOPING SEMICONDUCTORS IN CENTRIFUGE

Paul Schmider, Munich-Oberfoehring, Germany, assignor to Beckman Instruments G.m.b.H., Munich, Germany

Division of Ser. No. 458,972, April 8, 1974, Pat. No. 3,957,547. This application Jan. 26, 1976, Ser. No. 652,440
Int. Cl.² C23C 13/08
U.S. Cl. 118—49.5 **5 Claims**



1. Apparatus for incorporating impurity substance in a solid state material comprising:

a. a centrifuge rotor with means for rotating it about an axis, said rotor having a hollow interior with a surrounding wall having an inner surface;

b. means for heating disposed adjacent said inner surface, said heating means including means for holding solid state basic material; and,

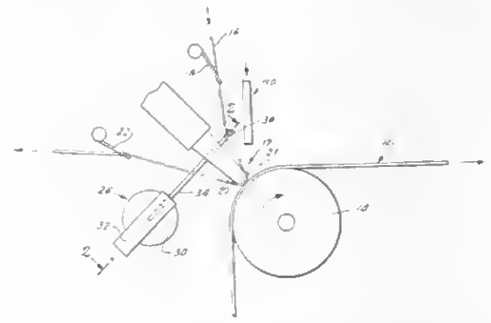
c. a layer of thermal insulating material disposed between said heating means and said inner surface.

4,027,623

SAMPLE MIXER AND SPREADER

Stanford L. Adler, Monsey, N.Y., assignor to Technicon Instruments Corporation, Tarrytown, N.Y.

Filed June 23, 1975, Ser. No. 589,483
Int. Cl.² B05C 1/14
U.S. Cl. 118—108 **7 Claims**



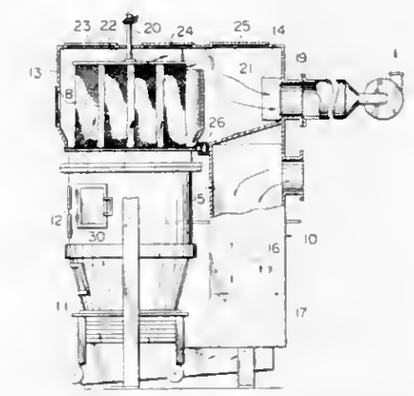
1. Apparatus for preparing a smear of biological fluid sample containing particulates, comprising: an elongated first element movable along a first path and having a surface, said first element being movable at least in part a limited distance in a direction substantially transverse of said first path, an elongated second element having a surface movable along a second path, means locating portions of said surfaces longitudinally in at least close proximity to one another to define a cusp therebetween, means for selectively introducing a predetermined discrete volume of said sample between said surface portions, means for relatively moving said first and second elements along said first and second paths, respectively, to draw a smear of said sample on said second element surface, and means spaced from said locating means moving said first element back and forth in said transverse direction at least during relative movement of said first and second elements.

4,027,624

FLUID GRANULATING/COATING APPARATUS UTILIZING SUCTION AIR CURRENT

Shimesu Motoyama, Tokyo, Japan, assignor to Freund Industrial Co., Ltd., Tokyo, Japan

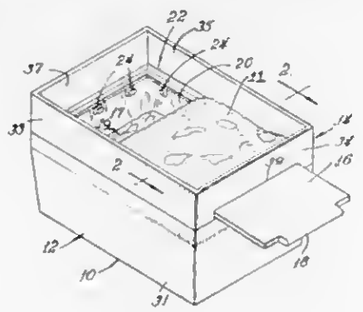
Filed Sept. 19, 1975, Ser. No. 615,123
Claims priority, application Japan, Sept. 20, 1974, 49-113203
Int. Cl.² B05B 17/00
U.S. Cl. 118—303 **5 Claims**



1. In apparatus designed to perform granulation or coating by spraying a prescribed liquid to deposit on the material accommodated in a container disposed in the lower part of the apparatus while whirling up said material by means of suction air current, said fluid granulating or coating apparatus to be worked by utilizing suction air current and in which a receptacle in the shape of a cylinder with a smooth interior accommo-

dates bag filters disposed in the upper part of the apparatus to catch the whirled-up material, an exhaust passage in the upper part of the apparatus including a portion offset laterally from said receptacle and an opening in a side surface of the apparatus through which said suction air current is to be discharged from said cylindrical receptable, means for generating said suction air and a damper for suspending air suction disposed away from a location directly above said cylindrical receptacle and communicating with said opening, a top plate over both said cylindrical receptacle and a portion of said exhaust passage, a plurality of relatively large-sized openings in said top plate, and safety lids over said openings being movable from over said openings in response to pressure within said apparatus.

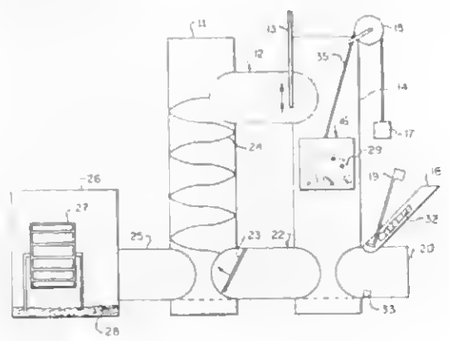
4,027,625
PET COMMODE
David C. Wheeler, 240 Tower Road, Barrington, Ill. 60010
Filed May 14, 1975, Ser. No. 572,481
Int. Cl.² A01K 29/00
U.S. Cl. 119—1 10 Claims



1. A commode for pets adapted to contain a litter material, comprising:
an opened mouth rigid base having a hollow interior;
an opened mouth box disposed on top of said base and having a lower normally closed opening, said lower opening being substantially smaller in size than said mouth of said base; and
said box includes inner and outer walls, said outer wall being supported by said base, said inner wall being connected to said outer wall and sloping downwardly and inwardly and terminating in said lower opening, mounting means disposed at said lower opening for supporting a closure, said closure movably mounted on said box for supporting the litter material and for normally closing and sealing said lower opening, said closure being movable to an open position to enable used litter material to fall under the force of gravity through said lower opening and into said base.

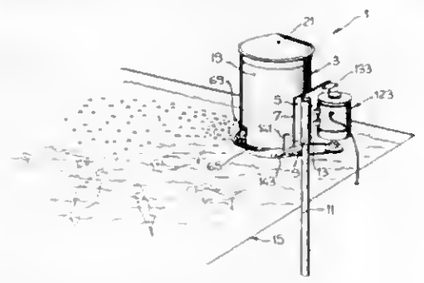
4,027,626
PET ELEVATOR
Peter DeSousa, 183 School St., Stoughton, Mass. 02072
Filed June 12, 1975, Ser. No. 582,821
Int. Cl.² A01K 1/00
U.S. Cl. 119—15 1 Claim

1. A pet elevator device comprising in combination with a cage,
horizontal tube means for connecting to an animal cage,
vertical tube means interconnecting said horizontal tube means whereby a pet can leave said animal cage and climb from one horizontal tube to a higher horizontal tube
a second vertical tube containing an elevator (tube) parallel to said first vertical tube interconnecting said horizontal tubes,
said elevator responsive to the entrance of a pet whereby the pet is brought from the higher level horizontal tube to the lower level horizontal tube
said elevator counterbalanced to return to said higher level in response to the exit of a pet,
a food receiving tube accessible when said elevator is in a lower mode extending said lower level horizontal tube,
a food dispenser affixed said food receiving tube responsive



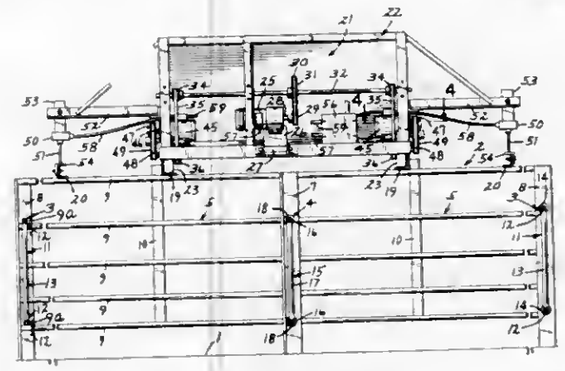
to the movement of said elevator wherein a preselected quantity of food is deposited in said food receiving tube with each operation of the elevator encouraging the operation of the elevator by the pet,
gate means in said lower horizontal tube interposed between said interconnected vertical tubes which forces the animal to ascend said first verticle tube to gain access to the elevator.

4,027,627
AUTOMATIC FOOD FEEDING DEVICE FOR FISH, FOWL AND THE LIKE
Romeo Fillion, 2425 Chapleau Street, Sillery, Quebec, Canada (G1T 1M5)
Filed Mar. 6, 1975, Ser. No. 556,197
Int. Cl.² A01K 5/02, 61/02
U.S. Cl. 119—51.11 9 Claims



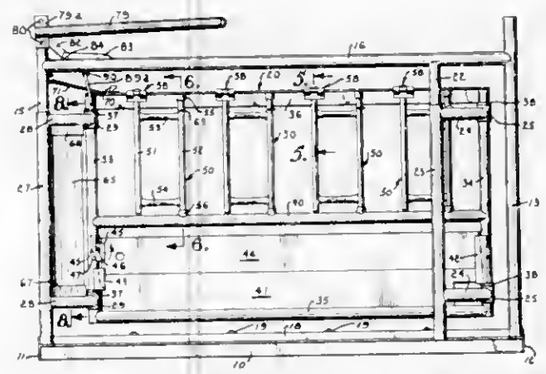
1. A feeding device comprising:
a. a canister for holding a supply of food to be dispensed;
b. means carried by the canister adjacent the bottom thereof for dispensing the food therefrom;
c. a rotatable substantially planar horizontal surface provided with at least one fixed distributor blade for receiving and distributing the dispensed food by centrifugal force upon rotation of the surface; and
d. adjustable retaining means for controlling the distribution of a width of food in a substantially tangential direction with respect to the rotatable surface, which retaining means includes a vertical wall surrounding a substantial portion of the periphery of the rotatable surface and having:
1. a fixed portion, and
2. a movable portion that is adjustble relative to the fixed portion along a horizontal path for defining a variable width peripheral opening therewith to thereby control the width of the food being distributed.

4,027,628
AUTOMATIC FEEDING SYSTEM FOR GESTATING LIVESTOCK
Robert M. Butler; John T. Butler, and James G. Butler, all of Box 221, Rte. 1, Austin, Minn. 55912
Filed Jan. 12, 1976, Ser. No. 648,192
Int. Cl.² A01K 5/00
U.S. Cl. 119—52 B 2 Claims



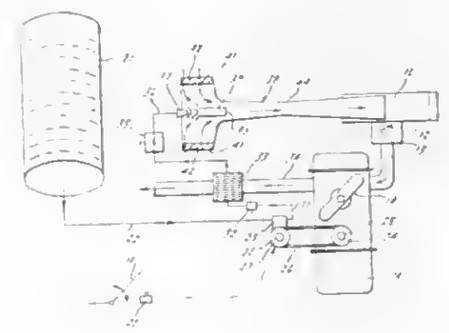
1. An automatic feeding system comprising:
a. open framework including laterally spaced parallel outer longitudinal frames, an intermediate longitudinal partition frame, and longitudinally spaced transverse frames connecting said longitudinal frames and cooperating therewith to define a pair of rows of open topped stalls;
b. a pair of laterally spaced parallel rails extending longitudinally over said framework;
c. a hopper having a pair of discharge openings each overlying a different row of said stalls adjacent said intermediate longitudinal partition frame;
d. wheel means on said hopper for supporting the hopper on said rails for movement over said stalls;
e. power operated means for imparting rotation to said wheel means;
f. a pair of conveyors in the bottom of said hopper each disposed to deliver material from the hopper to a different one of said discharge openings;
g. separate drive means for driving each of said conveyors independently of the other thereof; and
h. separate control means individual to said separate drive means for causing material from said hopper to be delivered to predetermined ones only of said stalls.

4,027,629
LIVESTOCK SQUEEZE CHUTE
Laurence B. Pearson, Thedford, Nebr., assignor to Pearson's, Inc., Thedford, Nebr.
Filed June 30, 1975, Ser. No. 591,488
Int. Cl.² A61D 3/00
U.S. Cl. 119—99 3 Claims



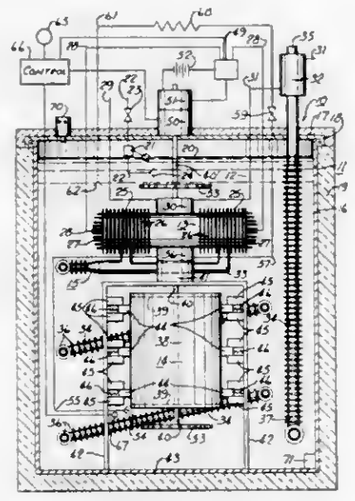
1. In a livestock squeeze chute having a frame and laterally spaced sides supported on said frame for movement toward and away from one another to squeeze an animal therebetween, the combination therewith of:
a bar section on at least one side, said bar section comprising a pair of spaced apart upright members interconnected by cross members with at least one upright member having an upper end and a lower end,
upper and lower coupling means on said one side providing a rotatable coupling for said upper and lower ends thereby to permit swinging movement of said bar section to different angular positions relative to said side, said coupling means arranged to provide for disconnection of said lower end from the lower coupling means in response to upward vertical movement of said one upright member,
means associated with said one upright member operable to prevent said upward vertical movement except when said bar section is in a predetermined angular position relative to said side, and
releasable latch means associated with the other upright member of said bar section and operable to releasably restrain swinging movement of said bar section to said predetermined angular position.

4,027,630
VAPOR INJECTION APPARATUS FOR AN INTERNAL COMBUSTION ENGINE
Dante S. Giardini, Dearborn Heights, Mich., assignor to Ford Motor Company, Dearborn, Mich.
Filed Mar. 22, 1976, Ser. No. 669,428
Int. Cl.² F02M 25/02
U.S. Cl. 123—25 P 10 Claims



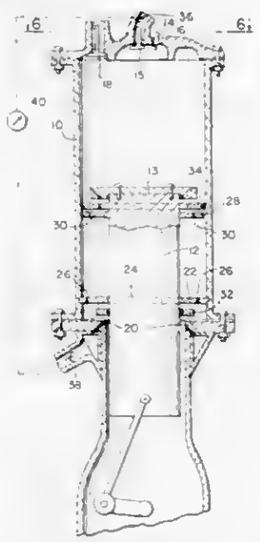
1. Vapor injection apparatus for controlling the vapor content of air supplied to a carburetor of an internal combustion engine, comprising:
a housing having an air intake chamber in communication with an air intake passageway of a carburetor,
valve means on the housing operative to permit flow of atmospheric air into the air intake chamber when the air pressure within the chamber is lower than the air pressure externally of the housing,
air injector means coupled to the housing in communication with the chamber,
steam generating means coupled to the air injector means,
and pump means for pumping liquid to be vaporized in the steam generating means in response to movement of an accelerator control means into a predetermined engine acceleration position,
the flow of vapor from the steam generating means through the air injector means causing aspiration of air into the air injector means and admixing of the air and steam for discharge into the housing chamber,
the air-vapor mixture raising the pressure within the chamber causing the valve means to close the chamber to the admittance of atmospheric air through the valve means whereby the air-vapor mixture becomes the sole air supply to the air intake passage of the carburetor.

4,027,631
COMBUSTION ENGINE DRIVEN LIQUID HEATER
Elzie E. Lavery, 424 S. Mount Vernon Ave., Uniontown, Pa. 15401
Filed July 6, 1976, Ser. No. 703,120
Int. Cl.² F22B 3/06; F28C 3/00
U.S. Cl. 122—26 14 Claims



1. An internal combustion engine driven liquid heater comprising a tank containing a liquid to be heated, an internal combustion engine suspended in said tank and submerged in said liquid and adapted to operate in its submerged condition, friction heater means submerged in said liquid and driven from said internal combustion engine, exhaust pipe heat transfer means connected to said engine to exhaust combustion fumes therefrom, said exhaust pipe heat transfer means meandering through said liquid before exhausting to the atmosphere to transfer exhaust heat to said liquid, and means to flow said liquid through a heat dissipation system.

4,027,632
AIR INJECTION ENGINE
William Wagner, Box 366, 2nd Ave. Rte. 2, Absecon, N.J. 08201
Filed June 21, 1976, Ser. No. 698,545
Int. Cl.² F02B 75/02
U.S. Cl. 123—75 RC 4 Claims



1. In an internal combustion engine having a cylinder, the cylinder having first and second ends, a piston having an end portion for movement towards and away from the second cylinder end, the piston being reciprocally movable in the cylinder, inlet means for receiving a combustible fuel mixture into the cylinder, a spark plug for igniting the combustible mixture therein under compression, and an exhaust valve for expelling the exhaust products of the ignited fuel mixture from the cylinder, the inlet means, the spark plug and the exhaust valve being mounted in the vicinity of the second end of the cylinder, the improvement comprising:

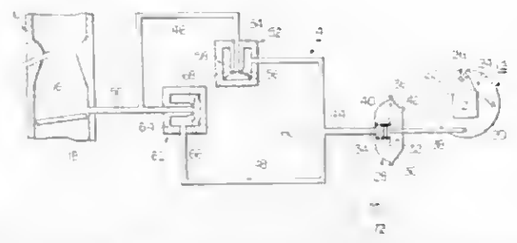
inlet means disposed in the vicinity of the first end of the cylinder for receiving air into the latter;

a first plate attached to the cylinder in the vicinity of the first end thereof, said first plate being formed with first and second openings for the piston and air to pass therethrough, respectively;

a second plate attached to the piston in the vicinity of the end portion thereof, said second plate being fittable into the cylinder and formed with a third opening for passing air therethrough; and

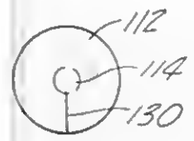
piston and cylinder rings slideable between said first plate and the first cylinder end, and between said second plate and said end portion of the piston, respectively, in timed relationship with the movement of the piston for a control of the air received into the cylinder through said air inlet means.

4,027,633
IGNITION TIMING CONTROL SYSTEM
Kizuku Otsubo, Kokubunji; Toru Suyama, Tokorozawa, and Masanuri Udagawa, Musashino, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan
Filed July 11, 1975, Ser. No. 595,146
Claims priority, application Japan, July 13, 1974, 49-82778[U]
Int. Cl.² F02D 5/04
U.S. Cl. 123—117 A 7 Claims



1. An ignition timing control system for an internal combustion engine including an induction passageway having a throttle valve rotatably mounted therein, said system comprising a vacuum motor adapted for controlling the ignition timing of said engine, first and second passage means adpated for providing communication between said vacuum motor and said induction passageway immediately upstream of the edge of said throttle valve in its fully closed position for applying vacuum in said induction passageway to said vacuum motor to operate it, said first passage means being located in parallel with said second passage means, and first and second bimetallic leaf valve means disposed respectively in said first and second passage means for closing and opening the corresponding passage means in accordance with the temperature of said engine to control vacuum application to said vacuum motor, said first leaf valve means being formed and constructed to have a thermal hysteresis characteristics in which said first leaf valve means, when in a first predetermined temperature range, alternatively closes and opens said first passage means in dependence on a temperature to which said first leaf valve means is cooled from a temperature higher than a temperature in said first predetermined temperature range, said second leaf valve means being formed and constructed to have a thermal hysteresis characteristics which is different from said thermal hyteresis charactertistics of said first leaf valve means and in which said second leaf valve means when in a second predetermined temperature range different from said first predetermined temperature range, alternatively closes and opens said second passage means in dependence on a temperature to which said second leaf valve means is cooled from a temperature higher than a temperature in said second predetermined temperature range.

4,027,634
VACUUM BREAK ASSEMBLY
Benjamin C. Benjamin, Flint, Mich., assignor to Schmelzer Corporation, Durand, Mich.
Filed Aug. 27, 1975, Ser. No. 608,102
Int. Cl.² F02M 1/10, 1/08
U.S. Cl. 123—119 F 8 Claims



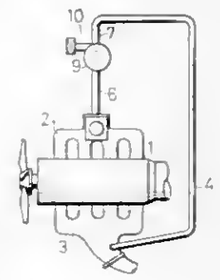
1. A vacuum break device for use with a carburetor choke of an internal combustion engine comprising: a housing including a pair of cup-shaped elements, a diaphragm disposed in sealing engagement with said cup-shaped elements and forming a control chamber in one of said cup-shaped elements at one side of said diaphragm, a stem connected to the other side of said diaphragm and adapted for connection to said choke for positioning the latter between a closed and open position upon movement of said diaphram, a wall member disposed in engagement with said one cup-shaped element in axially spaced relation to an end wall of said cup shaped element to form a circular filter chamber in said housing having a diameter substantially equal to the internal diameter of said one cup-shaped element, an air filter element disposed in said filter chamber, passage means between said control chamber and said filter chamber and including an opening in said wall member, valve means including an **0-ring** having one face in engagement with said wall and surrounding said opening, a valve closure element positioned for engagement with another face of said **0-ring**, an annular retaining element supported on said wall and having a smaller diameter than said filter chamber, first resilient means acting between one side of retaining element and said closure element to urge the latter into engagement with said **0-ring**, second resilient means acting between the other side of said retaining element and said diaphragm for urging the latter to a choke closed position, and vacuum inlet means communicating with said filter chamber and adapted for connection to a source of vacuum, said valve means being operative in the presence of vacuum pressure in said filter chamber to evacuate fluid from said control chamber at a restricted rate to move said diaphragm in a choke opening direction and being movable out of engagement with said O-ring in the absence of vacuum pressure in said filter chamber for free admission of air to said control chamber for return movement of said diaphragm to a choke closed position.

4,027,635
FLOW RATE CONTROL MECHANISM FOR USE IN EXHAUST GAS RE-CIRCULATING SYSTEM
Kenji Goto; Norio Shibata, and Yukihide Hashiguchi, all of Susono, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyoda, Japan
Filed Apr. 8, 1975, Ser. No. 566,678
Claims priority, application Japan, Sept. 25, 1974, 49-110282
Int. Cl.² F02M 25/06
U.S. Cl. 123—119 A 6 Claims

5. A flow rate control mechanism for an exhaust gas recirculating system in an internal combustion engine, said mechanism comprising:

means defining a swirl flow chamber having a circular cross-section and disposed in an intake system of the engine, said chamber having

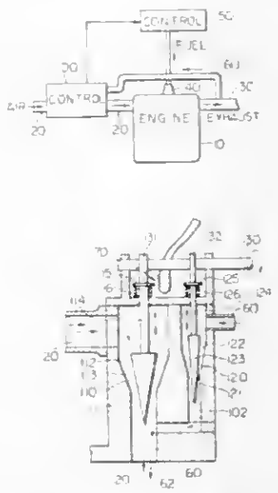
a first inlet port for atmospheric air only, said first port opening into said chamber in a direction substantially tangential to the circular periphery of said chamber,



a second inlet port for exhaust gas located adjacent said first inlet port and in fluid communication with an exhaust manifold of the engine, said second port opening into said chamber in a direction substantially normal to the axis of the circular periphery of said chamber, and

an outlet port in fluid communication with an intake manifold of the engine through which a mixture of the air and the exhaust gas is fed to the engine.

4,027,636
FLOW RATE CONTROL APPARATUS IN EXHAUST GAS RECIRCULATION SYSTEM
Tadahiro Yamamoto, Yokosuka, and Kenji Yoneda, Yokohama, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan
Filed May 14, 1976, Ser. No. 686,533
Claims priority, application Japan, May 26, 1975, 50-62648
Int. Cl.² F02M 25/06
U.S. Cl. 123—119 A 8 Claims



1. In an interanl combustion engine having an exhaust gas recirculation passage which interconnects the exhaust line to the induction passage of the engine, apparatus for controlling the mass flow rate of the exhaust gas in the recirculation passage comprising:

a first venturi section formed in the induction passage to serve as a sonic nozzle;

a first valve member movably arranged in association with said first venturi section such that the effective cross-sectional area of said first venturi section is varied depending on the position of said first valve member;

a second venturi section formed in the exhaust gas recirculation passage to serve as a sonic nozzle;

a second valve member movably arranged in association with said second venturi section such that the effective cross-sectional area of said second venturi section is varied depending on the position of said second valve member;

first means for moving said first valve member to vary the flow rate of air through said first venturi section and vary the speed of the engine, said first means including a movable member the movement of which causes the movement of said first valve member;

second means for transmitting the movement of said movable member of said first means to said second valve member such that said second valve member moves simultaneously with said first valve member and varies the effective cross-sectional area of said second venturi section in a predetermined relation to the variation in the cross-sectional area of said first venturi section.

4,027,637

AIR-FUEL RATIO CONTROL SYSTEM FOR USE WITH INTERNAL COMBUSTION ENGINE

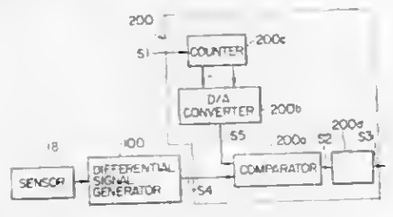
Shigeo Aono, Tokyo, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

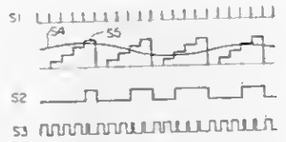
Filed Nov. 11, 1975, Ser. No. 630,851

Claims priority, application Japan, Nov. 14, 1974, 49-131345; Mar. 7, 1975, 50-26961

Int. Cl.² F01N *3/00*

U.S. Cl. 123—119 D **9 Claims**





I. System for effectively reducing oxides of nitrogen in exhaust gases emitted from a plurality of sequentially operative combustion chambers of an internal combustion engine, which system comprises:

first means for generating a train of first pulses;

second means for receiving said first pulses to count and to group the same every predetermined number of said first pulses, said predetermined number of said first pulses being in a prime relationship with the number of said plurality of sequentially operative combustion chambers;

third means for generating a control signal indicative of an optimal air-fuel mixture to be supplied to the combustion chambers according to engine operating conditions;

fourth means for reeiving both said control signal from said third means and said first pulses from said second means to generate a train of second pulses, each of said second pulses being generated within a time duration of said predetermined number of said first pulses in such a manner as to be modulated in width in dependence of said control signal;

fifth means for controlling a fuel supply to the combustion chambers, which receives the train of said second pulses to alternatively supply a rich and a lean air-fuel mixture to each of the combustion chambers according to each of said second pulses.

4,027,638

EXHAUST GAS RECIRCULATION DEVICE

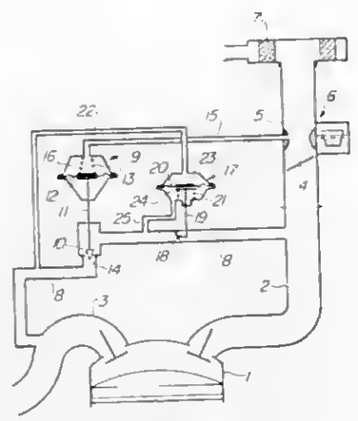
Hisanori Moriya, and Tadao Osawa, both of Katsuta, Japan, assignors to Hitachi, Ltd., Japan

Division of Ser. No. 405,899, Oct. 12, 1973. This application Jan. 13, 1976, Ser. No. 648,712

Claims priority, application Japan, Oct. 16, 1972, 47-102689

Int. Cl.² F02M *25/06*

U.S. Cl. 123—119 A **3 Claims**



1. An exhaust gas recirculation device for recirculating a part of exhaust gas discharged from the exhaust system to the downstream of the carburctor throttle valve through an exhaust recirculation passage for removing nitrogen oxides released from an internal combustion engine, characterized in that a pressure control valve is provided in the afterflow of a flow control valve disposed halfway in said exhaust recirculation passage for controlling the amount of exhaust gas recirculated to the downstream of said throttle valve, said pressure control valve being controlled such that its opening will be reduced when the negative pressure downstream of the throttle valve is high and that said opening will be enlarged when said negative pressure is low, means for operating the flow control valve by a signal proportional to air intake, wherein said flow control valve is controlled by negative pressure in the Venturi in the carburetor, and said pressure control valve is controlled by the difference between the pressure in the upstream of the flow control valve and the pressure between said pressure control valve and said flow valve.

4,027,639

ISOTHERMAL FUEL SUPPLY SYSTEM

Masuo Amano, Okazaki, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

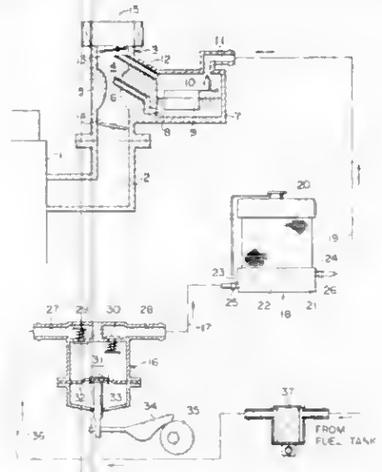
Continuation-in-part of Ser. No. 555,265, March 4, 1975, abandoned. This application June 23, 1975, Ser. No. 589,596

Claims priority, application Japan, Oct. 23, 1974, 49-122225

Int. Cl.² F02M *31/00*

U.S. Cl. 123—122 E **1 Claim**

1. In an internal combustion engine which includes an isothermal fuel supply system which incorporates the engine's cooling water circulating system including the engine's radiator which contains a bottom tank portion located at its exit portion, said system further including a fuel pump, a fuel supply tube, and a carburetor or fuel injection device, said fuel supply tube extending from the fuel pump to the carburetor or the fuel injection device, the improvement which comprises providing a substantial length of said fuel supply tube to extend through said bottom tank portion of the radiator in direct



heat exchange contact with the cooling water in said tank portion.

4,027,640

AUTOMATIC CHOKE VALVE APPARATUS IN AN INTERNAL COMBUSTION ENGINE

Yoshiaki Hirosawa, Tokyo; Toshio Nomura, Niiza, and Masahiko Iyama, Tokyo, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 15, 1975, Ser. No. 606,403

Int. Cl.² F02M *1/10;* **F02D** *11/08*

U.S. Cl. 123—179 G **6 Claims**

1. An automatic choke valve apparatus for an internal combustion engine comprising a choke valve mounted in an intake passage of an internal combustion engine, an operation shaft connected to said choke valve, an external pulse motor including a drive shaft, an intermediate torsion spring connecting said operation shaft and said drive shaft, coupling means between said shafts for imparting drive from said drive shaft to said operation shaft only in regular direction of rotation of the drive shaft, and a driving pulse circuit means connected to said pulse motor for driving the same from a position for engine starting to a position when engine firing is completed, said driving pulse circuit means comprising an electrical circuit having a first input sensitive to closure of an ignition switch, a second input sensitive to the beginning of completed engine firing, variable resistor means sensitive to engine temperature, and control means coupled to said inputs and resistor means for producing pulses for driving said pulse motor to move the choke valve in one direction from the engine starting position to the position at which completed engine firing is obtained, said pulses being produced by said circuit at a frequency and for a time period in accordance with the variable resistance of the resistor means whereby the choke valve is driven at a rate of speed and for a time interval related to engine temperature.

4,027,641

CONTROL APPARATUS FOR STARTING INTERNAL COMBUSTION ENGINES

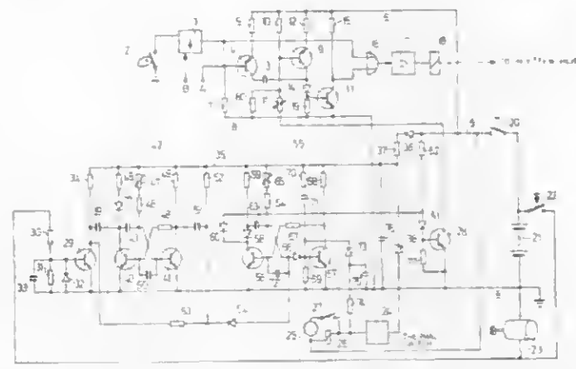
Helmut Möder, Stuttgart, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Feb. 3, 1975, Ser. No. 546,670

Claims priority, application Germany, Mar. 2, 1974, 2410090

Int. Cl.² F02B *3/00;* **F02D** *1/04*

U.S. Cl. 123—179 L **8 Claims**



1. In a starting control apparatus of an internal combustion engine with especially electronically controlled fuel injection, said engine including an electric starter motor, a starting switch, fuel injection valves, said control apparatus including electronic circuit means for controlling the injection valves of the engine and further including an engine temperature sensor for providing an electrical signal to said circuit means for controlling the fuel injection process, the improvement comprising:

an electronic switch, connected in series with said temperature sensor for altering the electrical signal provided by said temperature sensor; and

a thermal switch, connected to operate said electronic switch; whereby said electronic switch causes the release of supplementary fuel to the internal combustion engine when said engine is at normal operating temperature, and said starter motor has been actuated for more than a predeterminded time.

4,027,642

INTAKE AIR HEATING DEVICE FOR USE IN INTERNAL COMBUSTION ENGINE

Naoki Kamada, Hitachi, and Nobutoshi Hasebe, Ibaraki, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Aug. 12, 1975, Ser. No. 603,791

Claims priority, application Japan, Aug. 14, 1974, 49-92373

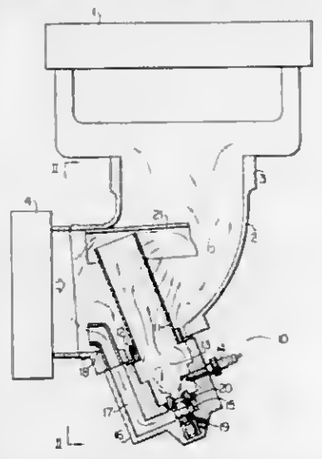
Int. Cl.² F02M *31/00*

U.S. Cl. 123—122 G **7 Claims**

I. In an intake air heating device including means for introducing fuel from a tank disposed outside said device and injecting fuel into a combustion chamber; an electrically controlled ignition plug disposed in the vicinity of an injection nozzle for firing the fuel which has been thus injected into the combustion chamber; and a flame baffle cylinder for guiding combustion flames to an intake pipe leading to an engine; the improvements comprising;

said flame baffle cylinder piercing through the wall of an elbow from outside into the interior thereof, said elbow serving as part of an air intake pipe and,

means for guiding flames from said flame baffle cylinder to the intake pipe, said means being secured to the inner



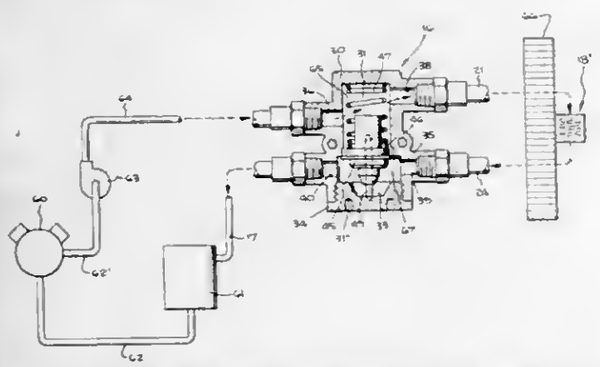
wall of said elbow in the vicinity of one end of said flame baffle cylinder.

4,027,643

OIL COOLER CONTROL

Patrick J. Feenan, 19123 Community St., Northridge, Calif. 91324, and Edward B. Walton, 3129 Yale Ave., Marina del Rey, Calif. 90291

Filed Aug. 14, 1975, Ser. No. 604,560
Int. Cl.² F01M *1/00*
U.S. Cl. 123—196 AB **6 Claims**



1. In a combustion engine temperature responsive system for passing lubricating oil from the combustion engine alternatively either directly back to the engine or through a cooling coil prior to return to the engine,

a valve device comprising a housing having a valve chamber therein,

an oil supply passage for oil from the engine to the chamber,

an oil return passage for oil from the chamber to the engine,

a cooling coil intake passage for oil from the chamber to the cooling coil and a cool oil discharge passage for oil from the cooling coil to the chamber,

said chamber having adjoining side wall structures of different diameters substantially cylindrically shaped at opposite ends, and end walls for the respective side wall structures,

an annular valve seat extending around an interior wall of said chamber at the junction of the side wall structure for one end with the side wall structure for the other end, whereby the portion of the valve seat of smallest diameter is no smaller than the diameter of the smaller of said side wall structures,

a valve member comprising a housing and a thermal responsive reciprocating piston element, said housing having an annular valve element thereon at the outermost perimeter in operable association with said seat,

said thermal responsive reciprocating piston element in said valve member having an operating engagement between said housing and said valve member and responsive to temperature changes in said oil,

resilient means in one of said side wall structures acting between the end wall therefor and said valve element in a direction normally holding said valve element in an unseated condition whereby to substantially bypass said coil,

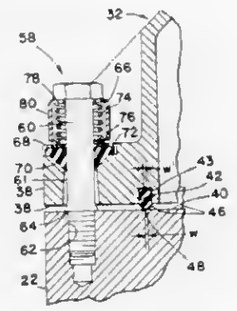
said reciprocating piston element having movement in a direction to overcome tension in said spring and to seat said valve element on said seat when oil temperature is relatively high.

4,027,644

ISOLATED ENGINE COVER

Sune E. Timour, Columbus, Ind., assignor to Cummins Engine Company, Inc., Columbus, Ind.

Filed June 26, 1975, Ser. No. 590,708
Int. Cl.² F02B *77/00*
U.S. Cl. 123—198 E **22 Claims**



1. In an interanl combustion engine having a housing, an anti-noise cover assembly comprising:

a cover adapted to be placed over said housing;

means forming a continuous perimeter groove on said cover, said groove facing towards said housing;

an elongated elastomeric element received thoughout the length of said groove; said element in its free state extending out of said groove to form a continuous ridge around said cover; and,

means connectable with said housing for yieldably urging said cover towards said housing high enough to form a seal along a band of contact between said elastomeric element and said housing and low enough to prevent contact between said cover and said housing, said cover being spaced from said housing;

whereby said cover is sound insulated with respect to said engine.

4,027,645

ARCHERY BOW WITH ARROW GUIDING DEVICE

William M. Damron, 458 S. 97th Place, Mesa, Ariz. 85208

Filed Nov. 24, 1975, Ser. No. 634,626
Int. Cl.² F41B *5/00*
U.S. Cl. 124—24 R **9 Claims**

5. A bow for guiding and launching archery arrows comprising:

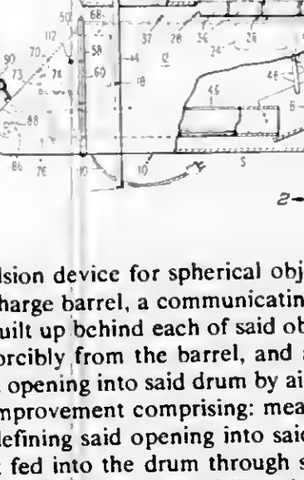
a bow,

a bowstring tautly arranged between the ends of the bow, and

a bowstring positioning and launching tube assembly attached to the bow at its spine point for extending laterally of the longitudinal axis of the bow for positioning and manual removal of a bowstring therefrom for launching an arrow,

said assembly comprising a first hollow tubular portion attached to the bow at its spline point and a second hollow tubular portion coaxially aligned with and detachably connected to said first tubular portion and positioned between the belly of the bow and the bowstring when the latter is in a neutral position,

the portions of said assembly being split along opposite ends of a diameter of said assembly along its length whereby the tips of an arrow head and some of the feathers at diagonally opposite parts of the arrow at its opposite end



protrude outwardly of the assembly through its slits for guiding of the arrow through the guiding and launching device, and

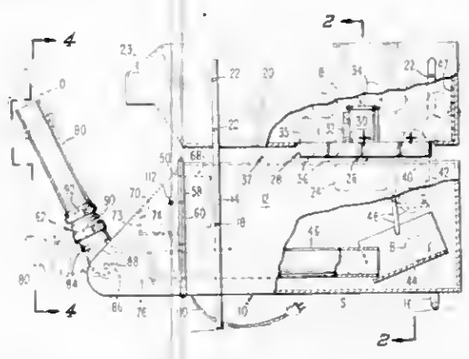
a finger guard means mounted along at least a part of the length of said assembly for protecting the archer's fingers from the protruding portions of an arrow passing through said assembly.

4,027,646

PROPULSION DEVICE FOR TENNIS BALLS AND LIKE SPHERICAL OBJECTS

Gerard F. Sweeton, Skillman, N.J., assignor to Prince Manufacturing, Inc., Princeton, N.J.

Filed June 8, 1976, Ser. No. 694,119
Int. Cl.² F41F *1/04*
U.S. Cl. 124—56 **14 Claims**



1. In a propulsion device for spherical objects, of the type including a discharge barrel, a communicating drum in which air pressure is built up behind each of said objects for propelling the same forcibly from the barrel, and a trap door normally closing an opening into said drum by air pressure within the drum, the improvement comprising: means mounting the trap door and defining said opening into said drum so that a spherical object fed into the drum through said opening will build up kinetic energy while in free fall vertically downwardly through said mounting means into the drum to an extent effective to momentarily bias the door to a substantially vertical open position while said object is still in free fall said trap door, in so opening, momentarily inhibiting free fall of the spherical object; and means within the drum to which said object, while regaining substantially free fall, will gravitate clear of the trap door, so as to permit an immediate return of the trap door to a closed position free of any restraint imposed thereon by the spherical object.

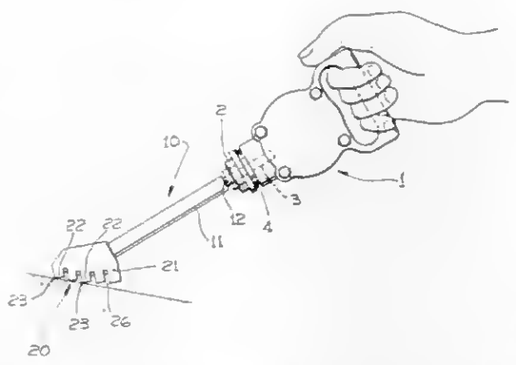
6. In a propulsion device for spherical objects of the type including a discharge barrel, a hopper for holding a quantity of said objects, a pressurized drum disposed below the hopper in communication with the barrel, and a rotating distributor for sequentially feeding said objects into the drum from the hopper, said drum having a curved top wall and said distributor having an annular series of feed sleeves carrying said objects into position to be fed into the drum, the improvement comprising: a feed opening formed in said top wall of the drum at a location such that said sleeves will be moved in succession into registration therewith for passage of said objects from the sleeves through said opening into the drum; and means mounting the distributor with the sleeves disposed in a plane approximately tangential to said curved top wall of the drum, said sleeves being bottomless and cooperating with the curved top wall of the drum to permit objects supported therein to move upwardly and downwardly therewithin, and to permit said objects to be individually rotated, during rotation of the distributor with said sleeve-supported objects in contact with the top wall of the drum, thus to agitate the spherical objects within the hopper disposed above the distributor in contact with the objects located within the distributor sleeves.

4,027,647

PLANING AND CUTTING TOOL

Herbert H. Hoffman, 598 G Avenida Majorca, Laguna Hills, Calif. 92653

Continuation-in-part of Ser. No. 487,916, July 12, 1974, abandoned. This application Feb. 23, 1976, Ser. No. 660,725
Int. Cl.² B28D *1/22*
U.S. Cl. 125—6 **8 Claims**



1. A cutting tool having a forward end and a rear end and having means associated therewith for positioning a shank on the rear end thereof in force transmitting relation, said tool comprising:

a tool body having generally parallel and spaced cutting teeth means associated therewith for cutting into a workpiece under action of said tool, each cutting tooth having a cutting edge formed by the intersection of a forward face and a bottom face, each forward face being generally parallel with each other forward face and each bottom face being generally parallel with each other bottom face;

shank means for receiving power from a source of power;

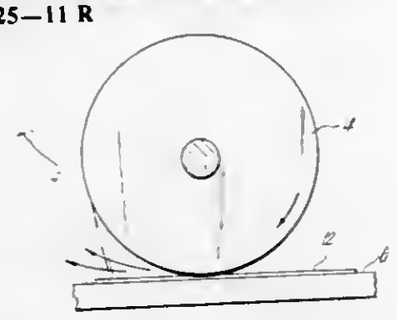
means for connecting said shank means and said tool body in force transmitting relation; and

cutting disposal groove means between said cutting teeth means, said cutting disposal groove means being generally tapered from the center of the tooth to widen at the sides.

4,027,648
GRINDING WHEEL DRESSING METHOD

Phillip E. Bonnice, Worthington, Ohio, assignor to General Electric Company, Columbus, Ohio

Continuation of Ser. No. 535,018, Dec. 20, 1974, abandoned.
This application Apr. 29, 1976, Ser. No. 681,603
Int. Cl.² B24B 53/04
U.S. Cl. 125—11 R 7 Claims

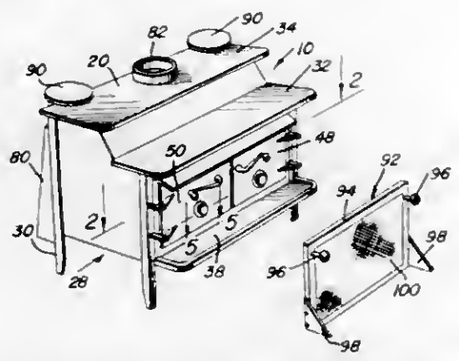


1. A method of dressing a bonded, rigid grinding wheel on a high speed grinding machine comprising the steps setting the wheel against a metal piece at substantially zero clearance, rotating the wheel at normal grinding speed of the machine, applying a wheel dressing slurry comprising a multiplicity of abrasive crystals dispersed in a normally fluid carrier medium to the moving surface of said grinding wheel by forcing said wheel dressing slurry through a conduit in a dressing shoe having a metal dressing face in substantially zero clearance to said wheel surface, whereby the dressing slurry is spread on the surface of the wheel, and abrading said wheel surface having said slurry spread thereon against said metal dressing face to remove selected portions of the surface of said wheel.

4,027,649
COMBINED WOOD BURNING STOVE AND FIREPLACE

J. D. Jackson, 38751 Camp Creek Road, Springfield, Oreg. 97477

Filed Oct. 30, 1975, Ser. No. 627,245
Int. Cl.² F24C 1/14, 15/36
U.S. Cl. 126—4 12 Claims

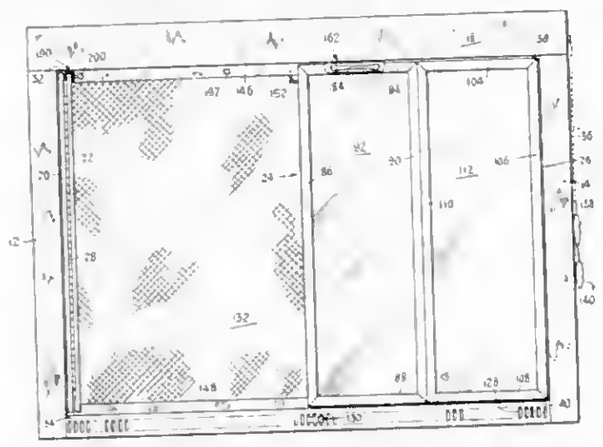


1. A combined stove and fireplace assembly including a housing having interconnected opposite side, front, rear, and top and bottom walls, said front wall having a large opening formed therein whose upstanding side edges are spaced inwardly of said side walls, a pair of opposite side closure doors hingedly supported from opposite side portions of said front wall and swingable horizontally between coplanar positions closing said opening with their free swinging edges in close juxtaposition and open positions with said doors swung outwardly and rearwardly into position closely paralleling the outer surfaces of the forward portions of said side walls, a rear portion of said assembly having a flue outlet opening formed therein, said front wall including a horizontally outwardly projecting hearth spaced slightly below the lower marginal poertion of said large opening, an upright screen structure having front and rear sides and support legs including at least portions thereof spaced forward of the opposite side marginal portions of said screen structure, said screen structure, including said legs being removably positionable on said hearth with the periphery of said screen structure at least closely juxtaposition the outer surfaces of said front wall extending about said large opening, said hearth including a raised curb extending about its outer periphery, said curb including opposite end inwardly curving portions, said legs being closely embraced by said inwardly curving portions of said curb when said screen structure is disposed on said hearth, whereby said inwardly curving curb portions serve to limit forward displacement and lateral shifting of said legs, and thus said screen structure, relative to said large opening.

4,027,650
FIREPLACE ENCLOSURE

Harrison F. Edwards, Norwich, N.Y., assignor to Bennett-Ireland, Inc., Norwich, N.Y.

Filed Jan. 12, 1976, Ser. No. 648,387
Int. Cl.² F23M 7/00
U.S. Cl. 126—140 11 Claims

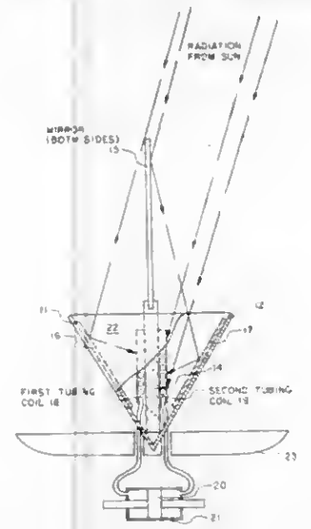


1. A fireplace enclosure, comprising in combination:
a. a frame having substantially vertical side members and substantially horizontal top and bottom members extending between and respectively connected to the side members,
b. a door stop carried by one of said members,
c. two pairs of hingedly connected folding doors adapted to close off the space encompassed by the frame, and to engage said door stop when closed,
d. means movably mounting the doors on the frame for movement between open and closed positions,
e. an elongate handle movably carried by one of said doors,
f. means for slidably mounting said handle on the one door for lengthwise movement,
g. cooperable latch means on said one door and frame, responsive to movement of said handle for selectively latching the door to the frame and releasing the door therefrom,
h. said handle mounting means comprising a channel having a U-shaped cross-section, said channel being slidable along the top edge of said one door,
i. said cooperable latch means comprising a lug stamped out from said channel, and
j. means defining an aperture in the door stop for receiving said lug when said latch means is actuated,
k. sliding of said handle effecting latching engagement of the lug and door stop.

4,027,651
SOLAR-ENERGY-POWERED SUN TRACKER

Roland W. Robbins, Jr., 825 E. California Blvd., Ridgecrest, Calif. 93555

Filed Feb. 17, 1976, Ser. No. 658,544
Int. Cl.² H24J 3/02; G01J 1/20
U.S. Cl. 126—270 5 Claims

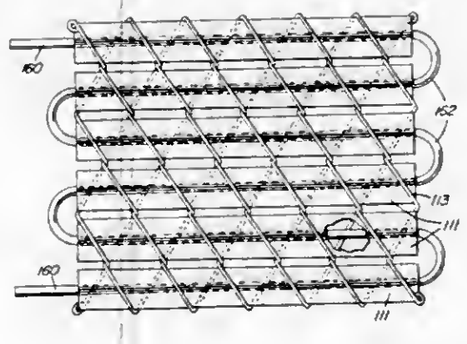


1. Apparatus for aiming a rotatable solar energy collector constantly towards the sun comprising:
a housing open on one side;
a central divider mounted inside said housing so as to divide said housing into two compartments each open on said side;
a first mirror, in the first of said two compartments, mounted on said housing so as to face said divider;
a second mirror, in the second of said two compartments mounted on said housing so as to face said divider;
a first fluid containing reservoir mounted on one side of said divider and facing said first mirror;
a second fluid-containing reservoir mounted on the second side of said divider and facing said second mirror;
means for translating vapor pressure of said first and second reservoirs into movement of said apparatus and said collector whereby the vapor pressure provides the motive force for the movement; and
means for shading one of said two compartments from the sun when said central divider is not bore-sighted towards the sun.

4,027,652
SOLAR ENERGY COLLECTOR

Frank Collura, 2926 W. Jean St., Tampa, Fla. 33610

Filed Apr. 15, 1975, Ser. No. 568,188
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 10 Claims

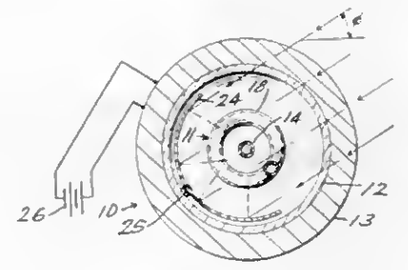


1. In a solar heater, a plurality of elongated side-by-side thin metal strips, a plurality of elongated cylindrical pipe sections underlying said strips and interconnected to define a continuous liquid flow path through said pipe sections, said metal strips being arched over and disposed in good heat transfer relation with the adjacent portions of said pipe sections opposing said strips, the arching of said strips being such as to closely conform to the radii of curvature of said adjacent pipe section portions and establish a wide area of good heat transfer relationship between said adjacent pipe section portions and said strips, a woven mesh fabric including crossed interwoven opposite side plies, said pipe sections paralleling said strips, said strips and pipe sections being interposed between the opposite side plies of said woven mesh fabric.

4,027,653
SOLAR ENERGY COLLECTOR

Gershon Meckler, 7425 Democracy Blvd., Unit 212, Bethesda, Md. 20034

Filed Oct. 10, 1975, Ser. No. 621,477
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 3 Claims



1. An improved solar energy collector for transferring solar energy from the sun to a fluid comprising, in combination, a solar energy heat absorber including tube means through which the fluid is circulated for transferring solar energy to the fluid, reflector means for directing solar energy from the sun to said heat absorber, said reflector means having a ferromagnetic portion, vacuum insulating means separating said heat absorber and said reflector means from the atmosphere for preventing conduction and convection heat losses from said collector and said reflector means, means mounting said reflector means within said vacuum insulating means for rotation about an axis along which said tube generally extends, and means for automatically positioning said reflector means for directing a maximum amount of solar energy to said heat absorber as the sun advances across the sky each day including means for rotating said reflector about such axis as the sun moves across the sky including means exterior to said vacuum insulating means for producing a magnetic field which attracts the ferromagnetic portion of said reflector and means for rotating such magnetic field producing means about said axis for in turn rotating said reflector about said axis for reflecting a maximum amount of solar energy from the sun to said tube means.

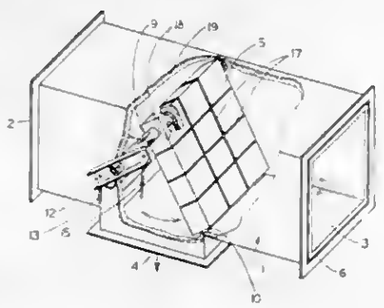
4,027,654
DAMPER ASSEMBLY FOR HIGH TEMPERATURE OR CORROSIVE GASES

David H. Kannapell, Prospect, Ky., assignor to American Air Filter Company, Inc., Louisville, Ky.

Filed Dec. 4, 1975, Ser. No. 637,720
Int. Cl.² F23L 3/00, 11/00, 13/04
U.S. Cl. 126—285 R 9 Claims

1. A damper assembly comprising: a flow through housing having a flow through inlet and a flow through outlet; a pair of metallic plate members disposed within the housing and attached on opposite sides to a transversely extending movable support member having pressure relieving means therein, the support member extending through aligned openings in the sidewalls of the housing; said plate members including means for receiving refractory thereon; a refractory substantially

covering said plate members, said refractory being divided into a plurality of preselected sections; and, a material having a relatively low disintegrating temperature disposed between



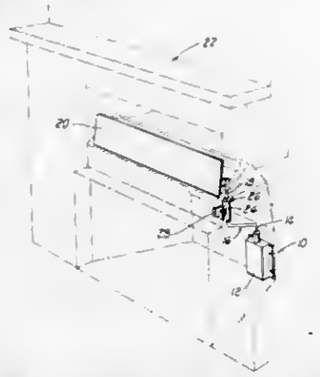
adjacent sections of said refractory whereby upon initial heating of the assembly said low temperature disintegrating material disintegrates thereby leaving spacing in the refractory for expansion and contraction over a wide temperature range.

4,027,655

FIREPLACE DAMPER RELEASE MECHANISM

Erich J. Feldl, 227 S. Wind Place, Manhattan, Kans. 66502

Filed Mar. 22, 1976, Ser. No. 669,050
Int. Cl.² F23L *11/00*
U.S. Cl. 126—288 **5 Claims**



1. A fireplace damper release mechanism for automatically allowing a damper to close after a fire has gone out in a fireplace, the damper including a fireplace damper connecting rod having an upper end portion and a vertical lower end portion, the upper end portion of the rod attached to the damper, the damper opened and closed by manually raising and lowering the rod, the mechanism comprising:
- a housing mounted in the fireplace for receiving the lower end portion of the rod;
- a first temperature sensitive release means pivotally mounted in said housing, the bottom of the lower end portion of the rod disposed directly above said first release means and resting thereon, the rod holding the damper in an open position while starting a fire in the fireplace, said first release means flexing with an increase in temperature away from the bottom of the lower end portion of the rod thereby allowing the rod to drop downward; and
- a second temperature sensitive release means pivotally mounted in said housing, said second release means constructed to flex more rapidly than said first release means when the temperature increases in the fireplace, said second release means positioned below the bottom and in a spaced relationship to one side of the lower end portion of the rod, said second release means flexing with an increase in temperature toward the center of the bottom of the lower end portion of the rod and directly below for receiving the rod thereon when the rod is released by said first release means;

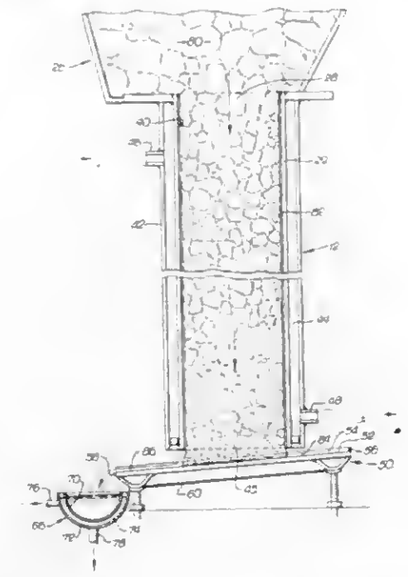
said second release means flexing with a decrease in temperature when the fire is gone out in the fireplace and flexing away from the center of the bottom of the lower end portion of the rod thereby returning to its original position and allowing the rod to drop downwardly closing the fireplace damper.

4,027,656

SULPHUR MELTING APPARATUS AND METHOD

Robert S. Geddes; William W. Chalmers, and Ross R. Williams, all of Calgary, Canada, assignors to Canadian Occidental Petroleum, Ltd., Calgary, Canada

Filed July 11, 1975, Ser. No. 595,329
Int. Cl.² F24H *1/00*
U.S. Cl. 126—343.5 A **15 Claims**



1. A sulfur melting apparatus comprising:
- a substantially vertical tube for receiving solid sulfur at its upper end;
- means for heating the inside wall of the tube so as to melt the sulfur in contact therewith;
- said tube having a lower open end; and
- an adjustable, heated plate externally positioned directly below the lower open end of the tube and defining a controlled restriction to prevent the flow of solid sulfur from the tube but allowing the flow of molten sulfur from the tube onto the plate, said plate having a top surface with opposing end rails and a rear rail enclosing three sides of said surface, said rails extending upward above the surface of said plate, said plate extending downward from the rear rail, the lower side of said plate being fitted with a heating means.

4,027,657

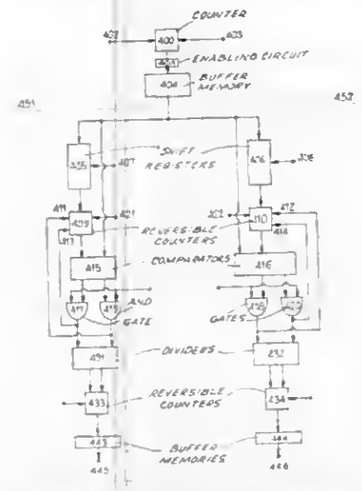
FOETAL HEART RATE APPARATUS AND METHOD IN WHICH AVERAGE FOETAL HEART RATE DURING NON-DECELERATION PERIODS IS COMPARED WITH THE AVERAGE FOETAL HEART RATE OVER A FEWER NUMBER OF PERIODS

Claude Sureau; Michel Tournaire, both of Paris; Jean-René Zorn, Bourg-la-Reine; Gilbert Sturbois, Paris; Jacques Chavinié, Saint-Maur; Roger Le Houezec, Villejuif, and André Ripoche, Vitry-sur-Seine, all of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuily sur Seine, France

Filed Apr. 15, 1975, Ser. No. 568,160
Claims priority, application France, Apr. 17, 1974, 74.13270
Int. Cl.² A61B *5/04*
U.S. Cl. 128—2.06 F **17 Claims**

1. A method for quantitatively determining the decelerations of a foetal heart rate, comprising the following steps:

sensing the foetal heart rate and providing an electric heart rate signal;
forming from the heart rate signal a heart period signal comprising a plurality of heart beats;
forming from the heart period signal a signal corresponding to a filtered average value of the heart period over a given number of heartbeats;
inhibiting in the heart period signal the values corresponding to the deceleration periods;



forming, from the non-inhibited value, an average signal of a number of heart periods greater than said given number;
comparing the instantaneous values of the filtered value and of the average value;
integrating the difference signal between said average value and said filtered value in the case where the filtered value is greater than the average value.

4,027,658

INSTRUMENT FOR TAKING SAMPLES

Manly Ernest Marshall, 1824 Grove Ave., Richmond, Va. 23220

Filed Dec. 1, 1975, Ser. No. 636,570
Int. Cl.² A61B *10/00*
U.S. Cl. 128—2 W **9 Claims**

1. An instrument for taking samples comprising a stem, a head, and a handle wherein
- said stem, head, and handle are formed of a single polymer material in a solid unitary construction, said head and handle being formed at opposed ends of said stem,
- said stem is of a substantially constant diameter,
- said stem is of a diameter such that it is flexible,
- said head and handle are of diameters larger than said stem such that they are relatively inflexible,
- said head is cylindrical and of a substantially constant diameter of less than 6 millimeters, and
- said head has grooves formed therein for accepting samples.

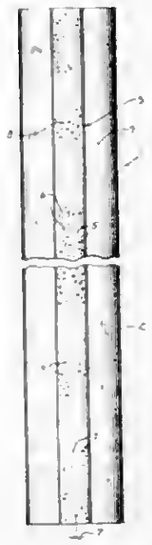
4,027,659

RADIOGRAPHIC OPAQUE AND CONDUCTIVE STRIPPED MEDICAL TUBES

Eugene L. Slingluff, East Troy, Wis., assignor to Krandex Corporation, Milwaukee, Wis.

Filed Nov. 21, 1975, Ser. No. 634,075
Int. Cl.² A61M *25/00;* **F16L** *11/12*
U.S. Cl. 128—2 M **10 Claims**

1. A radiographic opaque and conductive medical tube comprising a tubular member formed of a flexible impervious plastic material and including a single integral stripe portion extending throughout the length of the tubular member, said stripe portion including a mixture of first material and a second material different than said first material, said first material being a highly conductive material, said second material



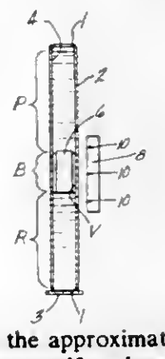
being a radiographic opaque material dispersed throughout the stripe portion whereby said single portion is operable for grounding of the tubular member to prevent significant electrostatic charge existing on the tubular member during use and simultaneously defines a visually observable portion of the tubular member when subjected to a radiographic beam.

4,027,660

MATERIAL LAYER VOLUME DETERMINATION

Stephen Clark Wardlaw, 16 Pine Orchard Road, Branford, Conn. 06405; Robert Aaron Levine, 31 Pilgrim Lane, Guilford, Conn. 06437, and James Vincent Massey, III, 80 Driftwood Lane, Trumbull, Conn. 06610

Filed Apr. 2, 1976, Ser. No. 673,058
Int. Cl.² A61B *5/14*
U.S. Cl. 128—2 F **28 Claims**



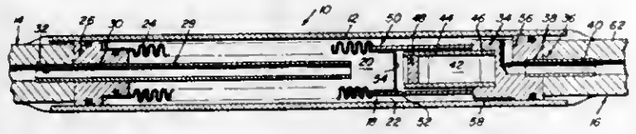
1. For use in measuring the approximate volume of a constituent material layer in a centrifuged material mixture having at least first and second adjacent material layers of different densities, an apparatus comprising: a tube the bore of which is of substantially constant diameter for containing the centrifuged material mixture; and a volume-occupying mass disposed within the bore in said tube, said mass comprising an axially elongated body formed of a resinous material which sinks through the layer of lesser density but is buoyant upon the layer of greater density, said body having an outside diameter which is sufficiently smaller than the tube bore diameter to form a free space means between said body and said tube bore operable to reduce the available free volume within said tube which substantially all of the layer of lesser density will

occupy to axially expand the extent of the layer of lesser density by a multiple of at least about four.

4,027,661
PRESSURE SENSOR

Warren Charles Lyon, Baltimore, and William H. Hayes, Jr., Woodbine, both of Md., assignors to Hittman Corporation, Columbia, Md.

Filed July 16, 1974, Ser. No. 488,988
Int. Cl.² A61B 5/00
U.S. Cl. 128—2 A 23 Claims

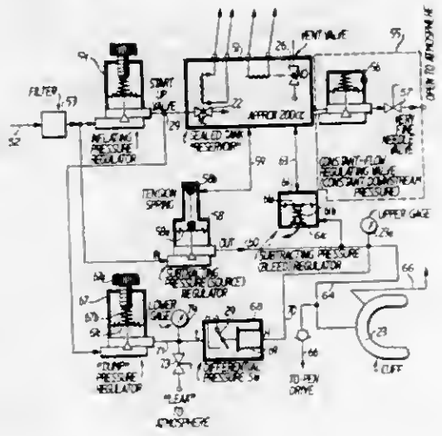


1. A pressure sensor apparatus comprising a housing, resilient means defining a chamber in said housing, a non-radioactive fluid contained within said chamber, pressure communication means for placing said chamber in communication with the pressure to be sensed so that said pressure will cause said resilient means to move, a radioactive material contained within said housing and radiation shielding means at least partially surrounding said radioactive material, one of said radioactive material and said radiation shielding means being operatively connected to said resilient means and moveable therewith, said radiation shielding means shielding said radioactive material as a function of the pressure acting upon said pressure communication means.

4,027,662
AUTOMATIC BLOOD PRESSURE RECORDER

Arnold S. J. Lee, Englewood, N.J., assignor to Milstein Medical Research Foundation, Inc., New York, N.Y.

Continuation of Ser. No. 378,167, July 11, 1973, abandoned.
This application Sept. 26, 1975, Ser. No. 617,175
Int. Cl.² A61B 5/02
U.S. Cl. 128—2.05 A 27 Claims

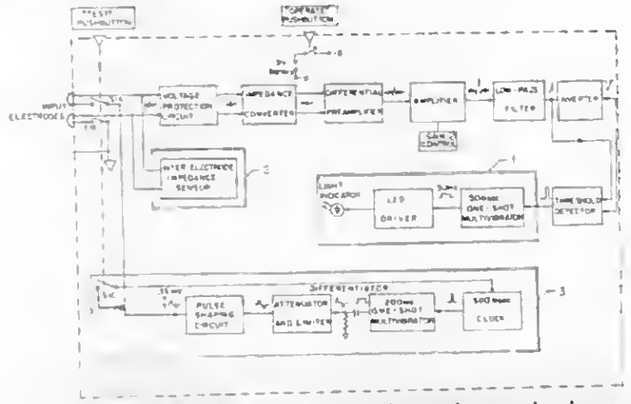


1. In an apparatus for automatically detecting and recording a succession of time-spaced blood flow surges occurring while a variable external pressure applied to a patient's artery is decreased over a first range including the systolic to diastolic pressure range of the patient, an inflatable cuff for applying the external pressure to the artery, normally unoperated means for pressurizing the cuff to a first predetermined value corresponding to the upper end of the first range, bleed valve means coupled to the cuff, means operative when the cuff has reached the first predetermined pressure value for depressurizing the cuff through the bleed valve means, control means including a portion of the depressurizing means and coupled to the bleed valve means and to the pressurizing means for maintaining said depressurizing at a specified constant rate throughout the first range, means for detecting successive blood flow surges caused by successive movements of the artery as the cuff is depressurized through the first range and for generating a succession of spaced first pulses corresponding to the successive detected surges, means coupled to the output of the detecting means for converting the successive first pulses into spaced, time-modulated second pulses having durations individually indicative of the time integral of the respective first pulses, a recording medium having a first axis, at least one marking means associated with and scannable along the first axis of the recording medium, each marking means including first gating means selectively operable to mark the then-adjacent portion of the recording medium along the first axis while the first gating means is operated, first means coupled to the cuff depressurizing means for scanning each marking means along the first axis of the recording medium through a region of the first axis corresponding to the first range at the constant rate maintained by the control means, and means selectively coupling successive time-modulated second pulses to the first gating means of at least a first one of the marking means for operating the last-mentioned first gating means.

4,027,663
HEART BEAT DETECTOR

Henryk Fischler; Yaakov Krupka, both of Rehovot, and Yacov Itzchak, Ramat Efal, all of Israel, assignors to Yeda Research & Development Co. Ltd., Rehovot, Israel

Filed Oct. 6, 1975, Ser. No. 620,224
Claims priority, application Israel, Oct. 4, 1974, 45786
Int. Cl.² A61B 5/04
U.S. Cl. 128—2.06 R 5 Claims

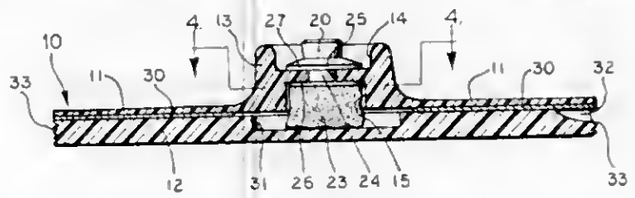


1. A heart-beat detector for continuously monitoring an ECG in emergencies and under adverse conditions, the detector comprising a pair of electrodes which are to be placed in contact with the body of a patient; circuit means coupled to said electrodes and responsive to signal output thereof for extracting QRS complexes and producing signals representative of occurrences of heart-beats; light generating means coupled to said circuit means and responsive to signal output thereof for producing a visible output representative of heart-beats even under adverse conditions of noise, vibrations, ambient light and the like; and means coupled to said electrodes and to said circuit means and responsive to impedance between said electrodes for producing a distinctive input signal to said circuit means upon said impedance exceeding a given level as an indication of too low a conductivity between said electrodes and the body of a patient, said circuit means further producing a distinct output signal upon the occurrence of said distinctive input signal, said light generating means being responsive to said distinct output signal from said circuit means indicative of the occurrence of said impedance exceeding said given value for providing a distinct visible output indicative thereof.

4,027,664
DIAGNOSTIC ELECTRODE ASSEMBLY WITH A SKIN PREPARATION SURFACE

Paul William Heavner, Jr., Kettering, Ohio, and Gregor Dean Long, Libertyville, Ill., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Nov. 17, 1975, Ser. No. 632,740
Int. Cl.² A61B 5/04
U.S. Cl. 128—2.06 E 8 Claims



1. A disposable electrode assembly for establishing an electrical connection to an underlying skin surface comprising, in combination:

a relatively flexible base member formed of electrically-insulating material having an outside surface and an inside surface;

contact means on said base member for establishing electrical contact with said underlying skin surface, said contact means including a first contact portion on said outside surface and a second contact portion in electrical communication with said first contact portion on said inside surface;

a cover member having an inside surface substantially coextensive with said inside surface of said base member, said cover member being, overall, substantially less flexible than the major extent of said base member and including a circumferential edge portion;

an adhesive layer on said inside surface of said base member holding said inside surface of said cover member against said inside surface of said base member so as to increase the rigidity of said electrode assembly during storage, said base member being peelable away from said cover member to enable said adhesive layer to be placed in contact with said underlying skin surface to hold said second contact portion in contact with said skin while said electrode assembly is in use; and

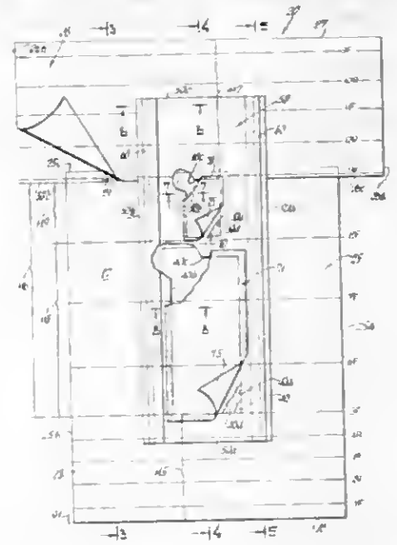
means including an abrasive surface on at least a portion of said circumferential edge portion of said cover member for use in preparing said underlying skin surface prior to application of said second contact portion thereto.

4,027,665
CARDIOVASCULAR DRAPE

George W. Scrivens, Edison, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.

Filed Mar. 3, 1976, Ser. No. 663,900
Int. Cl.² A61B 19/06
U.S. Cl. 128—132 D 32 Claims

1. A surgical drape comprising a main sheet of flexible, drapable material, said main sheet having an upper surface, a lower surface, a top edge, a bottom edge, and a pair of opposed side edges, said main sheet having at least two fenestrations therein, each of said fenestrations being covered on the upper surface of the drape by a closure member comprising a thin flexible piece of polymeric film having upper and lower surfces, said closure members having adhered to their exposed lower surfces a coating of pressure sensitive adhesive, each of said adhesive coatings being protected, prior to use of the drape, by a removably adhered release covering; said main sheet having secured to its upper surface at least one retainer member made from a generally flexible material and comprising an elongated, open-ended conduit through which flexible

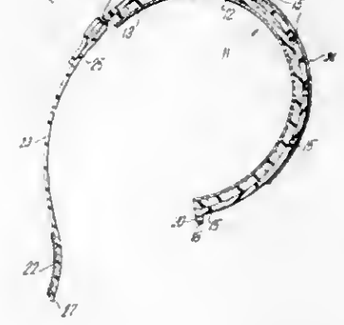


elements such as suction tubing and the like may be threaded and thereby retained in desired position on the drape.

4,027,666
SEMIRIGID COUNTERFORCE BRACE

Alvin J. Marx, 315 College Road, Bronx, N.Y. 10471

Filed Sept. 26, 1975, Ser. No. 617,144
Int. Cl.² A61F 13/00
U.S. Cl. 128—165 6 Claims

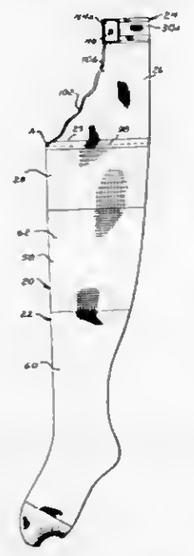


1. A counterforce brace adapted for application over a subject's forearm entirely below the elbow comprising semirigid curved backer sheet means having a plurality of perspiration eliminating apertures therein, the width of said backer sheet means being less than its length in the forearm circumferential direction, said circumferential length being the greater part of a subject's forearm circumference, a porous perspiration passing inner strip disposed about the inner surface of said backer sheet means, slot means formed within said backer sheet means at one end thereof, strap means attached to said semirigid curved backer sheet at said slot means at said one end of said backer sheet means, loop means integrally formed within said semirigid backer sheet means about the outer surface thereof near the other end of said semirigid backer sheet means, said loop being adapted to receive the other end of said strap means, and brace securing means comprising mating first and second portions, said first portion of said brace securing means being affixed to the outer surface of said strap means about the end thereof remote from said slot means and the second portion of said brace securing means being secured to the outer surface of said semirigid backer sheet means.

4,027,667
THERAPEUTIC STOCKING

Roger T. Swallow, Crystal Lake, Ill., and John E. Pendergrass, Seneca, S.C., assignors to The Kendall Company, Boston, Mass.

Filed July 3, 1975, Ser. No. 593,159
Int. Cl.² A61F *13/00, 13/06*
U.S. Cl. 128—165 **17 Claims**

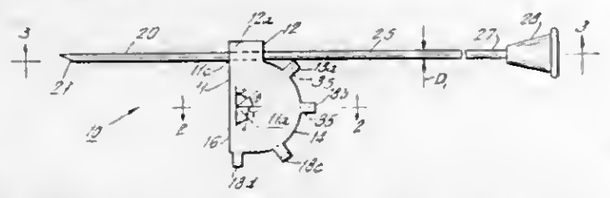


1. A therapeutic stocking, comprising: a circumferentially elastic boot portion having an upper thigh panel for exerting a desired compressive pressure against the upper thigh of a wearer's leg, said upper thigh panel having a limited vertical stretch for accurate placement of the upper thigh panel on the wearer's upper thigh, waist support means, and a hip panel extending between the support means and said upper thigh panel along the side of the wearer's hip, said hip panel being vertically stretchable between the support means and upper thigh panel to permit placement of the support means on the wearer's waist a variable distance from the upper thigh while the upper thigh panel remains at its proper position on the wearer's upper thigh.

4,027,668
MULTI-ANGLE U-SHAPED HUB FOR INFUSION MEMBER

Allan R. Dunn, 1160 Kane Concourse, Miami Beach, Fla. 33154

Filed Dec. 10, 1975, Ser. No. 639,411
Int. Cl.² A61M *5/00, 25/02*
U.S. Cl. 128—214 R **16 Claims**



1. A hub for use with an infusion combination including a flexible infusion tube having a first end in fluid-flow connection with hollow infusion means and having a second end including means for forming another fluid-flow connection to an infusion supply, said hub comprising:
a hub member having a generally semicircular shape and having a protrusion radially extended away from its curved periphery;
a first portion of said flexible tube being secured through said hub protrusion;
clip means integrally jointed to said hub member and positioned along its curved periphery at a location spaced from said hub protrusion for selectively receiving a second portion of said flexible tube intermediate said first portion and said second end to selectively maintain the axis of said flexible tube at a selected angular orientation relative to the axis of said hollow infusion means.

15. A styletto-catheter for use with medical infusion apparatus, comprising: a single lumen flexible catheter having a distal end and a proximal end, said proximal end including means for forming a fluid-flow connection with said medical infusion apparatus; said catheter having a first secondary channel formed in a first thickened wall portion of said catheter; a first substantially rigid stylette having a sharpened distal end and a proximal end, said proximal end of said first stylette extending at an angle with respect to the axis of said first stylette; said first stylette being closely received for axial movement within said first secondary channel; said catheter having a recess adjacent to said proximal end of said first stylette and in communication with said first secondary channel to enable said proximal end of said stylette to move between first and second positions to enable said distal end of said first stylette to be respectively extended beyond and retracted into the bore of the first and secondary channel and means for preventing said stylette from being removed from said first secondary channel.

4,027,669
DESTRUCTIBLE LUER LOCK SYRINGE AND METHOD OF DESTRUCTING SAME

Donald Leroy Johnston, Arcadia; Manuel Garfield Perkins, Gardena, and Lynn Zaugg Youngberg, Long Beach, all of Calif., assignors to American Hospital Supply Corporation, Evanston, Ill.

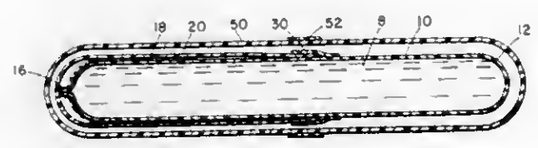
Filed Apr. 12, 1976, Ser. No. 676,232
Int. Cl.² A61M *5/00*
U.S. Cl. 128—218 N **18 Claims**

1. A destructible Luer lock syringe comprising: a barrel with a forward end; a needle adapter joined to the barrel's forward end, said adapter and forward end forming a unit having a fracturable section; and a laterally flexible needle retainer connected to the barrel and adapter combination, said needle retainer extending forwardly beyond the unit's fracturable section to a front end of the needle retainer, whereby the adapter and retainer can bend in a common lateral direction for fracturing this fracturable section.

4,027,670
CONTRACEPTIVE DEVICE

Emanuel H. Bronner, Box 28, Escondido, Calif. 92025

Filed Oct. 15, 1976, Ser. No. 732,800
Int. Cl.² A61M *31/00*
U.S. Cl. 128—261 **19 Claims**

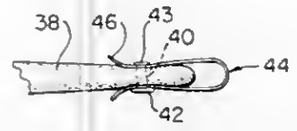


1. A contraceptive device, comprising,
a contraceptive gel having a pH of less than b 3.0;
a delicate elongated inside sausage casing containing the gel, and having a closed insertion end that will open to release the gel when the inside casing is squeezed;
a lubricant covering the inside casing at said insertion end;
a semi-sausage casing covering the lubricated insertion end of the inside casing for maintaining the lubricant in a lubricant state and at said insertion end, the semi-sausage casing having a closed end fitted over the inside casing near the longitudinal mid-portion of the inside casing; and
tear strip means having a first length removably attached to the semi-sausage casing near the open end of the semi-sausage casing and to the inside casing for hygenically sealing the lubricated insertion end of the inside casing and a second length attached to the semi-sausage casing to enable removal of the semi-sausage casing for exposing the lubricated insertion end of the inside sausage casing.

4,027,671
INSERTABLE DISPENSING CAPSULE

George S. Sperti, 1842 Madison Road, Cincinnati, Ohio 45206, and Norbert J. Berberich, Jr., 2550 Idlewild Road, Burlington, Ky. 41005

Continuation of Ser. No. 605,523, Aug. 18, 1975, abandoned, which is a continuation of Ser. No. 511,947, Oct. 4, 1974, abandoned, which is a continuation of Ser. No. 341,261, March 14, 1973, abandoned, which is a continuation of Ser. No. 82,742, Oct. 21, 1970, abandoned. This application June 18, 1976, Ser. No. 697,570
Int. Cl.² A61M *3/00;* **A61J** *3/07*
U.S. Cl. 128—272 **4 Claims**

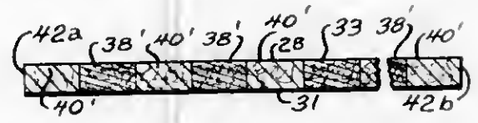


1. A one piece tapered tubular dispensing capsule of substantially uniform wall thickness and having a smaller body orifice fitting end portion and a larger operating reservoir end portion for holding a medicament therein said smaller end portion being elongated and adapted for providing a means for dispensing said medicament therefrom, said elongated end portion having a wall rigidity sufficient to be insertable through a selected body orfice, said larger end constituting a means for expelling medicament to said elongated end portion comprising a bulb portion having a rigidity less than the rigidity of said body orifice fitting end to be deformable in response to external pressure wherein the medicament contained therein will be forced out of said elongated end portion upon application of said pressure to said bulb portion.

4,027,672
ABSORBENT ARTICLE WITH IMPROVED PAD AND METHOD

Hamzeh Karami, Crystal Lake, Ill., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Dec. 29, 1975, Ser. No. 644,691
Int. Cl.² A61F *13/16;* **B32B** *5/12*
U.S. Cl. 128—284 **21 Claims**



1. An absorbent article comprising, an absorbent pad assembly having a backing sheet of fluid impervious material, a top sheet, and an absorbent pad located intermediate the backing and top sheets and comprising a mass of fibers, said pad having densified regions for transmitting liquid through the pad at relatively high rates and for supporting the pad when placed under loads, and relatively undensified areas adjacent said regions providing a relatively high liquid holding capacity for the pad, with said regions having a thickness approximately at least as large as the thickness of said areas.

4,027,673
DIGITALLY INSERTABLE TAMPON

Mark P. Poncy; Richard P. Poncy, and George W. Poncy, all of 3660 E. Indus. Way, Riviera Beach, Fla. 33404

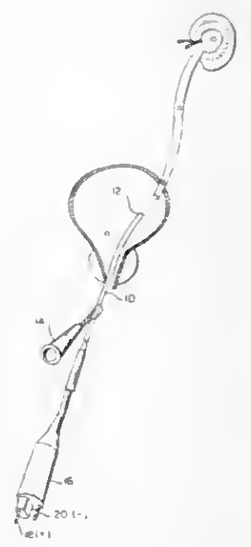
Filed Sept. 29, 1975, Ser. No. 617,497
Int. Cl.² A61F *13/20*
U.S. Cl. 128—285 **9 Claims**

1. A digitally insertable tampon comprising a generally cylindrically shaped member made of material adapted to absorb and store menstrual fluid being of a size and shape to function as a catamenial tampon, a cylindrical skirt attached to said cylinder extending from one end thereof to define an opening axially aligned with said cylinder, said opening being of a size and shape so that said skirt fits snugly around and surrounds a substantial portion of a human finger inserted fully into said opening and means for preventing menstral fluid from coming in contact with the inserted finger when the tampon in digitally inserted into the vagina comprising said skirt opening being of a sufficient depth for said skirt to cover a sufficient portion of said finger to avoid menstrual contact.

4,027,674
METHOD AND DEVICE FOR REMOVING CONCRETIONS WITHIN HUMAN DUCTS

Arthur N. Tessler, 566 First Ave., New York, N.Y. 10016; Gerd Lupke; Manfred Lupke, both of 221 Rayette Road, Concord, Ontario, Canada (L4K1C7), and Myron J. Tobias, 12 Dunsl mane Drive, Thornhill, Canada

Filed June 6, 1975, Ser. No. 584,672
Int. Cl.² A61B *17/22*
U.S. Cl. 128—328 **7 Claims**



1. Method for removing concretions within human ducts comprising:
A. generating a series of high voltage pulses of sufficiently low amperage to avoid harm to human tissues;
B. directing said pulses within an insulating medium extending into said ducts to the situs of said concretions; and

C. selectively discharging said pulses radially outwardly across the surface of said concretions; and

D. flowing a liquid peripherally of said discharging of pulses, so as to direct an hydroelectric impact against said concretions.

5. A device for removing concretions within human ducts comprising:

A. A flexible conduit of inert material extensible within said ducts to the situs of said concretions and including:

i. a flexible positive electrode extending coaxially within said conduit and being embedded in electrically insulative material; and

ii. a flexible negative electrode peripherally embedded in said conduit apart from said positive electrode and terminating at the outer end of said conduit, as a continuous electrically conductive surface encircling and coextensive with said positive electrode;

B. A liquid carrying outer annulus supported peripherally with respect to said flexible conduit of inert material, such that liquid may be delivered simultaneously and coextensively with said electrical discharges, as hydroelectric cavitation upon said concretions; and

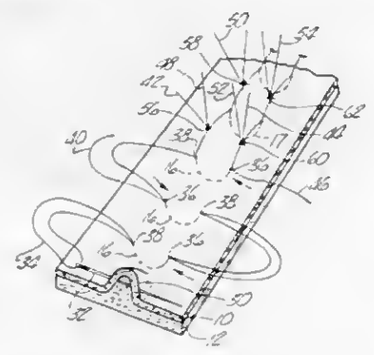
C. a high voltage, low amperage pulse generating apparatus operatively connected to said positive electrode such that electrical discharges radiate from said positive electrode outwardly to said encircling negative electrode across the surface of said concretions.

4,027,675

METHOD FOR IMPLANTING HAIR

Anthony S. Colone, 8580 Saratoga, Oak Park, Mich. 48237

Filed Oct. 17, 1975, Ser. No. 623,403
Int. Cl.² A61B 17/00
U.S. Cl. 128—330 **9 Claims**



1. A method of implanting hair in living skin which comprises the steps of:

a. inserting a plurality of lengths of hair into living skin by passing lengths of hair into the skin at an entry point, then into the subcutaneous layer, and then out of the skin at an exit point to form a plurality of stitches and leave at least one length of hair protruding from each said entry and exit point; and

b. tying knots close to the skin in a plurality of pairs of such hair lengths wherein each such knot joins a length of hair from one such stitch to a length of hair from a second such stitch.

4,027,676

COATED SUTURES

Frank V. Mattei, Piscataway, N.J., assignor to Ethicon, Inc., Somerville, N.J.

Filed Jan. 7, 1975, Ser. No. 539,122
Int. Cl.² A61L 17/00
U.S. Cl. 128—335.5 **17 Claims**

1. A finished multifilament absorbable surgical suture having improved tie down properties characterized in that the surface of the suture is coated with an absorbable composition providing in combination:

a. from about 10 to 50 percent by weight of an absorbable film forming polymer selected from the group consisting of homopolymers and copolymers of lactide and glycolide, copolymers of vinyl acetate with unsaturated carboxylic acids, water soluble or dispersible cellulose derivatives, natural gums, high molecular weight crystalline

ethylene oxide polymers, polyacrylamide, polyvinyl alcohol, polyvinyl pyrrolidone, gelatin, collagen, polyamino acids, and conjugated unsaturated triglycerides,

b. from about 20 to 60 percent by weight of an absorbable lubricant comprising a polyalkylene glycol having a molecular weight between about 5,000 and 200,000, and

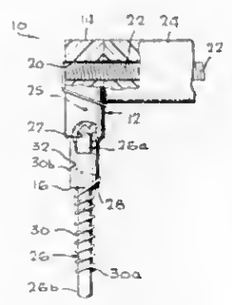
c. from about 10 to 40 percent by weight of an absorbable hydrophobic material selected from the group consisting of higher fatty acids and esters of higher fatty acids.

4,027,677

MYOCARDIAL LEAD

Joseph H. Schulman, Los Angeles, and Robert F. Moore, Oxnard, both of Calif., assignors to Pacesetter Systems, Inc., Sylmar, Calif.

Filed Jan. 9, 1976, Ser. No. 647,902
Int. Cl.² A61N 1/04
U.S. Cl. 128—418 **12 Claims**



1. A myocardial lead for applying pulses to the myocardium, comprising:

an electrode body of an electrically conductive metal, characterized by relatively high stress fatigue and corrosion resistance properties, said body defining a longitudinal axis and top and bottom ends, a first cavity extending through said body near the body top end and a second cavity extending partially into said body from the bottom end thereof;

an electrode stud of electrically conductive metal partially extending into said body through said second cavity, with the stud portion extending beyond the electrode body bottom end defining an electrode pin, said stud being mechanically and electrically attached to said body;

a distal wire formed of a plurality of wire coils of an electrically conductive flexible metal, surrounded by a flexible sleeve with electrical insulating properties, said wire coils extending from a first end, adapted to be connected to a source of electrical pulses, to a second end, the coils extending into said body through the first cavity thereof, with portions of said coils up to said second end extending from said first cavity and being wrapped around said body and in mechanical and electrical contact therewith; and

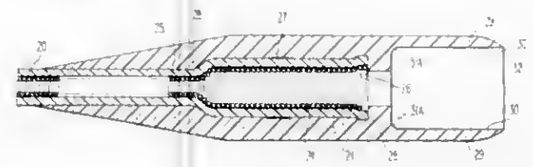
insulating means in contact with at least the electrode body portion around which said wire coils are wrapped for substantially electrically insulating the wire coils from said electrode pin, except through said body to which the coils and pin-forming stud are attached.

4,027,678

PACING SYSTEM WITH CONNECTOR FOR CONNECTING ELECTRODE TO PACER

Arie A. van Oostveen, Laag-Keppel, and Fred H. M. Wittkampf, Brummen, both of Netherlands, assignors to Vitatron Medical B.V., Dieren, Netherlands

Filed Nov. 19, 1975, Ser. No. 633,240
Int. Cl.² A61N 1/36
U.S. Cl. 128—419 P **6 Claims**



1. A connector adapted for connecting a pacer to an electrode, where said electrode has a proximal end with a conductor prong of predetermined diameter and a casing of predetermined geometry, said connector being adapted at its distal end to connect to said proximal electrode end and at its proximal end to a pacer terminal, said connector comprising:

a. an inner coil extending through the length of said connector, said coil having at a distal portion an inside diameter just smaller than said conductor prong predetermined diameter, said coil further having several end turns of slightly larger diameter at said distal end, whereby entry of said electrode prong into said coil is facilitated;

b. an inner casing surrounding said coil, said casing extending substantially the length of said connector;

c. an outer casing around said inner casing at said connector distal end, said outer casing having a portion extending axially distal of the end of said coil, said extending portion having an opening with geometry substantially matching said predetermined electrode casing geometry;

d. proximal end means at the proximal end of said connector for providing mechanical and electrical connection of said coil to a pacer terminal; and

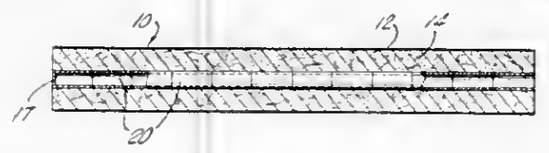
e. means for allowing rotation of said connector relative to said electrode in only one direction.

4,027,679

TOBACCO PRODUCT

Joseph Kaswan, 3092 14th St., Astoria, N.Y. 11102

Continuation-in-part of Ser. No. 534,478, Dec. 19, 1974, abandoned. This application Aug. 3, 1976, Ser. No. 711,218
Int. Cl.² A24D 1/00
U.S. Cl. 131—9 **5 Claims**



1. A cigarette which comprises

a. a thin walled, hollow smoke vector, of ceramic or metal construction, extending longitudinally substantially the length of and disposed concentrically therewith so as to be surrounded by tobacco,

b. said vector comprising a substantially impervious hollow and empty cylindrical member having a substantially impervious closed mouth end and an open front end,

c. said vector establishing the heat removal sequence during a draw by collecting draw heat at the point of convergence inside the vector, creating the highest possible temperature differential between the open end of the vector and free air outside the vector, and removing heat by high velocity convection currents,

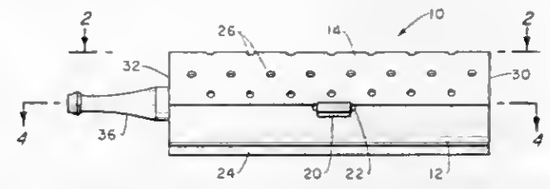
d. whereby the smoker draws in, during a puff, smoke comprising the products of the combustion of tobacco in systemic heat, below the formation temperatures of temperature dependant hazardous chemicals.

4,027,680

SAFETY CIGARETTE HOLDER AND ASH RETAINING DEVICE

Nicholas De Marco, 5011 Loyola St., Westminster, Calif. 92683

Filed Dec. 22, 1975, Ser. No. 643,503
Int. Cl.² A24D 1/12, 13/16
U.S. Cl. 131—175 **1 Claim**



1. A cigarette holding device comprising:

a first member and a second member, said second member being integrally hingedly connected to said first member, said second member being movable between a closed position and an open position, said closed position being with said first members and said second members cooperating together to form a closed chamber, said open position permitting access to said closed chamber;

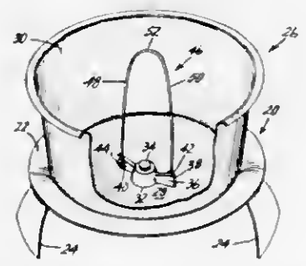
with said members in said closed position said members cooperating to form a forward end wall and a rear end wall, said forward end wall being closed, said rear end wall having a first opening therein, a cigarette supporting tip piece being mounted within said first opening, a cigarette being adapted to be placed within said tip piece and extend within said chamber in a cantilevered manner;

said first member being a solid unitary structure so as to function as a receptacle for the cigarette ash as the cigarette burns;

said second member having a plurality of openings therein to permit air to pass therethrough in order to facilitate burning of the cigarette; and

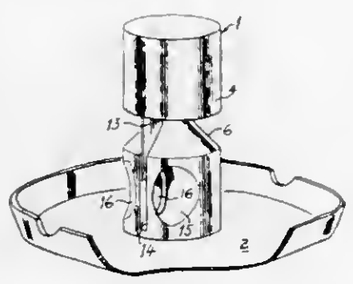
locking means interconnecting said first member and said second member when in the closed position so as to securely retain said first member and said second member in said closed position, said locking means includes a locking tab integrally formed upon said first member which is to connect with an enlarged bead on the said second member, said locking tab to biasingly engage said enlarged bead.

4,027,681
PIPE REAMER AND CAPTURE TRAY
Jackson D. Todd, 602 Berkley Drive, and Francis C. Yarger, 1107 Windsor Drive, both of Marion, Ind. 46952
Filed Oct. 28, 1975, Ser. No. 626,080
Int. Cl.² A24F 19/10
U.S. Cl. 131—232 1 Claim



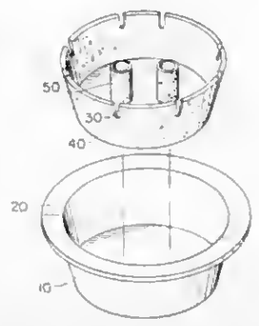
1. A pipe reamer-capture tray for cleaning a pipe bowl comprising:
a supportive tray having a bottom surface and upstanding peripheral walls for ash and dottle containment;
a single, unitary, elongated resilient loop element formed of relatively stiff wire having a pair of convexly curved side portions smoothly joined by an arcuate arch portion, said side portions having distal ends; said loop element lying in a loop-defined fixed plane; supporting means having said distal ends of said side portions secured thereto for supporting said element on said bottom surface of said tray in upstanding relationship therewith and in said loop-defined fixed plane whereby said side and arch portions resiliently conform to the inner surface of a pipe bowl for reaming the same upon insertion therein and application of downward rotative force thereon; and said supporting means comprises a member having said distal ends secured thereto, fastener means for securing said member to said bottom surface.

4,027,682
CIGARETTE EXTINGUISHING AND CIGAR CUTTING DEVICE
Victor Halmaghi, 6211 Charing St., San Diego, Calif. 92117
Filed Aug. 9, 1976, Ser. No. 712,435
Int. Cl.² A24F 13/24, 15/10
U.S. Cl. 131—233 2 Claims



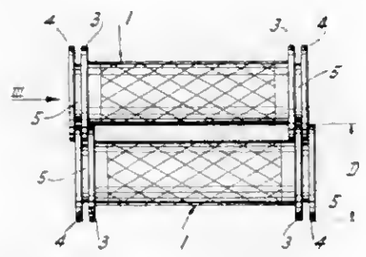
1. A cigarette extinguishing device which comprises:
a base;
a depressable stamper having a central cavity extending vertically from the bottom and a narrowed collar around the lower lip of the cavity;
a central shaft extending vertically from said base into said cavity having a flanged area around the top edge which has been force inserted past said narrow collar;
a coil spring in said cavity for holding said stamper apart from said base; and
a cigar cutter comprising:
a lateral section of the base having a generally horizontal hole, and a vertical slot having a slanted bottom perpendicularly intercepting said hole; and
a blade having a sharpened lower edge, fastened to the stamper and travelling into the slot.

4,027,683
DISPOSABLE ASHTRAY LINER AND MATING BOWL
J. Medley Lawbaugh, South Gate, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y.
Filed Nov. 28, 1975, Ser. No. 635,966
Int. Cl.² A24F 13/18, 19/14
U.S. Cl. 131—235 R 5 Claims



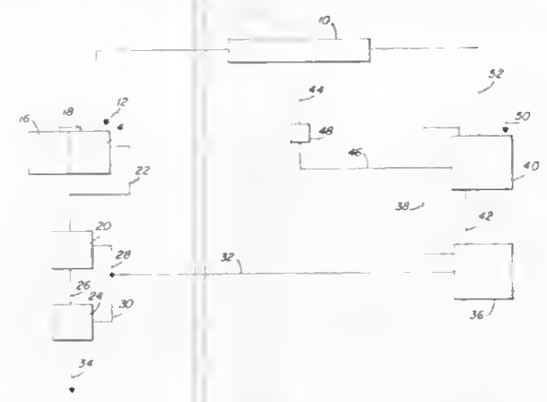
1. A disposable ashtray liner and mating bowl, comprising:
a bowl forming a lip on an upper edge,
a liner inserted in the bowl,
the liner forming a side that rises above the lip of the bowl forming a round bottomed slot, the bottom of the slot at the same level as the top of the tip,
the bottom of the liner forming a stub,
a cigarette snuffing insert attached to the stub, and the cigarette snuffing insert forming a hollow cylindrical depression in a top of the insert.

4,027,684
PERMANENT-WAVE OR WATER-WAVE CURLER
Siegfried Mueller, Max-Reger-Weg 3, 7737 Bad Buerrhelm, Germany
Filed Nov. 10, 1975, Ser. No. 630,258
Claims priority, application Germany, Mar. 15, 1975, 7438190; Jan. 18, 1975, 2501935
Int. Cl.² A45P 2/00
U.S. Cl. 132—40 10 Claims



1. In a permanent-wave or water-wave curler having an elongated cylindrical curler body with at least one holding body, said holding body being arranged at one end coaxially of the curler body axis, said holding body being greater in diameter than said curler body, the improvement comprising wherein said holding body has two axially spaced and radially extending flanges, said flanges having a resilient characteristic and substantially equal diameters to thereby define an annular groove therebetween, at least one of said flanges having a thickness slightly larger than said axial spacing between said two flanges, whereby when said one flange is inserted under force into a groove of an adjacent curler, said flanges on said adjacent curler will flex to permit entry of said one flange therebetween and effect a friction holding of said one flange against a rotation relative to said two flanges defining said groove.

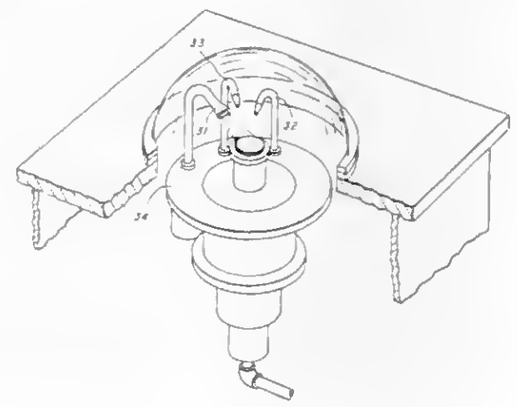
4,027,685
METHOD FOR PROCESSING USED EMULSION COOLANT
George E. Heard, Golden, and Thomas Buchanan McPherson, IV, Arvada, both of Colo., assignors to Coors Container Company, Golden, Colo.
Filed June 9, 1976, Ser. No. 694,283
Int. Cl.² C23G 1/02
U.S. Cl. 134—10 12 Claims



1. A method of recovering used oil and water emulsion coolant from can bodies in a can making process and processing the coolant to form reconstituted emulsion coolant comprising:
washing emulsion coolant adhering to can bodies off of the can bodies with an aqueous solution having a pH less than about 5.0 thereby forming a mixture of the emulsion coolant and the aqueous solution,
heating the mixture to an elevated temperature sufficient to break a substantial portion of the emulsion coolant into a predominately hydrocarbon phase and a predominately aqueous phase said elevated temperature being at least 100° F,
settling the predominately aqueous phase from the predominately hydrocarbon phase,
separating the predominately hydrocarbon phase from the predominately aqueous phase,
adding a sufficient amount of water to the predominately hydrocarbon phase to reconstitute the emulsion coolant,
adding a sufficient amount of an emulsifying agent to the predominately hydrocarbon phase and the water to emulsify the predominately hydrocarbon phase and the water, and
filtering the predominately hydrocarbon phase, the water and the emulsifying agent to form reconstituted emulsion coolant.

4,027,686
METHOD AND APPARATUS FOR CLEANING THE SURFACE OF A SEMICONDUCTOR SLICE WITH A LIQUID SPRAY OF DE-IONIZED WATER
Samuel R. Shortes, Plano, and Edwin Graham Millis, Dallas, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.
Filed Jan. 2, 1973, Ser. No. 320,400
Int. Cl.² B08B 3/00, 3/04
U.S. Cl. 134—33 8 Claims

1. An apparatus for cleaning the surface of a slice of semiconductor material, said apparatus comprising:
a member providing a surface on which a slice of semiconductor material to be cleaned is adapted to be placed,
means for imparting rotation to said member about an axis extending centrally through the slice-supporting surface thereof,
means for retaining the slice upon said slice-supporting surface of said member when rotary movement is imparted thereto,
means disposed in off-set relationsip to the level of said slice-supporting surface for dispensing a liquid spray onto the exposed surface of a slice positioned on said slice-supporting surface at a predetermined angular relationship with respect thereto,
said spray dispensing means including a spray nozzle disposed above the level of said slice-supporting surface, said nozzle having a spray-dispensing orifice therein so constructed as to produce a flat fan-shaped spray pattern for striking the exposed surface of a slice positioned on said slice-supporting surface with liquid spray along a linear path coinciding with the diameter of the slice, said nozzle being arranged in relation to the level of said slice-supporting surface to deliver the liquid spray at an angle lying within a range of 20° to 60° with respect to said slice-supporting surface.
a source of de-ionized water, said source of de-ionized water being operably connected to said nozzle such that de-ionized water is employed as the liquid spray to be dispensed from said nozzle onto the exposed surface of the semiconductor slice, and
control means for regulating the pressure and velocity of the liquid delivered by said nozzle against the exposed surface of the semiconductor slice supported on said slice-supporting surface to effect a cleaning operation thereon



removing particulate surface debris of a particle size smaller than the width of the theoretically determined dead space layer associated with the exposed slice surface.

5. A method of cleaning a surface of a slice of semiconductor material, said method comprising:
rotating the semiconductor slice about an axis extending through a central point thereof,
delivering de-ionized water as a liquid spray to a major surface of the semiconductor slice in a flat fan-shaped spray pattern striking the surface of the slice along a linear path coinciding with the diameter of the slice at a controlled pressure and velocity with the liquid spray striking the surface of the semiconductor slice at an angle lying within a range of 20° to 60° with respect thereto, and
regulating the pressure and velocity of the liquid spray within a predetermined range to produce a corona discharge in the region adjacent the surface of the semiconductor slice in response to the striking of the liquid spray against the surface of the semiconductor slice for effecting a cleaning action on the surface of the semiconductor slice removing particulate surface debris of a particle size smaller than the width of the dead space layer theoretically associated with the surface of the semiconductor slice.

4,027,687

PROTECTIVE AND/OR DECORATIVE COVER FOR WALKING AIDS

Malissa A. McGowan, 1502 E. 126th St., Compton, Calif. 90222

Filed Aug. 12, 1976, Ser. No. 713,671
Int. Cl.² B65D *65/08;* **A45B** *3/00*
U.S. Cl. 135—66 **8 Claims**

1. A protective and/or decorative cover for use with a walking aid which includes a load-supporting frame with a plurality of elongate angularly-related, intersecting leg, column and beam members, with one or more of said members having a free end, comprising:

a plurality of elongate, angularly-related intersecting tube portions in operative engagement, said tube portions being made from flexible material;

one or more of said tube portions being slidably engageable about said one or more members having a free end, substantially coextensive and in enclosing engagement therewith;

other tube portions being split longitudinally for substantial coextensive, enclosing engagement with others of said members, said split tube portions have opposed edge surfaces; and

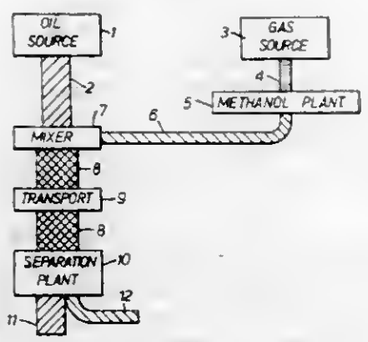
releasable, mating fastening means at said opposed edge surfaces extending substantially coextensive therewith for releasably securing said split tube portions about their related members in enclosing relationship.

4,027,688

TRANSPORTATION OF FOSSIL FUEL MATERIALS

Kurt Gruber, Monchengladbach; Willi Keim, Aachen-Walheim, and Klaus Hentschel, Aachen, all of Germany, assignors to Mannesmannrohren-Werke AG, Dusseldorf, Germany

Filed Jan. 22, 1975, Ser. No. 543,242
Claims priority, application Germany, Jan. 30, 1974, 2404326
Int. Cl.² F17D *1/16*
U.S. Cl. 137—13 **10 Claims**



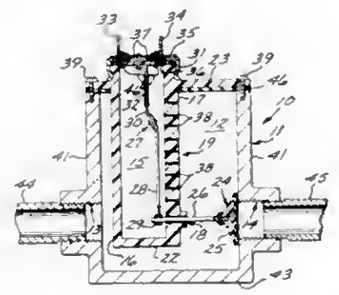
1. A process for the long-distance transport of fossil fuel material, in which a part of the fossil fuel material to be transported is converted into methanol before being transported, and is utilised as a transport medium in the fluid transport of the remainder of the material.

4,027,689

EXPLOSION RESISTANT ELECTRIC HEAT MOTOR GAS VALVE

Denis G. Wolfe, Santa Ana, Calif., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Apr. 21, 1976, Ser. No. 679,160
Int. Cl.² F16K *13/06*
U.S. Cl. 137—68 R **7 Claims**



1. A gas value assembly comprising:

a. a housing enclosing a valve chamber and having inlet and outlet ports defined therein through which a combustible fluid enters and leaves said chamber;

b. an explosion resistant structure forming a separate compartment within said chamber and through which an access aperture is defined;

c. closure means operatively associated with one of the aforesaid ports;

d. mechanical linkage means extending from within said compartment through said access aperture to said closure means;

e. heat sensitive actuating means located within said compartment and connected to said mechanical linkage means, and

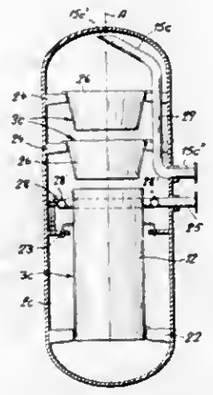
f. an electrical resistance coil located within said compartment and proximately positioned with respect to said heat sensitive actuating means.

4,027,690

GRAVITY-TYPE STEAM ACCUMULATOR

Georg Beckmann, Vienna, Austria, assignor to Siempelkamp Giesserei KG, Krefeld, Germany

Filed Aug. 14, 1975, Ser. No. 604,810
Claims priority, application Austria, Aug. 14, 1974, 6642/74
Int. Cl.² F22B *35/00*
U.S. Cl. 137—154 **1 Claim**



1. A steam accumulator comprising:

a vertically elongated vessel,

means for withdrawing steam from the upper end of said vessel;

a guide in said vessel subdividing same into a central downflow column and an annular upflow column surrounding said downflow column, said downflow column being of greater hydraulic diameter than said upflow column, said guide including at least one generally frustoconical downwardly tapered tube in said vessel; and

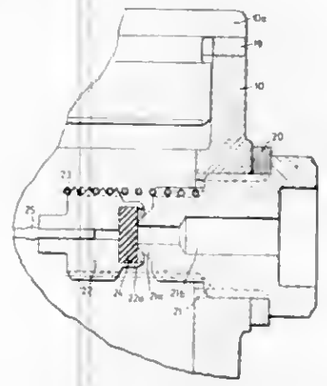
a plurality of upwardly directed nozzles in said vessel outside said guide in said upflow column, and means for spraying water under pressure from said nozzles.

4,027,691

DEVICE FOR VENTING AND AERATING CLOSED CIRCULATORY WATER FLOW SYSTEMS

Franciscus Roffelsen, NL Helmond, Netherlands, assignor to N.V. Spiro Research, Helmond, Netherlands

Continuation-in-part of Ser. No. 526,314, Nov. 22, 1974, abandoned, which is a division of Ser. No. 321,970, Jan. 8, 1973. This application May 28, 1975, Ser. No. 581,662
Claims priority, application Germany, Jan. 8, 1972, 2200904
Int. Cl.² F16K *45/02*
U.S. Cl. 137—202 **7 Claims**



1. A vent valve for use in venting devices for closed water flow systems, wherein the valve is arranged on a vent casing which defines an air collecting chamber, said vent casing being connected to a horizontal conduit of the system and extending upwardly therefrom, said valve being capable of establishing communication between said chamber and the outside, the opening and closing of the valve being float-controlled in response to the water level in the casing, said valve consisting of an exteriorly threaded cylindrical valve body with an axially extending flow passage, a first axial extension on said valve body having a smaller diameter than the valve body proper, and having a plane end surface forming a valve seat surrounding said passage, an exteriorly threaded cylindrical closure body of the same diameter as said valve body and having a second axial extension of smaller diameter than said closure body and forming a plane end surface, and a spring engaging in the threads of said exteriorly threaded valve body and closure body and urging the plane end surface of said second extension against said valve seat in a rest position of said valve, said closure body being rotatable relative to said valve body whereby tension of said spring may be adjusted and operating limits of said valve may be preset, wherein said float being connected to said closure body at a point remote from said valve seat and wherein said axially extending flow passage of said valve is arranged to release collected gases outside of said vent casing when said valve is opened.

3. A valve for use in providing flow control of a fluid system, said valve consisting of:

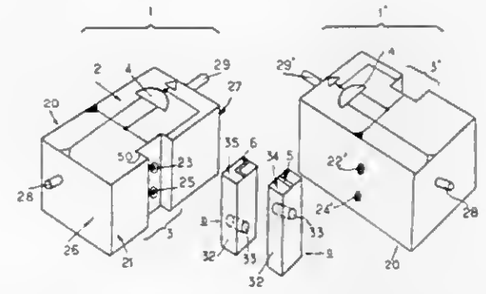
an exteriorly threaded cylindrical valve body with an axially extending flow passage, a first axial extension on said valve body having a smaller diameter than the valve body proper, and having a plane end surface forming a valve seat surrounding said passage, an exteriorly threaded cylindrical closure body of the same diameter as said valve body and having a second axial extension of smaller diameter than said closure body and forming a plane end surface, and a spring engging in the threads of said exteriorly threaded valve body and closure body and urging the plane end surface of said second extension against said valve set in a rest position, said closure body being rotatable relative to said valve body whereby tension on said spring may be adjusted and the operating limits of said valve may be preset.

4,027,692

SYSTEM ALLOWING THE REALIZATION OF LOGIC CIRCUITS BY JUXTAPOSITION OF PNEUMATIC ELEMENTS

Daniel Boutelle, Marnes la Coquette; Pierre Hardouin, Asnieres, and Andre Thomasse, Cocherel, all of France, assignors to La Telemecanique Electrique, France

Filed Mar. 17, 1975, Ser. No. 559,356
Claims priority, application France, Apr. 1, 1974, 74.11546
Int. Cl.² F15C *3/00;* **F16K** *37/00*
U.S. Cl. 137—270 **6 Claims**



1. An assembly of fluid logic circuit module means comprising, in combination:

i. a first fluid logic circuit module means

ii. a second fluid logic circuit module means, each said module means having a first face, a parallel second face, and a graphic symbol representing the module function, said module means being disposed with their first and second faces parallel, said module means defining between them a recess into which there open fluid passages in the module means,

iii. a selecting unit disposed in said recess and cooperating with said module means, said selecting unit including:

a. at least one connecting channel

b. a graphic symbol on a face of the unit, said selecting unit and said recess being shaped and dimensioned such that said selecting unit may adopt each of two positions in said recess, in each of which positions the connecting channel connects fluid passages of the module means in a respective manner, and in each of which positions the graphic symbol of the unit is presented adjacent the graphic symbol of the module means to indicate the manner of connection of the passages.

4,027,693

FLOAT CONTROLLED VALVES

Martin C. Thompson, Maidstone, England, assignor to Reed International Limited, London, England

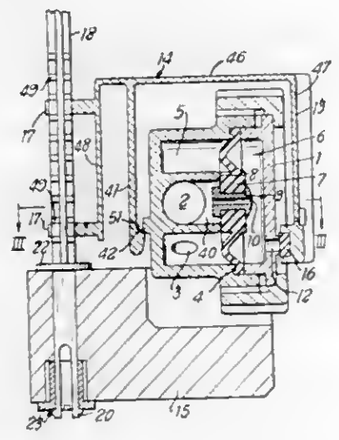
Filed Apr. 25, 1975, Ser. No. 571,660
Int. Cl.² F16K *31/18*
U.S. Cl. 137—414 **5 Claims**

1. A float-controlled valve comprising:

a valve housing defining inlet and outlet ports,

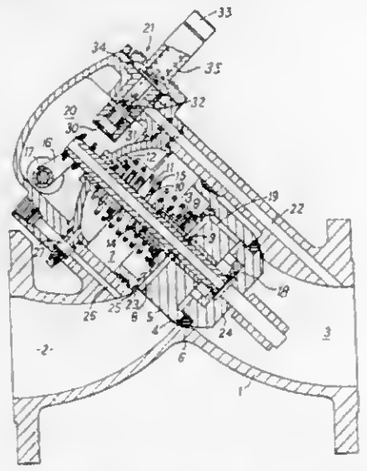
a flexible diaphragm supported in said housing and dividing said housing into an inlet chamber and a back-pressure

chamber which communicate with each other through a small port,
a valve member carried by said diaphragm for selectively permitting flow between said inlet and outlet ports,
a pilot valve controlling an outlet port in said back-pressure chamber,



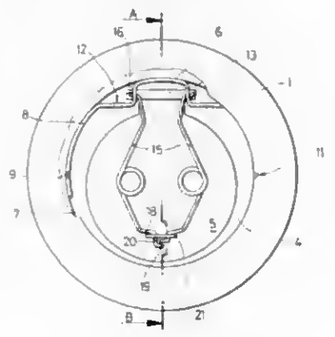
a shroud member of generally semi-cylindrical configuration covering said housing and being pivotally mounted,
and an actuating lever extending generally parallel to the axis of said shroud member and supporting a float,
said pilot valve also being supported on said shroud member substantially diametrically opposite said actuating lever.

4,027,694
CONTROL VALVE
Alan George Butcher, Bracknell, England, assignor to Dresser Europe S. A., Brussels, Belgium
Filed Sept. 30, 1974, Ser. No. 510,864
Claims priority, application United Kingdom, Oct. 4, 1973, 46503/73
Int. Cl.² F16K *31/143*
U.S. Cl. 137—495 **4 Claims**



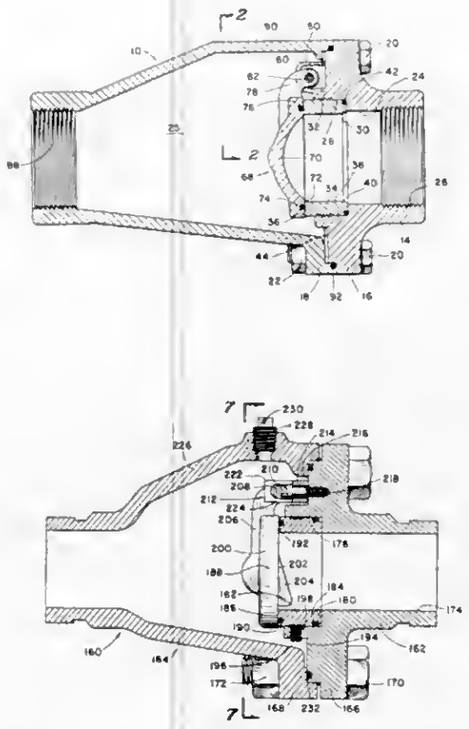
1. A pilot-operated fluid control valve comprising:
a valve body having a main flow passage therethrough with a main valve seat therein dividing said flow passage into upstream and downstream portions, said valve body further having a control chamber therein connected by a first passage to said upstream side of said flow passage, and a reservoir chamber separated from said control chamber and connected by a second passage to said downstream side of said flow passage;
main valve means sealed within said control chamber, subject to fluid pressure within said control chamber and movably fitted against said valve seat for seating in said valve seat and separating the upstream and downstream portions in response to pressure in said control chamber, whereby said valve is opened and closed, said main valve means having a third passage therethrough connecting said upstream side of said flow stream to said control chamber;
control rod means fitted through said main valve means and through said third passage therein for moving said main valve means toward and away from said valve set, said control rod means having a longitudinal opening therethrough for forming a fourth passage between said third passage connected to said control chamber and said reservoir chamber;
first control valve means operatively connected to said control rod means and positioned in said third passage for controlling fluid flow through said third passage in response to movement of said control rod means, whereby when said control rod means is positioned to open said main valve means said first control valve means closes said third passage;
second control valve means operatively positioned at the end of said fourth passage through said control rod means adjacent said main valve means for controlling fluid flow through said fourth passage in response to movement of said control rod means, whereby when said main valve means is open said second control valve means is open and fluid entering said control chamber through said first passage may flow from said control chamber to said reservoir chamber through said third and fourth passages and out of said reservoir chamber through said second passage, thereby by-passing around said main valve means when said main valve means is open;
auxiliary control valve means in said second passage for controlling the fluid flow therethrough; and
mechanically operated valve means located in said first passage for controlling the amount of fluid flow through said first passage.

4,027,695
CHECK VALVE
Hans Schnatmeyer, Bremen, and Gerhard Schützer, Stuhr-Moordeich, both of Germany, assignors to Gustav F. Gerdts KG, Bremen, Germany
Filed May 10, 1976, Ser. No. 684,706
Claims priority, application Germany, July 4, 1975, 2529910
Int. Cl.² F16K *15/03*
U.S. Cl. 137—527 **8 Claims**



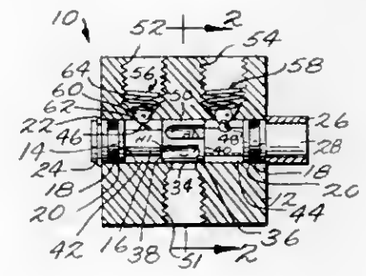
1. A check valve controlled by the medium passing through comprising:
a valve housing (1) having an inner surface defining an inlet channel (2) and discharge channel (4) communicative with said inlet channel and joined thereto by a radially inwardly directed shoulder which defines a valve seat (3), said discharge channel having a circumferential receiving groove (7) formed therein;
a locking member (5) disposed over the inlet channel and positioned interiorly thereof adjacent said valve seat and including means for pivotably mounting said locking member (6) for cooperative engagement with said valve seat; and
a generally C-chaped resilient mounting yoke (8) disposed substantially within said receiving groove of said discharge channel and in biased engagement therewith, said yoke extending over an annular arc of more than 180°, and having two radially-inwardly extending bend portions (12) formed therein adjacent its central portion which define two opposed shank segments (13), said shank segments having lateral recesses (14) formed therein for receiving the pivotable mounting means of said locking member.

4,027,696
CHECK VALVE
Glen B. Guyton, 3401 E. Newton, Tulsa, Okla. 74115
Division of Ser. No. 415,742, Nov. 14, 1973, Pat. No. 3,934,608. This application May 21, 1975, Ser. No. 579,469
Int. Cl.² F16K *15/03*
U.S. Cl. 137—527.4 **1 Claim**



1. A check valve comprising a first housing member having an inlet port, a second housing member removably secured to said first housing and having an outlet port in substantial longitudinal alignment with the inlet port, a sleeve member removably secured in said first housing member in alignment with the inlet port and having one end thereof extending into the second housing member for providing a valve seat, hanger means removably secured to the first housing member, clapper means removably secured to the hanger means and pivotal in directions toward and away from the valve seat to provide alternate closed and open positions for the valve, and compensating means provided on said hanger means for constantly urging the clapper means in a direction toward the valve seat in a manner to compensate for substantially any dimensional variances in the clapper member and valve seat, and wherein the hanger means comprises bar means removably secured to the first housing member, outwardly extending boss means provided on said bar means and having aligned elongated apertures provided therein for receiving the clapper means, said apertures being angularly disposed with a slope in the direction toward the valve seat to provide said compensation means for compensation of dimensional variances.

4,027,697
ROTARY VALVE
Roland W. Bonney, R.F.D. No. 1, Box 65, Kennebunkport, Maine 04046
Filed Nov. 19, 1975, Ser. No. 633,559
Int. Cl.² F16K *11/00*
U.S. Cl. 137—596 **2 Claims**



1. A rotary valve, comprising:
a housing having means defining a throughbore;
a valve body member rotatably received in the throughbore;
an operating handle secured on and forming part of the valve body member axially beyond the throughbore;
retaining means acting between the valve body member and the housing to prevent substantial axial movement of the valve body member;
a spool defined on the valve body member at an axially intermediate portion of the valve body member;
four axially extending grooves in the spool, equally spaced angularly of the outer periphery of the spool, one diametrically opposed pair of the grooves being of equal area, communicating with one end of the spool and terminating short of the opposite end of the spool and the other diametrically opposed pair of the grooves being of equal area, communicating with the opposite end of the spool and terminating short of the one end of the spool;
two respective circumferential seal ring means sealing between the valve body member and the housing throughbore distally of the one end of the spool and distally of the other end of the spool;
at least one of the valve body member and the housing being circumferentially relieved within the throughbore at two sites, one between said sealing ring means and said one end of the spool, and another between said sealing ring means and said other end of the spool to provide a first and a second respective chambers;
an inlet passage communicating with the spool through the housing intermediate the axial extent of the spool;
an outlet passage communicating with the spool through the housing intermediate the axial extent of the spool at a site disposed about one-quarter of the way angularly of the spool from where the inlet passage communicates with the spool;
a first auxiliary passage communicating with the first chamber through the housing; and
a second auxiliary passage communicating with the second chamber through the housing;
a normally closed check valve interposed in the first auxiliary passage, said check valve disposed to open away from the first chamber;
a cam mounted on the valve body member and disposed to forcibly open the check valve when the valve body member is rotated to a respective angular position;
a stop provided on the valve body member;
two stops provided on the housing for engagement by said valve body member stop when the operating handle is rotated in two respectively angularly opposed senses, to limit rotation of the valve body member to substantially a quarter turn, the stops defining the clockwise and counterclockwise extremes of rotation, and a neutral position being defined angularly centrally of these two extremes;
a second normally closed check valve interposed in the

second auxiliary passage, said check valve disposed to open away from the first chamber;

a cam mounted on the valve body member and disposed to forcibly open the second check valve when the valve body member is rotated to a second respective angular position;

the two stops on the housing being so positioned that when the handle is rotated to one angular extreme, the first-described check valve is held forced open by its associated cam and the second check valve is undisturbed by its associated cam, when the handle is rotated to the opposite angular extreme, the second check valve is held forced open by its associated cam and the first-described check valve is undisturbed by its associated cam, and when the handle is rotated to its neutral position, neither cam disturbs its associated check valve;

the stops on the housing are so arranged relative to the grooves on the spool that when the handle is rotated to its neutral position the inlet passage of the housing is communicated to one groove of each of said pairs;

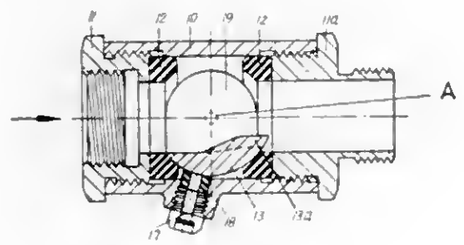
the following tabulation summarizing operation of the valve when the operating handle is in each of said three positions thereof:

a. when the handle is in the neutral position thereof:
one groove of said one pair connects the inlet passage with the outlet passage and connects the inlet passage with the other groove of said one pair;
one groove of said other pair connects the inlet passage with said second chamber and with the other groove of said other pair;
the other groove of said one pair connects with said first chamber;
the other groove of said other pair connects said second chamber with said outlet passage; neither cam is forcing open a check valve, whereby fluid flow in at the inlet passage is divided, part passing from said one groove of said one pair to said outlet passage, and the remainder passing from said one groove of said other pair to said second chamber and to said other groove of said other pair then to said outlet passage;

b. when the handle is rotated 45° clockwise from said neutral position thereof:
said one groove of said one pair connects said inlet passage with said first chamber;
said one groove of said other pair connects with said second chamber;
said other groove of said one pair connects with said first chamber;
said other groove of said other pair connects said second chamber with said outlet passage;
said first cam is inactive;
said second cam is forcing said second check valve to remain open,
whereby, fluid pressure may open said first check valve and permit flow from said inlet passage, through said one groove of said one pair, through said first chamber, through said first check valve and into said first additional passage, and said second additional passage and said other groove of said other passage and said other groove of said other pair may drain through said second check valve, through said second chamber and through said other groove of said other pair, to said outlet passage; and

c. when the handle is rotated 45° counterclockwise from said neutral position thereof:
said one groove of said one pair connects said first chamber with said outlet passage;
said one groove of said other pair connects said inlet passage with said second chamber;
said other groove of said one pair connects with said first chamber;
said other groove of said other pair connects with said second chamber;
said first cam is forcing said first check valve to remain open;
said second cam is inactive,
whereby, said first additional passage and said other groove of said one pair may drain through said first check valve, through said first chamber and through said one groove of said one pair to said outlet passage, and fluid pressure may open said second check valve and permit flow from said inlet passage, through said one groove of said other pair, through said second chamber, through said second check valve and into said second additional passage.

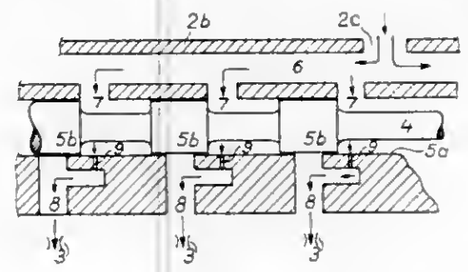
4,027,698
VALVE WITH GENERALLY SPHERICAL CLOSURE MEMBER
Karl Weinhold, Im Jagdfeld 43, 4040 Neuss, Germany
Filed Jan. 6, 1975, Ser. No. 539,152
Claims priority, application Germany, Jan. 12, 1974, 2401459; May 30, 1974, 2426065
Int. Cl.² F16K *11/02*
U.S. Cl. 137—625.22 **14 Claims**



1. A valve including:
an inlet for letting fluid into the valve;
an outlet for letting fluid out of the valve;
a housing connecting the inlet to the outlet;
a plug for selectively closing the inlet, said plug having a portion with a convex spherical surface area thereon and rotating about an axis extending through said housing between an open and closed position, wherein said axis passes through the center of curvature of said spherical surface;
means for defining at least one concave spherical sealing surface within said housing, wherein said convex spherical surface has the same center of curvature, as said convex spherical surface area of said plug, and wherein said concave and convex spherical surfaces cooperate to close said inlet, when said plug is rotated to said closed position;
a U-shaped cut-out extending through said plug, and defining an opening adjacent to said convex spherical surface for registering said inlet with outlet, when said plug is rotated to said open position, said U-shaped cut-out extending radially with respect to said axis;
a vent opening for venting said outlet and extending through said housing, said opening having a sealing sleeve therein with an entry surface thereon having a concave spherical surface which conforms to and engages the convex spherical surface of the plug, when the plug is in the open position;
said convex spherical surface area of said plug being sufficiently large to said inlet opening, when said plug is rotated to the closed position and sufficiently limited to uncover said vent when said plug is rotated to the closed position; and
a projection extending up from the bottom of the "U-shaped" cut-out, wherein said projection has a groove therein extending normal to the axis of rotation of the plug, said groove registering with said vent opening, and said projection engaging the concave entry of said sleeve.

positioned in said opening, when said convex spherical surface closes said inlet opening.

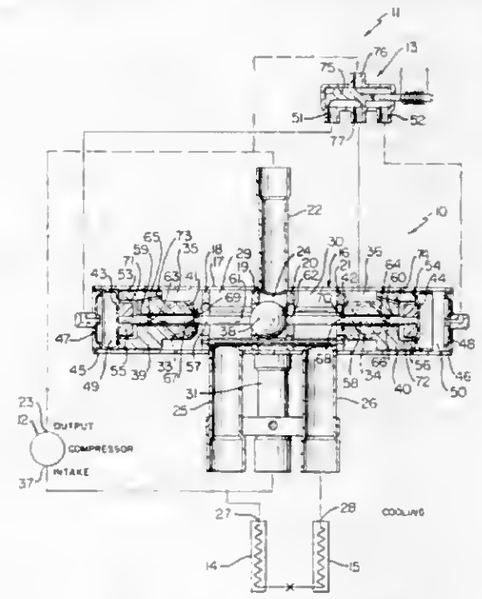
4,027,699
FLUID DISTRIBUTION VALVE
Leif Andersson, and Ritindar Singh, both of Finspong, Sweden, assignors to Stal-Laval Turbin AB, Finspong, Sweden
Filed Sept. 29, 1975, Ser. No. 617,558
Claims priority, application Sweden, Oct. 2, 1974, 7412379
Int. Cl.² F16K *11/07*
U.S. Cl. 137—625.37 **4 Claims**



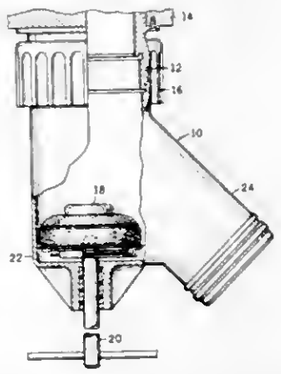
1. A fluid distribution valve for controlling fluid flow from a fluid source to a plurality of parallel fluid demand locations, comprising:
valve body means having at least one inlet for connection to said source and a corresponding plurality of parallel outlets, each of said parallel outlets being adapted for connection to one of said plurality of parallel fluid demand locations;
a corresponding plurality of valve elements selectively positionable within said valve body means to simultaneously open or close a corresponding plurality of parallel, large-flow fluid communication paths through said valve body between said at least one inlet and each of said plurality of parallel outlets; and
a corresponding plurality of parallel throttle by-passes located in said valve body, each one of said plurality of parallel throttle by-passes respectively connecting a corresponding one of said plurality of parallel outlets to said at least one inlet when said large flow communication paths are closed by said plurality of parallel valve elements;
whereby a maximum fluid flow is established to said plurality of parallel demand locations when said valve elements are in their open position; and a minimum flow, when said valve elements are in their closed position.

4,027,700
REVERSING VALVE CONSTRUCTION
Charles H. Perkins, Newtown Square, Pa., assignor to Robertshaw Controls Company, Richmond, Va.
Filed Apr. 1, 1976, Ser. No. 672,607
Int. Cl.² F16K *11/00*
U.S. Cl. 137—625.66 **7 Claims**

1. In a reversing valve construction having a housing means provided with a pair of valve seats and a pair of valve members for respectively opening and closing said valve seats, a single pneumatically operated movable part carried by said housing means and being operatively associated with said valve members for sequentially moving the same to their closed positions against their respective valve seats when said movable part is moved in one direction a certain amount, said movable part comprising a flexible diaphragm, said pair of valve seats being in aligned relation, said valve members being in aligned relation and each including a piston portion disposed in engagement with said flexible diaphragm, the improvement wherein said diaphragm causes relative movement between said piston portions to provide for said sequential closing of said valve seats.



4,027,701
AIRCRAFT LAVATORY DRAIN PLUG
Milton Donald Duckworth, Jr., 1316 Orchard Lakes, St. Louis, Mo. 63141
Continuation-in-part of Ser. No. 530,679, Dec. 9, 1974, Pat. No. 3,954,123. This application Dec. 29, 1975, Ser. No. 645,232
Int. Cl.² F16L *35/00*
U.S. Cl. 137—800 **1 Claim**



1. In combination with a valve of the type attachable to an aircraft alvatory drain port, the valve being generally tubular and axially alignable with the port and having a lateral outlet integratedly formed therewith, the valve including means for engaging a port plug to move the plug into and out of engagement with the port, the improvement comprising the port plug including:
a. a base plate;
b. a first cam mounted on the base plate in fixed relationship therewith;
c. radially expandable means connected for relative rotatable relationship with the first cam, the radially expandable means including:
i. a disc portion; and
ii. radial exanders pivotally mounted on the disc, each of the expanders including a radially inwardly facing peripheral surface being generally annular and having alternate curvilinear and rectilinear portions;

d. radially outwardly facing peripheral surface means on the first cam being generally annular and having alternate curvilinear and rectilinear portions for cooperating engagement with the alternative curvilinear and rectilinear portions, respectively, of the expanders, and, upon relative rotating motion between the first cam and the expandable means, for pivoting the expanders radially outwardly with respect to the disc portion due to engagement of the curvilinear and rectilinear portions of the cam with the rectilinear and curvilinear portions, respectively, of the expanders;

e. resilient seal means radially embracing the expanders and including an axially extended face for enclosing an airspace in axial relationship with the expanders; the resilient seal means including:

i. radially facing annular means mounted on the expanders for radial expansion therewith; and

ii. axially facing annular means integratedly formed with the radial facing means and maintained axially spaced from the expanders for enclosing an airspace therebetween and including a disc having at least one convolution concentric with and radially inwardly spaced from the radially facing annular means;

f. radially inwardly protruding lip means on the seal means formed with the radially facing annular means for securing the resilient seal means into engagement with the radially expandable means;

g. a second cam mounted on the base plate in relative rotatable relationship therewith; and

h. locking means mounted on the base plate for outward slidable radial extension thereof with respect to the base plate into locking engagement with the port upon rotation of the second cam.

4,027,702

LOOM REED

Frank C. Sherrill, Greensboro, N.C., assignor to The Ellison Company, Inc., Greensboro, N.C.

Filed Apr. 21, 1976, Ser. No. 678,969

Int. Cl.² D03D *49/62*

U.S. Cl. 139—192 **1 Claim**

1. An improved loom reed of the type having an upper and lower backing strip extending transversely in parallel relation across the width of a loom and secured in a loom by means of set screws which extend from the lay, impinge upon, and bring pressure to bear against the outer surface of the lower backing strip, said loom reed comprising:

a. a plurality of spaced, parallel dent wires extending vertically between said upper and lower transversely extending backing strips, the lower ends of said dents being secured in spaced relation by cementitious material;

b. at least the lower of said backing members comprising a U-shaped member having a pair of spaced upstanding legs intergrally formed with a vertically enthickened lower force absorbing portion;

c. said pair of spaced upstanding legs of said U-shaped member overlying and receiving the lower, cementitious material filled ends of said dent wires, and the upper surface of the lower, force absorbing portion of said U-shaped member abutting against the lower ends of said dents and the vertically enthickened portion providing a force absorbing surface against which said set screws impinge.

4,027,703

SHUTTLELESS WEAVING MACHINE, ESPECIALLY RIBBON LOOM

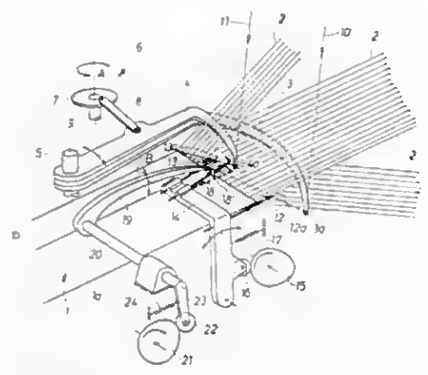
Ferdinand Diesner, Murg, Hanner, Baden, Germany, assignor to Jakob Muller, Forschungs-und Finanz AG, Frick, Switzerland

Filed Oct. 16, 1975, Ser. No. 623,074

Claims priority, application Switzerland, Oct. 16, 1974, 13884/74

Int. Cl.² D03D *47/42*

U.S. Cl. 139—431 **8 Claims**



1. A shuttleless weaving machine for weaving a fabric ribbon from weft threads and auxiliary threads, comprising at least one weft insertion element, at least one selvedge knitting needle having a hook, means for driving said selvedge knitting needle to-and-fro along a knitted selvedge edge of the fabric ribbon which is located opposite the weft insertion element for the formation of the knitted selvedge edge by knitting the inserted weft thread to the previously inserted weft thread or the auxiliary thread, a pivotable deflection element operatively associated with the selvedge knitting needle for controlled deflection of the weft thread or the weft thread and the auxiliary thread, into a knitting zone of the hook of the selvedge knitting needle, means for to-and-fro motion of the deflection element, an actuation element, means for driving the actuation element in cycle with the operation of said knitting needle and said deflection element so as to engage said deflection element for displacement thereof transversely with respect to the latter's direction of movement from a rest position into an operative position for acting on one of said threads or to deflect the latter into the knitting zone of the knitting needle hook.

4,027,704

METHOD AND DEVICE FOR DUMMY SHUTTLE OPERATION ON CONVENTIONAL SHUTTLE LOOMS

Bruno Romanin, Milan, Italy, assignor to Campagnie des Brevets et Applications Industrielles Etablissement, Liechtenstein

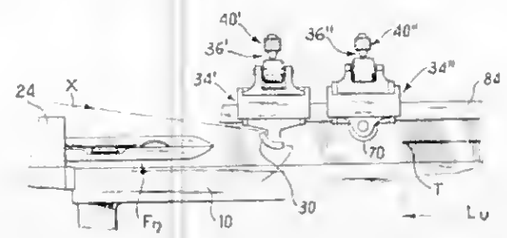
Continuation-in-part of Ser. No. 480,105, June 17, 1974, abandoned. This application Nov. 7, 1975, Ser. No. 630,026

Claims priority, application Italy, July 6, 1973, 26285/73; Mar. 25, 1974, 8408/74

Int. Cl.² D03D *47/24*

U.S. Cl. 139—438 **4 Claims**

1. A device for converting a shuttle loom, including a stationary supporting frame, a cyclically oscillatable slay mounted on the frame, slay oscillating means, a heald assembly cyclically opening sheds of the warp yarns, a weft yarn carring shuttle carried by the slay and reciprocable thereon in a shuttle path extending parallel to the axis of oscillation of the slay, and shuttle boxes and pickers at opposite ends of the slay for receiving the shuttle and reciprocating the shuttle through open sheds, into a dummy shuttle loom without modification of the operation of the shuttle loom in oscillating the slay, in operating the heald assembly, and in reciprocating a shuttle through open sheds by operation of the shuttle boxes and pickers, said device comprising, in combination, a dummy shuttle reciprocable along said slay, having a transverse dimension substantially equal to that of said first-mentioned shuttle and braking surfaces engageable with said shuttle boxes, operatively cooperable with said shuttle boxes and pickers, formed with a longitudinal groove to receive weft yarn guides, and provided, adjacent each end, with releasable weft yarn grippers operable to grip a weft yarn as said dummy shuttle enters the shed; respective gripper actuators mounted on said slay adjacent each end thereof and operable to actuate said grippers to release a weft yarn as said dummy shuttle exits from the shed; respective gripper actuator control means mounted on said stationary supporting frame in the paths of oscillation of said gripper actuators and directly engageable



with said gripper actuators, to actuate said grippers to release a weft yarn, responsive solely to oscillatory motion of said slay relative to said stationary frame and reciprocation of said dummy shuttle along said slay; respective mounting means mounting the gripper actuators adjacent each end of said slay, said mounting means being displaceable vertically relative to said slay; said control means comprising cam means operable to engage said mounting means during slay movement through a predetermined arc of its oscillatory motion in each direction; resilient means biasing each mounting means upwardly to an inoperative position of respective gripper actuator mounted thereon; a respective cam means engaging means articulated on each mounting means for operation by said cam means, to lower the associated mounting means, responsive to engagement of said cam means engaging means only when said slay is moving in one predetermined direction, said cam means engaging means, when engaged with said cam means during movement of said slay in the opposite direction, being displaced to an inoperative position.

4,027,705

STRAND-BRAKING APPARATUS

Petr Safar; Josef Langr; Miloslav Kolar, and Stanislav Nosek, all of Usti nad Orlici, Czechoslovakia, assignors to Vyzkumny Ustav Bavlnarsky, Usti nad Orlici, Czechoslovakia

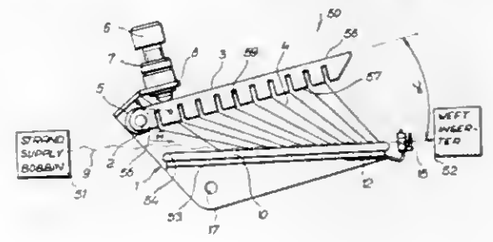
Filed Apr. 8, 1976, Ser. No. 675,183

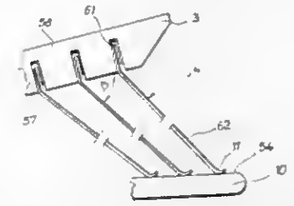
Claims priority, application Czechoslovakia, Apr. 16, 1975, 2617/75

Int. Cl.² D03D *47/34*

U.S. Cl. 139—450 **9 Claims**

1. In an apparatus for applying a braking force to a strand advanceable along a prescribed first path, a support frame, a guide plate carried by a lower portion of the frame and having an upper surface extending along the first direction adjacent the strand, an elongated holding member pivoted at one end to an upper portion of the frame, means for urging the holding member into a position oblique to the guide plate with the distance between the lower surface of the holding member and the upper surface of the guide plate increasing in the direction of advance of the strand, a plurality of resilient arms having upper ends individually supported by the holding member at longitudinally spaced intervals therealong, the successive resilient arms extending downwardly and forwardly toward the upper surface of the guide plate at progressively increasing angles to the holding member and terminable at their lower ends in substantial alignment with the upper surface of the guide plate to force the intervening portion of the





strand against the guide plate, and means for selectively pivoting the holding member downwardly toward the guide plate against the force of the urging means to vary the differential contact pressure of the successive resilient arms against the guide plate through the intervening strand.

4,027,706

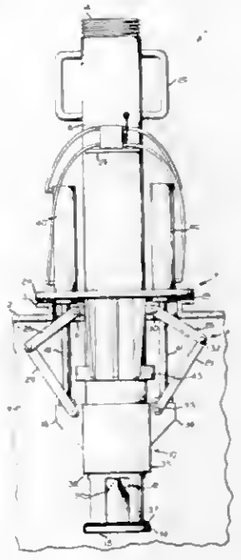
LIQUID DISPENSING AND VAPOR RECOVERY SYSTEM

James R. Stephens, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Nov. 13, 1975, Ser. No. 631,581

Int. Cl.² B65B *3/18*

U.S. Cl. 141—301 **7 Claims**



1. An apparatus for dispensing of liquids through an opening of a container, said apparatus comprising:

a. a tubular member having first and second ends, said second end being closed and having an aperture through a side wall of said tubular member;

b. a valve member slidably mounted on the exterior of a portion of said tubular member and axially movable thereon between a first position opening said aperture and a second position closing said aperture, said tubular

member portion and valve member being adapted to be received in a container for use;

c. a linkage arrangement carried by said tubular member and pivotally connected to said valve member for pivotal movement relative thereto;

d. first means carried by said tubular member and operably connected to said linkage arrangement and said valve member to selectively effect pivoting movement of said linkage arrangement relative to said valve member and movement of said valve member axially on said tubular member between said first and second positions, wherein movement of said linkage arrangement effects engagement between a portion of same and a portion of a container adjacent an opening therein when said valve member is in the first position; and

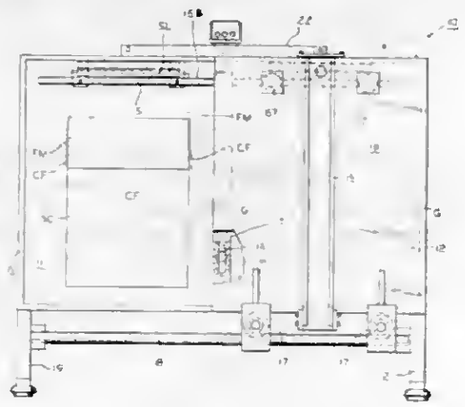
e. first seal means mounted on said tubular member and adapted to sealingly engage a portion of said container adjacent said opening when said link arrangement portion is in engagement with a portion of said container.

4,027,707

VACUUM CHAMBER STRUCTURE AND CONTROL SYSTEM THEREFOR

Richard N. Maskell, Bloomingdale, Ill., assignor to Cootainer Corporation of America, Chicago, Ill.

Filed May 14, 1976, Ser. No. 686,285
Int. Cl.² B65B *31/02*
U.S. Cl. 141—66 **7 Claims**



1. In a system for evacuating two side-by-side walled chambers, one of such chambers being arranged for evacuation while the other has the pressure therein restored to ambient pressure following reduction therein to a pressure less than ambient:

a. a pair of side-by-side walled evacuation chambers having a common wall therebetween;

b. a passageway with a port in said common wall and connected selectively to one or the other of said walled evacuation chambers;

c. a closure for a chamber and said port movable between positions where one or the other of said chambers and said port are connected;

d. circuit means operable upon movement of said closure to either closing position for connecting said port and its connected chamber to a source for reducing pressure in said connected chamber below ambient.

4,027,708

DISPENSING NOZZLE CONTROL SYSTEM

William B. Hansel, Media, Pa., assignor to Suntech, Inc., St. Davids, Pa.

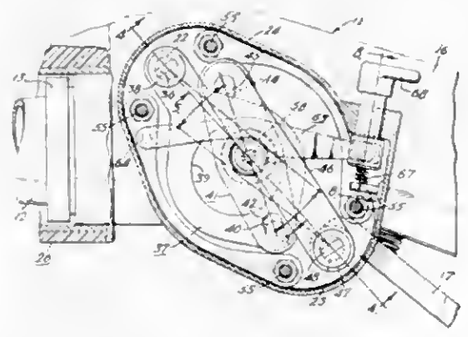
Filed Apr. 1, 1976, Ser. No. 672,580
Int. Cl.² B65B *1/36*
U.S. Cl. 141—209 **9 Claims**

1. In a dispensing nozzle for filling a tank with a liquid, and having,

a. a nozzle valve,

b. means for actuating the nozzle valve into an open or a closed position; and

c. automatic shut-off means, responsive to the liquid in the tank reaching a predetermined level, for placing the actuating means in a disabled condition wherein the nozzle valve cannot be actuated, said shut-off means having an enabling mode wherein the actuating means can actuate the nozzle valve and a disabling mode wherein the actuating means cannot actuate the nozzle valve;



an improvement for preventing the further dispensing of liquid by the nozzle once the tank liquid level has reached its predetermined level, said improvement comprising:

d. means, responsive to the automatic shut-off means obtaining its disabling mode, for maintaining the actuating means in the disabled condition so that the nozzle valve cannot be actuated by the actuating means; and

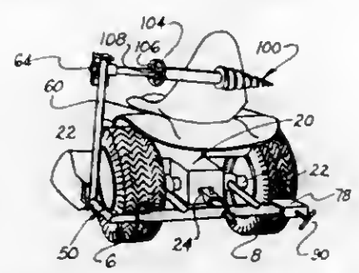
e. means for resetting the maintaining means to its normal position wherein further dispensing of liquid is permitted until the automatic shut-off means and the maintaining means is actuated again.

4,027,709

TRACTOR MOUNTED LOG SPLITTER

Russell H. Thackery, 2376 Brentwood Road, Columbus, Ohio 43209

Filed Apr. 19, 1976, Ser. No. 678,352
Int. Cl.² A47J *49/02*; **B27L** *7/00*
U.S. Cl. 144—193 R **14 Claims**



1. A tractor mounted log splitter comprising, in combination, a tractor comprising a tractor frame, driven wheels including hubs, wheel discs removably mounted on said hubs, and a plurality of fixed and removable threaded wheel fasteners on each of said hubs; a log splitting tool removably mounted on one of said wheels and including an inner mounting plate provided with mounting holes that register with said threaded wheel fasteners whereby said mounting plate can be removably mounted on said hub by said fixed threaded wheel fastenrs; and tractor lifting and support means comprising a transverse mounting portion removably mounted on the rear of said tractor frame, and a ground engaging portion extending downwardly from said mounting portion and forwardly to

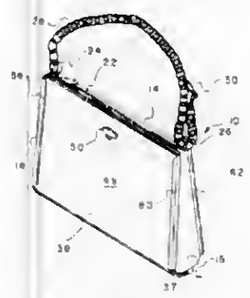
a position below the level of one of said tractor wheels and adjacent said log splitting tool.

4,027,710

CONVERTIBLE HANDBAG

EveLynne Marie Keebler, 11 Poplar Ave., Merchantville, N.J. 08109

Filed July 15, 1976, Ser. No. 705,527
Int. Cl.² A45C *3/06*
U.S. Cl. 150—28 A **5 Claims**



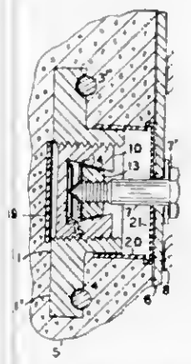
1. A handbag comprising a main body portion in the form of a bag, said main body portion including first and second substantially vertical side walls, first and second substantially vertical end walls and a bottom wall; at least one facing member, said facing member having one end secured to said bottom wall and being moveable between a first position wherein said facing member covers said first side wall and a second position wherein said facing member covers said second side wall, said facing member being of a size such that it covers only one of said side walls at a time and means for selectively securing said facing member to either one of said first and second side walls.

4,027,711

MEANS FOR MOUNTING CONCRETE STRUCTURAL MEMBERS

Natale J. Tummarello, 2073 Hillside Ave., Bellmore, N.Y. 11710

Continuation-in-part of Ser. No. 415,159, Nov. 12, 1973, abandoned. This application Apr. 23, 1976, Ser. No. 679,811
Int. Cl.² F16B *5/02*, *39/00*
U.S. Cl. 151—41.7 **4 Claims**



1. Means for fastening wall panels, structural concrete beams, girders, machinery and equivalent members to a supporting structure comprising,

an internally threaded hollow first member, said member being anchored to a member which is to be mounted on a supporting member with a self-locking bolt,

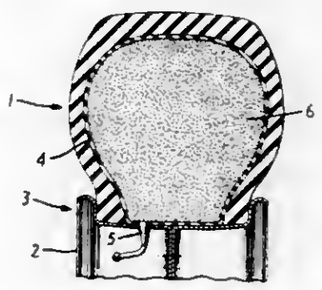
an externally threaded hollow member mounted in the threads of said first member, and being axially adjustable therein, said second member having opposed, substantially planar internal tapering surfaces defining a tapering hollow interior dovetailed keyway perpendicular to its axis, an internally threaded nut having opposed, substantially planar external tapering surfaces mounted in said tapering keyway, the degree of taper being the same on said nut and said keyway, the depth of the tapered extent of the hollow member beng greater than the; length of taper on the nut so that the nut will move near the bottom of hollow space and will be freely movable within the hollow member during adjustment therein, the width of the nut at the top of the taper being greater than the width of the taper at the top of the hollow member, so that the nut is held in the keyway when the bolt moves the nut in the axial direction, said tapering nut being movably mounted within said tapering hollow keyway throughout 360°, the nut being movable the length of the keyway, while the tapering hollow member with the keyway and the nut is threadedly moved in the anchored internally threaded hollow member to align the thread of the tapering nut with a hole of a structural supporting member through which the self-centering bolt passes and threadedly engages nut, the tapered walls of said hollow member having first substantially axially extending, straight thread-like striations thereon, said striations being relatively minute and being only on the upper three-quarters portion of said surfaces, second identical striations on the full tapering surfaces of said nut whereby said nut surfaces may interlock in the tapering striated surfaces of said hollow member as the bolt moves the nut up to locking tapering surfaces and interlocking striation, thus gaining the strength of the dovetailed keyway and stability through interlocking of the striations, and means for maintaining the nut in a desired position along the length of the keyway.

4,027,712

TIRE FILLED WITH LUBRICANT COATED CELLULAR PARTICLES

Henri Verdier, Beauregard-l'Eveque, France, assignor to Compagnie Generale des Etablissements Michelin, raison sociale Michelin & Cie, France

Division of Ser. No. 535,699, Dec. 23, 1974. This application June 6, 1975, Ser. No. 584,335
Claims priority, application France, Dec. 21, 1973, 73.46442
Int. Cl.² B60C *7/12*, *17/00*, *21/08*, *29/00*
U.S. Cl. 152—311 **10 Claims**

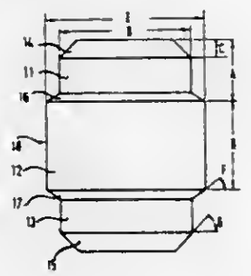


6. A tire mounted on a wheel rim so as to form a tire cavity having an inflation valve and a separate particle introducing orifice provided with a plug, said tire cavity being filled at least partially with solid lightweight discrete particles of cellular material having a very low apparent density of less than about 100g./dm³ but resistant to stresses due to travel, said particles bearing a lubricant which is inert with respect to the materials present in the tire cavity and being free to move relative to one another with low friction and low generation of heat when they have to cushion the tire after a puncture of the tire cavity and plug the puncture hole, said particles having been introduced into the tire cavity in an airstream by causing air pressure to act on a supply of said particles contained in an airtight enclosure connected by a tube to the particle introducing orifice of the tire cavity, the inflation valve of the tire cavity having been kept open during said operation.

4,027,713
LUBRICANT CONTAINER ASSEMBLY

Michael John Kenney, Erdington, England, assignor to Dunlop Limited, London, England

Filed June 13, 1975, Ser. No. 586,609
Claims priority, application United Kingdom, June 21, 1974, 27545/74
Int. Cl.² B60C 17/00
U.S. Cl. 152—330 L 14 Claims

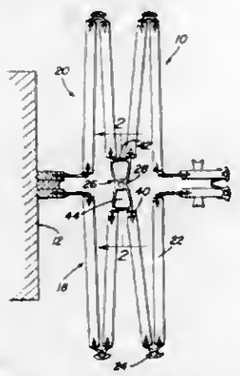


1. A device for a tire and wheel assembly for containing and releasing a lubricant, comprising:
a container having an orifice bounded by an edge;
a sealing member having a central resilient portion, at least partially of elastomeric material and which is in an interference fit in the orifice, the orifice being positioned to cause local deformation of the material of the central portion so that the sealing member is retained in the orifice by engagement of the edge of the orifice with the sealing member, the sealing member having at its end external to the container a projecting outer end portion of smaller cross-sectional dimensions than the orifice so that the central portion can be moved out of the orifice and into the container while part of the projecting portion remains outside the container, means on the end external to the container for holding away from the edge of the orifice the junction between the end and the central portion and the sealing member having at its end inside the container a further inner end portion of smaller cross-sectional dimensions than the orifice.

4,027,714
HINGE STRIP FOR DUAL WALL ACCORDION FOLDING DOOR

Guy E. Dixon, Miami; Thomas M. Dixon, Hollywood, and Russell I. Geyer, Jr., Miami, all of Fla., assignors to Panelfold Doors, Inc., Miami, Fla.

Filed May 18, 1973, Ser. No. 361,852
Int. Cl.² E06B 3/94
U.S. Cl. 160—84 R 11 Claims

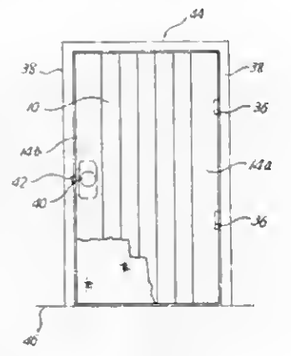


1. An accordion folding door including dual walls, each defined by a plurality of panels having edges pivotally connected together, means pivotally connecting certain adjacent panels of one wall to corresponding adjacent panels in the other wall thereby defining an inner hinge means connecting four panels together, said hinge means comprising a vertically continuous strip of material including a central body and four radiating flanges, said flanges being connected with the edges of the four panels, said strip and flanges constructed of resilient flexible material to enable relative pivotal movement of the panels and acoustically isolate the panels from each other and the walls of the dual wall door from each other, said flanges being oriented in adjacent pairs, a flexible web interconnecting the flanges of each pair in spaced relation to the central body thereby defining a vertically continuous void space between the pair of flanges for maintaining acoustical integrity of the strip.

4,027,715
DOOR

Tsuyoshi Tohma, Yamatotakada, Japan, assignor to Tohma Kohan Kabushiki Kaisha, Yamatotakada, Japan

Filed Nov. 21, 1975, Ser. No. 634,063
Claims priority, application Japan, Nov. 25, 1974, 49-136912; Aug. 30, 1975, 50-105334
Int. Cl.² E05D 3/48
U.S. Cl. 160—181 8 Claims

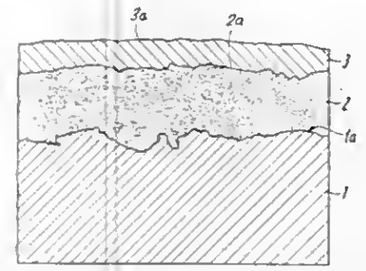


1. A door assembly comprising:
a. a pair of spaced, parallel, vertical posts;
b. a horizontal lintel and a spaced, parallel horizontal floor defining portion both of which extend between said posts; said lintel, said floor defining portion of said posts defining a door opening;
c. a door in said opening, said door including a tough, flexible, substantially non-elastic sheet and a plurality of vertical unit blocks fixed to one surface of said sheet and arranged in side-by-side relationship with each other, each of the unit blocks having a thickness substantially greater than the thickness of the flexible sheet:
d. said door having a first vertical door side closely adjacent to and parallel with one of said vertical posts and a second vertical door side closely adjacent to and parallel with the other of said vertical posts;
e. each of said unit blocks having vertical side surfaces the entireties of which are of a flat planar configuration, the side surfaces of adjacent unit blocks fully contacting each other when said door is in said closed position;
f. said unit blocks being arranged in a series, all of said unit blocks extending substantially the entire vertical length of said posts in parallel relationship therewith, a first unit block of said series being disposed immediately adjacent said one vertical post, one of said vertical side surfaces of said first unit block facing said one post and defining said first vertical door side, said door being fixedly connected with said one vertical post by connecting means, said connecting means being coupled with said door in the region of said first vertical door side;
g. said door being unconnected with said lintel and floor defining portion and being free to swing away therefrom during opening;
h. whereby said door may flex sideways toward said sheet to an open position while permitting each of the unit blocks to move out of contact with the side surface of each adjacent unit block, the door being retainable in its closed position by each of the unit blocks coming into intimate fitting contact with the side surface of each adjacent unit block to prevent the door from warping.

4,027,716
METHOD FOR PREPARING A CONTINUOUS CASTING BELT

Reiner Theobald, Frankfurt am Main, and Ulrich Heubner, Bad Homburg, both of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany and Schweizerische Aluminium AG, Zurich, Switzerland, part interest to each

Filed Mar. 7, 1975, Ser. No. 556,311
Claims priority, application Germany, Mar. 11, 1974, 2411448; May 6, 1974, 2421801
Int. Cl.² B22C 3/00; B22D 11/06
U.S. Cl. 164—19 8 Claims

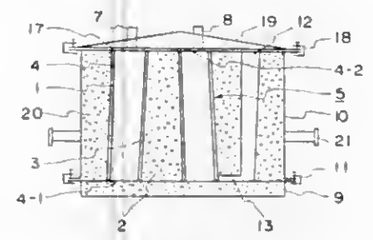


1. A method of making a pair of metal-casting belts for a continuous casting apparatus for use with a specific metal to be cast between them, comprising the steps of applying for each belt a heat-lagging layer on a belt substrate, and depositing at least one abrasion-resistant cover coating on said heat-lagging layer to form the casting-engaging surface of the belt, said cover coating consisting of at least one metal having a melting point in ° K at least equal to 0.7 times the melting point in ° K of the metal of the casting.

4,027,717
METHOD FOR FORMING A CASTING MOLD AND A FLEXIBLE PATTERN TO BE USED THEREFOR

Mitushi Mio, 4 - 2 Kamikamo, Sumoto, Hyogo, Japan

Filed Sept. 17, 1975, Ser. No. 614,155
Claims priority, application Japan, Oct. 7, 1974, 49-115761
Int. Cl.² B22C 9/00; B28B 7/32
U.S. Cl. 164—44 13 Claims



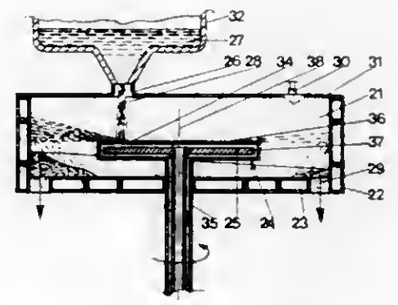
1. A method for forming a casting mold to be used for the manufacture of hollow metal castings, said method comprising:
forming a tubular, hollow outer flexible pattern member by providing plural plate members arranged generally in the configuration of a predesigned casting outer surface, and wrapping a flexible cloth member around exterior surfaces of said plate members and adhering said cloth member to said exterior surfaces of said plate members, thereby forming a tubular outer flexible pattern member having open opposite ends;
forming a tubular, hollow inner core mold from at least one rigid plate arranged generally in the configuration of a predesigned casting inner surface, thereby forming a tubular core mold having open opposite ends;
placing first ends of said flexible pattern member and said core mold on a mold bottom member, with said core mold within said flexible pattern member, and air-tightly sealing said first ends;
air-tightly sealing second ends of said flexible pattern member and said core mold, to form an enclosed space between said flexible pattern member and said core mold;
supplying fuid into said enclosed space to expand and form said flexible pattern member into precisely the configuration of said predesigned casting outer surface;
placing an outer mold around said flexible pattern member;
supplying mold forming material into a space between said outer mold and said flexible pattern member and into a space within said core mold, and allowing said mold forming material to substantially harden to form a casting mold;
removing said fluid from said enclosed space and allowing said flexible pattern member to contract inwardly from the casting mold; and
removing said flexible pattern member and said core mold from the casting mold without separation of said mold bottom member from said casting mold.

8. A pattern for forming a casting mold to be used for the manufacture of hollow metal castings, said pattern comprising:
a tubular, hollow outer flexible pattern member formed of a plurality of plate members arranged generally in the configuration of a predesigned casting outer surface, and a flexible cloth member wrapped around and adhered to exterior surfaces of said plate members;
a tubular, hollow inner core mold formed of at least one rigid plate arranged generally in the configuration of a predesigned casting inner surface;
said inner core mold being positioned within said flexible pattern member;
means closing opposite adjacent ends of said flexible pattern member and said inner core mold and forming an enclosed space therebetween; and
means for supplying a fluid into said enclosed space to expand and form said flexible pattern member into precisely the configuration of said predesigned casting outer surface, said flexible pattern member being capable of inward expansion upon release of said fluid from said enclosed space.

4,027,718
PROCESS FOR MANUFACTURING A REINFORCING MATERIAL FOR CONCRETE

Bengt G. S. Lundgren, Ulricehamn, Sweden, assignor to SKF Nova AB, Goteborg, Sweden

Filed Nov. 24, 1975, Ser. No. 634,341
Claims priority, application Sweden, Nov. 26, 1974, 7414809
Int. Cl.² B22D 23/08
U.S. Cl. 164—46 3 Claims



1. A process for manufacturing a reinforcing material for

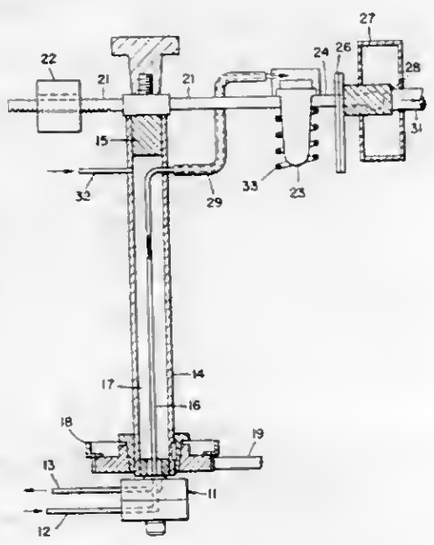
concrete, said material being a multitude of short and substantially straight steel reinforcing elements of substantially rectangular cross section and small thickness in relation to their length and width, intended to be uniformly distributed and in principle randomly orientated in the concrete, characterized by causing molten steel, which is of such a composition that rapid cooling of thin layers of the melt produces relatively flexible, difficult to crush films, to impinge upon at least one relatively cold metal surface of great cooling capacity, moving rapidly substantially across the direction of delivery of the molten steel, to form at least one discrete, relatively thin flake-shaped layer of molten steel on the metal surface, and causing the relatively thin layer to solidify on the metal surface with great cooling capacity, to form a relatively thin, flexible and difficult to crush steel flake with a relatively rough surface and shape tapering towards the end of the flake, and mutually adjusting the parameters which determine the dimensions of the steel flakes so as to give the flakes a thickness of at least about 0.1 mm and at most about 0.5 mm and a length of at least about 100 times the thickness.

4,027,719

ARGON BATH INDUCTION CASTING SYSTEM

Willy Strempel, Hamburg, Germany, assignor to Ultratek International, Inc., Concord, Calif.

Filed Mar. 24, 1976, Ser. No. 670,094
Int. Cl.² B22D *13/00*
U.S. Cl. 164—51 9 Claims



1. A method of metal casting, comprising the steps of providing a crucible secured to a centrifuge arm, and a metal flow channel extending therefrom to a porous mold spaced radially outwardly therefrom, supplying an inert gas to said crucible, applying a continuous vacuum to the exterior distal portions of said porous mold to draw said inert gas through said channel and said mold, heating a metal charge to a molten state in the inert gas bath in said crucible, and rotating said centrifuge arm to drive said metal into said mold, said vacuum removing any gas from the molten metal.

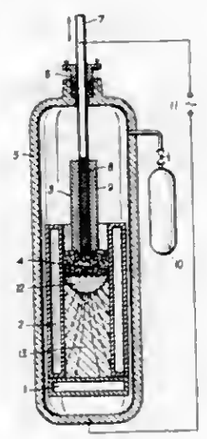
3. An apparatus for metal casting, comprising a centrifuge arm, a crucible secured to said arm, a porous mold secured to said arm and spaced radially outwardly from said crucible, a closed metal flow channel extending between said crucible and said mold, rotating means for rotating said centrifuge arm at high speed, gas delivery means for supplying an inert pressurized gas to said crucible, said metal flow channel, and said mold, and vacuum means for continuously applying a vacuum to the exterior distal portions of said mold.

4,027,720

METHOD OF PRODUCING HOMOGENOUS INGOTS OF HIGH-MELTING, NITROGEN-CONTAINING ALLOYS

Erwin Plöckinger; Otto Daghofer, both of Kapfenberg, Austria, and Farouk Barakat, Damaskus, Syria, assignors to Vereinigte Edelstahlwerke AG, Vienna, Austria

Filed Feb. 23, 1976, Ser. No. 660,233
Claims priority, application Austria, Feb. 25, 1975, 1404/75
Int. Cl.² B22D *7/00, 27/20*
U.S. Cl. 164—52 19 Claims



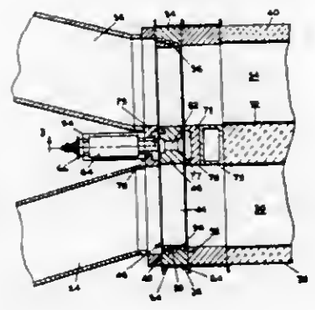
1. In a method of producing homogenous ingots of high-melting, nitrogen-containing alloys having nitrogen contents exceeding the solubility limit at atmospheric pressure by electric slag remelting under a pressure higher than atmospheric pressure, the improvement comprising employing a composite electrode having at least one core consisting essentially of a first nitrogen-containing alloy and a jacket consisting essentially of a second nitrogen-containing alloy, said first nitrogen-containing alloy having a nitrogen content differing from the nitrogen content of said second nitrogen-containing alloy in that one of these nitrogen contents is hgher than the nitrogen content of the ingot to be produced, while the nitrogen content of the respective other nitrogen-containing alloy is lower than that of the ingot to be produced.

4,027,721

ROTARY HEAT EXCHANGER WITH IMPROVED SEAL STRUCTURE

Charles B. Gentry, Grand Rapids, Mich., assignor to AGM Industries, Inc., Grand Rapids, Mich.

Division of Ser. No. 400,314, Sept. 24, 1973, Pat. No. 3,942,953. This application May 9, 1975, Ser. No. 576,214
Int. Cl.² F28D *19/00*
U.S. Cl. 165—9 6 Claims



1. In a rotary heat exchanger for recuperating heat from hot gases wherein a ceramic heat exchanger wheel having a plurality of passages extending axially therethrough is mounted for rotation about a central axis and a seal member surrounds said heat exchanger wheel in sealed relationship thereto, the improvement which comprises:

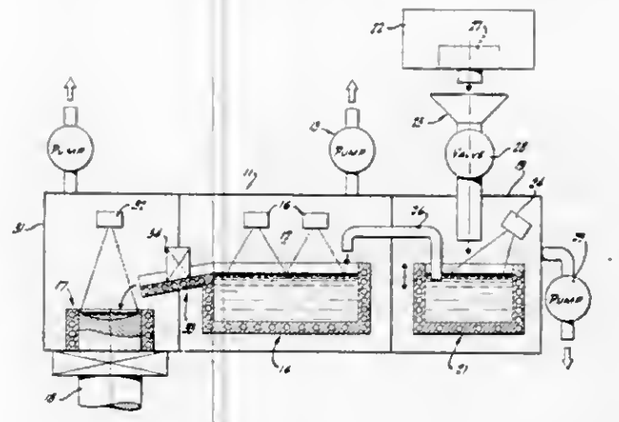
said heat exchanger wheel having an axially tapered circumferential surface which has said central axis of said heat exchanger as its center of rotation, and said seal member formed of a refractory material and including a tapered circumferential surface of said heat exchanger wheel, whereby a gap seal is formed between said complementary surfaces on said heat exchanger wheel and said seal member.

4,027,722

ELECTRON BEAM FURNACE

Charles d'A. Hunt, Larkspur, Calif., assignor to Airco, Inc., Montvale, N.J.

Continuation-in-part of Ser. No. 255,625, Feb. 1, 1963, abandoned. This application July 27, 1965, Ser. No. 477,357
Int. Cl.² B22D *11/10*
U.S. Cl. 164—64 15 Claims



1. A high vacuum furnace for treating metals and alloys comprising, an air tight enclosure including a receiving zone, a processing zone, and a casting zone, an air tight barrier wall separating each of said zones, a hearth within said processing zone for receiving molten material to be treated, electron beam beating means for heating the molten material in said processing zone, pump means for exhausting said processing zone to a low absolute pressure, means for introducing molten material into said receiving zone, a receptacle within said receiving zone for receiving the molten material, means for heating the material in said receptacle, pump means for exhausting said receiving zone to a low absolute pressure, a feed tube extending in sealed relation through said barrier between said receiving zone and said processing zone, one end of said feed tube being positioned so as to be disposed within said receptacle below the normal level of molten material therein and the other end terminating adjacent said hearth, means for effecting relative movement between said feed tube and said receptacle so as to remove said one end of said feed tube from below the level of molten material in said receptacle, means for selectively sealing said feed tube, means defining a sealed flow path between said processing zone and said casting zone through said barrier therebetween, and means in said casting zone for receiving the molten material for withdrawal from the furnace.

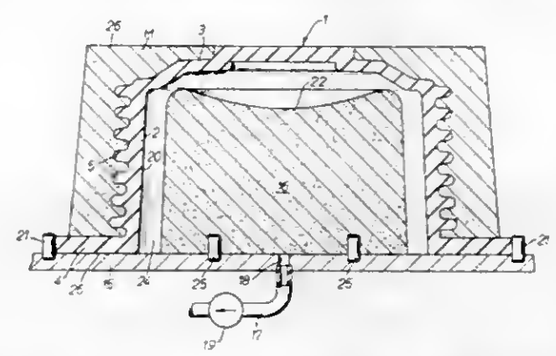
4,027,723

MOLDING APPARATUS INCLUDING A FLEXIBLE MOLD FOR MAKING ARTICLES HAVING RADIALLY INWARDLY EXTENDING PROJECTIONS ON AN INTERIOR SURFACE

William J. Maurino, and Raymond M. Putzer, both of Racine, Wis., assignors to Precision Flexmold, Inc., Racine, Wis.

Filed Jan. 20, 1975, Ser. No. 542,215
Int. Cl.² B22C *17/00, 7/00*
U.S. Cl. 164—213 3 Claims

1. Apparatus for molding a generally hollow and seamless article having undercut portions comprising a one-piece distensible and flexible hollow male mold having a generally cylindrical side wall having a plurality of radially outwardly extending annular projections for defining radially inwardly extending grooves and ridges on the inside surface of an article molded thereon, said flexible mold also having an end wall extending across one end of said side wall such that said mold defines a generally cylindrical cavity, said male mold also having an annular radial flange extending outwardly from said side wall and at an end thereof which is opposite from said end wall, a mandrel receivable in said generally cylindrical cavity and defining a generally annular vacuum chamber with said mold, plate means extending across and abutting against said



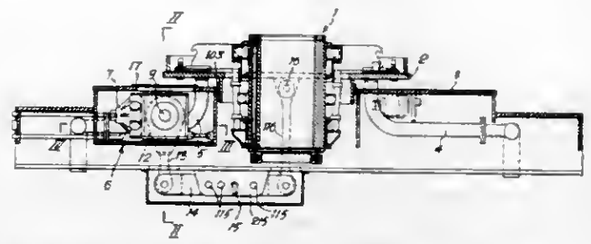
flange and said mandrel for removably supporting said mold and mandrel and having a sealing engagement therebetween, aligning means between said plate means and said mold flange and said mandrel for accurately but removably locating said mold and mandrel on said plate means, said mandrel being foraminous such that a vacuum may be drawn evenly through said mandrel for insuring radially inward collapse of the flexible mold, said plate means having a fluid pressure connection to a source of vacuum such that a vacuum may be drawn through said plate means and said mandrel and from said annular vacuum chamber to cause said mold to contract radially inwardly to release a molded article from around said mold.

4,027,724

ROCKING DEVICE FOR CONTINUOUS CASTING MOLDS

Piero Colombo, 27, Via Leopardi, Udine, Italy

Filed Apr. 23, 1976, Ser. No. 679,566
Claims priority, application Italy, Apr. 30, 1975, 12590/75
Int. Cl.² B22D *11/06*
U.S. Cl. 164—260 7 Claims



1. A continuous casting plant for metals comprising:
a fixed frame,
a first table fastened to said fixed frame and a motor secured to said first table,
a vertical guide means secured to said first table for supporting and guiding a second table for vertical reciprocating movement,
a mold supported by the second table for vertical reciprocating movement along with the second table, at least a portion of the mold being located at the same level as the said motor,
a first connecting rod operatively connected to the output

shaft of the motor and extending downwardly therefrom to reciprocate vertically,

a second connecting rod articulated at one end to the second table and extending downwardly therefrom,

and a lever extending horizontally at a level below the level of the motor and of the mold, said lever fulcrumed at an intermediate position to a frame secured to the first table, and the opposite ends of said lever connected respectively to the lower ends of the first and second connecting rods,

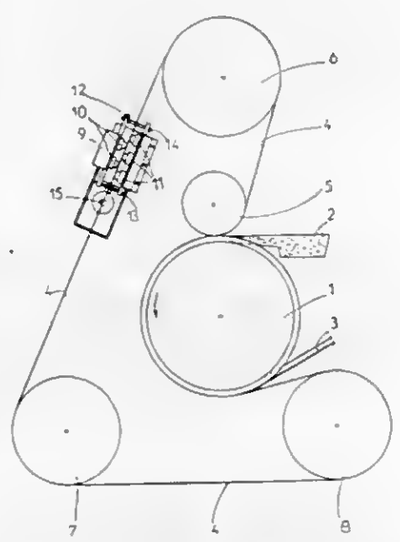
whereby the motor, acting downwardly through the first connecting rods and across the lever and upwardly along the second connecting rods effects vertical reciprocating movement of the second table and hence also of the mold.

4,027,725

DEVICE FOR RESTORATION OF THE MECHANICAL CHARACTERISTICS OF THE METAL BAND IN A CASTING WHEEL FOR CONTINUOUS CASTING OF LIQUID METAL

André Quehen, Pontoise, France, assignor to SECIM, Courbevoie, France

Filed Nov. 9, 1976, Ser. No. 739,866
Claims priority, application France, Dec. 3, 1975, 75.37044
Int. Cl.² B22D *11/06*
U.S. Cl. 164—278 **2 Claims**



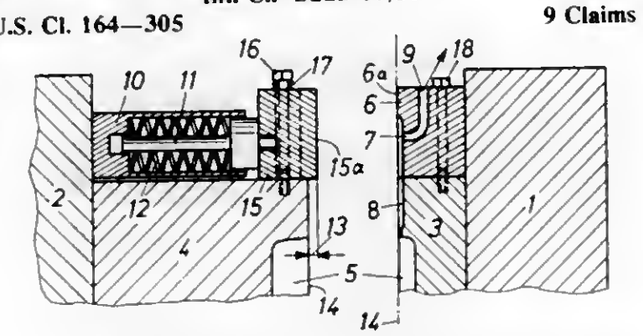
1. In a machine for continuous casting of liquid metal comprising a casting-wheel the periphery of which is provided with a groove covered over a portion of the circumference of the wheel by an endless metal band which defines with the groove a rotary mould for the liquid metal, the improvement comprising a device for the restoration of the mechanical properties of the metal band used for closing the mould of the machine, the device comprising planishing rollers arranged with their axes parallel with the axis of the casting wheel and located on opposite sides of the band in a zone where the band is not in contact with the casting wheel, a frame, means for mounting said rollers for rotation in said frame and so as to bear against the two faces of the band and so that said rollers are not opposite one another on each side of the band, and means for connecting said frame to the frame of said machine.

4,027,726

PRESSURE DIE-CASTING BLOCK WITH A VENTING VALVE

Fritz Hodler, 3 Chemin du Chatagny CH 1842, Territet, Switzerland

Filed June 4, 1975, Ser. No. 583,665
Claims priority, application Germany, June 10, 1974, 2427970
Int. Cl.² B22D *17/20*
U.S. Cl. 164—305 **9 Claims**



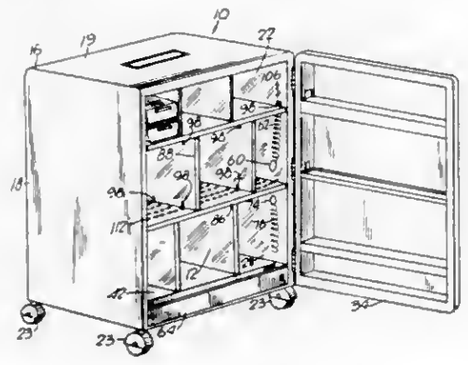
1. A pressure die-casting block in which a casting operation is performed in an internal cavity thereof, said block comprising two block halves assembled together along a plane defining a parting plane of the block, the parting plane passing through said cavity, a venting valve mounted on one of the block halves and having a venting port communicating with the cavity along the parting plane, an independent mating means mounted on another of the block halves, said venting valve having an end face which abuts an end face of the independent mating means, said mating means being mounted on the other of said block halves and being independently moveable from the block halves, and means associated with the mating means for providing a prestressing force tending to hold said abutting faces together in the assembled condition of the half blocks, which force is independent of and additional to that force holding the block halves together in said assembled condition.

4,027,727

PORTABLE BATTERY OPERATED HOT-COLD STORAGE UNIT

Gedell Pullens, P.O. Box No. 198, New York, N.Y. 10025

Filed Feb. 12, 1975, Ser. No. 549,318
Int. Cl.² F25B *29/00, 27/00;* **A47B** *77/08*
U.S. Cl. 165—48 **4 Claims**



1. A portable battery operated cold-hot food storage unit having an interior chamber capable of holding food articles contained therein in a fixed vertical position, which comprises:

a. an outer rectangularly shaped housing having a base, a pair of upwardly extending sidewalls, an upwardly extending rearwall, and an open front face;

b. an inner rectangularly shaped metallic shell contained within said housing, said shell having a base, a pair of upwardly extending sidewalls, an upwardly extending rearwall, and an open front face;

c. an insulation layer sandwiched between said outer housing and said inner shell;

d. a door hingably mounted onto said housing, said door having an outer layer, an inner layer, and an insulation layer sandwiched between said inner layer;

e. a horizontal partition affixed onto said walls of said inner shell dividing said interior chamber into an upper and a lower portion;

f. a cooling assembly consisting of a fluid tank, a compressor, an electric motor, an expansion valve, and a condensor contained in said lower portion of said interior chamber;

g. a removable plate covering said open front face of said lower portion of said interior chamber;

h. means for powering said electric motor;

i. a first section of said upper portion of said interior chamber having a first thermostat and cooling coil elements therein and communicating with said cooling assembly;

j. a second section of said upper portion of said interior chamber having a second thermostat and heating coil elements, said heating coils extending downwardly into said lower portion of said interior chamber;

k. means for heating said heating coil elements;

l. a plurality of horizontal shelves contained in said upper portion;

m. a plurality of vertical shelves contained in said upper chamber, said vertical shelves aligned side to side or front to back;

n. means for adjustably affixing said horizontal shelves to said sidewalls of said inner casing, said means comprising a plurality of mounting brackets, each said bracket consisting of an elongated U-shaped flange having a magnetic circular disc affixed onto one end of said U-shaped flange each said magnetic circular disc engaging said sidewalls of said inner shell;

o. a pair of retractable metallic pin members mounted each end of each said horizontal and vertical shelve, said pin members extending linearly outwardly from each said shelve, said pin members of each said horizontal shelve resting into one said U-shaped flange;

p. means for adjustably affixing said vertical shelves between said horizontal shelves, said means comprising each said horizontal shelve having a plurality of longitudinal aligned rows of apertures therethrough, said pin members on each end of each said vertical shelve inserting into said apertures of two said horizontal shelves; and

q. means for adjustably affixing said vertical shelves between one said horizontal shelf and said upper end of said inner shell or one said horizontal shelf and said bottom base of said inner shell, said means comprising a plurality of mounting members, each said mounting member consisting of an elongated cylindrically shaped sleeve having a magnetic base member affixed onto one end of each said sleeve, said magnetic base member engaging with said upper end of said inner shell and said pin members inserting into each said sleeve of each said mounting member, as well as said aperture of said horizontal shelf.

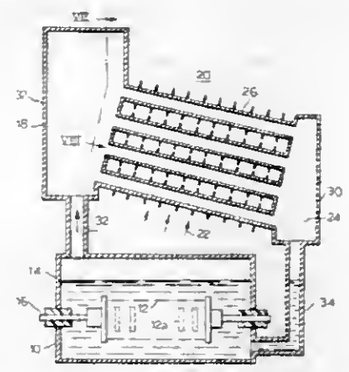
4,027,728

VAPOR COOLING DEVICE FOR SEMICONDUCTOR DEVICE

Gai Kobayashi; Yoshiro Shikano, and Masao Yano, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 31, 1975, Ser. No. 563,354
Int. Cl.² H01L *23/42*
U.S. Cl. 165—105 **2 Claims**

1. A cooling device for cooling a heat generating semiconductor device comprising a vessel, an amount of a cooling medium disposed in said vessel, said cooling medium having a liquid phase and a vapor phase and effecting a phase transition therebetween to cool a heat generating member, condenser means operatively connected to said vessel to condense said cooling medium from its vapor phase into its liquid phase and including a pair of spaced opposed headers having a substantial vertical dimension in the vertical cross-section thereof, a plurality of cooling tubes connected in parallel between said headers, one of said headers being an inlet header and being connected to said vessel to receive vapor therefrom and having a space therein at a level higher than the openings into said cooling tubes for collection of any gas entrained in said device, and conduit means connecting the other header to said vessel below the liquid level of the cooling medium in said vessel.

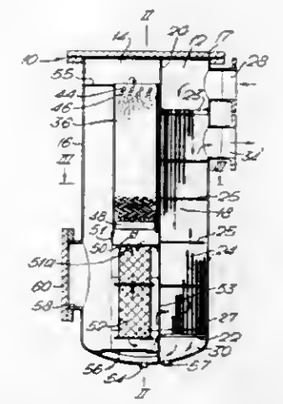


4,027,729

DEVICE FOR CHILL-DRYING A GAS

Peter Brühl, Fehmarnstr. 1, 4 Dusseldorf-Nord, Germany

Filed July 15, 1974, Ser. No. 488,798
Claims priority, application Germany, July 13, 1973, 7325183[U]
Int. Cl.² F28B *1/00*
U.S. Cl. 165—111 **5 Claims**



1. A device for chill-drying a gas comprising a pressure vessel having an inner surface, a first gas/gas heat exchanger, located in said pressure vessel and having vertically extending tubes parallel with each other and with the axis of said pressure vessel, said tubes defining first and second independent generally vertical fluid paths each having upper and lower ends and in heat-exchanging relationship, a gas outlet at said lower end of said first path and a gas inlet at said lower end of said second path, a second gas/cooling medium heat-exchanger located in said pressure vessel and extending vertically alongside said first heat-exchanger and having two independent fluid paths in heat-exchanging relationship, each of said fluid paths of said second heat-exchanger being generally vertical and having upper and lower ends, a gas inlet at said upper end and a gas outlet at said lower end of one of said fluid paths of said second heat-exchanger, and channels defined between said first and second heat-exchangers and said inner surface of said pressure vessel for connecting said gas outlet of said first heat-exchanger with the said gas inlet of said

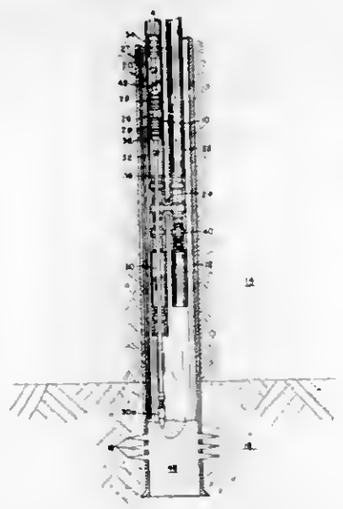
second heat-exchanger, and means for connecting said gas outlet of said second heat-exchanger with said gas inlet of said first heat-exchanger whereby in use of the device the gas to be treated flows through said first path of said first heat-exchanger, through said channels, through one of said paths of said second heat-exchanger and finally through said second fluid path of said first heat-exchanger so that the first and second heat-exchangers are contained in said common pressure vessel which serves the function of two individual pressure vessels and connecting tubes.

4,027,730

SEAL ASSEMBLY FOR FLUID INJECTION PUMP-DOWN TOOLS

Derry D. Spartin, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Filed June 28, 1976, Ser. No. 700,696
Int. Cl.² E21B 33/16
U.S. Cl. 166—156 5 Claims



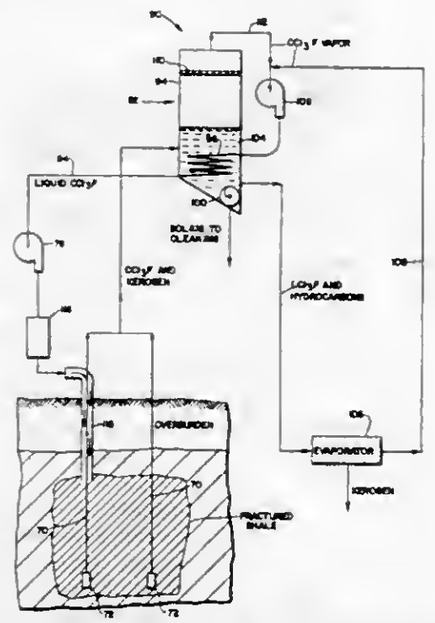
1. In a pump-down tool for use in well maintenance and treatment operations wherein fluids are injected into or circulated in a well, said tool including a tubular member, having locomotive means positioned thereabout and a fluid passageway positioned therethrough, and a fluid injection means positioned in fluid communication with the lower end of said tubular member as positioned for use; said well having positioned therein a first tubing member and a second tubing member, said first and second tubing members being in fluid communication at a junction near their lower ends, so that when placed in said first tubing member said tool is urged along the length of said first tubing member toward said junction by pumping fluid sequentially through said first tubing member, said junction and said second tubing member and is urged along the length of said first tubing member toward the upper end of said first tubing member by pumping fluid in the opposite direction, the improvement comprising: a sealing ring means positioned around said tubular member, and positioning means on said tubular member for releasably maintaining said sealing ring in position at an angle of at least about 5° from a position perpendicular to the axis of said tubular member.

4,027,731

METHODS OF AND APPARATUS FOR HYDROCARBON RECOVERY

Clay D. Smith, and D. V. Keller, Jr., both of Lafayette, N.Y., assignors to Otisca Industries, Ltd., Lafayette, N.Y.

Division of Ser. No. 460,558, April 12, 1974, Pat. No. 3,941,679. This application Aug. 26, 1975, Ser. No. 607,808
Int. Cl.² E21C 41/10; E21B 43/28
U.S. Cl. 166—267 9 Claims



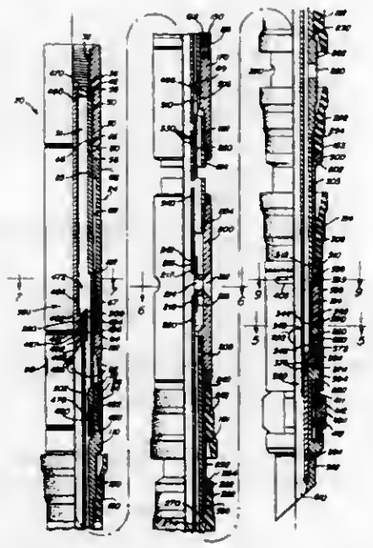
1. A method of mining hydrocarbon bearing geological composites which includes the step of directing a solvent which is essentially non-reactive with said hydrocarbons under the process conditions and is or comprises trichlorofluoromethane against a deposit or formation of said composite to extract hydrocarbons therefrom and form a fluid phase containing the hydrocarbons.

4,027,732

TOOL FOR WASHING PERFORATIONS IN CASED WELL BORE

Lee E. Perkins, 127 Mailbou Blvd., Houma, La. 70360, assignor to Kajan Specialty Company, Inc., Houma, La.

Filed Aug. 6, 1975, Ser. No. 602,414
Int. Cl.² E21B 37/00
U.S. Cl. 166—312 29 Claims



1. A tool for washing perforations in the casing of a cased well bore, the tool comprising:

an elongated cylindrical housing having a top adapted to connect to the lower end of a tubular member suspended in the casing;

first sealing means near the top of said housing, and adapted to be positioned above the uppermost perforation in said casing, for blocking the downward passage of fluid between said housing and said casing, but for enabling the passage of fluid in an upward direction,

second sealing means below and spaced from said first sealing means for blocking the upward passage of fluid between said housing and said casing;

third sealing means below and closely spaced from said second sealing means for blocking the downward passage of fluid between said housing and said casing;

first fluid passage means through said housing between said second and third sealing means;

second fluid passage means through said housing above said first sealing means;

first valve means for selectively opening or closing said second fluid passage means;

third fluid passage means through said housing below said third sealing means;

second valve means for selectively opening or closing said third fluid passage means;

fourth fluid passage means through said housing intermediate said first and second sealing means;

fluid opening means at the bottom of said housing for enabling fluid to communicate between the interior of said housing and said well bore; and

control means for operating said first and second valve means to open said second fluid passage means while said third fluid passage means is closed, to open said second fluid passage means while said third fluid passage means is opened, and to close said second fluid passage means while said third fluid passage means is closed.

17. A method for injecting into or washing perforations in the casing of a cased well bore with a well tool having a first sealing means near the upper region thereof for preventing downward passage of fluid in the casing annulus between the exterior of the tool and the casing, second sealing means below and spaced from the first sealing means for preventing the upper passage of fluid in the casing annulus, and third sealing means near but below the second sealing means for preventing the downward passage of fluid in the casing annulus, the method comprising the steps of:

lowering the well tool into the cased well bore with the second and third sealing means on opposite sides of a perforation,

delivering a pressurized stream of fluid down the casing annulus above the first sealing means, directing the fluid into an interior passage of the well tool, and then out an opening in the interior wall of the well tool between the second and third sealing means and out the perforation between the second and third sealing means;

return circulating the fluid to the surface of the well through a central bore of the well tool; and

should a perforation require a high pressure for injection or washing, adjusting the well tool and delivering a pressurized stream of fluid down the interior passage, out the opening between the second and third sealing means, through the high-pressure perforation and toward the surface of the well through the central bore and casing annulus.

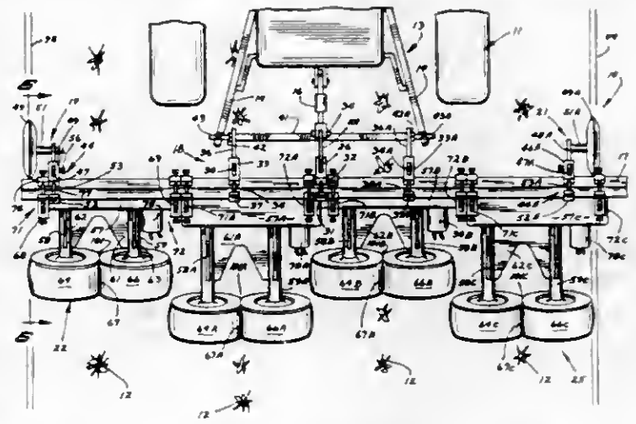
4,027,733

WEED PULLING MACHINE

Fred W. Eisenhardt, 610 University Drive N., Fargo, N. Dak. 58102, and Wayne S. Tonsfeldt, Sabin, Minn. 56580

Filed Aug. 28, 1975, Ser. No. 608,681
Int. Cl.² A01D 25/04, 49/00
U.S. Cl. 171—58 24 Claims

1. An apparatus for pulling weeds and the like from a row of crops and weeds comprising: a transverse tool bar mountable on a draft vehicle, a weed pulling unit attached to the tool bar, said unit having a housing and generally rearwardly directed spaced members attached to the housing, first shaft means rotatably mounted on one of the members, second shaft means rotatably mounted on the other of the members, first wheel means attached to the first shaft means, second wheel means attached to the second shaft means, said first and second wheel means being rotatable about axes located in planes extended generally parallel to the row, each of said wheel means having surfaces that engage each other and adapted to



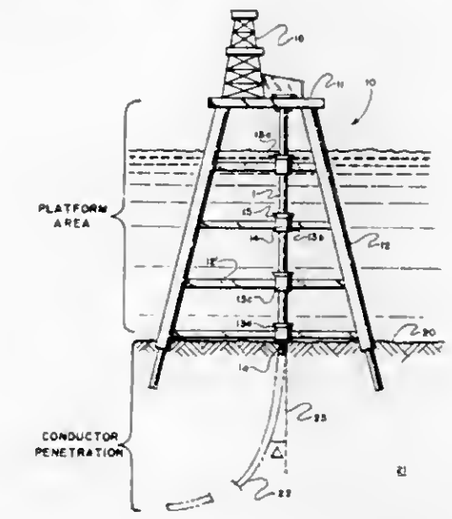
engage the weeds in the row and pull the weeds out of the ground, power transmission means to drive said first and second wheel means in opposite directions whereby said weeds between said first and second wheel means are pulled from the ground, said power transmission means being located in said housing and drivably connected to the first shaft means and second shaft means to rotate the first and second shaft means in opposite directions, and power means operable to supply power to the power transmission means.

4,027,734

DEVIATED CONDUCTOR DRIVING SYSTEM

Lajos (Louis) Horvath, Norwich, England, assignor to Hebert & Co., Inc. Gurtler, New Orleans, La.

Filed Dec. 11, 1975, Ser. No. 639,857
Int. Cl.² E21B 7/08
U.S. Cl. 175—9 10 Claims



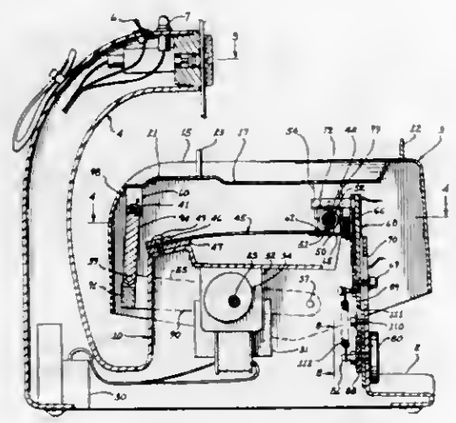
1. A method of providing a deviated conductor system at an offshore body of water site for directional drilling of wells comprising the following steps:

a. providing an open ended conductor casing of incremental segments;

b. securing an open ended dog-leg section on the distal end of the otherwise straight conductor producing a longitudinally elongated, off-set portion extending over laterally past one side of the outer circumference of the otherwise straight conductor, said off-set being open ended;

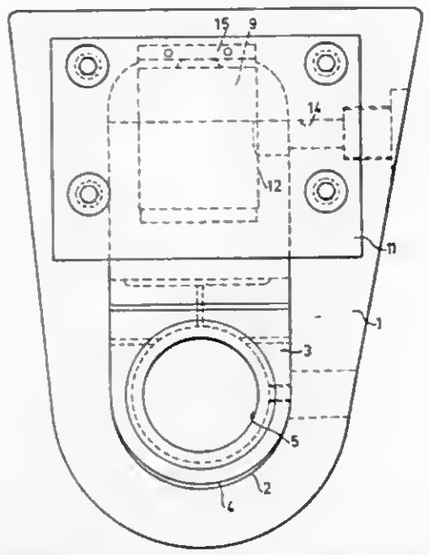
c. setting said conductor through vertically aligned guides until the mudline is reached, maintaining or positioning the dog-leg in the desired directional orientation; and
d. driving said open ended conductor with said open ended dog-leg section through the substratum causing the conductor to be laterally deviated due to the interaction of the substratum against the offset, lower side surfaces of said dog-leg section from its entry into the substratum to its final deviated position.

4,027,735
BLOOD MIXING AND WEIGHT MONITORING APPARATUS
Johnnie E. Floyd, Austin, Tex., assignor to Engineering & Research Associates, Inc., Tucson, Ariz.
Filed May 20, 1976, Ser. No. 688,400
Int. Cl.² A61B 5/14; G01G 13/30
U.S. Cl. 177—118 13 Claims



1. A dynamic weight monitoring apparatus for collecting a predetermined weight of fluid flowing into a collection bag while the collection bag is rocked to mix the collected fluid and including a base for supporting said apparatus upon a surface and a foundation extending upwardly from the base, said apparatus comprising in combination:
a. a rocker for receiving and retaining the collection bag in fixed relationship thereto;
b. weight responsive means having one end secured to the foundation and another end extending from the foundation for supporting said rocker, said other end of said weight responsive means being deflectable in the vertical plane in response to any change in weight of the contents of the collection bag;
c. pivot means disposed intermediate said other end of said weight responsive means and said rocker for accommodating reciprocating angular movement of said rocker with respect to the foundation;
d. motor driven linkage means disposed intermediate the foundation and said rocker for imparting a reciprocating vertical movement to one end of said rocker and producing a rocking motion of said rocker about said pivot means;
e. position sensing means extending from the foundation for detecting a predetermined downward deflection of said other end of said weight responsive means, which deflection is commensurate with the weight of a predetermined quantity of fluid that has flowed into the collection bag; and
f. indication means responsive to said sensing means for indicating that the predetermined quantity of blood has flowed into the collection bag.

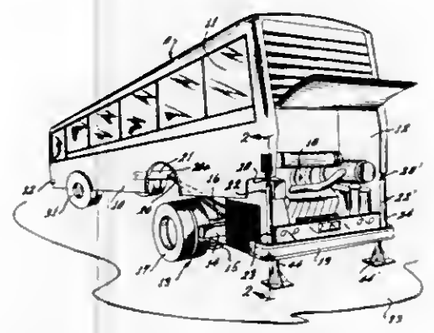
4,027,736
LOAD-WEIGHING DEVICE
Karl Gunnar Bohlin, Sundsvall; Karl Rune Eriksson, Kvissleby, and Carl-Erik Gustafsson, Sundsvall, all of Sweden, assignors to SCA Development Aktiebolag, Sundsvall, Sweden
Filed Feb. 25, 1976, Ser. No. 661,194
Claims priority, application Sweden, Mar. 14, 1975, 7502903
Int. Cl.² G01G 19/18
U.S. Cl. 177—147 4 Claims



1. A load-weighing device for indicating the weight of a load and for attachment to the load-carrying member of a lifting device, comprising:
a frame connected to said load-carrying member, the lower part of said frame including a curved surface,
a bearing block mounted in said frame for rotation relative to said load-carrying member, the upper surface of said bearing block having a curved shape, and the lower surface of said bearing block being curved, said bearing block being mounted in said frame to provide a clearance space between the curved surface of said frame and the lower curved surface of said bearing block, which clearance space is eliminated upon the application of a load,
a bearing member mounted in said frame and abutting said upper curved surface, and
a pressure-sensitive member mounted in said bearing member so that the force of a load is transferred by the lifting device to the pressure-sensitive member which operates to provide an accurate load-measuring value regardless of the distribution of the load or the non-planar positioning of the lifting device.

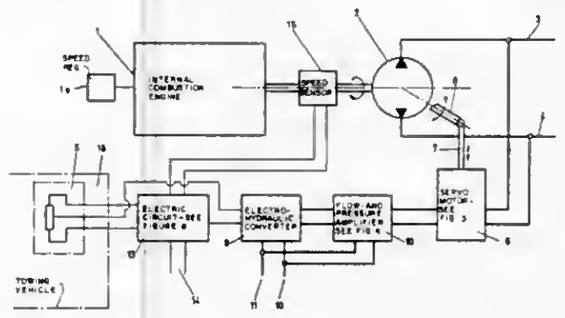
4,027,737
JACKING MEANS FOR PROVIDING ADDITIONAL CLEARANCE BETWEEN THE ENGINE AND BODY OF A REAR ENGINE DRIVEN VEHICLE
Frederick W. Garry, El Cajon, Calif., assignor to Rohr Industries, Inc., Chula Vista, Calif.
Filed May 9, 1975, Ser. No. 576,010
Int. Cl.² B60K 5/10
U.S. Cl. 180—11 3 Claims

3. In a bus comprising a body with a forward passenger compartment and a rear engine compartment therein, with dirigible front support wheels journaled beneath a forward portion of the body, and a power drive unit removably docked in the rear end of the bus, said power drive unit comprising a frame releasably secured to a rear portion of the body, said frame having an extension extending a substantial distance forward from said engine and means pivotally connecting its forward end to the vehicle body and having the bus propulsion engine mounted on said frame for location within the engine compartment, said engine being in operative, driving connection with a pair of rear support wheels journaled on an axle which is in resilient supporting relation with said frame, the improvement which comprises:
hydraulic jacking means interposed between an element of the power drive unit and a rear element of the bus body, and operable, upon release of the power drive unit frame



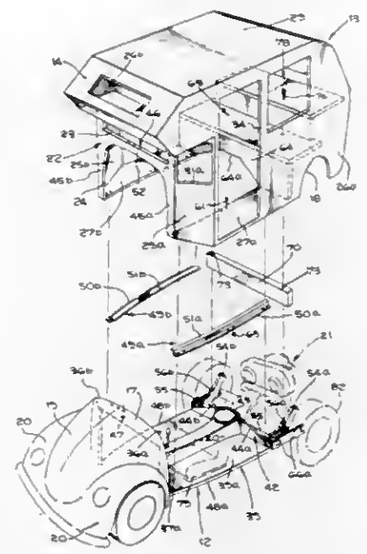
from the body, to elevate the rear end of the body relative to the power drive unit frame, thereby tilting the body about the axes of the front wheels as a fulcrum to provide additional working clearance between the propulsion engine and elements of the body adjacent thereto; and
means interposed between an element of the power drive unit and the ground to preclude movement of the power drive unit when the body is tilted.

4,027,738
DEVICE FOR CO-ORDINATED DRIVING OF A TOWING VEHICLE AND A TOWED VEHICLE
Lars Olof Lundin, Karlskoga, Sweden, assignor to AB Bofors, Bofors, Sweden
Filed Dec. 8, 1975, Ser. No. 638,257
Claims priority, application Sweden, Dec. 18, 1974, 7415880
Int. Cl.² B62D 59/04
U.S. Cl. 180—14 A 32 Claims



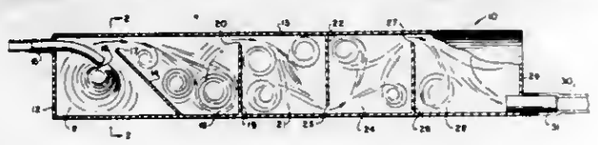
1. Apparatus for controlling the torque applied to each driven wheel of a towed vehicle of a towing and towed vehicle combination, comprising:
a variable displacement hydraulic pump;
hydraulic motor means associated with each driven wheel, said hydraulic motor means being driven by the output of said variable displacement hydraulic pump; and further being selectively engageable with said driven wheel; and
means selectively operable from said towing vehicle for controlling the displacement of said variable displacement hydraulic pump to maintain thereby a preselected driving torque delivered by said hydraulic motor means to said driven wheel, independent of the speed of said driven wheel.

4,027,739
MINICAMPER
Douglas L. Allenthorp, 16222 Monterey Lane, No. 96, Huntington Beach, Calif. 92649, and Michael L. Galleher, 11645 Mapledale St., Norwalk, Calif. 90650
Filed May 7, 1975, Ser. No. 575,352
Int. Cl.² B62D 23/00
U.S. Cl. 180—89.1 9 Claims



1. A camper body in combination with a chassis having front and rear wheels and a hood and front fenders supported thereon by a cowling support provided with shoulders on the side faces thereof, and including a floorboard having bracket arms extending rearwardly and angularly upwardly from the rear sides thereof,
said camper body comprising top, front, rear and sidewalls, with the lower portion of the front wall forming a frame disposed below an opening provided on the front wall for a windshield, said sidewalls having inwardly extending side floorboard portions on the bottoms thereof and provided with an upwardly stepped portion on the rear bottom thereof spaced inwardly of the rear wall thereof, and a transverse support member beneath said stepped portion, said transverse support member being shorter than and centered in the spacing between the sidewalls,
said camper body being mounted on said chassis with said frame on the front wall fitted about said cowling support and anchored to the top thereof with the sides of said frame being seated against the shoulders formed on the respective side faces of the cowling support and with the inwardly extending side floorboard portions on the bottom of the sidewalls disposed adjacent to and anchored to the sides of the floorboard of said chassis to provide a continuation thereof, and with the transverse support member beneath the stepped portion thereof resting on and anchored to said bracket arms,
whereby the inwardly extending floorboard portions on the bottoms of the sidewalls of the camper body provide for the floorboard of the assembled camper body being on the order of half again wider than the width of the floorboard of the chassis, and
whereby the stepped portion on the rear bottom of the camper body provides clearance within the sidewalls for the rear wheels on the chassis.

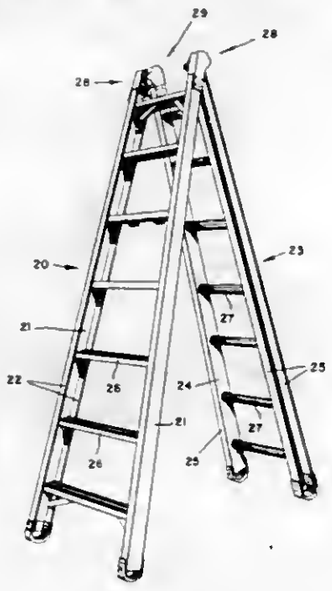
4,027,740
MULTI-CHAMBER MUFFLER
James F. Martin, P.O. Box 302, Hondo, Tex. 78861
Continuation of Ser. No. 548,190, Feb. 10, 1975, abandoned.
This application June 15, 1976, Ser. No. 696,421
Int. Cl.² F01N 1/08
U.S. Cl. 181—68 9 Claims



1. In a muffler: a plurality of exhaust gas transfer chambers including, an initial cyclonic vortex chamber having a forward wall, muffler casing, and baffle wall means mounted within the muffler casing, with a pronounced slant toward said forward wall; an exhaust gas expansion chamber within the muffler case, flow-wise, behind said initial cyclonic vortex chamber; exhaust gas input means positioned to feed exhaust gases to said initial cyclonic vortex chamber; exhaust gas flow outlet means for passage of exhaust gas products from said expansion chamber, ultimately to the atmosphere; wherein said baffle wall means is a common wall between said initial cyclonic vortex chamber and said exhaust gas expansion chamber with the slant toward said forward wall forming an acute angle with muffler casing on the initial cyclonic vortex chamber side of the baffle wall means; with said baffle wall means having a hurdle end edge defining, with said muffler case, opening means for passage of exhaust gas in flow from said initial cyclonic vortex chamber to said exhaust gas expansion chamber; said exhaust gas input means comprising a pipe extended through the forward wall of the muffler and into the confines of said vortex chamber to an outlet end termination near the center of said vortex chamber, said outlet end having an opening with dimension substantially smaller than one-half the vertical dimension of said vortex chamber and radially displaced from the chamber longitudinal axis toward the hurdle end edge of said baffle wall, said outlet end being positioned and directed to aid cyclonic vortex gas flow within said initial cyclonic vortex chamber; and, wherein the outlet end of said exhaust gas input means pipe is located at a relatively lower pressure area within the confines of and near the center of the gas flow cyclonic vortex established within said vortex chamber when exhaust gas is being fed from said exhaust gas input means pipe and through the muffler.

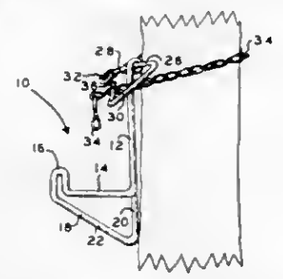
4,027,741
LOCKING HINGE MECHANISM FOR A STEPLADDER
Danny O. Derrick, Columbia, S.C., assignor to Shakespeare Company, Columbia, S.C.
Filed July 15, 1976, Ser. No. 705,478
Int. Cl.² E06C 1/12
U.S. Cl. 182—22 12 Claims

1. Hinge mechanism for a stepladder having front and rear sections hinged together at one end, comprising first pin and slot means on the upper end of one section engaging complementary slot and pin means on the upper end of the other section for hinging movement of said sections, said first and said complementary pin and slot means interlocking with each other to hold the sections in spread-apart relation and being disengageable by relative longitudinal movement of said sec-



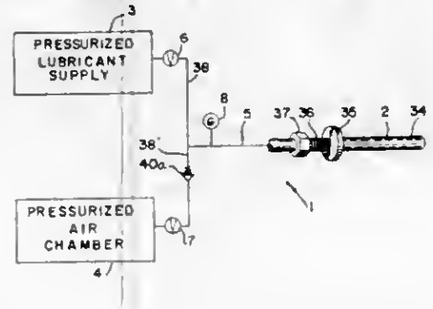
tions to slide the pins out of the slots when the sections are folded together.

4,027,742
CLEAT FOR CLIMBING TREES AND THE LIKE
Aniel Hermas House, Jr., 2204 S. Tyler, Little Rock, Ark. 72204
Filed Aug. 2, 1976, Ser. No. 710,641
Int. Cl.² B60R 3/00
U.S. Cl. 182—92 3 Claims



1. An improved climbing cleat comprising:
A. an elongated shank;
B. means defining a step angularly projected from the shank near one end thereof;
C. suspension means for removably suspending said shank from a vertically oriented body of a substantially cylindrical configuration including a cross bar extended transversely with respect to said shank and rigidly affixed to the end portion thereof opposite said one end having an arcuate midportion and a pair of end portions extended in substantial parallelism and inclined toward said step, a length of chain, and means located at each of the opposite ends of said cross bar for receiving said chain in a connected relationship therewith; and
D. stabilizing means for supporting said step against displacement including a support member extended angularly from the projected end of said step toward an extension of the longitudinal axis of said shank for imparting vertical support to the step.

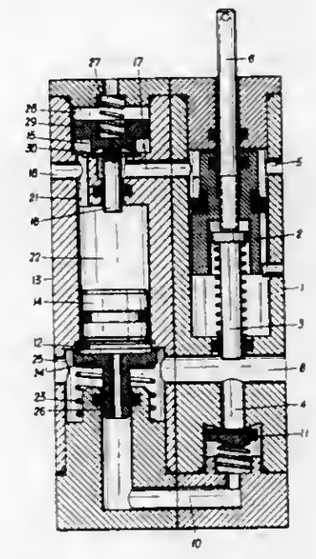
4,027,743
AXLE END OIL FILL AND LEAKAGE DETECTOR METHOD OF CHARGING LUBRICANT
Robert J. Deller, and Edwin L. Carmel, both of Cincinnati, Ohio, assignors to Pullman Incorporated, Chicago, Ill.
Filed July 9, 1975, Ser. No. 594,385
Int. Cl.² F01M 1/20
U.S. Cl. 184—6.4 7 Claims



1. For a wheel hub including an outer end portion and a body portion,
said body portion incuding a pair of axially spaced bearings and a closed lubrication reservoir between said bearings and in lubricating relation therewith,
said outer end portion havng a selectably sealable lubricant filling port extending generally axially therethrough providing access between said lubricant reservoir and the exterior of the wheel hub, the improvement of
a lubrication apparatus for charging lubricant into said lubricant reservoir and detecting leaks therefrom, including:
separate sources of pressurized lubricant and pressurized gas,
a probe having an elongated shank insertably extendable through said lubricant filling port and into the lubricant reservoir and including sealing means cooperative with said outer end portion,
valve means for selectively closing and opening respective sources to said lubricant reservoir,
means for charging said lubricant reservoir under a predetermined pressure,
means for dropping said pressure of the lubricant to ambient pressure,
means for loading the lubricant reservoir with gas to a predetermined pressure after said lubricant reaches ambient pressure, and
means for monitoring any pressure drop of the gas within the lubrication reservoir to thereby detect potential or actual leaks.

7. A method of lubricating a closed lubrication system and detecting lubricant leakage while the system is under static conditions and which simulates dynamic conditions comprising:
filling the system with lubricant under relatively high pressure displacing air in the system with the lubricant and compressing the air to a relatively small volume, then depressurizing the system and purging the air therein to return the system to ambient pressure then pressurizing the system with gas under relatively low predetermined pressure to slowly force the lubricant through the system, then closing the gas under said pressure from exhausting from the system, and thereafter monitoring the pressure of the gas in the system to determine if any pressure drop occurs thereby detecting potential leakage of the lubricant from said system under operating conditions.

4,027,744
PNEUMATIC PULSE HYDRAULIC CONTROLLED VALVE FOR CONTROLLING A LUBRICATING DEVICE
Herbert Kühnelt, and Rudolf Huber, both of Vienna, Austria, assignors to Hoerbiger Fluidtechnik KG, Vienna, Austria
Filed Apr. 23, 1976, Ser. No. 679,878
Claims priority, application Austria, Apr. 25, 1975, 3209/75
Int. Cl.² F01M 1/06
U.S. Cl. 184—7 F 14 Claims

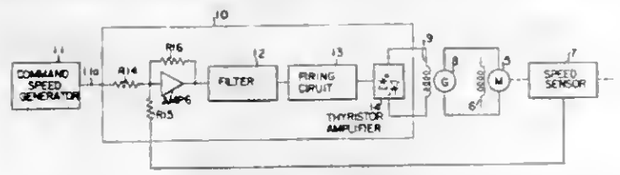


1. In apparatus for controlling the delivery of pulses of compressed gas from a source of such pulses to a device which is to be actuated by such pulses, which apparatus includes a drive piston disposed in a cylinder to undergo reciprocating movement therein, a normally closed control valve disposed in a fluid conducting line arranged to be connected between such source and such device, opening of the valve, placing the source in pressure-transmitting communication with the device, and a stepping mechanism connected between the drive piston and the control valve to effect opening of the control valve in response to the reciprocating movements of the drive piston, the improvement wherein said stepping mechanism comprises: a reciprocating pump connected to be driven by said drive piston and having an input receiving a supply of liquid and a liquid output, said pump constituting means for conveying from its output a predetermined quantity of liquid upon each cycle of reciprocating movement of said drive piston; means defining an actuating cylinder containing an actuating piston and defining a first cylinder chamber provided with a liquid input connected to receive the quantities of liquid conveyed from said pump output for causing said actuating piston to undergo a unidirectional stepwise movement in said actuating cylinder in response to receipt of each quantity of liquid from said pump outlet; and actuating means operatively connected to said control valve and disposed in the path of movement of said actuating piston for opening said control valve in response to arrival of said actuating piston at a selected location along the length of said actuating cylinder.

4,027,745
ELEVATOR SPEED CONTROL SYSTEM
Eiki Watanabe, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Filed Aug. 11, 1975, Ser. No. 603,627
Claims priority, application Japan, Aug. 30, 1974, 49-100456
Int. Cl.² B66B 1/30
U.S. Cl. 187—29 R 8 Claims

1. An elevator speed control system comprising, in combination, an elevator car, a hoisting rope for suspending said elevator car, and a sheave engaging said hoisting rope to form a mechanical system having an angular resonance frequency

and an angular antiresonance frequency, command speed generator means for generating a command speed signal for the elevator car, speed sensor means for sensing the actual speed of said elevator car, speed control means including comparison circuit means for comparing said command speed signal with a signal for said actual speed of said elevator car,



and filter means of electrically higher order connected in said speed control means to cancel out said angular resonance and antiresonance frequencies of said mechanical system, said speed control means being operative to control said mechanical system in response to the result of the comparison made by said comparison circuit means and through said filter means.

4,027,746

CENTER-PULL TYPE CALIPER BRAKE FOR A BICYCLE

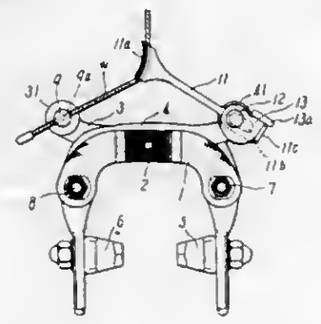
Masayoshi Kine, Sakai, Japan, assignor to Shimano Industrial Company, Limited, Osaka, Japan

Filed Aug. 16, 1976, Ser. No. 714,507

Claims priority, application Japan, Sept. 5, 1975, 50-123353[U]; Sept. 5, 1975, 50-123354[U]

Int. Cl.² F16D *65/54*

U.S. Cl. 188—24 **7 Claims**



1. A center-pull type caliper brake for a bicycle, said brake comprising:

an arm fixed to the frame member of the bicycle;

a pair of brake arms pivotally mounted on the ends of said fixed arm in freely oscillating relation through pivots, each of said brake arms having a portion which extends substantially horizontally;

a brake shoe on one end of each of said brake arms;

a control wire for operating said brake arms;

a holder, on the other idle end of one of said brake arms, for securing one end of said control wire thereto; and

a retainer pivotally mounted on the other idle end of the other one of said brake arms, said retainer having a base on one end thereof attached to the other idle end of the other one of said brake arms and an extension extending from said base toward a center line perpendicular to the horizontal portions of said brake arms, said extension having a grip for retaining an intermediate portion of the control wire.

4,027,747

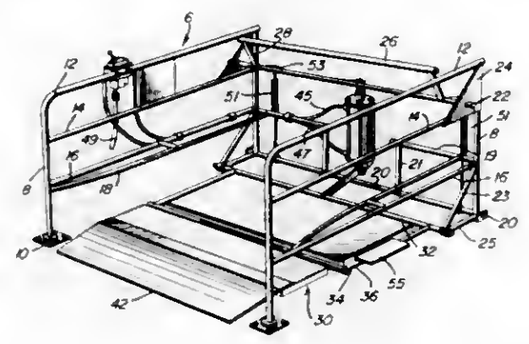
WHEELCHAIR HOLDING DEVICE FOR VEHICLES

James H. Moorman, Jr., Fort Valley, Ga., assignor to Blue Bird Body Company (Entire), Fort Valley, Ga.

Filed Feb. 10, 1976, Ser. No. 656,888

Int. Cl.² B60T *1/04*

U.S. Cl. 188—28 **7 Claims**



1. A fixture for restraining the motion of a wheelchair while it is being transported on a vehicle body, comprising means to enable an occupant of the wheelchair to readily secure the chair in a locked position including, a U-shaped rigid framework enclosure independent of the vehicle body, open at the front end, and having a pair of side support members and a rear support member adapted to be mounted on the floor of the vehicle, the open front end facing in a direction to receive a wheelchair with the propulsion wheels thereof adjacent said rear support member, means easily operable by the wheelchair occupant to hold the propulsion wheels in fixed position including a pair of spaced clamping jaws mounted on said framework moveable between an open position wherein said wheels are free, and a closed position wherein the jaws move toward one another to engage the wheels at opposed circumferential portions of the wheels, one of said jaws engaging the upper rear portion of the wheel, and the other jaw engaging the lower forward portion of the wheel to grip the wheel therebetween, and means for actuating the clamping jaws mounted on the framework.

4,027,748

BRAKING DEVICE FOR ROPES AND BELTS, ESPECIALLY LIFELINES

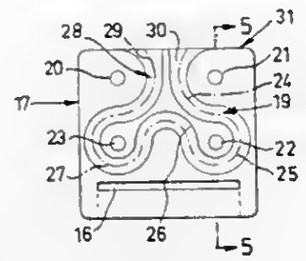
Nils Christer Persson, Ope 2790, S-831 00 Ostersund, Sweden

Filed July 7, 1975, Ser. No. 593,453

Claims priority, application Sweden, Aug. 16, 1974, 7410459

Int. Cl.² B65H *59/14*

U.S. Cl. 188—65.4 **1 Claim**



1. A rope braking device, particularly for fire escape, comprising

a. a two-piece solid block,

b. a guide channel of cylindrical cross-section in said block for a rope of cylindrical cross-section extending through the channel,

c. means for attaching a person to be suspended by the device,

d. the channel extending in a loop comprised of a number of bends having different radii of curvature,

e. said loop running in a middle plane which divides the block in two identical and separate halves united together by fastening means,

f. said bends being disposed symmetrically with respect to a central plane at right angles to the middle plane,

g. the guide channel having its both ends located at one of said ends of the block to form inlet and outlet channel portions for the rope,

h. said loop comprising a first pair of substantially identical outer bends which are convex relative to the central plane and located on opposite sides of the central plane and including at their outer end portions said inlet and outlet channel portions, whereas the inner end portions of the first pair of bends merge into the upper end portions of a second pair of inner bends which are concave relative to the central plane and at their lower end portions merge into a central bend which is convex seen from the inlet and outlet channel portions,

i. the radius of curvature being substantially greater for the first pair of bends than for the second pair of bends,

j. the outlet and inlet channel portions opening in the same direction and also being widened in the middle plane so that the rope portions located in the widened outlet and inlet channel portions may be positioned substantially parallel to each other or at any desired angle to each other until the rope portions closely follow the curvature of the first pair of bends to their outer ends.

4,027,749

LATCH SPRING ASSEMBLY FOR DISC BRAKE PAD GUIDE PINS

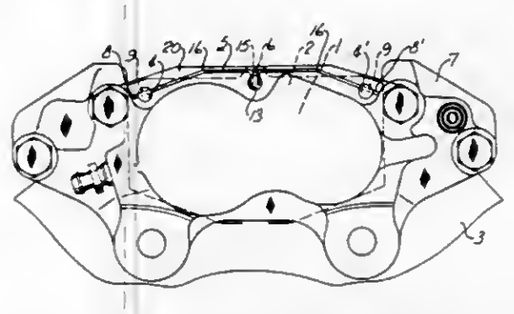
Masachika Yamamoto, Toyonaka, and Yasuhiko Taniuchi, Itami, both of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Feb. 11, 1976, Ser. No. 657,025

Claims priority, application Japan, Feb. 13, 1975, 50-20330[U]

Int. Cl.² F16D *55/228*

U.S. Cl. 188—73.3 **4 Claims**



1. A latch spring assembly for brake pad guide pins received in a disc brake caliper including an opposed pair of disc brake pad members retained between opposed caliper body walls of a disc brake caliper on a pair of spaced guide pins passing transversely through the pad members and latched for retention by a latch spring having outwardly extending legs with the ends thereof respectively received in said pins, the improvement comprising a spring retention opening through one of said opposed caliper body walls, said latch spring having a central hook extending through said opening and hooking said one wall under spring tension, a mid portion of each of said spring legs engaging said caliper body under tension relative to said hook to retain said spring ends stationary relative to the axial direction of said pins within the flexural elasticity limits of said spring legs, said legs extending generally outward in opposite directions from said hook for their entire length.

4,027,750

FLOATING DISC BRAKE INCLUDING AIR ESCAPE STRUCTURE

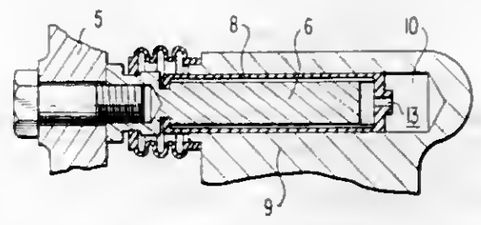
Kyoji Kawamoto, and Yosuke Ishihara, both of Itami, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Apr. 15, 1976, Ser. No. 677,470

Claims priority, application Japan, Apr. 18, 1975, 50-53301[U]

Int. Cl.² F16D *55/224*

U.S. Cl. 188—73.3 **6 Claims**



1. In a floating disc brake of the type having, a fixed member spanning said disc, a piston and a first pad positioned on one side of said disc, a caliper spanning said disc and a second pad on the other side of said disc, said caliper, piston and pads being arranged to press both pads in a direction towards said disc when said piston operates, a pair of guide pins fixed to said caliper and extending parallel to the axis of said disc and a pair of corresponding blind holes in said fixed member for slidably receiving said pins, each said blind hole having a receiving end and a blind end, the improvement comprising, at least one of said pins being enclosed in a resilient bag movable therewith, said bag having a groove therein providing an air passageway between said blind end of said blind hole and the space external to said blind hole during normal operation.

4,027,751

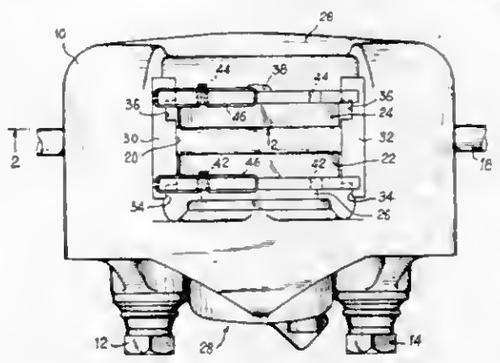
NOISE-REDUCING SPRING FOR A DISC BRAKE

Jean-Louis Gérard, Paris, France, assignor to Societe Anonyme D.B.A., Paris, France

Filed Dec. 17, 1975, Ser. No. 641,412

Int. Cl.² F16D *65/12*

U.S. Cl. 188—73.5 **8 Claims**



1. A disc brake comprising:

a rotary disc having a pair of friction faces;

a pair of friction elements each having a backing plate carrying friction linings facing respective friction faces on said disc;

a torque-taking member having actuation means urging said friction elements into engagement with the friction faces;

said torque-taking member having guiding surfaces which carry and anchor said friction elements;

at least one spring cooperating with said friction elements to resiliently urge the latter radially outwardly;

said one spring having two first arms facing respective surfaces on the backing plate and extending substantially parallel to the friction faces, at least one second arm

extending into an aperture between the surfaces on the backing plate, at least one third arm engaging the guiding surface on the torque member and at least one fourth arm engaging the backing plate;

said second arm extending from one of the first arms facing one of the surfaces to the other of the first arms facing the other of the surfaces and releasably engaging the other of the first arms facing the other surface to attach said one spring to said friction element;

said second arm and said other of the first arms being disengageable from each other to permit said second arm to withdraw from the aperture while the one of the first arms remains connected to the other of the first arms.

4,027,752

DISC BRAKES FOR VEHICLES

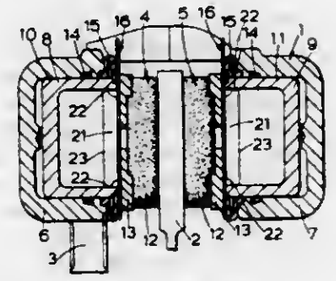
Herman Josef Brix, Koblenz, Germany, assignor to Girling Limited, Birmingham, England

Filed Jan. 23, 1976, Ser. No. 651,722

Claims priority, application United Kingdom, Jan. 23, 1975, 2916/75

Int. Cl.² F16D *55/228*

U.S. Cl. 188—73.6 **5 Claims**



1. A disc brake for a vehicle comprising a rotatable disc, a housing adjacent to said disc and having a bore arranged with the axis thereof normal to the plane of said disc, a friction pad assembly for engagement with said disc located in said housing, a piston slidably guided in said bore for applying said friction pad assembly to said disc, and a thrust transmitting device interposed between said piston and said friction pad assembly and comprising a shim of which a part is cut-out over a portion of what would otherwise be the area of contact between said piston and said friction pad assembly so that when said piston is advanced in said bore towards said disc to apply said friction pad assembly to said disc, thrust from said piston is applied to said friction pad assembly only over the remainder of the said area of contact, wherein said thrust transmitting device includes a projection which defines a stop to prevent said shim from being inserted into said brake with said pad assembly in position, and the total overall effective axial length of said thrust transmitting device including said projection is less than the thickness of said pad assembly minus the wear thickness thereof so that said thrust transmitting assembly can be removed from its position of use in said brake after removal of said friction pad assembly and without forcing back said piston in said bore, irrespective of the wear condition of said pad assembly.

4,027,753

IN-AXLE VEHICLE WHEEL SPEED SENSING DEVICE

Charles Hunter Lantz, Troy, Ohio, assignor to The B.F. Goodrich Company, Akron, Ohio

Filed Apr. 15, 1976, Ser. No. 677,215

Int. Cl.² B60T *8/08*

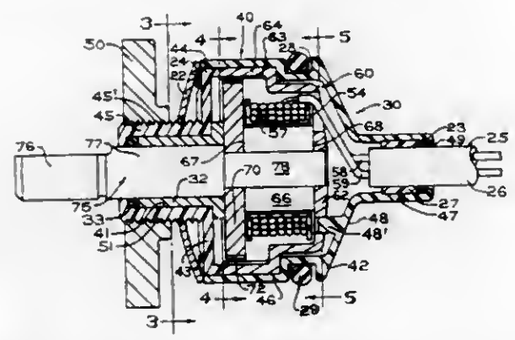
U.S. Cl. 188—181 R **6 Claims**

1. In combination

A. an axle adapted to support a wheel for rotation thereon, said axle having a cylindrical bore therein extending axially inwardly from an end of said axle;

B. a wheel speed sensor assembly disposed in sealed relationship with and entirely within said bore, said sensor assembly comprising:

1. a hermetically sealed nonmagnetic housing,
2. a ferromagnetic stator mounted within said housing, said stator having an annular portion provided with a selected number of spaced notches,
3. a rotor assembly mounted within said housing, said rotor assembly comprising
   a. a rotatable, nonmagnetic shaft and
   b. a ferromagnetic rotor
   i. secured to said shaft,
   ii. having an annular portion provided with number of spaced notches equal to said selected number, and
   iii. disposed relative to said stator so as to provide an annular gap of selected magnitude between the annular notched portion of said stator and the annular notched portion of said rotor;



4. a permanent magnet mounted within said housing and disposed to generate magnetic flux through said rotor and stator;
5. a wire coil mounted within said housing and disposed for induction of current by changing magnetic fields caused by rotation of said rotor;

C. a curved, metallic retainer device disposed
1. outside said housing
2. entirely within said bore and
3. operable, upon flattening, to lock said sensor assembly against both rotational and axial movement relative to said bore; and

D. means disposed adjacent said retainer device adapted to
1. be moved into contact with said retainer device and
2. flatten said retainer device

E. means disposed outside said housing for connecting said rotor assembly shaft for rotation with a wheel mounted on said axle.

4,027,754

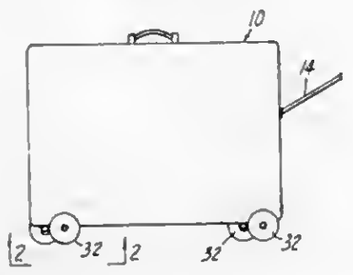
WHEELED SUITCASE

Brooks Walker, 807 Francisco St., San Francisco, Calif. 94109

Filed Feb. 26, 1976, Ser. No. 661,655

Int. Cl.² A45C *5/14*

U.S. Cl. 190—18 A **10 Claims**



1. In a suitcase having two opposed portions and provided

with a plurality of hinge structures on one side thereof for hingedly mounting said portions together,

a sleeve integrally secured to one of said hinge structures, and

a wheel assembly including an axle received in said sleeve for supporting said suitcase,

said axle being formed with an annular groove,

a detent carried by said hinge structure and received in said groove, and

a housing surrounding said sleeve for protecting said detent.

4,027,755

APPARATUS AND METHOD FOR REDUCING DRAG BETWEEN CLUTCH OR BRAKE COMPONENTS IMMERSED IN A LIQUID

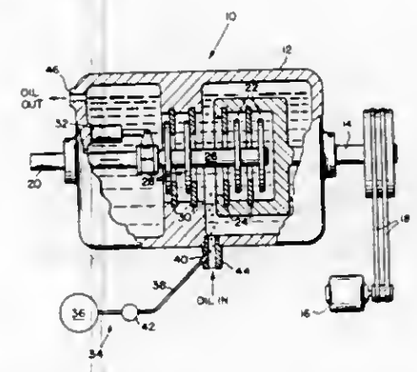
Kenneth W. Evans, Fairport; Mason M. Howlett, Penfield, and David H. Kirkpatrick, Rochester, all of N.Y., assignors to The Gleason Works, Rochester, N.Y.

Continuation of Ser. No. 339,785, March 9, 1973, abandoned.

This application Jan. 29, 1976, Ser. No. 653,332

Int. Cl.² F16D *13/72, 67/04*

U.S. Cl. 192—18 A **6 Claims**



1. In a driving mechanism of a type that includes (a) components which can be brought successively into and out of engagement with each other to effect a change in driving characteristic of said mechanism and (b) a liquid bath into which said components are continuously immersed sufficiently to provide a heat transfer liquid for cooling the components during operation of the mechanism, the improvement comprising

gas injecting means for introducing a quantity of a gas into said liquid bath to thereby reduce drag between said components and the liquid of said bath while said components are maintained in said immersed condition in said liquid bath at all times, and said gas injecting means being arranged to introduce said gas below the surface level of said liquid bath to thereby provide for a mixing of the gas with the liquid bath.

4,027,756

TRANSMISSION WITH SHIFT BLOCKER CLUTCH MECHANISMS

Robert W. Wolfe, Jackson, Mich., assignor to Clark Equipment Company, Buchanan, Mich.

Filed Mar. 15, 1976, Ser. No. 666,531

Int. Cl.² F16D *23/06*

U.S. Cl. 192—53 E **18 Claims**

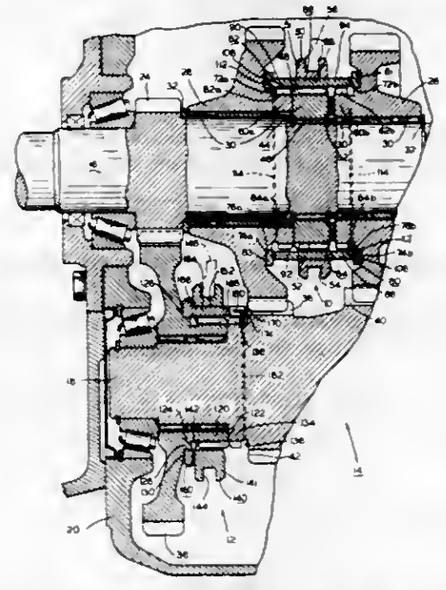
1. In an interengageable toothed clutch system, the combination comprising:

a. first rotatable means having a collar member mounted thereon in axial sliding relationship and positive rotation therewith, said collar member having a first clutch portion with first clutch teeth;

b. second rotatable means, coaxially related to said first rotatable means and axially fixed relative thereto, having a second clutch portion with second clutch teeth arranged thereon for interengagement with said first clutch teeth upon relative movement of said first clutch portion relative to said second clutch portion;

c. blocker means coacting with said first clutch portion and said second rotatable means for positively preventing engagement of said clutch teeth so long as a substantial difference in relative rotational speed exists between said first and second rotatable means, said blocker means including an annular blocker ring having a plurality of axially projecting struts, with said struts having blocking portions thereon;

d. some of said first clutch teeth being provided with spaces therebetween capable of receiving therethrough said axially projecting struts, including said blocking portions, when said struts and said spaces are axially aligned to



permit said blocking portions to relatively move axially into said spaces so that said clutch teeth can be engaged with one another; and

e. a surface on one of said blocker ring and ends of said struts removed from said blocker ring frictionally cooperating with a surface on said second rotatable means for offsetting said blocker means with respect to said first rotatable means whenever and for so long as a substantial difference in relative rotative speeds exists between said respective clutch portions, said blocking portions interfering with an annular side surface of said first clutch portion when said blocker means is circumferentially offset relative to said collar member so as to prevent engagement of said clutch portions.

4,027,757

COMPACT VIBRATION DAMPER

Edmund John Radke, Mount Clemens, and Joseph Louis Bair, Royal Oak, both of Mich., assignors to Borg-Warner Corporation, Chicago, Ill.

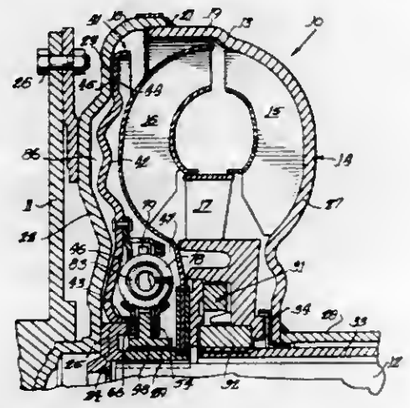
Filed Dec. 19, 1975, Ser. No. 642,508

Int. Cl.² F16D *3/66*

U.S. Cl. 192—106.2 **10 Claims**

1. A vibration damper for a clutch for a hydrodynamic device, comprising a hub having a flange, a plate assembly including a pair of plates disposed on opposite sides of said flange and spaced therefrom, said flange and plates each

having means defining a plurality of openings, resilient means disposed in each of said openings, and circumferentially spaced mounting legs on each said plate adapted to be secured to and located in a common plane of a driving member.



4,027,758

WET DISC CLUTCH AND METHOD OF FORCE COOLING THE SAME

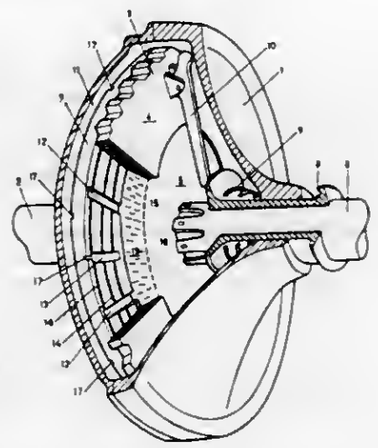
Värne Axel Gerhard Gustavsson, and Lars-Göran Moberg, both of Karlskoga, Sweden, assignors to AB Bofors, Bofors, Sweden

Filed Nov. 7, 1975, Ser. No. 629,954

Claims priority, application Sweden, Nov. 15, 1974, 7414359

Int. Cl.² F16D *13/72*

U.S. Cl. 192—113 B **12 Claims**



1. A method of force cooling a rotatable wet disc clutch, of the type having a pair of relatively movable discs which are provided with friction surfaces coupled to and disposed centrally around the input and output shafts of the clutch, during the slipping-in and subsequent engagement of said friction surfaces, said method comprising the steps of continuously feeding a pressurized cooling liquid into the region between the friction surfaces of the discs along evenly distributed radial distribution grooves provided in the surfaces of the discs, said radial distribution grooves extending from the inner edges of the discs nearest the input and output shafts across part of the width of the discs but not across their entire width, passing the cooling liquid from said radial distribution grooves through a plurality of cooling grooves which emerge from the radial distribution grooves and which are evenly distributed in the friction surfaces of the discs in directions generally parallel to the direction of rotation of the clutch, passing the cooling liquid from the cooling grooves into conveying grooves communicating with the cooling grooves and arranged radially between the radial distribution grooves, the conveying grooves extending across part of the width of the discs but not all the way to their inner edges, and passing the cooling liquid through said conveying grooves to constricted outlets adjacent the outer edges of the discs, said distribution grooves, when the clutch is engaged, being kept constantly filled with said cooling liquid under pressure, said constricted outlets causing the conveying grooves at the same time to be kept entirely filled with cooling liquid flowing from the cooling grooves, whereby the cooling liquid passing through said distribution grooves and said cooling grooves is forced to overcome the counter-pressure arising in the conveying grooves resulting from the filling of the conveying grooves with liquid due to said constricted outlets, the pressure in the cooling liquid which is fed to the distribution grooves being so selected that its said pressure together with the influence of centrifugal force on the cooling liquid produced by rotation of the clutch is capable of forcing cooling liquid in a sufficient and evenly distributed quantity through all the grooves in the disc surfaces of the clutch in sequence to produce the desired cooling effect.

4,027,759

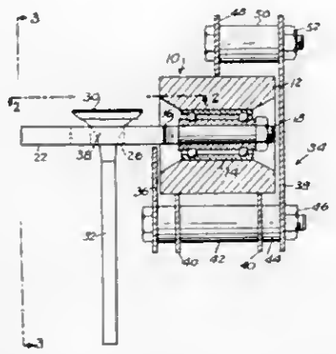
GRAVITY CONVEYOR SYSTEM

Walter H. Van Deberg, Berkley, Mich., assignor to F. Jos. Lamb Company, Warren, Mich.

Filed May 5, 1976, Ser. No. 683,631

Int. Cl.² B65G *11/00*

U.S. Cl. 193—1 **14 Claims**



1. A conveying system for workpieces of the type having a head and a depending stem portion of narrower cross section than said head comprising, a downwardly inclined chute assembly through which work support carriers are adapted to roll by gravity, said chute assembly including means forming a downwardly inclined support surface and lateral guide surfaces for causing the work carriers to roll along a predetermined path, each work carrier comprising a roller having cylindrical outer surface supported by the support surface of the chute assembly for rolling movement thereon and having radially extending faces adapted to be engaged by the guide surfaces on the chute assembly to guide the roller laterally, means providing an anit-friction bearing on said roller at the central rolling axis thereof, and an arm supported by said bearing and being rotatable relative to said roller, said arm extending laterally outwardly at one end of said roller beyond said support and guide surfaces so that the arm laterally overhangs said chute assembly at one side thereof, the free end portion of said arm being apertured to receive the stem of a workpiece, said apertured end portion being adapted to engage the underside of the head of the workpiece with the stem thereof extending downwardly through said aperture so that the workpiece is supported in a vertically oriented position.

4,027,760

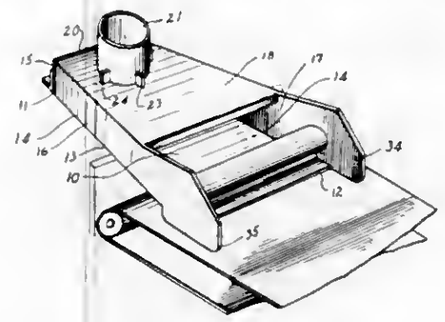
FEED BOX FOR LIQUID-SOLID MIXTURES

Robert L. Somerville, Old Amwell Road Rte. 1, Box 256, Neshanic, N.J. 08853

Filed Sept. 30, 1975, Ser. No. 618,075

Int. Cl.² B65G *11/08*

U.S. Cl. 193—2 R **3 Claims**



3. A sludge, slurry or liquid feeding device comprising a head box with inlet means for said feed,

sides and bottom to guide said feed,

an open end to direct said feed to a point of disposition,

means to hold the box bottom at an incline of about 22½ to about 60° to the horizontal, whereby the feed flows from said inlet down said incline to develop some velocity,

means terminating the bottom of the box transversely at the end of the incline in an upwardly directed arcuate lip to flip sludge upwardly, and a corresponding arcuate arrangement substantially semi-circular and spaced above said lip to reverse the direction of flow of sludge.

4,027,761

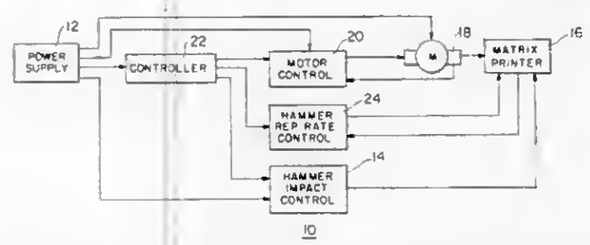
MATRIX PRINT HEAD IMPACT ENERGY CONTROL

Richard S. Quaif, Dryden, N.Y., assignor to NCR Corporation, Dayton, Ohio

Filed Oct. 21, 1975, Ser. No. 624,502

Int. Cl.² B41J *3/04*

U.S. Cl. 197—1 R **12 Claims**



1. In a matrix printer having at least one print head containing one or more print elements energized by a pulsed drive signal for printing matrix characters in accordance with character data as the printing head is moved across a printing medium, a print element drive control circuit supplied with electrical power from a power supply for varying said print element drive signal in accordance with variation of the power supply output voltage comprising:

means for generating a variable frequency clock signal whose frequency varies directly with the speed of movement of the printing head;

a summing amplifier for sensing the output voltage of said power supply and a reference voltage;

means responsive to said clock signal for deriving a plurality of synchronized trigger signals of the same frequency as said clock signal at different phases;

character data source coupled to a plurality of output registers;

means responsive to said trigger signals for pulse width modulating the output of said summing amplifier to drive a pulse drive signal;

and means for selectively coupling said pulse drive signal through said output registers for simultaneously energizing said print elements at each of said print heads in accordance with said data coupled to the output register associated with each of said print heads respectfully.

4,027,762

DOT PRINTER

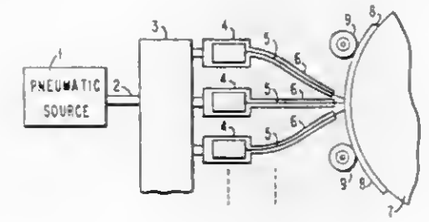
Shunsaku Nakauchi, Mitaka, Japan, assignor to Kokusai Gijutsu Kaihatsu Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 11, 1974, Ser. No. 522,962

Claims priority, application Japan, Nov. 10, 1973, 48-125932; Nov. 21, 1973, 48-130076; Dec. 26, 1973, 48-143983

Int. Cl.² B41J *23/20*

U.S. Cl. 197—1 R **12 Claims**



1. A dot printer comprising:

a pneumatic pressure source containing air compressed to a pressure higher than atmospheric pressure;

a plurality of pneumatic motors adapted to be actuated by the compressed air;

a dot-printing wire associated with each of said motors for imprinting a dot on a printing medium upon the actuation of the associated motor;

first electrically operated valve means for selectively permitting the transmission of the compressed air from said source to selected individual ones of said motors only in response to an electric signal representing a desired character pattern, whereby the selected motors are actuated to imprint the desired character pattern on the printing medium; said valve means comprising a plurality of first valves pneumatically coupled to respective ones of said plurality of motors and operated only in response to the electric signal to permit the transmission of the compressed air; and

second electrically operated valve means, coupled between said pneumatic source and said plurality of first valves and normally blocking the transmission of compressed air from said source to said first valves, for transmitting compressed air from said source simultaneously through all of the operated said first valves only after they are operated, and thence to said selected motors.

4,027,763

KEYBOARD FOR OFFICE MACHINES

Rinaldo Salto, Ivrea (Turin), Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Continuation of Ser. No. 531,719, Dec. 11, 1974, abandoned. This application Aug. 2, 1976, Ser. No. 710,671

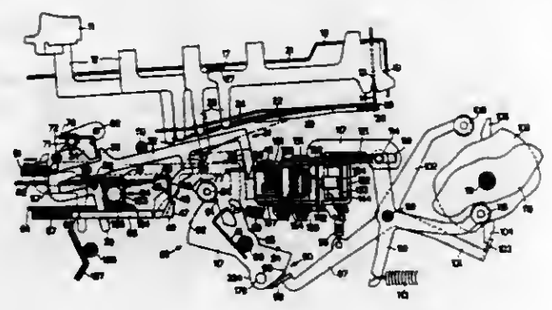
Claims priority, application Italy, Dec. 14, 1973, 70699/73

Int. Cl.² B41J *23/02*

U.S. Cl. 197—16 **24 Claims**

1. A keyboard for a typewriter, teleprinter, calculator and similar office machines comprising: a series of keys each movable from a rest position to a working position: a group of code-bars movably supported along a predetermined trajectory; spring means connected to said code bars for pulling said code-bars along said trajectory from a rest position to an active position; bridge means for controlling said code-bars against the action of said spring means; a series of setting

elements associated with said keys, each one of said setting elements being selectable by an associated one of said keys when said key is moved to said working position; a common setting member movably supported between an inoperative position and an operative position, said common setting member when in its operative position being engageable with said selected one of said setting elements to move said selected one of said setting elements into the trajectory of said code-bars, and means for causing a light load upon said selected setting element when another key is moved to said working position in unacceptably rapid succession to a first key, said means for causing a light load comprising a setting spring connected to said common setting member for causing movement of said common setting member from said inoperative position toward said operative position; releasing means normally arresting said common setting member in said inoperative position against the action of said setting spring; means operated by said keys when said keys are in said working position for operating said releasing means to release said setting member from said inoperative position whereby said setting spring moves said common setting member to said operative position and said common setting member thereby causes said selected setting element to move into the path of said code-bars; a starting clutch having a driving motive part, an actuatable driven part and a releasing member operable for connecting



said driving motive part to said driven part; an intermediate member connecting said common setting member to said releasing member for operating said releasing member to connect said driving motive part to said driven part when said common setting member moves toward said operative position; reloading means operated by said driven part of said starting clutch for returning said common setting member from said operative position to said inoperative position against the action of said setting spring; sensing means for sensing the selection of another of said setting elements by another said key moved to said working position while said common setting member is in the operative position; said sensing means being interconnected with said common setting member to permit said common setting member to engage said other of said setting elements only immediately after said common setting member returns to said inoperative position; and cam means operatively connecting the driven part of said starting clutch with said bridge means for positioning said bridge means with respect to said code-bars to control movement of said code-bars between said rest position and said active position so that said one and said other of said selected setting elements arrests in two following cycles some of said code-bars, against the action of said spring means, according to the coded combination corresponding to said one and said other key moved in said working position.

4,027,764

APPARATUS FOR CONFIRMING THE CORRECT IMPRESSION OF PRINTING CHARACTERS

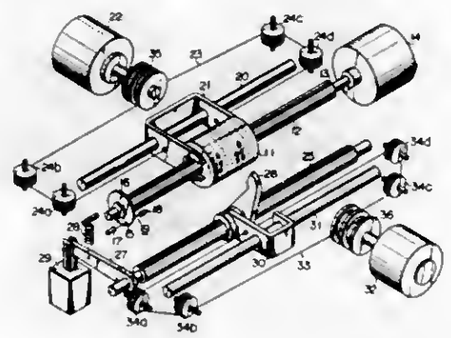
Toshio Kashio, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed June 22, 1976, Ser. No. 698,313

Claims priority, application Japan, June 24, 1975, 50-77871; Aug. 11, 1975, 50-97349

Int. Cl.² B41J *1/04*

U.S. Cl. 197—49 **6 Claims**



1. Apparatus for confirming a correct impression of printing characters in which the rotation angle of an axially movable, stepwise rotatable, printing drum on the outer surface of which at least one group of characters is arranged is so controlled that a designated character on the outer surface of the printing drum confronts a predetermined printing position on a recording medium for printing, said apparatus comprising:

first means for defining at least one rotational reference angle position of the printing drum at a given reference angle;

second means for designating the number of rotation steps required to cause a desired character on the outer periphery of the printing drum corresponding to a distance from said reference angle position of the printing drum to confront the recording medium;

third means for storing the number of said designated rotation steps;

fourth means for detecting a difference between the number of rotation steps stored in said third means and the number of rotation steps corresponding to that distance from said reference angle position of said rotating drum where a character to be next printed is located on the outer periphery of the printing drum;

fifth means coupled to said printing drum for effecting printing according to the detection output of said fourth means through a cummulative control of the rotation angle of said printing drum while sequentially and axially moving the printing drum;

sixth means for returning said printing drum to said reference angle position after printing is completed in a line on the recording medium; and

seventh means for checking a printing error for each line on the recording medium by comparing the number of rotation steps required for the printing drum to be returned to said reference angle position and the number of rotation steps corresponding to a distance from said reference angle position to that position at which the last character is to be printed in each line on the recording medium.

4,027,765

RECORD MEDIA DRIVE MECHANISM

Leslie L. Crump, and Victor J. Italiano, both of Trumansburg, N.Y., assignors to NCR Corporation, Dayton, Ohio

Filed July 31, 1975, Ser. No. 600,699

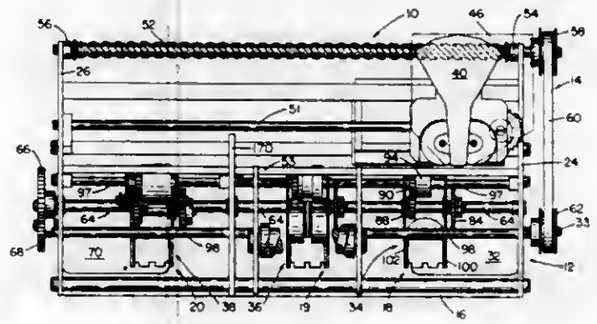
Int. Cl.² B41J *15/00*

U.S. Cl. 197—133 R **18 Claims**

1. Record media drive mechanism for accommodating a plurality of printing stations, at least one of said stations being

a receipt station, a journal station, or a form station, said mechanism comprising a drive member extending in juxtaposition past said plurality of printing stations,

modular means including roller means operably connected with said drive member for advancing record media in one direction of travel at one of said printing stations, said



modular means including side frame members for journaling said drive member and for containing said roller means, and means engaging with said side frame members for supporting and along which said modular means is movable thereby permitting operation of said modular means at another printing station.

4,027,766

INKING DEVICE FOR THE TYPE-CARRIER ELEMENT OF A CALCULATING MACHINE

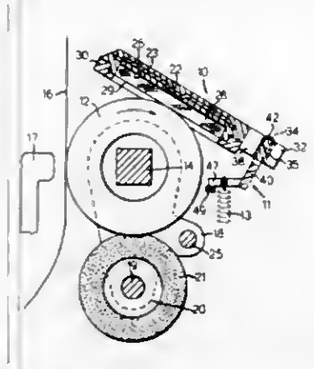
Enrico Sargentini, Turin, and Ugo Carena, Ivrea (Turin), both of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Filed July 8, 1975, Ser. No. 594,155

Claims priority, application Italy, July 15, 1974, 69241/74

Int. Cl.² B41J *35/02, 35/26*

U.S. Cl. 197—151 **6 Claims**



1. A device for inking the type-carrier element of a calculating machine or similar office machine of the type in which the type-carrier element includes a wheel having an edge with protruding characters and support means for effecting the rotation of said wheel to select a desired character and for effecting the movement of said wheel along a printing line to define the various writing positions of said wheel, the device comprising:

a container having a long window substantially the same length as the printing line;

an ink deposit element in the container;

a permeable, wear-resistant layer covering the ink deposit element at the window and in contact with the deposit element to permit the outflow of the ink;

a spring element for biasing said permeable layer tight against the type-carrier element during the rotation and movement of the wheel;

a support member connected to the office machine;

mounting means for removably mounting said container to said support member, said mounting means comprising stationary hooking means for hooking on said support and movable hooking means for hooking on said container and movable with respect to and into engagement with the stationary hooking means, wherein said stationary hooking means includes a pair of hooks and wherein said movable hooking means includes a flexible cross-bar having two ends each cooperative with one of said pair of hooks and means connecting the cross-bar to said container including intermediate ribs.

4,027,767

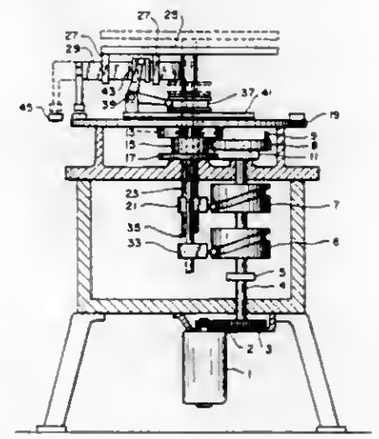
INDEXING MACHINE TRANSFER MECHANISM

William Gluck, P.O. Box 336, Monroeville, Pa. 15146

Continuation of Ser. No. 456,819, April 1, 1974, abandoned. This application July 24, 1975, Ser. No. 598,623

Int. Cl.² B23Q *7/02*

U.S. Cl. 198—339 **7 Claims**



1. In combination with an indexing machine of the type wherein various mechanical operations are performed on articles at workstations about a worktable rotatable about a center, the improvement which comprises:

a. a transfer means for picking up and placing the articles on the worktable;

b. a support means mounted on the indexing machine and in operative engagement with a drive shaft below the worktable for operation within the periphery of the worktable and penetrating the plane of the worktable for reciprocating the transfer means; and

c. a projection means mounted on the indexing machine in operative engagement with a drive shaft below the worktable for operation within the periphery of the worktable and penetrating the plane of the worktable within the periphery of the worktable for oscillating the transfer means between a first point beyond the periphery of the worktable and a second point within the periphery of the worktable, whereby the reciprocating action of the support means and the oscillating action of the projection means combine with the pickup action of the transfer means.

4,027,768

LOW LEVEL AUGER SPOUT

Richard R. Riessen, R.R. No. 1, Walcott, Iowa 52773

Filed Jan. 12, 1976, Ser. No. 648,427

Int. Cl.² B65G *33/14, 47/46*

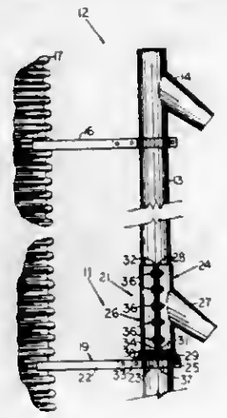
U.S. Cl. 198—370 **6 Claims**

1. An auger spout for use with vertical truck conveyors, the vertical truck conveyor being attached to a grain bin, the vertical truck conveyor having at the upper end thereof a down spout, the grain flowing out of the grain bin passing upwardly through the vertical truck conveyor and out through the down spout, said auger spout comprising:

a sleeve member, said sleeve member being detachably affixed to the vertical truck conveyor, said sleeve member being slidable along the length of and rotatable about the

vertical truck conveyor, said sleeve member having a first aperture formed through the side thereof;

a spout affixed to said sleeve member, said spout being affixed over said first aperture, said spout extending downwardly and angularly from said sleeve member, said sleeve member including elongated front and rear sleeve halves, said first aperture being formed through said front sleeve half, said spout being affixed to said front sleeve half over said first aperture, said sleeve halves being detachably joined along the longitudinal edges thereof, said spout being carried by said sleeve member; and



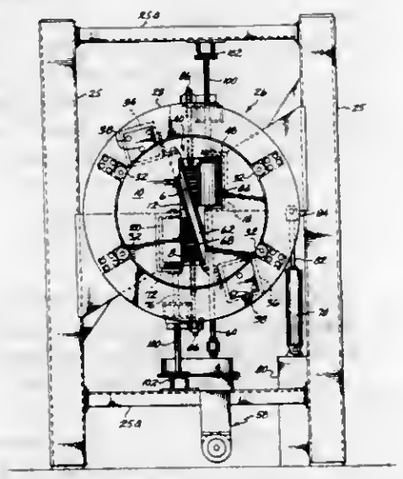
the vertical truck conveyor having a second aperture formed through the side thereof, said sleeve member slidable to a position directly over said second aperture, said sleeve member selectively rotatable to align said first aperture, said second aperture and said spout, whereby the grain is made to flow out of the vertical truck conveyor through said spout, said sleeve member slidable to a position completely away from said second aperture, whereby access to and through said second aperture is facilitated.

4,027,769

MACHINE FOR CONVEYING SECTOR SHAPED PIECES

Earl Dean Hasenwinkle, and Frank Wislocker, both of Longview, Wash., assignors to Weyerhaeuser Company, Tacoma, Wash.

Filed Jan. 7, 1976, Ser. No. 647,031
Int. Cl.² B65G *37/00*
U.S. Cl. 198—570 **12 Claims**



1. An apparatus for supporting and longitudinally conveying a pair of elongated similarly sized sector-shaped pieces in an orientation where said pieces are spatially offset from one another such that an apex of one piece is directed toward an apex of the other with the angles of said apexes being substantially similar and with at least one face of each piece being substantially parallel with the corresponding other face comprising:

a first V-shaped conveyancing channel comprised in part of means to support and engage for conveying at least one face of one of said pieces and in part of means to at least support said other face of said one piece, and further in part of means to support a base of the piece, and

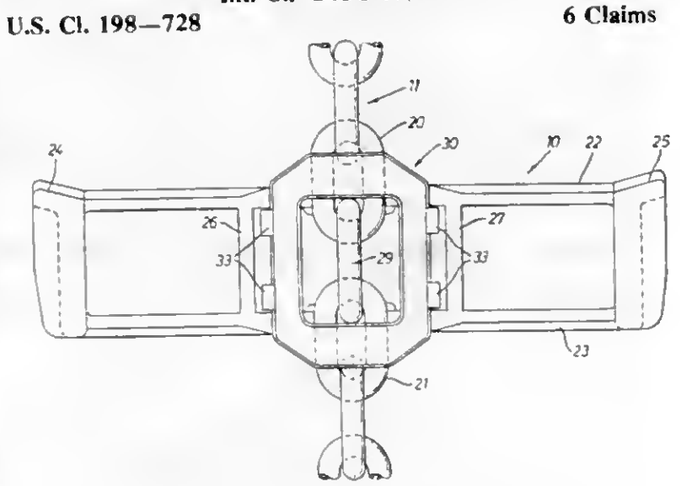
a second V-shaped conveyancing channel comprised in part of means to support and engage for conveying at least one face of the other of said pieces and in part of said means to at least support said other face of said other piece.

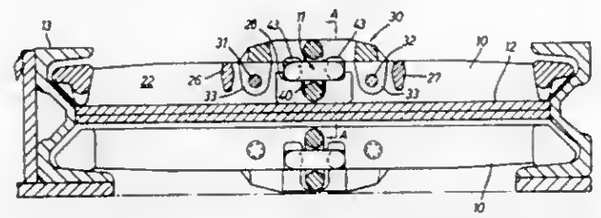
4,027,770

CONVEYOR CHAIN ASSEMBLIES HAVING SCRAPER BARS ATTACHED AT INTERVALS TO A CHAIN OR CHAINS

Paul Arthur Collier, Rock, near Kidderminster, England, assignor to Rellico Engineering Limited, Rock near Kidderminster, England

Filed Aug. 13, 1975, Ser. No. 604,269
Claims priority, application United Kingdom, Sept. 2, 1974, 38273/74
Int. Cl.² B65G *19/00*
U.S. Cl. 198—728 **6 Claims**





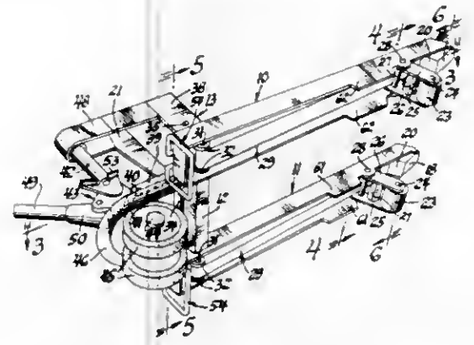
1. A conveyor chain assembly comprising, in combination, at least one endless chain in upper and lower runs, scraper bars attached at intervals along said chain, and a deck separating said upper and lower runs, each said bar having attachment means associated with a three link length of said chain to attach said bar to said chain, said three link length comprising two outer links and an intermediate link, said attachment means embracing said outer links and allowing articulation of said outer links relative to said bar whereby said chain may pass round a sprocket, wherein the planes of said outer two links are parallel to said deck, and further comprising a main frame part and an upper frame part to each scraper bar, said parts being secured together with said outer links restrained therebetween, and further comprising slots defined in said main frame part at a side thereof remote from said deck, said outer links being received in said slots and restrained therein by said upper frame part, and wherein said slots increase in depth towards the sides of said main frame part in the direction of said chain whereby to allow said articulation.

4,027,771

PALLET TRUCK FOR USE WITH FORK LIFT TRUCK

Thomas F. Adams, 28334 Ridgebrook Road, Farmington Hills, Mich. 48024

Filed May 8, 1975, Ser. No. 575,971
Int. Cl.² B66F *9/12*
U.S. Cl. 214—621 **19 Claims**



1. In a pallet truck having a pair of forks for movement under a palleted load, and wherein said forks are provided with movable load rollers and said pallet truck includes means for moving the load rollers between a raised position and a lowered position, the combination comprising:

a. each of said forks being hollow and open on at least one of its ends for the insertion of a fork lift into the fork for lifting the pallet truck and moving the same;

b. fork lift tine retainer means operatively associated with each of the pallet truck forks for retaining each fork on a fork lift tine inserted into the fork; and,

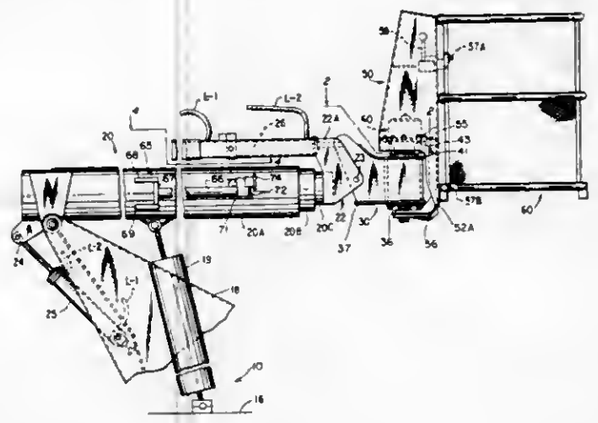
c. said fork lift tine retainer means including a looped member operatively associated with said means for moving the load rollers between a raised position and a lowered position, so as to move the retainer means to an inoperative position when the load rollers are in a raised position, and to an operative position when the load rollers are in a lowered position.

4,027,772

PROTECTIVE CIRCUIT FOR OVERLOAD SENSOR

Eugene L. Garber, McConnellsburg, Pa., assignor to Fulton Industries, Inc., McConnellsburg, Pa.

Filed Apr. 17, 1975, Ser. No. 568,932
Int. Cl.² E02F *3/84*
U.S. Cl. 214—762 **15 Claims**



1. In combination:

a load supporting boom, means including control circuit means comprising boom load increasing circuit means and boom load decreasing means for increasing and decreasing the loading of said boom,

a boom deflection detector comprising overload switch means and means for actuating said overload switch means upon excess deflection of said boom,

further circuit means connected to said overload switch means for interrupting said boom load increasing circuit means upon actuation of said overload switch means,

said further circuit means comprising means for maintaining said boom load increasing circuit means in interrupted condition independently of said state of said overload switch means, and

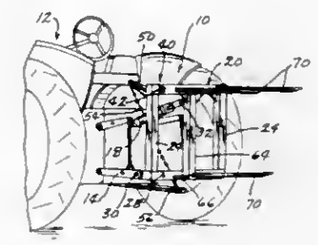
additional circuit means including re-set means for restoring said interrupted boom load increasing circuit means only upon movement of said overload switch means from the state thereof corresponding to the excess boom deflection state thereof and actuation of said re-set means.

4,027,773

BALED HAY LOADING AND TRANSPORT DEVICE

John B. Kenworthy, R.R. 4, Ottumwa, Iowa 52501

Filed Nov. 11, 1975, Ser. No. 631,147
Int. Cl.² B60P *1/00*
U.S. Cl. 214—766 **7 Claims**



1. A baled hay handling device comprising,

a frame having mounting means for connection to tractor lifting and stabilizer arms,

a hay-carrying arm pivotally connected to said frame for pivotal movement in a plane parallel to said frame,

a trio of hay-engaging fingers on said hay-carrying arm extending perpendicular to said arm and spaced in triangular relationship,

a lifting lever arm connected to said hay-carrying arm at said pivot to said frame and extending in substantially the opposite direction whereby a downward force applied to said lifting lever arm will cause said hay-carrying arm to be pivoted upwardly, and

said hay-carrying arm including a perpendicular downwardly extending portion intermediate the ends of said arm whereby said hay-carrying arm is T-shaped and said fingers are positioned on opposite ends of said hay-carrying arm and at the outer end of said arm portion.

4,027,774

RUBBISH CONTAINER

Leopold J. Cote, 17 Clifton St., Cambridge, Mass. 02138

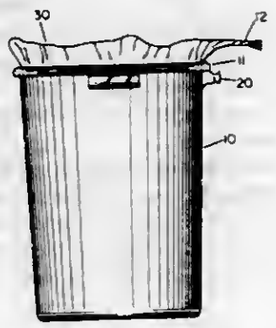
Filed July 22, 1975, Ser. No. 591,187
Int. Cl.² B65D *25/16;* **B65B** *67/12*
U.S. Cl. 220—63 R **6 Claims**

1. A container comprising:

a. a trash can having a rim about the mouth thereof;

b. a flexible plastic liner disposed within said trash can to receive rubbish therein, having an edge thereof tightened about the rim and twisted to form an ear

c. a notched member cooperating with the rim of said trash can arranged to receive the ear of the flexible plastic liner



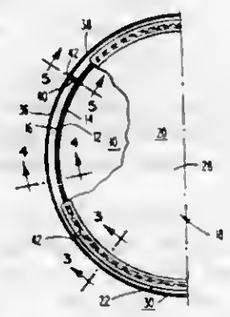
and hold the flexible plastic liner detachably and securely in an open configuration.

4,027,775

TAMPER-INDICATING CONTAINER AND LID THEREFOR

Leonard T. Mygatt, Jr., Wallingford, Pa., and Edward E. Goldsmith, Passaic, N.J., assignors to National Packaging Associates Corporation, Wallingford, Pa.

Filed May 28, 1975, Ser. No. 581,577
Int. Cl.² G65D 41/32
U.S. Cl. 220—266 13 Claims



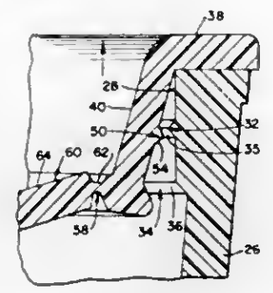
1. A tamper-indicating container and lid combination, comprising a container including a continuous sidewall having at its upper end a rim forming an open mouth; a lid including a central portion for removably closing the mouth of said container, and having a peripheral skirt extending downwardly from the periphery of said central portion and firmly engaging the exterior of said container below said rim; and that improvement comprising a guard flange formed about said sidewall and integrally therewith immediately below said skirt, with small clearance or no clearance between said guard flange and the bottom edge of said skirt, said guard flange extending away from said sidewall outwardly beyond said skirt whereby said guard flange shields the bottom edge of said skirt from forces which would otherwise remove said lid, said guard flange including a minor portion thereof comprising a removable section having a weakened part and a major portion thereof comprising a non-removable section, whereby said removable section may be removed to unshield a portion of said bottom edge of said skirt and thereby permit removal of said lid, and the non-removable section of guard flange being retained to guard a major portion of the bottom edge of said skirt if said lid is replaced during reuse of said container.

4,027,776

RECLOSEABLE CONTAINER

David Douglas, Indian Wells, Calif., assignor to Avon Products, Inc., Indian Wells, Calif.

Filed July 31, 1975, Ser. No. 600,274
Int. Cl.² B65D 43/10
U.S. Cl. 220—281 16 Claims



1. A resealable container comprising container means and closure means sealingly cooperating with said container means, said container means having a sidewall with at least one open end portion defining an opening, said open end portion having first sealable means for enabling the formation of two separate and positive seals substantially about the periphery of said open end portion, said closure means including, in integral combination, a generally peripheral shoulder portion being seated on said open end portion, a flange portion connected to said shoulder portion and defining second sealable means for sealingly interfitting and cooperating with said first sealable means to provide the two separate and positive seals, said second sealable means including bead means sealingly interfitting and cooperating with said first sealable means for defining one of said two seals, and flexible means for enabling quick and easy disengagement and engagement of the two separate and positive seals formed by said first and second sealable means, said flexible means includes a generally displaceable actuating means and toggle hinge means including a web portion having a thickness less than the adjacent actuating means and bead means and being arranged to be centrally interconnecting said displaceable actuating means to said bead means, such that in response to downward displacement of said actuating means said toggle hinge means including a web portion increases the effective diameter of said bead means so that said bead means engages said first sealable means, said bead means whenever engaged with said first sealable means in the assembled position forms one of said two seals and said toggle hinge means including a web portion enables said bead means to have the effective diameter thereof decreased in response to further downward displacement of said actuating means from the assembled position so that said second sealable means including said bead means and said first sealable means are disengaged to thereby break open both said seals.

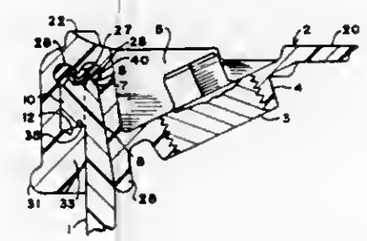
4,027,777

PAIL ASSEMBLIES

Richard H. Blanke, Jr., 1224 Dubray Court, Kirkwood, Mo. 63022

Filed Oct. 6, 1975, Ser. No. 619,633
Int. Cl.² B65D 41/06
U.S. Cl. 220—295 5 Claims

1. In a pail assembly including a pail having a side wall with a rim circular in top plan, and a plastic lid capable of being sealingly mounted on said pail, the improvement comprising an annular rib extending uninterruptedly around the pail rim, a plurality of peripherally spaced pail lugs on and integral with said side wall adjacent the said rim, each of said pail lugs having a rib parallel to, in the same plane with, and spaced outwardly radially from the uninterrupted rib of the rim, and, along its lower surface at one end an inclined cam surface tending away from said rim; said lid having an internal annular skirt on, integral at and along its upper edge with and depending from said lid, and of a shape and outside diameter complementary to the inside surface of the pail side wall adjacent said rim for engaging one another snugly when said lid is mounted on said pail, annular flange integral with said lid, spaced outwardly radially of said skirt and defining with said skirt a channel having a closed bottom wall and an open mouth, said bottom wall having an annular nose, projecting from the bottom wall toward the open mouth, which, when the lid is mounted, is positioned radially between the uninterrupted rim rib and the lug rib, a plurality of peripherally spaced radially



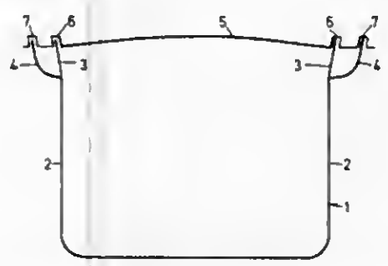
inwardly extending flange lugs integral with said flange and spaced outwardly from said closed bottom wall toward said open mouth, of a peripheral length less than the space between successive pail lugs with which said flange lugs are to engage, said flange lugs having a bearing surface extending radially inwardly and shaped and positioned to engage a pail lug bearing surface, said nose, side walls of the flange and skirt bottom wall defining a gasket seat, and an annular gasket seated in said seat, said gasket being compressed between said nose and said ribs when the lid is mounted on the pail.

4,027,778

CONTAINER FOR FOODSTUFFS OR THE LIKE

Earl Silas Tupper, Panama City, Panama, assignor to Tupl (Panama) S.A., Panama City, Panama

Filed Dec. 15, 1975, Ser. No. 641,112
Claims priority, application United Kingdom, Dec. 19, 1974, 54988/74
Int. Cl.² B65D 43/06, 43/08
U.S. Cl. 220—354 9 Claims



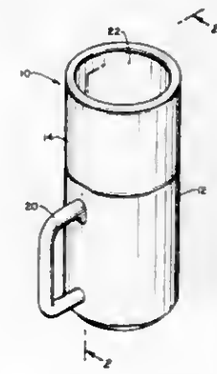
1. The combination of (A) a container for food or drink, said container comprising a base and an integral peripheral wall, said wall having a free upstanding rim around the top and a member conncted to said wall below said rim and extending away from the wall and thence upwardly, terminating in a free upstanding upper edge, to define a moat therewith, and (B) a lid having structure defining a seal both (a) with the said rim of the container around the top of the peripheral wall and (b) with the said upper edge of the upwardly extending member defining the moat or channel.

4,027,779

SERVING CONTAINER FOR HOT LIQUIDS

Carol De Long, 5938 Cahuenga, North Hollywood, Calif. 91601

Filed Aug. 11, 1975, Ser. No. 563,177
Int. Cl.² A47G 19/22; B65D 21/02
U.S. Cl. 220—23.83 1 Claim



1. A serving container comprising:
a first container having a single access opening therein, said access opening providing an access into a liquid retaining chamber, said first container having a lip surrounding said access opening, said first container including a handle;
a second container having a first compartment and a second compartment, a common wall separating said first compartment and said second compartment, said first and second compartments being substantially equal in volume with their volume being approximately one-half of said liquid retaining chamber of said first container, said common wall being integral with said second container; and
means connected to the wall of said second container in the area of said second compartment for interconnecting with said first container, whereby said second container is adapted to be placed upon said first container with said means interlocking said second container with said first container to form a single unit, said means comprises an annular flange and an annular shoulder, with said second container placed upon said first container said annular flange extending within the confines of said first container and said annular shoulder resting upon the lip of said first container, with said second container placed upon said first container said first compartment being capable of containing a tea bag as well as other items while said common wall essentially closes said access opening of said first container, thereupon said second container may be removed from said first container after removal of the contents from said first compartment and said second container be inverted and placed upon a planar supporting surface with the said second compartment being capable of containing items such as the used tea bag.

4,027,780

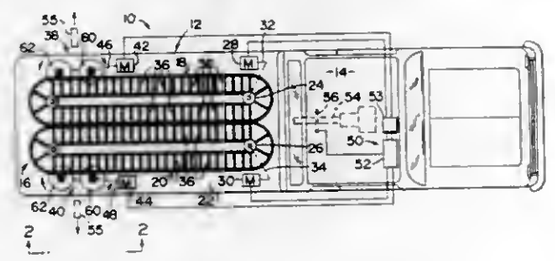
PAPER THROWER

Robert J. Dikman, 1811 1/2 Shore Drive South, South Pasadena, Fla. 33707

Filed Aug. 1, 1975, Ser. No. 601,084
Int. Cl.² G06F 15/50
U.S. Cl. 221—7 7 Claims

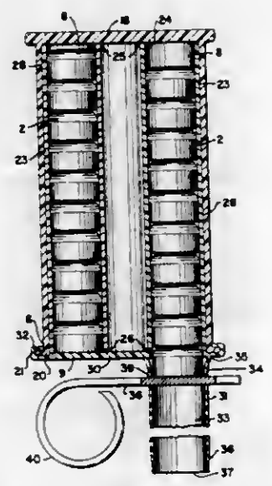
1. An object delivery system used in combination with a mobile supporting platform, said delivery system comprising: carrying means movably mounted on said mobile platform, said carrying means configured to carry a plurality of predetermined objects thereon; delivery means comprising at least one pair of opposing discs disposed in communicating relation to said carrying means; carrier drive means connected in driving relation to said carrying means; said mobile platform comprising a drive assembly connected thereto to receive power from a power source and disposed to drive said mobile

platform and cause movement thereof; control means interconnected between said drive assembly of said mobile platform and said carrier drive means; encoder means mechanically attached to said drive assembly, said encoder means physically and electronically configured to translate mechanical movements of said drive assembly into electrical pulses, said encoder means being electrically connected in pulse-communicating relation to said control means; said control means comprising logic means including reference storage facility containing prestored reference information and comparator means electrically connected to said logic means, said



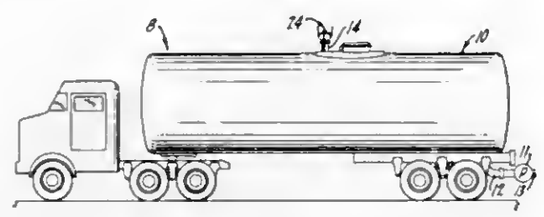
comparator means connected in circuitry to said encoder means whereby said comparator means compares incoming data from both said encoder means and said storage facility; and indicator means mounted on said platform and electrically interconnected to said control means, said indicator means elelctrically configured for actuation upon signal response defined by a predetermined occurrence, whereby activation of said carrying means and said delivery means automatically occurs on a periodic basis dependent upon a predetermined length of travel of said drive assembly of said mobile platform and the resulting speed of operation of said drive assembly.

4,027,781
PRIMER FEED CARTRIDGE
John S. Covert, 320 E. Nettleton, Independence, Mo. 64050
Filed Mar. 17, 1976, Ser. No. 667,511
Int. Cl.² B65H *3/32*
U.S. Cl. 221—105 **3 Claims**



1. A primer container for automatically feeding primer caps into a shell reloading tool, said container comprising:
   a. a cylindrical body having a closed end, a central axis, and a dispensing end, said body dispensing end includes an interior circumferential rim;
   b. a first closure cap fixedly attached to said body closed end;
   c. a second closure cap rotatably mounted to said body dispensing end;
   d. a storage magazine member disposed within said container and including a plurality of mutually parallel, elongated, receptacles spaced radially equidistantly from the central axis of said body, each of said receptacles having interior cross-sectional dimensions slightly larger than a primer cap dimensions and being adapted to slidingly receive therein a plurality of stacked primer caps;
   e. said second cap includes a centrally apertured dispensing spout being disposed therein for selected rotational registry with said storage member receptacles and being adapted for gravitationally transmitting said primer caps from said container to a press portion of said shell reloading tool;
   f. said second closure cap includes a flat circular portion and a peripheral collar portion attached perpendicularly thereto, said collar portion having a circumferential groove therein mating with said rim for cooperating, sliding, rotational contact therewith;
   g. said second closure cap is removably attached to said body dispensing end;
   h. a third imperforate closure cap is removably attached to said body dispensing end when said second closure cap is removed therefrom, thereby providing an airtight storage seal for said container; and
   i. said second and third closure caps respectively include a flexible and resilient portion for removable attachment to the body dispensing end.

4,027,782
METHOD AND APPARATUS FOR DISCHARGE OF HOT ASPHALT TANKER
Adason Morey Miller, 400 Blackstone, LaGrange, Ill. 60525
Filed Mar. 25, 1976, Ser. No. 670,185
Int. Cl.² B67D *3/00*
U.S. Cl. 222—1 **7 Claims**

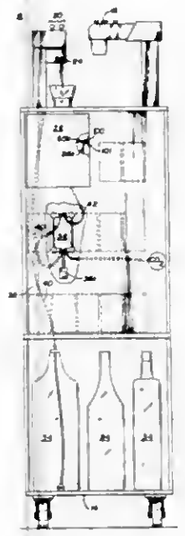


1. The method of discharging hot asphalt from a heated tanker of the kind comprising a large sealed manhole opening connected to the tank, a discharge conduit connected to the bottom of the tank, and having a small normally closed vent connected to the top of the tank, comprising:
   initiating high-velocity pumping of hot asphalt from the tank, through the discharge conduit;
   and subsequently promptly opening the small vent to allow entry of air into the tank, without release of noxious fumes to the atmosphere, to preclude a pressure reduction in the tank sufficient to collapse the tank,
   while maintaining the manhole opening sealed throughout the discharge operation.

4,027,783
TALLYING BEVERAGE DISPENSER
William C. Branch; Oliver W. Cole, and Robert P. Kidd, all of Dallas, Tex., assignors to Booth, Inc., Carrollton, Tex.
Filed Aug. 28, 1975, Ser. No. 608,454
Int. Cl.² B67D *5/24*
U.S. Cl. 222—26 **12 Claims**

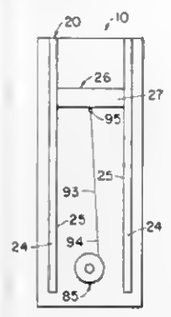
1. In a beverage dispenser in which measured quantity of liquid is drawn from a supply container and dispensed through an output line leading from said measuring means, the combination which comprises:

   a. counter means having an input actuator to increment said counter, and



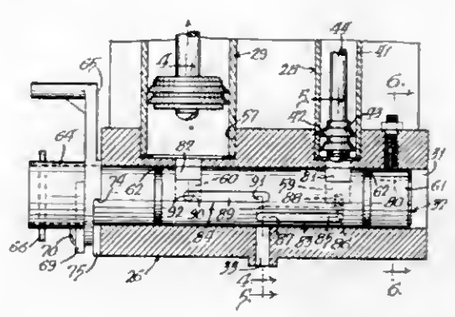
   b. means responsive only to liquid pressure connected to said output line for actuating said counter once for each delivery of liquid through said output line.

4,027,784
TUBE DISPENSER
Gary Mattson, Box 280, Nashwauk, Minn. 55769
Filed Aug. 24, 1976, Ser. No. 717,026
Int. Cl.² B65D *35/28*
U.S. Cl. 222—102 **9 Claims**



1. A device for holding a collapsible tube and dispensing the contents thereof, comprising:
   a. a frame adapted for vertical mounting and including a vertical trackway,
   b. a carriage supported on said trackway for movement along a tube adapted to be positioned with in said frame,
   c. compressor means operatively associated with said carriage including:
      1. a first press roll freely rotably supported on said carriage for engaging one side of the tube, and
      2. a second press roll freely roatably supported on said carriage for engaging the other side of the tube and mounted in fixed spaced apart relation to said first press roll so as to expel the contents of the tube as said carriage is moved downwardly relative to the tube,
   d. valve means removably carried by said frame at the lower end of said trackway, said valve means including:
      1. a valve member having a valve discharge port with a seat communicating with said valve discharge port and adapted for receiving the discharge end of the tube to locate the same in alignment with said trackway, and
      2. a valve stem adapted to be moved between an open position in communicating relation with said discharge port to a closed position in non-communicating relation with said discharge port,
   e. tension means for applying a downwardly directed force to said carriage which is operable to effect step-by-step movement thereof in tube-collapsing advance along the tube for expeling the contents thereof, said tension means being activated when said valve stem is moved into said open position to permit the contents of the tube to flow outwardly therefrom and deactivated when said valve stem is in its closed position, and
   f. said tension means includes:
      1. at least one spool rotatably mounted relative to said valve member,
      2. a coiled tension spring mounted relative to said spool to apply a continuous torque thereto, and
      3. means connecting said spool to said carriage to provide continuously thereto a downwardly directed force of said first and second press roll, such that the downward movement of said carriage automatically occurs when said valve stem is in said open position.

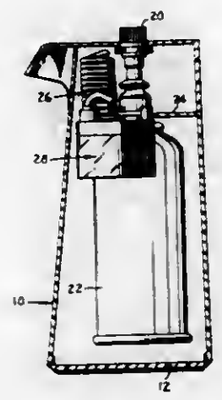
4,027,785
DUAL PUMP COLORANT DISPENSER
Keith G. Edstrom, Park Ridge, and Gene K. Edstrom, Arlington Heights, both of Ill., assignors to Chicago Commutator, Inc., Wheeling, Ill.
Filed Apr. 12, 1976, Ser. No. 675,759
Int. Cl. B67d *5/56*
U.S. Cl. 222—135 **10 Claims**



1. In a colorant dispenser of the type which has a colorant canister supported on a platform, a shelf at a side of the platform on which a paint container may rest to receive colorant from said canister, first and second vertically oriented measuring piston pumps positioned side by side in operative association with the canister for dispensing precise quantities of colorant from the canister, said first pump having a predetermined maximum capacity and said second pump having a maximum capacity which is an even multiple of the maximum capacity of said first pump, and a single valve to control the discharge of colorant from both said pumps to a container, the improvement comprising:
   a base for the canister and pumps which has a horizontal bore beneath the pumps;
   a first intake passage in the base connecting the canister to said bore in the vertical plane of the first pump;
   a second intake passage in the base connecting the canister to said bore in the vertical plane of the second pump;
   a single exit port from the bore to the exterior of the base, said exit port being in a transverse vertical plane between the pumps;
   and a barrel valve member mounted in the bore for rotation between an intake position, a first dispensing position and a second dispensing position;
   said valve member having a first inlet which communicates with the first passage and with the first pump when the valve member is in intake position;
   said valve member having a second inlet which communicates with the second passage and with the second pump when the valve member is in intake position;

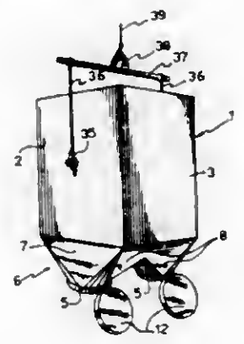
a first discharge passage in the valve member which extends from the first inlet to a first part of the valve surface which is in the same transverse vertical plane as the exit port and which is circumferentially spaced from said exit port when the valve is in intake position;
a second discharge passage in the valve member which extends from the second inlet to a second part of the valve surface which is in the same transverse vertical plane as the exit port and which is circumferentially spaced from said exit port when the valve is in intake position, said first and second parts of the valve surface being circumferentially spaced from one another;
means for rotating said valve member from said intake position in which neither discharge passage communicates with the exit port selectively to said first dispensing position in which the first discharge passage communicates with the exit port or to said second dispensing position in which said second discharge passage communicates with said exit port, each inlet being closed to the canister when its discharge passage communicates with the exit port;
positive stop means for stopping rotation of the valve member at its intake position and at its second dispensing position;
and detent means for arresting rotation of the valve member at its first dispensing position;
whereby either metering pump may be selectively operated to charge it with a desired amount of colorant when the valve member is in intake position, and the valve member may then be rotated selectively to the dispensing position which places the charged pump in communication with the exit port so the charge of colorant may be dispensed through said port.

4,027,786
APPARATUS FOR HEATING DISPENSABLE FLOWABLE MATERIAL
William D. Ryckman, Jr., Asheboro, N.C., assignor to General Electric Company, Bridgeport, Conn.
Filed Mar. 22, 1976, Ser. No. 669,305
Int. Cl.² H05B 1/02; B67D 5/62
U.S. Cl. 222—146 HA **5 Claims**



1. Apparatus for heating flowable material from a pressurized container in a housing with a heat exchanger assembly having an inlet and outlet and passage means conducting the material therebetween, and electric heating means in heat transfer relation with said passage means, the improvement in control means for said heating means comprising,
a substantially flat non-conducting chassis,
electric conductors through said chassis and sealed thereto,
an adjustable thermostat supported on one side of said chassis and connected to said conductors,
an extending heat conducting closed tube in fluid tight seal with said chassis on the other side thereof and having said heating means therein,
said passage means disposed around said tube for said heat transfer relation,
a biased axially and rotatably movable control rod extending through said chassis and sealed thereto,
cam means rotatable by said rod connecting to said thermostat,
said rod disposed to activate the thermostat on axial movement and adjust it through said cam on rotation, and
a non-conducting cover hermetically sealed to said chassis enclosing the thermostat and all connections thereto,
whereby said electrically and fluidically sealed control means provides both adjustable material temperature selection and turn-on with a single control rod.

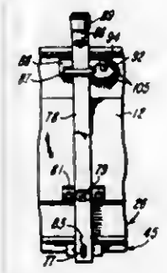
4,027,787
SHIPPING CONTAINER
Marcel Bibeau, 4611 Castel d'Autray, St. Felix de Valois, Joliette County, Quebec, and Marcellin Barrette, 1013 Berard Avenue, Val d'Or, Abitibi East, Quebec, both of Canada
Filed Feb. 5, 1976, Ser. No. 655,380
Int. Cl.² B67D 5/64, 3/00
U.S. Cl. 222—166 **2 Claims**



1. A shipping container for particulate material, comprising a container portion of square or rectangular cross-section with a closed flat bottom and flat side walls having a straight top edge uniformly distant from said bottom, and a dual funnel portion forming a pair of funnels both tapering upwardly from the top of said container portion in lateral relationship and forming a pair of equal diameter circular mouths truncating the smaller end of the funnels respectively and located at the same level and along a line parallel to and equally distant from a first pair of parallel side walls, both funnels including a pair of equally inclined flat walls each common to both funnels and joining with the top edges of the first pair of side walls respectively, both funnels further including an inclined outer flat wall joining with the top edge of the side wall of the second pair of side walls, and an inclined inner flat wall joining with the inclined inner flat wall of the other funnel along a straight line parallel to, above and equally distant from the top edges of the side walls of said second pair, said outer flat walls forming a steeper funneling angle than that of said inner flat walls, a circular cover for closing each mouth pivoted to the latter about a pivotal axis parallel to said first pair of side walls for pivotal movement between a mouth closing position engaging said mouth and a mouth opening position lying against said funnel, latch means carried by said funnels engageable with said covers to removably latch the latter in closed position, a tube extending through said container portion, secured to, opening and terminating at said other pair of side walls, said tube parallel to said bottom and to said first pair of said side walls, said tube serving to receive a supporting rod about which said container can be supported and pivoted, said container being free of any projections, such as said covers, whether open or closed, said latch means and said tube, which would protrude from said side walls, so that several shipping

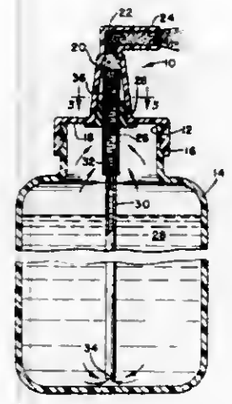
containers can be positioned side by side with their side walls in contact.

4,027,788
SPREADER FOR FERTILIZER, SEED AND THE LIKE
Richard W. Parker, and Arthur L. Kaeser, both of Springfield, Ohio, assignors to Parker Sweeper Company, Springfield, Ohio
Filed Mar. 15, 1976, Ser. No. 666,667
Int. Cl.² A01C 15/00
U.S. Cl. 222—614 **21 Claims**



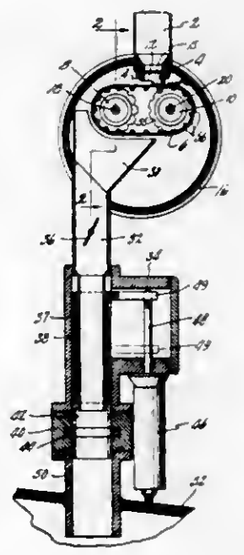
1. An improved spreader for distributing a flowable material on the ground, comprising a hopper having opposite end walls connected by opposite side walls and adapted to receive the material, means supporting said hopper for ground traversing movement, means extending from said hopper to facilitate moving said hopper over the ground, said side and end walls of said hopper having lower edge portions defining a generally rectangular opening, an elongated bottom extrusion forming a bottom wall for said hopper and extending generally between said end walls for closing said opening, means for securing said bottom extrusion to said side walls of said hopper, means defining a first series of longitudinally spaced apertures within said extrusion, said bottom extrusion including an integral lower portion defining a longitudinally extending guideway, an elongated slide member supported for longitudinal movement within said guideway, means defining a second series of longitudinally spaced apertures within said slide member and cooperating with said first series of apertures to provide for a flow of material from said hopper, and means for adjustably positioning said slide member longitudinally within said guideway for controlling the flow of material through said apertures.

4,027,789
FOAMING DEVICE FOR HIGH SOLIDS CONTENT FOAMABLE LIQUIDS
Clarence A. Dickey, Atlanta, Ga., assignor to Glasrock Products, Inc., Atlanta, Ga.
Filed Sept. 10, 1975, Ser. No. 612,039
Int. Cl.² B65D 37/00
U.S. Cl. 222—190 **12 Claims**



1. In a foaming device for mixing foamable liquid with a gas overlying the liquid and to dispense the mixture as a foam under pressure of a magnitude on the order of pressures developed by manual collapse of an elastomeric bottle adapted to contain the liquid and gas, the improvement comprising:
means defining an imperforate foam discharge passageway;
a tube having a continuous wall of porous material and depending from said means as an extension of said passageway to a lower end elevated above the level of foamable liquid to be dispensed;
an imperforate dip tube depending from said porous tube as a further extension of said passageway to a lower end to be submerged in the foamable liquid; and
an elongated static mixer in said passageway at or above the level of said porous tube said static mixer being operable to impede direct upward flow of liquid through said passageway and to insure foam generation by mixing of liquid with gas passing into said passageway through the wall of said porous tube along the length thereof and without passage of liquid outwardly through the porous tube wall.

4,027,790
APPARATUS FOR DELIVERING PARTICULATE MATERIAL AT A SELECTED RATE
Jerry A. King, Palm Beach Gardens, Fla., assignor to United Technologies Corporation, Hartford, Conn.
Filed Dec. 4, 1975, Ser. No. 637,625
Int. Cl.² G01F 11/10
U.S. Cl. 222—285 **3 Claims**



1. Apparatus for delivering particulate material at a selected rate including:
a vertically positioned delivery spout for the particulate material having a removable bottom end opening,
a conveyor belt positioned in closely spaced relation below said end opening and having a delivery end, the conveyor belt having a large number of closely spaced plates forming the operative surface of the belt, with the spacing of the belt from the opening establishing a quantity control,
means positioned directly between the spout and the bottom end opening for adjusting the position of said opening relative to the belt,
a scoop below the delivery end to receive the particulate material from the belt, and
means for driving the belt at such a speed as to deliver particulate material at the selected rate from the spout to the scoop.

4,027,791

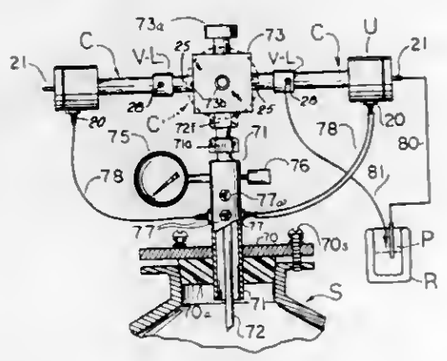
GAS-ENERGIZED LIQUID TRANSFER AND CONTROL SYSTEM

W. Edward Samuels, 402 W. Blackbeard Road, Wilmington, N.C. 28401

Division of Ser. No. 482,338, June 24, 1974, Pat. No. 3,938,554. This application Feb. 12, 1976, Ser. No. 657,446

Int. Cl.² B65D *83/14*

U.S. Cl. 222—396 **5 Claims**



1. A manifold device for cluster mounting, at the mouth of a Dewar flask or like storage vessel for cryogenic liquid, a plurality of N gas-energized fluidic control controller units each including a liquid valving section having a liquid inlet end formation and a liquid outlet and a gas-energized control section having a gas inlet connection, and comprising:

closure means for the vessel mouth;

a gas manifold tube having one end extending through said closure means for communication with gas space having the normal liquid fill of the vessel, and the other end projecting upwardly beyond the closure means;

a liquid riser tube having its upper end sealed gas-tight to and projecting from the upper end of the manifold tube, and extending downwardly through the manifold tube and adapted to reach into a liquid-occupied space of the vessel;

a liquid shutoff valve having

an inlet portion of its body connected to said riser tube,

an N-plurality of connection means on the valve body respectively adapted to have a liquid inlet end formation of a respective controller unit sccured supportedly thereto;

said gas manifold tube having on its upwardly extending portion

a plurality of at least N gas outlet connection fittings whereby the respective energizing gas connections of a plurality of N units mounted on said shutoff valve are connectable to the Dewar flask gas region;

and

a pressure regulating pop-off valve communicating by a passageway through said closure means with said gas space.

4,027,792

LOOP FORMING CHAIN

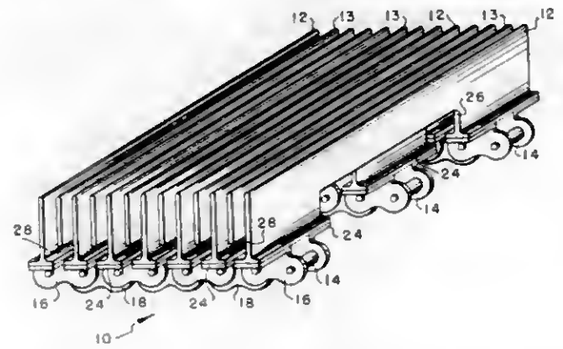
Sheldon M. Jeter, LaGrange, Ga., assignor to Milliken Research Corporation, Spartanburg, S.C.

Filed Apr. 5, 1973, Ser. No. 348,329

Int. Cl.² B65G *15/00*

U.S. Cl. 198—618 **1 Claim**

1. An improved chain construction for a conveyor system comprising: at least two chains spaced from one another, each of said chains having alternately connected inside chain lugs and outside chain lugs, each of said chain lugs of each chain having attaching elements connected thereto, a first elongated element mounted on the attaching element of the outside lug of the first chain, a second elongated element mounted adjacent and substantially parallel to the first elongated element on the attaching element of the outside lug of the second chain, a third elongated element mounted adjacent and substantially parallel to said second elongated element on the inside lug of said first chain and means maintaining said chains and elongated elements in a fixed relationship to one another,



each of the elongated elements mounted on one chain having a cut out portion adjacent the attaching element of the other chain to prevent interference.

4,027,793

SCRAPER CHAIN CONVEYOR

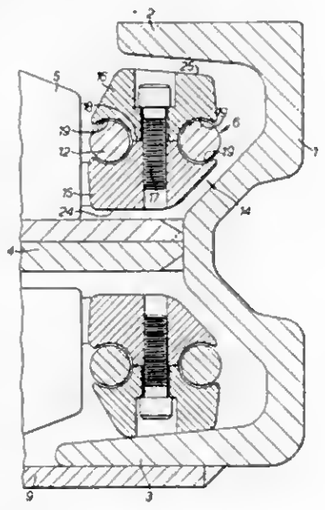
Friedrich Lampl, Cheltenham, and Thomas Campbell Paul, Worcester, both of England, assignors to Dowty Meco Limited, Worcester, England

Filed May 7, 1974, Ser. No. 467,811

Claims priority, application United Kingdom, May 7, 1973, 21536/73

Int. Cl.² B65G *19/00*

U.S. Cl. 198—719 **1 Claim**



1. A scraper chain conveyor comprising a plurality of conveyor pans secured together in end-to-end relation to provide slight relative misalignment between each adjacent pair of pans, the pans together defining a conveyor channel, at least one chain movable lengthwise of the channel, the chain comprising a plurality of similar interconnected oval links giving universal flexing capability between each adjacent pair of links, a plurality of scrapers mounted at spaced intervals along the chain to engage the conveyor channel over a substantial part of its width to propel loose material along the channel, a plurality of wear pads secured to each chain at links spaced from the scraper positions, each wear pad having a flat wear surface capable of engaging the channel whose dimension transverse to the direction of chain movement is within a range from slightly less than the width of the wire of the links to slightly greater than the width of the link, and whose dimension in the direction of chain movement is substantially greater than the space between the curved ends of two links which connect with the link carrying the wear pad, a pair of

recesses being provided in the pad to accommodate the said curved ends, the wear surfaces of said pads between adjacent pairs of scrapers being spaced above said channel when the associated said pair of scrapers is supported on said channel.

4,027,794

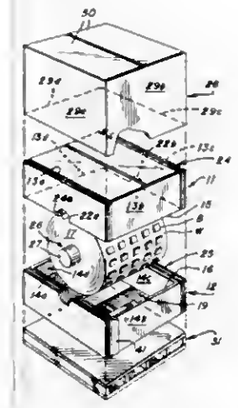
SHIPPING CONTAINER

Gregory J. Olson, Burlington, Wis., assignor to Packaging Corporation of America, Evanston, Ill.

Filed Feb. 17, 1976, Ser. No. 658,707

Int. Cl.² B65D *85/672, 5/36*

U.S. Cl. 206—395 **6 Claims**



1. A container for accommodating a cylindrical unit provided with axially disposed protrusions at opposite ends thereof, said container comprising a pair of foldable complemental housing sections adapted to assume either a collapsed or setup state, said housing sections having one of said sections disposed in an inverted superposed relation with the other section whereby said sections coact to form a unit-accommodating compartment; each housing section including foldably connected wall panels having corresponding first edges delimiting an open end, the wall panel first edges of said housing sections being in substantially abutting relation when said sections form said unit-accommodating compartment, each housing section having a first pair of wall panels in opposed relation and having interior surfaces positioned adjacent the opposite ends of the unit when the latter is disposed within the unit-accommodating compartment; said first pair of wall panels of each housing section being adapted to be in substantially parallel close proximity to each other when said section is in a collapsed state; and substantially inflexible reinforcing pads affixed to exterior surfaces of said first pair of wall panels of each housing section, said pads and the first edges of the wall panels connected thereto having means on peripheral portions thereof adapted to supportingly engage the unit protrusions when the unit is accommodated within said compartment.

4,027,795

DISPENSER PACK FOR CONTINUOUS STATIONERY

Peter Charles Edwin Rigden, Horsham, England, assignor to Spicers Limited, Sussex, England

Filed Jan. 12, 1976, Ser. No. 648,205

Claims priority, application United Kingdom, Jan. 13, 1975, 1281/75

Int. Cl.² B65D *85/67*

U.S. Cl. 206—409 **12 Claims**

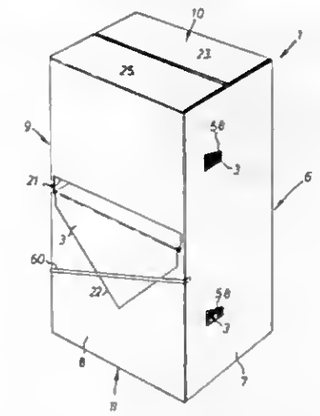
1. A dispenser pack for continuous dispensing of stationery in web form from a roll thereof comprising:

a closed rectangular container having a top, a bottom, a front wall, a rear wall and a pair of side walls,

a rectangular carrier having a rear wall, a pair of side walls and top and bottom walls, said carrier being open at its front, said carrier being disposed in the container

said side walls of the carrier including means for rotatably supporting at least one roll of said stationery between the side walls of the carrier,

the front wall of the container having a transversely extending slot formed therein to permit the web of stationery to pass therethrough from the interior of the container, said transversely extending slot being located on the front wall between the top and bottom of the front wall.



4,027,796

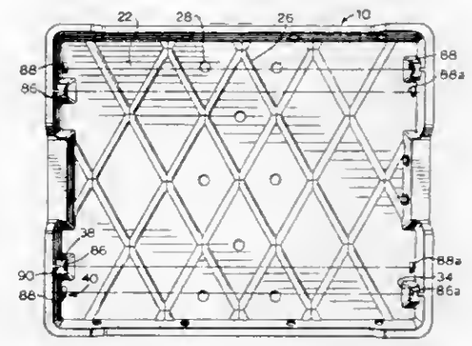
STACKABLE AND NESTABLE CONTAINER

Sam M. Martin, Toronto, Canada, assignor to Consumers Glass Company Limited, Etobicoke, Canada

Filed Dec. 1, 1975, Ser. No. 636,634

Int. Cl.² B65D *21/04*

U.S. Cl. 206—507 **11 Claims**



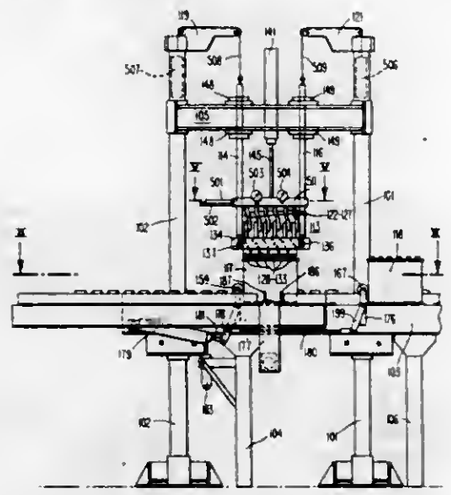
1. An open-top container adapted to be stacked and nested vertically with a container of substantially identical shape comprising two pairs of opposed interconnected upright walls, each pair of upright walls sloping inwardly toward each other from top to bottom thereof and an interconnected bottom wall, a pair of said upright walls having ventilation means for providing ventilation for the container interior, the bottom wall having drainage means for draining liquid from the container interior, a pair of upright walls each having inwardly projecting flutes extending upwardly from the bottom of the wall and terminating near the top thereof, the upper portion of each flute being closed to present a support surface, stacking guidance means and engagement means being provided on said container, said guidance means being located above said support surfaces and on an inner surface of each wall having said flutes, said engagement means being adapted for engaging stacked containers in a manner to restrict movement between stacked containers in a substantially horizontal plane, and means being provided on said container for precluding an upper container binding in a lower container when like containers are nested one within the other, the arrangement being such that said guidance means is adapted to guide the stacking of an upper container down onto a lower container by the interaction between said guidance means of a lower container and a lower portion of the outer surface of a corresponding

upper container upright walls whereby said engagement means of the upper and lower containers are in register.

4,027,797
AUTOMATIC AIR LEAK TESTING APPARATUS AND METHOD

William J. Eberle, Reading, Pa., assignor to General Battery Corporation, Reading, Pa.

Division of Ser. No. 475,273, May 31, 1974, Pat. No. 3,938,368. This application July 31, 1975, Ser. No. 600,840
Int. Cl.² G01M 3/26
U.S. Cl. 209—74 R 4 Claims

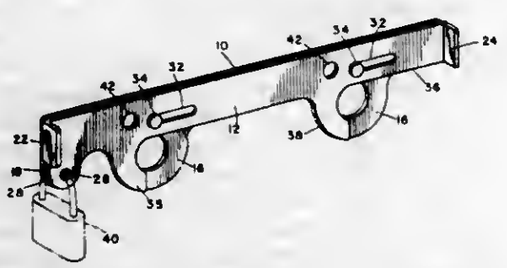


1. In an automotive battery production system, apparatus for selectively isolating automotive batteries comprising:
a. first and second conveyor means, each comprising a plurality of parallel rollers, at least a portion of the rollers being elongated rollers each of which extend at least substantially across both conveyor means in the vicinity of a battery processing position defined on said first conveyor means, whereby said elongated rollers constitute a portion of each of said conveyor means;
b. continuous cable means between said first and second conveyor means disposed parallel to and underneath said elongated rollers; and
c. a pusher disposed contiguous to said battery processing position mounted to slidably track along at least two of said elongated rollers upon motion of said cable means to slide a battery substantially axially along said elongated rollers to said second conveyor means, said rollers coacting with said pusher to substantially prevent movement of said pusher in a direction transverse with respect to the axis of said rollers.

4,027,798
LOCKABLE RACK FOR FISHING RODS AND THE LIKE

Gayland Clarence Swaim, 4922 Mount Bigelow Drive, San Diego, Calif. 92111

Filed July 14, 1976, Ser. No. 705,054
Int. Cl.² A47F 5/00
U.S. Cl. 211—4 5 Claims

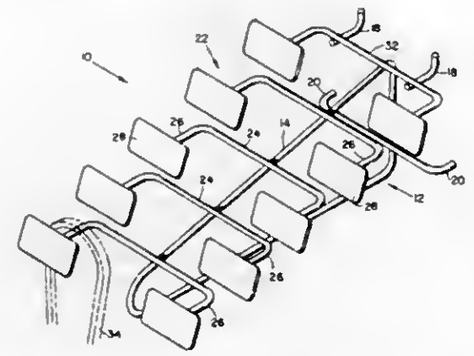


1. A lockable rack for fishing rods and the like, comprising:
an elongated mounting plate having at least one open hook extending from one longitudinal edge thereof;
an elongated slide bar longitudinally slidably mounted on said mounting plate to move between an open position and a closed position;
said slide bar having at least one hook portion extending from one longitudinal edge to overlap and close the open hook on said mounting plate in the closed position;
said mounting plate having screw receiving holes therein for attachment to a supporting surface;
said slide bar having access openings therein to expose said screw receiving holes in the open position;
and locking means on said mounting plate and slide bar for receiving a lock in the closed position.

4,027,799
V-BELT DISPLAY HOOK

Donald D. Stucker, Littleton, Colo., assignor to The Gates Rubber Company, Denver, Colo.

Filed June 18, 1975, Ser. No. 587,926
Int. Cl.² A47F 5/08
U.S. Cl. 211—13 1 Claim



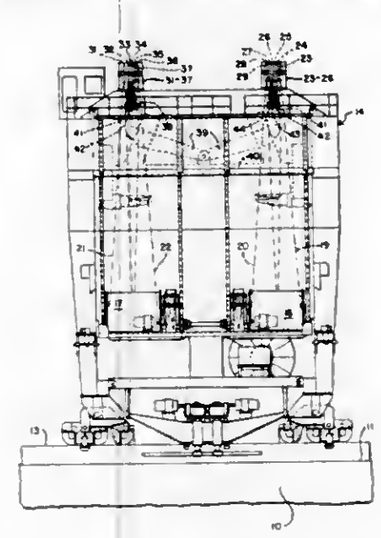
1. A display support for V-belts comprising:
a frame member having a sloping mounting portion;
means for attaching the frame member to a secondary frame member;
a plurality of generally U-shaped hooks with bottom portions spaced and secured transversely of the mounting portion, so arranged that the leg portions of the hook project forwardly of and are laterally spaced from the mounting portion, and are oriented in the same direction and spaced generally end-to-end in generally spaced planes whereby the legs are stepped in relation to each other; and
means for mounting belt indicia to the leg portions of each hook, said means comprising a plurality of generally flat plates, one plate attached to the forwardly projecting end of each leg portion.

4,027,800
GANTRY CRANE WITH PLURAL HOIST MEANS

Karl L. Poleo, Alliance, Ohio, assignor to The Alliance Machine Company, Alliance, Ohio

Filed Dec. 3, 1975, Ser. No. 637,230
Int. Cl.² B66C 5/02
U.S. Cl. 212—14 5 Claims

1. In a gantry crane adapted to run on spaced parallel rails having two spaced apart end frames connected by an overhead frame, the improvement comprising a pair of drums in each end frame, means for driving each pair of drums in one end frame in unison, a pair of cables on each drum extending upward over sheaves at the top of the end frame, one of said cables from each drum passing across the overhead frames to the opposite end frame and around a sheave at the top thereof and through a multiplying lift sheave assembly of upper and lower relatively movable sheaves and dead end at one of said upper and lower sheaves, the other of said pairs of cables from each drum passing over multiplying upper and lower relatively movable lift sheaves at the end frame carrying the drum and dead ending at one of said upper and lower relatively movable

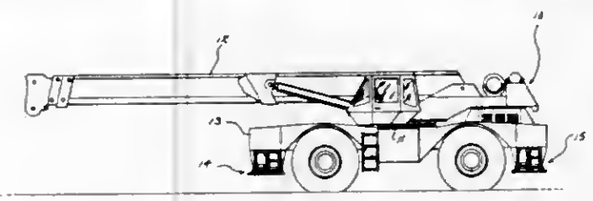


lift sheaves whereby each set of relatively movable lift sheaves has a double cable reeving, one from the drum at the end adjacent it and one from the drum directly opposite it on the other end frame.

4,027,801
OUTRIGGER SYSTEM FOR VEHICLES

Roger L. Johnston, Muskego, and Daniel C. Wiencek, Milwaukee, both of Wis., assignors to Bucyrus-Erie Company, South Milwaukee, Wis.

Filed May 21, 1976, Ser. No. 688,925
Int. Cl.² B66C 23/62
U.S. Cl. 212—145 8 Claims

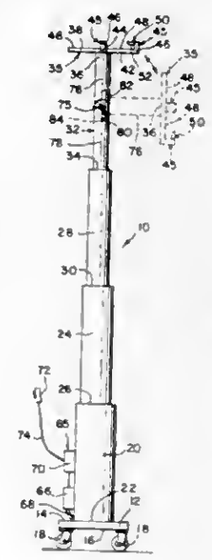


1. An outrigger system for increased stability which comprises:
a support member,
an extendible housing movably supported on said support member,
a beam telescopically positioned within said housing and adapted for sidewards movement out of said housing,
stop means on said beam and on the housing to prevent said beam from being moved completely out of said housing,
a float jack on the free end of said beam, and
a fluid-actuated cylinder having an extensible piston rod, and a base, the base of said cylinder being anchored to the support member which extends through a slot in housing and the free end of the piston rod being attached to the beam so that as the piston rod is extended the beam is moved sidewardly out of said housing, until said beam is substantially fully extended at which time the stop means on the housing and beam coact to prevent further sidewards extension of the beam at which time further extension of the piston rod moves the housing sidewardly thus providing greater reach and stability than with the beam alone.

4,027,802
BUILDING PANEL POSITIONER

Francis E. Reynolds, 166 E. 4th St., Chillicothe, Ohio 45601

Filed Aug. 3, 1976, Ser. No. 711,134
Int. Cl.² B23Q 5/26
U.S. Cl. 214—1 SW 2 Claims



1. A building panel positioner for use in applying ceiling or wall board or panel to a framework in building construction comprising:
a. a base having wheels to facilitate positionment thereof;
b. an elongated hollow upright bottom section secured at one end thereof to said base;
c. an elongated tubular intermediate section mounted for telescopic movement inside said base section;
d. an elongated inner top section mounted for telescopic movement inside said intermediate section;
e. support means secured to said top section for containing thereon the board or panel during positionment relative to the framework, said support means including four substantially equally spaced support arms extending outwardly from said top section to define a planar support surface;
f. retaining means for preventing lateral movement of the board or panel relative to said support means in a given direction, said retaining means including a vertically extending finger associated with at least two of said adjacent support arms at substantially one end thereof positioned above the support plane, such that lateral movement of the board or panel on the support plane in the direction of said retaining means is prevented;
g. means for vertically adjusting said sections relative to each other for raising or lowering a wall board or panel positioned on said support means in place for securment to the framework;
h. said vertically adjusting means includes a compressor, an electric motor for powering said compressor, and a switch electrically connected to said electric motor, such that when said motor is energized the compressor is actuated to raise and lower said sections;
i. locking means in operative relation with said retaining means on two of said adjacent support arms to be adjusted to a position in spaced relation to said support arm and in partially overlapping relation to the board or panel, such that outward movement of the board or panel from the support plane is prevented; and
j. said locking means includes:
i. a locking member pivotally secured at one end to the upper end of said finger,
ii. means for securing said locking member in releasably fixed position and in overlapping relation to the board or panel,

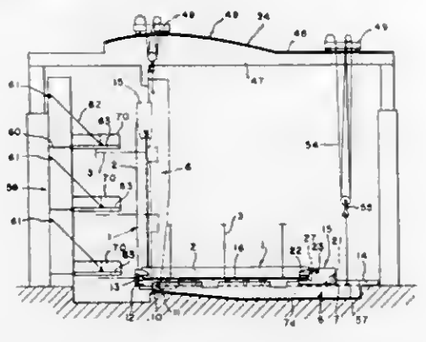
iii. mating surfaces on said locking member and said finger for engagement with each other, and
iv. said securing means includes a fastener extending between said locking member and said finger which when tightened will retain said mating surfaces in fixed position.

4,027,803

MECHANISM FOR ASSEMBLING SHIP'S HULL

Kaoru Kawasaki; Takeshi Sakano; Shigeru Furuya, all of Kure, and Shigeru Endo, Hiroshima, all of Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Ote, Japan

Filed Sept. 15, 1975, Ser. No. 613,414
Claims priority, application Japan, Sept. 27, 1974, 49-111036
Int. Cl.² B65G *49/00*
U.S. Cl. 214—1 H **2 Claims**



1. Mechanism for assemblying ship's hull blocks having longitudinal and transverse structural members to be welded together, said mechanism comprising a hull block supporting and erecting bed for supporting a hull block in a horizontal position, a stationary part, means forming a pivotal connection between one side edge of the bed and said stationary part, and means including a travelling crane for rotating said bed and hull block about said pivotal connection to move the bed and block to an upright position for welding operations between said structural members and to return the bed and block to a horizontal position, said crane having a substantially horizontal track terminating in an upwardly convex curved section positioned above said pivotal connection.

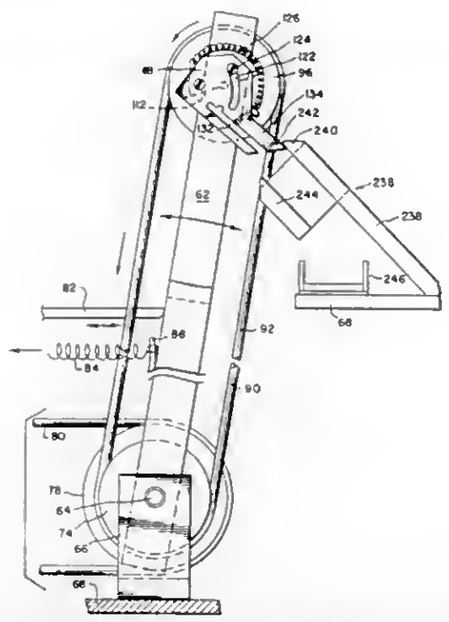
4,027,804

LAMP COMPONENT TRANSPORT DEVICE

Donald J. Belknap, P.O. Box 325, Mountain Home, N.C. 28758

Division of Ser. No. 372,535, June 22, 1973, Pat. No. 3,914,640, which is a division of Ser. No. 147,747, May 28, 1971, Pat. No. 3,762,900. This application Aug. 8, 1975, Ser. No. 603,160
Int. Cl.² B65G *47/92*
U.S. Cl. 214—1 BV **6 Claims**

1. A component transport comprising a platform for holding a component, means for moving said platform from one station to another, and means for unloading said component from said platform, the last-mentioned means including pivotal means supported on said platform for pivotal movement relative thereto and for engaging the component on said platform and moving it therefrom, said platform having a magnet for holding a component thereon magnetically, said component unloading means including means located along the path



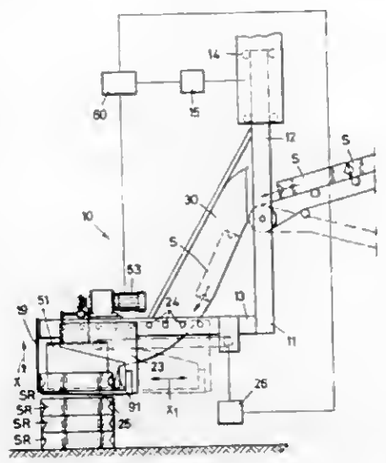
of movement of said platform for engaging said pivotal means and causing it to pivot relative to said platform.

4,027,805

AUTOMATIC LOADING APPARATUS FOR LOADING DISCRETE CARGO, PARTICULARLY SACKS, ONTO STATIONARY OR MOBILE LOADING PLATFORMS

Bernhard Beumer, Beckum, and Wolfram Jendrzey, Ostenfelde, both of Germany, assignors to B. Beumer Maschinenfabrik KG, Beckum, Germany

Filed Oct. 24, 1975, Ser. No. 625,671
Claims priority, application Germany, Apr. 17, 1975, 2516957
Int. Cl.² B65G *57/06*
U.S. Cl. 214—6 G **8 Claims**



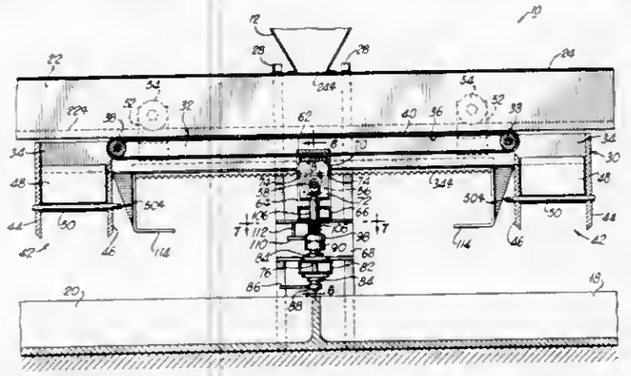
1. An automatic loading apparatus for loading discrete cargo, particularly sacks, onto a stacking plane on stationary or mobile loading platforms, comprising a machine frame, a feed track for feeding discrete goods mounted in the machine frame, a packing plate and pusher means movable in opposite directions within a plane above the packing plate, the packing plate and the pusher means being movable upwardly and downwardly in a substantially vertical direction through a distance corresponding substantially to the height of a layer of sacks, said apparatus being characterized by the combination of the following characteristics:
a. a loading head consisting of a mounting frame including a vertical support rod and a horizontally cantilevered substantially rectangular frame secured to the support rod, a vertical stop plate extending across the whole width of the packing plate mounted at one face of the rectangular frame and having a pair of longitudinal frame members defining guide rails for guiding a pair of slides movable respectively along either side of the rectangular frame, the slides being driven in a substantially horizontal direction by an associated drive unit, and mounting at their free lower ends the packing plate, the latter being spaced from the frame by a distance corresponding at least to the height of a sack layer, the packing plate being movable in a horizontal direction and transversely of sack rows being assembled and adapted to cooperate with a stationary stop bar extending transversely of the pull-off direction of the packing plate in a position opposite the vertical stop plate;
b. means for slidably displacing the loading head in a plane parallel to the stacking plane;
c. sack feed means on the upstream side of the loading head, the sack feed means being disposed at an elevating frame in the machine frame in the vicinity of the discharge end of feed conveyor means, and cyclically operated timing feed conveyor means extending parallel to the feed direction of discrete goods and adapted to be moved in increments corresponding substantially to the length or width dimension of the discrete goods;
d. means for moving the packing plate in the sack feeding direction, a first sensing plate mounted on the bottom of the packing plate, and spring plates each mounted on an opposite end of said packing plate and serving as actuating means for associated electrical switches;
e. transfer means provided above the packing plate adjacent an end of transverse pusher means that faces the sack feeding means;
f. sack pivoting means operatively associated with the sack feeding means;
g. the loading head including a second sensing plate located adjacent one side of said packing plate and connected to control members, and these control members being coupled, together with respective control members associated with the first sensing plate, to controller means for controlling feed and elevational movements of the elevating frame.

4,027,806

RECIPROCATING BELT FEEDER FOR ELONGATED BINS

Walter N. Weihmuller, Warsaw, Ind., assignor to Supreme Farmstead Equipment, Inc., Silver Lake, Ind.

Filed Aug. 18, 1975, Ser. No. 605,268
Int. Cl.² A01K *5/02*; B65G *21/12, 41/02*
U.S. Cl. 214—16 R **8 Claims**



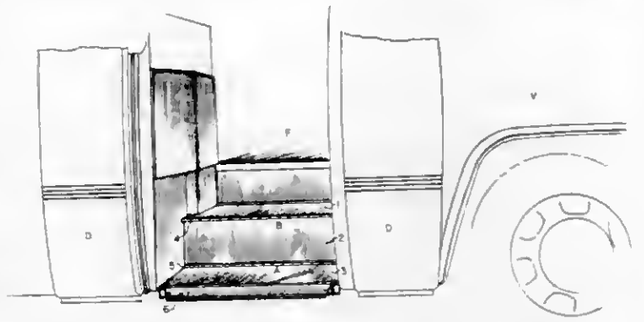
1. A feeder for distributing material from a common supply point into a selected one of a plurality of elongated bins, said bins arranged in parallel rows in side by side relation and in end to end relation in said rows, said feeder comprising:
an elongated conveyor having a frame and a reversibly movable belt supported from said frame,
drive means positioned adjacent said common supply point engaging said frame for reciprocally moving said conveyor longitudinally on opposite sides of said common supply point between longitudinal opposite ends of said bins,
clamping means for sequentially holding and releasing a run of said conveyor belt with respect to the direction of movement of said conveyor,
means for discharging material from said belt into a selected bin in a selected row thereof, and
cam means for controlling said clamping means and selectively movable between a first position operative to clamp said belt when said frame is driven in one direction along said bins and to release said belt when said frame is driven in an opposite direction, and a second position operative to clamp said belt when said frame is driven in said opposite direction along said bins and to release said belt when said frame is driven in said one direction, said cam means comprising a pair of cam members having confronting cam surfaces and a selector for moving a cam surface of one of said cam members relative to the other between said first and second positions and actuator means on said conveyor for moving a cam surface of the other of said cam members relative to said one cam member in response to the position of said conveyor relative to said bins.

4,027,807

WHEELCHAIR LIFT

Graham R. Thorley, San Diego, Calif., assignor to Transportation Design & Technology, San Diego, Calif.

Filed Aug. 20, 1975, Ser. No. 606,137
Int. Cl.² B60R *3/02*; B61D *23/02*; B62D *25/22*
U.S. Cl. 214—75 R **3 Claims**



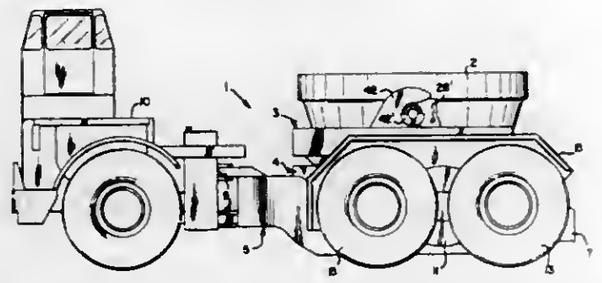
1. The combination with a stairway structure of a plurality of movable steps cooperating to form a lift platform which comprises:
a collapsible step;
an extensible step;
a joint raiser section hingedly connected to said collapsible step and extensible step;
a pair of vertical guides disposed respectively at opposite ends of the collapsible step;
means for vertically moving the collapsible step along and between the vertical guides;
a pair of horizontal guides disposed respectively at opposite ends of the extensible step;
means for horizontally and outwardly moving the extensible step along and between the horizontal guides;
a pair of vertical lifting guides disposed respectively at opposite sides of the stairway structure; and
means for moving the collapsible step, and the extensible step, together along the lifting guides between the lower and upper levels of the stairway structure.

4,027,808

RECEPTACLE TRANSPORTING VEHICLE

Thomas Lee Richard Hardwick, 1212 S. Parker Road, Olathe, Kans. 66061

Filed Mar. 29, 1976, Ser. No. 671,623
Int. Cl.² B65G *65/04*
U.S. Cl. 214—313 **3 Claims**



1. A transporting vehicle for receptacles having opposed handles including trunnions and bracket portions with depending lobes thereon comprising:
   a. an elongated mobile carrier frame having a forward end portion and a pair of side members extending rearwardly from said forward end portion and spaced transversely outwardly from a longitudinal central axis of said carrier frame;
   b. an elongated base frame mounted on said carrier frame;
   c. an elongated support frame mounted on said base frame for pivoted movement relative thereto, said support frame having a forward portion and spaced transversely outwardly from a longitudinal central axis of said support frame, said support frame side members each having an upper surface and a recessed shelf portion thereon for supporting a bracket portion of the respective handles of a receptacle on said support frame, said shelf portions each terminating at a respective upstanding shoulder adjacent said support frame forward portion for engagement by a bracket of a respective one of the receptacle handles;
   d. means extending between said carrier frame and said base for effecting longitudinal movement of said base frame toward and away from said carrier frame forward end portion and for raising and lowering said base frame relative to said carrier frame;
   e. means extending between said base frame and said support frame for effecting pivoted movement of said support frame between a first position for carrying a receptacle and a second position for discharging contents of the receptacle;
   f. a pair of hooks each mounted on a respective one of said support frame side members and being rearwardly open to receive therein a trunnion of a respective one of the receptacle handle portions, said hooks being spaced from said shoulders and cooperating therewith to position the receptacle relative to said frame;
   g. power means on said support frame for locking the receptacle handles thereto and including latch members operative for selectively engaging a depending lobe of each of the receptacle handles for retaining same in engagement with said respective shoulder during travel of said carrier frame and during pivotal movement of said support frame relative to said base frame.

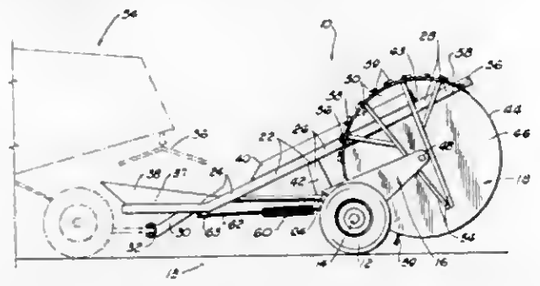
4,027,809

CHAFF COLLECTOR

Jerome J. Gerber, Mordock, Kans. 67111

Filed Dec. 8, 1975, Ser. No. 638,450
Int. Cl.² B60P *1/00*
U.S. Cl. 214—353 **4 Claims**

1. A chaff collector towed behind a vehicle and receiving chaff therefrom, the collector automatically unloading the chaff on the ground surface when the collector is full, the collector comprising:
   a pair of wheels mounted on a wheel shaft;
   conveyor and drum supports having a front portion, a center portion and a rear portion, the center portion of said supports rotatably mounted on said wheel shaft, said supports disposed adjacent said wheels;
   an endless conveyor mounted on a conveyor frame, said frame having a front portion, a center portion and a rear portion, the front portion of said frame attached to the rear of the vehicle, the center portion of said frame attached to the front portion of said supports and supported thereon; and



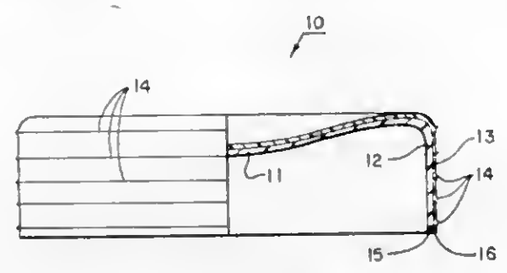
   a drum having a cylindrical surface with an open portion therein; the sides of the open portion resting against the bottom of the rear portion of said frame when said conveyor is loading shaft into said drum;
said drum and said frame balanced on opposite ends of said supports so that the weight of said frame and said conveyor rotate said supports in a counterclockwise direction biasing said drum in an upward position above the ground surface when said drum is being located with chaff, when said drum is loaded with chaff the weight of the drum rotates said supports in a clockwise direction and said drum moves downward contacting the ground surface and unloading the chaff while rotating thereon.

4,027,810

SEALING PLUNGER FOR CARTRIDGE

Dick T. vanManen, Canandaigua, N.Y., assignor to Voplex Corporation, Pittsford, N.Y.

Filed Jan. 27, 1976, Ser. No. 652,829
Int. Cl.² B27G *11/02*
U.S. Cl. 222—327 **8 Claims**



1. A sealing plunger for a generally cylindrical cartridge, said plunger comprising:
   a. a generally cup-shaped body molded of resin material rigid enough to provide structural support for said plunger;
   b. said body having an annular wall with a generally cylindrical outer surface providing a substantial wall area closely and uniformly spaced from the inner surface of said cartridge when said plunger is in said cartridge;
   c. seal material adjoined to said body and molded of resin material substantially softer and more resilient than said resin material of said body;
   d. said seal material extending in a thin layer around all of said outer surface of said annular wall;

   e. said seal material having a resin-to-resin bond with said outer surface of said annular wall; and
   f. said annular wall compressing said seal material tightly against said inner surface of said cartridge to conform said seal material to said inner surface when said plunger is in said cartridge.

4,027,811

BLOW MOLDED CONTAINER WITH NESTABLE POURING SPOUT WITH IMPROVED SPOUT OPENING AND WITHDRAWAL MEANS

Walter K. Chlystun, 327 St. James Drive, Spartanburg, S.C. 29304

Filed Dec. 8, 1975, Ser. No. 638,618
Int. Cl.² B67D *3/00*
U.S. Cl. 222—529 **14 Claims**

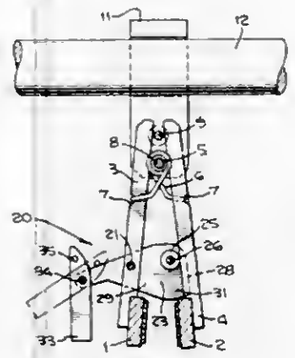
1. An improved dispensing container comprising:
   a. a container body;
   b. a top secured to said body;
   c. a pouring spout secured to said top, said spout being nestable within said body and withdrawable to an extended, dispensing position;
   d. a cover secured to said pouring spout and including spout withdrawal means thereon, said cover being removeable from said spout to permit dispensing of the contents of said container therethrough; and
   e. vent forming means located on said spout and being secured to an underside of a portion of said cover, said vent forming means comprising a strip of meterial extending from beneath said cover along a portion of the length of said spout, said material having an undercut portion therealong to foster rupture upon receipt of sufficient force thereon to produce said vent in said spout and permit ease of withdrawal of said spout from a vested position.

4,027,812

CLOTHING HANGER

Harry G. Roseberg, 3101 S. Barrington, Los Angeles, Calif. 90066

Filed Apr. 2, 1976, Ser. No. 673,091
Int. Cl.² A47J *51/14*
U.S. Cl. 223—96 **8 Claims**



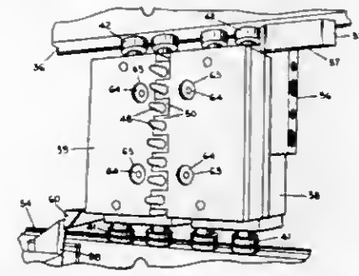
1. In a clothing hanger having a pair of jaws and a pair of arms, each arm being connected to a jaw, said arms being pivotally mounted relative to each other whereby pivoting of the arms clamps and unclamps the jaws, biasing means for biasing the jaws to their clamped position and separating means for opening the jaws against the biasing means, the improvement in separating means comprising the provision of:
   camming means movably mounted on one of said arms for camming engagement with the other of said arms during movement of the camming means between a first arm separating position and a second position allowing said biasing means to clamp the jaws, said camming means being pivotally mounted to said one of said arms for pivoting of the camming means between the first arm separating position and the second position, and stop means on the hanger for preventing movement of the camming means beyond the first arm separating position to retain the camming means in the first position and means for mounting said stop means in a position for setting the first position of the camming means such that small forces on the camming means toward the second position move the camming means a sufficient distance so that the other of said arms cams the camming means to its second position under urging from the biasing means.

4,027,813

TUBE SEPARATOR

Glenn V. Dukes, Cadillac, and Thomas L. Stroh, Lake City, both of Mich., assignors to Cadillac Rubber & Plastics, Inc., Cadillac, Mich.

Filed June 17, 1976, Ser. No. 697,207
Int. Cl.² B26F *3/02*
U.S. Cl. 225—97 **24 Claims**



1. An apparatus comprising:
   a first separator element having a plurality of toothed extensions on a side edge;
   a second separator element having a plurality of toothed extensions on a side edge;
   the second toothed extensions interdigitating with first toothed extensions;
   fastening elements extending from a front portion of the toothed extensions; and
   separation means for separating the first separator element from the second separator element a sufficient distance to separate a group of joined tubes into two sets of tubes.

4,027,814

APPARATUS FOR BREAKING BRITTLE RODS OR FIBERS

Detlef Christoph Gloge, Red Bank; Peter William Smith, Colts Neck, and Edwin LeRoy Chinnock, Rumson, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Division of Ser. No. 412,293, Nov. 2, 1973, Pat. No. 3,934,773.
This application Oct. 24, 1975, Ser. No. 625,484
Int. Cl.² B26F *3/00*
U.S. Cl. 225—104 **9 Claims**

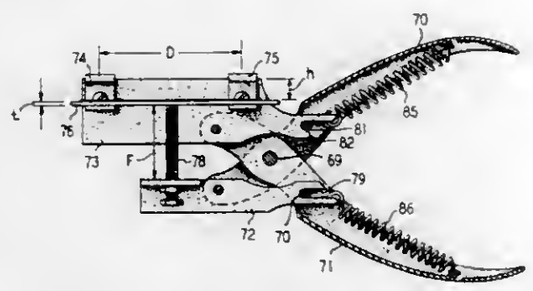
1. Apparatus for breaking a rod of brittle material by bending and tensioning appropriate for use with scoring, comprising:
   means for placing said rod under tensile stress and
   bending said rod within an intermediate section between

separate sections of said rod, said means for placing and bending comprising

friction-producing clamps for holding said separate sections of said rod;

a member disposed under said rod to support it and adapted to have a curved surface in contact with said intermediate section of said rod under conditions of bending, and

means for translating said supporting member normal to the axis of said rod,



the supporting member being sufficiently flexible to impart a varying radius of curvature to said rod when said member is translated, the rod and the supporting member acting as one composite member,

whereby said support member is able to define both a radius of curvature and an always positive stress distribution for said rod in said intermediate section.

4,027,815

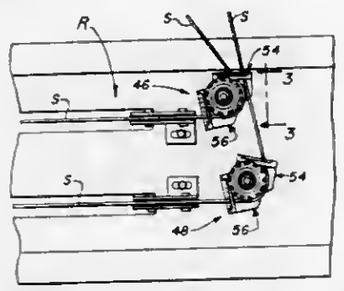
WIRE GUIDING ASSEMBLY ON A BALER

Robert G. Young, Bird-in-Hand, Pa., assignor to Sperry Rand Corporation, New Holland, Pa.

Filed Apr. 5, 1976, Ser. No. 673,773

Int. Cl.² B65H *17/20*

U.S. Cl. 226—194 **14 Claims**



1. An improved assembly on a baler for guiding a tying medium, such as at least one strand of wire or the like, toward a desired position on said baler for facilitating the banding of bales formed by said baler with said strand of said medium, said improved guiding assembly comprising:

at least one roller element including a pair of spaced apart sidewalls and a body connected thereto and mounted for rotation on said baler, said body having at least an outer portion being disposed between said sidewalls, said sidewalls extending outwardly beyond said outer portion of said body to form spaced apart flanges on said outer body portion which together with the same define a strand guiding channel; and

a wrapper element removably receivable over at least one of said flanges to and from within said channel about said outer body portion and between said flanges, said wrapper element, when received within said channel, being engaged by said strand during the guiding of the same toward said desired position on said baler.

4,027,816

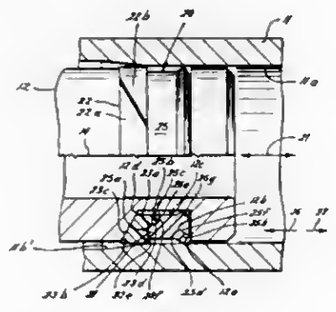
SEAL ASSEMBLY

Damon T. Slator; Thomas R. Bishop, and Archie W. Peil, all of Houston, Tex., assignors to Bowen Tools, Inc.

Filed Apr. 18, 1975, Ser. No. 569,370

Int. Cl.² F16J *15/24*

U.S. Cl. 277—188 R **3 Claims**



1. A seal assembly for tool members wherein one of said tool members has a groove therein for receiving said seal assembly for sealably engaging another tool member, comprising:

a split protective ring for mounting in an annular groove in a first tool member, said split protective ring including tapered end portions that overlap in said groove, said ring having an inwardly positioned circumferential ledge; and

a seal ring for mounting in said annular groove, said seal ring having first and second radially directed surfaces and a circumferential locking shoulder facing inwardly for mounting over said circumferential split protective ring ledge, whereby said split protective ring is held in said groove in said first tool member even during assembly of said tools, and said seal ring is adapted to sealably engage a second tool member mounted for relative movement with respect to said first tool member.

4,027,817

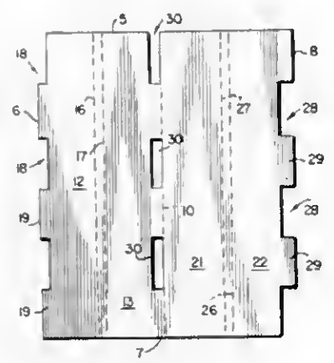
SELF-LOCKING CUSHIONING MEMBER

Edwin A. Fremion, West Alexandria, Ohio, assignor to Westvaco Corporation, New York, N.Y.

Filed Oct. 4, 1976, Ser. No. 728,999

Int. Cl.² B65D *5/50, 25/12, 85/00*

U.S. Cl. 229—14 C **10 Claims**



1. A self locking cushioning member formed from a blank of foldable sheet material comprising:

a. a substantially rectangular sheet of said material formed from several layers of said material having parallel top and bottom edges and opposed parallel lateral edes perpendicular to said top and bottom edges;

b. a first score line extending from said top to said bottom edge located substantially centrally of said sheet of material and dividing said sheet laterally into a plurality of leg forming panels;

c. a first pair of leg forming panels on each side of said first score;

d. at least one additional pair of leg forming panels foldably connected to the laterial free edges of said first pair of leg panels;

e. a first set of cut outs in said sheet material located along the lateral free edges of each of said additional pair of leg forming panels which provide a plurality of first tongue elements;

f. a second set of cut outs in said sheet material located along the lateral free edges of the other of said additional pair of leg forming panels, said second set of cutouts being equally spaced between the first set of cutouts to provide a plurality of second tongue elements that are diametrically offset from said ffirst tongue elements;

g. a third set of cutouts in said sheet material arranged along one side of said first score line and corresponding in diametrical location to one of the first or second set of cutouts.

4,027,818

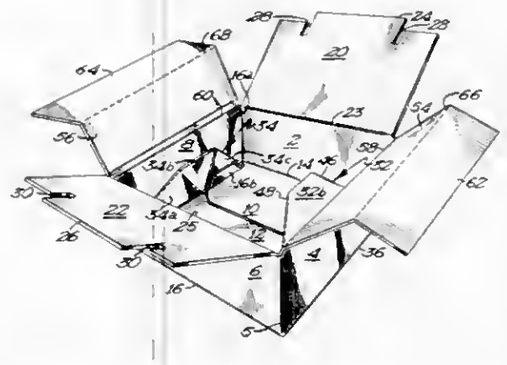
SELF LOCKING CONTAINER

Mark Steven Stoll, Minneapolis, Minn., assignor to Liberty Carton Co., Minneapolis, Minn.

Filed Dec. 18, 1975, Ser. No. 642,150

Int. Cl.² B65D *5/22, 5/02*

U.S. Cl. 229—37 R **5 Claims**



1. A container formed from cut and scored, bendable fiberboard comprising:

four upright side walls joined together in a substantially rectangular configuration;

a pair of opposed bottom panels hingedly attached to the bottom, longitudinal edges of one opposed pair of said side walls along fold line connections therewith, said bottom panels being folded upwardly and inwardly towards each other to horizontal positions defining the bottom wall of said container;

a pair of reinforcing panels hingedly attached to the bottom, longitudinal edges of the other pair of opposed side walls along fold line connections therewith, said reinforcing panels being folded upwardly and inwardly inside of said bottom panels to substantially upright positions in overlying relation against the inside faces of the other pair of side walls in supporting relation therewith;

said reinforcing panels are attached along fold line connections to said bottom panels at the corners of said container and are each gusseted by a pair of score lines angling inwardly and downwardly towards each other from the opposite ends of the bottom longitudinal edges of said other pair of side walls, when said reinforcing panels are in a downwardly extended, open position, whereby the upward and inward folding movement of said bottom panels from downwardly extended, open positions to their closed positions forming said bottom wall carries said interconnected reinforcing panels upwardly and inwardly therewith to collapsed positions of triangular-like shape in which said reinforcing panels are held in upright, overlying relation to said other pair of side walls; and

means securing said reinforcing panels in said upright positions against said other pair of side walls.

4,027,819

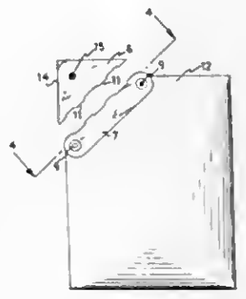
CLOSURE DEVICE FOR BAGS OR SIMILAR CONTAINERS

Jesus Herrera-Gutierrez, Escobedo Sur 733-201, Monterrey, N.L., Mexico

Filed Mar. 29, 1976, Ser. No. 671,506

Int. Cl.² B65D *33/30*

U.S. Cl. 229—65 **6 Claims**



1. A closure device for affixing to the corner of a flexible bag, comprising in combination, a planar sheet of flexible metal substantially triangular in form having a weakened fold line therein for folding over two interconnected substantially triangular segments and sandwiching between them the corner of a bag, mating apertures located substantially at corners of said two triangular segments to receive clasping structure for holding the segments in place on the corner of a bag, slots defined along that edge of at least one segment which will occupy a position furthermost from the corner of the bag thereby defining an edge band, said slots also being for receiving knife structure to perforate for ready removal the corner of a bag when held between said two segments, narrow metallic joints formed on each segment positioned for breaking off a substantially triangular corner section with repeated bending when affixed to a bag thereby leaving said edge band and at least two of said mating apertures affixed to the bag and thereby for removing a corner section of the bag defined along said slots with the broken off corner section thereby defining a mouth in one corner of the bag, wherein said flexible metal band has a characteristic such that it may be bent to hold open the mouth of the bag for removal of contents and restraightened to hold the mouth closed.

4,027,820

SELF-CLEANING CENTRIFUGAL DRUM FOR THE PERIODICAL REMOVAL OF A PORTION OF THE SOLIDS SEPARATED FROM A LIQUID AND COLLECTING IN THE PERIPHERAL PART OF THE INTERIOR OF THE DRUM

Otto Külker, Rietberg, Germany, assignor to Westfalia Separator AG, Germany

Filed Aug. 24, 1976, Ser. No. 717,300

Claims priority, application Germany, Aug. 30, 1975, 2538630

Int. Cl.² B04B *3/02*

U.S. Cl. 233—20 A **3 Claims**

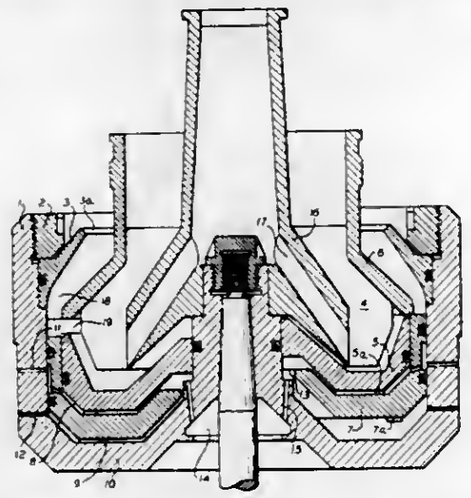
1. Self cleaning centrifugal drum for separating solids from a liquid constructed for the periodic removal of solids separated from the liquid comprising:

a. a rotating drum housing, a closing piston disposed in the lower part of the housing, and a separating plate disposed in the upper part of the housing, the closing piston and separating plate defining a separating chamber for said separation, and are disposed radially inwardly of the

housing so as to define an annular gap between the housing and the closing piston and separating plate,

b. a pumping piston disposed in lower part of the drum encompassing the closing piston and extending upwardly into the annular gap, means defining a closing piston control chamber between the pistons and means defining a pumping piston control chamber between the pumping piston and the bottom of the housing, and

c. means for supplying and discharging control liquid to the control chambers for supplying control liquid to the clos-



ing piston control chamber for raising the closing piston into sealing relation with the separating plate and lowering the closing piston, in response to weight of the solids in the drum, for discharge of solids from the separating chamber into the annular gap, and for raising the pumping piston only after and while the closing piston is in said sealing relation for pumping of solids discharged into the annular gap, upwardly in the annular gap, and for lowering the pumping piston below the lower level of the separating plate for permitting the discharge of solids into the annular gap.

4,027,821

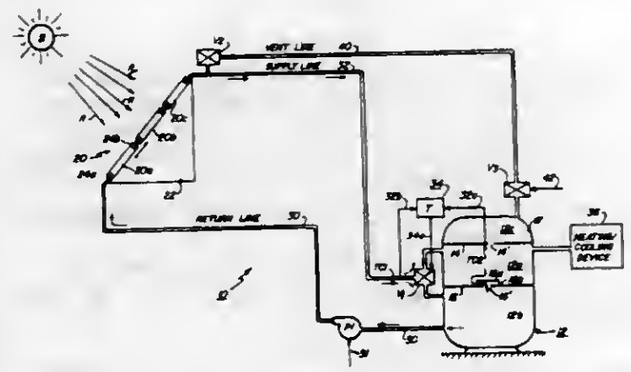
SOLAR HEATING/COOLING SYSTEM

William Roger Hayes, Deerfield, and Satoru Shikasho, Chicago, both of Ill., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed July 18, 1975, Ser. No. 597,282

Int. Cl.² F24J 3/02

U.S. Cl. 237—1 A **14 Claims**



1. A solar energy conversion system of the type wherein a heat transport fluid is forced to circulate between a solar energy collection area and a thermal energy utilization device comprising, in combination:

at least one solar collector panel receptive of solar radiation, said panel including an inlet header and an outlet header with a plurality of conduits extending across the surface of said panel and providing passageways interconnecting said headers, whereby a fluid circulating through said panel is heated by said solar radiation;

an insulated storage vessel for receiving said fluid, said vessel having first and second portions and said vessel being adapted for coupling to said device at said first portion of said vessel;

a supply line connected at one end thereof to said outlet header of said collector panel and said supply line being adapted for coupling to said storage vessel at its other end thereof;

a return line connected at one end thereof to said inlet header of said collector panel and said return line being connected to said second portion of said storage vessel at a point remote from said first portion of said storage vessel;

means cooperating with said return line for pumping said fluid from said storage vessel and through said collector panel; and,

means for alternately connecting said supply line to one of said first and second portions of said storage vessel.

13. A solar energy conversion system of the type wherein a heat transport fluid is forced to circulate between a solar energy collection area and a thermal energy utilization device comprising, in combination:

at least one solar collector panel receptive of a solar radiation, said panel including an inlet header and an outlet header with a plurality of conduits extending across the surface of said panel and providing passageways interconnecting said headers, whereby a fluid circulating through said panel is heated by said solar radiation;

an insulated storage vessel for receiving said fluid, said vessel being adapted for coupling to said device at an upper portion of said vessel;

a supply line connected at one end thereof to said outlet header of said collector panel and said supply line being adapted for coupling to said storage vessel at its other end thereof;

a return line connected at one end thereof to said inlet header of said collector panel and said return line being connected to said storage vessel at a point remote from said upper portion or said storage vessel;

means cooperating with said return line for pumping said fluid from said storage vessel and through said collector panel;

means for stratifying said fluid within said storage vessel into layers of varying temperature between said upper portion and said remote point; and,

means for connecting said supply line to said storage vessel so that the hottest layer of fluid in said storage vessel is coupled to said device.

4,027,822

ATTACHMENT DEVICE FOR A SHOWER UNIT

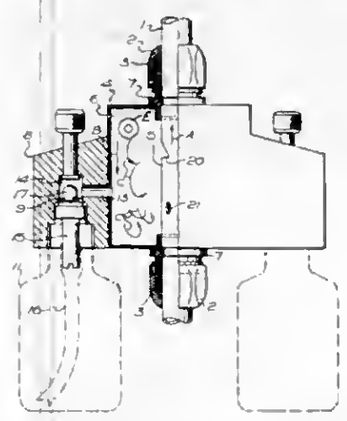
George William Usher, 41, Harlech Road, Leeds 11 Yorkshire, England

Filed Aug. 25, 1975, Ser. No. 607,533

Int. Cl.² B05B 7/28

U.S. Cl. 239—305 **7 Claims**

1. An attachment device for a shower unit, said device comprising a casing in which is located a tube having connection means at each end whereby the tube can be connected into the supply path along which water flows to the exit port of the shower, a mixing chamber in the casing, deflection means in the tube lying in the path of flow of water through the tube so as to deflect some of such water into the mixing chamber, at least one aperture in the tube which permits the return of water back to the flow through the inside of the tube means permitting additive to be injected into said mixing chamber to be mixed with water deflected thereinto, said deflection means and aperture or apertures being spaced axially of the tube so that in use water deflected into the chamber circulates



back into the flow in the tube before the flow encounters said deflection means.

4,027,823

LOADING-UNLOADING APPARATUS FOR A VEHICLE

Takashi Kawarai; Yuji Sawada, both of Tokyo; Katsumi Takemoto, Tokyo, and Sadao Mikami, Kobe all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Toyko, Japan

Filed Oct. 29, 1975, Ser. No. 627,010

Claims priority, application Japan, Nov. 18, 1974, 49-132024

Int. Cl.² B65G 67/02

U.S. Cl. 214—38 CA **2 Claims**

1. An apparatus for loading or unloading a transporter vehicle, comprising:

a travelling frame mounted to be moved by a travel drive device along a guide track provided on a fixed frame;

the travelling frame carrying a fork support member provided with a plurality of lifting forks, which support member can be raised and lowered with respect to the travelling frame by a vertical drive device;

said vertical drive device comprising a hydraulic cylinder, which is designed additionally to incline the fork support member with respect to the travelling frame about an axis parallel to the guide track;

there being provided respective projections mounted at opposite ends of the fork support member;

and tilting frames mounted on respective depending portions of the travelling frame;

each tilting frame having a guide piece for receiving and guiding a respective one of the projections;

a tilt drive mechanism for driving the tilting frames and projections so as to tilt the fork support member about an axis transverse to the guide track;

a shifting device for moving the fork support member transversely to the guide track;

said vertical drive device being operable to lower the forks and the fork support member while maintaining them in a horizontal state by exhausting oil from two end ports disposed on opposite sides of two pistons of the hydraulic cylinder by an equal amount while supplying pressurized oil to within the hydraulic cylinder through a center port of said hydraulic cylinder to project the both pistons by an equal distance, or on the contrary, to raise the forks and the fork support member while maintaining them in a horizontal state by exhausting oil from the center port of said hydraulic cylinder while supplying pressurized oil to within the hydraulic cylinder through the both end ports of said hydraulic cylinder to retract the both pistons by an equal distance; and said vertical drive device being operable to lower one end of said fork support member to a greater extent than the other end thereof, that is, to incline the support member by making the amount of oil exhausted from one end port of said hydraulic cylinder larger than the amount of oil exhausted from the other end port thereof;

the shifting device comprising a hydraulic cylinder mounted on a transverse beam disposed between the depending positions of the travelling frame; the latter hydraulic cylinder being operable to shift a movable member;

the fork support member having a vertical movement guide member which engages with the movable member in such a way that it is movable vertically independently of such movable member but is constrained to move transversely with such movable member.

4,027,824

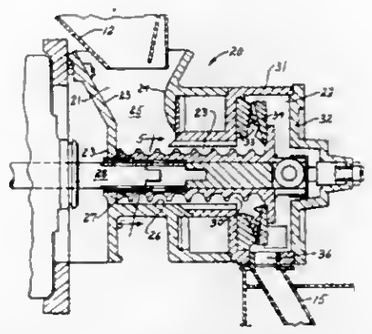
NUT GRINDING MILL

Don W. Fuller, Louisville, Ky., assignor to Grindmaster of Kentucky, Incorporated, Louisville, Ky.

Filed June 7, 1976, Ser. No. 693,494

Int. Cl.² B02C 19/22

U.S. Cl. 241—152 A **4 Claims**



1. A grinder for peanuts, coffee and the like, comprising:

A. means providing a rear feeding chamber extending downwardly and terminating in a horizontal upwardly-open trough-like passageway having an outlet;

B. means providing a front grinding chamber having an inlet and an outlet;

C. a tunnel interconnecting the trough outlet with the grinding chamber inlet;

D. a conveyor means extendng through the trough and tunnel and operative, when rotated in one direction, to convey the material to be ground into the grinding chamber inlet, said conveyor means including

1. a spiral screw conveyor having sections corresponding to said trough and tunnel; and

E. an axially-aligned succession of L-shaped cuts contained in a corresponding succession of conveyor screw spirals in the conveyor's trough section.

1. each cut

a. having a tangential leg and a radial foot.

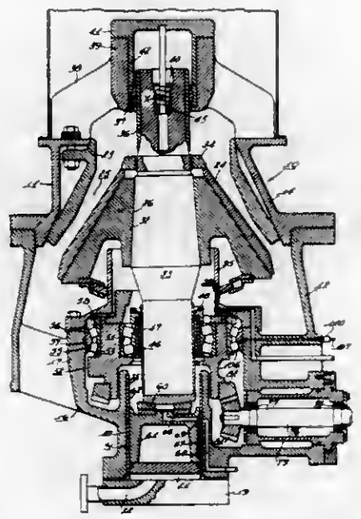
b. extending substantially within the radial plane of the corresponding portion of its spiral, and

c. opening forwardly in said one direction of rotation.

4,027,825
GYRATORY CRUSHER ECCENTRIC ASSEMBLY REMOVAL SYSTEM

Major Coxhill, Appleton, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed June 8, 1976, Ser. No. 693,781
Int. Cl.² B02C 2/06
U.S. Cl. 241—213 9 Claims



1. In a gyratory crusher having a frame defining a bearing housing, with a vertical central axis and a bottom inner axial extending lower portion defining a cylinder, an axial movable piston within the cylinder, a bearing sleeve assembly, a crusher head shaft supported for rotational and axial movement in the bearing sleeve assembly, a drive eccentric for driving the crusher head shaft in a gyratory movement about the vertical central axis, an antifriction bearing having its outer race confined with an interference fit in the bearing housing, the inner race of the antifriction bearing being engaged on the drive eccentric, a fluid circuit connected to supply fluid under pressure to the cylinder at the side of the piston remote from the end of the crusher head shaft:

a plurality of pusher plates disposed within the cylinder in position to be moved upwardly into forceful engagement with the drive eccentric upon upward movement of the piston;

fluid distribution means in the bearing housing in which the outer race of the antifriction bearing has an interference fit to distribute fluid under pressure around the outer race of the antifriction bearing; and,

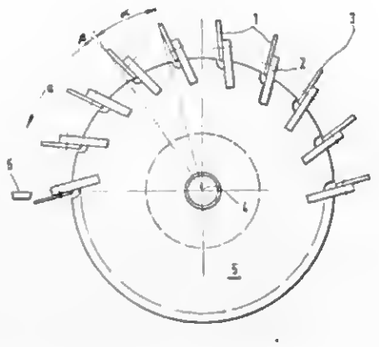
a fluid circuit connectible to said fluid distribution means and to the fluid circuit of the crusher to supply fluid under pressure to said fluid distribution means as fluid under pressure is supplied to the cylinder for effecting upward movement of the piston within the cylinder,

whereby a mechanical upwardly acting pushing force is applied to the drive eccentric and simultaneously therewith fluid under higher pressure is injected around the race of the antifriction bearing to thereby effect a gradual easing of the antifriction bearing from the housing.

4,027,826
CHOPPING MACHINE PARTICULARLY FOR THE HARVEST OF CORN COBS AND THEIR COMMINUTION

Klaus Grimm, Freising-Weihenstephan, Germany, and Alois Mengele, deceased, late of Gunzburg, Germany (by Dieter Kark Paul Mengele, legal representative), assignors to Karl Mengele & Sohne, Guenzburg, Danube, Germany

Filed July 31, 1975, Ser. No. 600,915
Claims priority, application Austria, Feb. 7, 1975, 941/75
Int. Cl.² B02C 18/18
U.S. Cl. 241—221 6 Claims

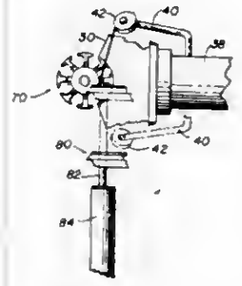


1. Forage harvester, particularly for corn ear harvesting and pulverizing, comprising a counterknife arranged in the inlet of the harvester and having a cutting edge, a cutter assembly, said cutter assembly comprising a cutter support member rotatable about an axis spaced laterally from and substantially parallel with the cutting edge of said counterknife, said cutter support member having a circumferential periphery extending around the axis thereof, said counterknife spaced outwardly from the circumferential periphery of said cutter support member, a plurality of spaced knife supports mounted on spaced uniformly angularly apart around the circumferential periphery of said cutter support member, said knife supports projecting outwardly from the circumferential periphery of said cutter support member, a beater bar displaceably mounted on and extending outwardly from each said knife support away from said cutter support, each said beater bar having a straight impact edge spaced outwardly from said knife support and said impact edge arranged to cooperate with said counterknife so that said beater bar serves as a forage knife, said counterknife having a first side surface disposed in a plane substantially radial relative to the axis of said cutter support member and facing in the direction opposite to the direction of rotation of said cutter support member and said cutting edge of said couterknife located along the edge of said first side surface closer to said cutter support member, said beater bars each having a side surface leading in the direction of rotation of said cutter support member and extending outwardly in a plane intersecting the periphery of said cutter support member with the plane of the leading side surface disposed at an angle of about 8 degrees to a radial plane of said cutter support member extending through the axis thereof and through the intersection of the impact edge and the leading side surface of said beater bar, and said beater bars being angularly spaced apart about the circumferential periphery of said cutter support member in the range of about 15° to 20° relative to the axis of said cutter support member, said knife supports and said beater bars being dimensioned so that the dimension between the adjacent said impact edges on said beater bars is in the range of 60°–100 mm.

4,027,827
AUTOMATIC ARMATURE WINDING

John M. Biddison, Dayton, Ohio, assignor to The Globe Tool and Engineering Company, Dayton, Ohio

Division of Ser. No. 97,488, Dec. 14, 1970, Pat. No. 3,713,209, which is a continuation-in-part of Ser. No. 67,759, Aug. 28, 1970, abandoned. This application July 17, 1972, Ser. No. 272,635
Int. Cl.² H02K 15/09
U.S. Cl. 242—7.05 B 2 Claims

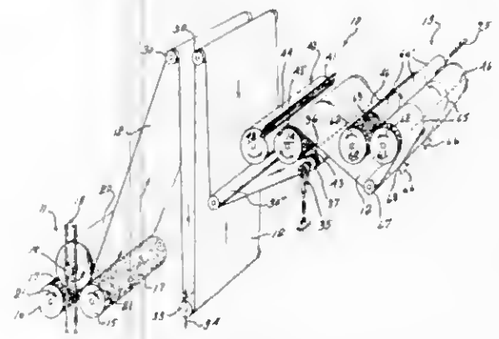


1. In a machine for winding armatures having commutator tangs, the machine being of the type having a flier for winding wire onto said armatures, cutting means for cutting wire from a freshly wound armature in a winding station and then cutting said wire from the next armature to be wound after said wire is connected to one of the commutator tangs of said next armature, and power operated clamp means for clamping the wire extending from said flier during the interval between the winding of said freshly wound armature and the cutting of said wire from said next armature, the improvement comprising means for moving said clamp means from an extended position wherein said clamp means is positioned to clamp said wire closely adjacent the commutator tangs of said armatures to an intermediate position to take up slack in said wire between the parts thereof which are clamped and said armatures, and to a retracted position remote from said winding station.

4,027,828
PERFORATING MACHINE

Niall Mathieson, Montreal, Canada, assignor to Mackay Center Specialties, Inc., Montreal, Canada

Filed June 14, 1976, Ser. No. 696,036
Int. Cl.² B65H 35/04
U.S. Cl. 242—56.6 14 Claims

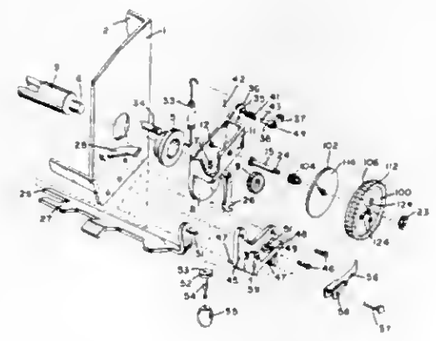


1. A perforating machine for making tear lines in woven or non-woevn fiber sheet material, said machine comprising feeder means for feeding a web of said sheet material, means to maintain said web stretched by applying constant tension to said web, means to stretch said web prior to perforating, perforating means having a cutting blade element supported for periodic contact with said stretched web to cut fibers in said stretch web along a line extending substantially transverse to the direction of said stretch to form a tear line while said stretch is maintained in said web, a support roll having a web engaging outer surface and maintaining said web in a stretch condition through said perforating means, means in said web engaging outer surface to permit said cutting blade element to cut stretched fibers in said stretched web to form a tear line when in contact with said web, and accumulator means to receive said web after tear lines have been made therein.

4,027,829
FLYWHEEL AND CLUTCH MECHANISM FOR SAFETY BELT RETRACTOR

Robert Larry Stephenson, Sterling Heights, and Arduino Colasanti, East Detroit, both of Mich., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed May 2, 1975, Ser. No. 574,058
Int. Cl.² A62B 35/02; B65H 75/48
U.S. Cl. 242—107.4 A 7 Claims



1. In a safety belt retractor for restraining an occupant in a vehicle in event of emergency conditions, said retractor having a spool and a locking mechanism for locking said spool, said locking mechanism including an improved flywheel and clutch mechanism comprising:

a polymeric flywheel having an outer circumference, a planar surface extending from the outer circumference of said flywheel toward the center of said flywheel, a ridge disposed around the outer circumference of said flywheel on at least one side of said planar surface, a recess in the interior of said flywheel, said recess formed by said outer circumferential ridge and said planar surface;

a clutch plate disposed within said recess of said flywheel, said clutch plate having an interior surface disposed adjacent to said planar surface of said flywheel and an exterior surface on the opposite side of said clutch plate from said interior surface, said clutch plate having frictional engagement with said flywheel whereby said clutch plate and said flywheel rotate together under normal conditions;

a mechanical member rigidly affixed to the center of said clutch plate and extending at least from said exterior side of said clutch plate, said mechanical member coupling said flywheel and said clutch plate to the retractor spool to rotate therewith;

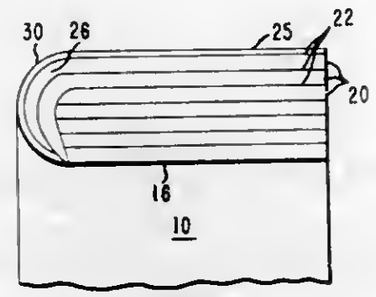
a biasing means disposed in said recess of said flywheel adjacent to said interior surface of said clutch plate and pressing against said clutch plate in a direction urging said clutch plate away from the planar surface of said flywheel; and

a retaining means disposed around the outer circumferential ridge of said flywheel, adjacent to the exterior surface of said clutch plate and extending partially from said outer circumferential ridge inwardly toward the center of said flywheel, said retaining means retaining said clutch plate in said recess of said flywheel against the bias of said biasing means.

4,027,830
YARN SUPPORT

Thomas Albert Dolan, Old Hickory, Tenn., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 5, 1975, Ser. No. 628,955
Int. Cl.² B65H 75/10
U.S. Cl. 242—118.32 8 Claims



1. A hollow laminated yarn support comprising superposed bonded layers of core material with an external surface of water-resistant covering material and an internal surface, a flap of the covering material and of at least the outermost layer(s) of core material abutting one end of the remaining inner layers of core material along the inner surface of said flap, the end of said flap being faired into the internal surface of the support, whereby the flap protects an end of the support to present a snag-free surface on at least its external face.

4,027,831
SPOOL FOR THREAD

Dieter Rottleb, Gutach, Germany, assignor to Gutermann & Co. Aktiengesellschaft, Zurich, Switzerland

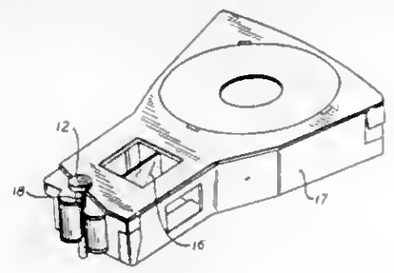
Filed Jan. 19, 1976, Ser. No. 650,302
Claims priority, application United Kingdom, Jan. 29, 1975, 3894/75
Int. Cl.² B65H 75/28
U.S. Cl. 242—125.1 14 Claims

1. A unitary moulding of plastics material comprising:
a. a spool member for carrying thread windings, having a male portion at one end thereof, and
b. a thread trapping member joined to said spool member by frangible bridging means and having a female portion the internal diameter of which is substantially equal to the external diameter of the male portion of the spool member, said male and female portions being adapted, after breaking of the fringible bridging means, to cooperate together so that a surface of the thread trapping member and a surface of the spool member together form a groove for trapping thread.

4,027,832
LEADER-PIN

Ira Lopata, 35 Sutton Place, New York, N.Y. 10022

Filed Apr. 23, 1976, Ser. No. 679,691
Int. Cl.² G03B 1/04; G11B 15/32, 23/04
U.S. Cl. 242—197 1 Claim

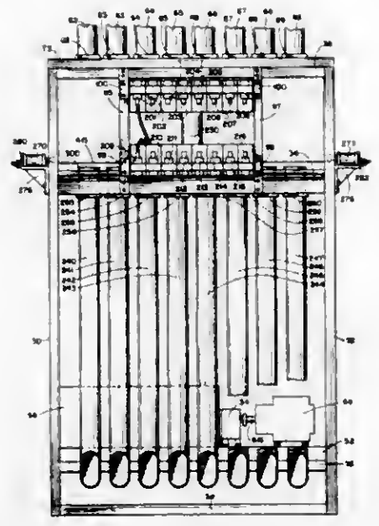


1. A combination leader-pin and tape cartridge comprising,
a. a rod,
b. a knob on the end of the rod,
c. the other end of the rod being bifurcated, to receive an elongated strip therebetween,
d. an elongated tube dimensioned to receive the rod by coaxial movement over the one end toward the knob, and having a longitudinal slit in the tube to accomodate the extension of a strip therefrom as the tube is applied to the rod,
e. a strip passed through the bifurcated end of the rod, and extending out of the slit in the tube,
f. a cassette,
g. the remainder of the elongated strip in the cassette,
h. the rod seated externally at the end of the cassette when the strip is wound up into the cassette.

4,027,833
ARTICLE TRANSFER SYSTEM

Clay Bernard, II; William F. Matheny, III, and Billy J. Parker, all of Tulsa, Okla., assignors to Clay Bernard Systems International Ltd., Tulsa, Okla.

Filed Feb. 23, 1976, Ser. No. 660,160
Int. Cl.² B65G 51/24
U.S. Cl. 243—31 20 Claims



19. An article transfer system for transferring an article carrier from one carrier tube to another comprising: a frame having an upper horizontal beam structure and a lower horizontal beam structure spaced below said upper horizontal beam structure; a plurality of incoming carrier tubes for the movement of said carriers therein towards said frame, each incoming carrier tube having an end attached to said upper beam structure; a vertical hopper positioned between said beam structures having an open upper end for receiving a carrier therein and having a hopper gate at the bottom end thereof for opening said hopper for allowing said carrier to fall from said hopper, means for selectively moving said hopper horizontally to predetermined positions between said beam structures; means associated with each incoming carrier tube for controlling the departure of said carriers from said ends of said incoming carrier tubes individually for allowing a carrier to fall into said hopper when said hopper is positioned beneath a given incoming carrier tube having said carrier located therein; a plurality of outgoing carrier tubes for the movement of carriers therein away from said frame, each outgoing carrier tube having an end attached to said lower beam structure for allowing said carrier to fall thereinto from said hopper when said hopper gate is opened and when said hopper is positioned above said outgoing carrier tube and wherein said means associated with each incoming carrier tube comprises a slide gate attached to each incoming carrier tube for selectively opening said end thereof.

4,027,834
MISSILE NOZZLE CONFIGURATION

Louis F. Hellig, Corona del Mar, and Alson C. Frazer, Santa Ana, both of Calif., assignors to Ford Aerospace & Communications Corporation, Dearborn, Mich.

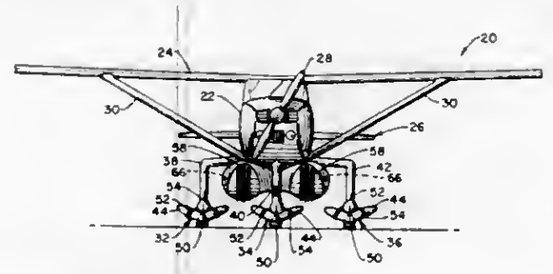
Filed Apr. 13, 1964, Ser. No. 359,222
Int. Cl.² F41G 7/00
U.S. Cl. 244—3.11 8 Claims

1. In a guiding and propulsion system for a missile, the combination which comprises:
communication means mounted in a central portion of the missile toward the aft end thereof and effective to receive and emit radiant energy along a rearward line of view substantially axial of the missile, to guide the missile, and
nozzle means mounted on said aft end to propel the missile by generally rearward discharge of fluid, said nozzle means being canted outward from said central portion to keep said line of view free from said fluid.

4,027,835
AIRPLANE

Elmer B. Sachs, 3371 Rexford St., Ventura, Calif. 93003

Filed Aug. 28, 1975, Ser. No. 608,578
Int. Cl.² B64C 25/52
U.S. Cl. 244—101 1 Claim

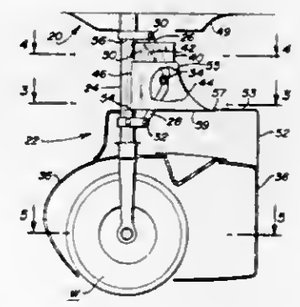


1. An airplane comprising:
a fuselage;
a wing attached to said fuselage;
landing pods attached to said fuselage, each said pod including a landing wheel, each said pod including a ski surface in the area surrounding said landing wheel, each said pod being hydrofoil shaped, whereby said airplane is capable at all times of landing on land, water, snow and ice;
a boat, said boat being securable by securing means to the underside of said fuselage, said securing means being operable to permit detachment of said boat from said fuselage, said boat functioning as a pontoon to buoyantly support said airplane upon water and also functioning as a speed decreasing surface during landing;
said securing means comprises a plurality of movable latches movable between a locked position and unlocked position, each said latch being connected together to operate simultaneously in movement between said locked position and said unlocked position, said latches being operable from within the inside of said fuselage, each said latch connects with a fixed member located on said boat when in the latched position with there being a separate said fixed member for each said latch;
winch means connected to said fuselage, said winch means being connectable with said boat to effect raising and lowering of said boat with respect to said fuselage;
said ski surface being substantially V-shaped in cross-section;
a plurality of suction breaking ribs formed on said ski surface, each said rib being located substantially parallel to the longitudinal axis of said fuselage.

4,027,836
DRAG REDUCING FAIRING FOR LANDING GEAR

Julia K. Seibel, 916 Live Oak Lane, Arlington, Tex. 76012

Filed Mar. 1, 1976, Ser. No. 662,425
Int. Cl.² B64C 25/32
U.S. Cl. 244—103 R 34 Claims



1. A construction adapted for cooperation with an aircraft landing gear which includes an oleo shock absorber and two torque links, comprising:
a. a first and generally V-shaped member fo rigid attachment to the upper one of the two torque links for movement with the upper torque link; and
b. a second and generally V-shaped member for rigid attachment to the lower one of the two links for movement therewith, and both of said V-shaped members extending rearwardly from the oleo strut to form a streamlined afterbody behind said oleo strut when the strut is fully extended, whereby parasite drag associated with the shock absorber may be reduced.

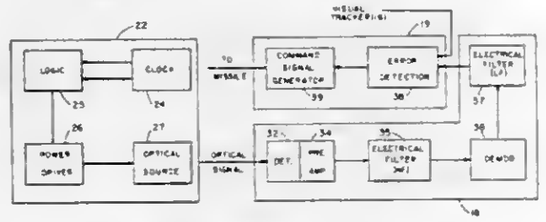
4,027,837
OPTICAL TRACKING LINK UTILIZING PULSE BURST MODULATION FOR SOLID STATE MISSILE BEACONS

Walter E. Miller, Jr., and Jimmy R. Duke, both of Huntsville, Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 23, 1969, Ser. No. 869,452
Int. Cl.² F41G 7/00
U.S. Cl. 244—3.16 7 Claims

1. An optical tracking link for interfacing with existing tracking systems for providing a complete closed loop track-

ing system, comprising: a movable object to be tracked; a photoemissive beacon within the housing of said movable object for transmitting an optical signal; an optical tracker separate from said object for receiving said optical signal and providing an error signal for directional control of said movable object; said beacon including an electronic high frequency generator, a low frequency modulating means for modulating the high frequency output signal of said generator, and a solid state light emitting source responsive to said modulated signal to transmit optical energy at said modulated frequency; said optical tracker including a light sensitive, solid state, optical detector and a preamplifier responsive to said optical energy, providing a preamplified modulated electrical output signal responsive to the modulated optical input, and means for reducing said output signal to obtain the modulation frequency; and said high frequency generator in said beacon including a clock having an output for generating a



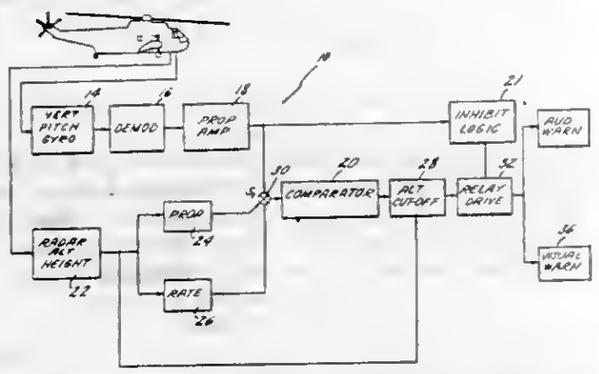
sub-multiple of said high frequency, a first frequency divider circuit having an output and an input connected to an output of said clock and responsive thereto to provide a high frequency output signal therefrom, and a second frequency divider having an input connected to the output of said first divider and being responsive to said high frequency input thereto to provide a sub-multiple, low frequency output therefrom, a gate circuit having first and second inputs and an output, and an amplifier driver circuit for energizing said solid state light emitting source; said gate circuit having the first input connected to the output of said first divider, and the second input connected to the output of said second divider, for providing a high frequency pulse burst output during each alternate half cycle of said low frequency; and said amplifier driver having an input connected to the output of said gate and an output coupled to said solid state light emitting source to stimulate optical emission therefrom synchronous with said modulated high frequency.

4,027,838

HELICOPTER WARNING SYSTEM

Ronald E. Barnum, Trumbull; Franklin A. Tefft, Killingworth, and Louis S. Cotton, Monroe, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Continuation of Ser. No. 559,452, March 18, 1975, Pat. No. 3,979,717. This application May 3, 1976, Ser. No. 682,437
The portion of the term of this patent subsequent to Sept. 7, 1993, has been disclaimed.
Int. Cl.² G08G 5/04
U.S. Cl. 244—17.11 **5 Claims**



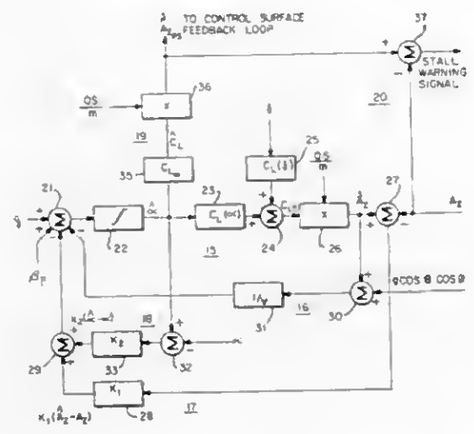
1. For a helicopter of the type that includes a tail stabilizer or tail skid, means for providing a warning signal solely when the tail is in a position that it might contact the ground, said means includes means responsive to the absolute value of the altitude of the helicopter for generating a first signal, means responsive to the absolute value of the attitude of the helicopter for generating a second signal, means responsive to said first signal and said second signal for combining both of said signals for producing a third signal, means for generating a reference signal whose value is indicative of tail ground contact, means for comparing said third signal with said reference signal for energizing a relay upon reaching a predetermined differential therebetween and means responsive to the rate of descent of the helicopter for changing the value of said referenced signal in proportion to said rate of descent, whereby said warning signal is solely actuated whenever the value of the first and second signals are at a predetermined value relative to the rate of descent of the helicopter.

4,027,839

HIGH ANGLE OF ATTACK AIRCRAFT CONTROL SYSTEM UTILIZING A PSEUDO ACCELERATION SIGNAL FOR CONTROL PURPOSES

Richard Paul Quinlivan, Binghamton, N.Y., assignor to General Electric Company, Binghamton, N.Y.

Filed Mar. 30, 1976, Ser. No. 671,830
Int. Cl.² G05D 1/00
U.S. Cl. 244—195 **3 Claims**



1. In an aircraft control system utilizing angle of attack and lift acceleration signals for control purposes, the combination of:

a. means for indirectly producing an estimated angle of attack signal from measured aircraft pitch moment generating signal, including:

1. network means simulating dynamic lift characteristics of an aircraft, said network means providing an output signal proportional to the estimated change of the aircraft coefficient of lift for any variation in angle of attack, said output signal being representative of the actual dynamic lift characteristics,

2. network means to convert said estimated coefficient of lift signal an estimated aircraft lift acceleration signal which is representative of the actual lift acceleration characteristics of an aircraft,

3. means for combining the estimated lift acceleration signal with signals proportional to aircraft pitch rate, roll, sideslip angle and an angular rate of the aircraft around a pitch axis to produce a signal which represents an estimated angle of attack,

b. means responsive to the estimated angle of attack signal to produce a pseudo coefficient of lift signal which is linear with angle of attack over an entire range of operational values and which is thus identical with the assumed aircraft characteristics in the region where an aircraft

coefficient of lift versus angle of attack is linear but deviates from the actual aircraft dynamic lift characteristics where an aircraft rate of change of coefficient of lift decreases and goes to zero with increases in angle of attack, including a newtork having a linear output signal response characteristic over the entire range of input signals and means to apply said estimated angle of attack signal as an input to said network,

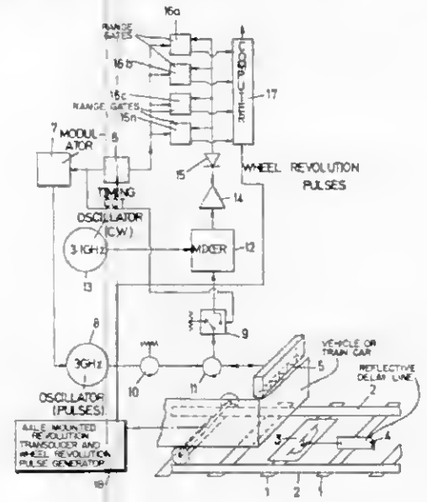
c. and means to convert said pseudo coefficient of lift signal to a pseudo lift acceleration signal which is linear over an entire range of aircraft angles of attack.

4,027,840

VEHICLE POSITION INDICATOR WITH RADAR INTERROGATION EACH OF SPACED TRANSPONDERS DISPOSED ALONG A PATHWAY FOR THE VEHICLE

Peter Kenneth Blair, Harlow, England, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Sept. 30, 1975, Ser. No. 618,184
Claims priority, application United Kingdom, Oct. 15, 1974, 44566/74
Int. Cl.² G01S 9/56
U.S. Cl. 246—122 R **4 Claims**



1. A vehicle position indicating system including a pulse radar transmitter/receiver and a plurality of passive transponders each of which has an antenna coupled to a reflective delay line, different transponders having different delays, the radar and the transponders being arranged for relative movement with respect to each other as a consequence of movement of a vehicle so that passage of a transponder past the radar causes the transmitted radar pulses to be reflected and received at the radar after a time determined by the transponder delay, the radar receiver having a plurality of range gates whereby the received pulses may be classified into time intervals corresponding to the different transponder delays; the radar including a transmitter/receiver coupled to an antenna, and a timing circuit to control the emission of pulses by the transmitter, the timing circuit also controlling the operation of the receiver a predetermined time after the emission of a pulse by the transmitter and the opening of the range gates at predetermined times.

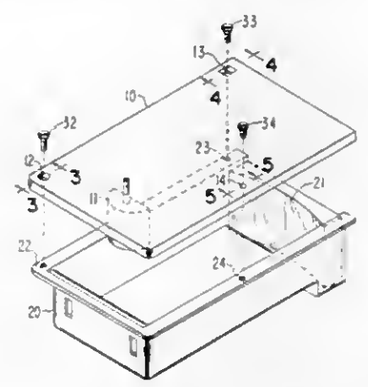
4,027,841

REPRODUCIBLE MOUNTING OF PREALIGNED OPTICAL ASSEMBLIES

Alfred H. Sturtevant, Palo Alto, and Robert L. Trumbull, Mountain View, both of Calif., assignors to Varian Associates, Palo Alto, Calif.

Filed Apr. 12, 1976, Ser. No. 676,095
Int. Cl.² F16M 11/04
U.S. Cl. 248—19 **21 Claims**

1. An assembly comprising a base member and a mating member; said base member having first, second and third noncollinearly disposed mounting holes; said mating member having first, second and third matching holes; first, second and third locating means; said mating member being mountable upon said base member such that said first locating means passes through said first mounting hole and said first matching hole, said second locating means passes through said second mounting hole and said second matching hole, and said third locating means passes through said third mounting hole and said third matching hole; said base and mating members being configured to be in contact with each other, when assembled, at three noncollinear areas, the dimensions of said three contact areas being small relative to the distance between any two of said contact areas; said first mounting and matching



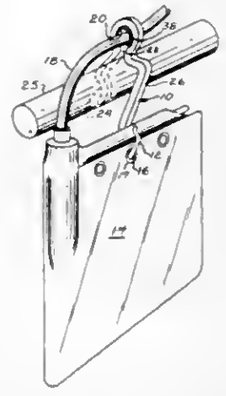
holes being configured to preclude translational motion of said mating member relative to said base member in a direction parallel to a plane defined by said three small contact areas when said first locating means passes through said first mounting and matching holes; said second mounting and matching holes being configured to allow rotational motion of said mating member relative to said base member only about a lne joining said first and second mounting holes when said second locating means passes through said second mounting and matching holes; said third mounting and matching holes being configured to preclude rotational motion of said mating member relative to said base member about said line joining said first and second mounting holes when said third locating means passes through said third mounting and matching holes.

4,027,842

FLEXIBLE HANGER MEMBER FOR DRAINAGE BAGS AND THE LIKE

Herbert Mittleman, Deerfield, Ill., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Sept. 24, 1975, Ser. No. 616,218
Int. Cl.² F16M 13/00
U.S. Cl. 248—75 **6 Claims**



1. A hangar for a drainage bag or the like which comprises: an elongated body, bag suspending means at one end of said body, means for engaging a hangar support, said means being

carried at the other end of said body, and a holding part for supporting a portion of a length of tubing in transverse relation to said hangar support engaging means, the improvement comprising, said holding part including a flange of greater width than said body, said flange defining an eye portion for receiving and holding said tubing for the prevention of kinking thereof, said hangar support engaging means comprising an elongated member defining an acute angle of no more than substantially 45° to said body, for added hanging stability, said hangar being resilient, for improved gripping retention of a hanger support.

4,027,843

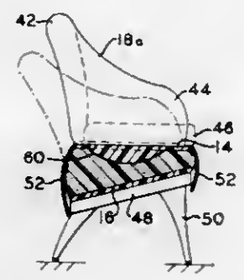
UNIVERSAL ROCKER

Donald R. Thompson, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation-in-part of Ser. No. 371,005, June 18, 1973, abandoned. This application Dec. 19, 1975, Ser. No. 642,519

Int. Cl.² A47C *3/02*

U.S. Cl. 248—375 **3 Claims**



1. A chair suitable for rocking comprising in combination:
A. an upper seat;
B. a lower platform, and
C. a central unit comprising a thickness of an organic, volume-compressible, flexible polyether based urethane foam having a density of 2–5 pounds per cubic foot, a maximum compression set of 20 percent, and indention and compression load deflections not exceeding 50 percent, said foam bounded by substantially rigid upper and lower sections of a noncompressible, high density foam molded to the flexible foam to form a single integral unit, the upper section securely attached to the seat and characterized by a downwardly directed nodal protrusion penetrating into the flexible foam to increase the shear surface between the rigid upper section and the flexible foam, the lower section securely attached to the platform, said central unit providing complex pitch and roll motion about a vertical axis through the center of gravity when the chair is occupied.

4,027,844

BIG-END-DOWN INGOT MOLD FOR CASTING METAL

Takaho Kawawa, and Masaharu Ito, both of Fukuyama, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

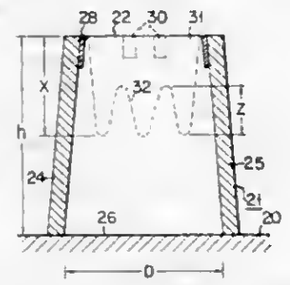
Filed June 14, 1976, Ser. No. 695,458

Claims priority, application Japan, June 18, 1975, 50-74053

Int. Cl.² B22D *15/00, 7/06*

U.S. Cl. 249—111 **9 Claims**

1. A big-end-down ingot mold for casting metal having a side wall, and further comprising a heat insulating chamber in said side wall, the cross-sectional area of said chamber gradually increasing toward the top of the ingot mold, the depth of said chamber being smaller than a difference between the height of the interior of the mold and the bottom length of the inside of a narrower wall of the mold where the interior of the mold has a rectangular cross section and being smaller than the difference between the height of the interior of the mold



and the bottom length of the inside of a wall of the mold where the interior of the mold has a square cross section.

4,027,845

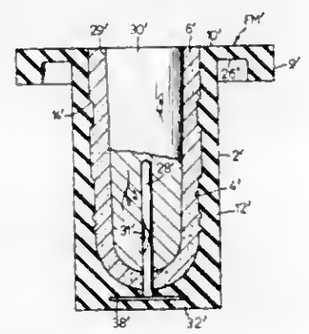
FLEXIBLE MOLD INCLUDING RIGID ENCAPSULATED MANDREL

Raymond M. Putzer, Racine, Wis., assignor to Precision Flexmold, Inc., Racine, Wis.

Filed Apr. 28, 1975, Ser. No. 572,101

Int. Cl.² B28B *7/16, 7/28;* **B29C** *1/06*

U.S. Cl. 249—142 **5 Claims**



1. Apparatus for molding seamless articles comprising a generally hollow, one-piece distensible flexible mold having a bottom wall and side walls of such thickness that the mold is self-supporting and supports the weight of a molding material poured therein without distortion of said mold, and a rigid upwardly extending core member having a radially extending flange around the periphery of its lower portion fixedly embedded in the bottom wall of said mold and positioned intermediate the thickness of said bottom wall, and a downwardly extending core member received in said mold and defining an annular chamber therewith, said downwardly extending core including an axially extending bore for receiving therein said upwardly extending core member in mating engagement such that said downwardly extending core member is supported and positioned with respect to said mold by said upwardly extending core, said core members and said mold defining a generally annular chamber for receiving molding material.

4,027,846

PANEL FOR CASTING CONCRETE

Sylvain Caplat, Le-Blanc-Mesnil, France, assignor to Societe Les Coffrages Madernes, Paris, France

Continuation of Ser. No. 318,034, Dec. 26, 1972, abandoned. This application Dec. 31, 1975, Ser. No. 645,907

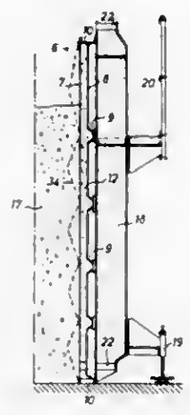
Claims priority, application France, Dec. 28, 1971, 71.47090

Int. Cl.² E04G *9/00, 17/00;* **E04C** *2/32*

U.S. Cl. 249—189 **7 Claims**

1. A panel for casting concrete comprising
a front casting wall of steel sheet,

a rear wall of steel sheet, said front casting wall facing said rear wall and being spaced therefrom, and
a layer of expanded rigid polyurethane foam of high density cast in situ between said walls and joining said walls together, the mechanical properties of the cast foam being such that the panel behaves under the load of the concrete as a beam, said mechanical properties being such that:
the polyurethane layer has a sufficient rigidity to prevent relative displacement of said two walls and to resist the shear-tensile forces and as a consequence has a density of at least 200kg/m³;



said front casting wall has a thickness of at least 2.5mm for resisting the tensile forces applied thereto by bending of the panel,
said rear wall has a thickness of at least 2.5mm for resisting the compression forces applied thereto by bending of the panel,
the adherence of the polyurethane layer with the walls being sufficient to resist the shear-tensile forces and being obtained solely due to the properties of adherence of the polyurethane after polymerization in situ between the two walls.

4,027,847

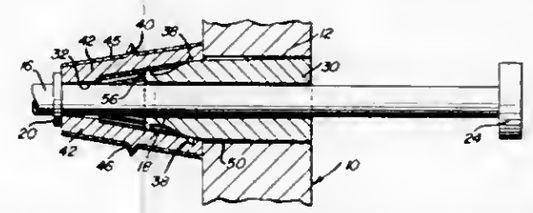
EXPANDABLE TIE ANCHOR

Clavin R. Johnson, 1813 Juniper Drive, Alamogordo, N. Mex. 88310

Filed Mar. 26, 1976, Ser. No. 670,979

Int. Cl.² E04G *17/08*

U.S. Cl. 249—190 **12 Claims**



1. A form tie construction including an elongated rod having an abutment on one end portion thereof spaced a predetermined distance inwardly of the terminal end of said one end portion, a tubular circumferentially continuous sleeve slidably mounted on said one end portion outwardly of said abutment for endwise abutting engagement with the latter, said sleeve including means rendering said sleeve substantially incompressible in an axial direction thereof, but expandable in radial directions, a wedge member slidably mounted on said one end portion outwardly of said sleeve and including wedge portions thereof receivable within and operative to radially expand the adjacent end of said sleeve upon shifting of said wedge member along said rod toward said abutment.

4,027,848

THERMALLY CONTROLLED FLUID FLOW REGULATING OR SHUT-OFF VALVES

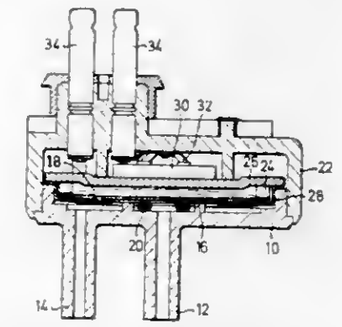
Waldemar Dietmar Mundil, Pulheim, Germany, assignor to Deutsche Vergaser GmbH & Co Kommanditgesellschaft, Neuss, Germany

Filed Oct. 14, 1975, Ser. No. 622,379

Claims priority, application Germany, Nov. 13, 1974, 2453757

Int. Cl.² F16K *31/04, 31/56*

U.S. Cl. 251—11 **8 Claims**



1. A fluid flow control valve comprising a thermally responsive bimetallic element, means defining a fluid flow passage through said valve, means defining a valve seat located to be engaged and disengaged by said bimetallic element to closed and open said fluid flow passage, a thermally conductive member, means mounting said thermally conductive member together with said bimetallic element to define therebetween an enclosed volume insolated from said fluid flow passage, and temperature varying means mounted on said thermally conductive member in thermally conductive relationship with said bimetallic element operating to control said bimetallic element to open and close said valve.

4,027,849

VALVE FOR AGGRESSIVE FLUIDS

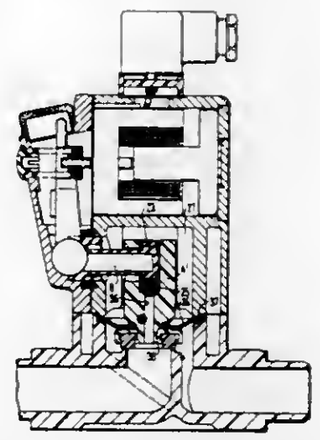
Fritz Muller, Beim Bahnhof, D 7119 Criesbach, Germany

Filed Mar. 31, 1975, Ser. No. 563,409

Claims priority, application Germany, Apr. 4, 1974, 2416359

Int. Cl.² F16K *31/10*

U.S. Cl. 251—30 **18 Claims**



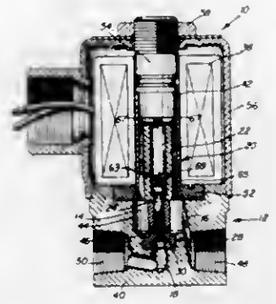
1. A valve arrangement for aggressive fluids, the arrangement comprising: a plurality of plastic components including a valve body with inlet and outlet connections, a valve seat, means selectively movable toward and away from the valve seat for controlling a flow of the aggressive fluid, guide means for guiding the movement of said controlling means in a direction perpendicular to a valve seat plane, a two-armed lever means pivotally mounted on an axle extending substantially

parallel to the plane of the valve seat, means provided in said controlling means for accommodating a first of said two-armed lever means, said first arm of said two-armed lever means extending substantially parallel to the plane of the valve seat, the other arm of said two-armed lever means extending substantially at a right angle to said first arm, an actuating means operatively associated with said other arm, a movable seal interposed between said other arm and said controlling means, the movable seal having an end portion terminating in proximity to the pivot axis of said two-armed lever means, said seal being fashioned as a diaphragm bellows having a hose-like extension adjoining a central area thereof with one of said extension being closed and with said extension extending over the length of said first arm and encompassing the same.

4,027,850
SOLENOID VALVE

Walter E. Allen, Prospect, Conn., assignor to Peter Paul Electronics Co., Inc., New Britain, Conn.

Filed Sept. 5, 1975, Ser. No. 610,748
Int. Cl.² F16K *31/06*
U.S. Cl. 251—141 **6 Claims**

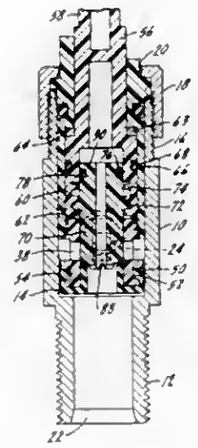


1. The combination comprising an armature assembly and a valve seat insert for a solenoid operated fluid control valve, said armature assembly including an impact plunger and a seal pin mounted in said plunger for reciprocal movement relative thereto and having a cylindrical shank portion projecting outwardly from said plunger, said seal pin having a seating surface at its outer end, said insert having a base portion for assembly in a cavity in the body of the control valve and an integral guide portion projecting inwardly from said base portion and toward said impact plunger, said guide portion having a generally radially disposed abutment surface at its inner end for abutting engagement with an associated outer end portion of said impact plunger, said insert having a stepped cylindrical bore extending therethrough in coaxial alignment with said cylindrical shank portion for communicating with an outlet passageway in the valve body, said bore having an outer end portion defining an outlet orifice and a valve seat, said valve seat surrounding the inner end of said outlet orifice, said bore including a diametrically enlarged inner end portion defining a seal pin guide surface and having a diameter substantially equal to the diameter of said cylindrical shank, said enlarged inner end portion receiving an associated portion of said cylindrical shank for sliding movement therein, said seating surface being movable into and out of engagement with said valve seat, said impact plunger being movable relative to said seal pin and said base when said seating surface is in engagement with said valve seat, said seal pin guide surface being in surrounding sliding engagement with an associated portion of said clindrical shank at all times when said insert-armature assembly is assembled in said control valve and guiding said seal pin in its movements toward and away from said valve seat, said guide portion having a generally radially extending hole therethrough communicating with a chamber of the control valve and with said enlarged bore portion immediately inwardly of said valve seat and cooperating with said enlarged bore portion, said valve seat and said orifice to provide a fluid flow path from the chamber to the outlet passageway when said seating surface is out of engagement with said valve seat.

4,027,851
FAUCET VALVE AND SEAL THEREFOR

Walter F. Schlotman, Bay Village, Ohio, assignor to Stanadyne, Inc., Windsor, Conn.

Filed June 27, 1975, Ser. No. 590,848
Int. Cl.² F16K *25/00*
U.S. Cl. 251—172 **14 Claims**



1. A fluid valve including hollow sleeve means, an axial inlet at one end of said sleeve means, at least one outlet in said sleeve means,

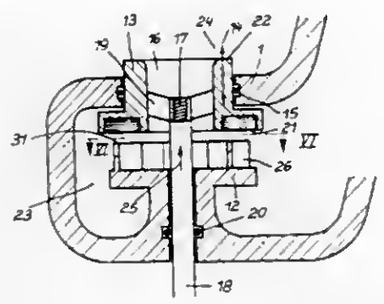
seal means attached to said sleeve means adjacent its inlet, said seal means having an inner portion, an end portion lying flat against an end of said sleeve means and a portion extending outside of and interlocked with said sleeve means,

adjustable valve means positioned within said sleeve means and movable toward and away from said sleeve means inlet and said annular seal means, said valve means having an end portion arranged for sealing contact with said seal means inner portion, movement of said valve means against the direction of flow through said sleeve means inlet into contact with said seal means closing said fluid valve, said seal means inner portion and end portions being axially movable in response to closing movement of said valve means.

4,027,852
VALVE DISC AND SEAT CONSTRUCTION

Bernhard W. Braukmann, Am. Posenbag 1, D-695 Mosbach, Germany

Filed Mar. 27, 1974, Ser. No. 455,174
Claims priority, application Germany, Mar. 29, 1973, 2315626
Int. Cl.² F16K *1/34*
U.S. Cl. 251—333 **2 Claims**



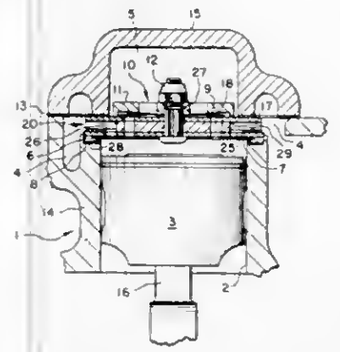
1. A valve comprising a valve body having a first aperture,

a first seal in said first aperture, a valve disc integral with said valve body and surrounding said first aperture, a movable stem in said first aperture engaging said first seal, a second aperture in said valve body opposed to said first aperture, a second seal in said said second aperture, a valve element in said second aperture engagable with second seal, said movable stem being attached to said valve element to move the latter into contact with said valve disc and away therefrom, one of said valve disc and said valve element having a raised zig zag surface forming a seat.

4,027,853
VALVE PLATE HAVING IMPROVED SUCTION GAS FLOW PATH

Peter J. Linnert, La Crosse, Wis., assignor to The Trane Company, La Crosse, Wis.

Filed May 3, 1976, Ser. No. 682,528
Int. Cl.² F16K *51/00*
U.S. Cl. 251—361 **17 Claims**



1. A valve plate for use in a reciprocating gas compressor comprising

a. a lower member at least a portion of which defines a first substantially planar surface of generally annular configuration and having suction port means disposed adjacent a radially inner portion thereof,

b. an upper member at least a portion of which defines a second substantially planar surface of generally annular configuration, said first and second surfaces facing each other in spaced relationship,

c. axially extending means located adjacent radially inner portions of said first and second surfaces, and inwardly of said suction port means, said axially extending means defining therewith a suction gas flow area of generally annular configuration between said first and second planar surfaces,

d. discharge port means passing axially through said valve plate and disposed radially inwardly of said suction gas flow area, and

e. a corrugated element located in said suction gas flow area, the corrugations thereof defining suction gas flow paths in communication with said suction port means.

4,027,854
SELF-EQUALIZING LINKAGE FOR WELL DERRICKS

William J. Mounton, Jr., Box 10515, New Orleans, La. 70181

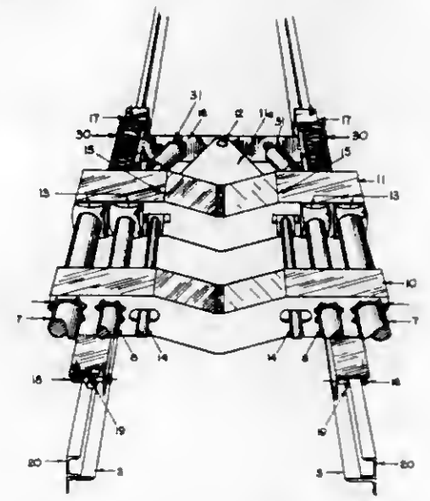
Filed Oct. 15, 1975, Ser. No. 622,583
Int. Cl.² B66F *3/24*
U.S. Cl. 254—29 R **13 Claims**

1. In a hydraulic ram system for well derricks using force-producing rams paralleled in pairs, a cross-head structure for summing and transferring the forces from the heads of the rams to common load means, the structure comprising

a. a pin trolley carriage restricted for translation only along a path parallel to the axes of the rams, said carriage carrying

b. a pivot pin with centerline at a right angle to the plane through the axes of the rams of a pair, and positioned between said axes, and

c. a cross-head beam pivotally mounted on said pin and bridging said rams to receive their forces,



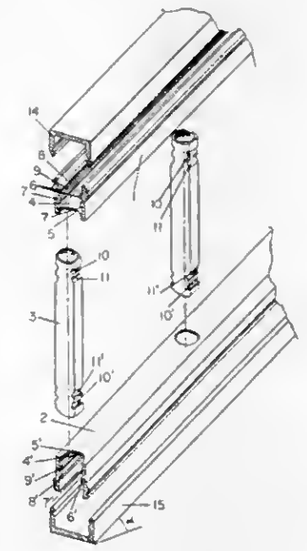
d. the forces being received on rolling-sliding convex faces on the said beam from each ram, said faces being located between the heads of the rams and the pivot pin, and

e. common load means attached to said structure.

4,027,855
GUARD RAIL

Réne Lauzier, Ruy, France, assignor to CEGEDUR, Societe De Transformation De L'Aluminum Pechiney, Paris, France

Filed Feb. 2, 1976, Ser. No. 654,077
Claims priority, application France, Mar. 21, 1975, 75.09565
Int. Cl.² B21F *27/00*
U.S. Cl. 256—21 **6 Claims**



1. Guard rail comprising an inclined handrail and vertical bars of a width L in the plane of the guard rail and which forms with the horizontal an angle capable of varying between two limits $\alpha-\delta\alpha$ and $\alpha+\delta\alpha$, the said handrail being itself essentially constituted by an open profile section of generally U-shaped cross-section in which the side walls of the profile extend in the direction away from the handrail and with the web of the profile being of a thickness *l*, ribs extending inwardly from said side walls, perforations in the web of the hand rail dimensioned to allow the ends of the vertical bars to traverse the said web, at least one notch in the end portion of said vertical bar

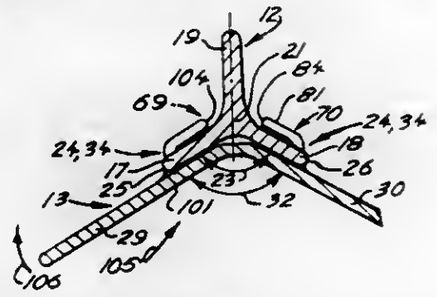
to be secured by clipping on ribs extending inwardly from the side walls of the handrail, said guard rail being characterized in that on the one hand the perforations in the web of the hand rail have in the plane of the guard rail a horizontally measured width $L + e\ (tg\delta\alpha/cos\alpha)$ and in that, on the other, the bearing surface of each notch on the corresponding rib of the rail is defined by a surface of revolution tangent to the bearing surface of the rib, the axis of this surface of revolution being at right-angles to the plane of the guard rail and traversing this plane beyond the rail with respect to the portion of the plane in which the vertical bars are located.

4,027,856

FENCE POST ASSEMBLY

Ernest James Kingsley, and Horst Guenter Mendgen, both of West Vancouver, Canada, assignors to Zygon Industries Limited, Vancouver, Canada

Filed Aug. 18, 1975, Ser. No. 605,269
Int. Cl.² B21F 27/00
U.S. Cl. 256—47 **10 Claims**



I. A fence post assembly including:

i. an elongated, generally Y sectioned post having first, second and third flanges extending from an inner core portion of the post, the first and second flanges having outer edges and being inclined to each other at a main angle to define a V therebetween, each outer edge having two longitudinally spaced notches,

ii. a V sectioned anchor plate having a longitudinal axis and first and second wings, the wings extending on generally opposite sides of the axis and being inclined to each other at an angle generally equal to the main angle of the post so as to fit in the V defined by the first and second flanges when the longitudinal axis is generally parallel to the fence post, the first and second wings each having a pair of tangs extending therefrom and spaced apart longitudinally at an axial spacing equal to axial spacing of the respective notches on the post, the tangs being adapted to engage respective notches in the outer edges of the flanges,

so that the anchor plate is secured to the post by the tangs which engage the notches in the flanges and essentially prevent the plate from moving axially relative to the post.

4,027,857

STATIC MIXER FOR FLOWABLE MATERIALS, AND RELATED METHOD

Ashley D. Cunningham, c/o Cunningham Industries, Inc., P.O. Box 353, Pawling, N.Y. 12564

Filed Feb. 23, 1976, Ser. No. 660,059
Int. Cl.² B01F 5/00
U.S. Cl. 259—4 AB **13 Claims**

6. A static mixing unit for mixing flowable materials, which comprises

a. a substantially solid body having a longitudinal axis and provided with an inlet end and an outlet end,

b. a plurality of flow passages formed in said body,

c. a first plurality of said flow passages communicating with said inlet end and extending angularly to the outer surface of said body,

d. each of said flow passages converging from said outer surface centrally through said body to said longitudinal axis whereby all of said flow passages intersect at a common area along the axis of said body,

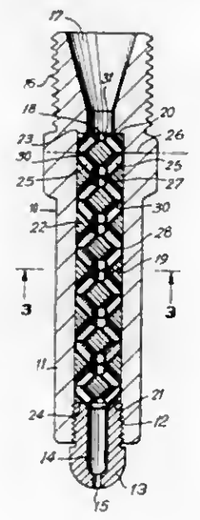
e. said flow passages diverging from said common area to said outer surface and reconverging and diverging to intersect at one or more additional common areas at the axis of said body to provide a plurality of series related mixing stages, and

f. said flow passages communicating with the outlet end of said body.

11. The method of mixing a stream of flowable materials comprising the steps of

a. passing the stream through the inlet end of a static mixer,

b. dividing the stream into a plurality of sub-streams,



c. diverging the sub-streams outwardly away from a central axis extending in the direction of flow of the stream to the outer surface of said static mixer,

d. thereafter converging the sub-streams toward said central axis until they intersect and blend in a common area at said axis,

e. increasing the velocity of the flowing materials momentarily as said materials flow through said common area,

f. repeating steps (b) through (d) until the stream is thoroughly mixed, and

g. reuniting the sub-streams at the outlet end of said static mixer.

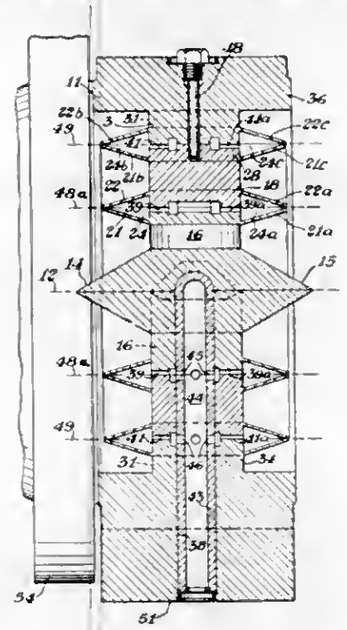
4,027,858

APPARATUS FOR MIXING

Edward V. Dettmer, Bay City, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed June 29, 1976, Ser. No. 700,938
Int. Cl.³ B01F 15/02, 5/04
U.S. Cl. 259—4 R **3 Claims**

1. A fluid dispenser or mixing aid having a dispenser body, the dispenser body having a first end, a second end, and a longitudinal axis, the dispenser body defining a generally centrally disposed mandrel, the mandrel having a first end and a second end, the first and second ends of the mandrel being disposed generally along the longitudinal axis, the body defining at least one generally concentric first passageway generally surrounding the mandrel, the body defining a first generally annular dispensing means disposed about said first passageway and affixed to the mandrel, the first dispensing means having defined therein a fluid passage means and an annular dispensing portion, the fluid passage means being in operative connection with the first dispensing means, the dispensing portion having first and second concentric annular lip means, the first and second lip means being generally concentric about the mandrel, the lip means converging at a location remote from the supply passage and in the direction of the first body end, the lip means being deflectable by fluid pressure internal and external thereto, the lip means and the body defining an enclosed generally annular plenum, the body defining a support means external to the dispensing means and a second plurality of passageways radially outwardly disposed from the first dispensing means, the second plurality of passageways extending generally parallel to the first plurality of passageways, the



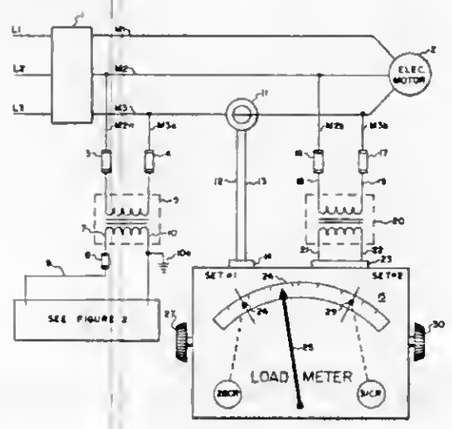
body defining a support external to the second plurality of passageways, the support means being adapted to be operatively connected to a conduit, the body defining generally radially outwardly extending minor stream supply passages in communication with said fluid passage means.

4,027,859

AUTOMATIC CONTROL OF LIQUID ADDITION TO A MIXTURE BY POWER SENSING

Milton Stone, Chicago, Ill., assignor to Pettibone Corporation, Chicago, Ill.

Filed May 25, 1976, Ser. No. 689,873
Int. Cl.² B01F 15/02
U.S. Cl. 259—18 **13 Claims**



1. In the process of mixing the materials of a liquid-dependent-viscosity mixture and said liquid in a mixing machine powered electrically, the improvement of automatically controlling the trim liquid, comprising:

a. means for sensing the temperature of said mixture, and for signalling at a selected temperature,

b. initiating means for enabling said temperature means signal,

c. means responsive to said temperature means signal when enabled by said initiating means, for producing a pulsing signal,

d. means for supplying liquid under pressure to the mixing machine when enabled,

e. means for enabling said liquid means in a pulsing manner in response to said pulsing signal,

f. means for sensing the electric power taken by said machine and for signalling at a selected power level, and

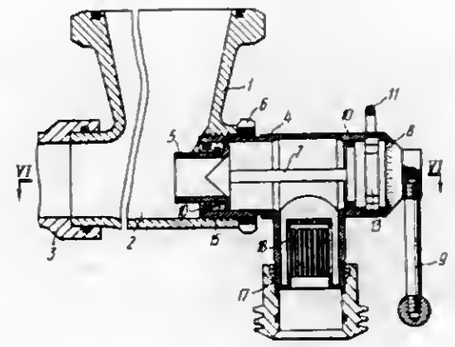
g. means responsive to said power sensing means signal to disable said liquid control means, whereby the admission of liquid is terminated.

4,027,860

METHOD OF CONTROLLING THE DENSITY OF A PLUGGING FLUID

Alexandr Sergeevich Mamvrlisky, prospekt Revoljutsii, 26/36, kv.7, and Alexandr Mikhailovich Lapchenko, ulitsa Moskovskaya, 68, both of Grozny, U.S.S.R.

Filed July 24, 1975, Ser. No. 598,550
Int. Cl.² B28C 7/04
U.S. Cl. 259—149 **6 Claims**



1. A method of controlling the density of a fluid, such as a plugging fluid comprising a mixture of dry solid material and a liquid, comprising the steps of supplying continuously a stream of said dry solid material and a flow of a carrier liquid, pre-shaping the flow of said carrier liquid into a substantially flat jet, mixing said flow of the carrier liquid with said dry solid material in a mixing zone, and rotating said substantially flat jet of said carrier liquid about the longitudinal axis thereof in the mixing zone through an angle corresponding to a required density of the fluid being prepared.

4,027,861

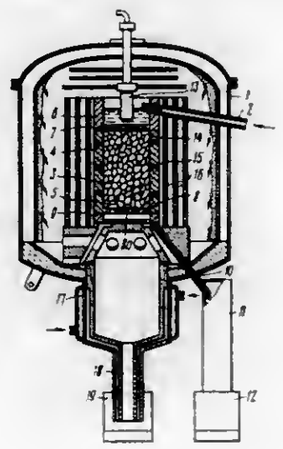
APPARATUS FOR CONTINUOUS VACUUM-REFINING OF METALS

Vladimir Semenovich Cherednichenko, ulitsa Zorge, 269, kv. 79; Gennady Ivanovich Orlov, ulitsa Vatutina, 27, kv. 20, both of Novosibirsk; Aron Semenovich Mikulinsky, ulitsa Bosova, 1, kv. 54, Istra Moskovskol oblasti; Jury Semenovich Arzamastsev, ulitsa Zorge, 267, kv. 58, Novosibirsk; Vladimir Vasilievich Efremkin, ulitsa Gurzulskaya, 15a, kv. 23, Sverdlovsk, all of U.S.S.R.; Valentin Alexeevich Nikitin, deceased, late of Kishinev, U.S.S.R.; by Valentina Kuzminichna Nikitina, administrator, and by Dmitry Valentinovich Nikitin, administrator, both of ulitsa Zelinskogo, 8, kv. 50,, Kishinev, both of U.S.S.R.

Filed Apr. 2, 1976, Ser. No. 673,106
Int. Cl.² C22B 9/04
U.S. Cl. 266—149 **4 Claims**

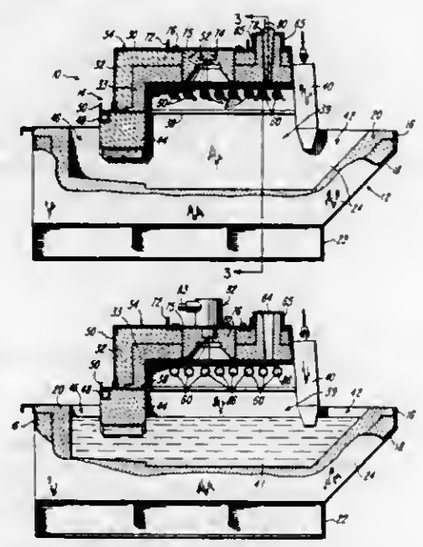
1. An apparatus for continuous vacuum-refining of metals, comprising: a cylindrical vacuum chamber; an evaporator for preliminary melted impure metal, said evaporator being accommodated in said vacuum chamber and constituting a vessel with a granulated loose material filling said vessel to capacity to provide a maximum evaporating surface washed by the molten metal being refined; a heater with a current lead to feed energy thereto for heating said vessel together with the metal to a volatilization temperature of low-boiling impurities; side walls of said vessel fitted with outlets for the effluence of

the low-boiling impurities liberated during metal heating; a condensate header mounted under said vacuum chamber and adapted to collect the impurities; the bottom of said vessel



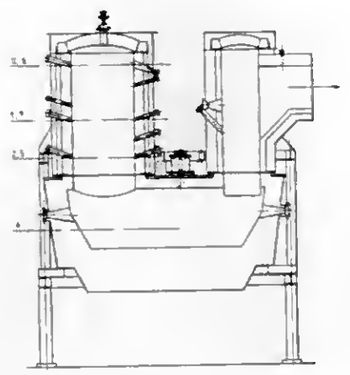
with a drain for discharging the refined metal from said vacuum chamber; a tank adapted to receive the refined metal and disposed externally of said vacuum chamber.

4,027,862
METAL MELTING FURNACE WITH ALTERNATE HEATING SYSTEMS
Carl W. D. Schaefer; Richard L. Schaefer, both of Dayton, and Gordon F. Kennedy, Miamisburg, all of Ohio, assignors to Frank W. Schaefer Inc., Dayton, Ohio
Filed Dec. 19, 1975, Ser. No. 642,243
Int. Cl.² C21B *11/00*
U.S. Cl. 266—160 **1 Claim**



1. In a furnace structure for a reverberatory metal melting furnace of the type having a lower furnace structure for holding metal and an upper furnace structure supported on top of the lower furnace structure and having means including sidewalls and a roof supported by said sidewalls cooperating with the lower furnace structure and molten metal therein defining a heating chamber, the improvement permitting conversion between the use of a fossil fuel fired radiant heating element and an electrically operated radiant heating element including means defining an aperture extending through said roof and a roof portion around said aperture for supporting said fossil fuel fired element in said aperture, means defining a flue for exhausting gases from said heating chamber when using said fossil fuel fired element, means defining mutually aligned apertures adapted for receiving the ends of said electrical resistance heating elements in said sidewalls, and means for plugging said apertures and said flue so that said fossil fuel fired heating element may be used for melting metal in said lower furnace structure or said electrical resistance heating element may be used for melting metal in said lower furnace structure and the conversion from one of said elements to the other of said elements may conveniently be made by installing the desired heating element in said aperture or apertures provided therefor and plugging and unplugging said aperture or apertures and said flue as needed.

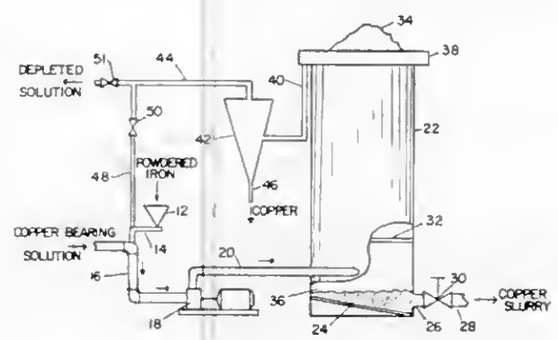
4,027,863
SUSPENSION SMELTING FURNACE FOR FINELY-DIVIDED SULFIDE AND/OR OXIDIC ORES OR CONCENTRATES
Olavi August Aaltonen, Pori; Timo Tapani Talonen, Nakkila, and Seppo Untamo Härkki, Haukilahti, all of Finland, assignors to Outokumpu Oy, Helsinki, Finland
Filed July 23, 1976, Ser. No. 708,118
Int. Cl.² C22B *5/00*
U.S. Cl. 266—162 **4 Claims**



1. A suspension smelting furnace for the suspension smelting of a finely-divided raw material selected from sulfide and oxide ores and concentrates, having a horizontal lower furnace to which the lower ends of at least one vertical suspension reaction shaft and one rising-flow shaft have been connected, with devices at the upper end of the suspension reaction shaft for producing a suspension of the finely-divided raw material with an oxygen containing gas and for directing this suspension downwards in the reaction shaft perpendicularly to the surface of the melt accumulated in the lower furnace in order to discharge most of the suspension into the melt, with means in the rising-flow shaft for removing the residual suspension from its upper part, and with means in the lower furnace for removing the slag and the metal as well as the matte from the lower furnace, comprising inside the suspension reaction shaft a gas-tight pressure water cooling system for producing on the surface of the pressure water cooling system a lining material of matte and slag components to control the suspension temperature.

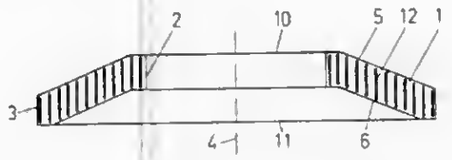
4,027,864
PROCESS AND APPARATUS FOR RECOVERING DISSOLVED COPPER FROM SOLUTIONS CONTAINING COPPER
Jan Hulsebos, Cranbury, N.J., assignor to Cities Service Company, Tulsa, Okla.
Continuation of Ser. No. 555,014, March 3, 1975, abandoned, which is a division of Ser. No. 293,616, Sept. 29, 1972, which is a continuation-in-part of Ser. No. 128,435, March 26, 1971, abandoned. This application June 16, 1976, Ser. No. 696,458
Int. Cl.² C22B *15/12*
U.S. Cl. 266—170 **3 Claims**

1. An apparatus for recovering dissolved copper which comprises means for mixing a powdered iron with said solution for a sufficient time to allow said iron to reduce said copper in said solution to metallic copper, a container wherein said means for mixing is tangentially connected so that said solution enters said container circumferentially to reduce the flow velocity of said solution containing metallic copper to allow said copper to settle to the bottom of said container, means for withdrawing said settled metallic copper from the bottom of said container, said container additionally includes a means for supporting material containing iron, said means for supporting material containing iron includes a support grid



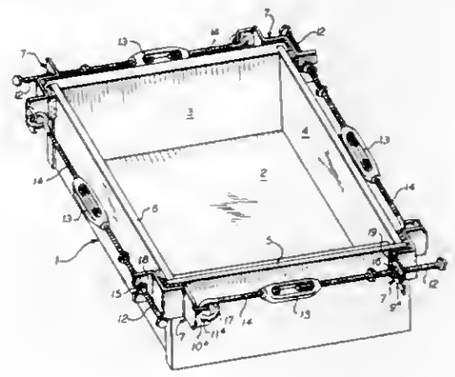
horizontally mounted within said container supporting a mass of particulate scrap iron, said container is substantially cylindrical and said tangential connection of said means for mixing to said container is in the lower portion thereof and underneath said support grid, and said apparatus additionally includes a means for passing upwardly through said scrap iron a solution containing residual copper values, and a means for secondary removal of entrained residual copper valves from the solution passed upwardly through said scrap iron.

4,027,865
REINFORCED DISK SPRINGS
John H. Greenwood, Clophill, England, and Emmerich Robitschek, Zurich, Switzerland, assignors to BBC Brown Boveri & Company Limited, Baden, Switzerland
Filed July 22, 1975, Ser. No. 598,008
Claims priority, application Switzerland, July 24, 1974, 10204/74; May 12, 1975, 6036/75
Int. Cl.² F16F *13/00*
U.S. Cl. 267—148 **29 Claims**



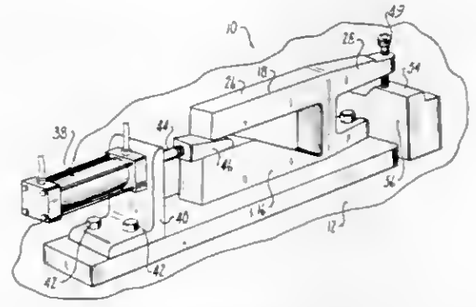
1. A reinforced disk spring comprising:
a conical shell of elastically deformable material having an upper plane or convex surface, a lower concave surface, an outer bounding surface, and an inner bore; and
a plurality of reinforcing elements embedded within said conical shell and disposed such that each of said elements is a three dimensional body of revolution and coaxial with the spring axis, said elements also being disposed throughout said shell in a radially extending array,
whereby the reinforcing elements present directed resistance to specific deformations occurring when the spring is axially loaded.

4,027,866
MULTI-FACE CLAMP FOR MANUFACTURING OR REGLUING OF DRAWERS, CHAIRS OR THE LIKE
Arthur Ruggiero, 68 Soundview St., New Rochelle, N.Y. 10805
Filed Dec. 29, 1975, Ser. No. 644,627
Int. Cl.² B25B *1/20*
U.S. Cl. 269—41 **2 Claims**



1. A multi-face clamp for woodworking comprising
a clamping unit including a plurality of corner pieces,
each of said corner pieces defining at least two pressure faces adapted to engage complementary faces of a work piece,
two threaded bolts extending from and operatively connected with said corner pieces,
one of said threaded bolts having threads formed in an opposite direction from those of the other of said threaded bolts,
a turn-buckle disposed between each pair of adjacent corner pieces and receiving in its inner threads the respective free end portions of said threaded bolts, so that upon turning of said turn-buckle the pressure faces of said corner piece exert pressure upon said complementary faces of said work piece,
wherein at least one of said threaded bolts has a plurality of nuts, some of said nuts being adjustable along said of one said threaded bolts, and
means on said corner piece for retaining said one of said threaded bolts selectively in a plurality of end positions.

4,027,867
WORKPIECE HOLDER
Bernard M. Pollington, Finkle Road, McBain, Mich. 49657
Filed Jan. 30, 1976, Ser. No. 653,733
Int. Cl.² B23Q *3/02*
U.S. Cl. 269—94 **15 Claims**



1. A workpiece holder for clamping a workpiece to a work table comprising:
a base secured to said work table,
an elongated clamp member positioned above said base and generally parallel thereto,
a bending arm secured at one end to said base and at its other end to said clamp member at a position intermedi-

ate the longitudinal ends of said clamp member thereby dividing the clamp member into a first and second leg, said bending arm being dimensioned so as to form a slot of predetermined width between said base and said first leg of the clamp member,

a plunger adapted to be axially received in said slot and having means to vary the width of said slot in dependence on the axial position of said plunger so that said second leg of said clamp member moves in a direction for engaging said workpiece, and

means for varying the axial position of said plunger,

wherein said base, said clamp member, and said bending arm are integral with each other.

4,027,868

WELDING JIGS

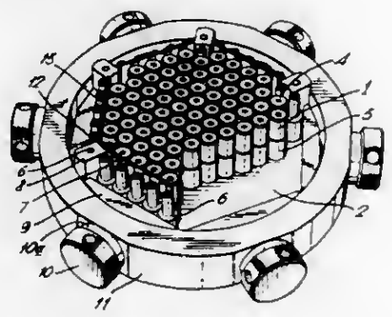
Robert Jolly, Preston, England, assignor to United Kingdom Atomic Energy Authority, Great Britain

Filed Mar. 22, 1976, Ser. No. 668,901

Claims priority, application United Kingdom, Apr. 2, 1975, 13534/75

Int. Cl.² B25B *1/24*

U.S. Cl. 269—266 **5 Claims**



1. A welding jig for cellular grids for use in nuclear reactor fuel element assemblies, the jig comprising

a base plate,

a multiplicity of members which are right cylinders, each stepped intermediately to define opposed end regions of major and minor diameters, the members being upstanding on the base plate on their ends of major diameter and arranged in regular hexagonal array

means for locating the central member of the base plate, the remaining members being free standing on the plate, and

means confining the free standing members in hexagonal array on the base plate with the cylindrical surfaces of major diameter of adjoining members in mutual abutment.

4,027,869

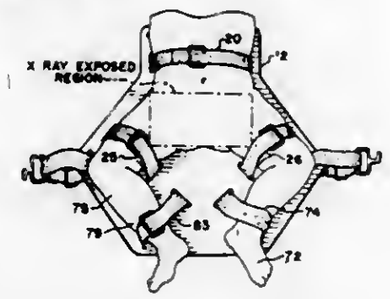
PATIENT RESTRAINT FOR X-RAY STUDIES OF INFANTS

Gilbert G. Ruiz, 2614 N. Sterling Drive, McHenry, Ill. 60050

Filed June 1, 1976, Ser. No. 691,566

Int. Cl.³ A61G *13/00*

U.S. Cl. 269—328 **3 Claims**



1. An infant restraint particularly suitable for immobilizing an infant in either supine or frog-leg position during X-ray examination including:

a panel having a vertical midline;

first strap means near the top of said panel for encircling the lower abdomen of the infant;

a first pair of vertical slots laterally spaced apart and equidistant from said midline for receiving said first strap means;

second strap means near the bottom of said panel for encircling both thighs of the infant when said thighs are positioned next to each other;

a second pair of vertical slots laterally spaced apart and equidistant from said midline for receiving said second strap means;

third and fourth strap means respectively located above said second strap means for separately encircling the respective thighs of the infant when in frog-leg position;

a third and a fourth pair of spaced slots for receiving said third and fourth strap means, respectively, said third and fourth pairs of slots being respectively oriented and positioned perpendicular to and laying along one of a pair of upwardly divergent lines crossing said midline at substantially the same juncture point; and

a fifth pair of spaced slots arranged below said third and fourth pairs of slots adjacent said upwardly extending divergent lines and substantially parallel thereto;

for receiving therethrough said second strap means to form ankle-restraining loops when the infant is in frog-leg position.

4,027,870

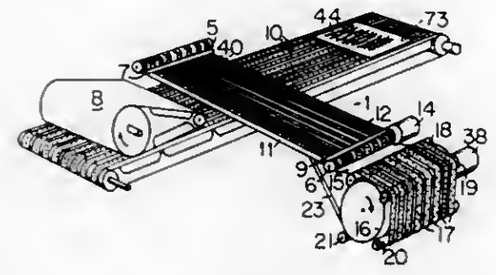
END FOR END DOCUMENT INVERTER

Roger Alvan Frech, Canoga Park, and Martin Moses Bondar, Northridge, both of Calif., assignors to Terminal Data Corporation, Woodland Hills, Calif.

Filed Oct. 4, 1976, Ser. No. 729,047

Int. Cl.² B65H *29/00*

U.S. Cl. 271—65 **10 Claims**



3. A document moving apparatus comprising;

a. first belt means (**10**) to reversibly translate a document,

b. first control means to stop said first belt means for a predetermined interval of time at a first position and thereafter to reverse the direction of motion of said first belt means and to stop the same at a second position,

c. other belt means (**12**) disposed above said first belt means at said second position and oriented to move said document (**44**) at right angles to the previous direction of translation of said document,

d. a drum (**16**),

e. still other belt means (**17**) substantially surrounding and acting to support said drum, to accept said document from said other belt means and to return it inverted to said other belt means,

f. pneumatic means adjacent to and coactive with both said first and said other belt means, to attach said document to either of said belt means and

g. other control means (**30,-72**) coactive with said first and said other belt means and with said pneumatic means to sequentially;

1. release said document from said first belt means,

2. attach said document to said other belt means (12) for turning the document over,

3. release said document from said other belt means, and

4. again attach said document to said first belt means in an end-for-end inverted relation with respect to the first attachment of said document to said first belt means.

4,027,871

APPARATUS FOR APPLYING CONTACT PRESSURE TO PACKS OF TUBE SECTIONS

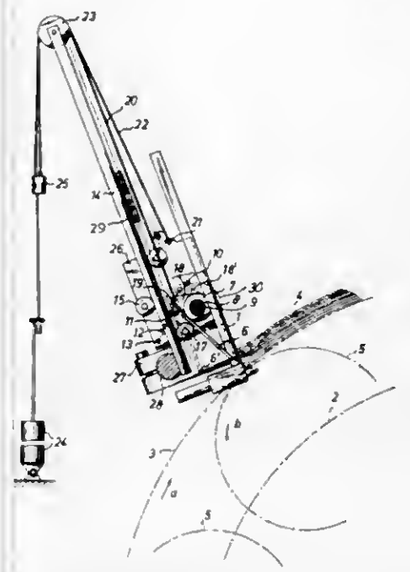
Willy Niemeyer, Natrup-Hagen, and Helmut Simon, Lengerich, both of Germany, assignors to Windmoller & Holscher, Lengerich, Germany

Continuation-in-part of Ser. No. 469,897, May 14, 1974, abandoned. This application May 14, 1975, Ser. No. 577,479

Claims priority, application Germany, May 14, 1973, 2324361

Int. Cl.² B65H *1/06, 3/10*

U.S. Cl. 271—95 **7 Claims**



1. Apparatus for pressing downwardly packs of tube sections deposited and replenished in the stack magazine of a rotary feeder equipped with suction cylinders, comprising in combination:

carriage means arranged for reciprocal movement in said stack magazine and having a rotatable shaft means mounted thereon for pivotally mounting a plurality of pressing fingers having end portions for pressing engagement upon said tube sections and spring means connected to said carriage and said rotatable shaft means for biasing said fingers into a position for said pressing engagement,

means for lowering said carriage means as the height of the stack of tube sections beneath said carriage decreases to maintain the downward pressing, and

actuating means connected to said rotatable shaft means to pivot said fingers for lateral withdrawal from the stack of tube sections and to move concurrently said carriage means upwardly in said stack magazine when said carriage means reaches a predetermined spacing from the suction cylinders of the rotary feeder thereby placing said fingers in pressing engagement with the uppermost tube section in the replenished stack magazine.

4,027,872

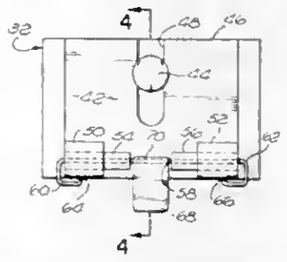
SHEET SEPARATION DEVICE

Robert A. Bueker, Mission Viejo, Calif., assignor to Direct Image Corporation, Monterey Park, Calif.

Filed Jan. 15, 1976, Ser. No. 649,394

Int. Cl.² B65H *3/54*

U.S. Cl. 271—170 **5 Claims**



1. A sheet separation device for use with a stack of sheets held by a support structure for individual sheet removal by a lifting mechanism, comprising:

a bracket member affixed to said support structure and defining spaced-apart, axially aligned passages adjacent to said stack of sheets;

a torsion spring having opposed ends fixed to said bracket member and extending coaxially between said aligned passages;

a pair of tubular spacers mounted in said passages to support said spring coaxially with said aligned passage and extending to substantially enclose said torsion spring on each side of a central length;

and

tab means affixed to said central length of said torsion spring to provide a flat leaf section in a plane substantially parallel to said sheets, for contacting the stack at one edge thereof.

4,027,873

SHEET HANDLING APPARATUS

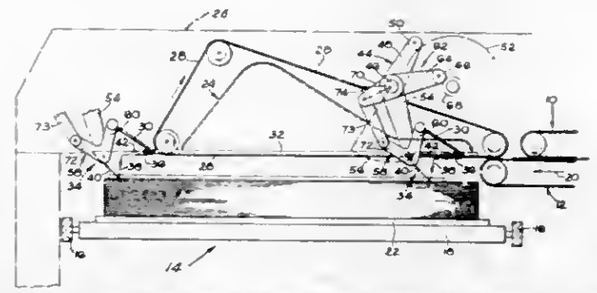
Thomas Desmond Bishop, Solihull, England, assignor to The Deritend Engineering Company Limited, Birmingham, England

Filed Apr. 29, 1976, Ser. No. 681,446

Claims priority, application United Kingdom, Apr. 30, 1975, 17940/75

Int. Cl.² B65H *29/32*

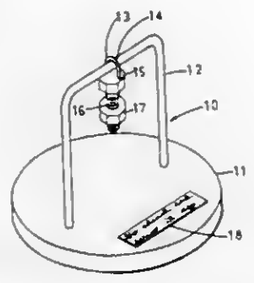
U.S. Cl. 271—197 **10 Claims**



1. Sheet handling apparatus comprising a conveyor belt drive, a suction chamber extending above a lower run of said belt drive, for drawing a sheet against said lower run to enable the sheet to be conveyed forward by the belt drive, at least one sheet-engaging element movable between a first position above the plane of said lower run and a second position below said plane, and drive means for effecting forward and downward movement of said element from said first to said second position, with a horizontal component of velocity which is momentarily substantially the same as the belt speed, and for effecting return movement of said element to said first position, characterized in that the path of said return movement

extends from said second position forward and upward to bring said element above the plane of said lower run, and thence extends rearward above said plane to said first position.

4,027,874
NOVELTY ITEM
Theonda N. Buckholtz, Jr., 113 Sigma St., Apt. 2, Belle Chasse, La. 70037
Filed July 23, 1975, Ser. No. 598,212
Int. Cl.² A63B *71/00*
U.S. Cl. 272—1 R **4 Claims**

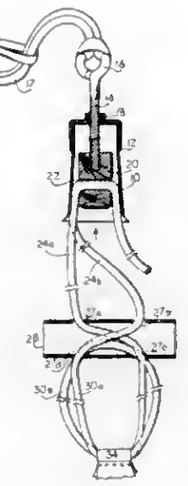


1. A novelty item comprising:
a. base means;
b. stanchion means comprising a U shaped member rigidly affixed in an inverted position to said base means, being oriented essentially perpendicular thereto; and
c. a threaded bolt and nut assembly comprising a conventional threaded bolt member having a U shaped member in turn rigidly affixed to its head portion and adapted to receive and bayonet upon said U shaped upright stanchion member along its mid portion.

4,027,875
RECATION SPEED TRAINING DEVICE
Carson Monroe Hurley, P.O. Box 12783, Roanoke, Va. 24028
Filed Apr. 23, 1975, Ser. No. 570,616
Int. Cl.² A63B *69/00*
U.S. Cl. 272—76 **1 Claim**

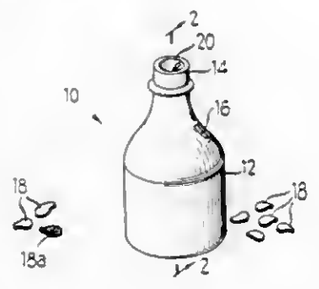
1. A reaction-speed training device comprising first and second spaced apart substantially vertical support stands, said first stand having secured thereto a first electrical switch box having a first user actuated contact switch connected thereto; said second stand having secured thereto a second electrical switch box and a second user actuated contact switch connected thereto; timing means; said timing means being electrically connected to each of said user actuated contact switches such that said timer will be started when said first user actuated contact switch is actuated by a user and will be stopped when said second user actuated contact switch is actuated by the same said user to thereby indicate the time elapse between actuation of said first and second contact switches by said user; said second switch box having an elongated, spring biased substantially horizontally extending plunger mounted thereon, said second contact switch being mounted adjacent one end of said plunger such that said one end will engage said switch when said plunger is moved in the direction thereof, said plunger having mounted on its opposite end an enlarged resilient target pad for striking by a user to move said plunger one end into contact with said second switch.

4,027,876
EXERCISING APPARATUS
Lyman Clarke Johnston, 12 Boulton Drive, Toronto, Ontario, Canada
Filed Apr. 7, 1976, Ser. No. 674,580
Int. Cl.² A63B *21/00*
U.S. Cl. 272—133 **10 Claims**



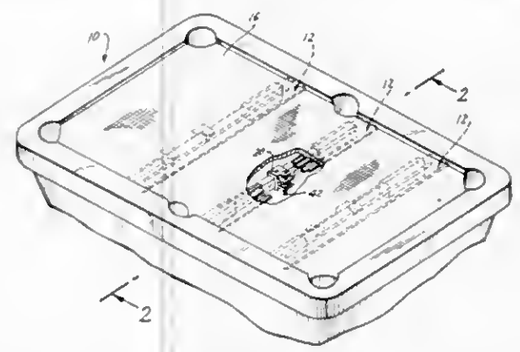
1. A portable exercising apparatus comprising an open ended inwardly tapered member, a block member positionally locatable inside said tapered member, said block member having a channel providing a passage for a pair of ropes frictionally engageable between said block member and said tapered member, means secured to said block member, and extending outward of the base of said tapered member, rotatable to adjust the position of said block member in said tapered member to vary the frictional resistance against movement on said pair of ropes therebetween, means to maintain said block member in the selected position, said rotatable means being adapted for detachable securement to a fixed object with the end of said pair of ropes emerging from one end of said channel and the said tapered member, each having an individual hand grip for the user, with the other ends of said pair of ropes emerging from the other end of said channel and then said tapered member each having individual means to contain a foot of the user.

4,027,877
GAME DEVICE
Jeffrey D. Breslow, Highland Park, and Mitchell J. Frumkin, Chicago, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.
Filed Aug. 13, 1975, Ser. No. 604,262
Int. Cl.² A63B *67/00*
U.S. Cl. 273—1 R **1 Claim**



1. A game apparatus, comprising:
a container in the form of a bottle having an interior cavity and an opening thereto at the top of a reduced neck portion of the bottle;
a plurality of playing pieces smaller than said opening positionable into the interior cavity of said container;
restriction means at said opening permitting the playing pieces to pass thereby out of the container through said opening but inhibiting free movement of the playing pieces so as to require manual manipulation of the container by a player of the game in order to shake a given number of playing pieces out of the container, said restriction means including a plurality of rod-like baffles spaced angularly and longitudinally within said neck portion in a general radial disposition and extending only partially across the neck portion; and
an aperture in the side of said bottle for replacing said playing pieces thereinto.

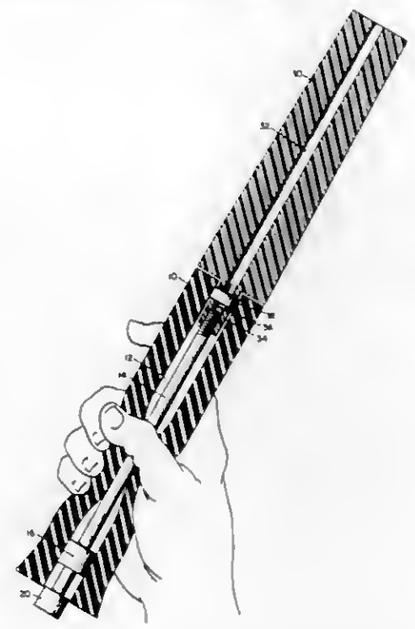
4,027,878
BED LEVELING MECHANISM
Bemanali H. Dadbeh, Seal Beach, Calif., assignor to Crown Recreation, Inc., Hollis, N.V.
Filed Sept. 15, 1975, Ser. No. 613,186
Int. Cl.² A63D *15/00*
U.S. Cl. 273—6 **10 Claims**



7. A bed-leveling mechanism for use in table type games having a game board positioned therein, said leveling mechanism comprising an elongated rigid support bar adapted to be mounted on said game below the game board, a bed level slide bracket slidably mounted on said support bar for selective movement to any of a plurality of selected positions along said bar, said bracket having a pair of generally horizontally extending spaced flange members located along one side thereof respectively including vertically aligned apertures therein, a threaded adjusting rod freely rotatably received in said apertures in spaced relation to one exterior side of the support bar and having an enlarged head portion on its upper end; a nut positioned between said flanges in threaded engagement with said rod whereby the nut is held against vertical movement by the flanges and rotation of the nut causes longitudinal movement of the rod; and a bed-level guide plate adapted to be secured to the underside of said game board directly above and in alignment with the path of travel of said adjusting rod along said support bar, said guide plate having a longitudinally extending slot formed therein through which said rod extends, with the enlarged head of the rod received in said channel, whereby rotation of said nut will cause adjacent portions of said game board to be raised or lowered.

4,027,879
TENNIS TRAINING DEVICE
Bruce David Wright, 96 Longhill St., Springfield, Mass. 01108
Filed Apr. 21, 1975, Ser. No. 569,829
Int. Cl.² A63B *69/38*
U.S. Cl. 273—29 A **1 Claim**

1. A tennis training aid comprising the combination of:
a shaft, an elongated hollow resilient grip member having a longitudinal central opening loosely enclosing said shaft, an elongated neck member axially aligned with and normally disposed closely adjacent one end of said grip member,
a neck extension extending outwardly from one end of said neck member and loosely extending into said central opening of the grip member, one end of said shaft fixedly being engaged with said neck extension,
a shaft slide collar fixed within said central opening adjacent the other end of said grip member and encircling said shaft for sliding engagement therewith,
a neck extension slide collar fixed within said central opening and encircling said neck extension,
and a stop knob, said stop knob being fixedly engaged with the other end of said shaft and spaced from said shaft slide collar when in a normal position,

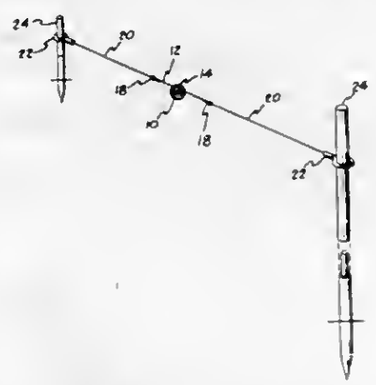


said grip member being deformable to a position of embracement about said shaft when and as a user grips said grip member with proper pressure during simulation of any of the usual stroke motions in a tennis game, said grip member moving away from its position of embracement about said shaft when improper pressure is applied thereto, wherefore said shaft and said neck extension slide relative to their respective collars and said neck member moves from its normal position closely adjacent said end of said grip member to a position wherein it is spaced therefrom to give a visual signal to a user that a proper degree of grip firmness has not been attained, with said stop engaging said shaft collar and emitting a sound on contact therewith to give an audible signal to a user that a proper degree of grip firmness has not been attained.

4,027,880
TENNIS TUNER
Frederick B. Hadtke, New Providence, N.J., assignor to Idex Corporation, Scotch Plains, N.J.
Filed Jan. 9, 1976, Ser. No. 647,909
Int. Cl.² A63B *69/38*
U.S. Cl. 273—29 A **9 Claims**

1. A captive tennis ball apparatus for practice purposes comprising: a captive tennis ball; suspending means attached to and suspending said captive tennis ball, comprising at least one relatively inelastic, high strength cord, capable of being stretched repeatedly only to from about 110% to less than about 350% of its original length without breaking or rupturing and without suffering permanent deformation or permanent set; and relatively elastic, lower strength cords, capable of being stretched repeatedly at least to from about 400% to about 750% of their original lengths without breaking or

rupturing or without suffering permenent deformation or permanent set, the ends of said relatively elastic, lower strength cords being attached to the ends of said suspending means comprising at least one relatively inelastic, high



strength cord, the other ends of said relatively elastic, lower strength cords being adapted to be secured to supports at a predetermined height above the ground or floor and at a predetermined distance from said captive tennis ball.

4,027,881

TENNIS RACKET WITH VARIABLE BALANCE AND WEIGHT

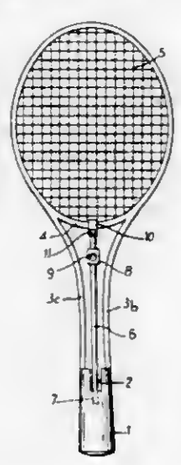
Paul Francis Marcel Hufenus, 16 Rue de la Coste, 34 110 Frontignan, France

Filed Dec. 23, 1974, Ser. No. 537,105

Claims priority, application France, May 13, 1974, 74.16392

Int. Cl.² A63B *49/04*

U.S. Cl. 273—73 R **11 Claims**



11. Tennis racket comprising a frame and a handle attached to said frame, said handle comprising a grip at the end thereof remote from the frame, a single elongated guide member extending between said grip and frame, said guide member having a circular section and being provided with a plurality of longitudinally spaced recesses therein, said recesses completely encircling said guide member, a movable member mounted to slide longitudinally along said guide member in response to pressure exerted on said movable member longitudinally of said guide member, and resiliently biased stop means carried by said movable member and dimensioned to project into any one of said recesses so as to releasably retain said movable member at any one of a plurality of different positions longitudinally spaced along said guide member, said stop means and the recesses in said guide member having cooperating surfaces transverse to said guide member, at least one of which is so sloped that only resilient resistance to sliding movement of said movable member is provided when said stop means projects into one of said recesses.

4,027,882

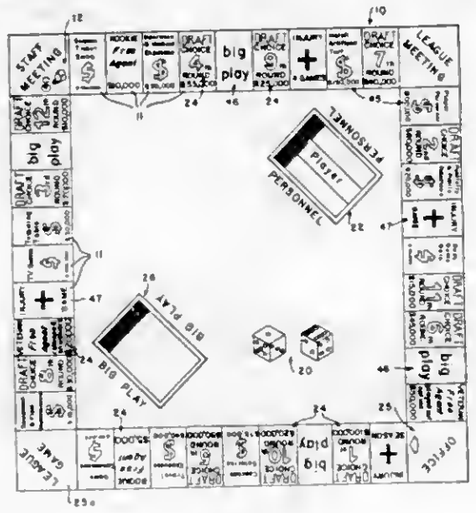
FRANCHISE BOARD GAME

John D. Rosenberg, 200 Highland Ave., State College, Pa. 16801

Filed June 23, 1976, Ser. No. 699,170

Int. Cl.² A63F *3/00*

U.S. Cl. 273—134 AT **10 Claims**



1. A parlor game for a number of participants, comprising
a. a game board with a plurality of consecutive playing sections arranged thereon, each of said playing sections having indicia associated therewith,
b. a plurality of movable game pieces for movement from section to section of the game board, one for each participant,
c. a plurality of player boards, one for each participant,
d. a plurality of player pieces for the player boards, at least two different indicia being provided for distinguishing two distinct types of player pieces,
e. chance means for advancing the movable pieces around the game board from section to section,
f. chance player piece selection means having indicia corresponding to the indicia for distinguishing between the at least two distinct types of player pieces, and
g. selected playing sections on the game board having indicia indicating that the chance player piece selection means may be employed.

4,027,883

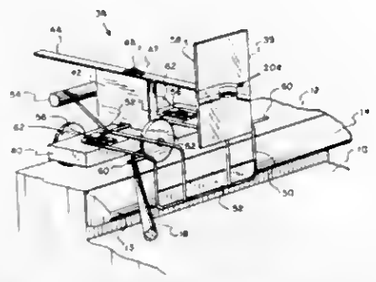
METHOD FOR AIMING A BILLIARDS BANK SHOT

Michael C. Batori, 01710 SW. Riverdale Road, Portland, Oreg. 97219

Filed Sept. 22, 1975, Ser. No. 615,244

Int. Cl.² A63D *15/00*

U.S. Cl. 273—14 **10 Claims**



1. A method of aiming a billiards bank shot, whereby a billiard ball on the playing field of a billiard table is bounced off of the face of a cushion of said table toward a target, which comprises positioning a reflective surface at a location adjacent a cushion of said table relative to said billiard ball and target such that said billiard ball is visually alignable along a straight line with an image of said target reflected from said reflective surface, and visually aligning said billiard ball with said reflected image along said straight line.

4,027,884

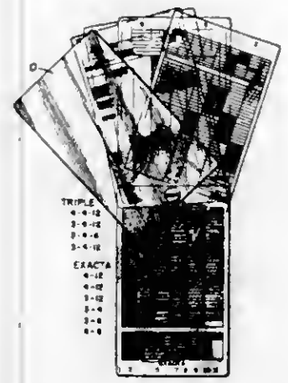
BETTING DEVICE

Thomas J. Oakley, 5811 Jarvis Lane, Bethesda, Md. 20014

Filed Mar. 19, 1976, Ser. No. 668,668

Int. Cl.² G09F *9/00*

U.S. Cl. 273—148 R **12 Claims**



1. A betting device for indicating all of the combinations of numbers 1 through *n* (where *n* is greater than 4), in groups of only two different ones of said numbers each, from at least three different preselected ones of said numbers, said device comprising:
a base card having the following combinations of numbers 1 through *n*, in groups of only two different ones of said numbers each, thereon:
1-2, 1-3, 1-4 to 1-*n*
2-3, 2-4 to 2-*n*
3-4 to 3-*n*
4-*n*
a first overlay sheet which covers all of the groups of numbers on the base card which include the number 1 and exposes all of the groups of numbers on the base card which include only numbers other than 1 when the first sheet overlies the base card;
a second overlay sheet which covers all of the groups of numbers on the base card which include the number 2 and exposes all of the groups of numbers on the base card which include only numbers other than 2 when the second sheet overlies the base card;
a third overlay sheet which covers all of the groups of numbers on the base card which include the number 3 and exposes all of the groups of numbers on the base card which include only numbers other than 3 when the third sheet overlies the base card;
a fourth overlay sheet which covers all of the groups of numbers on the base card which include the number 4 and exposes all of the groups of numbers on the base card which include only numbers other than 4 when the fourth sheet overlies the base card;
an *n*th overlay sheet which covers all of the groups of numbers on the base card which include the number n and exposes all of the groups of numbers on the base card which include only numbers other than *n* when the *n*th sheet overlies the base card whereby when the overlay sheets corresponding to at least three different preselected ones of said numbers are removed from their position overlying the base card, all of the combinations of the preselected numbers, in groups of only two different ones of said numbers each on the base card, are exposed; and
each of said sheets having a character thereon enabling ready association of each associated sheet with the respective number covered by that sheet.

4,027,885

GOLF IRON MANUFACTURE

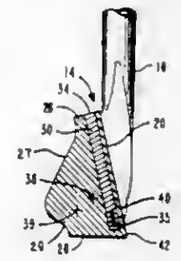
Kenneth A. Rogers, 13520 Victory Blvd., Van Nuys, Calif. 90401

Division of Ser. No. 476,851, June 6, 1974, Pat. No. 3,970,236.

This application July 19, 1976, Ser. No. 706,648

Int. Cl.² A63B *53/04*

U.S. Cl. 273—169 **8 Claims**



1. A golf club comprising a head of the numbered category iron type having an improved weight distribution below its center of precussion with a ball which comprises:
a head blank having a hosel, neck and body dependent thereof of the shape and size generally characteristic of an iron head of numbered catagory and bearing, in the face of said body, a cavity extending from at least one edge of said body across a substantial portion of said face and below said center of precussion;
a sheet metal face plate extending across the face dimensions of said cavity and mounted flush with the surface of said head and secured thereto by fusion along its periphery to said head body, thereby defining a homogeneous head blank having an interior cavity open along the top edge of said head and extending across a substantial distance of said face to below said center of precussion;
a predetermined amount of high density weighted material in the bottom of said cavity below said center of percussion to impart the desired swing weight to said blank; and
a low density filler filling the remainder of said cavity.

4,027,886

GOLF SWING TIMING DEVICE

Toyonari Katsube, 2-4-3, Takeyama, Midori, Yokohama, Japan

Filed Sept. 19, 1975, Ser. No. 614,977

Int. Cl.² A63B *69/36*

U.S. Cl. 273—186 A **3 Claims**

1. A device for measuring time of a golf swing comprising:
1. a golf club having a shaft, a clubhead portion and a grip portion;
2. a magnet element fixedly positioned on a part of the golf club shaft adjacent to the grip portion, said magnet ele-

ment being in the form of a tube having replaceable magnetic inserts to vary its magnetic attractive force;

3. a stop unit fixedly mounted on said golf club shaft at a position close to the clubhead, and

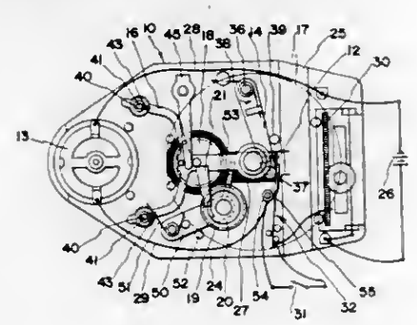
4. a movable tube having a metal portion which can be attracted by the magnet element, said movable tube being also fitted on said club shaft intermediate said magnet element and said stop unit and being adapted to move away from said magnet element toward said stop unit in response to centrifugal force created by the golfer's swing so as to collide with said stop unit.

4,027,887

TOY PHONOGRAPH WITH AUTOMATIC PICKUP ARM RETURN MEANS

Katsumi Watanabe, Kawasaki, Japan, assignor to Yugen Kaisha Watanabe Kenkyusho, Japan

Filed May 17, 1976, Ser. No. 686,719
Claims priority, application Japan, Jan. 3, 1976, 51-22030
Int. Cl.² A63H 3/33; G11B 17/06
U.S. Cl. 274—1 A **7 Claims**



1. In a phonograph of the type comprising a turntable rotatable with a record having at least one spiral groove formed therein, a pickup arm pivotally supported at one end and carrying at another end a reproducing stylus movable relatively into and out of engagement with the groove in the record, first spring means which biases the pickup arm toward a predetermined starting position on the record and against the bias of which the pickup arm is movable toward a predetermined terminal position on the record as the stylus follows the groove in the record for receiving mechanical vibrations therefrom during rotation of the turntable, and a diaphragm for converting the vibrations of the stylus into corresponding sound waves, an improved pickup arm return means, comprising:

a. a drive wheel rotatable with said turntable;

b. a driven wheel which is engageable by the drive wheel;

c. carriage means rotatably supporting said driven wheel and adapted to be actuated by said pickup arm when the pickup arm travels from said starting to said terminal position, the carriage means moving said driven wheel into engagement with said drive wheel, said driven wheel being adapted to be rotated by said drive wheel when in engagement therewith;

d. second spring means acting on said carriage means for normally holding said driven wheel out of engagement with said drive wheel;

e. a cam rotatable with said driven wheel;

f. a cam follower actuated by said cam when said pickup arm is in said terminal position for causing said stylus to disengage the groove in the record, and

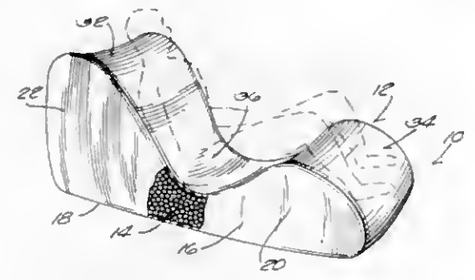
wherein said pickup arm is permitted to return to said starting position under the bias of said first spring means upon actuation of said cam follower by said cam, said cam being adapted to permit said stylus to re-engage the groove in the record upon return of said pickup arm to said starting position.

4,027,888

VARIABLE CONTOUR SEATING DEVICE

Thomas J. Wilcox, Rte. 1, Box 334, East Troy, Wis. 53120

Filed Jan. 30, 1976, Ser. No. 653,896
Int. Cl.² A47C 7/02
U.S. Cl. 297—284 **7 Claims**



1. A variable contour seating device comprising

an elongated sack-like cover of a flexible material forming a cavity which is loosely filled with a freely flowable filler material,

said cover including

a pair of generally vertical, opposed side panels, each of which has enlarged curvate end portions and a constricted intermediate portion, and

an elongated center panel having its opposed longitudinal sides joined to the perimeter of said side panels so as to provide a longitudinal body supporting upper surface having a generally convex first enlarged end portion adapted to serve as a backrest area, a generally convex second enlarged end portion adapted to serve as a leg rest area, and a generally concave intermediate area adapted to support the derriere of the occupant, the vertical height of said enlarged curvate end portions being greater than the vertical height of said constricted intermediate portions so that the vertical heights of said backrest area and said leg rest area are always greater than the vertical height of said intermediate area,

whereby an occupant lying on said body supporting surface can vary the contour thereof by selectively shifting his weight from one to another of said areas so as to cause said filler material to flow in a longitudinal direction from said intermediate area and decrease the vertical height of said intermediate area when weight is shifted onto said intermediate area, and to flow into said intermediate area and increase the vertical height of said intermediate area when weight is shifted from said intermediate area, and can thereby selectively alter the contour of said areas relative to one another and from and back to the initial shape of said seating device imparted by reason of the construction features recited above.

4,027,889

STAIR-CLIMBING CARRIER

Gary F. Krofchalk, Rochester, and Andrew D. Dodds, Claremount, both of Minn., assignors to Kando Incorporated, Claremont, Minn.

Filed Nov. 10, 1975, Ser. No. 630,093
Int. Cl.² B60P 9/00
U.S. Cl. 280—5.22 **15 Claims**

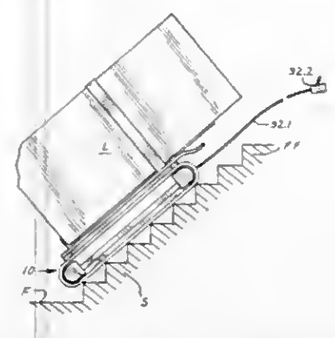
1. A tracked carrier for carrying loads in a tilted position across floors and up and down stairs, and comprising

an elongate load-carrying frame with means to which a load may be attached along the elongate frame, the frame having upper and lower ends,

a spaced pair of elongate, parallel, endless tracks extending along opposite sides of the frame and being movable in elongated paths to drive the frame along a supporting surface and up and down stairs, the tracks extending

beyond the lower end of the frame to support the frame upon such a supporting surface when the frame is tipped to upright and inclined positions;

a lifting arm pivotally mounted at one end to the frame adjacent the lower end thereof, and having a floor-engaging caster at its other end, the lifting arm being configured for reception within the frame between the tracks when swung upwardly into a retracted position with the caster nearer the upper than the lower end of the tracks, and the



arm being swingable to near horizontal position when the elongate frame is supported in upright position on the lower ends of the elongate endless tracks and against a load to be tipped into inclined transport position; and

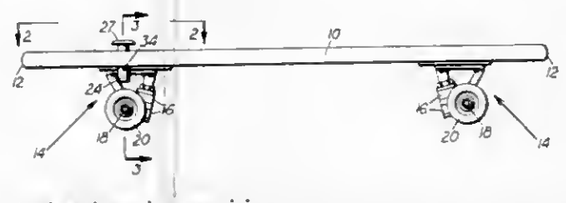
means for controllably swinging the lifting arm outwardly from its retracted position to support the frame in an inclined angle with the floor for travel therealong on the caster wheel and the lower ends of the elongate endless tracks.

4,027,890

SKATEBOARD WITH BRAKE

Adolf Volkmann, 4614 SE. Yamhill St., Portland, Oreg. 97215

Filed Apr. 12, 1976, Ser. No. 676,377
Int. Cl.² A63C 17/14
U.S. Cl. 280—11.2 **6 Claims**



1. A skateboard comprising

a. an elongated rigid body member having forward and rearward ends and also having top and bottom surfaces,

b. wheel truck assemblies on the under side of said body member adjacent each end,

c. each of said truck assemblies having a pair of wheels,

d. a pair of upright brake shoes extending down through said body member in slidable relation adjacent at least one of said pair of wheels,

e. said brake shoes having bottom ends arranged to engage the surfaces of respective wheels upon downward movement of said shoes,

f. a foot engageable cross plate secured to the tops of said brake shoes and arranged to be pushed downwardly by the skateboard operator for moving said shoes down into engagement with the surface of said wheels in a braking function.

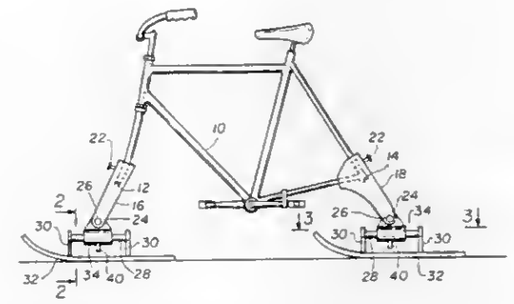
g. and resilient retracting means normally holding said brake shoes and above said wheels in non-braking position.

4,027,891

BICYCLE TYPE SKI APPARATUS

Bruce H. Frame, Wytheville, Va., assignor to The Raymond Lee Organization, Inc., a part interest

Filed Apr. 9, 1976, Ser. No. 675,487
Int. Cl.² B62B 13/04
U.S. Cl. 280—7.14 **4 Claims**



1. A device comprising:

a bicycle frame having front and rear wheels removed whereby the frame has bottom front and bottom rear end points;

first and second elongated downwardly inclined hollow sheaths, each sheath having an enlarged opening at an upper end, each of the end points being disposed removably in the upper end of the corresponding one of the sheaths;

first and second horizontal skis;

first and second brackets, each bracket being secured to the corresponding ski and including a horizontal rod extending longitudinally along the corresponding ski and spaced above its top surface;

first and second parallel horizontal axles extending at right angles to said rods, each axle being secured to and extending through the lower end of the corresponding sheath;

first and second connectors, each connector being pivotally secured to the corresponding one of the axles and rotatably disposed about the corresponding one of said rods; and

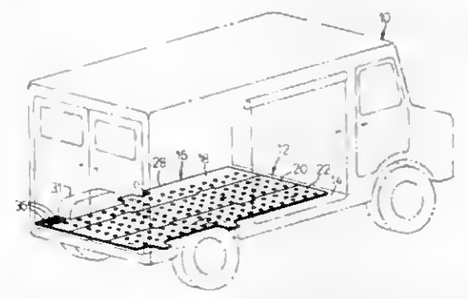
first and second rotation limiting means, each means being secured to the corresponding one of the connectors and extending downwardly towards the top surface of the corresponding one of the skis to limit the rotation of the corresponding connector in either direction about the corresponding rod to a selected arc.

4,027,892

CARGO RESTRAINING ASSEMBLY FOR USE IN A VEHICLE

James R. Parks, 9380 W. Loomis Road, Franklin, Wis. 53132

Filed Oct. 28, 1975, Ser. No. 626,265
Int. Cl.² B60P 7/10
U.S. Cl. 280—179 R **10 Claims**



1. A cargo restraining assembly for use in vehicles for pre-

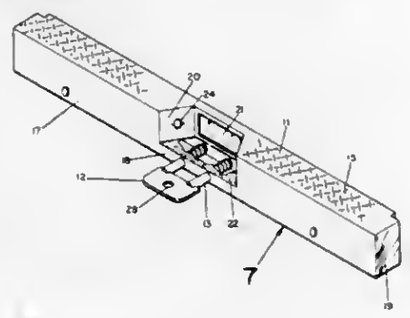
venting shifting of cargo transported in said vehicles, said cargo restraining assembly comprising a platform means receivable on a cargo supporting surface of said vehicle for use in supporting cargo, said platform means having spaced bore therein, peg means receivable in said bores, and supporting plate means for restraining cargo supported by said platform means said supporting plate means being secured in position on said platform means by said peg means.

4,027,893

FORCE ABSORBING HITCH FOR A VEHICLE

Forrest R. Drudge, 1201 Begonia St., SE., DeMotte, Ind. 46310

Filed Oct. 31, 1975, Ser. No. 627,616
Int. Cl.² F16G 7/10; B60D 1/16
U.S. Cl. 280—487 **7 Claims**



1. A force absorbing hitch for a vehicle, said hitch comprising:
a hitch plate;
frame means adapted to be connected to a vehicle, said frame means having a pair of spaced wall portions with each of said wall portions having means defining a pair of openings therein;
plate mounting means connected to said hitch plate and having a pair of rods extending through said openings in said frame means so that said plate mounting means is movable with respect to said frame means in first and second predetermined opposite directions;
limit means including stop means attached to said rods of said plate mounting means and positioned between said wall portions of said frame means to limit the movement of said plate mounting means in said first and second predetermined directions; and
biasing means including spring means surrounding each of said rods with said spring means being positioned at both sides of said stop means of said limit means to bias said plate mounting means against movement in said first and second predetermined directions to at least partially absorb forces imposed upon said hitch in said predetermined directions.

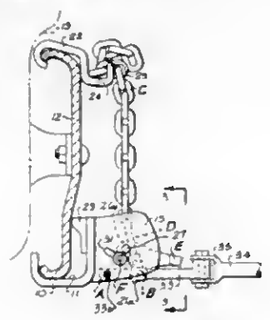
4,027,894

COUPLING HEAD FOR SECURING A VEHICLE TOWING ASSEMBLY

Wallace H. Hawkins, Rte. 7, Buncombe Road, Greenville, S.C. 29609

Filed Nov. 6, 1975, Ser. No. 629,586
Int. Cl.² B60D 1/14
U.S. Cl. 280—502 **3 Claims**

1. A coupling head for securing a towing assembly to the bumper of a vehicle comprising:
a housing defining an open lower bumper edge receiving groove;
a mounting member pivotally carried by said housing for oscillation opposite said bumper receiving groove;
a bumper chain carried for attachment on one end thereof adjacent an upper bumper edge;
means fastening the other end of said chain to said mounting member;
means pivoting said mounting member in a direction to tighten said chain; and



a locking member operable when said mounting member has been pivoted to a chain tightening position to restrain said mounting member;
whereby the chain is retained in tightened untwisted position until said locking member is released.

4,027,895

CROSS-COUNTRY SKI HAVING ALTERNATE SLIDING AND HOLDING SURFACES

Hans Evald Larsson, Klippvagen 30, 862 00 Kvissleby, Sweden

Filed Dec. 4, 1975, Ser. No. 637,661
Claims priority, application Sweden, Jan. 30, 1975, 7501008
Int. Cl.² A63C 7/00
U.S. Cl. 280—604 **10 Claims**

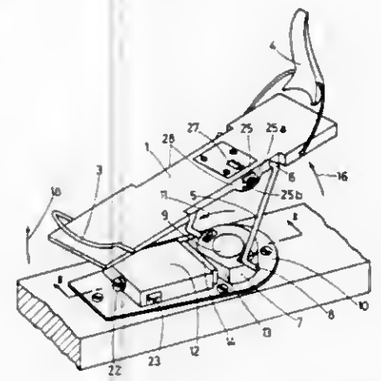
1. A ski, particularly intended for cross-country skiing, comprising a sliding-surface for cooperating with snow-covered ground or the like,
a slot extending through said ski in a longitudinal direction of said ski,
said slot being arranged in a longitudinal central plane of said ski extending in the direction of but not through the ends of said ski,
said slot dividing the sliding surface of said ski into first and second partial sliding surfaces,
said first partial sliding-surface being treated to maintain a non-sliding, firm grip against the ground, and
said second partial sliding-surface being treated to maintain a sliding contact against the ground.

4,027,896

SKI BINDING

Jean-Paul Frechin, Chamonix, and Francis Vandaux, Boege, both of France, assignors to Garcia Corporation, Teaneck, N.J.

Filed Mar. 4, 1976, Ser. No. 663,999
Claims priority, application France, Mar. 18, 1975, 75.08392
Int. Cl.² A63C 9/08
U.S. Cl. 280—618 **11 Claims**



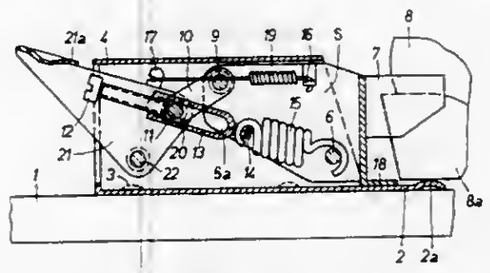
1. In a ski binding of the type comprising a mounting plate having means for securing a boot sole thereon, at least one rigid intermediate linkage member pivotally connected at one end to said plate and at another end to the upper face of a ski about parallel axes parallel to said face of the ski, means for pivoting said plate for rotation at least about an axis perpendicular to the plane of said plate, and elastic locking means for holding said plate against upward and rotational movement relative to said ski as long as forces exerted on the plate in at least one direction remain below a limiting value, the improvement wherein said linkage member is directly linked to said plate and is linked to the ski by the intermediary of a piece pivoted on the ski about an axis perpendicular to the upper face of the ski and disposed substantially along the longitudinal axis of the ski, said locking means comprising first elastic locking means carried by one of said ski and said pivoting piece and cooperating with the other of said ski and said pivoting piece to normally prevent rotation of said plate, and second elastic locking means carried by one of said ski and said plate and cooperating with one of said plate, linkage member and said pivoting piece to normally prevent raising of said plate relative to said ski.

4,027,897

SAFETY SKI BINDING

Kurt Hildebrand, Steingaden 43, Sulzberg, Germany (8961)

Filed Nov. 25, 1975, Ser. No. 635,170
Int. Cl.² A63C 9/08
U.S. Cl. 280—631 **10 Claims**



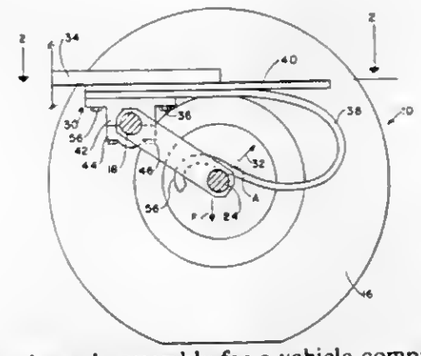
1. A safety ski binding comprising spring-loaded, releasable holding jaw means for the heel of a ski boot comprising:
a. housing means detachably connected to the surface of a ski comprising parallel vertical side members, and forward and rear axle means disposed transversely between said side members at a lower portion thereof;
b. jaw lever means within said housing means disposed pivotally on said forward axle means and comprising holding jaw means connected to said jaw lever means extending forwardly of said housing means;
c. release bolt means disposed transversely between said side members above said axle means and adapted to be movable and adjustable in parallel slot means contained in said side members, said jaw lever means connected pivotally to said release bolt means by link means;
d. release lever means within said housing means disposed pivotally on said rear axle means and on said release bolt means comprising, actuating means connected to said release lever means and extending rearwardly of said housing means;
e. tension adjusting and release means disposed within said housing means comprising, adjusting member means disposed pivotally on said release bolt means, tension spring means connected between said adjusting member and said forward axle means; and auxiliary tension spring means connected between said jaw lever means and said release lever means.

4,027,898

LEVEL LOAD LEAF SPRING DROP AXLE

Buster M. Steen, Seagoville, Tex., assignor to Southwest Wheel and Manufacturing Company, Dallas, Tex.

Filed Apr. 7, 1976, Ser. No. 674,507
Int. Cl.² B60G 11/04
U.S. Cl. 280—720 **5 Claims**



1. In the spring axle assembly for a vehicle comprising:
a pair of spaced bearing brackets,
a main shaft rotatably journaled in said brackets,
a pair of parallel spaced crank arms rigidly fixed to each end of said main shaft on opposite sides of said bearing brackets,
wheel mounting means rigidly fixed to each pair of said crank arms at points remote from said main shaft and extending parallel thereto, a spring follower means extending between each of said crank arm pairs for providing a spring follower surface positioned between said crank arms, and leaf spring means connected to each of said mounting brackets and extending transverse to the length of said main shaft and positioned between said pairs of crank arms whereby interference between said crank arms and said spring is prevented, said spring means being narrower than the width of the space between said crank arm pairs, said spring means having a first portion extending from said bracket away from said main shaft and a second portion extending from the end of said first portion and curved in a direction back toward and parallel to said first portion, and a third hooked portion coupled to the end of said second portion.

4,027,899

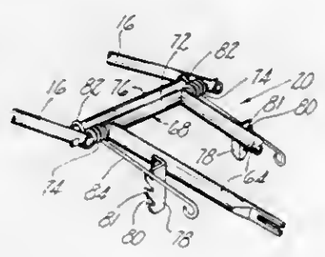
MOTORCYCLE TRAILER

Edward L. Hawes, 405 E. Goulson, Hazel Park, Mich. 48030; Allen R. Hawes, 453 E. Marshall, Ferndale, Mich. 48220, and Edward C. Hawes, 3234 Otis, Warren, Mich. 48091

Division of Ser. No. 360,635, May 16, 1973, Pat. No. 3,937,489. This application July 28, 1975, Ser. No. 599,685

Int. Cl.² B60G *11/20*

U.S. Cl. 280—722 **3 Claims**



1. A vehicle having a frame, a U-shaped wheel support structure comprising a swing arm and a wheel support member extending from each end of said swing arm, a road wheel rotatably mounted between said wheel support members, said swing arm being pivotally mounted to said frame for pivotal movement of said wheel support structure about a horizontal axis, a torsion spring member wrapped around said swing arm and having one end attached to a bar extending transversely across and attached to said frame and means for adjustably attaching the other end to said wheel support structure whereby the force exerted by said torsion spring with respect to said frame and said wheel support structure can be changed by manipulating said adjustable attaching means, said adjustably attaching means comprising a bracket attached to one of said wheel support members, said bracket having a plurality of vertically spaced notches provided therein, the end of said spring being insertable in any one of said notches to thereby affix said spring between said wheel support structure and said frame, the notch selected for engagement with the end of said spring determining the torsion produced by said spring.

4,027,900

SEAT BELT ASSEMBLY

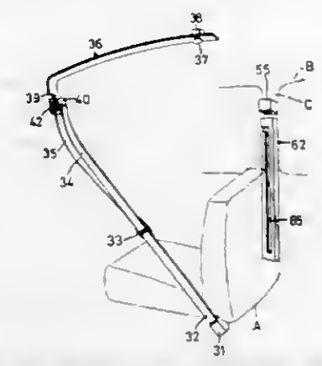
Harutoshi Igeta, No. 1518, Kire-cho, Higashisumiyoshi, Osaka, Osaka, Japan

Filed July 9, 1975, Ser. No. 594,432

Claims priority, application Japan, Mar. 27, 1975, 50-42695[U]; Mar. 27, 1975, 50-42696[U]; Mar. 27, 1975, 50-42697[U]

Int. Cl.² B60R *21/10*

U.S. Cl. 280—745 **7 Claims**



1. A seat belt assembly for an automobile seat comprising:

pivot arm means pivotably mounted to the roof of said automobile above the side of said seat for pivotably rotating in a horizontal plane thereabove;

first said belt means attached to the free end of said pivot arm means for fitting across the torso of a person seated on said automobile seat;

second seat belt means removably attached to the free end of said pivot arm means for fitting across the lap of a person seated on said automobile seat;

belt retracting means operatively connected to the free ends of said first and second belt means opposite the ends thereof connected to said pivot arm means and positioned at the lower side of said automobile seat below said pivot arm means for extending said first and second seat belt means to fit across the person seated on said seat when said pivot arm means is rotated;

lock means positioned on the inside wall of said automobile in the path of rotation of said pivot arm means for engaging and locking said pivot arm means when said pivot arm means is rotated and said first and second seat belt means are crossed over the person on said seat; and

transfer means positioned beneath said lock means on the inside of said automobile wall in the path of said second seat belt means rotating with said pivot arm means for engaging said second seat belt means when said pivot arm means is rotated and locked in said lock means and for lowering said second seat belt means downward from said pivot arm means across the lap of the person on said seat and locking said second seat belt means in position across the person's lap.

6. A seat belt assembly for an automobile seat comprising:

pivot arm means pivotably mounted to the roof of said automobile above the side of said seat for pivotably rotating in a horizontal plane thereabove, said pivot arm means being comprised of:

a hollow pivot arm pivotably mounted to the roof of said automobile,

a flexible lever member slidably fitted within said pivot arm, said lever member having a longitudinal groove therein,

a first mounting block slidably mounted in said groove in said lever member, and

a second mounting block fixedly mounted in said groove in said lever member beneath said first mounting block, said second mounting block being narrower than said first mounting block;

first seat belt means attached to said first mounting block of said pivot arm means for fitting across the torso of a person seated on said automobile seat;

second seat belt means attached to said second mounting block of said pivot arm means for fitting across the lap of a person seated on said automobile seat;

belt retracting means operatively connected to the free ends of said first and second seat belt means opposite the ends thereof connected to said mounting blocks and positioned at the lower side of said automobile seat below said pivot arm means for extending said first and second seat belt means to fit across the person seated on said seat when said pivot arm means is rotated; and

transfer means on the inside of said automobile wall adjacent said seat and beneath said pivot arm means for contacting said flexible lever member and moving said lever member and said first and second seat belt means downward across the torso and lap of the person on said seat and for locking said second seat belt means in position across the person's lap, said transfer means being comprised of:

a guide member secured to the side wall of said automobile adjacent said seat, said guide member having a groove therein large enough to receive said flexible lever member,

drive means above said guide member for contacting said lever member when said pivot arm means is rotated and for lowering said lever member and said first and second mounting blocks into said groove in said guide member,

said guide member further having stopper means projecting therefrom for stopping the downward movement of said first mounting block in said groove in said guide member while allowing said narrower second mounting block to pass thereby, and

locking means at the bottom of said groove in said guide member for locking said flexible lever member with said second belt means attached thereto.

7. A seat belt assembly for an automobile seat comprising:

pivot arm means pivotably mounted to the roof of said automobile above the side of said seat for pivotably rotating in a horizontal plane thereabove, said pivot arm means being comprised of:

a spring mounted pivot arm mounted to the roof of said automobile above the side of said seat,

spring loaded telescopic member means rotatably mounted to the end of said pivot arm means and extending downward therefrom for telescopically extending downward from said pivot arm, and

a metal piece attached to the bottom of said telescopic member means and extending downward therefrom;

first seat belt means attached to said pivot arm means above said telescopic member means for fitting across the torso of a person seated on said automobile seat;

second seat belt means attached to said telescopic member means for fitting across the lap of a person on said automobile seat;

belt retracting means operatively connected to the ends of said first and second seat belt means and said telescopic member means, said seat belt retracting means being positioned at the lower side of said automobile seat below said pivot arm means for extending said first and second seat belt means to fit across the person seated on said seat when said pivot arm means is rotated and said telescopic member means is extended;

first lock means positioned on the inside wall of said automobile on the path of rotation of said pivot arm means for engaging and locking said pivot arm means when said pivot arm means is rotated and said first and second seat belt means are crossed over the person on said seat; and

second lock means positioned on the inside wall of said automobile beneath said first lock means for receiving and locking therein the metal plate attached to the bottom of said telescopic member when said pivot arm means is locked in said first lock means and said telescopic member is forced downward into said second lock means.

4,027,901

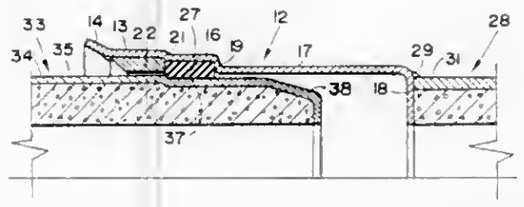
ASBESTOS-CEMENT PIPE FITTING AND METHOD FOR MAKING IT

Jay S. Forni, 1101 Lema, Danville, Calif. 94526

Filed May 24, 1976, Ser. No. 689,340

Int. Cl.² F16L *9/08*

U.S. Cl. 285—55 **9 Claims**



1. A fitting for cylindrical pipe, such as asbestos-cement pipe, for use in connecting a pair of pipe sections such as generally cylindrically-ended iron pipe sections interiorly lined with cement, comprising:

a generally cylindrical sheet metal sleeve having

one generally cylindrical spin-formed end portion, means connecting said end portion to a first of the two iron pipe sections, said end portion extending axially outwardly therefrom toward the second pipe section, said cylindrical end portion having an inside diameter slightly larger than the outside diameter of the end of the second pipe section;

a directly succeeding gasket-engaging spin-formed portion of larger diameter than said cylindrical spin-formed portion, said larger diameter portion meeting the one cylindrical end portion at a gasket-stop shoulder, a slightly still larger diameter portion directly succeeding the gasket-engaging portion, with a smaller shoulder formed between the latter two portions;

said two spin-formed portions having greatly increased tensile strength relative to said still larger diameter portion and resistance to change from true roundness by the heat of welding; and

an annular bar fitted within said slightly larger-diameter portion and means affixing said bar therewithin, said bar having an inside diameter slightly larger than the outside diameter of the second pipe section and having an abutment face seated against said smaller shoulder,

said bar defining an annular seat for an elastomeric gasket ring on said gasket-engaging portion between its said abutment face and said gasket-stop shoulder,

whereby the second pipe section may be assembled into the end of the fitting with an elastomeric gasket ring positioned in the annular seat and compressed between said gasket-engaging portion and the outside surface of the second pipe section.

4,027,902

JOINT FOR CULVERT SECTIONS AND THE LIKE

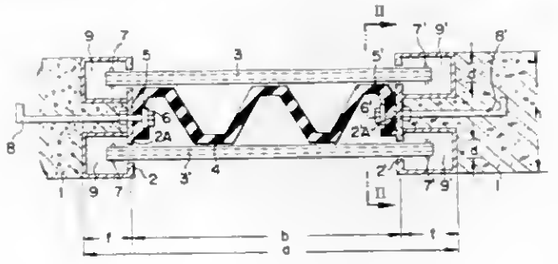
Takayoshi Tanikawa, Zentsujl, Japan, assignor to Seibu Polymer Kasei Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 23, 1976, Ser. No. 669,527

Claims priority, application Japan, Mar. 27, 1975, 50-37338

Int. Cl.² F16L *27/02*

U.S. Cl. 285—114 **8 Claims**



1. Joint for connecting culvert sections and the like comprising

a. a short tubular flexible member of elastic material each end of which is adapted to be attached to one of the adjacent ends of two aligned culvert sections;

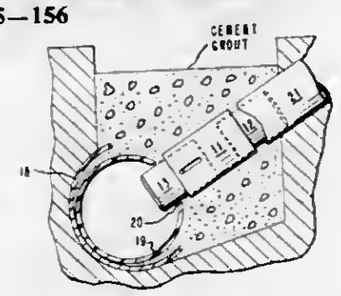
b. a plurality of rigid, substantially parallel, closely spaced strengthening members extending between the adjacent ends of said culvert sections both inside and outside of said flexible member to form protective cages around and within said tubular member which substantially inhibit the application of transverse pressure to said tubular member; and

c. means for loosely connecting the ends of said strengthening members to the adjacent ends of said culverts so that said strengthening members can swing to permit relative lateral displacement of said culvert sections.

4,027,903
WATER-DEGRADABLE COUPLING MEMBER

Finn Hannover, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 6, 1975, Ser. No. 547,468
Int. Cl.² F16L *41/00*
U.S. Cl. 285—156 6 Claims

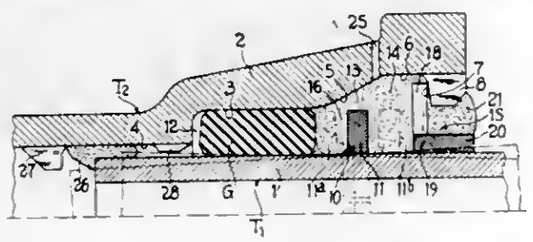


1. A lateral connection between an end of a branch pipe and a wall of a main pipe comprising:
a branch pipe
a main pipe spaced apart from the branch pipe, having a diameter greater than the diameter of the branch pipe, and having an opening in the wall aligned with the end of the branch pipe
a tubular body member disposed between the end of the branch pipe and the opening in the main pipe
a first tubular coupling member of water-degradable material disposed within one end of said tubular body member and extending outwardly therefrom, in substantially coaxial relation therewith, into the end of the branch pipe
a second tubular coupling member of water-degradable material disposed within the other end of said tubular body member and extending outwardly therefrom, in substantially coaxial relation therewith, into the opening in the main pipe.

4,027,904
DEVICE FOR A TENSILE LOCKING OF PIPE ELEMENTS

Georges Eugéne Bram, Pont-a-Mousson, France, assignor to Pont-A-Mousson S.A., Nancy, France

Filed Jan. 29, 1976, Ser. No. 653,567
Claims priority, application France, Mar. 14, 1975, 75.07989
Int. Cl.² F16L *21/08*
U.S. Cl. 285—297 10 Claims

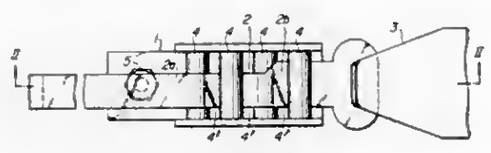


1. In a device for the tensile locking of a coupling between a first pipe element having a male end portion and a second pipe element having a socket portion, the male end portion being in an inserted position in the socket portion with interposition of an elastic sealing element, the device comprising an outer abutment projection integral with the male end portion, an inner flange integral with the socket portion and defining an inner shoulder facing axially inwardly of the socket portion and axially spaced from the abutment projection, the socket portion and flange defining with the male end portion a clearance exceeding a clearance for ease of axial assembly so that the pipe elements are able to be assembled at a given angular offset from axial alignment of the pipe elements, a ring located axially between the abutment projection and the flange and axially bearing against the abutment projection and a mass of hardenable material which is in the hardened state and disposed in the whole of a space which is empty between the male end portion and the socket portion and around the abutment projection and the ring, the elastic sealing element being located axially inwardly of the mass of hardenable material and the hardenable material being capable in its hardened state of rigidly resisting extraction of the male end portion from the socket portion; the improvement comprising in combination with the hardenable material and the flange an intermediate tensile locking means axially interposed between the hardenable material and the inner shoulder of the flange and radially overlapping the shoulder and radially extending to the male end portion, the intermediate means radially defining with the socket portion and with the flange sufficient annular clearance to allow said angular offset upon assembly of the two pipe elements.

4,027,905
SEAT BELT SYSTEM FOR VEHICLE

Toshiaki Shimogawa, Nishio; Masayuki Morita, Tokoname, and Takashi Kawaharazaki, Ichinomiya, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Sept. 12, 1975, Ser. No. 613,018
Claims priority, application Japan, Sept. 16, 1974, 49-111053[U]
Int. Cl.² B60R *21/10*
U.S. Cl. 280—746 5 Claims

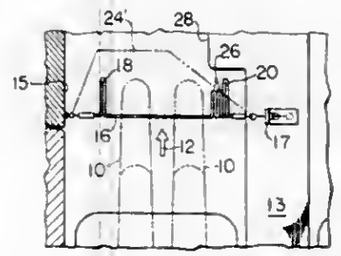


1. A vehicle seat belt system, comprising:
a seat belt for restraining an occupant;
a seat belt anchor firmly secured to a vehicle body, said anchor having means providing a series of transversally extending, longitudinally spaced members having respective gaps between adjacent members in the series; and
a variable effect shock absorber comprising a strip of metal woven through said gaps, said strip having a head end secured to one end of the seat belt downstream from said gaps and a tail end protruding upstream of said gaps; means providing a stop on said strip for cooperating with the anchor upon achievement of a predetermined amount of longitudinal advance of the strip;
the transverse cross-sectional area and stiffness of the strip being such that the strip must progressively bend and overcome friction in order to advance through the gaps and accordingly a sustained pulling force is needed to cause said predetermined amount of longitudinal advance;
the cross-sectional area of the strip decreasing from a larger value nearer the head end to a smaller value nearer the tail end, in a manner such that as the strip is pulled to longitudinally advance the strip said predetermined amount, at first the resistance offered to strip advancement is larger and then, as the smaller value transverse cross-sectional area traverses the gaps, the resistance offered to strip advancement decreases, in order to first provide maximum restraint during the initial part of a vehicle accident and to then provide some relaxation.

4,027,906
KNEE PROTECTOR

Hideoki Matsuoka, No. 143, Kanazawa-cho, Kanazawa, Yokohama, and Hiroshi Tsuda, No. 3-5-20, Nakahara, Isogo, Yokohama, both of Japan

Filed June 4, 1975, Ser. No. 583,916
Claims priority, application Japan, June 8, 1974, 49-66545[U]; June 15, 1974, 49-70030[U]
Int. Cl.² B60R *21/00*
U.S. Cl. 280—751 9 Claims



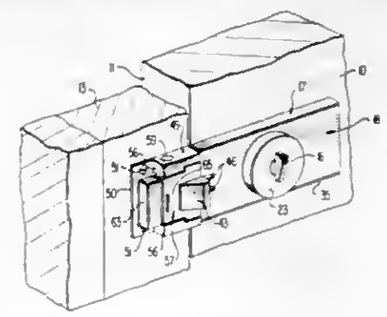
1. In a motor vehicle having a seat, a knee protector comprising, in combination:
A. an elongated belt having one end fixed to a first portion of said vehicle disposed forwardly of said seat;
B. a device fixed to a second portion of said vehicle disposed forwardly of said seat and spaced laterally, with respect to the longitudinal direction of the vehicle, from said first portion of said vehicle, said device anchoring the other end of said elongated belt to apply a predetermined tension to said elongated belt;
C. a zone, on said elongated belt, which is adapted to receive an impact force by knees of an occupant of said seat during frontal collision of the vehicle, said elongated belt being provided with two longitudinally extensible folds, each said fold having superposed layers which are interconnected by breakable stitches, said two longitudinally extensible folds being disposed on the longitudinally opposite sides of said zone; and
D. a lateral movement control means for directing said zone laterally during said frontal collision, comprising at least one second longitudinally extensible fold having superposed layers which are interconnected by stitches which are more easily breakable than those interconnecting said superposed layers of each said two first longitudinally extensible folds, said at least one second longitudinally extensible fold being disposed on one of said longitudinally opposite sides from said zone that is nearer to an obstacle attached to said vehicle and disposed forwardly of said elongated belt.

4,027,907
SECURITY CHAIN LOCK FOR DOORS

Alois Crepinsek, El Paso, Tex., assignor to International Top Security Corporation, El Paso, Tex.

Filed Apr. 8, 1976, Ser. No. 675,215
Int. Cl.² E05C *17/06, 17/36*
U.S. Cl. 292—264 12 Claims

1. A chain lock for doors comprising a housing secured to the interior side of a door near the free-swinging edge thereof, an extensible and retractable chain and chain latch means within the housing and adapted to be extended beyond one end of the housing, a latch keeper assembly mountable upon a door frame adjacent to said one end of the housing and adapted to lockingly engage with said chain and chain latch means when the latter is extended beyond said one end of the housing, said latch keeper assembly including a manual release element accessible from the interior side of a door when such door is closed, and means anchoring said housing to a lock cylinder housing means of a door, said last-named means including an oblong opening formed through said housing laterally, and a threaded clamping rosette engaging the interior side of the housing and adapted for threaded engagement

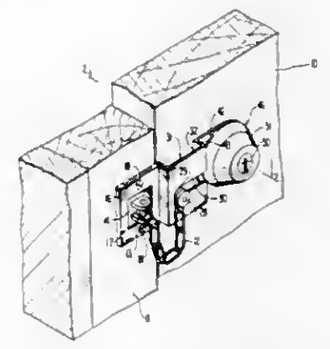


with a threaded coupling member of a door lock cylinder housing means.

4,027,908
SAFETY CHAIN LOCK FOR DOORS

Alois Crepinsek, El Paso, Tex., assignor to International Top Security Corporation, El Paso, Tex.

Filed July 25, 1975, Ser. No. 599,093
Int. Cl.² E05C *17/36*
U.S. Cl. 292—264 4 Claims



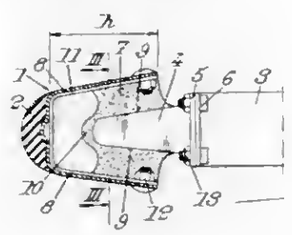
1. A safety chain lock for doors comprising a flexible safety element, a first anchor carried by one end of said element, a first retainer for the first anchor and being substantially right angular and adapted for attachment to the interior vertical edge of a door frame, a second anchor for the opposite end of said flexible safety element, and a second retainer for said second anchor adapted to engage the second anchor releasably, the second retainer having substantially right angular portions adapted to extend about the interior vertical edge of a door and to be attached thereto, and a plate extension on said second retainer adapted to lie on the interior face of a door and to be immovably anchored to an adjacent door lock assembly, said flexible safety element comprising a length of chain, said first anchor coupled to one end link of said chain, said second anchor coupled to the opposite end chain link and having a shank, said second retainer having a slot receiving said shank lockingly and separably, said slot being substantially horizontal and being formed in a wall portion of the second retainer which is offset inwardly from a door on which the chain lock is mounted, a short right angular connecting web on the second retainer extending between said offset wall portion and said plate extension, and one end of said slot opening through said short right angular connecting web.

4,027,909

RESILIENT MOUNTING FOR VEHICLE BUMPER BAR

Pierre Hauraux, Paris, and Michel Domer, Montigny-les-Cormeilles, both of France, assignors to Paulstra, France

Filed July 21, 1975, Ser. No. 597,947
Claims priority, application France, Aug. 2, 1974, 74.26970
Int. Cl.² B60R *19/06*
U.S. Cl. 293—88 **7 Claims**



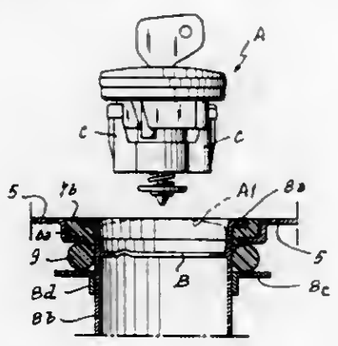
1. In a vehicle comprising an energy-absorbing means employing a resilient elastomeric cushion means disposed between the vehicle bumper and the vehicle frame, the improvement wherein said energy-absorbing means comprises a rigid casing member, of generally U-shaped configuration as viewed in transverse cross-section perpendicular to the bumper, affixed to, but formed separate from, one of said bumper and said frame and defining a cavity, the side walls of said casing member forming said U-shaped configuration being inclined outwardly; the side walls of said casing member, in cross-section, forming a small acute angle with a line parallel to the longitudinal axis of said casing member, and a support member which partially projects into the cavity defined by said casing member, said support member being affixed at one end thereof to the other one of said bumper and said frame, and the surfaces of said support member which oppose said side walls of said casing member being inclined in a direction toward said cavity and substantially conforming in shape to the shape of said side walls, a said elastomeric cushion means being disposed between said support member and said casing member and being bonded to said inclined surfaces of said support member and to the opposed internal surfaces of said side walls of said casing member so that by virtue of the opposed inclined surfaces of said members the energy-absorption means absorbs stresses in both shear and compression.

4,027,910

TERMINAL FOR THE FUEL FILLING PIPE OF A MOTOR VEHICLE

Mario Farelli, C. so Giulio Cesare 298, Turin, Italy

Filed Oct. 15, 1975, Ser. No. 622,563
Claims priority, application Italy, Oct. 18, 1974, 70109/74
Int. Cl.² B60P *3/22;* **B65D** *39/00*
U.S. Cl. 296—1 C **8 Claims**



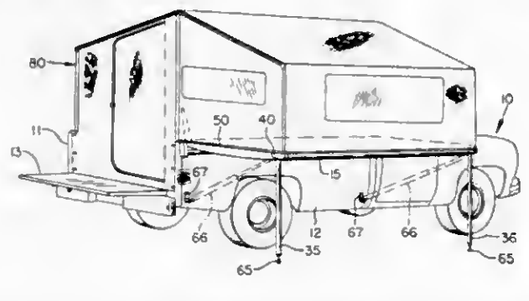
1. An automobile fuel filler pipe assembly comprising:
a. an automobile body portion having a recessed opening surrounded by an inwardly-projecting seat recessed beneath the outer surface of the body portion,
b. a filler pipe having a terminal portion within said opening,
c. a first outwardly projecting flange at the end of said pipe, said flange being spaced above said seat in the body portion,
d. a resilient gasket having portions between:
I. the outer edge of said first flange and said automobile body portion,
II. said first flange and said seat, and
III. the inner edge of said seat and said filler pipe, said gasket maintaining said pipe and body portion completely out of contact with each other,
e. a second flange projecting outwardly from said pipe, said second flange being spaced beneath said seat, and
f. resilient retaining means around the exterior of said pipe and fitted snugly between said seat and said second flange.

4,027,911

SLEEPER/CAMPER ATTACHMENT

George Verne Johnson, 5510 SW. Buddington, Portland, Oreg. 97219

Filed Dec. 8, 1975, Ser. No. 638,653
Int. Cl.² B60P *3/34*
U.S. Cl. 296—23 H **10 Claims**



1. A sleeper/camper attachment for a pickup truck and the like having upstanding sidewalls, comprising a cover having a hinge on one side edge connected to the upper edge of one of said sidewalls, an arm rigidly mounted on the under side of said cover adjacent said hinge, means connected with said arm for opening said cover and for closing the opposite side edge of said cover on the upper edge of the other sidewall, a leg having a pivotal mounting adjacent said opposite side edge of said cover for supporting the cover in a horizontal open position, and latch means on said leg engaging said other sidewall to latch said cover in closed position, said opening and closing means comprising a windlass on said other sidewall having a cable with one end connected to said arm, said windlass comprising a hand crank, and means for detachably connecting the opposite end of said cable with said crank for winding in and paying out said cable.

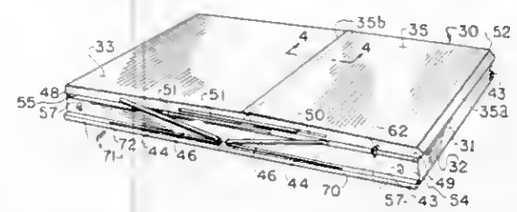
4,027,912

COLLAPSIBLE ROOF-TOP CAMPER

Egmar A. Pacca, 6012 Dudman Ave., Garden Grove, Calif. 92645

Filed May 3, 1976, Ser. No. 682,777
Int. Cl.² B60P *3/34*
U.S. Cl. 296—23 MC **10 Claims**

1. A collapsible, roof-top camping structure, comprising:
a body assembly having a floor panel and four vertical panels, each vertical panel being connected to said floor panel along an edge thereof and extending above said floor panel to define a box-like structure having an open top;
a pair of elongated guide-tubes each connected to a first opposing pair of said vertical panels, the longitudinal axis of each such tube being substantially parallel to said floor panel, each such tube having a slotted opening along at least a portion of its length;
a pair of end-wall panels each pivotally connected to a second opposing pair of said vertical panels, each said end-wall panel having a pair of flange means laterally extending toward the opposing end-wall panel;
a plurality of connector rod means, each rod means being rotatably connected at a first end to said flange means carried by one of said end-wall panels and rotatably connected at a second end to a cylinder means whereby each said cylinder means is slideable longitudinally within said guide-tube;
a pair of roof panels, one such roof panel pivotally connected to each said end-wall panel, said roof panel having a pair of flange means laterally extending towards the interior of said box-like structure, and each such flange means having a slotted opening, said roof panels being



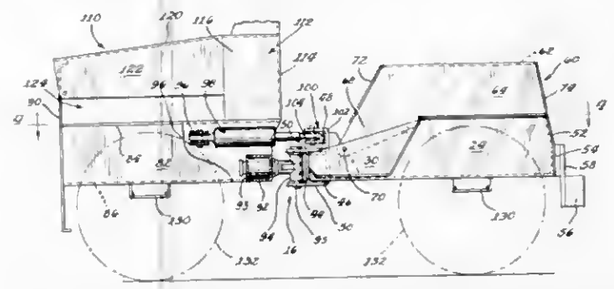
adapted to rest against one another along their respective leading edges;
a plurality of connecting arms each such arm being rotatably connected at a first end to a flange means carried by an end-wall panel and being slideably connected at a second end within the slotted opening of an adjacent flange means of a roof panel;
a pair of side-wall panels pivotally connected to said first opposing pair of vertical panels, said sidewall panels each being adapted to conform to the openings defined by the flange means of said end-wall panels and the flange means of said roof panels when the leading edges of the roof panels rest against one another;
at least one of said pivotally connected panels having a means for providing access to the interior of said camping structure; and
means for detachably mounting said body assembly to the roof of a vehicle.

4,027,913

FRAME STRUCTURE FOR ARTICULATED VEHICLE

Steve A. Youngers, Clearwater, and Terry D. Erickson, Wichita, both of Kans., assignors to J. I. Case Company, Racine, Wis.

Filed Dec. 8, 1975, Ser. No. 638,944
Int. Cl.² B62D *23/00*
U.S. Cl. 296—28 J **7 Claims**



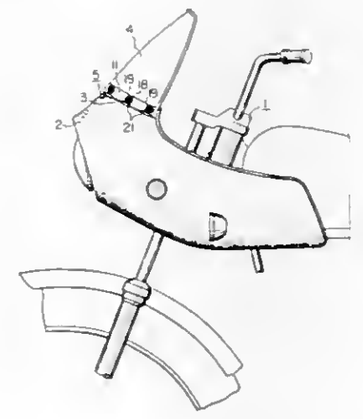
1. In an articulated vehicle having a forward frame section and a rear frame section with a pivotal connection between said sections accommodating relative pivotal movement of said sections about a vertical pivot axis, said rear frame section including first and second transversely spaced fenders, each of said fenders having a forward portion and a rear portion, each of said rear portions including a vertical plate portion and a horizontal plate portion integral with an upper edge of said vertical plate portion and extending outwardly therefrom, brace means respectively interconnecting said forward and rear portions of said first and second fenders, and a cover member cooperating with said fenders to define an enclosed compartment, said cover member including a top horizontal wall and a pair of transversely spaced depending walls on opposed edges of said horizontal wall, said dependent walls being respectively substantially vertically aligned with the respective vertical plate portions of said fenders, said depending walls respectively having outwardly directed flanges on lower edges thereof with said outwardly directed flanges respectively supported on the respective horizontal plate portions.

4,027,914

FITTING DEVICE FOR WINDSHIELD

Takenori Yamamoto; Tsuneo Tsukisaka, and Takeshi Tsukahara, all of Kawagoe, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 26, 1976, Ser. No. 652,294
Claims priority, application Japan, Jan. 29, 1975, 50-11422
Int. Cl.² B62J *17/02*
U.S. Cl. 296—78.1 **8 Claims**



1. A fitting device for a wind shield on a motor-cycle, and the like, which comprises in combination: a body of the motor-cycle; a wind shield plate to be fixed to the motor-cycle body; a fairing means fixedly secured at one portion of the motor-cycle body in a surrounding manner with a curvature; means for fixing said wind shield plate to said fairing means, and which is prone to break or deform when an excessive impact force acts thereon; and means for retaining said wind shield plate in a connected state to said fairing means so as to prevent said wind shield plate from flying and hitting a cycle rider, when an excessive impact force acts on said wind shield plate from the forwarding direction of the motor-cycle and said wind shield plate fixing means becomes broken or deformed.

4,027,915

SUN SHIELD ASSEMBLY FOR DETACHABLE ATTACHMENT TO INFANT'S SEAT

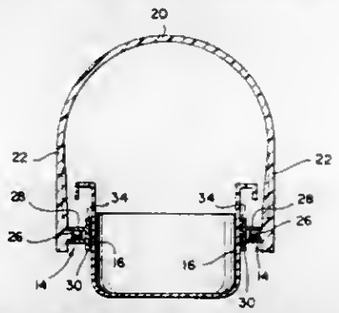
Donald Anderson, and Kaye Anderson, both of 17091 Regulus, Yorba Linda, Calif. 92686

Filed May 7, 1976, Ser. No. 684,103
Int. Cl.² A47C *7/00*
U.S. Cl. 297—184 **4 Claims**

1. A sun shield assembly for detachable attachment to a selected location on an infant's seat comprising in combination:

a pair of mounting brackets each having a base portion and a hollow cylindrical boss projecting from one face of said base portion, an adhesive material being provided on the opposed face of said base portion for releasably securing the bracket to a selected region on the outer side wall of an infant's seat;

a hood having a top wall and opposed side walls, a pivot pin integral with each of said side walls and projecting laterally therefrom inwardly and having a configuration complementary to that of the corresponding boss of the



mounting bracket and dimensioned to be accommodated rotatably within said bosses, said hood being sufficiently resilient to permit separation of the side walls thereof to a spaced apart distance enabling positioning of said pivot pins within the corresponding bosses of the mounting brackets;

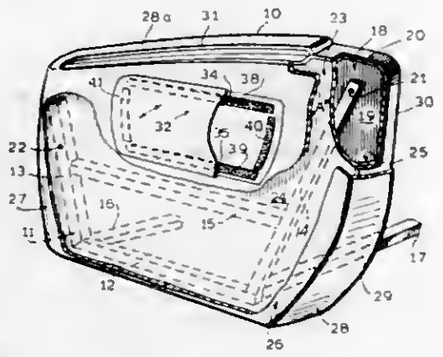
and means on said pivot pins and mounting brackets cooperable with each other to maintain the sun shield in a predetermined angular disposition relative to the infant's seat.

4,027,916

SEAT ARMREST AND PROCESS OF MANUFACTURE THEREOF

Bennitt McElroy, Rural Hall, N.C., assignor to Fairchild Industries Inc., Germantown, Md.

Filed Dec. 15, 1975, Ser. No. 640,917
Int. Cl.² A47C *7/62*
U.S. Cl. 297—194 **8 Claims**



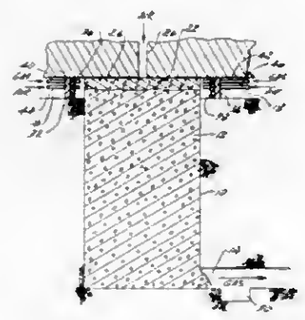
1. An armrest for a seat comprising a first shell, said first shell comprising a central substantially flat portion with a flange extending outward therefrom, a second shell, said second shell comprising a central substantially flat portion with a flange extending outward therefrom, the flanges of said first and said second shells being formed so that the flange of one shell fits into the flange of the other shell, the flanges of said first and said second shells being interconnected with the flange of one shell fitting into the flange of the other shell to form a combined unit comprising said first and second shells, and a third shell member, said third shell member having a central substantially flat portion with a flange extending outward therefrom, the flange of said third shell being formed to be slidable over the unit formed by said first and said second shells, the flange of said third shell being connected to the combined unit formed by said first and second shells after the flange of said third shell has been slid over the unit formed by said first and said second shells.

4,027,917

METHOD FOR IGNITING THE TOP SURFACE OF OIL SHALE IN AN IN SITU RETORT

William J. Bartel, and Robert S. Burton, III, both of Grand Junction, Colo., assignors to Occidental Petroleum Corporation, Los Angeles, Calif.

Filed May 16, 1975, Ser. No. 578,203
Int. Cl.² E21B *43/24, 43/26*
U.S. Cl. 299—2 **18 Claims**



1. A method of igniting an in situ oil shale retort containing a fragmented mass of particles containing oil shale, said in situ oil shale retort having an ignition zone extending across the in situ retort and a sufficient void volume distributed through the fragmented mass below the ignition zone for introducing inlet gas into the ignition zone and moving the gas through the fragmented mass below the ignition zone toward the bottom of the in situ retort, and further wherein, the ignition zone contains a portion of the fragmented mass of particles having sufficient average void volume for movement of a volume of inlet gas through a volume of the portion of fragmented mass in the ignition zone with less pressure loss than for the movement of a comparable volume of gas through a comparable volume of fragmented mass below the ignition zone, which comprises the steps of:

directing a sufficient quantity of an ignited combustible mixture of fuel and an oxygen supplying gas horizontally into said ignition zone for producing a self-sustaining combustion zone across the in situ oil shale retort in the fragmented mass below the ignition zone and generating flue gas in the combustion zone; and

causing the flue gases generated in said combustion zone to move from the combustion zone toward the bottom of the in situ oil shale retort for establishing a retorting zone on the advancing side of the combustion zone.

18. An in situ oil shale retort in a subterranean formation containing oil shale comprising:

a fragmented mass of formation particles in such retort;

an ignition zone extending across the top of the fragmented mass of particles in the in situ retort with an average void volume higher than the average void volume of the fragmented mass of particles below the ignition zone;

means for directing a combustible ignition zone;

means for directing a combustible inlet mixture of fuel and an oxygen supplying gas into the ignition zone; and

access means at the bottom of the in situ retort for withdrawing retort off gases and liquids.

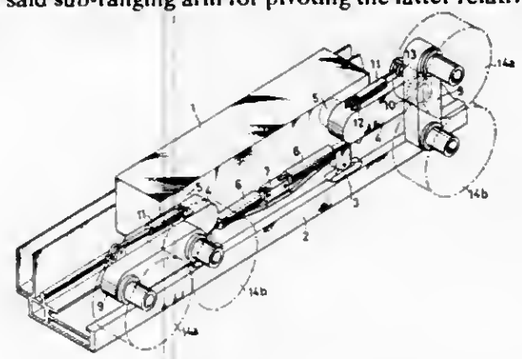
4,027,918

LONGWALL COAL MINING MACHINE WITH PLURAL CUTTERS ON SUB-RANGING ARM

Masao Hujimori; Shigeo Nakajima; Ken Takahashi, all of Tokyo; Tsunetoshi Ito; Toshio Shimada, both of Yokohama, and Hajime Endo, Kushiro, all of Japan, assignors to Taihelyo Engineering Incorporated, Tokyo, Japan

Filed Feb. 26, 1976, Ser. No. 661,578
Claims priority, application Japan, June 30, 1975, 50-80614
Int. Cl.² E21C *27/24*
U.S. Cl. 299—53 **8 Claims**

1. A coal mining machine for use in a pit having a long-walled pit face comprising a shearer body, a main ranging arm having one end portion thereof pivotally mounted on said shearer body, a ranging jack operatively connected between said shearer body and said main ranging arm for pivoting the latter relative to said shearer body, a sub-ranging arm having an intermediate portion and two end portions, means pivotally mounting said intermediate portion of said sub-ranging arm to the other end portion of said main ranging arm, a sub-ranging jack operatively connected between said main ranging arm and said sub-ranging arm for pivoting the latter relative to said



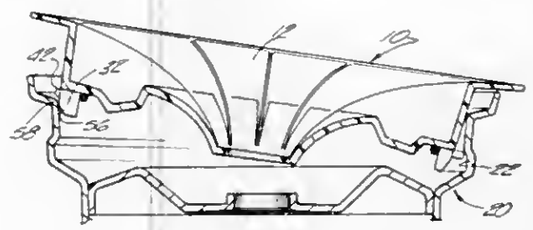
main ranging arm, said sub-ranging arm being pivotal between a first position generally parallel to said main ranging arm and a second position generally perpendicular to said main ranging arm, drum means rotatably mounted on said two end portions of said sub-ranging arm such that when sub-ranging arm is in said first position, said coal mining machine is operable to effect cutting along a height substantially equivalent to the diameter of one of said drums and when said sub-ranging arm is in said second position, said mining machine is operable to effect cutting along a height substantially equivalent to the sum of the diameter of said two drums.

4,027,919

WHEEL COVER

Edwin E. Foster, and Thomas E. Foster, both of Austin, Tex., assignors to Michael Ladney, Jr., Grosse Pointe Shores, Mich.

Filed May 22, 1975, Ser. No. 579,903
Int. Cl.² B60B *7/00*
U.S. Cl. 301—37 TP **18 Claims**



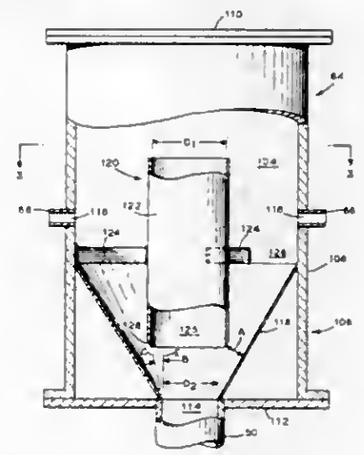
1. A wheel cover adapted for application to the outboard face of a vehicle wheel of the type having a radially inwardly facing annular surface concentric with the wheel axis and with which the wheel cover is adapted to frictionally engage to retain the cover on the wheel, said cover having an annular portion which, when the cover is applied to the wheel, overlies said annular surface of the wheel, a spring wire ring mounted on the inboard face of the cover concentric with said annular portion, said ring lying in a generally flat plane perpendicular to the central axis of said annular portion of the cover, said wire ring having a plurality of at least three radially outwardly extending projections thereon adapted to engage said annular surface when the cover is applied to the wheel, said projections being spaced apart circumferentially around said ring and being connected by portions of the ring extending circumferentially between the projections, the outer ends of said projections defining a circle having a diameter at least slightly greater than the diameter of said annular surface of the wheel when the ring is in the unstressed condition, said projections having generally parallel side edge portions extending generally radially of the ring in the plane thereof, said projections being relatively rigid in a radial direction and acting as rigid columns when radially inwardly directed forces are applied to the radially outer ends thereof, said circumferentially extending portions of said ring being resiliently flexible radially in the plane of the ring in response to radial displacement of said projections, a plurality of ring mounting means on the inboard face of the cover spaced apart circumferentially to correspond with the circumferential spacing of said projections, each of said mounting means having a pair of radially extending guide surfaces thereon spaced apart to engage said side edge portions of said projections with a close sliding fit for preventing relative circumferential and axial movement between the ring and the cover, said close sliding fit also preventing radial displacement of the ring as a whole relative to the cover while permitting free radial inward movement of the projections relative to the cover, said circumferentially extending portions of said ring between said projections being relatively free of the cover in a radial direction to permit flexing thereof in the plane of the ring without transmitting forces to the cover when the projections are displaced radially inwardly.

4,027,920

DISTRIBUTOR

Jerald Meeker Wennerstrom, Canal Fulton, Ohio, assignor to The Babcock & Wilcox Company, New York, N.Y.

Filed Oct. 14, 1975, Ser. No. 622,353
Int. Cl.² B65G *53/34*
U.S. Cl. 302—28 **4 Claims**



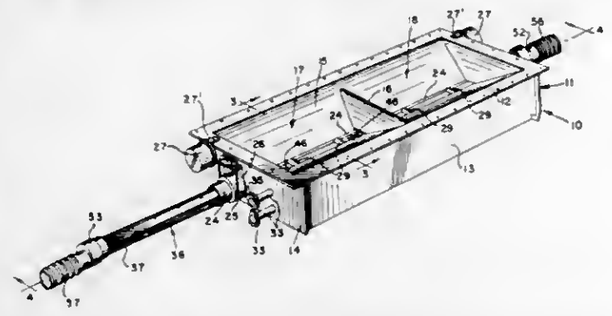
1. In combination with a pneumatic transport system having at least one distributor and means for passing gas entrained particles therethrough, said distributor including an upright cylindrical vessel, an upright open-ended cylindrical member coaxially disposed within said vessel and defining therein an inner passageway of uniform horizontal cross-sectional area throughout, the upright member and vessel being spaced from one another to form an outer annular passageway therebetween, the vessel having a plurality of uniformly spaced outlets opening to said outer passageway and a circular inlet disposed in coaxial and subjacent spaced relation to said upright member, support means connecting the upright member to the vessel, an inverted frusto-conical filler piece disposed within the vessel and defining therein a sloped bottom extending downwardly from below the vessel outlets to the vessel inlet perimeter, conduit means for conveying the gas entrained particles to the distributor, said conduit means terminating at the circular inlet, and the horizontal cross-sectional area of the inner passageway being greater than the horizontal cross-sectional area of the vessel inlet thereby assuring the passing of substantially all of the gas entrained particles through the inner passageway prior to discharge from said vessel outlets.

4,027,921

PRESSURE PROBE UNLOADING DEVICE FOR PNEUMATIC OPERATED DISCHARGE GATES

Franklin P. Adler, and John D. Pavolka, both of Michigan City, Ind., assignors to Pullman Incorporated, Chicago, Ill.

Filed July 15, 1976, Ser. No. 705,723
Int. Cl.² B65G *53/14, 53/40*
U.S. Cl. 302—52 **10 Claims**



1. A hopper discharge arrangement including a housing adapted to be connected for communication with the discharge opening of a hopper,

said housing including downwardly and inwardly sloping sides, terminating in an elongated discharge opening,

an elongated first tube open at its ends rigidly connected to said housing below said elongated opening and communicating therewith,

valve means regulating the flow of material through said elongated opening, and

removable closure caps for the open ends of said first tube, the improvement comprising;

a second pressure discharge tube insertable through one of the open ends of said first tube and projecting outwardly from opposite ends thereof,

said second pressure discharge tube having opening means adapted to communicate with said elongated discharge opening,

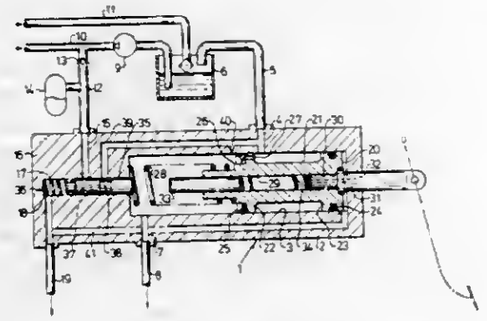
and means within said second pressure discharge tube adjacent to said opening means restricting the air pressure flow through said second tube thereby providing a negative pressure differential in the area of said opening means whereby material flows through said opening means and is discharged through one end of said second tube, said other end of said second discharge tube being connected to a source of positive pressure.

4,027,922

HYDRAULIC SERVO-BRAKE ARRANGEMENT FOR DOUBLE CIRCUIT BRAKES

Heinrich August Schlicker, Stenungsund, Sweden, assignor to AB Volvo Penta, Goteborg, Sweden

Filed Mar. 12, 1976, Ser. No. 666,332
Claims priority, application Sweden, Mar. 13, 1975, 7502824
Int. Cl.² B60T *60/548, 13/28*
U.S. Cl. 303—6 R **7 Claims**



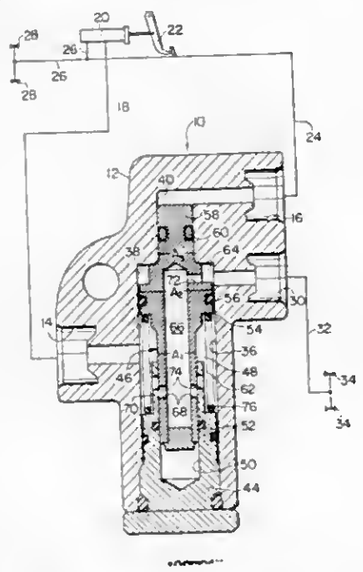
1. A hydraulic servo-brake arrangement for a vehicle brake system having two brake circuits, comprising a cylinder having an inlet connected to a fluid reservoir and an outlet connected to a first said brake circuit, a piston movably mounted in said cylinder and having a piston rod for connection to the vehicle brake pedal, a valve housing having an inlet connected to a pressure source and an outlet connected to the second said brake circuit, a valve body movably mounted in said valve housing, said valve housing communicating with the first brake circuit such that the pressure in the first circuit forces the valve body in a direction to open the connection between said pressure source and the second brake circuit, said second brake circuit communicating with said cylinder such that the pressure in the second brake circuit forces the piston in a direction to increase the pressure in the first brake circuit, the piston being mounted for limited displacement in relation to the piston rod, and means for mechanically displacing the valve body in the opening direction after a predetermined piston rod travel in the braking direction.

4,027,923

PRESSURE REDUCER DEVICE

Yuichi Saito, Tokyo, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Dec. 23, 1975, Ser. No. 643,707
Claims priority, application Japan, Dec. 25, 1974, 49-147941
Int. Cl.² B60T *8/26*
U.S. Cl. 303—6 C **6 Claims**



1. In a pressure reducer device, for hydraulic brake systems in motor vehicles, comprising:

a housing having a bore;

pressure responsive valve means within said bore of said housing having a cylindrical portion having a closed bore and a land portion projecting radially from said cylindrical portion,

said land portion sealingly engaging said bore of said housing to axially divide the same into a high pressure chamber and a low pressure chamber,

said cylindrical portion having at least one valve port at that side thereof from said land portion which is exposed to said high pressure chamber and at least one opening at that side thereof from said land portion which is exposed to said low pressure chamber, said at least one valve port opening to said closed bore of said cylindrical portion, said at least one opening opening to said closed bore of said cylindrical portion;

an end plug closing one end of said bore of said housing, said end plug having a blind bore sealingly and slidably receiving said that side of said cylindrical portion which is exposed to said high pressure chamber, said end plug having an integral sleeve disposed coaxially with and in alignment with said blind bore,

said pressure responsive valve means having a first effective area exposed to said high pressure chamber pressure and a second effective area exposed to said low pressure chamber pressure after closure of said at least one valve port by said sleeve; and

spring means biasing said pressure responsive valve means in a direction assisting said high pressure chamber pressure;

the force applied to said pressure responsive valve means by pressure acting on said second effective area after the closure of said at least one valve port by said sleeve biasing said pressure responsive valve means to a closed position against the force of said spring means;

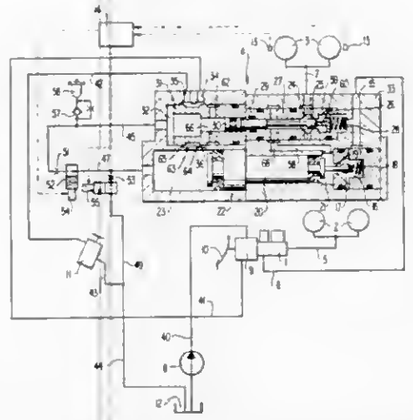
the improvement comprising said sleeve slidably receiving that side of said cylindrical portion which is exposed to said high pressure chamber to open and close said at least one valve port to limit transmission of pressure from said high pressure chamber to said low pressure chamber through said at least one valve port, said closed bore of said cylindrical portion and said opening without the the presence of a seal.

4,027,924

ANTI-SKID BRAKE CONTROL DEVICE FOR VEHICLES

Toshiyuki Kondo, Toyota, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Mar. 2, 1976, Ser. No. 663,031
Claims priority, application Japan, Mar. 13, 1975, 50-30873
Int. Cl.² B60T *8/00, 13/68*
U.S. Cl. 303—92 **6 Claims**



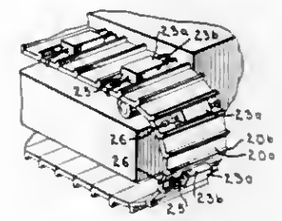
1. A brake system comprising first fluid circuit means including fluid pressure source means, operator actuated master cylinder means fluidically connected with said pressure source means, wheel brake cylinder means fluidically connected with said master cylinder means and actuator means including control valve means for controlling fluid pressure from said master cylinder means to said wheel brake cylinder means and power piston means operatively associated with said control valve means and second fluid circuit means including said fluid pressure sources means, reservoir means, auxiliary fluid pressure operated means disposed between said pressure source means and said reservoir means and throttle valve means disposed between said auxiliary fluid pressure operated means and said pressure source means and further fluidically connected with said power piston means of said actuator means; said throttle valve means including a first throttle valve disposed between said auxiliary fluid pressure operated means and said pressure source means for throttling the pressure downstream of said first throttle valve in response to the pressure from said master cylinder means and a second throttle valve disposed between said power piston means of said actuator means and said pressure source means for throttling the pressure downstream of said second throttle valve in response to the actuation of said first throttle valve.

4,027,925

DETACHABLE ROAD PROTECTING DEVICE FOR TRACKED VEHICLES

Chester A. Black, Black Trac-Pad, Box 296, Stanley, Kans. 66223, and Lester A. Black, 1106 Second St., Alva, Okla. 73717

Continuation of Ser. No. 469,092, May 13, 1974, abandoned. This application June 26, 1975, Ser. No. 590,617
Int. Cl.² B68D *55/08*
U.S. Cl. 305—46 **10 Claims**



1. Track and road protecting means for use with individual track elements of an endless tracked vehicle, successive track elements of said endless track having a transverse cleat on the outboard surface thereof adjacent one end thereof, comprising, in combination:

a resilient, flexible, deformable yet shape-retaining block under load adapted to fit on the outboard face of a single track element of an endless track and positioned thereon,

said block substantially rectangular in plan, side and end views and having substantially rectangular, paired and parallel side faces, end faces and inboard and outboard load bearing faces,

the length of said block a substantial part of the distance from cleat to cleat of successive track elements,

the height of the block substantially greater than the cleat height from the clean outboard surface of the track element, and

the width of the block at least a substantial part of the width of the track,

means for connecting the block to the opposite side edges of an individual track element positioned laterally of each of the side faces of said block, and

resilient tensioning means engaging the block with the inboard portion thereof and the connecting means with the outboard portions thereof,

said tensioning means including a coil spring.

4,027,926

ANTI-SKID CONTROL SYSTEM FOR VEHICLES

Hiroshi Arai, Toyota; Akira Nakamura, Susono; Akio Sugiura, Nagoya; Atutoshi Okamoto, Toyohashi, and Koichi Toyama, Kariya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, both of, Japan

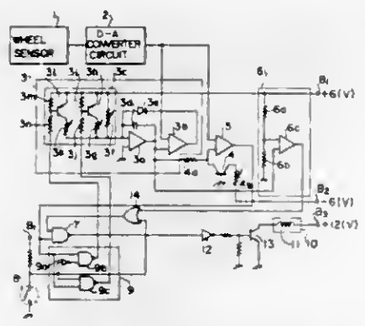
Filed Apr. 30, 1975, Ser. No. 573,151
Claims priority, application Japan, May 13, 1974, 49-53623
Int. Cl.² B60T *8/10*
U.S. Cl. 303—109 **13 Claims**

1. In an anti-skid control system for a vehicle comprising a wheel sensor for detecting the rotational speed of a wheel of a vehicle in motion, locking decision means connected to said wheel sensor for detecting when said wheel is on the verge of locking in accordance with an output signal of said wheel sensor and generating a braking pressure releasing signal, and braking pressure modulating means connected to said locking decision means and responsive to said braking pressure releasing signal for modulating the braking pressure applied to said

wheel to eliminate the application of excessive braking pressure, the improvement comprising:

vehicle speed detecting means for generating a vehicle speed signal corresponding to the vehicle body speed of said vehicle in motion;

auxiliary means connected to said vehicle speed detecting means for limiting the modulation of the braking pressure by said braking pressure modulating means when said



vehicle speed signal becomes lower than a predetermined value;

a deceleration sensor for detecting the deceleration of the vehicle body of said vehicle; and

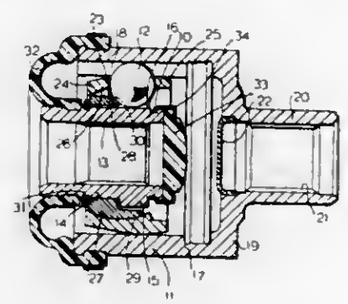
inhibiting means connected to said deceleration sensor for inhibiting operation of said auxiliary means when a deteeting vehicle deceleration signal becomes lower than a predetermined level.

4,027,927

UNIVERSAL JOINTS

Colin Francis Samuel Turner, Sutton Coldfield, England, assignor to GKN Transmissions Limited, Birmingham, England

Filed July 9, 1976, Ser. No. 703,893
Int. Cl.² F16C *9/06*
U.S. Cl. 308—72 **9 Claims**



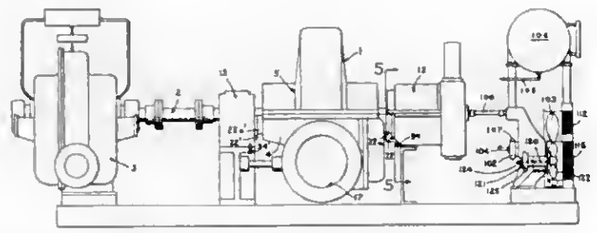
1. In a plunging constant velocity universal joint comprising a hollow outer member and an inner member which are formed with pairs of opposed longitudinally extending grooves, torque transmitting balls which are each engaged in and between a pair of said grooves in the inner and outer members and are movable along the grooves to permit relative angular and axial (plunging) movement between the members, a ball cage which is located between the inner and outer members and is formed with apertures in which the balls are located and a guide member which is mounted on the inner member or a member fixed thereto so as to be axially movable relative to the inner member, the cage having a convex part-spherical outer surface which engages the surface of a eylindrical bore in the outer member or a member fixed thereto whereby the cage is movable relative to the outer member axially of the latter, and a concave part-spherical inner surface which engages a complementary convex part-spherical surface provided on the guide member, the part-spherical surfaces of the cage having centers of curvature which are offset by an equal amount on opposite sides of the joint center along the joint axis whereby the cage is operative to assist in maintaining the balls in the bisector plane of the joint thereby to provide the constant velocity ratio charaeteristics of the joint, the improvement wherein the guide member is axially movable relative to the inner member or the said member fixed thereto to a limited extent to allow the torque-transmitting balls to roll rather than skid with respect to the surfaces of the grooves in the inner and outer members over part only of the permitted plunging movement of the joint substantially less than the whole range of permitted plunging movement.

4,027,928

COOLING AND LUBRICATION ARRANGEMENT FOR WATER COOLED BEARINGS HAVING SELF CONTAINED LUBRICATION SYSTEMS

John G. Williams, Warren, N.J., assignor to Turbodyne Corporation (Steam Turbine Div.), Wellsville, N.Y.

Filed June 1, 1976, Ser. No. 691,232
Int. Cl.² F16C *1/24*
U.S. Cl. 308—77 **25 Claims**



1. In a cooling and lubrieation arrangement for a bearing supporting a rotatable member,

a. bearing housing means for supporting said bearing having a lower section, and an upper seetion,

b. connecting means for said bearing housing means to minimize conduetive heat flow to said bearing,

c. a partition in said lower section of the bearing housing means defining therein on opposite sides of the partition, means forming a sump for a self contained lubrieation system for the bearing, and means forming a eooling fluid flow chamber;

d. means connected to said bearing housing means and in communieation with said cooling fluid flow chamber means to provide an inlet for cooling fluid and an outlet for cooling fluid,

e. means providing an internal geometry for said cooling fluid flow chamber ineluding, baffle means between said inlet and said outlet to provide a zone of relatively high velocity cooling fluid in the cooling fluid flow ehamber at the portion thereof closely adjacent to the bearing, and

f. means eonnected to said inlet and outlet for circulating cooling fluid to and returning the same from said cooling fluid flow chamber.

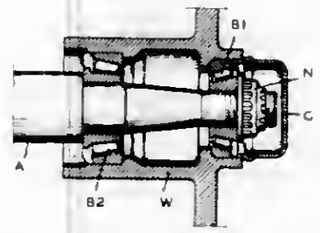
4,027,929

BEARING LUBRICATOR

Jack M. Huddleston, Fort Gibson, Okla., assignor to National Distillers and Chemical Corporation, New York, N.Y.

Filed Sept. 12, 1975, Ser. No. 612,893
Int. Cl.² F16C *1/24*
U.S. Cl. 308—97 **7 Claims**

1. A bearing lubricator comprising a tubular element having a hand-hold portion at the outer extremity thereof, an intermediate inwardly tapered portion, and an elongated and angularly offset restricted passageway extending inwardly from the opposite extremity of said tubular element and communicating with said inwardly tapered portion, said restricted passageway terminating in a narrow elongate areuately curved discharge orifice; a lubricant receiving chamber having an open mouth extending inwardly through said hand-hold portion to said intermediate inwardly tapered portion and communicating therewith; and an outwardly projecting lubricating fitting



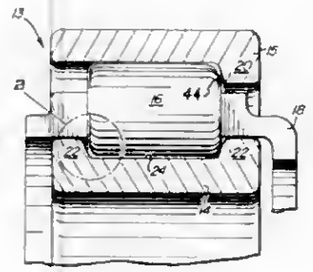
securely mounted within said open mouth in sealed relationship with respect to said lubricant receiving chamber.

4,027,930

BEARING ASSEMBLY AND METHOD

Ernest J. Bodensieck, Scottsdale, Ariz., assignor to The Garrett Corporation, Los Angeles, Calif.

Filed Dec. 19, 1975, Ser. No. 642,510
Int. Cl.² F16C *19/00*
U.S. Cl. 308—202 **15 Claims**



1. An antifriction bearing assembly comprising:

an outer circular bearing race;

an inner circular bearing race concentric with said outer race;

a plurality of bearing members arranged between said bearing races;

opposed, upstanding end flanges on said inner race defining a depressed raceway therebetween receiving said bearing members, said bearing members having end faces engagable with the adjacent end flanges; and

at least one of said end flanges having a convex surface engageable with the adjacent end face of each bearing member to define a wedge shaped space between said convex surface and the adjacent end face disposed radially outwardly of the location of contact between said convex surface and the adjacent end face, said wedge shaped space arranged whereby rolling movement of said bearing member on said depressed raceway forces a lubricating fluid flow into said wedge shaped space to provide a hydrodynamic fluid film between said convex surface and the adjacent end face at said location of contact.

4,027,931

FLEXIBLE DAMPED BEARING SUPPORT

Keith L. Streifert, Duanesburg, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.

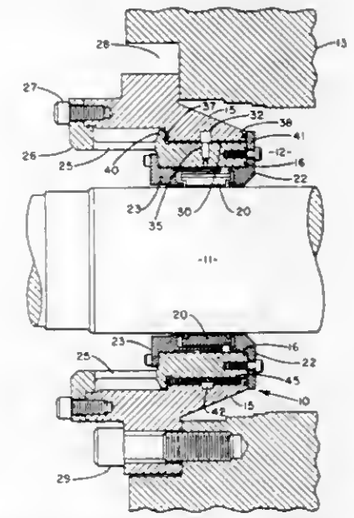
Filed Oct. 3, 1975, Ser. No. 619,324
Int. Cl.² F16C *35/08*
U.S. Cl. 308—15 **10 Claims**

1. The method of rotatably supporting a rotor structure within a stationary machine frame including

mounting a bearing for supporting the rotor shaft within a movable member,

suspending the member from the machine frame upon a series of resilient springs,

establishing a fluid damping film between the member and the machine frame, and



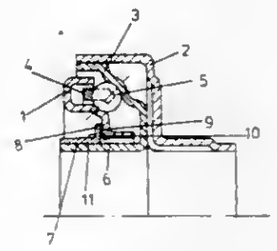
biasing the movable member with a force having a magnitude and direction sufficient to offset the static weight of the rotor structure to prevent preloading of the resilient springs and degrading of the damping film.

4,027,932

CLUTCH RELEASE BEARING

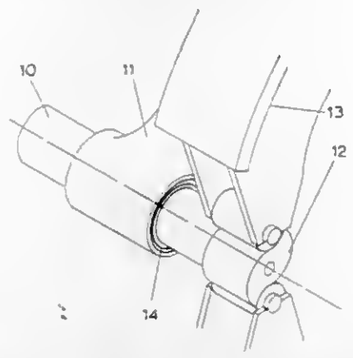
Heinrich Kunkel, Schweinfurt; Manfred Brandenstein, Aschfeld; Armin Olschewski, Schweinfurt; Sigismund Finzel, Dittelbrunn; Willi Gossmann, Niederwerrn, and Peter Horling, Mainberg, all of Germany, assignors to SKF Industrial Trading and Development Company B.V., Nieuwegein, Netherlands

Filed May 20, 1975, Ser. No. 579,266
Claims priority, application Germany, May 25, 1974, 2425351
Int. Cl.² F16C *19/00*
U.S. Cl. 308—233 **9 Claims**



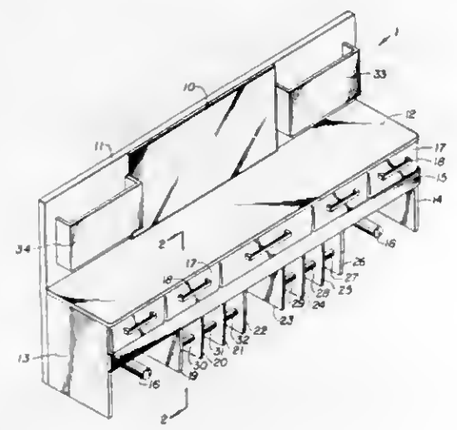
1. In a cluteh release bearing operable with a lubricant and including inner and outer rings, rolling elements arranged therebetween, and a holding ring mounted to a first of the bearing rings and holding the two bearing rings and the rolling elements together as an assembly, the improvement comprising a radial flange on said second of said bearing rings and said holding ring comprising a hydrodynamic thrust bearing, said holding ring having a second radial flange closely adjacent said first radial flange, said flanges having facing surfaces, and means for developing, during relative rotation of said surfaces, hydraulic pressure in said lubricant between said surfaces urging same apart and urging said bearing rings together in a direction for preventing radial displacement therebetween.

4,027,933
SHAFT BUSHES
Gordon Joseph Taylor, 18 Seng St., Graceville, Queensland 4075, Australia
Filed June 18, 1976, Ser. No. 697,462
Claims priority, application Australia, June 24, 1975, 2109/75
Int. Cl.² F16C *27/00*
U.S. Cl. 308—238 **6 Claims**



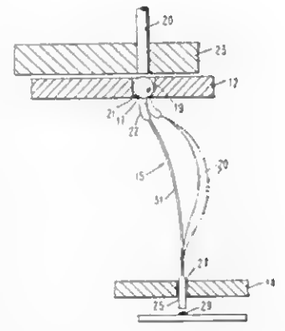
1. A shaft bush of tough, deformable material and including; a first part threaded at one end; a second annular part correspondingly threaded to engage the thread on said first part; and external inwardly-facing radial faces on said first and on said second parts; so that the length of said bush between said faces may be adjusted by relative rotation of said parts to clamp said bush tightly against a housing for said bush.

4,027,934
VALET RACK
John A. Wiser, P.O. Box 192, Liberty, Tex. 77575
Filed June 23, 1975, Ser. No. 589,417
Int. Cl.² A47B *88/00;* **E05B** *73/00*
U.S. Cl. 312—321 **8 Claims**



1. A valet rack comprising
a body having an opening therein,
a drawer movably located in said opening and having a first metal member fixedly attached at the back thereof in operable alignment with a second metal member immobily affixed to said body for contacting the first metal member on said drawer only when said drawer is in the closed position in said body, at least one of said metal members being magnetized, thereby releasably maintaining the drawer in the closed position by magnetic attraction, and
a plurality of independent hanger elements positioned in operable relationship with said body, each hanger element, comprising means for horizontally and slidably mounting to said body, a back plate, at least one holding member projecting from said back plate toward an adjacent back plate or wall of said body and spring means for biasing said hanger elements together.

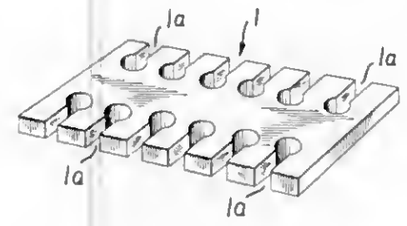
4,027,935
CONTACT FOR AN ELECTRICAL CONTACTOR ASSEMBLY
Herbert P. Byrnes, Poughkeepsie, and Richard Wahl, Fishkill, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed June 21, 1976, Ser. No. 697,812
Int. Cl.² H01R *9/12*
U.S. Cl. 339—48 **8 Claims**



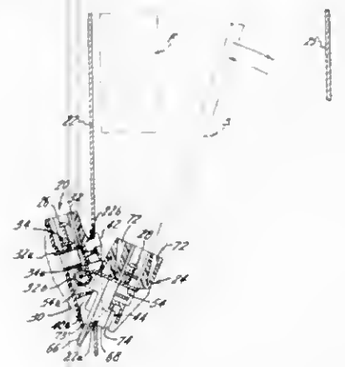
1. In an electrical contactor assembly for making electrical connections to a plurality of closely spaced pads on a product such as a chip simultaneously;
a plurality of short, electrically conductive contacts made of thin spring wire each arranged in said assembly to extend between a first and second connector pad when the second connector pads contact the contacts of said assembly;
means for pivoting in an upper die formed on a first end of each of said contacts so as to make wiping contact with said respective first connector pads;
a substantially straight short neck section extending away from said means for pivioting toward said second pad;
a curved central section extending from the end of said neck towards said second pad with a large radius such that the ends thereof are offset with respect to one another in the plane containing said radius;
a short straight end section extending from the other end of said curved central section toward said second connector pads through a lower die and having the end thereof adapted for contacting the second connector pad;
said curved center section of said contacts deflecting in the plane containing said radius and said pivot means pivoting when said second connector pads apply force to the contacts, thereby applying a minimal pressure to said second connector pads and maintaining high frequency electrical uniformity.

4,027,936
CONNECTOR HAVING ELECTRO-CONDUCTIVE RUBBER TERMINAL
Hideo Nemoto, Sakura, and Yuuji Koike, Matsudo, both of Japan, assignors to Kabushiki Kaisha Daini Seikosha, Japan
Filed July 16, 1975, Ser. No. 596,219
Claims priority, application Japan, July 22, 1974, 49-86968[U]
Int. Cl.² H01R *11/02*
U.S. Cl. 339—59 M **1 Claim**

1. A connector having electro-conductive rubber terminals comprising: an electrically insulated casing having a platelike shape and having along at least one of its outer marginal side edges a row of recesses, each recess having a generally keyhole configuration defined by a linear portion extending inwardly a given distance from the peripheral edge of said casing and terminating in an enlarged opening portion; and a plurality of electro-conductive rubber terminals disposed within respective ones of said recesses, each rubber terminal having a generally keyhole configuration defined by a branch portion lying within its corresponding recess linear portion and terminating in an enlarged terminal portion lying within its corresponding recess opening portion, said enlarged terminal portion projecting in a direction transverse to said platelike casing beyond both major surfaces of said casing, said enlarged terminal portion of each rubber terminal having a cylindrical shape both ends of which project beyond said major surfaces of said casing, and said branch portion of each rubber terminal lying flush with both major surfaces of said casing.

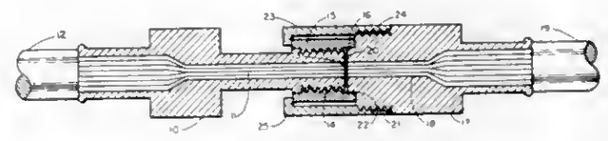


4,027,937
ELECTRICAL TERMINAL BLOCKS
Alexander R. Norden, 350 Central Park West, New York, N.Y. 10025
Filed Jan. 20, 1975, Ser. No. 542,293
Int. Cl.² H01R *9/10, 13/60, 13/62*
U.S. Cl. 339—66 M **14 Claims**



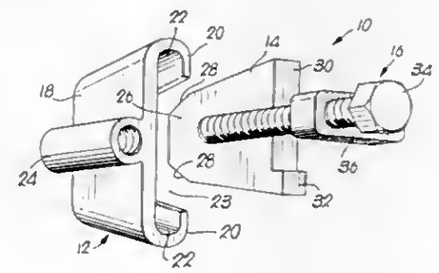
1. A terminal block having a plurality of circuit connectors each having at least one terminal screw and the terminal screws being arranged for operation by screw-driver thrust generally in a common direction for securing circuit connections to said connectors, and an insulating body supporting said circuit connectors, said insulating body having means for retaining the terminal block in an opening in a mounting panel, said retaining means including a pair of flexible detents each having an abutment portion for locking engagement with a marginal portion of a panel at such an opening, and said insulating body including means providing a recess essentially opposite to said screw-driver thrust, said flexible detents facing away from each other at opposite sides of the terminal block, said opposite sides adjoining the side of the terminal block at which said recess is provided, said recess opening away from the screws for receiving an edge of a terminal block mounting panel complementary to the recess, whereby application of thrust to said screws is resisted directly by the terminal block adjacent said recess without imposing substantial stress on said terminal-block retaining means.

4,027,938
FIBER OPTIC CABLE CONNECTOR
Adolph L. Lewis, La Mesa, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.
Filed July 1, 1976, Ser. No. 701,467
Int. Cl.² G02B *5/16*
U.S. Cl. 350—96 C **5 Claims**



1. A fiber optic cable connector comprising:
a first ferrule having an internal bore therethrough to receive the end of a first fiber optic cable bundle and bonding material for securing said first fiber optic cable bundle within said internal bore,
said first ferrule, first fiber optic cable bundle, and bonding material being ground and polished substantially optically flat at a terminal end;
external threads on a portion of said first ferrule at its terminal end;
a collar member internally threaded and dimensioned to engage over said external threads and having a cylindrical portion coaxially extending beyond the terminal end of said first ferrule;
a second ferrule having an internal bore therethrough to receive the end of a second fiber optic cable bundle and bonding material for securing said second fiber optic cable bundle within said internal bore,
said second ferrule, second fiber optic cable bundle, and bonding material being ground and polished substantially optically flat at a terminal end having a cylindrical embossment dimensioned to be received within the coaxially extending portion of said collar member for aligning said first and second fiber optic cable bundles; external threads on the outermost portion of said second ferrule at its terminal end; and
a connection sleeve having internal threads at one end dimensioned to engage the external threads of said second ferrule and an inwardly diposed flange at its other end dimensioned to bear upon an end of said collar member for drawing said terminal ends together in aligned assembly.

4,027,939
ELECTRICAL CONNECTOR
Thomas William White, 612 E. 74th Terrace, Kansas City, Mo. 64131
Filed Mar. 3, 1976, Ser. No. 663,258
Int. Cl.² H01R *7/06*
U.S. Cl. 339—247 **1 Claim**



1. A connector assembly for electrically joining a pair of cable members, comprising:

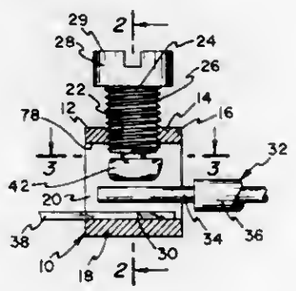
a housing having structure defining respective cable receiving areas therein for receiving said pair of cable members;
a wedge block positioned within said housing and complementally configured therewith for tightly wedging said cable members into the body members, said wedge block having a tapered leading portion, a generally planar rearmost surface and a lug extending rearwardly from said rearmost surface; and
means for drawing the wedge block into wedging engagement with said cable members and including a bolt receiving sleeve mounted on the housing, bolt means threadably received within the sleeve and an element rotatably carried by said bolt and extending laterally therefrom for engaging said rearmost surface of the wedge block, said lug preventing rotation of said element during tightening of the bolt.

4,027,940

ELECTRICAL CONNECTOR WITH CAPTIVE CLAMPING JAW

Charles F. Mazzeo, Scotch Plains, N.J., assignor to Amerace Corporation, New York, N.Y.

Filed Aug. 10, 1976, Ser. No. 713,298
Int. Cl.² H01R *7/14*
U.S. Cl. 339—272 R **13 Claims**



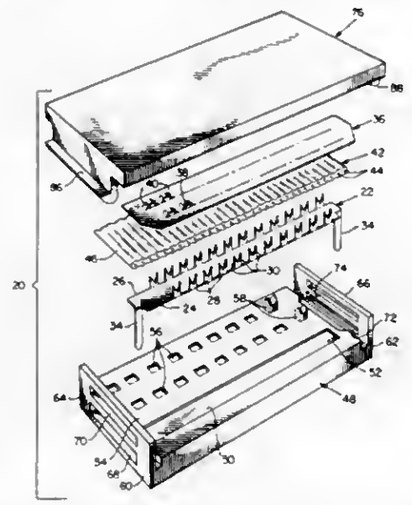
1. In an electrical connector of the type including a contact member having opposite top and bottom walls and opposite side walls, a clamping surface on the bottom wall and a clamping screw having axially opposite ends and a screw thread, the clamping screw being received within the top wall of the contact member for clamping a conductor between one of the opposite ends of the clamping screw and the clamping surface, the improvement comprising:
a cup-like clamping jaw placed over said one of the opposite ends of the clamping screw and including a clamping base juxtaposed with the one end and a circumferentially continuous, generally tubular wall extending axially from the clamping base toward the other of the opposite ends of the clamping screw;
circumferentially spaced portions of the tubular wall being permanently deformed radially inwardly;
coupling means integral with the clamping screw at the one end thereof cooperatively engaging the circumferentially spaced inwardly deformed portions of the tubular wall for retaining the cup-like clamping jaw in place upon the clamping screw while enabling rotation of the clamping screw relative to the clamping jaw; and
circumferentially spaced lobes projecting radially outwardly between the inwardly deformed portions a radial distance sufficient to engage at least one of the side walls of the contact member to preclude rotation of the clamping jaw upon rotation of the clamping screw.

4,027,941

TERMINATION METHOD AND APPARATUS FOR FLAT FLEXIBLE CABLE

Ronald S. Narozny, Panorama City, Calif., assignor to Thomas & Betts Corporation, Elizabeth, N.J.

Filed Nov. 1, 1976, Ser. No. 737,952
Int. Cl.² H01R *3/06*
U.S. Cl. 339—14 R **25 Claims**



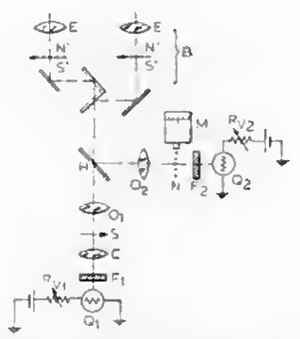
1. Terminating apparatus for multiconductor flat flexible cable comprising, in combination: an elongate metallic contact plate having a plurality of contact elements having tines extending outwardly therefrom and integral therewith; and an elongate metallic retainer plate having a plurality of apertures, one for each of said contact elements and located therein coincident with corresponding ones of said plurality of contact elements and dimensioned to receive and embrace said tines of corresponding ones of said contact elements; said contact plate and said retainer plate being arranged to receive therebetween a portion of a flat flexible cable and to be urged together so that said tines of each of said contact elements penetrate the insulation of such cable about a corresponding conductor thereof and enter a corresponding one of said apertures of said retainer plate, thereby providing a common electrical connection between such corresponding conductors through said contact plate and said retainer plate.

4,027,942

MICROMETER MICROSCOPE WITH BINOCULAR VIEWING

Tatsuzo Fukushige, Osaka, Japan, assignor to Kogaku Ltd., Osaka, Japan

Filed Dec. 16, 1975, Ser. No. 641,591
Int. Cl.² G02B *27/32*
U.S. Cl. 350—10 **2 Claims**



1. A micrometer microscope, comprising, in combination; a main optical system having a light source, means coupled to the light source for adjusting the brightness thereof, a filter, a condenser lens, and a single objective lens in a single line along the optical axis of said system, binocular eyepieces symmetrically arranged with respect to the opticaly axis, and reflecting means on said single line for reflecting the image on said line to both said binocular eyepieces; and a further optical system having a scale projecting lens, a negative of a scale, a micrometer connecter to said negative, a scale light filter and a scale light source arranged on a further optical axis perpendicular to and intersecting the optical axis of said main optical system, further means coupled to said scale light source for adjusting the brightness thereof, and a half mirror on said line on the optical axis of said main optical system at the point where said optical axes intersect and at an angle thereto for receiving the image of the scale from said further optical system and directing it along said line of said optical axis of said main optical system.

4,027,943

SOLAR PROMINENCE ADAPTER

George Everett, Belden Road, Burlington, Unionville, Conn. 06085

Continuation of Ser. No. 399,693, Sept. 24, 1973, abandoned. This application Sept. 19, 1975, Ser. No. 615,126
Int. Cl.² G02B *23/00*
U.S. Cl. 350—17 **6 Claims**

1. A solar prominence adapter for a telescope, comprising:
a housing having a first coupling portion adapted for connection with the eyepiece holder of the telescope and a second coupling portion adapter for connection with an eyepiece;
occulting means supported inside the housing in a first plane and on the longitudinal axis of the housing for occulting an image in that plane;
means supported inside the housing and on said longitudinal axis for focusing the occulted image in a second plane whereby the occulted image in the second plane may be viewed by means of an eyepiece connected to the adapter,
a filter supported inside the housing on the longitudinal axis, the filter being rotatable about the longitudinal axis of the housing and pivotable about an axis perpendicular to the longitudinal axis of the housing for enabling the filter to be tuned to the desired optical wavelength; and
means adjacent the first coupling portion for attenuating the radiation entering the housing to enable viewing of solar prominences when the adapter is positioned between the eyepiece holder of the telescope and the eyepiece.

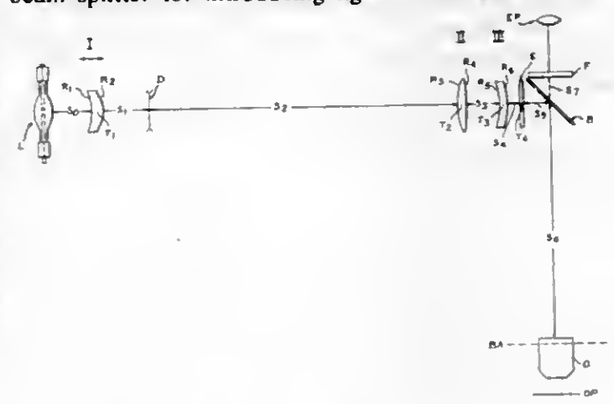
4,027,944

ILLUMINATED SYSTEM FOR VERTICAL FLUORESCENT MICROSCOPY

Nathan Gottlieb, Kenmore, N.Y., assignor to American Optical Corporation, Southbridge, Mass.

Filed Feb. 9, 1976, Ser. No. 656,765
Int. Cl.² G02B *21/06*
U.S. Cl. 350—91 **3 Claims**

1. A vertical illuminator for imaging a light source at a microscope objective back aperture to illuminate an object under examination through the microscope objective in fluorescent microscopy which comprises, in sequence and optical alignment along an axis, a light source, an axially-moveable positive meniscus lens I having an aspheric convex surface, a positive biconvex lens II, a negative meniscus lens III and a beam splitter for introducing light from said source into a microscope observation system, whereby an object is illuminated through said observation system.

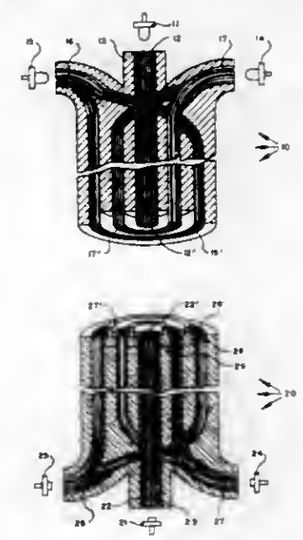


4,027,945

OPTICAL SLIPRINGS

Myren L. Iverson, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 4, 1976, Ser. No. 663,889
Int. Cl.² G02B *5/16*
U.S. Cl. 350—96 C **11 Claims**



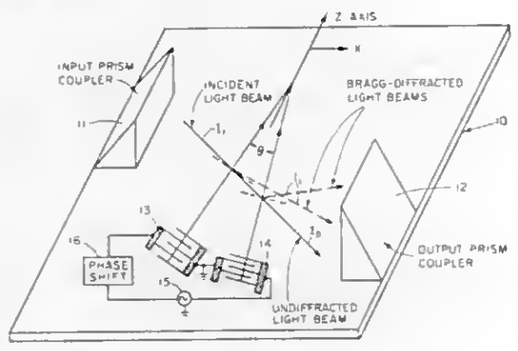
1. An optical slipring for transferring light signals between a first body and a second body which is fixed for rotation about an axis relative to the first body, comprising:
a first light carrying member attached to one of said bodies and having a plurality of separate elongated fiber optic input bundles, said elongated fiber optic input bundles being joined to define a plurality of separate optical input terminals and a common projection terminal; and
a second light carrying member attached to the other body and having a plurality of separate elongated fiber optic output bundles, said elongated fiber optic output bundles being joined to define a common reception terminal and a plurality of separate optical output terminals;
said projection and reception terminals being maintained in aligned proximity in a confronting relationship, centered about said axis of rotation.

4,027,946

ACOUSTO-OPTIC GUIDED-LIGHT BEAM DEVICE

Chen S. Tsai, Pittsburgh, Pa., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 24, 1975, Ser. No. 616,338
Int. Cl.² G02B *5/14*
U.S. Cl. 350—96 WG **9 Claims**



1. An acousto-optic light deflector comprising, in combination

a substrate having an optical waveguide formed along one boundary surface thereof;

means for coupling a light beam into said substrate such that said light beam normally travels through said waveguide along a predetermined path;

means for launching a pair of surface acoustic waves along said boundary surface in directions such that both surface acoustic waves simultaneously change the index of refraction of a portion of said path whereby said light beam is deflected therefrom; and

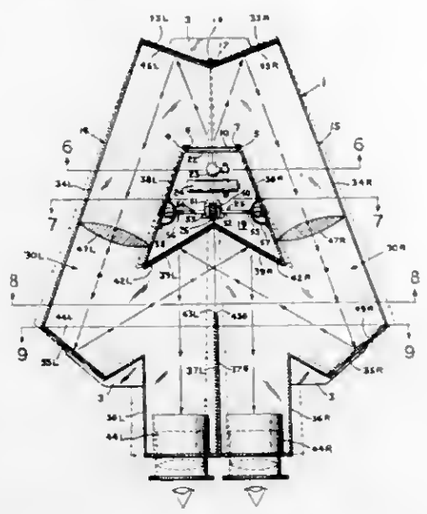
means for extracting said deflected light beam from said substrate.

4,027,947

OPTICAL DEVICE FOR PROVIDING A THREE DIMENSIONAL VIEW OF A TWO DIMENSIONAL IMAGE

Leonard J. Taylor, R.D. No. 2, Box 824, Chester, N.J. 07930

Filed Dec. 12, 1975, Ser. No. 640,068
Int. Cl.² G02B *27/22*
U.S. Cl. 350—144 **5 Claims**



1. An optical device for viewing a two dimensional image in three dimensional form comprising:

a. holder means

b. a right viewing box assembly and a left viewing box assembly pivotally connected in said holder means and respectively disposed on opposite sides of the longitudinal center line thereof,

c. means connected to the respective right viewing box assembly and left viewing box assembly for moving the same towards and away from each other and towards and away from the longitudinal center line of said holder means,

d. an image receiving means on said holder means for holding the two dimensional image therein,

e. said right viewing box assembly having a first mirror means at one end optically associated with the image receiving means to provide a first image of the two dimensional image therein,

f. said left viewing box assembly having a second mirror means at one end optically associated with the image receiving mean to provide a second image of the two dimensional image different from the first image,

g. said right viewing box assembly having a right eye viewing member and said left viewing box assembly having a left eye viewing member at the respective end thereof remote from the end optically associated with the image receiving means,

h. said right viewing box assembly having a right cross-over opening along the longitudinal center line of the holder means and inward of the right eye viewing member, and said left viewing box assembly having a left cross-over opening along the longitudinal center line of the holder means inward of the left eye viewing member and in alignment with the right cross-over opening,

i. said right viewing box assembly having a right eye viewing mirror optically associated with the right eye viewing member disposed adjacent the right cross-over opening, and said left viewing box assembly having a left eye viewing mirror operatively associated with the left eye viewing member disposed adjacent the left cross-over opening, and

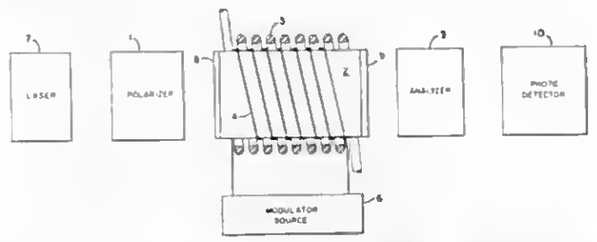
j. coacting optical transmitting systems respectively in said right viewing box assembly and said left viewing box assembly including lens means and at least one transmitting mirror for transmitting said respective first image from said first mirror means through said cross-over opening to the left eye viewing mirror and said second image from said second mirror means through said left cross-over opening to the right eye viewing mirror so that the resolved image viewed will be in three dimensional form.

4,027,948

LOW LOSS LASER MODULATOR

George A. Tanton, and Harry C. Meyer, both of Huntsville, Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 15, 1976, Ser. No. 667,226
Int. Cl.² G02F *1/09*
U.S. Cl. 350—151 **3 Claims**



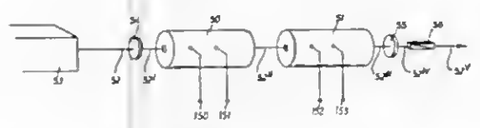
1. A system comprising electro-magnetic radiation polarized at a first angle; controlled means for rotating the polarization angle of said radiation; analyzer means for varying the intensity output of said radiation in accordance to the polarization angle; signal means connected to said controlled means so as to cause a change in the polarization angle in proportion to the value of the signal means; said radiation being directed through said controlled means to and through said analyzer means; said electro-magnetic radiation is a beam of laser radiation at a predetermined frequency; polarizer means positioned between said laser radiation and said controlled means so as to provide the polarization of the laser beam; said analyzer is a further polarizer means; said controlled means comprises a modulating material containing two narrow absorption lines either side of said predetermining frequency of said laser beam; and a field producing means for producing a static electro-magnetic field aligned through said modulated material in the direction of said travel of said laser beam.

4,027,949

OPTICAL SYSTEMS

Daniel Richard Lobb, Farnborough, England, assignor to Redifon Limited, London, England

Filed Sept. 23, 1975, Ser. No. 616,078
Claims priority, application United Kingdom, May 13, 1975, 20001/75; June 8, 1971, 19417/71
Int. Cl.² G02B *27/00*
U.S. Cl. 350—150 **14 Claims**



1. An optical system comprising a source of a beam of plane polarised polychromatic radiation and, in sequence in the path of the radiation beam an input birefringent optical waveplate, a first controllably birefringent electro-optic cell, an output birefringent optical waveplate, and an optical analyser; the radiation beam comprising two constituents distinguished by radiation wavelength; each birefringent optical waveplate being designed and arranged substantially to rotate the direction of polarisation of one beam constituent through 45° while leaving the state of polarisation of the other beam constituent substantially unaltered; the electro-optic cell being arranged to resolve a first radiation constituent into two substantially equal parts plane polarised at right angles and introduce a relative phase shift between these two parts, the magnitude of the phase shift being determined by an electrical signal applied to the first electro-optic cell, while leaving the state of polarisation of the second beam constituent substantially unaltered, whereby the first radiation constituent is polarisation modulated while the second radiation constituent is substantially unaffected; the optical analyser being arranged to transmit radiation plane polarised in a preferred direction at 45° to the directions of polarisation of the plane polarised parts of the first radiation constituent, thus converting the polarisation modulation of the first radiation constituent into intensity modulation, controlled by the electrical signal applied to the first electro-optic cell.

4,027,950

ELECTRO-OPTICAL DISPLAY DEVICE

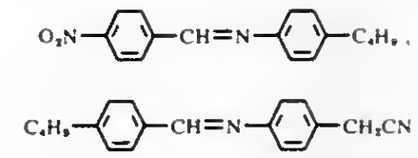
Akio Moriyama, Katano; Masakazu Fukai, Nishinomiya; Hiroshi Tatsuta, Katano; Hiroaki Takahashi, and Hiroshi Esaki, both of Moriguchi, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

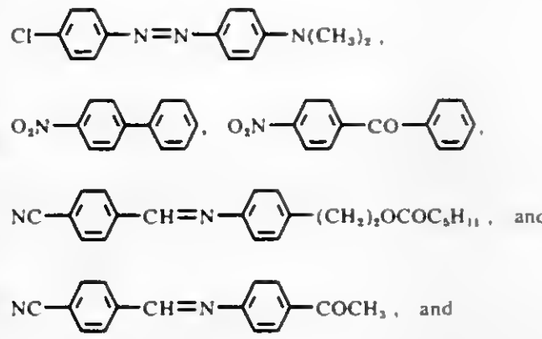
Filed Aug. 16, 1974, Ser. No. 497,935
Claims priority, application Japan, Aug. 20, 1973, 48-93523
Int. Cl.² C09K *3/34*; **G02F** *1/13*
U.S. Cl. 350—160 LC **2 Claims**

1. An electro-optical display device comprising

i. two electrode plates, at least one of which is transparent,

ii. a nematic liquid crystal composition interposed between said plates, wherein said composition has positive dielectric anisotropy and consists essentially of a nematic liquid crystal material with negative dielectric anisotropy and at least one non-liquid crystal compound selected from the group consisting of





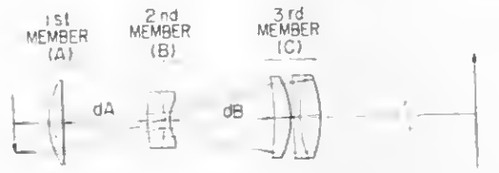
iii. means for applying an electric field across said composition.

4,027,951

PARFOCAL LOW-MAGNIFICATION MICROSCOPE OBJECTIVE LENS SYSTEMS

Ikuo Mori, and Yoshiyuki Shimizu, both of Kawasaki, Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Filed Oct. 10, 1975, Ser. No. 621,347
Claims priority, application Japan, Oct. 19, 1974, 49-11989
Int. Cl.² G02B *21/02*
U.S. Cl. 350—175 ML **4 Claims**



1. A parfocal low-magnification microscope objective lens system comprising:

a positive first lens member disposed at a position nearest to the object and with its convex surface facing the object;

a negative second lens member disposed at a position farther from said object than said first lens member and including at least one negative meniscus lens component having its convex surface facing the object side; and

a third positive lens member disposed at a position farthest from said object and including a positive lens component with that surface thereof sharper in radius of curvature facing the image plane side;

said lens system satisfying the following four conditions:

$$d_1 < f_1 < d_1 + |f_B| \quad (1)$$
$$d_A < d_B \quad (2),$$
$$f_B < f_A \quad (3),$$
$$d_B < f_B \quad (4),$$

where f_A is the composite focal length of the first lens member, f_B is the composite focal length of the second lens member, d_A is a rear focal plane of the first lens member to front focal plane of the second lens member distance, and d_B is a rear focal plane of the second lens member to front focal plane of the third lens member distance, the parameters of said system having the following values:

		WD=5.5			
1st member (A)	$R_1 = 14.8$	$d_1 = 2.2$	$n_1 = 1.58913$	$\nu d_1 = 61.2$	
	$R_2 = -600.0$	$d_2 = 13.1$			
2nd member (B)	$R_3 = 45.0$	$d_3 = 3.0$	$n_2 = 1.74077$	$\nu d_2 = 27.7$	
	$R_4 = -16.0$	$d_4 = 0.5$	$n_3 = 1.713$	$\nu d_3 = 53.9$	
	$R_5 = 5.487$	$d_5 = 16.7$			
3rd member (C)	$R_6 = -54.8$	$d_6 = 2.8$	$n_4 = 1.51823$	$\nu d_4 = 59.0$	
	$R_7 = -12.7$	$d_7 = 0.1$			
	$R_8 = 360.0$	$d_8 = 1.0$	$n_5 = 1.7495$	$\nu d_5 = 35.0$	
	$R_9 = 18.85$	$d_9 = 3.1$	$n_6 = 1.50032$	$\nu d_6 = 81.9$	
	$R_{10} = -20.38$				

wherein R_1, R_2, ... are the radii of curvature of the individual surfaces, d_1, d_2 . . . . are the axial thickness or spacing of the individual elements, WD is the axial distance from the object to the first surface of the lens system, n_1, n_2 . . . . are the refractive indexes of the individual elements and νd_1, νd_2, ... are the Abbe numbers of the individual elements.

4,027,952

SINGLE OPTICAL LENS WITH LARGE APERTURE AND LARGE FIELD

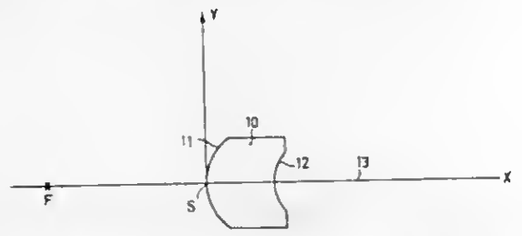
Edgard Alfred Hugues, Courbevoie, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 7, 1975, Ser. No. 575,148

Claims priority, application France, May 14, 1974, 74.16628

Int. Cl.² G02B *3/04*

U.S. Cl. 350—189 **6 Claims**



1. A single lens, wherein an expression for the wave front aberration is represented by a series expansion as a function of the aperture, terms of high degree being utilized, the single lens having spherical refractive surfaces, whose parameters are given by the co-ordinates of a point of the region which is bounded in the plane with the coordinate axes

$$\left(\frac{e}{(n-1)f}, \frac{C_2}{C_1}\right)$$

by two straight lines with the respective equations:

$$\frac{C_2}{C_1} = 2.58 - 1.29\,\frac{e}{(n-1)f}$$

$$\frac{C_2}{C_1} = 2.2 - 1.5\,\frac{e}{(n-1)f}$$

and which is situated between these two straight lines, each of the refractive surfaces being of an aspherical shape for minimizing wave-front aberration, the aspherization of the refractive surfaces being expanded in a series which contains terms of at least the sixth degree as a function of the distance between the points of the refractive surface and the axis of revolution to the lens, where n is the refractive index, e is the thickness, f is the focal length, and C_1, C_2 are the osculation curvatures of the refractive faces of the lens.

4,027,953

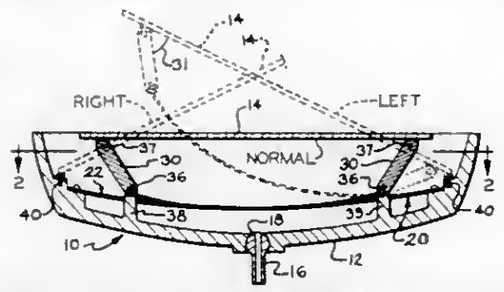
SWITCH CONTROLLED ADJUSTABLE REAR VIEW MIRROR WITH BIMETAL MEANS

Keith D. Jacob, Ann Arbor, Mich., assignor to Donald F. Hassinger, Ann Arbor, Mich.

Filed Mar. 10, 1976, Ser. No. 665,688

Int. Cl.² G02B *5/08*

U.S. Cl. 350—288 **8 Claims**



1. An adjustable rear view mirror for use in a motor vehicle comprising a mirror, means movably mounting said mirror on said vehicle for movement between a normal centered position and positions angled to the left and right of said centered position to enlarge the areas of vision to the left rear and right rear of the vehicle operator, respectively, including bimetal means comprising metallic components having different coefficients of heat expansion, said bimetal means connected to said mirror, and means for heating and thereby expanding said components to cause bending of said bimetal means to move said mirror to said angled positions.

4,027,954

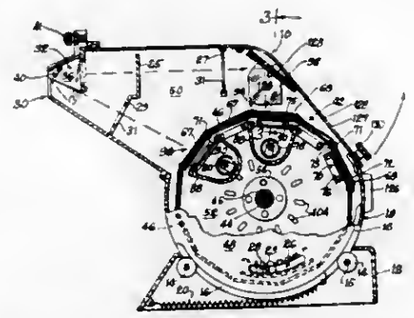
EYE-TESTING APPARATUS

Carleton R. Good, Addison, Ill., assignor to School Health Supply Company, Addison, Ill.

Filed Feb. 10, 1975, Ser. No. 548,383

Int. Cl.² A61B *3/02*

U.S. Cl. 351—17 **1 Claim**



1. Vision testing apparatus of the type adapted to test both far and near vision characteristics comprising: a base, light-occluding casing carried by said base having substantially parallel spaced walls extending from the base, a drum disposed in said casing and rotatable on an axis normal to said walls, means for rotating said drum, said casing having a far vision station and a near vision station disposed along separate portions of the drum periphery, a plurality of transparent far point and near point test objects carried by said drum in position to be selectively moved into alignment with a related test station, a light source disposed within the drum, viewing means carried by said casing including lens means adapted for optical alignment with said test objects located at either of said test stations, a reflector disposed confronting said far vision station and intermediate said viewing means and said far vision station for defining an angulated visual path therebetween which substantially increases the visual distances between said viewing means and said far vision station while reducing the physical distance therebetween, said viewing means being selectively operated between a first position in alignment with said reflector for viewing far point test objects aligned with said far vision station and a second position for viewing said near point test objects aligned with said near vision station, said near vision station being disposed intermediate said viewing means and said far vision station, and an aperture disposed in one wall of the casing between the far vision station and the reflector to permit an operator to view the test object disposed at the far vision station, characterized by the improved construction wherein a second viewing means is mounted on the casing, said second viewing means is mounted on the casing, said second viewing means having an optical path extending through the aperture substantially parallel to the axis of rotation of the drum and including a second light reflector positioned in said optical path adjacent to the other wall for reflecting the path onto the far vision station and wherein the second viewing means includes a convex lens mounted on the casing adjacent to the aperture.

4,027,955

SOUND-CINE-CAMERA

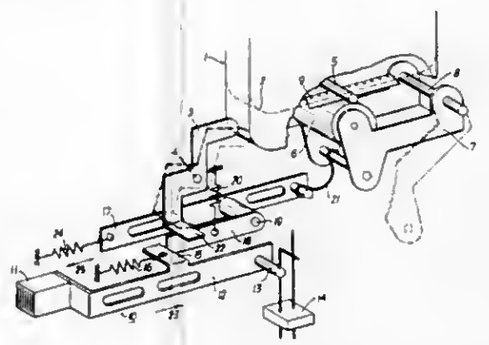
Willi Reichen, Yvonand, and Robert Aste, Yverdon, both of Switzerland, assignors to Bolex International SA, Ste-Croix, Switzerland

Filed Sept. 23, 1975, Ser. No. 616,046

Claims priority, application Switzerland, Sept. 24, 1974, 12933/74

Int. Cl.² G03B *23/02*

U.S. Cl. 352—72 **2 Claims**



1. In a sound-film-camera comprising, in combination, a compartment arranged to selectively receive a first or a second cartridge, the first cartridge being of smaller dimensions than the second cartridge and containing silent-film without a magnetic sound-track and the second cartridge being of greater dimensions than the first cartridge and containing sound-film tracked with a magnetic sound-track, sound recording means for continuously driving the sound-film and for recording sound onto the sound-film magnetic sound-track, said sound recording means comprising a capstan and a pressure roll movable in and out of engagement with the sound-film against said capstan, and said sound recording means having at least partly an operative and an inoperative condition, release means for controlling the condition of said sound-recording means and being movable between an inoperative position wherein said sound-recording means is in the operative condition and an operative position, a power transfer mechanism interconnected between said release means and said sound recording means, said power transfer mechanism comprising mechanical coupling means movable between an operative position for transferring movement of said release means to said sound recording means and an inoperative position for interrupting the interconnection of said power transfer mechanism between said release means and said sound recording means, and sensing means for sensing the type of cartridge inserted into said compartment and for controlling the position of said coupling means, said coupling means being movable into said inoperative position upon the insertion of the first cartridge in said compartment and said coupling means being movable into said operative position upon the insertion of a second cartridge into said compartment to permit said release means to operatively condition said sound recording means.

4,027,956

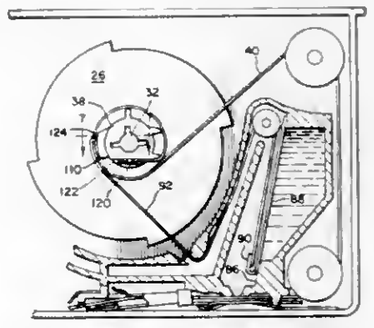
APPARATUS FOR FACILITATING ENGAGEMENT BETWEEN FILM AND FILM ACTUATED PULL-STRIP

Joseph A. Stella, Peabody, and Paul B. Mason, Magnolia, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Aug. 12, 1976, Ser. No. 713,693

Int. Cl.² G03C *11/00*

U.S. Cl. 352—130 **12 Claims**



1. In a film cassette comprising a housing, a rotatably mounted reel within the housing presenting an annular surface, an elongated strip of photographic film disposed along a predetermined path within said cassette and having one end thereof connected to said reel so that, responsive to the rotation of said reel, said film strip will be progressively coiled around and supported on said reel's annular surface, said film strip having a bottle shaped aperture passing therethrough adjacent its said one end and extending away from said one end to present in sequence a major portion, a necked-down portion and a locking portion, said cassette additionally comprising a processing station containing a quantity of processing fluid sufficient to coat substantially the entire length of said film strip and actuatable responsive to withdrawal of an elongated strip-like structure having a free end bearing against said film strip intermediate its said bottle-shaped aperture and said reel prior to said film strip being coiled around said reel, said free end of said strip-like structure being formed as a latching tongue presenting a neck-down portion, having a width greater than the width of said necked-down portion of said film strip's aperture, located behind a terminating tongue portion having a width greater than both the width of said necked-down portion and said latching portion of said film strip's aperture but less than the width of said major portion of said film strip's aperture, said latching tongue of said strip-like structure thus being adapted to enter said major portion of said bottle-shaped aperture of said film strip and become disposed between said annular surface of said reel and an adjacent section of said film strip in a folded back manner with respect to other portions of said strip-like structure as said reel is rotated to progressively coil said film strip therearound, the improvement comprising:

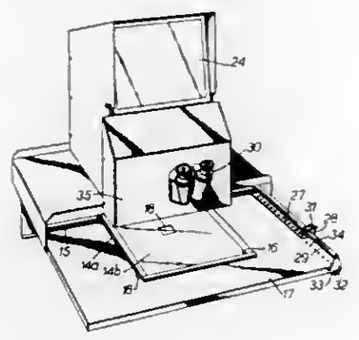
a recess formed in said annular surface of said reel and configured to present another surface positioned radially inwardly of said annular surface of said reel, said recess being structured with a width and depth dimensioned to

receive therewithin said latching tongue of said strip-like structure as said film strip is coiled onto said reel and to support said latching tongue on its said other surface to cause it to fold back with respect to other portions of said strip-like structure without squeezing said latching tongue between said other surface of said reel and said adjacent coiled section of said film strip whereby substantial frictional forces are not developed between said latching tongue and said adjacent sections of said reel and said coiled film strip, which forces otherwise would tend to preclude slidable motion between said folded back latching tongue and said adjacent section of said reel and said coiled film strip facilitating said necked-down portion of said strip-like structure's latching tongue snapping through said necked-down portion of said film strip's aperture and entering said locking portion of said film strip's aperture.

4,027,957
ILLUMINATED OPTICAL VIEWERS

Victor Henry Shaw, Broadstone, England, assignor to Plessey Handel und Investments A.G., Switzerland

Filed Sept. 25, 1975, Ser. No. 616,690
Claims priority, application United Kingdom, Sept. 28, 1974, 42231/74
Int. Cl.² G03B *21/00*
U.S. Cl. 353—21 **6 Claims**

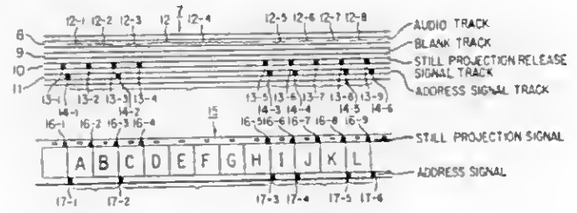


1. An optical device for facilitating corrective operations on a substantially flat object, which comprises: a base structure; an object-conveyor member including an object-supporting element having a flat surface for supporting such object; object-scanning means including two linear guiding means respectively adjustably guiding said conveyor member relative to said base structure in two mutally perpendicular co-ordinate directions, both parallel to said surface; a projection screen exposed to the view of an operator, first optical means supported in said base structure and forming on said screen an enlarged objective image of a small portion of said surface, when said small portion is in a predetermined position relative to said first optical means; illuminating means for illuminating at least that portion of said surface of which an enlarged objective image is thus formed by the first optical means; second optical means forming an enlarged virtual image of small portion of said surface displaced within said surface by a predetermined distance in a predetermined direction from the portion of which the first optical means form such objective image, said virtual image being substantially aligned in the view of an observer with the actual position of said small surface portion; and two-position change-over means which, when moved from a first one of its two positions to its other position, displaces, without affecting the adjusted position of said object-scanning means, said object-supporting element be said predetermined distance in said predetermined direction, whereby an enlarged steroscopic virtual image of the previously projected small portion of said surface becomes available for viewing through said second optical means.

4,027,958
SYSTEM FOR CONTROLLING REPRODUCTION OF AUDIO TAPE IN SYNCHRONISM WITH PROJECTION OF VIDEO FILM

Yoshihiro Shigeta, Toyko; Kuniyoshi Suzaki, Machida, and Mitsutoshi Ogiso, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 397,806, Sept. 17, 1973, abandoned. This application Aug. 21, 1975, Ser. No. 606,643
Claims priority, application Japan, Sept. 22, 1972, 47-95302
Int. Cl.² G03B *31/00, 23/06*
U.S. Cl. 353—26 A **33 Claims**


AUDIO TRACK
BLANK TRACK
STILL PROJECTION RELEASE SIGNAL TRACK
ADDRESS SIGNAL TRACK
STILL PROJECTION SIGNAL
ADDRESS SIGNAL
A B C D E F G H I J K L

1. A system for reproducing video information and audio information in synchronism with each other, said system comprising:

a. A roll film on which the video information, a plurality of still projection signal marks and a plurality of film address marks are optically recorded, said video information being recorded on the film in frame units, and each of said still projection signal marks being provided for each frame of the film for which a still picture projection should be done;

b. a magnetic tape on which the audio information, a plurality of still projection release signal marks and a plurality of tape address marks are magnetically recorded, said audio information being associated with the video information recorded on said film in frame units and each of still projection release signal marks being provided at such a location on the tape that the location has a corresponding relationship to the frame of the film for which the still picture projection should be done;

c. video information reproduction means for reproducing the video information on said roll film;

d. audio information reproduction means for reproducing the audio information on said magnetic tape, said audio information reproduction means including converting means for detecting the tape address marks recorded on the tape and converting same into a corresponding tape stop signal;

e. means for optically detecting the still projection signal marks and the film address marks on the film and for developing corresponding film stop signals;

f. means for detecting the still projection release signal mark on the tape and developing a film start signal;

g. means for transporting the film through a video information reproducing station of said video information reproducing means;

h. means for transporting the tape through an audio information reproducing station of said audio information reproducing means;

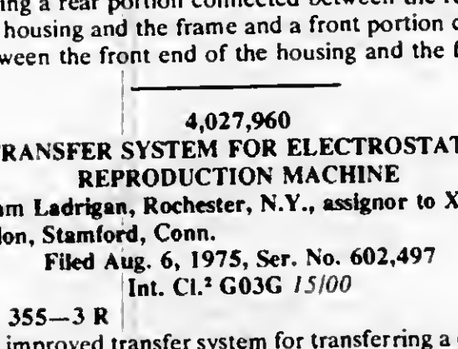
i. control means for controlling the film stop and start operation of said film transporting means in accordance with the film stop signal and the film start signal, said control means having a first input terminal connected to said still projection signal mark detecting means, a second input terminal connected to said still projection release signal mark detecting means, and an output terminal connected to said film transporting means, wherein upon receipt of the film stop signal at the first input terminal, said control means causes said film transporting means to stop the film and upon receipt of the film start signal at the second input terminal, said control means causes said film transporting means to start the film; and

j. retrieving means coupled to each of the two said transporting means, to said converting means and to said optical detecting means for retrieving selected corresponding portions of said tape and said film in response to entered address instructions.

4,027,959
MICROFORM VIEWER FOR USE WITH A RIGID FRAME

Billie Eugene Fisher, 1608 Squirrel Tree Place, Edmond, Okla. 73034, and Thompson Eugene Hodges, 415 Macy, Norman, Okla. 73069

Filed June 30, 1975, Ser. No. 591,643
Int. Cl.² G03B *21/22*
U.S. Cl. 353—77 **6 Claims**



1. A microform viewer comprising:

a housing having a front end, a rear end, an upper surface with an opening therethrough near the front thereof, a longitudinal pivot axis intersecting substantially perpendicularly the middle of the front end of the housing and an end transverse pivot axis perpendicularly intersecting the longitudinal pivot axis near the front end of the housing;

a microform projector mounted on the housing, the microform projector projecting a microform image along a projection axis;

a viewing screen having an upper surface and a lower surface, mounted in the opening through the upper surface of the housing;

a reflector connected to the housing beneath the upper surface thereof and across the projection axis, reflecting the microform image upwadly onto the lower surface of the viewing screen;

a rigid frame having a hole in the upper surface thereof sized to receive the housing;

longitudinal rotation means for pivoting the housing about the longitudinal pivot axis, the longitudinal rotation means having a rear portion connected between the rear end of the housing and the frame and a front portion connected between the front end of the housing and the frame; and

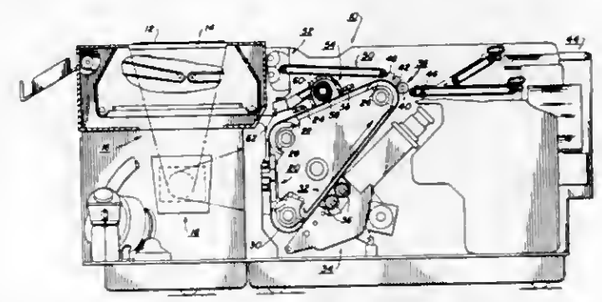
transverse rotation means for pivoting the housing about the end transverse pivot axis, the transverse rotation means having a rear portion connected between the rear end of the housing and the frame and a front portion connected between the front end of the housing and the frame.

4,027,960
TRANSFER SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINE

J. William Ladrigan, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Aug. 6, 1975, Ser. No. 602,497
Int. Cl.² G03G *15/00*
U.S. Cl. 355—3 R **6 Claims**

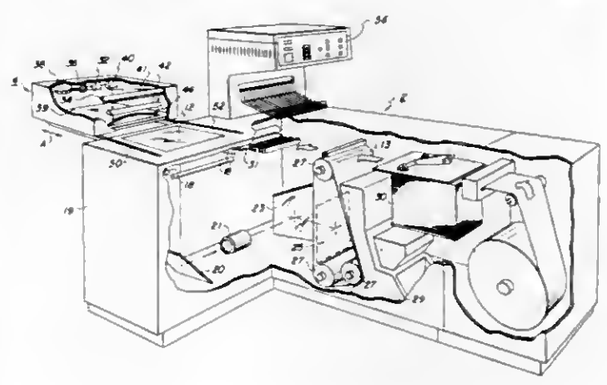
1. An improved transfer system for transferring a developed electrostatic image from a charged photoreceptor to a transfer member, the improvement comprising first means for pressing the transfer member into contact with the developed image while simultaneously applying a first charge to the transfer member of the same polarity as the charge on the photoreceptor and of a magnitude sufficient to both initiate transfer of the developed electrostatic image and electrostatically tack the transfer member to the photoreceptor, and second means for applying a second charge to the transfer member while the latter is electrostatically tacked to the photoreceptor, the second charge being of the same polarity as but of a greater magnitude than the first charge, whereby transfer of the developed electrostatic image is completed.



4,027,961
COPIER/RASTER SCAN APPARATUS

Gary K. Starkweather, Saratoga, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 6, 1976, Ser. No. 674,253
Int. Cl.² G03G *15/00*
U.S. Cl. 355—3 R **8 Claims**



1. An apparatus capable of producing output information in hard copy form from more than one type of input information comprising:

a first unit including a light transparent platen, a photoreceptor, a light source, and optical means including a lens for projecting the information content of a document placed on said platen onto a portion of said photoreceptor,

a second unit including means for producing an information modulated, spot size, high intensity beam of light, and means for providing line scanning movement of said beam of light, and

means for mounting said second unit on said first unit such that said second unit can be positioned (1) over said platen whereby a portion of said photoreceptor receives information in accordance with said information modulated beam of light or (2) remote from said platen whereby said platen can receive a document such that the information content of said document can be projected onto a portion of said photoreceptor,

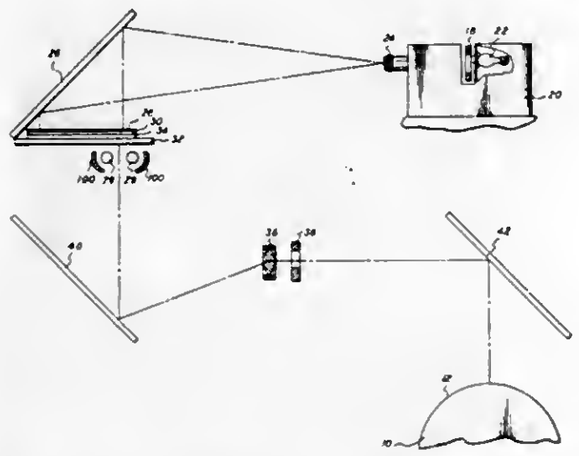
said second unit further including optical means for projecting said information modulated beam of light onto the entrance pupil of said processor lens.

4,027,962

COLOR TRANSPARENCY REPRODUCING MACHINE

Louis D. Mailloux, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jan. 13, 1975, Ser. No. 540,617
Int. Cl.² G03G 15/01
U.S. Cl. 355—4 11 Claims



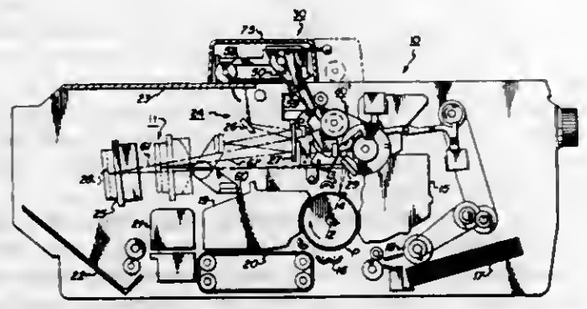
1. An electrophotographic printing machine for reproducing a transparency, including:
a photoconductive member;
means for charging at least a portion of said photoconductive member;
a composition frame;
a platen having said composition frame disposed thereon;
means for projecting a light image of the transparency onto said platen;
a screen member disposed on said platen for modulating the light image of the transparency projected onto said platen to form a half-tone light image thereof; and
means for exposing the charged portion of said photoconductive member to a light image of said composition frame and the half-tone light image of the transparency to record on said photoconductive member a combined electrostatic latent image comprising the electrostatic latent half-tone image of the transparency and the electrostatic latent image of said composition frame.

4,027,963

MULTI-MODE REPRODUCING APPARATUS

Werner F. Hoppner, Webster; Richard A. Spinelli, and Robert F. Allis, both of Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed June 20, 1975, Ser. No. 588,971
Int. Cl.² G03G 15/28
U.S. Cl. 355—8 14 Claims



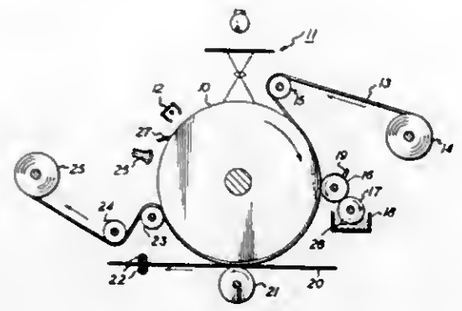
1. In a reproducing apparatus including an imaging surface which moves during operation, means for viewing a stationary document in a first mode of operation and for projecting an image thereof onto said imaging surface, means for viewing a document moving at a first speed synchronized to the speed of said moving imaging surface in a second mode of operation and for projecting an image thereof at a desired magnification onto said imaging surface, the improvement wherein said apparatus further includes:
means for viewing a document moving at a second speed synchronized to the speed of said moving imaging surface in a third mode of operation and for projecting an image thereof onto said moving imaging surface at a reduced magnification as compared to said desired magnification, said second speed being greater than said first speed; and
means for selecting between said modes of operation.

4,027,964

APPARATUS FOR INTERPOSITION ENVIRONMENT

Joseph Fantuzzo, Webster; Robert M. Ferguson, Penfield, and John W. Weigl, West Webster, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 309,842, Nov. 27, 1972, which is a continuation-in-part of Ser. No. 104,386, Jan. 6, 1971, abandoned. This application July 25, 1974, Ser. No. 491,727
Int. Cl.² G03G 15/10
U.S. Cl. 355—10 2 Claims



1. Electrostatographic imaging apparatus comprising a path defining imaging surface and sequentially positioned with relationship to said path, means to form an electrostatic charge pattern on said imaging surface, means to substantially uniformly contact and maintain said contact with said imaging surface with a thin dielectric film, means to apply a polar liquid developer to the interposed thin dielectric film in image configuration in response to the electrostatic charge pattern on the imaging surface, conductive means to separate said thin dielectric film from said imaging surface with substantially no transfer of charge from said imaging surface to said thin dielectric film and means to transfer said liquid developer from said thin dielectric film to an image receiving surface.

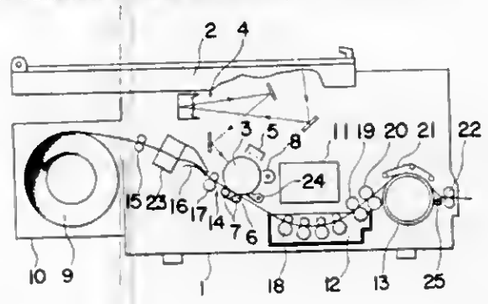
4,027,965

COPYING MACHINE CONTROL MECHANISM

Yoshio Mikasa; Masami Nakane, both of Toyokawa, and Yukio Tokura, Toyohashi, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Apr. 28, 1975, Ser. No. 572,294
Claims priority, application Japan, May 15, 1974, 49-55815[U]; May 31, 1974, 49-62271
Int. Cl.² G03G 15/00
U.S. Cl. 355—13 9 Claims

1. In an electrophotographic copying apparatus including a reciprocatingly movable support onto which an original to be copied is placed, a scanning means for driving said support and including a clutch for controlling the drive of said scanning means, a stationary optical system having an illuminating means for projecting an image of the original, a feeding means for feeding a copying paper from a roll along a predetermined path, a feeding clutch coupled to said feeding means, and a cutting means disposed on said path for cutting the copying paper; a control means which comprises:
a movable member on said support for aligning with one end of the original placed on said support and having a projecting member integral therewith, a cutting switch connected to said cutting means and positioned in the path of said projecting member for being actuated thereby as said support is moved,
a manually actuated copy initiating means having an arm extending therefrom,
a first cam having an engaging portion normally engaged by said arm for preventing said first cam from rotating, said first cam initiating its rotation upon operation of said copy initiating means,
a second cam coaxial with and rotatable together with said first cam for actuating said feeding clutch for feeding the copying paper in substantial synchronism with the initiation of rotation of said first cam,



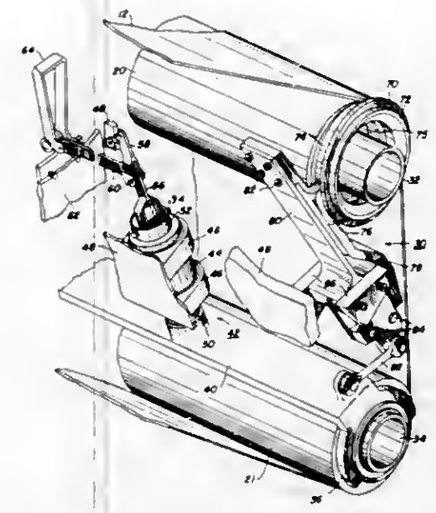
a third cam for actuating said clutch of said scanning means for moving said support in delayed relation to the initiation of the rotation of said first cam,
said projecting member and said cutting switch being spaced a distance such that when said support is moved said switch is actuated for cutting the copying paper into a length substantially corresponding to the length fed during the rotation of said first cam from the initiation of the rotation until the energization of said clutch by said scanning means by said third cam plus the length fed during the movement of said projecting member until the actuation of said switch thereby.

4,027,966

TRACKING ASSEMBLY FOR AN ENDLESS BELT ELECTROSTATIC REPRODUCTION MACHINE

William E. Jordan, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 418,720, Nov. 23, 1973, abandoned. This application Mar. 25, 1976, Ser. No. 670,304
Int. Cl.² G03G 15/00
U.S. Cl. 355—16 3 Claims



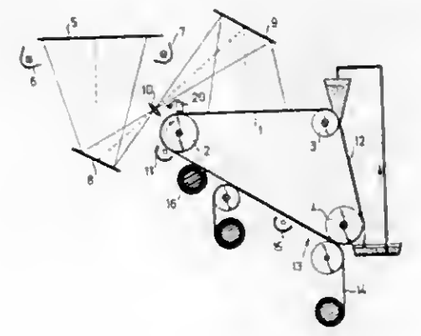
1. An improved electrostatic reproduction machine having an endless belt assembly and a stationarily mounted frame member, the belt assembly having a plurality of rollers adapted to support an endless belt having a photoconductive area thereon, the improvement comprising tracking means for sensing a lateral deviation of the belt from its normal course as it moves over a first of the rollers, and for rotating a second of the rollers about an axis in response to any deviation so as to return the belt to its normal course, the tracking means including a sensing member mounted so as to be contacted and moved by an edge of the belt during a lateral deviation of the latter, means connecting the sensing member to the second roller, and resilient means connected to both the frame member and the connecting means for supporting the entire weight of both the sensing member and the connecting means and for causing the sensing member to return to its initial position after being moved by a lateral deviation of the belt.

4,027,967

APPARATUS FOR CONNECTING A MOVING PHOTOCONDUCTIVE WEB WITH A FIXED ELECTRIC POTENTIAL

Reinhold Euler, Kelkheim, Taunus, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt, Germany

Continuation of Ser. No. 329,562, Feb. 5, 1973, abandoned. This application Aug. 2, 1974, Ser. No. 494,303
Claims priority, application Germany, Feb. 7, 1972, 2205601; Netherlands, Feb. 24, 1972, 7202437
Int. Cl.² G03G 15/00
U.S. Cl. 355—16 3 Claims



1. An electrophotographic apparatus comprising a corona charge device, a web movable past said corona charge device, an electrically conductive layer disposed on said web, a photoconductive layer disposed on said electrically conductive layer, a stationary contact electrically connectable to a fixed electrical potential and slidably in contact with said electrically conductive layer, said stationary contact consisting of a carbon layer in contact with said electrically conductive layer, a first and second part between which the carbon layer is elastically supported, a foam cushion and two plate members each of which is attached to one of said parts, said first part of said stationary contact being L-shaped and said second part being spaced from and parallel to the foot of said L-shaped part, said second part and said foot being elongated in the direction of travel of the insulating web, each plate member facing the foam cushion positioned underneath said members.

4,027,968

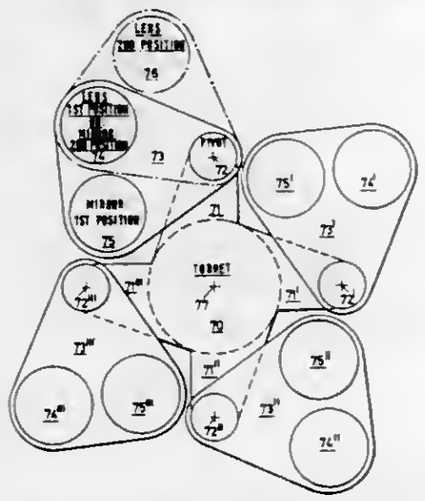
CAMERA MECHANISM

Harry Arthur Hele Spence-Bate, Lot 115, Cheam Place, Morley, Australia (6062)

Filed June 24, 1975, Ser. No. 589,928
Int. Cl.² G03B 27/32
U.S. Cl. 355—46 10 Claims

1. Optical input means for a microfiche camera adapted to allow selective filming of inputs from at least two different optical sources which comprises:
a rotatable turret plate having mounted thereon a plurality of pivoted support plates, each support plate carrying a lens and a mirror and adapted to pivot in the plane of the

turret plate between two positions, the first of said positions placing the lens in the optical axis of the camera and

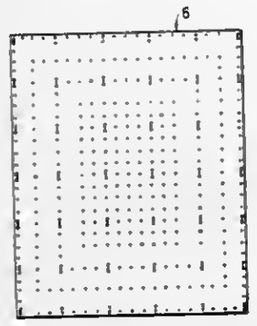


the second of said positions placing the mirror in the optical axis of the camera.

4,027,969
METHOD AND DEVICE FOR SIMULTANEOUS SCREENING OF SETS OF COLOR-SEPARATED HALF-TONE NEGATIVES

Gunnar Foxell, 5 Hovdingagatan, Hagersten, Sweden (S-126 52)

Filed Dec. 17, 1974, Ser. No. 533,557
Claims priority, application Sweden, Dec. 18, 1973, 7317056
Int. Cl.² G03B 27/60, 27/64, 27/68
U.S. Cl. 355—73 **5 Claims**

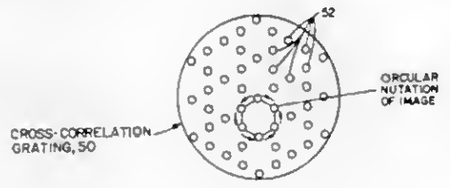


1. Apparatus for use in screening half-tone negatives comprising:
- a rigid base plate and a superposed relatively thin support plate of resiliently deformable material,
- said support plate being pierced by a great number of minute holes for connecting to a vacuum source and having spaced groups of further holes extending through the thickness of the support plate, one hole in each group being threaded and another hole being smooth and having a widened upper portion,
- set screws engaging the threaded holes and extending below the bottom surface of the support plate or not, depending on adjustment,
- further screws provided with heads inserted in the smooth holes and engaging threaded holes in the base plate, all screws leaving the upper side of the support plate unobstructed and being operative to exercise a pushing and pulling action on the support plate relative to the base plate so as to adapt the configuration of the support plate to an image projected onto the upper surface thereof to counteract the effects of optical distortion on the image.

4,027,970
METHOD AND APPARATUS FOR PASSIVE OPTICAL FUSING AND DISTANCE MEASUREMENT

Victor A. Misek, Hudson, N.H., assignor to Sanders Associates, Inc., Nashua, N.H.

Filed Oct. 28, 1975, Ser. No. 626,383
Int. Cl.² G01C 3/08; G01J 1/20
U.S. Cl. 356—4 **24 Claims**

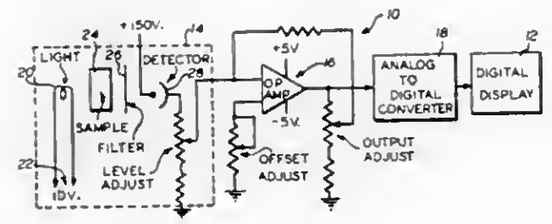


24. A method of optimizing the performance of a focus detection system utilizing a grating, focusing means, and means for causing the image produced by said focusing means to cyclically traverse the grating comprising:
- providing a gratng with apertures defining a single spatial frequency in the direction of the cyclical traverse of the image and,
- matching the single spatial frequency to the resolution of the focusing means in terms of in-focus and out-of-focus MTF characteristics for the focusing means.

4,027,971
METHOD OF SIMULTANEOUSLY COUNTING BLOOD CELLS

Philip Kolman, 26 Glen Brook Road, Monsey, N.Y. 10942; Maurice J. Dunn, 90 Charles St., Lindenburst, N.Y. 11757, and David Tiersten, 57 Curtiss Place, Maplewood, N.J. 07040

Continuation of Ser. No. 321,755, Jan. 8, 1973, abandoned. This application Oct. 30, 1975, Ser. No. 627,187
Int. Cl.² G01N 33/16
U.S. Cl. 356—36 **5 Claims**

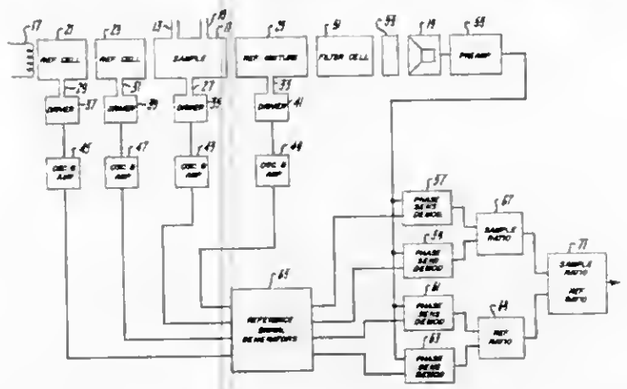


1. An analytical method for counting the quantity of blood cells suspended in a predetermined quantity of fluid comprising a blood fraction comprising the steps of preparing said fluid for simultaneously counting the overall quantity of leucocytes suspended in said fluid, said preparing step comprising the steps of delivering a predetermined volume of whole blood to a calibrated separation tube, adding a predetermined volume of high molecular weight polysaccharide in physiological saline, mixing said whole blood and said polysaccharide-physiological saline volumes and letting said mixture stand to form an erythrocyte layer and a plasma layer above said erythrocyte layer, waiting until said layer of erythrocytes reaches a predetermined volume level in said tube and siphoning off said plasma layer to provide a predetermined volume of plasma, said siphoned plasma being an intermediary preparation, suspending said siphoned plasma in a reagent capable of lysing any residual erythrocytes and platelets to form a dilute final sediment, illuminating said dilute final sediment with a white light along an optical axis so as to illuminate substantially all of said suspended leucocytes substantially simultaneously; filtering the light directly transmitted through said dilute final sediment at an optical wavelength which passes light which has not been absorbed by said leucocytes, and providing a simultaneous count indication of said overall quantity in response to said filtered light.

4,027,972
GAS ANALYZER METHOD AND APPARATUS

Donald W. Davies, Tujunga, Calif., assignor to Andros Incorporated, Berkeley, Calif.

Filed Mar. 31, 1976, Ser. No. 672,058
Int. Cl.² G01J 1/00; G01N 21/24, 21/26, 21/34
U.S. Cl. 356—51 **18 Claims**

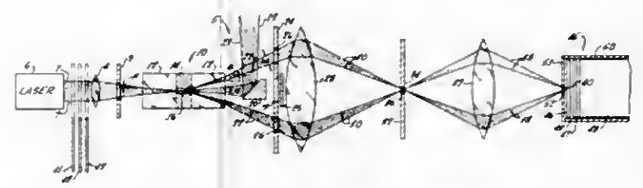


1. A method for determining the relative amounts of first and second gases in an unknown mixture of gases, comprising, directing radiant energy serially through a first reference volume of said first gas, a second reference volume of said second gas, and a sample volume of the unknown gas mixture, said radiant energy having a wavelength spectrum including characteristic absorption wavelengths of said first and second gases, modulating the absorption of the radiant energy by the first and second reference volumes and the sample volume at first, second, and third frequencies, respectively, detecting the amount of radiant energy passing serially through the first and second reference volumes and the sample volume, developing first and second corresponding sideband signals resulting from heterodyning of the energy modulated at the first and third frequencies and at the second and third frequencies, respectively, and obtaining a ratio of said first and second sideband signals.

4,027,973
DETECTOR APPARATUS FOR LASER LIGHT SCATTERING PHOTOMETERS

Wilbur I. Kaye, Fullerton, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Filed July 2, 1973, Ser. No. 375,930
Int. Cl.² G01N 21/22
U.S. Cl. 356—73 **6 Claims**

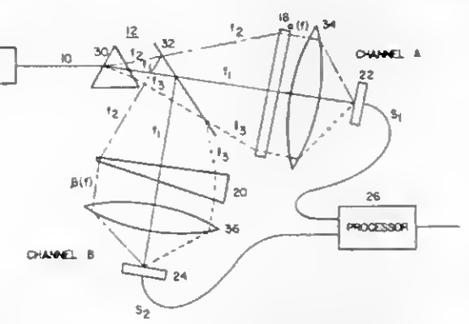


1. In a laser photometer for measuring radiant power scattered from a sample at a selectable angle with respect to the direction of an incident beam of radiant power and for measuring radiant power transmitted through the sample in the direction of said incident beam, said photometer including means for focusing said scattered and said transmitted power into converging conical beams, the improvement comprising means for receiving and detecting said scattered power and said transmitted power and for providing a spatially uniform output indicative of the radiant power of each, said means comprising:
- a planar diffuser positioned in the plane of the apices of said conical beams to diffuse said converging beams;
- a detector having a large area end-window spaced from and parallel to said diffuser; and
- a cylindrical container surrounding said diffuser and said detector, said cylindrical container being enclosed at the end thereof adjacent said diffuser, said enclosed end of said container having an aperture therein through which said beams pass to said diffuser, the inside surfaces of said cylindrical container and said enclosed end being highly reflective whereby the energy reflected from said end-window is reflected by said inside surfaces back to said end-window of said detector.

4,027,974
OPTICAL FREQUENCY PROCESSOR

Jon H. Bumgardner, 738 Felspar, Ridgecrest, Calif. 93555

Filed Dec. 5, 1975, Ser. No. 638,137
Int. Cl.² G01J 3/14
U.S. Cl. 356—74 **7 Claims**



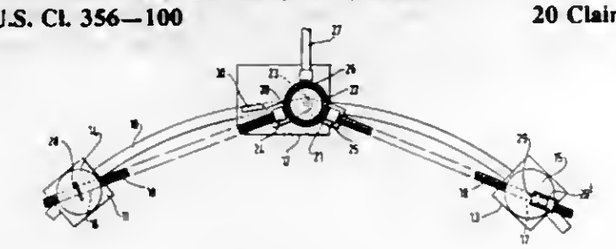
1. An optical source frequency processor, comprising:
- dispersion means fixedly mounted on intercept a beam of radiant energy for providing spatial redirection according to the frequency of beam of radiant energy incident thereon so as to produce a chromatically dispersed output therefrom;
- optical means with respect to said dispersion means fixedly positioned so as to intercept the output thereof for spliting said spatially redirected radiant energy into a plurality of beams;
- first modifying means fixedly positioned with respect to said optical means for uniformly attenuating one of said plurality of beams;
- second modifying means fixedly positioned with respect to said dividing means for attenuating another of said plurality of beams an amount having a predetermined relationship with the amount of spatial redirection introduced by said dispersion means;
- detector means fixedly positioned with respect to said first and second modifying means for separately detecting each of said attenuated beams and providing separate outputs responsive to the intensity of each of said attenuated beams; and
- means for processing said outputs effectively connected to said detector means to provide an output definitive of a characteristic of said radiant energy.

4,027,975

SCANNING MONOCHROMATOR AND CONCAVE REFLECTING GRATING EMPLOYED THEREIN

David Turner, London, and Robert John Speer, Reading, both of England, assignors to National Research Development Corporation, London, England

Filed May 27, 1975, Ser. No. 580,920
Claims priority, application United Kingdom, May 28, 1974, 23688/74
Int. Cl.² G01J 3/18; G02B 5/18
U.S. Cl. 356—100 20 Claims



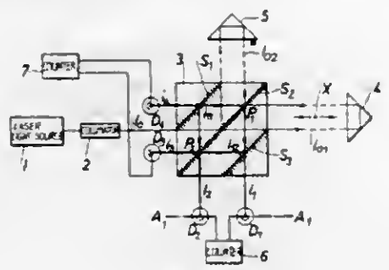
1. A scanning monochromator comprising a reflecting grating having on a concave surface thereof lines which perpendicularly intersect the meridian plane of the grating, source means for providing electromagnetic radiation to irradiate said grating, radiation receiving means for receiving radiation from said source means which has been diffracted by said grating, and means for effecting relative movement between said grating, said source means and said radiation receiving means such that given points of said source means and said radiation receiving means always lie on a circle in said meridian plane which touches said concave surface, characterised in that the radius of curvature of said concave surface in the meridian plane is equal to the radius of said circle, the grating line frequency varies systematically along the grating, and said means for effecting relative movement comprises means for causing said given points to be maintained at equal distances from a point of origin on said circle which is spaced from and fixed relative to said grating.

4,027,976

OPTICAL INTERFEROMETER

Georg Amon, Jena, Germany, assignor to Jenoptik Jena G.m.b.H., Jena, Germany

Filed Apr. 21, 1975, Ser. No. 570,048
Claims priority, application Germany, May 13, 1974, 178453
Int. Cl.² G01B 9/02
U.S. Cl. 356—106 R 7 Claims



1. An optical interferometer for producing two interference patterns 90° phase-shifted relative to each other, particular for use in length measurements, comprising

a light source emitting a light bundle,

a collimator for spreading said light bundle,

a partially transmissive optical body arranged in the path of said light bundle,

said partially transmissive optical body having a first beam splitting partially silvered face, inclinedly arranged relative to the incident light bundle,

a second and a third beam splitting and partially silvered face, substantially in parallel with and equally spaced relative to said first beam-splitting partialy silvered face,

said first beam splitting partially silvered face splitting up said light bundle into a first passed-on partial light bundle and into a first reflected partial light bundle,

a measuring reflector located in the path of said first passed-on partial light bundle,

said measuring reflector back-reflecting the incident first passed-on partial light bundle to said partially transmissive optical body parallel, however, in lateral displacement to said first passed-on partial light bundle,

said measuring reflector being displaceable along the path of said first passed-on partial light bundle,

a reference reflector located in the path of said first reflected partial light bundle,

said reference reflector reflecting the incident first reflected partial light bundle back to said partially transmissive optical body in parallel, however, laterally displaced to said first reflected partial light bundle,

said first passed-on partial light bundle and said first reflected partial light bundle, after reflection, being fused at said first beam splitting partially silvered face of said partially transmissive optical body and producing a first interference pattern,

said first beam splitting partially silvered face splitting up the impinging fused partial light bundles into a second passed-on partial light bundle passed through said face, and into a second reflected partial light bundle reflected thereupon,

the second, reflected partial light bundle being deviated at said second beam splitting partially silvered face, and fusing with the passed through second passed-on partial light bundle, being deviated at said third beam splitting partially silvered face, thereby producing a second interference pattern at said first beam-splitting partially silvered face,

said first interference pattern and said second interference pattern being 90° phase-shifted relative to each other,

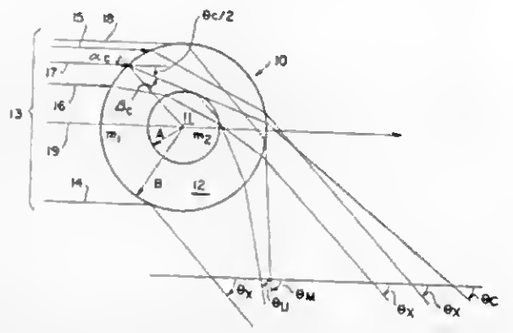
and means for evaluation of said interference patterns, phase-shifted relative to each other.

4,027,977

METHOD AND APPARATUS FOR DETERMINING RATIO OF CORE RADIUS TO CLADDING RADIUS IN CLAD OPTICAL FIBERS

Ralph Edward Frazee, Jr., Spotswood Borough, and Laurence Shrapnell Watkins, Hopewell Township, Mercer County, both of N.J., assignors to Western Electric Company, New York, N.Y.

Filed Dec. 17, 1975, Ser. No. 641,697
Int. Cl.² G01B 9/02, 11/08, 11/12
U.S. Cl. 356—111 4 Claims



1. A method of determining the ratio of the core radius to the cladding radius, A/B, of a clad optical fiber which comprises:

directing a monochromatic coherent light beam at the fiber to generate a far-field scattering pattern including contributions from portions of the beam reflected by the fiber, portions of the beam refracted by both the core and the cladding of the fiber, and portions of the beam refracted only by the cladding of the fiber;

detecting a scattering angle, θ_p, at which the maximum of a fringe modulation component occurs in the scattering pattern; and

converting the detected scattering angle, θ_p, into the ratio A/B from the relationship:

$$A/B = \sin[(\theta_p - \Delta\theta)/2] / \sqrt{m_1^2 + 1 - 2m_1\cos[(\theta_p - \Delta\theta)/2]}$$

where

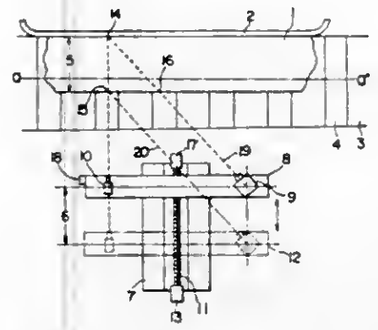
$\Delta\theta$ is a constant that is substantially the difference between θ_p and the angle θ_c where modulation begins, and m_1 is the refractive index of the cladding.

4,027,978

METHOD AND APPARATUS FOR NON-CONTACT MEASUREMENT OF A GAUGE OF A HIGH TEMPERATURE MATERIAL

Tomio Yamamoto, Takamatsu; Koji Sakasegawa, Fukuyama; Atsushi Osuml, Fukuyama; Yukio Hosaka, Fukuyama, and Takeo Yamada, Yokohama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo and Fuji Toyuki Kabushiki Kaisha, Takamatsu, both of, Japan

Filed Jan. 8, 1974, Ser. No. 431,735
Claims priority, application Japan, Aug. 27, 1973, 48-96019; Jan. 10, 1973, 48-5140
Int. Cl.² G01B 11/04
U.S. Cl. 356—156 14 Claims



1. A method for non-contact measurement of a gauge of a high temperature material comprising:

a. directing at least one camera tube having a sensitivity to a beam of light of a given wavelength band in the near-ultraviolet zone in a direction such that the optical axis of the camera tube extends in the direction of a gauge of a high temperature material to be measured;

b. arranging at least one band-pass filter having said wavelength band as its transmission band in front of said camera tube along the directional axis of said camera tube;

c. projecting said beam of light in said wavelength band to a reference projection point along said directional axis with the high temperature material being absent from said beam of light;

d. establishing a sampling mark corresponding to an optical mark formed by said beam of light at said reference projection point on the screen of at least one television monitor which displays the output of said camera tube;

e. displaying an optical mark projected by said projection of light on said high temperature material to be measured on said television monitor screen;

f. moving said light source and said camera tube in a direction parallel to said direction of the gauge to be measured by maintaining the light projecting and receiving axes relationships established in said reference projection conditions and in such a manner that said optical mark and said sampling mark on said television monitor screen coincide with each other; and

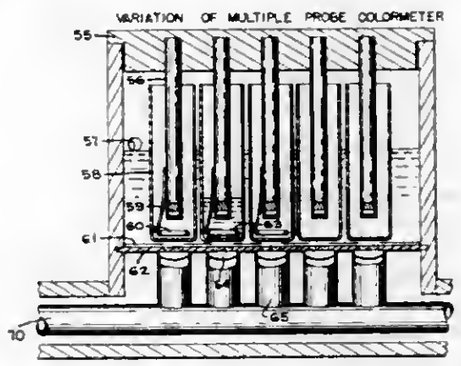
g. detecting the gauge of said high temperature material from said reference projection point in accordance with the distance covered by said movement of said light source and said camera tube.

4,027,979

MULTIPLE CHEMISTRY ANALYZER

John Victor Komarniski, 2167 Burr Court, Santa Cruz, Calif. 95062

Filed Apr. 27, 1973, Ser. No. 355,171
Int. Cl.² G01J 3/46
U.S. Cl. 356—180 3 Claims



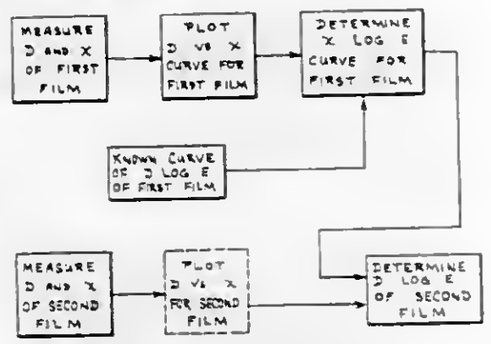
1. A combination of a multiple dilutor and a multiple probe colorimeter both temperature controlled by a circulating liquid for carrying out colorimetrical tests on batches of liquid samples and said multiple dilutor comprising of many modified syringes inclosed in a liquid tight enclosure with part of their tips protruding a few centimeters below the bottom of said liquid tight enclosure and the opposite end of the cylinder part of each modified syringe is anchored in the top part of said liquid tight enclosure in a manner that the plungers are controlled from the outside of said liquid tight enclosure and there is provision for temperature controlled liquid to enter, flow around said modified syringes, and leave through an outlet, the outer ends of said plungers are connected to a movable handle, stops control the amount or reagent, air-bubble, and liquid sample to be metered simultaneously, said multiple colorimeter comprising a light tight enclosure, near the bottom filtered electromagnetic waves are directed up through many lenses that are sealed in a horizontal plane into a second bottom wherein is a temperature controlled liquid bath, reaction tubes with opaque walls and optical bottoms are situated above each said lens in said temperature controlled liquid bath, a removeable cover has many probes with optical bottoms wherein each has an electromagnetic wave sensing device, said probes are attached to said removeable cover in a manner that each said probe enters each said reaction tube and said optical bottom of each said probe rests the same distance from each said optical bottom of said reaction tubes, the said tips of said multiple dilutor are so spaced they fit into each said reaction tube for emptying the test sample and reagent at the proper temperature simultaneously into said reaction tubes which are also at the proper temperature, a stirrer is attached to each said probe in a manner to allow simultaneous agitation by movement of said cover, said filtered electromagnetic waves pass through the liquid samples as they react and to said electromagnetic wave sensing devices which store an electrical current in a manner responsive to the electromagnetic wave absorbing characteristics of its corresponding liquid sample in an electrical storage device, by means of control switches said electrical currents are stored simultaneously at timed intervals in many said storage devices, the said electrical current in each said storage device is interpreted by use of an electrical measuring device.

4,027,980

METHOD OF OBTAINING A D(LOG E) CURVE

Kenneth R. Piech, Williamsville, and John R. Schott, Buffalo, both of N.Y., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 9, 1976, Ser. No. 675,676
Int. Cl.² G01N 21/06
U.S. Cl. 356—203 **2 Claims**


MEASURE D AND X OF FIRST FILM
PLOT D VS X CURVE FOR FIRST FILM
DETERMINE X LOG E CURVE FOR FIRST FILM
KNOWN CURVE OF D LOG E OF FIRST FILM
MEASURE D AND X OF SECOND FILM
PLOT D VS X FOR SECOND FILM
DETERMINE D LOG E OF SECOND FILM

1. A method of determining a D(log E) curve for an unknown film comprising:

a. measuring the densities of a plurality of selected objects appearing on a first film having a known D(log E) curve and being of the same film type as the unknown film;

b. measuring a plurality of corresponding distances in which the measured densities decay from object density to film base density;

c. plotting a second curve with the plurality measured densities and the corresponding distances for the first film;

d. determining an x(log E) relationship for the first film using the known D(log E) curve and the second curve;

e. measuring the densities of a plurality of selected objects appearing on the unknown film;

f. measuring a plurality of corresponding distances for the unknown film in which the measured object densities decays to film base densities; and

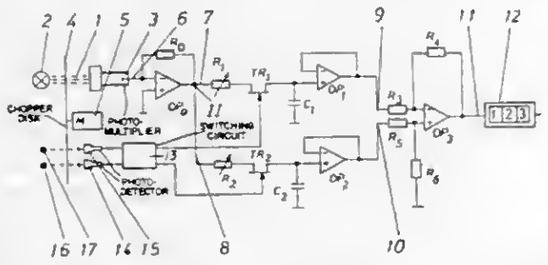
g. determining the D(log E) curve of the unknown film using the measured values of object densities and corresponding measured densities of the unknown film with the x(log E) curve of the first film.

4,027,981

STORAGE CIRCUIT FOR PHOTOMETER

Alfred Steinbatz, Vienna, Austria, assignor to C. Reichert Optische Werke AG, Vienna, Austria

Filed Oct. 28, 1975, Ser. No. 626,672
Claims priority, application Austria, Oct. 14, 1974, 8222/74
Int. Cl.² G01J 1/10, 3/45; G01N 21/06
U.S. Cl. 356—229 **7 Claims**



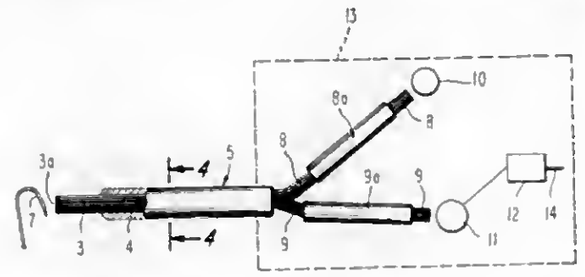
1. In an alternating light photometer, especially a single-beam photometer, in conjunction with which a periodically interrupted beam by means of a chopper disk rotated over a motor is incident on a photoelectric transducer, the corresponding output signal of which is amplified and conducted to a display device, in conjunction with which the chopper disk simultaneously releases, alternatively, an illuminating beam for one of two photo-sensitive elements of a switching circuit, by means of which, switches governing two differential current-paths are alternately controllable, wherein the improvement comprises a storage circuit including the output (6) of the photo-electric transducer (3) is connected with both of the inputs (9, 10) of a differential amplifier (OP_3) over two parallel, uniform current-paths (7–9; 8–10); that in each of both of the current-paths, in series, a resistance (R_1, R_2) is located, and a condensor (C_1, C_2) in conjunction with one of the switches provided (TR_1, TR_2) as well as between switch and corresponding input of the differential amplifier, when the resistance and the condensor of a circuit-path form a low-pass (R_1, C_1; R_2, C_2) with a time-constant (T) lying appreciably over the connecting or disconnecting time of the beam (1) as determined by the rotational speed of the chopper disk (4); and that the switches over the switching circuit (13) are selectively controlled, that one of them is closed only during the time (T_H) of the complete release, and the other one only during the time (T_D) of the complete interruption of the beam to the photoelectric transducer.

4,027,982

NEEDLE DETECTOR FOR CIRCULAR KNITTING MACHINES

Tadashi Ohishi, Osaka, Japan, assignor to Kyodo Denshi Kogyo Co., Ltd., Osaka, Japan

Filed Apr. 23, 1975, Ser. No. 570,789
Int. Cl.² G01N 21/16, 21/30; D04B 35/10
U.S. Cl. 356—237 **3 Claims**



1. Apparatus of the type used upon cirular knitting machines for continuous inspection of individual ones of a series of uniformly spaced like needles of such machines to detect faulty ones of such needles, wherein said apparatus is provided with a housing in extension of one end of a tube of predetermined length, the other end of said tube being free, wherein a light source, a photoelectric sensing member and an amplifier operatively related to said sensing member are disposed within said housing, wherein a bundle of a plurality of individual glass fibers of predetermined length are encased within and extend lengthwise of said tube and extend into said housing, wherein said bundle of fibers are divided into a first and a second group thereof with said groups of fibers being spaced within said housing and being intermingled within said tube, wherein said light source is operatively related to the ends of said first group of fibers within said housing, wherein said photoelectric sensing member is operatively related to the ends of said second group of fibers within said housing, wherein said intermingled fibers within said tube terminate adjacent to said free end thereof, said series of needles being movable relative to the ends of said intermingled fibers, said first group of fibers guiding light from said light source to impinge upon each of said moving needles, a quantity of such impinged light being reflected back from each of said needles, said second group of fibers guiding said reflected light to impinge upon said photoelectric sensing member, wherein said housing is disposed so as to be readily adjustable to placesaid free ends of said intermingled fibers in desired location closely adjacent to said moving needles, wherein the space between said needles and said ends of said intermingled fiber is unobstructed. and wherein said

apparatus is provided with means to evaluate said reflected light received by said photoelelctric sensing member,

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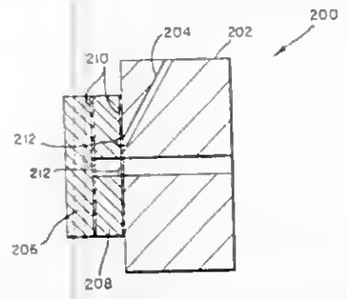
4,027,983

NOVEL GASKET AND FLOW CELL COMPRISING SAME

Louis Abrahams, Worcester, Mass., assignor to Waters Associates, Incorporated, Milford, Mass.

Continuation-in-part of Ser. No. 415,784, Nov. 14, 1973, Pat. No. 3,918,495. This application Apr. 9, 1975, Ser. No. 566,182
Int. Cl.² G01N 1/10; G01J 1/42
U.S. Cl. 356—246 **8 Claims**



1. In a flow cell apparatus of the type comprising a liquid flow path along an optical path, and an inlet to said flow path from the bottom thereof,

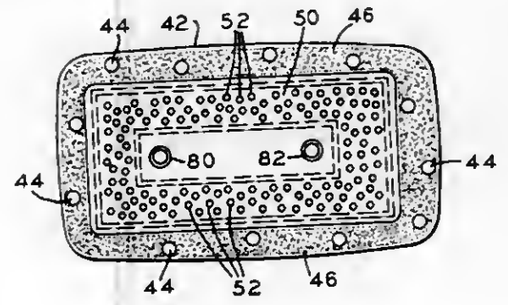
the improvement wherein said inlet flow path includes a segment thereof formed in a gasket compressed between said flow cell housing member and a window member, said gasket comprising an aperture forming a portion of said optical path and also a portion of said liquid flow path, and said inlet flow path being formed as a channel in on one side of said gasket and terminating at the bottom of said aperture.

4,027,984

SHAMPOO BRUSH

Robert L. Underwood, 2302 Oxford, Fort Wayne, Ind. 46806

Filed Apr. 5, 1976, Ser. No. 673,640
Int. Cl.² A46B 11/00
U.S. Cl. 401—28 **2 Claims**



1. A shampoo brush comprising:

an elongate hollowed handle having a rinsing and dilutant conduit supported therewithin; a housing affixed to said handle and having a shampoo chamber supported therewithin;

said chamber having a plurality of shampoo dispensative first openings formed therein for dispensing shampoo in a first direction; said first openings being symmetrically disposed about a plane parallel to said first direction and substantially bisecting said housing;

pump means for receiving and dispensing shampoo being supported within said chamber; said pump means having a first passage in fluid communication with said chamber and a second passage in fluid communication with said openings; plunger means being reciprocably mounted in said pump means; a pair of first and second one way valves being mounted in said first and second passages respectively and cooperable to admit shampoo into said pump means upon movement of said plunger means in said pump means in one direction and to dispense shampoo from said first openings upon movement of said plunger means in the opposite direction;

an annular fluid chamber being supported in said housing around said shampoo chamber; said annular chamber being in fluid communication with said dilutant conduit;

said housing supporting a surface immediately adjacent said annular chamber and in fluid communication therewith; said surface having a plurality of second openings therein for dispensing rinsing and dilutant fluid in said first direction; said annular chamber supplying said second openings with rinsing and dilutant fluid;

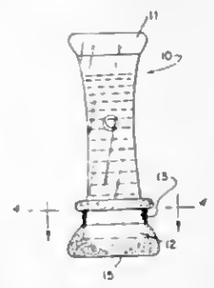
said first openings being positioned within and extending through said surface; an annular track being supported in said housing around said surface; said track supporting a plurality of flexible, resilient elements extending in said first direction and adapted to contact, groom and massage the body area to be shampooed.

4,027,985

COMPRESSIBLE DISPENSING CONTAINER HAVING PIERCING PRONGS

Ernest W. Loesser, III, 5 Dalewood Drive, Cedar Grove, N.J. 07009

Filed June 16, 1975, Ser. No. 587,066
Int. Cl.² A61M 35/00; B05C 21/00
U.S. Cl. 401—134 **7 Claims**



1. A dispensing container for a flowable material housed therein which substantially completely fills the same, said container comprising sealed upper and lower end portions and a compressible body having a front and rear wall extending between said sealed end portions, said lower portion of said compressible body terminating in a partially collapsed area, a band having an upper and lower edge encircling a portion of said lower partially collapsed end portion area and secured thereto a piercing prong mounted on the upper edge of the said band and being directed towards the front wall only of said container adjacent said partially collapsed area, said piercing prong normally out of contact with the said front wall of said container but adapted to contact and pierce said container wall only upon application of a compressive force intermediate the upper and lower end portions of the container, said compressive force displacing the materials within the container thus causing the walls thereof to bulge outwardly whereupon said piercing prong will pierce the said wall at the partially collapsed area to form an exit opening therein and upon continued application of said compressive force on the walls of the container, the materials within the container will be expelled from therewithin through the said exit opening.

4,027,986

HERBICIDE APPLICATOR

Stanley R. Patrick, 606 Hickory Circle, Canonsburg, Pa. 15317

Filed Oct. 23, 1975, Ser. No. 625,098
Int. Cl.² A01C 23/04
U.S. Cl. 401—138 **9 Claims**

1. A herbicide applicator comprising; means for controlling the flow of herbicide fluid so that controlled amounts of fluid

may be applied to unwanted vegetation including, a long hollow body portion for holding herbicide fluid having an applicator means at one end thereof, air control means at the other end thereof, the applicator means including a single

orifice flow control member, the air control means includes an enlarged coupling portion which is threaded internally and an adjustable coarse threaded screw plug for closing the end with the air control being by the air leaks through the coarse threads when the plug is partially loosened.

4,027,987

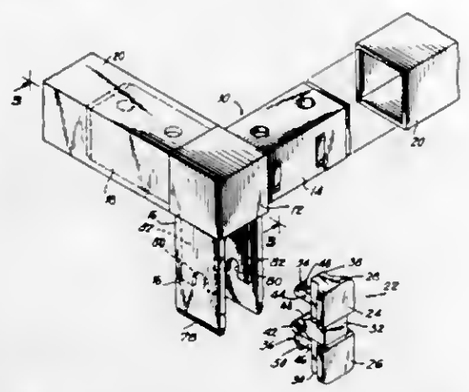
JOINING DEVICE FOR CONNECTING TUBES

Irving L. Berkowitz, Binghamton, N.Y., assignor to Kason Hardware Corporation, Binghamton, N.Y.

Continuation-in-part of Ser. No. 368,453, June 8, 1973, Pat. No. 3,958,889. This application Dec. 2, 1975, Ser. No. 636,847

Int. Cl.² F16B *7/00*

U.S. Cl. 403—172 **10 Claims**



1. A joining device for use in connection with one or more tubes, or the like, comprising: a base portion, at least one branch portion integral with and extending from said base portion and capable of insertion into said tubes, locking means carried by said branch portion for holding said branch portion within a tube, said locking means comprising a body portion having a pair of bearing surfaces and being pivotally supported at a position in said branch portion for limited angular movement between first and second predetermined limit positions, said locking means further including protruding retaining surfaces formed as spaced projecting portions integral with said body portion, said body portion including first and second rearward surfaces, each adapted to independently engage an inner wall of said branch portion, thereby defining the extent of said limited angular movement, said bearing surfaces projecting beyond a transverse side of said branch portion, said bearing surfaces being insertable in succession together with said branch portion into a tube whereupon during said insertion a first of said pair of bearing surfaces is substantially freely receivable by the tube and thereafter the second of said pair is only forceably receivable by said tube due to lever action resulting from engagement of said first bearing surface with internal surfaces of the tube, and means for movably securing said locking means to said branch portion said securing means comprising holding means integral with portions of said branch portion for contacting said protruding retaining surfaces, the cooperation of said holding means and said protruding retaining surfaces facilitating arcuate movement of said body portion with respect to said branch portion.

4,027,988

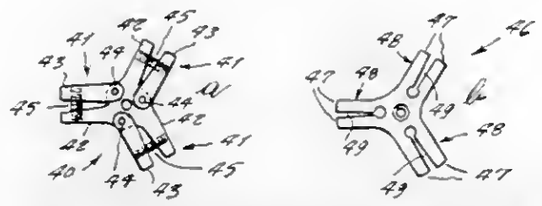
JOINT CONNECTOR FOR BARS

Dong Woo Kum, c/o George Spector, 3615 Woolworth Bldg, 233 Broadway, New York, N.Y. 10007

Filed Oct. 28, 1975, Ser. No. 626,039

Int. Cl.² F16B *7/04*

U.S. Cl. 403—218 **3 Claims**



1. In a joint connection, the combination of a pair of jaws, a screw fitted with nut for holding said jaws fixedly together, and a plurality of three bars for being retained between said jaws, said bars crossing each other angularly respective to each other at said joint and being each angular respective to an axis of said screw, wherein said jaws each comprise a spider-like member including three symmetrically extending arms with a cylindrical notch on an inner side of each said arm, and with each arm being segmented for adjustability, a surface of each said notch extending angularly under an adjacent one of said arms, said surface being semicylindrical when viewed from one axial end thereof, said jaws each having a spherical outer surface.

4,027,989

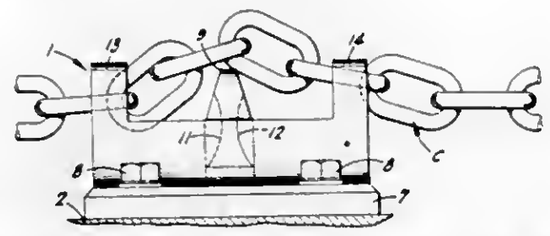
CHAIN ANCHOR

Harless Pierce, 1212 W. Longview Ave., Stockton, Calif. 95207

Filed Aug. 13, 1976, Ser. No. 714,236

Int. Cl.² F16D *1/00*

U.S. Cl. 403—291 **14 Claims**



1. A chain anchor comprising a fixed support, an anchor block rigid with and upstanding from the support, the anchor block having a throat open to the top and to opposite faces of said block, the throat being of a depths to receive—from above and in manually disengageable relation—a vertical link of a chain extending in the general direction that the block faces, an immediately adjacent horizontal link of the chain end-abutting one face of said block, the working reach of the chain extending away from the other face of said block, and guard means on the support embracing an adjacent portion of said working reach of the chain in vertical motion limiting relation.

4,027,990

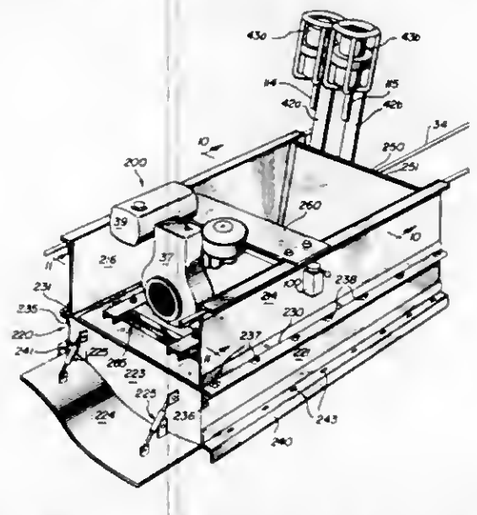
ADJUSTABLE CURBER AND SIDEWALK-FORMING MACHINE

Charles T. Merrill, 760 S. Postville Drive, Lincoln, Ill. 62656

Continuation-in-part of Ser. No. 480,844, June 19, 1974, abandoned. This application Oct. 6, 1975, Ser. No. 619,921

Int. Cl.² B28B *13/04*; **E01C** *19/48*

U.S. Cl. 404—98 **14 Claims**



1. Adjustable apparatus for forming contoured concrete as the apparatus travels along forms defining a run, comprising, in combination, first and second machine sides adjustable toward and away from one another and together defining a hopper having at least one wall inclined from a large upper concrete receiving opening to a small lower concretedropping opening and a platform comprising a plurality of floor plates, each plate affixed to a machine side and together mounting motive power means, attachment means on each machine side, for attaching a mold to each machine side, and a detachable mold of fixed width selected from a series of detachable molds of differing fixed configurations and widths, the mold being fitted to the attachment means of both machine sides when the machine sides are located at a predetermined distance from one another, and rail means carried on the mold for guiding the apparatus along run-defining forms.

4,027,991

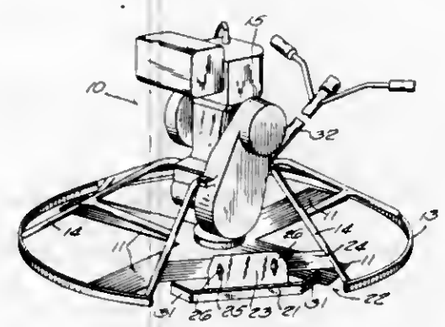
CONCRETE FINISHER WITH RETRACTABLE GUARD RING SECTION

Helmut A. Maass, West Bend, Wis., assignor to M-B-W, Inc., Slinger, Wis.

Filed Sept. 8, 1976, Ser. No. 721,266

Int. Cl.² E01C *19/22*

U.S. Cl. 404—112 **12 Claims**



1. In a concrete surface finishing machine having driven finishing paddles surrounded outside their perimeter by a generally concentric guard ring, a gap in said ring, a retractable guard ring segment in said gap and retraction means mounted on said machine on which said segment is mounted for retraction of said segment inwardly to allow the driven finishing paddles to work up to an obstruction disposed at an edge of the concrete surface to be finished.

4,027,992

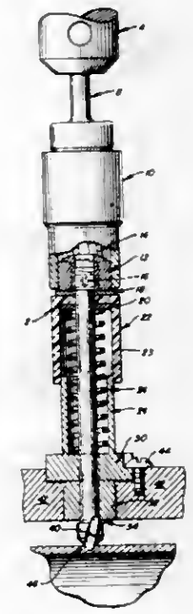
BORING TOOL GUIDE DEVICE

Bruce A. Mackey, Sr., 2730 E. Bonniebrook, Waukegan, Ill. 60085, and Bruce A. Mackey, Jr., 2-120B Chevy Chase, Mundelein, Ill. 60060

Filed Nov. 17, 1975, Ser. No. 632,646

Int. Cl.² B23B *49/00*

U.S. Cl. 408—97 **10 Claims**



1. A boring tool guide device comprising in combination; a spindle chuck adapter, a speed fit driver, a cutter shank having a cutter at one end and means for coupling the shank to the speed fit driver at the other end, a guide body, said guide body including a base portion having an axial bore and a tubular portion extending axially from said base portion and being substantially coaxial with said bore, said guide body having retainer means to secure the guide body to a work fixture, a tubular shaped depth control spacer having an end wall and an axial aperture therein, said control spacer being in telescoping engagement with said tubular portion, said control spacer having means for limiting the distance that the tubular portion of the guide body can be telescoped therein, resilient means received within said tubular portion and said control spacer to bias the control spacer and the guide body axially apart, said cutter shank being guidingly received in the axial bore of said guide body and the cutter and speed fit driver extending beyond the guide body and control spacer respectively, whereby said retainer means can be secured to said work fixture and rotatable driven power means can be removably secured to the speed fit driver to axially feed the cutter along its axis into a workpiece with the maximum depth of penetration being determined by said limiting means.

4,027,993

METHOD AND APPARATUS FOR COMPRESSING VAPOROUS OR GASEOUS FLUIDS ISOTHERMALLY

Otto E. Wolff, Weston, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Oct. 1, 1973, Ser. No. 402,315

Int. Cl.² F01D *00/00*

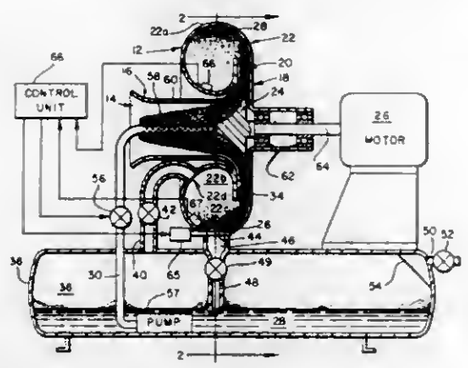
U.S. Cl. 415—1 **11 Claims**

1. A process for substantially isothermally compressing a gas comprising the steps of:

mixing said gas with a foamable liquid to form a foam

thereof having a discontinuous, substantially closed cell distribution of said gas contained within a thin wall continuous distribution of said liquid;

compressing said foam to increase the pressure thereof from a first pressure level to a second, significantly higher pressure level thereby substantially isothermally compressing the gas contained in said foam from said first to said second pressure level;



separating said gas from said liquid portion of said foam within a separation chamber while maintaining the separated gas and the separated liquid at said second pressure level; and

independently withdrawing said separated gas and said separated liquid from said separation chamber and introducing said withdrawn gas to an outlet conduit while maintaining said withdrawn gas at said second pressure level.

4,027,994

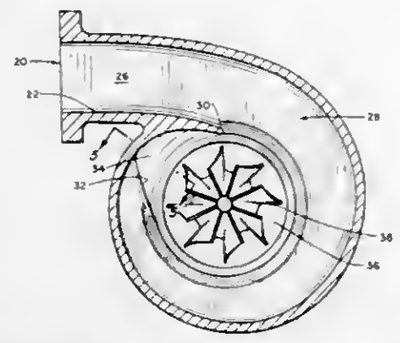
PARTIALLY DIVIDED TURBINE HOUSING FOR TURBOCHARGERS AND THE LIKE

Hugh MacInnes, La Canada, Calif., assignor to Roto-Master, Inc., North Hollywood, Calif.

Filed Aug. 8, 1975, Ser. No. 602,928

Int. Cl.² F01D *1/06*

U.S. Cl. 415—1 **15 Claims**



1. In a radial inflow turbine housing for turbochargers and the like, said housing being of the type having a generally 360° volute housing chamber surrounding a radial flow bladed turbine wheel, and an inlet chamber upstream of said volute housing chamber and terminating at the inlet to said volute housing chamber, said volute housing chamber being arranged for receiving gas flow from said inlet chamber and exhausting said gas flow progressively generally radially inwardly circumferentially around said volute housing chamber into said radial flow bladed turbine wheel; the improvement comprising: a radial divider throughout said inlet chamber and continuously circumferentially around said volute housing chamber and extending radially closely adjacent the periphery of said radial flow bladed turbine wheel, said radial divider separating both said inlet chamber and said volute housing chamber into circumferentially continuous axially separated first parts, said volute housing chamber axially separated first parts each exhausting its respective gas flow progressively generally radially into said radial flow bladed turbine wheel circumferentially throughout said separated first parts, said radial divider in said volute housing chamber extending circumferentially continuously from said volute housing chamber inlet and terminating not less than 180° and not more than 300° from said inlet of said volute housing chamber with said volute housing chamber having an undivided second part the remainder of said 360° thereof about the periphery of said radial flow bladed turbine wheel whereby gas flow received in said undivided second part of said volute housing chamber from said volute housing chamber axially separated first parts is exhausted progressively generally radially into said radial flow bladed turbine wheel.

4,027,995

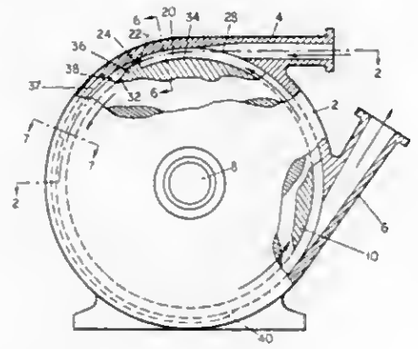
STEAM TRACK TURBINE

Clyde F. Berry, R.F.D. 7 Box 169 C, Manchester, N.H. 03104

Filed July 14, 1975, Ser. No. 595,544

Int. Cl.² F01D *1/02*

U.S. Cl. 415—92 **7 Claims**



1. A steam turbine comprising

a stationary housing,

a rotor mounted for rotation within said housing,

said rotor having a steam groove about its periphery, said groove being closed at its leading end and tail end by faces of unequal areas,

a steam intake nozzle associated with said housing and aligned substantially tangentially with said rotor whereby steam can be directed into said groove toward said leading end to cause rotation of said rotor,

a steam exhaust nozzle associated with said housing and positioned angularly beyond said intake nozzle where it receives exhaust steam continuously from said rotating groove,

the circumferential walls of said groove being in the form of opposed diverging helices of small pitch starting at the smaller leading end face of the groove and terminating at the larger tail end face of the said groove and

a circumferentially extending pressure dividing ridge forming the bottom of said groove, said ridge having a crest and continuous uninterrupted sloping surfaces extending away from said crest toward said walls.

4,027,996

TURBOMACHINE, SUCH AS A STEAM TURBINE WITH HIGH STEAM INLET TEMPERATURE, ESPECIALLY

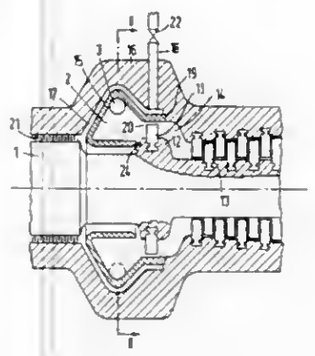
Herbert Keller; Bruno Krieg, and Ludwig Römer, all of Mulheim, Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany

Filed July 18, 1975, Ser. No. 597,300

Claims priority, application Germany, July 22, 1974, 2435153

Int. Cl.² F01D *25/24*

U.S. Cl. 415—116 **2 Claims**



1. A turbomachine having a stationary housing and a rotatable rotor mounted therein and including a series of rotor blade rings carried by the rotor and a series of guide vane rings carried by the housing, the guide vane rings and the rotor blade rings being disposed in mutually alternating relationship beginning with a first rotor blade ring, comprising means defining an annular space located forward of the first rotor blade ring of the series of rotor blade rings, flow medium supply means communicating with said annular space for supplying flow medium thereto, said annular space extending radially outwardly and along the entire periphery of the turbomachine for producing a torsional flow of the flow medium, the rotor having a shaft formed with a collar, and the series of rotor blade rings including a first blade ring mounted on said collar directly behind said annular space and being fully exposed at all times directly to said annular space, said first blade ring having a diameter greater than that of the succeeding blade rings of said series, whereby the flow medium supplied to said annular space axially impinges directly on said first blade ring without being initially guided by any guide vane rings, said means defining an annular space comprising a casing spaced from the housing and from the rotor, said casing extending to a location at which it is disposed in spaced relationship between the housing and said first rotor blade ring, and means for supplying flow medium to the space between the housing and said casing cooler than the flow medium supplied to said annular space by said flow medium supply means whereby the housing in the region of said annular space is shielded by cooler medium from the thermal effect of the hotter medium supplied to said annular space.

4,027,997

DIFFUSER FOR A CENTRIFUGAL COMPRESSOR

Alexander Connor Bryans, Reading, Mass., assignor to General Electric Company, Lynn, Mass.

Filed Dec. 10, 1975, Ser. No. 639,232

Int. Cl.² F04D *29/44*

U.S. Cl. 415—207 **1 Claim**

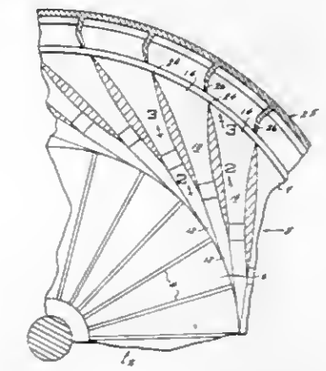
1. A diffuser for diffusing the accelerated gas flow from a relatively high pressure centrifugal compressor to an annular combustion chamber comprising:

an annular housing circumscribing the centrifugal compressor;

a plurality of passages spaced about the circumference of the housing and extending therethrough, each passage having a substantially linear center line;

wherein the inlet to each of the passages is circular in cross-section and disposed to receive the accelerated gases exiting the centrifugal compressor and each of the passages gradually merge to a near retangular cross-section at its outlet which is defined by two float opposing axial spaced parallel sides and two opposing curved circumferential sides formed as arcs of a circle, such that the internal walls of the passages in proximity to the diffuser outlet are formed as two flat parallel walls and two opposed slightly curved walls with the curved walls being convex with respect to the passage center line; and

wherein the curved walls terminate in a relatively sharp edges at the diffuser inlet and outlet.



4,027,998

FIXING ARRANGEMENT FOR A GUIDE PART OF A FIXED CASING ON A ROTATING MACHINE

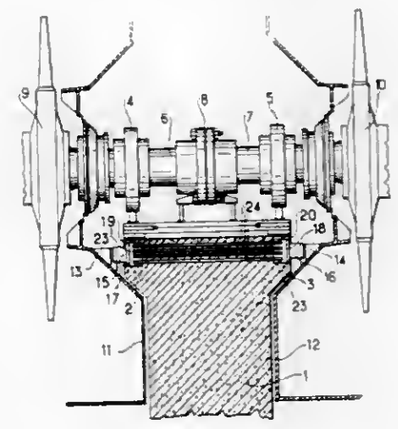
René Schwartz, Belfort, France, assignor to Groupe Europeen pour la Technique des Turbines a Vapeur G.E.T.T. S.A., Paris, France

Filed Jan. 14, 1976, Ser. No. 649,002

Claims priority, application France, Jan. 16, 1975, 75.01301

Int. Cl.² F01D *25/24*

U.S. Cl. 415—219 R **2 Claims**



1. In a machine assembly comprising:

at least one machine having at least one rotating machine part,

a concrete support beam,

a first journal bearing mounted to the top of said concrete beam and rotatably supporting said rotating machine part for rotation about the part axis, and

a casing for said at least one machine,

the improvement comprising:

a first casing guide part fixed to said casing and extending longitudinally relative to said rotating machine part,

a second guide part, and

means for fixing the second guide part to said beam in juxtaposition to said first part, with said second part

extending longitudinally adjacent said first guide part to guide said casing in its movement relative to said beam,

and wherein said means for fixing said second guide part to said beam comprise first and second plates positioned against opposed lateral walls of said concrete beam, said plates including vertical ribs sunk in the mass of concrete forming said beam, and horizontal tie rods extending laterally and being fixed respectively to the ribs of said first and second plates, and wherein said second guide part is fixed to one of said plates on the side opposite that of said concrete embedded ribs.

4,027,999

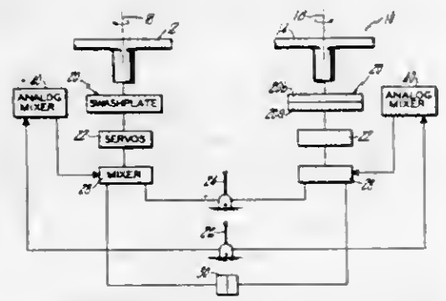
ANALOG MIXER TO VARY HELICOPTER ROTOR PHASE ANGLE IN FLIGHT

Ronald Arthur Durno, Trumbull, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Nov. 13, 1975, Ser. No. 631,599

Int. Cl.² B64C *27/80*

U.S. Cl. 416—40 **7 Claims**



1. An analog mixer adapted to be used with the controls of a helicopter rotor to vary phase angle thereof comprising:

A. a swashplate assembly mounted concentrically about a first axis for tilting motion about all tilting axes intersecting said first axis and lying in a plane normal thereto and including:

1. a nonrotatable member mounted to be tiltable about one of said tilting axes so that its tilting motion may be utilized to supply control inputs to a helicopter control, and to be restrained from rotating about said first axis, and

2. a rotatable member mounted to be tiltable with the said nonrotatable member, and to be rotatable about said first axis,

B. control input means adapted to provide control tilt creating inputs to said rotatable member at two azimuth stations separated by 90° and including:

1. first control means including a final link member having a first end connected to one such station of said rotatable member and a second end mounted for control motion along said first axis only so that uncoupled tilting motion will be imparted thereby to said swashplate assembly about a first of said tilting axes, and

2. second control means including a final link member having a first end connected to the other of said stations of said rotatable member and a second end mounted for control motion along said first axis only, so that uncoupled tilting motion will be imparted thereby to said swashplate assembly about a second of said tilting axes normal to said first of said tilting axes, and

C. means to cause said rotatable member to rotate about said first axis to thereby vary the azimuth location of said two stations and hence the first and second of said tilting axes about which said first and second control means cause said swashplate assembly to tilt.

4,028,000

BLADE CONNECTION FOR HELICOPTER ROTOR BLADES

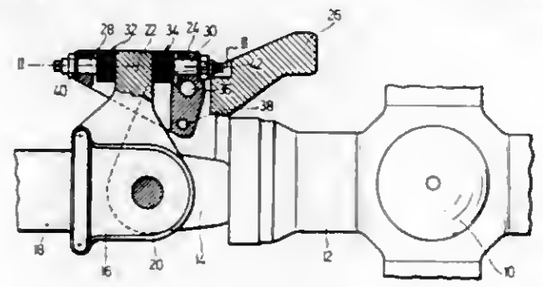
Emil Weiland, Hohenbrunn; Alois Schwarz, Putzbrunn, and Hubert Frommlet, Munich, all of Germany, assignors to Messerschmitt-Bolkow-Blohm GmbH, Munich, Germany

Filed Oct. 31, 1975, Ser. No. 627,702

Claims priority, application Germany, Nov. 8, 1974, 2452974

Int. Cl.² B64C *27/42*

U.S. Cl. 416—107 **9 Claims**



1. In a blade connection for helicopter rotor blades, comprising a blade fastening pin and a damped connection between a blade mounting member and a rotor hub, the improvement comprising a shoulder secured on said blade mounting member, a carrier bracket secured on said rotor hub and supporting two oppositely oriented adjustable pressure screws adjustable toward and away from one another in direction of rotation around the axis of said blade fastening pin and elastomeric dampers inserted between said shoulder and said pressure screws.

4,028,001

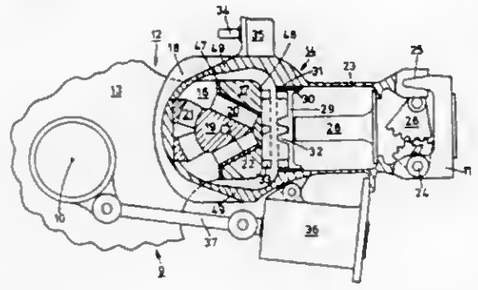
ROTOR FOR ROTARY WING AIRCRAFT

Kenneth Watson, Yeovil, England, assignor to Westland Aircraft Limited, Yeovil, England

Filed July 28, 1975, Ser. No. 599,785

Int. Cl.² B64C *27/38*

U.S. Cl. 416—134 A **18 Claims**



1. For a rotary wing aircraft a rotor including a hub arranged for rotation about a generally vertical axis and supporting a plurality of rotor blades, the rotor hub comprising, in combination,

a central portion,

a plurality of connecting arms extending radially from the central portion, each including first and second parts,

each first part comprising a pair of outwardly extending opposed plates and a joining member connecting the opposed plates to define therewith a cavity,

an elastomeric bearing means located on the radial inner side of the joining means,

each second part including a U-shaped radial inner part with the bottom of the U passing through said cavity and connected to the radial inner side of said elastomeric bearing and the legs of the U extending radially outwardly beyond said joining member, a pivot means on the second part radially outwardly of the joining member for attaching a rotor blade to permit folding of the rotor blade in a generally horizontal plane about said pivot axis,

and a locking means operable between the first and second parts for locking said first and second parts against movement relative to each other and for clamping in compression the said elastomeric bearing.

4,028,002

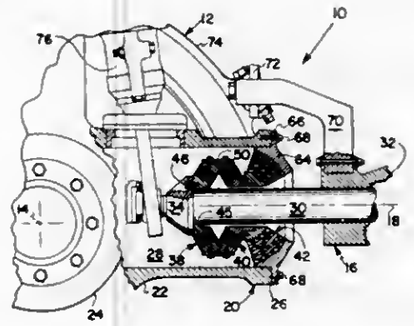
ROTOR BLADE RETENTION SYSTEM

Robert H. Finney, and Warren E. Schmidt, both of Erie, Pa., assignors to Lord Corporation, Erie, Pa.

Filed Mar. 1, 1976, Ser. No. 662,476

Int. Cl.² B64C *27/38*

U.S. Cl. 416—134 A **8 Claims**



1. A rotor blade retention system for connecting at least one elongated rotor blade to a rotor hub that is rotatable about a central axis, the connected rotor blade normally extending generally radially from the hub and being rotatable with the hub about its central axis, said retention system comprising

means carried by the rotor blade defining a first mounting surface which is oriented transversely to a longitudinal axis of the rotor blade and which faces generally outwardly relative to the central axis of the rotor hub,

means carried by the rotor hub defining a second mounting surface which is oriented transversely to the longitudinal axis of the rotor blade, the second mounting surface being spaced from the first mounting surface and facing generally inwardly relative to the central axis of the rotor hub,

at least three laminated elastomeric bearings connected together in serial compression load transmitting relationship with each other, each laminated bearing including a plurality of alternating and bonded together layers of elastomeric material and substantially inextensible material, each layer of each of the serially interconnected laminated bearings being at least partially inclined relative to the longitudinal axis of the rotor blade and having in section taken radially of the longitudinal axis of the rotor blade at least a portion projecting longitudinally toward an end of the rotor blade, the bearings being mounted to extend between the first and second mounting surfaces so as to restrain through compression loading of each of the bearings the rotor blade against centrifugal loads imposed on the blade during rotation of the blade and the rotor hub.

4,028,003

TORSIONALLY COMPLIANT HELICOPTER ROTOR BLADE WITH IMPROVED STABILITY AND PERFORMANCE CHARACTERISTICS

Timothy A. Krauss, Sandyhook, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Apr. 12, 1976, Ser. No. 675,664

Int. Cl.² B64C *27/44*

U.S. Cl. 416—141 **9 Claims**

1. A helicopter blade having:

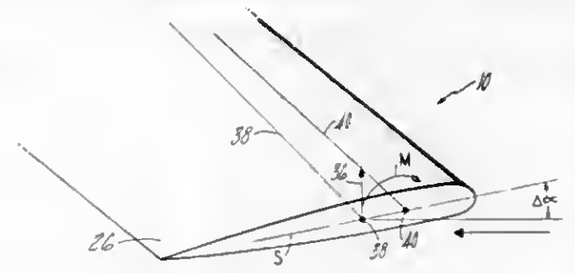
1. a root portion,

2. a tip portion,

3. an airfoil portion therebetween,

4. said tip portion being torsionally flexible and said root portion being substantially torsionally inflexible,

5. said root portion being shaped so that the locus of shear centers and the locus of centers of lift at the root portion sections are substantially coincident, and



6. said tip portion being shaped so that the locus of shear centers is forward of the locus of centers of lift at the tip portion sections to thereby establish an aerodynamic restoring moment in response to blade tip portion torsional excursions due to aerodynamically imposed tip portion loads thereby establishing improved blade torsional stability.

4,028,004

FEATHERING CONTROLLABLE PITCH PROPELLER

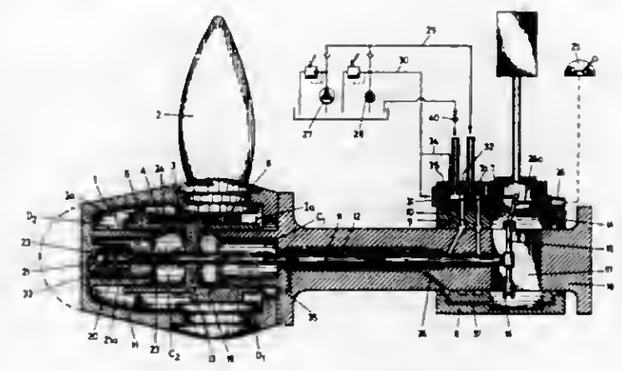
Jaap Wind, Waalwijk, Netherlands, assignor to Lips B.V., Drunen, Netherlands

Filed July 1, 1975, Ser. No. 592,261

Claims priority, application United Kingdom, July 3, 1974, 29494/74

Int. Cl.² B63H *3/08*

U.S. Cl. 416—157 R **5 Claims**



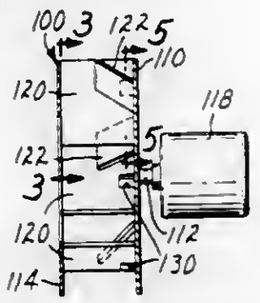
1. A controllable-pitch marine propeller having blades carried by a hub and having a hydraulic actuator housed in the hub and coupled to the blades for altering the blade pitch angle in both directions, and a servo control system for controlling the actuator to adjust the blade pitch angle, the control system having a blade position feedback loop by which the system operates with positional feedback over the range of pitch angle between astern and fullahead pitch angles, and means to render the feedback loop inoperative in response to a demand signal for blade feathering whereby the actuator then moves the blades into the feathering position without feedback action in response to the said demand signal, said feedback loop including a mechanical link constituted by a fluid supply pipe longitudinally-movably mounted in a bore in the propeller shaft, to supply pressure fluid to the actuator, the oil supply pipe having an end stop arranged to engage a fixed abutment to render the feedback loop inoperative when the actuator adjusts the blade pitch angle beyond the full-ahead position.

4,028,005

IMPELLER BLADE REINFORCEMENT

Bruno Eck, Geisbergstrasse 24, 5 Cologne 41 Klettenberg, Germany

Filed Apr. 16, 1975, Ser. No. 568,406
Claims priority, application Germany, Apr. 24, 1974, 2419651
Int. Cl.² F04D *29/24*
U.S. Cl. 416—186 R **5 Claims**



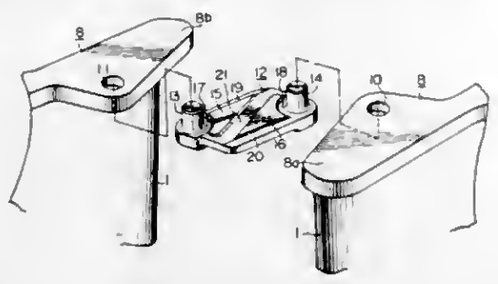
1. A centrifugal impeller having sides consisting of a circular hub disk and an annular inlet ring, impeller blades, and gusset plates attached to said blades in the space between each blade and the adjacent trailing blade, said impeller blades being securely attached to said hub disk and said inlet ring at their ends and having pressure sides and suction sides and further having inner leading inlet edges and outer trailing outlet edges, one said gusset plate being attached along one edge to the suction side of each said impeller blade from the outer trailing edge thereof along a line at right angles to said trailing edge of said blade, said line being not closer than one fourth the distance between said hub disk and said inlet ring from either end of said blade; said gusset plate being attached to said blade at an acute angle to said impeller blade so that the edge of said gusset plate opposite the edge attached to said impeller blade is attached to a side of said impeller.

4,028,006

BUCKET COVER ATTACHMENT

Michio Kuroda; Kiyoshi Namura; Fumio Kato; Yoshiaki Yamazaki, all of Hitachi; Tutomu Iwasaki, Mito; Akira Ishida, Hitachi; Akio Sohma, Hitachi, and Tetsu Imai, Hitachi, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 20, 1976, Ser. No. 650,768
Claims priority, application Japan, Jan. 24, 1975, 50-9772
Int. Cl.² F01D *5/22*
U.S. Cl. 416—191 **13 Claims**



1. A bucket cover attachment for turbine buckets annularly arranged around a rotor to constitute a turbine bucket wheel for a steam turbine, such bucket cover attachment comprising:

a plurality of ledges, each provided at the upper end of one of said plurality of turbine buckets and disposed at right angles to an outer surface of the turbine bucket; and

a plurality of bucket cover pieces, each interposed between ends of the adjacent two turbine buckets;

wherein the improvement comprises a leading end portion and a trailing end portion formed in each said ledge and extending in opposite directions on both sides of the turbine bucket,

a plurality of vertical holes formed in said leading end portion and said trailing end portion of the ledge,

a plurality of cylindrical projections formed on an upper surface of said bucket cover piece and adapted to be loosely received in the vertical holes formed in the ledges of the adjacent two turbine buckets, at least one of said projections being formed at its upper end with an enlarged diameter projection portion so that the bucket cover piece may be held in place by the turbine buckets,

contact surfaces formed on the upper surface of said bucket cover piece and adapted to come into contact with the ledges of the adjacent two turbine buckets, and

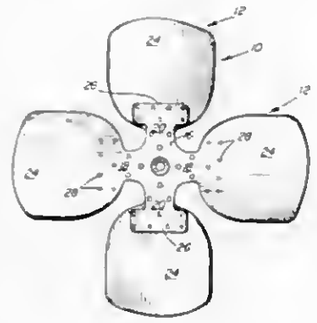
a groove interposed between said cylindrical projections for separating said contact surfaces on the upper surface of the bucket cover piece, whereby the contact surfaces can be positively brought into contact with the trailing end portion and leading end portion of the ledges of the adjacent two turbine buckets.

4,028,007

PROPELLER FAN

Erman V. Cavagnero, Torrington, and Ashok Z. Patel, Avon, both of Conn., assignors to Torin Corporation, Torrington, Conn.

Filed Aug. 18, 1975, Ser. No. 605,765
Int. Cl.² F04D *29/34*
U.S. Cl. 416—212 R **10 Claims**



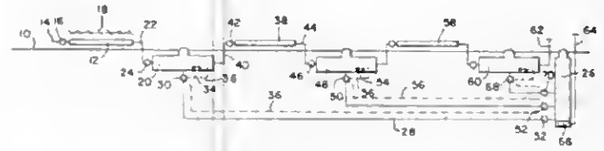
1. A propeller fan comprising a pair of similar spider-blade members each having a substantially flat central hub section, two substantially right angularly arranged pairs of narrow radially outwardly projecting spider arms, each arm being integral with the hub section at a radially inner end portion and each arm being twisted at an intermediate portion so that radially outer end portions of the arms of each pair are inclined in opposite directions relative to the hub section, a pair of air moving blades integral at inner end portions respectively with the outer end portions of the spider arms of one of said pairs of arms, and a pair of laterally projecting blade support members integral respectively with said outer end portions of said other pair of spider arms; each spider arm having a length at least one-half its width, each lateral blade support member having a width at least 50 percent greater than each spider arm, each blade having a width at least twice the width of each spider arm, and each blade having a width at least one-third its length, and said two spider-blade members being right angularly arranged with their hub sections and spider arms in contiguous face-to-face relationship and with the lateral support members of one member in face-to-face engagement with and supporting inner end portions of the blades of the other member, and means fastening said hub sections, spider arms, support members and blades together, and all of said blades when so assembled having their pitch angles provided by the associated twisted arms with no deformation and no substantial change in pitch occurring throughout the length of the blades.

4,028,008

SOLAR ENERGY OPERATED AIR COMPRESSOR

Herbert P. Shelton, 4832 Martin St., Alexandria, Va. 22312

Filed June 18, 1976, Ser. No. 697,417
Int. Cl.² F04B *19/24*
U.S. Cl. 417—52 **9 Claims**



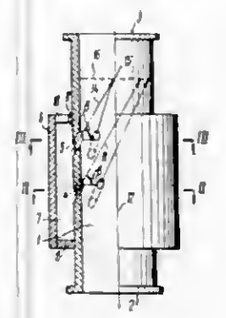
1. A solar energy operated air compressor and condenser comprising at least two tanks, said at least two tanks being disposed above the grade of the earth and to the sun's rays, a first receiving tank, said first receiving tank being disposed below said grade and shilded from said sun's rays, means to alternately shield each of said at least two tanks from said sun's rays, first means to communicate compressed air from within said each of said at least two tanks to within said first receiving tank when the pressure level within said each of said at least two tanks exceeds the pressure level within said first receiving tank, a condensate tank, said condensate tank being disposed below said grade, first means to drain condensate water from said first receiving tank into said condensate tank when said condensate water reaches a pre-determined level within said first receiving tank, a first heating tank, said first heating tank being disposed above said grade and to said sun's rays, second means to communicate compressed air from within said first receiving tank to within said first heating tank when said pressure level within said first receiving tank exceeds the pressure level within said first heating tank, a second receiving tank, said second receiving tank being disposed below said grade and shielded from said sun's rays, third means to communicate said compressed air within said first heating tank to within said second receiving tank when said pressure level within said first heating tank exceeds the pressure level within said second receiving tank, second means to drain condensate water from said second receiving tank into said condensate tank when said condensate water within said second receiving tank reaches a pre-determined height within said second receiving tank, means to supply atmospheric air to within said each of said at least two tanks.

4,028,009

JET PUMP

Nikolai Vasilievich Gudzenko, ulitsa Krasnolimanskaya, 35, kv. 1; Mikhail Efimovich Zaichenko, ulitsa Saljutnaya, 21, kv. 47, and Konstantin Leonidovich Larin, ulitsa Arsenalnaya, 15, kv. 9, all of Kiev, U.S.S.R.

Filed Sept. 24, 1975, Ser. No. 616,398
Int. Cl.² F04F *5/22*
U.S. Cl. 417—163 **15 Claims**



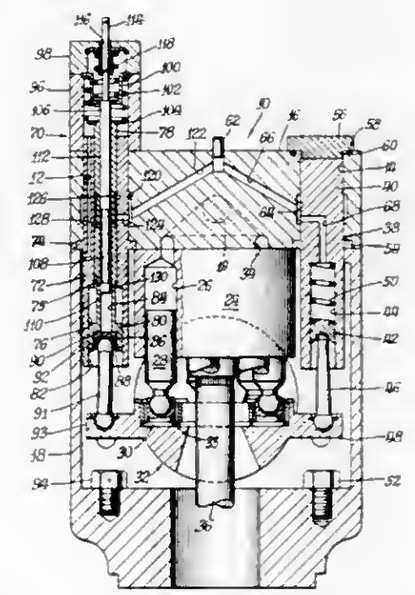
1. A jet pump having inlet and outlet ends comprising: a walled mixing chamber; through channels made in the walls of said mixing chamber for delivering a conveying fluid into said mixing chamber, said through channels being inclined along the movement of the transferred fluid, said through channels being arranged in said walls of said mixing chamber in at least two circular rows arranged one following the other in the direction of the transferred fluid, the axis of each of said channels in one of said rows being inclined to the cross-sectional plane of said mixing chamber in the direction of flow of the transferred fluid at one and the same angle and being additionally inclined at one and the same angle to the plane passing through the longitudinal axis of said mixing chamber and through the point where the axis of the corresponding of said channels intersects the outer surface of said mixing chamber, thus forming a vortex stage, whereas the axis of each of said channels in the other of said rows is inclined at the same angle with repect to the cross-sectional plane of said mixing chamber, thus forming an injecting stage, said row of channels of the vortex stage preceding said row of channels of the injecting stage along the flow of the transferred fluid, while the distance between said rows of through channels is selected in such a way that the points of intersection of said axes of the channels in said vortex stage with the inner surface of said mixing chamber and said point of intersection of said axes of channels in said injecting stage is arranged in one and the same plane perpendicular to the longitudinal axis of said mixing chamber.

4,028,010

REVERSIBLE, VARIABLE-DISPLACEMENT PISTON PUMP WITH POSITIONER MEANS FOR AUTOMATIC RETURN TO ZERO DISPLACEMENT

Donald L. Hopkins, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Continuation-in-part of Ser. No. 481,798, June 21, 1974, abandoned. This application June 20, 1975, Ser. No. 588,919
Int. Cl.² F04B *1/26;* **F16D** *31/02*
U.S. Cl. 417—217 **7 Claims**



1. In a reversible, variable displacement piston pump of the type having a housing including a pair of fluid passages for intake of fluid into and a discharge of fluid from said housing, a rotatable pump cylinder barrel within said housing, a plurality of pistons reciprocable within piston bores in said cylinder barrel, an angularly adjustable swash plate defining a pair of opposite ends, said swash plate being pivotally mounted intermediate said opposite ends, for determining piston displacement and thereby the amount of fluid discharged from the pump, a first servo mechanism in said housing for rotating said swash plate through a central, zero displacement position for discharge of pressurized fluid in one direction against a load, a second servo mechanism in said housing for rotating said swash plate in the opposite direction through said central, zero

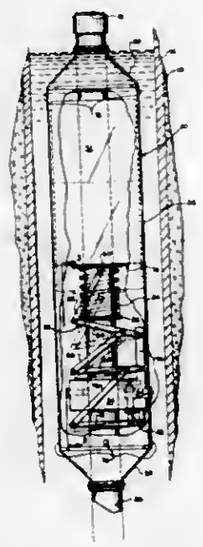
displacement position for discharge of pressurized fluid in the reverse direction against a load, zero displacement positioner means for automatically returning said swash plate to a central, zero displacement position to thereby discontinue the pumping action of the pump if pump discharge pressure is lost, wherein said zero displacement positioner means comprises a first piston means within said first servo mechanism and first spring means within said first servo mechanism biasing said first piston means against one end of said swash plate, wherein said first servo mechanism comprises a first servo housing having an axial bore therethrough and said first piston means comprises a tubular sleeve slidably fitted within said axial bore and a first piston on one end of said sleeve and slidably contained within a first chamber contained within the first servo housing, the bore of the tubular sleeve being connected with the first chamber by passage means, and further comprising valve spool means movably mounted within the bore of the tubular sleeve for selective blocking and unblocking of the passage means, and a second piston means within said second servo mechanism and second spring means within said second servo mechanism biasing said second piston means against the opposite end of said swash plate, wherein said second servo mechanism comprises a second servo housing and said second piston means comprises a second piston slidably contained within a second chamber within said second servo housing, and further including means supplying pump discharge pressure (i) to said first chamber through the tubular sleeve, and (ii) to the second chamber to power the servo mechanisms to tilt and swash plate away from said central, zero displacement position, and further including auxiliary fluid pressure generating means for providing fluid pressure (i) to said first chamber through the tubular sleeve, and (ii) to the second chamber to power said servo mechanisms and to initially tilt said swash plate away from said central, zero displacement position, the auxiliary fluid pressure generating means ceasing operation upon establishment of pump pressure, and means for providing unblocking of the passage means by the valve spool means when pump discharge pressure is lost, for providing that the first chamber is communicated with relief conduit means for providing unloading of fluid pressure from the first chamber.

4,028,011

LOW WELL YIELD CONTROL SYSTEM

Richard W. Kramer, R.D. No. 2, Box 490 B, Northumberland, Pa. 17857

Continuation of Ser. No. 472,133, May 22, 1974, abandoned. This application Sept. 3, 1975, Ser. No. 610,064
Int. Cl.² F04B *49/00;* **F01B** *25/00*
U.S. Cl. 417—278 **10 Claims**



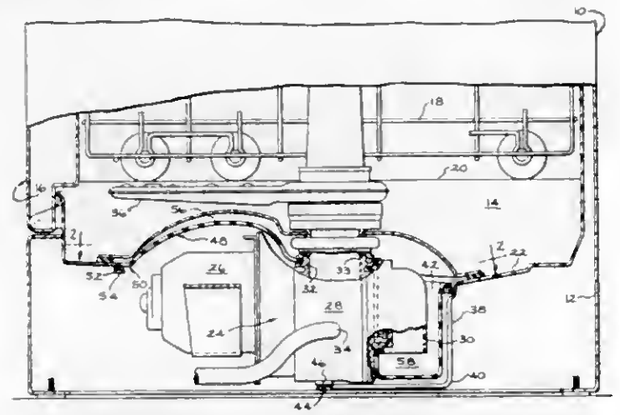
1. A control system for preventing overpumping liquid from a reservoir of liquid by a pump having an inlet located in the liquid and a pipe extending from the pump for removing liquid from the reservoir, the control system comprising a member defining a passage communicating the interior of the pipe with the reservoir, a valve in the passage operable to open and close the passage, a body vertically moveable in response to change in the level of the liquid in the reservoir operatively connected to the valve to actuate the same for progressively opening and closing the passage and a spring biasing said body vertically upwardly so that the passage is opened sufficiently to permit an amount of liquid pumped from the reservoir and into the pipe to flow through the passage and back into the reservoir to replenish the liquid supply in the reservoir sufficiently to meet the capacity of the pump.

4,028,012

SEALING MEANS FOR A DISHWASHER TUB AND MOTOR ASSEMBLY

Donald S. Cushing, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed June 2, 1975, Ser. No. 582,662
Int. Cl.² F04B *17/00;* **F16J** *15/06*
U.S. Cl. 417—360 **4 Claims**



1. In a dishwasher having an internal wash chamber including a bottom wall with an opening therethrough, the improvement comprising:

a motor-pump assembly disposed within the opening and partially projecting above the level of the bottom wall;

rigid support means associated with the bottom wall for supporting the pump-motor assembly in a removably attached relationship with the wash chamber bottom wall;

a resilient shroud overlying said pump-motor assembly and preselectively sized to cover said opening;

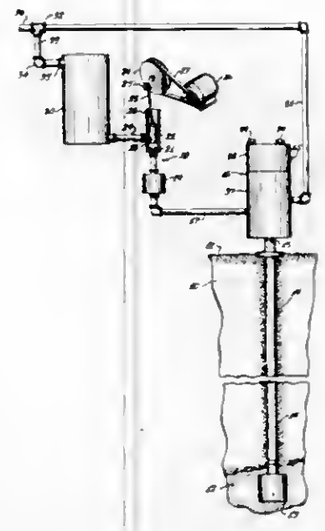
sealing means associated with said bottom wall including an upwardly facing groove peripherally positioned at the outer edge of said opening for exerting a clamping force radially against a downwardly directed bead member of said resilient shroud that is inserted therein for compressibly sealing the periphery of said resilient shroud in fluid-tight relationship with the bottom wall of said tub, said bead being installed into the groove from within the wash chamber, said groove being preselectively sized, as compared to the size of the bead, when uncompressed, to be in a ratio of four to five, thereby accommodating thermal expansion of said groove without disturbing the integrity of said seal.

4,028,013

PULSE MULTIPLIER FOR SURFACE OPERATED SINGLE TUBE PUMP

Arthur P. Bentley, P.O. Box 88, Arizona City, Ariz. 85223

Filed Nov. 13, 1975, Ser. No. 631,726
Int. Cl.² F04B *9/10*
U.S. Cl. 417—390 **7 Claims**



1. In a single tube surface operated pump including

a. an underground pump that is operated by pulses on a column of the liquid being pumped,

b. a tube extending from said pump to a ground surface and containing said column of liquid,

c. a receiving tank at said ground surface, and

d. a pulse generator comprising:

I. a cylinder having a lateral port communicating with said receiving tank,

II. a piston reciprocal in said cylinder, and

III. power means for reciprocating said piston,

a pulse multiplier for increasing the pulses created by said generator which are effective on said column of liquid, said pulse multiplier being connected at one side to the lower end of said cylinder, at the other side to said receiving tank and comprising:

e. a casing having a bore one end of which is connected to the upper end of said tube,

f. a first lateral port in said casing to which a conduit from the end of said cylinder is connected,

g. a second lateral port in said casing and connected to a conduit from said receiving tank,

h. a piston reciprocal in said casing,

i. a spring in said casing biasing said piston into a position in which there is a direct flow of the liquid of said column from said first lateral port to said cylinder under the influence of said underground pump which is operated by pulses created by said pulse generator,

j. surfaces on said piston in the casing which are exposed to gas pockets in said column of liquid and tending to displace said piston from its position providing said direct flow, and

k. a yieldable detent holding said piston in said position until the pressure of said gas pockets on said piston surface reaches a predetermined degree,

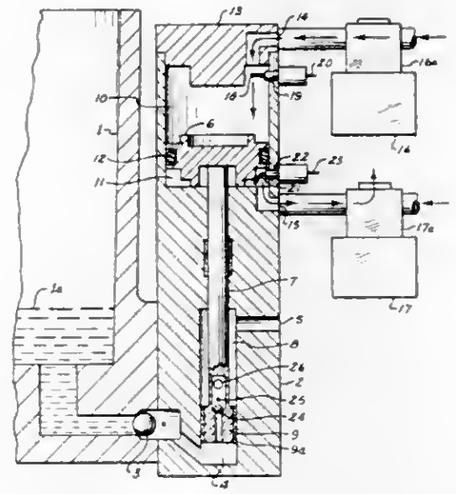
whereupon said detent yields and said piston in said casing is moved by gas pressure into a position in which a portion of the liquid from said column is diverted to the second lateral port and is delivered to said receiving tank, said diverted liquid entraining gas in said casing and thereby relieving the gas pressure to permit said spring to return the piston in said casing into its position providing said direct flow of liquid.

4,028,014

REVERSING MEANS FOR DOUBLE-ACTING FLUID PUMP

Eric H. Cocks, 4100 Galt Ocean Drive, Fort Lauderdale, Fla. 33308

Filed June 18, 1975, Ser. No. 587,977
Int. Cl.² F04B *9/10*
U.S. Cl. 417—403 **1 Claim**



1. A reversible pump comprising

a pump housing,

a first fluid cavity within said pump housing containing a reciprocable piston dividing said first cavity into first and second portions,

first and second port means in said first and second portions, respectively, for the inlet and outlet of fluid,

first and second fluid lines connected to said first and second port means, respectively,

first and second switch means mounted in said first and second fluid lines, respectively,

first and second switch means mounted in said first and second first fluid cavity portions,

said first and second switch means being positioned within their respective cavity portions to be actuated by said piston at each end of the reciprocating path,

control means connected to said solenoid valves and said switch means for reversing the direction of fluid flow and piston travel as the piston reaches each end of its reciprocating path,

said control means comprising a latching relay actuated by signals from said first and second switch means,

third and fourth solenoid valves connected in said first and second fluid lines to shut-off simultaneously and completely block fluid flow to and from said reciprocable piston,

a second fluid cavity within said pump housing having an inlet and an outlet port,

a first check valve in said inlet port to block said inlet port during the pressure stroke,

a double-acting, fluid piston connected to said reciprocable piston and forming a portion of said second fluid cavity, and

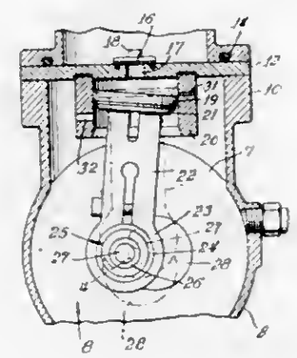
a second check valve in said fluid piston to block off said second fluid cavity from said outlet port during the suction stroke,

whereby reciprocating movement of said reciprocable piston causes said fluid piston to produce a pumping action to draw fluid into said second fluid cavity through said outlet port.

4,028,015
UNLOADER FOR AIR COMPRESSOR WITH WOBBLE PISTON

Thomas Robert Hetzel, Sheboygan, Wis., assignor to Thomas Industries, Inc., Sheboygan, Wis.

Filed Nov. 3, 1975, Ser. No. 627,856
Int. Cl.² F04B 17/00
U.S. Cl. 417—415 7 Claims

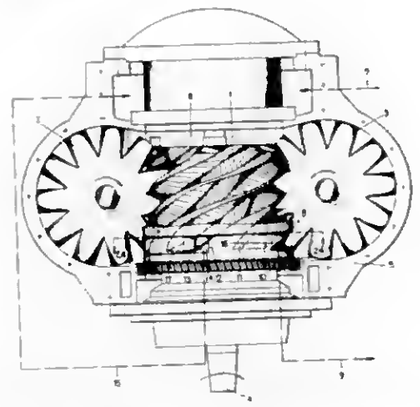


1. A compressor of the wobble piston type comprising:
a hollow, vertically extending frame open at the top and having an upwardly facing rim;
a transverse cylinder head plate extending across the top of said frame and being clamped onto said rim;
a downwardly opening vertically extending cylinder attached to and downwardly extending from the lower surface of said head plate;
an inverted cup-shaped discharge chamber having its rim clamped to the rim of the top surface of said head plate;
a discharge passageway extending through said heat plate from within said cylinder to the inside of said discharge chamber;
a check valve within said passageway to permit flow from said cylinder to said discharge chamber;
a wobble piston fitting in said cylinder;
a crank shaft journaled in said frame and carrying a crank pin;
a piston rod rigidly connected at one end to said wobble piston and connected at its other end through a crank pin bearing to said crank pin, rotation of said crank shaft driving said wobble piston so that on its downstroke from the top center position one side of the wobble piston descends more rapidly than the other;
a bleed hole extending through the side wall of said cylinder to continuously connect the interior of said cylinder to atmosphere, said bleed hole being adjacent the upper end of the cylinder and so located as to be uncovered by said piston substantially at the beginning of said downstroke; and
an intake port extending through the side wall of said cylinder at the lower end thereof said bleed hole and said port being overrun in succession to permit the successive entry of air into said cylinder above the piston during the downward stroke of the piston, said bleed hole being substantially smaller in diameter than said intake port to relieve the suction which occurs near the beginning of a downward stroke of said piston without substantially affectng the efficiency of said compressor.

4,028,016
ROTARY DISPLACEMENT COMPRESSOR WITH CAPACITY CONTROL

Jan T. Keijer, Rosmalen, Netherlands, assignor to Grasso's Koninklijke Machinefabrieken N.V., s-Hertogenbosch, Netherlands

Filed Dec. 31, 1975, Ser. No. 645,815
Claims priority, application Netherlands, Jan. 31, 1975, 7501187
Int. Cl.² F04B 49/02; F01C 21/12, 1/08; F04C 29/08
U.S. Cl. 417—440 5 Claims



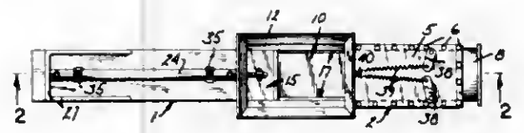
1. In a rotary displacement gas compressor, including a single driven cylindrical rotor provided with spirally-extending grooves, at least two gears having teeth in sealing engagement with said grooves, the axis of rotation of each being perpendicular to a plane passing through the axis of rotation of said rotor, a close-fitting cylindrical casing enclosing said rotor and part of each gear, each gear traversing the wall of said casing, the gas to be compressed being drawn in through the open ends of the grooves at one head end of the rotor, for each gear an exhaust port in the wall of the casing near the other head end of the rotor, seen in the direction of rotation of the rotor in front of the gear, and a pressure pipe connected to each exhaust port, the improvement comprising: for each gear a return port in the wall of the casing at the same axial height as said exhaust ports; a return pipe connecting each return port with the intake side of the compressor; and a single rotatable regulating ring rotating with respect to said casing to control the size of said return ports from a completely closed position to a maximum open position while simultaneously adjusting the size of the exhaust ports in the reverse sense, said regulating ring comprising a fully circular element rotating relative to said casing and having side flaps in the same number as gears, one regulating edge of each side flap adjusting an exhaust port and the other regulating edge adjusting a return port.

4,028,017
MANURE PUMP HAVING AGITATOR PISTON

Gerald F. Kobiske, Loyal, Wis., assignor to Kobiske Industries, Inc., Loyal, Wis.

Filed Mar. 26, 1976, Ser. No. 670,753
Int. Cl.² F04B 7/04
U.S. Cl. 417—489 5 Claims

1. A manure pump comprising:
a. a supply hopper having an open bottom;
b. a generally horizontally extending housing having one end supporting said hopper and defining an open topped chamber in register with the open bottom of said hopper and a generally horizontal discharge passageway leading from said chamber and having a discharge end portion;
c. a piston reciprocably movable in said chamber and passageway and having a generally flat pumping surface facing said discharge end portion of the passageway said pumping surface being disposed in a plane normal to the direction of movement of the piston, and an opposite material mixing surface angularly displaced from said plane and sloping upwardly toward said pumping surface;
d. guide means guiding said piston for reciprocatory pumping and return movements in said chamber and said passageway;

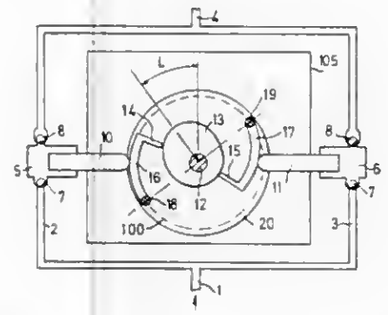


e. means for imparting said reciprocatory movements to said piston;
f. and check valve means in said housing normally closing said discharge end of the passageway.

4,028,018
NON-PULSING APPARATUS

Alan Keith Audsley, Winchester, England, assignor to Paterson Candy International Limited, London, England

Filed June 6, 1975, Ser. No. 584,467
Claims priority, application United Kingdom, June 10, 1974, 25732/74
Int. Cl.² F04B 21/04
U.S. Cl. 417—534 2 Claims

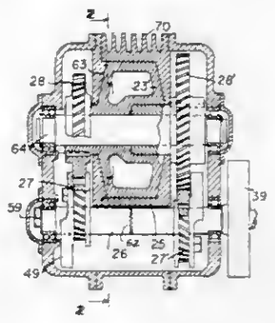


1. Pumping apparatus suitable for pumping chemical fluids comprising a plurality of flowpaths extending between a fluid inlet and a fluid outlet, an identical reciprocating pump in each flow path, a housing between the pumps, a pump reciprocating member for each pump extending outwardly through said housing in sealing relation therewith, a respective cam follower device in said housing for each pump reciprocating member and in constant engagement therewith, continuously rotatable cam means in said housing constantly engaging said cam follower devices for actuating them and being shaped to provide a substantially constant pumped volume from said pumping apparatus, and pivotable carrier means in said housing, each cam follower device including an arm pivotably mounted at one end on said carrier means and a cam follower at the other end engaging said rotatable cam means, each arm having a convexly-curved surface engaging the pump reciprocating member of the respective pump, said carrier means being rotatable on the same axis as said rotatable cam means for altering the stroke of each pump when said carrier means is turned on said axis but still maintaining the pumped volume of said apparatus substantially constant, the pivotal mountings of the arms on the carrier means being arranged on a common circle, and the arms lying on the circle at maximum discharge of the pumps irrespective of the pivoting of the carrier means and being movable radially inwardly only of the circle.

4,028,019
POSITIVE-DISPLACEMENT UNIT WITH COAXIAL ROTORS

Ernest Wildhaber, 124 Summit Drive, Rochester, N.Y. 14620

Continuation-in-part of Ser. No. 551,102, Feb. 20, 1975, Pat. No. 4,003,681. This application Feb. 4, 1976, Ser. No. 655,161
Int. Cl.² F01C 1/00; F16H 35/02
U.S. Cl. 418—36 5 Claims



1. A rotary unit for positive displacement of fluid having two coaxial rotors whose arms project outwardly from their axis inside of a housing,
a shaft offset from the rotor axis for transmission of motion between said rotors and the outside,
a pair of varying-motion gears directly connecting said shaft with one of the rotors,
another pair of varying-motion gears of opposite phase directly connecting said shaft with the other rotor, to achieve spaces of varying volume between said arms, wherein
the gear pitch-lines that roll on each other without slippage differ on the two gears of each pair, and intersect the pitch circles of a pair of imaginary uniform-motion gears coaxial therewith and of the same tooth ratio,
the pitch line of said gear on each rotor contains two diametrically opposite maximum radii and perpendicular thereto two minimum radii, is convex throughout, and projects outwardly of said pitch circle more than it recedes inwardly thereof,
having a smaller radius of curvature at the two maximum radii than an ellipse of the same maximum and minimum radii,
the tooth profiles are equally spaced along said pitch lines and have a constant inclination thereto,
and the tooth profiles have curvature radii varying with the curvature radii of the pitch curves.

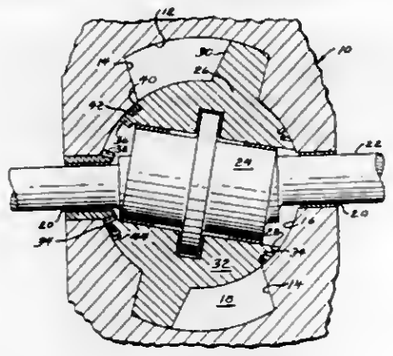
4,028,020
OIL SEAL FOR A ROTARY ENGINE

James A. Ritchie, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Sept. 8, 1975, Ser. No. 611,038
Int. Cl.² F01C 19/08
U.S. Cl. 418—51 3 Claims

1. In a slant axis rotary mechanism, the combination comprising:
a housing;
a rotor having spherical hub with an axial bore and within said housing;
a shaft journalled in said housing and having an angularly offset portion received in said bore and journalling said rotor;
said rotor hub having a pair of annular seal receiving

grooves, said grooves being at opposite ends of said rotor hub and surrounding said bore, each of said grooves having a bottom, a radially inner sidewall and a radially outer sidewall, each of said grooves having a cross-sectional configuration such that the radius measured in a plane transverse to said axial bore of any interior portion



of said inner sidewall is at least as great as the radius measured in a plane transverse to said axial bore of the rim of said inner sidewall; and

a unitary closed ring seal residing within each of said grooves between said sidewalls for bearing against said housing.

4,028,021

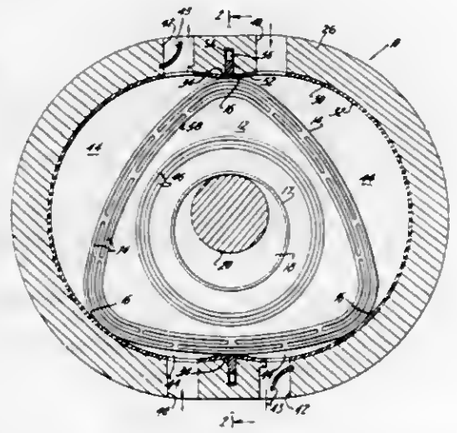
ROTARY TROCHOIDAL COMPRESSOR WITH COMPRESSIBLE SEALING

Murray Berkowitz, Woodcliff Lake, N.J., assignor to Curtiss-Wright Corporation, Wood-Ridge, N.J.

Filed Dec. 8, 1975, Ser. No. 638,678

Int. Cl.² F01C *1/22, 19/00, 5/04*

U.S. Cl. 418—56 **3 Claims**



1. A rotary mechanism such as a compressor, expansion engine or the like comprising:

a. an outer body comprising a pair of axially-spaced end walls and an intermediate wall defining a cavity therebetween;

b. an inner body mounted for relative rotation within said cavity and having its axis eccentric to the axis of the outer body, the peripheral surface of said inner body being substantially a hypotrochoid with three nose portions rigid therewith and the inner peripheral surface of said intermediate wall being approximately the outer envelope of the peripheral surface of the inner body such that said intermediate wall peripheral surface has two diametrically opposed regions which generate said hypotrochoidal surface during relative rotation of said bodies and such that a plurality of fluid working chambers are formed between said inner body and said intermediate wall peripheral surface;

c. radially movable seal bar means carried by the outer body intermediate wall at each of said hypotrochoid generating regions and spring means for urging each seal bar means into continuous sealing contact with the hypotrochoid peripheral surface of the inner body;

d. said outer body having intake and outlet ports disposed on opposite sides of each said generating region; and

e. a compressible liner for the peripheral surface of said intermediate wall, said liner extending over the entire portion of said peripheral surface except said liner being interrupted at each said seal bar means and the inner surface of said liner being disposed slightly radially inwardly of the outer envelope of the inner body so that except when under one of said seal bars the rigid nose portions of the inner body continuously depress the liner slightly as the inner body rotates to provide a continuous seal between said nose portions and the liner in all positions of the inner body, said liner comprising a radially flexible base portion and having a flexible sheet-like layer over the inner surface of said base portion for sliding contact with the rigid nose portions of the inner body.

4,028,022

OIL SEAL ASSEMBLY

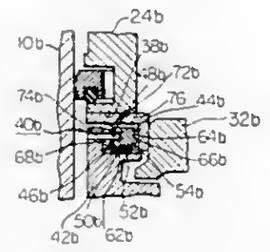
Hiroshi Takeuchi, Tokyo; Toshitugu Ishizawa, Higashi-Murayama; Tetuyuki Yamano, Kodaira; Ko Chiba, and Daisaku Kobayashi, both of Kashiwazaki, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama and Riken Piston Ring Kogyo Kabushiki Kaisha, Tokyo, both of, Japan

Division of Ser. No. 398,784, Sept. 19, 1973, abandoned. This application May 16, 1975, Ser. No. 578,128

Claims priority, application Japan, Sept. 20, 1972, 47-109358

Int. Cl.² F01C *19/12*

U.S. Cl. 418—104 **7 Claims**



1. In a rotary piston internal combustion engine having a rotor journalled on an eccentric portion of an engine shaft, an oil sealing arrangement comprising:

a first disc connected to the engine shaft and having a first radially extending annular face which is in rotatable unison with the engine shaft;

a second disc connected to the rotor and having a second radially extending annular face which is in rotatable unison with the rotor, said second face being spaced from and facing with said first face;

a sealing ring disposed between said first and second faces, said sealing ring having a surface adapted to engage with the adjacent one of said first and second faces;

a spring disposed between the other one of said first and second faces and said sealing ring to be compressed therebetween to bias said sealing ring away from said other face to sealingly engage said surface of said sealing ring with said one face; one

an O-ring sealing disposed between said sealing ring and that one of said first and second discs which has said other face and.

4,028,023

FLUID OPERABLE ROTARY PISTON DEVICE

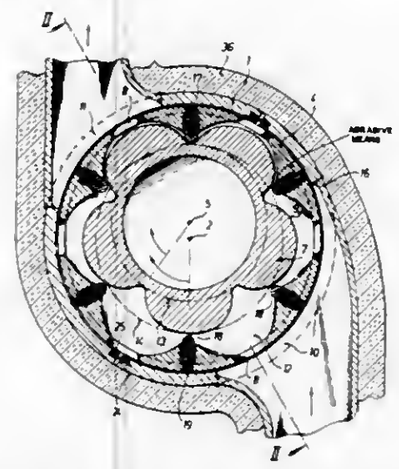
Herwig Labus, Julich, Germany, assignor to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung, Julich, Germany

Filed Nov. 26, 1975, Ser. No. 635,661

Claims priority, application Germany, Nov. 28, 1974, 2456252

Int. Cl.² F01C *1/10, 19/04, 21/10*

U.S. Cl. 418—108 **7 Claims**



1. In a fluid operable rotary piston device; a housing including means forming a cylindrical chamber therein with gas inlet and gas outlet means, a hollow cylinder rotatable on the central axis thereof in said chamber with radial clearance and having gas openings which communicate with said inlet and outlet means as said cylinder rotates in said chamber, a piston eccentrically mounted in said cylinder and rotatable therein on the central axis of the piston, transmission means connecting the piston and cylinder for rotation at respective speeds, said cylinder having inwardly concave axial recesses therein and said piston having outwardly convex axial protruberances therein receivable in said recesses as the cylinder and piston rotate, said recesses and protruberances forming working chambers between the cylinder and piston which vary in size as the cylinder and piston rotate, means supporting said piston and cylinder in said housing for rotation of the piston and cylinder on the respective central axes thereof while supporting the piston and cylinder in contact free relation, and axial sealing strips on one of said cylinder and piston for sealing betwcen adjacent working chambers, and means for adjusting the sealing strips radially to provide for contact free sealing gaps between adjacent working chambers, said cylindrical chamber is said housing and said cylinder having a contact free sealing gap between the opposed surfaces thereof, said means in the housing forming said chamber being segmented with the segments thereof being relatively adjustable to control the said gap between the gap between the cylindrical chamber and the cylinder.

4,028,024

MANUFACTURE OF FILLED CAPSULES OR THE LIKE

Stephen T. Moreland, 789 Anita Ave., Grosse Pointe Woods, Mich. 48236

Continuation-in-part of Ser. No. 519,435, Oct. 31, 1974, abandoned. This application Sept. 30, 1976, Ser. No. 728,140

Int. Cl.² B29D *31/00*

U.S. Cl. 425—133.1 **25 Claims**

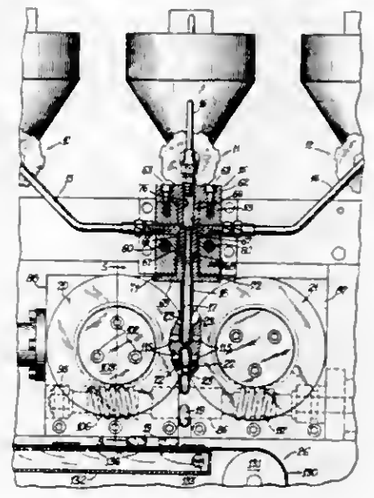
1. An apparatus for making units comprising an ingestable substance with a coating of ingestable material, said apparatus comprising:

first means forming a source of said substance in fluid form under pressure;

second means adjacent said first means forming a source of said material in fluid form under pressure;

extruder means comprising a body having a vertical passageway open at the bottom, said extruder means being connected to said first and second means for extruding a rod comprising a continuous core of said substance with a continuous coating of said material along a vertically downward path from said bottom opening;

unit molding means subsequent said extruder means for forming said rod into individual units and comprising two endless devices each positioned at a respective side of said path below said opening, each device having a surface with a sequence of half-unit-cavities therein which move past said path in a downward direction in timed relationship such that the half-unit-cavities of the two devices meet at said path to define a whole-unit-cavity, each half-unit-cavity comprising walls defining a pocket having sides and ends, each endless device being a wheel rotating about an axis and having a periphery with the half-unit-cavities therein, the peripheries of said wheels



meeting at a pinch-point on a line between said axes, each wheel including means associated with each half-unit-cavity for pushing the unit away therefrom after the wheel moves away from the pinch-point, the periphery of each wheel defining a rim surrounding the exterior of each pocket and extending radially outwardly from the portion of the wheel periphery to the outside of the rim, the rims of the wheels being in registry at the pinch-point, said molding means including means mounting one of the wheels for movement toward and away from the other wheel to adjust the pressure between the rims at the pinch-point; and

means positioned below said molding means for receiving the individual units descending by gravity from the molding means and for cooling the material, said cooling means comprising a foramenous conveyor and means operatively associated with said conveyor for directing cooling air through said conveyor.

4,028,025

SCREW PUMP

Arne Lonnebring, Alvsjo, Sweden, assignor to Aktiebolaget Imo Industre, Stockholm, Sweden

Filed Apr. 30, 1976, Ser. No. 682,164

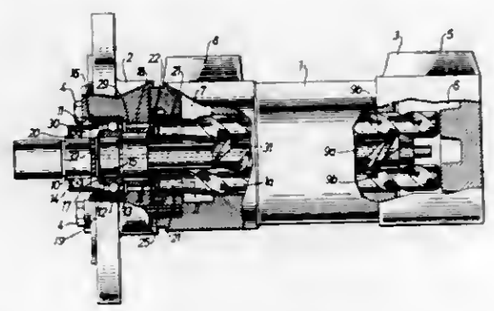
Claims priority, application Sweden, May 2, 1975, 7505141

Int. Cl.² F04C *1/10;* **F16C** *33/74;* **F16J** *15/08*

U.S. Cl. 418—197 **1 Claim**

1. A screw pump having a screw unit which comprises a drive screw (9*i*) and at least one impeller screw (9*b*) meshing therewith, a housing 19) sealingly enclosing said screws; said impeller screws on the pressue side of the pump being provided with pins (21) mounted in sleeves (22), the interiors of

which communicate with the suction side of the pump through channels (28, 29, 31, 32) in said pump housing and in said drive screw; to relieve axial forces on said impeller screws; a disc-like packing (35) mounted between an end surface of each sleeve and an end wall (2) of said housing which said wall closes the pressure side of said housing, through which end



wall and packing said channels partially extend, and through which a drive shaft (10) for said drive screw is extended; wherein said sleeves are provided with at least one deformation zone (39) on sides thereof remote from said packing, and facing a fixed surface in said housing, the zones being arranged to abut and seal said fixed surface in the housing.

4,028,026

SCREW COMPRESSOR WITH INVOLUTE PROFILED TEETH

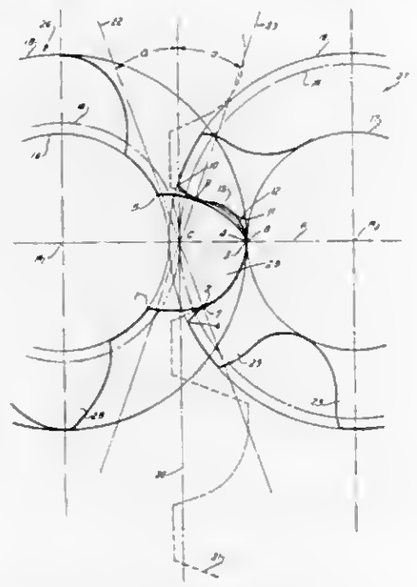
Ernst Menssen, Horren, Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Germany

Continuation-in-part of Ser. No. 379,303, July 16, 1973, abandooed. This application June 9, 1975, Ser. No. 584,820

Claims priority, application Germany, July 14, 1972, 2234777

Int. Cl.² F01C *1/16*; **F16H** *55/04*; **F04C** *17/12*

U.S. Cl. 418—201 **1 Claim**



1. A screw compressor for the compression and axial displacement of a gas, said compressor comprising:

a housing formed with an axially extending passage having at one axial end a gas inlet and at the other axial end a gas outlet;

a one-piece main rotor extending axially in said passage and formed with a plurality of helical ribs having generally convex flanks and root regions formed at least partially as involutes in cross section, said ribs being asymmetrical with respect to the centers of said ribs, each rib of said main rotor having a profile consisting of a leading flank formed as an involute (1–2) from a point (1) at its junction with the respective root region to an intermediate location (2) along said leading flank and a circular arc (2¾) from said intermediate location (2) to a circular arc apex (3,4) of the rib, and a trailing flank (¾–5) formed as an involute from said apex (3,4) to the junction point (5) of said trailing flank with a respective root portion;

a one-piece auxiliary rotor extending axially in said passage and formed with a respective plurality of helical ribs meshing with said ribs of said main rotor and having opposite flanks, the leading flank of each rib of said auxiliary rotor being formed as a concave cycloid (8-9/7-8) from the root point (8) to an intermediate location (7,9) along the leading flank, the trailing flank being formed as a circular arc from said root point to an intermediate location along the trailing flank, and both flanks further being formed as convex involutes (6-7/9-10) from the latter intermediate locations (7,9) to the crown (6,10) of each rib at the auxiliary rotor; and

drive means connected only to said main rotor for rotating same and thereby rotating said auxiliary rotor in mesh therewith, said flanks being of arcuate shape adjacent their regions shaped as involutes, relative to a rotation direction of the respective rotor the front flanks of said ribs having a different pressure angle from the back flanks.

4,028,027

SCREW HOUSING FOR A SCREW MACHINE

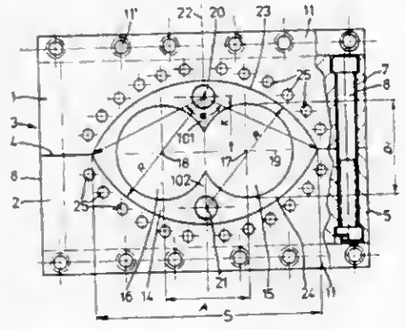
Wolfgang Wörz, Illingen, Germany, assignor to Werner & Pfleiderer, Stuttgart, Germany

Filed May 9, 1975, Ser. No. 576,019

Claims priority, application Germany, May 16, 1974, 2423785

Int. Cl.² F01C *21/10*; **B30B** *3/00*; **B29B** *1/10*

U.S. Cl. 418—201 **10 Claims**



7. A screw housing with a non-circular insert for a two-shafted screw machine, wherein the wearing insert has two spaced parallel bores to accommodate respective screw shafts, the mutually parallel longitudinal axes of the shafts lying in the principal plane of symmetry of the wearing insert, and being spaced apart to form saddles between the bores, the insert having substantially constant external cross-section along its axial length and being arranged in a cavity of the same cross-section in the screw housing, the wearing insert having an external cross-section which is bounded by at least two convex curves, while no angles are present in the external cross-section in the region of the saddles and the insert is undivided in the region of the saddles.

4,028,028

SLIDING VANE FLUID DEVICE

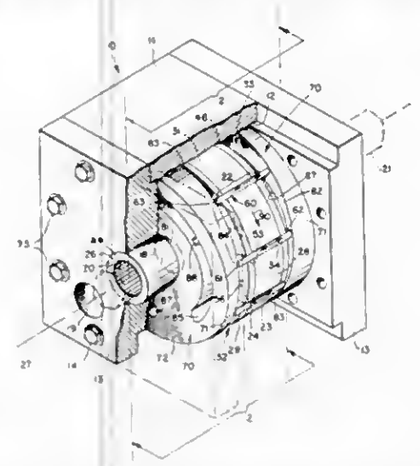
Francis Joseph Fuchs, Jr., Princeton Junction, N.J., assignor to Western Electric Company, Inc., New York, N.Y.

Filed Apr. 9, 1976, Ser. No. 675,439

Int. Cl.² F04C *15/02*, *1/00*

U.S. Cl. 418—219 **8 Claims**

1. An improved rotary fluid device of the type having a rotor received in a chamber defined by a chamber wall; a plurality of vanes mounted, one in each of a plurality of slots formed in the rotor, for side-to-side sliding movement in the slots in an axial direction, parallel to an axis of rotor rotation; means within the chamber for sliding the vanes from side to side in said axial direction upon rotation of the rotor; the



rotor, chamber wall and vanes together dividing the chamber into a plurality of variable volume cells; and means for serially introducing fluid into and for serially receiving fluid from the cells as the rotor rotates, wherein the improvement comprises:

means, operated by fluid pressure, for opposing the tendency of the fluid within the cells to slide the vanes in said axial direction within the slots.

4,028,029

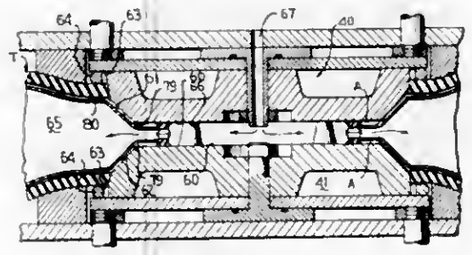
RETREADING MOLD WITH BLADDER FOR CREATING ANNULAR VACUUM GAP

Kenneth T. MacMillan, 4992 Wesleyan Woods Drive, Macon, Ga. 31204

Continuation-in-part of Ser. No. 391,816, Aug. 27, 1973, Pat. No. 3,997,284. This application Aug. 20, 1976, Ser. No. 716,206

Int. Cl.² B29H *5/04*

U.S. Cl. 425—23 **6 Claims**



1. A retreading mold comprising a pair of relatively movable platens, matrix means carried by each platen for receiving therein a tire to be retreaded, a bead aligner wheel associated with each platen, said bead aligner wheels being in axially opposed relationship to each other, each bead aligner wheel having means at a periphery for contacting a wheel bead and aligning a tire relative thereto, an annular bladder disposed between said platens, said annular bladder having innermost peripheral marginal portions, said innermost peripheral marginal portions being in overlying relationship upon said bead aligner wheels inboard of said contacting means; means for creating an annular gap between a terminal edge of each bladder peripheral marginal portion, an outboard portion of each said bladder peripheral marginal portion, and the associated bead aligner wheel, said annular gap creating means being defined by an annular axially projecting bead carried by each outboard portion of each said bladder peripheral marginal portions in sealing contact with its associated head aligner wheel, and each annular bead being positioned between said contacting means and said terminal edge.

4,028,030

INSTALLATION FOR PELLETIZING ORGANIC WASTE MATERIALS

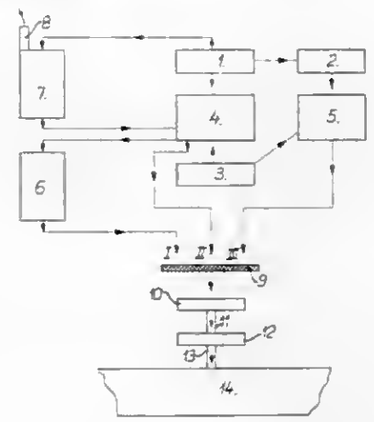
Hugo Imhof, Geneva, Switzerland, assignor to S.A.F. Societe Agricole et Fonciere S.A., Luxembourg

Division of Ser. No. 577,167, May 14, 1975. This application Aug. 5, 1976, Ser. No. 711,889

Claims priority, application Switzerland, July 3, 1974, 9140/74; Nov. 13, 1974, 15121/74

Int. Cl.² B29C *3/02*

U.S. Cl. 425—135 **10 Claims**



1. An installation for processing organic waste materials into pellets, comprising areas for storing and mixing organic waste materials, at least one chamber for passing hot dust-carrying exhaust gas through mixed and partly dried organic waste material to recuperate the heat in said gas and the dust carried thereby, at least one oven for heating mixed organic materials, means for breaking and pulverizing the mixed and partly dried organic materials, adjustable supply means for supplying the pulverized organic materials, chopping means receiving organic materials from said supply means for chopping the received organic materials, means for extruding the chopped organic materials to form strands, at least one perforated vibrating plate receiving broken strands from the extruding means, means for supplying a rising current of hot air through perforations of said plate, and at least one rest silo.

4,028,031

SCREW EXTRUDER AND CALENDER ASSEMBLAGE

Adolf Selde, Bissingen, Enz, Germany, assignor to Werner & Pfleiderer, Stuttgart-Feuerbach, Germany

Filed Dec. 8, 1975, Ser. No. 638,638

Claims priority, application Germany, Dec. 11, 1974, 2458614

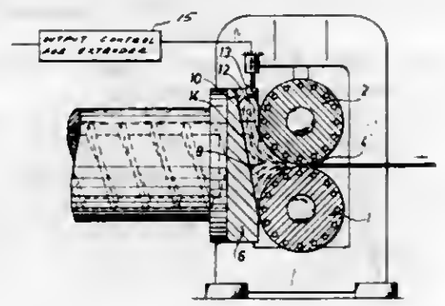
Int. Cl.² B29C *3/06*

U.S. Cl. 425—147 **6 Claims**

1. An extruder-calender assemblage for rolling out pliable material in the form of plates and foils or sheets, said assemblage comprising in combination:

a screw extruder having at one end a discharge member including an opening for discharging material to be rolled from the extruder; a calender including a pair of axially parallel and superimposed rolls mounted adjacent to the discharge member of the extruder, said calender rolls being disposed normal to the extruder and having a working gap axially aligned with the center axis of the extruder; the side of the discharge member facing the rolls in conjunction with the peripheral wall surfaces of the calender rolls defining a chamber extending across the

entire width of the feed-in gap between said rolls and to the lower end of said opening in the discharge member, the chamber being closed at its end juxtaposed to the lower roll and open at its end juxtaposed to the upper roll and increasing in crosswise width from the lower calender



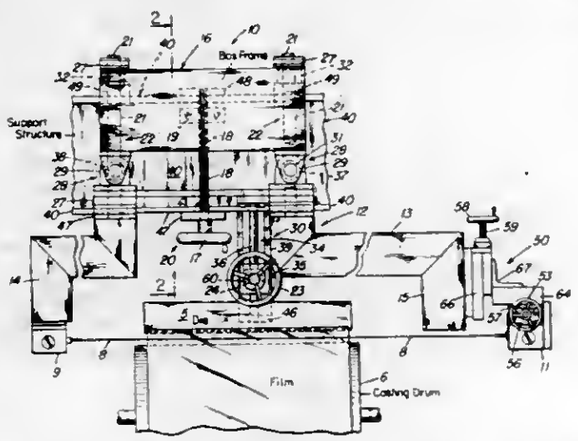
roll toward the upper one; said chamber constituting an equalization chamber for accumlating the material discharged from the extruder and compensating for variations in the quantity of material fed from the extruder to the calender rolls.

4,028,032

APPARATUS FOR PRECISION ELECTROSTATIC PINNING

Elie Loyd Hebert, Taylors, S.C., assignor to Celanese Corporation, New York, N.Y.

Filed Mar. 9, 1976, Ser. No. 665,353
Int. Cl.² B29D *7/22*
U.S. Cl. 425—174.8 E **18 Claims**



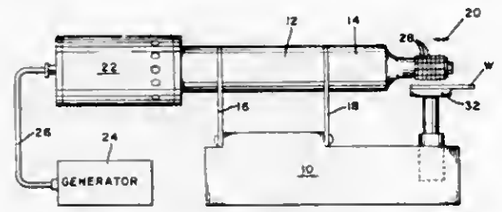
1. An apparatus for the precision positioning of electrostatic pinning means comprising
a frame moveable in the horizontal and vertical directions;
pinning means support means connected to said frame;
an electrostatic pinning means held by said pinning means support means;
horizontal adjusting means, connected to said frame, comprising a horizontal actuating means connected to horizontally moveable means responsive to said horizontal actuating means;
horizontal precision control means, cooperating with said horizontal adjusting means, and connecting to said moveable frame;
vertical adjusting means, connected to said frame, comprising a vertical actuating means connected to vertically moveable means responsive to said vertical actuating means; and
vertical precision control means, cooperating with said vertical adjusting means, and connected to said moveable means.

4,028,033

APPARATUS FOR EMBOSSING A PLASTIC WORKPIECE USING VIBRATORY ENERGY

Ronald K. Bryant, Brookfield, Conn., assignor to Branson Ultrasonics Corporation, New Canaan, Conn.

Division of Ser. No. 569,807, April 21, 1975, abandoned. This application Feb. 17, 1976, Ser. No. 658,231
Int. Cl.² B29C *3/00*
U.S. Cl. 425—183 **10 Claims**



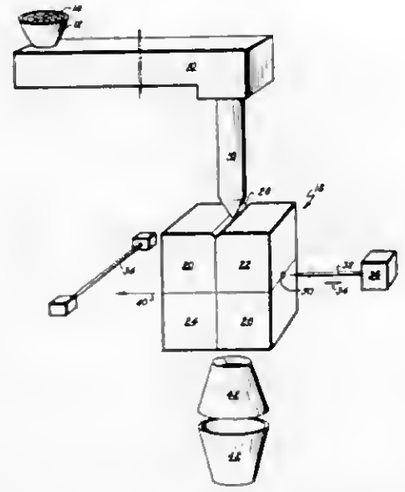
1. An embossing horn for use in a vibratory embossing apparatus comprising:
an elongated resonator dimensioned to be resonant along it longitudinal axis at a predetermined frequency of vibration;
a removable embossing ring having a plurality of circumferentially disposed ridges, said ridges forming a unitary part of said ring and being provided with peripherally disposed and radially extending embossing indicia, and
means for clamping said ring concentrically upon said resonator at or in proximity to an antinodal region of longitudinal motion of said resonator.

4,028,034

METHOD AND APPARATUS FOR BLOW MOLDING PLASTIC

Granville J. Hahn, Dallas, Tex., assignor to Cosden Oil & Chemical Company, Big Spring, Tex.

Division of Ser. No. 326,568, Jan. 24, 1973, Pat. No. 3,939,236, and a continuation-in-part of Ser. No. 81,488, Oct. 16, 1970. This application Feb. 14, 1975, Ser. No. 550,017
Int. Cl.² B29D *23/04*
U.S. Cl. 425—302 B **3 Claims**



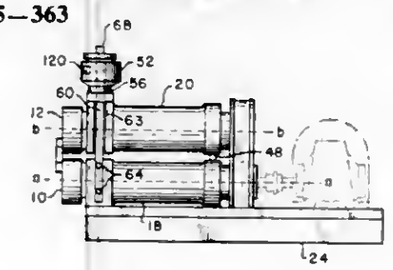
1. An apparatus for blow molding which comprises a split quadrisectional mold having an upper left mold quadrant, an upper right mold quadrant, a lower left mold quadrant and a lower right mold quadrant; said quadrants forming a mold cavity when joined; means connected to said upper mold quadrants for separately moving said upper mold quadrants relative to each other; means connected to said lower mold quadrants for separately moving said lower mold quadrants relative to each other; means connected to said upper mold quadrants for moving said upper mold quadrants relative to said lower mold quadrants; a hollow needle-like blowing means adjacent said mold and insertable through the mold center to blow mold a foamed plastic parison in the mold cavity to the shape of the mold; and cutting means adjacent said mold and insertable between upper and lower mold sections after blow molding said parison through said needle penetrated center for smoothly severing the blow mold product through the needle penetrated center to divide the same into substantially equal duplicate smoothly cut finished molded halves, said severing means being thin and adapted to pass as a single cut through the walls of the plastic molding and through the needle penctrated center without leaving any significant scrap residue.

4,028,035

FRAMELESS BRIQUETTING MACHINE

Karl R. Komarek, Chicago, Ill., assignor to K. R. Komarek, Inc., Elk Grove Village, Ill.

Filed Jan. 27, 1976, Ser. No. 652,776
Int. Cl.² B29C *15/00*
U.S. Cl. 425—363 **21 Claims**



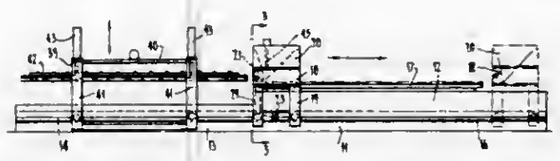
1. A press for forming briquettes of particulate material between the peripheral surfaces of a pair of rolls, comprising:
a. a pair of elongated shafts for rotating said rolls, said shafts being substantially parallel;
b. a pair of bearing housings for rotatably mounting said shafts, one of said bearing housings being rigidly mounted;
c. means for pivoting the other of said bearing housings to the rigidly mounted bearing housing for rotation in the plane of said shafts, said pivoting means being located substantially midway between the axes of said shafts; and
d. means for biasing said rolls into substantially tangential contact, said biasing means including pressure-responsive means proximate said rolls and rods slidably passing through said pivotally mounted bearing housing for connecting said rigidly mounted bearing housing to said pressure-responsive means.

4,028,036

ROTATABLE CONCRETE PROFILING MEANS

James Douglas Farfor, Brighton, Australia, assignor to Fictor Pty. Limited, Brighton, Australia

Filed June 3, 1975, Ser. No. 583,448
Claims priority, application Australia, June 3, 1974, 7747/74
Int. Cl.² B28B *3/12*
U.S. Cl. 425—374 **5 Claims**



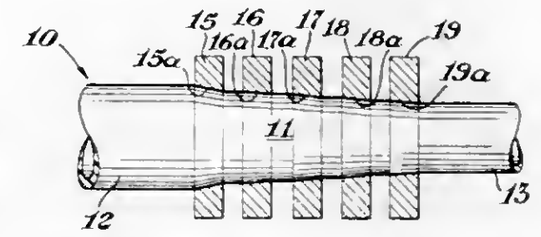
1. Means for shaping the surface of moldable material comprising a rotatable device journalized for rotation about an axis, means operatively coupled to the device for advancing the device normal to its axis of rotation along and over material to be molded whereby the surface of the material is molded by the engagement of the lower part of the peripheral surface of the device with the material, and means coupled with the said device for rotating the device about its axis of rotation in a direction counter to the direction it would rotate if rolled along the material surface in the direction of advancement so that the lower peripheral surface of the device moves in the direction of advancement and relative to the rate of advancement of the device whereby the surface of the device in engagement with the material is continuously changed and there is relative movement between the surface of the device and the material, the radius from the axis of rotation of the device, in at least some cross-sections of the device, varying in a smooth and stepless manner around the periphery of the device, said device being of circular cross-section but arranged eccentrically so that its geometric axis is spaced from the axis of rotation.

4,028,037

TUBE TREATING AND APPARATUS THEREFOR

David H. Dawson, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 559,347, March 17, 1975, abandoned, which is a division of Ser. No. 498,680, Aug. 19, 1974, Pat. No. 3,939,243. This application May 26, 1976, Ser. No. 690,227
Int. Cl.² B29C *17/00*
U.S. Cl. 425—392 **3 Claims**



1. A tube diameter reducing apparatus, the tube diameter reducing apparatus comprising in cooperative combination
a frame, the frame having a longitudinal axis,
a plurality of die plates supported within the frame and selectively portionable therein, the die plates each defining
a tube receiving opening, the tube receiving opening of the die plates being of generally successively decreasing diameter, the openings of the die plates being disposed in planes generally normal to the longitudinal axis, the openings of the die plates being generally coaxially disposed,
means to: (a) selectively position the die plates along the axis of the frame, (b) provide sequential movement of a minor portion of the die plates relative to a major portion thereof, and (c) subsequently move each of the die plates relative to a major portion of the die plates whereby a tube on having a diameter approximately the diameter of the larger tube receiving opening the tube on being passed through the openings of decreasing diameter by the movement of die plates is reduced in diameter.

4,028,038

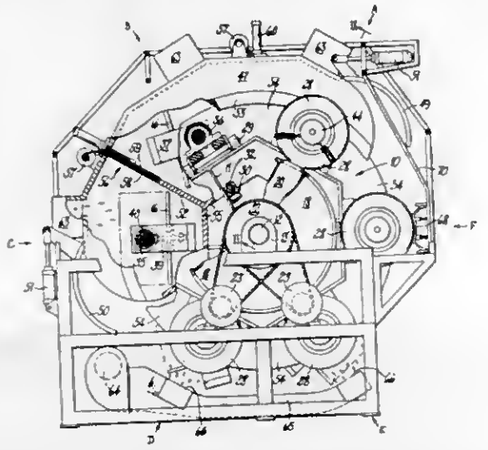
ROTATIONAL MOULDING MACHINES

Douglas John Haigh, Wellingborough, England, assignor to USM Corporation, Boston, Mass.

Filed Jan. 27, 1976, Ser. No. 652,766
Claims priority, application United Kingdom, Feb. 4, 1975, 4689/75
Int. Cl.² B29C *5/04*
U.S. Cl. 425—430 **10 Claims**

1. A rotational moulding machine comprising a turret mounted for rotation about a main axis, a plurality of mould carriers mounted on the turret at regular angular intervals

about the main axis, and indexing means operative to rotate the turret step-by-step about the main axis so as to bring, in indexing movements of the turret, each mould carrier in turn movable to a work station of the machine, each mould carrier being mounted for pivotal movement relative to the turret between a first position in which drive means of the machine



is operative to cause rotation of a mould mounted on the mould carrier, and a second position in which the drive means is inoperative in respect of the mould on that mould carrier, and the machine comprising independently operable clutch means whereby each mould carrier can be moved between its first and second positions.

4,028,039

REMOVAL OF INJECTION MOULDED PRODUCTS

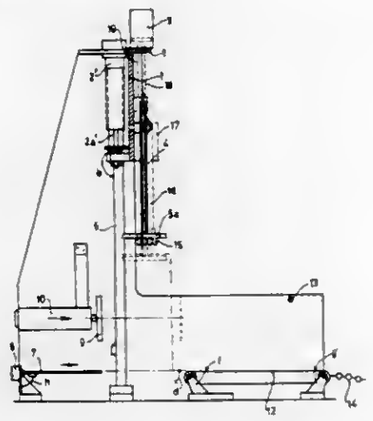
Warner Jan de Putter, Hardenberg, Netherlands, assignor to Wavin B.V., Netherlands

Filed Jan. 8, 1975, Ser. No. 539,723

Claims priority, application Netherlands, Jan. 9, 1974, 7400312

Int. Cl.² B29C *7/00*

U.S. Cl. 425—436 R **3 Claims**



1. A device for automatically removing a plastic article from the mould of an injection moulding machine having a pair of die halves, comprising a grab supported near the mould part of the machine for removing. and discharging a synthetic plastic article; means for moving said grab; said grab having a range covering the entire space formed by the open die halves; a lateral transfer and support member; means for moving said lateral transfer and support member; said transfer and support member having a range outside the operative area of the injection moulding machine for receiving said articles from the grab and discharging said articles beyond the machine; an actuating means comprising at least one moving part on the grab which sets the lateral transfer and support member into motion; the lateral transfer and support member comprising a laterally movable flat plate upon which the moulded articles are transferred externally of the machine; the range of said plate of the lateral transfer and support member intersecting the range of said grab to effect the article discharge; and means for increasing the moving speed of the grab when the die halves are partially open whereby the time between entirely open die halves and entirely closed die halves is minimized.

4,028,040

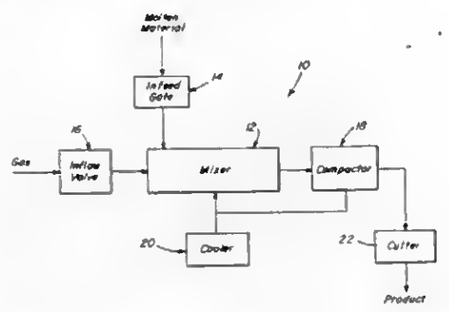
MATERIAL MIXING AND COMPACTING APPARATUS

Owen R. Waltrip, Roseville, Calif., assignor to Nuclear Supreme, Casper, Wyo.

Filed July 9, 1976, Ser. No. 704,077

Int. Cl.² B29C *3/04*

U.S. Cl. 425—449 **11 Claims**



1. Apparatus for processing a molten material, comprising an elongated housing having a pressure sealed mixing zone and a compaction zone, means for regulating infeed of said molten material into the mixing zone of the housing, means for displacing the material received from the infeed regulating means from the mixing zone into the compaction zone, means for injecting fluid into the material within the mixing zone, means for cooling the material within the housing to form a solid mass within the compaction zone, and means for expelling the solid mass, when formed, from the compaction zone.

4,028,041

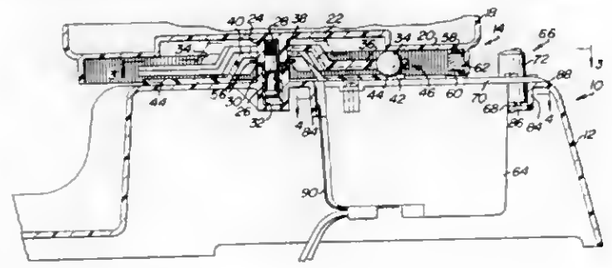
POTTER'S WHEEL

Noblie Zambrano, Jr., Branford, Conn., assignor to Gabriel Industries, Inc., New York, N.Y.

Filed May 4, 1976, Ser. No. 683,438

Int. Cl.² B28B *1/02*; **F16H** *13/08*

U.S. Cl. 425—459 **8 Claims**



1. A potter's wheel, comprising:

a casing;

a turntable assembly removably mounted on said casing, said turntable assembly including a turntable having a peripheral rim, said turntable being rotatably mounted on said casing, and a bearing assembly disposed beneath said turntable, said turntable and said bearing assembly being coupled for removal from said casing as a unit, a motor housing and a motor mounted therein having a shaft provided with a drive sleeve, said shaft and drive sleeve projecting outwardly from said housing, said housing being removably mounted on said casing for reciprocating movement thereon; and

means operatively associated with said motor housing and said casing for displacing said motor housing in a first direction to cause said drive sleeve to rollably engage said turntable peripheral rim and in a second direction to cause said drive sleeve to disengage said rim.

4,028,042

MOULDING APPARATUS

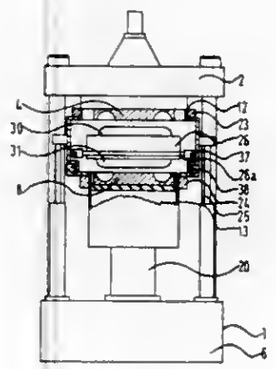
Anthony Gerald Goodfellow, Maghull, near Liverpool, and Maurice Rand, Skelmersdale, both of England, assignors to Dunlop Limited, London, England

Continuation of Ser. No. 495,135, Aug. 6, 1974, abandoned. This application Apr. 14, 1975, Ser. No. 567,843

Claims priority, application United Kingdom, Aug. 14, 1973, 38338/73

Int. Cl.² B29C *17/00*; **B29F** *1/00*

U.S. Cl. 425—515 **13 Claims**



1. A moulding apparatus for moulding a hollow rubber article which is first formed in two or more separate parts, the apparatus comprising:

a. means to pre-work unvulcanized rubber without any substantial curing, prior to the rubber being formed into the parts;

b. two mould halves arranged for relative movement towards and away from each other, and each having a mould cavity for a respective one of said article parts, and a locking spue groove adjacent said mould cavity to prevent accidental displacement of a moulded article part from its respective mould cavity;

c. two sleeves respectively surrounding and carried by said two mould halves and having similar radial cross-section;

d. male formers to co-operate respectively with the mould cavities to provide mould chambers into which molten rubber can be fed to provide said article parts;

e. means to feed the pre-worked rubber to said mould chambers; and

f. means to provide super-atmospheric gaseous pressure in the space between the mould halves when separated apart, said last recited means including a retractable casing which is movable between an operative position in which the mould halves are enclosed in a gas-tight volume by the casing, and a retracted position in which the mould halves are not enclosed in a gas-tight volume, said casing having in two opposed walls thereof corresponding apertures which can engage in a gas-tight fit the two respective sleeves carried by the two mould halves.

4,028,043

CIGARETTE LIGHTER WITH PRESALE TAMPER PROTECTION

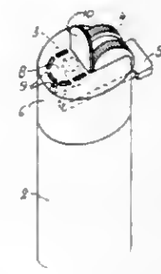
Guy Neyret, Francheville, France, assignor to Genoud & Cie., Venissieux, France

Filed July 29, 1975, Ser. No. 600,072

Claims priority, application France, July 29, 1974, 74.27049

Int. Cl.² F23Q *25/00*

U.S. Cl. 431—144 **5 Claims**



1. A lighter comprising:

a reservoir having an end and containing a supply of fuel;

a burner on said end;

valve means at said end between said burner and the interior of said reservoir actuatable for feeding said fuel to said burner;

ignition means at said end adjacent said burner and having a striker wheel rotatable for sparking at said burner and igniting fuel issuing therefrom;

an anular metal cap covering said end and having a flat wall extending transversely to said burner, said wall being formed with a window receiving said wheel and aligned with said burner;

a metal tab received within said window and covering said burner; and

a destructible connection securing said tab in said portion;

said tab and said connection unitarily formed with said cap, said connection being at least one relatively thin web interconnecting said tab and said cap, said wheel projecting above said wall.

4,028,044

FUEL BURNERS

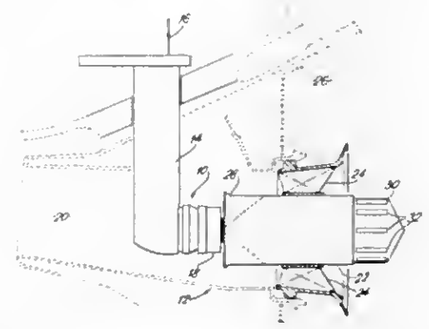
Denis Richard Carlisle, Risley, England, assignor to Rolls-Royce (1971) Limited, London, England

Filed Sept. 30, 1975, Ser. No. 618,238

Claims priority, application United Kingdom, Oct. 7, 1974, 43418/74

Int. Cl.² F23R *1/00*

U.S. Cl. 431—158 **4 Claims**



1. A gas turbine engine fuel burner positioned in a combustion chamber comprising:

a fuel supply means having at least one fuel nozzle and a vaporizing and pre-mixing duct which is arranged to receive both fuel from the fuel supply means and a supply

of compressed air, said vaporizing and pre-mixing duct being closed off at its downstream end and having an outlet just upstream of the downstream end for discharging a vaporized mixture of fuel and compressed air into the combustion chamber for burning therein, said outlet comprising a plurality of slots spaced around the periphery of the duct, said slots being elongated and having the longest side of each slot extending substantially parallel to the longitudinal axis of the duct, said slots having a total surface area which is substantially one third of a total exterior area of said vaporizing and pre-mixing duct between extremities of the slots whereby the fuel burner has good weak extinction characteristics.

4,028,045

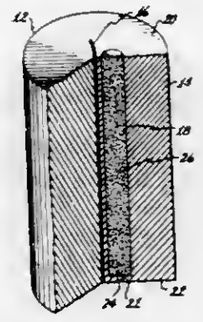
SPECIALIZED CANDLE

Wilfred L. Reiher, 4701 N. 55th St., Phoenix, Ariz. 85018

Filed Apr. 4, 1975, Ser. No. 565,270

Int. Cl.² F23D *3/16*

U.S. Cl. 431—289 **4 Claims**



1. A candle structure comprising:
a. an elongated candle body having a coextensive bore;
b. an elongated candlewick in said candle body and extending substantially along the longitudinal axis thereof; and
c. a wickless columnar body located within said bore and laterally spaced from and substantially parallel with respect to said candlewick and coextending therewith, said columnar body formed of a mixture of candle wax and a deodorizing chemical, said columnar body located adjacent said candlewick for controlled release of the deodorizing chemical in response to the heat of the flame of said candlewick when said candlewick is lit.

4,028,046

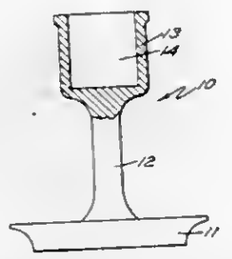
METHOD OF MOUNTING A CANDLE

Charles A. Kilvert, 21 Barnes St., Providence, R.I. 02906

Filed Oct. 3, 1975, Ser. No. 619,211

Int. Cl.² F23D *3/16*

U.S. Cl. 431—297 **2 Claims**



1. In the method of mounting a candle with a solid circular end diameter base comprising providing a candlestick holder having an upwardly opening recess therein and a cup with a uniform inner surface diameter and an imperforate bottom and an upstanding side wall of an outer size to fit into said recess, placing said cup in said recess with molten material surrounding said upstanding side wall, allowing the molten material to solidify and secure the cup in said recess, reducing by showing the solid base of said candle to a uniform circular diameter to fit within the upstanding wall of said cup and mounting the candle in said cup with its base against the inner surface thereof.

4,028,047

PHOTOELECTRIC START-STOP CONTROLS FOR GAS BURNER

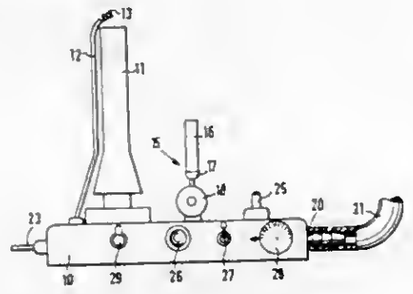
Alfred Strunz, Rietberg, and Jürgen Rohrer, Gutersloh, both of Germany, assignors to Firma Dr. Th. Wieland, Pforzheim, Germany

Filed Dec. 19, 1975, Ser. No. 642,571

Claims priority, application Germany, Dec. 21, 1974, 2460745

Int. Cl.² F23D *13/40*

U.S. Cl. 431—355 **9 Claims**



1. A device for electrically starting and stopping the operation of a bunsen burner, or of a comparable source-fed intermittently operable apparatus, in response to the presence in its immediate vicinity of and operator's hand holding an object to be heated by the burner, for example, the device comprising in combination:
a gas line adapted for connection to a source of combustible gas;
a solenoid valve in the gas line, the valve being normally closed and opening in response to the energization of the solenoid coil;
a connection to a source of electrical power for the operation of the solenoid valve; and
a dimmer switch circuit with a valve relay controlling the solenoid valve; and wherein
said circuit includes means for photoelectrically sensing the presence of the operator's hand in the vicinity of the burner, by responding to its shadow in an ambient light field other than the light field which is created by the gas burner when its flame is burning.

4,028,048

SCRAP METAL PREHEATING APPARATUS AND METHOD

Harrison R. Woolworth, P.O. Box 88573 Tukwila Branch,, Seattle, Wash. 98188

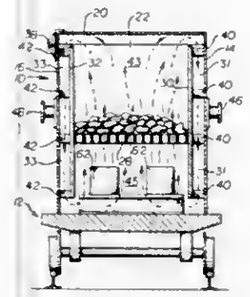
Continuation-in-part of Ser. No. 543,114, Jan. 22, 1975, abandoned. This application Oct. 20, 1975, Ser. No. 623,998

Int. Cl.² F27D *7/00, 17/00*

U.S. Cl. 432—5 **12 Claims**

1. A movable apparatus for preheating a material comprising:
a. housing means defining a substantially fluid tight receptacle having a top,
b. a load-supporting member located within said housing means and so positioned therein as to divide said receptacle into a closed upper portion and a lower portion, said load-supporting member having apertures therein placing

the lower portion of said receptacle in fluid communication with the upper portion of said receptacle along a first flow path,
c. conduit means associated with said housing means and defining a fluid channel for placing the upper portion of said receptacle in fluid communication with the lower portion of said receptacle via a second flow path separate from said first flow path, said conduit means having an inlet positioned adjacent said top of said receptacle, said inlet placing said fluid channel in fluid communication with the upper portion of said receptacle, said conduit means extending from the upper portion of said receptacle to the lower portion of said receptacle, said conduit



means having an outlet positioned in the lower portion of said receptacle, said outlet placing said fluid channel in fluid communication with the lower portion of said receptacle,
d. door means associated with said housing means to allow access to the upper portion of said receptacle,
1. for charging the upper portion of said receptacle with a material to be heated, and,
2. for discharging a heated material from the upper portion of said receptacle, and,
e. means associated with said housing means for gaining access to the lower portion of said receptacle for positioning a heated object therein.

4,028,049

METHOD AND INSTALLATION OF TREATING RAW MATERIAL FOR PRODUCING CEMENT

René Naudy, Narbonne; Francois Phoyu, Port La Nouvelle; Louis Robert, Port La Nouvelle; Maurice Legousse, Port La Nouvelle; Jean-Marie Audouard, Boulogne, and Hervé Le Roux, Montelimar, all of France, assignors to Ciments Lafarge S.A., Paris, France

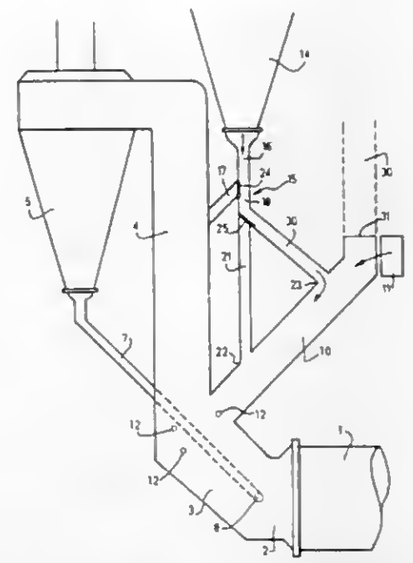
Filed Mar. 25, 1975, Ser. No. 561,856

Claims priority, application France, Mar. 29, 1974, 74.11196; Sept. 11, 1974, 74.30711

Int. Cl.² F27B *15/00*

U.S. Cl. 432—14 **4 Claims**

1. In a method for treating raw material containing solid substances for producing cement, in an installation comprising: a rotary clinkerization kiln, said kiln having an inlet end and an outlet end, said kiln inlet end being in communication with a junction chamber defined by a junction member; a downwardly directed flow path including a plurality of successive cyclones each defining a cyclone chamber, a fumes conduit for interconnecting the last of said cyclone chambers with said junction chamber whereby the fumes issuing from said inlet end of said kiln will flow through said junction chamber and said fumes conduit into said last cyclone chamber, a material inlet conduit for interconnecting the material outlet of said last of said cyclones with said junction chamber at a point adjacent said kiln inlet; said method comprising the steps of drying, dehydroxylating, and decarbonating said material by feeding said solid substances along said downwardly directed flow path into said inlet end of said clinkerization kiln, and contacting said solid substances, while said substances are fed along said downwardly directed flow path, with a current of upwardly directed gases generated in said kiln and issuing through said inlet end thereof, the improvement comprising the additional steps of: removing an adjustable portion of the material issuing from the penultimate one of said successive cyclones and injecting said removed portion of material into said junction chamber at a location downstream, with reference to the flow direction of said current of gases issuing from said inlet end of said kiln, from the point of communica-



tion of said materials inlet conduit with said junction chamber, and directing the remainder of said material issuing from said penultimate cyclone into said fumes conduit at a point downstream of said injection location of said adjustable portion of material issuing from said penultimate cyclone, whereby said adjustable portion of material may be used to cool the current of gases issuing from said inlet end of said kiln to thereby reduce the buildup of deposits in said installation.

4,028,050

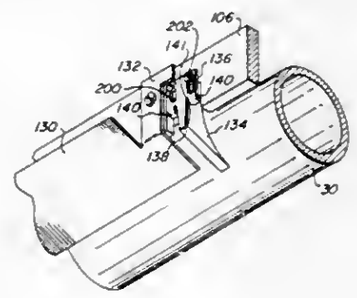
STRIPPER FINGER AND COMBINATION MOUNTING MEANS THEREFOR

Ari Bar-on, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed June 24, 1974, Ser. No. 482,676

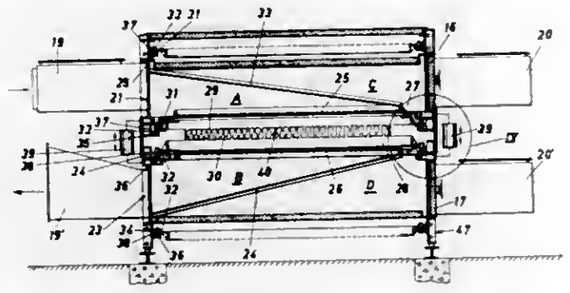
Int. Cl.² B65H *29/56*

U.S. Cl. 432—59 **6 Claims**



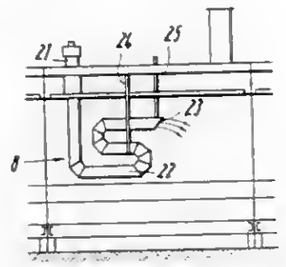
6. Stripper finger support and bias structure utilized in conjunction with a heated fuser member for stripping copy sheets therefrom, said structure comprising:
a unitary member havng a pair of rolled portions providing bearing surfaces for a shaft of said stripper finger, said unitary member also having a finger engaging portion which biases the stripper finger into engagement with said heated fuser member to thereby provided suitable contact engagement pressure.

4,028,051
CURING OVEN FOR MINERAL WOOL
Bengt Lundström, Torslanda, Sweden, assignor to Jungers Verkstads AB of Goteborg, Sweden
Filed Sept. 5, 1975, Ser. No. 610,854
Claims priority, application Sweden, Sept. 27, 1974, 7412167
Int. Cl.² F27B 9/00; F26B 25/00
U.S. Cl. 432—144 6 Claims



1. An oven for curing impregnated mineral wool mats, such as rock or glass wool as they pass through the oven comprising in combination:
an insulated housing;
a pair of endless conveyors defining a longitudinal path of travel through said insulated housing and having opposed confronting portions cooperating with opposite sides of the impregnated mineral wool mats to be maintained at an appropriate thickness as they are conveyed through the oven;
the oven including pressure-and-evacuation chamber means at opposite sides of the longitudinal path of travel of the conveyors and including means for directing a fluid treatment medium through the mat between the opposed confronting portions of the conveyors;
means for driving the conveyors through the insulated housing, said means for driving the conveyors being located outwardly of the pressure-and-evacuation means whereby the means for driving the conveyors are not generally subjected to curing temperatures immediately present in the chambers where the mineral wool is being cured, said oven including mutually-reversed separate chamber means communicating with said pressure-and-evacuation means for circulating the fluid treating medium through opposite sides of the mineral wool mats as they are cured, and
means connected to the oven for maintaning interior areas of the housing, outside the pressure-and-evacuation chamber means, at a lower pressure than ambient pressure, said pressure-and-evacuation chamber means for directing the fluid treatment medium comprising a decreasing cross-sectional area transverse to the longitudinal direction of travel of the conveyors and in communication with induction and evacuation ports through which the fluid treatment medium is circulated.

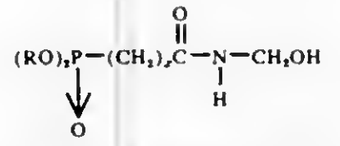
4,028,052
TUNNEL FURNACE FOR THE HEAT TREATMENT OF ARTICLES
Gerardus H. Th. M. Verhoeven, Zevenaar, and Heinrich P. Stensen, Nijmegen, both of Netherlands, assignors to Smit Ovens Nijmegen B.V., Nijmegen, Netherlands
Filed Apr. 23, 1975, Ser. No. 570,966
Claims priority, application Germany, Nov. 4, 1974, 7436722[U]
Int. Cl.² F27B 9/00
U.S. Cl. 432—145 4 Claims



1. A tunnel furnace composed of individual sections for the heat treatment of articles which are transported through said tunnel comprising:
a rotating, endless, air permeable conveyor belt for carrying said article through a main heating space;
means for separating each said section into said main heating space and outer spaces on either side of said main space in communication with said heating space at the top thereof and below said belt;
circulation fans within said furnace for circulating air in a continuous path upwards through said conveyor belt and then downwards through said outer spaces;
a heater disposed in each said outer space comprising a vertically extending burner pipe and a pipe section extending therefrom in a vertical plane in said outer space for conducting the flame and combustion gases, said section having an S-shaped configuration with vertically spaced horizontal portions connected by U-shaped portions so that the combustion gases flow upward during a portion of their travel within said section and for heating said circulating air which moves past said burner pipe and said section, said section terminating in a mouth exposed to the circulating air flow.

4,028,053
FIRE RETARDANT FABRICS AND METHOD FOR PREPARATION THEREOF
Marshall W. Duke, Aiken, S.C., assignor to United Merchants and Manufacturers, Inc., New York, N.Y.
Continuation-in-part of Ser. No. 314,532, Dec. 13, 1972, abandoned. This application Feb. 18, 1975, Ser. No. 550,295
Int. Cl.² D06M 1/00
U.S. Cl. 8—116 P 10 Claims

1. A process for rendering a cellulose containing fabric fire retardant comprising:
a. impregnating the fibers of a cellulose-based fabric having a minimum cellulose content of about 80% by weight with an aqueous solution of an aminoplast resin, an acid having a first hydrogen acid dissociation constant in the range from about 1×10^{-1} to 5×10^{-5}, and an effective amount of a dialkyl phosphono methylol alkylamide to produce fire retardancy in the resulting fabric having the formula



(I)

Wherein R is a lower alkyl having from 1 to 6 carbon atoms and x is an integer from 1 to 3;
b. wet fixing the resin in the impregnated fabric and then
c. drying the fabric;
d. curing the resin in the fabric, and
e. washing and drying the fabric.

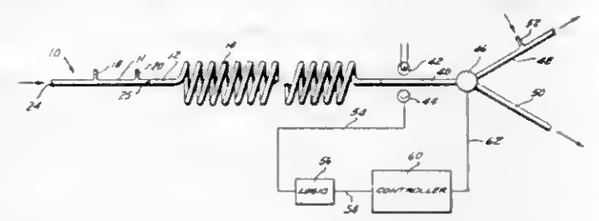
4,028,054
PERMANENT-PRESS SYSTEM
Bernard F. North, Rock Hill, and George H. Lourigan, Chester, both of S.C., assignors to Sun Chemical Corporation, New York, N.Y.
Continuation-in-part of Ser. No. 565,071, April 9, 1975, Pat. No. 3,954,405. This application Mar. 26, 1976, Ser. No. 670,705
Int. Cl.² D06M 13/34, 13/36
U.S. Cl. 8—185 10 Claims

5. In a process for producing crease-resistant textiles comprising impregnating a textile with a solution of dimethylol dihydroxyethylene urea or a partially or wholly methylated derivative thereof, a catalyst, and a buffering agent and heating the impregnated textile to cure the resulting impregnated textile and impart crease-resistance thereto, the improvement wherein the catalyst is aluminum sulfate and the buffering agent is sodium metaborate.

4,028,055
ANTI-CORROSIVE AGENT FOR METALS
Tsunesuke Doi, Tama; Hiroshi Komoto, Yokohama; Masazumi Chono, Yokohama; Akira Inoue, Yokohama; Kazuaki Saito, Chigasaki, and Isao Shinozuka, Kawasaki, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan
Filed Mar. 17, 1976, Ser. No. 667,622
Claims priority, application Japan, Mar. 19, 1975, 50-33392
Int. Cl.² C09K 3/00; C23F 11/04, 11/06, 11/10; C23G 1/05, 1/18, 1/26
U.S. Cl. 21—2.7 R 7 Claims

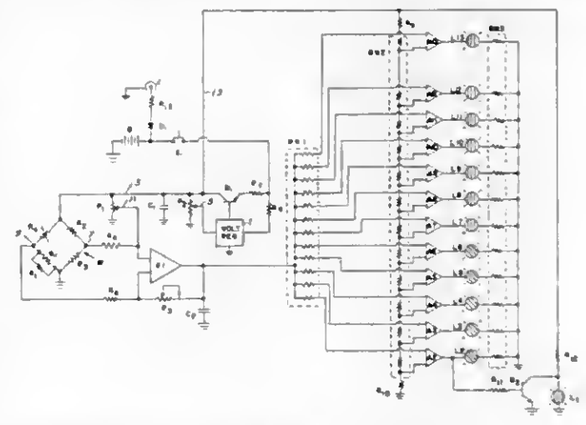
1. A method of inhibiting corrosion of metal surfaces comprising applying to a metal surface a solution or dispersion containing an effective concentration of at least one saturated aliphatic triamine of 9 carbon atoms having a main chain which is branched at the 4-position and having a primary amino group at each carbon atom in a terminal position.

4,028,056
SUBSTANCE SEPARATION TECHNIQUE
Lloyd R. Snyder, Yorktown Heights; Bruce J. Oberhardt, Hartsdale, and Jack Olich, Mahopac, all of N.Y., assignors to Technicon Instruments Corporation, Tarrytown, N.Y.
Filed Apr. 20, 1976, Ser. No. 678,778
Int. Cl.² B01D 43/00; B01L 11/00; G01N 33/00, 33/16
U.S. Cl. 23—230 B 20 Claims



1. A method of separating a particulate portion from a mixture including a liquid portion, comprising the steps of: introducing said mixture into a liquid stream flowing along an open bore conduit having an internal surface of porous configuration for permeation thereof by at least said liquid portion, segmenting said liquid stream with immiscible fluid segments during passage along said open bore of said conduit, permeating over a period of time the internal surface of said conduit with at least said liquid portion during the flow of said mixture along said open bore of said conduit to retard the flow of said liquid portion along said conduit and separating at least one of said portions.

4,028,057
GAS ANALYZER
David M. Nelson, Verona, Pa., assignor to Ambac Industries, Inc., Pittsburgh, Pa.
Filed Apr. 29, 1976, Ser. No. 681,444
Int. Cl.² G01N 27/16; G08B 21/00
U.S. Cl. 23—254 E 4 Claims



1. A gas analyzer comprising:
a Wheatstone bridge including a catalytic resistance element in a first leg thereof exposed to the gas to be analyzed and a compensating resistance element in a second leg, said resistance elements each having an electrical resistance which increases in response to heat generated by an electric current passed therethrough, the electrical resistance of said catalytic resistance element being further increased by heat generated by combustion of the gas to be analyzed coming in contact with the heated catalytic resistance element;
an electric power supply connected to said Wheatstone bridge;
a plurality of light emitting diodes arranged to form an analog display;
means for applying electric power from said power supply to successive LEDs in the analog display in proportion to the imbalance of the Wheatstone bridge produced by the

presence of the gas to be analyzed including a reference voltage generator for generating a plurality of voltages ranging in magnitude in steps from a voltage corresponding to a balanced output of the bridge up to a voltage corresponding to a predetermined imbalance, and comparison means associated with each LED in the analog display for comparing the output of the Wheatstone bridge with one of said plurality of reference voltages and for turning on the associated LED when the output of the bridge circuit exceeds the associated reference voltage; and

an impedance which is relatively temperature independent compared to the catalytic and compensating resistance elements connected in parallel with the compensating resistance element in said second leg of the Wheatstone bridge which drives the bridge circuit negative and prevents the LEDs in the analog display from illuminating until the catalytic and compensating resistance elements reach operating temperature.

4,028,058

DEVICE FOR MAKING MONOCRYSTALLINE GALLIUM ARSENIDE

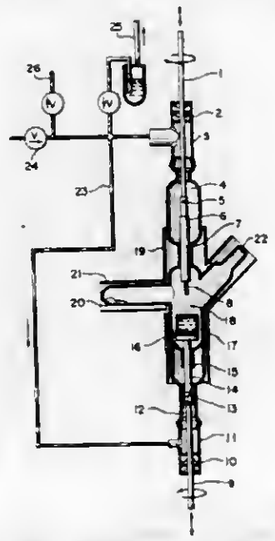
Klaus Beinert, and Herbert Weidner, both of Burghausen, Germany, assignors to Wacker-Chemitronic Gesellschaft fur Elektronik-Grundstoffe mbH, Burghausen, Germany

Filed Mar. 21, 1975, Ser. No. 560,744

Claims priority, application Germany, Apr. 30, 1974, 2420899

Int. Cl.² B01J *17/18*

U.S. Cl. 23—273 SP **6 Claims**



1. A device for making monocrystalline gallium arsenide by drawing a crystal from a gallium arsenide containing melt, comprising a quartz apparatus, a crucible in said apparatus for receiving the melt in an uncovered state, means for drawing the crystal, means for rotating and lifting or lowering said drawing means, means for rotating and lifting or lowering the crucible without rotating the entire quartz apparatus, said crucible having a driving shaft passing through ground-in joint, said joint comprising the core of said shaft and a quartz glass sleeve, said core being made from a material having a higher coefficient of expansion than quartz glass at the operating temperature of said joint and which is fracture proof and low in abrasion at the operating temperature of said joint said shaft carrying coupling means to said crucible to allow rotation of the crucible.

4,028,059

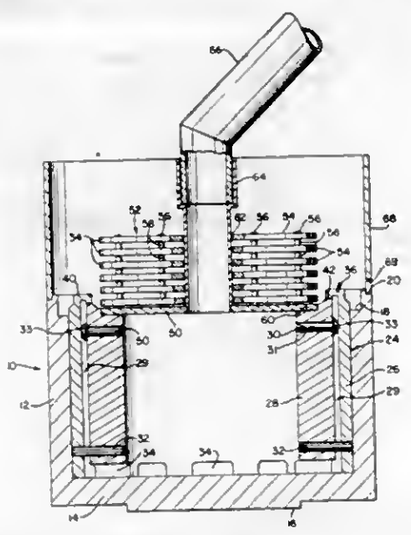
MULTIPLE DIES FOR RIBBON

Harold E. LaBelle, Jr., Hanover, and Charles J. Cronan, Taunton, both of Mass., assignors to Tyco Laboratories, Inc., Waltham, Mass.

Continuation-in-part of Ser. No. 641,744, Dec. 18, 1975, abandoned. This application Oct. 12, 1976, Ser. No. 731,948

Int. Cl.² B01J *17/18*; **B22C** *9/08*; **B22D** *39/00*

U.S. Cl. 23—273 SP **20 Claims**



1. Apparatus for use in growing crystalline bodies from the melt comprising a crucible open at the top and having a bottom wall and a side wall, and a die assembly disposed within said crucible, said die assembly comprising two separate parts in the form of inner and outer concentric members, said members being spaced with respect to one another to define a lower capillary passage having a bottom end that communicates with the interior space of said crucible adjacent said bottom wall, one of said members being longer than the other and having at its upper end an extension which overhangs and engages the upper end of said other member, said extension comprising first slots which subdivide said extension into a plurality of dies with top end surfaces and second slots in said dies which intersect the space between said inner and outer members and provide capillaries between said lower capillary passage and said top end surfaces of said dies.

15. A die assembly for use in growing a plurality of crystalline bodies from the melt, said die assembly comprising inner and outer concentric sleeves, said sleeves being spaced with respect to tone another to define a capillary passage, and means locking said sleeves against relative movement, one of said sleeves being longer than the other sleeve and having at one end a radially extending flange which overlies and engages the corresponding end of the other sleeve, said flange comprising first slots which subdivide said flange into a plurality of dies with top end surfaces and second slots in said dies which intersect the passage between said inner and outer sleeves and provide capillaries leading from said capillary passage to the top end surfaces of said dies.

4,028,060

METHOD AND APPARATUS FOR THE THERMAL EXTRACTION OF HYDROCARBONS FROM A SOLID MATRIX

Charles E. Godsey, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Filed Mar. 26, 1976, Ser. No. 670,790

Int. Cl.² B01D *11/02*

U.S. Cl. 23—293 R **15 Claims**

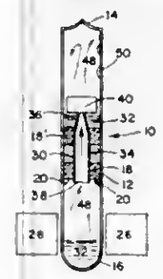
8. A method for extracting organic material from a sample portion of a solid matrix containing said organic material, said method comprising;

a. mixing said sample with a water absorbing material to form a sample mixture;

b. positioning said sample mixture in an apparatus comprising;

1. an outer tubular member having a first sealable end and a second sealed end; and

2. a permeable sample support means intermediate said first end and said second end of said outer tubular member



said sample mixture being supported by said support means so that at least a portion of said support means is between said sample mixture and said second end

c. sealing said first sealable end of said outer tubular member;

d. simultaneously heating said first end of said outer tubular member and cooling said second end of said outer tubular member.

4,028,061

SILVER-CADMIUM OXIDE ALLOYS

Han J. Kim, Chelmsford, and F. Joseph Reid, Acton, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Division of Ser. No. 521,609, Nov. 11, 1974, Pat. No. 3,969,112. This application June 17, 1976, Ser. No. 696,979

Int. Cl.² C22C *5/10*

U.S. Cl. 75—233 **2 Claims**

1. An as-sintered, non-cold worked silver cadmium oxide alloy comprising about 70% to about 95% silver about 30% to about 5% cadmium oxide, and a quantity of the thermal decomposition product of from about 0.05% to about 0.5% of an additive selected from the group consisting of the alkali metal and alkaline earth metal salts of nitric acid, said alloy being characterized by an as-sintered density of about 99% of theoretical, and enhanced tensile strength and toughness.

4,028,062

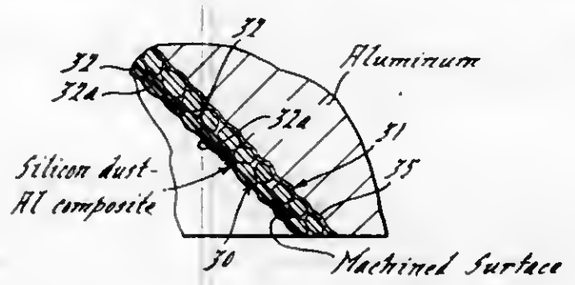
ALUMINUM CYLINDER HEAD VALVE SEAT COATING TRANSPLANT

Adolf Hetke, Livonia, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 608,439, Aug. 27, 1975. This application May 5, 1976, Ser. No. 683,368

Int. Cl.² B32B *15/20*

U.S. Cl. 428—558 **6 Claims**



1. A composite casting product, comprising:

a. cast body of aluminum substantially devoid of silicon,

b. a machined wear surface on said body disposed interiorly of said casting, said wear surface having a thin layer of silicon particles integrally bonded to said aluminum, each silicon particle having one flat facet exposed coincident with said surface and having the remaining facets thereof covered by an aluminum-silicon alloy layer acting as a metallurgical binder to the surrounding aluminum body.

4,028,063

COMPACTS FOR PREPARING SILVER-CADMIUM OXIDE ALLOYS

Han J. Kim, Chelmsford, and F. Joseph Reid, Acton, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Division of Ser. No. 521,609, Nov. 11, 1974, Pat. No. 3,969,112. This application June 17, 1976, Ser. No. 697,175

Int. Cl.² B22F *3/02*

U.S. Cl. 75—233 **3 Claims**

1. A pressed unsintered compact comprising a mixture of about 70% to about 95% of finely-divided silver particles, about 30% to about 5% of finely-divided cadmium oxide particles, and about 0.05% to about 0.5% of an additive selected from the group consisting of the alkali metal and alkaline earth metal salts of nitric acid.

4,028,064

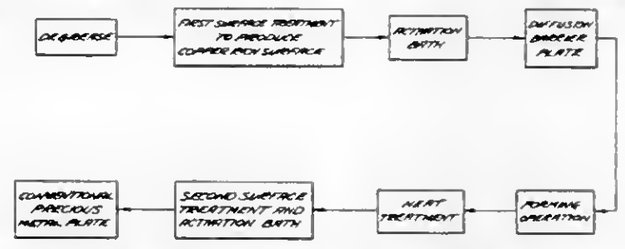
BERYLLIUM COPPER PLATING PROCESS

Stephen Cassidy, Canton, Mass.; Robert Babolan, Johnston; Raymond A. Frechette, Woonsocket, both of R.I.; Gardner S. Haynes, Attleboro, Mass., and John W. Ross, Cumberland, R.I., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 17, 1976, Ser. No. 658,319

Int. Cl.² C25D *5/12*, *5/34*, *5/50*

U.S. Cl. 428—675 **15 Claims**



2. A process for electroplating beryllium copper material in which a heat treatment after forming is needed to obtain a desired temper comprising the steps of:

degreasing the material to remove any organic substances;

passing the material through an anodic alkaline solution to form beryllium compounds of the beryllium in the beryllium copper both on the surface and in molecular portions immediately adjacent the surface of the beryllium copper;

passing the material through a concentrated sulfuric acid bath to dissolve the formed beryllium compounds thereby providing for a copper-rich skin;

activating the surface of the material for electroplating;

electroplating the copper-rich surface with a beryllium diffusion barrier plate;

heat treating the beryllium copper material to the desired temper;

activating the surface of the material for electroplating; and

electroplating the material with a suitable plating material.

4,028,065

MANGANESE CONTAINING FUELS

James W. Sprague, Bedford; Daniel W. Feldman, Beachwood, and Franklin Veatch, Cleveland, all of Ohio, assignors to Standard Oil Company, Cleveland, Ohio

Continuation-in-part of Ser. No. 470,692, May 16, 1974, Pat. No. 3,966,429. This application Nov. 27, 1974, Ser. No. 527,676

The portion of the term of this patent subsequent to June 29, 1993, has been disclaimed.

Int. Cl.² C10L 1/18

U.S. Cl. 44—68 40 Claims

1. Gasoline containing an added gasoline soluble manganese compound to improve the octane rating of the gasoline and including a small but effective amount of a gasoline soluble hydrocarbon ester of citric acid.

4,028,066

LOW VISCOSITY-HIGH FLASH POINT RAMJET AND TURBOJET FUELS

George W. Burdette, and Dean H. Couch, both of China Lake, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 21, 1974, Ser. No. 516,068

Int. Cl.² C10L 1/16

U.S. Cl. 44—80 4 Claims

1. In the process for propelling a ramjet or turbojet engine wherein a fuel is injected into a combustion chamber, mixed with air and combusted, the improvement residing in utilizing, as the fuel, a mixture consisting essentially of 80 ± 2% petroleum distillate which boils at a temperature of from 380° F to 415° F and a balance butylbenzene, said mixture having a flashpoint of about 140° F and freezing at a temperature of lower than −65° F.

4,028,067

PROCESS FOR PRODUCING COMBUSTIBLE GASES

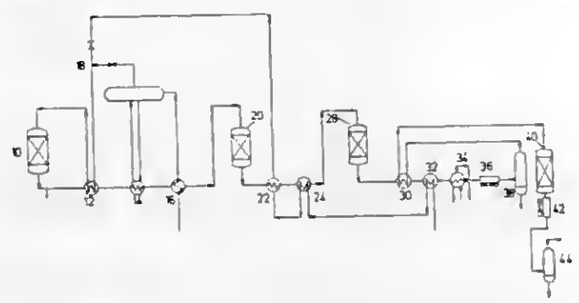
Colin William Gent, Stockton-on-Tees, England, assignor to Imperial Chemical Industries Limited, London, England

Filed June 3, 1975, Ser. No. 583,292

Claims priority, application United Kingdom, June 10, 1974, 25639/74

Int. Cl.² C10G 11/28

U.S. Cl. 48—197 R 4 Claims



1. A process for producing a substitute natural gas which consists essentially of reacting methanol vapour in a decomposition stage, wherein the feed to the decomposition stage contains steam and the molar ratio of steam to methanol is in the range of 0.3 to 2.0, under substantially adiabatic conditions with an outlet temperature of at least 600° C over a refractory catalyst having steam reforming and methanation activity, cooling the resulting gas by indirect heat exchange to a temperature in the range 250° –350° C, methanating the resulting cooled gas in a first catalytic methanation stage with an outlet temperature in the range 500° –650° C, cooling the resulting first catalytic methanation stage gas by indirect heat exchange and methanating the cooled gas in at least one further catalytic methanation stage, said refractory catalyst containing nickel, cobalt or mixtures thereof on a refractory support, the content of nickel, cobalt or mixtures thereof being in the range 40–85% by weight as metal oxide on the non-volatile content of the oxide precursor from which the catalyst is made by reduction, the refractory support having been introduced into the catalyst partly by coprecipitation and partly as solid powder.

4,028,068

PROCESS AND APPARATUS FOR THE PRODUCTION OF COMBUSTIBLE GAS

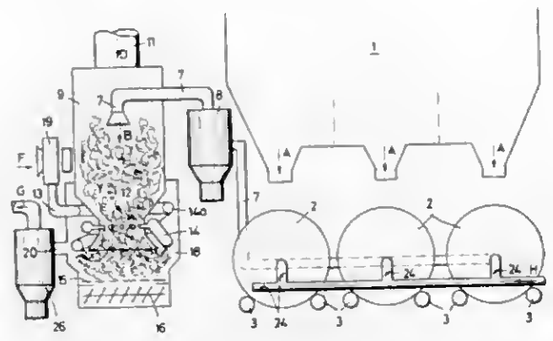
Karl Kiener, 7081 Goldshofe, Ostalbkreis, Germany

Filed June 26, 1975, Ser. No. 590,715

Claims priority, application Germany, July 4, 1974, 2432504; June 16, 1975, 2526947

Int. Cl.² C10J 3/06, 3/58

U.S. Cl. 48—209 7 Claims



1. A process for the disposal of domestic and industrial refuse with simultaneous production of combustible gases wherein domestic or industrial waste in particulate form is carbonised in a first process stage by indirect heating, with the exclusion of air, at a temperature between about 300° to 600° C producing carbonization gases and solid residues and said carbonization gases are passed to a separate, second process stage wherein, at a temperature between about 1000° and 1200° C, said gases are reacted with preheated air and solid carbonization coke from said first process stage to produce combustible gases, wherein (a) in said first process stage said waste in particulate form is subjected to continuous rotation in a cylindrical zone about a substantially horizontal longitudinal axis, (b) dust is separated from said carbonization gases between said first and second process stages, (c) the carbonization gases from step (b) are mixed with preheated air prior to contact with carbonization coke in said second process zone and (d) carbonization coke for said second process zone is obtained from a recovery stage in which solid residues produced in said first process stage are separated into a carbonization coke portion with an ash softening point of at least 1200° C and a non-combustible substances portion.

4,028,069

PURIFICATION AND DRYING OF HYDROCARBON STREAMS WITH ADSORBENTS

John P. Nolley, Jr., Glendale Heights, and John G. Kunesh, Deerfield, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed Aug. 30, 1976, Ser. No. 719,029

Int. Cl.² B01D 53/04

U.S. Cl. 55—33 12 Claims

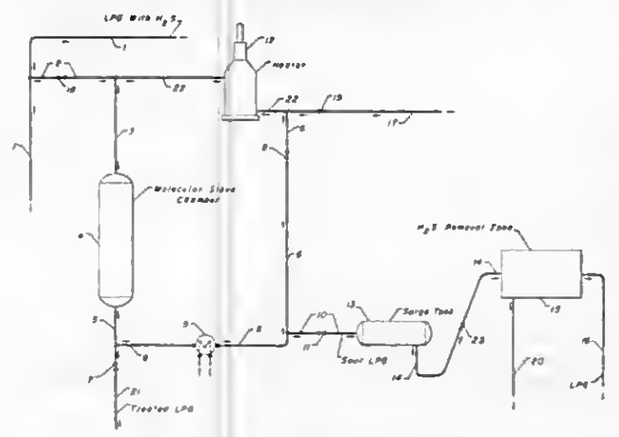
1. A process for removing a preselected chemical compound from a fluid stream by the use of a bed of a solid adsorbent which comprises the steps of:

a. passing a feed stream comprising a hydrocarbon and a chemical compound different than the hydrocarbon through a first bed of adsorbent material at conditions effective to cause the removal of the chemical compound from the feed stream by adsorption, including a preselected adsorption temperature;

b. switching the passage of the feed stream from through the first bed of adsorbent material to through a second bed of adsorbent material;

c. heating the first bed of adsorbent material by continuously recirculating a fixed quantity of a heating fluid which comprises a hydrocarbon contained in the feed stream through the first bed of adsorbent material in a closed-loop recirculation system comprising a heating means and the first bed of adsorbent material while heat is being added to the heating fluid by the heating means;

d. terminating the closed-loop recirculation of the heating



fluid when the first bed of adsorbent material reaches a preselected regeneration temperature;

e. passing a stream of regeneration fluid through the heating means and the first bed of adsorbent material at conditions effective to cause the transfer of the chemical compound from the first bed of adsorbent material to the stream of regeneration fluid and thereby forming a stream rich in the chemical compound and which is removed as an effluent stream; and,

f. terminating the removal of the effluent stream when substantially all of the chemical compound has been removed from the first bed of adsorbent material.

4,028,070

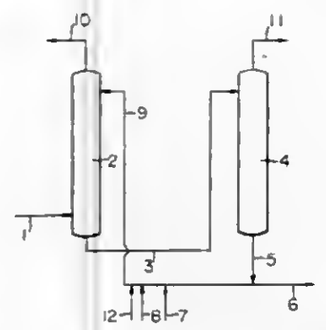
METHOD OF RECOVERING ETHYLENE OXIDE

Jiro Uchil, Kamakura; Masatsugu Kodo, Tokyo; Tsunehiko Soga, Koza, and Yutaka Morimoto, Yokohama, all of Japan, assignors to Nippon Shokubai Kagaku Kogyo Co., Ltd., Osaka, Japan

Continuation of Ser. No. 459,962, April 11, 1974, abandoned. This application Dec. 8, 1975, Ser. No. 638,841

Int. Cl.² B01D 19/00

U.S. Cl. 55—48 7 Claims



1. In the method of recovering ethylene oxide from the reaction product gas that is obtained by the catalytic vapor phase oxidation of ethylene with molecular oxygen over a silver-containing catalyst, which comprises conducting the said reaction product gas to an absorption column maintained at a pressure in the range of 2 – 40 kg/cm², countercurrently contacting said reaction product gas with an aqueous absorbent at said absorption column to dissolve ethylene oxide in the aqueous absorbent to form an aqueous ethylene oxide solution, conducting the thus formed aqueous solution to a stripping column, stripping and recovering ethylene oxide from said aqueous ethylene oxide solution at said stripping column, and thereafter recycling the remaining aqueous solution which is obtained after stripping ethylene oxide to said absorption column to be again used as the aqueous absorbent, the improvement of using as said aqueous absorbent one consisting essentially of ethylene glycol in the range of 1 – 30% by weight, 99 – 70% by weight of water and a defoaming agent consisting essentially of an organopolysiloxane in the range of 2 – 500 ppm and having a pH in the range of 3 – 12.

4,028,071

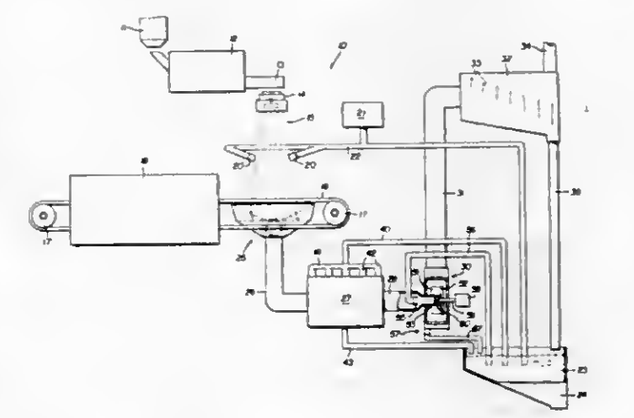
METHOD FOR REMOVING PARTICULATE POLLUTANTS FROM STACK GASES

Roland E. Langlois, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Continuation-in-part of Ser. No. 532,264, Dec. 12, 1974, abandoned. This application Jan. 26, 1976, Ser. No. 652,370

Int. Cl.² B01D 47/18

U.S. Cl. 55—89 4 Claims



1. In a glass wool product forming process wherein a stream of process air containing gaseous contaminants and solid contaminants of the size on the order of 100 microns or less flows through at least one centrifugal fan interposed between a drop out box and a de-entrainment device communicating with an exhaust stack, the improvement comprising the steps of (1) wetting the rotor of said fan with at least 1.5 gallons per minute of water for each one thousand standard cubic feet per minute of process air passing therethrough so that the fan rotor and shroud are coated with a film of water, (2) contacting said contaminants flowing through said fan in said air stream with said film to agglomerate at least some of said contaminants into composite masses of substantially greater size and mass, and (3) inertially separating said composite masses and the water from said air stream at the location of the fan and at the de-entrainment device prior to the passage of said air stream up the exhaust stack.

4. In a glass wool product forming process wherein a stream of process air is passed through a drop out box to remove about 90% of the process air contaminants to yield exit air at a relative humidity of about 100% and containing gaseous contaminants and solid and liquid contaminants of a size on the order of 100 microns or less flows through a centrifugal fan having rotor and shroud components and an inlet interposed between said drop out box and a de-entrainment device communicating with an exhaust stack, the improvement of removing at least about 45% of the contaminants from said exit air by the steps of (1) directly impinging a massive stream of water on the order of at least about 1.5 gallons of water per minute per 1000 standard cubic feet per minute of process air onto the rotor of said fan to break-up the water stream into droplets thoroughly wetting the fan rotor and shroud, (2) contacting said particles with the water-wet rotor and shroud

components of said fan as the exit air is centrifugally pumped through the fan, so that the particles agglomerate into composite masses of substantially greater size and mass and (3) separating the agglomerated particles from said air stream by inertia separation during the passage of said air stream through the fan and through the de-entrainment device.

4,028,072

APPARATUS FOR SCRUBBING OF HYDROCARBONS FROM GAS

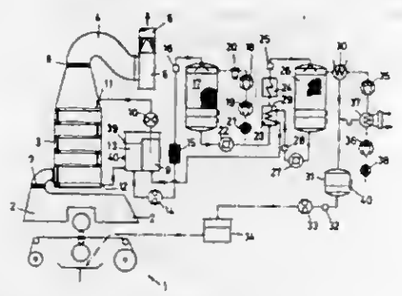
Walter Braun, Nievenheim, and Gunter Hoffmann, Stuttgen, both of Germany, assignors to Aluminium Norf GmbH, Stuttgen, Germany

Filed Oct. 24, 1975, Ser. No. 625,654

Claims priority, application Germany, Oct. 28, 1974, 2451157

Int. Cl.² B01D *47/00*

U.S. Cl. 55—195 **9 Claims**



1. Apparatus for separating hydrocarbons from flue gas or the like, comprising:

a. a gas scrubber receiving hydrocarbon-charged gas,

b. a flue to which the outlet of the scrubber is attached for the discharge of the said gas thereto,

c. a conduit connected to the scrubber to provide it with wash oil in counterflow to the said gas,

d. a collecting container connected by the said conduit and a pump to the scrubber to suppy it with the wash oil,

e. a vacuum distillation container connected by a conduit and a pump to the gas scrubber to receive wash oil discharged therefrom,

f. a condenser having an inlet connected by a conduit to the distillation container,

g. a vacuum pump assembly connected to the outlet of the condenser,

h. a condensate storage unit connected to the outlet of the condenser to receive the condensate, and

i. a pump having an inlet connected by a conduit to the output side of the distillation container to bring about the return of the wash oil passing from the distillation container through a conduit connecting the output of the pump to the collecting container.

4,028,073

CONTAINER FOR AIR TREATING MATERIAL

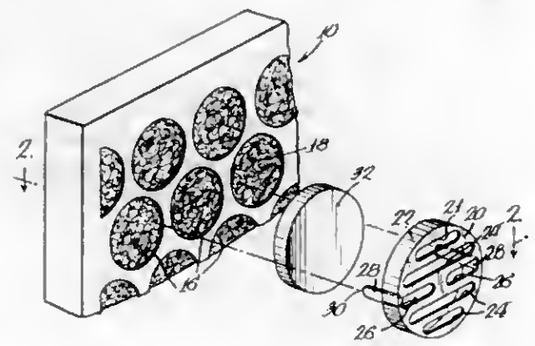
Charles M. Swaim, 994 Hampton Park, Barrington, Ill. 60010

Filed Mar. 12, 1976, Ser. No. 666,218

Int. Cl.² B01D *50/00*

U.S. Cl. 55—279 **3 Claims**

1. Air treating means including a container for holding a body of air treating material to an air filter in a ventilation system or the like, said container being formed of a bendable material and having a bottom, a peripheral upstanding side wall ex- tending from said bottom and terminating in an open top, there being a plurality of cutouts in said bottom to permit air to enter said container therethrough, at least one of said cutouts being elongated and defined by an elongated tab integral with said container and having a length greater than the height of said side wall, there being two said tabs, each remaining attached to said container adjacent said side wall, an air filter having a layer of filter material sandwiched between perforated backing members, said tabs extending



through said filter and having their ends bent over one of said backing members; and a body of air treating material in said container.

4,028,074

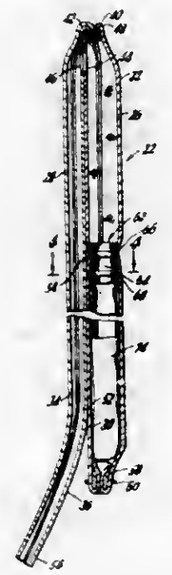
VACUUM CLEANER FILTER BAG

Robert Schaaf, Brooklyn, N.N.Y., assignor to Air Filters, Inc., Brooklyn, N.Y.

Filed Oct. 14, 1975, Ser. No. 621,828

Int. Cl.² B01D *46/02*

U.S. Cl. 55—366 **6 Claims**



1. A vacuum cleaner filter bag for an upright vacuum cleaner comprising an elongated air pervious filter receptacle having an upper end provided with an inlet port, an air impervious feed tube disposed externally of said filter receptacle in a side-by-side arrangement, said feed tube having a lower inlet end for releasable connection to an outlet port of the vacuum cleaner and an upper outlet end secured in a face-to-face relationship to and in communication with said inlet port of said filter receptacle, said filter receptacle including opening means to provide access to a lower interior thereof, a collar of relatively rigid material disposed within said filter receptacle intermediate said upper end and a lower end thereof, said collar being configurated to conform to the interior of said filter receptacle when in operating condition, clamping means disposed externally of said filter receptacle in juxtaposition with an upper portion of said collar for securing and supporting said upper portion of said collar in position by a clamping engagement against side walls of said filter receptacle, said clamping means being disposed between said filter receptacle and said feed tube, said feed tube being connected to said filter receptacle above and below said clamping means to provide a space for receiving said clamping means, a dust receptacle removably disposed within said lower interior of said filter receptacle, said dust receptacle including an open mouth bag-like enclosure fabricated from an air impervious material and having its mouth portion disposed about a lower end of said collar, resiliently expandable ring means for releasably securing said dust receptacle mouth portion about said collar to maintain said dust receptacle in an open mouth suspended condition within said lower interior of said filter receptacle to receive and collect debris introduced into said filter receptacle, said collar being provided with a pair of axially spaced apart circumferential grooves in an external peripheral surface thereof to receive and removably retain said ring means, a lower one of said grooves being utilized for receiving said ring means to secure said dust receptacle in position against said collar, an upper one of said grooves being utilized for retaining the ring means while said dust receptacle is being removed and replaced, said opening means being dimensioned to permit insertion and removal of said dust receptacle from said filter receptacle, said filter receptacle being flared outwardly from its medial portion towards said upper and lower ends to funnel the debris downwardly towards said collar and to permit easier access to said collar through said opening means, and releasable sealing means for sealing said opening means when said filter receptacle is in said operating condition.

4,028,076

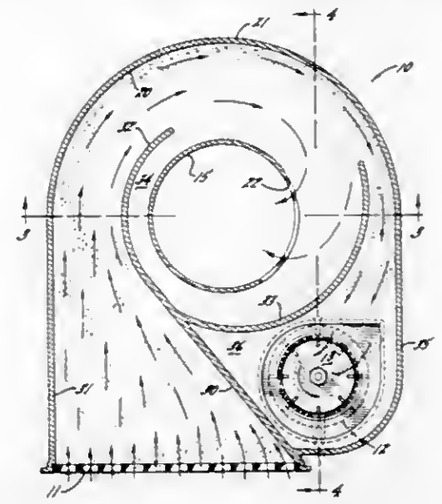
CENTRIFUGAL AIR PRECLEANER FOR INTERNAL COMBUSTION ENGINES

Gerald S. Fields, Boulder, Colo., assignor to Parma Industries, Inc., Longmont, Colo.

Filed Aug. 18, 1975, Ser. No. 605,345

Int. Cl.² B01D *45/16*

U.S. Cl. 55—394 **10 Claims**



1. An air precleaner for internal combustion engines having air intakes, said precleaner comprising the combination of

a. a conduit for conducting precleaned air to the air intake of the engine,

b. a housing disposed around said conduit and having an air intake opening, an arcuate wall adjacent said intake opening and spaced radially outwardly from said conduit and substantially concentric therewith for conducting the incoming air stream from said intake opening circumferentially around said conduit so that any dust in said air stream is collected along the housing wall by centrifugal action, a pair of end walls attached to opposite ends of said arcuate wall, and a dust outlet for discharging dust from said housing at one end of said arcuate wall,

said conduit having a clean air port near said one end of said arcuate wall for discharging clean air from the inner region of the space between said arcuate wall and said conduit, said conduit also having an open end which extends through one of the end walls of said housing,

c. an internal baffle integral with said arcuate wall and extending between said arcuate wall and said conduit at said intake opening, said internal baffle forming a restricted passageway that increases the velocity of the incoming air at the other end of said arcuate wall and also forming a dust-receiving chamber at said one end of said wall, said dust-receiving chamber communicating with said dust outlet for discharging the dust from said housing, said internal baffle extending around a major portion of said conduit and spaced therefrom to form a recirculating passageway for recirculating any clean air that does not enter said clean air port around said conduit and back toward said clean air port without mixing said clean air with the incoming air in said restricted passageway, said internal baffle extending to a point such that the space between said arcuate housing wall and said conduit is uninterrupted between said restricted passageway and said dust receiving chamber so as to provide an enlarged chamber in which the velocity of the air stream is reduced to facilitate discharge of the clean air through said clean air port, and

d. means for withdrawing air from said housing through said dust outlet so as to draw ambient air into said housing through said intake opening.

4,028,075

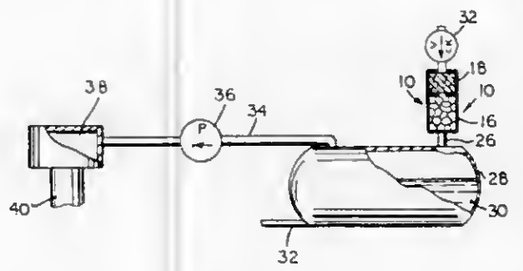
FUEL TANK CAP

Emile Roberge, 90 Portland Ave., Dover, N.H. 03820

Filed Nov. 2, 1976, Ser. No. 738,229

Int. Cl.² B01D *53/02*

U.S. Cl. 55—387 **7 Claims**



4. A fuel system comprising:

a fuel tank containing liquid and vapor fuel, said vapor phase being above said liquid phase in said tank;

a first fuel outlet line connected to the liquid fuel phase in said tank;

a second fuel outlet line connected to the vapor fuel phase in said tank;

a fuel inlet line connected to said tank;

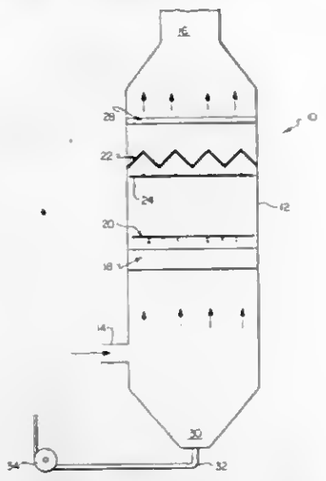
a fuel tank cap adapted to be placed in said fuel inlet line, said cap including,

a cylindrical body member having a lower open end and a closed upper end,

a chamber in said body member adjacent said lower end containing fuel vapor absorbent material; and

valve means between said chamber and upper end of said body member for permitting air to flow through said chamber from the atmosphere.

4,028,077
MIST ELIMINATOR
Robert Joseph Gleason, Edison, N.J., assignor to Research-Cottrel, Inc., Bound Brook, N.J.
Filed Jan. 15, 1976, Ser. No. 649,234
Int. Cl.² B01D *45/00*
U.S. Cl. 55—442 **2 Claims**



1. In a gas scrubbing tower having a generally vertical gas flow therethrough an impingement or rebound separator, means mounted across the tower in the path of the gas flow for removing mist from the flow of gas comprising a first series of spaced apart eliminator blades, at least one end plate, each of said first of the series of eliminator blades having at least one of its ends connected to said at least one end plate with the transverse axis of each said blade sloping at an angle of from about 20° to about 30° to the direction of flow of the gas through the tower and a second series of spaced apart eliminator blades each having at least one of its ends connected to said end plate with a transverse axis of each eliminator blade sloping at an angle of from about 20° to about 30° to the direction of flow of gas through the tower but pitched in an opposite direction to the pitch of the first series of eliminator blades, the first and second series of eliminator blades defining a separator unit having a plurality of gas flow channels therebetween with the longitudinal axis of the blades of the separator unit tilted at an angle of from about 30° to about 45° to the direction of flow of gas through the tower so that liquid removed from the gas stream will be channeled along the edges of the first and second series of eliminator blades to collection means which may comprise the at least one end plate and wherein a pair of the said impingement separators are assembled in a V-type configuration with the apex of the V being positioned downstream with respect to the gas flow through the tower.

4,028,078
METHOD AND APPARATUS FOR ABSORPTION REFRIGERATION SYSTEM
David G. Peckham, La Crosse, Wis., assignor to The Trane Company, La Crosse, Wis.
Filed June 17, 1976, Ser. No. 696,945
Int. Cl.² F25B *15/00, 27/00*
U.S. Cl. 62—101 **12 Claims**

9. The method of producing refrigeration comprising the steps of:

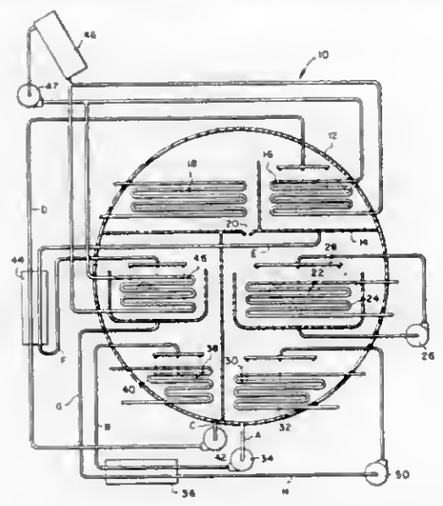
a. heating at high pressure by an external heat source a fully diluted absorption solution to generate a refrigerant vapor and a partially concentrated absorption solution;

b. cooling said refrigerant vapor to form a refrigerant condensate;

c. evaporating said refrigerant condensate to derive a cooling effect and thereby forming a refrigerant vapor;

d. heating at low pressure by an external heat source said partially concentrated absorption solution to generate a secondary vapor and a concentrated absorption solution;

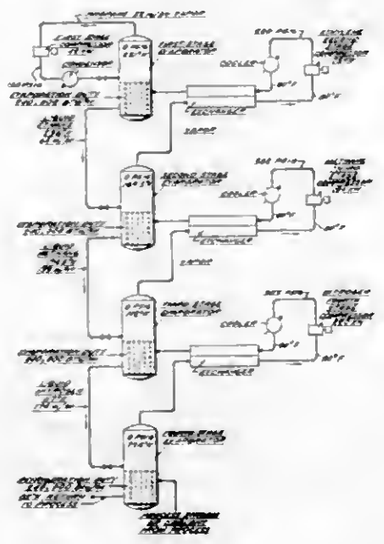
e. passing said concentrated absorption solution in intimate contact with said refrigerant vapor to thereby absorb said refrigerant vapor into said absorption solution at low pressure to form a partially diluted absorption solution;



f. passing said partially diluted absorption solution at high pressure in intimate contact with said secondary vapor to absorb said secondary vapor and form a fully diluted absorption solution; and

g. returning said fully diluted solution to step (*a*).

4,028,079
CASCADE REFRIGERATION SYSTEM
Edward G. Scheibel, Media, Pa., assignor to Suntech, Inc., St. Davids, Pa.
Filed Feb. 23, 1976, Ser. No. 660,218
Int. Cl.² F25B *7/00*
U.S. Cl. 62—335 **7 Claims**

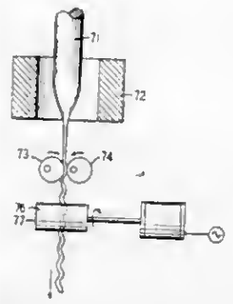


1. A cascade refrigeration system where low pressure vapor from an evaporator stage is compressed and then recycled for condensation to the evaporator of a previous stage which comprises passing the low pressure vapor from an evaporator stage through a heat exchanger to heat said vapor to ambient temperature, compressing said vapor through a cooler, cooling said compressed vapor by passing said vapor through said heat exchanger in heat exchange relationship with said low pressure vapor, condensing said vapor in the evaporator of the next higher temperature cycle of the cascade system and recycling the liquid to the low pressure evaporator stage.

4,028,080
METHOD OF TREATING OPTICAL WAVEGUIDE FIBERS
Sam Di Vita, West Long Branch, and John R. Vig, Colts Neck, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.
Filed June 23, 1976, Ser. No. 699,150
Int. Cl.² C03C *15/00*
U.S. Cl. 65—2 **16 Claims**

1. Method of treating glass optical waveguide fibers, said method comprising irradiating the fibers at about 1,000° C in an oxygen-containing environment with shortwave ultraviolet light, wherein the shortwave ultraviolet used has two important wave lengths between 1700 and 2700 angstroms, with at least one wavelength being less than 2400 angstroms in length and capible of being absorbed by oxygen to generate ozone, the other wavelength capible of being absorbed by hydrocarbons and ozone.

4,028,081
METHOD FOR MANUFACTURING HELICAL OPTICAL FIBER
Enrique Alfredo Jose Marcatill, Rumson, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Division of Ser. No. 639,842, Dec. 11, 1975. This application Sept. 28, 1976, Ser. No. 727,464
Int. Cl.² C03B *37/02*
U.S. Cl. 65—2 **9 Claims**



1. A method of manufacturing an optical fiber in the form of an elongated helix, comprising the steps of:

heating the lower extremity of a substantially vertically disposed preform to soften the preform; and

drawing the optical fiber from said softened preform, said method being characterized by the further steps of:

passing said optical fiber, while still in a softened state, through at least one pair of eccentrically rotatable rollers; and

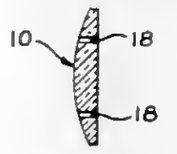
rotating said rollers in synchronism with the rate at which said fiber is drawn from the softened preform.

4,028,082
METHOD OF MAKING ARTIFICIAL INTRAOCULAR LENSES WITH HOLES
David A. Krohn, Southbridge; Bernard Grolman, Worcester, both of Mass., and Walter P. Siegmund, Woodstock, Conn., assignors to American Optical Corporation, Southbridge, Mass.
Filed Feb. 10, 1976, Ser. No. 656,780
Int. Cl.² C03C *19/08, 15/00*
U.S. Cl. 65—23 **6 Claims**

1. The method of making a lens for a pseudophakos having spaced apart holes adjacent its edge, said method comprising the steps of:

preparing a preform of pieces of lens material and parallel columns of leachable material by assembling in juxtaposition with said columns a number of said pieces of lens material, said columns and lens materials having compatible drawing temperatures and coefficients of thermal expansion and being so geometrically arranged in said preform as to space said columns apart from each other and away from the center of said preform according to relative positions desired of holes to be produced in said lens adjacent its edge;

heating and drawing at least a portion of said preform to a reduced cross-sectional size in a directon parallel to the



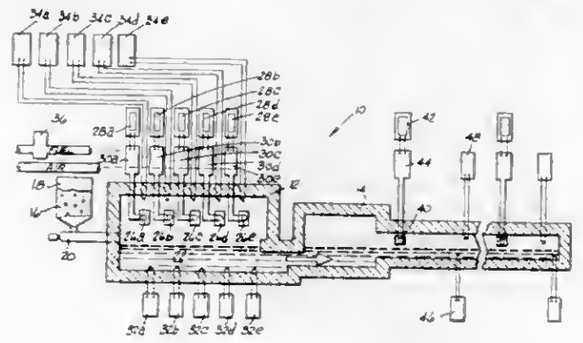
longitudinal direction of said columns to fuse said pieces of lens material and columns together as a unit;

cutting from said drawn portion of said preform a cross-section of its length to form a lens blank;

leaching away portions of said columns remaining in said lens blank to produce holes in their place; and

at one stage of the process following said cutting step, grinding and polishing opposite sides and edges of said lens blank to the final thickness and curved surface configuration desired of said lens.

4,028,083
METHOD AND APPARATUS FOR CONTROLLING TEMPERATURE WITHIN A FURNACE
Richard Arthur Patznick, Toledo, and Gary Clayton Border, Bowling Green, both of Ohio, assignors to Johns-Manville Corporation, Denver, Colo.
Continuation of Ser. No. 498,688, Aug. 19, 1974, abandoned. This application Oct. 16, 1975, Ser. No. 622,931
Int. Cl.² C03B *5/24*
U.S. Cl. 65—29 **14 Claims**



1. A method for controlling temperatures in a furnace which includes a melting and refining tank wherein the furnace has a plurality of zones through which molten material within the furnace passes, each zone having a means for sensing temperature, means for providing heat input into the zone, and regulator means for regulating the amount of heat input into the zone, said regulator means being responsive to a signal from a signal generating means, comprising:

a. determining the desired temperature for each of said zones,

b. sensing the current temperature in each zone adjacent the end of a regular time interval,

c. measuring the total heat input into each of said zones during said regular time interval,

d. accumulating first data in a storage device comprising all historical heat inputs representing the total heat input into each of said zones for each regular time interval during a preselected time period, said preselected time

period comprising a plurality of said regular time intervals, and information on thermal lags in the furnace and interactions between the separate total heat inputs of the plurality of zones,

e. after each regular interval comparing the last sensed temperature for each zone with the desired temperature level for that respective zone,

f. when at least one of said last sensed temperatures differs from the desired temperature level for its respective zone, generating at least one new signal for the regulator means of said at least one zone by comparing said temperature difference with respect to the last sensed temperatures for each of said zones and said accumulated first stored data,

g. sending said at least one new signal to at least one regulator means to adjust the total heat input into said at least one of the zones for the next said regular time interval to reduce any temperature difference between the actual zone temperature and the desired temperature for said zone, and

h. after said signal generating step, adding data, representing any total heat input signal to said regulator means for said plurality of zones at the time of said sending step, to said accumulated first stored data to be used in the signal generating step after the next regular interval.

8. Apparatus for controlling temperatures in a furnace which includes a melting and refining tank wherein the furnace has a plurality of zones through which molten material within the furnace passes, each zone having means for heating the molten material and a regulator means for adjusting said heating means, said regulator means being responsive to a signal, and each zone having a predetermined temperature to be maintained, comprising:

a. means for sensing the current temperature in each of said zones adjacent the end of a regular time interval,

b. means for comparing the last sensed temperature in each of said zones with said predetermined temperature level for each respective zone,

c. means for measuring the total heat input into each of said zones during said regular time interval,

d. first storage means for accumulating first data comprising all historical heat inputs representing the total heat input into each of said zones for each regular time interval during a preselected time period, said preselected time period comprising a plurality of said regular time interval and information on thermal lags in the furnace and interactions between the separate total heat inputs of the plurality of zones,

e. signal generating means for generating at least one new signal for at least one regulator means when at least one of said sensed temperatures differs from the respective predetermined temperature, said signal generating means having means for generating at least one new signal in response to a comparison of said temperature for each of said zones and said accumulated first data in said first storage means.

f. means for sending said at least one new signal to at least one regulator means to change the heat input into at least one of the zones to reduce any said temperature difference, and

g. means for adding data representative of the heat inputs to each of said zones, after said new signal has been sent, to said first accumulated data to be used after the next regular time interval.

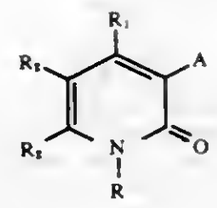
4,028,084

DERIVATIVES OF 3-CARBOXY PYRID-2-ONES

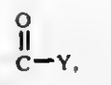
Patrick J. McNulty, Wyndmoor, and Harlow L. Warner, Hatboro, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed Oct. 11, 1974, Ser. No. 513,988
Int. Cl.² C07D *213/80*; A01N *9/22*
U.S. Cl. 71—94 8 Claims

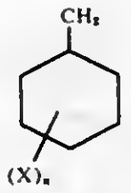
1. A compound of the formula:



wherein A is the group



wherein Y is a halogen, NH_2, OH or (C_1–C_7) alkoxy;
R_2 is hydrogen;
R_1 and R_3 are methyl or ethyl;
R is a group of the formula:



wherein X is hydrogen, NH_2, halogen, trifluoromethyl, nitro, or C_1–C_4) alkyl; and *n* is 0 to 2 and is physiologically acceptable salts.

8. A gametocidal herbidical or plant growth inhibiting composition which comprises 1) an agronomically acceptable carrier and 2) as the active ingredient an effective amount of a compound of claim 1.

4,028,085

METHOD FOR MANUFACTURING SILICATE GLASSES FROM ALKOXIDES

Ian M. Thomas, Temperance, Mich., assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Feb. 3, 1976, Ser. No. 655,025
Int. Cl.² C03B *5/16*; C03C *3/04*
U.S. Cl. 65—134 4 Claims

4. In a process for forming a carbon free silicate glass comprising: forming a hydrolysis reaction product of water, a silicon tetraalkoxide and a metal alkoxide, said reaction product comprising alcohol and hydrolyzable alkoxy groups and heating the product at a temperature and for a time sufficient to form a glass, the improvement comprising fractionally distilling said reaction product in the presence of free water with a fractionating column for a time sufficient to produce a column-head temperature of 100°C to remove all residual alcohol and hydrolyze residual alkoxy groups.

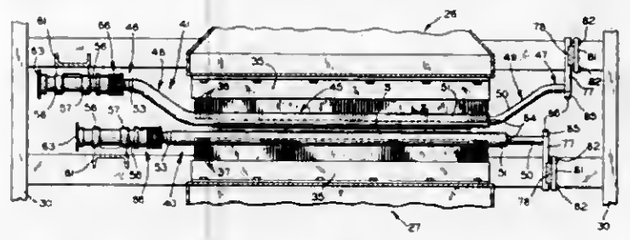
4,028,086

APPARATUS FOR BENDING AND TEMPERING GLASS SHEETS BY DIFFERENTIAL COOLING

Donald D. Rahrig, and Robert G. Revells, both of Toledo, Ohio, assignors to Libbey-Owens-Ford Company, Toledo, Ohio

Filed Feb. 25, 1976, Ser. No. 661,368
Int. Cl.² C03B *23/02*
U.S. Cl. 65—273 6 Claims

1. Apparatus for bending and tempering glass sheets comprising: a heating furnace, a chilling section, and a cooling section arranged substantially in line with one another, a conveyor for supporting and conveying a glass sheet along a generally horizontal path successively through said furnace, chilling section and cooling section, means in said furnace for heating said sheet as it passes through said furnace to substantially the softening temperature of the glass, means in said chilling section for directing a gaseous cooling medium under pressure against opposite surfaces of said sheet as it advances through said chilling section, means controlling the pressure of said cooling medium against said opposite surfaces to direct said cooling medium against the bottom surface of said sheet at a greater pressure than the pressure of said cooling medium directed against the upper surface thereof thereby to cool the bottom surface at a greater rate than said upper surface to cause said sheet to bend into a desired curvature, a series of driven rolls mounted in said chilling section above said conveyor, each of said rolls comprising a fixed core and a driven rotatable load supporting sleeve surrounding said core, each



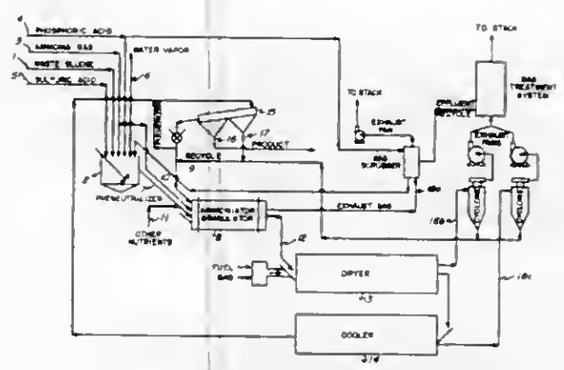
of said rolls comprising a generally horizontally extending central portion in substantial parallelism with said conveyor but spaced thereabove a distance slightly greater than the thickness of the glass sheets to be conveyed thereby so that said advancing sheet normally contacts only said conveyor or said roll central portions at any given time during its passage therebetween, each of said rolls including opposite end portions having a common axis disposed above said central portion and substantially above said conveyor for providing adequate clearance for the mounting structure of said conveyor, and inclined portions connecting said end portions to said central portion.

4,028,087

FERTILIZER PROCESSES INCORPORATING SCRUBBED FLUE GAS SLUDGE BYPRODUCT

James J. Schultz, and Vincent J. Van Pelt, both of Florence, Ala., assignors to Tennessee Valley Authority, Muscle Shoals, Ala.

Continuation of Ser. No. 660,054, Feb. 23, 1976, now Defensive Publication No. T955,002. This application Oct. 18, 1976, Ser. No. 733,395
Int. Cl.² C05F *7/00*
U.S. Cl. 71—25 8 Claims



PROCESS FOR THE PRODUCTION OF SOLID GRANULAR FERTILIZER MATERIAL FROM SCRUBBER SLUDGE

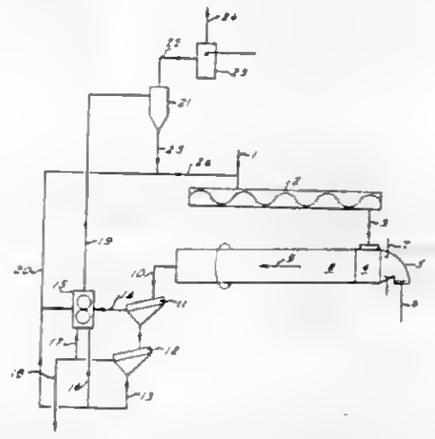
1. A process for the production of solid granular fertilizer material wherein at least a portion of the plant nutrient values thereof are derived from waste sludge discharged from boiler flue gas scrubbing processes, which process comprises introducing into a preneutralizer vessel a stream of said waste sludge together with streams of ammonia, sulfuric acid, and/or phosphoric acid to form therein a partially neutralized ammonium sulfate and/or phosphate slurry, said waste sludge containing upwards to about 50 percent by weight water whereby the exothermic heat of reaction of the ammonia and mineral acids in said preneutralizer raises the temperature of the slurry therein sufficiently high to remove, by evaporation, substantial portions of excess water from said sludge; adjusting the relative amounts of ammonia to mineral acid introduced therein to maintain an N:P ratio in said preneutralizer in the range from 0.5 to about 0.7 for effecting fluidization of said slurry and easy transfer to a later-mentioned ammoniator-granulator; introducing a stream of said ammonium sulfate and/or phosphate slurry from said preneutralizer together with a stream of ammoniating fluid and particles of undersize product from a later-mentioned sizing step into the upper end of an inclined rotating drum; adjusting the relative amounts of said stream of ammoniating fluid and said slurry from said preneutralizer vessel to increase the N:P mole ratio of material introduced into said rotating drum to a range of about 1 to about 2; therein maintaining a bed of rolling discrete particles of ammonium sulfate and/or phosphate; recovering ammonia evolved from said rotating drum by passing the offgas therefrom through scrubbing means; returning the recovered ammonia from said scrubbing means to said preneutralizer; withdrawing granular ammonium sulfate and/or phosphate material from the lower end of said rotating drum; introducing said withdrawn material from said rotating drum to drying and sizing means; returning particles of predetermined size from said sizing means into the upper end of said drum and withdrawing from said sizing means granular particles of ammonium sulfate and/or phosphate product; said process being characterized by the fact that less than about 50 percent of the calcium sulfite contained in said waste sludge is converted to calcium sulfate.

4,028,088

SOIL AMENDMENT AND METHOD

Donald C. Young, Fullerton, and P. Stanley Backlund, Anaheim, both of Calif., assignors to Union Oil Company of California, Brea, Calif.

Filed Dec. 17, 1975, Ser. No. 641,366
Int. Cl.² C05C *9/00*
U.S. Cl. 71—28 16 Claims



1. The method of producing a multicomponent soil amendment containing at least about 40 weight percent of a particulate nitrifier selected from the group consisting of urea, ammonium nitrate and combinations thereof, at least about 10 weight percent calcium sulfate and at least one additional soil additive selected from elemental sulfur, phosphates, borates and compounds having cations selected from the group consisting of potassium, calcium, iron, magnesium, boron, manganese, copper, zinc and molybdenum, and combinations thereof, wherein said amendment comprises said nitrifier particles coated with a layer of the reaction product of calcium sulfate dihydrate and said nitrifier containing said additional soil additive, including the steps of mixing finely divided

calcium sulfate dihydrate, nitrifier particles having particle diameters between about 5 and about 30 mesh, an agronomically effective amount of said additional soil additive in particle form, and at least about 2 weight percent based on the total weight of said soil amendment of a powdered binder supplement selected from the group consisting of powdered urea, ammonium nitrate and combinations thereof having particle sizes below about 40 mesh, heating the resulting mixture under substantially anhydrous conditions to an elevated temperature sufficient to promote the endothermic reaction of said calcium sulfate dihydrate and nitrifier and below the melting point of said nitrifier, and produce said multicomponent soil amendment comprising said particulate nitrifier coated with a layer of the reaction product of said calcium sulfate dihydrate, said powdered binder supplement, and said nitrifier particles, said layer containing said additional soil additive.

4,028,089

PLANT GROWTH INFLUENCERS

Pierre Bocion, Winterthur; Wijitha De Silva, Schofflisdorf, and Pavol Winternitz, Greifensee, all of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

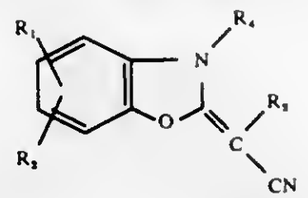
Filed Mar. 17, 1975, Ser. No. 559,195

Claims priority, application Switzerland, Mar. 22, 1974, 04038/74

Int. Cl.² A01N 9/22; C07D 263/54

U.S. Cl. 71—88 **30 Claims**

I. Compounds represented by the formula



wherein R_1 and R_2 each are hydrogen or a phenyl; R_3 is cyano; and R_4 is hydrogen or a lower alkyl having 1–4 carbons, and salts thereof.

14. A plant growth regulating composition containing as the active ingredient, a plant growth regulating effective amount of one or more of the compounds of claim 1 and an agriculturally acceptable compatible carrier.

4,028,090

HERBICIDAL USE OF 5-CYANOALKYL-1,3,4-THIADIAZOL-2-YLUREAS

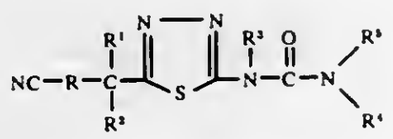
Tony Cebalo, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 514,671, Oct. 15, 1974, Pat. No. 3,959,303. This application Jan. 26, 1976, Ser. No. 652,278

Int. Cl.² A01N 9/12

U.S. Cl. 71—90 **8 Claims**

1. An herbicidal method of selectively killing herbaceous weeds which comprises contacting the weeds with an herbicidally effective amount of a compound of the formula:



wherein

R represents a carbon-carbon bond or

R^1, R^2, R^6 and R^7 independently represent hydrogen or C_1–C_2 alkyl,

provided that at least one of R^1, R^2, R^6 and R^7 must represent C_1–C_2 alkyl;

R^3 and R^4 independently represent C_1–C_3 alkyl; R^5 represents hydrogen, C_1–C_3 alkyl or C_1–C_3 alkoxy.

4,028,091

HERBICIDAL COMPOSITION

Kazuo Jikihara, Kakegawa; Shinichi Iori, Ogasa; Ichiro Kimura, Shizuoka, and Kyoichi Adachi, Yaizu, all of Japan, assignors to Kumiai Chemical Industry Co., Ltd., Tokyo, Japan

Filed Sept. 2, 1975, Ser. No. 609,725

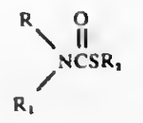
Claims priority, application Japan, Sept. 2, 1974, 49-100695

Int. Cl.² A01N 9/12

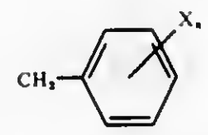
U.S. Cl. 71—94 **9 Claims**

1. A herbicidal composition, which consists essentially of:

an effective amount of the mixture of a bipyridylium salt selected from the group consisting of the dichloride and dibromide salts of 1,1'-dimethyl-4,4'-bipyridylium and 1,1'-ethylene-2,2'-bipyridylium and a thiocarbamate having the formula



wherein R and R_1 each represent a lower alkyl group or which in combination with each other and with the N atom can form a hexamethyleneimino ring, R_2 represents



and X represents a halogen atom of a lower alkyl group, and *n* represents 0, 1 or 2, wherein the ratio of said bipyridylium salt to said thiocarbamate is 1:1–4.

4,028,092

SUBSTITUTED PYRIDINYLALKOXY-, PYRIDINYLALKYLSULFONYL- AND PYRIDINYLALKYLTHIOPHENYLUREA HERBICIDES

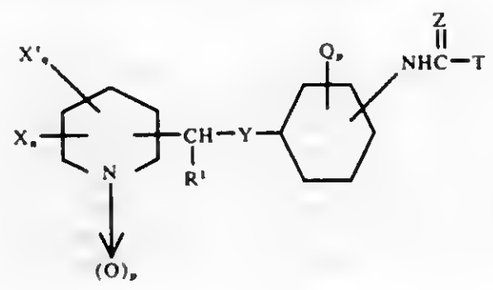
Alin H. Gulbenk, Walnut Creek, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 435,608, Jan. 22, 1974, Pat. No. 3,931,200. This application Oct. 14, 1975, Ser. No. 622,352

Int. Cl.² A01N 9/22

U.S. Cl. 71—94 **15 Claims**

1. The method of controlling undesired plant growth which comprises applying to plants and/or their habitats a herbicidally-effective amount of a compound of the formula:



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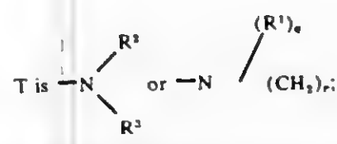
wherein



each X independently represents bromo, chloro, fluoro or iodo;

each X' independently represents trichloromethyl, NH_2, trifluoromethyl, cyano, methyl, methylthio or methoxy;

n represents an integer of 0 to 4, inclusive;

each *q* independently represents an integer of 0 to 2, inclusive;

each *p* independently represents an integer of 0 or 1;

r represents an integer of 4 to 5;

each R^1 is hydrogen or methyl;

Y is a chalcogen of atomic number 8 to 16, inclusive or —SO2;

Q is methyl, ethyl or halo;

Z is a chalcogen of atomic number 8 to 16, inclusive;

R^2 represents hydrogen, alkyl of from 1 to 4 carbon atoms, inclusive or an alkoxy group of from 1 to 4 carbon atoms, inclusive; and

R^2 represents an alkyl group of from 1 to 4 carbon atoms, inclusive.

4,028,093

META-BIS ANILIDE DERIVATIVES AND THEIR UTILITY AS HERBICIDES

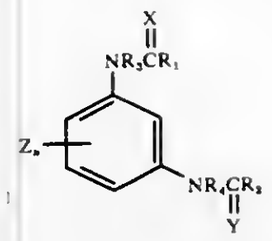
Eugene G. Teach, El Cerrito, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 179,224, Sept. 9, 1971, Pat. No. 3,941,581, which is a division of Ser. No. 20,104, March 16, 1970, abandoned, which is a continuation-in-part of Ser. No. 741,267, July 1, 1968, abandoned, which is a continuation-in-part of Ser. No. 659,865, Aug. 11, 1967, abandoned. This application Oct. 2, 1975, Ser. No. 619,113

Int. Cl.² A01N 9/20

U.S. Cl. 71—118 **8 Claims**

I. A method for controlling the growth of vegetation which comprises applying to the area where control of said vegetative growth is desired, a growth controlling amount of a compound having the formula



in which X and Y are each oxygen, R_3 and R_4 are each hydrogen, R_2 is halogenated lower alkyl and R_1 is alkyl containing from 1 through about 10 carbon atoms, inclusive, and n is 0.

4,028,094

STAINLESS STEEL POWDER

Orville W. Reen, New Kensington, and Donald J. McMahon, Export, both of Pa., assignors to Allegheny Ludlum Industries, Inc., Pittsburgh, Pa.

Filed Oct. 29, 1975, Ser. No. 626,945

Int. Cl.² B22D 23/08; C22C 38/44

U.S. Cl. 75—.5 BA **4 Claims**

1. Atomized, prealloyed stainless steel powder consisting essentially of, by weight, up to 0.03% carbon, up to 2.0% manganese, up to 0.05% phosphorus, up to 0.04% sulfur, up to 2.0% silicon, 17.5 to 18.0% chromium, 10.0 to 14.0% nickel, 2.5 to 3.0% molybdenum, balance iron and residuals; said powder having an apparent density of at least 2.0 g./cu.cm.; said powder being suitable for use in the manufacture of sintered powder parts requiring superior corrosion resistance to the chloride ion.

4,028,095

FREE FLOWING POWDER AND PROCESS FOR PRODUCING IT

John M. Laferty, Jr., Wheat Ridge, Colo.; Joseph E. Ritsko, Towanda, and David J. Port, Athens, both of Pa., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Division of Ser. No. 594,734, July 10, 1975, Pat. No. 3,973,948, and a continuation-in-part of Ser. No. 414,976, Nov. 12, 1973, abandoned. This application Mar. 31, 1976, Ser. No. 672,502

Int. Cl.² C22C 1/04

U.S. Cl. 75—.5 AB **7 Claims**

1. Process for producing a free flowing powder from finely divided particles of an inorganic material having a melting point about 500° C, the process comprising producing agglomerates of the particulate material by spray drying a slurry of the material in a liquid, the liquid comprising a solution of binder in a volatile solvent, characterized in that at least 50 percent by weight of the binder consists essentially of at least one water soluble metallic ammonium complex of an element selected from the group consisting of molybdenum and tungsten whereby upon heating in a reducing atmosphere the ammonium complex decomposes to base metal and at least one volatile product.

4,028,096

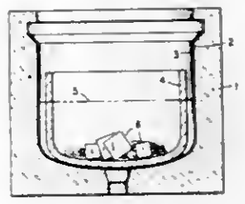
METHOD OF MELTING METALS TO REDUCE CONTAMINATION FROM CRUCIBLES

John G. Banker, Kingston, and Hubert L. Wigginton, Oak Ridge, both of Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed May 13, 1976, Ser. No. 686,447

Int. Cl.² C22B 60/02

U.S. Cl. 75—20 R **5 Claims**



1. A method of reducing the contamination of a metallic charge from a crucible during melting operations comprising:

a. first providing the interior surface of said crucible with a ceramic coating substantially non-reactive with said metallic charge;

b. disposing within said coated crucible a liner formed from at least a portion of said metallic charge, said liner being substantially concentric to the inner surface of said crucible and having an outside diameter less than the inside diameter of said coated crucible such that as the crucible is heated the liner expands and presses against said ceramic coating prior to melting; and

c. heating said crucible to a temperature sufficient to completely melt said liner whereby said ceramic coating is contact with molten metallic charge.

4,028,097

SELF-LUBRICATING IRON BASE ALLOY

Yoshiyuki Mizutani; Masaaki Tada, and Yasuo Imada, all of Nagoya, Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Nagoya, Japan

Continuation-in-part of Ser. No. 447,109, Feb. 28, 1974, abandoned. This application Feb. 3, 1976, Ser. No. 654,689
Claims priority, application Japan, Mar. 2, 1973, 47-25485
Int. Cl.² C22C *38/12, 38/60*
U.S. Cl. 75—123 AA 3 Claims

I. A self-lubricating wear-resistant iron base alloy consisting essentially of 15 to 30% by weight of molybdenum, 1 to 5% by weight of an element selected from the group consisting of sulphur and selenium, and 0.5 to 1.2% by weight of carbon, the balance being iron.

4,028,098

CRYOGENIC STEEL

Werner Pepperhoff, Duisburg-Huckingen, and Friedheim Richter, Mulheim (Ruhr), both of Germany, assignors to Mannesmann Aktiengesellschaft, Dusseldorf, Germany

Continuation of Ser. No. 447,866, March 4, 1974, abandoned. This application June 30, 1975, Ser. No. 591,594
Claims priority, application Germany, Mar. 6, 1973, 2311739
Int. Cl.² C22C *38/24, 38/38*
U.S. Cl. 75—126 B 1 Claim

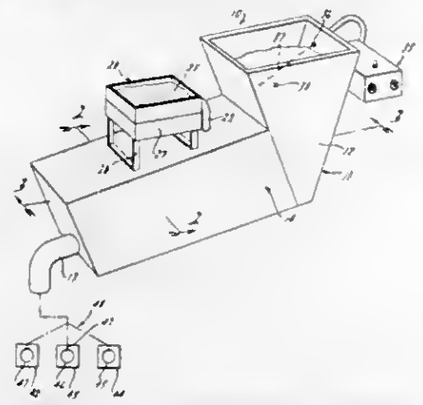
I. In a method comprising conducting cryogenic liquids through pipes or tubes, the improvement comprising said pipes or tubes being fabricated from a steel consisting of 20% to 30% Mn, 5% to 12% Cr and non-zero quantities of up to about 0.5%C, up to 1.5% Si and up to 0.5%V.

4,028,099

CONTINUOUS STREAM - INCLINED TROUGH TREATMENT OF DUCTILE IRON

Gerald S. Cole, Dearborn; Bela Y. Kovacs; Robert A. Sensoli, both of Dearborn Heights, and Herschel B. Smartt, Plymouth, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Apr. 17, 1975, Ser. No. 569,029
Int. Cl.² C22C *33/08, 33/00*
U.S. Cl. 75—130 B 14 Claims



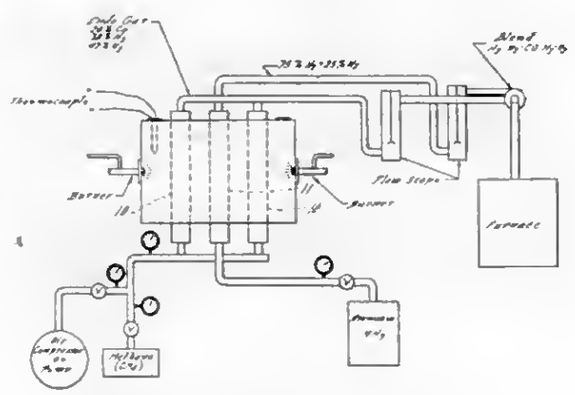
1. A method of producing treated iron, comprising:
a. providing an inclined and enclosed course through which a molten stream of treatable iron may flow, said enclosed course having an expansion chamber interposed therein with an inlet and an outlet respectively connecting said course to said chamber while permitting said iron to flow therethrough, at least one of said inlet or outlet being controllable in aperture size, said chamber having another opening into which and through which a graduated supply of treating agent may be injected to contact, react, mix and expand with said iron flow, said chamber being comprised of refractory material substantially unreactive with the iron flow or agent and said chamber being maintained in a gas-tight condition, said course further being arranged so that the outflow from said expansion chamber is directed immediately to a mold solidifying said treated iron substantially independent of time and temperature variations,
b. introducing a predetermined quantity of molten treatable iron to said course in a manner to flow into and through said chamber, said treatable iron having a sulfur content in the range of 0.01–0.015% by weight of the predetermined quantity of iron,
c. simultaneous with flow through said chamber, injecting a predetermined and continuous supply of treating agent through said another opening, said treating agent being a modifier selected from the group consisting of a rod of solid magnesium, magnesium ferro-silicon in the form of either lumps or pellets and magnesium vapor, and
d. adjusting the aperture of said controllable inlet or outlet so that a predetermined collection of iron is developed and maintained in said chamber for a substantial portion of said iron flow therethrough whereby reaction between said agent and iron can create turbulence to promote further reaction and uniform distribution of products of said iron treatment.

4,028,100

HEAT TREATING ATMOSPHERES

Henry F. Latva, Dearborn, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Division of Ser. No. 361,082, May 17, 1973, Pat. No. 3,891,473. This application Oct. 15, 1974, Ser. No. 514,352
Int. Cl.² B22F *9/00*; C21P *1/76*
U.S. Cl. 75—224 20 Claims



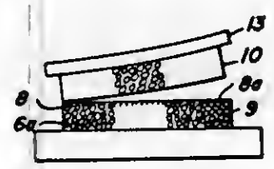
1. A method of sintering steel powder metal compacts, comprising:
combusting methane to form CO, N_2 and H_2 constituents,
dissociating ammonia to form N_2 and H_2 constituents,
blending the constituents together and
subsequently introducing the blended constituents into a sintering environment containing the compact while heating the compact at sintering temperatures.
9. A method of sintering comprising:
providing an endothermic generator and an ammonia dissociator,
passing a flow of methane into the generator and a flow of ammonia into the dissociator,
regulating the flow of the two gases relative to each other,
combusting the methane in the generator and dissociating the ammonia in the dissociator,
providing a steel powder metal compact in a sintering environment,
passing the combusted constituents out of the generator,
passing the dissociated constituents out of the dissociator,
mixing constituents together, and
introducing the mixed constituents into the sintering environment of the compact.

4,028,101

MIGRATION IMAGING MEMBER EMPLOYING A SURFACE SKIN

David A. Buckley, Rochester, and Frank G. Belli, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 499,716, Aug. 22, 1974. This application July 23, 1975, Ser. No. 598,310
Int. Cl.² G03G *5/00*
U.S. Cl. 96—1.5 5 Claims



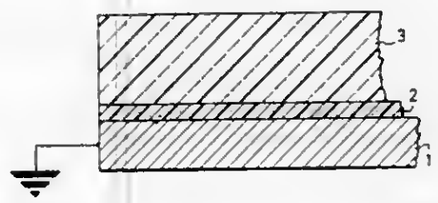
1. An imaged member comprising:
a first layer of softenable material containing a background of migration material, said first layer of softenable material overlying a second layer of softenable material, said softenable material being either electrically photosensitive or substantially electrically insulating, said second layer of softenable material containing migration particles distributed in depth in said second layer of softenable material in image pattern configuration, at least one of said layers of softenable material containing a surface skin located at the entire surface of at least one of said softenable layers and at the interface between said layers of softenable material, said surface skin formed by exposing said surface of at least one of said layers of softenable material to hardening radiation sufficient to form said surface skin having a thickness from about 0.01 to about 0.5 micron

4,028,102

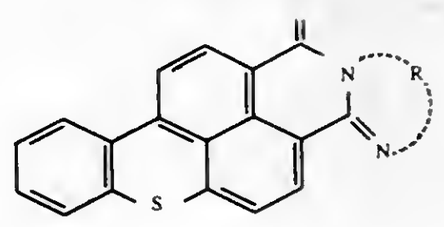
DIAMINE CONDENSATION PRODUCTS IN DOUBLE LAYER PHOTOCONDUCTIVE RECORDING ELEMENTS

Jürgen Rochlitz, Wiesbaden, and Reinhard Zuoker, Kelkheim, both of Germany, assignors to Hoechst Aktiengesellschaft, Germany

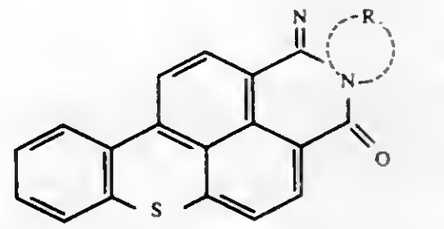
Division of Ser. No. 519,650, Oct. 31, 1974, abandoned. This application Dec. 5, 1975, Ser. No. 637,929
Claims priority, application Germany, Nov. 3, 1973, 2355075
Int. Cl.² G03G *5/06*
U.S. Cl. 96—1.5 9 Claims



1. An electrophotographic recording material comprising an electrically conductive carrier material having a photoconductive double layer thereon composed of an organic pigment layer of a thickness in the range of about 0.005 to about 2μm and a transparent top layer of organic insulating materials having at least one charge transfer compound in which the organic pigment layer is composed of a compound of at least one of the formulae

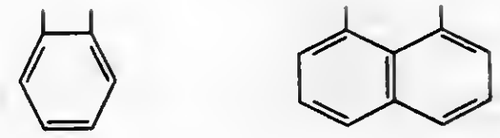


I



II

wherein R is one of the groups



which may be substituted.

4,028,103

PROCESSING COMPOSITIONS FOR COLOR TRANSFER PROCESSES COMPRISING ALKALI METAL FLUORIDES AND OXALATES

David Eugene Hannie, Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 12, 1976, Ser. No. 675,661
Int. Cl.² G03C *7/00, 5/54, 5/30, 1/40*
U.S. Cl. 96—29 D 16 Claims

13. In a process for producing a photographic transfer image in color from an imagewise-exposed photosensitive element comprising a support having thereon at least one photosensitive silver halide emulsion layer having associated therewith a dye image-providing material; said process comprising treating said photosensitive element with an alkaline processing composition in the presence of a silver halide developing agent to effect development of each of said exposed silver halide emulsion layers, said alkaline composition having a pH of at least about 11, whereby an imagewise distribution of dye image-providing material is formed as a function of development and at least a portion of it diffuses to a dye image-receiving layer to provide said transfer image, the improvement comprising including in said alkaline processing composition a salt which is an alkali metal fluoride or an alkali metal oxalate.

4,028,104

INFRARED HOLOGRAM RECORDING METHOD

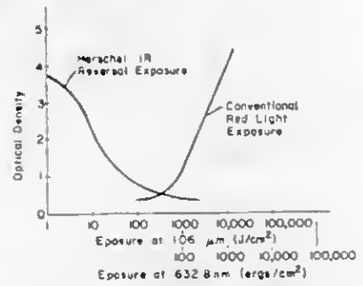
Andrejs Graube, Venice, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Apr. 21, 1975, Ser. No. 569,737
Int. Cl.² G03C *5/04, 5/50*
U.S. Cl. 96—27 H 7 Claims

1. A method of fabricating infrared holograms from silver halide emulsion photographic plates or films comprising, first exposing said plates to visible light, second uniformly exposing said plates or films to holographic infrared radiation and developing said exposed plates or films.

5. A method of fabricating infrared holograms comprising the steps of:
a. uniformly exposing a photographic plate or film, comprised of a silver halide emulsion, to visible light whereby

the sensitivity of said film or plate is extended to 1 + 0.25 μm wavelength range,



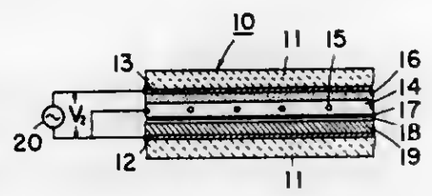
b. subsequently subjecting said plate or film to a holographic infrared radiation exposure until the desired optical density reduction is achieved, and
c. developing said exposed plate.

4,028,105

COLOR CORRECTION PROCESS FOR COLOR PRINTING USING ELECTROLUMINSCENT ELEMENT

Yoshio Ono, No. 25-2, Nishirendaino-cho, Murasakino, Kita, and Takashi Sakamoto, No. 16, Sagasono-cho, Narutaki, Ukyo, Kyoto, both of Japan

Filed Apr. 16, 1975, Ser. No. 568,711
Claims priority, application Japan, Apr. 17, 1974, 49-42292
Int. Cl.² G03C 7/04; G03F 1/00; G03C 1/92, 7/00
U.S. Cl. 96—3 D **4 Claims**



1. In a process for making a color separation record for color printing including the steps of:
a. applying a light image onto the surface of a photosensitive material with a color filter for color separation;
b. placing an electroluminescent member in close proximity to the upper surface of the photosensitive material; the member having the property of the lower surface thereof emitting light in response to the amount of light impinged on the upper surface thereof; the member also having the property of radiating onto the surface of the photosensitive material a light image which is the negative of the light image applied onto the upper surface of the member; and exposing the said electroluminescent member to the said light image through a color correction filter, and then
c. exposing the said photosensitive material to a reversal of the said light image radiated from the electroluminescent member when said member is in registration with the photosensitive material.

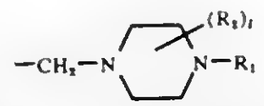
4,028,106

METHOD FOR DEVELOPING AN EXPOSED SILVER HALIDE COLOR PHOTOSENSITIVE MATERIAL

Haruo Hori; Shoji Kikuchi; Hajime Wada; Sadatosi Kobayasi, and Takaya Endo, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Nov. 4, 1975, Ser. No. 628,762
Claims priority, application Japan, Nov. 5, 1974, 49-127314
Int. Cl.² G03C 7/00, 1/40
U.S. Cl. 96—55 **7 Claims**

1. A method for developing an imagewise exposed silver halide color photosensitive material which comprises conducting the development in the presence of at least one of p-phenylenediamines and a phenol or naphthol cyan coupler having, in the active position thereof, the following split-off group:



wherein R_1 is selected from the group consisting of alkyl, alkenyl, aryl, acyl, formyl, amino carbonyl group or a heterocyclic ring, said group and said ring may be substituted with a member selected from the group consisting of nitro; hydroxyl; amino; sulfo; substituted or unsubstituted alkyl, aryl, heterocyclic ring, alkoxy, arylazo, acylamino, or carbamoyl, said heterocyclic ring having 5 to 6 members and is selected from the group consisting of pyridyl, quinolyl, thienyl, piperidyl, imidazolyl and oxydiazolyl; R_2 is alkyl, alkenyl, aryl, acyl, formyl, or aminocarbonyl; and 1 is an integer of 0 to 4 inclusive.

4,028,107

PROCESS AND APPARATUS FOR PRODUCING PRINTED MATTER

John C. Henley, III, 2345 Crest Road, Birmingham, Ala. 35223

Filed May 19, 1971, Ser. No. 144,885
Int. Cl.² G09F 1/10; G03C 5/04
U.S. Cl. 96—41 **4 Claims**

1. The process of printing a plurality of imposed pages comprising:
a. manufacturing proofs of each page on sheets of material on which the matter to be printed is positioned in predetermined areas thereof,
b. confining said proof sheets in a co-planar and predetermined relation to each other by engaging the sheets solely along selected ones of the sheet thickness edges thereof, whereby the entire upper surfaces of said sheets are unobstructed, and
c. simultaneously reproducing on a single surface the subject matter of all of said proof sheets while maintaining them confined and related to each other as set forth in (b) above.

4,028,108

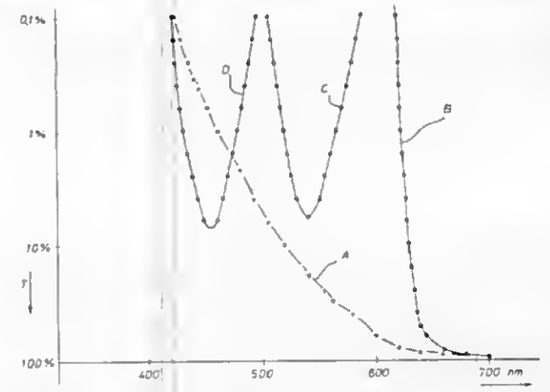
FREE-RADICAL PHOTOGRAPHIC MATERIAL

Freddy Ghisleen Van Royen, Ranst, Belgium, assignor to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed Nov. 10, 1975, Ser. No. 630,496
Claims priority, application United Kingdom, Nov. 12, 1974, 48943/74
Int. Cl.² G03C 5/24, 1/52
U.S. Cl. 96—48 R **11 Claims**

1. A photographic material containing in a layer on a support a mixture of the following compounds:
1. at least one ultraviolet-sensitive organic polyhalogen compound capable of producing a dye salt with a spiropyran compound on exposure with ultraviolet radiation,
2. at least one spirobi(arylpyran) compound,
3. N-vinylcarbazole,
4. at least one compound selected from the group consisting of furan, furylacrylic acid and 2-carboxyfuran,

5. at least one compound selected from the group consisting of 1-phenyl-3-pyrazolidinone, benzalphenylhydrazone and 1,5-dimethyl-2-phenyl-4-pyrazolin-3-one, and



6. a polymeric compound containing N-vinylcarbazole units.

4,028,109

PHOTOGRAPHIC TRANSPARENCY FOR PRODUCING A LENTICULAR ARRAY

Robert L. Lamberts, Penfield, and Nelson R. Nail, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 455,759, March 28, 1974, Pat. No. 3,984,242. This application Nov. 7, 1975, Ser. No. 629,948
Int. Cl.² G03F 5/00; G03C 5/00
U.S. Cl. 96—116 **2 Claims**

1. A photographic transparency for use in photographically producing an improved screen element having an array of substantially identical lenticules of predetermined profile, said transparency comprising a support, a layer of developed photosensitive emulsion extending over one surface of said support and defining one or more lenticule exposing sectors of said transparency, each such exposing sectors being subdivided into a plurality of profile defining areas which are of the same size and shape and located contiguously in a grid array within said sector, each of said profile defining areas having a separate, substantially uniform optical density throughout, the relative optical densities, and the relative locations within such sector of said profile defining areas, being designed to facilitate recording in a photographic emulsion, of exposure pattern for forming a lenticule of predetermined profile.

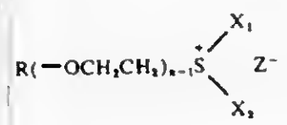
4,028,110

DEVELOPMENT OF EXPOSED LITH-EMULSIONS

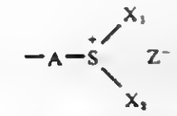
Jules Robert Berendsen, Deurne; Robert Joseph Pollet, Vremde; Herman Adelbert Phlippaerts, Edegem; Francis Jeanne Sels, Kontich, and Jozef Frans Willems, Wilrijk, all of Belgium, assignors to AGFA-GEVAERT, N.V., Mortsel, Belgium

Filed Feb. 21, 1975, Ser. No. 552,037
Claims priority, application United Kingdom, Feb. 28, 1974, 9106/74
Int. Cl.² G03C 5/30, 1/28
U.S. Cl. 96—66.3 **11 Claims**

1. A method of developing an exposed photographic element including a lith silver halide emulsion containing at least about 50 mole % of silver chloride, at least about 5 mole % of silver bromide and from 0 to 5 mole % of silver iodide wherein during development a sulphonium compound corresponding to the formula:



wherein:
each of X_1 and X_2 represents an alkyl group at least one of which carries a hydroxy, carboxy, sulpho or cyano group,
R represents an alkyl group, an aryl group or the group



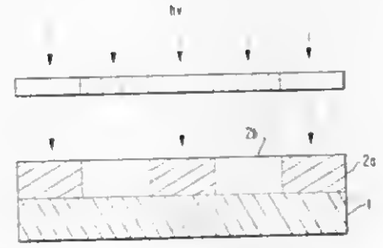
wherein A is a divalent organic group, or
R may represent hydrogen when X_1 and X_2 are hydroxyalkyl,
n is an integer of at least 1 when the compound is a disulphonium compound and is an integer of at least 2 when the compound is a monosulphonium compound, and
Z is an anion but does not exist when one of X_1 and X_2 itself contains an anionic group,
is present in the developer employed or in the photographic element in an amount sufficient to increase the initial rate of development and to stabilize the speed upon prolonged development.

4,028,111

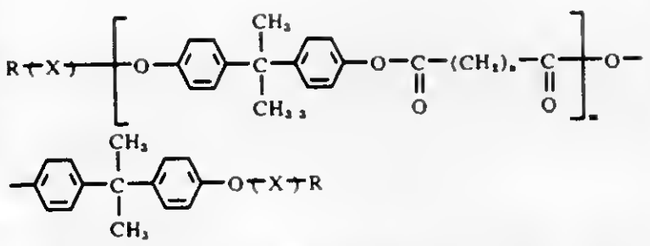
LIGHT-SENSITIVE LITHOGRAPHIC PRINTING PLATE

Masayuki Iwasaki; Hiroshi Misu, both of Minami-ashigara, and Shizuo Miyano, Odawara, all of Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Feb. 25, 1975, Ser. No. 552,902
Claims priority, application Japan, Feb. 25, 1974, 49-22133
Int. Cl.² G03C 1/52, 1/68
U.S. Cl. 96—75 **10 Claims**



1. A light-sensitive lithographic printing plate comprising a support with a hydrophilic surface having thereon a light-sensitive layer comprising a light-sensitive polyester, containing o-quinonediazide groups as terminals, represented by the formula:



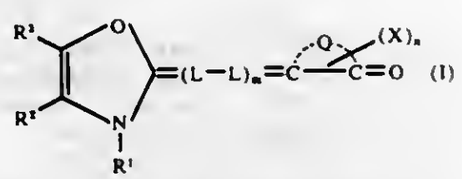
wherein X represents a sulfonyl group or a carbonyl group; wherein R represents an aromatic o-quinonediazide group in which the aromatic ring can be substituted with a substituent which does not hinder the photolysis of said o-quinonediazide group; n represents an integer of 2 to 10; and m represents an integer of 2 to 50.

4,028,112
PHOTOGRAPHIC SENSITIVE MATERIALS HAVING A DYED LAYER

Akira Sato; Tadashi Ikeda; Tohru Sueyoshi; Yasuharu Nakamura, and Takeo Shimada, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed May 9, 1975, Ser. No. 575,878
Claims priority, application Japan, May 10, 1974, 49-51927
Int. Cl.² G03C *1/84*
U.S. Cl. 96—84 R **6 Claims**

1. A silver halide photographic sensitive element comprising a support having thereon at least one silver halide photosensitive emulsion layer and at least one hydrophilic colloid layer containing (1) a basic polymer which is a water-soluble high molecular weigth material containing basic groups in the main chain thereof or in a branched chain thereof and which is compatible with gelatin, said polymer being a polymer of an ethylenically unsaturated compound having a dialkylaminoalkyl ester group, a maleic acid anhydride copolymer or a derivative thereof, a polymer produced by reacting a polyvinylalkylketone with aminoguanidien, a polymer containing a 2-methylimidazole nucleus in a side chain thereof, and addition polymer of bisacrylamid and a secondary diamine or the quaternary salt thereof, or a copolymer including polyvinylpyridine or polyvinylquinoline, and (2) 80 to 800 mg per m² of said element of a merocyanine dye represented by the following formula (I):



wherein R^1 represents an alkyl group having 1 to 20 carbon atoms, a substituted alkyl group having 1 to 20 carbon atoms and containing 1 or more of a halogen atom, a cyano group, a carboxy group, an alkoxycarbonyl group, a sulfo group, a sulfoalkoxy group, a phospho group, a carbamoyl group, an acyl group, an acyloxy group, a hydroxy group, an alkoxy group, an amino group, a mono- or bicyclic aryl group, a mono- or bicyclo heterocyclic group, a momo- or bicycle aryloxy group, a mono- or bicyclic aryloxy-carbonyl group, an alkenyl group, or an alkynyl group as substituents; each of R^2 and R^3 represents a mono-, bi-or tricyclic aryl group or a substituted mono, bi-or tricyclic aryl group substituted with 1 or more of an alkyl group, an alkoxy group, an alkylthio group, a halogen atom, a nitro group, a cyano group, a sulfo group, a phospho group, a carboxy group, an alkoxycarbonyl group, an amino group, an aralkyl group, a mono- or bicyclic aryl group, or a mono- or bicyclic aryloxy group as substituents; L represents a methine group; *m* represents an integer of 0, 1, 2 or 3; Q represents the group of atoms necessary to complete a ketomethylene group containing nucleus; X represents a carboxy group, a sulfo group, a phospho group or a group containing 1 or more of a carboxy group, a sulfor group or a phospho group as a substituent; *n* represents an integer of 1, 2 or 3 and wherein the total number of carboxyl groups, sulfo groups and phospho groups included R^1, R^2, R^3, L and X is at least 2 to 5, said basic polymer being present in an amount such that about 4 to 20 basic functional groups in the basic polymer are present per molecule of said dye, the placement of said at least one hydrophilic colloid layer containing said polymer and said dye being as follows:

A. Said support has thereon more than one hydrophilic colloid layer, and said silver halide photosensitive emulsion layer is a first hydrophilic collied layer which is located between said support and second hydrophilic collied layer which contains said basic polymer and said merocyanine dye,

B. said support has thereon more than one hydrophilic colloid layer, and the hydrophilic colloik layer which contains said basic polymer and said merocyanine dye is located between said support and a hydrophilic colloid layer which contains said silver halide photosensitive emulsion, or

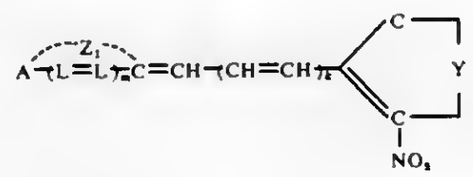
C. said support has thereon more than one hydrophilic colloid layer, and the hydrophilic colloid layer which contains said basic polymer and said merocyanine dye is located between two hydrophilic colloid layers which each contain silver halide photosensitive emulsions.

4,028,113
PHOTOGRAPHIC SUPPORTS AND ELEMENTS UTILIZING PHOTOBLEACHABLE O-NITROARYLIDENE DYES

David M. Sturmer, Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 443,654, Feb. 19, 1974, abandoned, which is a continuation-in-part of Ser. No. 260,618, June 7, 1972, abandoned, which is a continuation-in-part of Ser. No. 176,681, Aug. 25, 1971, abandoned. This application Oct. 30, 1975, Ser. No. 627,427
Int. Cl.² G03C *1/89, 1/72*
U.S. Cl. 96—84 R **19 Claims**

1. A photographic element comprising a support and, coated thereon, a radiation-sensitive image recording means, the improvement comprising an otherwise transparent photographic film support having incorporated therein a photobleachable dye which has the following formula:



wherein:

a. *K* represents 0 or 1;

b. *m* represents 0 or 1;

c. each L represents a methine group;

d. A represents oxygen, sulfur or N-R_1;

e. R_1 represents an alkyl group, an alkenyl group or an aryl group;

f. Z_1 represets the nonmetallic atoms necessary to complete a cyanine dye type heterocyclic ring whose skeletal atoms consist of the oxygen, sulfur or nitrogen atom of A, carbon atoms and one other atom chosen from the group consisting of carbon, oxygen, nitrogen, selenium and sulfur atoms; and

g. Y represents the atoms necessary to complete a phenyl or naphthyl group.

4,028,114
PHOTOCHEMICAL SYSTEM FOR COATING THE LUMINESCENT SCREEN OF A COLOR TELEVISION PICTURE TUBE

Uwe Viohl, Aichschiess, Germany, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Mar. 10, 1975, Ser. No. 557,220
Claims priority, application Germany, Mar. 12, 1974, 2411869
Int. Cl.² G03C *1/66, 5/36*
U.S. Cl. 96—93 **1 Claim**

1. In a photochemical system for coating luminescent screens of color television picture tubes containing a photosensitive polyvinyl alcohol and a salt of chromic acid, the improvement comprising addition to said photochemical system of a polyether alcohol of the general formula $HOCH_2[CH_2OCH_2]_nCH_2OH$ wherein the quantity *n* has a valve of from 2 to 3.

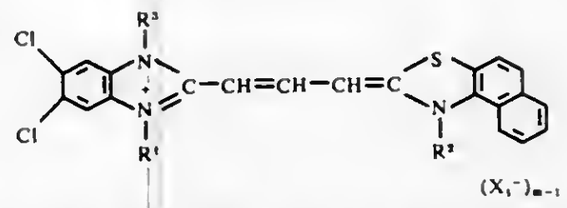
4,028,115
SILVER HALIDE PHOTOGRAPHIC EMULSION SENSITIZED TO RED WITH FOUR CARBOCYANINE DYES

Masanao Hinata; Haruo Takei; Akira Sato; Atsuo Iwamoto, and Jun Hayashi, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Aug. 26, 1976, Ser. No. 717,837
Claims priority, application Japan, Aug. 26, 1975, 50-103228
Int. Cl.² G03C *1/14*
U.S. Cl. 96—124 **13 Claims**

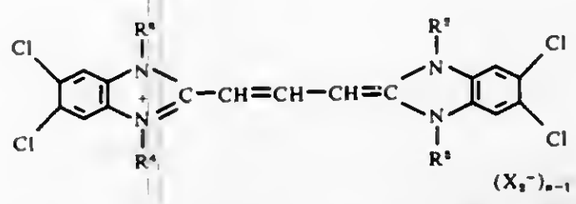
1. A spectrally sensitized silver halide photographic emulsion containing, in combination, at least one sensitizing dye represented by the following general formula (I), at least one sensitizing dye represented by the following general formula (II), at least one sensitizing dye represented by the following general formula (III) and at least one sensitizing dye represented by the following general formula (IV):

general formula (I)



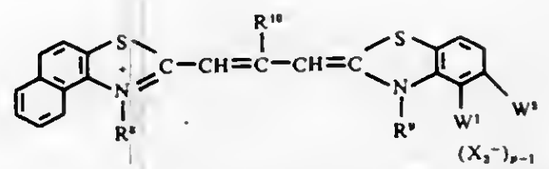
in which R^1 and R^2 each represents an alkyl group R^3 represents an alkyl group, X_1 represents an acid anion, and *m* is 1 or 2, *m* being 1 in the case that the dye forms an inner salt (betaine-like structure);

general formula (II)



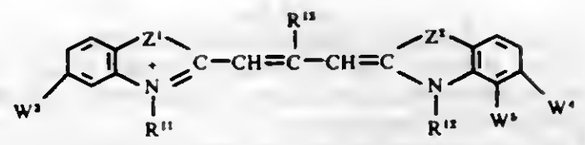
in which R^7 represents an alkyl group, R^4, R^5 and R^6 each represents an alkyl group, X_2 represents an acid anion, and *n* is 1 or 2, *n* being 1 in the case that the dye forms an inner salt (betaine-like structure);

general formula (III)



in which R^8 and R^9 each represents an alkyl group, R^{10} represents an alkyl group, an aryl group, a furyl group or a thienyl group, W^2 represents a hydrogen atom, a halogen atom, an alkyl group, an alkoxy group, a hydroxy group, an alkoxycarbonyl group, an acyl group, an acylamino group or a phenyl group, and W^2 may form a benzene nucleus in conjunction with W^1, W^1 represents a hydrogen atom or an atomic group required to form a benzene nucleus in conjunction with W^2, X_3 represents an acid anion, and *p* is 1 or 2, *p* being 1 in the case that the dye forms an inner salt (betaine-like structure);

general formula (IV)



in which Z^1 and Z^2 each represents a sulfur atom or a selenium atom, W^2 and W^4 each represents a hydrogen atom, an alkyl group, an alkoxy group, a hydroxy group, a halogen atom, a phenyl group, an acyl group, an acylamino group or an alkoxycarbonyl group, W^4 may form a benzene nucleus in conjunction with W^5 only when W^1 and W^2 in general formula (III) form a benzene nucleus, W^5 represents a hydrogen atom or an atomic group required to form a benzene nucleus in conjunction with W^4, R^{11} and R^{12} each represents an alkyl group or a substituted alkyl group having a sulfo group, at least one of R^{11} and R^{12} representing a substituted alkyl group having a sulfo group, and R^{13} represents alkyl group; and

when the dye represented by general formula (I), (II), (III) or (IV) is an anionic dye, it has a cation as a counter ion.

4,028,116
SOLUTION FOR ELECTROLESS CHROME ALLOY PLATING

Curtis E. Cedarleaf, 4826 Spring Creek Road, Rockford, Ill. 61111

Filed Dec. 1, 1972, Ser. No. 311,437
Int. Cl.² C23C *3/02*
U.S. Cl. 106—1 **5 Claims**

1. An aqueous solution for electroless or catalytic deposition of chromium alloy consisting essentially of an organic chromium salt having a concentration between about 10 to 40 grams per liter, a nickel salt having a concentration of not less than about 2 grams per liter and not more than about one-fifth the concentration of the chromium salt; a hypophosphite reducing agent having a concentration of between 5 and 30 grams per liter; a buffering compound capable of maintaining the pH of the solution between 3.5 and 6; and a complexing agent comprising a water soluble salt of oxalic acid in concentration about 1 to 5 grams per liter.

4,028,117
CORROSION INHIBITORS

Nicholas Warrington Moat, Hawley, England, assignor to Edwin Cooper & Company Limited, Bracknell, England

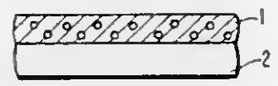
Filed May 29, 1975, Ser. No. 581,744
Claims priority, application United Kingdom, May 30, 1974, 23986/74
Int. Cl.² C09D *5/08*
U.S. Cl. 106—14 **8 Claims**

1. A mixture suitable for use as a corrosion inhibitor, which mixture comprises (a) from 1.8 to 25 parts by weight dimerised unsaturated fatty acid said fatty acid containing 8–20 carbon atoms and (b) 1 part by weight of an ethoxylated alkyl phenol, said phenol having an average of about 3–4 ethylene oxide units and said alkyl containing 4–16 carbon atoms and wherein said mixture provides a WSIM number of at least 60.

4,028,118
THERMOCHROMIC MATERIALS

Norikazu Nakasuji; Takashi Kataoka; Hiroshi Inagaki, and Sunao Nakashima, all of Nagoya, Japan, assignors to Pilot Ink Co., Ltd., Nagoya, Japan

Continuation-in-part of Ser. No. 365,330, May 30, 1973, abandoned. This application Dec. 23, 1975, Ser. No. 643,656
Claims priority, application Japan, May 30, 1972, 47-53649; July 27, 1972, 47-75355; July 29, 1972, 47-76132; Sept. 14, 1972, 47-92378; Dec. 2, 1972, 47-120936; Jan. 19, 1973, 48-8801; Feb. 9, 1973, 48-16856; Feb. 16, 1973, 48-19602; Apr. 2, 1973, 48-38117
Int. Cl.² C09D 11/06, 11/12
U.S. Cl. 106—21 9 Claims



1. A reversible thermochromic material comprising (A) from about 1% to about 20% by weight of one or more electron-donating, chromatic organic compounds selected from the group consisting of diaryl phthalides, polyaryl carbinols, leuco auramines, lactum leuco compounds, indolines, spiropyrans and fluoranes having a molecular weight of from about 350 to about 1...; (B) from about 2% to about 30% by weight of one or more compounds having a phenolic hydroxyl group and a molecular weight of from about 200 to about 800; (C) from about 10% to about 90% by weight of one or more compounds selected from the group consisting of lauryl alcohol, myristyl alcohol, cetyl alcohol, stearyl alcohol, docosyl alcohol, oleyl alcohol and mixtures thereof; and (D) the balance to make 100% being one or more compounds selected from the group consisting of octyl caprylate, decyl caprylate, octyl caprate, decyl caprate, cetyl caprate, stearyl caprate, butyl laurate, octyl laurate, lauryl laurate, stearyl laurate, butyl myristate, decyl myristate, myristyl myristate, cetyl myristate, octyl palmitate, butyl stearate, decyl stearate, lauryl stearate, stearyl stearate, 12-hydroxy stearic acid triglyceride and mixtures thereof, said component (C) and (D) controlling the temperature and sensitivity of coloration/decoloration of said thermochromic material undergoing reversible metachromatism at a temperature within the range of from about −40° to about 80° C.

4,028,119
PROCESS FOR PREPARING RESINS FOR USE IN PRINTING INK

Koichi Yamada; Teijiro Morimoto, both of Iwakuni, and Yoshiaki Yoshioka, Waki, all of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed Feb. 4, 1975, Ser. No. 547,028
Claims priority, application Japan, Feb. 5, 1974, 49-14149
Int. Cl.² C09D 11/00
U.S. Cl. 106—32 15 Claims

1. A process for preparing resins for use in printing inks, which comprises

a. copolymerizing not less than 50% by weight of dicyclopentadiene and not more than 50% by weight of at least one other cationically polymerizable monomer having at least one double bond at a temperature ranging from −20 to 100° C. in the presence of a Friedel-Crafts polymerization catalyst resulting in a copolymer,

b. reacting 1 to 20% by weight, based on the weight of the resulting copolymer, of an α,β-unsaturated carboxylic acid or its anhydride with the resulting copolymer, and then

c. esterifying the resulting adduct to a degree of 20 to 100% with a polyhydric alcohol.

4,028,120
MOLD RELEASE AGENT FOR URETHANE FOAMED RUBBER

Robert Earl Emond, Mooretown, Canada, assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed Dec. 20, 1974, Ser. No. 534,858
Int. Cl.² B28B 7/38
U.S. Cl. 106—38.24 6 Claims

1. A mold release agent for applying to the surfaces of a mold, consisting essentially of from about 3 to about 25% by weight of the sodium soap of tall oil acids in admixture with from about 12 to about 38 wt. % kerosene, from about 3.5 to about 5 wt. % paraffin wax and a paraffin base oil.

4,028,121
LEAD FELDSPAR GLASS-CERAMIC BODIES

Kenneth Chyung, Elmira, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed July 18, 1975, Ser. No. 597,249
Int. Cl.² C03C 3/22
U.S. Cl. 106—39.8 9 Claims

1. A glass-ceramic article exhibiting a coefficient of thermal expansion (25°–300° C.) of less than 35×10^{-7}/°C., a D.C. resistivity (log ρ) at 200° C. of at least 10 and at 500° C. of at least 7, a dielectric constant at 1 KC and 25° C. of at least 5, and a loss tangent at 100 KC and 25° C. of less than 0.001, and consisting essentially of substantially uniformly-sized crystals homogeneously dispersed within a glassy matrix, said crystals comprising at least 50% by volume of the article, subsantially all of said crystals having a grain size less than about 1 micron in diameter, and consisting predominantly of lead feldspar solid solution (basically $PbO.Al_2O_3.2SiO_2$), said article consisting essentially, by weight on the oxide basis, of about 26–45% PbO, 12–28% Al_2O_3, 30–50% SiO_2, and at least 3% but less than 6% TiO_2.

4,028,122
POROUS REFRACTORY SHAPES

Herbert Greenewald, Jr., 4296 Braunton Road, Columbus, Ohio 43220

Continuation-in-part of Ser. Nos. 370,624, June 18, 1973, abandoned, and Ser. No. 172,550, Aug. 17, 1971, abandoned. This application Aug. 5, 1975, Ser. No. 602,122
Int. Cl.² C04B 35/52
U.S. Cl. 106—40 R 9 Claims

1. A process of manufacturing a rigid porous refractory shape comprising the steps of: (a) mixing refractory particles selected from the group consisting essentially of alumina particles, zircon particles, silica particles, chromium oxide particles, and silicon carbide particles with bond-forming ingredients consisting of aluminum metal powder, water, and a corrosion accelerator in solution with said water to a fluid consistency; (b) casting said fluid mixture into a form at least in part defining said shape; and (c) reacting said bond-forming ingredients to form aluminum hydroxide bonds between said refractory particles, said aluminum metal powder ingredient weighing substantially from 5 to 20% the weight of said refractory particles, said water ingredient weighing substantially from 10 to 40% the weight of said refractory particles, and said corrosion accelerator being from the group consisting essentially of aluminum nitrate, aluminum chloride, nitric acid, hydrochloric acid, sulfuric acid, ammonium oxalate, oxalic acid, chromic acid, chromium nitrate, hydroxylacetic acid, gluconic acid, and citric acid and weighing substantially from 5 to 35% the weight of said refractory particles and substantially from 67 to 700% the weight of said aluminum metal powder.

4,028,123
COMPACTED REFRACTORY SHAPES

Herbert Greenewald, Jr., 4296 Braunton Road, Columbus, Ohio 43220

Continuation-in-part of Ser. Nos. 370,624, June 18, 1973, abandoned, and Ser. No. 172,550, Aug. 17, 1972, abandoned. This application Aug. 5, 1975, Ser. No. 602,123
The portion of the term of this patent subsequent to Mar. 24, 1994, has been disclaimed.
Int. Cl.² C04B 35/52
U.S. Cl. 106—44 10 Claims

1. A process of manufacturing a rigid refractory shape comprising the steps of: (a) mixing refractory particles selected from the group consisting essentially of alumina particles, zircon particles, silica particles, chromium oxide particles, and silicon carbide particles with bond-forming ingredients consisting of aluminum metal powder, water, and a corrosion accelerator in solution with said water to form a uniform mixture; (b) compacting said mixture in a form at least in part defining said refractory shape; and (c) reacting said bond-forming ingredients to form aluminum hydroxide bonds between said refractory particles and thereby form said rigid refractory shape, said aluminum metal powder weighing substantially from 5 to 10% the weight of said refractory particles, said water weighing substantially from 2 to 15% the weight of said refractory particles, and said corrosion accelerator being from the group consisting essentially of aluminum nitrate, aluminum chloride, nitric acid, hydrochloric acid, sulfuric acid, ammonium oxalate, oxalic acid, chromic acid, chromium nitrate, magnesium oxide, calcium oxide, hydroxylacetic acid, gluconic acid, and citric acid and weighing substantially from 2 to 10% the weight of said refractory particles and substantially from 35 to as much as 200% the weight of said aluminum metal powder.

4,028,124
METHOD OF ENHANCING THE REFRACTORINESS OF HIGH PURITY FUSED SILICA

Peter P. Bihuniak, Corning, and Donald L. Guile, Horseheads, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Apr. 26, 1976, Ser. No. 680,451
Int. Cl.² C04B 35/14
U.S. Cl. 106—69 9 Claims

1. In an improved method of producing a high purity fused silica product, wherein a liquid form of silica sol or slurry is dried to form solid silica bodies which are then thermally vitrified, the improvement, whereby the refractoriness of the fused silica is enhanced, which comprises doping the silica containing liquid with 20 to 200 parts per million by weight, as based on the fused silica, of a metal oxide selected from the group consisting of chromium, molybdenum, zinc, and iron oxides in conjunction with up to 1500 parts per million by weight of elemental silicon.

4,028,125
CEMENT COMPOSITION

Robert C. Martin, Tulsa, Okla., assignor to The Dow Chemical Company, Midland, Mich.

Filed Mar. 25, 1976, Ser. No. 670,331
Int. Cl.² C04B 7/35
U.S. Cl. 106—89 27 Claims

1. A cement composition comprising portland cement and the calcium sulfate hemihydrate form of gypsum in a weight ratio of from 3:1 to 1:3 and, based on the total weight of said portland cement and gypsum:

a. from about 5 to about 25 percent alkali metal nitrate; and

b. from about 0.1 to about 2 percent of at least one retarder selected from the group consisting of

1. a low molecular weight polycarboxylic acid,

2. a sodium, potassium, or lithium salt of a low molecular weight polycarboxylic acid, and

3. an alakline hexametaphosphate.

4,028,126
PROCESS FOR MANUFACTURING RAPID HARDENING PORTLAND CEMENT CLINKER

Shigejiro Mori, Kawasaki; Hiroshi Uchikawa, Funabashi, and Shunichiro Uchida, Tokyo, all of Japan, assignors to Onoda Cement Company, Ltd., Yamaguchi, Japan

Continuation of Ser. No. 208,068, Dec. 15, 1971, abandoned. This application Jan. 7, 1974, Ser. No. 431,157
Claims priority, application Japan, Dec. 28, 1970, 46-120519
Int. Cl.² C04B 7/54
U.S. Cl. 106—100 9 Claims

1. A process for manufacturing rapid hardening portland cement which comprises adding calcium sulfate hemihydrate and anhydrite to a clinker containing 10 – 70% by weight of $11CaO.7Al_2O_3.CaX_2$, wherein X is a halogen, 15 – 60% by weight of $3CaO.SiO_2$ and less than 1% by weight of free CaO which clinker is prepared by adding 0.5 – 4.5% by weight based on SO_3 of at least one sulfur compound selected from the group consisting of calcium sulfate, calcium sulfite and calcium sulfide to mixed raw materials which comprise an aluminous material, a calcareous material, a siliceous material, an iron source and a halogen source; and burning the obtained mixture at the temperature of 1265° – 1400° C in an oxidizing atmosphere, wherein said calcium sulfate hemihydrate and anhydrite are added in an amount such that the weight ratio of Al_2O_3/SO_3 in the cement is present in a range of 0.7 – 1.8.

4,028,127
PLASTER OF PARIS USING GLYOXAL TREATED HYDROXYALKYL GUAR

Fred John Maske, St. Paul, and Robert Nordgren, Minneapolis, both of Minn., assignors to General Mills Chemicals, Inc., Minneapolis, Minn.

Filed Mar. 10, 1976, Ser. No. 665,360
Int. Cl.² C04B 11/14
U.S. Cl. 106—111 3 Claims

1. A blend consisting essentially of as the first component a reaction product of hydroxyalkyl ether of guar and glyoxal, wherein the hydroxyalkyl group of the hydroxyalkyl ether of guar contains from 2 to 4 carbon atoms, and the amount of glyoxal reacted with the hydroxyalkyl ether of guar is about 0.01 to 1.5% by weight of the hydroxyalkyl ether of guar, said reaction being conducted at a pH of about 6.0 to 6.3 in a water-solvent media; said reaction product being in an amount of about 0.2 to 3.0% by weight of the total blend; and, as the second component a non-guar cross-linking gypsum cement.

4,028,128
PIGMENT DISPERSIONS

George Heddle Robertson, Paisley, Scotland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Mar. 9, 1976, Ser. No. 665,192
Claims priority, application United Kingdom, Mar. 12, 1975, 10239/75
Int. Cl.² C09C 3/08
U.S. Cl. 106—308 Q 11 Claims

1. A composition comprising

i. a pigment

ii. a carboxy ester having an acid value in the range of from 15 to 140 mg KOH/g and having been formed by the reaction of:

a. a compound of formula ROH, or a mixture of such compounds, wherein R is an alkyl or alkenyl residue, each having from 12 to 30 carbon atoms, or a hydroxy-terminated carboxylic acid ester having from 12 to 100 carbon atoms, with

b. trimellitic acid or a derivative thereof and optionally

c. a diol of the formula HO-Y-OH wherein Y is a straight-

or branched-alkylene residue having from 2 to 12 carbon atoms, optionally containing in addition, an alkyl or alkylene side chain of 2 to 22 carbon atoms, attached by an ether or ester linkage, or Y is a hydrocarbon residue having from 4 to 12 carbon atoms containing ether or thioether linkages, and optionally

iii. an organic liquid, wherein said carboxy ester is present in an amount of from 2 to 200% by weight based on the weight of pigment and the solvent is present in the range of from 10% to 90% by weight based on the total weight of the dispersion.

4,028,129

HEAT-DEVELOPABLE PHOTOSENSITIVE MATEKIALS

Nobuo Suzuki; Yasuhiro Noguchi, and Takao Masuda, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Jan. 8, 1975, Ser. No. 539,566
Claims priority, application Japan, Jan. 8, 1974, 49-5453
Int. Cl.² G03C *1/02*, *1/76*
U.S. Cl. 96—114.1 15 Claims

1. A heat-developable photosensitive material comprising a support having thereon one or more layers with at least one of the layers containing at least one of (a) an organic silver salt, (b) a catalytic amount of a photosensitive silver halide or a component capable of forming a photosensitive silver halide and (c) a reducing agent, and (d) at least one of an inorganic peroxide and a peroxodisulfate wherein the amount of said inorganic peroxide is about 0.001 to 50 moles per mole of said organic silver salt of component (a) and wherein the amount of said peroxodisulfate is about 10^{-6} to 10^{-2} moles per mole of said organic silver salt of component (a).

4,028,130

DISPOSAL METHOD AND USE OF SEWAGE SLUDGE

William C. Webster; Robert G. Hilton, and Ronald F. Cotts, all of Norristown, Pa., assignors to IU Conversion Systems, Inc., Philadelphia, Pa.

Continuation-in-part of Ser. Nos. 494,338, Aug. 2, 1974, abandoned, and Ser. No. 420,364, Nov. 30, 1973, abandoned. This application Nov. 15, 1974, Ser. No. 524,148
Int. Cl.² C04B *1/00*
U.S. Cl. 106—120 32 Claims

1. A water-solids mixture hardenable under atmospheric conditions the dry solids of which comprise (based on weight % of dry solids):

1–15% lime
1–50% digested sewage sludge solids
20–90% fly ash, and the water of which provides a moisture content (based also on weight % dry solids) of 5- 50%.

7. Method of treating a sludge from a municipal sewage plant comprising admixing said sludge with lime and fly ash such that the final composition of said admixture has a moisture content of 5–50% and the dry solids therein comprise:

1–15% lime
1–50% digested sewage sludge solids
20–90% fly ash, and

permitting said admixture to harden under atmospheric conditions.

4,028,131

RAW MATERIALS FOR GLASS MAKING AND METHOD OF MAKING THEM

André Pons, Villejuif, France, assignor to Saiot-Gobain Industries, Neuilly sur Seine, France

Continuation of Ser. No. 258,423, May 31, 1972, abandoned, which is a continuation-in-part of Ser. No. 792,261, Jan. 21, 1969, abandoned. This application May 31, 1974, Ser. No. 475,201
Claims priority, application France, Jan. 23, 1968, 68.137060
Int. Cl.² C03C *3/04*
U.S. Cl. 106—52 5 Claims

1. The method of preparing a vitrifiable charge for the manufacture of silicon-sodium-calcium glass which comprises mixing at room temperature into a homogeneous mass sand, quicklime, and calcined dolomite, incorporating in the mixture an alkali metal supplying material including alkali metal hydroxide, from 15 to 100% by weight of the alkali metal being supplied by said alkali metal hydroxide, and a quantity of water sufficient to permit granulation of the mixture.

4,028,132

CELLULOSE SOLUTIONS AND PRODUCTS PREPARED THEREFROM

Morton H. Litt, University Heights, Ohio, and Narayan Ganesh Kumar, Webster, N.V., assignors to International Playtex, Inc., New York, N.Y.

Filed Nov. 25, 1975, Ser. No. 635,017
Int. Cl.² C08L *1/02*
U.S. Cl. 106—163 R 18 Claims

1. A solution of cellulose in hydrazine where in the solvent medium comprises at least 30% by weight hydrazine.

4,028,133

REDUCED CHARGE MONTMORILLONITE PIGMENT FOR SENSITIZING RECORD MATERIAL

Peter A. H. Isaac, Summit, and T. Dixon Oulton, Watchung, both of N.J., assignors to Engelhard Minerals & Chemicals Corporation, Menlo Park, N.J.

Continuation-in-part of Ser. No. 648,163, Jan. 12, 1976. This application Apr. 5, 1976, Ser. No. 673,596
The portion of the term of this patent subsequent to Nov. 23, 1993, has been disclaimed.
Int. Cl.² C09C *1/42*
U.S. Cl. 106—288 B 14 Claims

1. A sensitizing pigment for record material comprising micron-size particles of a mixed layer smectite, the lattice of which is partially dioctahedral montmorillonite and partially trioctahedral such as saponite or hectorite, and wherein the proportion of trioctahedral is small, said mixed layer smectite having been subjected to ion-exchange treatment with a preselected quantity of lithium ions followed by heat treamtnet to collapse irreversibly the dioctahedral montmorillonite structure, said particles being capable when coated on paper of producing a stable intense blue image when printed with a solution of crystal violet lactone in an organic solvent.

4,028,134

REINFORCED RESIN FILLER COMPOSITIONS

Vance A. Stayner, and Barry L. Sloss, both of P.O. Box 63, Sugar Grove, Ill. 60554

Division of Ser. No. 401,208, Oct. 24, 1973, Pat. No. 3,920,603. This application Aug. 25, 1975, Ser. No. 607,138
Int. Cl.² C08K *7/00*
U.S. Cl. 106—291 5 Claims

1. For use as a reinforcing filler in a curable, synthetic polyester resin, a dry blend of about 1 to 30 parts by weight of microscopically sized glass spheres, about 10 to 60 parts by weight of Suzorite mica platelets, and about 20 to 70 parts by weight of aluminum trihydrate particles.

4,028,135

METHOD OF CLEANING SURFACES BY IRRADIATION WITH ULTRAVIOLET LIGHT

John R. Vig, Colts Neck, and John W. LeBus, Farmingdale, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 22, 1976, Ser. No. 671,798
Int. Cl.² B08B *3/10*
U.S. Cl. 134—1 12 Claims

1. Method of removing contaminants from surfaces including the steps of:

A. precleaning the surfaces with solvents; then rinsing in running ultrapure water; and finally, spinning dry immediately after the running water rinse; said precleaning also being carried out under an atmosphere of air;

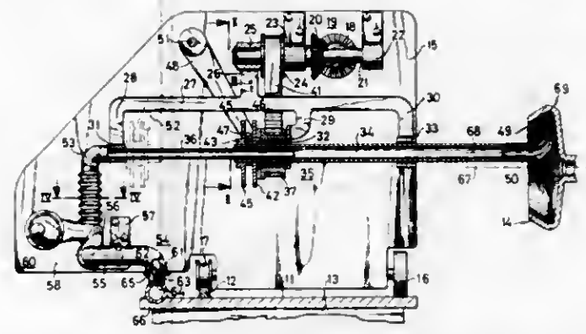
B. placing the precleaned surfaces within about 5 millimeters of a lamp which emits short wavelength ultraviolet light that generates ozone in an oxygen containing atmosphere and that contains at least one wavelength between about 2000 angstroms and about 3000 angstroms; and irradiating the placed surfaces in an oxygen containing atmosphere with said short wavelength ultraviolet light from said lamp for about one minute.

4,028,136

METHOD AND DEVICE FOR CLEANSING SPINNING TURBINES OF A SPINNING MACHINE

Heinz Kamp, Rickelrath, Germany, assignor to W. Schlafhorst & Co., Monchengladbach, Germany

Filed Dec. 3, 1975, Ser. No. 637,461
Claims priority, application Germany, Dec. 3, 1974, 2457034
Int. Cl.² B08B *1/04*, *5/02*
U.S. Cl. 134—8 6 Claims



1. Method of cleansing rotatable spinning turbines located at respective spinning stations of a spinning machine which comprises driving a cleansing device having a telescoping tube assembly provided with a rotary cleansing brush at one end thereof from spinning turbine to spinning turbine of the spinning machine, inserting the one end of the telescoping tube assembly with the rotary cleansing brush provided thereat into the respective rotatable spinning turbine, connecting the other end of the telescoping tube assembly to a source of compressed air and rotating the rotary brush independently of the rotatable spinning turbine so as to cleanse the inner surface of the rotatable spinning turbine therewith and with the compressed air.

4,028,137

PROCESS FOR THE QUANTITATIVE REMOVAL OF RESIDUAL MELTS FROM CRUCIBLES

Adalbert Ellbrunner, Seibersdorf, Germany; Georg Priewasser, Ach, Duttendorf, Austria; Friedrich Georg, Braunau, Austria, and Horst Stock, Burghausen, Germany, assignors to Wacker-Chemitronic Gesellschaft fur Elektronik-Grundstoffe mbH, Burghausen, Germany

Filed Nov. 10, 1975, Ser. No. 630,572
Claims priority, application Germany, Nov. 14, 1974, 2454092
Int. Cl.² B01D *9/00*; B08B *1/00*, *9/08*
U.S. Cl. 134—8 6 Claims

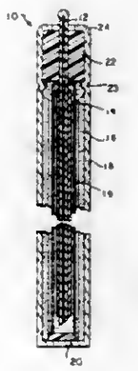
1. A process for quantitatively removing a residual high temperature crystal producing melt from the interior of a crucible containing the same comprising lowering into and immersing in the melt an inert movable solid capillary body having a melting point significantly higher than the temperature of said melt and which is insoluble in the melt, for a sufficient period of time to permit the melt to be absorbed by and to rise upward into the capillary body by way of capillary action, and vertically removing the capillary body and absorbed melt therein from the interior of the crucible.

4,028,138

METHOD OF CONSTRUCTION OF AN ULTRAMINIATURE HIGH ENERGY DENSITY CELL

Arabinda N. Dey, Needham, Mass., assignor to P. R. Mallory & Co. Inc., Indianapolis, Ind.

Continuation-in-part of Ser. No. 314,316, Dec. 12, 1972, Pat. No. 3,945,846. This application Mar. 8, 1976, Ser. No. 664,780
Int. Cl.² H01M *6/00*
U.S. Cl. 29—623.2 13 Claims



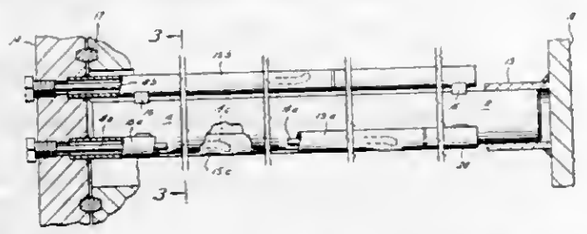
1. A method for constructing an ultraminiature electrical cell comprising the steps of adhering a first solid active electrode material as a layer on the lower end of a hollow metal needle; adhering a second solid active electrode material as a layer on the inner surface of an elongated cylindrical metallic container, said container having a volume of less than about 0.01 cubic inch and being open at one end thereof with the inner surface of said second electrode material layer forming a cavity having a diameter greater than that of said needle with said layer of first solid active electrode material thereon; securing means for sealing the open end of said container on the upper end of said needle; thereafter axially placing a separator and said needle, lower end first, within said cavity with said sealing means in position to seal said container; introducing an organic electrolyte solution through said needle; and closing the end of said needle above said sealing material.

4,028,139

METHODS AND MULTIPLE THERMOCOUPLE SUPPORT ASSEMBLY

Randlow Smith; Henry B. Jones; Adrianus C. Jobsis, and Hugh C. Deloney, all of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 4, 1975, Ser. No. 637,787
Int. Cl.² H01L 35/02
U.S. Cl. 136—230 17 Claims



6. A multiple thermocouple assembly for a vessel used in processing a fluid over a fixed bed of particulate solids for measuring various fluid temperatures simultaneously in different, defined locations in a horizontal section through the fixed bed in the vessel comprising,

a. an elongated tube support fastened horizontally in the vessel extending from one side wall to the opposite side wall in a predetermined horizontal section across the vessel,

b. a plurality of thermowells fixedly secured with a fastening means to said elongated tube support along the length of the tube support and substantially equally spaced around the periphery of the tube support to provide a high structural strength multiple thermocouple assembly as a beam,

c. a bevelled plug fixed in each thermowell at different predetermined locations across the tube support, and

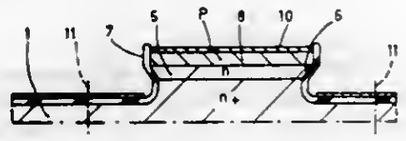
d. a thermocouple mounted in each of the thermowells wedged against the bevelled plug in its respective thermowell at said predetermined locations in said horizontal section across the vessel for simultaneously measuring the fluid temperatures at the different various predetermined locations across the fixed bed in the vessel.

4,028,140

SEMICONDUCTOR DEVICE MANUFACTURE

John Gilbert Summers, Crowborough, and Maurice Pierrepont, Horley, both of England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 22, 1975, Ser. No. 624,726
Claims priority, application United Kingdom, Oct. 29, 1974, 46726/74
Int. Cl.² H01L 21/265
U.S. Cl. 148—1.5 9 Claims



1. A method of manufacturing a semiconductor device comprising the steps of

a. providing a semiconductor layer of one conductivity type on a semiconductor body portion of the same conductivity type but higher conductivity,

b. forming an etch-masking layer on part of the semiconductor layer surface,

c. subjecting the semiconductor layer surface to an etching treatment which etches through the semiconductor layer where exposed around said etch-masking layer to leave a mesa portion of the semiconductor layer under said etch-masking layer and to expose the part of said semiconductor body portion around said mesa portion, and

d. while using the etch-masking layer to mask the top of said mesa-portion, subjecting the exposed parts of said semiconductor body portion and said mesa portion to further etching which includes removing the material of said semiconductor body portion faster than that of said semiconductor layer to etch under said mesa portion of the semiconductor layer and cause the whole upper edge of said mesa portion to overhang the adjacent etched surface, the side of said mesa portion being bevelled by the further etching so that the area of the resulting mesa portion of the semiconductor layer increases from its interface with said semiconductor body portion.

4,028,141

ALUMINUM IRON SILICON ALLOY

E. Henry Chia; Frank M. Powers, and Kenneth E. Chadwick, all of Carrollton, Ga., assignors to Southwire Company, Carrollton, Ga.

Filed Mar. 12, 1975, Ser. No. 558,045
Int. Cl.² C22F 1/04
U.S. Cl. 148—2 8 Claims

1. A method of preparing a heat resistant aluminum alloy electrical conductor having a minimum electrical conductivity of sixty-one percent (61%) IACS and having evenly dispersed therein iron-aluminum-silicon intermetallic particles having a particle diameter of less than one micron when measured along the transverse axis of said particles, comprising the steps of:

a. Alloying from about 0.25 to about 0.85 weight percent silicon, from about 0.30 to about 0.95 weight percent iron with the balance of aluminum containing trace elements selected from the group consisting of copper, manganese, magnesium, titanium, vanadium and zinc wherein the individual concentrations of said trace elements do not exceed 0.05 weight percent and the total concentration of said trace elements does not exceed 0.15 weight percent;

b. Casting the alloy in a moving mold formed between a groove in the periphery of a rotating casting wheel and a metal belt adjacent to said groove for a portion of its length to form a continuous bar; and

c. Hot-rolling the continuous bar substantially immediately after casting while the continuous bar is in substantially that condition as cast to form a continuous rod.

2. The method of claim 1 further including the steps of drawing said continuous rod through a series of wire-drawing dies without intermediate anneals to form a wire; and annealing or partially annealing said wire.

5. A heat resistant aluminum alloy electrical conductor made by the method of claim 2 having a minimum electrical conductivity of sixty-one percent (61%) IACS and having evenly dispersed therein iron-aluminum-silicon intermetallic particles having a particle diameter of less than one micron when measured along the transverse axis of said particles consisting essentially of from about 0.25 to about 0.85 weight percent silicon, from about 0.30 to about 0.95 weight percent iron with the balance of aluminum containing trace elements selected from the group consisting of copper, manganese, magnesium, titanium, vanadium and zinc wherein the individual concentrations of said trace elements do not exceed 0.05 weight percent and the total concentration of said trace elements does not exceed 0.15 weight percent.

4,028,142

CARBO-NITRIDING PROCESS USING NITRILES

Diethelm Bitzer, Putzbrunn near Munich, Germany, and Dieter Lohmann, Pratteln, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Feb. 5, 1975, Ser. No. 547,284
Claims priority, application Switzerland, Feb. 7, 1974, 1705/74
Int. Cl.² C21D 1/48
U.S. Cl. 148—16.5 9 Claims

1. A process for producing on a metallic or metalloid substrate, which consists at least partially of one or more of the elements selected from the group consisting of iron, boron, silicon and the transition metals of sub-groups 4 to 6 of the periodic table, a diffusion layer of material selected from the group consisting of said metal carbide, nitride, and carbonitride which comprises

heating said substrate to a temperature of 500° C to 1800° C, and

contacting said substrate with a gaseous or vaporous reactant stream comprising a carrier gas selected from argon and hydrogen and at least one carbon- and nitrogen-releasing compound which readily decomposes at substrate temperature, said compound selected from the group consisting of acetonitrile, adipodinitrile, 3-chloropropionitrile, tetracyanoethylene, acrylonitrile, tolunitrile, butyronitrile, succinodinitrile, 3-dimethylaminopropionitrile and cyclohexanecarboxylic acid nitrile, permitting reaction thereof to form said diffusion layer on said substrate.

4,028,143

WAX-FLUX COMPOSITION CONTAINING A SUCCINIMIDE SALT OF AN ALKYLARYL SULFONIC ACID FOR SOLDERING

Robert A. Stayner, Lafayette, and Warren Lowe, El Cerrito, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 537,147, Dec. 30, 1974, Pat. No. 3,954,494. This application Nov. 3, 1975, Ser. No. 627,992
Int. Cl.² C23K 35/34
U.S. Cl. 148—23 6 Claims

1. A process for soldering an electrical component to a printed circuit board, said board comprising a non-conducting substrate and a pattern of an electrically conductive metal laminated to said substrate, said metal being solderable with a low-melting-point alloy solder, said board having component lead receiving holes through both said substrate and said metal pattern, said component having electrical leads, and said component being mounted on said board by having at least one of said leads inserted through a said lead receiving hole, said process comprising:

a. applying a molten wax-flux composition to the metal pattern side of said board and to said component lead;

b. allowing said wax-flux composition to solidify;

c. trimming said component lead; and

d. soldering said component to said printed circuit board with a low-melting-point alloy solder, wherein said wax-flux composition comprises:

I. a major amount of a wax having an AMP between 0° C and 100° C; and

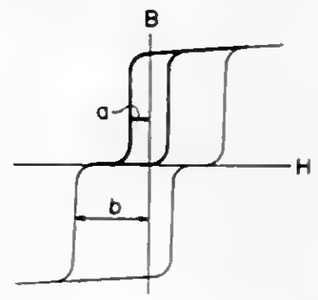
II. an amount effective to cause fluxing, at or below the soldering temperature, of the piece to be soldered in said process of a wax-soluble product obtained by first reacting a C_{20}–C_{400} aliphatic hydrocarbon-substituted succinic acid or a derivative thereof which is capable of forming carboximide bonds with a C_2–C_{30}, N_2–N_{10} alkylene polyamine to form a carboximide and then reacting said carboximide with a (C_5–C_{30} alkyl)aryl sulfonic acid.

4,028,144

SEMI-HARD MAGNETIC ALLOY WITH COMPOSITE MAGNETIC PROPERTY AND METHOD OF MAKING THE SAME

Hiroshi Tomishima; Toshio Takahashi; Kenichi Ono, and Kazuhiro Kumasaka, all of Mito, Japan, assignors to Nippon Telegraph and Telephone Public Corporation, Tokyo, Japan

Filed Aug. 14, 1975, Ser. No. 604,790
Claims priority, application Japan, Aug. 22, 1974, 49-96379
Int. Cl.² C04B 35/00
U.S. Cl. 148—31.55 8 Claims



1. A cold-worked and annealed semi-hard magnetic alloy consisting essentially of, by weight, 15–50% Co, 5–25% Ni, 1–9% Cr, 0.5–10% Cu, balance Fe and incidental impurities, and further characterized by exhibiting composite hysteresis characteristics as shown in FIG. 3.

4,028,145

STOICHIOMETRIC ANNEALING OF MERCURY CADMIUM TELLURIDE

Anthony F. Kasenga, Lyme, N.H., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 29, 1975, Ser. No. 626,811
Int. Cl.² C22F 1/02
U.S. Cl. 148—20.3 6 Claims

1. A process for controlling stoichiometry and free-carrier concentration of a mercury cadmium telluride alloy, the process comprising:

providing a body of the alloy and a cadmium vapor source other than the body in a closed environment; and

heat treating the body in the presence of the excess cadmium vapor and maintaining the body at a temperature for a time of sufficient duration to adjust stoichiometry and free-carrier concentration.

4,028,146

LPE TECHNIQUE FOR FABRICATING TAPERED OPTICAL COUPLERS

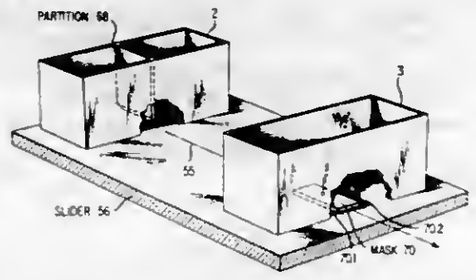
Ralph Andre Logan; James Logan Merz, both of Morristown; Franz Karl Reinhart, Summit, and Harry Gregory White, Bernardsville, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Division of Ser. No. 557,250, March 11, 1975, Pat. No. 3,978,426. This application May 20, 1976, Ser. No. 688,122
Int. Cl.² H01L 21/208
U.S. Cl. 148—171 11 Claims

1. A liquid phase epitaxy method of fabricating on a substrate a layer having a taper adjacent a zone of uniform thickness comprising the steps of:

positioning a mask in closely spaced relation over a portion of said substrate,

bringing a saturated source solution into contact with said



substrate while maintaining a controlled cooling program for a time period effective to grow said layer to the desired thickness, said taper being formed adjacent the edges of said mask.

4,028,147

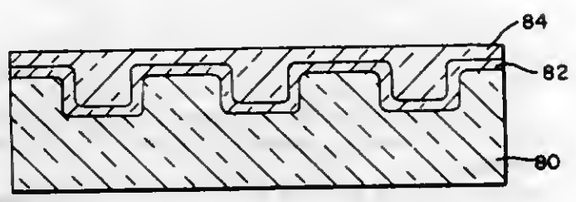
LIQUID PHASE EPITAXIAL PROCESS FOR GROWING SEMI-INSULATING GAAS LAYERS

G. Sanjiv Kamath, Malibu, and Bradley W. Smith, Oxnard, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Division of Ser. No. 530,336, Dec. 6, 1974, Pat. No. 3,994,755. This application Aug. 16, 1976, Ser. No. 714,726

Int. Cl.² H01L *21/208*

U.S. Cl. 148—171 **3 Claims**



1. A process for forming a monolithic gallium arsenide structure having a plurality of electrically insulated gallium arsenide regions therein comprising the steps of:

a. providing a gallium arsenide substrate,

b. removing preselected portions of said gallium arsenide substrate in order to form ridges and valleys adjacent one surface thereof,

c. forming a thin layer of semi-insulating gallium arsenide on said one surface of said substrate and covering said ridges and valleys thereof,

d. forming an epitaxial layer of gallium arsenide on the surface of said semi-insulating layer; and

e. removing excess portions of said epitaxial layer extending beyond said semi-insulating layer to thereby expose portions of said semi-insulating layer and leave a plurality of electrically isolated gallium arsenide islands in the valleys of said substrate, whereby said islands may be utilized in the fabrication of gallium arsenide light emitting devices, as well as gallium arsenide monolithic circuitry for driving said gallium arsenide light emitting devices.

4,028,148

METHOD OF EPITAXIALLY GROWING A LAMINATE SEMICONDUCTOR LAYER IN LIQUID PHASE

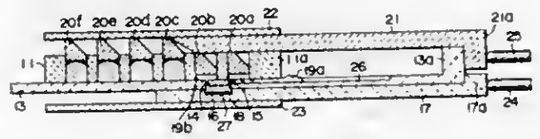
Yoshiji Horikoshi, Tokyo, Japan, assignor to Nippon Telegraph and Telephone Public Corporation, Tokyo, Japan

Division of Ser. No. 639,713, Dec. 11, 1975, Pat. No. 4,013,040. This application Aug. 19, 1976, Ser. No. 715,844

Claims priority, application Japan, Dec. 20, 1974, 49-145599

Int. Cl.² H01L *21/208*

U.S. Cl. 148—171 **4 Claims**



1. A method of epitaxially growing a laminate semiconductor layer in liquid phase on the surface of a crystalline substrate by bringing different kinds of liquid phase epitaxial growth solutions into contact with said surface, which characteristically comprises the steps of expelling the unnecessary portion of each preceding one of the respective epitaxial growth solutions deposited on the surface of the crystalline substrate by each succeeding one from said surface for interchange between the adjacent epitaxial growth solutions, and repeating said operation for the epitaxial growth of a laminate semiconductor layer.

4,028,149

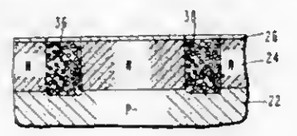
PROCESS FOR FORMING MONOCRYSTALLINE SILICON CARBIDE ON SILICON SUBSTRATES

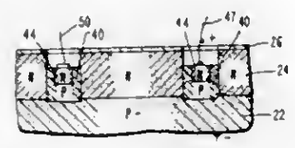
John L. Deines, Pleasant Valley; San-Mei Ku, Poughkeepsie; Michael R. Poponiak, Newburgh, and Paul J. Tsang, Poughkeepsie, all of N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed June 30, 1976, Ser. No. 701,452

Int. Cl.² H01L *21/76, 21/20, 27/04*

U.S. Cl. 148—175 **12 Claims**





1. A method for forming a monocrystalline silicon carbide on a monocrystalline silicon substrate comprising

converting a portion of a monocrystalline silicon substrate into a porous silicon substance by an anodic treatment carried out in an aqueous solution of hydrofluoric acid,

heating the resultant substrate to a temperature in the range of 1050° C to 1250° C in an atmosphere that includes a hydrocarbon gas selected from the group consisting of methane, ethane, ethylene, propane, propylene and mixtures thereof for a time sufficient to react the porous silicon and the gas thereby forming a lower layer of monocrystalline silicon carbide and an overlying layer of polycrystalline silicon carbide.

4,028,150

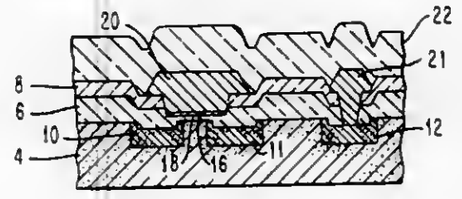
METHOD FOR MAKING RELIABLE MOSFET DEVICE

Robert Henry Collins, Wappingers Falls; Richard F. Levine; William D. North, both of Poughkeepsie; Gerald D. O'Rourke, Poughkeepsie, and Gerald R. Parker, Wappingers Falls, all of N.Y., assignors to IBM Corporation, Armook, N.Y.

Division of Ser. No. 357,046, May 3, 1973, abandoned. This application Feb. 9, 1976, Ser. No. 656,222

Int. Cl.² H01L *21/22*

U.S. Cl. 148—187 **4 Claims**



1. A method for fabricating a field effect transistor, in which the active regions of the transistor are protected against contamination, comprising the steps of:

forming a silicon dioxide coating on a surface of a silicon semiconductor substrate;

removing portions of said coating to expose spaced adjacent regions in the substrate;

depositing phosphorus pentoxide on the oxide coating and on said exposed regions;

heating the substrate in an oxygen atmosphere to cause phosphorus to diffuse into said exposed adjacent regions, thereby forming source and drain regions of a field effect transisitor, and also a relatively thick composite insulator layer, over said exposed source and drain regions, of silicon dioxide and phosphosilicate glass;

exposing a channel region between said source and drain regions;

forming a thin coating of silicon dioxide over said exposed channel region;

forming a thin layer of phosphosilicate glass on said thin oxide; and

depositing a gate electrode over said thin layer of phosphosilicate glass and over a portion of said thick composite insulator layer.

4,028,151

METHOD OF IMPREGNATING A SEMICONDUCTOR WITH A DIFFUSANT AND ARTICLE SO FORMED

Joseph Lindmayer, Bethesda, Md., assignor to Solarex Corporation, Rockville, Md.

Filed Jan. 19, 1976, Ser. No. 650,139

Int. Cl.² H01L *21/223*

U.S. Cl. 148—189 **10 Claims**

1. A method of forming a junction at a surface of a silicon wafer, comprising heating said surface with a diffusant in the presence of an inert gas selected from the group consisting of helium and neon in an amount sufficient to enhance the electrical performance of the junction resulting from penetration of said wafer surface by said diffusant compared to a junction formed by diffusion in an atmosphere of argon or nitrogen.

4,028,152

EXPLOSIVE COMPOSITION CONTAINING HIGH DENSITY HYDROCARBON LIQUID

Walter L. Borkowski, Media, and Abraham Schneider, Overbrook Hills, both of Pa., assignors to Suntech, Inc., St. Davids, Pa.

Filed Mar. 29, 1976, Ser. No. 671,634

Int. Cl.² C06B *31/28*

U.S. Cl. 149—46 **15 Claims**

1. An improved method of blasting wherein a hole is drilled and then filled with both an inorganic nitrate or mixture thereof and a liquid hydrocarbon and then a detonator is placed in the hole, and then the nitrate, the hydrocarbon and detonator are confined and then the detonator is activated thereby causing a blast; the improvement comprises that the hydrocarbon is a high density hydrocarbon liquid having a density ≥ 0.910 and a net heating value ≥ 135,000 BTU/-gallon and a pour point ≤ −30° F and wherein the amount of hydrocarbon is within ± 15% of an oxygen balance.

9. A blasting composition comprising a mixture of both

A. an inorganic nitrate selected from the group consisting of ammonium nitrate, mixture of a major amount of ammonium nitrate and a minor amount of sodium nitrate, potassium nitrate, calcium nitrate, magnesium nitrate and a mixture of the minor nitrates; and

B. a high density hydrocarbon having a density 0.910, and a net heating value 135,000 BTU/gallon and wherein the amount of the hydrocarbon is within ± 15% of an oxygen balance.

4,028,153

EXPLOSIVE COMPOSITION CONTAINING ALKYL ETHERS HAVING HIGH DENSITIES

Abraham Schneider, Overbrook Hills, Pa., assignor to Suntech, Inc., St. Davids, Pa.

Filed Mar. 29, 1976, Ser. No. 671,635

Int. Cl.² C06B *31/28*

U.S. Cl. 149—46 **5 Claims**

1. An improved method of blasting wherein a hole is drilled and then filled with both an inorganic nitrate or mixture thereof and a liquid sensitizer and then a detonator is placed in the hole, and then the nitrate, the hydrocarbon and the detonator are confined and then the detonator is activated thereby causing a blast; the improvement comprises that the sensitizer contains at least about 30% by weight of alkyl ether of Binor-S and wherein the amount of sensitizer is within ±15% of an oxygen balance.

4,028,154

AMMONIUM 2,4,5-TRINITROIMIDAZOLE

Michael D. Coburn, Los Alamos, N. Mex., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Sept. 1, 1976, Ser. No. 719,636

Int. Cl.² C06B *25/34*

U.S. Cl. 149—92 **1 Claim**

1. As a chemical explosive, the composition of matter ammonium 2,4,5-trinitroimidazole.

4,028,155

PROCESS AND MATERIAL FOR MANUFACTURING THIN FILM INTEGRATED CIRCUITS

Adir Jacob, Framingham, Mass., assignor to LFE Corporation, Waltham, Mass.

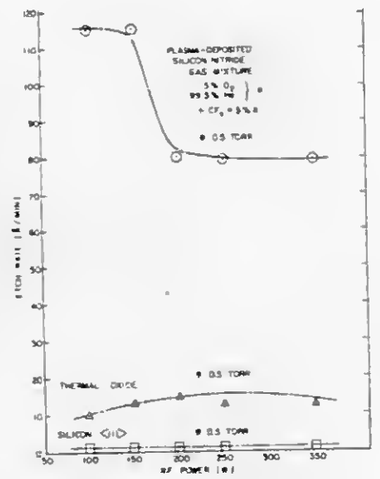
Continuation-in-part of Ser. No. 446,667, Feb. 28, 1974, abandoned. This application Aug. 10, 1976, Ser. No. 713,128

Int. Cl.² B29C *17/08*

U.S. Cl. 156—643 **54 Claims**

1. A process for use in the manufacture of multi-layer thin film integrated circuits for selective removal of specific layers, comprising the step of:

exposing the multi-layer thin film integrated circuit to a low temperature, low pressure plasma formed from a gaseous multi-component mixture of oxygen, a noble gas carrier and a halogen containing gas selected from the group consisting of:



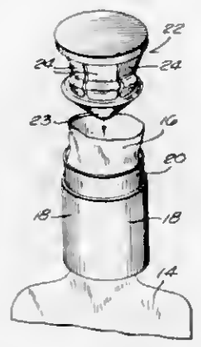
organohalides defined as having no more than two carbon atoms per molecule and being at least partially substituted by halogens including a pedominance of fluorine atoms, inorganic halides defined as having at least one fluorine atom per molecule, and fluorine gas.

4,028,156

PLASTIC CONTAINER AND CLOSURE COLLAR COMBINATION AND METHOD

James L. Clark, Whitefish Bay, and Byron L. Mather, Milwaukee, both of Wis., assignors to Plastronics, Inc., Milwaukee, Wis.

Division of Ser. No. 499,008, Aug. 19, 1974, abandoned. This application Jan. 2, 1976, Ser. No. 646,124
Int. Cl.² B29C *27/04*
U.S. Cl. 156—69 **1 Claim**



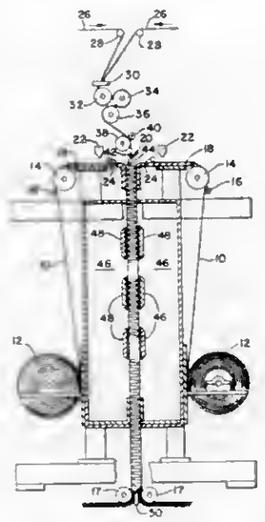
1. The method of attaching a closure collar member having a circular groove formed therein to the tubular neck portion of a plastic container comprising the steps of:
   a. inserting the tubular neck portion of the plastic container into and partially through a tubular mandril member so that the end portion of the neck will extend out the end of the mandril;
   b. folding the end portion of the neck over the edge of the mandril member;
   c. positioning the collar member on the mandril so that the folded end portion of the neck is inserted fully into the circular groove formed in the collar member; and
   d. fusing the folded edge of the neck to the collar member at the root of the circular groove by passing radio frequency energy through the collar member and bag in the area to be fused to thereby seal the collar to the plastic container, said fusing step being performed by positioning a cylindrical welding electrode in contact with the collar and in alignment with the groove formed therein and then passing the radio frequency energy through the parts.

4,028,157

METHOD AND APPARATUS FOR MOVING AND GUIDING WIRES

Martin L. Abel, Franklin, Mich., assignor to Permalock Company, Inc., Auburn Heights, Mich.

Continuation-in-part of Ser. No. 323,440, Jan. 15, 1973, Pat. No. 3,915,789. This application June 6, 1975, Ser. No. 584,521
Int. Cl.² D05C *15/00*
U.S. Cl. 156—72 **28 Claims**



1. Method for folding a plurality of strands of flexible material to make non-woven bonded carpeting, comprising the steps of:
   1. simultaneously moving the portions of a pair of elongated bondable members on both sides of the strands of flexible material along first predetermined paths,
   2translating the movement of said elongated bendable members first predetermined paths to second predetermined paths in the portion of said members that engage the plurality of strands and fold them back and forth to form a series of loops therein,
   3. advancing the series of loops and the plurality of strands,
   4. bonding the ends of the loops in a fixed position relative to each other.

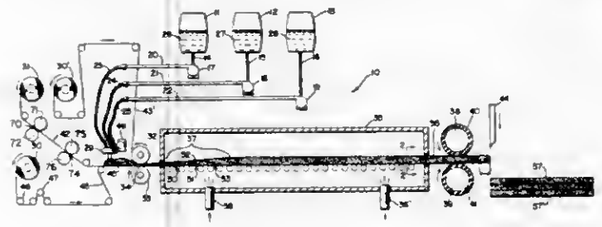
8. Apparatus for moving a pair of elongated bendable members, to engage and fold a length of flexible material into a series of loops, comprising moving means for moving both elongated members simultaneously on each side of the flexible material along first predetermined paths, translating means for translating the movement of the portion of each elongated member that engages the flexible material from its predetermined path to a second predetermined path so that the elongated members will alternately engage the flexible material and urge it back and forth to form the series of loops.

4,028,158

STRUCTURAL LAMINATE AND METHOD FOR MAKING SAME

Donald E. Hipchen, Seminole; Michael J. Skowronski, and Joseph R. Hagan, both of Clearwater, all of Fla., assignors to The Celotex Corporation, Tampa, Fla.

Filed Jan. 19, 1976, Ser. No. 650,243
Int. Cl.² B32B *5/20*
U.S. Cl. 156—79 **26 Claims**



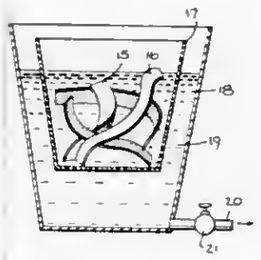
1. A process for producing a structural laminate comprising the steps of:
   I. contacting a thin, substantially incompressible yet expansible mat of glass fibers with a foam-forming mixture,
   II. positioning a facing sheet on each face of the mat, and
   III. passing the facing sheets having the mat and the foam-forming mixture therebetween through the nip of two rotating rolls,
   the mat of glass fibers being further characterized by
   A. the glass fibers being arranged in layers,
   B. the glass fibers within each layer being long, straight and substantially parallel, and
   C. the glass fibers in each layer being at an acute angle to the glass fibers in each next adjacent layer.

4,028,159

RESIN RECLAMATION IN CARPET MANUFACTURE

Alan H. Norris, Rome, Ga., assignor to Champion International Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 480,693, June 19, 1974, abandoned. This application Apr. 7, 1976, Ser. No. 674,413
Int. Cl.² B32B *35/00*
U.S. Cl. 156—94 **7 Claims**



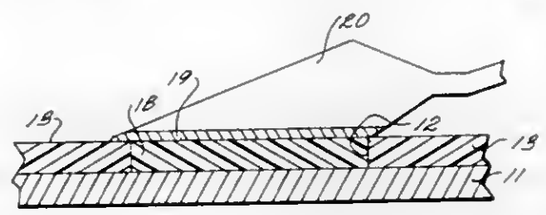
1. In the process for producing carpeting, the steps of removing and collecting selvedge during production of carpet material comprising:
   a. a yarn supporting back of thermoplastic resin;
   b. an adhesive comprising a mixture of:
      1. an amorphous low molecular weight polyethylene resin;
      2. a high molecular weight ethylene vinyl acetate copolymer resin which is an adhesive modifier for said amorphous resin; and
      3. a filler; and
   c. pile yarns formed from high molecular weight synthetic resin fibers selected from the group consisting of nylon, polypropylene and polyester fibers;
   heating said selvedge in air to a temperature above the melting points of said resins to melt and degrade said resins sufficiently to produce adhesive modification characteristics substantially equivalent of said copolymer resin, separating melted resin from solid residue, if any, to reclaim meltable resin from said selvedge and utlizing said reclaimed resin as a substitute for ethylene vinyl acetate copolymer resin in an adhesive mixture in subsequent carpet production.

4,028,160

PRECURED STRIP METHOD FOR REPAIRING FLEXIBLE MATERIALS

Harvey J. Golumbic, Fullerton, Calif., assignor to Vinyl-Chem International, Inc., Glendale, Calif.

Filed Sept. 17, 1975, Ser. No. 614,129
Int. Cl.² B32B *35/00*
U.S. Cl. 156—98 **12 Claims**



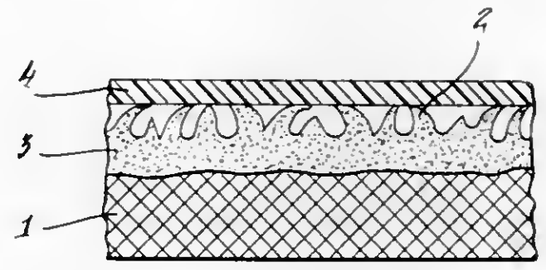
1. A process for repairing a damaged area in a vinyl base material comprising:
   a. preparing an area to be repaired in the vinyl base material by making a hole with a sharp, clean edge;
   b. cleaning the surface of the base material adjacent to the hole with a liquid cleaner;
   c. drying the cleaned area by removing the liquid cleaner from the cleaned area;
   d. applying at least one preformed layer of a substantially non-heat shrinking, precured thermoplastic vinyl-welding compound into the hole, each layer having a fusion temperature about equal to that of the vinyl base material and a high tensile strength relative to the vinyl base material, each layer having substantially the same shape and peripheral dimensions as the hole so that the periphery of each such layer butts against the periphery of the hole; and
   e. fusing each layer to the vinyl base material by the application of heat to the vinyl base material.

4,028,161

METHOD OF MAKING SHEET MATERIAL

Osamu Fukushima; Kazuo Nagoshi, and Toshiaki Iwamoto, all of Kurashiki, Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

Continuation-in-part of Ser. No. 64,721, Aug. 18, 1970, abandoned. This application Oct. 29, 1974, Ser. No. 518,830
Int. Cl.² B32B *31/20*
U.S. Cl. 156—153 **10 Claims**



1. A process for producing a sheet material having leather-like grain, excellent scuffing and abrasion resistance and superior dyeability, comprising:
   forming a finely napped porous polymeric layer having a thickness of about 0.05 to 2.50 mm, a density of about 0.10 to 0.30 g/cc and a nap length of about 0.03 to 0.5

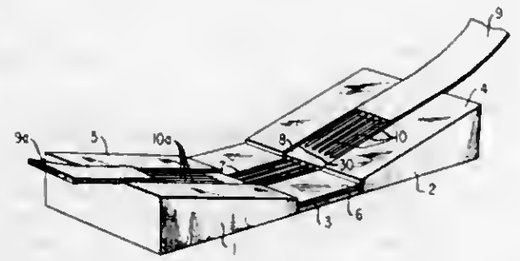
mm, on a fibrous substrate, said layer containing minute pores of about 0.1 to 100 microns in diameter;
treating the finely napped porous polymeric layer with a nap binding agent of the group consisting of a swelling agent for the polymer of the napped porous polymeric layer, solution of a polymer dissolved in the swelling agent and a two-liquid type curable polyurethane elastomer;
compressing the finely napped porous polymeric layer by about 10 to 90% of its original thickness by means of even pressure in order to obtain a layer having a desinty of from 0.20 to 0.50 g/cc; and,
overcoating the resultant compressed material with an upper layer consisting of a non-porous polymeric coating having a thickness of 1 to 100 microns.

4,028,162

METHOD OF SPLICING PAIRS OF ARRAYED OR INDIVIDUAL FIBERS UTILIZING OPTICAL FIBER ALIGNING GROOVES

Allen Henry Cherin, Doraville, and Philip Jay Rich, Atlanta, both of Ga., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Division of Ser. No. 517,420, Oct. 24, 1974, Pat. No. 3,912,574. This application May 15, 1975, Ser. No. 577,630
Int. Cl.² B65H 69/02
U.S. Cl. 156—158 **10 Claims**



1. A method for joining a first optical fiber to a second such fiber comprising the steps of:
placing said first and second fibers in respective first and second planes which converge toward each other and intersect a fiber receiving groove in two different places and at a slight angle thereto;
advancing said first and second fibers toward each other along said planes and into said fiber receiving groove, said fibers entering said groove at a slight angle of inclination to said groove sufficient to generate within each fiber a downwardly biasing stress to maintain each said fiber in contact with said groove;
continuing said advancing step until the ends of said first and said second fibers meet in abutting axial alignment; and
joining said abutted fibers.

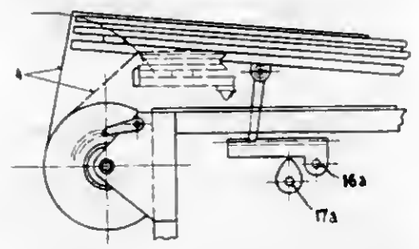
4,028,163

METHOD AND APPARATUS FOR CLADDING A PANEL

Markus Frey, Greifensee, Switzerland, assignor to Conventa-Stiftung, Vaduz, Liechtenstein

Filed July 21, 1976, Ser. No. 707,187
Claims priority, application Switzerland, July 30, 1975, 9979/75
Int. Cl.² B32B 31/00
U.S. Cl. 156—229 **12 Claims**

1. A method of cladding panels, particularly doors, with a synthetic plastic foil, comprising the steps of
positioning a panel so that two longitudinal edges thereof extend normal to the axis of rotation of a foil supply roll;
withdrawing a length of foil from said roll and thereafter arresting said roll against rotation;
securing a leading end of said length of foil to a transverse edge of said panel which is remote from said roll;
shifting said panel substantially in its own plane in a path away from said roll to stretch said length of foil;
shifting said panel in said path back towards said roll when a predetermined degree of stretch has been achieved, and at the same time imparting to the panel end facing said roll a movement transverse to said path and away from said roll, to maintain said length of foil stretched;
securing the foil intermediate said roll and said panel; and
connecting said foil to the other edge of said panel.
2. Apparatus for cladding a panel, particularly a door, with a foil of synthetic plastic material, comprising
means for rotatably supporting a supply roll of synthetic plastic foil;



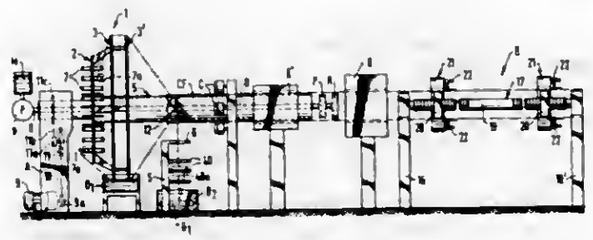
guide means extending substantially horizontally from said supply roll in direction normal to the axis of rotation thereof;
a carriage movable on said guide means towards and away from said supply roll, so that when a leading end of a length of foil withdrawn from said supply roll is secured to the remote edge of a door resting on said carriage and the carriage moves away from said supply roll, said length becomes stretched; and
means for uplifting the end of the door which is proximal to said supply roll, in response to movement of said carriage towards said supply roll so as to maintain said length of foil stretched.

4,028,164

PROCESS AND APPARATUS FOR THE CONTINUOUS OBTAINMENT BY DISPLACEMENT OF CYLINDRICAL OR PRISMATIC HOLLOW BODIES PRODUCED WITH FIBRE-REINFORCED SYNTHETIC RESINS

José Salvador Montagut, Calvet 67, Barcelona, Spain

Filed May 30, 1975, Ser. No. 582,086
Claims priority, application Spain, June 5, 1974, 427018; Jan. 21, 1975, 433994
Int. Cl.² B65H 81/00
U.S. Cl. 156—173 **9 Claims**



1. Improvements in or relating to a process for the continuous manufacture by displacement of an elongated hollow body with fibre-reinforced synthetic resins, obtained by the continuous winding of fibrous elements impregnated with synthetic resin over an elongated mandrel previously covered with resin impregnated support fibres placed parallel to the longitudinal axis of said mandrel, comprising the steps of:
a. rotating the mandrel about an axis parallel to the longitudinally extending direction thereof;

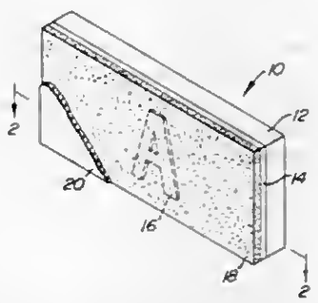
b. providing a plurality of feed stations for supplying said support fibres;
c. rotating said plurality of feed stations about said axis in unison with said mandrel and simultaneously feeding said support fibres from said feed stations to said rotating mandrel;
d. impregnating said support fibres with a liquid resin after they leave said feed stations but before they contact the mandrel;
e. placing said resin impregnated support fibres longitudinally over the continuously rotating mandrel as it rotates in unison with said plurality of feed stations to thus form a fibrous substructure which rotates with the mandrel;
f. displacing the rotating fibrous substructure thus obtained longitudinally along the length of said mandrel in a direction away from the feed stations by pulling on the substructure while preventing relative rotary movement between said substructure and said mandrel;
g. winding a plurality of continuous resin impregnated fibrous elements around said rotating fibrous substructure as it is supported on and being displaced longitudinally along the mandrel to form an elongated hollow body, whereby the fibrous elements extend spirally around the hollow body to form a layer of given thickness;
h. treating the wall of the holow body thus obtained to eliminate trapped air;
f. controlling and correcting defects in the wall of the hollow body;
i. moving said hollow body past a first heating station to at least partially cure and harden the resin;
j. providing a resin distributor head at a location which is spaced downstream from both the heating station and the discharge end of the mandrel;
k. applying a layer of resin of desired thickness to the interior surface of the hollow body by means of said distributor head as said hollow body is moved therepast;
l. moving said hollow body past a second heating station which is located downstream of said distributor head to cure and harden the inner layer of resin; and
m. severing said hollow body into sections of desired length.
2. Improvements in or relating to an apparatus for the continuous manufacture by displacement of a hollow body with fibre-reinforced synthetic resins, comprising:
frame means; an elongated mandrel rotatably mounted adjacent one end thereof on said frame means so that said mandrel projects outwardly from said means in a cantilever manner, said mandrel being supported for rotation about a longitudinally extending axis;
first drive means operatively interconnected to said mandrel for rotating same;
a spool-frame fixedly joined concentrically to said mandrel for rotation therewith, said spool-frame being positioned adjacent said one end of said mandrel and having a plurality of spools supported thereon for feeding a plurality of longitudinal support fibres axially along the periphery of said mandrel to thereby form a fibrous substructure which rotates in unison with said mandrel;
guiding means rotatable with said spool-frame and disposed for guidably deflecting the support fibres after they are removed from the spools but prior to the fibres being positioned adjacent the periphery of said mandrel;
tank means disposed adjacent said guiding means and containing therein a synthetic resin so that said guiding means and the support fibres guided thereon are submerged in said tank means during rotation of said spool-frame and mandrel;
means for winding one or more fibrous elements impregnated with synthetic resin around the rotating fibrous substructure which is supported on and extends longitudinally of the rotating mandrel, said last-mentioned means including stationary support means spaced from said mandrel, said fibrous element body guided from said stationary support means to said mandrel so as to be wound around the fibrous substructure thereon, whereby said fibrous substructure and said fibrous element form a hollow body;
means for eliminating air trapped in the wall of the hollow body;
pulling means for engaging the hollow body and pulling same in its longitudinal direction for displacing said hollow body relative to said mandrel in the longitudinal direction of said mandrel away from said spool-frame, said pulling means including first and second clamping units which are spaced apart from one another in the longitudinal direction of the mandrel, each of said clamping units having movable clamping means adapted for engagement with the hollow body;
second drive means drivingly interconnected to each of said clamping units for rotating said clamping units synchronously with said mandrel about the rotational axis thereof;
third drive means drivingly interconnected to each of said clamping units for causing linear reciprocation thereof in a direction substantially parallel to said rotational axis;
each clamping unit including a first part which is mounted for linear reciprocating movement parallel to said longitudinal direction and is restrained from rotation, said third drive means being drivingly interconnected to said first part; and
each said clamping unit also including a second part rotatably supported on said first part for rotation about said rotational axis, said second drive means being drivingly interconnected to said second part, and said clamping means being mounted on said second part and disposed for engagement with said hollow body to thereby rotate simultaneously with said hollow body in response to mandrel rotation as said hollow body is being displaced longitudinally of said mandrel.

4,028,165

DRY TRANSFER PRODUCT AND PROCESS

Jerome E. Rosenfeld, 1349 Lexington Ave., New York, N.Y. 10028

Filed June 14, 1976, Ser. No. 695,790
Int. Cl.² B44C 1/16
U.S. Cl. 156—234 **7 Claims**



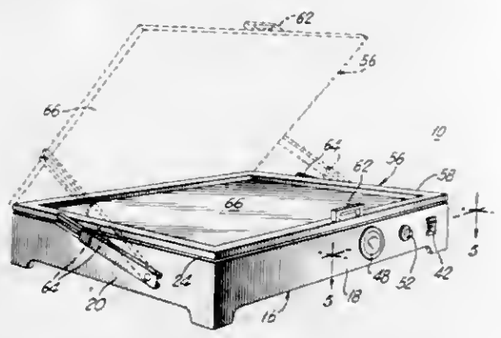
1. A dry transfer material comprising a nonextensible carrier sheet constructed of a light-transmitting polymer film of low extensibility under the stresses of light rubbing or burnishing, said sheet having a polymeric surface layer, said surface layer being substantially non-extensible and being susceptible to penetration by ink-carrying solvents, ink-printed indicia on said polymeric surface layer, said indicia being capable of being transferred to a receptor surface without the application of heat, and a pressure-sensitive adhesive coating overlying said indicia.

4,028,166

APPARATUS FOR LAMINATING SHEET MATERIAL

Charles J. Leonhart, Carol Stream, Ill., assignor to Nuarc Company, Inc., Chicago, Ill.

Filed Oct. 28, 1975, Ser. No. 626,362
Int. Cl.² B30B 9/22; G03B 27/20
U.S. Cl. 156—382 **2 Claims**



1. Apparatus for laminating pieces of sheet material together with adhesive comprising:

a base of rigid material having a flat upper surface formed with a plurality of relatively small size, spaced apart perforations distributed substantially uniformly over said surface;

a rigid base support member having a flat upper surface supporting an underside of said base and having a plurality of concentric grooves interconnected with a plurality of grooves radiating outwardly of a central portion of said support member, said grooves underlying and in communication with said perforations and an upstanding peripheral rib projecting above said flat surface of said base and spaced outwardly of said perforations;

means in communication with said grooves in said central portion of said base support member for developing a partial vacuum in said grooves for causing fluid flow through said perforations around one or more pieces of sheet material placed in contact with said upper surface of said base;

a cover of flexible fluid impervious transparent sheet material movable between non-overlaying and overlaying positions on said base and pieces of said sheet material placed on said base to be laminated together;

and means for sealing between peripheries of said base outwardly of said concentric grooves and said cover when in said overlaying position including a peripheral rigid frame supporting a peripheral edge portion of said flexible cover and mounted for pivotal movement relative to said base between said non-overlaying and said overlaying positions of said cover, said rigid frame including a groove around the periphery of said rigid frame confronting said rib when said flexible cover is in said overlaying position, said peripheral edge portion of said flexible cover extending across said groove and deflectable into said groove into sealing engagement against said rib when said cover is in said overlaying position.

4,028,167

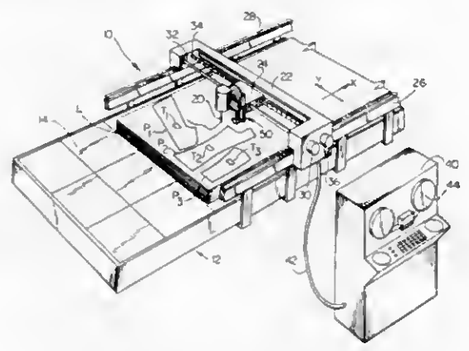
LABEL APPLICATOR FOR AUTOMATICALLY CONTROLLED CUTTING MACHINE

Heinz Joseph Gerber, West Hartford, Conn., assignor to Gerber Garment Technology, Inc., East Hartford, Conn.

Filed July 29, 1976, Ser. No. 709,901
Int. Cl.² B32B 31/00
U.S. Cl. 156—384 **7 Claims**

1. In combination in an automatically controlled cutting machine having a cutting tool and a support table which move relative to one another in a cutting operation to cut pattern pieces from sheet material spread on the support surface of the table, the improvement comprising:

a label applicator mounted with the cutting tool for movement above the support surface of the table relative to the sheet material spread on the table, the applicator including dispensing means for applying information labels



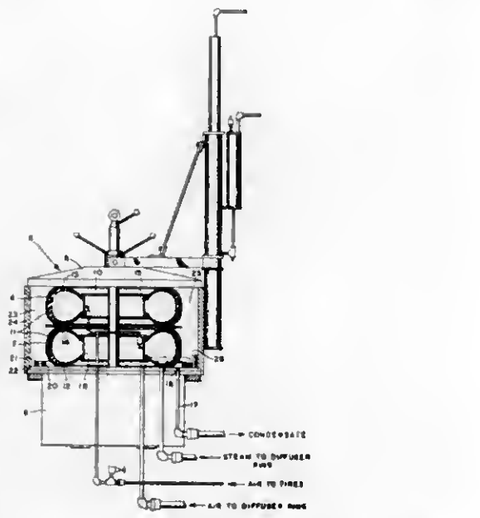
individually to the exposed surface of the sheet material within the periphery of the pattern pieces cut from the material.

4,028,168

KETTLE USED IN THE RETREADING OR REPAIR OF TIRES

Merritt W. Wolfe, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed July 15, 1976, Ser. No. 705,381
Int. Cl.² B29H 5/04
U.S. Cl. 156—394 **12 Claims**



1. A kettle used in the retreading and repair of tires, comprising:

a. a plurality of parts which, when brought together, form a chamber which is sealed from the ambient atmosphere;

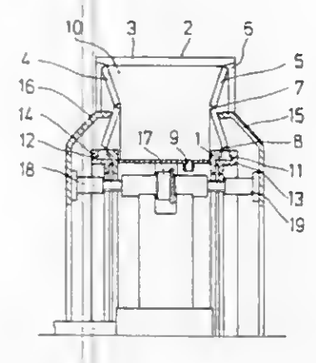
b. means associated with the kettle for simultaneously circulating steam and air, under pressure, within the chamber when it is sealed from the ambient atmosphere, said means including a number of closely spaced inlets through which the steam and the air each pass separately into the chamber, and means for spacing the inlets of the steam in sufficiently close proximity to the inlets of the air to obtain a more nearly uniform temperature within the chamber.

4,028,169

WINDING DRUM FOR PRODUCING BELT INSERTS FOR PNEUMATIC TIRES

Werner Eichholz, and Gerd Krebs, both of Hamburg, Germany, assignors to Phoenix Gummiwerke AG, Hamburg, Germany

Filed Oct. 15, 1975, Ser. No. 622,712
Claims priority, application Germany, Nov. 19, 1974, 2454751
Int. Cl.² B29H 17/16
U.S. Cl. 156—416 **7 Claims**



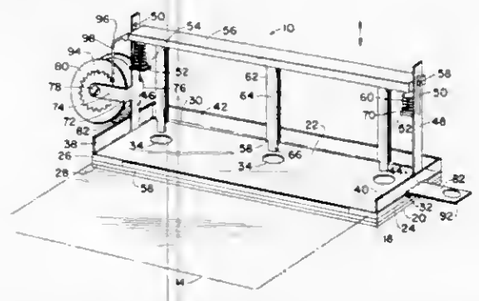
1. A winding drum for producing belt inserts for pneumatic tires, comprising a cylindrical casing having axial outer edges, disks connected with said edges and having radially inwardly extending portions, said disks being foldable to facilitate radial expansion of the casing, an inner drum, said disks having radial inner ends sealed to said drum to form an annular air chamber between the drum and the casing, and supports engaging said disk portions radially outward of said drum at adjustable positions limiting the amount of unfolding which the disks can carry out and thus controlling the radial expansion of the casing.

4,028,170

REINFORCING HOLE PUNCH DEVICE

Sundar Savarimuthu, 17 Glen Eagle Crecent, Willowdale, Ontario, Canada

Filed Aug. 3, 1976, Ser. No. 711,267
Int. Cl.² B32B 31/00
U.S. Cl. 156—513 **10 Claims**



1. A reinforcing hole punch device for punching a hole in a sheet of material and applying an annularly shaped reinforcing element to said sheet around said formed hole in said sheet, which comprises:

a. a base having a bottom, a plurality of upwardly extending walls, and a top, said base having a channel therein, said channel extending between two said walls, another said wall having an elongated opening therein, said opening extending inwardly into said base to communicate with said channel, said top of said base having at least one circular aperture therein, said circular aperture extending downwardly into said base to communicate with said channel, said elongated opening adapted to receive said sheet therein;

b. a pair of arm members, one arm member affixed to each end of said base and extending upwardly therefrom, each said arm member having an elongated slot therethrough;

c. a rectangularly shaped bar member having a pair of distal ends;

d. a pair of pin elements, each said pin element affixed linearly onto one said distal end of rectangularly shaped bar member, each said pin element slideably disposed in one said elongated slot of one said arm member;

e. means for restricting down movement of said bar member between said arm members;

f. at least one punch element perpendicularly affixed to said bar member, said punch element received in said aperture upon a downward movement of said bar member; and

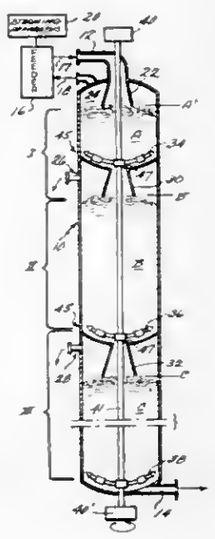
g. means for inserting a plurality of reinforcing elements into said channel for application of said reinforcing elements to said sheet.

4,028,171

METHOD FOR CONTINUOUS TREATMENT OF FIBER MATERIAL IN A VERTICAL ARRAY

Johan C. F. C. Richter, St. Jean Cap Ferrat, France, assignor to Kamyr Aktiebolag, Karlstad, Sweden

Filed July 2, 1975, Ser. No. 592,659
Claims priority, application Sweden, July 5, 1974, 7408858
Int. Cl.² D21C 3/26, 3/24
U.S. Cl. 162—19 **5 Claims**



1. A method for continuously treating fiber material in a vertical array comprising the steps of

a. establishing a first fiber column of a predetermined height in a liquid-filled first upper treatment zone having first predetermined temperature and pressure conditions, and a first given cross-sectional area,

b. continuously moving individual fibers of said first fiber column downwardly at a first predetermined flow velocity towards a liquid-filled lower second zone having second predetermined temperature and pressure conditions greater than said first predetermined temperature and pressure conditions, and a second given cross-sectional area,

c. forcing individual fibers in said first fibers in said first fiber column from said first zone into said second zone at a second flow velocity greater than said first flow velocity and of a predetermined magnitude great enough to substantially prevent flow of liquid from said second zone into said first zone, by forcing said fiber material through an area between said zones of smaller cross-sectional area than said first and second cross-sectional areas, and

d. forming a second fiber column in said second zone.

4,028,172

PROCESS OF MAKING PAPER

Emil D. Mazzarella, Mountainside, N.J., assignor to National Starch and Chemical Corporation, Bridgewater, N.J.

Continuation-in-part of Ser. No. 460,918, April 15, 1974, abandoned. This application Oct. 23, 1975, Ser. No. 624,732
Int. Cl.² D21D 3/00
U.S. Cl. 162—164 R 4 Claims

1. In a process of making paper the improvement which comprises the step of adding to the wet pulp, prior to its entrance into the press section of the paper machine, a polysiloxane polymer selected from the group consisting of (A) a fluid water-soluble copolymer of dimethylpolysiloxane-polyoxyalkylene ether wherein the alkylene moiety is ethylene, propylene or mixtures thereof, and (B) an aqueous emulsion of dimethylpolysiloxane, said emulsion remaining water dispersible in all proportions, in an amount sufficient to provide a concentration of from about 0.005 to 0.15% of active polymer based on dry fiber weight, thereby substantially or completely eliminating the problem of wet press picking.

4,028,173

METHODS OF MAKING COMBINED TITANIUM DIOXIDE AND CALCIUM CARBONATE AND OPAQUE PAPER CONTAINING THE RESULTING COMBINATION

Robert A. Olson, York New Salem, Pa., assignor to P. H. Glatfelter Co., Spring Grove, Pa.

Filed Aug. 15, 1975, Ser. No. 605,216
Int. Cl.² D21D 3/00
U.S. Cl. 162—181 A 9 Claims

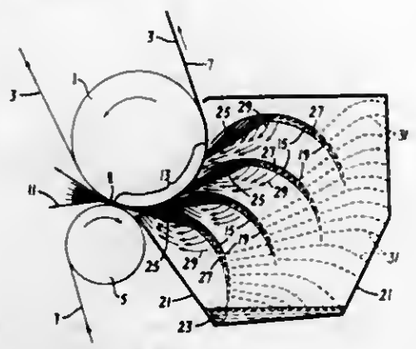
1. In a method of making opaque paper containing pigment wherein said pigment is added to a paper furnish and the resulting mixture is formed into sheets and water is removed, that improvement comprising preparing said pigment by mixing an aqueous slurry consisting essentially of TiO_2 with an aqueous slurry consisting essentially of $CaCO_3$ in amounts adequate to provide from 10 to 50 wt. % of $CaCO_3$ based on the total combined dry weight of TiO_2 and $CaCO_3$ to form a slurry consisting essentially of a combined TiO_2—$CaCO_3$ pigment; adding said combined TiO_2 — $CaCO_3$ pigment slurry to said paper furnish and thereafter forming said furnish into sheets and removing water said combined pigment in said paper having essentially the same scattering coefficient as 100% TiO hd 2.

4,028,174

APPARATUS FOR COLLECTING LIQUIDS THROWN FROM A MOVING MEMBER

Harry Ingemar Myren, Karlstad, Sweden, assignor to Aktiebolaget Karlstads Mekaniska Werkstad, Karlstad, Sweden

Filed May 14, 1976, Ser. No. 686,290
Claims priority, application Sweden, Nov. 19, 1975, 7512988
Int. Cl.² D21F 1/66
U.S. Cl. 162—264 3 Claims



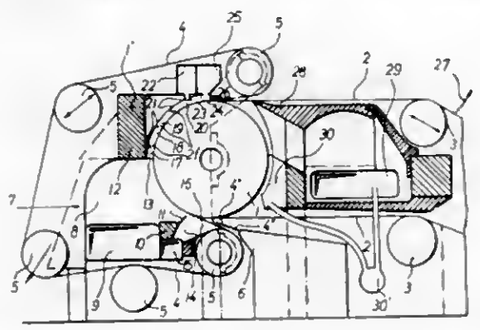
1. In apparatus including a moving member from which liquid is thrown during movement thereof and at least one plate-like deflector positioned adjacent the member to intercept at least a portion of said liquid, the deflector extending generally transverse to the direction of movement of the member and having an inner edge located close to the member and an outer edge located remote from the member, and further having a curved transverse cross-section which is generally concave to the direction of movement of the liquid thrown from the member such that it intercepts and collects the liquid thereon as a moving layer, the improvement comprising means defining a multiplicity of holes located in a portion of the deflector adjacent to the outer edge and in a band along the length of the deflector remote from the member where substantially no liquid thrown from the member directly impinges for permitting substantially all liquid collected by the deflector to pass through said holes, a part of the liquid passing through and out of each hole as a stream moving at a velocity substantially less than the velocity with which the liquid was thrown from the member.

4,028,175

CYLINDER MACHINE HAVING POSITIVE PRESSURE CHAMBERS ADJACENT AN OUTER BAND

Christian Schiel, Heidenheim-Schnaitheim, Germany, assignor to J. M. Voith GmbH, Heidenheim, Germany

Continuation of Ser. No. 554,425, March 3, 1975, abandoned. This application June 25, 1976, Ser. No. 699,949
Claims priority, application Austria, Mar. 13, 1974, 2074/74
Int. Cl.² D21F 1/04
U.S. Cl. 162—274 20 Claims



1. A paper making machine comprising: a hollow cylinder rotatable in a predetermined direction and having a porous surface; an inner mesh band wrapped around a portion of said cylinder; means guiding said inner mesh band into and out of contact with said cylinder; an outer band wrapped around said inner mesh band and partially surrounding said cylinder; means guiding said outer band into and out of contact with said inner mesh band, said inner and outer bands converging to form an inlet aperture therebetween; a nozzle for spraying suspended matter into said aperture between said bands; and a housing formed with a plurality of chambers disposed and open on a side facing said cylinder surrounded by said outer band, means providing successive chambers in the direction of operative rotation of said cylinder with increasing air pressure, the entire inner surface of said cylinder being subjected to a uniform pressure smaller than the pressure exerted on the part thereof surrounded by said outer band.

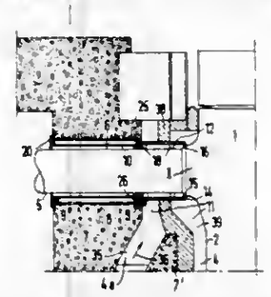
4,028,176

NUCLEAR REACTOR INSTALLATION

Werner Kraupa, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Sept. 5, 1974, Ser. No. 503,462
Claims priority, application Germany, Sept. 17, 1973, 2346638
Int. Cl.² G21C 9/00
U.S. Cl. 176—38 5 Claims

1. A nuclear reactor installation comprising a reactor pressure vessel, a concrete biological shield having a wall surrounding said vessel, and a cylindrical pressurized water coolant pipe extending from said vessel, said wall forming a hole of substantially larger diameter than the diameter of said pipe and through which the pipe is extended with a cylindrical space therearound, and the wall forming at least one air space between said vessel and the wall and which is spanned by the pipe; wherein the improvement comprises a cylindrical containment encircling said pipe and extending through said



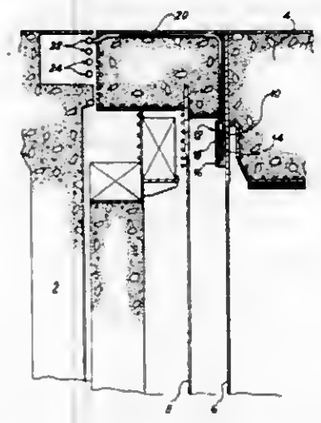
cylindrical space to and in contact with said vessel and having an open exhaust end at the outside of said wall, said tubular containment being axially slidable on said pipe and forming a pressurized coolant containment space around the pipe, said containment having an inner end and an inwardly extending flange on this inner end, said flange having an inner periphery and said vessel forming an annular seat on which the inner periphery of said flange seats to close said containment space from said air space.

4,028,177

PROVISION FOR COOLING THE TOP END OF A SUSPENDED VESSEL, SUCH AS THE PRESSURE VESSEL OF A NUCLEAR REACTOR

Henri Failla, Aix-en-Provence; Karl Schaller, Valen Sole, and Michel Vidard, Aix-en-Provence, all of France, assignors to Commissariat A l'Energie Atomique, Paris, France

Filed Aug. 29, 1975, Ser. No. 609,166
Claims priority, application France, July 2, 1975, 75.20820; Aug. 30, 1974, 74.29648
Int. Cl.² G21C 15/00
U.S. Cl. 176—38 10 Claims



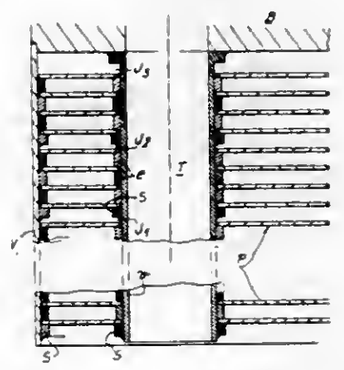
1. Means for cooling the top end of a pressure vessel of a nuclear reactor, suspended from a cover and containing a primary liquid at a first temperature, comprising coils receiving a flow of a second liquid coolant at a temperature lower than that of the primary liquid, the coils being out of contact with the primary liquid and in contact with an intermediate heat-conducting material isolated from the primary liquid and in contact with the top end of the vessel.

4,028,178

SYSTEM FOR THE HEAT INSULATION OF HORIZONTAL CLOSURE SURFACES FOR A LIQUID METAL COOLED NUCLEAR REACTOR

René Jullien, Veurey-Voroise; Maurice Perona, Varces, and Robert Venot, Fontenay-aux-Roses, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Sept. 5, 1975, Ser. No. 610,850
Claims priority, application France, Sept. 6, 1974, 74.30347
Int. Cl.² G21C 13/06
U.S. Cl. 176—38 4 Claims



1. A system for the heat insulating of horizontal pressure vessel closure surfaces in a nuclear reactor with respect to a hot gaseous medium which is present within the pressure vessel, comprising a containment vault, a roof for said vault, rotatable shield plugs in said roof, substantially coplanar horizontal inner surfaces for said roof and said plugs, an assembly of uniformly spaced metallic plates including a bottom plate of substantial thickness extending parallel to said surfaces, a first vertical cylindrical shell surrounding said plates and entering said roof surface, second vertical cylindrical shells within said shell surrounding said plugs and entering said roof surface, said bottom plate of substantial thickness being suspended from said horizontal surfaces to be heat-insulated by means of suspension members disposed in spaced relation on the surface of said bottom plate and attached at the upper extremities thereof to said horizontal surfaces and at the lower extremities thereof to said plate of substantial thickness, said plate of substantial thickness supporting said metallic plates stacked one above the other by spacer members, said metallic plates being protected on the sides by said first shell, and said first and second shells being joined to said plate of substantial thickness in leak-tight manner for free expansion at the upper portion thereof.

4,028,179

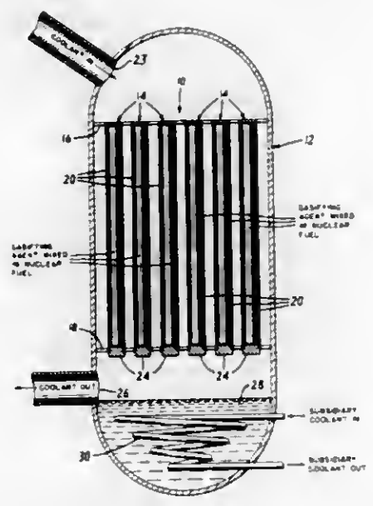
NUCLEAR REACTOR CORE SAFETY DEVICE

Stirling A. Colgate, 4616 Ridgeway Ave., Los Alamos, N. Mex. 87544

Filed Jan. 22, 1976, Ser. No. 651,514
Int. Cl.² G21C 9/00
U.S. Cl. 176—38 15 Claims

1. In a liquid cooled nuclear reactor having a vessel, and a multiplicity of fuel rods having fissionable fuel contained in an enclosing jacket mounted in the core, and a residual liquid coolant bath in the vessel located essentially below the core in the bottom of the vessel, said fuel rod jackets having a blow-out means disposed to release the fuel rod contents into said residual coolant bath when a blow-out pressure is reached, the improvement comprising a gasifying agent in the fuel rods, the gasifying agent being passive at normal operating temperatures of the core and generating an inert gas at a predetermined elevated temperature between said operating temperatures and the melting temperature of the fuel rod, the agent being in an amount in relation to the blow-out plug and so disposed relative to the fuel in said fuel rod that upon gasifying it will release a gas volume sufficient to rupture said blow-out

means, and expel the fuel from the fuel rods into the residual coolant bath to prevent melt-down of the core, whereby fluid-



fluid explosive self-mixing of a molten mixture of fuel rod contents and the residual coolant bath is avoided.

4,028,180

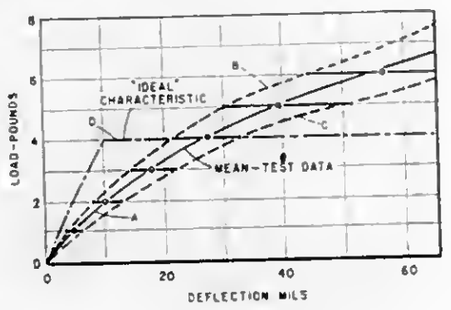
SUPPORT GRID FOR FUEL ELEMENTS IN A NUCLEAR REACTOR

Lester M. Finch, Pasco, Wash., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Mar. 16, 1976, Ser. No. 667,815

Int. Cl.² G21C *3/30*

U.S. Cl. 176—78 **1 Claim**



1. In a support grid for holding a multiplicity of nuclear fuel rods in a rectangular array wherein a plurality of intersecting sheet metal partition strips are joined to define cells for individually receiving said fuel rods, a plurality of resilient springs and rigid support dimples being formed in said partition strips whereby each of said fuel rods are supported against lateral displacement by at least two of said resilient springs and at least two of said rigid dimples disposed in opposition to said springs; the improvement characterized by said support dimples being formed between a pair of parallel slots, said resilient springs each comprising a toggle spring arm formed from said partition strip by a pair of elongated parallel slots in said partition strips perpendicular to said dimple slots and extending from near one of said support dimples to near another of said support dimples leaving a cross arm of said partition strip at each end of said spring arm perpendicular thereto, said toggle spring arm also having protrusions at each of said ends and a central larger protrusion all extending in the same direction with essentially straight members interconnecting said protrusions, each of said toggle springs arms normally being slightly convexed toward the interior of a corresponding cell on one side of said partition strip to engage a fuel rod extending therethrough and adapted to toggle through a null point by flexing of said spring arm and said cross-members to a slightly concave shape on the other side of said partition strip upon lateral deflection of said fuel rod, said spring arm and cross-member having nonlinear generally S-shaped force-deflection characteristics.

4,028,181

FUEL PARTICLES WITH COATINGS WITHOUT PROPERTY GRADIENTS

Hans Huschka, Grossauheim; Hermann Schmutz, Hanau, and Peter Vygen, Kalberau, all of Germany, assignors to Nukem G.m.b.H., Wolfgang near Hanau am Main, Germany

Continuation-in-part of Ser. No. 162,225, July 13, 1971, abandoned. This application Apr. 3, 1974, Ser. No. 457,618

Claims priority, application Germany, July 23, 1970, 2036545

Int. Cl.² E21B *7/04*

U.S. Cl. 176—82 **4 Claims**

1. A process for the production of coated nuclear fuel particles in a fluidized bed employing a coating gas and a carrier gas and in which the coating consists of pyrolytic carbon substantially free of radial uniformly disposed and alternating property gradients comprising holding constant the ratio of the amount of coating gas per unit of time to the coating surface area,

wherein the ratio of the amount of coating gas per unit of time to the coating surface area is kept constant by drawing off a part of the particules from the fluidized bed during the coatings to hold the total particle surface area constant; thereby keeping the speed of growth the same during the entire coating time and also over the entire coating zone of the fluidized bed and thereby maintaining the fluctuations of the speed of growth within boundaries which boundary speeds are related each to a lower and an upper value of the Bacon Anisotropy Factor wherein said coating step is undertaken in a tube with a conical bottom equipped with nozzles for introducing the coating gas into the tube from the nozzles wherein the ratio of the working tube cross section to nozzle cross section is 150 and the ratio of the volume of the fluidized particles to the volume of the coating zone is 1.

3. A process for the production of coated nuclear fuel particles in a fluidized bed employing a coating gas and a carrier gas and in which the coating consists of pyrolytic carbon substantially free of radial uniformly disposed and alternating property gradients comprising holding constant the ratio of the amount of coating gas per unit of time to the coating surface area,

wherein the ratio of the amount of coating gas per unit of time to the coating surface area is kept constant by increasing the rate of feed of the coating gas with increase in coating surface area; thereby keeping the speed of growth the same during the entire coating time and also over the entire coating zone of the fluidized bed and thereby maintaining the fluctuations of the speed of growth within boundaries which boundary speeds are related each to a lower and an upper value of the Bacon Anistropy Factor wherein said coating step is undertaken in a tube with a conical bottom equipped with nozzles for introducing the coating gas into the tube from the nozzles wherein the ratio of the working tube cross section to nozzle cross section is 150 and the ratio of the volume of the fluidized particles to the volume of the coating zone is 1.

4,028,182

MICROBIOLOGICAL SYNTHESIS OF PROTEINACEOUS MATERIAL EMPLOYING NORMALLY GASEOUS HYDROCARBON SUBSTRATE AND THE PRODUCTS THEREOF

James E. Zajic, London, and Bohumil Volesky, St. Lambert, both of Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Continuation-in-part of Ser. No. 316,151, Nov. 18, 1972, abandoned, which is a continuation-in-part of Ser. No. 55,810, July 17, 1970, abandoned. This application Mar. 26, 1975, Ser. No. 562,085

Int. Cl.² C12B *1/00*

U.S. Cl. 195—28 R **18 Claims**

1. A process for the microbiological preparation of protein containing material comprising cultivating aerobically a protein producing species of Graphium fungus having all the characteristics of Graphium UWO 27 in a fermentation medium containing a nitrogen source and a hydrocarbon substrate selected from the group consisting of methane, ethane, propane, butane and mixtures of two or more of said hydrocarbons and separating the protein containing material from the fermentation medium.

4,028,183

PROCESS OF PREPARING DOUBLE SALTS OF S-ADENOSYL-L-METHIONINE

Alberto Fiecchi, Milan, Italy, assignor to Bioresearch Limited, Milan, Italy

Division of Ser. No. 482,153, June 24, 1974, Pat. No. 3,954,726. This application Jan. 29, 1976, Ser. No. 653,655

Claims priority, application Italy, June 27, 1973, 25895/73; May 24, 1974, 23148/74

Int. Cl.² C12D *13/02*

U.S. Cl. 195—28 N **3 Claims**

1. Process for preparing double salts of S-adenosyl-L-methionine (SAM) with sulphuric acid and p-toluenesulphonic acid comprising a) preparing a concentrated solution of SAM by enzymatic synthesis by the action of the specific enzyme ATP-methionineadenosyltransferase at high purity on a mixture of adenosine triphosphate (ATP) and methionine; b) precipitating the SAM present in the solution by acidifying with a solution of picrolonic acid; c) dissolving the produced SAM picrolonate in a mixture consisting of equal parts by volume of an aqueous solution of equal normalities of p-toluenesulphonic acid and sulphuric acid, and an organic solvent partially miscible with water; d) precipitating the SAM salt from the aqueous layer by a ketone or alcohol based solvent totally soluble in water; e) dissolving the precipitated salt in a solution of p-toluenesulphonic acid in methanol; and f) precipitating the double salt of SAM with sulphuric acid and p-toluenesulphonic acid by a suitable organic solvent.

4,028,184

PROCESS FOR PRODUCING 3',5'-CYCLIC ADENYLIC ACID

Jiro Ishiyama; Motohiko Kato, both of Noda; Fumihiko Yoshida, Matsudo, and Tamotsu Yokotsuka, Nagareyama, all of Japan, assignors to Kikkoman Shoyu Co., Ltd., Noda, Japan

Continuation-in-part of Ser. No. 592,061, June 30, 1975, abandoned, which is a continuation of Ser. No. 405,897, Oct. 12, 1973, abandoned. This application Apr. 2, 1976, Ser. No. 673,067

Claims priority, application Japan, Oct. 16, 1972, 47-102780

Int. Cl.² C12D *13/06*

U.S. Cl. 195—28 N **9 Claims**

1. A process for producing 3', 5'-cyclic adenylic acid which comprises culturing under aerobic conditions a strain of microorganism, capable of producing 3', 5'-cyclic adenylic acid without using a precursor thereof and in the absence of fluoride, said microorganism being selected from the group consisting of microorganisms belonging to the genera Corynebacterium, Arthrobacter and Microbacterium, in a medium containing carbon and nitrogen sources, inorganic nutrient substances and no precursor at pH 5–9, at a temperature of 20°–40° C until 3', 5'-cyclic adenylic acid is accumulated in the medium, and recovering 3', 5'-cyclic adenylic acid from the medium.

4,028,185

METHOD FOR PRODUCING L(+)-TARTARIC ACID

Yoshio Kamatani, Osaka; Hisayoshi Okazaki, Kyoto; Ko Imai, Osaka; Noriaki Fujita, Suita; Yoshio Yamazaki, Toyonaka, and Katsubiko Ogino, Osaka, all of Japan, assignors to Takeda Chemical Ind., Ltd., Japan

Filed May 6, 1976, Ser. No. 683,802

Claims priority, application Japan, May 7, 1975, 50-54956; May 7, 1975, 50-54957; June 23, 1975, 50-78124

Int. Cl.² C12D *1/02*

U.S. Cl. 195—30 **6 Claims**

1. In a method for producing L(+)-tartaric acid or calcium salts thereof by microbiologically hydrolyzing epoxy-succinic acid or calcium salts thereof, the improvement of which comprises;

A. preparing a culture medium containing calcium cis-epoxysuccinate of particle size not larger than 100 microns,

B. incubating in said culture medium a microorganism which is capable of hydrolyzing cis-epoxysuccinic acid to L(+)-tartaric acid, thereby converting said calcium cis-epoxysuccinate into calcium L(+)-tartarate.

4,028,186

PROCESS FOR THE PRODUCTION OF SACCHARIFIED STARCH PRODUCTS

Shuzo Sakai, Okayama, Japan, assignor to Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo, Okayama, Japan

Filed July 10, 1975, Ser. No. 594,679

Claims priority, application Japan, Nov. 30, 1974, 49-137174

Int. Cl.² C12D *13/02*

U.S. Cl. 195—31 R **1 Claim**

1. A process for the production of saccharified starch products with a higher maltose purity (percent maltose, d.s.b.) comprising subjecting a starch hydrolysate with an 80% or more maltose purity to the action of a fungal alpha-amylase with a maltotriose-decomposing activity versus dextrinogenic activity ratio of 0.001–0.1 wherein the hydrolysate has a concentration of 2.0–30.0% and said step of subjecting to the action of a fungal alpha-amylase is at a temperature of 30°–70° C and a pH of 3.0–9.0.

4,028,187

METHOD OF OBTAINING UROKINASE

Abe Tsutomu; Hashino Yasuo, and Kobayashi Hidehiko, all of Fuji, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed July 1, 1976, Ser. No. 701,930

Claims priority, application Japan, July 4, 1975, 50-81969

Int. Cl.² C07G *7/026*

U.S. Cl. 195—66 B **13 Claims**

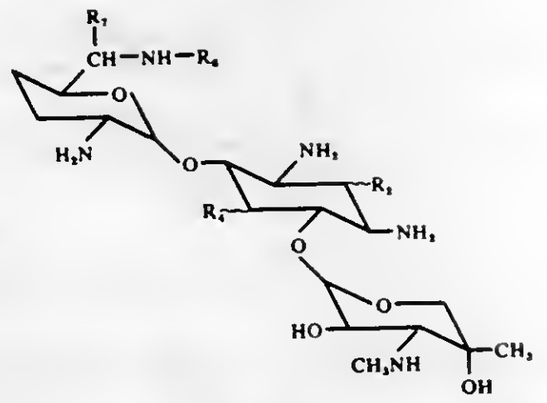
1. A method of obtaining urokinase from human urine comprising contacting human urine with an acrylonitrile polymer of a porous structure having a porosity of not less than 10% and a specific surface area of 5 m²/g. to adsorb urokinase onto said acrylonitrile polymer, said porous structure having been formed at the time of polymerization for formation of the polymer, and subsequently eluting the urokinase from said acrylonitrile polymer having the urokinase adsorbed thereon.

4,028,188
AMINOCYCLITOL ANTIBIOTICS

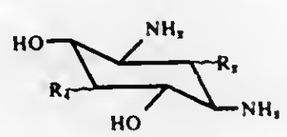
Sol J. Daum, Albany, and Robert L. Clarke, Bethlehem, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 550,273, Feb. 18, 1975, Pat. No. 3,972,930. This application Jan. 21, 1976, Ser. No. 651,034
Int. Cl.² C12D *9/14*
U.S. Cl. 195—96 **1 Claim**

1. A process for preparing compounds having the formula:



where R_3 represents hydrogen or hydroxy; R_4 represents hydrogen, hydroxy or halogen, except that when R_3 is hydrogen, R_4 is not hydroxy cis to the amino groups at the 1- and 3-positions; and R_6 and and R_7 each represent hydrogen or methyl which comprises culturing a nutrient medium containing carbohydrates, a source of assimilable nitrogen, essential salts, an added aminocyclitol having the formula:



where R_3 and R_4 have the meanings given above, and *Micromonospora purpurea* ATCC 31,119 until said compounds are produced, and isolating said compounds from the culture medium.

4,028,189
PROCEDURE AND DEVICE FOR RAPID COMPOSTING OF ORGANIC WASTE

Bjørn Fagerhaug, Skarer, and Karl Øberg, Nesoya, both of Norway, assignors to Kvaerner Brug A/S, Oslo, Norway

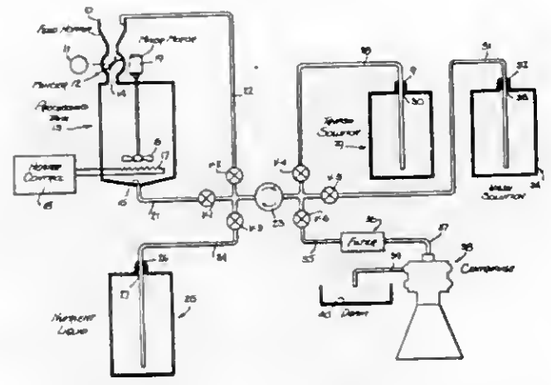
Filed Aug. 26, 1975, Ser. No. 608,017
Claims priority, application Norway, Jan. 23, 1975, 750211
Int. Cl.² C12B *1/14*
U.S. Cl. 195—109 **8 Claims**

1. A procedure for rapid composting of organic waste substances, comprising rotating a cylinder about its axis with its axis substantially horizontal, introducing waste substance into one end of said cylinder and withdrawing waste substance from the other end of said cylinder thereby to establish in said cylinder a mass of said waste substance that has an exposed upper surface within the cylinder whereby upon rotation of the cylinder, portions of the waste substance slide on said surface, introducing air into said mass from within said mass from locations distributed along the length of said mass in said cylinder and below said surface, and withdrawing gas from within said cylinder above said surface from locations distributed along the length of said cylinder.

4,028,190
APPARATUS FOR PREPARING ISOLATED CELLS FROM TISSUE

William J. McAleer, Ambler, and William M. Hurni, North Wales, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 521,922, Nov. 7, 1974, abandoned. This application Nov. 17, 1975, Ser. No. 632,610
Int. Cl.² C12K *9/00*
U.S. Cl. 195—127 **11 Claims**

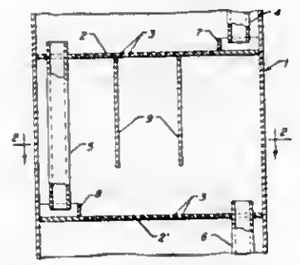


1. A closed semi-automated apparatus for producing primary cell suspensions from tissue which includes:
a shredder device for shredding the tissue;
a processing vessel adapted for contacting the shredded tissue with an enzyme solution to break down intercellular material thereby freeing tissue cells;
first inlet means for feeding tissue from the shredder into the processing vessel;
second inlet means for feeding enzyme into the processing vessel;
means for separating cells from the enzyme solution and
a source of nutrient liquid and means for feeding the nutrient liquid to the means for separating cells from the enzyme solution.

4,028,191
FRACTIONATION COLUMN WITH VAPOR CHANNELING BAFFLES

Norman H. Scott, Arlington Heights, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 533,053, Dec. 16, 1974, abandoned. This application June 10, 1976, Ser. No. 694,871
Int. Cl.² B01D *3/14*
U.S. Cl. 202—158 **5 Claims**

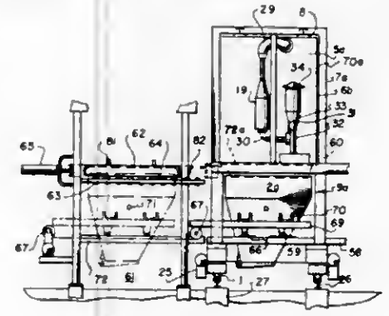


1. An apparatus for fractional distillation which comprises:
a. a vertically oriented cylindrical outer vessel having an internal volume;
b. an upper first fractionation tray horizontally disposed across the internal volume of said outer vessel and having a lower surface;
c. a second fractionation tray having an upper surface adapted to support a liquid and froth thereupon and horizontally disposed across the internal volume of said outer vessel below said first fractionation tray, said first and second fractionation trays being vertically contiguous;
d. a first downcomer means extending downward from said first fractionation tray to a point above said second tray;
e. a second downcomer means having an upper inlet opening and extending downward from said second fractionation tray;
f. an outlet liquid flow control means comprising a vertical weir attached to the upper surface of said second fractionation tray and operatively positioned at the upper inlet opening of said second downcomer means; and,
g. at least two substantially parallel, planar, vertical vapor baffles of substantially equal length, said baffles comprising a means distinct and separate from a downcomer means, and extending downward from said lower surface of said first fractionation tray to a common lever above said outlet liquid flow control means and above the liquid level on said second fractionation tray to a common length sufficient to minimize intermixing of vapor around the tops of said vapor baffles, said vapor baffles being oriented substantially perpendicular to a horizontal straight line between the vertical centerlines of said first downcomer means and said second downcomer means, said vapor baffles abutting the lower surface of the first tray.

4,028,192
APPARATUS FOR RECEIVING INCANDESCENT COKE FROM RESPECTIVE COKE OVENS IN A BATTERY AND FOR REMOVING THE COKE IN A CLOSED CHAMBER AWAY FROM THE BATTERY

Martin Bender, Dusseldorf; Johannes Knappstein, and Josef Stratmann, both of Recklinghausen, all of Germany, assignors to Firma Carl Still and Hartung, Kuhn & Co. Maschinen fabrik GmbH, both of, Germany

Filed Nov. 26, 1975, Ser. No. 635,285
Claims priority, application Germany, Nov. 26, 1974, 2455830
Int. Cl.² C10B *39/00*
U.S. Cl. 202—227 **9 Claims**

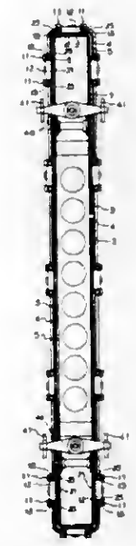


1. Apparatus for receiving incandescent coke from respective coke ovens of a horizontally arranged battery of coke ovens, comprising a wheeled carriage adapted to be moved backwardly and forwardly along the battery of coke ovens, a coke receiving device on said carriage including a closed hood portion adapted to be positioned into alignment with each of the ovens for the discharging of coke therefrom by the movement of said carriage and a tank portion below and enclosed by said hood, gas purifying means associated with said hood portion for removing impurities from the gases and discharging the purified gases, said coke hood portion having openable and closable lateral door means for receiving the incandescent coke from the oven and for closing the hood after receiving of the coke, said tank portion being located below said hood portion in a position to receive the coke discharged from the coke ovens through said hood portion, engagement means on said coke receiving device, and transport means movable along on said carriage and engageable with said engagement means to lift at least said tank portion off said carriage and to transport at least said tank away from said undercarriage.

4,028,193
COKE OVEN DOOR

Konno Nagayoshi, Tokyo, Japan, assignor to Koritsu Kikaikogyo Co., Ltd., Japan

Filed Apr. 19, 1976, Ser. No. 677,965
Int. Cl.² C10B *1/06, 25/06*
U.S. Cl. 202—248 **3 Claims**



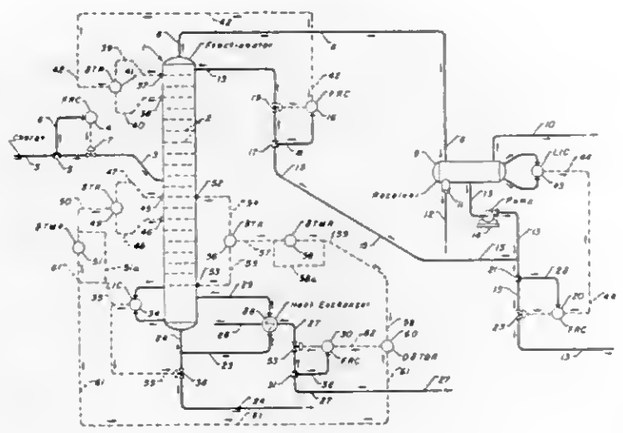
1. In a self-sealing coke oven door having an inner adiabatic door plug and an outer metallic door body,
a latch bar connected to said door body,
complementary latching hooks for engaging said latch bar for securing said oven door in the closed position,
and a door seal circumscribing the periphery of said oven door, the improvement comprising:
a base plate connected to said metallic door body,
a guard plate spaced from said base plate,
said guard plate being disposed between said adiabatic door plug and said base plate,
an adiabataic layer disposed in the space between said base plate and guard plate,
said guard plate shielding the entire inner surface of said adiabatic layer,
a sealing means in the form of a knife-like sealing edge circumscribing said guard plate,
said knife edge seal being adapted to engage a door frame defining an oven door opening,
and said knife edge seal having a series of circumferentially spaced U-shaped slots formed therein opposite said sealing edge, and having projections disposed on the outer surface of said seal on both sides of said slots,
and a plurality of means for adjustably biasing said sealing means into sealing position,
said biasing means including a seal depressor engaging said edge seal,
a spring biasing said depressor,
and hook shaped levers adjacent said biasing means for engaging said projections to resist the spring bias acting on said seal means when the door is moved to an opened position.

4,028,194

SYSTEMATIZED METHOD AND CONTROL OF FRACTIONATION HEAT BALANCE

David M. Boyd, Claredon Hills, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Dec. 29, 1975, Ser. No. 644,988
Int. Cl.² B01D 3/42
U.S. Cl. 203—2 7 Claims



7. A method for controlling a fractionation column, wherein (i) a feed stream is introduced through a locus intermediate the top and bottom thereof; (ii) liquid bottoms material is recovered from the lower end of said column, and at least a portion thereof is partially vaporized and returned to the reboiler section; and, (iii) vaporous overhead material is recovered from the upper end of said column, condensed and at least a portion thereof returned to the rectification section as a reflux stream, which method comprises the steps of:

a. sensing a first temperature differential between two vertically-spaced temperature sensing points below said feed locus, separated by a first plurality of trays, measuring the resulting first differential-temperature and generating a first signal representative thereof; (*a*) (*b*) (c) (*d*)

b. sensing a second temperature differential between two vertically-spaced temperature sensing points below said feed locus, separated by a second plurality of trays which is greater than said first plurality of trays, measuring the resulting second differential temperatue and generating a second signal representative thereof;

c. multiplying a selected one of said first and second differential temperature signals by a multiplier representing the ratio of the number of trays between the sensors supplying the non-selected differential temperature signal to the number of trays between the sensors supplying said selected differential temperature signal, and generating a third signal representing the resulting product;

d. obtaining a computed relationship of said third signal and said non-selected signal, and generating a fourth signal representative of the resulting computed relationship;

e. regulating the degree to which said liquid bottoms material is vaporized in response to said fourth signal;

f. sensing a third temperature differential between two vertically-spaced temperature sensing points above said feed locus, measuring the resulting third differential temperature and generating a fifth signal representative thereof; and,

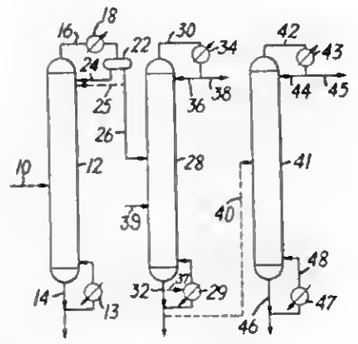
g. regulating the quantity of said returned reflux stream responsive to said fifth signal.

4,028,195

RECOVERY OF ALKYLENE GLYCOLS BY DISTILLATION WITH AQUEOUS ORGANIC ACID

Mitchell Becker, Teaneck, and Charles C. Yang, Hackensack, both of N.J., assignors to Halcon International, Inc., New York, N.Y.

Filed Sept. 12, 1975, Ser. No. 612,827
Int. Cl.² B01D 3/34; C07C 29/26
U.S. Cl. 203—38 5 Claims



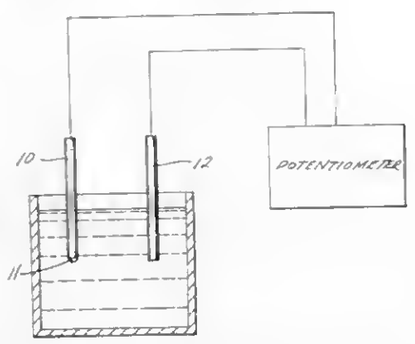
1. A process for purifying by distillation ethylene glycol or propylene glycol admixed with the lower alkanoate monoester of said glycol and an azeotroping agent originating from a previous distillation to produce a purified glycol substantially free from said azeotroping agent, said monoester and the corresponding ortho ester, which tends to form during said distillation which comprises introducing said glycol to be purified into a fractional distillation zone, introducing at least one of an aqueous acetic acid and an aqueous formic acid in said zone at a point below the point of introduction, into said zone of said glycol to be purified in an amount sufficient to substantially suppress the formation of said ortho ester and recovering purified glycol from the lower portion of said zone.

4,028,196

PH RESPONSIVE GLASS COMPOSITIONS AND ELECTRODES

Chung-Chang Young, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed June 19, 1975, Ser. No. 588,446
Int. Cl.² G01N 27/36
U.S. Cl. 204—1 T 26 Claims



1. A glass composition for use in pH responsive glass electrodes consisting essentially of:

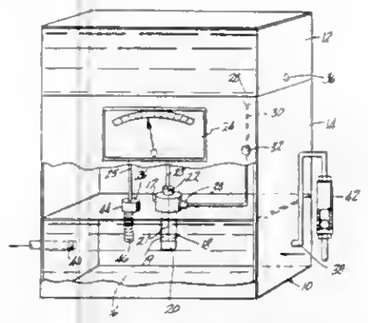
Component	Mole %
Li_2O	30–40
SiO_2	50–60
La_2O_3	2–8
Ta_2O_5	2–8
Cs_2O	0–3
wherein $Li_2O+Ta_2O_5$	$\geq$34

4,028,197

METHOD FOR MONITORING AVAILABLE CHLORINE IN SWIMMING POOLS

Italo A. Capuano, Orange, Conn., assignor to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 456,088, March 29, 1974, Pat. No. 3,956,094. This application Dec. 31, 1975, Ser. No. 645,582
Int. Cl.² G01N 27/46
U.S. Cl. 204—1 T 13 Claims



1. A method for measuring the available halogen concentration of an aqueous solution in the absence of an applied potential comprising:

1. providing a sensing electrode having a porous conductive component and a reference electrode in a measuring zone,
2. connecting a potential measuring means between said sensing electrode and said reference electrode,
3. introducing said aqueous solution containng said available halogen into said measuring zone,
4. contacting said porous conductive component of said sensing electrode and said reference electrode with said aqueous solution containing available halogen,
5. passing a pH control solution through at least a portion of said porous conductive component of said sensing electrode, said pH control solution cleansing said portion of said porous conductive component and said pH control solution controlling the pH at said surface of said portion of said porous conductive component contacting said aqueous solution containing said available halogen,
6. measuring said available halogen concentration in said aqueous solution, and
7. indicating said available halogen concentration on said potential measuring means.

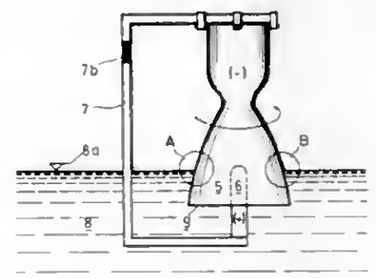
4,028,198

METHOD OF FORMING A REINFORCING LAYER ON THE INNER WALL OF THE COMBUSTION AND/OR THRUST NOZZLES FOR A LIQUID ROCKET ENGINE

Otto Tuscher, Munich; Johann Tewich, Ottobrunn, both of Germany, and Willibald Wittich, deceased, late of Ottobrunn, Germany, assignors to Messerschmitt-Bolkow-Blohm GmbH, Munich, Germany

Filed Feb. 10, 1975, Ser. No. 548,619
Claims priority, application Germany, Feb. 14, 1974, 2406976
Int. Cl.² C25D 1/02, 5/16
U.S. Cl. 204—9 6 Claims

1. A method of forming the combustion chamber and/or thrust nozzle of a liquid rocket engine having an inner wall and an outer wall with laterally spaced cooling ducts located between the inner wall and outer wall and formed by shaping the inner wall with laterally spaced inwardly extending projections forming troughs closed by the outer wall and the inwardly facing surface of the inner wall having a corrugated-like shape, comprising the steps of electroplating a layer on a core having the negative form of the inner wall with the troughs formed therein for forming the inner wall with the cooling ducts, and removing the core, wherein the improvement comprises, after the removal of the core, electroplating a reinforcing layer at least on the radially inwardly projecting portions of the inner surface of the inner wall the radially outer surfaces of which projecting portions in combination with the radially inwardly facing surfaces of said outer wall define the



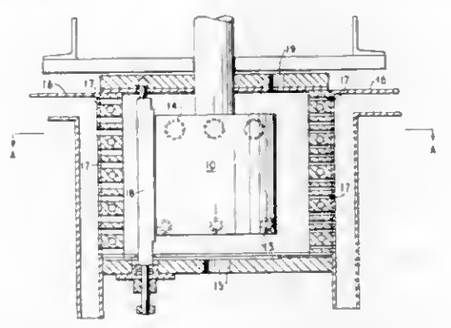
cooling ducts, and effecting the electroplating by positioning the inner wall within an electrolytic bath and locating a material-depositing electrode within the bath equidistantly spaced radially inwardly of the inner wall.

4,028,199

METHOD OF PRODUCING METAL POWDER

Frank Stanley Holland, Stockport, England, assignor to National Development Research Corporation, London, England

Continuation-in-part of Ser. No. 495,003, Aug. 5, 1974, abandoned. This application July 30, 1975, Ser. No. 600,253
Claims priority, application United Kingdom, Feb. 25, 1975, 7736/75
Int. Cl.² C25C 5/00, 5/02, 1/16
U.S. Cl. 204—10 32 Claims



1. A method of producing a metal powder from a dilute aqueous solution of the metal which solution has a low concentration of the metal ion, said method comprising the steps of subjecting the dilute aqueous solution of the metal to electrolysis in a cell having a rotating cylinder cathode, the current density of the cathode being proportional to the peripheral speed of the rotating cylinder cathode to the power of a number between 0.7 and 1.0 whereby the metal is deposited as a powder on the cathode, and recovering metal powder from the cathode.

4,028,200

PLATING BATHS FOR DEPOSITING COBALT-LEAD NICKEL-LEAD ALLOYS OR COMBINATIONS THEREOF AND METHOD OF COATING ALUMINUM ARTICLES THEREWITH

Kostas F. Dockus, Cicero, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Division of Ser. No. 589,992, June 24, 1975, Pat. No. 3,970,237, which is a continuation-in-part of Ser. No. 304,457, Nov. 7, 1972, abandoned. This application May 3, 1976, Ser. No. 682,885
Int. Cl.² C25D 3/56; C23C 3/00, 3/02
U.S. Cl. 204—43 T 13 Claims

7. A plating bath for the deposition on aluminum and alumi-

num alloy surfaces of metals selected from the group of nickel-lead, cobalt-lead and combinations thereof, comprising an aqueous bath containing the dissolved salts of the plating metals and buffering salts, wherein

the pH of said bath is maintained in the range of from pH 7 to about pH 12 by the addition of a base selected from the group consisting of alkali metal hydroxides and ammonium hydroxide, and

from about 0.005% by weight to about 1.0% by weight of a lead salt based on the total plating bath composition is added thereto,

whereby the resultant plating on the aluminum and aluminum alloy surfaces is deposited in the form of small, finely divided sponge-like particles not exceeding 100 microinches in diameter.

4,028,201

ELECTROLYTIC MONOCARBOXYLATION OF ACTIVATED OLEFINS

Donald Armon Tyssee, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Nov. 13, 1972, Ser. No. 306,227
Int. Cl.² C25B *3/00*
U.S. Cl. 204—72 **13 Claims**

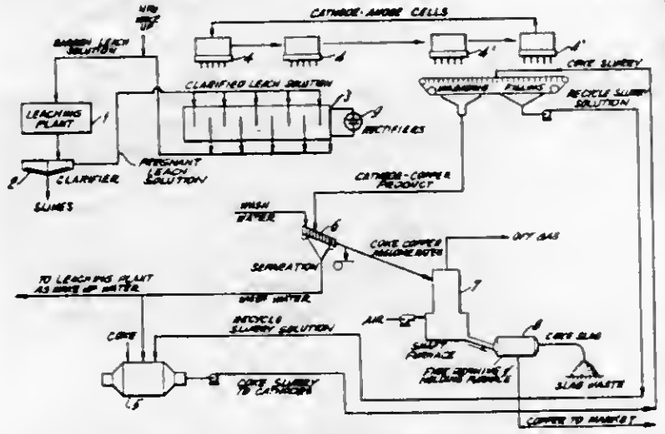
1. The method of electrolytic carboxylation of alpha,beta-olefinic nitriles, esters and amides which comprises electrically reducing such olefinic compounds at the cathode, in an electrolysis medium comprising solvent and supporting electrolyte and in the presence of carbon dioxide and a small amount of water sufficient to direct the carboxylation substantially toward mono-carboxylation and recovering a product in which mono-carboxylation of the said olefinic compound has occurred.

4,028,202

DIRECT ELECTROCHEMICAL RECOVERY OF COPPER FROM DILUTE AMMONIACAL SOLUTIONS

Paul R. Ammann, Boxford; Glenn M. Cook, Harvard, and Charles Portal, Newton, all of Mass., assignors to Kennecott Copper Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 596,458, July 16, 1975. This application Oct. 28, 1975, Ser. No. 626,114
Int. Cl.² C25C *1/12*
U.S. Cl. 204—106 **17 Claims**



1. A process for recovering copper from an ammoniacal copper solution containing about 0.1 to 20 gpl copper, 4 to 60 gpl NH_4^+ and 2 to 30 gpl NH_3 and having a pH of 8 to 10, which comprises

a. introducing said solution into an electrolysis cell with a porous cathode material having a surface area of 2 to 1000 cm^2/cm^3 and an anode,

b. applying a voltage of 1 to 10 volts across said cell such that the current density in said cathode is from about 1 to 100 ASF,

c. flowing said solution through said cathode and by said anode at a rate to permit substantially complete reaction of the desired copper solute whereby copper is deposited in an on said cathode and a barren leach solution containing about 0.01 to 1.0 gpl copper is withdrawn, and

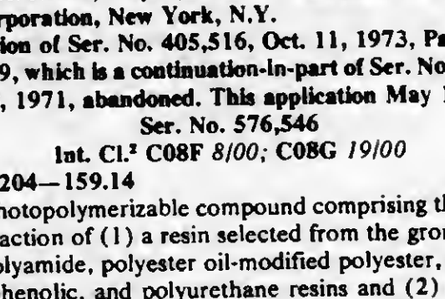
d. recovering deposited copper from said cathode.

4,028,203

PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIAL

Joseph Y. C. Chu, Fairport, and W. H. H. Gunther, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 454,896, March 26, 1974. This application Jan. 15, 1976, Ser. No. 649,450
Int. Cl.² B01J *1/10*
U.S. Cl. 204—158 R **1 Claim**



1. A process for preparation of a solid phase dispersion of inorganic photoconductive materials in an insulating polymeric matrix comprising:

a. forming a polymeric composition from a film forming insulating polymeric resin and at least one organo-selenium compound of the formula

wherein R, R′, R″ and R‴ are independently selected from hydrogen, alkyl, of 1 to 10 carbon atoms, phenyl, substituted phenyl, benzyl and substituted benzyl; and 'b. subjecting said polymeric composition to sufficient energy to decompose said organoselenium compound whereby elemental selenium is deposited within the organic polymeric composition in substantial conformity with the distribution of said energy throughout the composition.

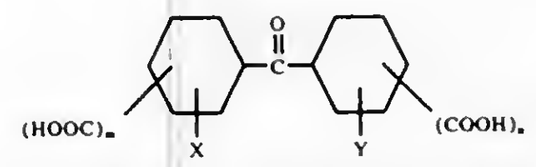
4,028,204

PHOTOPOLYMERIZABLE COMPOUNDS AND COMPOSITIONS COMPRISING THE PRODUCT OF THE REACTION OF A RESIN AND A POLYCARBOXY-SUBSTITUTED BENZOPHENONE

George Rosen, Wayne; Daniel J. Carlick, Livingston, and Ralph H. Reiter, Wayne, all of N.J., assignors to Sun Chemical Corporation, New York, N.Y.

Division of Ser. No. 405,516, Oct. 11, 1973, Pat. No. 3,926,639, which is a continuation-in-part of Ser. No. 200,174, Nov. 18, 1971, abandoned. This application May 12, 1975, Ser. No. 576,546
Int. Cl.² C08F *8/00*; **C08G** *19/00*
U.S. Cl. 204—159.14 **8 Claims**

1. A photopolymerizable compound comprising the product of the reaction of (1) a resin selected from the group consisting of polyamide, polyester oil-modified polyester, polyether, epoxy, phenolic, and polyurethane resins and (2) a polycarboxy-substituted benzophenone having the formula



wherein *m* and *n* is each an integer from 0 to 3 and the sum of *m* plus *n* is in the range of 2 to 6; and X and Y is each 1 and 4 halogen atoms or dialkylamino groups having 1 to 4 carbon atoms; X and Y may be the same or different and either or both may be omitted.

4,028,205

SURFACE TREATMENT OF ALUMINUM

Geoffrey A. Dorsey, Jr., Danville, Calif., assignor to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.

Filed Sept. 29, 1975, Ser. No. 617,550
Int. Cl.² C23F *7/06*; **C09K** *13/02*; **C25D** *13/00*
U.S. Cl. 204—181 **13 Claims**

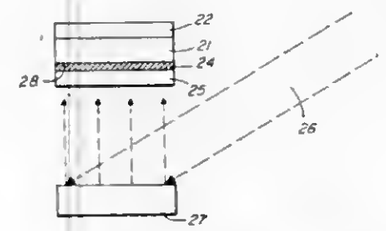
1. A method of forming a hydrophilic oxide coating on an aluminum surface which facilitates the bonding thereto of curable organic matter comprising treating the aluminum surface with an aqueous alkaline solution consisting essentially of caustic alkali, a surfactant and the balance water, with the interfacial temperature between the aluminum surface and the treating solution ranging from about 50° C to the boiling point of the solution, the pH of the solution controlled by caustic alkali to more than 8 but less than 10 and the surfactant retarding the etching of the solution so as to effect the formation of the desired oxide coating which facilitates the bonding of the curable organic matter.

4,028,206

METHOD FOR COOL DEPOSITION OF LAYERS OF MATERIALS ONTO A SUBSTRATE

William James King, 9 Putnam Road, Reading, Mass. 01867

Filed Mar. 10, 1976, Ser. No. 665,857
Int. Cl.² C23C *15/00*
U.S. Cl. 204—192 C **6 Claims**



1. In deposition processes wherein at least one layer is deposited upon thermally degradable substrates including plastic substrates in such a way that substantial degradation including deformation, melting, delamination or surface hazing of the substrate is caused by radiant heat transmission in the absence of a reflective material, the method of reducing radiant heating of the substrate which comprises depositing upon said substrate a reflective material which reflects a significant fraction of the thermal radiation incident upon said substrate during the deposition process and subsequently depositing upon said substrate said layer at a rate which is less than that which will cause degradation of the substrate but which is at least as great as that which would have caused degradation of the substrate in the absence of said reflective material.

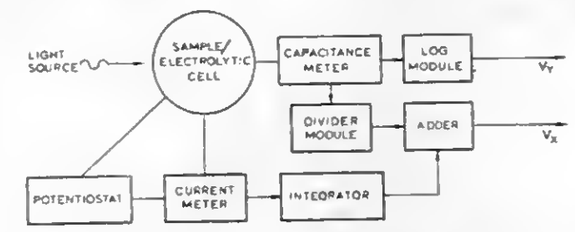
5. A method according to claim 1 wherein said deposition process includes the step of bombarding a target with an ion beam so as to cause sputtering of the target material which is then deposited on the substrate.

4,028,207

MEASURING ARRANGEMENTS

Marc Marian Faktor, Bushey Heath; Thomas Ambridge, Harrow Weald, and Ean Grant Bremner, Stanmore, all of England, assignors to The Post Office, London, England

Filed May 16, 1975, Ser. No. 578,144
Int. Cl.³ G01N *27/46*; **B23P** *1/00*
U.S. Cl. 204—195 R **5 Claims**



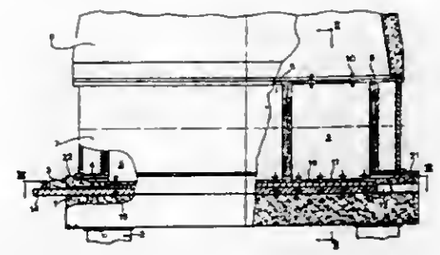
1. Apparatus for determining the carrier concentration as a function of depth in a semiconductor material by measuring the capacitance of a Schottky diode depletion layer formed in the semiconductor, said apparatus comprising an electrolytic cell arranged to contain electrolyte, means for mounting the semiconductor material in the cell so that a surface of the semiconductor can contact the electrolyte, the junction of said semiconductor and electrolyte forming said Schottky diode and said electrolyte in use progressively etching the surface area of the semiconductor material, masking means defining an area of the semiconductor material in contact with the electrolyte, electrical contact means for contacting the semiconductor, means for applying a d.c. voltage to said electrical contact means, electrode means for applying a d.c. voltage to said electrolyte, means for measuring the d.c. current through the electrolyte, means for applying an a.c. voltage to said Schottky diode, and a capacitance measuring unit responsive to said a.c. voltage for measuring the capacitance of the depletion layer of the Schottky diode.

4,028,208

ELECTROLYTE CELL WITH VERTICAL ELECTRODES

Umberto Giacopelli, Rosignano-Solvay (Leghorn), Italy, assignor to Solvay & Cie, Belgium

Filed Nov. 18, 1975, Ser. No. 633,104
Claims priority, application France, Dec. 16, 1974, 74.41708
Int. Cl.² B01K *3/10*
U.S. Cl. 204—252 **22 Claims**

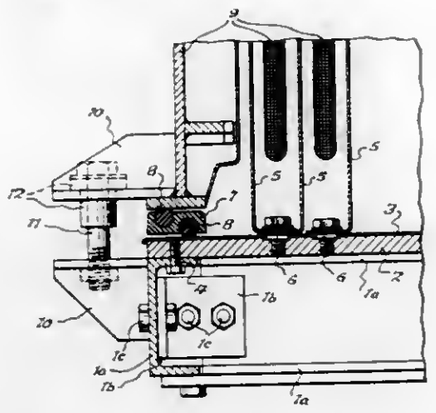


1. Electrolytic cell comprising, a baseplate with slots passing therethrough, anode plates which pass through the slots in the baseplate, sealing joints in the slots of the base plate, between the anode plates and the faces of the slots, a current lead-in disposed beneath the base plate and electrically and mechanically connected to the anode plates in order to support said anode plates, and means for supporting said current lead-in beneath the cell, and said sealing joints being supported on said current lead-in and compressed between said current lead-in and the faces of said slots in the base plate.

4,028,209
ELECTROLYSIS CELL

Pierre Labedan, Crepieux La Pape; Robert Mugnier, and Hubert Chavanel, both of Lyon, all of France, assignors to Rhone-Poulenc, Paris, France

Continuation-in-part of Ser. No. 221,746, Jan. 28, 1972, abandoned. This application Sept. 24, 1976, Ser. No. 726,220
Claims priority, application France, Feb. 2, 1971, 71.04345
Int. Cl.² C25B *1/26, 9/00*
U.S. Cl. 204—252 **6 Claims**



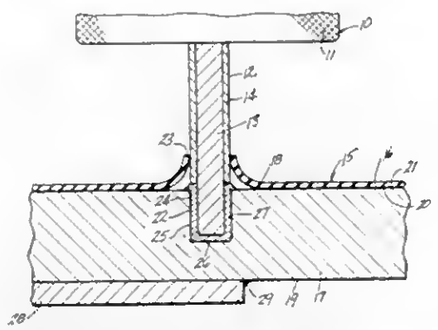
1. A cell of the diaphragm type for the electrolysis of aqueous solutions of alkali metal halides comprising an anodic bottom, an anode assembly and a cathode assembly, said anodic bottom comprising a profile frame having an upper face forming the bottom of the cell, a support plate for the anodes located on the upper face of the frame and covering the said face, and a foil of corrosion-resistant and electrically-conductive metal sleeving the support plate, and characterized in that a multiple-component, hydraulic and electrically insulating gasket assembly is placed between the cathode assembly and the foil of corrosion-resistant and electrically-conductive metal, over the periphery of the said foil, said multiple-component, hydraulic and electrically insulating gasket assembly comprising a non-deformable part having an upper face ad a lower face, each of the faces being provided with at least one groove in which is placed a non-permanently deformable flexible gasket, each of which protrudes above the face of said non-deformable part, said grooves being staggered opposite each other so that said non-deformable part rests on said foil of corrosion resistant, electrically-conductive metal, the non-deformable part and the non-permanently deformable flexible gaskets consisting of a corrosion-resistant material and which is also electrically insulating.

4,028,210
CONNECTION MEANS FOR ANODE POSTS IN ELECTROLYTIC DIAPHRAGM CELLS

Morton S. Kircher, Clearwater, Fla., assignor to Olin Corporation, New Haven, Conn.

Filed Nov. 28, 1975, Ser. No. 636,242
Int. Cl.² C25B *9/00*
U.S. Cl. 204—266 **8 Claims**

1. In an electrolytic cell comprised of a cell base having:
a. a non-metallic interior layer which provides an interior surface,
b. a metal conducting layer which provides an exterior surface
c. an interface between the bottom of said interior layer and the top of said conducting layer,
d. a cell body secured to said cell base,
1. a plurality of diaphragm-coated cathodes secured to said cell body,
e. a plurality of anodes, each anode comprising
1. a metallic conductive surface secured to,
2. an anode post, said anode post being secured to said cell base,
3. each metallic conductive surface being positioned adjacent to and parallel to at least one of said cathodes,
f. and current conducting means secured to said exterior surface,

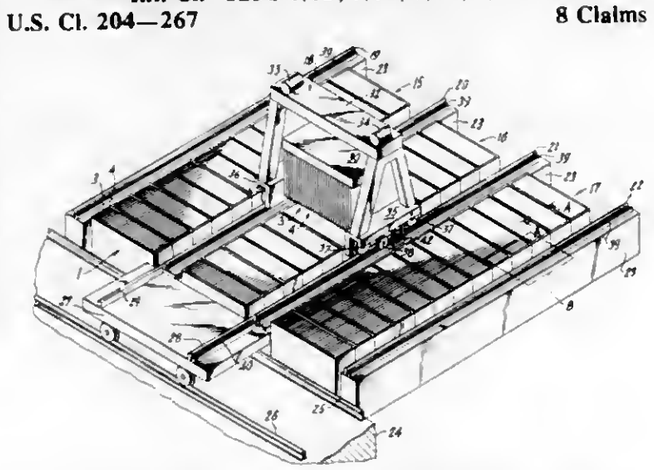


characterized by the improvement which comprises in combination,
g. soldered connections between each of said anode posts and said cell base in a separate opening for each of said anode posts, and
h. liquid-tight sealing means between said interior layer and each of said anode posts.

4,028,211
APPARATUS FOR AUTOMATICALLY REPLACING ELECTRODES USED FOR ELECTROLYTIC REFINING OF METAL

Seishiro Hirakawa; Shyuji Kanai; Matsuo Ikeda, and Toshinori Hirata, all of Gifu, Japan, assignors to Mitsui Mining & Smelting Co., Ltd., Tokyo, Japan

Filed May 17, 1976, Ser. No. 686,747
Claims priority, application Japan, Feb. 10, 1976, 51-13404
Int. Cl.² C25C *1/12, 1/18, 7/00, 7/06*
U.S. Cl. 204—267 **8 Claims**

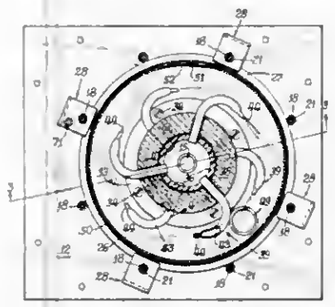


1. An apparatus for automatically replacing electrodes used for the electrolytic refining of metal comprising:
a group of electrolytic cells arranged in series and having a plurality of first electrodes and a plurality of second electrodes disposed alternately therein, each said electrode in said first electrode group being provided with a pair of horizontal recesses on opposite side edges of the upper end thereof and a central cutout formed between said recesses to terminate in a bottom level lower than the level of the upper end of the electrodes of said second electrode group disposed alternately with those of said first electrode group;
an electrode handling device adapted for travelling movement along rails laid in parallel on opposite sides of said electrolytic cell group;
an electrode carrier mounted in said electrode handling device for vertical movement;
a pair of parallel rods mounted to said electrode carrier to extend horizontally normal to the disposed direction of said electrodes, said rods being urged toward and away from each other thereby engaging said recesses of said electrodes in said first electrode group when urged toward each other; and
a plurality of clamping units mounted to said electrode carrier and adapted to freely make clamping movement in the space defined by said cutout of said electrodes in said second electrode group, thereby clamping said electrodes in said second electrode group at opposite sides of the upper central part thereof.

4,028,212
SILVER RECOVERY APPARATUS

Woodrow L. Bowen, 175 W. Oakton St., Des Plaines, Ill. 60018, and Harlan D. Moore, 809 Meadow Lane, Barrington, Ill. 60010

Filed June 14, 1976, Ser. No. 695,515
Int. Cl.² C25C *1/20, 7/00*
U.S. Cl. 204—272 **8 Claims**

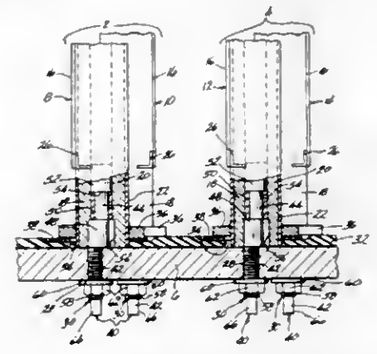


1. A silver recovery apparatus comprising an electrolytic chamber having a generally liquid tight cylindrical shape disposed with its axis in a generally vertical position, said chamber having a fixed plastic bottom and a removable plastic top, an anode of a relatively small diameter cylindrical shape fixedly disposed on the general vertical center axis of and within the cylindrical electrolytic chamber, a plastic tube sealingly affixed around its circumference to said bottom and extending upwardly within said cylindrical anode, said plastic tube closed at its upper end, said closed ended plastic tube defining a vertical central passage within said electrolytic chamber, a cathode of a relatively larger diameter cylindrical shape arranged and constructed in a concentric position with and spaced outwardly from the center anode and defining the outer extent of the cylindrical electrolytic chamber, an inlet passage in the electrolytic chamber for silver contaminated hypo solution, said inlet passage communicating with the central passage in the closed ended plastic tube, a plurality of spaced apart jet tubes affixed in a generally radial position in the walls of said plastic tube, said jet tubes having their inner ends in liquid communication with the central passage in the plastic tube and their outer ends passing through the walls of the anode and extending into the space between the anode and the cathode, the outer end of each jet tube bent at substantially right angles in the same direction so that hypo solution delivered to the inlet passage will flow into the central passage within the plastic tube, thence outwardly through the jet tubes, and thence in a circular path in the concentric space around the anode and within the cathode, whereby silver freed from the hypo solution is deposited on the inner surface of the cathode to thus rejuvenate the hypo solution, and a discharge passage communicating with the electrolytic chamber between the anode and the cathode.

4,028,213
VARIABLE GAP ANODE ASSEMBLY FOR ELECTROLYTIC CELLS

James M. Ford, Cleveland, Tenn., assignor to Olin Corporation, New Haven, Conn.

Filed Feb. 9, 1976, Ser. No. 656,166
Int. Cl.² C25B *11/00;* **C25C** *7/00*
U.S. Cl. 204—286 **10 Claims**

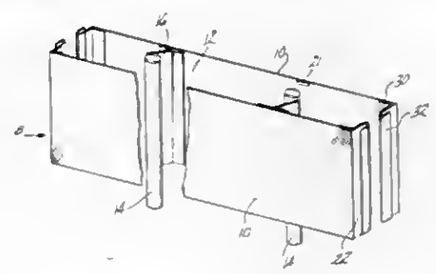


1. A multiple anode assembly for an electrolytic cell of the type including an anode mounting plate, at least one anode, and at least one foraminous cathode, said assembly comprising:
a. at least one mounting means for each of said anodes, said mounting means is a post, one end of said post being held in electrical contact with said anode mounting plate; and
b. attaching means for attaching at least some of said mounting means to said anode mounting plate so said anodes are maintained in a substantially perpendicular relationship thereto, said attaching means including a portion extending through said anode mounting plate and adapted for rotation therein for imparting lateral movement to said mounting means with respect to said anode mounting plate.

4,028,214
ADJUSTABLE ELECTRODE

James M. Ford, Cleveland, Tenn., and Elmer N. Macken, Baltimore, Md., assignors to Olin Corporation, New Haven, Conn.

Filed Jan. 28, 1976, Ser. No. 653,144
Int. Cl.² C25B *9/02, 1/03*
U.S. Cl. 204—286 **8 Claims**



1. An electrode suitable for use in a cell for the electrolysis of alkali metal chloride solutions which comprises:
a. two rectangular electrode surfaces positioned in parallel and having a space between said electrode surfaces,
b. at least two electrode posts positioned in said space between said electrode surfaces,
c. at least two resilient electrically conductive means each of said resilient electrically conductive means being attached to only one of said electrode posts and to only one of said electrode surfaces,
d. contractible means having means for attach- ment along two non-adjacent edges of each of said electrode sur-

faces, said contractible means being positioned outside of said space between said electrode surfaces, and

e. removable clamping means adapted to contact said contractible means.

4,028,215

MANGANESE DIOXIDE ELECTRODE

David L. Lewis, Mentor; C. Richard Franks, North Madison, and Barry A. Schenker, Mayfield Heights, all of Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Dec. 29, 1975, Ser. No. 644,639
Int. Cl.² C25B 11/10, 11/04
U.S. Cl. 204—290 F **12 Claims**

1. An electrode for use in an electrolytic process comprising: a valve metal substrate selected from the group of aluminum, molybdenum, niobium, tantalum, titanium, tungsten, zirconium and alloys thereof; on the surface of said valve metal substrate, a semi-conductive intermediate coating consisting essentially of tin and antimony compounds applied and converted to their respective oxides such that said semi-conductive intermediate coating attains a weight greater than 2 grams per square meter of said valve metal substrate surface area; and on the surface of said semi-conductive intermediate coating, a top coating consisting essentially of manganese dioxide such that said top coating attains a weight greater than 25 grams per square meter of said valve metal substrate surface area.

4,028,216

METHOD FOR PRODUCING AN ALUMINA SOL

Edward Michalko, Chicago, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed May 30, 1975, Ser. No. 582,524
Int. Cl.² B01J 13/00; C01F 7/02
U.S. Cl. 252—313 R **1 Claim**

1. A method of producing an alumina sol which comprises commingling a stoichiometric amount of aluminum with hydrochloric acid in an aqueous media to provide a final reaction mixture containing from about 10 to about 14 wt. % aluminum in from about a 1:1 to about a 1.5:1 ratio with the chloride anion content thereof, and treating the reaction mixture in the presence of from about 0.05 to about 0.5 wt. % cobalt chloride or nickel chloride based on the weight of said aluminum reactant at a reflux temperature of from about 98° C to about 115° C to effect substantially complete digestion of said aluminum.

4,028,217

METHOD FOR THE SEPARATION OF CHLOROPHYLL

Akira Okada; Keiji Iriyama, and Masaru Shirakl, all of Yokohama, Japan, assignors to Director-General of the Agency of Industrial Science and Technology, Tokyo, Japan

Filed Oct. 10, 1975, Ser. No. 621,516
Claims priority, application Japan, Oct. 14, 1974, 49-117850
Int. Cl.² C07D 487/22
U.S. Cl. 260—314 **2 Claims**

1. A method for the separation of chlorophyll, characterized by adding to a given amount of a photosynthetizing living organism at least one organic solvent selected from the group consisting of methyl alcohol, acetone, methyl ethyl ketone and butylcarbitol in a weight amount of 3–8 times as much as said living organisms, triturating the mixture, removing insoluble matter from the liquid, admixing therewith dioxane in a volumetric amount of 1/5 – ⅓ of the volume of said organic solvent, adding to the liquid mixture an aqueous phosphate buffer solution having a pH of about 8 until said liquid mixture becomes turbid, allowing said mixture to stand in a cooled dark place and thereafter separating the precipitated crystalline chlorophyll.

4,028,218

DEFOAMING COMPOSITION AND METHOD OF DEFOAMING AQUEOUS SOLUTIONS OR DISPERSIONS

Hans-Ferdi Fink, Essen-Ruttenscheid; Herwig Fritsch, Gladbeck; Götz Koerner, Essen; Gerd Rossmy, Essen-Werden, and Günter Schmidt, Essen, all of Germany, assignors to Th. Goldschmidt AG, Essen, Germany

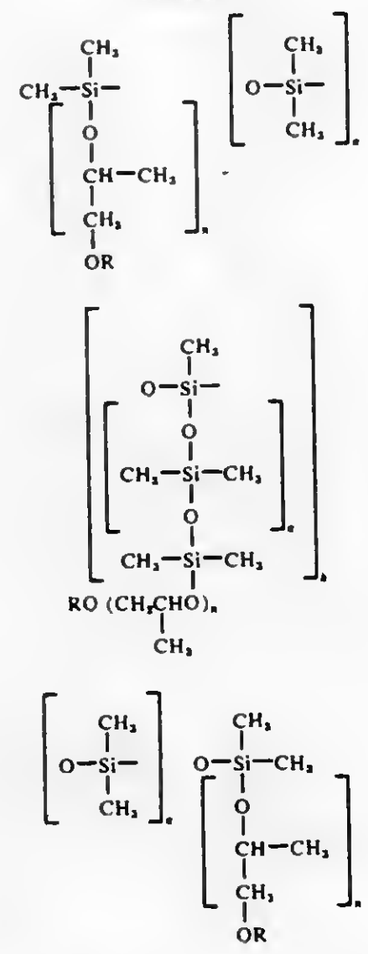
Filed Oct. 18, 1974, Ser. No. 515,847
Int. Cl.² B01D 19/04
U.S. Cl. 252—321 **13 Claims**

1. In a method for preventing the formation of foam and destroying existing foam in an aqueous solution or dispersion wherein an effective amount of defoaming composition composed of an oil, highly dispersed silica and a defoaming substance of a polyoxyalkylene-polysiloxane block copolymer is used, the improvement which comprises said block copolymer consisting essentially of

a. about 10 to 60 % by weight of methylpolysiloxane and

b. with the balance polyoxyalkylene, said polyoxyalkylene block consisting of oxypropylene units and said block copolymer having the formula:

Formula I



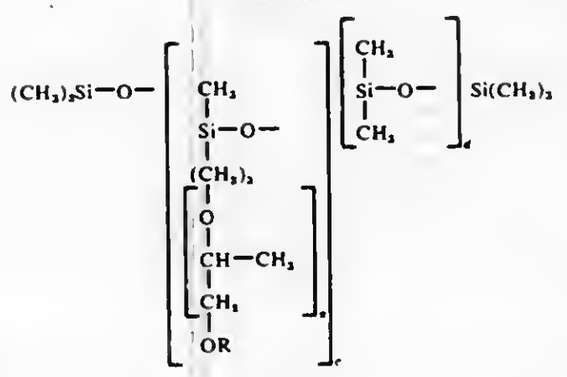
wherein

R is alkyl, acyl, aryl or R′—NH—CO—, wherein R′ stands for aryl or alkyl,

a and *n* have finite values and the absolute values for *n*, *a* and *b* are the corollary of conditions (a) and (b); or the formula

Formula II

-continued



wherein R is alkyl, acyl, aryl or R′—NH—CO—, wherein R′ is alkyl or aryl,

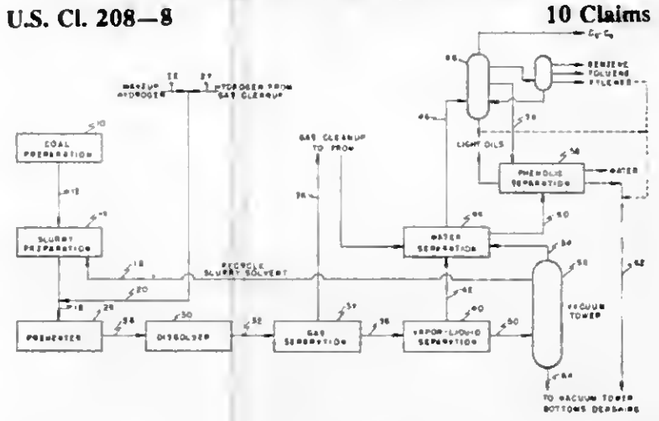
c ≧ 1, and the absolute values for n, c, and d are the corollary of conditions (a) and (b).

4,028,219

PROCESS FOR THE PRODUCTION OF DEASHED COAL LIQUIFACTION PRODUCTS

Roger Allen Baldwin, and Robert Elliott Davis, both of Oklahoma City, Okla., assignors to Kerr-McGee Corporation, Oklahoma City, Okla.

Filed Oct. 23, 1975, Ser. No. 625,206
Int. Cl.² C10G 1/04
U.S. Cl. 208—8 **10 Claims**



1. In a process which comrises preparing coal liquefaction products by contracting coal with coal dissolving solvent at elevated temperature and pressure in a hydrogen atmosphere, passing the resulting mixture to a vaccum tower to remove coal dissolving solvent for recirculation and leave still bottoms substantially free of such coal dissolving solvent, the improvements which comprise contacting said vacuum tower still bottoms, which are substantially free of coal dissolving solvent, with a solubilizing solvent to dissolve a substantial quantity of said still bottoms and separating said dissolved still bottoms from undissolved still bottoms.

4,028,220

GAS EXTRACTION OF COAL

Donald Bremner Urquhart, Charlton Kings, England, assignor to Coal Industry (Patents) Limited, London, England

Filed Oct. 15, 1975, Ser. No. 622,737
Claims priority, application United Kingdom, Nov. 19, 1974, 50122/74
Int. Cl.² C10G 1/04
U.S. Cl. 208—8 **8 Claims**

1. A process for the hydrogenative extraction of coal characterized by the combination of treating coal with water and carbon monoxide at a temperature within the range 300° C to 380° C in an initial hydrogenation step, separating the gases from the treated coal at the end of the treatment, extracting the treated coal with an extractant in the gas phase under supercritical conditions at a temperature of at least 400° C, separating the solid residue from the gas phase and recovering the coal extract from the extractant.

4,028,221

LIQUEFACTION OF SUB-BITUMINOUS AND LIGNITIC COAL

Morgan C. Sze, Upper Montclair, and George J. Snell, Fords, both of N.J., assignors to The Lummus Company, Bloomfield, N.J.

Filed June 6, 1975, Ser. No. 584,627
Int. Cl.² C10G 1/06
U.S. Cl. 208—8 **12 Claims**

1. In a process for the hydroliquefaction of a coal selected from the group consisting of sub-bituminous and lignitic coals, the improvement comprising:

employing as a pasting solvent for said hydroliquefaction, a liquid fraction produced by the hydroliquefaction of said coal, said liquid fraction containing at least 25 weight percent of components boiling above 800° F.

4,028,222

METHOD FOR EXTRACTING OIL FROM OIL SHALE

Phillip Earl Prull, 2100 Lewelling Blvd. No. 10, San Leandro, Calif. 94579

Filed Feb. 23, 1976, Ser. No. 660,060
Int. Cl.² C10G 1/04
U.S. Cl. 208—11 R **9 Claims**

1. A process for extraction of oil from oil shale comprising crushing said oil shale;

classifying said crushed oil shale by particle size into at least two portions of differing range of particle size;

heating said oil shale to a temperature sufficient to release oil therefrom and below the flash point of the oil released therefrom; and

separately centrifuging each of said portions to remove liquid oil therefrom at a centrifuge speed and for a length of time selected for maximal efficiency of oil separation from said portion per unit of driving energy input to said centrifuge.

4,028,223

GUARD BEDS IN HYDROCARBON CONVERSION WITH AN ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE

John C. Hayes, Palatine, and Ernest L. Pollitzer, Skokie, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 522,209, Nov. 8, 1974, Pat. No. 3,960,710. This application Aug. 11, 1975, Ser. No. 603,839
The portion of the term of this patent subsequent to June 1, 1993, has been disclaimed.
Int. Cl.² C10G 35/08
U.S. Cl. 208—91 **18 Claims**

1. A process for converting a hydrocarbon charge stock which comprises contacting the hydrocarbon charge stock and a hydrogen stream at hydrocarbon conversion conditions, in a reaction zone maintained in a substantially sulfur- and water-free condition, with an acidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group metal, about 0.5 to about 5 wt. % cobalt, about 0.01 to about 5 wt. % tin, and about 0.1 to about 3.5 wt. % halogen, wherein the platinum group metal, catalytically available cobalt, and tin are uniformly dispersed throughout the porous carrier material, wherein substantially all of the platinum group metal is present in the elemental metallic state, wherein substantially all of the tin is present in an oxidation state above that of the elemental metal wherein the average crystalline size of said tin is less than 100 Angstroms in maximum dimension, and wherein substantially all of the catalytically available cobalt is present in the elemental metallic state or in a state which is

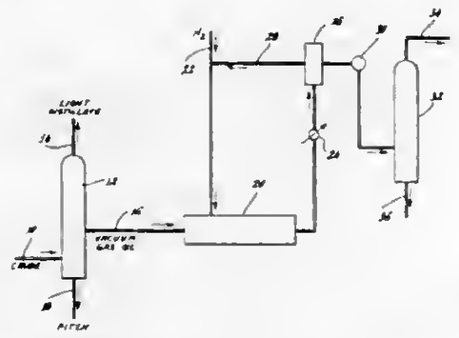
reducible to the elemental metallic under hydrocarbon conversion conditions or in a mixture of these states.

4,028,224

PROCESS FOR THE PREPARATION OF LOW POUR POINT LUBRICATING OILS

John M. MacDonald, Sarnia, and Robert Kartzmark, Mississauga, both of Canada, assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation of Ser. No. 317,608, Dec. 22, 1972, abandoned. This application Dec. 17, 1975, Ser. No. 641,351
Int. Cl.² C10G 13/00
U.S. Cl. 208—92 11 Claims



1. A process for the preparation of low pour point lubricating oils from heavy naphthenic Cold Lake crude oil feedstocks without the need for solvent extracting and dewaxing procedures which process consists essentially of the sequential steps of:

i. vacuum distilling, in a distillation zone, a heavy naphthenic crude oil feedstock containing from about 2 to 10 weight % of sulfur based on the weight of the feedstock, said feedstock exhibiting a specific gravity ranging from about 5° to 20° API to obtain at least one distillate cut exhibiting a boiling range of from about 500° to 1000° F and a specific gravity ranging from about 10° to 25° API;

ii. passing said distillate cut from said distillation zone directly to at least one hydrocracking zone wherein said distillate cut is contacted with a hydrocracking catalyst at a temperature from about 650° to 850° F, a hydrogen partial pressure of about 500 to 5000 psig and a space velocity of from about 0.1 to 2.0 V/V/Hr;

iii. removing the low boiling light ends from the hydrocrackate; and

iv. recovering a low pour point lubricating oil.

4,028,225

HYDROCARBON CONVERSION WITH A SULFIDED ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE

Frederick C. Wilhelm, Ann Arbor, Mich., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 479,231, June 13, 1974, Pat. No. 3,915,846, which is a continuation-in-part of Ser. No. 353,925, April 23, 1973, Pat. No. 3,839,195, which is a continuation-in-part of Ser. No. 152,467, May 28, 1971, abandoned, which is a division of Ser. No. 835,218, June 20, 1969, abandoned. This application Sept. 8, 1975, Ser. No. 611,582
Int. Cl.² B01J 23/62; C10G 35/08
U.S. Cl. 208—139 16 Claims

1. A process for converting a hydrocarbon which comprises contacting the hydrocarbon at hydrocarbon conversion conditions with a sulfided acidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum or palladium, about 0.01 to about 2 wt. % rhodium, about 0.1 to about 3.5 wt. % halogen, about 0.01 to about 1 wt. % sulfur, and lead in an amount sufficient to result in an atomic ratio of lead to platinum or palladium of about 0.05:1 to about 0.9:1, wherein the platinum or palladium, rhodium and lead are uniformly dispersed throughout the porous carrier material, wherein substantially all of the platinum or palladium and rhodium are present in a sulfided state or in a mixture of the sulfided state and the elemental metallic state, wherein substantially all of the lead is present in an oxidation state above that of the elemental metal, and wherein the composite is sulfided, prior to contact with the hydrocarbon and after substantially all of the platinum or palladium and rhodium contained therein have been reduced to the elemental metallic state while substantially all lead is maintained in an oxidized state, by treatment with a sulfiding gas at conditions selected to incorporate about 0.01 to about 1 wt. % sulfur.

4,028,226

METHOD OF REREFINING OIL WITH RECOVERY OF USEFUL ORGANIC ADDITIVES

John Wesley Forsberg, Mentor-On-The-Lake, Ohio, assignor to The Lubrizol Corporation, Cleveland, Ohio

Filed Nov. 12, 1975, Ser. No. 631,360
Int. Cl.² C10M 11/00
U.S. Cl. 208—180 9 Claims

1. A method of recovering oil of lubricating viscosity from used oil of lubricating viscosity which comprises the steps of:

A. Diluting said used oil with a water-soluble polar diluent in which said used oil is substantially soluble, said diluent comprising a lower alkanol or lower alkanone, and removing impurities insoluble in the soluble in the solution of said oil in said polar diluent from said solution;

B. Removing a major amount of said polar diluent for the solution of step A by addition of water having a pH of about 6–8 and removal of the resulting aqueous phase; and

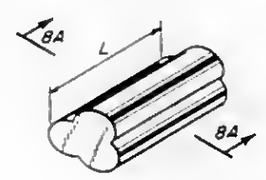
C. Removing the balance of said polar diluent from said oil.

4,028,227

HYDROTREATING OF PETROLEUM RESIDUUM USING SHAPED CATALYST PARTICLES OF SMALL DIAMETER PORES

William Roy Gustafson, Trumbull, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 508,780, Sept. 24, 1974, Pat. No. 3,966,644, which is a continuation-in-part of Ser. No. 385,519, Aug. 3, 1973, abandoned, which is a continuation-in-part of Ser. No. 255,491, May 22, 1972, abandoned. This application Apr. 5, 1976, Ser. No. 673,839
Int. Cl.² C10G 23/02
U.S. Cl. 208—216 7 Claims



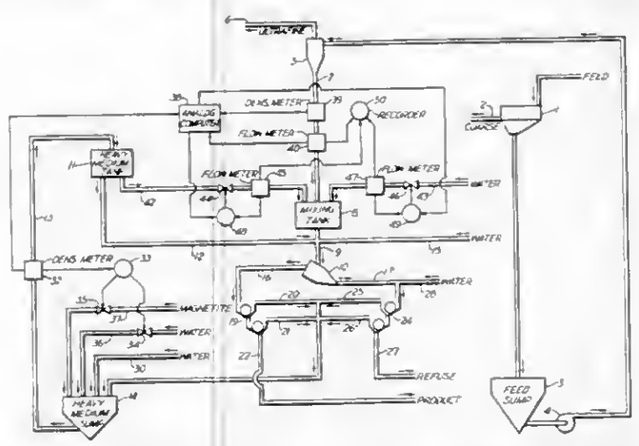
1. A process for hydrotreating a petroleum residuum with a porous hydrotreating catalyst particle to obtain a desulfurized product, said particle having a composition of a major portion of alumina; up to about 36 weight percent of silica, based on the total weight of silica and alumina; from about 10 to 25 weight percent of molybdenum in the form of its oxide or sulfide; and a total of about 1 to 8 weight percent of a metal selected from cobalt, nickel, and mixtures thereof in the form of the corresponding oxide or sulfide, said percentages being based on the total weight of said catalyst particle; said particle being further characterized by a polylobal cross-sectional shape defining a concave geometric solid, said cross-sectional shape being defined by circles, all of said circles being spaced from one another by a distance which is from three-eighths to about fifteen-sixteenths of the diameters of said circles and when more than two lobes are present, lines connecting the centers of adjacent circles form a substantially equilateral polygon, each side of said polygon being from three-eighths to fifteen-sixteenths of the diameter of said circles and all of said cross-sectional shape included by said circles being of said composition; said particle size being defined by a ratio of geometric volume to geometric surface in the range of about 0.001 to 0.042 inch; a catalytic surface area greater than 150 square meters per gram; and a catalytic pore volume in the range of about 0.35 to 0.85 cubic centimeters per gram, said pore volume resulting from a major portion of pores of diameter in the range of 40 to 90 Angstrom units when measured with mercury at up to about 50,000 pounds per square inch absolute pressure and a contact angle of 140°; which process comprises contacting said residuum with said catalyst particle and with hydrogen at a flow rate of about 500 to 5,000 standard cubic feed per barrel of oil at a liquid hourly space velocity of about 0.20 to 5.0 reciprocal hour, a temperature in the range of about 600° to 850° F., and a total pressure in the range of about 200 to 10,000 pounds per square inch guage.

4,028,228

PROCESS AND APPARATUS FOR CLEANING VERY FINE ORE

David D. Ferris, and Kenneth E. Harrison, both of Pittsburgh, Pa., assignors to Heyl & Patterson, Inc., Pittsburgh, Pa.

Filed Feb. 2, 1976, Ser. No. 654,230
Int. Cl.² B03B 5/34
U.S. Cl. 209—39 3 Claims



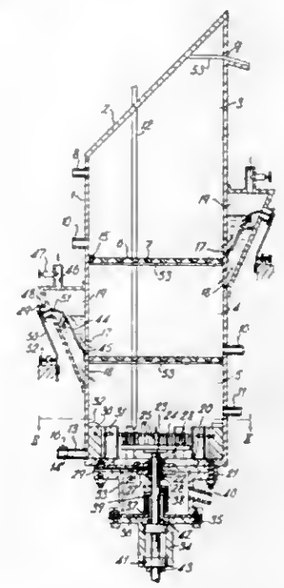
1. Coal cleaning apparatus comprising a classifying cyclone having an inlet and an overflow outlet for ultrafine coal particles and an underflow outlet, means for continually delivering a stream of coal and water to the inlet of the cyclone, a heavy medium cyclone having an inlet and an overflow outlet and an underflow outlet, conduit means connecting the underflow outlet of the classifying cyclone with the inlet of the heavy medium cyclone and including a receptacle through which underflow from the classifying cyclone flows, means containing a supply of heavy medium formed from a suspension of magnetizable particles and water, means for continually delivering heavy medium from said containing means to the underflow in said conduit means, means for continually delivering water to the underflow in said conduit means, means for delivering to said receptacle additional heavy medium from said containing means and the required amount of water to maintain a substantially constant specific gravity and flow rate at the inlet of the heavy medium cyclone, magnetic separating means for receiving overflow from the heavy medium cyclone and having an outlet for separated heavy medium and an outlet for coal, magnetic separating means for receiving underflow from the heavy medium cyclone and having an outlet for separated heavy medium and an outlet for rejects, and means for conducting said separated heavy medium from the magnetic separating means back to said containing means.

4,028,229

FROTH FLOTATION

Christopher Cambridge Dell, Leeds, England, assigoor to National Research Development Corporation, London, England

Filed Mar. 14, 1975, Ser. No. 558,499
Claims priority, application United Kingdom, Mar. 22, 1974, 12857/74; Jan. 17, 1975, 02128/75
Int. Cl.² B03D 1/22
U.S. Cl. 209—164 21 Claims



1. Apparatus for use in froth flotation which comprises:

a receptacle;

means for generation of bubbles in said receptacle;

means for dividing said receptacle to provide two or more flotation cells arranged one above another;

apertured passage means in said dividing means for the passage of froth upwardly through said dividing means from each lower cell into the adjacent upper cell; and

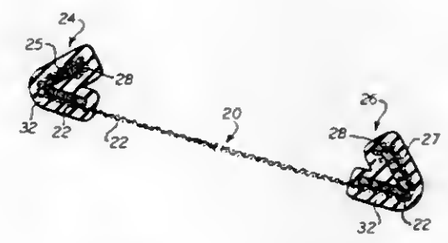
control means for each lower cell, said means being responsive to changes in the thickness of the froth layer in said lower cell and serving to maintain said thickness at a predetermined value.

4,028,230

VIBRATORY SEPARATOR SCREEN AND METHOD OF MANUFACTURE

Jesse Rosenblum, 112 Roosevelt St., Closter, N.J. 07624

Filed Apr. 2, 1975, Ser. No. 564,446
Int. Cl.² B07B 1/48
U.S. Cl. 209—403 17 Claims



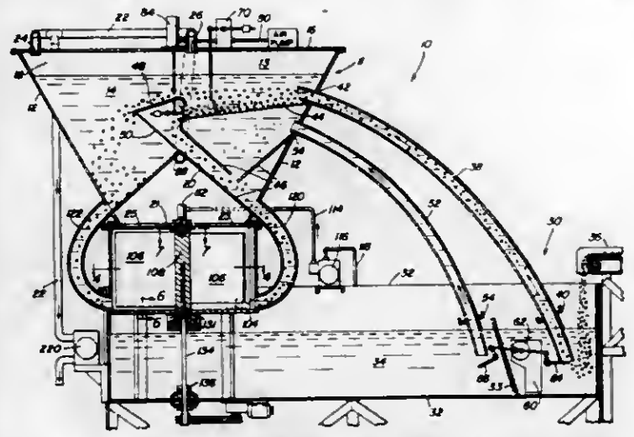
1. In a vibratory separator screen in which a wire mesh has at least a first pair of opposed wire mesh edges having a corresponding first pair of opposed end portions at said wire mesh edges each comprising a reinforced edge strip capable of being tensioned to a surrounding frame, the improvement comprising a reinforcing spline member located adjacent each of said opposed end portions of said first pair and being substantially equal in longitudinal extent thereto and a mold cured encapsulating medium at each of said opposed end

portions of said first pair completely surrounding said spline member and said adjacent first pair opposed end portion for forming a reinforced molded member at each of said opposed end portions, said spline member being fixedly secured to said adjacent opposed end portion in said molded member with said mesh at a desired tautness for providing a substantially evenly tensioned mesh when tensioned to said surrounding frame, said completely encapsulated molded member comprising said reinforced edge strip, said reinforced edge strip having sealed end points and comprising means for enabling said wire mesh to be tensioned to said surrounding frame for providing said substantially evenly tensioned mesh, said spline reinforced molded members maintaining stiffness of said wire mesh edges and controlling spillage over said edges.

4,028,231
VACUUM TYPE COAL SEPARATOR

Harold D. Parham, R.R. No. 1, White Plains, Ky. 42464

Filed Oct. 8, 1975, Ser. No. 620,831
Int. Cl.² B03B *5/24*
U.S. Cl. 209—457 **14 Claims**



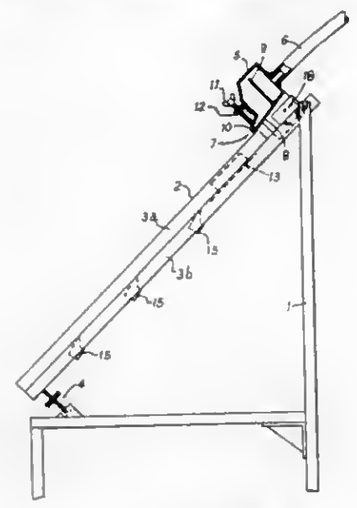
1. A coal and rock separator using water and vacuum comprising: means for separating undesired particles from desired particles including; a main separator hopper for holding water and having two separate compartments therein, one for receiving rock, and the other for receiving coal; a vacuum source connected to the top portion of the separator hopper for maintaining a vacuum in the hopper; input means to allow water and a coal-rock mix to be fed into the separator hopper; a permeable support means mounted in the hopper for receiving said coal-rock mix; means for introducing a pulsating flow upwardly through the support; means for dividing the material stratified thereby into two fractions; and discharge means at the bottom of the main separator hopper to prevent reverse water/airflow into the hopper while permitting separate discharge of the coal and rock as separated therein.

4,028,232
SEPARATOR METHOD AND APPARATUS

James William Wallis, Larefield, England, assignor to Wallis Separators Limited, Sittingbourne, England

Filed Aug. 8, 1975, Ser. No. 603,092
Claims priority, application United Kingdom, Aug. 9, 1974, 35290/74
The portion of the term of this patent subsequent to Feb. 4, 1992, has been disclaimed.
Int. Cl.² B01D *35/20*
U.S. Cl. 210—19 **7 Claims**

1. A separator for effecting separation of solid materials from liquids which comprises a filter screen, said filter screen being so arranged that in operation liquid passes through said filter screen and solid materials are retained on and travel along said filter screen in a first direction, generator means for subjecting said filter screen to acoustic pressure waves, said generator means being arranged close to but not touching said filter screen so that in operation liquid passing through said filter screen couples acoustic pressure waves from said generator means to said filter screen, said generator means being an acoustic pressure wave transducer assembly that stretches at



least nearly the whole way across said filter screen in a second direction transverse to said first direction.

4,028,233
WATER PURIFICATION PROCESS

Karl-Ernst Quentin; Ludwig Weil, both of Munich, and Harald Berger, Kelkheim, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Continuation-in-part of Ser. No. 403,020, Oct. 3, 1973, abandoned. This application Mar. 7, 1975, Ser. No. 556,222
Claims priority, application Germany, Oct. 5, 1972, 2248832
Int. Cl.² C02B *1/14*
U.S. Cl. 210—28 **3 Claims**

1. In a process for preparing drinking water by removing hydrocarbon or halogenated hydrocarbon contaminants dissolved in water in a concentration below 10 mg/l, wherein an aluminum or iron salt and a flocculation aid selected from the group consisting of polyacrylamide and starch is added to the water and the floc thus formed together with contaminants is separated from the water, the improvement which comprises mixing the water with a pulverulent copolymer composed of from 99.5 to 95% by weight of ethylene structural units and of from 0.2 to 2.0 mole % of vinylacylamide structural units and having a particle size between 0.1 and 200 microns, in an amount of from 2 to 100 mg/l of water to be treated, before, during or after the addition of the aluminum or iron salt, said copolymer being introduced together with said flocculation aid to the water, and separating said polymer substance together with said floc and contaminants from the water.

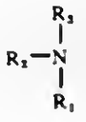
4,028,234
BUFFERING AGENTS

Arthur Katzakian, Jr., Sacramento, and David O. DePree, Loomis, both of Calif., assignors to Aerojet-General Corporation, El Monte, Calif.

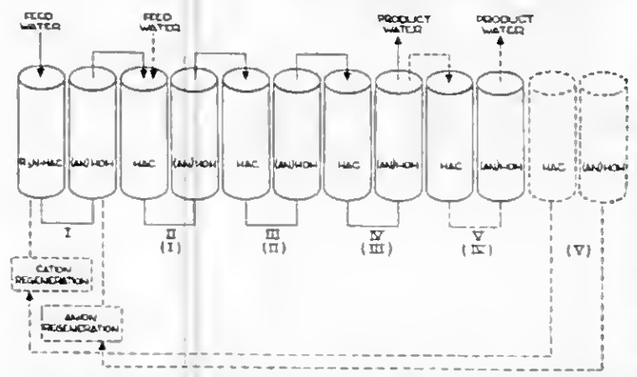
Continuation-in-part of Ser. No. 476,966, June 6, 1974, abandoned. This application Sept. 18, 1975, Ser. No. 614,428
The portion of the term of this patent subsequent to Dec. 23, 1992, has been disclaimed.
Int. Cl.² B01D *15/04*
U.S. Cl. 210—37 R **9 Claims**

1. A process for demineralizing water comprising the steps of:

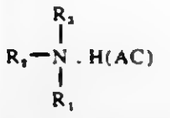
passing an amine buffer of the formula:



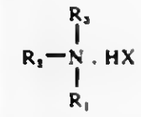
where R_1, R_2 and R_3 are selected from hydrogen, alkyl of 1 to 6 carbon atoms or hydroxyalkyl provided that the amine buffer contains at least two hydroxyl groups and at least two of the hydroxyl groups are separated from the



nitrogen atom by from 1 to 3 linear carbon atoms; through a bed of weakly acidic cation exchange resin in hydrogen form of the formula, H(AC) having a pK of from 5.0 to 7.5 to form a buffer amine salt bed of the cation resin of the formula:



passing feedwater containing dissolved mineral salts of the formula, MX, where M is a metal cation and X is an anion through said buffer amine salt bed and ionically exchanging the metal ion with the amine of the resin salt to form a first effluent containing a dissolved amine salt of the formula:



passing the first effluent through a bed of weakly basic anion exchange resin having a pK from 5.0 to 7.5 and depositing the anions, X, thereon to form a second effluent containing said amine buffer.

4,028,235
FROTH FLOTATION WITH SEWAGE TREATMENT PLANT WATER EFFLUENT

Gerald F. Fountain; Jaime Veloz; Edward A. Bilson, and John A. Cronin, all of Inspiration, Ariz., assignors to Inspiration Consolidated Copper Company, Morristown, N.J.

Filed June 4, 1976, Ser. No. 692,926
Int. Cl.² B03D *1/02*
U.S. Cl. 210—44 **5 Claims**

1. In the process of concentrating a sulfide mineral by froth flotation from an aqueous pulp of an ore containing such mineral, the improvement comprising using as at least part of the aqueous phase of the pulp sewage treatment plant water effluent conditioned prior to use with at least about 3 parts per million of a polyglycerol comprising, for each 100 parts by weight thereof, from about 55 parts to 80 parts by weight of a mixture of glycerol, diglycerol, triglycerol, tetraglycerol, and pentaglycerol, with the glycerol being present in an amount no greater than about 15 parts by weight.

4,028,236
RECOVERY OF MERCURY

Douglas W. Townsend, Port Credit, and H. Douglas Woods, Ottawa, both of Canada, assignors to Ontario Research Foundation, Sheridan Park, Canada

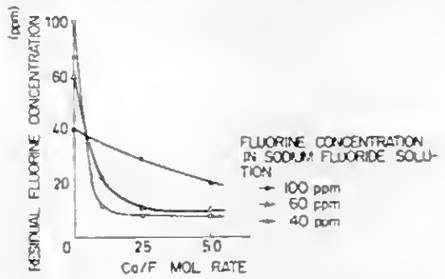
Filed Jan. 21, 1975, Ser. No. 542,853
Claims priority, application United Kingdom, Jan. 21, 1974, 2781/74
Int. Cl.² C22B *3/00*
U.S. Cl. 210—45 **9 Claims**

1. A method for the removal of mercury in metallic form and/or soluble ionic form from a aqueous medium containing such mercury which comprises contacting said aqueous medium with tin-coated iron strips having tin-iron interfaces exposed to the medium to reduce said mercury in soluble ionic form to the metallic form by the iron, accumulating said mercury in metallic form initially present in said aqueous medium and/or formed by said reduction of mercury in soluble ionic form on the tin surface, and separating the tin-coated iron strips having surface accumulated mercury.

4,028,237
METHOD AND APPARATUS FOR TREATMENT OF FLUORINE-CONTAINING WASTE WATERS

Shigeoki Nishimura; Toshio Sawa; Kouji Otani, all of Hitachi, and Seiichi Kikkawa, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 1, 1976, Ser. No. 662,615
Claims priority, application Japan, Feb. 28, 1975, 50-23950
Int. Cl.² C02B *1/20*
U.S. Cl. 210—45 **3 Claims**



1. A method for treating fluorine-containing waste waters to remove fluorine values therefrom, which comprises adding aluminum ions to fluorine-containing waste waters at pH 5 to 8 to convert a portion of said fluorine values to hydroxy-fluoride complexes, adding phosphate ions and calcium ions to the waste water at pH 6 to 8 to form fluoride apatite with the residual fluorine that has not been converted to said complexes, and removing said hydroxy-fluoride complexes and fluoride apatite from the treated water.

4,028,238
TREATMENT OF MUNICIPAL WASTE SLUDGES

John L. Allan, Glen Rock, N.J., assignor to Dart Industries Inc., Los Angeles, Calif.

Filed Nov. 3, 1975, Ser. No. 628,454
Int. Cl.² C02C *3/00*
U.S. Cl. 210—53 **6 Claims**

1. In a process for dewatering a municipal waste sludge, having a suspended solids content between about 1 and about 5 percent by weight, wherein said sludge is subjected to treatment with sufficient quantities of calcium oxide or hydroxide and from about 5 to about 5000 milligrams alum per liter of waste sludge to obtain a pH value in the range from about 10 to about 11, and a flocculating agent is added thereto in amounts of from about 1 to about 100 milligrams per liter of said waste sludge, whereby a flocculated sludge containing precipitated aluminum hydroxide is obtained, the improvement which comprises:

a. adding to the flocculated sludge from about 25 to 75% by

weight of calcium oxide or hydroxide based on the weight of suspended solids in the municipal waste sludge before said treatment, and

b. filtering the resultant mixture under a pressure of at least about 0.5 atmospheres to obtain a liquid filtrate and a solids filter cake.

4,028,239

PROCESS FOR PREVENTING LIME DEPOSITS IN A HUMIDIFIER

Christoph Zinsstag; Heinz Kntschera, both of Visp, and Dietrich Knutti, Rheinfelden, all of Switzerland, assignors to Lonza Ltd., Gampel, Valais, Switzerland

Continuation of Ser. No. 483,764, June 27, 1974, abandoned. This application Apr. 12, 1976, Ser. No. 676,207

Claims priority, application Switzerland, June 3, 1973, 9658/73

Int. Cl.² C02B *5/06*

U.S. Cl. 210—58 **4 Claims**

1. A process of preventing the formation of lime deposits in the water distribution system of a humidifier which comprises adding a tablet-form preparation consisting essentially of (i) 2 to 20 percent by weight of acetylsalicylic acid, (ii) 0.05 to 1 percent by weight of formaldehyde resin condensation product and (iii) the remainder citric acid to said water distribution system of said humidifier.

4,028,240

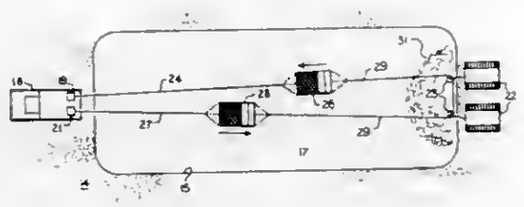
METHOD AND APPARATUS FOR TREATING SUMPS

Frank Manchak, Jr., 635 Grove Lane, Santa Barbara, Calif. 93105

Filed Oct. 15, 1973, Ser. No. 406,349

Int. Cl.² C02B *1/18*

U.S. Cl. 210—59 **2 Claims**



1. The method of treating oil field sumps to convert the contents into ecologically acceptable material comprising:

a. mixing in place in the sump calcium oxide with the sump contents in the range ½ to 5 percent by weight of calcium oxide to sump contents, adding oxide until the mixture stiffens;

b. resting the mixture up to 2 days;

c. removing the mixture from the sump;

d. spreading the mixture for drying up to 3 weeks; and

e. thereafter compacting the mixture,

the compacted mixture forming a self-sealing mass that does not appreciably bleed out sump constituents, nor are they appreciably leached out.

4,028,241

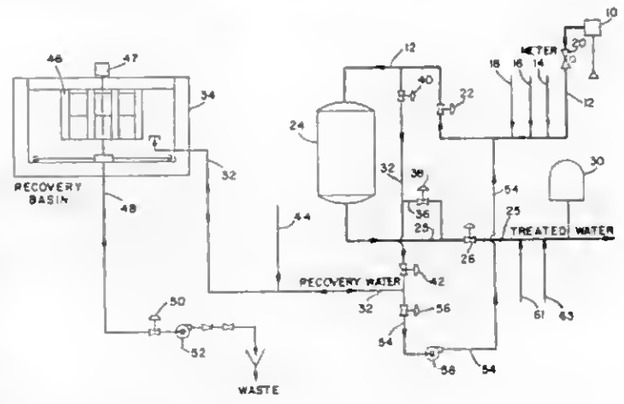
APPARATUS FOR AND METHOD OF RECOVERING WATER USED TO BACKWASH AND RINSE A FILTER

Raymond R. Davis, Pitman; Alfred M. Langberg, Sewell, and Alvin P. Debus, Pitman, all of N.J., assignors to Hungerford & Terry, Inc., Clayton, N.J.

Continuation of Ser. No. 607,496, Aug. 25, 1975, abandoned, which is a continuation of Ser. No. 490,016, July 19, 1974, abandoned, which is a continuation of Ser. No. 319,089, Dec. 27, 1972, abandoned. This application Oct. 1, 1976, Ser. No. 728,773

Int. Cl.² B01D *41/02*

U.S. Cl. 210—60 **4 Claims**



4. A process as defined in claim 3 in which, during the backwashing, purified water is supplied to the point of community use from the backwashing reservoir.

4,028,242

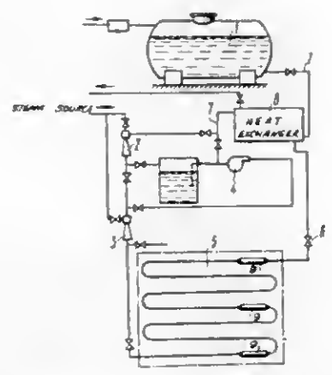
METHOD OF THERMAL DISINFECTION OF SEWAGE AND PLANT REALIZING SAME

Vyacheslav Alexandrovich Kokurin, Bolnichny proezd, 18, kv. 46, Pokrov Vladimirskoi oblastl; Igor Alexeevich Bakulov, Ryazansky prospekt, 82, korpus 2, kv. 79, and Vitaly Mikhailovich Kotlyarov, ulitsa Koshtoiantsa, 5, kv. 69, both of Moscow, all of U.S.S.R.

Filed Feb. 6, 1975, Ser. No. 547,881

Int. Cl.² C02C *1/00*

U.S. Cl. 210—71 **2 Claims**



1. A plant operable with a source of steam for thermal disinfection of sewage, which plant comprises: a tank for collecting sewage; a first pipeline connected to said tank at an outlet thereof; an intermittently operable jet apparatus having a nozzle coupled to said source of steam and connected by said first pipeline with said tank to inject sewage into the jet apparatus to preheat the sewage to a temperature not greater than 100° C; a pump having an inlet and an outlet; means connecting the inlet of said pump to the outlet of said first jet apparatus; a second pipeline connecting the first pipeline directly to the inlet of the pump; valve means in said second pipeline and in the means connecting the outlet of the jet apparatus to the inlet of the pump for controlling the flow to the inlet of said pump; a second jet apparatus having a nozzle coupled to said outlet of the pump such that sewage is pumped through said second jet apparatus under pressure; said second jet apparatus being connected to said steam source for induction of steam under the effect of the pumped sewage for heating the sewage by the inducted steam to a temperature greater than 100° C.; a pipe coil connected to the outlet of said second jet apparatus and including further valve means for controlling discharge of sewage from said coil such that the sewage received from said second jet apparatus flows continuously through said coil at a temperature above 100° C. and at a pressure corresponding to the steam saturation temperature whereby the sewage is disinfected; a heat-exchanger connected to the outlet of the pipe coil and to said first pipeline at a location upstream of said pump such that heat is extracted from the disinfected sewage discharged from the coil and is transferred to the sewage in the first pipeline; and cyclones in said pipe coil for imparting a helical motion to the sewage flow therein.

4,028,243

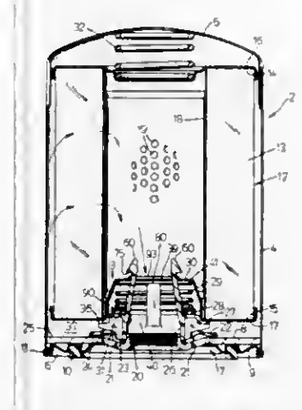
RELIEF VALVE FOR A FLUID FILTER ASSEMBLY

Robert J. Offer, Racine, Wis., and Bernard J. Van Vooren, Albert Lea, Minn., assignors to Tenneco Inc., Racine, Wis.

Filed May 28, 1976, Ser. No. 690,835

Int. Cl.² B01D *27/10*

U.S. Cl. 210—130 **3 Claims**



1. In a fluid treatment assembly having an outer shell closed at one end, a fluid treatment element, having a first end cap and a second end cap, within said shell, a treatment element hold down spring interposed between said closed end of said shell and said first end cap and a unit end cap assembly sealingly engaged with said open end of said shell, said hold down spring biasing said treatment element toward said unit end cap assembly, an improved treatment element by-pass valve comprising:

a valve housing formed of a spring retention means sealingly engaged with said second end cap, said valve housing having a closed end and an opened end, said closed end having a fluid flow opening for enabling fluid to flow from said treatment element into said valve housing;

a valve body interposed between said open end of said valve housing and said unit end cap assembly and sealingly engaged with said open end of said valve housing, said valve body having a fluid flow opening for enabling fluid to flow from said valve housing and at least one pressure responsive fluid flow opening for enabling fluid to flow into said valve housing through said pressure responsive opening in response to a predetermined fluid pressure; and

by-pass valve assembly facilitating means attached to said valve body and extending through said fluid flow opening in said closed end of said valve housing, for engaging a portion of said valve housing adjacent said opening in said closed end of said valve housing for maintaining said housing and said body as a unit prior to assembly of said valve into said fluid treatment assembly, said assembly facilitating means being substantially disengaged from said valve housing by the biasing force of said element hold down spring for preventing operation of said valve from being dependent upon said assembly facilitating means in said fluid treatment assembly.

4,028,244

APPARATUS FOR ESTABLISHING CONTACT BETWEEN A LIQUID AND A GAS

Leif Holmberg, Dragor, Denmark, assignor to European Plastic Machinery Mfg. A/S, Kopenhamn S, Denmark

Continuation of Ser. No. 495,002, Aug. 5, 1974, Pat. No. 3,956,127, which is a continuation of Ser. No. 326,725, Jan. 26, 1973, abandoned. This application Oct. 10, 1975, Ser. No. 622,278

Claims priority, application Sweden, Jan. 26, 1972, 72847

Int. Cl.² C02C *5/10*

U.S. Cl. 210—150 **9 Claims**

1. An apparatus for establishing contact between a liquid and a gas, comprising a cylindrical container having a circumferential wall and end walls, said container being packed with hollow filling bodies and mounted for rotation about a horizontal axis, at least the circumferential wall of the cylindrical container being perforated so that the liquid and the gas can flow therethrough, the hollow filling bodies being of sufficiently light weight to support the cylindrical container when said container is partially immersed in the liquid, said cylindrical container being substantially completely filled with said filling bodies.

4,028,245

ARRANGEMENT FOR CONVERSION OF FOREIGN MATTER CONTAINED IN WATER

Theo Stähler, Hadamar-Niederzeuzheim, Germany, assignor to Rheintechnik Weiland & Kaspar KG, Neunkirchen (Saar), Germany

Filed Feb. 23, 1976, Ser. No. 660,229

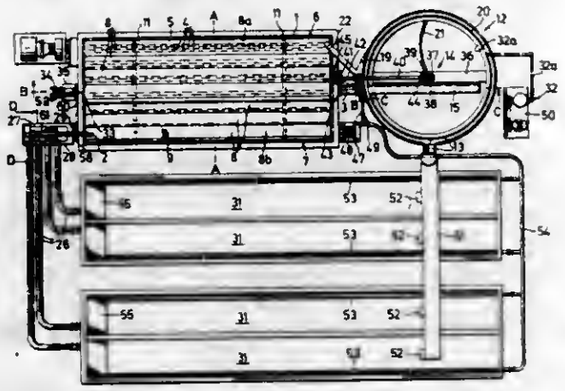
Claims priority, application Germany, Oct. 3, 1975, 2544177; Feb. 28, 1975, 2508749

Int. Cl.² C02C *5/10;* **A01K** *61/00*

U.S. Cl. 210—151 **25 Claims**

1. An arrangement for the conversion of foreign matter found in water, particularly sewage water, into harmless materials comprising, in combination, a conversion tank having an intake for water to be treated and having a drain for treated water; rotatable hollow means in said tank and having perforations in walls of said hollow means and emerging on one side completely out of water, the other side of said rotatable hollow means being immersed entirely into the water, said rotatable hollow means being filled with materials insoluble in the water and having a large surface area accessible to air and water; means for rotating said rotatable hollow means; a plurality of feeders to said intake of said conversion tank; a common collecting tank, all said feeders discharging into said collecting tank, said intake discharging from said collecting

tank; said collecting tank being substantially cylindrically-shaped; said feeders entering laterally the cylindrical wall of said collecting tank, the intake of said conversion tank discharging from a head end area of said collecting tank; an



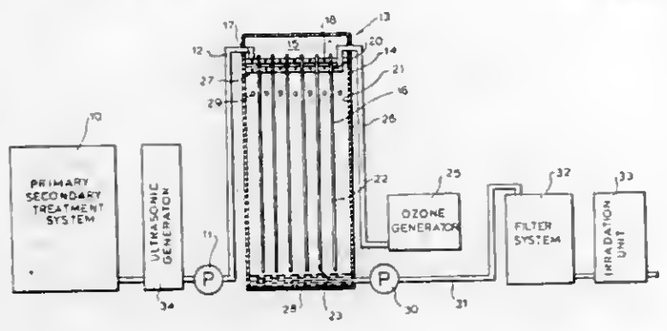
elastic lip rotatable inside said collecting tank and contacting the cylindrical wall of said collecting tank, said lip covering completely the individual feeders when traveling past said feeders.

4,028,246

LIQUID PURIFICATION SYSTEM

Norman S. Lund, 6525 New Haven; George Ralph Young, Jr., East River Drive, Melbourne, both of Fla. 32901, and Norman W. Lund, 612 W. Vine, Kissimmee, Fla. 32741

Filed Nov. 20, 1975, Ser. No. 633,669
Int. Cl.² C02B *3/08;* **C02C** *5/06*
U.S. Cl. 210—151 **8 Claims**



1. A liquid gas contactor unit for treating liquids with ozone comprising in combination:

a sealable container having a top portion and a bottom portion and at least two sidewalls having a plurality of elongated vertically extending grooves therein and supporting ledges located on said top portion thereof;

a plurality of panels each having its side edges supported in a pair of grooves and each said panel being individually supported from said sidewall ledges and being individually removable from said container;

a removal cover removably attached to said container for enclosing and sealing said container;

a plurality of fluid distribution lines located in spaced relationship to each other and to said panels and attached to said cover for removal therewith, said plurality of fluid distribution lines including a set of liquid distribution lines suspended from said removable cover and a plurality of gas distribution lines suspended from said cover;

at least one input line passing through said cover to said liquid distribution lines; and at least one input line passing through said cover to said gas distribution lines;

an ozone generator for generating ozone gas, said ozone generator being connected to said input line connected to said gas distribution line; and

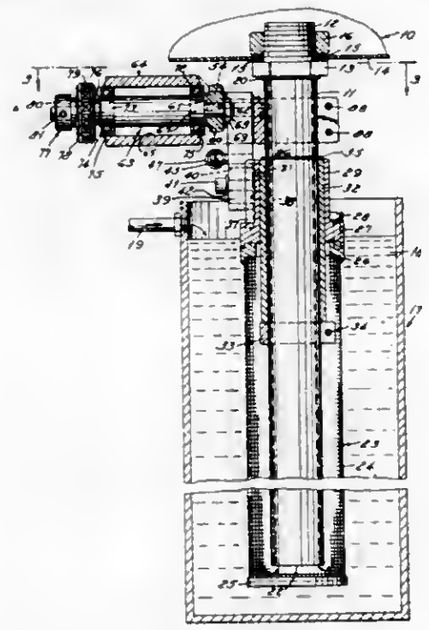
an output line operatively coupled to said container for removing liquid treated by said gas.

4,028,247

VIBRATORY COOLANT STRAINER FOR MACHINE TOOL COOLANT SYSTEMS

Harry A. Yessaian, 1035 Ridgemont Drive, Union Lake, Mich. 48085

Filed July 7, 1975, Ser. No. 593,646
Int. Cl.² B01D *33/00*
U.S. Cl. 210—153 **4 Claims**



1. In a machine tool having a cutting tool coolant system including a coolant reservoir and a fixed coolant supply pipe extended into the reservoir, the combination comprising:

a. a coolant strainer assembly operatively disposed in said reservoir;

b. means movably supporting said coolant strainer assembly on said fixed supply pipe for oscillating rotary movement thereabout, with said supply pipe extended into said strainer;

c. means for oscillating in a rotary motion said means for movably supporting the strainer assembly on said supply pipe to provide a vibrating, rotary oscillating motion to said strainer assembly to prevent a build-up of dirt and the like on the outer surface of said strainer assembly;

d. said means movably supporting said coolant strainer assembly including a mounting means attached to a strainer screen in said coolant strainer assembly; and,

e. said oscillating means includes:

1. a cam follower means attached to said mounting means; and,

2. a cam drive means engaged with said cam follower means for moving said cam follower means in one direction.

4,028,248

FLUID FILTER

Donald J. Murauskas, Painesville; Edward E. Kish, Jr., Kirtland; Frank M. Cunningham, Solon; Bernard J. Gallagher, Mayfield, and Earl D. Shufflebarger, Mentor, all of Ohio, assignors to Nupro Company, Willoughby, Ohio

Filed July 10, 1975, Ser. No. 594,613
Int. Cl.² B01D *25/02*
U.S. Cl. 210—232 **9 Claims**

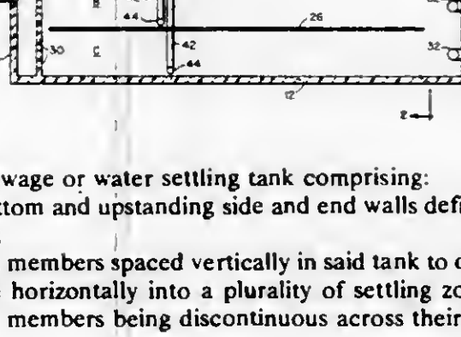
1. A fluid filter comprising:

a main body member having oppositely disposed, generally planar end faces with a cylindrical through-passage extending through said body portion between said end faces;

a pair of end fitting members positioned adjacent to said main body member at opposite ends of said through-passage, each said end fitting member having a through-opening generally aligned with said through-passage to define inlet and outlet openings;

connecting plural members extending between said end fittings for releasably clamping said end fittings and main body member together, whereby removal of only one of said connecting members ultimately permits outward pivoting of said main body member about one of said connecting members which has not been removed;

a filter cartridge positioned in said main body member through-passage, said filter cartridge comprising (1) a hollow open-ended cylindrical sleeve having inner and outer surfaces and an outer diameter dimensioned such that said sleeve is closely and slidably received in said through-passage and (2) at least one fluid filter element operably mounted within said sleeve and positioned



therein such that all fluid passing through said fluid filter from said inlet opening to said outlet opening will pass through said filter element;

means for positively retaining said filter cartridge in a desired position in said main body member through-passage when said pair of end fittings are clamped to said main body member at opposite ends of said through-passage, said retaining means permitting said filter cartridge to be axially removed from either end of said through-passage when at least the end fitting member associated with that end is removed therefrom; and,

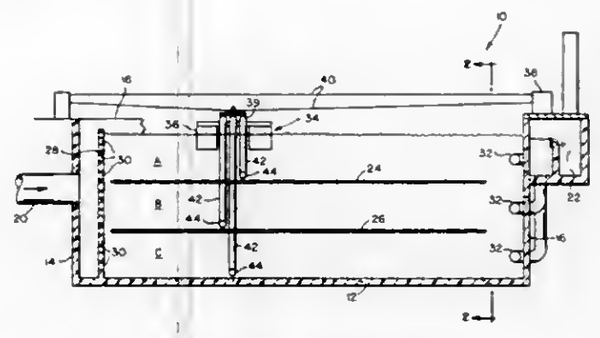
seal elements positioned circumferentially about the ends of said sleeve to provide a fluid seal between the outer surface of said sleeve and said through-passage and to provide a fluid seal between said end fittings and said main body member.

4,028,249

SEWAGE SETTLING TANK

Robert F. McGivern, Columbus, Ohio, assignor to Sybron Corporation, Rochester, N.Y.

Filed May 17, 1976, Ser. No. 686,946
Int. Cl.² B01D *21/10;* **C02B** *9/00;* **C02C** *1/26*
U.S. Cl. 210—242 R **9 Claims**



1. A sewage or water settling tank comprising:

a. a bottom and upstanding side and end walls defining said tank;

b. deck members spaced vertically in said tank to divide the same horizontally into a plurality of settling zones, said deck members being discontinuous across their width to provide an unobstructed vertical channel extending the full depth and length of said tank;

c. inlet means for liquid to be treated at one end of said tank and an outlet for treated liquid at the opposite end, each of said deck members and said tank bottom defining surfaces to receive sludge settling from the liquid in said tank during flow of the liquid from said inlet to said outlet means;

d. a carriage capable of floating on the surface of liquid in said tank;

e. a sludge removal siphon system carried by said carriage, said siphon system including a plurality of depending inlet legs each disposed in said vertical channel and each terminating in a horizontal branch extending over one of said deck members and said tank bottom for removing the sludge accumulating thereon; and

f. means for traversing said carriage from one end of said tank to the other whereby sludge is removed from substantially the full width and length of each deck member and said tank bottom.

2. A sewage or water settling tank comprising:

a. a bottom and upstanding side and end walls defining said tank;

b. a plurality of open, generally rectangular, buoyant frames dividing said tank into a plurality of horizontal settling zones, said frames each formed by joined lateral and transverse members, said lateral members extending generally the length of said tank and said transverse members extending less than one-half the width of said tank;

c. a hinge connecting each frame to a side wall of said tank;

d. a sheet material covering each of said open frames to provide settling surfaces spaced above the bottom of said tank; and

e. means for restraining said frames against the buoyancy thereof so as to maintain said frames in a horizontal orientation at predetermined vertically spaced submerged positions in said tank.

4. A sewage or water settling tank comprising:

a. a bottom and upstanding side and end walls defining said tank;

b. a plurality of vertically spaced deck members each hinged by hinge connections, along one edge to a side wall of said settling tank for dividing said tank into a plurality of horizontal settling zones;

c. float means for raising said deck members about said hinge connections; and

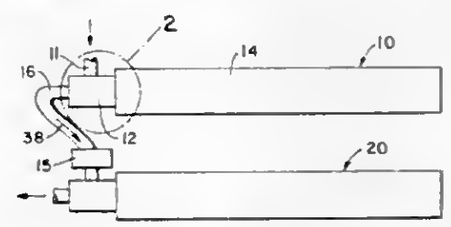
d. means for restraining said deck members against the buoyancy of said float means so as to maintain each of said deck members in a horizontal orientation at predetermined vertically spaced submerged positions in said tank.

4,028,250

FILTRATION APPARATUS

John T. Loft, Summit, N.J., assignor to Amerace Corporation, New York, N.Y.

Filed May 30, 1975, Ser. No. 582,453
Int. Cl.² B01D *31/00*
U.S. Cl. 210—259 **12 Claims**



1. Filtration apparatus comprising:

a. tubular means, having at least one longitudinally extending slot therein for receiving a filtrate; and

b. filter means, said filter means being disposed in a plurality

of separate layers relative to said tubular means, said filter means comprising at least a pair of microporous members, said members being coupled together along a plurality of peripheral edges and defining at least a pair of uncoupled edges, said at least pair of uncoupled edges being adapted to engage sealing with said slot, and wherein at least one member of said pair of microporous members includes a plurality of spaced longitudinal extending channels reposed on a surface thereof between said coupled members for directing a filtrate into said tubular means through said slot; and

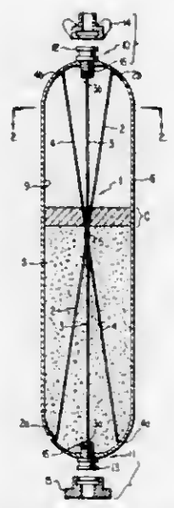
c. spacing means for separating said spearate layers of said filter means from one another; and for conveying unfiltered fluid between said layers.

4,028,251

AGITATOR FOR SOLIDS-CONTAINING VESSELS

William Deneen, 306 E. Forest St., Marengo, Ill. 60152

Filed Oct. 14, 1975, Ser. No. 621,849
Int. Cl.² B01D *27/12*
U.S. Cl. 210—280 **9 Claims**



1. An agitator for installation in a tank having opposite ends and containing loose solids comprising:

a. at least two rods,

b. means for securing said rods to each other at a crossing point intermediate their lengths to form

c. a cross member having portions extending toward the opposite ends of the tank in substantially opposite directions from the crossing point, wherein the portions of separate rods form obtuse angles with one another on opposite sides of the crossing point,

d. means of positioning said cross member in said tank, said positioning means including

e. free rod ends at each end of said cross member and spaced from each other a normal distance sufficient to abut an internal portion of the tank adjacent opposite ends of the tank.

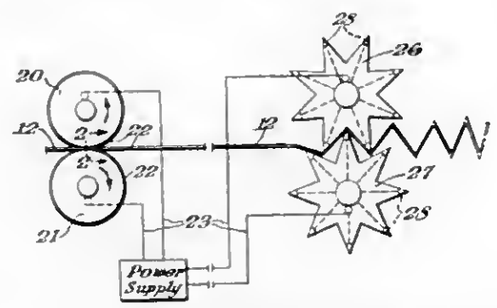
4,028,252

ACCORDION FOLD FLAT PLATE DIALYZER

Livingston B. Morris, Devon, Pa., assignor to Extracorporeal Medical Specialties Inc., King of Prussia, Pa.

Filed June 4, 1975, Ser. No. 583,648
Int. Cl.² B01D *31/00*
U.S. Cl. 210—321 B **14 Claims**

1. A flat plate dialyzer comprising a housing having separate inlets and outlets therein for blood and dialysate, a single continuous layer of flexible, nonwoven support material, said support material accordian folded along transverse score lines formed in the support material, a pattern on at least one side of said support material being oriented substantially perpendicular to the score lines whereby compaction of the support material is obtained by interdigitation of the pattern when accordian folded upon itself, a continuous layer of permeable membrane material placed within the accordian folds on one



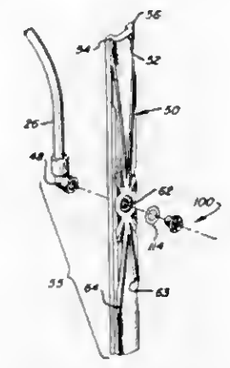
side of the support material to form a pleated stack and sealed in said housing to form separate flow paths for blood and dialysate on opposite sides of said membrane.

4,028,253

DIALYZER CONNECTOR SYSTEM

Jimmy L. Miller, Waukegan, and William J. Schnell, Arlington Heights, both of Ill., assignors to Baxter Laboratories, Inc., Deerfield, Ill.

Filed Oct. 8, 1975, Ser. No. 620,619
Int. Cl.² B01D *13/00*
U.S. Cl. 210—321 B **11 Claims**



1. A connector system for use in a dialyzer to connect an external fluid conduit and a tubularly-shaped, semipermeable membrane, having at least one connecting aperture in the wall thereof, and to protect said membrane from forces imposed on said conduit, said system including: a jack member adapted to be secured within said dialyzer and having means defining a fluid passageway therethrough, and means associated with one end of said jack member passageway for coupling said conduit and passageway in fluid communication; and a button-type connector for cooperation with the other end of said jack member passageway and membrane connecting aperture for connecting said passageway and said tubular membrane, said connector incuding a cap and a barrel and having a passageway extending through said cap and barrel.

4,028,254

FLUID FILTER

Earl D. Shufflebarger, Mentor; Edward E. Kish, Kirtland; John R. Boylan; George D. Diehl, both of Euclid; Bernard J. Gallagher, Mayfield, and William P. Tobbe, Lyndhurst, all of Ohio, assignors to Nupro Company, Willoughby, Ohio

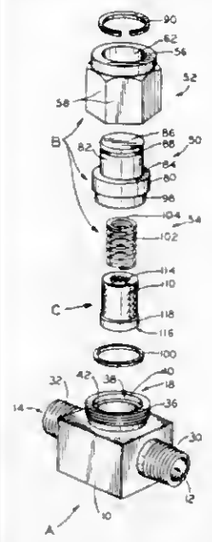
Filed Oct. 14, 1975, Ser. No. 622,032
Int. Cl.² B01D *27/08*
U.S. Cl. 210—447 **25 Claims**

1. A fluid filter comprising:

a filter body including a fluid chamber therein having an open outer end and a seat area spaced axially therealong, a fluid inlet communicating with said chamber on one side of said seat area and a fluid outlet communicating with said chamber on the other side of said seat area;

a fluid filter element disposed in said chamber with one end thereof communicating with said seat area;

a bonnet assembly adapted to close said chamber open end, said assembly being releasably retained on said filter body and comprising a bonnet and bonnet nut operably associated with each other so as to permit rotational and axial movement therebetween;



means for continuously urging said filter element into said seat area; and,

a sealing ring disposed between said bonnet and filter body for sealing the interconnection of said bonnet assembly on said filter body in a fluid tight manner.

4,028,255

PREPARATION OF POLYMER COMPOSITES

Brian Alfred Bolto, Mitcham, and Robert James Eldridge, Moorabbin, both of Australia, assignors to ICI Australia Limited and Commonwealth Scientific and Industrial Research Organization, both of, Australia

Continuation of Ser. No. 432,988, Jan. 14, 1974, abandoned. This application Oct. 6, 1975, Ser. No. 620,043
Claims priority, application Australia, Jan. 31, 1973, 2092/73
Int. Cl.² B01D *39/02;* **H01F** *1/00*
U.S. Cl. 210—500 R **1 Claim**

1. Filter aid comprising composite particles having an average size of particle in the range from 5 to 10 μm with at least 90% w/w of the particles having a size within 10 μm of the average size and from 75% to 85% w/w of each particle comprising a magnetic particulate material of size less than 5 μm embedded in a matrix of a thermoplastic linear polymeric material.

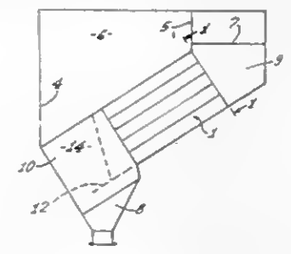
4,028,256

SEPARATION DEVICE

Jacob Pielkenrood, Krommenie, Netherlands, assignor to Pielkenrood-Vinitex N.V., Assendelft, Netherlands

Continuation of Ser. No. 427,291, Dec. 21, 1973, abandoned, which is a continuation of Ser. No. 146,201, May 24, 1971, abandoned. This application Oct. 22, 1975, Ser. No. 624,703
Claims priority, application Netherlands, May 24, 1970, 7007498
Int. Cl.² B01D *21/00*
U.S. Cl. 210—519 **22 Claims**

1. A device for separating relatively light, such as floating components, and relatively heavy, such as precipitating components, from a liquid comprising: a plurality of corrugated plates, arranged in downward sloping relation with corrugation tops and valleys of the plates extending parallel to each other and in the direction of the downward slope, the plates being arranged spaced-apart transverse to the slope, the valleys and tops respectively defining downward sloping channels separated by ridges, the valleys and the tops of the plates being vertically aligned, each plate having upper and lower ends defined by edges having the alternating corrugation tops and valleys as wave-like contours extending along a horizontal, transversely to said direction; a plurality of vertically extending baffles placed side by side and in horizontally spaced-apart relation, the baffles being arranged outside of the space be-



tween the plates and being disposed adjacent to the edges of the plates of the plurality and at least at one end of the plates and in edge face-to-edge abutment therewith; the baffle plates of the plurality as disposed at the one end being respectively situated in the edge-to-edge arrangement adjacent similar phase points of the wave-like corrugation contours; and a comb-shaped plate, the teeth of which are situated at the discharge end of a component as separated from the liquid, and symmetrically between the guide baffles, the teeth extending toward one of the plate edges with corrugated contour.

4,028,257

COMPOSITION AND METHOD FOR REDUCING THE SURFACE TENSION OF AQUEOUS FLUIDS

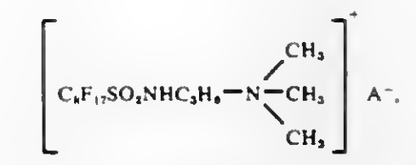
James L. Thompson, Tulsa, Okla., assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 527,577, Nov. 27, 1974, abandoned. This application Aug. 23, 1976, Ser. No. 716,508
Int. Cl.² E21B *43/27, 43/26*
U.S. Cl. 252—8.55 C **11 Claims**

1. An aqueous composition suitable for use in treating subterranean formations comprising:

A. An aqueous liquid, and

B. dispersed in said aqueous liquid a perfluorinated surfactant of the formula



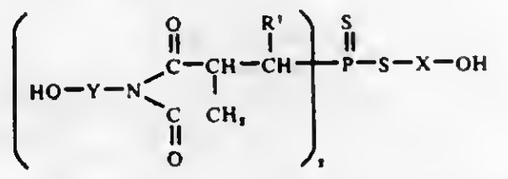
wherein A^- is Cl^-, F^-, I^-, or Br^-, and another surfactant consisting of an adduct of trimethyl-1-heptanol plus seven moles of ethylene oxide, said surfactants being present in an other surfactant:perfluorinated surfactant weigh ratio of from about 1:1 to about 40:1, and the total amount of said perfluorinated surfactant and said surfactant in said aqueous liquid ranging from about 0.005 to about 0.1 per cent by weight of said composition.

4,028,258
ALKYLENE OXIDE ADDUCTS OF PHOSPHOSULFURIZED N-(HYDROXYALKYL) ALKENYLSUCCINIMIDES

Mahmoud S. Kablaoui, Wappingers Falls, N.Y.; Robert E. Reid, Houston, and Arthur W. Godfrey, Sugarland, both of Tex., assignors to Texaco Inc., New York, N.Y.

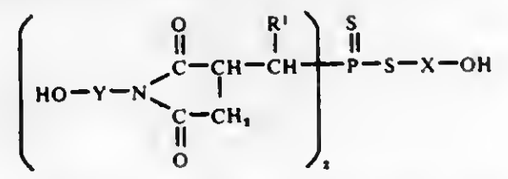
Filed Dec. 3, 1975, Ser. No. 636,906
Int. Cl.² C10M 1/48
U.S. Cl. 252—46.7 **15 Claims**

1. An alkylene oxide adduct of a phosphosulfurized N-(hydroxyalkyl) alkenyl succinimide characterized by the formula:



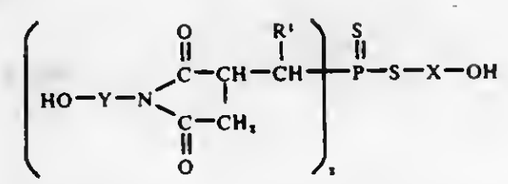
where R^1 is alkenyl of from 10 to 30 carbons and X and Y are divalent saturated hydrocarbon radicals of from 2 to 6 carbons.

6. An automatic transmission fluid composition comprising at least about 50 wt. % of a mineral lubricating oil and between about 0.01 and 50 wt. % of an alkylene oxide adduct of phosphosulfurized (N-hydroxyalkyl)-alkenylsuccinimide characterized by the formula:



where R^1 is alkenyl of from 10 to 30 carbons and X and Y are divalent saturated aliphatic hydrocarbon radicals of from 2 to 6 carbons.

11. A method for operating an automatic transmission which comprises supplying to said transmission a fully formulated lubricating oil composition comprising at least about 85 wt. % of a mineral lubricating oil and between about 0.01 and 5 wt. % of an alkylene oxide adduct of phosphosulfurized N-(hydroxyalkyl) alkenyl succinimide characterized by the formula:



where R^1 is alkenyl of from 10 to 30 carbons and X and Y are divalent saturated aliphatic hydrocarbon radicals of from 2 to 6 carbons.

4,028,259
PROCESS FOR PREPARING A METAL SALT OF AN OXIDIZED, PHOSPHOSULFURIZED HYDROCARBON AND LUBRICANT COMPOSITIONS CONTAINING SAME

Richard S. Herd, and Ferdinand P. Otto, both of Woodbury, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed May 29, 1975, Ser. No. 582,027
Int. Cl.² C10M 1/48
U.S. Cl. 252—46.7 **5 Claims**

1. A process for preparing an oil-soluble, phosphorus and sulfur containing oxidized oil reaction product which comprises the steps of (1) preparing a mixture comprising (a) a hydrocarbon having a molecular weight of from about 200 to about 1000 and (b) from about 1% to about 10% based on the weight of said hydrocarbon of a metal oxide, the metal being selected from Group 1 or Group 2 of the Periodic Table, (2) contacting said mixture with an oxidizing gas at from about 100° C to about 300° C to effect oxidation of said hydrocarbon and reaction of said metal oxide with the oxidized hydrocarbon, (3) continuing the oxidation for a time sufficient to incorporate from about 0.2% to about 1.0% by weight of metal into the oxidized hydrocarbon, (4) reacting, at from about 100° C to about 150° C, the product from step (3) with a phosphorus sulfide to form a phosphorus-, sulfur- and metal-containing product, the amount of phosphorus sulfide used being from about 6% to about 10% by weight of the oxidized hydrocarbon charge, (5) reacting the reaction product of step (4) with additional metal oxide in the presence of water, the amount of metal oxide present at this stage being from about 2% to about 8% of the original hydrocarbon charge and (6) substantially completely dehydrating the mixture formed in step (5).

4,028,260
LIQUID FOR A FEELER ELEMENT FOR THE ELECTRICAL MEASUREMENT OF INCLINATIONS

Harry Zuest, Erlenbach, Switzerland, assignor to Contraves AG, Zurich, Switzerland

Continuation-in-part of Ser. No. 534,654, Dec. 19, 1974, abandoned. This application Dec. 15, 1975, Ser. No. 640,879
Claims priority, application Switzerland, Jan. 17, 1974, 606/74
Int. Cl.² G01C 9/06
U.S. Cl. 252—62.2 **10 Claims**

1. A liquid for a level or feeler element for the electrical measurement of inclinations and for the determination of the vertical by measuring an electrical current between surface electrodes, said liquid consisting essentially of at least about 50 percent by weight of hydrazine monohydrate and an effective amount of at least one conducting salt dissolved therein for increasing the electrical conductivity of said hydrazine monohydrate, said salt being chemically inert with said hydrazine monohydrate.

4,028,261
TILE AND GROUT CLEANER AND RESTORER

Arthur W. Petersen, Chatham Township; Arthur Cimiluca, Wood-Ridge, and Leonard Hirschberger, Marlboro, all of N.J., assignors to Frederick G. Schwarzmann, Kearny, N.J.

Filed Feb. 17, 1976, Ser. No. 658,300
Int. Cl.² C11D 7/02, 3/14
U.S. Cl. 252—89 R **6 Claims**

1. A composition for cleaning tile and grout and renewing grout consisting essentially of an aqueous solution of 0.1 to 10% by weight on a dry basis of a sequestering agent, 0.1 to 10% by weight on a dry basis of a surfactant compatible with the binding agent and 10 to 60% by weight on a dry basis of a water insoluble pigment and a water-soluble or water-dispersible organic binding agent which dries to a water resistant film, the ratio of pigment to binding agent being 5:1 to 1:5.

4,028,262
CITRATE-CARBONATE BUILT DETERGENT

Bao-Ding Cheng, Highland Park, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 297,972, Oct. 16, 1972, abandoned. This application Jan. 24, 1975, Ser. No. 543,848
Int. Cl.² C11D 7/34, 3/34
U.S. Cl. 252—89 R **2 Claims**

1. A phosphate-free nonionic-based detergent composition consisting essentially of, approximately by weight, 5 to 30% of a synthetic detergent selected from the group consisting of nonionic reaction products of 6 to 30 moles of ethylene oxide with higher fatty alcohols and 1:1 by weight mixtures thereof with dodecyl benzene sulfonate, 45 to 55% of sodium carbonate, and 10 to 33% of sodium citrate. the sodium carbonate and sodium citrate being correlated so that the weight ratio of sodium carbonate to sodium citrate is less than or equal to about 2 under washing conditions of water of 150ppm hardness and 40° C.

4,028,263
BLEACHING AND BRIGHTENING DETERGENT COMPOSITION

Frederick William Gray, Summit, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Aug. 24, 1973, Ser. No. 391,058
Int. Cl.² C11D 7/56
U.S. Cl. 252—99 **12 Claims**

1. A bleaching and brightening detergent composition comprising by weight about 7 to 30 parts of water soluble synthetic organic detergent selected from the group consisting of anionic detergents, nonionic detergents and mixtures of anionic with nonionic organic detergents, about 9 to 70 parts of water soluble builder salt(s) selected from the group consisting of alkali metal silicates, pyrophosphates, tripolyphosphates, citrates, bicarbonates, and carbobates, about 2 to 80 parts of water soluble alkali metal peroxymonosulfate bleaching agent promoted by about 0.05 to 1.5 equivalent proportions of a water soluble alkali metal bromide per equivalent proportion of active oxygen in the peroxymonosulfate, and from about 0.05 to 3 parts of organic optical brightening agent(s) selected from the group consisting of

a. 4,4'-bis-(4-phenyl-2H-1,2,3-triazol-2-yl)-2,2'-stilbene disulfonic acid and salts thereof,

b. 4-(2-naptho-1,2-triazolyl)-stilbene-2-sulfonic acid and salts thereof, and

c. 2,2'(4,4'-divinylbiphenyl)-dibenzenesulfonic acid and salts thereof, and the sum of the parts is from about 21 to 100.

4,028,264
POLYBUTENE COMPOSITION CONTAINING HALO-CARBONYL ADDITIVES AND USE THEREOF

Imre Puskas, Glen Ellyn, and John A. Cengel, Wheaton, both of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Division of Ser. No. 358,958, May 10, 1973, Pat. No. 3,953,475. This application Apr. 18, 1975, Ser. No. 569,374
Int. Cl.² C07D 307/36
U.S. Cl. 252—182 **4 Claims**

1. A composition comprising 300–3000$\bar{M}_n$ polybutene and based on the weight thereof as additive from 5 to 200 ppm of an alpha-bromo dialkyl ketone having in addition to the keto-carbonyl carbon atom up to a total of twenty carbon atoms, or alpha-dibromo-substituted alkyl diketone wherein its two keto-carbonyl carbon atoms are in a chain of from 4 to 22 carbon atoms and each bromo-substituent is on a chain carbon atom adjacent to a keto-carbonyl carbon atom, or alpha-bromo aceto-phenone or naphthone, or C_1–C_{10} dialkyl acetal of alpha-bromo acetaldehyde which additive has a normal boiling point in the range of from 40° C up to 225° C.

4,028,265
PROCESS FOR CONVERTING SODIUM NITRATE-CONTAINING, CAUSTIC LIQUID RADIOACTIVE WASTES TO SOLID INSOLUBLE PRODUCTS

Gary S. Barney, and Lloyd E. Brownell, both of Richland, Wash., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Continuation-in-part of Ser. No. 457,325, April 2, 1974. This application Aug. 25, 1975, Ser. No. 607,853
Int. Cl.² G21F 9/16
U.S. Cl. 252—301.1 W **7 Claims**

1. A method for converting sodium nitrate-containing, caustic, liquid radioactive wastes to a solid relatively insoluble, thermally stable, salt-filled radioactive mineral form consisting essentially of the steps of reacting powdered aluminum silicate clays selected from the group consisting of kaolin, bentonite, dickite, halloysite and pyrophillite with aqueous solutions or slurries of said caustic, liquid, radioactive wastes which have a sodium hydroxide concentration of at least about 3 to about 7 M at a temperature of about 30° C to 100° C to thereby entrap radioactive isotopes in the crystalline aluminosilicate framework structure of cancrinite reaction product, air drying said cancrinite reaction product and firing the resultant product at a temperature of at least 600° C to form said solid, salt-filled, radioactive mineral form.

4,028,266
STABILIZED HYDROUS PENTAVALENT ANTIMONY OXIDE SOL COMPOSITION AND ITS PRODUCTION, PRODUCTION OF DRY POWDER FROM SOL COMPOSITION AND RESULTING DRY POWDER

Ronald Francis Langere, Cranbury, and Otto Ernest Loeffler, Rahway, both of N.J., assignors to NL Industries, Inc., New York, N.Y.

Filed Apr. 15, 1976, Ser. No. 677,313
Int. Cl.² B01J 13/00; B01F 3/12
U.S. Cl. 252—313 R **4 Claims**

1. A stable aqueous antimony pentoxide sol comprising from 25% to 35% antimony pentoxide, from 6.5% to 17% of an amine and the remainder water, said sol prepared by admixing antimony trioxide, an amine and water and to said mixture adding H_2O_2 slowly with refluxing for a period of 5 minutes to 1½ hours then cooling the mixture, thus forming the stable sol, the amount of ingredients added for each part of antimony trioxide being from 1.2 to 2.5 parts of water, from 0.2 to 0.6 parts of an amine and from 0.65 to 0.68 parts of hydrogen peroxide, all of the parts and percentages expressed on a weight basis, said amine being selected from the group consisting of secondary and tertiary aliphatic amines having from 1 to 5 carbon atoms and cyclicamines.

4,028,267
METHOD AND APPARATUS FOR MEASURING THE CONCENTRATION OF A COMPONENT, FOR INSTANCE IRON, IN A MATERIAL

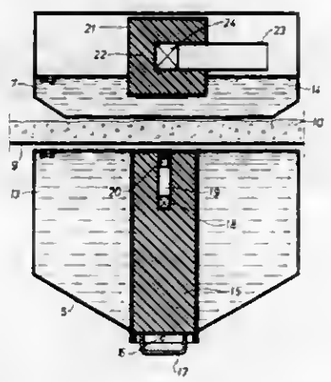
Adolf Ragnar Roland Umberto Einarsson Christell, Stockholm; Kaijo Aatto Matias Koski, Tyreso, and Knut Lennart Ljunggren, Stockholm, all of Sweden, assignors to Stiftelsen Isotoptekniska Laboratoriet, Stockholm, Sweden

Filed Mar. 27, 1975, Ser. No. 562,460
Claims priority, application Sweden, Apr. 9, 1974, 7404824
Int. Cl.² G01N 23/02
U.S. Cl. 250—359 **16 Claims**

1. In the method of measuring the concentration of a component in a material sample, which at the measuring location is at rest or moves as a stream of material, that improvement which includes

irradiating said sample with thermally-moderated neutrons and detecting resultant gamma ray emission from said sample to provide a base line measurement;

irradiating said sample with unmoderated neutrons to provide a gamma ray emission from said sample and measuring same; and



determining said concentration by comparison of known gamma ray emissions relative to concentration

whereby the concentration of said component in said material sample may be determined.

4,028,268

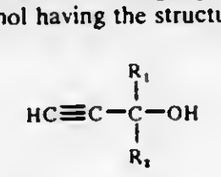
HIGH TEMPERATURE CORROSION INHIBITOR

Daniel S. Sullivan, 3rd, Houston, Tex.; Charles E. Strubelt, Tamare, Venezuela, and Kenneth W. Becker, Houston, Tex., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Dec. 3, 1975, Ser. No. 637,168
Int. Cl.² C23F *11/04*
U.S. Cl. 252—392 **22 Claims**

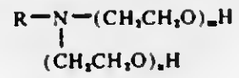
1. A corrosion inhibitor composition comprising:

1. from about 25 to about 60 weight percent of a quaternary compound of (i) a heterocyclic nitrogen base selected from the group consisting of quinoline, acridine and phenanthridine and (ii) a halomethylated polycyclic aromatic compound selected from the group consisting of halomethylated indane, indene, naphthalene, anthracene, phenanthrene, acenaphthene, fluorene, xanthene, chrysene and pyrene, halomethylated petroleum fractions containing C_9 to C_{12} aromatic hydrocarbons, and halomethylated polystyrenes having molecular weights ranging from about 100 to about 5,000;
2. from about 5 to about 30 weight percent of an aliphatic acetylenic alcohol having the structural formula of



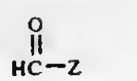
wherein R_1 is selected from the group consisting of hydrogen and a methyl group and R_2 is selected from the group consisting of hydrogen and alkyl groups containing from 1 to about 7 carbon atoms;

3. from about 0.01 to about 15 weight percent of a water-soluble surfce active agent selected from the group consisting of polyethoxylated octyl phenol and polyethoxylated amines having the structural formula of



wherein R is a C_8 to C_{30} alkyl group, and m and n are numbers ranging from 1 to about 20; and

4. from about 30 to about 75 weight percent of a formic acid derivative having the formula of



wherein Z is selected from the group consisting of an alkoxy group containing from 1 to about 4 carbon atoms, an amino radical, and an alkyl-substituted amino group containing from 1 to about 4 carbon atoms.

4,028,269

PROCESS FOR THE PREPARATION OF A SOLID BED CATALYST SYSTEM

David H. J. Carlson, Park Ridge; Thomas A. Verachtert, Wheeling, and Jay E. Sobel, Highland Park, all of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed Aug. 21, 1975, Ser. No. 606,635
Int. Cl.² B01J *31/12, 31/02*
U.S. Cl. 252—428 **11 Claims**

1. A process for the preparation of a solid bed catalyst system which comprises:

a. treating a charcoal-containing solid support with an atmosphere comprising steam and a substantially inert gas at a temperature of from about 800° F. to about 950° F. for a period of time comprising from about 2 hours to about 6 hours;
b. drying the treated charcoal-containing solid support in an atmosphere comprising a substantially inert gas at drying conditions;
c. impregnating the dried charcoal-containing solid support at impregnation conditions with from about 0.001 wt. % to about 10.000 wt. % of a metal phthalocyanine compound; and
d. recovering the resultant metal phthalocyanine impregnated charcoal-containing solid support.

4,028,270

VINYL POLYMERIZATION INITIATOR AND REDUCING AGENT

Oh-Kil Kim, Burke, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 15, 1976, Ser. No. 696,238
Int. Cl.² C08F *4/08*
U.S. Cl. 252—428 **3 Claims**

1. An olefinic polymerization initiator comprising a micellar complex of a micell-forming cationic detergent selected from the class consisting of C_{10} to C_{18} aliphatic-trimethylammonium bromide, C_{10} to C_{18} aliphatic-trimethylammonium chloride, hexadecyl pyridinium bromide, and hexadecylpyridinium chloride and a sodium or potassium bisulfite in a detergent-to-bisulfite mole ratio from 1:2 to 50:1.

4,028,271

BINDING RESIN FOR FOUNDRY SAND AND CATALYST THEREFOR

William J. Schaidle, Urbana, and Patrick H. Stewart, Danville, both of Ill., assignors to Core-Lube, Inc., Danville, Ill.

Filed Apr. 3, 1975, Ser. No. 564,854
Int. Cl.² B01J *27/02, 27/12*
U.S. Cl. 252—429 R **5 Claims**

1. An acid catalyst for curing of resin-sand mixtures in the foundry industry comprising as the active ingredients thereof a mixture of an organic acid in a major amount said amount being effective for curing a resole phenolformaldehyde resin and selected from the group consisting of benzene sulfonic acid and toluene sulfonic acid and mixtures thereof; a solvent therefore, and from 0.1 to 5.0% by weight of an acid fluoride selected from the group consisting of hydrofluoric acid and fluorosiliicic acid.

4,028,272

PROCESS OF POLYMERIZATION OF CONJUGATED DIOLEFINS USING IRON CATALYSTS AND SULFUR LIGANDS

Morford C. Throckmorton, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 526,356, Nov. 22, 1974, Pat. No. 3,936,432. This application July 31, 1975, Ser. No. 600,684
Int. Cl.² C08F *4/70*
U.S. Cl. 252—429 B **2 Claims**

1. A catalyst composition consisting essentially of (1) an iron compound selected from the group consisting of ferric oxalate, ferric hexanoate, ferric octanoate, ferric decanoate, ferric stearate, ferric naphthenate, ferrous acetylacetonate, ferric acetylacetonate, ferric-1-ethoxy-1,3-butanedionate, ferrous dimethyl glyoxime, ferric chloride, ferrous chloride, ferric bromide, ferric phosphate, iron tetracarbonyl, iron pentacarbonyl and iron nonacarbonyl, (2) an organometallic compound selected from the group consisting of trialkylaluminums, dialkylaluminum halides, dialkylaluminum hydrides and dialkylaluminum alkoxides, and (3) a sulfur containing ligand selected from the group consisting of N,N'-dimethyldithiooxamide, dithiooxamide, N,N'-dicyclohexyldithiooxamide, N,N'-didodecyldithiooxamide, 2-mercaptobenzimidazole, 5-methyl-2-mercaptobenzimidazole, 5-chloro-2-mercaptobenzimidazole, thiourea and N,N'-diphenylthiourea, in which the molar ratio of the sulfur ligand to the iron compounds (S/Fe) ranges from about 0.1/1 to about 100/1 and when the organometallic compound is an aluminum trialkyl, the molar ratio of the aluminum trialkyl to the iron compound (Al/Fe) ranges from about 1/1 to about 400/1 and when the organometallic compound is a dialkylaluminum halide or a dialkylaluminum hydride, or a dialkylaluminum alkoxide, then the organometallic component to the iron component (AlX/Fe) can be varied from about 6/1 to about 25/1.

4,028,273

METHOD OF CATALYST MANUFACTURE

Mark J. O'Hara, Mount Prospect, Ill., and William K. T. Gleim, Seattle, Wash., assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 450,630, March 13, 1974, abandoned. This application Oct. 15, 1975, Ser. No. 622,580
Int. Cl.² B01J *21/02*
U.S. Cl. 252—432 **10 Claims**

1. In a method of manufacturing a catalytic composite consisting essentially of a Group VIII metal and a Group VIB metal composited with a refractory inorganic oxide-boron phosphate carrier material, the steps of:

a. precipitating in inorganic oxide hydrogel from a hydrosol of at least one inorganic oxide selected from the group consisting of alumina, silica, zirconia, thoria, and boria;
b. admixing the inorganic oxide hydrogel with a dried, finely divided form thereof in an amount to provide from about 5 to about 50 wt. % of said catalytic composite;
c. impregnating the resulting mixture with an aqueous solution containing sufficient boric and phosphoric acids to provide a catalytic composite comprising from about 13 to about 35 wt. % boron phosphate;
d. drying the resulting mixture and further impregnating the same with a decomposable Group VIII metal compound and a decomposable Group VIB metal compound in amounts sufficient to incorporate from about 0.1 to about 10 wt. % Group VIII metal and from about 5 to about 20 wt. % Group VIB metal into said catalytic composite; and
e. drying and calcining the resultant mixture in an oxidizing atmosphere.

4,028,274

SUPPORT MATERIAL FOR A NOBLE METAL CATALYST AND METHOD FOR MAKING THE SAME

Harold Russell Kunz, Vernon, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed June 1, 1976, Ser. No. 691,921
Int. Cl.² B01J *21/18, 23/42*
U.S. Cl. 252—447 **22 Claims**

20. A supported platinum catalyst made according to the following process:

heat treating a carbon powder at temperatures above about 1250° C to at least partially graphitize the carbon;
depositing a metal oxidizing catalyst on the surfaces of the heat treated carbon particles;
oxidizing the surfaces of the heat treated carbon particles in the presence of the metal oxidizing catalyst at a temperature sufficiently high to cause oxidation of the surfaces at the sites of the metal oxidizing catalyst, but not high enough to oxidize the heat treated carbon surfaces where no metal oxidizing catalyst is present;
removing the metal oxidizing catalyst; and
depositing platinum on the oxidized particles.

4,028,275

PROCESS FOR PREPARING CATALYTIC MATERIALS FOR PURIFYING EXHAUST GAS AND CATALYTIC MATERIALS PREPARED THEREBY

Toshiyuki Sakai, Funabashi; Koichi Matsuo, Tachikawa, and Yukihiro Tochio, Tokyo, all of Japan, assignors to Mitsui Mining & Smelting Co., Ltd., Japan

Continuation-in-part of Ser. No. 432,909, Jan. 14, 1974, abandoned. This application Sept. 29, 1975, Ser. No. 617,396
Claims priority, application Japan, Jan. 24, 1973, 48-9553
Int. Cl.² B01J *23/40, 23/42, 23/44*
U.S. Cl. 252—466 PT **13 Claims**

1. A process for preparing a catalyst for purifying exhaust gas comprising the steps of:

impregnating a heat-resistant ceramic material as the carrier for the catalyst with an impregnating liquid consisting essentially of an aqueous solution containing (A) 0.1–60 g/l calculated as the metal ion of at least one Platinum Group metal compound selected from the group consisting of platinous chloride, platinic chloride, chloroplatinous acid, chloroplatinic acid, platinous potassium chloride, platinic potassium chloride, palladium chloride, palladium nitrate, palladium acetate and palladium sulfate and (B) at least one organic compound selected from the group consisting of (1) organic nitrogen compounds which are azodicarbonamide, cyanuric acid, azobisisobutyronitrile, guanidine and melamine and (2) organic phosphorus compounds which are trimethyl phosphite, triethyl phosphite and diethyl phosphite, said at least one organic compound (B) being in an amount of 0.5–6 mols per mol of the Platinum Group metal,
drying the thus-impregnated carrier,
keeping the thus-dried impregnated carrier in a reducing gas stream at an elevated temperature to reduce the Platinum Group metal compound (A) impregnated in the carrier, and
calcining the thus-reduced impregnated carrier at a temperature not lower than the temperature at which said at least one organic compound (B) is thermally decomposed, for a time enough to burn off the organic compound (B) impregnated in the carrier thereby obtaining the desired catalyst.

4,028,276
PRESSURE-SENSITIVE ELASTIC RESISTOR COMPOSITIONS

John Charles Harden, Wilmington, and Sebastian V. R. Mastrangelo, Hockessin, both of Del., assignors to E. I. Du Pont de Nemours & Company, Wilmington, Del.

Continuation-in-part of Ser. No. 411,425, Oct. 31, 1973, abandoned. This application Mar. 27, 1975, Ser. No. 562,937

Int. Cl.² H01B 1/04

U.S. Cl. 252—513 **22 Claims**

I. A pressure-sensitive composition adaptable for use as an elastic resistor which comprises

i. metallic-conductive particles having Knoop microhardness at 100 grams applied load (K_{100}) of at least 500 Kg/mm², and electrical resistivity of less than 1000 microohm-cm, and being from 0.01 to 50 microns in their largest dimension, said particles being selected from at least one member of the group consisting of (a) the electrically conductive borides, carbides, nitrides, silicides and germanides of a transition metal selected from Periodic Groups III through VIII, and (b) the alloy of metal A, metal B, silicon and, optionally, chromium, metal A being cobalt, nickel or iron present at 50 to 78 atomic percent, metal B being molybdenum or tungsten present at 18 to 34 atomic percent, Si being present at 4 to 22 atomic percent, and chromium being present at 0 to 28 atomic percent, and

ii. elastomer having an interaction parameter, Z, with said particles of from 1.5 to 1.75, said particles being distributed in the elastomer to form a volume fraction, ϕ_f, of the composition that provides a first relatively high resistance in the uncompressed state and a second relatively low resistance in the compressed state; the value for Z being determined by the equation

$$Z = \frac{E_c'/E_e'-1}{E_c'/E_e'+1.5}/\phi_f$$

wherein E_c' is the elastic modulus of the particle-filled elastomer composition and E_e' is the elastic modulus of the unfilled elastomer.

4,028,277
VOLTAGE-DEPENDENT RESISTOR

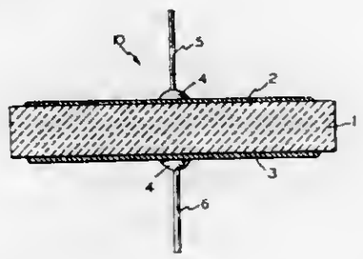
Mikio Matsuura; Nobuji Nishi, both of Hirakata; Michio Matsuoka, Ibaragi, and Takeshi Masuyama, Takatsuki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Jan. 6, 1975, Ser. No. 538,778

Claims priority, application Japan, Feb. 20, 1974, 49-20819; Feb. 20, 1974, 49-20820; Feb. 20, 1974, 49-20822; Apr. 17, 1974, 49-44311

Int. Cl.² H01B 1/08

U.S. Cl. 252—519 **2 Claims**



I. A voltage-dependent resistor of bulk-type comprising a sintered body consisting essentially of, as a main constituent, zinc oxide (ZnO) and, as additives, 0.1 to 5.0 mole percent of bismuth oxide (Bi_2O_3), 0.1 to 3.0 mole percent of titanium oxide (TiO_2) and 0.01 to 5.0 mole percent of strontium oxide (SrO), and electrodes applied to opposite surfaces of said sintered body.

4,028,278
CYCLOALIPHATIC UNSATURATED KETONES AS FRAGRANCE MODIFYING AGENTS

George H. Buchi, and Hans Wuest, both of Cambridge, Mass., assignors to Firmenich S.A., Geneva, Switzerland

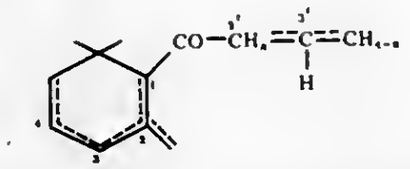
Continuation of Ser. No. 532,649, Dec. 13, 1974, abandoned, which is a division of Ser. No. 281,220, Aug. 16, 1972, Pat. No. 3,890,370. This application May 6, 1976, Ser. No. 683,939

Claims priority, application Switzerland, Aug. 17, 1971, 12119/71

Int. Cl.² C11B 9/00; C07C 49/48

U.S. Cl. 252—522 **7 Claims**

I. A perfume composition which comprises as one of its active ingredients, for enhancing, improving or modifiying its floral or fruity character, a small but effective amout of a compound having the formula



VIII

containing a double bond in the 2'- or 3'-position of the side chain and either two conjugated double bonds in the (endocyclic) 2- and (endocyclic) 4-, or (exocyclic) 2- and 3- positions of the ring, or two non-conjugated double bonds in the 1- and 4-positions of the ring, the double bonds being represented by the dotted lines, and whereas n stands for the integers 1 or 2.

4,028,279
NOVEL FRAGRANCE COMPOSITIONS CONTAINING 2,6,6 TRIMETHYL-1-CYCLOHEXEN-1-YL ACETALDEHYDE AND PHENYL C_6 KETONE

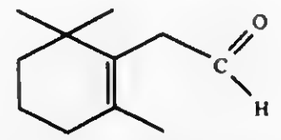
Anton Van Ouwerkerk, Livingston, N.J.; Bernard J. Chant, North Rye, and Arthur L. Liberman, Beechhurst, both of N.Y., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed Aug. 4, 1975, Ser. No. 601,727

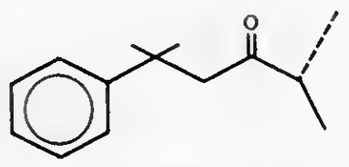
Int. Cl.² C11B 9/00

U.S. Cl. 252—522 **4 Claims**

1. A mixture consisting essentially of (i) 2,6,6-trimethyl-1-cyclohexen-1-ylacetaldehyde having the structure:



and (ii) a phenyl C_6 ketone having the structure:



wherein the dashed line represents a carbon-carbon single bond or a carbon-carbon double bond; the weight ratio of said 2,6,6-trimethyl-1-cyclohexen-1-ylacetaldehyde:phenyl C_6 ketone being in the range of from about 1:1 up to about 1:5.

4,028,280
NON-PHOSPHATE OR REDUCED PHOSPHATE DETERGENT COMPOSITIONS CONTAINING MIXTURES OF ALKYL ETHER SULFATES

Moriyasu Murata, Chiba; Fumio Sai, Funabashi, and Takashi Fujino, Yokohama, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Aug. 18, 1976, Ser. No. 715,379

Claims priority, application Japan, Sept. 4, 1975, 50-107367

Int. Cl.² C11D 3/065, 3/08, 1/14

U.S. Cl. 252—526 **7 Claims**

1. A detergent composition consisting essentially of from 0.5 to 60 percent by weight of ether sulfate surfactant consisting of

A. a mixture of

up to 70 percent by weight of unbranched-alkyl ether sulfate having the formula

$$R_1—O—(CH_2CH_2O)_nSO_3M \quad (I)$$

and

the balance is branched-alkyl ether sulfate having the formula

$$R_2—CH(R_3)—CH_2—O—(CH_2CH_2O)_nSO_3M \quad (II)$$

wherein R_1 is unbranched alkyl having a carbon atom number range of from 6 to 15 and wherein the average number of carbon atoms in R_1 of (I) is within the range of from 8 to 13, R_2 is unbranched alkyl having a carbon atom number range of from one to 12, R_3 is unbranched alkyl having a carbon atom number range of from one to 4, with the proviso that

$$R_1—CH(R_3)—CH_2—$$

has an average number of carbon atoms in the range of from 8 to 13, n is a number from 0.5 to 1.5 as an average for each of (I) and (II), and M is a water-solubilizing cation selected from the group consisting of alkali metals, alkaline earth metals, ammonium and alkanol amines;

and

B. an unbranched alkyl ether sulfate, or mixtures thereof, having the formula (III):

$$R_4—O—(CH_2CH_2O)_mSO_3M \quad (III)$$

wherein R_4 is unbranched alkyl having from 14 to 20 carbon atoms and R_4 has 18 carbon atoms for at least 80 percent by weight of the entirety of component (B), m is 1 to 50 on the average and M is as defined above for formulae (I) and (II),

the ratio of (A) to (B) being in the range between 95:5 and 5:95 and the balance is water-soluble, anionic surfactant with the proviso that said anionic surfactant is not an ether sulfate, or water-soluble, synthetic, nonionic surfactant, or water-soluble, synthetic, amphoteric surfactant, or water-soluble alkaline or neutral inorganic builder salt, or water-soluble heavy metal-sequestering agents, or solubilizing agents, or water, or mixtures thereof.

4,028,281
METAL PLATE TREATING SOLUTION

Ben Millard, South Windham, and Susan P. Roble, Gorham, both of Maine, assignors to Scott Paper Company, Philadelphia, Pa.

Filed Dec. 8, 1975, Ser. No. 638,926

Int. Cl.² B41N 3/06; C11D 3/08, 3/33; C23G 5/02

U.S. Cl. 252—527 **5 Claims**

1. An aqueous solution capable of cleaning and imparting a hydrophilic silicate coating onto a metal surface, said solution comprising:

from 0.5 parts by weight to 10.0 parts by weight of an alkali metal silicate;

from 0.05 parts to 5.0 parts by weight of a water active surfactant;

from 1.0 parts to 5.0 parts of a ferric chelate of elthylene diamine tetra acetic acid;

and water.

4,028,282
METHOD OF MANUFACTURING GRANULAR DETERGENTS

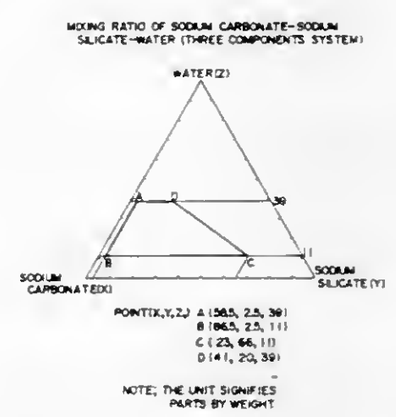
Osamu Okumura, Funabashi; Takenobu Sakatani, Chiba; Izumi Yamane, Yokohama, and Toshinobu Kashiwada, Chiba, all of Japan, assignors to Lion Fat & Oil Co., Ltd., Tokyo, Japan

Filed May 5, 1976, Ser. No. 683,387

Claims priority, application Japan, May 14, 1975, 50-57094

Int. Cl.² C11D 1/14, 3/10

U.S. Cl. 252—537 **3 Claims**


MIXING RATIO OF SODIUM CARBONATE-SODIUM SILICATE-WATER (THREE COMPONENTS SYSTEM)
WATER(Z)
SODIUM CARBONATE(X)
SODIUM SILICATE(Y)
POINTS(X,Y,Z) A (56.5, 2.5, 39)
B (56.5, 2.5, 11)
C (23, 66, 11)
D (41, 20, 39)
NOTE; THE UNIT SIGNIFIES PARTS BY WEIGHT

1. A method of manufacturing a granular detergent which comprises the steps of:

heating to a temperature of from 70° to 180° C a detergent slurry consisting essentially of

a. from 10 to 30 weight percent of olefin sulfonate having from 10 to 22 carbon atoms

b. from 60 to 90 weight percent of a mixture of sodium carbonate, sodium silicate and water, wherein the proportions of the ingredients of said mixture are on or within the closed polygon defined by points A, B, C and D in FIG. 1 of the attached drawings and wherein the molar ratio of SiO_2 to Na_2O in said sodium silicate is in the range of from 2/1 to 3/1, and

c. from zero to 30 weight percent of other detergent additives,

and then atomizing said slurry and cooling it in an atmosphere having a temperature of room temperature or lower to transform same to granules.

4,028,283
GRANULAR OR POWDERY DETERGENT COMPOSITION

Moriyasu Murata, Chiba; Fumio Sai, Funabashi, and Takashi Fujino, Yokohama, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Sept. 21, 1976, Ser. No. 725,184

Claims priority, application Japan, Sept. 30, 1975, 50-117816

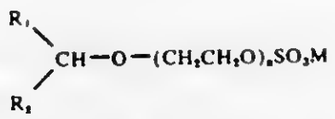
Int. Cl.² C11D 1/06, 1/37

U.S. Cl. 252—551 **5 Claims**

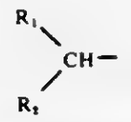
1. A granular or powdery detergent composition consisting essentially of

1. from 2 to 40 percent by weight of a first surfactant having a tendency to cake selected from the group consisting of

a. alkylethoxy sulfates having the formula

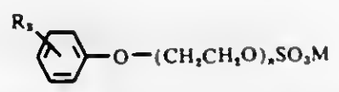


wherein R_1 and R_2, which can be the same or different, are hydrogens, alkyls having one to 17 carbon atoms, or alkenyls having two to 17 carbon atoms, provided that the average carbon atom number of

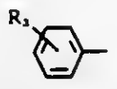


is from 10 to 18 carbon atoms, n is a number of from 0.5 to 5, and M is an alkali metal or an alkaline earth metal,

b. alkylphenylethoxy sulfates having the formula

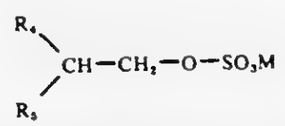


wherein R_3 is alkyl having 4 to 16 carbon atoms or alkenyl having 4 to 16 carbon atoms, provided that the average carbon atom number of

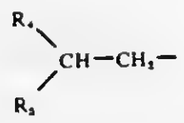


is from 10 to 18, and n and M are the same as defined above,

c. branched alkyl sulfates having the formula

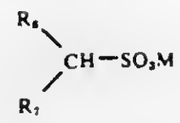


wherein R_4 and R_5, which can be the same or different, are alkyls having one to 15 carbon atoms or alkenyls having two to 15 carbon atoms, provided that

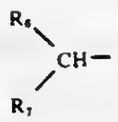


contains from 10 to 18 carbon atoms, and M is the same as defined above,

d. alkane sulfonates having the formula



wherein R_6 and R_7, which can be the same or different, are hydrogens or alkyls having one to 17 carbon atoms, provided that

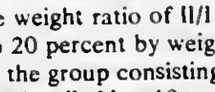


contains from 10 to 18 carbon atoms, and M is the same as defined above,

e. sulfonate salts of vinylidene olefins having the formula

wherein R_8 and R_9, which can be the same or different, are alkyls having one to 15 carbon atoms, provided that the number of carbon atoms in the olefin molecule is from 10 to 18, and the salt-forming cation is an alkali metal or alkaline earth metal,

f. sulfonate salts of internal olefins having the formula

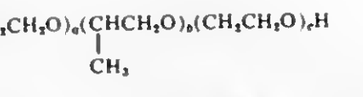


wherein R_{10} and R_{11}, which can be the same or different, are hydrogens or alkyls having one to 17 carbon atoms, provided that the number of carbon atoms in the olefin molecule is from 10 to 20 and further provided that in up to 80 wt.% of the olefin molecules, one of R_{10} and R_{11} can be hydrogen, and in the balance of the olefin molecules, neither of R_{10} and R_{11} is hydrogen, and the salt-forming cation is an alkali metal or alkaline earth metal,

g. ethylene oxide nonionic surface active agents having an HLB value of from 8 to 18 and selected from the group consisting of polyoxyethylene (6 to 12) alkyl (C_{12} to C_{18}) or alkenyl (C_{12} to C_{18}) ethers, polyoxyethylene (6 to 12) alkyl (C_6 to C_{10}) phenyl ethers, polyoxyethylene (8 to 20) saturated or unsaturated fatty acid (C_{12} to C_{18}) esters and polyoxyethylene (4 to 20) sorbitan saturated or unsaturated fatty acid (C_{12} to C_{18}) esters, and mixtures thereof,

II. from 0.2 to 20 weight percent of an anti-caking agent, being a carboxylic acid or an alkali metal salt thereof, obtained by reacting at 50 to 100° C without any catalyst

A. a polyalkylene glycol selected from the group consisting of (i) polyethylene glycol having an average molecular weight of from 2000 to 10000 and (ii) a nonionic surfactant having the formula



wherein $140 \leqq a+c \leqq 200$ and $30 \leqq b \leqq 40$, with

B. an acid anhydride selected from the group consisting of maleic anhydride, phthalic anhydride and succinic anhydride, at a molar ratio of A/B of from 1/2 to 1/1, wherein the weight ratio of II/I is from 1/10 to 3/2,

III. from zero to 20 percent by weight of second surfactant selected from the group consisting of alkylbenzene sulfonates in which the alkyl has 10 to 16 carbon atoms, linear alkyl sulfates having an average of 11 to 18 carbon atoms, α-olefin sulfonates having 10 to 20 carbon atoms and mixtures thereof, and

IV. from 10 to 40 weight percent water-soluble inorganic alkaline detergent builders, or water-soluble inorganic neutral detergent builders, or water-soluble organic detergent builders, or mixtures thereof.

4,028,284
PHENOLIC CHELATE RESIN

Masahide Hirai, Uji; Mikio Fujimura, Kamo; Masahiro Kazigase, and Minoru Saito, both of Uji, all of Japan, assignors to Unitika Ltd., Amagasaki, Japan

Continuation-in-part of Ser. No. 435,126, Jan. 21, 1974, Pat. No. 3,936,399. This application Sept. 11, 1975, Ser. No. 612,523

Claims priority, application Japan, Jan. 23, 1973, 48-9793

The portion of the term of this patent subsequent to Feb. 3, 1993, has been disclaimed.

Int. Cl.² C08G *14/06;* **C08J** *5/20*

U.S. Cl. 260—2.2 C **7 Claims**

1. A high adsorption capacity phenolic chelate resin consisting of a heavy metal-adsorbing phenolic chelate resin having an adsorbability to a heavy metal in the proportion of at least 1.2 milliequivalents per g. of dried terminal Na type resin, said phenolic chelate resin being prepared from at least one phenol, at least one aldehyde and iminodiacetic acid, said iminodiacetic acid being used in the ratio of more than 0.2 based on the total phenol.

4,028,285
STYRENE POLYMER FOAMS HAVING REDUCED FLAMMABILITY CONTAINING ALLYL ETHER SYNERGISTS

Walter Oscar Pillar, Monroeville, Pa., assignor to ARCO Polymers, Inc., Philadelphia, Pa.

Filed Nov. 24, 1976, Ser. No. 744,578

Int. Cl.² C08K *5/02, 5/06*

U.S. Cl. 260—2.5 FP **4 Claims**

1. A foamed styrene polymer composition consisting essentially of a styrene polymer foam, 0.2 to 3.0 percent by weight of polymer of a flame retardant selected from the group consisting of halogenated aliphatic compounds, halogenated cycloaliphatic compounds, and halogenated araliphatic compounds, said flame retardants being halogenated only in the aliphatic portion of the molecules, and 0.25 to 0.75 percent by weight of an allyl ether selected from the group consisting of allyl phenyl ether and tetraallyloxy propane.

4,028,286
INK TRANSFER MEMBER

Joseph Dominic Neri, Colorado Springs, Colo., and John Lewis Williams, Rochester, N.Y., assignors to Burroughs Corporation, Detroit, Mich.

Filed June 30, 1975, Ser. No. 591,856

Int. Cl.² C08J *9/00*

U.S. Cl. 260—2.5 P **11 Claims**

1. In an ink releasing member of the plastisol matrix type in which a liquid ink is suspended within the pores of the matrix the improvement wherein a liquid polyglycol of low vapor pressure at the fusion temperature of the plastisol, low viscosity at ambient temperature, substantial insolubility in water, substantially non-hygroscopic and effective as a dispersant for colorant materials is used as the vehicle for the liquid ink, said polyglycol having a molecular weight substantially in the range of 1000 to 5000 and being selected from a group consisting of polypropylene glycol and triols of ethylene and propylene.

4,028,287
PROCESS FOR CONTINUOUS PREPARATION OF A FOAM POLYAMIDE

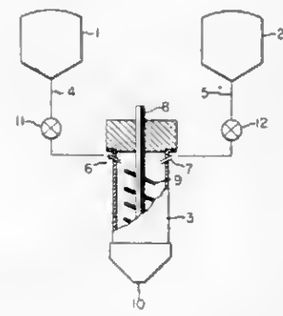
Shigetake Sato, Kamakura; Suminobu Kurahashi, Yokohama; Toru Okuyama, Yokohama, and Noboru Hamada, Yokohama, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Continuation-in-part of Ser. No. 352,638, April 19, 1973, abandoned. This application June 4, 1975, Ser. No. 583,635

Claims priority, application Japan, Apr. 27, 1972, 47-42463; Apr. 27, 1972, 47-42466

Int. Cl.² C08J *9/02*

U.S. Cl. 260—2.5 N **17 Claims**



1. A process for the preparation of a polyamide foam by ring-opening polymerization of a polymerizable lactam in the presence of a basic catalyst, a promoter and a foaming agent which comprises the steps of:

A. preparing a first composition containing the lactam and the catalyst at a temperature above the melting point of the lactam;

B. preparing a second liquid composition containing the promoter and the foaming agent at room temperature without heating and maintaining it at room temperature;

C. mixing said compositions at their preparation temperatures in a mixing vessel with violent agitation to initiate polymerization;

D. discharging the reacting mixture into a container before polymerization of the lactam is more than 10% complete, and allowing the polymerization to run to completion.

4,028,288
MOLDABLE END PRODUCTS FROM PRIMARILY RECLAIMABLE WASTE MATERIALS

James E. Turner, Southlake, Tex., assignor to Tire Recyclers International, Inc., Southlake, Tex.

Filed Feb. 3, 1976, Ser. No. 654,959

Int. Cl.² B29H *19/00;* **B32B** *5/00*

U.S. Cl. 260—2.3 **7 Claims**

1. A heat and pressure molded end product comprising a mixture of particalized rubber tires including the fibrous cord content thereof and a lesser amount of synthetic resin thermoplastic material bits, said end product comprising a substantially homogeneously incomplete reset mixture, including portions of a reset mixture of melted synthetic thermoplastic resin and rubber tire particles, and portions of said rubber tire particles, per se, in a bonded relationship, the porosity of said end product being substantially proportional to the ratio of said rubber tire particles to said synthetic thermoplastic resin material bits in said mixture.

5. The product of claim 4, with said particalized rubber tire material comprising, by weight, not less than 50 percent and not more than 80 percent of said mixture.

4,028,289

FOAMED POLYESTER RESIN

William F. Brown, Bonduel, Wis., assignor to Vast Products Inc., Bonduel, Wis.

Filed Oct. 5, 1976, Ser. No. 729,876
Int. Cl.² C08V 9/08
U.S. Cl. 260—2.5 N 8 Claims

1. The method of preparing objects of a foamed-filled polyester resin material which comprises (a) preparing a liquid resin blend comprised of a liquid polyester resin, an inorganic filler, bicarbonate of soda, and an effective amount of a cell stabilizing mixture containing sodium acetate, aluminum ammonium sulfate, ferrous ammonium sulfate and tannic acid; (b) preparing a catalyst blend comprised of an effective amount of an organic peroxide catalyst for the polyester resin, an acidic substance effective to release carbon dioxide from the bicarbonate of soda, and water; (c) combining the resin blend and the catalyst blend to form a uniform liquid mixture; and (d) applying that mixture to a mold or surface and allowing the mixture to foam.

4,028,290

HIGHLY ABSORBENT MODIFIED POLYSACCHARIDES

Albert R. Reid, Hockessin, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed Oct. 23, 1975, Ser. No. 625,332
Int. Cl.² C08L 1/02
U.S. Cl. 260—17.4 GC 8 Claims

1. A method of preparing a modified polysaccharide which exhibits high absorbency for water and salt solutions, which method comprises reacting a water-insoluble, water-swellable polysaccharide simultaneously with acrylamide, at least one other water-soluble monoolefinic vinyl monomer which, in the absence of the polysaccharide, is copolymerizable with acrylamide to form a water-soluble copolymer, and a water-soluble copolymer, and a water-soluble free radical polymerizable divinyl monomer, in the presence of a free radical catalyst system, said reaction being carried out in a reaction medium comprising a substantially water-immiscible inert aromatic hydrocarbon having dispersed therein water equal to about 1.5 to 2.5 times the weight of the aforesaid reactants and a low boiling, water-miscible, organic liquid selected from the class consisting of acetone and isopropyl alcohol, in an amount equal to about 25 to 65% of the volume of the aromatic hydrocarbon.

4,028,291

PROCESS FOR THE PRODUCTION OF RESINS FOR PRINTING INK

Shozo Tsuchiya, Kawasaki; Hisatake Sato, Yokohama; Akio Oshima, Yokohama, and Hideo Hayashi, Yokohama, all of Japan, assignors to Nippon Oil Company Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 434,140, Jan. 17, 1974, abandoned. This application Sept. 29, 1975, Ser. No. 617,486
Claims priority, application Japan, Jan. 23, 1973, 48-9137
Int. Cl.² C08L 9/100
U.S. Cl. 260—23.7 C 7 Claims

1. A process for the production of resins for offset printing ink comprising reacting an intermediary resin obtained by heat polymerizing, in the absence of a catalyst, at least one of cyclopentadiene, dicyclopentadiene and C_1 to C_3 alkyl substituted derivatives thereof and an unsaturated alcohol or unsaturated alcohol ester of organic acid wherein said unsaturated alcohol is a monoethylenically unsaturated monohydric alcohol of 3 to 22 carbon atoms and said unsaturated alcohol ester of organic acid is an ester of monoethylenically unsaturated monohydric alcohol of 2 to 22 carbon atoms with aliphatic or aromatic organic acid of 2 to 22 carbon atoms, at a temperature of 150° to 350° C. in the presence or in the absence of an inert hydrocarbon solvent, wherein the hydroxyl value of said intermediary resin is 30–300, with a higher monohydric saturated fatty acid or higher monohydric unsaturated fatty acid or their mixtures at a temperature ranging from 180°–280° C. to form the corresponding ester by esterification or ester-exchange to produce a resin having a softening point of 100° C or more wherein the amount of said higher monohydric saturated fatty acid or higher monohydric unsaturated fatty acid or their mixtures used is 0.2–1.1 moles for every mole of the hydroxyl amount determined from the hydroxyl value of said intermediary resin.

4,028,292

HOT MELT ADHESIVE

Ralf Korpman, Somerville, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.

Filed May 23, 1974, Ser. No. 472,791
Int. Cl.² C08L 91/00
U.S. Cl. 260—27 R 5 Claims

1. A thermoplastic hot melt pressure-sensitive adhesive composition which comprises an elastomeric component comprising a major amount by weight of said component of a linear or radial elastomeric and thermoplastic A-B-A block copolymer wherein B is an elastomeric polymer block derived from a conjugated diene and A is a thermoplastic polymer block derived from styrene or a styrene homologue and said A blocks constitute about 10–50 percent by weight of the block copolymer; about 125–300 parts by weight of the elastomeric component of a tackifying component consisting essentially of a blend of normally solid and liquid tackifier resins, the proportion of solid resin to liquid resin in the blend being between about 4 to 1 and 1 to 3, said solid resins being normally friable at about 25° C. and said liquid resins being in a liquid state at about 25° C.; and an essentially non-catalyzed heat stabilizing component comprising about 1-5 percent by weight of the adhesive composition of an oil-soluble heat-reactive phenol formaldehyde resin and at least about 0.5 percent by weight of the composition of an antioxidant therefor.

4,028,293

METHOD FOR PREPARING MATERIALS CONTAINING MINERALS AND SYNTHETIC SUBSTANCES, MATERIALS MANUFACTURED ACCORDING TO SAID METHOD AND OBJECTS CONSISTING OF SAID MATERIALS

Antoon J. van den Berg, Epe, Netherlands, assignor to Hollandsche Wegenbouw Zanen B.V. and Oister Asphalt Fabriek B.V., both of, Netherlands

Filed Sept. 29, 1975, Ser. No. 617,625
Claims priority, application Netherlands, Apr. 19, 1973, 7305619
Int. Cl.² C08L 23/06, 95/00
U.S. Cl. 260—28.5 AS 5 Claims

1. A method of preparing a material consisting essentially of a mineral component, a polymeric component, and bitumen, said method comprising sequentially

1. heating a mineral component to a temperature of at least 180° C;
2. mixing with the heated mineral component of (1) a thermoplastic polymeric component, said polymeric component being in diminutive form and in an amount of 2 to 30% by weight, calculated on the amount by weight of the mineral component;
3. mixing with said mixture of (2) the bitumen which has been previously heated, said heated bitumen being used in an amount of 40% to 60% by weight, calculated on the amount by weight of said polymeric component; and
4. allowing the material product of (3) to cool.

4,028,294

EPOXY MODIFIED ACRYLIC LATICES AND METHOD OF PRODUCING SAME

George L. Brown, Scotch Plains, and Michael A. Tobias, Somerville, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Nov. 10, 1975, Ser. No. 630,610
Int. Cl.² C08L 33/02
U.S. Cl. 260—29.6 NR 7 Claims

1. A method of producing a thermosetting aqueous latex comprising dissolving a polyepoxide which is a diglycidyl ether of a bisphenol having a molecular weight in the range of 350–4000 into at least one of the monoethylenically unsaturated monomers to be polymerized, said monomers including from 2 to 30% of monoethylenic carboxylic acid, and the balance of said monomers consisting essentially of nonreactive monoethylenic monomers, emulsifying said monomers and polyepoxide in water with the aid of from 0.25–3 parts of surfactant per 100 parts of said monomers, polymerizing said monomers in said aqueous emulsion with the aid of a free radical polymerization catalyst and at a temperature below which said carboxylic acid will react with the epoxy groups of said polyepoxide, the relative proportion of said polyepoxide and said carboxylic acid monomer varying from about a stoichiometrically equivalent amount up to a 50% equivalent excess of said carboxylic acid monomer, and adding ammonia to said latex to provide a pH of 7.0–9.0 to stabilize the latex and catalyze the cure thereof.

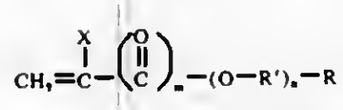
4,028,295

HYDROPHILIC POLYMER AND CONTACT LENS

Samuel Loshaek, Chicago, Ill., assignor to Wesley-Jessen Inc., Chicago, Ill.

Filed Jan. 8, 1976, Ser. No. 647,634
Int. Cl.² C08F 220/20; C08L 31/02; G02B 3/00
U.S. Cl. 260—29.6 H 8 Claims

1. A contact lens consisting essentially of hydrated polymer consisting essentially of, for each 100% by weight, about 70 to 90% by weight of a hydroxy C_2–C_4 alkyl monoester of acrylic or methacrylic acid containing less than 0.1% by weight of a diester and 10 to 30% by weight of a comonomer having the general formula:



wherein R is a C_1 to C_4 straight or branched chain alkoxy group, R′ is a C_2 to C_3 straight or branched chain alkylene group, X is hydrogen or a methyl group, m is 0, and n is 1 or 2, said polymer having a water content of about 25 to 40% by weight, a linear swelling index of about 10 to 18%, and a Shore A hardness of about 20 to 65.

4,028,296

SOLID, RAPID-SETTING, RIGID POLYURETHANES

Franciszek Olstowski, Freeport, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 573,704, May 1, 1975, Pat. No. 3,983,065, which is a division of Ser. No. 405,244, Oct. 10, 1973, Pat. No. 4,001,166, which is a continuation-in-part of Ser. No. 327,630, Jan. 29, 1973, abandoned, which is a continuation-in-part of Ser. No. 221,784, Jan. 28, 1972, abandoned. This application May 27, 1976, Ser. No. 690,461
The portion of the term of this patent subsequent to Sept. 28, 1993, has been disclaimed.
Int. Cl.² C08K 5/15
U.S. Cl. 260—30.4 N 14 Claims

1. A rigid, non-cellular, solid composition having a density of at least 1 g/cc, a percent elongation of less than 100 and which is demoldable within about 5 minutes, without the application of an external source of heat, after admixture of the components of a rapid-setting polyurethane-forming composition, free of catalytic quantities of a catalyst for urethane formation, and comprising

A. an amine initiated polyol having an OH equivalent weight of from about 50 to less than about 250;
B. an organic aromatic polyisocyanate;
C. a liquid modifier compound having a boiling point above about 150° C selected from the group consisting of cyclic ethers and mixtures thereof; and

wherein components (A) and (B) are present in quantities such that the NCO:OH ratio is from about 0.8:1 to about 1.5:1 and component (C) is employed in quantities of from about 5% to about 60% by weight of the combined weight of components (A), (B) and (C).

4,028,297

NOVEL FLAME RETARDANT POLYCARBONATE COMPOSITIONS

Jimmy L. Webb, Ballston Lake, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed July 18, 1975, Ser. No. 597,006
Int. Cl.² C08K 3/30
U.S. Cl. 260—37 PC 10 Claims

1. A polycarbonate composition comprising a non-halogenated aromatic polycarbonate and a flame retardant additive selected from an alkali or alkaline earth metal salt of an inorganic sulfite, thiosulfate, dithionite, or pyrosulfite and mixtures thereof.

4,028,298

ORGANOSILICON COMPOSITIONS PARTICULARLY SUITABLE FOR THE NON-STICK, RUB-RESISTANT TREATMENT OF CELLULOSIC AND SYNTHETIC MATERIALS

Jean Dumoulin, Ste Croix-en-Jarex, and Parasko Nicou, Francheville-le-Haut, both of France, assignors to Rhone-Poulenc Industries, Paris, France

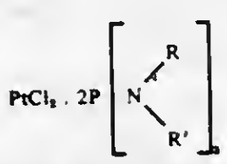
Filed Aug. 29, 1975, Ser. No. 608,977
Claims priority, application France, July 17, 1975, 75.22336
Int. Cl.² C08L 43/04
U.S. Cl. 260—29.1 SB 8 Claims

1. An organosilicon composition which contains the following:

A. 100 parts by weight of a polymer mixture which is selected from:
i. a mixture containing about 60 to 100% by weight of a diorganopolysiloxane polymer with terminal hydroxyl groups (a), having a viscosity at least about 10 cPo at 25° C, and about 40 to 0% by weight of a diorganopolysiloxane oil (b) blocked at one chain end of their chain by a triorganosiloxyl unit and at the other end by a triorganosiloxyl unit or a hydroxyl group, having a viscosity from about 5 cPo to about 500 cPo at 25° C, and
(ii) a mixture containing about 30 to 90% by weight of a diorganopolysiloxane polymer (a) as defined above and about 70 to 10% by weight of a diorganopolysiloxane rubber (c) blocked at each chain end by a triorganosiloxyl unit, having a viscosity of at least about 1 million cPo at 25° C, the organic radicals linked to the silicon atoms of the said diorganopolysiloxanes described under (i) and (ii) being selected from methyl, vinyl, ethyl and n-propyl radicals such that at least about 80% of them are methyl radicals and at most about 3% of them are vinyl radicals and such that there is only a single vinyl radical linked to a silicon atom;
B. about 1 to 15 parts by weight of an organohydrogenopolysiloxane polymer (d) corresponding to the general formula:

in which the symbol G represents a methyl, ethyl or n-propyl radical such that at least about 80% of the G radicals are methyl radicals, the symbol x represents a number from 1 to 1.99 and the symbol y represents a number from 0.1 to 1, the sum $x+y$ being from 1.7 to 2.6, and the viscosity being from about 2 cPo to about 4,000 cPo at 25° C;

C. about 0.001 to 0.1 part by weight of platinum in the form of a platinous chloride phosphorus derivative complex of the general formula:



in which the symbols R and R′, which may be identical or different, each represents a monovalent hydrocarbon radical having from 1 to 8 carbon atoms, or two of these radicals, together with the nitrogen atom to which they are attached, form a monovalent heterocyclic radical.

4,028,299

SOLID, RAPID-SETTING, RIGID POLYURETHANES

Franciszek Olstowski, Freeport, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 574,158, May 2, 1975, Pat. No. 3,983,066, which is a division of Ser. No. 405,244, Oct. 10, 1973, Pat. No. 4,001,166, which is a continuation-in-part of Ser. No. 327,630, Jan. 29, 1973, abandoned, which is a continuation-in-part of Ser. No. 221,784, Jan. 28, 1972, abandoned. This application May 27, 1976, Ser. No. 690,761 The portion of the term of this patent subsequent to Sept. 28, 1993, has been disclaimed.

Int. Cl.² C08K *5/15*

U.S. Cl. 260—30.4 N **14 Claims**

1. A rigid, non-cellular, solid composition having a density of at least 1 g/cc, a percent elongation of less than 100 and which is demoldable within about 5 minutes, without the application of an external source of heat, after admixture of the components of a rapid-setting polyurethane-forming composition free of catalytic quantities of a catalyst for urethane formation and comprising

A. an amine initiated polyol having an OH equivalent weight of from about 50 to less than about 250;

B. an organic aromatic polyisocyanate;

C. a liquid modifier compound having a boiling point above about 150° C selected from the group consisting of organic carbonates and mixtures thereof; and

wherein components (A) and (B) are present in quantities such that the NCO:OH ratio is from about 0.8:1 to about 1.5:1 and component (C) is employed in quantities of from about 5% to about 60% by weight of the combined weight of components (A), (B) and (C).

4,028,300

COATING COMPOSITION

Shigeo Wake, and Mikio Futagami, both of Nihama, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Sept. 12, 1975, Ser. No. 613,035

Claims priority, application Japan, Sept. 13, 1974, 49-106532

Int. Cl.² C08K *5/01, 5/06, 5/07, 5/09*

U.S. Cl. 260—31.2 R **6 Claims**

1. A coating composition comprises

A. silicon compounds partial hydrolyzates comprising at least one partial hydrolyzate of a tetraalkoxysilane and at least one partial hydrolyzate of an organic silicon compound of the formula: $R_nSi(OR')_{4-n}$ wherein R is a hydrocarbon group having 1 to 6 carbon atoms, R′ is an alkyl group having 1 to 4 carbon atoms and n is 1 or 2, wherein said partial hydrolyzate of the organic silicon compound of the formula: $R_nSi(OR')_{4-n}$ is contained in an amount of 10 to 100 parts by weight (calculated as $R_nSiO_{4-n/2}$) to 100 parts by weight (calculated as SiO_2) of said partial hydrolyzate of the tetraalkoxysilane,

B. an acrylic copolymer which is a copolymer of an alkyl acrylate and/or an alkyl methacrylate and a hydroxyalkyl acrylate and/or a hydroxyalkyl methacrylate, wherein the ratio of alkyl (metha)acrylate and the hydroxyalkyl (metha)-acrylate is in the range of 1/10 to 10/1 by weight and said acrylic copolymer is contained in an amount of 5 to 200 parts by weight to 100 parts by weight (calculated as SiO_2) of said partial hydrolyzate of the tetraalkoxysilicon, and

C. an etherated methylolmelamine, which is contained in an amount of 0 to 150 parts by weight to 100 parts by weight (calculated as SiO_2) of said partial hydrolyzate of the tetraalkoxysilicon, which are dissolved in a solvent selected from the group consisting of an alcohol, a ketone, an ester, an ether, a cellosolve, a halide compound, a carboxylic acid, an aromatic compound and a mixture thereof.

4,028,301

SOLID, RAPID-SETTING, RIGID POLYURETHANES

Franciszek Olstowski, Freeport, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 573,718, May 1, 1975, Pat. No. 3,966,664, which is a division of Ser. No. 405,244, Oct. 10, 1973, Pat. No. 4,001,166, and a continuation-in-part of Ser. No. 327,630, Jan. 29, 1973, abandoned, which is a continuation-in-part of Ser. No. 221,784, Jan. 28, 1972, abandoned. This application May 17, 1976, Ser. No. 687,427 The portion of the term of this patent subsequent to June 29, 1993, has been disclaimed.

Int. Cl.² C08K *5/10*

U.S. Cl. 260—31.4 R **12 Claims**

1. A rigid, non-cellular, solid composition having a density of at least 1 g/cc, a percent elongation of less than 100 and which is demoldable within about 5 minutes, without the application of an external source of heat, after admixture in the absence of a catalytic quantity of a catalyst for urethane formation and also in the absence of a chemically hindered aromatic diamine of the components of a rapid-setting polyurethane-forming composition comprising

A. an amine initiated polyol having an OH equivalent weight of from about 50 to less than about 250 and from about 3 to about 8 hydroxyl groups;

B. an organic aromatic polyisocyanate;

C. a liquid modifier compound having a boiling point above about 150° C selected from the group consisting of ester-modified polyoxyalkylene compounds having an average hydroxyl equivalent weight above about 700 when such compounds contain 2 hydroxyl groups, an average hydroxyl equivalent weight above about 500 when such compounds contain 3 or more hydroxyl groups and an average molecular weight above about 700 when such compounds contain zero or 1 hydroxyl group and mixtures thereof; and wherein components (A) and (B) are present in quantities such that the NCO:OH ratio is from about 0.8:1 about 1.5:1 and component (C) is employed in quantities of from about 5% to about 60% by weight of the combined weight of components (A), (B) and (C).

4,028,302

PROCESS FOR PREPARING CONCENTRATED ACRYLONITRILE POLYMER SOLUTIONS

Daniel Gregory Tynan, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 7, 1975, Ser. No. 620,422

Int. Cl.² C08K *5/07, 5/36*

U.S. Cl. 260—32.6 N **4 Claims**

1. In the preparation of acrylonitrile polymer solutions from polymer powder and an organic solvent selected from the

group consisting of dimethylformamide, dimethylacetamide, dimethylsulfoxide and tetramethylenesulfone in a twin-screw machine having temperature-control jackets for providing a cool zone followed by a heated zone; the process for preparing concentrated, clear, bubble-free, acrylonitrile polymer solutions of satisfactory color which comprises continuously feeding the powdered polymer into the cool zone of the twin-screw machine, injecting the organic solvent in a subsequent part of the cool zone at a rate of one to two parts solvent per one part of polymer, mixing the polymer and solvent to form a slurry at a temperature below 40°C., continuously advancing the slurry to the heated zone of the machine, advancing the slurry through a zone of reduced pressure and removing gas released from the slurry, heating the slurry at 110° to 150°C. while intermittently squeezing the slurry in directions transverse to the axes of the screws to provide sharply accelerated flow in directions of the axes, continuing the heating and intermittent squeezing to form a solution at 110° to 150°C., and finally discharging the solution from the machine.

4,028,303

SOLID, RAPID-SETTING, RIGID POLYURETHANES

Franciszek Olstowski, Freeport, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 574,156, May 2, 1975, Pat. No. 3,983,068, which is a division of Ser. No. 405,244, Oct. 10, 1973, Pat. No. 4,001,166, which is a continuation-in-part of Ser. No. 327,630, Jan. 29, 1973, abandoned, which is a continuation-in-part of Ser. No. 221,789, Jan. 28, 1972, abandoned. This application May 28, 1976, Ser. No. 691,253

Int. Cl.² C08K *5/06*

U.S. Cl. 260—33.2 R **13 Claims**

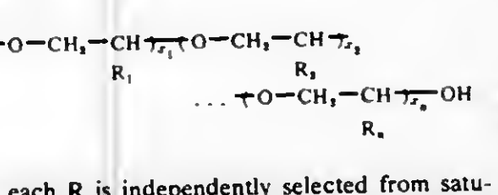
1. A rigid, non-cellular, solid composition having a density of at least 1 g/cc, a percent elongation of less than 100 and which is demoldable within about 5 minutes, without the application of an external source of heat, after admixture of the components of a rapid-setting polyurethane-forming composition free of catalytic quantities of a catalyst for urethane formation and comprising

A. an amine initiated polyol having an OH equivalent weight of from about 50 to less than about 250;

B. an organic aromatic polyisocyanate;

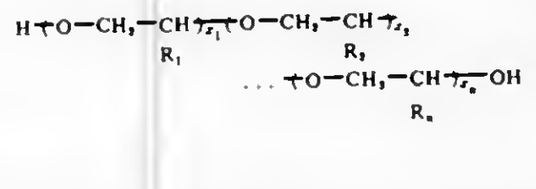
C. a liquid modifier compound having a boiling point above about 150° C selected from the group consisting of

1. a liquid partially capped, block or randomly formed polyoxyalkylene compound represented by the general formula



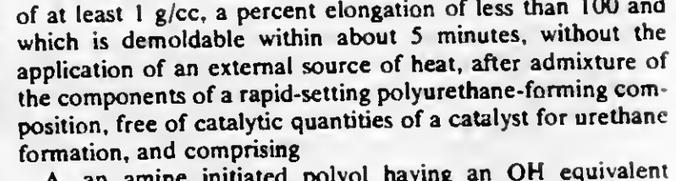
wherein each R is independently selected from saturated and unsaturated hydrocarbon groups having from about 1 to about 6 carbon atoms; R_1, R_2, . . . and R_n are independently hydrogen, an aryl group, an alkyl group or haloalkyl group, said alkyl or haloalkyl group having from about 1 to about 2 carbon atoms with the proviso that when R_1, R_2, . . . R_n is a haloalkyl group, it is present in a ratio of from about 0 to about 10 percent of the total R_1, R_2, . . . R_n groups, and x_1, X_2, . . . x_n are integers, the sum of which provides the partially capped polyoxyalkylene compound with a molecular weight of at least about 700;

2. a liquid, block or randomly formed polyoxyalkylene glycol represented by the general formula



wherein R_1, R_2, . . . R_n are as defined in formula 1 above and x_1, x_2, . . . x_n are integers, the sum of which provides the polyoxyalkylene glycol with an equivalent weight of at least about 700;

3. a liquid, random or block polyoxyalkylene polyol having a hydroxyl functionality of from 3 to about 8 represented by the general formula



wherein R_1, R_2, . . . R_n are as defined in formula 1 above, Z is the residue of an initiator compound having from 3 to about 8 hydroxyl groups, x_1, x_2, . . . x_n are integers, the sum of which provides the polyoxyalkylene polyol with a hydroxyl equivalent weight of at least about 500 and q is an integer having a value of from 3 to about 8; and

4. mixtures thereof; and

wherein components (A) and (B) are present in quantities such that the NCO:OH ratio is from about 0.8:1 to about 1.5:1 and component (C) is employed in quantities of from about 5% to about 60% by weight of the combined weight of components (A), (B) and (C).

4,028,304

SOLID, RAPID-SETTING, RIGID POLYURETHANES

Franciszek Olstowski, Freeport, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 573,679, May 1, 1975, Pat. No. 3,983,069, which is a division of Ser. No. 405,244, Oct. 10, 1973, Pat. No. 4,001,166, which is a continuation-in-part of Ser. No. 327,630, Jan. 29, 1973, abandoned, which is a continuation-in-part of Ser. No. 221,784, Jan. 28, 1972, abandoned. This application May 27, 1976, Ser. No. 690,459 The portion of the term of this patent subsequent to Sept. 28, 1993, has been disclaimed.

Int. Cl.² C08K *5/02*

U.S. Cl. 260—33.8 UB **13 Claims**

1. A rigid, non-cellular, solid composition having a density of at least 1 g/cc, a percent elongation of less than 100 and which is demoldable within about 5 minutes, without the application of an external source of heat, after admixture of the components of a rapid-setting polyurethane-forming composition, free of catalytic quantities of a catalyst for urethane formation, and comprising

A. an amine initiated polyol having an OH equivalent weight of from about 50 to less than about 250;

B. an organic aromatic polyisocyanate;

C. a liquid modifier compound having a boiling point above about 150° C selected from the group consisting of chlorinated aliphatic compounds and mixtures thereof; and

wherein components (A) and (B) are present in quantities such that the NCO:OH ratio is from about 0.8:1 to about 1.5:1 and component (C) is employed in quantities of from about 5% to about 60% by weight of the combined weight of components (A), (B) and (C).

4,028,305
VULCANIZABLE ELASTOMERS DERIVED FROM THIODIETHANOL

Tai Tieh Li, Milltown, and Robert Saxon, Princeton, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 534,545, Dec. 19, 1974, abandoned. This application Oct. 31, 1975, Ser. No. 627,648

Int. Cl.² C08G *63/54, 63/68*

U.S. Cl. 260—75 S **4 Claims**

1. A vulcanizable elastomeric composition comprising the polymeric condensation reaction product of 80 to 90 mole percent of a mixture of thiodiethanol and one or more aliphatic or cycloaliphatic diols and, correspondingly, from 20 to 10 mole percent of an aromatic or cycloaliphatic dicarboxylic acid wherein at least 50 mole percent of the diol content is thiodiethanol and from about 1 to 10 mole percent of the diol content is a diol which provides an allylic double bond in a group pendant from the polymeric chain, said reaction product having a Mooney value of about 20 to 60.

4,028,306
UREA OR CARBONAMIDE CONTAINING DIISOCYANATE POLYADDITION PRODUCTS WITH PHOSPHORIC ESTER SUBSTITUENTS

Kuno Wagner, Leverkusen-Steinbuechel, and Manfred Hajek, Cologne, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

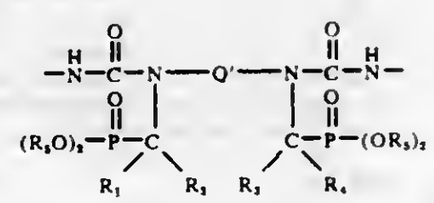
Filed June 2, 1975, Ser. No. 583,133

Claims priority, application Germany, June 5, 1974, 2427090

Int. Cl.² C08G *18/73*

U.S. Cl. 260—75 NT **23 Claims**

1. Linear, film-forming diisocyanate polyaddition products soluble in lacquer solvents, wherein they contain from 10 to 69% by weight of structural units corresponding to the formula



wherein

Q' represents a divalent C_3–C_{10} alkyl radical, C_4–C_{13} cycloalkyl radical, C_7–C_{11} aralkyl radical or C_6–C_{14} aryl radical optionally interrupted by oxygen, sulphur or nitrogen and optionally substituted by a C_1–C_8 alkyl radical, $-N(R_6)_2$, [R_6 = C_1–C_2 alkyl radical, C_6–C_{10} cycloalkyl radical, C_7–C_{11} aralkyl radical], NO_2- and/or halogen atoms,

R_1 and R_2 are the same or different and represent hydrogen, a C_1–C_{10} alkyl radical, C_4–C_{10} cycloalkyl radical or a C_6–C_{10} aryl radical,

R_3 and R_4 are the same or different and represent hydrogen, a C_1–C_{10} alkyl radical, C_4–C_{10} cycloalkyl radical, C_6–C_{10} aryl radical, in addition to which

R_1 and R_2 or R_3 and R_4 together with the carbon atom between nitrogen and phosphorus may form a 5- to 7-membered isocyclic ring, and

R_5 represents a C_1–C_4 alkyl, cyclohexyl or phenyl radical.

4,028,307
PREPARATION OF POLYESTERS USING SALTS OF SUBSTITUTED QUATERNARY AMMONIUM BASES

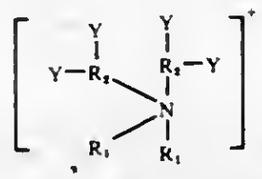
George R. Ure, Charlotte, N.C., assignor to Fiber Industries, Inc., Charlotte, N.C.

Continuation of Ser. No. 474,644, May 30, 1975, abandoned. This application Oct. 16, 1975, Ser. No. 623,174

Int. Cl.² C08G *63/14, 63/18, 63/38*

U.S. Cl. 260—75 R **3 Claims**

1. In a continuous process for the production of polyethylene terephthalate by direct esterification of ethylene glycol and terephthalic acid, the improvement comprising the continuous addition to an esterification reactor, maintained at a temperature of from 200°0 C. to 300° C., of a carboxylic acid salt of a quaternary ammonium base, wherein the cation may be represented by the general formula:



wherein R_1 is a monovalent group or radical independently selected from the group consisting of alkyl, cycloalkyl, aralkyl, alkaryl and aryl, R_2 is a trivalent group or radical independently selected from the group consisting of alkyl, cycloalkyl, aralkyl, alkaryl and aryl, and Y is a member selected from the group consisting of hydrogen and hydroxyl, at least one Y being hydroxyl.

4,028,308
POLY(CYCLOHEXANEDIMETHYLENE DIBROMOTEREPHTHALATE)

James P. Nelson, Woodridge, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Division of Ser. No. 455,588, March 28, 1974, abandoned, which is a continuation-in-part of Ser. No. 263,196, June 15, 1972, abandoned. This application Aug. 21, 1975, Ser. No. 606,503

Int. Cl.² C08G *63/18, 63/68*

U.S. Cl. 260—75 H **3 Claims**

1. A fire-retardant polyester consisting essentially of a dicarboxylic acid component and 1,4-cyclohexanedimethanol component wherein the dicarboxylic acid component comprises from 15 to 100 mole percent 2,5-dibromoterephthalic acid moieties and correspondingly 85 to 0 mole percent terephthalic acid moieties.

4,028,309
COATING COMPOSITIONS CONTAINING ESTERS OF DIBASIC ACIDS, GLYCOLS AND GLYCIDYL ESTERS, AND POLYISOCYANATES

James C. Fang, Media, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

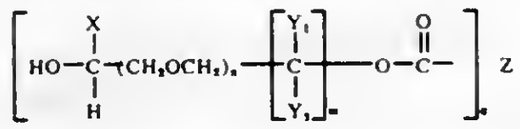
Continuation-in-part of Ser. No. 557,579, March 12, 1975, abandoned, which is a continuation of Ser. No. 369,175, June 12, 1973, abandoned. This application July 31, 1975, Ser. No. 600,848

Int. Cl.² C08G *18/42, 18/62, 18/80*

U.S. Cl. 260—77.5 AN **17 Claims**

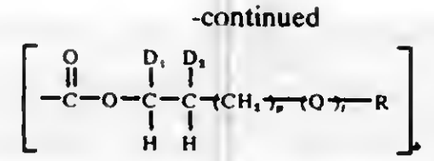
1. A composition comprising the reaction product of

A. a compound selected from the group consisting of:

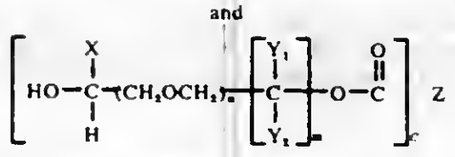


(1)

-continued



and



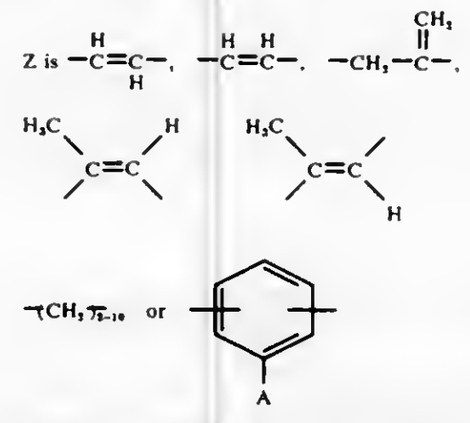
(2)

where,

in either structure,

X is hydrogen, an alkyl radical of 1–4 carbon atoms or phenyl;

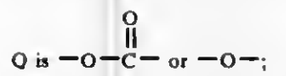
Y_1 and Y_2 can be the same or different and are hydrogen, $-CH_2OH$ or an alkyl radical of 1–4 carbon atoms;



where A is hydrogen or —COOH for the diester and a valence bond for the triester;

D_1 is hydrogen or $-CH_2OH$;

D_2 is hydrogen or —OH provided that one and only one of D_1 or D_2 must be —OH or $-CH_2OH$;



R is an alkyl radical of 4–18 carbon atoms, or a singly, doubly or triply unsaturated hydrocarbon radical of 17 carbon atoms;

a and *b* and 1 or 2, provided that *a* + *b* is 2 or 3;

c is 2 or 3;

n is 0 or 1;

m is 1–5;

p is 0 or 1; and

t is 0 or 1;

and

B. a polyfunctional isocyanate.

4,028,310
PROCESS FOR THE PRODUCTION OF POLYUREAS

Walter Schäfer; Kuno Wagner, both of Leverkusen, and Hans-Jürgen Müller, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed July 18, 1975, Ser. No. 597,043

Claims priority, application Germany, July 30, 1974, 2436740

Int. Cl.² C08G *18/06*

U.S. Cl. 260—77.5 CH **23 Claims**

1. A process for the production of polyureas by reacting organic polyisocyanates with diamines, optionally in the presence of other compounds with more than one isocyanate-reactive hydrogen atom per molecule wherein the NCO/NH molar ratio is between about 0.4:1 and 1.1:1 and the polyisocyanates used are polyisocyanates which have an NCO content of about 0.5 to 25% by weight, an acylated urea group (-CO-N-CO-NH-) content of about 0.5 to 50% by weight and a carbodiimide group (—N=C=N—) content of from about 0 to 25% by weight.

4,028,311
PROCESS FOR THE HYDROLYSIS OF POLY(IMINOIMIDAZOLIDINEDIONES) TO POLYPARABANIC ACIDS

Tad L. Patton, Baytown, Tex., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed Feb. 2, 1976, Ser. No. 654,098

Int. Cl.² C08G *18/82, 18/06*

U.S. Cl. 260—77.5 R **22 Claims**

1. In the sulfuric acid hydrolysis of polymers containing repeating iminoimidazolidinedione units to polymers containing repeating parabanic acid groups, the improvement which comprises

contacting a polymer solution containing repeating iminoimidazolidinedione units with 0.5 to 0.8 moles of sulfuric acid and 1 to 20 moles of water for each mole of iminoimidazolidinedione group in said polymer solution

i. at a temperature of 80° to 110° C

ii. for a hydrolysis reaction time of 5 to 60 minutes

iii. while maintaining the polymer in solution

to cause a substantially complete hydrolysis to polymers containing said parabanic acid groups, and to form large, easily filtered crystals of by-product ammonium sulfate.

4,028,312
POLYURETHANES CROSSLINKED WITH OXAZOLINES

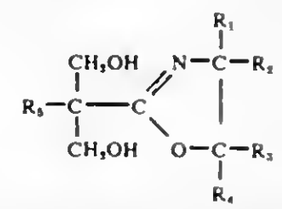
Clifford L. Ball, and Harry A. Smith, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed May 24, 1976, Ser. No. 689,300

Int. Cl.² C08G *18/06*

U.S. Cl. 260—77.5 AQ **8 Claims**

1. In a polyurethane prepared from polyols and polyisocyanates the improvement comprising employing as a crosslinker, chain extender or curing agent therefore an oxazoline or mixture of oxazolines represented by the formula



wherein each R_1, R_2, R_3, R_4 and R_5 are independently selected from the group consisting of hydrogen and hydrocarbon or halohydrocarbon radicals having from 1 to about 6 carbon atoms.

4,028,313
PROCESS FOR THE PRODUCTION OF WATER-DISPERSIBLE POLYHYDROXYL COMPOUNDS

Peter Müller; Kuno Wagner, and Richard Muller, all of Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed June 15, 1976, Ser. No. 696,455

Claims priority, application Germany, June 25, 1975, 2528212; Dec. 16, 1975, 2556621

Int. Cl.² C08G *18/71, 18/14, 18/48*

U.S. Cl. 260—77.5 AP **11 Claims**

1. A process for the production of water-dispersible polyhydroxyl compounds comprising reacting from about 0.08 to 25% of the hydroxyl groups in an organic polyhydroxyl compound having a molecular weight of from about 400 to 10,000 or in a mixture of organic polyhydroxyl compounds having an

average molecular weight of from about 400 to 10,000, which are neither soluble nor dispersible in water, with a compound which contains at least one non-ionic hydrophilic group which contributes to the solubility or dispersibility of the reaction product in water and at least one group which reacts with hydroxyl groups in an addition reaction, the quantitative ratios and the functionality of the reactants in regard to said addition reaction being selected in such a manner that the products obtained by the process contain a statistical average of at least two free hydroxyl groups.

4,028,314

POLYLAURYLLACTAM HAVING A LOW FISHEYE GEL CONTENT

Rainer Feldmann, and Roland Feinauer, both of Marl, Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

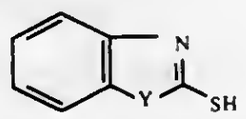
Filed Sept. 26, 1975, Ser. No. 617,147

Claims priority, application Germany, Oct. 9, 1974, 2448047

Int. Cl.² C08G *69/14, 69/16*

U.S. Cl. 260—78 L **10 Claims**

1. A film forming polyamide composition having a low fisheye gel content consisting essentially of about 98.5 to 99.99 percent by weight polylauryllactam and about 0.01 to 1.5 percent by weight of a compound of the general formula



wherein Y is a sulfur or oxygen atom or an NH-group.

4,028,315

SOLID PHASE SYNTHESIS OF PEPTIDES

Miklos Bodanszky, Shaker Heights, Ohio, and John Timothy Sheehan, Middlesex, N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 81,531, Oct. 16, 1970, Pat. No. 3,743,628, which is a continuation-in-part of Ser. No. 829,127, May 29, 1969, abandoned, which is a continuation-in-part of Ser. No. 559,381, June 22, 1966, abandoned. This application Feb. 20, 1973, Ser. No. 333,918

Int. Cl.² C08G *69/44*

U.S. Cl. 260—78 A **6 Claims**

1. A process for bonding an amino acid to an insoluble hydroxymethyl polymer comprising esterifying the C-terminal carboxyl group of an N-terminal protected amino acid with the hydroxyl group of an insoluble hydroxymethyl polymer selected from the group consisting of hydroxymethylated copolymers of styrene and divinylbenzene, hydroxymethylcellulose, hydroxymethylated sulfonated polystyrene and polyvinylalcohol, the esterifying taking place at about room temperature in the presence of a condensing agent selected from the group consisting of dicylcohexylcarbodiimide, carbonyldiimidazole, thionyl chloride, phosphorous oxychloride, and ethoxyacetylene.

4,028,316

VULCANIZED ACRYLATE-ETHYLIDENE NORBORNENE POLYMERS

Tadao Matsuo; Minoru Miura; Satoshi Mashimo, all of Kobe; Masanori Kakei, Toyonaka, and Kyoichi Mishima, Nishinomiya, all of Japan, assignors to Mitsubishi Belting Limited, Kobe, Japan

Continuation of Ser. No. 485,660, July 3, 1974, abandoned. This application Feb. 17, 1976, Ser. No. 658,936

Claims priority, application Japan, July 5, 1973, 48-76206; Apr. 29, 1974, 49-48096

Int. Cl.² C08F *8/34*

U.S. Cl. 260—79.5 P **12 Claims**

1. An acrylic copolymer vulcanizate comprising an acrylic copolymer composition consisting essentially of the radical polymerization product of a monomer mixture consisting of about 85 to 99 parts by weight of an acrylic acid ester of an aliphatic alcohol having 1 to 8 carbon atoms or a mixture of said alcohols and about 1 to 15 parts by weight of ethylidene norbornene vulcanized with sulfur.

7. An acrylic copolymer vulcanizate comprising an acrylic copolymer composition consisting essentially of the radical polymerization product of a monomer mixture consisting of about 55 to about 99 parts by weight of an an acrylic acid ester of an aliphatic alcohol having 1 to 8 carbon atoms or a mixture of said alcohols, about 1 to 15 parts by weight of ethylidene norbornene and up to about 30 parts by weight of acrylonitrile vulcanized with sulfur.

4,028,317

REMOVAL OF PROTEINS FROM LIQUID ACID CHEESE WHEY

Pei K. Chang, Montrose, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Filed May 30, 1975, Ser. No. 582,488

Int. Cl.² A23J *1/20*

U.S. Cl. 260—112 R **7 Claims**

1. A process for removing proteins from liquid acid cheese whey which comprises:

a. adding to liqiud cheese whey at a temperature of about 10° to about 25° C. and at a pH of from about 6.0 to about 8.0 an effective amount of undissolved sodium lauryl sulfate for precipitation of proteins therefrom as a sodium lauryl sulfate-protein complex; and

b. adjusting the pH of the resulting mixture to from about 2.0 and about 5.0 to accomplish said precipitation.

4,028,318

CHROMOGENIC ENZYME SUBSTRATES

Leif Erik Aurell, Molndal, and Karl Göran Claeson, Saro, both of Sweden, assignors to A B Kabi, Stockholm, Sweden

Filed Nov. 14, 1975, Ser. No. 631,974

Claims priority, application Sweden, Dec. 5, 1974, 7415229

Int. Cl.² C07C *103/52*

U.S. Cl. 260—112.5 R **9 Claims**

1. New chromogenic substrates for serine proteases, specially suitable for diagnostic determination of factor Xa, which are represented by the following general formula:

R_1-A_1-A_2-Gly-Arg-NH-R_3

or its salts, where R_1 is selected from the group consisting of hydrogen, alkanoyl having from 1 to 12 carbon atoms, cyclohexylcarbonyl, benzoyl, benzoyl substituted with one or two halogen atoms, methylamine or phenyl groups, benzene sulphonyl and toluenesulphonyl; R_2 is selected from the group consisting of nitrophenyl, naphthyl, nitronaphthyl, methoxynaphthyl, quinolyl and nitroquinolyl; A_1 is selected from the group consisting of a single bond, and the amino acids selected from the group consisting of Gly, Ala, Val, Leu, Ileu, Pro, Met, Phe and Tyr; and A_2 is selected from the group consisting of the amino acids Glu, Gln, Asp, and Asn.

4,028,319

2 AND 3-SUBSTITUTED ENKEPHALINS

David A. Jones, Jr., Evanston; James M. Schlatter, Glenview; Richard A. Mikulec, Chicago; Judith A. Reuter, Skokie, and Robert H. Mazur, Deerfield, all of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Filed May 7, 1976, Ser. No. 684,321

Int. Cl.² C07C *103/52*

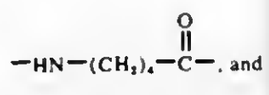
U.S. Cl. 260—112.5 R **23 Claims**

1. A compound of the formula

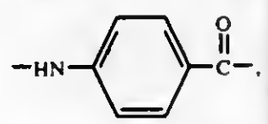
H—Tyr—W—Phe—Y—OH (I)

wherein Y is Leu or Met; W is selected from the group consisting of

—Aib—Gly—,
—Ala—Gly—,
—Sar—Gly—,
—Gly—Aib—,
—Gly—Ala—,
—Gly—Sar—,



, and



and the stereochemical configuration of each of the optically active amino acid residues is D, L or DL.

4,028,320

METHOD OF HARDENING GELATIN USING SULFONYL COMPOUNDS

Hidefumi Sera; Kameji Nagao, and Tsumoru Ishii, all of Minami-ashigara, Japan, assignors to Fujii Photo Film Co., Ltd., Minami-ashigara, Japan

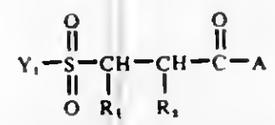
Filed Apr. 26, 1976, Ser. No. 680,416

Claims priority, application Japan, Apr. 25, 1975, 50-50500

Int. Cl.² C09H *7/00*

U.S. Cl. 260—117 **8 Claims**

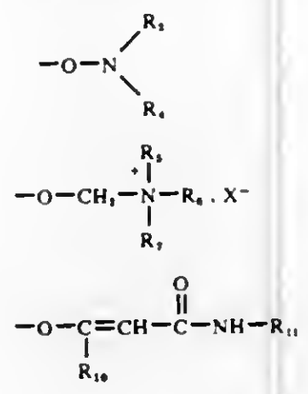
1. A method of hardening gelatin which comprises adding thereto a compound of the following general formula (I):



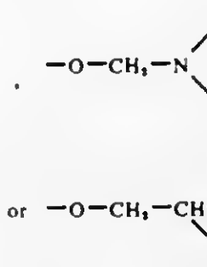
(I)

in which Y_1 is CH_2=CH—, $ClCH_2$—CH_2—, $BrCH_2$—CH_2—, CH_3COO—CH_2CH_2— or $ClCH_2COO$—CH_2CH_2—, R_1 and R_2 are H or CH_2, but both of them are not CH_2 at the same time, and A is one of the following groups:

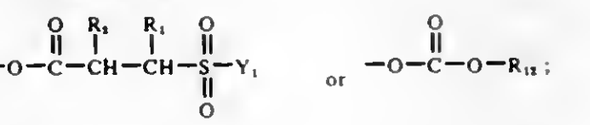
(1) esters



, —O—CH_2Cl,



(2) Acid anhydrides



(3) Amides(imides)

in which both R_3 and R_4 are acyl groups or at least one of them is an acyl group other than when R_3 and R_4 form a benzotriazole ring, and when one or R_3 and R_4 is an acyl group, the other is H or an alkyl group containing at most 4 carbon atoms; and wherein in any case, R_3 and R_4 may form a saturated or unsaturated carbocyclic or heterocyclic ring in combination with the nitrogen atom to which they are attached; R_5, R_6 and R_7 are alkyl groups containing at most 4 carbon atoms, and may form a saturated or unsaturated ring, or may form a bicyclo ring; X^- is an acid anion; R_8 and R_9 are a saturated or unsaturated carbocyclic or heterocyclic ring in combination with the nitrogen atom to which they are attached; R_{10} is an alkyl or aryl group containing at most 6 carbon atoms; R_{11} is an alkyl group containing at most 3 carbon atoms; R_{12} is an alkyl, aryl or aralkyl group containing at most 7 carbon atoms; and Y_2 is CH_2=CH—, $ClCH_2$—CH_2—, Br—CH_2—CH_2—, CH_3COO—CH_2CH_2—, or $ClCH_2COO$—CH_2CH_2—.

4,028,321

BASIC AZO AMINO-PHENYLENE DYESTUFFS

Erwin Fleckenstein, Hofheim, Taunus, and Peter Mischke, Neuenhain, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

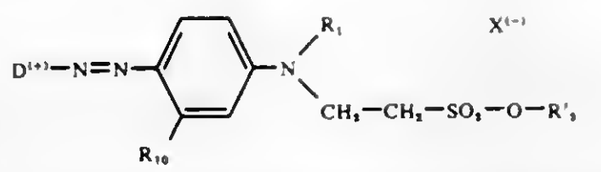
Filed July 23, 1974, Ser. No. 491,175

Claims priority, application Germany, July 27, 1973, 2338135

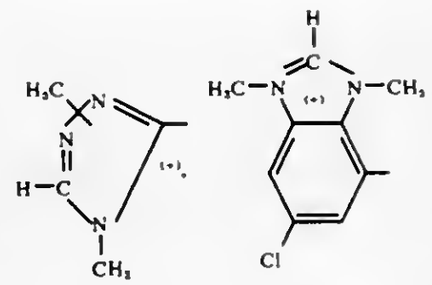
Int. Cl.² C09B *29/06, 29/08, 29/36, 43/00*

U.S. Cl. 260—146 R **4 Claims**

1. A basic dyestuff of the formula



wherein R_1 is hydrogen, alkyl of 1 to 5 carbon atoms, hydroxyalkyl of 1 to 4 atoms, cyanoalkyl of 1 to 4 carbon atoms in the alkyl moiety or chloroalkyl of 1 to 4 carbon atoms, R'_2 is phenyl or naphthyl or is phenyl or naphthyl substituted by one or more of alkyl of 1 to 4 carbon atoms, alkoxy to 1 to 4 carbon atoms, nitro, cyano, and chlorine, D^+ is



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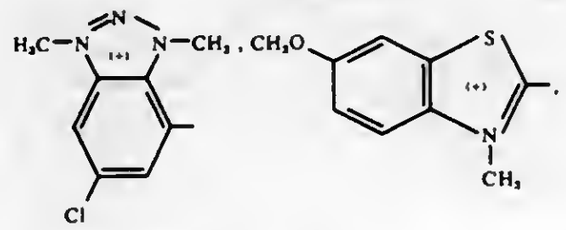
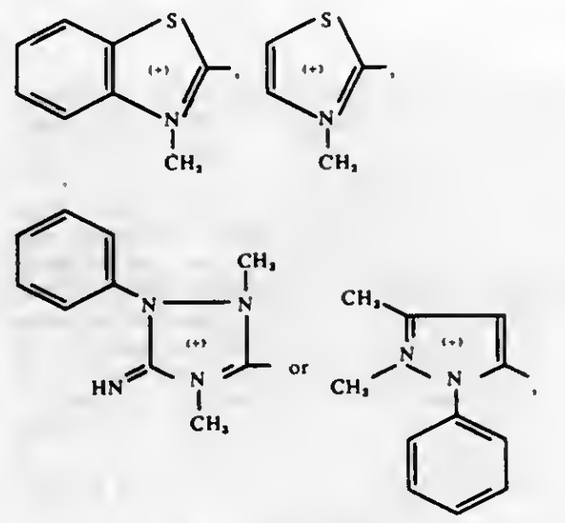




R_{10} is hydrogen, fluorine, bromine, chlorine, or alkyl of 1 to 4 carbon atoms X^- is an anion.

4,028,322

6-METHYLBENZIMIDAZOLONYLAZOBARBITURIC ACID PIGMENT

Rudolf Mory, Dornach, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

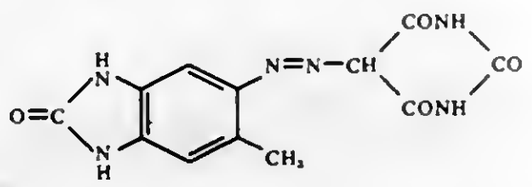
Continuation-in-part of Ser. No. 379,527, July 16, 1973, abandoned. This application Sept. 12, 1975, Ser. No. 612,591

Claims priority, application Switzerland, July 13, 1972, 10526/72

Int. Cl.² C09B *29/36*; **C09D** *11/00*; **D06P** *1/08, 3/00*

U.S. Cl. 260—154 **1 Claim**

1. The compound of the formula



4,028,323

PROCESS FOR MAKING AZO COMPOUNDS BY COUPLING WITH NITROSATED HETEROCYCLIC PRIMARY AMINES

Gert Hegar, Schoenenbuch, and Hans-Joerg Angliker, Basel, both of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

Continuation of Ser. No. 217,242, Jan. 12, 1972, abandoned, which is a continuation-in-part of Ser. No. 794,381, Jan. 27, 1969, abandoned. This application Oct. 8, 1975, Ser. No. 620,665

Int. Cl.² C09B *27/00*

U.S. Cl. 260—157 **10 Claims**

1. A process for the manufacture of azo compounds which comprises reacting the nitrosated primary amine of thiazole, benzthiazole, 1,3,4-thiadiazole, 1,2,4-thiadiazole, isothiazole, benzisothiazole, oxazole, benzoxazole, 1,3,4-oxadiazole, 1,2,4-oxadiazole, isoxazole, benzisoxazole, selenazole or benzselenazole which are unsubstituted or contain no other substituents than lower alkyl, phenyl, phenyl substituted by nitro, lower alkylthio, lower alkoxy, lower alkyl, chloro or bromo; benzyl cyclohexyl, cyano, thiacyano, chloro, bromo, lower alkylthio, lower alkoxy, lower alkylsulfonyl, nitro, lower alkoxycarbonyl, sulfonamide, N-lower alkyl sulfonamide, trifluoromethyl, phenylazo and lower alkanoyl, where lower means containing 1 to 7 carbon atoms, with, as an azo coupling component, aminobenzene which contains a member selected from the group consisting of lower alkyl and lower cyanoalkyl attached to the amino group and which is unsubstituted or substituted in the nucleus by a member selected from the group consisting of chlorine, bromine, lower alkyl, lower alkoxy and acylamino, wherein "lower" means containing at most 7 carbon atoms and "acyl" is lower alkanoyl, carbamoyl, N-lower alkyl carbamoyl or benzoyl in a weakly acid medium at a temperature of from room temperature to about 100° C.

4,028,324

HIGH TEMPERATURE SEAL MATERIAL AND METHOD FOR MANUFACTURING THE SAME

Jerome G. Tuschner, Enfield, and Richard C. Nickols, Jr., Glastonbury, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 16, 1975, Ser. No. 641,204

Int. Cl.² C08K *5/02*; **C10M** *5/18, 7/28*

U.S. Cl. 260—33.8 F **8 Claims**

1. An extruded seal material which, before use, consists essentially of:

a. 10–40% by weight fibrillating polytetrafluoroethylene;

b. 30–50% by weight halogenated oil having the characteristics that it is stable in phosphoric acid up to at least 400° F, has a low volatility up to at least 400° F, and is a liquid at room temperature through at least 400° F;

c. 0–5% by weight halogenated solvent; and

d. a balance of particulate filler material selected from the group consisting of non-fibrillating polytetrafluoroethylene, silicon carbide, and graphite, or combination thereof;

wherein said seal material is rope like in form, and the fibrils of polytetrafluoroethylene are substantially aligned in the direction of the axis of the rope.

4,028,325

COMPOSITE DENTAL MATERIAL AND METHOD OF PREPARING SAME

Alan G. King, 827 Chenook Trail, Macedonia, Ohio 44056, and Leon Levine, 94 Brewster Road, West Hartford, Conn. 06117

Continuation-in-part of Ser. No. 279,033, Aug. 9, 1972, abandoned. This application Mar. 7, 1975, Ser. No. 556,397

Int. Cl.² C08K *9/06, 3/22*

U.S. Cl. 260—42.15 **18 Claims**

1. A composite material for use in dentistry principally comprising: (A) silica glass composition consisting of on a weight basis of between about 7.0–18.0% of alkaline earth metal oxides in solution wherein said alkaline earth metal oxides are selected from the group consisting of calcium oxide, and magnesium oxide; and, (B) a methacrylate resin coupled to said silica glass by a silane mixture, said composite material including on a weight basis approximately 100 parts of said silica glass composition to between approximately 13.5 to 65 parts of said methacrylate resin.

4,028,326

PROCESS FOR PRODUCING POWDER PAINT PARTICLES FROM LIQUID PAINT I

Amos Golovoy, Inkster, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Sept. 25, 1975, Ser. No. 616,526

Int. Cl.² C08J *3/12*

U.S. Cl. 260—42.22 **5 Claims**

1. A process for producing powder paint particles from a liquid dispersion of organic paint components in an organic solvent which comprises:

1. depositing upon the surface of a stream of water in continuous movement through a spreading and extraction zone without strong agitation at the point of initial contact, a liquid dispersion of resincomprising organic paint components in an organic solvent that is miscible with water, has surface tension in the range of about 20 to about 40 dynes/cm. and contains between 10 and 40 weight percent paint components which will float together on and are less than 5 weight percent soluble in water, said resin having average molecular weight in the range of about 1500 to about 15,000,

2. maintaining the resultant floating deposit of paint dispersion in said spreading and extraction zone for a time sufficient to admit of

A. spreading of said dispersion in contact with said stream of water upon the surface of said stream,

B. extraction of at least 90 weight percent of said organic solvent from said dispersion of organic paint components floating upon the surface of said stream of water into said stream of water, and

C. solidification of said organic paint components on said surface into plate-like solids,

3. breaking said plate-like solids into smaller particles after said plate-like solids have passed from said spreading and extraction zone into a collection zone, and

4. recovering said smaller particles from said collection zone.

4,028,327

PROCESS FOR PRODUCING POWDER PAINT PARTICLES FROM LIQUID PAINT II

Amos Golovoy, Inkster, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Sept. 25, 1975, Ser. No. 616,527

Int. Cl.² C08J *3/12*

U.S. Cl. 260—42.22 **8 Claims**

1. A process for producing powder particles from a liquid dispersion of organic paint components in an organic solvent which comprises:

1. depositing upon the surface of a stream of an aqueous saline solution containing between 1 and about 15 weight percent of a water-soluble salt in continuous movement through a spreading and extraction zone without strong agitation at the point of initial contact a liquid dispersion of resin comprising organic paint components in an organic solvent that is miscible with said saline solution, has surface tension in the range of about 20 to about 40 dynes/cm. and contains between 10 and 40 weight percent paint components which will float together on said saline solution, said resin having average molecular weight in the range of about 1500 to about 15,000,

2. maintaining the resultant floating deposit of paint dispersion in said spreading and extraction zone for a time sufficient to admit of

A. spreading of said dispersion in contact with said saline solution upon the surface of said saline solution,

B. extraction of at least 90 weight percent of said organic solvent from said dispersion of organic paint components floating upon the surface of said saline solution into said saline solution, and

C. solidification of said organic paint components on said surface into plate-like solids,

3. breaking said plate-like solids into smaller particles after said plate-like solids have passed from said spreading and extraction zone into a collection zone, and

4. recovering said smaller particles from said collection zone.

4,028,328

ELIMINATION OF PINKING IN VINYL ASBESTOS FORMULATIONS

Gerald Rubin, Edison, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.

Division of Ser. No. 431,892, Jan. 9, 1974, Pat. No. 3,931,076. This application Sept. 5, 1975, Ser. No. 610,822

Int. Cl.² C08K *3/34, 5/09, 5/34*

U.S. Cl. 260—42.44 **8 Claims**

1. A vinyl asbestos composition comprising:

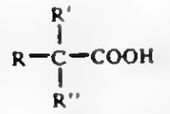
a. a vinyl resin;

b. asbestos;

c. fillers;

d. melamine in an amount of from about 0.1 to about 2.5 weight percent; and

e. an antipinking agent, in an amount ranging from about 0.01 to about 15 weight percent, selected from the group consisting of zinc salts, calcium salts, isopropylamine salts and diethanolamine salts of trialkyl acetic acids having the formula



wherein R, R′ and R″ are alkyl groups having from C_1 to C_{18} carbon atoms.

4,028,329

PROCESS FOR THE BULK POLYMERIZATION OF VINYL HALIDE POLYMERS SHOWING REDUCED REACTOR SCALE FORMATION

Henry Kahn, Williamsville, and William L. Schall, Grand Island, both of N.Y., assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed July 24, 1974, Ser. No. 491,189

Int. Cl.² C08K *3/36*

U.S. Cl. 260—42.53 **14 Claims**

1. In the process for the preparation of a vinyl halide polymer by bulk liquid phase polymerization carried out in the presence of an initiating amount of a free radical initiator for vinyl halide polymerization, the improvement comprising the steps of:

1. admixing a vinyl halide monomer composition with about 0.02 to about 0.3% water by weight based upon total monomer, and an organic or inorganic inert fine particle size material which is solid at least at reaction temperatures, is insoluble in said monomer, and consists essentially of particles having an average particle size in the range of about 0.001 to about 50 microns, the amount of water employed being about 27 to about 83 percent by weight of the inert fine particle size additive;

2. polymerization in a first stage using high speed agitation at a temperature of from about 30° to about 80° C. until about 3% to about 20% by weight of said monomer composition has been converted to polymer particles and

3. continuing said polymerization in a second stage during which the reaction mixture is subjected to low speed agitation until at least about 30% by weight of the reaction mixture has been converted to polymer comprising said inert fine particle size material.

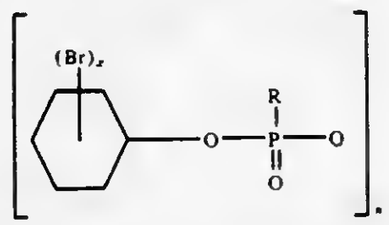
4,028,330

FIRE RETARDANT POLYESTER FIBERS

Henry L. King, Cary, N.C., assignor to Monsanto Company, St. Louis, Mo.

Filed May 26, 1971, Ser. No. 147,167
Int. Cl.² C08K *5/53*
U.S. Cl. 260—45.7 P **6 Claims**

1. A synthetic fiber in which the fiber-forming substance is any long chain synthetic polymer comprised of at least 85% by weight of an ester of a dihydric alcohol and terephthalic acid containing not more than about 20%, based on the weight of the polymer, of a compound having the general formula:



where R is a radical selected from the group consisting of alkyl, aromatic, and brominated aromatic; $x = 2$–4; and $n =$ 1–100.

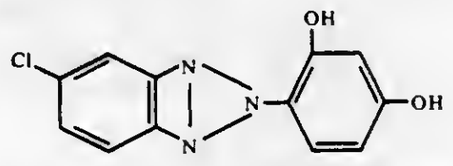
4,028,331

ULTRA VIOLET ABSORBER

Seiji Hotta, Ibaraki; Koichi Koga, Ota; Tomoyuki Bando, Ibaraki, and Yutaka Kondo, Tokyo, all of Japan, assignors to Sumitomo Chemical Company, Limited and Kyodo Chemical Company, Ltd., both of, Japan

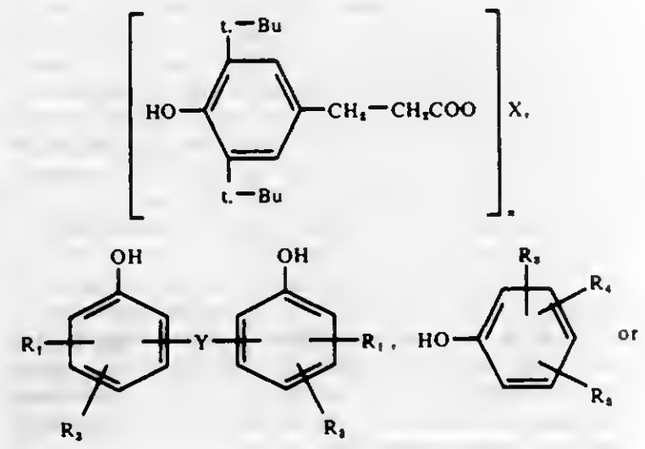
Filed Feb. 4, 1975, Ser. No. 547,091
Claims priority, application Japan, Feb. 8, 1974, 49-16435
Int. Cl.² C08K *5/13, 5/34, 5/46*
U.S. Cl. 260—45.8 NT **9 Claims**

1. A stabilized polyurethane resin composition comprising (1) a polyurethane resin and (2) a stabilizing amount of an ultraviolet absorber of the formula (A-1),



(A-1)

or a mixed ultraviolet stabilizer comprising the ultraviolet absorber (A-1) and an antioxidant which is selected from the group consisting of hindered phenols and hindered amines, said hindered phenol antioxidant being a compound of the formula,



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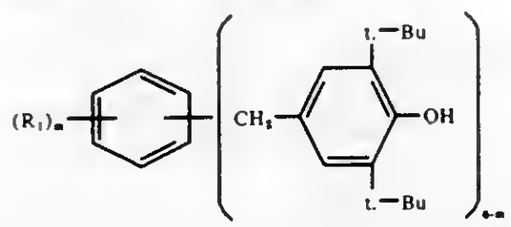
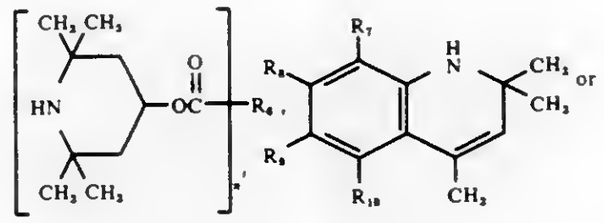
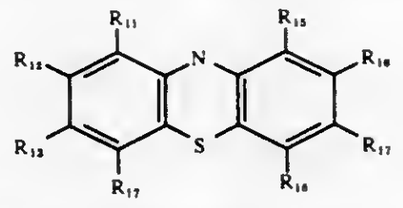


wherein X is a $C_1 - C_{18}$ alkyl, $C_1 - C_8$ alkylene, $-(CH_2)_4C$ or mono-, di- or tri-$C_1 - C_5$ alkyleneamine group, Y is a $C_1 - C_8$ alkylene, $C_4 - C_{18}$ alkylidene group or a sulfur atom, R_1 and R_2 are each a hydrogen atom or $C_1 - C_4$ alkyl group and R_1 and R_2 may be the same or different, R_3, R_4 and R_5 are each $C_1 - C_{18}$ alkyl group and R_3, R_4 and R_5 may be the same or different, n is an integer of 1 to 4 and m is an integer of 1 to 5 and said hindered amine antioxidant being a compound of the formula,





wherein R_6 is a $C_1 - C_{18}$ alkyl, aryl, aralkyl or $C_6 - C_{12}$ cycloalkyl group, R_7, R_8, R_9 and R_{10} are independently a hydrogen atom or a $C_1 - C_8$ alkyl or alkoxy group, R_{11}, R_{12} R_{12}, R_{14}, R_{15}, R_{16}, R_{17} and R_{18} are independently a hydrogen atom or a $C_1 - C_{18}$ alkyl group, and n' is 1 and wherein the weight ratio of the ultraviolet absorber (A-1) to the antioxidant is 1:9 to 9:1.

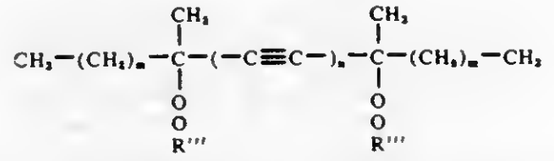
4,028,332

STABILIZATION OF CROSS-LINKED POLYOLEFINS

Donald G. Needham; Kenneth P. Taylor, and Claude V. Brown, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

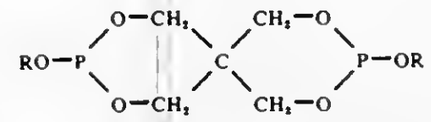
Filed Oct. 14, 1975, Ser. No. 621,895
Int. Cl.² C08K *5/14, 5/36, 5/52*
U.S. Cl. 260—45.8 R **9 Claims**

1. A composition of matter comprising
I. a solid polymer selected from the group consisting of ethylene homopolmers and copolymers of ethylene and at least one acyclic mono-1-olefin having from 3 to 8 carbon atoms per molecule, and mixtures thereof, wherein said copolymers contain from 75 to 99 weight percent of said ethylene;
II. a crosslinking amount of an acetylenic diperoxy compound of the formula



wherein n is an integer having a value of 1 or 2, m is an integer having a value of 0 or 1, and the sum of $n + m$ is 1 or 2, and

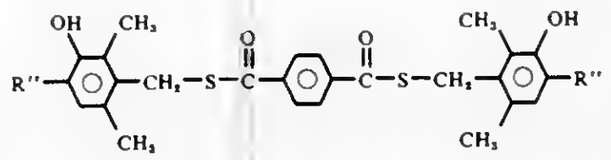
R''' is selected from the group consisting of tertiary alkyl having 4 to 8 carbon atoms, alkyl carbonate having 2 to 6 carbon atoms, haloalkyl carbonate having 2 to 6 carbon atoms, benzoate and lower alkyl-substituted benzoate; and
III. a stabilizing amount of a stabilizer system consisting essentially of
A. a dialkylpentaerythritol diphosphite having the formula



wherein R is an alkyl radical having from 12 to 20 carbon atoms, and
B. a sulfur-containing compound selected from the group consisting of
1. a diester of thiodipropionic acid having the formula

$$S(CH_2CH_2COOR')_2$$

wherein R' is an alkyl radical having 4 to 22 carbon atoms; and
2. a bis(3-hydroxy-4-alkyl-2,6-dimethylbenzyl) dithiolterephthalate of the formula



wherein R'' is a branched chain alkyl group having from 4 to 12 carbon atoms, wherein the weight ratio of compound (A) to compound (B) is in the approximate range of 3:1 to 1:3.

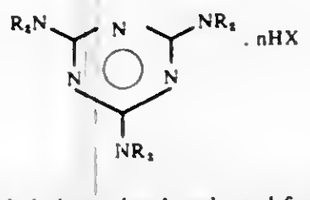
4,028,333

FLAME RETARDANT POLYMERIC COMPOSITIONS CONTAINING MELAMINE HYDROHALIDES

Michael W. Lindvay, Ann Arbor, Mich., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Filed Dec. 18, 1975, Ser. No. 642,012
Int. Cl.² C08K *5/34*
U.S. Cl. 260—45.8 NT **11 Claims**

1. A flame retarded polyolefin polymer containing a flame retarding amount of a compound of the formula:



wherein each R is independently selected from a group consisting of hydrogen, alkyl, halogenated alkyl, phenyl, and halogenated phenyl groups, said alkyl groups containing from 1 to about 6 carbon atoms and said halogenated groups containing from 1 to about 5 halogen substituents per group, said halogen substituents selected from a group consisting of chlorine and bromine; wherein X is selected from a group consisting of chlorine and bromine; and wherein n is an integer from 1 to 3, and mixtures thereof.

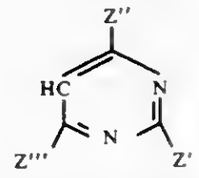
4,028,334

PIPERIDINE DERIVATIVES

Alexander Michael Chalmers, Cheadle; James Jack, Bramhall, and Barry Cook, Manchester, all of England, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

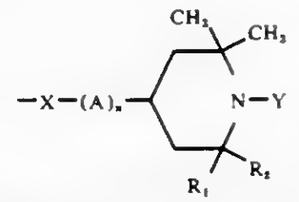
Division of Ser. No. 350,296, April 11, 1973, Pat. No. 3,925,376. This application Sept. 26, 1975, Ser. No. 617,220
Int. Cl.² C07D *239/00;* **C08K** *5/34*
U.S. Cl. 260—45.8 N **19 Claims**

1. A compound of the formula



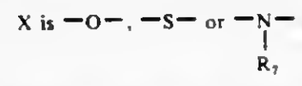
I

and salts thereof, wherein
Z' is a group having the formula:

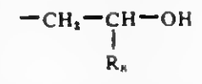


II

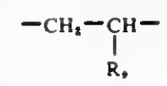
wherein R_1 and R_2 are the same or different and each is a straight or branched alkyl having from 1 to 12 carbon atoms or R_1 and R_2 form, together with the ring carbon atom to which they are bound, a cycloalkyl having from 5 to 12 carbon atoms;



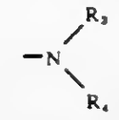
R_7 is hydrogen, a straight- or branched alkyl having from 1 to 20 carbon atoms or an aralkyl having from 7 to 12 carbon atoms; Y is oxygen, hydrogen, a straight- or branched alkyl having from 1 to 20 carbon atoms, an alkenyl or alkynyl having from 3 to 12 carbon atoms, an aralkyl group having from 7 to 12 carbon atoms or the group



wherein R_8 is hydrogen, or a methyl or phenyl; n is zero or 1; and A is $-CH_2-$, or the group



wherein R_9 is a hydrogen or an alkyl having from 1 to 20 carbon atoms; Z'' and Z''' are the same or different and each is a piperidine group of formula II as hereinbefore defined, a halogen atom, a substituted amino group having the formula:



III

wherein R_3 and R_4 are the same or different and each is hydrogen, a straight or branched alkyl having from 1 to 20 carbon atoms, a cycloalkyl having from 5 to 12 carbon atoms, an aryl

which is unsubstituted or substituted with one or more alkyl groups and having a total of from 6 to 18 carbon atoms or an aralkyl having from 7 to 12 carbon atoms, or R_3 and R_4, together with the nitrogen atom to which they are bound, form a heterocyclic group having 5 to 7 ring atoms; or Z'' and Z''' are a hydroxy or an ether group having the formula:

$$-OR_5 \qquad IV$$

wherein R_5 is hydrogen, a straight or branched chain alkyl having from 1 to 20 carbon atoms, a cycloalkyl having from 5 to 12 carbon atoms, an aryl which is unsubstituted or substituted by one or more alkyl groups and having a total of 6 to 18 carbon atoms, or an aralkyl having from 7 to 12 carbon atoms; or Z'' and Z''' are a thiol or thio ether group having the formula:

$$-SR_6 \qquad V$$

wherein R_6 is hydrogen, a straight or branched alkyl having from 1 to 20 carbon atoms or a cycloalkyl having from 5 to 12 carbon atoms.

4,028,335

THERMALLY STABLE FLAME-RETARDANT THERMOPLASTIC MOLDING COMPOSITION

Daniel Wayne Fox, Pittsfield, Mass., assignor to General Electric Company, Pittsfield, Mass.

Continuation-in-part of Ser. No. 527,167, Nov. 25, 1974, abandoned. This application Aug. 23, 1976, Ser. No. 716,882
Int. Cl.² C08K *5/59*
U.S. Cl. 260—45.75 B **4 Claims**

1. A thermally stable flame-retardant thermoplastic molding composition comprising in admixture, a styrenic polymer, from 1.0 to about 20 weight percent of a polyhalodiphenyl carbonate containing 6–10 halogen atoms and from 0.5 to about 10.0 weight percent of antimony trioxide; said weight percent being based on the weight of styrenic polymer; said halogen atoms being selected from the group consisting of bromine or chlorine or mixtures thereof.

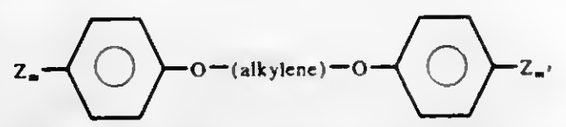
4,028,336

PLASTIC COMPOSITIONS

Arnold L. Anderson, Alma, Mich., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Filed Feb. 8, 1973, Ser. No. 330,790
The portion of the term of this patent subsequent to Apr. 5, 1994, has been disclaimed.
Int. Cl.² C08L *75/04*
U.S. Cl. 260—45.75 R **15 Claims**

1. A plastic composition comprising a polyurethane and a flame retardant, said flame retardant consisting of a compound having the formula



wherein (a) Z is bromine; (b) *m* and *m'* are independent and are integers having a value of from 1 to 5; and (c) alkylene is a straight or branched chain alkylene group having from one to six carbon atoms.

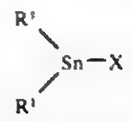
4,028,337

TECHNIQUE FOR STABILIZATION OF VINYL CHLORIDE POLYMERS

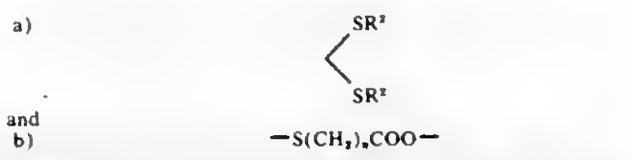
William Herbert Starnes, Jr., Roselle Park, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Continuation-in-part of Ser. No. 534,766, Dec. 20, 1974, abandoned. This application Mar. 24, 1976, Ser. No. 669,858
Int. Cl.² C08K *5/58*
U.S. Cl. 260—45.75 S **9 Claims**

1. Technique for preparing a stable vinyl chloride polymer which comprises removing heavy metal residues by solvent extraction from the product formed by reaction of a vinyl chloride polymer and from 1–8 grams of an organotin compound per gram of polymer in a solvent at a temperature within the range of 160°–185° C for a time period within the range of 76–18 hours, the shorter time periods corresponding with the higher temperatures and the converse, the organotin compound being of the formula



wherein R^1 is a straight chain hydrocarbon radical having from 1–8 carbon atoms and —X is a radical selected from the group consisting of



wherein R^2 is selected from the group consisting of straight chain hydrocarbon radicals having from 1–8 carbon atoms and $-CH_2COOR^3$ wherein R^3 is a hydrocarbon radical having from 1–8 carbon atoms, *n* being an integer from 1–8, the solvent being capable of dissolving vinyl chloride polymers and evidencing a boiling point in excess of 160° C.

4,028,338

FLUOROSILOXYDIPHENYLSILOXY BLOCK COPOLYMERS

John S. Razzano, Watervliet, N.Y., assignor to General Electric Company, Waterford, N.Y.

Filed Oct. 9, 1975, Ser. No. 621,032
Int. Cl.² C08G *77/04*
U.S. Cl. 260—46.5 R **3 Claims**

1. A solvent resistant block copolymer having desirable processability comprising a copolymer of the formula,

where R is an alkyl radical of 1 to 3 carbon atoms, R^1 is a perfluoroalkyl radical of 1 to 8 carbon atoms, Vi is vinyl, B is selected from the class consisting of lithium and hydrogen, z varies from 0 to 100, *x* varies from 20 to 400 and *y* varies from 700 to 6000.

4,028,339

ORGANOPOLYSILOXANE RELEASE RESINS USEFUL IN COOKING AND BAKING PROCESSES

Duane F. Merrill, Ballston Spa, N.Y., assignor to General Electric Company, Waterford, N.Y.

Division of Ser. No. 505,988, Sept. 16, 1974, Pat. No. 3,925,276, which is a continuation-in-part of Ser. No. 115,715, Feb. 16, 1971, abandoned, which is a continuation-in-part of Ser. No. 798,187, Feb. 10, 1969, abandoned, which is a continuation-in-part of Ser. No. 671,574, Sept. 29, 1967, abandoned. This application Nov. 22, 1974, Ser. No. 526,397
Int. Cl.² C08G *77/04*
U.S. Cl. 260—46.5 R **32 Claims**

1. A cooking utensil comprising an interior cooking surface having coated thereon a silanol-containing organopolysiloxane resin said resin prepared by the process comprising the steps of

i. agitating a mixture comprising (A) an organohalosilane blend consisting essentially of about 60 mole percent methyltrichlorosilane, about 35 mole percent phenyltrichlorosilane, and about 5 mole percent dimethyldichlorosilane, (B) water, (C) acetone, and (D) a water-immiscible organic solvent, wherein there is present by weight in said mixture per part by weight of (A), about 1.7 to about 10 parts of (B), about 0.2 to about 5 parts of (C), and about 0.3 to about 5 parts of (D); and

ii. separating the organic solvent solution of (F) from the resulting hydrolysis mixture of step (i), wherein (F) is a silanol-containing organopolysiloxane resin having an average ratio of about 1.05 organic radicals per silicon atom.

4,028,340

PROCESS FOR PREPARING P-VINYLPHENOL POLYMER

Kenji Kanezaki, Kitakyushu, Japan, assignor to Maruzen Oil Co. Ltd., Osaka, Japan

Filed Feb. 27, 1976, Ser. No. 661,874
Claims priority, application Japan, Mar. 1, 1975, 50-25207
Int. Cl.² C08F *132/00, 112/00, 12/04*
U.S. Cl. 260—47 UA **18 Claims**

1. A process for preparing a p-vinylphenol polymer which comprises dehydrogenating crude p-ethylphenol containing at least one of m-ethylphenol and o-ethylphenol to convert the ethylphenol(s) to vinylphenol(s), polymerizing the resulting crude product by heat or cationic polymerization without purification, and then purifying the resulting polymerization product by precipitating the p-vinylphenol with a non-solvent therefor or by the film evaporation method.

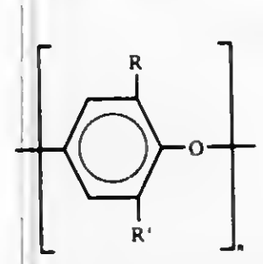
4,028,341

PROCESS FOR THE PREPARATION OF POLYPHENYLENE OXIDES WITH HYDROLYTICALLY STABLE COPPER CATALYSTS

Allan S. Hay, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 441,295, Feb. 11, 1974, abandoned. This application Jan. 13, 1975, Ser. No. 540,473
Int. Cl.² C08G *65/44*
U.S. Cl. 260—47 ET **23 Claims**

1. A process for formation of a polyphenylene oxide having the formula



where R and R' are lower primary alkyl and *n* is a number representing the average degree of polymerization and is at least 100 which comprises:

oxidatively coupling the corresponding monohydric phenol with an oxygen-containing gas under polymer-forming reaction conditions in a liquid reaction mixture which is essentially free of ammonium ion and in which the phenol is soluble

in the presence of a copper-amine complex soluble in the reaction mixture comprising

a. copper ion

b. bromide ion

c. a diamine having the formula

$$R_aHN—R_a—NHR_c$$

where R_a is C_{2-4}-alkylene or C_{3-7}-cycloalkylene and R_b and R_c are isopropyl or C_{4-8}-tertiary alkyl, including cycloalkyl, in which only the α-carbon atom has no hydrogens, there being at least two and no more than three carbon atoms separating the two nitrogen atoms

d. a tertiary amine which is N-methylpyrrolidine, triethylenediamine or a trialkylamine wherein at least two of the alkyl groups are methyl and the third is C_{1-6} primary or C_{3-8} secondary alkyl,

wherein, the molar ratio of (b) to (a) is at least 2, the molar ratio of (c) to (a) is at least 1 and the ratio of equivalents of (d) to moles of (a) is at least 6.

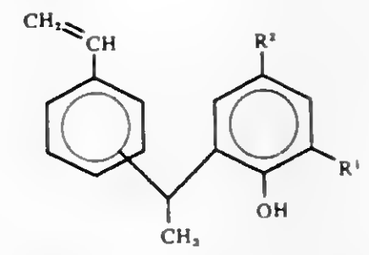
4,028,342

POLYMERIC PHENOLIC ANTIOXIDANTS

James A. Dale, Menlo Park, and William J. Leonard, San Francisco, both of Calif., assignors to Dynapol Corporation, Palo Alto, Calif.

Division of Ser. No. 449,929, March 11, 1974, Pat. No. 3,930,047. This application May 29, 1975, Ser. No. 581,611
Int. Cl.² A23D *5/04*; **C08F** *19/10*
U.S. Cl. 260—47 UA **14 Claims**

1. A material consisting essentially of a compound having the structural formula



wherein R_1 is a lower alkyl of from 1 to 5 carbons inclusive, and R_2 is hydrogen.

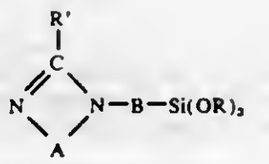
4,028,343

ORGANOFUNCTIONAL SILICON COMPOUNDS AS ADHESIVIZERS FOR ORGANIC BINDING AGENTS

Jurgen Amort, Troisdorf, Sieglar, and Heinz Nestler, Troisdorf, Eschmar, Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Filed Apr. 28, 1975, Ser. No. 572,585
Claims priority, application Germany, Apr. 30, 1974, 2420851
Int. Cl.² C07D *233/04*; **C08G** *2/28, 18/00, 59/00*
U.S. Cl. 260—59 R **14 Claims**

1. In an adhesive composition comprising an organic polyaddition or polycondensation polymer and an adhesivizing silane, the improvement where said silane has the general formula:



wherein R is a C_{1-C_4} alkyl radical which can contain oxygen or sulfur atom in the chain, R' is a C_{1-4} alkyl radical or hydrogen, A is a bivalent, saturated, branched or unbranched hydrocarbon radical having 2 to 4 carbon atoms in the chain and B is a bivalent, saturated, branched or unbranched hydrocarbon radical having 1 to 10 carbon atoms in the chain, said silane being present in said compositiom in an amount of 0.5 to 5 weight percent.

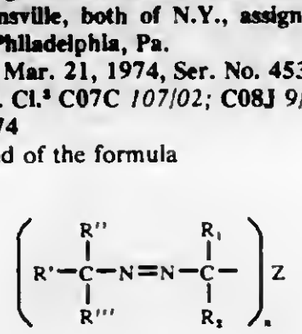
4,028,344

α-ISOCYANATO AND α-ISOTHIOCYANATO AZOS AND THEIR DERIVATIVES

Harold Carl Lange, Grand Island, and Ronald Edward MacLeay, Williamsville, both of N.Y., assignors to Pennwalt Corporation, Philadelphia, Pa.

Filed Mar. 21, 1974, Ser. No. 453,452
Int. Cl.² C07C *107/02*; C08J *9/00*
U.S. Cl. 260—174 **10 Claims**

1. A compound of the formula



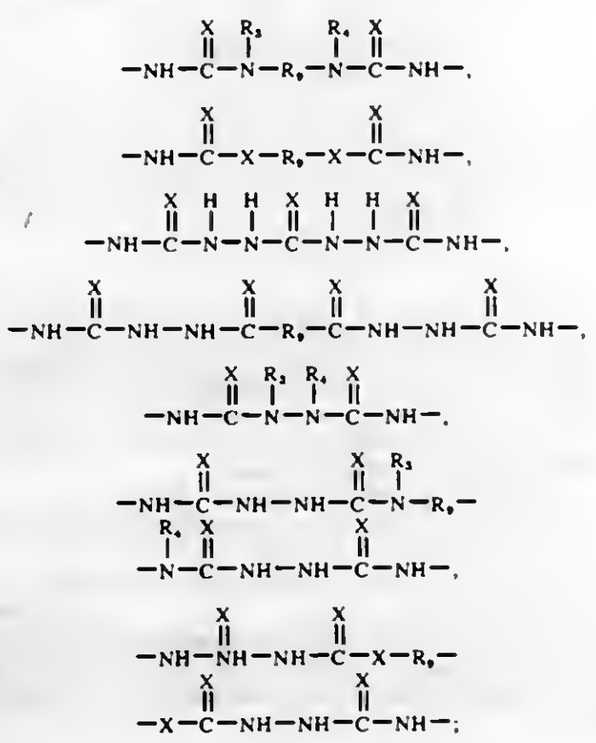
where:

a. *n* is 1 or 2;

b. R', R'' and R''' are selected from alkyl of 1–8 carbons and and aralkyl of 7–12 carbons, or 2 or more of R', R'' and R''' joined with the tertiary carbon atom to which they are attached form cycloalkyl of 3–12 carbons: or R'' is aryl of 6–14 carbons; or R''' is cyano or Y;

c. R_1 and R_2 are selected from alkyl of 1–8 carbons, cycloalkyl of 3–12 carbons, aralkyl of 7–12 carbons, or taken together are alkylene of 3–11 carbons; or R_2 is aryl of 6–14 carbons;

d. Z, when *n* is 1, and Y have the same definition and are selected from:



e. X is oxygen or sulfur;

f. R_3 and R_4 are selected from hydrogen, alkyl of 1–12 carbons, cycloalkyl or 3–12 carbons, aralkyl of 7–12 carbons, aryl of 6–14 carbons and, taken together, alkylene of 3–11 carbons;

g. R_5 is selected from alkyl of 1–12 carbons, cycloalkyl of 3–12 carbons, aralkyl of 7–12 carbons and aryl of 6–14 carbons;

h. R_6 is selected from hydrogen, alkyl of 1–8 carbons, cycloalkyl of 3–8 carbons, aralkyl of 7–12 carbons and aryl of 6–14 carbons;

i. R_7 is selected from primary or secondary alkyl of 1–12 carbons and cycloalkyl of 3–12 carbons;

j. R_8 is selected from tertiary alkyl of 4–8 carbons and aryl of 6–14 carbons; and

k. R_9 is a hydrocarbyl diradical selected from aliphatic hydrocarbyl of 2–20 carbons, cycloaliphatic hydrocarbyl of 3–20 carbons, aliphatic-cycloaliphatic hydrocarbyl of 4–20 carbons and aromaticaliphatic hydrocarbyl of 7–20 carbons optionally containing one or more nonadjacent and nonterminal oxygen, sulfur or nitrogen atoms in the backbone structure, and from aromatic of 6–12 carbons.

4,028,345

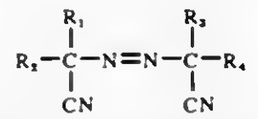
PROCESS FOR THE PREPARATION OF AZODINITRILES FROM AMINONITRILES IN THE PRESENCE OF A SURFACTANT

Earl Phillip Moore, Jr., Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 540,084, Jan. 10, 1975, abandoned. This application Oct. 3, 1975, Ser. No. 618,761
Int. Cl.² C07C *107/02*
U.S. Cl. 260—192 **20 Claims**

1. The process for the preparation of azodinitriles comprising reacting an alpha-aminonitrile selected from the group consisting of

mixtures of (a) and (b) wherein R_1, R_2, R_3 and R_4 are selected from the group consisting of (1) acylic aliphatic hydrocarbon radicals of 1 to 9 carbon atoms, (2) carbon acylic aliphatic radicals of 1 to 8 carbon atoms substituted with carboxyl, hydroxyl or —OR wherein R is selected from an acyclic aliphatic hydrocarbon radical of 1 to 4 carbon atoms, (3) cyclic aliphatic hydrocarbon radicals of 3 to 6 carbon atoms and (4) cyclic aliphatic hydrocarbon radicals of 3 to 11 carbon atoms formed by combining R_1 and R_2 or R_3 and R_4, with 5 to 15% by weight based on the reaction mixture of a metal hypochlorite, $M(OCl)_x$ where M is selected from sodium, potassium or calcium and *x* is the valence of M, in an aqueous medium in the presence of 0.25 to 10% by weight based on the weight of aminonitrile of a surface active compound or mixtures thereof having an HLB of 8 to 35 at a temperature of −10° C to 30° C said metal hypochlorite and alpha-aminonitrile being present in an equivalent ratio of from 1:1 to 2:1 of hypochlorite to aminonitrile and recovering from the reaction mixture an aliphatic azodinitrile compound of the formula



wherein R_1, R_2, R_3 and R_4 are as defined and R_1 and R_2 may be the same as R_3 and R_4.

4,028,346

TETRASELENOFULVALENE, DITHIODISELENOFULVALENE AND THE TCNQ SALTS THEREOF

Edward M. Engler, Wappingers Falls, and Vishnubhai V. Patel, Ossining, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 10, 1974, Ser. No. 477,553
Int. Cl.² C07D *421/04*
U.S. Cl. 260—239 R **4 Claims**

1. A composition of matter tetraselenofulvalene.

4. A composition of matter dithiodiselenafulvalene tetracyano-p-quinodimethanide.

4,028,347

METHOD FOR PROCESSING LACTAM RESIDUES WHICH CONTAIN BORIC ACID

Hans-Helmut Schwarz, Krefeld-Traar, and Otto Immel, Krefeld, both of Germany, assignors to Bayer Aktiengesellschaft, Germany

Continuation of Ser. No. 395,714, Sept. 10, 1973, abandoned. This application June 5, 1975, Ser. No. 584,219
Claims priority, application Germany, Sept. 15, 1972, 2245300
Int. Cl.² C07D *201/16*
U.S. Cl. 260—239.3 A **6 Claims**

1. In the method of recovering a lactam from a mixture comprising lactam and boric acid produced by rearrangement of an oxime to a lactam in the gaseous phase in the presence of a catalyst containing boric acid, said method comprising distilling said mixture to obtain lactam and a distillation residue of boric acid and lactam and then recovering lactam from said distillation residue by further distillation, the method of improving the yield of lactam recovered from said distillation residue which comprises introducing 0.5 to 2 mol, per mol of boric acid, of a polyhydric alcohol having 3 to 10 carbon atoms into said distillation residue and heating the resulting mixture to 80° to 170° C. In order to remove water produced by distilling and subsequently removing the lactam from the mixture by distillation to thereby obtain lactam substantially free of boric acid as distillate, said lactam being selected from the group consisting of caprolactam and the lactams of ω-aminovaleric acid, ω-aminocaprylic acid, ω-aminoundecanoic acid and ω-aminolauric acid.

5. The method of claim 1 wherein said lactam is caprolactam.

4,028,348

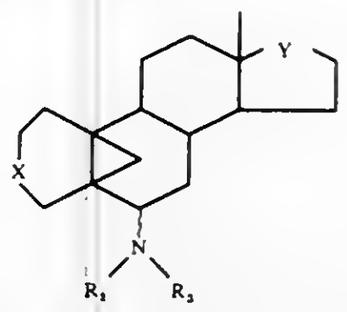
6-AMINO-5β,19-CYCLOANDROSTANE DERIVATIVES

Pal Bíte; Imre Moravcsik; Inge Schäfer; Gyula Horváth; Zsuzsanna Méhesfalvi née Vajna; János Borvendég, and Ilona Hermann née Szente, all of Budapest, Hungary, assignors to Richter Gedeon Vegyeszeti Gyar RT, Budapest, Hungary

Filed Feb. 17, 1976, Ser. No. 658,863
Int. Cl.² C07J *41/00*, *43/00*
U.S. Cl. 260—239.5 **1 Claim**

1. A 6-amino-5β,19-cycloandrostane derivative of formula I and its pharmaceutically acceptable acid addition salts

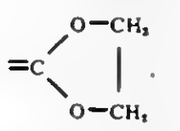
(I)



wherein

X denotes any of the groups of the formula =CH(OR), =CO or =C=N-OR_1,

Y denotes any of the groups of the formula =CO, =CH(OR_1), =C=N-OR_1, =C(OR_1)-C ≡ CH or



wherein

R denotes a hydrogen atom, a C_{1-4} alkyl group or a C_{2-3} acyl group, and

R_1 denotes a hydrogen atom a straight-chained or branched C_{1-3} alkyl group, a straight-chained or branched C_{1-3} hydroxyalkyl group, a C_{3-6} cycloalkyl group, an allyl group, or a benzyl group, and

R_2 has the same meaning as R_1 but if R_1 is a sec. or tert. alkyl group or an alicyclic group, then R_2 can only be a hydrogen atom; and if R_2 is a benzyl group then R_2 can only be a hydrogen atom or a primary alkyl group, further

R_2 and R_3 may denote together with the adjacent nitrogen atom a piperidine, a morpholine, or an N-methylpiperazine group.

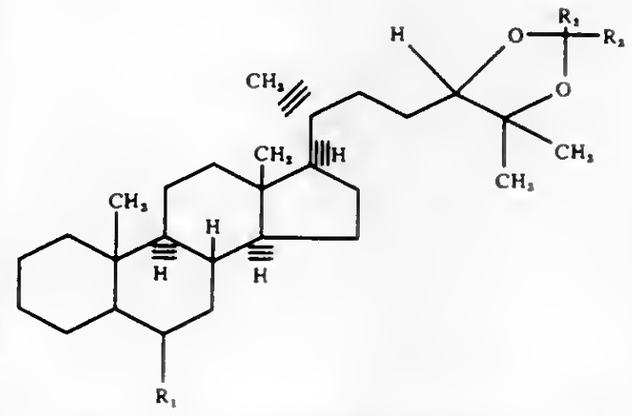
4,028,349

SYNTHESES OF 24R,25- AND 24S,25-DIHYDROXYCHOLESTEROL 24,25-KETALS AND ALKANOYL DERIVATIVES THEREOF

John Joseph Partridge, Jr., and Milan Radoje Uskokovic, both of Upper Montclair, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Mar. 8, 1976, Ser. No. 664,833
Int. Cl.² C07J *71/00*
U.S. Cl. 260—239.55 D **33 Claims**

1. A compound of the formula



wherein R_1 is hydroxy, lower alkoxy, phenyl lower alkoxy, lower alkanoyloxy or benzoyloxy, R_2 and R_3 each taken independently are lower alkyl, R_2 and R_3 taken together are lower alkylene and the absolute configuration at C-24 is R or S.

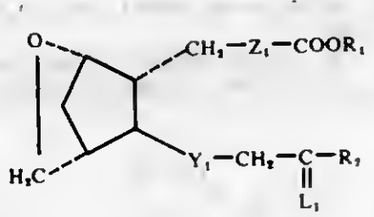
4,028,350

9α,11αOR 11α,9αEPOXYMETHANO-PROSTAGLANDANS AND PROCESS FOR THEIR PREPARATION

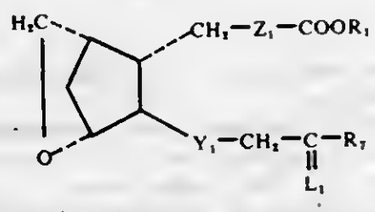
Gordon L. Bundy, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed June 25, 1976, Ser. No. 699,672
Int. Cl.² C07D *307/06*, *307/28*
U.S. Cl. 260—240 R **58 Claims**

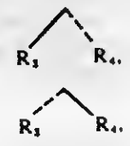
1. A process for preparing a prostaglandin analog of the formula:



or



wherein Y_1 is trans—CH=CH—, —C C—, or $—CH_2CH_2—$; wherein L_1 is

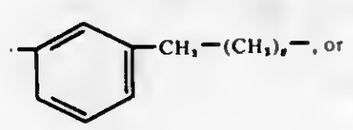


or a mixture of

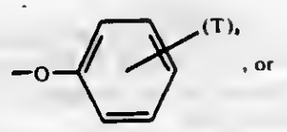
and

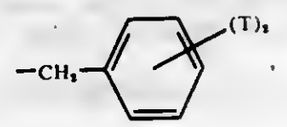
wherein R_2 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro; wherein Z_1 is

1. cis—CH=CH—CH_2—$(CH_2)_g$—CH_2—,
2. cis—CH=CH—CH_2—$(CH_2)_g$—CF_2—,
3. cis-CH_2-CH=CH-$(CH_2)_g$—CH_2—,
4. —$(CH_2)_2$—$(CH_2)_g$—CH_2—,
5. —$(CH_2)_2$—$(CH_2)_g$—CF_2—,
6. —CH_2—O—CH_2—$(CH_2)_g$—CH_2—,
7. —C C-CH_2-$(CH_2)_g$—CH_2—,
8. —CH_2—O ≡ C-$(CH_2)_g$—CH_2—,

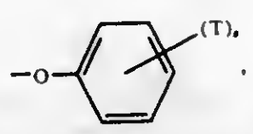


wherein g is one, 2, or 3;
wherein R_7 is
1. —$(CH_2)_m$—CH_2,





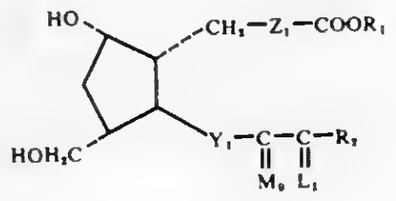
wherein 1 is zero to three, inclusive, wherein m is one to 5, inclusive, T is chloro, fluoro, trifluoromethyl, alkyl of one to 3 carbon atoms, inclusive, or alkoxy of one to 3 carbon atoms, inclusive, and s is zero, one, 2, or 3, the various T's being the same or different, with the proviso that not more than two T's are other than alkyl, with the further proviso that R_7 is



wherein T and s are as defeind above, only when R_2 and R_4 are hydrogen or methyl, being the same or different; and wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation,

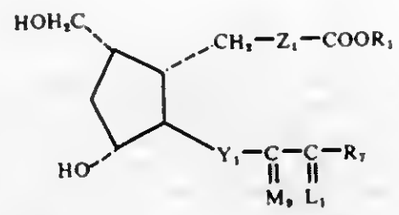
with the proviso that Z_1 is $—(CH_2)_2—(CH_2)_g—CH_2—$, Y_1 is $—CH_2CH_2—$, and R_2 and R_4 are both hydrogen, only when R_7 is not $—(CH_2)_m—CH_2$; which comprises:

1. sulfonating the ring hydroxyl of prostaglandin-type compound of the formula



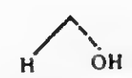
(9)

or



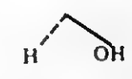
(10)

respectively, wherein M_8 is



(2)

or



(3)

and wherein L_1, R_1, R_7, R_8, Y_1, and Z_1 are as defined above;

2. cyclizing the reaction product of step 1;
3. deoxygenating the secondary hydroxyl of the reaction product of step 2.

4,028,351

METHOD FOR THE PREPARATION OF DERIVATIVES OF SPIRO (4,5)-DECANE AND DERIVATIVES THUS OBTAINED

Ida Taccone, Voghera (Pavia), Italy, assignor to Buskine S.A., Fribourg, Switzerland

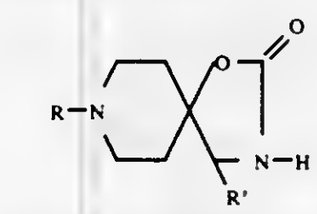
Continuation-in-part of Ser. No. 445,634, Feb. 25, 1974, abandoned, which is a continuation of Ser. No. 286,752, Sept. 6, 1972, abandoned. This application Feb. 11, 1975, Ser. No. 549,061

Claims priority, application Switzerland, Sept. 7, 1971, 13141/71; Feb. 12, 1974, 2053/74

Int. Cl.² C07D *498/10*

U.S. Cl. 260—240 K **10 Claims**

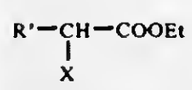
1. A method for the preparation of a spiro-[4,5]- decane derivative having the formula:



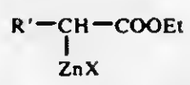
(1)

in which R is selected from the group consisting of beta-phenylethyl, 3',4'-methylenedioxy (beta-phenyl-ethyl)-, beta-(p-fluoro)-phenyl-ethyl; beta-phenoxy-ethyl, cinnamyl, diphenyl-methyl, and beta-(3'-trifluoromethyl)-phenyl- ethyl, and R' is hydrogen or phenyl, which comprises the steps of:

1. reacting, at a temperature of between 50° and 60° C, an alpha-halogen alkyl acetate, having the formula

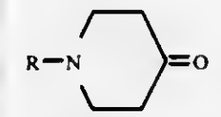


wherein R' is as defined above and X is Cl, Br or I, in the presence of activated elemental zinc to form a primary adduct having the formula

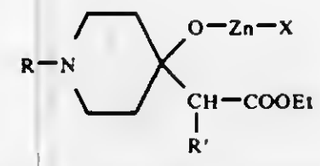


wherein R' and X have the above defined meanings, in an anhydrous solvent mixture of benzene and ethyl ether, until the alpha-halogen alkyl ester is wholly absent from the reaction mixture;

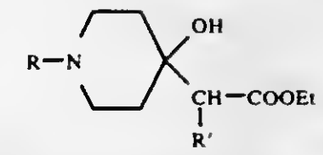
2. adding at least one mole of an N-substituted-4-piperidone of the formula



where R is as defined above per mole of primary adduct in the reaction mixture from step (1) at a temperature between 0° and 20° C. to form a final adduct, having the formula

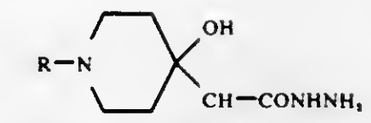


3. completely precipitating the final adduct at a temperature of 0° C by stepwise addition of anhydrous ethyl ether, and separating the final organo-metallic adduct by filtering and drying;
4. decomposing the solid final adduct with water to form an oily beta-hydroxy ester product of the formula



wherein R and R' are as defined above;

5. neutralizing the reaction mixture from step (4) to pH 7; extracting the beta-hydroxy ester product with an organic solvent and isolating the beta-hydroxy ester;
6. reacting said beta-hydroxy ester product with excess hydrazine for 8 to 30 hours at a temperature of 40°–60° C, in the molar ratio of ester to hydrazine of 1:1.5 to 1:100, to form the corresponding beta-hydroxy-hydrazide, having the formula



and (7) rearranging said beta-hydroxy hydrazide, according to the Curtius transportion reaction, by reacting it with excess nitrous acid, in the presence of a diluted mineral acid at a temperature from room temperature to 60° C, to form the spiro [4,5]-decane derivative of formula (1).

4,028,352

BENZAMIDOPIPERIDINE DERIVATIVES

John Frederick Cavalla, Isleworth, and John Lebeup Archibald, Windsor, both of England, assignors to John Wyeth & Brother Limited, Maidenhead, England

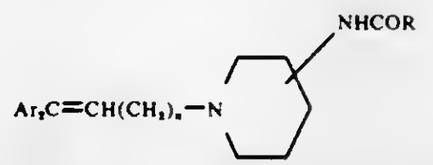
Division of Ser. No. 564,509, April 2, 1975, Pat. No. 3,992,389, which is a continuation-in-part of Ser. No. 323,684, Jan. 15, 1973, abandoned, which is a continuation of Ser. No. 175,345, Aug. 26, 1971, abandoned. This application Apr. 20, 1976, Ser. No. 678,773

Claims priority, application United Kingdom, Sept. 30, 1970, 42090/70; July 22, 1971, 34376/71; Dec. 21, 1972, 59144/72

Int. Cl.² C07D *211/06*

U.S. Cl. 260—240 R **3 Claims**

1. A compound selected from the group consisting of (A) heterocyclic compounds of formula I*a*



Ia

where n denotes an integer from 1 to 4, Ar represents phenyl or monohalophenyl and R represents phenyl and (B) the pharmaceutically acceptable acid addition and quaternary ammonium salts thereof.

4,028,353

NOVEL CHEMICAL COMPOUNDS

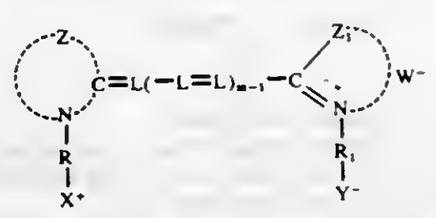
Alan L. Borror, Lexington, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation of Ser. No. 167,500, July 29, 1971, Pat. No. 3,734,739. This application Nov. 30, 1972, Ser. No. 310,942

Int. Cl.² C07D *403/06*

U.S. Cl. 260—240.6 **8 Claims**

1. A cyanine dye of the formula:



wherein L represents a methine group; *m* represents a positive integer of from 1 to 3, inclusive; Z and Z_1 each represents the nonmetallic atoms necessary to complete a heterocyclic ring system of the azole or azine series; R and R_1 each represents a divalent aliphatic group, cycloalkylene group or arylene group; X^+ represents a quaternary ammonium, sulfonium or phosphonium group; Y^- represents a $-SO_3^-$ or a $-COO^-$ group; and W^- represents an acid anion.

4,028,354

ALKENYL AND ALKINYLUREIDO CEPHALOSPORINS

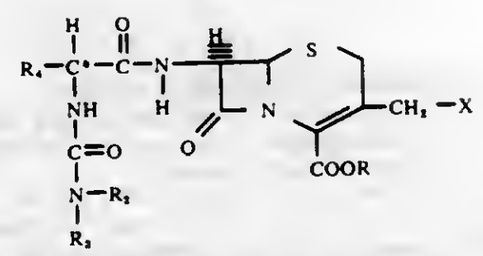
Hermann Breuer, and Uwe D. Treuner, both of Regensburg, Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Mar. 8, 1976, Ser. No. 664,467

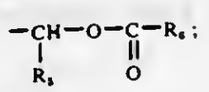
Int. Cl.² C07D *501/36*

U.S. Cl. 260—243 C **35 Claims**

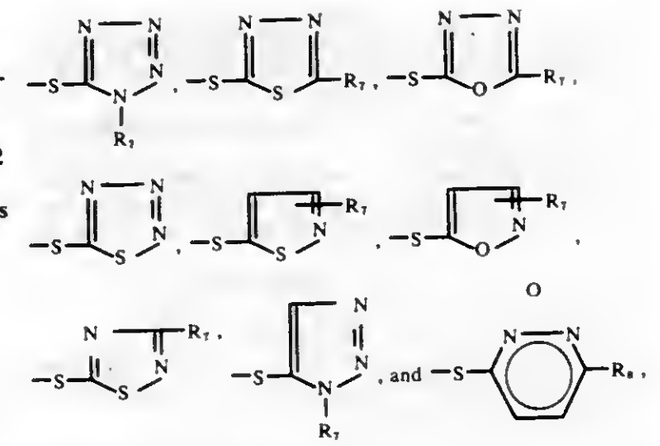
1. A compound of the formula:



wherein R is hydrogen, lower alkyl, phenyl-lower alkyl, diphenyl-lower alkyl, tri(lower alkyl) silyl, trihaloethyl, an alkali metal ion, and alkaline earth metal ion, an alkaline earth metal ion, dibenzylamine, N,N-dibenzylethylenediamine, methylamine, triethylamino, N-ethylpiperidine or



R_3 is lower alkenyl or lower alkinyl; R_3 is hydrogen or lower alkyl; R_4 is phenyl, phenyl-lower alkyl, substituted phenyl or phenyl-lower alkyl wherein said phenyl substituent is one or two members selected from the group consisting of halogen, lower alky of 1 to 4 carbons lower alkoxy of 1 to 4 carbons, and hydroxy, or a substituted or unsubstituted heterocyclic selected from the group consisting of 2-thienyl, 3-thienyl, 2-furyl, and 3-furyl wherein said heterocyclic substituent is attached at an available carbon atom and is halogen or lower alkyl of 1 to 4 carbons; R_6 is hydrogen or lower alkyl; R_6 is lower alkyl; and X is a heterothio group selected from the group consisting of



wherein R_7 is hydrogen or lower alkyl of 1 to 4 carbons and R_8 is hydrogen, lower alkyl of 1 4 carbons, methoxy, hydroxy,or halogen.

4,028,355

CEPHALOSPORIN PURIFICATION PROCESS

Dale W. Blackburn, Moorestown, N.J., assignor to SmithKline Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 435,911, Jan. 23, 1974, abandoned. This application July 18, 1975, Ser. No. 597,256

Int. Cl.² C07D *501/12*

U.S. Cl. 260—243 C **20 Claims**

1. A process for the purification of a semisynthetic cephalosporin which contains a free carboxylic acid comprising

a. contacting an aqueous solution of said semisynthetic cephalosporin, said solution having a pH of 3 to 6.5 so that said semisynthetic cephalosporin is about 99% ionized, with an adsorbent, said adsorbent being a nonionic macroreticular polymeric resin, said resin being a cross-linked styrene-divinylbenzene copolymer with an average pore size of 90 A or a cross-linked acrylic ester polymer with an average pore size of 80 to 250 A and eluting said semisynthetic cephalosporin from said adsorbent and adsorbed impurities with an eluant, said eluant being an aqueous solution having a pH of 3 to 8.5 so that said semisynthetic cephalosporin is maintained in the ionized form;

b. acidifying the eluates which contain the semisynthetic cephalosporin to a pH below its pKa; and

c. collecting the resulting precipitated semisynthetic cephalosporin.

4,028,356

TRIAZINOBENZODIAZEPINES

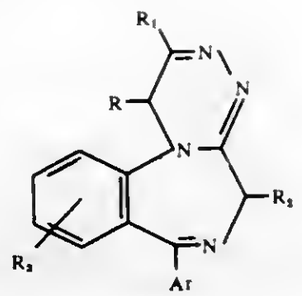
Robert Bruce Moffett, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Feb. 9, 1976, Ser. No. 656,372

Int. Cl.² C07D *253/08, 487/04*

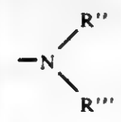
U.S. Cl. 260—248 AS **21 Claims**

1. A compound of formula IV:

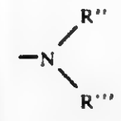


IV

wherein R and R_2 are hydrogen or methyl; wherein R_1 is —COOH, —COOR′ in which R′ is alkyl or 1 to 3 carbon atoms (inclusive), $-(CH_2)_nA$ in which *n* is an integer of 1 to 3 and A is fluoro, chloro, bromo, trifluoromethyl, hydroxy, alkoxy in which the alkyl group is defined as above, or



in which R″ and R‴ are hydrogen or alkyl as defined above or together



is pyrrolidino, piperidino, morpholino, 4-methylpiperazino, 4-(2-hydroxyethyl)piperazino; wherein R_3 is hydrogen, fluoro, chloro, bromo, trifluoromethyl, or nitro, and wherein Ar is phenyl, o-chlorophenyl, o-fluorophenyl, 2,6-difluorophenyl, or 2-pyridyl, and the pharmacologically acceptable acid addition salts thereof.

4,028,357

2′-(4,6-DISUBSTITUTED)-s-TRIAZIN-2-YL)AMINO-6′-DIALKYLAMINO FLURANS

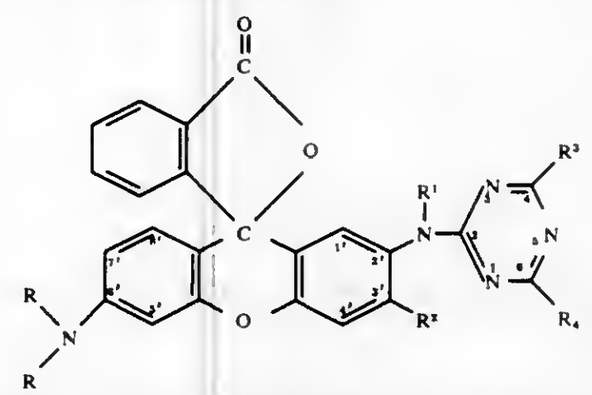
Nathan Norman Crounse, Cincinnati, Ohio, assignor to Sterling Drug Inc., New York, N.Y.

Filed July 31, 1975, Ser. No. 600,773

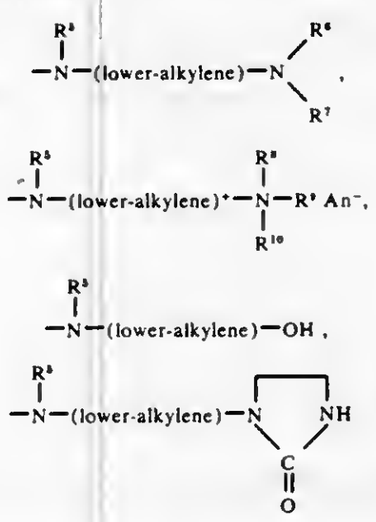
Int. Cl.² C07D *251/44, 251/50, 251/70*

U.S. Cl. 260—249.5 **22 Claims**

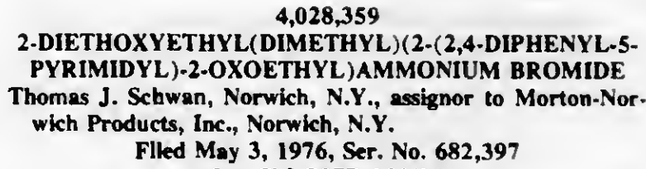
1. A compound having the formula



where R represents non-tertiary alkyl of one to four carbon atoms; R^1 and R^3 represent hydrogen or non-tertiary alkyl of one to four carbon atoms; R^3 and R^4 represent chlorine, NH_2 or one of the groups



-continued



in which R^5, R^6 and R^7 represent hydrogen or non-tertiary alkyl of one to four carbon atoms; R^8 and R^9 represent non-tertiary alkyl of one to four carbon atoms; R^{10} represents non-tertiary alkyl of one to four carbon atoms, benzyl or benzyl substituted in the benzene ring by one or two of halo or alkyl of one to three carbon atoms; and An represents an anion selected from the group consisting of halides, hydroxy, alkanoates, nitrate, phosphate, alkylsulfates and arylsulfates.

4,028,358

6-FLUORO-9-PERFLUOROBUTYL PURINE

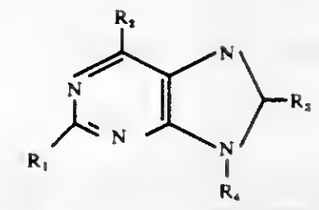
Charles L. Liotta, 3691 Stanford Circle, Decatur, Ga. 30034, and John D. Muzzy, 631 Norfleet Road NW., Atlanta, Ga. 30305

Filed Sept. 4, 1973, Ser. No. 393,718

Int. Cl.² C07D *473/40*

U.S. Cl. 260—254 **1 Claim**

1. A purine compound of the following formula:



wherein R_1 and R_3 are hydrogen, R_2 is fluorine, and R_4 is perfluorbutyl.

4,028,359

2-DIETHOXYETHYL(DIMETHYL)(2-(2,4-DIPHENYL-5-PYRIMIDYL)-2-OXOETHYL)AMMONIUM BROMIDE

Thomas J. Schwan, Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed May 3, 1976, Ser. No. 682,397

Int. Cl.³ C07D *239/24*

U.S. Cl. 260—256.4 R **1 Claim**

1. 2-Diethoxyethyl(dimethyl)[2-(2,4-diphenyl-5-pyrimidyl)-2-oxoethyl]ammonium bromide.

4,028,360

6-ACYLAMIDO-2,2-DIMETHYL-3-(PYRIMIDIN-4,6-DIONE-2-YL)-PENAMS AND INTERMEDIATES THEREFOR

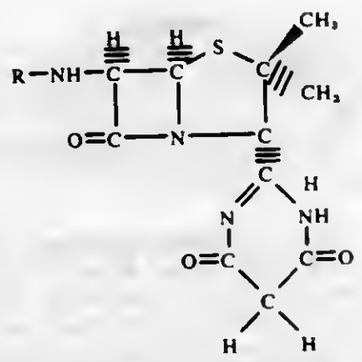
Gene Michael Bright, Groton, Conn., assignor to Pfizer Inc., New York, N.Y.

Filed Mar. 23, 1976, Ser. No. 669,508

Int. Cl.³ C07D *499/42, 499/44, 499/32*

U.S. Cl. 260—256.5 R **1 Claim**

1. A compound having the formula



wherein R is selected from the group consisting of hydrogen and the pharmaceutically-acceptable acid addition salts thereof.

4,028,361

PROCESS FOR THE PURIFICATION OF MDA

Adnan A. R. Sayigh, North Haven; Kwok K. Sun, Hamden, and Henri Ulrich, Northford, all of Conn., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed Aug. 18, 1975, Ser. No. 605,751
Int. Cl.² C07C *85/16*
U.S. Cl. 260—570 D **12 Claims**

1. A process for selectively removing 2,2'- and 2,4'-diaminodiphenylmethanes from admixtures thereof with 4,4'-diaminodiphenylmethane which comprises heating said mixtures of isomeric diamines with a member selected from the class consisting of 1,3,5-triarylhexahydro-1,3,5-triazines and polyaminals obtained as by-products in the formation of said triazines, said heating being carried out at a temperature of about 30° C to about 100° C in the presence of aqueous mineral acid.

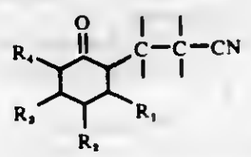
4,028,362

PROCESS FOR THE PREPARATION OF QUINOLINES

Jozef A. Thoma, Sittard, and Petrus A. M. J. Stijfs, Munstergeleen, both of Netherlands, assignors to Stamicarbon B. V., Geleen, Netherlands

Filed Dec. 12, 1974, Ser. No. 532,294
Claims priority, application Netherlands, Dec. 15, 1973, 7317228
Int. Cl.² C07D *215/00*
U.S. Cl. 260—283 SY **4 Claims**

1. A process for preparing quinolines, consisting essentially of contacting a vaporized compound of the formula



wherein each of R_1, R_2, R_3 and R_4 is the same or different and is a hydrogen atom or an alkyl group of 1 to 4 carbon atoms, wherein the summation of carbon atoms of the groups R_1, R_2, R_3 and R_4 is no greater than 10, at elevated temperatures with a dehydrogenation catalyst in the presence of hydrogen in two stages, wherein in a first stage (1) said vaporized compound is contacted with a dehydrogenation catalyst at a temperature ranging between 185° to 220° C to form a vaporized mixture of products and in a second stage (2) said mixture is contacted with the catalyst in the presence of hydrogen at a higher temperature than that of stage (1) and being between 260° and 300° C, wherein the mixture of products includes water, and wherein said water is removed prior to undertaking step (2).

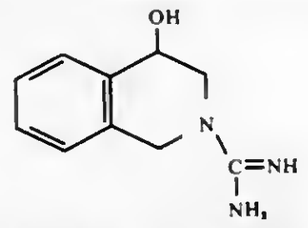
4,028,363

ISOQUINOLINE DERIVATIVES

Robert John Francis, Harpenden, and John Glyn Allen, St. Albans, both of England, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Mar. 3, 1976, Ser. No. 663,385
Int. Cl.² C07D *217/24*
U.S. Cl. 260—286 R **2 Claims**

1. 2-Amidino-4-hydroxy-1,2,3,4-tetrahydroisoquinoline characterized by the formula



or a pharmaceutically acceptable acid addition salt thereof.

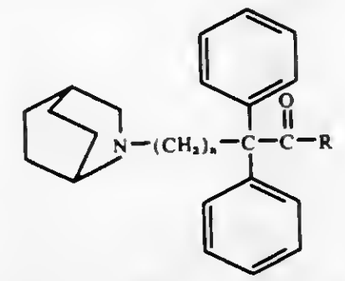
4,028,364

2-AZABICYCLO[2.2.2.]OCTAN-2-YL-DIPHENYL-ALKANONES AND RELATED COMPOUNDS

Gilbert William Adelstein, Evanston, Ill., assignor to G. D. Searle & Co., Chicago, Ill.

Filed July 6, 1976, Ser. No. 703,041
Int. Cl.² C07D *453/02*
U.S. Cl. 260—293.54 **2 Claims**

1. A compound of the general formula



(I)

wherein R is an alkyl radical containing from 1 to 6 carbon atoms and n is an integer from 1 to 3.

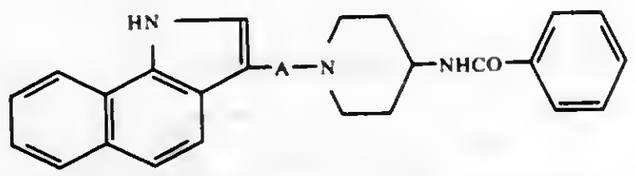
4,028,365

BENZ[g]INDOLYL COMPOUNDS

John Frederick Cavalla, Isleworth, and John Leheup Archibald, Windsor, both of England, assignors to John Wyeth & Brother Limited, Maidenhead, England

Continuation-in-part of Ser. No. 323,684, Jan. 15, 1973, abandoned, which is a continuation-in-part of Ser. No. 175,345, Aug. 26, 1971, abandoned. This application Nov. 15, 1974, Ser. No. 524,005
Claims priority, application United Kingdom, Sept. 3, 1970, 42090/70; July 22, 1971, 34376/71
Int. Cl.² C07D *471/02*
U.S. Cl. 260—293.61 **2 Claims**

1. A benz[g]indole compound of the formula



where A is lower alkylene of 1 to 4 carbon atoms, and the pharmaceutically acceptable acid addition salts thereof.

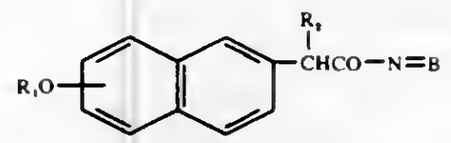
4,028,366

2-NAPHTHYL-LOWER-ALKANOYLAMINES

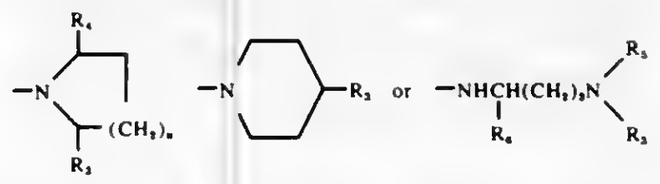
Bernard L. Zenitz, Colonie, N.Y., assignor to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 542,546, Jan. 20, 1975, Pat. No. 4,005,093. This application June 1, 1976, Ser. No. 691,630
Int. Cl.² C07D *211/16*
U.S. Cl. 260—293.62 **8 Claims**

1. A compound having the formula:



where R_1 and R_2 each represent hydrogen or lower-alkyl and N=B represents one of the groups



where R_3 represents lower-alkyl, cyclohexyl or cyclohexyl-lower-alkyl; R_4 and R_6 represent hydrogen or lower-alkyl; R_5 represents lower-alkyl; and n represents one of the integers 1, 2 and 3.

4,028,367

HIGH EFFICIENCY STABLE AQUEOUS RESOLES

Harold P. Higginbottom, Wilbraham, Mass., assignor to Monsanto Company, St. Louis, Mo.

Filed Mar. 10, 1975, Ser. No. 556,596
Int. Cl.² C08L *61/06*
U.S. Cl. 260—29.3 **14 Claims**

1. An aqueous solution of a resole wherein the solution has a pH in the range 6 to 8.5 and contains less than 2 percent of free phenol and less than 2 percent of free formaldehyde based on the weight of the resole and wherein the resole has a number average molecular weight of less than 300, a water tolerance between about 100 and 800 and a combined formaldehyde to phenol molar ratio in the range of 2.0:1 to 2.9:1 and contains sufficient methylolated 2,2'- and 2,4'-dihydroxydiphenylmethanes to inhibit crystal formation in the resole solution said resole being the product of:

a. reacting 1.0 mole phenol with from 0.05 to 0.03 moles formaldehyde under conditions for formation of novolac resin,

b. adding from 1.75 to 3.5 moles formaldehyde and reacting under basic conditions to produce a resole of molecular weight less than 300, and containing less than 2 weight percent free phenol, and

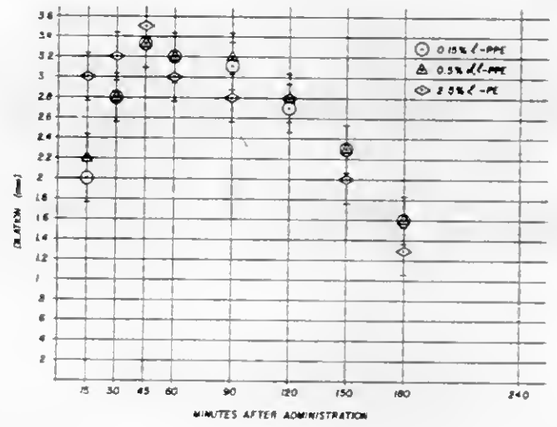
c. adjusting the pH of the aqueous resole to between about 6 and 8.5.

4,028,368

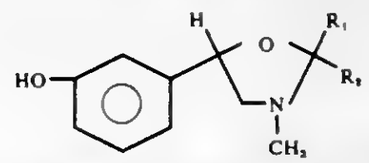
NOVEL INTERMEDIATES USEFUL IN THE SYNTHESIS OF OPTICALLY ACTIVE M-ACYLOXY-α-[(METHYLAMINO)METHYL]BENZYL ALCOHOLS

Nicolae S. Bodor, and Sun-Shine Yuan, both of Lawrence, Kans., assignors to Interx Research Corporation, Lawrence, Kans.

Division of Ser. No. 548,606, Feb. 10, 1975, Pat. No. 3,966,749. This application Mar. 29, 1976, Ser. No. 671,067
Int. Cl.² C07D *263/06*
U.S. Cl. 260—295 R **3 Claims**



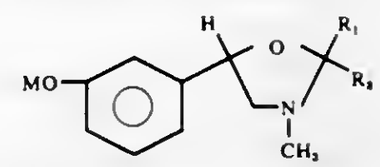
1. The intermediate compound:



(II)

wherein R_1 and R_2 which can be the same or different represent a member selected from the group consisting of a hydrogen atom, a C_1–C_{10} alkyl group or a di(C_1–C_2)alkylamino(C_1–C_{10})alkyl group.

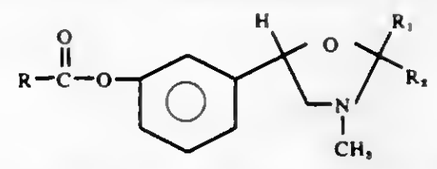
2. The intermediate compound:



(III)

wherein R_1 and R_2 which may be the same or different represent a hydrogen atom, a C_1–C_{10} alkyl group, or a di(C_1–C_2)alkylamino(C_1–C_{10}) alkyl group; and wherein M represents an alkali or alkaline earth metal or thallium.

3. The intermediate compound:



(IV)

wherein R represents a member selected from the group consisting of a straight or branched alkyl group of from one to twenty carbon atoms, an ethoxycarbonyl group, a benzyloxycarbonyl group, a phenyl group, a 2-pyridyl group, a 3-pyridyl group or a 4-pyridyl group, and wherein R_1z and R_2, which may be the same or different, represent a hydrogen atom, a C_1–C_{10} alkyl group or a di(C_1–C_2)aikylamino(C_1–C_{10})aikyl group.

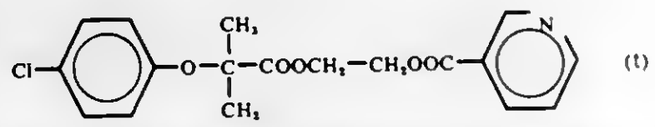
4,028,369

PREPARATION OF GLYCOL (2-(P-CHLOROPHENOXY)-2-METHYLPROPIONATE)-2-NICOTINATE

Carlos Sunkel Letelier, Olvega, and Fernando Cillero Grafulla, Ferraz, both of Spain, assignors to Alter S.A., Madrid, Spain

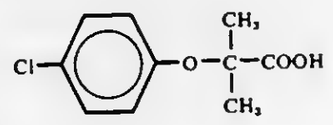
Filed Aug. 4, 1975, Ser. No. 601,865
Claims priority, application Spain, June 4, 1975, 438245
Int. Cl.² C07D *213/55*
U.S. Cl. 260—295.5 R **5 Claims**

1. A process for the preparation of glycol 2-(p-chlorophenoxy)-2-methylpropionate nicotinate, of formula (I):



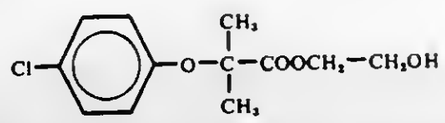
(I)

which process is characterized in that 2-(p-chlorophenoxy)-2-methylpropionic acid, of formula (II):



(II)

is reacted with ethylene oxide at a temperature of up to about 60° C in an inert solvent in the presence of a zinc chloride as a catalyst, to prepare the monoglycol ester of the acid (II), of formula (III):



(III)

which is in turn reacted with nicotinic acid chloride in an inert solvent and in the presence of a base at a temperature of up to about 60° C, to prepare the final product, of formula (I).

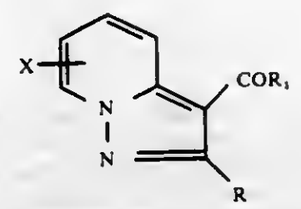
4,028,370

NOVEL PYRAZOLO [1,5-A]PYRIDINES

Tsutomu Irikura, Tokyo, Japan, assignor to Kyorin Pharmaceutical Co., Ltd., Tokyo, Japan

Filed Oct. 17, 1975, Ser. No. 623,311
Claims priority, application Japan, Nov. 1, 1974, 49-126319
Int. Cl.² C07D *487/00*
U.S. Cl. 260—296 H **6 Claims**

1. A compound of the general formula:



wherein X is hydrogen or methyl; R is dialkylamino or alkyleneimino; and R_1 is different from R and is hydrogen, straight or branched lower alkyl, or lower alkoxy alkyl.

4,028,371

THE COMPOUND 1,3,4-TRIMETHYL-1-(3,4,5-TRIMETHOXYBENZYL)-1,2,5,6-TETRAHYDROPYRIDINE CHLORIDE

Ricardo Granados Jarque; Juan Bosch Cartes; Jorge Canals Cabiro, all of Barcelona; Cristobal Martinez Roldao, and Fernando Rabadan Pelnado, both of Madrid, all of Spain, assignors to Laboratorios Made, S.A., Spain

Division of Ser. No. 569,193, April 17, 1975, abandoned. This application Mar. 1, 1976, Ser. No. 662,577
Claims priority, application Spain, May 4, 1974, 425970
Int. Cl.² C07D *211/00*
U.S. Cl. 260—297 R **1 Claim**

1. The compound 1,3,4-trimethyl-1-(3,4,5-trimethoxybenzyl)-1,2,5,6-tetrahydropyridine chloride.

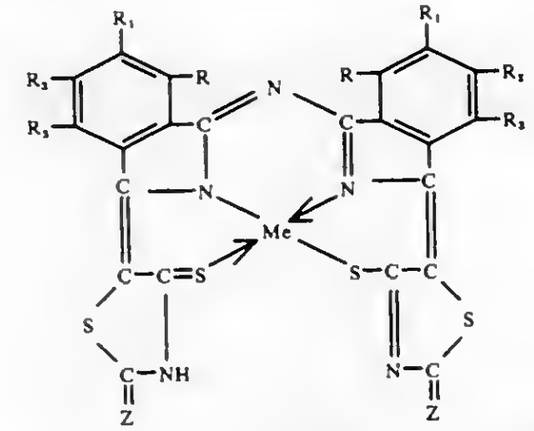
4,028,372

METAL CHELATES OF 1-IMINO-3-(4-THIOXO-5-THIAZOLIDINYLIDENE)ISOINDOLINES

Nathan N. Crounse, and Nicholas A. Ambrosiano, both of Cincinnati, Ohio, assignors to Sterling Drug Inc., New York, N.Y.

Continuation-in-part of Ser. No. 496,078, Aug. 9, 1974, Pat. No. 3,966,753. This application Nov. 19, 1975, Ser. No. 633,246
Claims priority, application United Kingdom, July 28, 1975, 31506/75
Int. Cl.² C07F *15/00, 15/04;* **C09B** *57/00*
U.S. Cl. 260—299 **9 Claims**

1. A compound of the formula



in which R, R_1, R_2 and R_3 are the same or different and are selected from the class consisting of hydrogen, alkyl having one to three carbon atoms, alkoxy having one to three carbon atoms, halo, trifluoromethyl, phenyl and phenyl substituted by alkyl having one to three carbon atoms, alkoxy having one to three carbon atoms or halogen; Me is a metal selected from the class consisting of copper, cobalt and nickel; and Z is oxygen or sulfur.

4,028,373

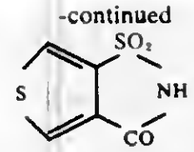
THIOPHENE SACCHARINES

Otto Hromatka, and Dieter Binder, both of Wien, Austria, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Sept. 2, 1975, Ser. No. 609,623
Claims priority, application Austria, Sept. 16, 1974, 7448/74; Sept. 16, 1974, 7449/74; Sept. 16, 1974, 7450/74
Int. Cl.² C07D *513/04*
U.S. Cl. 260—301 **8 Claims**

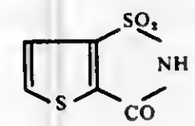
1. Thiophene saccharines of the formulae 2,3-dihydro-3-oxothieno-[3,4-d]-isothiazole-1,1-dioxide

-continued



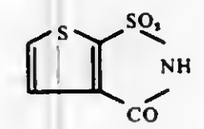
I,

2,3-dihydro-3-oxothieno-[2,3-d]-isothiazole-1,1-dioxide



II and

and 2,3-dihydro-3-oxothieno-[3,2-d]-isothiazole-1,1-dioxide



III

and their non-toxic water-soluble salts.

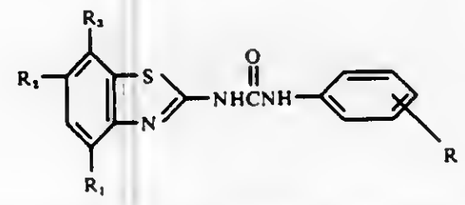
4,028,374

ANTIBACTERIAL THIOCYANATOBENZOTHIAZOLES

Stanford Salvatore Pelosi, Jr., and Robert James Alaimo, both of Norwich, N.Y., assignors to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed Nov. 3, 1975, Ser. No. 628,314
Int. Cl.² C07D *277/82*
U.S. Cl. 260—305 **10 Claims**

1. A compound of the formula:



wherein R is hydrogen, 4-bromo, 4-chloro, 4-flouro, 3,4-dichloro, or 4-nitro; R_1 is methoxy or thiocyanato; R_2 is n-butyl, chloro, methyl, or thiocyanato; R_2 is hydrogen or chloro and at least one of R_1 and R_2 is thiocyanato.

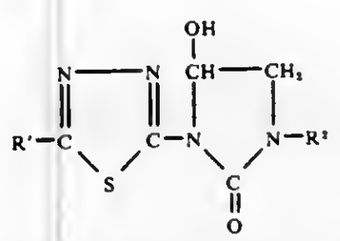
4,028,375

THIADIAZOLYLIMIDAZOLIDINONES

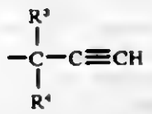
John Krenzer, Oak Park, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Filed Aug. 5, 1974, Ser. No. 494,441
The portion of the term of this patent subsequent to Aug. 26, 1992, has been disclaimed.
Int. Cl.² C07D *417/00*
U.S. Cl. 260—306.8 D **8 Claims**

1. A compound of the formula



wherein R′ is selected from the group consisting of lower alkyl, lower alkenyl, lower haloalkyl, lower alkoxy, lower alkylthio, lower alkylsulfonyl and lower alkylsulfinyl; and R^2 is selected from the group consisting of lower alkenyl, lower chloroalkenyl, lower bromoalkenyl, and



wherein R^3 and R^4 are selected from the group consisting of hydrogen and alkyl of up to three carbon atoms.

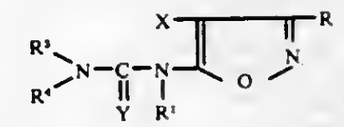
4,028,376

3-ALKYLISOXAZOLE DERIVATIVES AND HERBICIDES CONTAINING THEM

Hisajiro Yukinaga, Kusatsu; Shinzaburo Sumimoto; Ichiro Ishizuka, both of Osaka, and Jitsuo Sugita, Ikeda, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

Filed Sept. 23, 1975, Ser. No. 615,883
Claims priority, application Japan, Oct. 4, 1974, 49-114839
Int. Cl.² C07D *111/14*
U.S. Cl. 260—307 H **11 Claims**

1. A compound of the formula



wherein R represents alkyl of 3–6 carbon atoms or cycloalkyl of 3–6 carbon atoms,

R^1 represents hydrogen or alkyl of 1–6 carbon atoms,

R^2 represents hydrogen or alkyl of 1–6 carbon atoms,

R^4 represents hydrogen, alkyl of 1–6 carbon atoms, alkenyl of 2–7 carbon atoms, alkoxy of 1–6 carbon atoms or alkylthio of 1–6 carbon atoms, or

R^2 and R^4 are combined to form, together with the nitrogen atom to which they are attached, morpholino, pyrrolidino or piperidino,

X represents hydrogen or halogen, and

Y represents oxygen or sulfur, or

R and X are combined to form alkylene of 3–6 carbon atoms.

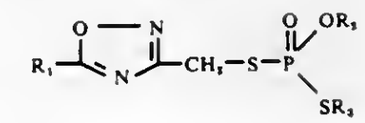
4,028,377

O,S-DIALKYL- AND O-ALKYL-S-ALKOXYALKYL-S-1,2,4-OXA-DIAZOLYL-3-METHYLENE DITHIOPHOSPHATES

Willy Meyer, Riehen; Beat Böhner, Binningen; Dag Dawes, Muttenz, and Kurt Rüfenacht, Basel, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Oct. 23, 1974, Ser. No. 517,359
Claims priority, application Switzerland, Nov. 2, 1973, 15460/73; Nov. 2, 1973, 15461/73; Aug. 16, 1974, 11260/74
Int. Cl.² C07F *9/165*
U.S. Cl. 260—307 G **19 Claims**

1. A compound of the formula



wherein

R_1 represents unsubstituted C_1–C_4-alkyl, benzyl or phenyl,

R_2 represents methyl or ethyl, and

R_3 represents unsubstituted C_3–C_5-alkyl optionally interrupted by oxygen.

10. O-Ethyl-S-allyl-S-(5-methyl-1,2,4-oxadiazole-methylene (3))-dithiophosphate.

4,028,378
FATTY AND BENZOIC ACID ESTERS OF ETHOXYLATED HYDANTOINS SUBSTITUTED OR NOT IN THE 5-POSITION

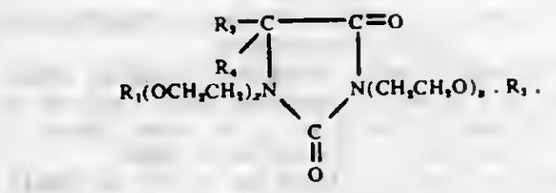
Donald Edward MacFadyen, Williamsport, Pa., assignor to Glyco Chemicals, Inc., Greenwich, Conn.

Continuation-in-part of Ser. No. 419,497, Nov. 27, 1973, abandoned. This application Nov. 17, 1975, Ser. No. 632,320

Int. Cl.² C07D *233/72*

U.S. Cl. 260—309.5 **32 Claims**

1. Esters of 1,3-dihydroxyethyl group-containing-hydantoins having the structural formula



wherein each of R_3 and R_4 separately is hydrogen, lower alkyl, cycloalkyl, or alkoxy and when either or each of R_3 and R_4 is alkyl, cycloalkyl or alkoxy, they jointly have at most 7 carbons, or R_3 and R_4 jointly are the divalent tetramethylene or pentamethylene chain; either one of R_1 and R_2 is hydrogen, and the other one or each of them is benzoyl, isostearoyl, oleoyl, linoleoyl, linolenoyl, or saturated fatty acyl having from 2 to about 22 carbons or a mixture of saturated fatty acyl groups having from 8 to about 22 carbons or a mixture of any of said saturated fatty acyl groups with any of oleoyl, linoleoyl and linolenoyl, palmitoleoyl and myristoleoyl; and each of x and y varies from each of them being 1 to their sum averaging from 2 to about 100; and mixtures of any of said esters.

4,028,379
PROCESS FOR PREPARING 2-AMINO-2-ALKYLTHIO-1-NITROETHYLENE COMPOUNDS

George Raymond White, Harpenden, England, assignor to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

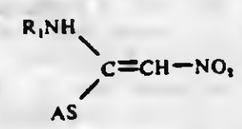
Filed May 5, 1976, Ser. No. 683,355

Claims priority, application United Kingdom, May 15, 1975, 20628/75

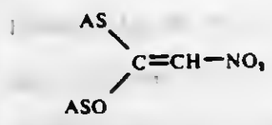
Int. Cl.² C07D *233/64*

U.S. Cl. 260—309 **4 Claims**

1. A process for the production of a compound of the formula:



wherein A is lower alkyl; R_1 is lower alkyl, lower alkoxy, 2,2,2-trifluoroethyl, $(CH_2)_nR_2$ or $HetCH_2Z(CH_2)_2$; Het is an imidazole, thiazole, pyridine, isothiazole, oxazole, isoxazole, triazole or thiadiazole ring, which ring is optionally substituted by lower alkyl, hydroxyl, lower alkoxy, chlorine or bromine, Z is sulphur or methylene; n is an integer from 1 to 12; and R_2 is hydroxy, lower alkoxy or lower alkylamino; wherein a compound of the formula:



is reacted with an amine of formula R_1NH_2.

4,028,380
HYDRAZINO-IMIDAZOLE DERIVATIVES

Harm Jan Panneman, and Antonius Hermanus Nicolaas Maria Bruins, both of Oss, Netherlands, assignors to Akzona Incorporated, Asheville, N.C.

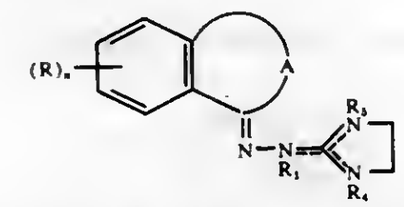
Division of Ser. No. 579,633, May 21, 1975. This application Dec. 10, 1975, Ser. No. 639,495

Claims priority, application Netherlands, June 1, 1974, 74.07469

Int. Cl.² C07D *233/50*

U.S. Cl. 260—309.6 **6 Claims**

1. A compound of the formula:



or a pharmaceutically acceptable acid addition salt thereof, in which the dotted lines mean one extra bond starting from the (guanidine-) carbon atom to one of the adjacent nitrogen atoms, and

A represents methylene, ethylene, propylene or butylene, which groups may optionally be substituted with alkyl having 1 to 4 carbon atoms;

R represents hydroxy, alkyl having 1 to 4 carbon atoms, alkylthio or alkoxy having 1 to 4 carbon atoms, halogen, trifluoromethyl, nitro, amino, hydroxymethyl, lowr alkanoyloxy, or a methylenedioxy group, the latter insofar as n is the number 2 and two adjacent carbon atoms atoms of the benzo ring are involved;

n is the number 0, 1, 2, 3 or 4 with the proviso that where n is 3 or 4, R is only alkyl;

R_1, R_4 and R_5 represent hydrogen or alkyl having 1 to 4 carbon atoms, with the proviso tht one of them is absent in view of the presence of the double bond; and wherein

R_2 together with R_3 represents an alkylene or alkenylene group with 2 carbon atoms.

4,028,381
PYRAZOLOBENZAZEPINES

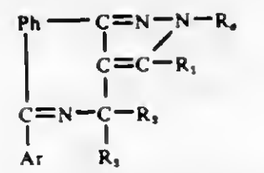
Heinz Werner Gschwend, New Providence, N.J., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 574,211, May 5, 1975, which is a continuation-in-part of Ser. No. 475,474, June 3, 1974, Pat. No. 3,947,585. This application Apr. 13, 1976, Ser. No. 676,609

Int. Cl.² C07D *471/00*

U.S. Cl. 260—310 R **6 Claims**

1. A compound of the formula



wherein Ph is 1,2-phenylene and Ar is phenyl, both of said radicals are unsubstituted or substituted by one or two, of the same or different substituents selected from the group consisting of lower alkyl, lower alkoxy, halo and trifluoromethyl, R_6 is hydrogen, lower alkyl, lower alkanoyl, lower alkoxycarbonyl, carbamoyl, lower alkylcarbamoyl, di-lower alkylcarbamoyl, hydroxy-lower alkyl, lower alkoxy-lower alkyl, amino-lower alkyl, lower alkylamino-lower alkyl, di-lower alkylamino-lower alkyl, Ar or Ar-lower alkyl, wherein the additional chain-nitrogen or oxygen atom is separated from

the ring-nitrogen by at least 2 carbon atoms, each of R_1 and R_2 is hydrogen or lower alkyl, and R_3 is hydrogen, lower alkyl, hydroxy or lower alkanoyloxy; or N-oxides thereof; or pharmaceutically acceptable acid addition salts thereof.

4,028,382
9-BENZOYL,3-HYDROXYMETHYL-1,2,3,4-TETRAHYDRO-CARBAZOLE

Ernest John Alexander, East Greenbush, and Aram Mooradian, Schodack, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 640,249, Dec. 12, 1975, Pat. No. 4,001,270, which is a continuation-in-part of Ser. No. 514,767, Oct. 15, 1974, Pat. No. 3,948,939, which is a continuation-in-part of Ser. No. 314,099, Dec. 11, 1972, Pat. No. 3,905,998, which is a continuation-in-part of Ser. No. 200,205, Nov. 18, 1971, Pat. No. 3,758,496, which is a continuation-in-part of Ser. No. 42,620, June 2, 1970, Pat. No. 3,687,969. This application June 24, 1976, Ser. No. 699,383

Int. Cl.² C07D *209/86*

U.S. Cl. 260—315 **1 Claim**

1. 9-Benzoyl-3-hydroxymethyl-1,2,3,4-tetrahydrocarbazole.

4,028,383
INDOLOPYRONES HAVING ANTIALLERGIC ACTIVITY

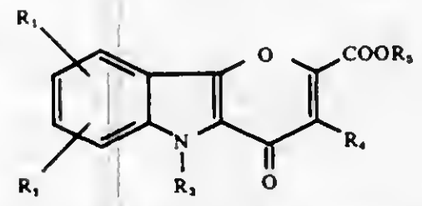
Richard E. Brown, Hanover, and Paul C. Unangst, Hacketts-town, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Sept. 8, 1975, Ser. No. 611,453

Int. Cl.² C07D *491/04*; **A61K** *31/40*

U.S. Cl. 260—326.29 **7 Claims**

1. A substituted indolopyrone of the formula:



wherein R_1 and R_2 may be hydrogen, hydroxy, lower alkoxy or lower alkyl, halogen, trifluoromethyl, or taken together to form a methylenedioxy group;

R_3 may be hydrogen, lower alkyl, phenyl;

R_4 may be hydrogen, lower alkyl of 1 to 6 carbon atoms; and

R_5 may be hydrogen or lower alkyl.

4,028,384
PROCESS FOR THE PREPARATION OF ORGANIC SILICON COMPOUNDS

Hans-Joachim Vahlensieck, Wehr; Claus-Dieter Seiler, and Hans-Joachim Kötzsch, both of Rheinfelden, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Continuation of Ser. No. 58,189, July 24, 1970, abandoned. This application Nov. 23, 1973, Ser. No. 418,793

Claims priority, application Germany, July 25, 1969, 1937904

Int. Cl.¹ C07D *307/12*; **C07F** *7/02*

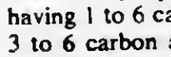
U.S. Cl. 260—347.8 **20 Claims**

1. In the process of hydrosilylation with a hydrogen silane of the formula:

wherein a is 1 or 2;

b is 0 or 1;

X is alkoxy, cycloalkoxy, aryloxy, or halo; and R is alkoxy cycloalkoxy, aryloxy, halo, alkyl, cycloalkyl or aryl with an organic compound containing carbon to carbon aliphatic unsaturation; the improvement which comprises catalyzing said hydrosilylation reaction with a platinum complex compound of the formula:



wherein a is 1 or 2; and R^1 is an olefinically unsaturated ketone selected from the group consisting of butenone, phorone, isophorone, dibenzalacetone and mesityl oxide.

4,028,385
PROCESS FOR PREPARING STEREOSPECIFIC FARNESYLACETIC ACID AND ESTER THEREOF

Yoshiji Fujita, Kurashiki; Yoshiaki Omura, Okayama; Takashi Nishida, and Kazuo Itoi, both of Kurashiki, all of Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

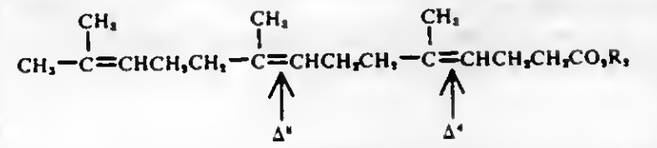
Filed Aug. 18, 1975, Ser. No. 605,455

Claims priority, application Japan, Sept. 2, 1974, 49-100631; Sept. 2, 1974, 49-100632; Sept. 2, 1974, 49-100633; Sept. 2, 1974, 49-100634; Sept. 2, 1974, 49-100635

Int. Cl.² C11C *3/02*, *1/00*

U.S. Cl. 260—410 **15 Claims**

1. A process for preparing a stereospecific farnesylacetic acid or ester thereof, at Δ^4 and Δ^8 positions, having the formula:



wherein R_2 represents hydrogen atom, a lower alkyl radical having 1 to 6 carbon atoms, a lower cycloalkyl radical having 3 to 6 carbon atoms, a lower alkenyl radical having 2 to 6 carbon atoms or a lower cycloalkenyl radical having 3 to 6 carbon atoms, which comprises rectifying a stereo isomeric mixture of farnesylacetic acids or esters thereof in a rectification column having from 10 to 100 theroretical plates and with a reflux ratio of from 2 to 100; said stereo isomeric mixture being one of the following mixtures:

i. a mixture of $\Delta^{4,8}$-cis- and Δ^4-trans-Δ^8-cis-farnesylacetic acids or esters thereof,

ii. a mixture of ^{4,8}-trans- and ^{4}-cis-^{8}-trans-farnesylacetic acids or esters thereof, or

iii. a mixture of four isomers of $\Delta^{4,8}$-cis-, Δ^4-trans-Δ^8-cis-, Δ^4-cis-Δ^8-trans- and $\Delta^{4,8}$-trans-farnesylacetic acids or esters thereof,

to separate each stereospecific farnesylacetic acid or ester thereof from the mixture of (i) or (ii), or to separate $\Delta^{4,8}$-trans- or $\Delta^{4,8}$-cis-farnesylacetic acid or ester thereof from the mixture of (iii).

4,028,386
NOVEL β-KETONE COMPOUNDS

Daniel Hainaut, Villemomble, and Jean-Pierre Demoute, Montreuil-sous-Bois, both of France, assignors to Roussel-UCLAF, Paris, France

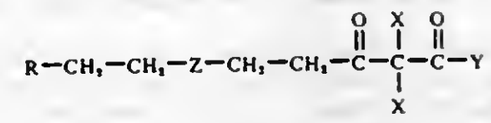
Filed Sept. 3, 1974, Ser. No. 502,635

Claims priority, application France, Sept. 24, 1973, 73.34076

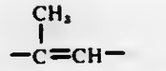
Int. Cl.² C11C *3/02*; **C07C** *69/66*

U.S. Cl. 260—410.9 R **7 Claims**

1. A compound of the formula



wherein R is a linear or branched alkyl of 4 to 10 carbon atoms, linear or branched alkenyl of 4 to 10 carbon atoms and alkoxyalkyl of 5 to 13 carbon atoms Z is selected from the group consisting of —CH=CH—, —CHOH—CH=CH—,



and $—OCH_2—$, X is selected from the group consisting of hydrogen and methyl, Y is linear and branched alkoxy of 1 to 5 carbon atoms.

4,028,387

(1-METHYL-2-VINYL)4,6-HEPTADIENYL-3,8-NONADIENOATE AND A METHOD OF MANUFACTURING THE SAME

Satoru Enomoto, Fujisawa; Hitoshi Takita, Tokyo; Hisayuki Wada, Tokyo; Yutaka Mukaida, Tokyo, and Mikiro Yanaka, Matsudo, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

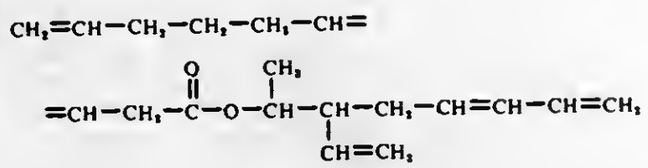
Filed Sept. 10, 1975, Ser. No. 612,082

Claims priority, application Japan, Sept. 18, 1974, 49-106628; Sept. 18, 1974, 49-106630

Int. Cl.² C11C *3/02*; C07C *69/52*

U.S. Cl. 260—410.9 N **12 Claims**

1. (1-methyl-2-vinyl)4,6-heptadienyl-3,8-nonadienoate expressed by the chemical formula:



4,028,388

PREPARATION OF ACIDS

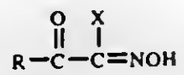
Roger G. Duranleau, Ardoola, and John M. Larkin, Wappingers Falls, both of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Jan. 8, 1976, Ser. No. 647,399

Int. Cl.² C07C *53/22*, *53/08*

U.S. Cl. 260—413 **20 Claims**

1. A method of preparing a carboxylic acid which comprises heating an acylhydroximyl halide corresponding to the formula:



where R is an alkyl group of from 1 to 50 carbon atoms and where X is Cl, Br, I or F in the presence of at least greater than 5 moles of water per mole of said halide at a temperature of about 70° to 220° C.

3. A method according to claim 1 wherein said heating is conducted in the presence of catalytic amounts of a mineral acid.

16. A method according to claim 1 wherein said heating is conducted in the presence of an oxygenated polar organic solvent.

17. A method according to claim 16 wherein said solvent is an alkanoic acid, an alkylformamide, an alkylacetamide, an alkylsulfoxide, an alkylurea, an alkylphosphoramide, an alkylpyrrolidinone, an aldehyde, a ketone or an ether.

4,028,389

METALLOCENES AND METALLOCENE DERIVATIVES HAVING A RADIOACTIVE CENTRAL ATOM

Martin Wenzel, and Detlef Langheim, both of Berlin, Germany, assignors to Schering Aktiengesellscbaft, Berlin & Bergkamen, Germany

Filed Sept. 21, 1973, Ser. No. 399,552

Claims priority, application Germany, Sept. 21, 1972, 2246460

Int. Cl.² C07F *17/02*, *17/00*

U.S. Cl. 260—429 CY **14 Claims**

1. A process for the production of metallocenes or metallocene derivatives with a radioactive central atom, which comprises heating at 150°–200° C. for 0.1–3 hours a non-radioactive metallocene or metallocene bearing a substituent selected from the group consisting of —COOH, —COO-alkyl, $CONH_2$, alkanoyl, halogen, amino or dialkylamino wherein alkyl and alkanoyl in each instance are of 1–8 carbon atoms on at least one cyclopentadienyl radical, with a radioactive metal nuclide selected from Group VIII and Subgroups VI and VII of the Periodic Table which is capable for forming a metallocene in ionic form and thereafter separating the thus-obtained radioactive metallocene or metallocene derivative from the ionic radioactive starting material.

4,028,390

METHODS OF MAKING BASIC ZIRCONIUM COMPLEXES

Andrew M. Rubino, New Providence; John L. Jones, Watchung, and Edward S. Bretschneider, Plainfield, all of N.J., assignors to Armour Pharmaceutical Company, Phoenix, Ariz.

Filed Mar. 26, 1975, Ser. No. 562,300

Int. Cl.² C07F *7/00*

U.S. Cl. 260—429.3 **14 Claims**

1. A process for making a water soluble, astringent aluminum-zirconium complex comprising reacting:

a. an aluminum compound selected from the group consisting of aluminum halide, basic aluminum halide, basic aluminum sulfate, basic aluminum nitrate, basic aluminum sulfamate, basic aluminum phenolsulfonate, and mixtures thereof; and

b. a freshly prepared basic zirconium compound comprising a basic zirconium-amino acid gel, said compounds being added in such amounts as to yield in the complex an Al/Zr mole ratio of about 10:1 to 1:10.

13. A process for making a water soluble, astringent zirconium complex comprising reacting in aqueous solution:

a. a zirconium compound selected from the group consisting of zirconium oxy salts, zirconium hydroxy salts, trioxodizirconyl hydroxy salts, and mixtures thereof;

b. a freshly prepared basic zirconium compound comprising a basic zirconium-amino acid gel; and

c. a buffer such that a stable solution containing five to twenty weight percent of the complex will have a pH above about 3.

4,028,391

METHOD OF PREPARING ORGANOSILICON CARBOXYLATES

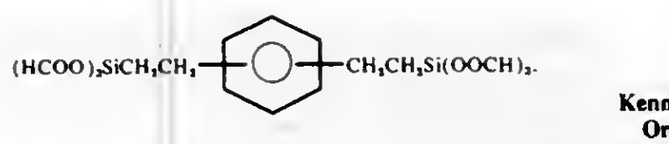
Kevin M. Foley, Hebron, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Continuation-in-part of Ser. No. 428,279, Dec. 26, 1973, abandoned. This application Jan. 6, 1975, Ser. No. 538,661

Int. Cl.² C07F *7/08*

U.S. Cl. 260—448.2 D **1 Claim**

1. A coupling agent for glass fibers comprising from 95 to 50 weight percent pentane and from 5 to 50 weight percent of an organosilane having the formula



4,028,392

ISOCYANATE PREPOLYMERS

Shinsaku Ogawa; Akira Ide; Kazurou Komatsu; Sojiro Matsumoto, and Yasushi Kishimoto, all of Nebeoka, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

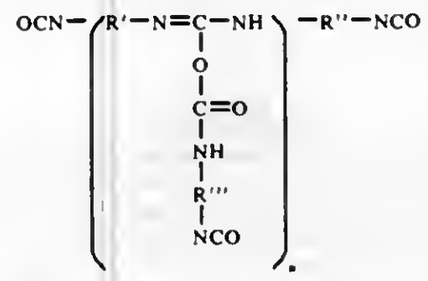
Filed May 20, 1975, Ser. No. 579,180

Claims priority, application Japan, May 20, 1974, 49-56355

Int. Cl.² C07C *119/042*, *119/045*, *119/048*

U.S. Cl. 260—453 AR **6 Claims**

1. An isocyanate prepolymer represented by the formula



wherein n is an integer of 1 to 6; R′, R″ and R‴ may be the same and each represents a divalent aliphatic, araliphatic, aromatic or acyclic group.

4,028,393

PROCESS FOR THE PRODUCTION OF POLYFUNCTIONAL CYANIC ACID ESTERS

Günther Rottloff, Cologne; Rudolf Sundermann, Leverkusen; Ernst Grigat, Odenthal-Gloebusch, and Rolf Putter, Duesseldorf, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

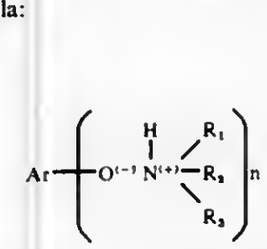
Filed Feb. 17, 1976, Ser. No. 658,814

Claims priority, application Germany, Feb. 22, 1975, 2507671; July 2, 1975, 2529486

Int. Cl.² C07C *122/00*

U.S. Cl. 260—453 P **4 Claims**

1. A process for the production of a polyfunctional aromatic cyanic acid ester which comprises reacting an excess of a cyanogen halide, in the presence of a trialkyl amine and an organic solvent with a di- or poly-trialkyl ammonium phenolate of the formula:



in which

Ar represents an optionally substituted aromatic radical,

R_1, R_2 and R_3 are the same or different and each represents a linear or branched alkyl radical, and

n is a number from 2 to 6.

4,028,394

ANTIBACTERIAL AND FUNGICIDAL S-PHENYLTHIOCARBAMATES

Kenneth S. Karsten, Westport, and Joseph V. Karabinos, Orange, both of Conn., assignors to R. T. Vanderbilt Company, Inc., Norwalk, Conn.

Continuation-in-part of Ser. No. 425,251, Dec. 17, 1973, abandoned. This application Aug. 5, 1975, Ser. No. 602,077

Int. Cl.² C07C *155/02*

U.S. Cl. 260—455 A **10 Claims**

1. The compound 2-hydroxyphenyl N-(3,4-dichlorophenyl)-thiocarbamate.

4,028,395

METHOD FOR THE PREPARATION OF OCTENE-NITRILE ORGANIC COMPOUNDS AND COMPOUNDS OBTAINED THEREBY

Aldo Prevedello, and Edoardo Platone, both of San Donato Milanese (Milan), Italy, assignors to Snam Progetti, S.p.A., San Donato, Milanese, Italy

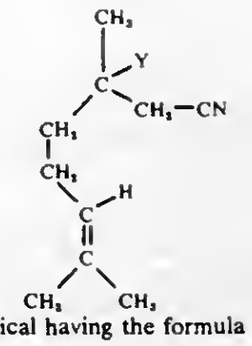
Filed Oct. 30, 1975, Ser. No. 627,349

Claims priority, application Italy, Oct. 30, 1974, 28956/74

Int. Cl.² C07C *121/30*, *121/34*

U.S. Cl. 260—465.4 **1 Claim**

1. Octenenitrile organic compounds having the structural formula:



wherein Y is a radical having the formula —O—CO—CH_2.

4,028,396

16,16-SPIROCYCLOALKYL PROSTAGLANDIN DERIVATIVES

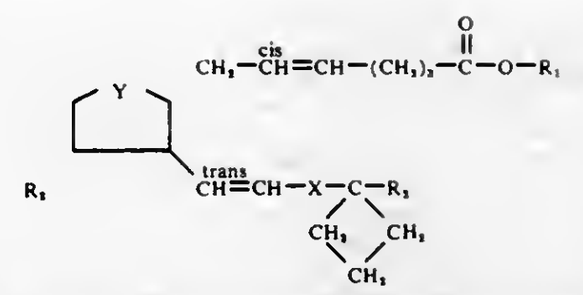
Robert Eugene Schaub, Upper Saddle River, and Martin Joseph Weiss, Oradell, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed July 2, 1975, Ser. No. 592,494

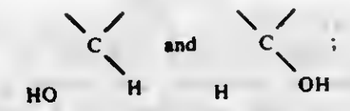
Int. Cl.² C07C *177/00*

U.S. Cl. 260—468 D **31 Claims**

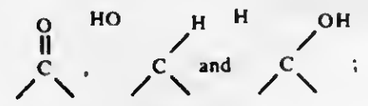
1. A compound selected from the group consisting of an optically active compound of the formula:



and a racemic compound of that formula and the mirror image thereof wherein X is a divalent radical selected from the group consisting of those of the formulae:



Y is a divalent radical selected from the group consisting of those of the formulae:



R_1 is hydrogen or alkyl having up to 4 carbon atoms; R_2 is hydrogen or hydroxy; and R_3 is 2-cis-alkenyl having 4 or 5 carbon atoms or 2-alkynyl having 4 or 5 carbon atoms; and the pharmacologically acceptable cationic salts thereof when R_1 is hydrogen.

4,028,397

HYDROXYCITRIC ACID DERIVATIVES

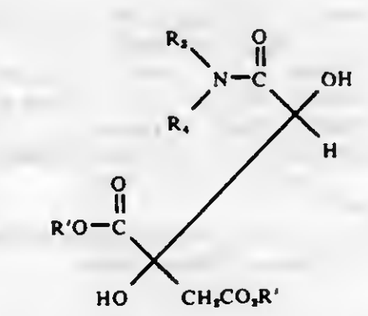
Robert William Guthrie, Fairfield, and Richard Wightman Kierstead, North Caldwell, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 376,478, July 5, 1973, Pat. No. 3,919,254, which is a division of Ser. No. 204,288, Dec. 2, 1971, Pat. No. 3,767,678. This application Aug. 1, 1975, Ser. No. 600,995

Int. Cl.² C07C *103/167, 103/37*

U.S. Cl. 260—468 G **2 Claims**

1. A compound of the formula



where R′ is lower alkyl, aryl lower alkyl or aryl, where aryl is selected from the group consisting of phenyl and phenyl monosubstituted with chlorine, bromine, iodine, fluorine, lower alkyl, hydroxy, lower alkoxy, nitro, cyano, carboxyl or alkanoyl amino; R_3 and R_4 each taken independently is hydrogen, lower alkyl, monocyclic cycloalkyl of 3 to 8 carbon atoms, 1-adamantyl, aryl or aryl lower alkyl, where aryl is selected from the group consisting of phenyl and phenyl monosubstituted with chlorine, bromine, iodine, fluorine, lower alkyl, hydroxy, lower alkoxy, nitro, cyano, carboxyl or alkanoyl-amino; and R_3 and R_4 taken together with the adjacent nitrogen atom form a 5- or 6-membered heterocyclic ring which may contain one additional heteroatom selected from the group consisting of nitrogen and oxygen.

4,028,398

PROCESS FOR SUBSTITUTED CYCLOHEXENES AND ITS PRODUCTS

Gerhard Satzinger, Cundelfingen, and Gustav Hechtfischer, Freiburg-Landwasser, both of Germany, assignors to Warner-Lambert Company, Morris Plains, N.J.

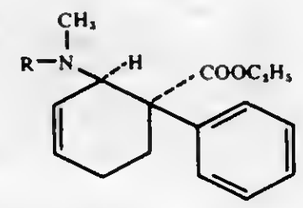
Continuation of Ser. No. 374,205, June 27, 1973, abandoned. This application Oct. 20, 1975, Ser. No. 623,837

Claims priority, application Germany, Feb. 17, 1970, 2007215

Int. Cl.² C07C *101/42*

U.S. Cl. 260—471 A **8 Claims**

1. A compound of the formula:



and its pharmaceutically acceptable salts wherein R is lower alkenyl of 3 to 5 carbon atoms, benzyl, phenethyl, or β-morpholinoethyl.

4,028,399

CARBAMATE

Albrecht Zschocke, Bad Durkheim; Horst Kummer, Ludwigshafen, and Heinrich Adolphi, Limburgerhof, all of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Continuation of Ser. No. 500,150, Aug. 23, 1974, abandoned, which is a continuation-in-part of Ser. No. 26,747, April 8, 1970, abandoned. This application Feb. 17, 1976, Ser. No. 658,408

Claims priority, application Germany, Apr. 18, 1969, 1919747

Int. Cl.² C07C *125/06*

U.S. Cl. 260—479 C **1 Claim**

1. 3,5-diethylphenyl-N-methylcarbamate.

4,028,400

D-HOMOSTEROIDS

Leo Alig, 76 Heidenlochstrasse, Liestal; Andor Fürst, 14 Magnolienpark, Basel; Peter Keller, 10 Bahnhofstrasse, Therwil; Marcel Müller, 10 Quellenweg, Frenkendorf, all of Switzerland; Ulrich Kerb, 8 Waltzstrasse, and Rudolf Wiechert, 5 Petzower Strasse, both of Berlin, Germany

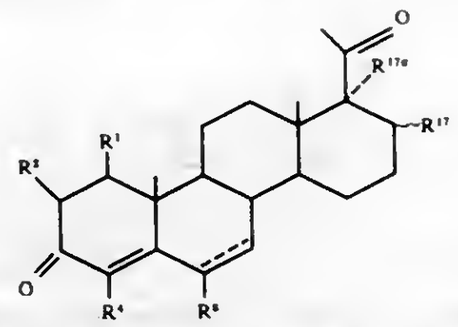
Filed Sept. 20, 1974, Ser. No. 507,884

Claims priority, application Switzerland, Sept. 26, 1973, 13762/73

Int. Cl.² C07J *63/00*

U.S. Cl. 260—488 B **18 Claims**

1. A D-homosteroid of the formula



wherein each of R^1 and R^2 is hydrogen or together are a carbon to carbon bond; R^4 is hydrogen or chloro; R^6 is hydrogen, fluoro, chloro, bromo or methyl; R^{17} is hydrogen, methyl, methylene, C_{1-7}-alkanoyloxy or alkyloxy; R^{17a} is methyl or C_{1-7} alkanoyloxy provided that at least one of R^{17} or R^{17a} is C_{1-7} alkanoyloxy and wherein the broken line in the 6,7-position denotes an optional carbon to carbon bond, provided that when R_1 and R_2 are each hydrogen and R_6 is H or methyl, there is a double bond at the 6,7-position.

4,028,401

(SUBSTITUTED)UREIDOACETOHYDROXAMIC ACIDS

Dyral C. Fessler; George A. Heavner, both of Norwich, and Thomas H. Massey, Sherburne, all of N.Y., assignors to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed July 1, 1976, Ser. No. 701,658

Int. Cl.² C07C *119/00*

U.S. Cl. 260—500.5 H **9 Claims**

1. A compound of the formula:

wherein R is isobutyl, hydrogen, methyl, benzyl, 4-aminobutyl or hexyl and R_1 is hydrogen or benzyl.

4,028,402

BIGUANIDE SALTS

Ulf Fischer, Frenkendorf, and Eckehard Lorch, Reinach, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

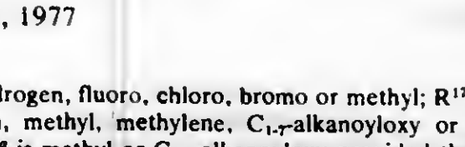
Filed Oct. 8, 1975, Ser. No. 620,525

Claims priority, application Switzerland, Oct. 11, 1974, 13697/74

Int. Cl.² C07C *129/16*

U.S. Cl. 260—501.14 **5 Claims**

1. A compound of the formula



wherein R^1 is hydrogen, lower alkyl or lower alkenyl; R^2 is lower alkyl, aryl or aryl-lower alkyl; R^3 is hydrogen; and *n* is 1 or 2.

4,028,403

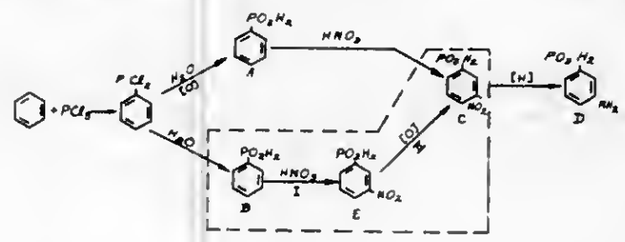
PROCESS FOR PREPARING M-AMINOBENZENEPHOSPHONIC ACID

William A. Sanderson, Palo Alto, Calif., assignor to Burlington Industries, Inc., Greensboro, N.C.

Filed June 7, 1976, Ser. No. 693,230

Int. Cl.² C07F *9/38*

U.S. Cl. 260—502.5 **1 Claim**



1. A process for preparing m-aminobenzenephosphonic acid comprising the steps of:

a. reacting benzenephosphonous acid in a sulfuric acid medium under nitrating conditions by the dropwise addition of nitric acid at a temperature of about 0° C. to about 5° C. to form m-nitrobenzenephosphonous acid in a reaction mixture;

b. warming the reaction mixture to about 20°–25° C. or a higher temperature sufficient to initiate oxidation of the m-nitrobenzenephosphonous acid, and thereafter continuing the oxidation reaction until m- nitrobenzenephosphonic acid is formed;

c. reducing the m-nitrobenzenephosphonic acid with hydrogen to form m-aminobenzenephosphonic acid; and

d. recovering the m-aminobenzenephosphonic acid from the reaction mixture.

4,028,404

ACETIC ACID DERIVATIVES

David Edmund Bays, and Roy Vivian Foster, both of London, England, assignors to Allen & Hanburys Limited, England

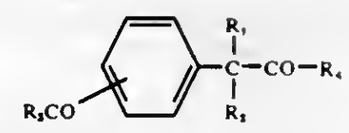
Continuation-in-part of Ser. No. 372,511, June 22, 1973, abandoned, which is a division of Ser. No. 747,435, July 27, 1968, Pat. No. 3,828,093. This application Apr. 26, 1974, Ser. No. 464,381

Claims priority, application United Kingdom, Feb. 22, 1974, 8218/74; July 31, 1967, 35166/67

Int. Cl.² C07C *63/33, 69/95*

U.S. Cl. 260—515 R **14 Claims**

1. A phenylacetic acid derivative of the general formula:



in which the group R_3CO— may only be meta or para oriented with respect to the side chain —CR_1R_2—COR_4 and in which R_1 and R_2, which may be the same or different, are each hydrogen or alkyl containing from 1 to 6 carbon atoms, R_3 is cycloalkyl containing from 3 to 9 carbon atoms, and R_4 is hydroxy or lower alkoxy containing from 1 to 6 carbon atoms, or a pharmaceutically acceptable salt of said derivative in which R_4 is hydroxy with an organic or inorganic base.

8. An anti-inflammatory and analgetic composition containing an anti-inflammatory effective amount or an analgetic effective amount of the compound of claim 1 and a pharmaceutically acceptable carrier or diluent therefor.

4,028,405

FLUORINATED AMINO ACIDS

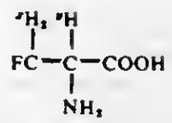
Janos Kollonitsch, Westfield, and Frederick M. Kahan, Rahway, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 514,865, Oct. 15, 1974, abandoned, which is a continuation of Ser. No. 238,684, March 27, 1972, abandoned, which is a continuation of Ser. No. 149,814, June 3, 1971, abandoned. This application June 7, 1976, Ser. No. 693,819

Int. Cl.² C07C *101/10*

U.S. Cl. 260—534 C **3 Claims**

1. A compound of structural formula



wherein X is 1 or 2 and y is 2.

2. 2-Deutero-3-fluoro-D-alanine.

3. 2,3,3-Trideutero-3-fluoro-D-alanine.

4,028,406
PROCESS OF PREPARING PENICILLAMINE

Friedrich Asinger, Aachen; Herlbert Offermanns, Grosssaubeim, and Karl-Heinz Gluzëk, Aachen, all of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

Continuation of Ser. No. 481,858, June 21, 1974, abandoned, which is a continuation of Ser. No. 158,512, June 30, 1971, abandoned. This application Feb. 13, 1976, Ser. No. 657,835
Claims priority, application Germany, July 3, 1970, 2032952; May 11, 1971, 2123232
Int. Cl.² C07C 99/00
U.S. Cl. 260—534 S 14 Claims

1. In a process for the production of D,L-penicillamine by the reaction of isobutyraldehyde with sulfur and ammonia to form 2-isopropyl-5,5-dimethylthiazoline-3, conversion of the thiazoline with anhydrous hydrogen cyanide into 2-isopropyl-5,5-dimethylthiazolidine-4-carbonitrile, hydrolysis of the nitrile with hydrochloric acid to 2-isopropyl-5,5-dimethylthiazolidine-4-carboxylic acid hydrochloride and ammonium chloride, working up the mixture and separation of the ammonium chloride and hydrolytically breaking down the 2-isopropyl-5,5-dimethylthiazolidine-4-carboxylic acid to form penicillamine the improvement comprising carrying out the hydrolysis of the 2-isopropyl-5,5-dimethylthiazolidine-4-carbonitrile by (1) converting the 2-isopropyl-5,5-dimethylthiazolidine-4-carbonitrile with the hydrochloric acid into 2-isopropyl-5,5-dimethylthiazolidine-4-carbonamide hydrochloride at a temperature of 0° to 80° C and (2) converting the 2-isopropyl-5,5-dimethylthiazolidine-4-carbonamide hydrochloride into 2-isopropyl-5,5-dimethylthiazolidine-4-carboxylic acid hydrochloride at a temperature of 80° to 150° C.

4,028,407
METHOD OF PRODUCING TARTARIC ACID

Klaus Petritsch, Weissenstein (Drau), and Peter Korl, Feistritz, both of Austria, assignors to Firma/Osterreichische Chemische Werke Gesellschaft m.b.H, Mariahilfer Gurtel, Austria

Filed Dec. 18, 1975, Ser. No. 641,875
Claims priority, application Austria, Dec. 20, 1974, 10215/74
Int. Cl.² C07C 59/14
U.S. Cl. 260—536 12 Claims

1. In a method of producing tartaric acid comprising the steps of epoxidising acid calcium maleate in a reaction medium with hydrogen peroxide in the presence of a tungstic acid-containing catalyst, reacting the resulting acid calcium epoxysuccinate with sulphuric acid to form calcium sulphate and epoxysuccinic acid, and effecting hydrolysis of said epoxysuccinic acid to tartaric acid in an equeous medium, the improvement comprising separating the acid calcium epoxysuccinate from the reaction medium, transferring said acid calcium epoxysuccinate into a solvent medium selected from the group consisting of organic solvents and mixtures of organic solvents and water, reacting the acid calcium epoxysuccinate in the solvent medium with sulphuric acid, separating calcium sulphate from the solvent medium, and recovering from said solvent medium liberated organic acids consisting essentially of epoxysuccinic acid in a substantially pure state and substantially free from calcium salt.

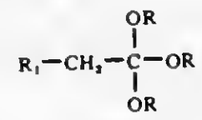
4,028,408
NOVEL PREPARATION OF TRIFLUOROMETHYLTHIOACETIC ACID

Sidney Harry Levinson, and Wilford Lee Mendelson, both of Philadelphia, Pa., assignors to SmithKline Corporation, Philadelphia, Pa.

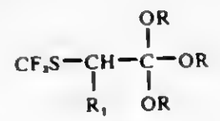
Filed Apr. 15, 1976, Ser. No. 677,190
Int. Cl.² C07C 149/16, 153/017, 148/00
U.S. Cl. 260—539 R 12 Claims

6. The method of preparing the trifluoromethylthio acetic or α-trifluoromethylthiopropionic acid comprising:

1. reacting a compound of the structure:



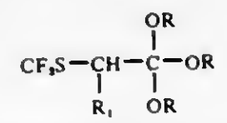
in which R_1 is hydrogen or methyl and R is methyl or ethyl with trifluoromethylsulfenyl chloride to give a trialkoxy compound of the structure:



in which R and R_1 are as defined above, then

2. reacting said trialkoxy compound at reflux temperature with a concentrated strong inorganic acid.

10. The compound of the structure:



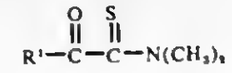
in which R_1 is hydrogen or methyl and R is methyl or ethyl.

4,028,409
PROCESS FOR THE PREPARATION OF α-OXOTHIODIMETHYLAMIDE COMPOUNDS

Wolfgang Krämer; Wilfried Draber; Helmut Timmler, and Heinz Förster, all of Wuppertal, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Dec. 15, 1975, Ser. No. 640,829
Claims priority, application Germany, Dec. 21, 1974, 2460909
Int. Cl.² C07C 153/05, 153/057
U.S. Cl. 260—551 S 12 Claims

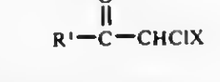
1. A process for the preparation of an α-oxothiodimethylamide of the general formula



in which

R^1 is alkyl or aryl,

which process comprises reacting an α-chloroketone of the general formula



in which

X is hydrogen or chlorine and

R^1 is identified as above,

with sulfur and dimethylamine in water at a temperature between 50° and 90° C.

4,028,410
PROCESS OF PREPARING 1,3-BIS(2-CHLOROETHYL)-1-NITROSOUREA

William H. Yanko, Centerville, and Donald E. Sharp, Dayton, both of Ohio, assignors to The United States of America as represented by the Secretary of the Department of Health, Education and Welfare, Washington, D.C.

Filed Nov. 13, 1974, Ser. No. 523,334
Int. Cl.² C07C 127/15
U.S. Cl. 260—553 R 4 Claims

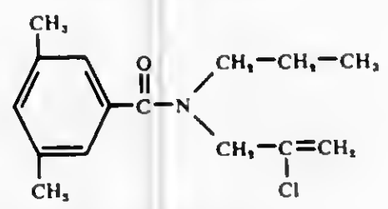
1. A method of producing 1,3-bis(2-chloroethyl)-1-nitrosourea which comprises reacting 1,3-bis(2-chloroethyl)-urea with an excess of dinitrogen trioxide in the cold at 0° C to −10° C in the presence of a solvent selected from at least one member of the group selected from methylene dichloride, nitromethane, ethylene dichloride, acetonitrile, and ethyl ether and free from solvents which would interact with the reactants dinitrogen trioxide, urea and the product compound nitrosourea.

4,028,411
INSECT REPELLENT DIMETHYLBENZAMIDES

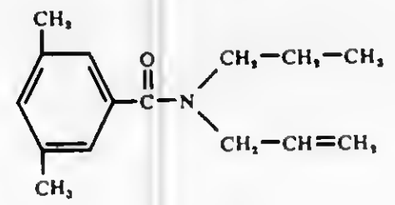
Don R. Baker, Orinda; Francis H. Walker, Mill Valley, and Peter E. Letchworth, Cupertino, all of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 417,306, Nov. 19, 1973, abandoned. This application Dec. 24, 1974, Ser. No. 536,276
The portion of the term of this patent subsequent to June 29, 1993, has been disclaimed.
Int. Cl.² C07C 103/76
U.S. Cl. 260—558 R 2 Claims

1. A compound having the formula



2. A compound having the formula

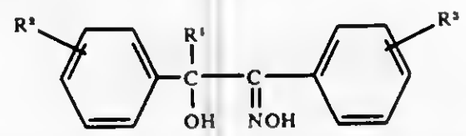


4,028,412
NOVEL CHELATE FORMERS

Jurgen Gehlhaus, and Dietrich Erdmann, both of Darmstadt, Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany

Filed Feb. 17, 1976, Ser. No. 658,507
Claims priority, application Germany, Feb. 18, 1975, 2506727
Int. Cl.² C07C 131/00
U.S. Cl. 260—566 A 8 Claims

1. A benzoin of oxime of formula



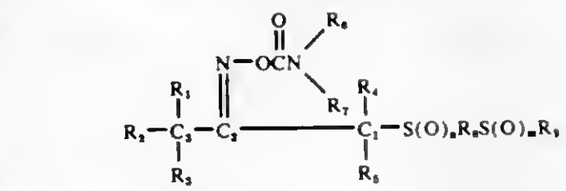
wherein R^1 is -A-S-R^4; R^2 and R^3 independently are H, methyl or chlorine; R^4 is alkyl of 1 to 8 carbon atoms and A is alkylene of 3 or 4 carbon atoms.

4,028,413
KETOXIME CARBAMATES

Thomas A. Magee, Mentor, Ohio, assignor to Diamond Shamrock Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 229,207, Feb. 24, 1972, Pat. No. 3,875,232, which is a continuation-in-part of Ser. No. 32,584, April 8, 1971, abandoned. This application Feb. 27, 1975, Ser. No. 553,648
Int. Cl.² C07C 131/00
U.S. Cl. 260—566 AC 3 Claims

1. A composition of matter having the formula:



where:

R_1=R_3–R_2 or hydrogen;

R_2–R_5=lower alkyl, lower alkenyl, lower alkynyl, with the proviso that R_2 and R_3 may be connected to form a cycloaliphatic ring;

R_4–R_5=hydrogen;

R_6–R_7=hydrogen, lower alkyl, lowr alkenyl, or lower alkynyl;

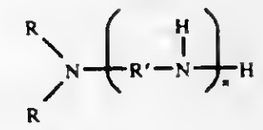
where *m* and *n* may be the same or different, and each is = 0, 1, or 2, R_8 is a lower alkylene radical; and R_9 is selected from the group consisting of hydrogen, lower alkyl, lower alkenyl, lower alkynyl, aryl, or haloalkyl.

4,028,414
PROCESS, PRODUCTS AND COMPOSITION

Thomas J. Clough, Glenwood, Ill., assignor to Atlantic Richfield Company, Philadelphia, Pa.

Continuation of Ser. No. 804,037, Jan. 2, 1969, abandoned, which is a division of Ser. No. 631,163, April 17, 1967, Pat. No. 3,479,291. This application Oct. 28, 1975, Ser. No. 625,977
Int. Cl.² C07C 119/00
U.S. Cl. 260—566 R 15 Claims

1. A mineral oil-soluble condensation reaction product of (A) a mineral oil-soluble polymeric ketone having a molecular weight of from about 1,000 to 5,000 said polymeric ketone being prepared by the polymerization of a major portion of an α-monoalkene having from 3 to about 30 carbon atoms and mixtures thereof and a minor portion of another olefinically unsaturated copolymerizable monomer having from about 3 to about 25 carbon atoms said polymerization being initiated by the use of an acyl halide strong Friedel Crafts catalyst complex wherein the acyl portion of the acyl halide has from 2 to about 10 carbon atoms and is selected from the group consisting of the corresponding acid halides of saturated aliphatic acids and the corresponding acid halide of unsubstituted aromatic acids; and (B) a polyamine having the formula:



wherein R' is a divalent alkylene radical of 2 to about 14 carbon atoms, R is selected from hydrogen and hydrocarbon radical of 1 to about 30 carbon atoms and *n* is 1 to about 10; the amounts of (A) and (B) in said product being sufficient to

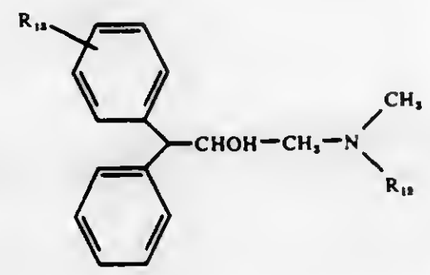
provide up to about 1 mole of (B) and at least about 0.1 gram atom of primary amine nitrogen, per gram atom of ketonic oxygen in (A), said condensation reaction products being soluble in mineral lubricating oil and said reactions being conducted at a temperature and for a time sufficient to form said reaction products.

4,028,415
DIPHENYLPROPYLAMINES

Judith Ann Clark, Barrington, England, assignor to Beecham Group Limited, England

Filed Feb. 15, 1974, Ser. No. 443,021
Claims priority, application United Kingdom, Feb. 24, 1973, 9183/73; Oct. 13, 1973, 47928/73
Int. Cl.² C07C 91/22
U.S. Cl. 260—570 R **29 Claims**

1. A compound of the formula



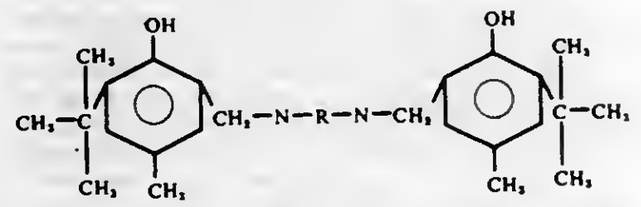
or a pharmaceutically acceptable acid addition salt thereof, wherein
R_{12} is hydrogen or methyl, and
R_{13} is fluorine, chlorine or bromine.

4,028,416
HINDERED PHENOL AMINES

Michael Robin, Colonia, N.J., and Sheldon R. Schulte, Columbus, Ohio, assignors to Ashland Oil, Inc., Ashland, Ky.

Filed Feb. 14, 1972, Ser. No. 226,236
Int. Cl.² C07C 87/28
U.S. Cl. 260—570.5 P **2 Claims**

1. A compound of the formula:



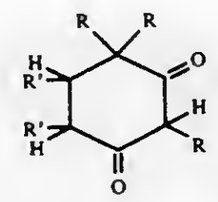
wherein R represents a C_2-C_{10} alkylene or alkylidene radical.

4,028,417
PROCESS FOR THE MANUFACTURE OF CYCLOHEXANDIONE-1,3

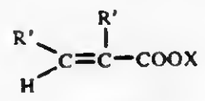
Werner Heinrich Müller, Aldersbach, Germany, and Tomas Weil, Sao Paulo, Brazil, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed July 28, 1976, Ser. No. 709,290
Claims priority, application Germany, July 30, 1975, 2533919
Int. Cl.² C07C 45/00
U.S. Cl. 260—586 C **3 Claims**

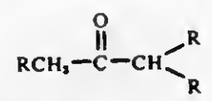
1. A process for the manufacture of a cyclohexandione-1,3 of the formula



in which each of the radicals R, which may be identical or different, represents hydrogen, an alkyl group or an aryl group and the radicals R′ represent hydrogen or an alkyl group, the cyclohexanedione-1,4 having up to 24 carbon atoms altogether, by reacting an α,β-unsaturated carboxylic acid ester of the formula



in which R′ has the aforesaid meaning and X stands for an alkyl group, with a ketone of the formula



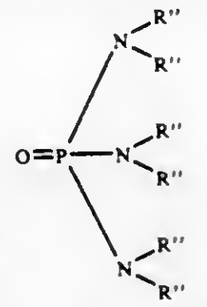
in which R has the aforesaid meaning, in the liquid phase in the presence of a strong base and of a solvent, which comprises using a solvent belonging to one of the following classes of compounds:

a. carboxylic acid amides of the formulae

I. II.

in which the radical R‴ represents hydrogen or an alkyl group and the radicals R″, which may be identical or different, represent an alkyl or an aryl group and two of the radicals R″ bound to the same nitrogen atom or one of the radicals R″ and the radical R‴ may form together a ring of methylene groups;

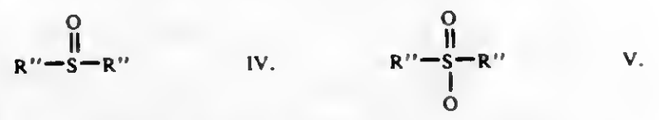
b. phosphoric acid amides of the formula



III.

in which the radicals R″ have the same meaning as in formulae I and II;

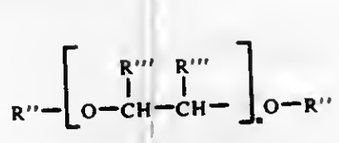
c. sulfoxides and sulfones of the formulae



IV. V.

in which the radicals R″ have the same meaning as in formulae I and II; and

d. ethers of the formula



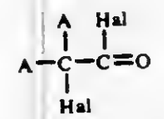
in which n is in the range of from 1 to 5 and the radicals R‴ and R″ have the same meaning as in formula I.

4,028,418
PROCESS FOR THE PREPARATION OF CYCLOBUTANONES

Marinus J. van den Brink; Helena Austermühle-Bertola, and Petrus A. Kramer, all of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Aug. 25, 1975, Ser. No. 607,534
Claims priority, application United Kingdom, May 21, 1975, 21814/75
Int. Cl.² C07C 45/02, 51/00
U.S. Cl. 260—586 C **17 Claims**

1. A process for the preparation of a cyclobutanone which process comprises contacting a 2-haloacyl halide of the formula



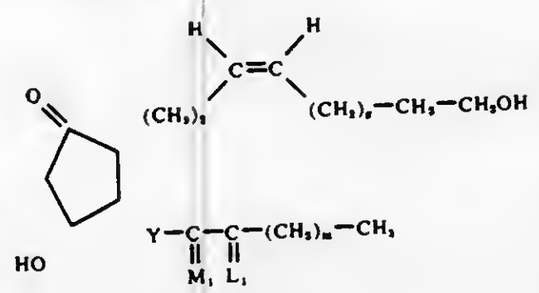
in which formula each A represents a halogen atom having an atomic number of not more than 35, a hydrogen atom or an unsubstituted hydrocarbyl group; and each Hal represents a halogen atom having an atomic number of not more than 35, in an alkanone solvent which has at least two branches in the carbon skeleton of the molecule and of which not more than one of the carbon atoms attached to the carbonyl group is quaternary with a straight or branched chain alkene having from 2 to about 20 carbon atoms at a temperature above 5° C in the presence of zinc and/or tin.

4,028,419
2-DECARBOXY-2-HYDROXYMETHYL-C1S-4,5-DIDEHYDRO-PGE$_1$ COMPOUNDS

Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Jan. 8, 1976, Ser. No. 647,363
Int. Cl.² C07C 49/46, 49/80, 49/82
U.S. Cl. 260—586 R **22 Claims**

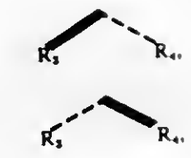
1. A prostaglandin analog of the formula



wherein Y is trans-CH=CH-;
wherein M_1 is

or

wherein R_5 is hydrogen or methyl;
wherein L_1 is



or a mixture of

and

wherein R_3 and R_4 are hydrogen, methyl, or fluoro, the same or different, with the proviso that one of R_3 and R_4 is methyl only when the other is hydrogen or methyl;
wherein g is one, 2, or 3; and
wherein m is one to 5, inclusive.

4,028,420
PROCESS FOR THE PREPARATION OF HEX-2-ENAL

Michel Jouffret, Rhone, France, assignor to Rhone-Poulenc Industries, Paris, France

Filed June 5, 1975, Ser. No. 584,118
Claims priority, application France, June 6, 1974, 74.19550
Int. Cl.² C07C 47/20
U.S. Cl. 260—601 R **9 Claims**

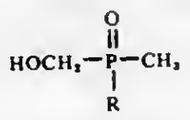
1. In a process for preparing hex-2-enal by subjecting cyclohexyl hydroperoxide is the liquid phase to the action of an aqueous solution of an alkali metal or alkaline earth metal halogenopalladate which is soluble in water, at a temperature from 50° C. up to the boiling point of the mixture, the improvement wherein the aqueous phase also contains a divalent iron salt of an inorganic acid in an amount so as to provide 0.01 to 20 gram atoms of elementary iron per 100 mols of hydroperoxide, and a number of gram atoms of iron which is at most equal to the number of gram atoms of palladium.

4,028,421
PRODUCTION OF TERTIARY (HYDROXYMETHYL)-METHYLPHOSPHINE OXIDES

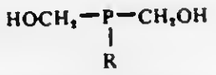
Bernd Lippsmeier, Hurth-Knapsack; Klaus Hestermann, Erftstadt Bliesheim, and Martin Reuter, Frankfurt am Main-Unterliederbach, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Mar. 21, 1975, Ser. No. 560,890
Claims priority, application Germany, Mar. 22, 1974, 2413824
The portion of the term of this patent subsequent to Apr. 26, 1994, has been disclaimed.
Int. Cl.² C07F 9/53
U.S. Cl. 260—606.5 P **3 Claims**

1. In the process for making tertiary methylpbosphine oxides of the formula



in which R is identical or different alkyls other than hydroxymethyl having 1 to 6 carbon atoms by rearranging tertiary bis-(hydroxymethyl)-phosphines of the formula



in which R has the meanings given above, in the presence of a catalyst and in the absence of oxygen, water and alcohol at minus 10° to plus 250° C, the improvement which comprises using BF_3 . etherate as catalyst.

4,028,422

OLEFINIC SULFONES

Marc Julia, Paris, France, assignor to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly sur Seine, France

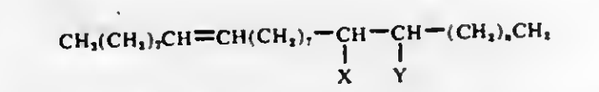
Filed June 23, 1975, Ser. No. 589,555

Claims priority, application France, June 25, 1974, 74.22004

Int. Cl.² C07C *147/08*

U.S. Cl. 260—607 AR **9 Claims**

1. Olefinic sulfones of the general formula:



wherein one of X and Y is a hydrogen and the other a $—SO_2—Ph$ radical wherein Ph is selected from the group consisting of an unsubstituted phenyl radical and a substituted phenyl radical having at least one substituted group selected from a halogen atom and an alkyl radical containing from 1 to 5 carbon atoms and wherein *n* is an integer from 1 to 3.

4,028,423

OXIDATION OF ALIPHATIC AND ALICYCLIC HYDROCARBONS

Arthur M. Brownstein, Cherry Hill, N.J., and David L. Kerr, Wilmington, Del., assignors to Sun Oil Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 722,178, April 18, 1968, abandoned. This application Nov. 25, 1970, Ser. No. 92,834

Int. Cl.² C07C *179/02*, *179/06*

U.S. Cl. 260—610 B **6 Claims**

1. A process for the oxidation of hydrocarbons which comprise contacting an unsubstituted C_3-C_{16} saturated or monounsaturated hydrocarbon selected from the group consisting of alkanes, alkenes, cycloalkenes and polycycloalkanes with oxygen or air at temperatures of from 25° to 200° C in the presence of a catalyst comprising a copper polyphthalocyanine and an aromatic heterocyclic amine, said amine being selected from the group consisting of pyridine, quinoline, isoquinoline, triazine, and pyrazine, wherein the weight ratio of amine to copper polyphthalocyanine is between 0.7:1 and 2:1.

4,028,424

PROCESS FOR PREPARING UNSATURATED ALCOHOLS

Yoshinori Yoshida, and Yoshiro Yamamoto, both of Yokohama, Japan, assignors to Japan Synthetic Rubber Co., Ltd., Tokyo, Japan

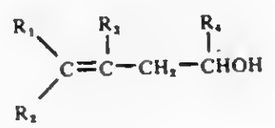
Filed Nov. 10, 1975, Ser. No. 630,148

Claims priority, application Japan, Nov. 15, 1974, 49-131114; Mar. 19, 1975, 50-32283

Int. Cl.² C07C *29/00*

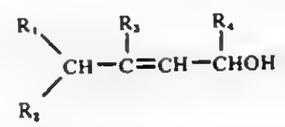
U.S. Cl. 260—638 R **11 Claims**

1. A process for preparing unsaturated alcohols of the formula



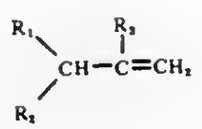
(III)

or



(IV)

wherein R_1, R_2 and R_3 are independently hydrogen or alkyl having 1 to 8 carbon atoms which comprises reacting an α-olefin of the formula,



(I)

wherein R_1, R_2 and R_3 are independently hydrogen or alkyl having 1 to 8 carbon atoms, with an aldehyde of the formula,

(II)

wherein R_4 is hydrogen or alkyl having 1 to 8 carbon atoms, the molar ratio of (I)/(II) being 1 to 10, at a temperature of from 150° to 250° C in the presence of 0.005 – 10 mole%, based on the aldehyde charged, of a phosphate of a metal in the IA and IIA groups of the periodic table or of zinc, aluminum, iron, cobalt, nickel or of ammonium.

4,028,425

CONTINUOUS PROCESS FOR CONCURRENT PRODUCTION OF DINITROTOLUENE AND HIGH-STRENGTH NITRIC ACID

Everett E. Gilbert, Morristown, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed June 1, 1976, Ser. No. 691,912

Int. Cl.² C07C *79/10*; C01B *21/38*

U.S. Cl. 260—645 **6 Claims**

1. The process of continuously producing dinitrotoluene and 93–103% nitric acid, which comprises continuously introducing toluene, nitrogen dioxide or nitrogen peroxide and oxygen into a reaction zone containing a reaction medium consisting essentially of dinitrotoluene and 93–103% nitric acid, maintaining the resulting mixture of toluene, nitrogen dioxide or nitrogen peroxide, oxygen and reaction medium under a pressure of at least 100 psig. until a reaction product consisting essentially of dinitrotoluene and 93–103% nitric acid in a mol ratio of about 2 mols of nitric acid and 1 mol of dinitrotoluene is produced, and continuously removing said reaction product from the reaction zone.

4,028,426

REMOVAL OF MONOCHLOROACETYLENE FROM CHLORINATED HYDROCARBONS

John Douglas Mansell, Corpus Christi, Tex., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Nov. 18, 1975, Ser. No. 632,922

Int. Cl.² C07C *17/38*

U.S. Cl. 260—652 P **8 Claims**

1. A method of reducing the monochloroacetylene content of liquid saturated or ethylenically unsaturated chlorohydrocarbons which comprises contacting said chlorohydrocarbons with a liquid catalyst composition comprising cuprous halide and aqueous haloid acid selected from HCl, HBr, HI at a temperature and pressure which mmaintains the catalyst in liquid form.

4,028,427

AQUEOUS STREAM TREATMENT IN CHLORINATED HYDROCARBON PRODUCTION

Utah Tsao, Jersey City, N.J., assignor to The Lummus Company, Bloomfield, N.J.

Filed Aug. 27, 1975, Ser. No. 608,193

Int. Cl.² C07C *19/00*, *21/04*, *25/04*

U.S. Cl. 260—659 R **10 Claims**

1. In a process for the production of chlorinated hydrocarbons from a hydrocarbon wherein a chlorinated hydrocarbon effluent including water vapor is withdrawn from a chlorinated hydrocarbon production zone, the improvement comprising:

recovering waste water from the chlorinated hydrocarbon effluent, said waste water including chlorinated hydrocarbons as impurities;

stripping chlorinated hydrocarbons from the waste water, said stripping being effected with a stripping gas comprising a portion of the feed to the chlorinated hydrocarbon production zone selected from the group consisting of hydrocarbon and oxygen containing gas;

recovering stripped waste water;

recovering stripping gas and stripped chlorinated hydrocarbon impurities; and

introducing said recovered stripping gas and chlorinated hydrocarbon impurities into the chlorinated hydrocarbon production zone.

4,028,428

PROCESS FOR THE SEPARATION OF ETHYLBENZENE

Richard W. Neuzil, Downers Grove, and Donald H. Rosback, Elmhurst, both of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed July 14, 1975, Ser. No. 595,838

Int. Cl.² C07C *7/00*

U.S. Cl. 260—674 SA **8 Claims**

1. A process for separating ethylbenzene and xylenes from a feed mixture comprising ethylbenzene and a plurality of xylene isomers including para-xylene which comprises contacting said mixture at adsorption conditions with an adsorbent comprising type X or type Y zeolite essentially completely exchanged with strontium, selectively adsorbing said xylene isomers to the substantial exclusion of ethylbenzene, recovering the unadsorbed ethylbenzene, contacting the absorbent with a desorbent material comprising toluene at desorption conditions to remove adsorbed xylene isomers therefrom, and withdrawing from the adsorbent an extract stream containing said xylene isomers.

4,028,429

PREPARATION OF HIGH TRANS-ISOMER CONTENT 1,4-DIENES

Richard David Cramer, Landenberg, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 9, 1976, Ser. No. 647,994

Int. Cl.² C07C *25/00*

U.S. Cl. 260—680 R **10 Claims**

1. Method of preparing 1,4-dienes of high trans-isomer content which comprises contacting ethylene with 1,3-diene of the formula

$CH_2=C(R^1)CH=CHR^2$ or

$CH_2=CHC(R^1)=CHR^2$

where

R^1 is hydrogen, methyl, ethyl or chlorine, and

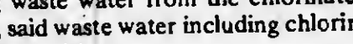
R^2 is hydrogen, C_1–C_{12} alkyl, C_6–C_{12} aryl, or C_7–C_{18} alkaryl,

in the presence of a soluble catalyst system which comprises

a. 0.00001–0.01 mole per liter of organic solvent-soluble organonickel compound in which the nickel is zerovalent or divalent,

b. hydrocarbylaluminum halide selected from the group consisting of hydrocarbylaluminum chlorides and hydrocarbylaluminum bromides in an amount at least equimolar with the organonickel compound, and

c. aminophosphine of the formula



where

R^3 is C_6–C_{12} aryl, or substituted C_6–C_{12} aryl containing up to two substituents selected from the group consisting of C_1–C_6 alkyl, chlorine, bromine, iodine and fluorine,

R^4 is C_1–C_6 alkyl, C_1–C_6 alkoxy, C_6–C_{12} aryloxy, or substituted C_6–C_{12} aryloxy containing up to two substituents selected from the group consisting of C_1–C_6 alkyl, chlorine, bromine, iodine and fluorine, and

R^5 is 1-pyrryl, di(C_1–C_6 alkyl)amino, (C_1–C_6 alkyl)(C_6–C_{12} aryl)amino, or substituted (C_1–C_6 alkyl)(C_6–C_{12} aryl-)amino in which the aryl group contains up to two substituents selected from the group consisting of C_1–C_6 alkyl, chlorine, bromine, iodine and fluorine,

m and *n* independently are integers from 0 to 2,

p is an integer from 1 to 3, and

$m + n + p = 3$,

provided, when R^5 is di(C_1–C_6 alkyl)amino,

m is 2, and

n is 0,

and, when R^5 is (C_1–C_6 alkyl)(C_6–C_{12} aryl)amino or substituted (C_1–C_6 alkyl)(C_6–C_{12} aryl) amino,

m is 1 or 2, and

n is 0.

4,028,430

SIMULATED MOVING BED REACTION PROCESS

Laurence O. Stine, Western Springs, and Dennis J. Ward, South Barrington, both of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed June 16, 1975, Ser. No. 587,468

Int. Cl.² C07C *3/50*

U.S. Cl. 260—683.43 **10 Claims**

1. A continuous fixed bed catalytic alkylation reaction and catalyst reactivation process comprising the steps of:

a. providing a fixed bed of solid catalyst containing four zones having a fluid flow connecting path between said zones to interconnect said zones;

b. arranging said zones in a series and providing fluid flow connecting means between the last zone and the first zone of the series to provide a directional circular flow path through said zones;

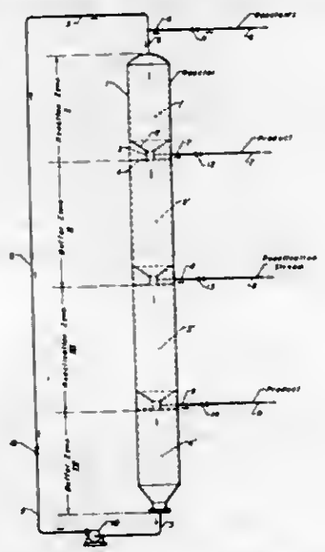
c. providing a point between each two successive zones for introducing an inlet stream or withdrawing a product stream;

d. introducing a reactivation stream including alkylatable

hydrocarbon at a first point located between two successive zones (zone II and zone III) to effect catalyst reactivation and to provide alkylatable hydrocarbon as a continuous component throughout said fixed bed of solid catalyst;

e. simultaneously withdrawing a first product stream from a second point located between said zone III and the next successive zone in the direction of flow (zone IV);

f. simultaneously introducing reactants consisting essentially of isobutane, isopentane or a mixture thereof and at least one $C_3 - C_5$ olefin into said fixed bed of catalyst at a third point located between said zone IV and the next successive zone in the direction of flow (zone I) and



reacting said reactants at a temperature of about 100° F to 400° F to effect an alkylation reaction, a result of which is deactivation of said catalyst, said alkylation and catalyst reactivation being the principal reactions of the process;

g. simultaneously withdrawing a second product stream from a fourth point located between said zone I and the next successive zone in the direction of flow (zone II); and,

h. periodically advancing downstream the points of charging said reactants and said reactivation stream, and the points of withdrawal of said product streams to the next successive points for introducing an inlet stream or withdrawing an outlet stream.

4,028,431

CURED RUBBER COMPOSITION

Takashi Futami, Hirakata; Yoshiharu Tatsukami, Nihama; Toyoji Takamoto, Takatsuki; Yasuhiro Oda, Takatsuki, and Masayasu Tomoda, Takatsuki, all of Japan, assignors to Daikin Kogyo Co., Ltd. and Sumitomo Chemical Company, Limited, both of Osaka, Japan

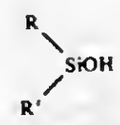
Filed May 12, 1975, Ser. No. 576,366

Claims priority, application Japan, May 15, 1974, 49-54889; May 15, 1974, 49-54890

Int. Cl.² C08L *23/00, 23/28, 83/00*

U.S. Cl. 260—827 **17 Claims**

1. A cured rubber composition prepared by curing with an organic peroxide as a curing agent, a composition consisting essentially of 99 to 5 parts by weight of (A) a fluorine-containing ethylene copolymer of ethylene, hexafluoropropene and if desired other ethylenically unsaturated monomers containing 10 to 50 mole % of hexafluoropropene and 0 to 50 mole % of the other ethylenically unsaturated monomers and 1 to 95 parts by weight of (B) a silicone rubber prepared by polycondensation of a silanol compound represented by the general formula



(wherein R and R' are saturated aliphatic groups, unsaturated aliphatic groups, aromatic groups, or derivatives of these groups) alone or polycondensation of a combination of two or more of said silanol compound and/or (C) a fluorine-containing copolymer of vinylidene fluoride and at least one other fluorine-containing olefinic monomer.

4,028,432

PROCESS FOR MANUFACTURING FLEXIBLE EPOXIDE RESINS

Francois Dawans, Bougival, and Jean-Pierre Durand, Chatou, both of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

Filed Mar. 27, 1975, Ser. No. 562,846

Claims priority, application France, Mar. 29, 1974, 74.11256

Int. Cl.² C08L *63/10*

U.S. Cl. 260—836 **10 Claims**

1. In a process for manufacturing a solid epoxy resin composition by reacting under heating a liquid epoxy resin having more than one 1,2-epoxy group per molecule, with a polycarboxy hardener having carboxylic functions selected from the group consisting of a carboxylic acid function and a carboxylic acid anhydride function, the proportion of said liquid epoxy resin to said polycarboxy hardener being of from 0.5 to 1.5 epoxy group per carboxy equivalent,

the improvement wherein said polycarboxy hardener consists essentially of a proportion of 98 to 85% with respect to the total carboxy equivalents of methylnadic anhydride and a proportion of 2 to 15% with respect to the total carboxy equivalents, of at least one polybutadiene containing carboxylic functions statistically distributed along the chain resulting from the addition of a proportion of 3–25 carboxy equivalents per each 100 butadiene units, of a carboxylic compound selected from the group consisting of maleic anhydride, thioglycolic acid and acetic acid, to a polybutadiene having a number average molecular weight of from 500 to 15,000 and containing more than 80% of cis - 1,4 units.

4,028,433

THERMOPLASTIC MOULDING COMPOUNDS

Richard Prinz, Leverkusen; Salah Elabd Elghani, Duesseldorf; Winfried Fischer, and Heinrich Alberts, both of Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed June 30, 1975, Ser. No. 591,501

Claims priority, application Germany, July 4, 1974, 243212

The portion of the term of this patent subsequent to Nov. 2, 1993, has been disclaimed.

Int. Cl.² C08L *67/06*

U.S. Cl. 260—873 **3 Claims**

1. A thermoplastic moulding composition comprising

1. from 5 to 95% by weight, based on component (1) and (2), of a polycarbonate of a divalent phenol,

2. from 95 to 5% by weight, based on component (1) and (2), of a graft copolymer comprising

a. at least one monovinyl aromatic compound,

b. acrylonitrile, an acrylonitrile derivative or a mixture thereof and optionally

c. an α-olefin on an ethylene/vinyl acetate copolymer as a graft substrate, and

3. from 10 to 50% by weight, based on the total moulding composition of a brittle thermoplastic resin which is a copolymer of

i. acrylonitrile, methacrylonitrile or any mixture thereof and

ii. styrene, a styrene derivative or any mixture thereof.

4,028,434

GRAFT POLYMERS OF VINYL PHOSPHONIC ACID ESTERS

Wolfgang Konter; Josef Witte, both of Cologne; Peter Vehlewald, Leichlingen, and Hans-Dieter Block, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Aug. 14, 1975, Ser. No. 604,680

Claims priority, application Germany, Sept. 3, 1974, 2442101

Int. Cl.² C08L *43/00*

U.S. Cl. 260—874 **6 Claims**

1. A graft polymer of

a. from 5 to 50 parts by weight of halogen-free vinyl phosphonic acid alkyl ester

b. from 0 to 30 parts by weight of nitrogen-containing polymerizable vinyl compound and

c. a polyalkylene oxide free from unsaturation having a molecular weight of from 1500 to 10,000 the amounts of components (a) and (b) being based on 100 parts by weight of component (c).

4,028,435

PROCESS FOR PRODUCING BLOCK COPOLYMERS

Kenji Seki; Akio Kimura; Satoshi Asahi, all of Sodegaura, and Yasuhiro Takeshita, Ichihara, all of Japan, assignors to Idemitsu Kosan Co., Ltd., Tokyo, Japan

Filed Sept. 20, 1976, Ser. No. 724,969

Claims priority, application Japan, Sept. 23, 1975, 50-114340; Sept. 26, 1975, 50-115521

Int. Cl.² C08F *295/00, 297/08*

U.S. Cl. 260—878 B **16 Claims**

1. A process for producing a block copolymer of (i) a polymer of ethylene or propylene, or a copolymer of ethylene or propylene with another α-olefin, and (ii) a polymer of an acrylic ester or a methacrylic ester, which comprises

polymerizing ethylene or propylene, or copolymerizing them, with another α-olefin having from 2 to 7 carbon atoms in the presence of catalytic amounts of titanium halide and an organic aluminum compound of the formula AlR_nX_{3-n} wherein R is an alkyl group having from 1 to 5 carbon atoms, X is a halogen and n is a integer of from 1 to 3,

adding in order (a), (b) and (c) to a polymeric product so obtained and copolymerizing therewith (a) an acrylic ester or a methacrylic ester, in the presence of (b) an organic phosphorus compound or a tertiary amine, and (c) a benzyl halide, a ring-alkylated benzyl halide, a benzyl halide in which a methylene hydrogen is replaced with an alkyl or aryl group, or an alkyl halide.

4,028,436

MELT PHASE PROCESS FOR THE PREPARATION OF EMULSIFIABLE POLYETHYLENE WAXES

Richard T. Bogan, and Claude M. Shelton, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 1, 1975, Ser. No. 563,992

Int. Cl.² C08L *23/26;* **C08F** *255/02, 222/06, 222/00*

U.S. Cl. 260—878 R **12 Claims**

1. A process for the preparation of an emulsifiable modified polyethylene composition which comprises reacting in the melt phase process at a temperature of from 200° to 250° C. in the presence of a free radical source and in the presence of less than 5 ppm of oxygen (1) low viscosity polyethylene waxes having a melt viscosity of from about 200 to 600 cp. as measured at 125° C. with (2) at least one unsaturated polycarboxylic component selected from the group consisting of maleic acid, maleic anhydride, fumaric acid, citraconic anhydride and half esters derived from maleic and fumaric acids.

4,028,437

DODECAHALO-9,10-OXADECAHYDRO-1,4:5,8-DIMETHANOANTHRACENE FLAME RETARDANTS FOR POLYMERS

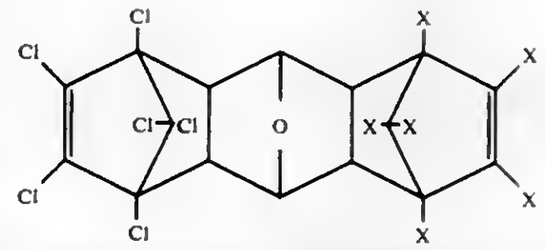
Yong S. Rim, Waterbury, and Walter Nudenberg, Newtown, both of Conn., assignors to Uniroyal Inc., New York, N.Y.

Division of Ser. No. 492,643, July 29, 1974, Pat. No. 3,976,664. This application Jan. 28, 1976, Ser. No. 653,164

Int. Cl.² C08K *5/59, 5/15*

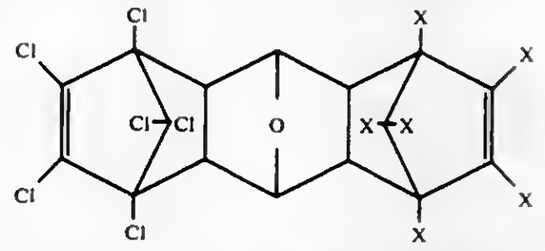
U.S. Cl. 260—880 R **21 Claims**

1. A flame retardant composition comprising an organic polymer selected from the group consisting of hydrocarbon polymers, nitrile-containing polymers, and polyurethane polymers; and an effective flame retardant amount of a compound having the formula



in which all of the X substituents are either chlorine or bromine.

11. A flame retardant composition comprising a graft copolymer of acrylonitrile, butadiene and styrene, an effective flame retardant amount of a compound having the formula



in which all of the X substituents are either chlorine or bromine and a compound of antimony.

4,028,438

PHOSPHOROTHIOLATES

Hiroshi Tsuchiya, Ashiya; Kunio Mukai, Nishinomiya; Akio Kimura, Takarazuka; Hiroshi Taya, Minoo; Keimei Fujimoto, Kyoto; Toshiaki Ozaki; Sigeo Yamamoto, both of Toyonaka; Taizo Ogawa; Tadashi Ooishi, both of Minoo, and Yositosi Okuno, Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

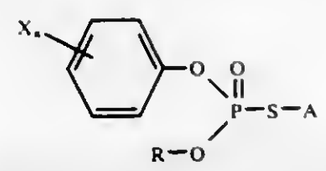
Continuation of Ser. No. 8,434, Feb. 3, 1970, abandoned, which is a continuation-in-part of Ser. No. 728,353, May 10, 1968, abandoned. This application Nov. 14, 1973, Ser. No. 415,682

Claims priority, application Japan, May 17, 1967, 42-31645; Sept. 8, 1967, 42-57677; Sept. 11, 1967, 42-58536; Sept. 12, 1967, 42-58859

Int. Cl.² C07F *9/165;* **A01N** *9/36*

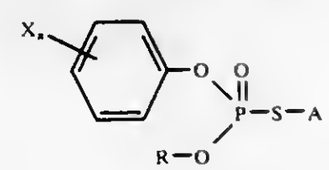
U.S. Cl. 260—948 **17 Claims**

1. A phosphorothiolate of the formula,



wherein R is an alkyl having up to 5 carbon atoms; A is an alkyl having 3 or 4 carbon atoms, haloalkyl having up to 3 carbon atoms, alkenyl having up to 4 carbon atoms, alkinyl having up to 4 carbon atoms, phenylthioalkyl having up to 9 carbon atoms or phenylsubstituted ethyl; X is hydrogen, halogen or alkyl having up to 5 carbon atoms; and *n* is an integer of 1 to 5.

17. A phosphorothiolate of the formula



wherein R is an alkyl having up to 5 carbon atoms; A is alkylthioalkyl having up to 6 carbon atoms; X is hydrogen, halogen or alkyl having up to 5 carbon atoms; and *n* is an integer of 1 to 5.

4,028,439

PROCESS FOR PREPARING PHOSPHOROTHIOATES AND PHENYLPHOSPHONOTHIOATES

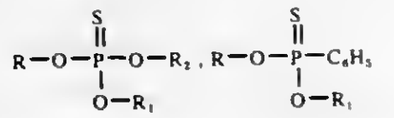
Lorraine M. Kroposki, Walnut Creek, Calif.; Masao Yoshimine, Midland, Mich., and Harold H. Freedman, Newton Center, Mass., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 354,040, April 24, 1973, Pat. No. 3,917,621, which is a continuation-in-part of Ser. No. 229,171, Feb. 24, 1972, abandoned. This application July 31, 1975, Ser. No. 600,542

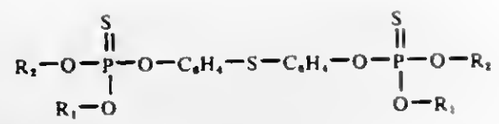
Int. Cl.² C07F *9/09, 9/165*

U.S. Cl. 260—973 **19 Claims**

1. In the process of preparing a compound corresponding to the formula

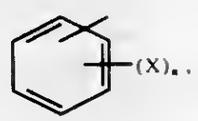


or



wherein:

R_1 and R_2 are each independently lower alkyl; and R is

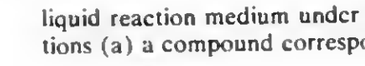


wherein:

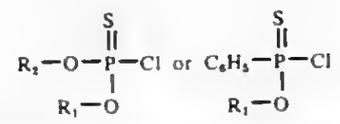
n is 0, 1, 2 or 3; and

X is nitro, cyano, halo, lower alkyl, lower alkoxy, lower alkylthio or lower alkylsulfinyl, with the proviso that R does not bear more than one nitro group, lower alkylthio group or lower alkylsulfinyl group; by reacting in an inert liquid reaction medium under neutral or alkaline conditions (a) a compound corresponding to the formula

or

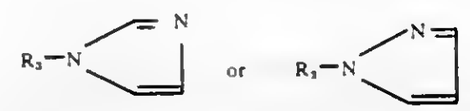


with (b) a compound corresponding to the formula



wherein M is an alkali metal and R, R_1 and R_2 have the aforesaid meaning;

the improvement consisting of conducting the process in the presence of a small but catalytic amount of (1) a quaternary ammonium salt having a minimum solubility of at least 1 weight percent in the liquid reaction medium at 25° C. and (2) a diazole corresponding to the formula



wherein R_3 is hydrogen or alkyl of 1 to 6 carbon atoms.

4,028,440

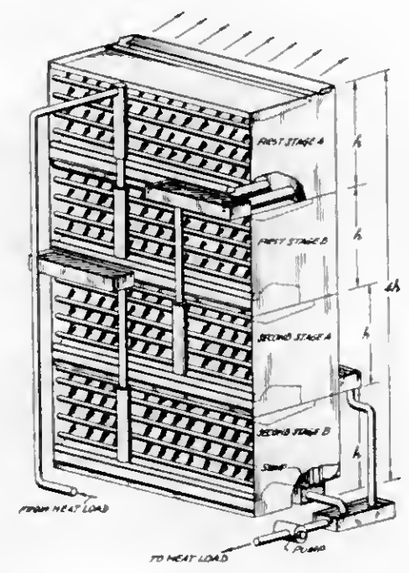
METHOD AND APPARATUS OF MULTI STAGE INJECTOR COOLING

John Engalitcheff, Jr., Gibson Island, Md., assignor to Baltimore Aircoil Company, Inc., Jessup, Md.

Continuation-in-part of Ser. No. 449,781, March 11, 1974, Pat. No. 3,929,435, which is a continuation of Ser. No. 183,015, Sept. 23, 1971, abandoned. This application May 29, 1975, Ser. No. 582,068

Int. Cl.² F28C *1/00*

U.S. Cl. 261—23 R **2 Claims**



2. A multiple stage injector type liquid cooling system comprising four injector type liquid cooling units stacked one above the other, the first being on the lowest level and the fourth on the highest level, said units four and three each containing a confined region having an end open to a source of first gas at a wet bulb temperature lower than that of the spray liquid, liquid spray means positioned to direct liquid sprays into said confined regions to induce a flow of first gas from said source therethrough for mixing and partial evaporation of said liquid, separator means positioned in said confined regions downstream of said liquid spray means for separating said liquid from said first gas exiting from said confined regions, liquid collection means positioned below said separator means to collect the separated liquid at a first temperature above the wet bulb temperature of the separated first gas, gravity means for passing the liquid from the liquid collection means of the fourth and third liquid cooling units to a liquid spray means of the second and first cooling units respectively, said second and first cooling units containing a confined region having an open end to a source of second gas at a wet bulb temperature no higher than that of the first gas at said first mentioned source, said liquid spray means of said confined region in said second and first cooling units being positioned to cause said sprays to induce flow of said second gas from said source into said confined region for mixing and partial evaporation of said liquid, separator means in said confined region of said second and first units positioned in said confined region downstream of said liquid spray means for separating said second gas and liquid and liquid collection means positioned below said separator means in said confined region of said second and first units for collecting the liquid at a second temperature above the wet bulb temperature of the separated second gas but below the wet bulb temperature of the separated first gas, the combined total cross sectional area at the open ends of all said confined regions being less than the cross sectional area at the open end of a single similar confined region capable of cooling said liquid to said second temperature.

4,028,441

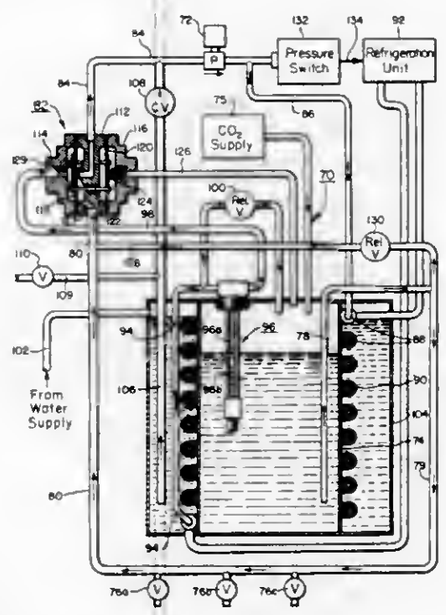
LIQUID LEVEL CONTROL SYSTEM AND CARBONATOR

George B. Richards, Lake Forest, Ill., assignor to Fluid Device Corporation, Highland Park, Ill.

Continuation of Ser. No. 345,907, March 29, 1973, abandoned, which is a division of Ser. No. 840,119, June 19, 1969, Pat. No. 3,730,500, which is a continuation-in-part of Ser. No. 724,385, April 26, 1968, abandoned. This application Sept. 5, 1975, Ser. No. 610,846

Int. Cl.² B01F *3/04*

U.S. Cl. 261—36 R **5 Claims**



1. In a beverage dispensing system of the type including a liquid supply source, a liquid chilling tank, beverage dispensing means and recirculation means defining a closed loop flow path including a liquid pump, said chilling tank and said dispensing means for continuously circulating a chilled liquid to said dispensing means and further including liquid level sensing means and valve means for introducing liquid from said supply source into said chilling tank when the liquid level therein recedes below a predetermined level, the improvement comprising:

conduit means included in said recirculation flow path and extending from said chill tank for a predetermined long distance to said dispensing means and returning to the inlet side of said valve means;

and bypass means including a flow conduit of a substantially shorter length than said conduit means coupled between a portion of said conduit means adjacent said chill tank and the inlet side of said valve means for providing an adequate supply of liquid to said liquid pump to preclude pump cavitation and for providing an ancillary flow path to said dispensing means by flow through said flow conduit and said conduit means.

4,028,442

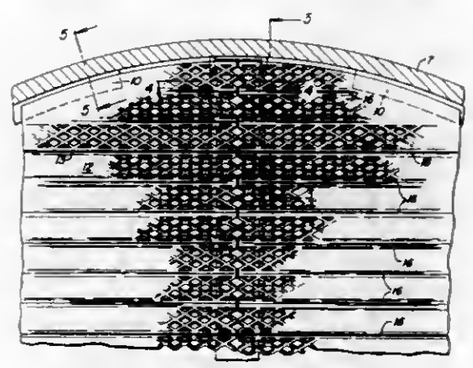
TOWER SUPPORT PLATE

John S. Eckert, 3000 Millboro Road, Cuyahoga Falls, Ohio 44224

Filed Sept. 12, 1975, Ser. No. 613,015

Int. Cl.² B01F *3/04*

U.S. Cl. 261—94 **6 Claims**



1. A tower of high gas-and-liquid handling capacity, provided with means for supplying gas and liquid thereto and having therein a support plate having packing elements thereon, for providing contact between the gas and liquid, which support plate is of undulating cross section and formed of units which comprise (a) areas of expanded sheet metal with openings formed of cross members and (b) areas which are not expanded, the size of said openings being suitable for supporting the packing elements, the support plate being broken in opposite directions along parallel lines with the bottoms formed of spaced unexpanded areas broken in the same plane to provide a bottom adapted to rest on a flat surface.

4,028,443

DISTILLATION APPARATUS

Richard Donnan Livingston, and Robert Dewey Sauerbrunn, both of Seaford, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

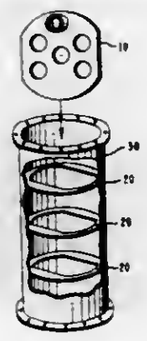
Filed Sept. 24, 1976, Ser. No. 726,290

Int. Cl.² B01D *3/14;* B01F *3/04*

U.S. Cl. 261—114 TC **3 Claims**

1. In a distillation column having a cylindrical wall and containing more than two distillation plates, each plate being comprised of a circular tray peripherally supported by a ring attached to said inner cylindrical wall of the column, and the support ring having an opening, the improvement comprising

said tray periphery and said opening both having the shape of a circle interrupted by two parallel chords, the tray width



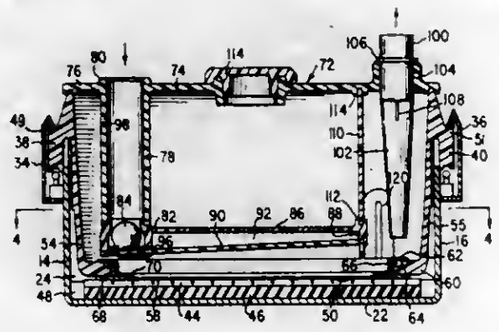
between the tray chords being smaller than the circular diameter of the support ring opening.

4,028,444

HUMIDIFIER AND AUTOMATIC CONTROL SYSTEM THEREFOR

Allen C. Brown, Acton; Neil R. Hattes, Danvers, and Theodore B. Eyrick, Andover, all of Mass., assignors to Chemetron Corporation, Chicago, Ill.

Filed Mar. 25, 1974, Ser. No. 454,503
Int. Cl.² B01D *47/02*
U.S. Cl. 261—122 **16 Claims**



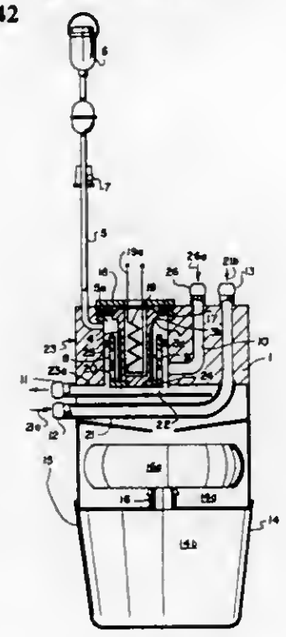
1. A system for humidifying breathing gases, comprising:
a support housing defining a recess;
a heater means in said recess and carried by said support housing;
container means for holding a supply of water, said container means including gas inlet and gas outlet means;
means removably securing said container means in said recess in heat transfer relationship with said heater means;
diffuser means within said container and spaced therefrom to define a diffuser chamber, said chamber being so located as to be below the surface of the supply of water during operation of said system and so located as to permit a free flow of water therearound, said diffuser means including a diffuser element for passing breathing gas upwardly out of said diffuser chamber;
means including said gas inlet means communicating with said diffuser chamber for directing said breathing gas into said diffuser chamber below the surface of the supply of water, said breathing gas thereafter passing upwardly through said diffuser element and the supply of water;
means including said gas outlet means communicating with the interior of said container to direct said breathing gas out of said container; and
a contaminant trap connected to said gas outlet means and located within said container for receiving and retaining backflowing contaminated liquid which returns from said outlet means to said container.

4,028,445

APPARATUS FOR WETTING RESPIRATORY GAS

Karl Hickmann, and Dieter Sahmkow, both of Lubeck, Germany, assignors to Dragerwerk Aktiengesellschaft, Germany

Filed Apr. 14, 1976, Ser. No. 676,648
Claims priority, application Germany, Apr. 15, 1976, 2516496
Int. Cl.² A61M *15/00*
U.S. Cl. 261—142 **4 Claims**



1. An apparatus for wetting respiratory gas, comprising a receiver having an interior wetting chamber and a cartridge receiving chamber with one end of said cartridge receiving chamber communicating with the wetting chamber and having an opposite end defining a cartridge receiving chamber opening, a water supply duct connected into the cartridge receiving chamber, a respiratory gas connected into the cartridge receiving chamber, and a heater cartridge in said cartridge receiving chamber comprising an inner portion, heater means in said inner portion for boiling water to evaporate it, a sleeve surrounding said inner portion and defining an annular water heating space therebetween having an opening for the passage of water into the wetting chamber, said sleeve being spaced from said inner portion and from the walls of the housing bounding said cartridge receiving chamber and having a lower closed end disposed in said wetting chamber, said water supply ducts being located to direct water into the annular water heating space defined between said sleeve and said inner portion.

4,028,446

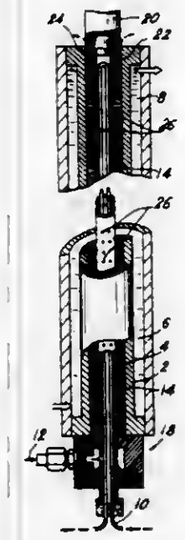
METHOD AND DEVICE FOR THE FABRICATION OF NUCLEAR FUEL COMPACTS

Roko Bujas, Gif-sur-Yvette, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Apr. 24, 1975, Ser. No. 571,390
Claims priority, application France, May 3, 1974, 74.15480
Int. Cl.² G21C *21/00*
U.S. Cl. 264—.5 **8 Claims**

1. A method of fabrication of nuclear fuel compacts in which a cylindrical mold is filled with coated particles containing fissile and fertile materials as well as grains of graphite if necessary and said mold is heated to a temperature which is higher than the softening temperature of pitch, wherein said pitch is injected into said hot mold through openings located at regular intervals over the entire length of a cylindrical wall of the mold, the injection of pitch being performed at right angles to the generator-lines of the cylinder constituted by the mold and through said openings whose diameter is smaller than the size of the coated particles.

4. A device for the fabrication of nuclear fuel compacts, wherein said device comprises:
a mold of approximately annular shape filled with coated particles and if necessary with grains of graphite,
means for controlling the temperature of said mold,
a hollow cylindrical central duct forming the internal wall of said mold and containing pitch under pressure, said duct



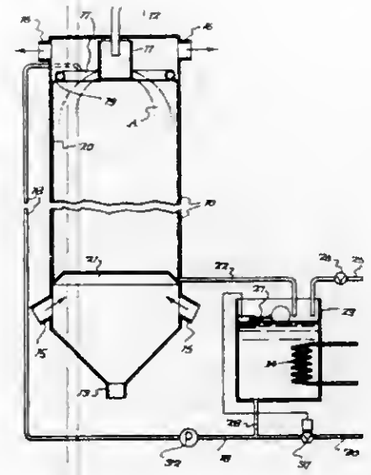
being pierced by radial openings through which the pitch is injected into the mold,
two pistons performing the function of plugs, said pistons being located at the upper and lower ends of said mold, one of them supporting said central duct, and
means, including a channel through said piston supporting said duct, for injecting the pitch under pressure into the central duct.

4,028,447

METHOD OF PRILLING MATERIAL

Norwood K. Talbert, Manlius, N.Y., assignor to Agway, Inc., DeWitt, N.Y.

Continuation-in-part of Ser. No. 354,592, April 26, 1973, abandoned. This application Apr. 1, 1976, Ser. No. 672,653
Int. Cl.² B01J *2/04*
U.S. Cl. 264—8 **4 Claims**



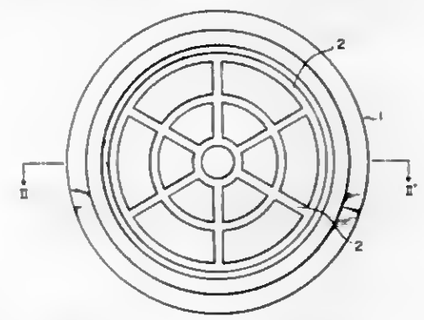
1. The method of prilling molten material in a prilling chamber having upper and lower ends and vertical side walls, comprising:
a. discharging molten material at said upper end of the prilling chamber in droplet form,
b. cooling said droplets by the falling movement thereof downwardly through said chamber out of contact with the side walls of the chamber to cool the droplets below their melting point to form solid prills before they reach the lower end of the prilling chamber,
c. directing a spray of aqueous liquid against the interior of said side walls of said prilling chamber to provide a falling film of aqueous liquid along said side walls substantially about the prilling chamber to entrain fine unprilled particles of the material being prilled and to prevent such particles from adhering to the chamber side walls and to promote cooling of the interior of the chamber, and
d. collecting the downward flow of said aqueous liquid at the lower portion of said side walls separately from the prilled material and conducting the same from said prilling chamber.

4,028,448

METHOD OF MOLDING PLASTICS MATERIAL

Makoto Hashimoto; Shinzi Uehara; Tadashi Sugita, all of Yokohama, and Naonori Shiina, Tokyo, all of Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Filed Nov. 17, 1975, Ser. No. 632,686
Claims priority, application Japan, Nov. 21, 1974, 49-134617; Nov. 21, 1974, 49-134618
Int. Cl.² B29F *3/10;* **B29D** *9/06, 27/00*
U.S. Cl. 264—37 **23 Claims**



1. A method of molding plastics material which comprises the steps of,
a. feeding first plastics material and second plastics material into two extruders respectively for softening and mixing, said first plastics material being substantially more difficult to thermally fuse than said second plastics material,
b. extruding through an extruder die the first plastics material in the form of a rod as a core having a diameter of at least 15mm and at the same time co-extruding the second plastics material through the same die around the periphery of said core rod as a sheath to surround said core rod,
c. charging the double structural co-extruded mass into a metal mold of which the inner walls are provided with a plurality of grooves,
d. applying pressure to the metal mold to mold the charge therein while the charge is plasticized, and,
e. taking out the molded product from the mold after the plasticization is substantially brought to an end by the cooling of the molded product.

4,028,449
PROCESS FOR PREPARING A HIGHLY EXPANDED POLYVINYL CHLORIDE FOAM PRODUCT

Haruaki Kakitani; Masao Maekawa, both of Yokkaichi, and Takashi Kokubo, Suzuka, all of Japan, assignors to Mitsubishi Monsanto Chemical Company, Tokyo, Japan

Filed Feb. 11, 1975, Ser. No. 548,924

Claims priority, application Japan, Feb. 13, 1974, 49-17313; Mar. 15, 1974, 49-29738

Int. Cl.² B29D *27/00*

U.S. Cl. 264—45.3 **10 Claims**

1. A process for preparing an expanded polyvinyl chloride foam, which comprises:

admixing a polyvinyl chloride resin which is prepared by emulsion polymerization of vinylchloride and a comonomer having a hydroxyl group, with a plasticizer, a crosslinking agent and a chemical blowing agent;

forming a preform of said mixture by introducing the mixture into a mold at a temperature lower than the melting temperature of said resin, wherein said melting temperature is defined as that temperature at which the crosslinkable polyvinyl chloride copolymer composition becomes a homogeneous melt by kneading at an elevated temperature;

and thereafter effecting foam expansion of the resulting molded preform by heating said preform to a temperature higher than the melting temperature of said resin.

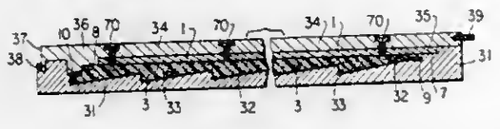
4,028,450
METHOD OF MOLDING A COMPOSITE SYNTHETIC ROOFING STRUCTURE

Walter M. Gould, 1731 Harriman Lane, Redondo Beach, Calif. 90278

Continuation-in-part of Ser. No. 318,288, Dec. 26, 1972, abandoned, which is a continuation-in-part of Ser. No. 45,373, June 11, 1970, abandoned. This application Apr. 19, 1974, Ser. No. 462,256

Int. Cl.² B29D *27/04*; **E04D** *1/20*

U.S. Cl. 264—45.5 **13 Claims**



1. A method of molding a composite foam synthetic resin product having a stepped portion on at least one edge thereof comprising the steps of:

introducing into a barrier coated contoured cavity of an open mold having an internal stepped section about a portion of the periphery of said cavity a foamable thermosetting resin reaction mixture;

temporarily attaching a relatively broad surface reinforcing base member into a stepped portion of a pressure plate for said mold;

placing said pressure plate with said base member attached thereto on said mold with said base member fitted into said stepped section of said mold;

securing said pressure plate to said mold, permitting said reaction mixture to foam, cure and unite to said base member;

removing said pressure plate from said mold with the composite foamed resin structure attached thereto after the thermosetting resin foam has cured; and

removing the composite foam synthetic resin product from said pressure plate.

4,028,451
METHOD OF MAKING WATER VAPOR PERMEABLE POLYMER SHEET MATERIAL

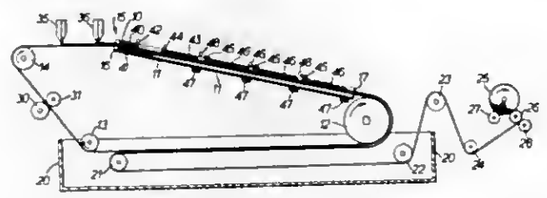
Eric Albert Warwicker, King's Lynn, England, assignor to Porvair Limited, King's Lynn, England

Division of Ser. No. 329,410, Feb. 5, 1973, Pat. No. 3,873,254, which is a division of Ser. No. 42,793, June 2, 1970, Pat. No. 3,729,536. This application Feb. 5, 1975, Ser. No. 547,125

Claims priority, application United Kingdom, June 3, 1969, 28076/69

Int. Cl.² B29D *27/04*

U.S. Cl. 264—45.8 **4 Claims**



1. A method of making a water vapor permeable polymer sheet material which comprises forming an initial mixture comprising elastomeric thermoplastic polyurethane dissolved in dimethylformamide with microscopic water soluble inorganic salt particles dispersed through the mixture, forming a layer at least 0.5 mm thick of the initial mixture in adherence with an endless porous fabric belt, passing the layer in adherence with said belt into contact with a body of coagulating liquid which is a solvent for said salt while the free surface of said layer is uppermost and has coagulating liquid on and over it and while said layer and belt are so supported as to prevent said layer adhered to said belt from assuming a concave transverse configuration, said layer being in contact with said body for a time sufficient to partially coagulate said layer, said layer adhering to and becoming keyed to said belt, bringing said partially coagulated layer on said belt into contact, with said free surface lowermost, with a second body of coagulating liquid non-solvent which is a solvent for said salt, said belt and layer passing through said second body until said layer is coagulated to self-supporting condition, and then stripping said self-supporting layer in sheet form from said belt, said second body of liquid being situated under said first body of liquid, said layer and belt being transferred from said first body to said second body by leading said belt carrying said adhering layer around guide means in a manner such that said free surface is held out of contact with said guide means and is prevented from assuming a concave transverse configuration.

4,028,452
ADDITIVES TO IMPROVE WETTABILITY OF SYNTHETIC PAPER PULP

Gary L. Driscoll, Boothwyn, Pa., assignor to Sun Ventures, Inc., St. Davids, Pa.

Division of Ser. No. 415,092, Nov. 12, 1973, abandoned. This application Sept. 25, 1974, Ser. No. 508,971

Int. Cl.² B29D *27/00*; **D21B** *1/30*

U.S. Cl. 264—51 **4 Claims**

1. A process for producing a synthetic thermoplastic resin pulp comprising:

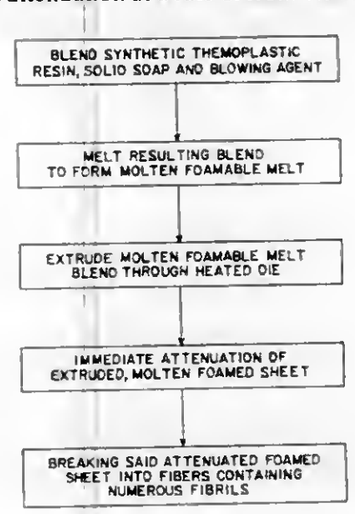
a. dry blending pellets or powder synthetic thermoplastic resin with 0.1 to 5.0 percent by weight of a solid soap of a metal salt of a fatty acid containing from 7 to 24 carbon atoms and wherein the metal is lithium, sodium, calcium or aluminum;

b. blending a blowing agent in the amount of from 0.1 to 20 weight percent of the resin being extruded into a blend of resin, soap, and agent to form a foamable melt;

c. melting the resulting foamable melt blend of the resin, the soap and the agent;

d. extruding the foamable melt blend into an area of reduced pressure through a heated die which lips are set from 5 to 100 mils apart;

e. immediately attenuating the molten extruded foamed sheet with attenuation at a rate of from 1.5 to 10 times the


BLEND SYNTHETIC THEMOPLASTIC RESIN, SOLID SOAP AND BLOWING AGENT
MELT RESULTING BLEND TO FORM MOLTEN FOAMABLE MELT
EXTRUDE MOLTEN FOAMABLE MELT BLEND THROUGH HEATED DIE
IMMEDIATE ATTENUATION OF EXTRUDED, MOLTEN FOAMED SHEET
BREAKING SAID ATTENUATED FOAMED SHEET INTO FIBERS CONTAINING NUMEROUS FIBRILS

rate linear at which the melt is extruded to induce formation of fibrils; and

f. breaking down said attenuated foamed sheet into short fibers containing numerous fibrils.

4,028,453
PROCESS FOR MAKING REFRACTORY SHAPES

Eldon D. Miller, Zelienople, and Ryan F. Washburn, Pittsburgh, both of Pa., assignors to Lava Crucible Refractories Company, Pittsburgh, Pa.

Filed Oct. 20, 1975, Ser. No. 623,741

Int. Cl.² C04B *33/32*

U.S. Cl. 264—67 **4 Claims**

2. A method of making a ceramic shape from a batch comprising nonplastic materials being free of raw clay comprising the steps for:

A. preparing a brickmaking batch comprising nonplastic size graded ceramic materials being free of raw clay said materials passing 8 mesh; 2 to 10% by weight volatilized silica; and 13 to 18 volume percent, based on the entire batch, of organic binders and lubricants selected from the group consisting of carboxymethylcellulose dextrine, polyvinylalcohol, polyethylene oxide, and mixtures thereof, and water;

B. processing the batch in a pug mill-extruder to deair and extrude a continuous column, said pug millextruder having means for maintaining the temperature of the exhusion barrel of said extruder near room temperature thereby maintaining the surface of the column near room temperature while it is being extruded;

C. cutting the column to form a billet;

D. pressing the billet to form a shape;

E. drying and firing to recover a ceramically bonded shape.

4,028,454
PROCESS FOR AGGLOMERATING COMPRESSIBLE MINERAL SUBSTANCES UNDER THE FORM OF POWDER, PARTICLES OR FIBRES

Joseph Davidovits, St. Quentin, and Jean Jacques Legrand, Aisne, both of France, assignors to Coordination et Developpement de l'Innovation Societe Anonyme en abrege Cordi, St. Quentin, France

Filed Dec. 31, 1974, Ser. No. 537,719

Claims priority, application France, Jan. 11, 1974, 74.00938

Int. Cl.² B28B *1/26, 3/00*

U.S. Cl. 264—82 **1 Claim**

1. The method of making a plate, comprising:

a. forming a mixture of clay, caustic soda and water into a moldable mass;

b. placing said mass between press platens,

c. between said mass and said platens disposing moistened layers of porous material and disposing perforated grid members between said layers and said platens,

d. pressing and mass between said layers and grid members with said platens heated to at least 150° C for a sufficient time to react said mixture and to form and cure said plate.

4,028,455
METHOD FOR PRODUCING A REDUCED-PRESSURE SHAPED MOULD

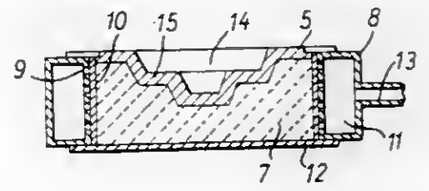
Shoji Ueda; Shuzi Ono; Hiroshi Sakaguchi, and Hideo Tsunoda, all of Nagasaki, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 17, 1975, Ser. No. 623,456

Claims priority, application Japan, Nov. 22, 1974, 49-134691

Int. Cl.² B22C *3/00*; **B29C** *17/04*

U.S. Cl. 264—89 **2 Claims**



1. A method for producing a reduced-pressure shaped mould comprising the steps of placing a pattern having gas-permeable orifices on a surface plate provided with first evacuating means, applying a coating film that is soluble in a solvent to the surface of said pattern and fixing it thereto by means of said first evacuating means, placing on the surface plate a flask provided with second evacuating means, filling the space portion defined by the coating film and the flask with solid particles, containing no caking agent, which serves as mould material, covering the surface of said mould material with an air-tight sheet, releasing the reduced pressure within the surface plate while evacuating the interior of said flask with the second evacuating means to make the air-tight sheet and the coating film adhere to the upper and lower surfaces, respectively, of the mould material, separating the pattern and the surface plate from the flask, and thereafter applying a solution, containing caking agent dissolved in the said solvent, to the coating film, which is adhered to the surface of a cavity formed at the lower surface of the mould material to enable the said caking agent to dissolve said coating film and penetrate interstices between the solid particles, and evaporating and removing said solvent whereby a layer that has been hardened by the said caking agent and coating film material is formed in a surface layer portion of the mould material bounding the cavity.

2. A mould shaped by the method according to claim 1.

4,028,456
METHOD OF EXTRUDING A WEATHERSTRIP HAVING A PILE STRIP

Earl Y. Lind, Rochester, N.Y., assignor to Schlegel Corporation, Rochester, N.Y.

Division of Ser. No. 446,301, Feb. 27, 1974, Pat. No. 3,923,576. This application July 21, 1975, Ser. No. 597,408

Int. Cl.² B29D *3/00, 9/00, 23/04*; **B29F** *3/00*

U.S. Cl. 264—90 **2 Claims**

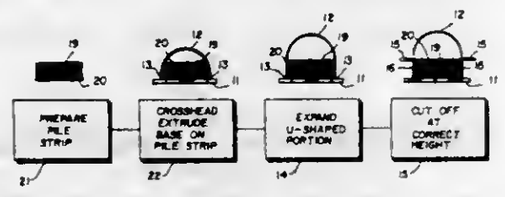
1. A weatherseal making method comprising:

a. preparing a long, thin strip of pile material;

b. cross-head extruding a resin base having a relatively thick, generally flat support portion formed on the back

of said pile strip and a relatively thin portion U-shaped in cross section and joined to opposite side edge regions of one face surface of said support portion and arching over said pile strip;

c. while said resin material is still plastic, producing a substantially lower pressure outside said U-shaped portion



than inside said U-shaped portion to expand said U-shaped portion away from said support portion and reduce the thickness of the wall of said U-shaped portion; and

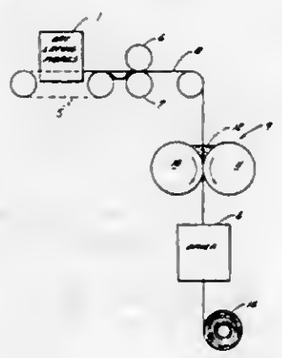
d. setting said resin material with said U-shaped portion expanded over said pile strip.

4,028,457

CONSOLIDATION OF DRY FORMED WEBS

Roger George Davey, Hudson Heights, Canada, assignor to Domtar Limited, Montreal, Canada

Continuation-in-part of Ser. No. 458,798, April 8, 1974, abandoned. This application June 20, 1975, Ser. No. 588,881
Claims priority, application Canada, Apr. 16, 1973, 168790
Int. Cl.² D04H *1/64*
U.S. Cl. 264—120 **7 Claims**



1. A method of continuously making a dry formed consolidated sheet of paper comprising:

a. dry forming fibres to form a continuous web, said fibres being predominantly discrete cellulose fibres previously liberated by chemical digestion of cellulosic material;

b. continuously passing said web containing 4 to 25% moisture based on the weight of said fibres between a pair of press rolls at a pressure of 500 – 3,000 lbs. per lineal inch and prebonding said fibres together thereby to impart sufficient strength to said web to enable it to pass through the nip of a size press when said web is substantially saturated with a binder in a liquid carrier but without significantly imparting the ability of said web to be impregnated by said binder in said liquid carrier;

c. continuously applying said binder in said liquid carrier to said prebonded web, the amount of said binder in said liquid carrier being sufficient to saturate said web in said nip;

d. continuously passing said prebonded web through said nip of said size press at a nip pressure of 20 to 150 lbs. per linear inch and at a speed of at least 50 ft. per minute said binder in said liquid carrier being at a temperature of 15 – 80° C thereby to distribute said binder substantially uniformly throughout said web and;

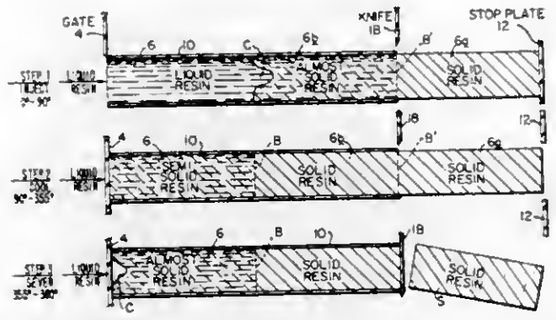
e. drying said web to form a continuous bonded consolidated sheet of paper.

4,028,458

METHOD FOR MAKING HOT MELT ADHESIVE STICKS AND OTHER SHAPES

Ray H. Wallace, Rockland, Mass., assignor to Transworld Adhesive & Chemical Corporation, Rockland, Mass.

Filed Aug. 25, 1975, Ser. No. 607,097
Int. Cl.² B29F *1/04*
U.S. Cl. 264—148 **5 Claims**



1. The method of making hot melt adhesive sticks comprising the steps of

A. intermittently injecting a charge of liquid adhesive into one end of a cooling chamber under sufficient pressure to eject a portion of a solidified shape resulting from the cooling of a previous adhesive charge, from the opposite end of the chamber,

B. preventing complete ejection of the solidified shape from the chamber thereby limiting the size of the liquid charge into the chamber and preventing leakage of liquid adhesive from said opposite end of the chamber,

C. severing the portion of the shape protruding from said opposite end of the chamber from its trailing end which plugs said opposite end of the chamber, and wherein said process comprises the additional steps of

maintaining the injecting charge under pressure until its outside wall forms and sets so that any resin shrinkage that occurs takes place at the trailing end of the charge where it can be made up by a succeeding resin charge into the chamber, and

interrupting the injection of liquid adhesive into the chamber after the solidified shape is partially ejected from the chamber.

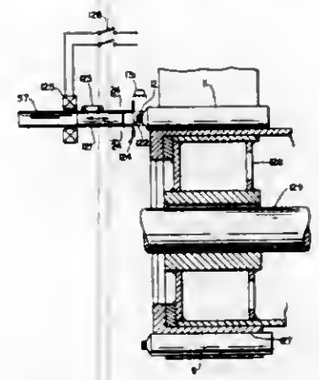
4,028,459

METHOD FOR PROTECTIVELY COVERING CONTAINER NECKS

Dusan S. LaJovic, Smithfield, Australia, assignor to Colgate-Palmolive Company, New York, N.Y.

Division of Ser. No. 340,293, March 12, 1973, Pat. No. 3,909,182. This application Apr. 25, 1975, Ser. No. 571,512
Claims priority, application Australia, Oct. 2, 1969, 61800/69; Oct. 13, 1969, 62213/69
Int. Cl.² B29C *17/00, 27/00;* **B29F** *5/00*
U.S. Cl. 264—159 **11 Claims**

1. A continuous method for applying covering elements of heat shrinkable plastics material upon articles comprising the steps of positioning articles in succession at an element applying station, periodically longitudinally advancing the open leading end of a length of tubing of said material toward articles positioned at said station, during said advancing moving said tubing over a mandrel to expand the leading end of the tubing to tubular form, periodically severing said tubing near said open end in timed relation with advance of said tubing to provide a succession of tubular elements of desired length each separated from said tubing and positioned in alignment with an article at said station, axially advancing a severed tubular element onto an article at said station during



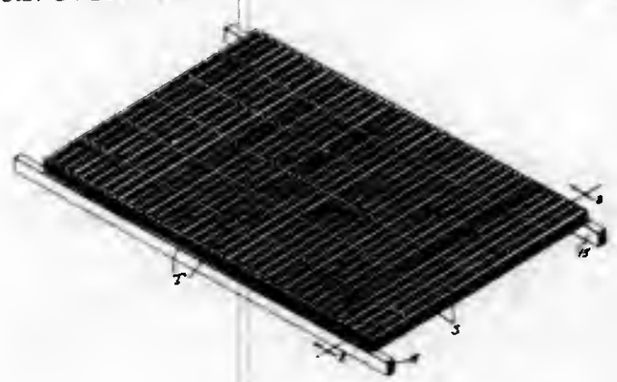
each period of advance of said tubing, and heat shrinking said elements onto said articles at said station.

4,028,460

METHOD FOR MAKING FIBER REINFORCED RESIN GRATING

Leonard S. Meyer, Columbia, S.C., assignor to Sybron Corporation, Rochester, N.Y.

Division of Ser. No. 110,076, Jan. 27, 1971, Pat. No. 3,704,561. This application June 21, 1972, Ser. No. 266,520
Int. Cl.² B29D *3/02;* **B29G** *7/00*
U.S. Cl. 264—263 **2 Claims**



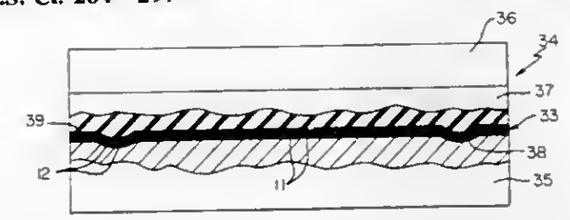
1. A method for making a grating having two sets of bars with the bars of one set parallel to each other and intersecting the bars of the other set, comprising introducing hardenable liquid resin in a mold having two sets of parallel intersecting cavities for molding the two sets of bars of the grating, placing a set of preformed fiber reinforced solidified resin strips in the parallel cavities of one of said sets of cavities in the mold, placing another set of preformed fiber reinforced solidified resin strips in the set of cavities of the other parallel set of cavities in the mold in positions overlying the strips of the first set, alternately placing additional sets of similar strips in each of the sets of cavities to provide interleaving strips in the positions of each of the sets of bars of the grating being formed, each set of said strips being submerged in liquid resin previously introduced into the mold cavities, and hardening said liquid resin with the strips embedded therein.

4,028,461

METHOD OF MAKING A PLURALITY OF SUBSTANTIALLY IDENTICAL FLEXIBLE DIAPHRAGMS

Rolf H. Ochsner, Trumbull, Conn., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Sept. 5, 1975, Ser. No. 610,664
Int. Cl.² B29D *9/00*
U.S. Cl. 264—297 **2 Claims**



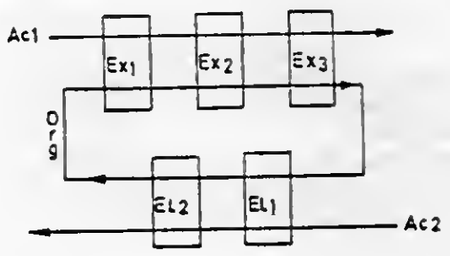
1. A method of making a plurality of substantially identical flexible diaphragms for control devices or the like comprising the steps of providing a plurality of sheets of polyester film each being approximately 0.0005 to 0.0010 of an inch thick and each being a circular disc approximately four and one-half inches in diameter, and forming said diaphragms from said sheets so that each diaphragm has an annular corrugation formed therein concentric with the center thereof and inboard of the outer periphery thereof, said step of forming said diaphragms comprising the steps of disposing said sheets in stacked aligned relation in a mold, and compressing and heating said sheets in said mold in said stacked aligned relation to substantially simultaneously heat form said corrugations in said sheets to thereby make said diaphragms substantially identical to each other.

4,028,462

METHOD OF EXTRACTION INVOLVING THE USE OF SOLVENTS AND NEW COMBINATION OF REACTORS USED

Esteban Domic; Albert Sfeir, and Jorge Sandoval, all of Santiago, Chile, assignors to Corporacion de Fomento de la Produccion, represented by Comite de Investigaciones Technologicas, Santiago, Chile

Continuation-in-part of Ser. No. 392,216, Aug. 28, 1973, abandoned. This application May 22, 1975, Ser. No. 580,038
Claims priority, application Chile, Aug. 28, 1972, 609-72
Int. Cl.² C22B *15/00, 3/00*
U.S. Cl. 423—24 **9 Claims**



1. In a liquid-liquid extraction process for the extraction of a constituent from an aqueous solution through the use of an organic solvent, in which process said constituent is extracted from the aqueous feed solution into said organic solvent and backwashed into an aqueous elution solution, wherein successive extraction and successive elution contacts occur, the improvement comprising

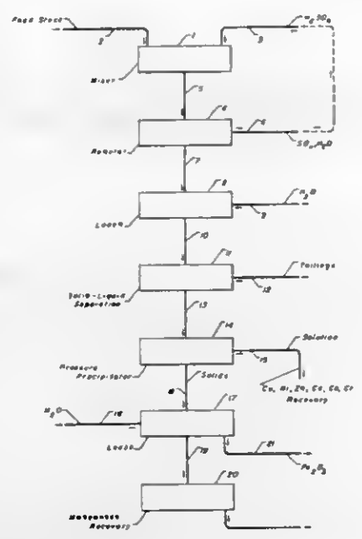
partially discharging said constituent from said organic solvent through contact of said organic solvent with said aqueous elution solution after each extraction contact.

4,028,463

RECOVERY OF MANGANESE VALUES

John C. Stauter, Itasca, and Richard T. Um, Mount Prospect, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed Feb. 19, 1976, Ser. No. 659,392
Int. Cl.² C01G 45/10
U.S. Cl. 423—52 **4 Claims**



1. In a process for the recovery of manganese values from a manganese bearing source, the steps of:

a. forming a mixture of said manganese bearing source, sulfuric acid and a reductant comprising a chromium-containing compound in a weight ratio of from about 1:1:1 to about 2:1:10 manganese bearing source, chromium-containing compound and sulfuric acid, respectively;
b. roasting said mixture at a temperature of from about 200° to about 500° C. for a sufficient time to remove the major portion of its water content and excess sulfuric acid;
c. leaching the resultant pulp with water at a temperature of from about 25° to about 95° C;
d. filtering the leach solution to separate undissolved solids from pregnant leach liquor containing dissolved manganese ions and chromium ions;
e. selectively extracting the chromium ions from said pregnant leach liquor with an organic amine solvent; and
f. precipitating manganese as solid manganese sulfate from the remaining leach liquor by subjecting the latter to a pressure of from about 50 to about 500 pounds per square inch at a temperature of from about 130° to about 250° C.

4,028,464

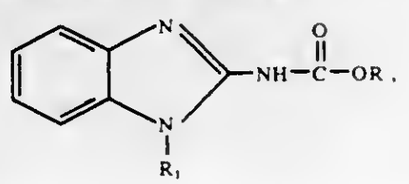
FUNGICIDE COMPOSITIONS FOR THE CONTROL OF SNOWMOLD

Robert Joseph Bell, and James Almy Simmons, both of Marysville, Ohio, assignors to The O. M. Scott & Sons Company, Marysville, Ohio

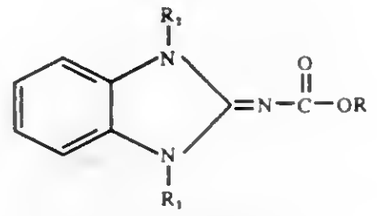
Continuation of Ser. No. 397,826, Sept. 17, 1973, abandoned. This application Nov. 24, 1975, Ser. No. 634,907
Int. Cl.² A01N 9/12, 9/22, 9/24
U.S. Cl. 424—273 **11 Claims**

1. A fungicidal composition for the control of snowmold comprising

a. 1,4-dichloro-2,5-dimethoxybenzene and
b. a compound selected from the group consisting of
1. a benzimidazole of the formula

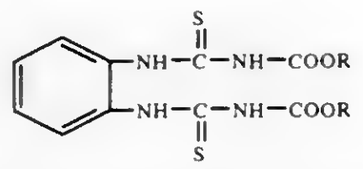


a benzimidazole of the formula



wherein R is selected from the group consisting of methyl and ethyl; and R_1 is selected from the group consisting of hydrogen and butyl carbamoyl, and

2. a thiophanate of the formula



in which R is selected from the group consisting of methyl and ethyl,

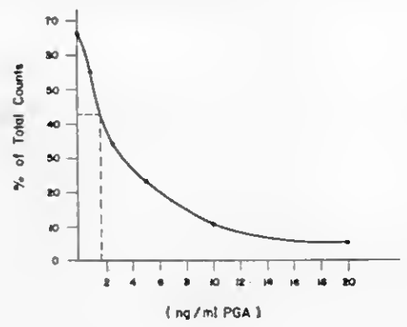
the ratio by weight of compound (a) to compound (b) ranging from 10:1 to 1:1.

4,028,465

ASSAY METHOD FOR SERUM FOLATE

Nathan Lewin, Corte Madera, and Emmy Tong-In Wong, Moraga, both of Calif., assignors to Bio-Rad Laboratories, Richmond, Calif.

Filed Nov. 10, 1975, Ser. No. 630,249
Int. Cl.² C07D 475/00; G01N 31/06, 33/16; G01T 1/16
U.S. Cl. 424—1 **15 Claims**



1. In the assay for serum folate by competitive binding in which endogenous serum folate binding proteins are inactivated by heat prior to the competitive binding step, the improvement in which said sera are heated in the presence of a buffered solution containing a stabilizing amount of a dithiopolyol having 4–6 carbon atoms.

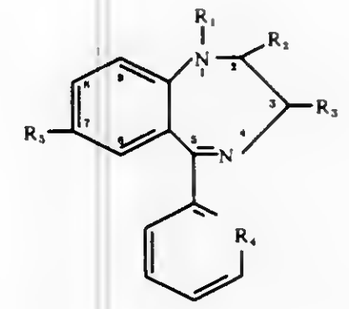
4,028,466

ANALGESIC COMPOSITIONS COMPRISING DEXTRO-PROPOXYPHENE AND BENZODIAZEPINE AND PROCESS

Frank M. Berger, 190 E. 72nd St., New York, N.Y. 10021

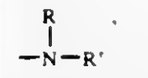
Continuation-in-part of Ser. No. 541,968, Jan. 7, 1975, abandoned, which is a continuation-in-part of Ser. No. 463,350, April 23, 1974, abandoned. This application Mar. 10, 1976, Ser. No. 665,595
The portion of the term of this patent subsequent to Apr. 12, 1994, has been disclaimed.
Int. Cl.² A61K 31/22, 31/33
U.S. Cl. 424—244 **18 Claims**

1. An analgesic composition having a remarkably high analgesic activity, comprising as analgesically active components, α, d-propoxyphene or pharmaceutically acceptable salt thereof and at least one benzodiazepine or pharmaceutically acceptable salt thereof, in an amount within the weight ratio range of α, d-propoxyphene:benzodiazepine from 100:0.5 to 2:1, the benzodiazepine enchancing the analgesic activity of the α, d-propoxyphene when administered separately, the benzodiazepine having the formula:



wherein:

R_1 is selected from the group consisting of hydrogen, n-butyl, and alkylamino

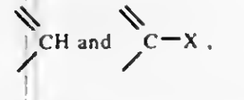


where R and R′ are selected from the group consisting of hydrogen, lower alkyl having from one to three carbon atoms, and bivalent alkylene having from two to four carbon atoms and linked to the nitrogen at two positions to form a heterocyclic ring;

R_2 is selected from the group consisting of oxo oxygen = O and hydroxyl OH;

R_3 is selected from the group consisting of hydrogen, hydroxyl OH and carboxyl COOH;

R_4 is selected from the group consisting of



where X is Cl or F; and

R_5 is selected from the group consisting of hydrogen, Cl and F.

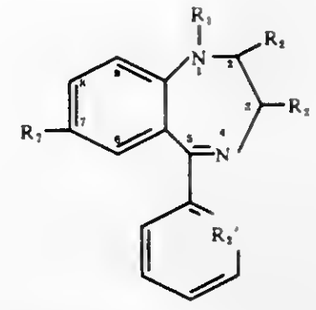
4,028,467

ANALGESIC COMPOSITIONS COMPRISING LEVO-PROPOXYPHENE AND BENZO DIAZEPINE AND PROCESS

Frank M. Berger, 190 E. 72nd St., New York, N.Y. 10021

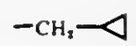
Continuation-in-part of Ser. No. 541,968, Jan. 17, 1975, abandoned, which is a continuation-in-part of Ser. No. 463,350, April 23, 1974, abandoned. This application June 12, 1975, Ser. No. 586,329
The portion of the term of this patent subsequent to Apr. 12, 1994, has been disclaimed.
Int. Cl.² A61K 31/22, 31/33, 31/235
U.S. Cl. 424—244 **17 Claims**

15. A process for obtaining an analgesic effect, which comprises administering in analgesically effective amount levopropoxyphene or pharmaceutically acceptable salt thereof and at least one benzodiazepine or pharmaceutically acceptable salt thereof, each in an amount within the weight ratio range of levopropoxyphene:benzodiazepine of from 100:0.5 to 2:1 imparting analgesic activity to the other, neither the levopropoxyphene nor the benzodiazepine when administered separately displaying analgesic activity, the benzodiazepine having the formula:

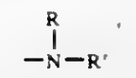


wherein:

R_1 is selected from the group consisting of hydrogen, alkyl,

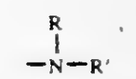


and amino or alkylamino



in which R and R′ are selected from the group consisting of hydrogen, lower alkyl having from one to three carbon atoms, and bivalent alkylene having from two to four carbon atoms; and linked to the nitrogen at two positions to form a heterocyclic ring;

R_2 is selected from the group consisting of hydrogen, oxo oxygen=O hydroxyl OH, alkyl, and amino or alkylamino

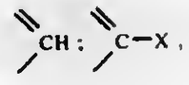


where R and R′ are as defined above;

R_3 is selected from the group consisting of hydrogen, hydroxyl OH and carboxyl COOH;

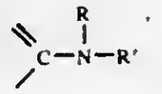
R_7 is selected from the group consisting of hydrogen, halogen and nitro NO_2; and

R_2' is selected from the group consisting of



where X is halogen

and amino or alkylamine



where R and R′ are as defined above.

4,028,468

OAT GROAT FRACTIONATION PROCESS

Gary Arlyn Hohner, Sleepy Hollow, and Roy Godfrey Hyldon, Crystal Lake, both of Ill., assignors to The Quaker Oats Company, Chicago, Ill.

Filed Oct. 1, 1975, Ser. No. 618,476
Int. Cl.² A23J 1/12
U.S. Cl. 426—436 **18 Claims**

1. In a process of fractionating oats comprising:
I. obtaining dried, dehulled oat groats;
II. grinding the oat groats to form an oat flour containing a dense, fine fraction of regularly shaped particles and a light, coarse fraction of irregularly shaped particles wherein the coarse fraction comprises oat bran, oat gum, oat protein and oat starch;
III. recovering the flour;
IV. separating the coarse fraction and the fine fraction;
V. recovering the coarse fraction; the improvement further comprising:
a. forming a heated, basic slurry of the recovered coarse fraction of the oat flour in a liquid;
b. agitating the heated, basic slurry to carry out an extraction and to form a bran fraction and a soluble fraction containing the oat gum, the oat protein and the oat starch by the extraction of the coarse fraction;
c. recovering the oat bran from the slurry while leaving the oat gum, the oat protein, and the oat starch in the soluble fraction to thereby form an alkaline extract of the soluble fraction;
d. chilling the alkaline extract to a temperature in the range from above the freezing point of the alkaline extract to ambient temperature;
e. acidifying the chilled alkaline extract to form a precipitate of oat protein;
f. removing the protein precipitate and the starch from the extract to form a supernatant liquid containing the oat gum to thereby recover the protein precipitate and the starch;
g. neutralizing the supernatant liquid;
h. heating the neutralized supernatant liquid to at least 90° C.; and
i. recovering the oat gum.

4,028,469

BREAD CONTAINING ALFALFA

David Kritchevsky, 136 Lee Circle, Bryn Mawr, Pa. 19010; Hilary Koprowski, 334 Fairhill Road, Wynnewood, Pa. 19096, and Hanna Makolska, 3900 Chestnut St., Apartment 928, Philadelphia, Pa. 19104

Filed May 10, 1976, Ser. No. 684,571
Int. Cl.² A21D 10/00
U.S. Cl. 426—551 **11 Claims**

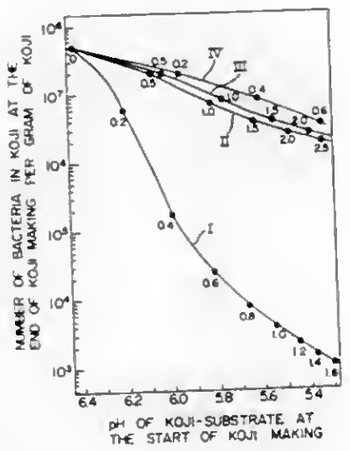
1. A composition for preparing bread comprising a farinaceous dough containing a leavening agent and alfalfa, said alfalfa being present in an amount of from about 3.5 to 10% by weight.

4,028,470

PROCESS FOR PRODUCING KOJI FOR FERMENTED FOOD PRODUCTS

Kazuya Hayashi, Kashiwa; Takeji Mizunuma, Noda, and Tamotsu Yokotsuka, Nagareyama, all of Japan, assignors to Kikkoman Shoyu Co., Ltd., Japan

Filed June 8, 1976, Ser. No. 693,762
Claims priority, application Japan, June 18, 1975, 50-73167
Int. Cl.² A23L 1/20, 1/238
U.S. Cl. 426—11 **8 Claims**



1. A process for producing koji for fermented food products which comprises
inoculating a koji mold in a modified koji-substrate composed of a vegetable protein material and a vegetable carbohydrate material and selected from the group consisting of steamed koji-substrate, puffed koji-substrate and roasted koji-substrate, and
cultivating the koji mold in the presence of 0.1 to 1.2% by weight, based on the water content of the modified koji-substrate of acetic acid at a pH of about 4 to 7.5, a temperature of about 20° to about 40° C and for a time sufficient to produce koji for fermented food products.

4,028,471

YEAST LEAVENED DOUGH COMPOSITION

Jack Kern Krum, Leawood; Louis Albert Wollermann, Prairie Village, both of Kans., and Dugan Allan Rucker, Kansas City, Mo., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Dec. 1, 1975, Ser. No. 636,848
Int. Cl.² A21D 2/20
U.S. Cl. 426—22 **7 Claims**

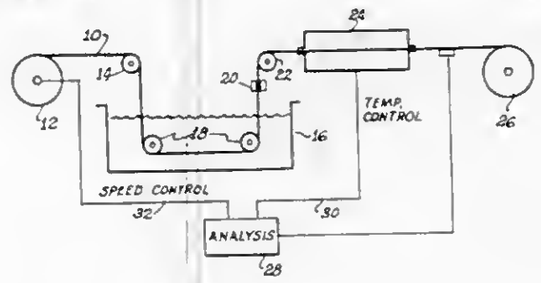
1. A process for preparing a baked product of improved resiliency and crumb structure from a yeast leavened dough composition which comprises
adding to said composition, for each 100 parts by weight of flour, an additive comprising from 0.0020 to 0.0120 parts by weight of a peroxide oxidizing agent and from 0.0025 to 0.090 parts by weight of a sorbate selected from the group consisting of sorbic acid and the sodium, potassium and calcium salts of sorbic acid, the ratio of peroxide to sorbate being no greater than one with more than 0.0075 parts by weight of peroxide, and
baking said dough composition, whereby a yeast leavened baked product is produced capable of being more thinly sliced than a baked product not containing said additive.

4,028,472

METHOD FOR ANALYSIS OF TREATED GLASS FIBERS

Klaus D. Rosinski, Granville, and John W. Schroer, Newark, both of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Division of Ser. No. 306,279, Nov. 13, 1972, Pat. No. 3,900,584. This application Apr. 14, 1975, Ser. No. 567,659
Int. Cl.² C03C 25/02; G01N 31/12
U.S. Cl. 427—8 **12 Claims**



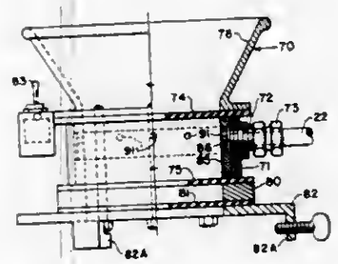
1. A method for determining the degree of cure of glass fibers coated with a heat-cured polymeric material containing water-soluble carbonaceous material when cured comprising contacting the coated glass fibers with water at an elevated temperature for a time sufficient to extract water-soluble carbonaceous material from the heat-cured polymeric material and determining the carbon content of the resulting aqueous extract as a measure of the degree of cure.

4,028,473

HYDRAULIC POWERED LUBRICATOR AND SPRAYER

Armand R. Conti, 3464 N. Wendover Circle, Youngstown, Ohio 44511

Continuation-in-part of Ser. No. 577,698, May 15, 1975, abandoned. This application Feb. 17, 1976, Ser. No. 658,353
Int. Cl.² B05C 3/02; G01F 11/02
U.S. Cl. 427—434 E **12 Claims**



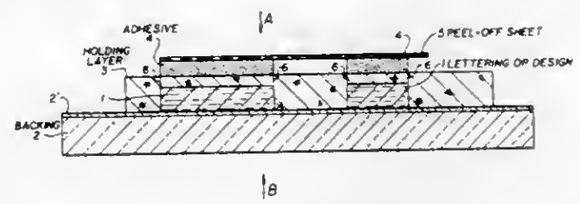
1. Apparatus powered by hydraulic fluid pressure for the delivery of liquid and semiliquid materials, such as a viscous fluid, a thixotropic gel or a gel-type grease, said apparatus including the combination of:
means for pressurizing hydraulic fluid,
a hydraulic motor powered by the pressurized hydraulic fluid,
valve means for controlling said hydraulic motor,
a container forming a supply reservoir for said liquid and semiliquid materials,
pump means driven by said hydraulic motor to withdraw the material from the container while pressurizing the withdrawn material,
an open-ended collar having an open discharge orifice in the side wall thereof,
a conduit line to interconnect said pump means with the open discharge orifice of said discharge means for discharging pressurized material,
resilient wiper means at the opposite ends of said collar to form an internal chamber wherein the pressurized material delivered by said conduit line is discharged from said open orifice onto the surface of an article while passing through the collar between said resilient wiper means, and
means to control the discharge of the material from said open discharge orifice only by controlling the pressurization of the material by said pump means.

4,028,474

WEATHERPROOF DECAL

Francois Martio, c/o Ste d'Exploitation des Procedes F. Martio dite SEPMA, Oursbelille 65 490, France

Continuation of Ser. No. 430,488, Jan. 3, 1974, abandoned. This application Mar. 1, 1976, Ser. No. 662,547
Claims priority, application France, Jan. 3, 1973, 73.00529
Int. Cl.² B32B 3/22, 7/02, 7/06, 7/14; C09J 7/02
U.S. Cl. 428—40 **7 Claims**



1. A decal comprising a backing with a smooth surface, lettering or designs of given contours placed on said smooth surface preferably in reverse fashion, anchoring means comprising a substantially dried adhesive material, and anchoring means covering said lettering or designs and said smooth surface, an edge of reduced thickness in said anchoring means, said edge extending at said contours of the lettering or designs, said anchoring means securing the lettering or designs to said smooth surface and in position relative to each other, and an adhesive layer covering said anchoring means only in the areas of said lettering or designs, said adhesive layer and said anchoring means being composed of the same adhesive agent, said adhesive layer having a greater adhesive strength than said anchoring means due to the dispersion of talcum and a mineral oil in the composition of the anchoring means and not in the adhesive layer, whereby the adhesive layer sticks more strongly than the anchoring means to facilitate the ripping of the anchoring means along said edge when the decal is transferred from the backing to a surface.

2. The decal according to claim 1, further comprising a peel-off sheet on said adhesive layer.

4,028,475

SECURITY FILM FOR SHATTERPROOFING WINDOWS

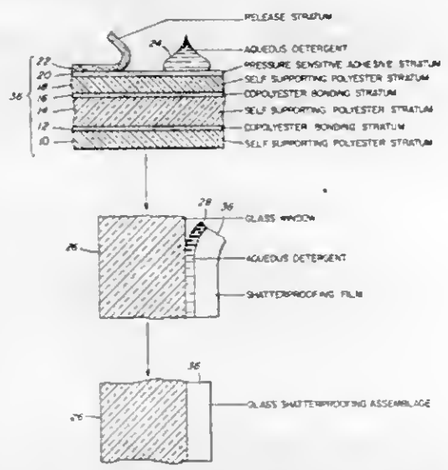
Michael E. Willdorf, Malden, Mass., assignor to Material Distributors Corporation, Woburn, Mass.

Filed May 21, 1975, Ser. No. 579,388
Int. Cl.² B32B 17/08; B60J 1/06, 3/00; B32B 15/08
U.S. Cl. 428—215 **2 Claims**

1. A security film comprising as laminated components:
a. from two to five self-supporting strata, each of said self-supporting strata ranging in thickness from 1 to 3 mils and being composed of biaxially oriented polyethylene terephthalate;
b. a plurality of inner bonding strata laminating said self-supporting strata together, each of said inner bonding strata ranging in thickness from 0.1 to 0.3 mil and consisting essentially of a copolymer of polyethylene terephthalate;
c. a pressure-sensitive adhesive stratum on one face of said self-supporting strata, said pressure sensitive adhesive

stratum ranging in thickness from 4 to 15 times the thickness of one of said inner bonding strata and consisting essentially of 15 to 30 parts of an acrylic resin and from 2.5 to 7.5 parts of a polyene tackifier wherein said pressure-sensitive stratum is characterized by a 72° F rolling ball test value ranging from 1/16 to 6 inches, a 72° F static sheer value ranging between 1 and 5 hours, and by a 180° F static peel test value ranging between 7.5 and 75 ounces;

d. all of the strata of said security film being optically clear and the overall thickness of said security film ranging in thickness from 3 to 6 mils wherein the thickness of said inner bonding strata is from 6 to 18 percent of said overall thickness and the thickness of said pressure-sensitive adhesive stratum ranges from 13 to 26 percent of said overall thickness;



e. whereby said laminated components provide sufficient overall flexibility to permit high incremental pressure when squeegeed onto a glass window, sufficient tensile modulus, impact strength and tear strength imparted by said self-supporting strata to preclude rupture while distributing shock; particular adhesion, cohesion, compatibility and resilience to withstand shock without failure, characteristic modulus of rigidity at the discontinuities between said self-supporting strata and said inner bonding strata to damp vibratory energy transfer, and particular adhesion, cohesion, compatibility and resilience imparted by said pressure sensitive bonding stratum to catch and retain glass chards produced by deformation of a laminated combination of said security film and a glass window at the moment of an impact.

4,028,476

TRANSPARENT POLYAMIDE ARMOR

Roger F. Kleinschmidt, and Robert W. Campbell, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

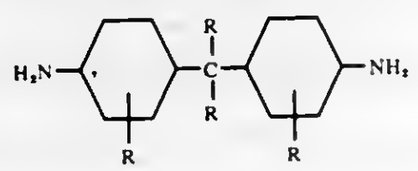
Continuation of Ser. No. 489,748, July 18, 1974, abandoned. This application Oct. 22, 1975, Ser. No. 624,619

Int. Cl.² B32B *27/34*; **F41H** *5/02, 5/06, 5/08*

U.S. Cl. 428—220 **17 Claims**

1. A lightweight, transparent armor shield having a thickness of about 1/32 inch to about 2 inches, consisting essentially of a transparent, substantially amonphouse polymeric material having an inherent viscosity of at least about 0.6 formed by the polymerization of:

A. at least one compound having the general formula

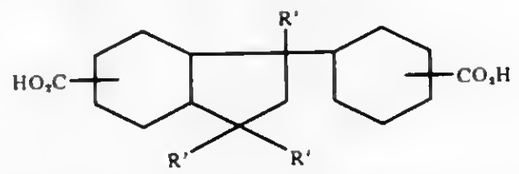


wherein each R is individually selected from the group consisting of hydrogen and $-CH_3$; and

b. at least one polycarboxylic acid having from 6 to 26 carbon atoms per molecule selected from the group consisting of:

a. straight chain dicarboxylic acids having from 6 to 18 carbon atoms,

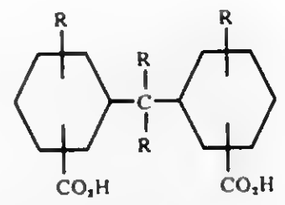
b. phenylidane dicarboxylic acids having the general formula



wherein each R' is selected from the group consisting of hydrogen and alkyl radicals having from 1 to 3 carbon atoms;

c. tricarboxylic acids having the general formula $r''(-CO_2H)_3$, wherein R'' is a trivalent saturated or aromatic hydrocarbon radical having from 3 to 12 carbon atoms,

d. bis(carboxyphenyl)methanes having the general formula



wherein R is $-H$ or $-CH_3$, and

e. mixtures thereof wherein an armor shield having a thickness of about ¼ inch is capable of having a V50 rating of at least about 878 fps, as determined according to MID-STD-662A, when fired at by a .22 califre 17-grain fragment-simulating projectile.

4,028,477

METHOD OF PRODUCING AN ARTICLE OF THERMOSETTING RESIN

Johan M. Goppel, and Peter R. Chant, both of Delft, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Division of Ser. No. 366,381, June 4, 1973, Pat. No. 3,915,783, which is a continuation-in-part of Ser. No. 208,937, Dec. 16, 1971, abandoned. This application Mar. 6, 1975, Ser. No. 556,075

Int. Cl.² B32B *5/18*

U.S. Cl. 428—285 **4 Claims**

1. A rigid laminated article comprising a dense compressed cellular foam core interposed between fibrous layers uniformly impregnated throughout their respective thickness with a hardened thermosetting resin, said foam core having substantially all of the open cell space therein filled with a hardened thermosetting resin and being bound to said resin-impregnated fibrous layers through said hardened thermosetting resin.

4,028,478

SAFETY SWITCH FOR SEALED GALVANIC CELLS

Gary Ronald Tucholski, Parma Heights, Ohio, assignor to Union Carbide Corporation, New York, N.Y.

Filed May 24, 1976, Ser. No. 689,524

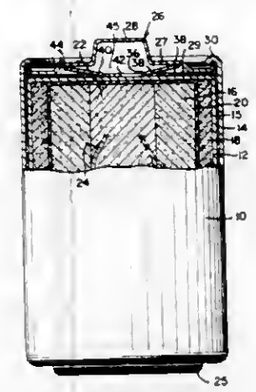
Int. Cl.² H01M *2/00*

U.S. Cl. 429—61 **6 Claims**

1. A sealed galvanic cell assembly comprising in combination:

a cylindrical metal container including a positive and negative electrode and an electrolyte, with said container being in electrical contact with said positive electrode;

an outer cover mounted over said metal container and being of a predetermined configuration to form a substantially centrally located cavity between said cover and said container;



switch means disposed in said cavity for providing an electrical connection between said container and said outer cover during normal operation of the cell and being responsive to a predetermined expansion of said container for irreversibly breaking such electrical contact;

said switch means being held in a slidable relationship with said container and cover and comprising an electrically conductive spring member having an inclined deformable section and a substantially centrally disposed opening.

4,028,479

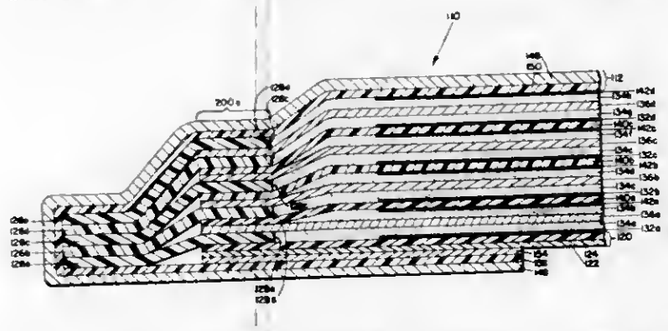
FLAT BATTERY

Ralph D. Fanciullo, Waltham, and Ludwig G. Fasolino, Wellesley, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 536,379, Dec. 26, 1974, abandoned, which is a continuation-in-part of Ser. No. 478,061, June 10, 1974, Pat. No. 3,907,599. This application Jan. 27, 1976, Ser. No. 652,735

Int. Cl.² H01M *6/48*

U.S. Cl. 429—152 **18 Claims**



1. In a thin planar battery having a multiplicity of discrete electrically conductive polymeric layers arranged in cooperative electrical association with one another to form a multicell battery, the improvement comprising:

continuous frame-type electrically insulative sheet sealing means providing an opening defined by an inner border and having a first surface bonded to a peripheral surface of each discrete electrically conductive polymeric layer, said sheet sealing means extending outwardly from the periphery of the so bonded electrically conductive layer to define a continuous border sealing portion; and

discrete, sheet-type separator means positioned between the electrically conductive layers and having a periphery extending beyond the sealing means inner opening and within said border sealing portion which periphery is bonded to the surface of the sealing means opposite the first surface.

4,028,480

PHOTODEGRADABLE POLYMER COMPOSITIONS

Genevieve Le Brasseur, Bully les Mines, France, assignor to Societe Chimique des Charbonnages - CdF Chimie, Paris, France

Filed Apr. 15, 1976, Ser. No. 677,377

Claims priority, application France, Apr. 17, 1975, 75.12000

Int. Cl.² C08J *3/20*

U.S. Cl. 526—3 **6 Claims**

1. A photodegradable polymer composition comprising at least one polymer selected from the group consisting of polyethylene and polystyrene and copolymers thereof and from 1 to 500 ppm based on the polymer of ferrous iron in the form of a salt of a carboxylic acid, said acid having an alkyl chain containing at least 6 carbon atoms and being substituted in at least one of the second, third, fourth or fifth positions relative to the acid group with at least one of the radicals selected from the group consisting of carboxylic acid, sulphonic acid, alcohol and amide radicals.

4,028,481

PRODUCTION OF OLEFIN POLYMERS AND NOVEL CATALYSTS THEREFORE

Tetsunosuke Shiomura; Akiro Ito; Yoshio Morimoto, and Tetsuya Iwao, all of Nagoya, Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Continuation of Ser. No. 153,791, June 16, 1971, abandoned. This application Aug. 6, 1973, Ser. No. 385,665

Claims priority, application Japan, June 18, 1970, 45-52420; July 31, 1970, 45-66627; Nov. 6, 1970, 45-97711; Dec. 28, 1970, 46-129938; Dec. 28, 1970, 46-129934; Dec. 28, 1970, 46-129935; Dec. 29, 1970, 46-129922; Dec. 29, 1970, 46-129924

Int. Cl.² C08F *4/66, 10/06*

U.S. Cl. 526—142 **17 Claims**

1. A catalyst composition useful for polymerizing α-olefins comprising:

A. An activated titanium trichloride component obtained by copulverizing a titanium trichloride composition with a complex or reaction product of an aluminum halide and at least one organic oxygen-containing compound selected from the group consisting of oxyethers, carboxylic esters and oxyketones and washing the product of copulverization with a solvent selected from the group consisting of aliphatic, cycloaliphatic and aromatic hydrocarbons, their halogen derivatives and mixtures thereof; and

B. an organoaluminum compound.

4,028,482

POLYMERS OF ACID ANHYDRIDE TYPE NORBORNENE DERIVATIVES AND A METHOD OF PREPARING THE SAME

Takashi Ueshima, Yokohama; Yasuzi Tanaka, Kawasaki, and Shoichi Kobayashi, Yokohama, all of Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 19, 1974, Ser. No. 507,556

Claims priority, application Japan, Sept. 25, 1973, 48-106902

Int. Cl.² C08F *5/00, 1/42*

U.S. Cl. 526—271 **1 Claim**

1. Resinous homopolymers prepared with a reduced viscosity of 0.1 to 20 measured at 30° C in a 1% by weight aqueous solution of sodium carbonate with the concentration of the polymers fixed at 0.2g/dl by ring-opening polymerization of acid anhydride type norbornene derivatives having a carboxylic anhydride group and selected from the group consisting of 3,6-methylene-1,2,3,6-tetrahydro-cis-phthalic anhydride; 6-(5-carboxy-bicyclo[2,2,1]-hepta-2-enyl) acetic anhydride;

3,6-methano-1-methyl-1,2,3,6-tetrahydro-cis-phthalic anhydride;2-oxa-1,4-dioxo-5,8-methano-1,2,3,4,4*a*,5,8,8*a*-octahydro-naphthalene; 5,8-methano-1,2,3,4,4*a*,5,8,8*a*-octahydronaphthalene-1,2-dicarboxylic anhydride; 5,8-methano-1-methyl-1,2,3,4,4*a*,5,8,8*a*-octahydronaphthalene-2,3-dicarboxylic anhydride; 1,4,5,8-dimethano-1,2,3,4,4*a*,5,8,8*a*-octahydro-naphthalene-2,3-dicarboxylic anhydride; 2-oxa-1,3-dioxo-1,2,3,4,4*a*,5,8,8*a*,9,9*a*,10,10*a*-dodecahydroanthracene and 4-(5-bicyclo[2,2,1]-hepta-2-enyl) phthalic anhydride.

4,028,483

EPDM INTERPOLYMERS FORMED WITH UNSATURATED ORGANOSILANES

William C. Bond, Jr., and Harold J. Wahlborg, both of Baton Rouge, La., assignors to Copolymer Rubber & Chemical Corporation, Baton Rouge, La.

Continuation-in-part of Ser. No. 592,381, July 2, 1975, abandoned, which is a continuation-in-part of Ser. No. 340,221, March 21, 1973, abandoned, which is a continuation of Ser. No. 102,929, Dec. 30, 1970, abandoned. This application Sept. 8, 1975, Ser. No. 610,987

Int. Cl.² C08F *30/08, 130/08, 15/40, 4/44*

U.S. Cl. 526—279 **16 Claims**

1. An interpolymer which is the product of the interpolymerization in the presence of a Ziegler type catalyst of monomers consisting essentially of (1) ethylene, (2) a monoolefin having from 3 to 20 carbon atoms, (3) a polyene selected from the group consisting of an open chain polyunsaturated hydrocarbon having from 4 to 20 carbon atoms and a polyunsaturated bridged ring hydrocarbon, and (4) an ethylenically unsaturated organosilane having the general formula R_nSiX_{4-n} in which X is a highly hydrolyzable group selected from the group consisting of a halogen and a tertiary amine, *n* is an integer from 1 to 3, and R is a group selected from the group consisting of hydrogen, alkyl, aryl, alkaryl, arylalkyl, cyclic or heterocyclic group, in which at least one of the R groups is a norbornenyl group, in which the ethylene and monoolefin are present in the interpolymer in the mole ratio of 20-95 moles ethylene to 80-5 moles monoolefin, the polyene is chemically bound in the interpolymer in an amount within the range of 0.1 to 10 mole percent of the total number of moles of ethylene, monoolefin and polyene, and the unsaturated organosilane is present in the polymer in an amount of more than 0.01% but less than 1.0% by weight.

4,028,484

ALFIN POLYMERIZED RUBBER

Avery A. Morton, 182 Standish Road, Watertown, Mass. 02172, and Edward J. Laupher, Rte. 111, E. Hampstead, Hampstead, N.H. 03826

Division of Ser. No. 193,742, Oct. 29, 1971, abandoned, which is a continuation-in-part of Ser. No. 862,681, Oct. 1, 1969, abandoned. This application Sept. 18, 1975, Ser. No. 614,540

Int. Cl.² C08F *136/06, 236/06*

U.S. Cl. 526—335 **1 Claim**

1. An alfin catalyzed rubber, selected from the group consisting of butadiene homopolymer and butadiene-styrene copolymer, of DSV greater than 9 and which compounds as soft rubber on a rubber mill after no more than about 15 minutes of mixing in the presence of no more than about 15 phr processing oil added on the mill, and being dischargeable from the mill at a temperature of no more than about 145° C said rubber having been made by polymerization in a closed reaction chamber in which the internal pressure during reaction corresponds to a vapor/liquid ratio of less than about 0.2.

4,028,485

NON-AQUEOUS REMOVAL OF SOLUBLE HYDROGENATION CATALYST

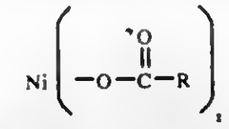
Anthony Poloso, Ridgefield, and James Gordon Murray, East Brunswick, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Jan. 29, 1976, Ser. No. 653,413

Int. Cl.² C08F *6/08, 8/04*

U.S. Cl. 528—486 **10 Claims**

1. A process for the removal of hydrogenation catalyst residue, wherein said hydrogenation catalyst was formed by mixing (a) a C_1–C_8 alkylaluminum or a C_1–C_8 alkyllithium compound and (b) an organonickel compound of the following formula:



where R is hydrogen or C_1–C_{12} alkyl or cycloalkyl, from a solution containing said hydrogenation catalyst and from about 1 to 50 wt. % of a hydrogenated olefinic polymer in a hydrocarbon solvent, said process comprising contacting said solution with a non-aqueous organic acid followed by neutralization with anhydrous base and filtration of said solution, thereby removing said hydrogenation catalyst residue.

4,028,486

ALPHA-METHYL-p-BROMO-STYRENE AND METHOD OF PREPARATION

George Jalics, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 475,711, June 3, 1974, Pat. No. 3,959,398. This application May 7, 1976, Ser. No. 684,426

Int. Cl.² C08F *12/16, 112/16, 30/02, 30/04*

U.S. Cl. 526—293 **4 Claims**

1. A copolymer of α-methyl-p-bromo-styrene and a vinyl polymerizable double bond monomer prepared by free radical addition solvent or emulsion copolymerizing a mixture of about 5 to about 20 weight percent α-methyl-p-bromo-styrene and, correspondingly, about 95 to about 80 weight percent vinyl polymerizable double bond monomer, where said double bond monomer is selected from at least one of dienes selected from 1,3-butadiene, isoprene, dimethyl butadiene and piperylene; monoolefins selected from ethylene, propylene and isobutylene; vinyl aromatic compounds selected from styrene, chlorostyrene, vinyl toluene, α-methyl styrene and divinyl benzene; monobasic acid esters selected from alkyl (C_1 to C_{10}) and alkoxy (C_1–C_4) acrylates and methacrylates; dibasic acid esters selected from maleate, fumarate and itaconates; vinyl cyanides selected from acrylonitrile and methacrylonitrile; vinyl chloride, vinylidene chloride; methyl vinyl ether; vinyl esters selected from vinyl acetate and esters of C_8–C_{10} acids; vinyl phosphonates; organophosphates selected from mono-, di- and triallyl phosphates; vinyl silanes; antimony fumarate.

4,028,487

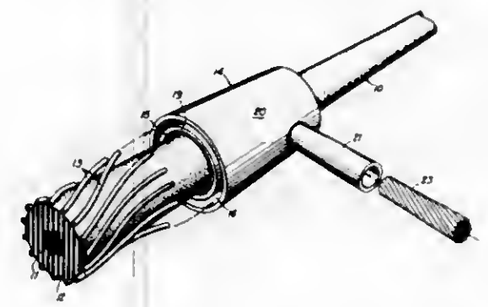
CABLE TERMINATOR AND GROUNDING UNIT

William B. McLean, 62 Pine Valley, and Edward P. McLean, Box 626, both of Moultrie, Ga. 31768

Filed June 21, 1976, Ser. No. 698,053

Int. Cl.² H02G *15/02*; **H01R** *5/10*

U.S. Cl. 174—78 **4 Claims**



1. A terminator and grounding unit for a cable having a central insulated conductor and an external concentric bare neutral conductor, said unit comprising a deformable metal sleeve to receive said insulated conductor and having an annular side wall chamber formed in one end thereof and terminating deeply within the sleeve for receiving said concentric neutral conductor, whereby the sleeve may then be externally pinched to lock the concentric neutral conductor firmly in said chamber, and a side radially extending deformable metal tube on said sleeve adapted to receive an extrinsic ground conductor and to be pinched thereon to lock the ground conductor securely within said tube.

4,028,488

SUPERCONDUCTORS

Ian Leitch McDougall, Aldridge, England, assignor to Imperial Metal Industries (Kynoch) Limited, Birmingham, England

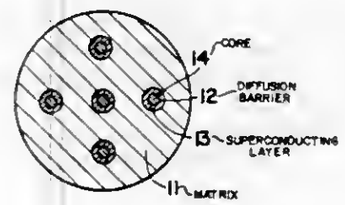
Filed Jan. 16, 1975, Ser. No. 541,648

Claims priority, application United Kingdom, Jan. 28, 1974, 3830/74

The portion of the term of this patent subsequent to Apr. 8, 1992, has been disclaimed.

Int. Cl.² H01B *12/00*

U.S. Cl. 174—128 S **10 Claims**



1. A composite superconductor assembly comprising a plurality of filaments of one component of a superconductive intermetallic compound embedded in a matrix material of a material which is non-superconductive at 5° K, there being a layer of the superconductive compound on the filaments, characterised in that the filaments have a diameter in the range 0.0005 to 0.0020 cm, and the layer of superconductive compound has a thickness in the range 0.00005 to 0.0002 cm and the interfilament distance is less than the diameter of the filaments.

4,028,489

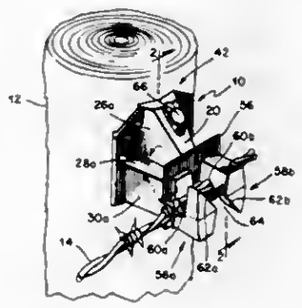
PLASTIC NAIL-ON ELECTRIC FENCE INSULATOR

Albert T. Berg, Jr., and Howard Langlie, both of Ellendale, Minn. 56026

Filed Dec. 12, 1975, Ser. No. 640,029

Int. Cl.² H01B *17/24*; **A01K** *3/00*

U.S. Cl. 174—166 R **3 Claims**



1. An all plastic nail-on electric fence insulator for attachment to wooden posts by means of a single nail comprising a body having a generally hollow interior, said body including a first angled panel inclining upwardly and rearwardly and second and third side panels extending downwardly and rearwardly from said first panel, means at the front of said body for holding an electric fence wire, and means at the rear of said body including a central panel extending between the rear edges of said second and third panels and wing panels extending laterally from said central panel, said rear means also including a first pair of rearwardly extending vertically disposed ribs at the junctures of said central panel with said wing panels and a second pair of rearwardly extending vertically disposed ribs at the free vertical edges of said wing panels, the angled first panel of said body having a nail hole therein so that a nail inserted into said hole can be driven into the post at an angle generally perpendicular to said angled first panel, a raised boss on said angled first panel, said nail hole extending through said boss and first panel, said central panel also having a hole therein at an elevation lower than that of the hole in said angled first panel, said body further including fourth and fifth panels extending laterally from the lower edges of said second and third panels and sixth and seventh panels extending downwardly from the outer edges of said fourth and fifth panels, said first, second, third, fourth, fifth, sixth and seventh panels, together with the back side of said front means and the central and wing panels of said rear means, forming said generally hollow interior, and reinforcing walls converging from the forward ends of said sixth and seventh panels rearwardly to said rear central panel, said reinforcing walls connecting with said central panel generally in forward alignment with said first-mentioned ribs.

4,028,490

MSK DIGITAL DATA SYNCHRONIZATION DETECTOR

Marvin Aaron Epstein, Monsey, N.Y., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Nov. 14, 1975, Ser. No. 632,044

Int. Cl.² H04L *17/16, 7/00*

U.S. Cl. 178—88 **9 Claims**

1. A minimum shift keying (MSK) digital data synchronization detector for a digital data transmission system transmitting Baudot code characters each having start and stop bits in the form of a MSK digital data signal having a stop-start triangle corresponding to adjacent stop and start bits of two adjacent Baudot characters comprising:

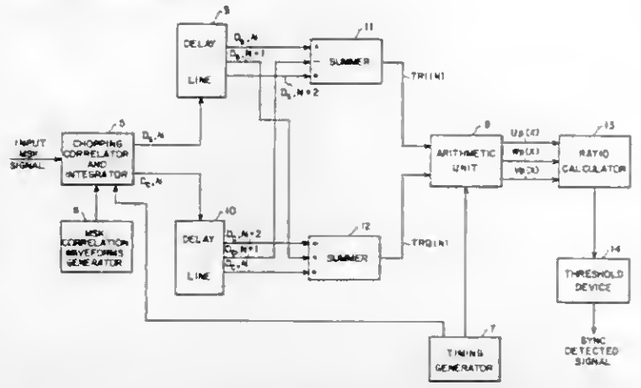
an input for said MSK digital data signal;

first means coupled to said input to produce first and second correlation signals;

second means coupled to said first means, said second means being responsive to said first and second correla-

tion signals to produce inphase and quadrature triangle signals;

third means coupled to said second means, said third means being responsive to said inphase and quadrature triangle signals to calculate many time and phase conditions of said MSK digital data signal at one time to produce third, fourth and fifth correlation signals as a function of assumed bit times; and



fourth means coupled to said third means, said fourth means being responsive to said third, fourth and fifth correlation signals to produce a ratio signal proportional to a ratio of a minimum magnitude squared to a maximum magnitude squared for all carrier phase angles for each of said assumed bit times and to produce a synchronization detected signal when said ratio signal value is less than a given amplitude threshold.

4,028,491

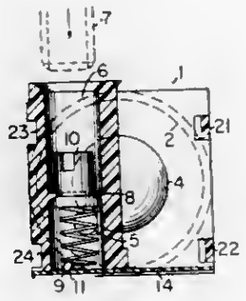
TRANSDUCER SWITCHING SYSTEM

Charles B. Huntress, Orange, and Henry Gabrielian, Newport Beach, both of Calif., assignors to Electronic Engineering Company of California, Santa Ana, Calif.

Filed Apr. 2, 1976, Ser. No. 673,182

Int. Cl.² H04R *1/00*

U.S. Cl. 179—1 SW **10 Claims**



1. A transducer switching system comprising;

a. an electro-acoustic transducer (3) having an enclosure (1) with an acoustic plug, (10)

b. an electrical resistive element (18),

c. an acoustic-use connector (7),

d. resilient electrically conductive means (9) having a small central part away from said acoustic-use connector, and deformable upon the insertion of said acoustic-use connector into said enclosure, to thereby move said acoustic plug, and

e. circuit means to conduct (16,17), connecting said transducer and said resistive element having electrical contact members (12, 15) adjacent to said resilient electrically conductive means,

whereby deformation of said resilient electrically conductive means by the insertion of said acoustic-use connector electrically shorts said resistive element from the circuit.

4,028,492

SPEECH AID APPARATUS FOR LARYNGECTOMEES

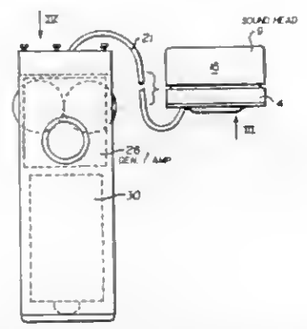
Helmut Sickel, deceased, late of Overath, Germany (by Liesbet Sickel, administrator), assignor to Dr. Kuhn & Co. GmbH, Cologne (Merheim), Germany

Filed Feb. 18, 1976, Ser. No. 659,052

Claims priority, application Germany, Feb. 22, 1975, 2507704

Int. Cl.² A61F *1/20;* **H04R** *9/06*

U.S. Cl. 179—1 AL **14 Claims**



1. Speech aid apparatus for laryngectomees, comprising a sound head consisting of a clamped hard diaphragm capable of being set in vibration by a plunger, a driver in the form of a vibration coil connected with the plunger and associated field-wise with a magnet assembly having a permanent magnet, a soft diaphragm connected to the plunger and a generator-amplifier section connected electrically to the sound head for the production of periodic current pulses for the vibration coil, wherein (a) the permanent magnet of the magnet assembly consists of a permanent magnetic material designated by the formula

$$RECo_5$$

wherein

RE represents one of the rare earth elements

Y, La, Ce, Pr, Nd, Sm or mixtures thereof, and (b) on at least one of the sound head and the generator-amplifier section there is provided a rapidly releasable device for the mechanical joining of the sound head and generator-amplifier, as well as a means for maintaining the electrical connection between the sound head and generator-amplifier section when the mechanical coupling is released and the sound head is spatially removed from the generator-amplifier section.

4,028,493

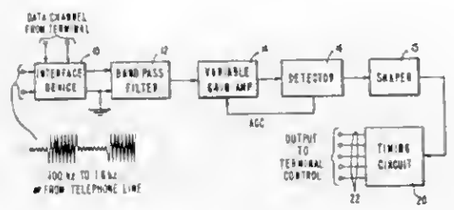
CALL PROGRESS SIGNAL DETECTOR

Andrew Ernest Brennemann, and Suk Suet Soo, both of Ossining, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 22, 1975, Ser. No. 643,213

Int. Cl.² H04M *11/06*

U.S. Cl. 179—2 DP **10 Claims**



1. A system for analyzing audio telephone call progress signals including means for coupling the audio signal on the telephone system to said analyzing means,

means for minimizing transient signal effects present in received signals, and normalizing the signal magnitudes,

detector means for removing the AC component from said normalized signal,

means for detecting the cadence of said pulses and,

means responsive to said cadence detector for indicating which one of a particular call progress signal is present on the telephone line.

4,028,494

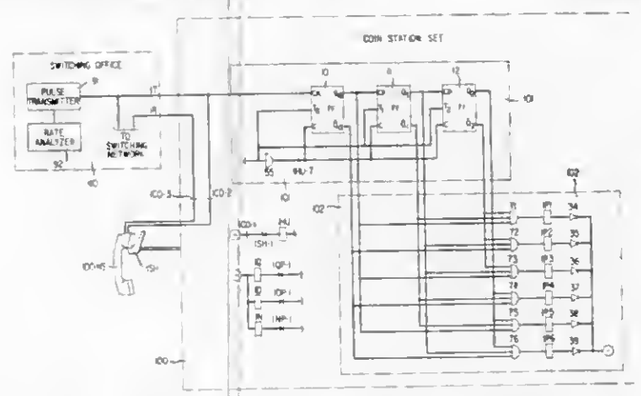
ESCROW TELEPHONE COIN COLLECTION CIRCUIT AND METHOD

Alfred Zarouni, Middletown, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 17, 1976, Ser. No. 687,291

Int. Cl.² H04M *17/00*

U.S. Cl. 179—6.3 R **13 Claims**



1. A pay telephone station set arrangement comprising:

means for controlling the storage of one or more deposited coins to establish a variable customer credit balance in accordance with the number and denomination of said deposited coins,

means at said set operative at the inception of a call for receiving rate indicating signals,

adjustable circuit means controlled by said receiving means for generating credit reduction signals throughout said cell at a frequency corresponding to said rate indicating signals, and

logic circuit means for coupling said credit reduction signals to said controlling means to decrement said customer credit balance as said call progresses.

4,028,495

TIME DIVISION COMMUNICATION SYSTEM ADAPTED TO STRUCTURAL EXPANSION

Hiroshi Funamo; Toshiro Kunihiro, and Masaaki Murai, all of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan

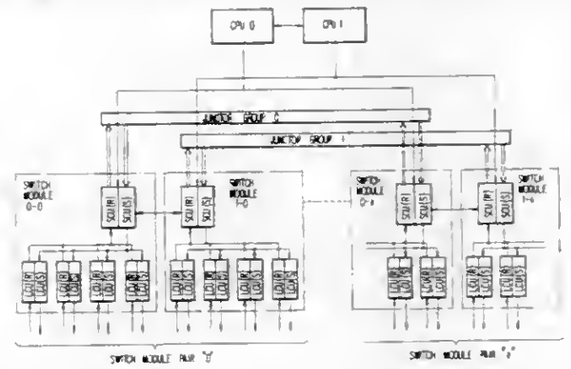
Filed Dec. 29, 1975, Ser. No. 645,069

Claims priority, application Japan, Dec. 30, 1974, 50-1642

Int. Cl.² H04M *3/00*

U.S. Cl. 179—15 AT **3 Claims**

1. A time division communication system adapted to structural and capacity expansion, comprising: $2n$ switch modules (n is a positive integer) each composed of m line control units (m is a positive integer) for accommodating m lines and a time division switch control unit capable of controlling $2m$ line control units; said switch modules being connected as n switch module pairs each composed of two switch modules with the switch modules of each said switch module pair being provided with cross connections for enabling the respective time division switch control units to be switched over and cross connected for enabling the respective switch modules to mutually send and receive time-division multiplexed information; and the input and output terminals of the corresponding time division switch control units of the respective switch module pairs being interconnected so that the respective ones of said switch module pairs may mutually send and receive said time-division multiplexed information.



4,028,496

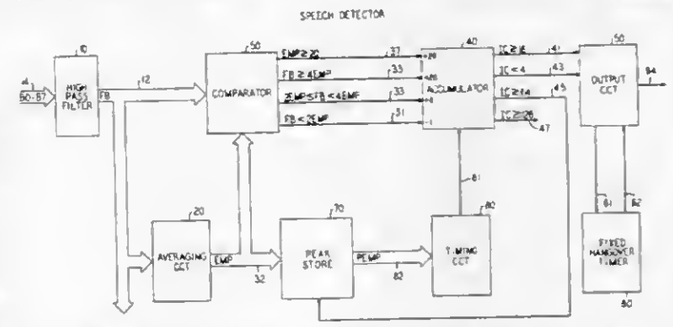
DIGITAL SPEECH DETECTOR

Robert Ernest LaMarche, Atlantic Highlands; Carl Jerome May, Jr., Holmdel, and Timothy James Zebo, Freehold, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 17, 1976, Ser. No. 715,121

Int. Cl.² H04J *6/00*

U.S. Cl. 179—15 AS **17 Claims**



1. A speech detector, means for receiving input signal samples, means for generating a representation of the average magnitude of said samples, means for comparing each said sample with said representation and for providing an output signal corresponding to the difference therebetween, and means for accumulating said output signals, said accumulating means generating different control signals corresponding to different predetermined levels of said accumulated output signals.

4,028,497

ACQUISITION TECHNIQUE FOR TIME DIVISION MULTIPLE ACCESS COMMUNICATION SYSTEM

Akio Saburi, Tokyo, Japan, assignor to Nippon Electric Company, Ltd., Tokyo, Japan

Filed Apr. 1, 1976, Ser. No. 672,797

Claims priority, application Japan, Apr. 4, 1975, 50-41437

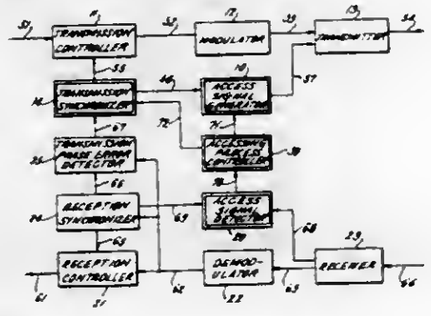
Int. Cl.³ H04J *3/06*

U.S. Cl. 179—15 BS **17 Claims**

1. Apparatus for initially accessing a relay station in a time division multiple access (TDMA) communication system in which a plurality of transmitting-receiving stations communicate with each other through the relay station and in which a transmitting-receiving station wanting to enter into communication transmits an access signal to the relay station and, receiving the access signal as relayed back therefrom, determines the position of the access signal within the time frame of the TDMA communication system so that information signals from the transmitting-receiving station may be inserted in the time slot assigned thereto for time division channel connec-

tion, said apparatus being characterized in that the transmitting-receiving station is provided with:

means for generating a signal the frequency of which varies

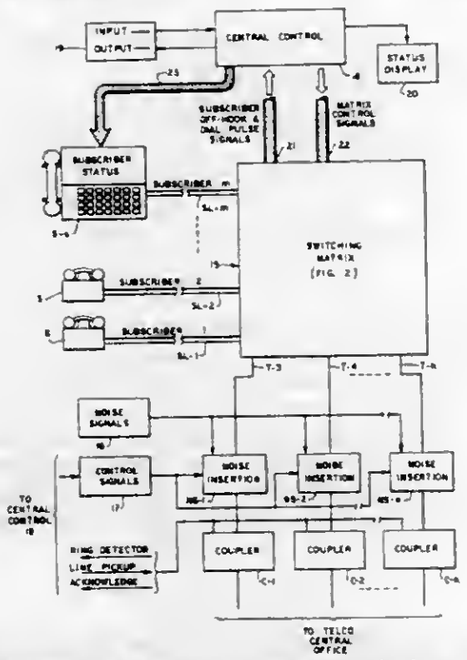


cyclically in periods each being related to those of the time frame of the TDMA communication system and transmitting such signal as an access signal to the relay station.

4,028,498
PRIVATE AUTOMATIC BRANCH EXCHANGE SYSTEM AND APPARATUS

Joseph H. Mehaffey, Atlanta; Edgar C. Mills, Marietta, and J. Harold Ivester, Smyrna, all of Ga., assignors to Solid State Systems, Inc., Marietta, Ga.

Filed Oct. 7, 1974, Ser. No. 512,675
Int. Cl.² H04Q *3/42*
U.S. Cl. 179—18 GE **15 Claims**



1. Apparatus for selectively coupling a telephone central office circuit to subscriber equipment, comprising:

first solid state means having a control circuit which is operatively coupled to said central office circuit and responsive to a ringing signal on said central office circuit to provide a signal on a ring detection circuit which is electrically isolated from said central office circuit;

switch means connected to said central office circuit and selectively operative to complete a circuit interconnection between the central office circuit and a subscriber circuit;

second solid state means having a control circuit which can receive a line pickup signal which is electrically isolated from said central office circuit and which is operative in response to said line pickup signal to control said switch means to complete said circuit; and

third solid state means having a control circuit which is connected to be responsive to current flow through said central office circuit and through said switch means to provide an output signal on a line pickup acknowledge circuit which is electrically isolated from said central office circuit.

6. An addressable N × M switching matrix, comprising:

a first number M of subscriber lines in parallel matrix array, each subscriber line comprising at least a pair of conductors for connection with a separate subscriber station;

a second number N of trunk lines in parallel matrix array with each other and in crossing relation with each of said subscriber lines, each of said trunk lines comprising at least a pair of conductors;

switching means separately and independently associated with each crossing point of subscriber lines and trunk lines in said matrix, each said switching means being selectively operative to connect a subscriber line to the trunk line at such crossing point; and

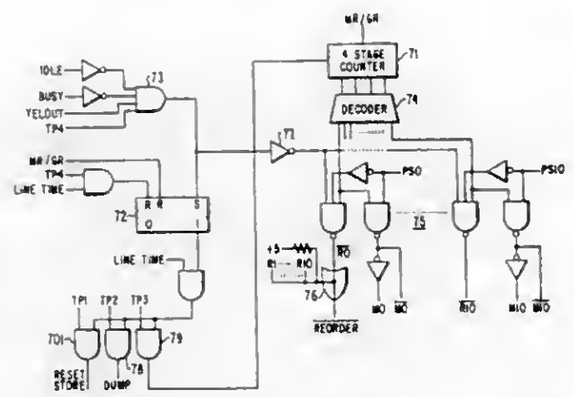
a number M of addressable switch actuating means;

one of said addressable switch actuating means being operatively associated with all of said switching means for said crossing points of a particular subscriber line, with each said addressable switch actuating means being operative to enable any of said associated switch means in response to a predetermined enabling input signal to said addressable switch actuating means, whereby a portion of the particular subscriber line and the subscriber station connected to said portion become connected to a selected said trunk line at the matrix crossing point controlled by said selected switching means and become disconnected from the remaining extent of such subscriber line across said matrix, and being operative to disenable all such associated switching means in response to a reset input signal to said addressable switch actuating means, whereby any existing previous said selected trunk line connection is terminated and said subscriber line uninterruptedly crosses said trunk lines without connection thereto.

4,028,499
UNIVERSAL/ASSIGNED NIGHT ANSWERING SYSTEM FOR EPABX

Norman Hovagimyan, Cherry Hill; Anthony Domenic Iadicola, Cinnaminson, and William Paul Ianuzzi, Cherry Hill, all of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Nov. 28, 1975, Ser. No. 636,094
Int. Cl.² H04M *3/58*
U.S. Cl. 179—18 BD **4 Claims**



1. In a telephone switching system having a plurality of incoming lines to be selectively coupled to selected ones of a plurality of telephone stations, said telephone stations having means for selectively producing dial signals, annunciator means responsive to a ringing signal on one of said plurality of incoming lines for indicating an active incoming line, register means responsive to an off-hook signal from a telephone station for producing answering mode signals, and means responsive to said register means for permitting interstation calls to be initiated between telephone stations not coupled to an incoming line, the improvement comprising:

coupling means responsive to said answering mode signals for directly coupling said off-hook telephone station to said active incoming line, said coupling means comprising

counter means for producing in sequence *m* combinations of signals, where *m* is an integer equal to or greater than the number of incoming lines;

decoding means responsive to said counter means for producing one-out-of-*m* signals;

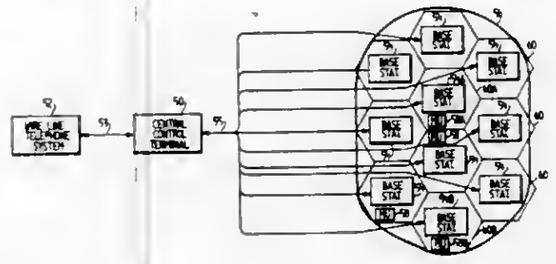
gating means responsive to said decoding means and to the ringing signal on said one of said plurality of incoming lines for producing an equipment locator signal to a switching matrix; and

terminator means responsive to an equipment locator signal from said gating means for disabling said counter means.

4,028,500
MOBILE UNIT SUPERVISORY CONTROL SEQUENCER AND METHOD

George F. McClure, Winter Park; John Richard Endicott, Maitland; Lionel D. Freeman; Marion L. Cunningham, both of Orlando, and Joel D. Wells, Orlando, all of Fla., assignors to Martin Marietta Corporation, Orlando, Fla.

Continuation-in-part of Ser. No. 360,560, May 15, 1973, Pat. No. 3,898,390. This application Apr. 21, 1975, Ser. No. 569,677
Int. Cl.² H04M *7/04*
U.S. Cl. 179—41 A **39 Claims**



1. A mobile telephone unit comprising:

first storing means for storing aan address signal representing a telephone system subscriber;

means for displaying the stored address signal;

a manually depressable call switch for generating a call initiation signal;

second stroring means for storing said generated call initiation signal;

means for selecting one of a predetermined plurality of communication channels for broadcast of a call-up signal;

means for generating a call enabling signal in response to the selection of said one communication channel;

means for broadcasting a call-up signal including said stored address signal over the selected one of the plurality of communication channels in response to the simultaneous presence of both said call initiation signal generated through the manual depression of said call switch and said call enabling signal generated in response to the selection of said one channel;

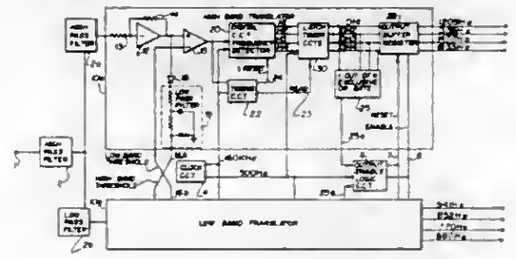
means for receiving a response signal acknowledging said call-up signal for automatically indicating receipt of said response signal; and

means including a handset removably cooperable with a hook-switch independent of said manually depressable call switch for establishing two-way voice communication over a two-way communication channel in response to removal of said handset from cooperating relationship with said hook-switch, whereby a call may be initiated and acknowledged without removing the handset from the hook-switch.

4,028,501
METHOD AND APPARATUS FOR TRANSLATING MULTIPLE FREQUENCY SIGNALLING

Dennis Edwin Rittenhouse, Kanata, Canada, assignor to Northern Electric Company Limited, Montreal, Canada

Filed Mar. 4, 1976, Ser. No. 663,687
Int. Cl.² H04M *1/50*
U.S. Cl. 179—84 VF **5 Claims**



1. A multiple frequency signalling receiver, for translating predetermined combinations of tone signals to derive signalling information therefrom, the receiver comprising:

input means for receiving voice frequency signals;

filter means, connected to the input means, for filtering the received signals into separate high and low bands;

means, connected to the filter means, for generating high band and low band threshold levels in response to the amplitudes of signals in the high and low bands respectively;

a high band detector including a high band digital circuit means for detecting ones of predetermined frequencies of the signals in the high band and for indicating the frequency detected;

first means connected between the high band digital circuit means and the filter means, the first means being responsive to the low band threshold level to transmit, to the high band digital circuit, only those signals in the high band which exceed the low band threshold level;

a low band detector including a low band digital circuit means for detecting ones of predetermined frequencies of the signals in the low band and for indicating the frequency detected;

second means connected between the low band digital circuit means and the filter means, the second means being responsive to the high band threshold level to transmit, to the low band digital circuit, only those signals in the low band which exceed the high band threshold level;

output means for indicating the frequencies detected by the detectors in response to a substantially simultaneous and constant indication of frequency detection from both detectors extending over a predetermined period of time.

4,028,502
APPARATUS FOR ADAPTING MULTI-LINE TELEPHONE INSTRUMENT FOR USE BY THE BLIND

Larry S. Moricca, Churubusco, and Gregory A. Zaker, Fort Wayne, both of Ind., assignors to Inventive Industries, Inc., Houston, Tex.

Filed Feb. 13, 1976, Ser. No. 657,719
Int. Cl.² H04M *1/72*
U.S. Cl. 179—99 **15 Claims**

11. Apparatus for adapting a multi-line telephone instrument having a plurality of line-selector pushbuttons and associated indicator lights for use by the blind comprising, for each said line-selector pushbutton, an auxiliary pushbutton, means for mounting said auxiliary pushbutton in alignment with the line-selector pushbutton whereby manual depression of said auxiliary pushbutton actuates said line-selector pushbutton, light-sensitive means for sensing illumination of the respective indicator light, means for generating an alternating current

signal in response to said light-sensitive means, and means for vibrating said auxiliary pushbutton in response to said signal

thereby to provide a vibratory discernible recognition of illumination of the respective indicator light.

4,028,503

ELECTROMAGNETIC SOUND GENERATOR

Hakon Rosenkilde, Brincks Have 5, 2630 Taastrup, Denmark

Filed Aug. 4, 1975, Ser. No. 601,284

Claims priority, application Denmark, Aug. 7, 1974, 4189/74

Int. Cl.² G10K 9/14

U.S. Cl. 179—115 R **8 Claims**

1. An electromagnetic sound generator comprising a frame, a membrane with the periphery thereof fixed to the frame and having an axis, an electromagnetic actuation means mounted on the frame for applying a cyclical force to the central portion of the membrane relative to its periphery and bending one portion of the membrane in a direction towards the elctromagnetic circuit and the other portion in a direction away from same, thereby providing a sound generator in which the sound intensity is increased by the interaction between the bending of the membrane and translation of the central portion of the membrane.

4,028,504

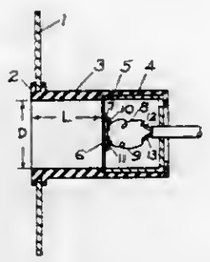
ACOUSTIC AMPLIFIER COMBINED WITH TRANSDUCER SHOCK MOUNT

Frank Massa, Cohasset, Mass., assignor to Fred M. Dellorfano, Jr., and Donald P. Massa, Trustees of The Stonelelgh Trust u/d/t, Cohasset, Mass.

Filed Nov. 12, 1975, Ser. No. 630,983

Int. Cl.² H04R 1/28

U.S. Cl. 179—146 R **8 Claims**



1. In combination in a sound detection system, an electroacoustic transducer, an acoustic amplifier comprising a tubular member, a first mounting means associated with said tubular member for holding said transducer at one end of said tubular member, said transducer and said first mounting means characterized in that said mounted transducer forms a closure at said one end of said tubular member, and further characterized in that said closure presents a plane surface at right angles to the axis of said tubular member and still further characterized in that said plane surface extends to the inner wall surface of said tubular member, and a second mounting means associated with said tubular member for attaching said tubular member to a support structure.

4,028,505

NEGATIVE IMPEDANCE REPEATER FOR TELEPHONE LINES

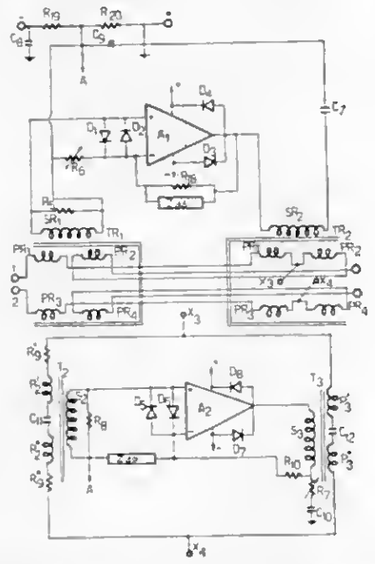
Lorenzo Fassino, Via Piedicavallo 32, Turin, Italy

Continuation-in-part of Ser. No. 441,369, Feb. 11, 1974, abandoned. This application Oct. 6, 1975, Ser. No. 619,905

Claims priority, application Italy, Mar. 12, 1973, 67674/73

Int. Cl.² H04B 3/36, 3/16

U.S. Cl. 179—170 G **3 Claims**



1. A negative impedance repeater for amplification of loaded or non-loaded telephone lines operating at voice frequency comprising:

a first open circuit stable one-port network, the terminals of which are the input terminals of a negative impedance converter, the output of which is loaded by a preset passive impedance network, chosen in relation to the characteristic impedances of the line section to be amplified;

a second short circuit stable one-port network, the terminals of which are the input terminals of a negative impedance converter, the output of which is loaded by a preset passive impedance network, chosen in relation to the characteristic impedances of the line section to be amplified;

adjusting means in each of said converters, and external to said impedance networks, for adjusting the feedback and consequently the conversion ratio;

said adjusting means being independent from each other and being manually varied on the basis of predetermined conversion ratio curves such that:

in the case of loaded lines, the product of the two conversion ratios remains constant over the entire variation range; to provide a gain adjustment which does not affect the repeater impedance and

in the case of non-loaded lines, the conversion ratio of the converter included with the short circuit stable network increases quicker than the conversion ratio of the converter included within the open circuit stable network decreases, to provide a gain adjustment which increases more quickly at the high frequencies than at the low frequencies of the transmitted band, so that an equalization, necessary for this type of lines is introduced, and, coupling means for coupling said converters to the line to be amplified.

4,028,506

MAXIMUM VALUE TRACING CIRCUIT FOR DIGITIZED VOICE SIGNALS

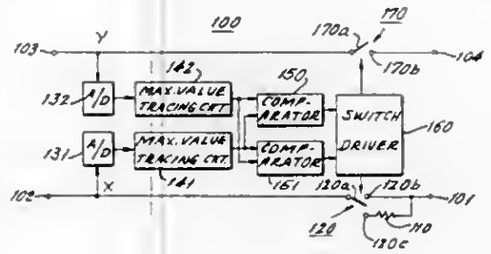
Takashi Araseki, and Kazuo Ochiai, both of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan

Filed Dec. 9, 1974, Ser. No. 530,620

Claims priority, application Japan, Dec. 12, 1973, 48-141059; Mar. 25, 1974, 49-33800

Int. Cl.² H04B 3/22

U.S. Cl. 179—170.2 **3 Claims**



3. A maximum value tracing circuit for extracting a peak value of an input signal of varying value, said input signal being periodically digitized, said tracing circuit comprising:

primary input means for receiving said periodically digitized signal;

first memory means for storing the last digital signal applied to its input terminal means and for clearing any signal stored therein at the end of each of a plurality of successive first time periods, said input signal being digitized a plurality of times during each of said first time periods;

first comparing means for comparing the digital signal stored in said first memory means to the last digital signal received by said primary input means and for generating a first control signal identifying the larger of the two signals last compared by said first comparing means;

first switch means responsive to said first control signal for applying the larger of the two signals last compared by said first comparing means to said input terminal means of said first memory means;

second memory means for storing the last digital signal applied to its input terminal means for clearing any signal stored therein at the end of each of a plurality of successive second time periods, each of said second time periods being of the same duration as each of said first time periods, the end of each of said second time periods being offset with respect to the end of each of said first time periods;

second comparing means for comparing the digital signal stored in said second memory means to the last digital signal received by said primary input means and for generating a second control signal identifying the larger of the two signals last compared by said second comparing means; output means; second switch means responsive to said second control signal for applying the larger of the two signals last compared by said second comparing means to said input terminal means of said second memory means;

third comparing means for comparing the digital signals resulting from the last comparison operations of said first and said second comparing means and appearing at the outputs of said first and said switch means and for generating a third control signal identifying the larger of the two signals last compared by said third comparing means; and third switch means responsive to said third control signal for applying the larger of the two signals last compared by said third comparing means to said output means.

4,028,507

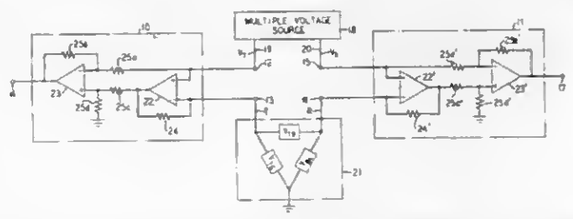
APPARATUS FOR APPLYING PARTICULAR VOLTAGES TO THREE-TERMINAL CIRCUITS AND MEASURING RESULTING CURRENT FLOWS FOR THE PURPOSE OF DETERMINING CIRCUIT CHARACTERISTICS

Richard Scott Hoppough, Greensboro, N.C., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 28, 1976, Ser. No. 700,333

Int. Cl.² H04B 3/46

U.S. Cl. 179—175.3 R **2 Claims**



1. Apparatus for forcing the terminals of a circuit to particular potential levels and for producing output voltages relating to currents flowing in said terminals, which output voltages may be utilized in determining the characteristics of said circuit, said apparatus comprising

first and second means each having a first input terminal for receiving an input voltage, a second input terminal for connection to one of said circuit terminals and, furthermore, which is forced to substantially the same potential level as said input voltage, and an output terminal for producing an output voltage linearly related to current through said second input terminal, and

third means operable for applying at least one combination of two voltages to said first input terminals, respectively, where said combination may comprise voltages of finite value, voltages of zero value or a voltage of finite value and a voltage of zero value.

4,028,508

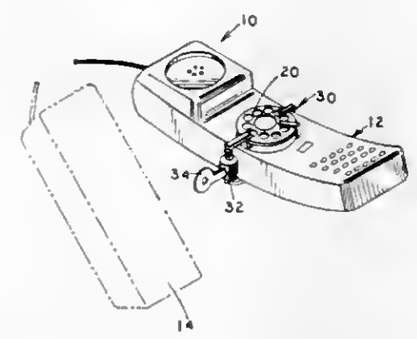
TELEPHONE LOCK

James N. Hall, 2851 Barker Ave., Bronx, N.Y. 10467

Filed June 2, 1976, Ser. No. 692,134

Int. Cl.² H04M 1/66

U.S. Cl. 179—189 D **6 Claims**



1. A telephone locking device for preventing the unauthorized use of a telephone of the type having a handset and a base portion and wherein a rotary calling dial is contained on the inside surface of the handset, said device comprising:

a generally U-shaped fixed engaging element adapted to engage said rotary dial;

a locking element attached to said fixed engaging element by means of an encircling strap positioned about the outer surface of said handset; and

a generally U-shaped adjustable engaging element adjustably secured to said locking element and adapted to engage said rotary dial in order to prevent rotation of said rotary dial.

4. A telephone locking device for preventing the unauthorized use of a telephone of the type having a handset and a base portion and wherein a plurality of pushbutton calling elements are contained on the inside surface of the handset, said device comprising:

a protective cover for said pushbutton calling elements;

a generally U-shaped fixed engaging element adapted to engage said cover;

a locking element attached to said fixed engaging element by means of an encircling strap positioned about the outer surface of said handset; and

a generally U-shaped adjustable engaging element adjustably secured to said locking element and adapted to engage said protective cover in order to prevent manipulation of said plurality of pushbuttons.

4,028,509

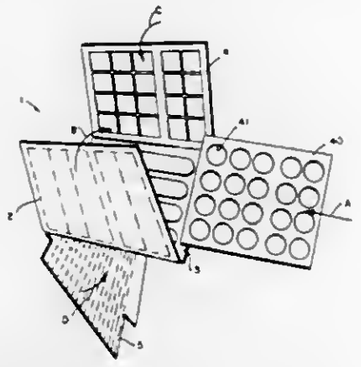
SIMPLIFIED TABULATOR KEYBOARD ASSEMBLY FOR USE IN WATCH/CALCULATOR HAVING TRANSPARENT FOLDABLE FLEXIBLE PRINTED CIRCUIT BOARD WITH CONTACTS AND ACTUATOR INDICIA

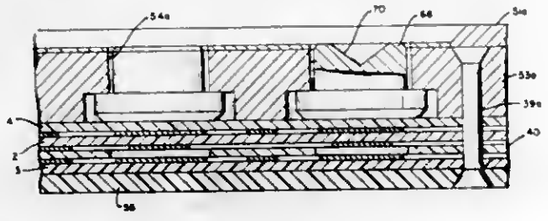
Rudolf F. Zurcher, Newport Beach, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Aug. 29, 1975, Ser. No. 608,852

Int. Cl.² G04B *47/06, 19/30;* **H01H** *9/00, 13/02*

U.S. Cl. 200—5 A **4 Claims**





1. As simplified tabulator keyboard assembly for use in a digital watch/calculator comprising:

a flexible circuit of unitary construction with metallic conductive areas and a flexible insulative backing, said flexible circuit comprising:

a lower array of contacts, each of said contacts make electrical connection to a contact terminator provided as part of said flexible circuit;

an upper array of deformable contacts, each of said deformable contacts making electrical connection to a contact terminator provided as part of said flexible circuit and being provided with a plurality of conductive tabs, one for each of said contacts in said lower array;

a flexible conductor portion for making electrical connection to at least the electronics module of said watch calculator;

said lower array and said upper array are separated by an insulative spacer having a plurality of holes, one for the intersection of each contact in said lower array with each contact of said upper array;

said upper array is folded over said lower array such that the metallic conductive portions thereof directly face the respective metallic conductive portions of said lower array but are separated thereform by said insulative spacer; and

an indicia array having a plurality of numeric and other symbols defined by a metallized region, one of such symbols being provided for each of said holes in said insulative spacer; and

said indicia array is folded over said upper array such that the metallized portions of said indicia array are in contact with the insulative backing of said upper array.

4,028,510

SAFETY DEVICE ACTUATABLE BY SEISMIC VIBRATIONS

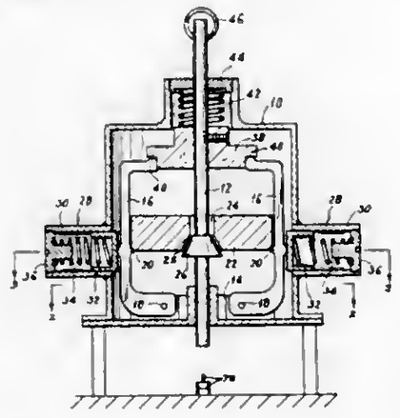
Yoshitomo Yamaura, Nagano; Takayoshi Kobayashi, Tokyo; Akira Asanuma, and Kuichiro Miyazawa, both of Nagano, all of Japan, assignors to Kabushiki Kaisha Shinko Seisakusho, Nagano, Japan

Filed Aug. 22, 1975, Ser. No. 607,045

Claims priority, application Japan, Aug. 24, 1974, 49-97272; Oct. 25, 1974, 49-123222

Int. Cl.³ H01H *35/14*

U.S. Cl. 200—61.45 R **5 Claims**



1. An apparatus actuatable by seismic vibrations comprising:

a longitudinal housing formed with a central bore and mountable on a support unit;

a rod axially penetrating said central bore and movable from an upper position to a lower position for selectively opening and closing a switch by its vertical movement;

first biasing means for biasing the rod downwardly;

a keeper member secured to an upper portion of said rod in said housing;

a plurality of stays disposed around said rod for holding said rod at the upper position against the action of said biasing means, and stays normally engaging said keeper member;

second biasing means for biasing the stays in the direction of urging engagement of each of said stays with the keeper member;

a weight support member attached to a lower portion of said rod in the housing; and

a first weight having a central portion penetrable by said rod, having a lower peripheral edge supportable at the inside thereof by each of said stays, said first weight being positioned to face an upper portion of said weight support member for pushing each of said stays outwardly during vertical and horizontal vibrations of said apparatus for

said rod to move downwardly to the second position upon separating said stays from said keeper member together with a drop of said weight, whereby said weight pressing on said weight support member increases the total mass of the downwardly moving rod.

4,028,511

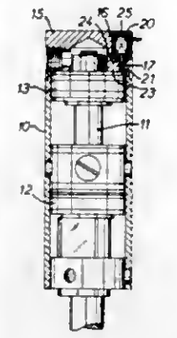
FLUID JACK WITH BUILT-IN PISTON OPERATED SWITCH

Andre Wack, 14 Rue Jules Verne, Sens; Robert Bezicot, 48 Rue Joseph Fouriaux, Antony, and Andre' Cosset, 5 Rue Claude Lebret, Gournay sur Marine, all of France

Filed June 16, 1975, Ser. No. 587,049

Int. Cl.² H01H *35/38*

U.S. Cl. 200—82 R **5 Claims**



1. The combination of a fluid jack of the type including a cylinder, a piston mounted on a piston rod movable in said cylinder along a path of movement between a retracted and an extended position, and end closure member closing said cylinder at one of its ends and having a recess opening to the exterior of said jack, said piston having an end face opposing said end closure member, a longitudinal passage extending through said end closure member from a transverse bottom wall of said recess to the interior of said cylinder; an electrical switch unit operable in response to movement of said piston to a position adjacent said end closure member, said switch unit being disposed substantially entirely inside said recess and embedded in electrical insulating material, said switch unit having an operating member extending beyond the embedding electrical insulating material, and a combined sealing and motion transmission member formed at least in part of electrical insulating material and in direct sealing contact with the wall of said passage for sealingly separating said switch unit from the interior of said cylinder, said combined sealing and motion transmission member normally projecting into the path of movement of said piston and in operative engagement with said operating member to actuate said switch unit when said piston end face comes into engagement with said sealing and motion transmission member and wherein said electrical insulating material is circumjacent said operating member along a substantial portion of its length.

4,028,512

LIQUID LEVEL ACTUATED ELECTRICAL SWITCH

Theodore E. Fiddler, 1268 Suffield Drive, Birmingham, Mich. 48008

Filed July 25, 1975, Ser. No. 599,132

Int. Cl.² H01H *35/40*

U.S. Cl. 200—84 C **1 Claim**

1. A normally open switch for closing a circuit to produce a signal voltage indicative of a condition, such as the liquid level in a tank, comprising,

a float,

means for movably mounting said float in a tank so that said float rises and falls with the level of the liquid in the tank,

electrical terminals spaced apart and lying adjacent said float connectable to signal circuits,

a bridge member for contacting said terminals to close a circuit between said terminals,

a magnet mounted at one said terminal and said bridge member,

an armature mounted at the other said terminal and said bridge member;

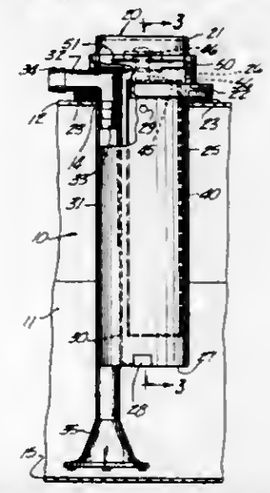
one said magnet and said armature being mounted for movement with said bridge member from a relatively remote position to a relatively proximate position relative to one another;

means connecting said float and said bridge member for moving said bridge member with said float responsive to the level of the liquid in a tank;

said float being capable of moving said bridge member toward said terminals from a relatively remote off position to an on position in contact with one another;

said magnet and said armature upon said terminals and said bridge member engaging one another in the on position, holding said bridge member and said terminals in contact with one another maintaining the on position to prevent flickering of the signal lamp;

a container enclosing said float; said container having at



least one small orifice for communicating liquid from a tank to said container at said float; said container protecting said float against sudden changes in liquid levels in the tank at the float due to outside influences to prevent movement of the float to the on position when the liquid level of the tank is not at the true refill level;

a cap housing said switch parts; said cap being connected to said container enclosing said float; said cap and said container being attachable and removable relative to a tank;

said container having an arcuate longitudinal indentation forming a receiving socket; and a liquid supply tube nested in said socket and held in position therein by the spring-like force of the engagement; said container, cap and tube forming an assembly removably mountable in a hole in the tank as a unit; said supply tube leading to the bottom of a tank on which the assembly is mounted;

said indentation in said container lying adjacent to said float; said float having a channel receiving said indentation; said indentation and channel forming a guide for up and down movement of the float preventing angular movement of said float to maintain said electrical terminals and said bridge member in alignment.

4,028,513

STEEL ARCING CONTACT FOR CIRCUIT BREAKER

Ward E. Laubach, Cherry Hill, N.J., assignor to I-T-E Imperial Corporation, Spring House, Pa.

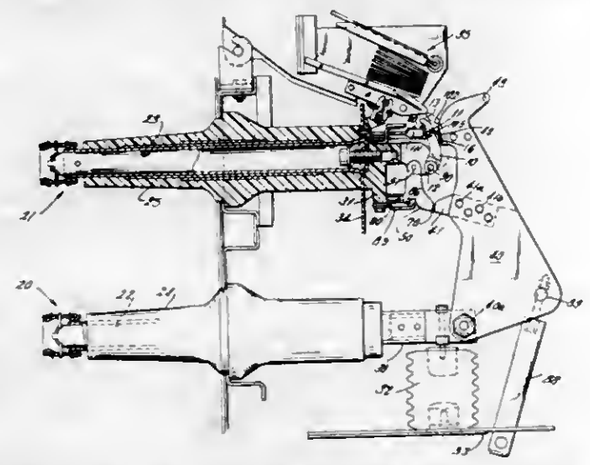
Filed May 8, 1975, Ser. No. 575,717

Int. Cl.² H01H *33/12*

U.S. Cl. 200—144 R **7 Claims**

1. In a high power circuit breaker; a first stationary main terminal and second stationary main terminal, first and second

main contacts movable between an engaged and disengaged position relative to one another and connected to said first and second main terminals, respectively, first and second arcing contacts electrically connected to said first and second main contacts, respectively, and to said first and second main stationary terminals, respectively, and movable between an engaged and disengaged position; said first and second arcing contacts being engaged before and disengaged after said first and second main contacts are engaged and disengaged, respectively; said first main contact having a major body portion



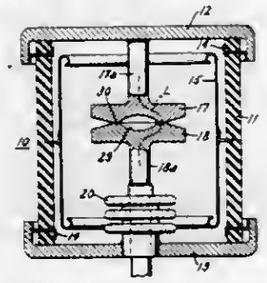
of highly conductive metal; said first arcing contact having a major body portion consisting of a ferrous material and having a resistivity which is greater than the resistivity of said major body portion of said first main contact; said first arcing contact having a contacting tip portion for making engagement to said second arcing contact which is of an alloy of copper which has a greater resistance to erosion under the influence of an electric arc than either the said highly conductive metal material of said first contact or said ferrous material.

4,028,514

HIGH CURRENT VACUUM CIRCUIT INTERRUPTER WITH BERYLLIUM CONTACT

Donald R. Kurtz; Carl C. Popadick, both of West Chester; Joseph C. Sofianek, Broomall, and Joseph L. Talento, Media, all of Pa., assignors to General Electric Company, Philadelphia, Pa.

Filed Dec. 3, 1974, Ser. No. 529,178
Int. Cl.² H01H *33/66, 1/02*
U.S. Cl. 200—144 B **14 Claims**



CAST AND EXTRUDED BERYLLIUM

1. A vacuum-type circuit interrupter rated for interrupting currents of 30,000 amperes r.m.s. and higher comprising:

a. a highly evacuated envelope,

b. a pair of separable contacts within said envelope that are relatively movable between engaged and disengaged positions,

c. said contacts having arcing portions between which arcs are formed upon disengagement of said contacts, said arcing portions including arc-initiation regions between which said arcs are initiated upon contact-disengagement,

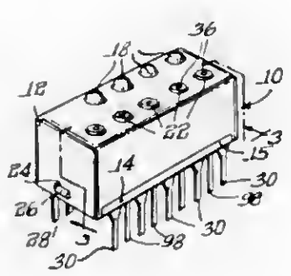
d. said arcing portions being of a material consisting essentially of beryllium formed from an ingot cast in an inert environment, which ingot has been subject to hot working to produce a microstructure that is characterized by grains much smaller on the average than the average grain size of the as-cast ingot.

4,028,515

SPRING CONTACT SWITCH FOR DUAL IN LINE MULTIPLE SWITCH ASSEMBLY HAVING MOMENTARY ACTUATED LIGHTED INDICATORS

Frank B. Desio, Melrose Park, and Samuel Lee Webb, Lisle, both of Ill., assignors to Illinois Tool Works Inc., Chicago, Ill.

Filed Sept. 15, 1975, Ser. No. 613,696
Int. Cl.² H01H *13/32, 1/06*
U.S. Cl. 200—276 **3 Claims**



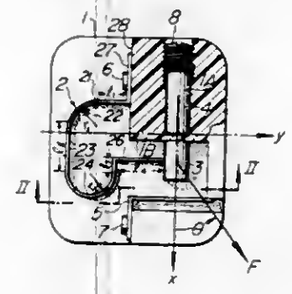
1. An electrical switch mechanism comprising a horizontally disposed base, first and second spaced-apart contact members which extend vertically upward from said base, a wound coil spring, the lower portion of which is supported in a vertical manner by receipt of the upper portion of said first contact member inside the lowermost end coils of said spring so that the lowermost end coils of said spring encircle said upper portion of said first contact member, said coil spring being bent in a smooth arc that prevents buckling of said coil spring during operation of said switch, and a depressible actuating member which has a cam surface thereon which contacts and deflects the upper portion of said spring toward said second contact member to form said smooth arc so that said upper portion of said coil spring directly overlays but does not contact said second contact member when said actuating member is in its undepressed condition and which further deflects said upper portion of said coil spring downwardly into contact with said second contact member with the lowermost end coils of said coil spring continuing to encircle the upper portion of said first contact member when said actuating member is depressed, so that an electrical circuit between said first and second contact members is thereby made and said coil spring acts to return said actuating member to its initial undepressed position following the release of actuation pressure on said actuating member.

4,028,516

ACCELERATION DETECTOR SWITCH HAVING MAGNETIC BIASED CONDUCTIVE OSCILLATING CONTROLLER

Kenzo Hirashima; Harutoshi Tsujimura, both of Yokohama; Akira Hasegawa, Katsuta; Takahiko Tanigami, Mito, and Kenichi Ushiku, Katsuta, all of Japan, assignors to Hitachi, Ltd. and Nissan Motor Co., Ltd., both of, Japan

Filed Jan. 8, 1975, Ser. No. 539,425
Claims priority, application Japan, Jan. 14, 1974, 49-6574
Int. Cl.² H01H *35/14*
U.S. Cl. 200—61.45 M **15 Claims**



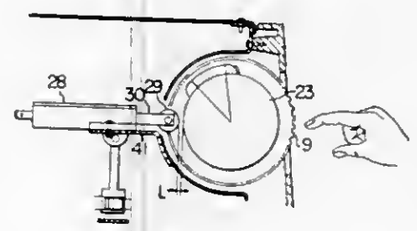
1. An acceleration detector, wherein a magnet and a fixed contact member are mounted on a base mount, and an inertial body serving as a movable contact and located between said magnet and said fixed contact is secured to the free end of a plate-spring, while the other end of said plate-spring is secured to said base mount, whereby when an acceleration of a predetermined magnitude is applied to said inertial body, said inertial body is biased against an attracting force of said magnet to contact said fixed contact member, thereby closing an electric circuit, characterized in that the widthwise direction of said plate-spring is perpendicular to the line extending between the center of said magnet and the center of said fixed contact, and that said plate-spring includes at least a pair of opposing curved portions formed between the fixed end and free end thereof, wherein said pair of curved portions are disposed in facing relationship to one another with the respective centers of curvature of said pair of facing curved portions being located in facing relationship to the same surface of said plate-spring.

4,028,517

MICROWAVE OVEN

Junzo Tanaka, Fujlidera, and Chikao Nakano, Yamatokoriyama, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Feb. 28, 1975, Ser. No. 554,113
Claims priority, application Japan, Mar. 4, 1974, 49-25427
Int. Cl.² H05B *9/06*
U.S. Cl. 219—10.55 B **6 Claims**



1. In a microwave oven including, an oven body having a heating cavity therein, a door for opening or closing a front opening of said heating cavity, a high frequency wave generating means for radiating high frequency energy into said heating cavity, a timer means for setting a heating time, and a cooking menu selecting means disposed on a front panel of said oven body including a rotatable scale having a plurality of menus printed thereon and a control know coupled to the rotatable scale for selecting one of said menus, the improvement comprising

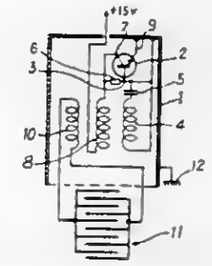
a high frequency wave output control means for controlling the magnitude of the output of said high frequency wave generating means, said high frequency output control means having a single switch operating rod being linked to a cam of said control knob of said cooking menu selecting means for effecting control of the output of said high frequency wave generating means in conjunction with the selection of a desired cooking menu, thereby generating an optimum high frequency wave output for the selected cooking menu.

4,028,518

DEVICE FOR SUPERFICIALLY HEATING AN ADJACENT BODY

Georges Boudouris, Grenoble; Grégoire Kalopissis, Neuilly-sur-Seine; Jean-Luc Leveque, and Paul Roussopoulos, both of Paris, all of France, assignors to L'Oreal, Paris, France

Filed June 13, 1975, Ser. No. 586,748
Claims priority, application Luxembourg, June 18, 1974, 70345
Int. Cl.² H05B *9/04*
U.S. Cl. 219—10.81 **8 Claims**



1. Device for increasing the superficial temperature of a body such as the skin, which comprises a resonator including an electrically conductive jacket which is substantially closed in the electromagnetic sense of the term, a coil inside said jacket for emitting high frequency electromagnetic energy, coupling means for matching said high frequency energy to the resonant frequency of the resonator, and an applicator circuit connected to conduct the energy produced inside the jacket to an applicator located outside the jacket.

4,028,519

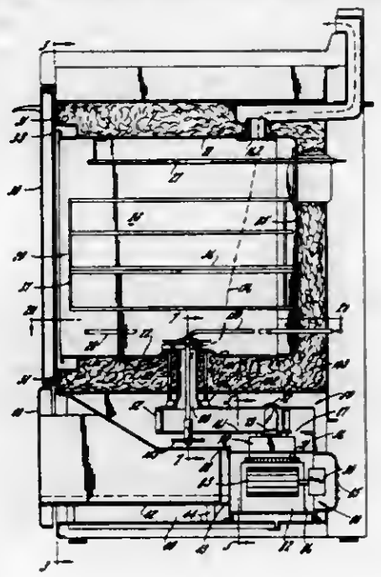
MODULAR POWER SUPPLY AND WAVEGUIDE CONSTRUCTION FOR MICROWAVE OVEN

Raymond Paul De Weese, Kankakee, Ill., and Beverly D. Kumpfer, Salt Lake City, Utah, assignors to Roper Corporation, Kankakee, Ill.

Filed Feb. 26, 1976, Ser. No. 661,564
Int. Cl.² H05B *9/06*
U.S. Cl. 219—10.55 B **18 Claims**

1. In a combined microwave-thermal range the combination comprising a frame having walls defining a rectangular oven cavity and an adjacent space, doors for respectively enclosing the front surfaces of the cavity and the adjacent space, a thermal element in the cavity, the walls of the cavity being insulated, the bottom wall of the oven cavity having an opening, a microwave module including a microwave power supply housing of generally rectangular shape arranged in the adjacent space, a magnetron and blower in the housing, the module including a waveguide of rectangular cross section having one end secured to the top of the housing and having its other end extending cantilever-fashion under the bottom wall of the cavity, the waveguide having an inlet alined with the magnetron and an outlet alined with the opening in the cavity, a hollow, open-ended conductor extending through the opening for coupling the outlet of the waveguide to the cavity, means

for securing the upper end of the hollow conductor to the bottom wall of the cavity and the lower end of the conductor to the waveguide, the hollow conductor being readily disengageable from the waveguide, and the module being disengageably secured in seated position and dimensioned for removal intact through the front surface of the adjacent space for replacement by a new module should servicing become necessary.



4,028,520

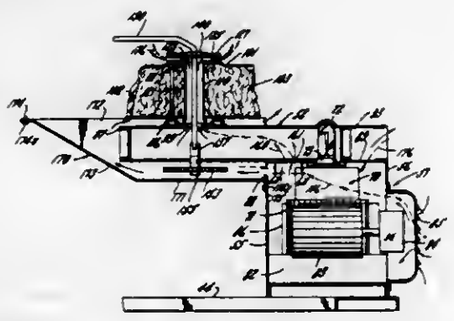
AIR FLOW SYSTEM FOR COMMON CAVITY MICROWAVE OVEN

Sumner H. Torrey, West Lafayette, Ind., assignor to Roper Corporation, Kankakee, Ill.

Filed Feb. 26, 1976, Ser. No. 661,524

Int. Cl.² H05B 9/06

U.S. Cl. 219—10.55 B **7 Claims**



1. In a combined microwave-thermal range, the combination comprising a frame having walls defining a rectangular oven cavity and a lower space, a door enclosing and sealing the front surface of the cavity against passage of air and microwave energy, a thermal element in the cavity, control means for operation of the thermal element at a normal temperature level for food preparation and at a high level for a self-cleaning mode, the walls of the cavity being insulated, the bottom wall of the cavity having an inlet opening, means defining a cavity air vent at the top of the cavity, a microwave power supply including a blower and a magnetron having cooling fins, the blower having a blower inlet for drawing in cooling air and an outlet for supplying such air under slight pressure to the cooling fins, a waveguide having an inlet connected to the magnetron and extending under the bottom wall of the cavity to terminate at an outlet, means for connecting the outlet of the waveguide to the inlet opening of the cavity for conduction of microwave energy into the cavity, means defining air passages of limited cross section for conducting air from the magnetron into the waveguide so that a portion of the pressurized air passes through the waveguide and into the cavity for ventilating the cavity when the magnetron and blower are turned on, the blower inlet being located at a lever below the bottom wall of the cavity so that when the blower and magnetron are turned off and the thermal element is turned on air is thermally convected from the blower inlet through the air passages into the waveguide and into the cavity for exiting through the cavity air vent notwithstanding the auto ignition pressure which exists in the cavity under high temperature self-cleaning conditions, the convention path of the air being sufficiently constricted so that air is convected in the self-cleaning mode at a level below that which is capable of producing an explosive reaction with the products of decomposition.

4,028,521

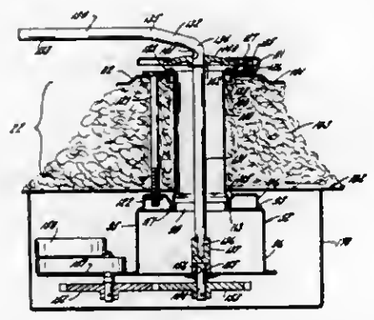
ANTENNA CONSTRUCTION FOR MICROWAVE OVEN

Frederick K. Uyeda, Attica, and Buddy J. Austin, Lafayette, both of Ind., assignors to Roper Corporation, Kankakee, Ill.

Filed Feb. 26, 1976, Ser. No. 661,543

Int. Cl.² H05B 9/06

U.S. Cl. 219—10.55 F **16 Claims**



1. In a microwave oven the combination comprising conductive walls and a conductive door defining an enclosed cavity, one of the walls having an opening, a source of microwave energy including a waveguide extending adjacent the said one wall, a hollow open-ended conductor penetrating the wall registering with the opening at one end and in communication with the waveguide at the other to propagate an inertial wave in the cavity, an antenna projecting into the hollow conductor, the antenna being formed of a rod having a straight shank portion and a radially extending arm portion arranged approximately perpendicularly thereto with an angled transitional portion in between bearing an obtuse angle with respect to each of them, the antenna thereby radiating a guided wave in the cavity in a direction different from the inertial wave, the transitional portion having a length at least equal to the radius of the hollow conductor and the radial arm portion having a length of at least that of the transitional portion, a rotatable mount for supporting the shank portion of the antenna substantially centered in the hollow conductor so that the transitional portion is spaced inwardly of the associated wall, and means including a driving motor coupled to the mount for rotating the antenna so that the guided wave is cyclically swept throughout the cavity superimposed upon the field of the inertial wave for improved energy distribution in the cavity and relative freedom from hot spots.

4,028,522

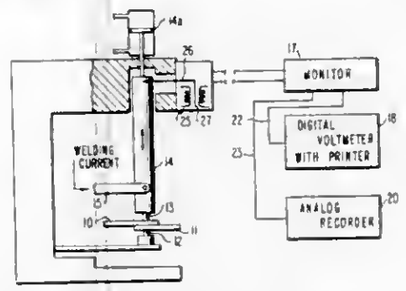
MULTI-MODE STRUCTURAL WELD MONITOR ON A TIME BASE

Russell Alexander Chihoski, and John Charles De Fellippie, both of Littleton, Colo., assignors to Martin Marietta Corporation, Rockville, Md.

Filed Apr. 29, 1975, Ser. No. 572,768

Int. Cl.² B23K 11/24

U.S. Cl. 219—109 **10 Claims**



1. A method of measuring a plurality of characteristics of a weld during a welding process in which a workpiece is clamped between two welder electrodes, one of which is movable to permit a change in electrode separation due to a dimensional change of the weld in the workpiece during a weld cycle, said method comprising:

selecting a plurality of predetermined time brackets within an individual weld cycle such that each bracket corresponds to one of the characteristics; and

measuring the change in electrode separation during each of said time brackets, whereby each measurement represents an indication of a weld characteristic for its corresponding time bracket.

4,028,523

ENERGY-BEAM ENGRAVING METHOD AND AN APPARATUS FOR CARRYING IT OUT

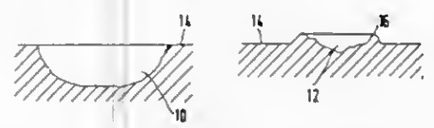
Peter Anderl; Monika Geffcken, and Joachim Geissler, all of Munich, Germany, assignors to Steigerwald Strahltechnik GmbH, Germany

Filed Dec. 9, 1975, Ser. No. 639,127

Claims priority, application Germany, Dec. 10, 1974, 2458370

Int. Cl.² B23K 9/00

U.S. Cl. 219—121 EM **4 Claims**



1. A method of energy beam engraving a workpiece having a workpiece surface comprising the following steps: directing an energy beam successively onto a plurality of discrete positions on said workpiece surface, said energy beam being adapted to produce a depression in said workpiece surface the depth and area of which increases with increasing dwell time, controlling the dwell time each position so as to produce smaller depressions and larger depressions, focusing said beam in a focus plane which lies within said workpiece in the vicinity of said workpiece surface, and controlling the focus of said beam so that said focus plane is nearer to the surface during production of said smaller depressions than during production of said larger depressions.

4,028,524

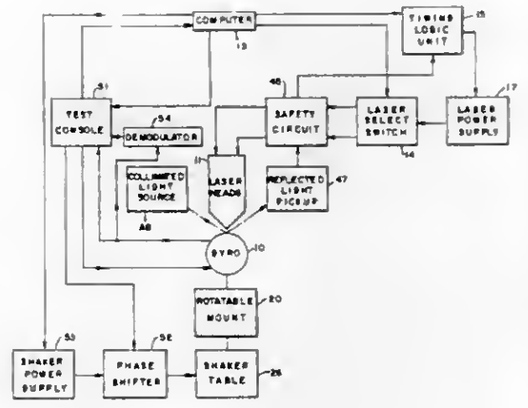
BALANCING SYSTEM FOR A ROTATING MASS

Dean H. Moll, Wayne, and Alan Greiner, Cedar Grove, both of N.J., assignors to The Singer Company, Little Falls, N.J.

Division of Ser. No. 483,149, June 26, 1974, Pat. No. 3,935,746, which is a division of Ser. No. 169,661, Aug. 6, 1971, Pat. No. 3,795,784. This application Apr. 24, 1975, Ser. No. 571,482

Int. Cl.² B23K 26/00

U.S. Cl. 219—121 L **1 Claim**



1. A method of balancing a free rotor gyroscope having a flywheel mounted for rotation about a spin axis and for pivotal displacement with respect to a pivotal plane perpendicular to the spin axis, comprising the steps of measuring the mass unbalance, radial unbalance and modulation of the spinning flywheel, and selecting and executing the following laser burn patterns based on the presence and absence of predetermined combinations of excess modulation, mass unbalance and radial unbalance:

a. aiming and firing a predetermined number of laser beam bursts at a single point on the circumference of the flywheel on one side of the pivotal plane depending on the sign of mass unbalance and at an angular location corresponding to the radial unbalance when an excess radial unbalance and an excess mass unbalance have been detected;

b. aiming and firing a predetermined number of pairs of laser beam bursts 180° apart from each other on opposite sides of the circumference of the flywheel on the same one side of the pivotal plane and equidistant therefrom depending on the sign of the mass unbalance when only an excess mass unbalance has been measured;

c. aiming and firing a predetermined number of pairs of laser beam bursts located at the same angular position on the circumference of the flywheel corresponding to the radial unbalance above and below the pivotal plane and equidistant therefrom when only an excess radial unbalance has been measured; and

d. aiming and firing a predetermined number of pairs of laser beam bursts located 180° apart from each other on opposite sides of the circumference of said flywheel and on opposite sides of said pivotal plane and equidistant therefrom at angular locations corresponding to the modulation unbalance when an excess modulation unbalance has been measured.

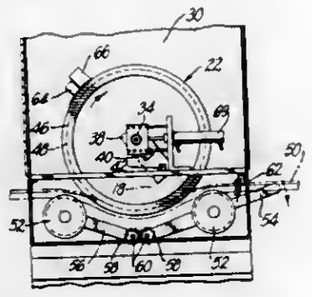
4,028,525
APPARATUS FOR CREATING HOLES IN FLEXIBLE MEMBERS

David E. Mominee, Alpine, and Gilbert W. Vance, Jamul, both of Calif., assignors to Reed Irrigation Systems, El Monte, Calif.

Continuation of Ser. No. 460,812, April 15, 1974, abandoned, which is a division of Ser. No. 239,921, March 31, 1972, Pat. No. 3,808,394. This application Nov. 6, 1975, Ser. No. 629,494

Int. Cl.² H05B 9/00

U.S. Cl. 219—121 L 15 Claims



1. An apparatus for use in creating a hole in an elongated flexible member which comprises:
wheel means having a periphery;
means for mounting the wheel means for rotation;
holding means for holding at least a portion of the elongated flexible member with respect to said periphery so that there is substantially no relative movement between said portion of said flexible member and said wheel means as said wheel means rotates;
reflecting means for reflecting a laser beam;
first means for rotatably mounting said reflecting means for rotation in synchronism with said wheel means;
laser means for creating and directing a laser beam toward said reflecting means; and
said reflecting means being positioned relative to said laser means and said wheel means so that the laser beam emitted from said laser means is directed toward a specific area of said portion of said flexible member during rotation of said wheel means through an arc with the laser beam intersecting said specific area at a first angle, said first angle being constant for the period that the wheel means rotates through said arc.

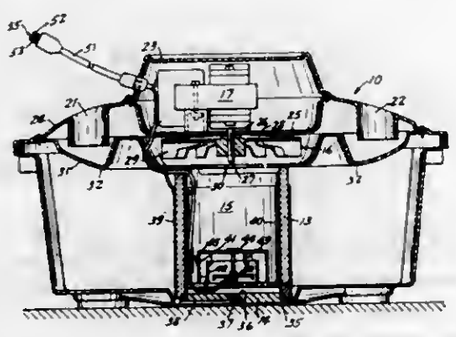
4,028,526
ELECTRICALLY GROUNDED VAPORIZER STRUCTURE

George W. Schossow, 2316 Lilac Lane, White Bear Lake, Minn. 55110

Continuation-in-part of Ser. No. 832,279, June 11, 1969, Pat. No. 3,809,374. This application Feb. 21, 1974, Ser. No. 444,337

Int. Cl.² H05B 1/02, 3/60; H02H 1/02; F22B 1/30

U.S. Cl. 219—295 16 Claims



1. A vaporizer for vaporizing water to steam and mixing the steam with air and dispensing a moist air below scalding temperature, said vaporizer comprising
a base defining a reservoir for liquid,
a plate supported in said base,
a cover supported on said base, said cover supporting a tubular member which has one end joined in abutting mating engagement with said plate to form a boiling chamber, an electrically driven fan supported in a manifold within said cover and in communication with the base and the boiling chamber to draw steam from said boiling chamber and air from said base into said manifold to be discharged therefrom through a discharge outlet, valve means permitting water to flow from said reservoir to said boiling chamber, and electrode heating means disposed in said boiling chamber to boil the water therein by electrical resistance of the water, and
an electrical circuit for energizing said electrode heating means and said fan, said circuit including a ground line for providing ground potential, an electrically energizable switching means for connecting said fan and the electrodes of said electrode heating means to a source of potential through a hot and neutral line respectively, a momentary contact switch connected in series with said hot line and said switching means for energizing said switching means, said circuit for said switching means, momentary contact switch, hot line and ground line being such that said switching means can be energized by said momentary contact switch only when ground potential is present to said circuit via said ground line, and a sensing member connected in series with said switching means and positioned in said base adjacent one of an element of said boiling chamber carrying current and an electrode of said electrode heating means disposed in said base to close said circuit including said switching means for holding said switching means energized only when there is water in said base above a predetermined minimum level to cover said sensing member for holding said fan and electrode heating means energized.

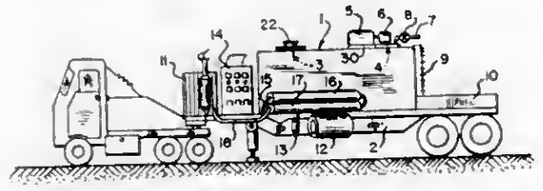
4,028,527
APPARATUS AND CONTROL SYSTEM FOR HEATING ASPHALT

George F. Thagard, Jr., 60 Linda Isle, Newport Beach, Calif. 92660

Filed Dec. 2, 1974, Ser. No. 528,732

Int. Cl.² F24H 1/18; H05B 1/00

U.S. Cl. 219—311 38 Claims



1. An apparatus for heating and maintaining an asphalt material to temperatures within a preselected range which comprises an enclosed vessel configured to contain the material in at least one of a solid and liquid state, inlet means for introducing the material into the vessel in at least one of a solid and liquid state, means for heating at least one of the wall portions of the vessel to maintain the temperature of at least one of the inner wall portions which contact the material therein and the material in the vessel above the melting temperature and below the decomposition temperature of the asphalt material, the surface area of heated wall portions contacting the material being sufficient to transfer heat to the material at least sufficient to maintain the temperature of the material to within said preselected range in a manner to avoid causing substantial decomposition thereof, control means for selectively controlling the temperatures of the heating means to maintain at least one of the inner wall portions of the vessel contacting asphalt material thereon and the asphalt material in the vessel within said preselected temperature range, venting means communicating an upper portion of the vessel with an atmosphere outside of the vessel, filtering means capable of filtering vapors such as condensible hydrocarbon vapors communicating with said venting means, and outlet means for removing the material from said vessel.

4,028,528
CODE SCANNING SYSTEM

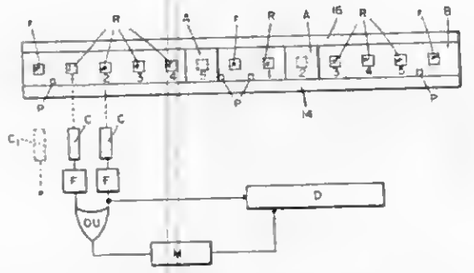
Daniel Staes, Bretigny sur Orge, France, assignor to Rapistan, Incorporated, Grand Rapids, Mich.

Filed Feb. 27, 1976, Ser. No. 662,005

Claims priority, application France, Feb. 28, 1975, 75.06486

Int. Cl.² G06K 7/10; G02B 5/12

U.S. Cl. 235—61.11 E 13 Claims



1. A code scanning system comprising:
a code strip including a plurality of spaced code elements arranged in a row and selectively obstructed to define a code,
a plurality of detectors positioned in a row aligned to permit serial scanning of said code strip when said code strip and said detectors are moved relative to one another said detectors spaced such that adjacent detectors are simultaneously aligned with adjacent code elements for detecting said code elements,
logic circuit means coupled to said detectors for providing a timing signal in response to the direction of a code element, and
circuit means coupled to one of said detectors and to said logic circuit for receiving signals therefrom representative of a code encoded in said code strip.

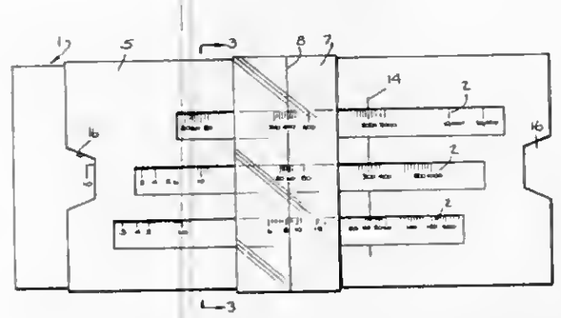
4,028,529
CURRENCY EXCHANGE CALCULATOR

George W. Van De Weghe, 477 Colonial Road, Ridgewood, N.J. 07450

Filed Aug. 28, 1975, Ser. No. 608,757

Int. Cl.² G06G 1/02

U.S. Cl. 235—89 R 7 Claims



1. A currency exchange calculator for simultaneously displaying the monetary unis of two currencies that are related by a conversion factor comprising: (a) a slide having a plurality of parallel quasi-logarithmic scales thereon with at least one said scale being laterally displaced relative to another of said scales by a predetermined factor of displacement not related to the conversion factor, (b) a sleeve slidably engaged about at least a portion of said slide and including means for exposing at least a portion of each of said quasi-logarithmic scales and said sleeve further including a sleeve index means for indexing the position of said sleeve relative to at least one of said scales, and (c) a cursor slidably engaged about at least a portion of said sleeve and including a cursor index means for indexing the position of said cursor relative to at least one of said scales.

4,028,530
COUNTING DEVICES

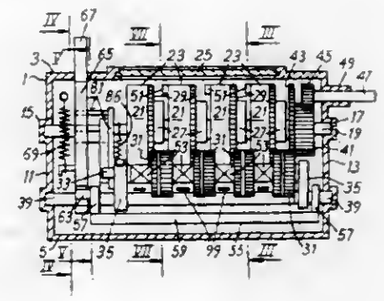
Hans Bud, London, and Peter Alway, Bushey, both of England, assignors to Hans Bud, London, England

Filed May 16, 1975, Ser. No. 578,342

Claims priority, application United Kingdom, May 22, 1974, 22945/74

Int. Cl.² G06C 15/42

U.S. Cl. 235—144 HC 8 Claims



1. A resettable counting device comprising:
coaxial number wheels;
a reset cam provided with each number wheel to rotate therewith;
a transfer pinion shaft displaceable relatively to the number wheels;
transfer pinions rotatably mounted on said shaft and disposed respectively intermediate successive number wheels, each pinion during counting operations of the device meshing with gear teeth on one of the number wheels adjacent thereto and engaging drive means on the other number wheel during rotation of said other number wheel thereby partially to rotate said one of the number wheels;
a cradle having parallel end members extending transversely with respect to the number wheel axis, a longitudinal member connected therebetween, and first and second abutment means;
reset fingers supported on said longitudinal member of the cradle so as to be out of contact with the reset cams during counting operations and to be together rotatable about a common axis to engage respectively with the reset cams to reset the number wheels;
a reciprocably movable actuating member adapted during movement thereof in one sense to effect displacement of the transfer pinion shaft thereby to disengage the transfer pinions from the number wheels and subsequently to engage said first abutment means thereby rotating said reset fingers and adapted upon movement in the reverse sense to be repositioned for subsequent resetting operations; and
flexible members disposed to be out of contact with the transfer pinions during counting operations and located so as to be engaged respectively by the transfer pinions subsequent to the disengagement thereof from the number wheels thereby to reorientate the transfer pinions, and so as to be engaged subsequently by said second abutment means upon rotation of the reset fingers, the

engagement with the second abutment means serving to stress the flexible members so that contact between the pinions and the flexible members is maintained until remeshing of the pinions with the number wheels takes place, the flexible members thereafter disengaging from the pinions.

4,028,531

SYSTEM FOR DISPLAYING INFORMATION ABOARD A MOVING OBJECT

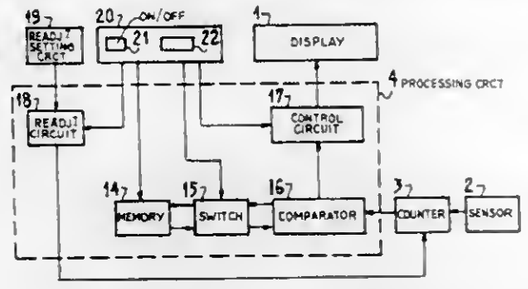
Jean Cottin, and Jean Laxague, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Nov. 20, 1975, Ser. No. 633,865

Claims priority, application France, Nov. 21, 1974, 74.38280

Int. Cl.² G06F *15/20;* **G09B** *29/10*

U.S. Cl. 236—150.2 **12 Claims**



1. A system for giving positional information to passengers aboard a vehicle traveling between a starting point and a terminal point over a route including a plurality of transit points, comprising:

memory means for storing numerical data corresponding to the lengths of sections of said route extending between said points;

odometric means on said vehicle for continuously registering the distance traveled from a reference point on said route;

display means on said vehicle for visually indicating to its occupants the current position of the vehicle with reference to said points, said display means including a plurality of markers individually assigned to said transit and terminal points;

comparison means provided with first and second inputs respectively coupled to said memory means and to said odometric means for generating a control signal upon the data on said inputs matching each other;

sequencing means connected to said comparison means for calling forth from said memory means, at said reference point, the stored data relating to the length of the first route section still to be traveled and for thereafter calling forth, in response to control signals emitted by said comparison means, the stored data relating to the lengths of successive route sections for transmission to said first input; and

circuit means connected between said comparison means and said display means for activating, in response to said control signal, the marker indicatng a point at the end of the route section to be traveled next.

4,028,532

TURBINE SPEED CONTROLLING VALVE OPERATION

John F. Reuther, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 247,888, April 26, 1972, abandoned. This application Nov. 2, 1973, Ser. No. 412,513

Int. Cl.² F01D *19/00*

U.S. Cl. 235—151.1 **27 Claims**

1. A system for operating a turbine in which an elastic fluid imparts rotation to the turbine, comprising

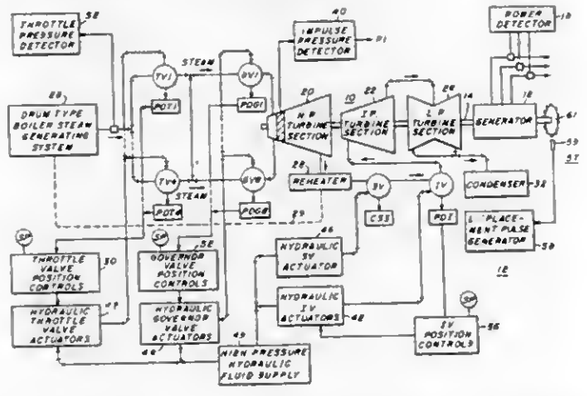
valve means for controlling the flow of elastic fluid to the turbine,

means for controlling the valve means in accordance with a desired turbine speed,

means for generating a first series of pulses at a rate proportional to the rotational speed of the turbine,

means for generating a second series of pulses at a predetermined rate, which rate is substantially greater than the generated rate of the first series at the upper range of turbine speed,

means to count the number of pulses of the first series during a predetermined time interval,



means to count the number of pulses of the second series during the generation of a predetermined number of pulses of the first series,

means to generate a first signal corresponding to the counted number of the first series of pulses,

means to generate a second signal corresponding to the counted number of the second series of pulses,

means governed by a predetermined rotational speed of the shaft and the count of the first and second series of pulses to select one of the first and second signals, and

means to operate the valve control means in accordance with the selected one of the first and second signals.

4,028,533

ROBOT MOVABLE IN A GROUP

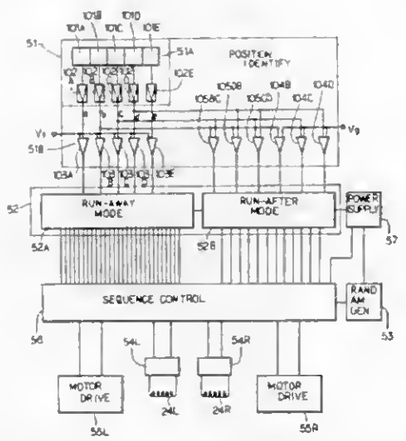
Sueo Matsubara, Tokyo, Japan, assignor to Techno-Venture Co., Ltd., Japan

Filed Dec. 29, 1975, Ser. No. 644,469

Claims priority, application Japan, Dec. 31, 1974, 50-3345; Dec. 31, 1974, 50-3346; Dec. 31, 1974, 50-3347; Dec. 31, 1974, 50-3348

Int. Cl.² B26D *1/02*

U.S. Cl. 235—151 **33 Claims**



1. Robots movable in a group, each of said robots being movable in one of at least two different modes of movement at a time and comprising:

identifying means for identifying the relative positions between this robot and the other robots of the group and for thereby generating a position signal representing the relative positions between said this robot and said the other robots of the group;

mode control means operatively associated with said identifying means for selecting one mode at a time out of said at least two different modes in accordance with said position signal received from said identifying means and for thereby generating a mode signal corresponding to said selected mode; and

moving means operatively associated with said mode control means for receiving said mode signal and for thereby actuating said this robot to move in one of said at least two modes which is selected by said mode control means.

4,028,534

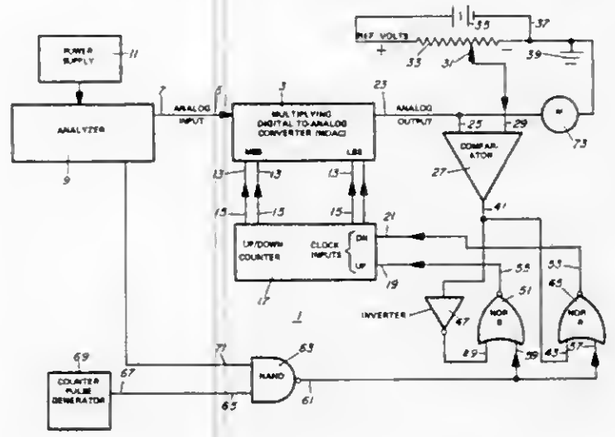
AUTOMATIC SPAN CIRCUIT

Huel C. Tucker, Centerville, Ohio, assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 14, 1976, Ser. No. 676,951

Int. Cl.² G06F *15/20;* **G06J** *1/02*

U.S. Cl. 235—151.35 **9 Claims**



1. An automatic gain control system comprising:

a multiplying digital-to-analog converter having an analog voltage input, an analog voltage output, and N digital input channels, where N is an integer greater than one, and having the characteristic that its analog output is a linear function of the product of its analog input and its digital input;

a binary UP/DOWN counter having N digital counting channels connected, respectively, to said N converter channels, and UP/DOWN counting input means;

a fixed reference voltage source;

a voltage comparator having two inputs, one connected to the analog voltage output of said converter and the other connected to said reference voltage source, and a binary output;

means for generating a pulse train;

gate means, controlled by said binary output of said comparator, for connecting said pulse train generating means to said input means to cause said counter to count UP when the analog output voltage from said converter is less than the reference voltage and to count DOWN when the analog output voltage is greater than the reference voltage; and

a voltage-responsive meter, connected to said analog voltage output of said converter, calibrated to register the analog voltage input to said converter.

4,028,535

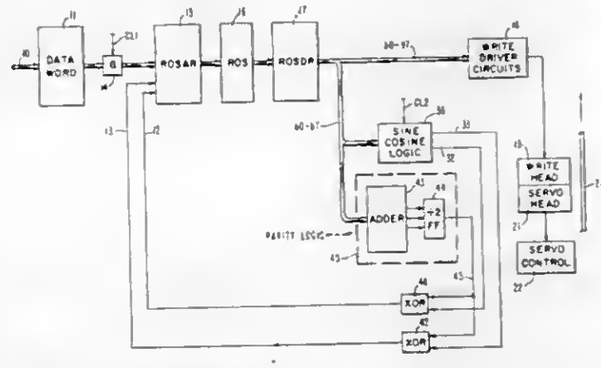
APPARATUS AND METHOD FOR GENERATING A DATA CODE WITH A SPECTRAL NULL

Peter Anthony Franaszek, Ossining, and David Allen Thompson, Somers, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 11, 1976, Ser. No. 695,295

Int. Cl.² G06F *13/04, 7/38, 15/34*

U.S. Cl. 235—152 **7 Claims**



1. In a code signaling system,

translating means for translating coded data to provide a spectral null at a predetermined frequency including an addressable translating apparatus for providing a coded output signal in response to a coded input signal,

monitoring means for monitoring the output signals from said translating apparatus with respect to predetermined limit conditions for providing code selection data as a function of said output signals,

said monitoring means having an output connected to supply said code selection data to modify the input signal to said translating means whereby said spectral null is achieved at said predetermined frequency.

4,028,536

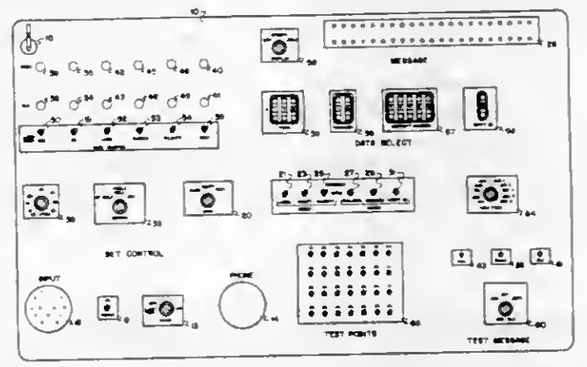
SNAIAS DIGITAL DATA TEST SET

John William Woodward, Virginia Beach, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 27, 1976, Ser. No. 661,901

Int. Cl.² H04B *3/46, 17/00;* **G08C** *25/00*

U.S. Cl. 235—153 A **20 Claims**



1. A portable Ship's Navigation Aircraft Inertial Alignment System Digital Test Set which evaluates the availability and adequacy of the data link navigation messages, transmitted between the shipboard navigation system and the aircraft inertial alignment system via a digital data radio link, umbilical cable or both, comprising:

power distribution circuitry which develops and distributes power signals throughout said test set;

timing circuitry which produces timing signals that control the processing of received data;

display circuitry which source selects and receives cable

data, transmitted RF data or both, checks the adequacy of the data for a sample period, displays a good or bad data evaluation, shapes, aligns and gates said data into a serial digital signal, converts said digital signal into a parallel data signal and provides semi-permanent storage to display data; and,

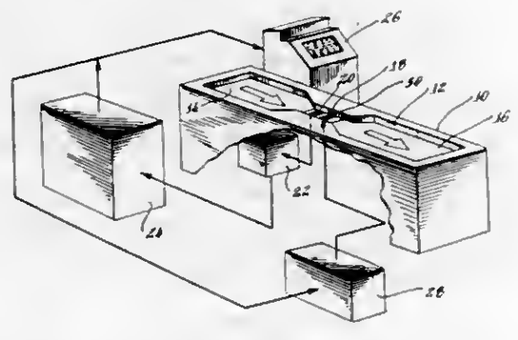
data check circuitry which decodes the operating mode, alignment or waypoint, of said test set, evaluates the received data, checks each message for a sample period for correct lable, parity, validity and alignment sublabel update rate in the alignment mode, checks each message for a sample period for correct label, parity, aircraft address, waypoint number and waypoint sublabel update rate in the waypoint mode, and instructs said display circuitry as to the overall adequacy of the data.

4,028,537

PRODUCT PROCESSING SYSTEM WITH PRICE PRINTER

John E. Snow, Minneapolis, Minn., assignor to Champion International Corporation, Stamford, Conn.

Filed Mar. 31, 1976, Ser. No. 672,055
Int. Cl.² G06K *3/02, 19/06*
U.S. Cl. 235—61.9 R **3 Claims**



1. A product check out system comprising:

a. a checkout stand including therein an automatic label reader means disposed on an upper surface thereof, said label reader means being capable of reading a plurality of universal product codes carried on said products and generating product-identifying signals corresponding thereto as each product is moved pass said label reader;

b. computer means responsive said product-identifying signals for generating price signals as a function of product prices currently stored in the memory of said computer;

c. register means for totalling said price generated in the course of processing an aggregation of products; and

d. printing means disposed in close proximity to said label reader means for printing visual representations of the price on said product in accordance with said price signals.

4,028,538

PROGRAMMABLE CALCULATOR EMPLOYING ALGEBRAIC LANGUAGE

Emil Edward Olander, Jr., Fort Collins; Rex L. James, Loveland; Ivar W. Larson, Loveland; Wayne F. Covington, Loveland; Jack M. Walden, Loveland; Robert E. Watson, Loveland; Francis J. Yockey, Loveland; Fred Wenninger, Jr., Loveland, and Homer C. Russell, Berthoud, all of Colo., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Division of Ser. No. 212,581, Dec. 27, 1971, Pat. No. 3,839,630. This application Sept. 30, 1974, Ser. No. 510,921
Int. Cl.² G06F *7/38, 15/02*
U.S. Cl. 235—156 **20 Claims**

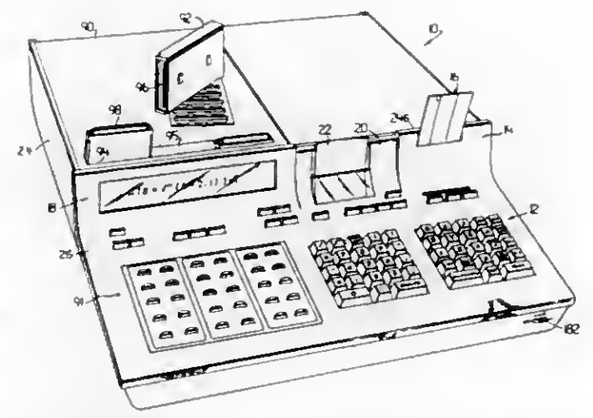
1. An electronic calculator comprising:

keyboard input means including a plurality of keys for entering lines of one or more alphameric statements each into the calculator;

buffer storage means, coupled to said keyboard input means, for storing each line of one or more alphameric statements as it is entered into the calculator from said keyboard input means;

memory means, coupled to said buffer storage means, for storing lines of one or more alphameric statements each entered into the calculator;

processing means, coupled to said keyboard input means, buffer storage means, and memory means, for selectively processing either a line of one or more alphameric statements entered into the calculator and stored in said buffer storage means or lines of one or more alphameric statements stored in said memory means to perform selected functions; and



output means, coupled to said buffer storage means and said processing means, for providing an output indication of selected functions performed by the calculator;

said keyboard input means including an execute control key for initiating execution of a line of one or more alphameric statements by said processing means, and a store control key for initiating storage of a line of one or more alphameric statements in said memory means; and

said processing means being responsive to actuation of said execute control key, following entry of a line of one or more alphameric statements into said buffer storage means, for executing that line of one or more alphameric statements, and being responsive to actuation of said store control key, following entry of a line of one or more alphameric statements into said buffer storage means, for storing that line of one or more alphameric statements in said memory means.

4,028,539

MEMORY WITH ERROR DETECTION AND CORRECTION MEANS

Pieter Anton Jacobs, Apeldoorn, Netherlands, assignor to U.S. Phillps Corporation, New York, N.Y.

Filed Nov. 20, 1975, Ser. No. 633,575
Claims priority, application Netherlands, Dec. 9, 1974, 7415966
Int. Cl.² G06F *11/00;* **G11C** *29/00*
U.S. Cl. 235—153 AM **2 Claims**

1. A memory comprising:

a first plurality of memory units, a first input address line connected to said memory units for delivering a first partial address thereto, said first plurality of memory units having valid partial addresses in a first partial address sequence from a specified first to a specified second memory unit;

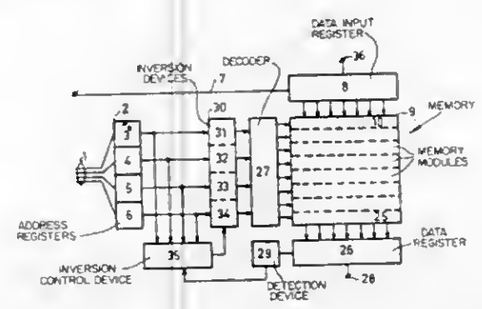
a second input address line connected to said memory units for addressing individual bits of one of said memory units;

a data input register connected to said plurality of memory units;

a data output register connected to said plurality of memory units;

a detection device connected to said data output register for detecting a non correctable storage error and producing an output signal;

an inversion device connected to said first input address line for inverting predetermined address bits, thereby allowing addressing of said first plurality of memory units in a second partial address sequence starting from a third memory unit;



an inversion control device, having an input connected to said detection device, and an output connected to said inversion device for activating said inversion device; and

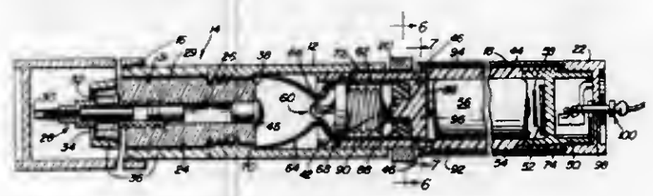
blocking means for blocking addressing of ones of a second plurality of memory units beyond a predetermined fourth memory unit, said blocking means and said inversion control device being linked for blocking addressing of a faulty memory unit in said second plurality of memory units.

4,028,540

FLASHLIGHT MARKING IMPLEMENT

Columbus B. Key, Jr., 49 New York Ave. NW., Washington, D.C. 20001, and Vincent M. Spaulding, 2914 W St. SE., Washington, D.C. 20020

Filed Nov. 11, 1975, Ser. No. 630,885
Int. Cl.² B43K *5/12;* **F21Y** *33/00*
U.S. Cl. 240—6.46 **9 Claims**



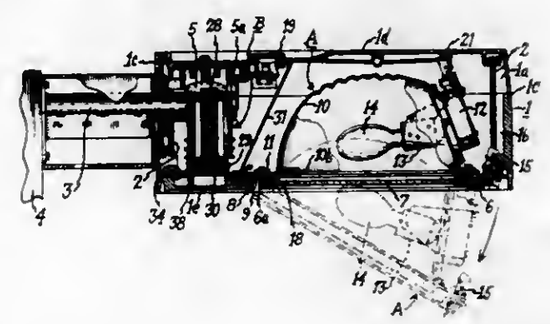
8. An illumination implement comprising an elongated tubular body having a light emitting end section and an opposite end section enclosing a source of illumination, a housing having a tubular end portion projecting into the opposite end section of the tubular body and a protective portion enclosing an internal source of electrical energy in axially spaced relation to the tubular body, energizing circuit means carried on the housing for conducting electrical energy from said internal source to the source of illumination, and switch means mounted on the tubular end portion of the housing axially between the tubular body and the protective portion of the housing for selectively connecting the internal source to the source of illumination through the circuit means.

4,028,541

LUMINAIRE

John S. Franklin, Hendersonville, N.C., assignor to General Electric Company, New York, N.Y.

Filed Nov. 11, 1974, Ser. No. 522,439
Int. Cl.² F21S *1/10, 3/10, 13/10*
U.S. Cl. 240—25 **4 Claims**



1. A luminaire comprising, in combination, a housing having a top wall, opposite side walls, a front wall and a rear wall defining a housing chamber and a bottom wall extending forwardly from said rear wall covering a portion of said housing chamber and defining with said side walls and said front wall a bottom opening at the front portion of said housing chamber, and a combined closure and optical assembly arranged in said front portion of said housing chamber detachably secured to said housing for movement as a unit to a closed operative position covering said bottom opening and an open inoperative position away from said bottom opening, said combined closure and optical assembly comprising a concave reflector, a light transmitting member and frame means joined together and defining an optical enclosure, said concave reflector having a front side formed with an aperture, and combined lamp holder and cover means detachably mounted on said reflector covering said front aperture therein and having lamp support means extending through said front aperture for holding a lamp within said optical enclosure, said front aperture being sufficiently large for passage of the lamp therethrough so that said lamp support means with lamp attached thereto is removable as a unit from said optical enclosure upon detachment from said reflector, and coacting separable electric connecting means on said housing and said combined closure and optical assembly adjacent said front wall for automatically making and breaking electrical connection between the lamp and an electrical supply upon respectively closing and opening said combined closure and optical assembly.

4,028,542

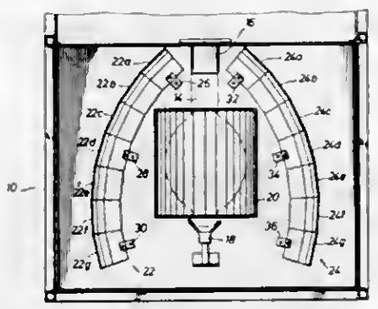
FACETED PARABOLIC-TYPE REFLECTOR SYSTEM

Glen Harold McReynolds, Jr., Houston, Tex., assignor to Esquire, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 505,140, Sept. 11, 1974, abandoned. This application Apr. 16, 1975, Ser. No. 568,725
Int. Cl.² F21V *7/09*
U.S. Cl. 240—41.36 **7 Claims**

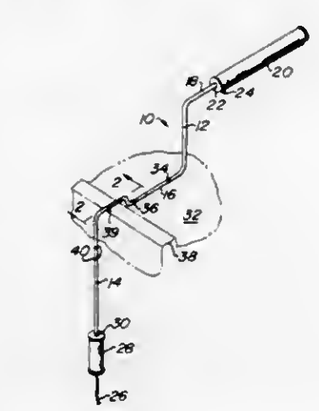
1. A luminaire adaptable for securing therein a light source through which an optical axis passes, and having an opening through which light from the source is emitted, including a reflector having a plurality of substantially contiguous planar segments, said segments forming a part of a circular arc in a plane behind the source and parallel to the opening to one side

of the axis, said arc approximating a parabolic shape with the center of the source at its focus, said reflector parabolically



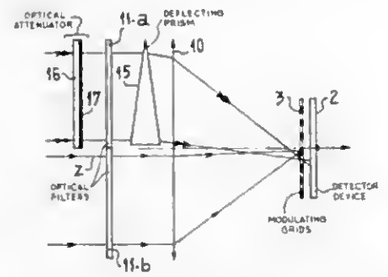
positionable with respect to said source so as to change the reflected beam angle through the opening.

4,028,543
BASELESS LAMP
Joseph Oster, Allentown, Pa., assignor to Keystone Lamp Manufacturing Corporation, Slatington, Pa.
Filed Mar. 3, 1976, Ser. No. 663,320
Int. Cl.² F21V *21/08, 21/20;* **A47G** *29/30*
U.S. Cl. 240—52.1 **6 Claims**



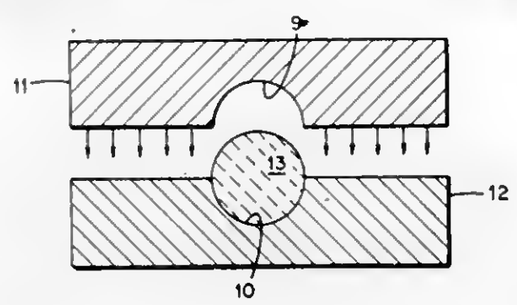
1. A lamp comprising:
an elongated tubular support member;
said support member having a substantially downwardly extending portion, a substantially upwardly extending portion spaced from said downwardly extending portion and a substantially horizontally extending portion connected between the lower end of said upwardly extending portion and the upper end of said downwardly extending portion;
friction means covering at least part of at least the underside of said horizontally extending portion, said friction means being adapted to rest on a support surface for supporting said lamp;
a lamp fixture mounted on said upwardly extending portion of said support member adjacent the upper end thereof; and
a counterweight means mounted on said downwardly extending portion of said lamp support adjacent the lower end thereof, the weight of said counterweight means being such that the center of gravity of the lamp is below said horizontally extending portion whereby said lamp is balanced in a substantially upright position when said friction means is resting on a support surface.

4,028,544
RADIANT ENERGY DETECTION SYSTEM
Francis Jourdan; Georges Couderc, and Serge Ediar, all of Paris, France, assignors to Thomson-CSF, Paris, France
Filed Apr. 5, 1976, Ser. No. 673,818
Claims priority, application France, Apr. 7, 1975, 75.10741
Int. Cl.² G01J *1/20*
U.S. Cl. 250—203 R **9 Claims**



1. In a radiant energy system for discriminating between radiation from a target and ambient radiation, the combination of: optical receiver means comprising an optical objective for focusing the said radiation originating from an observed field, an optical splitter device for producing two optical channels, a first optical filter in a first of said channels having a pass-band corresponding substantially to the said target radiation spectrum, a second optical filter in the second of said channels having a pass-band corresponding to a portion of the said ambient radiation spectrum and outside the target spectrum and optical attenuating means for balancing the ambient radiation levels in the two channels; reticle means for modulating the focused radiation by means of grids comprising, in a plane, transparent zones separated by opaque zones said grids being moved substantially in the focal plane of said optical objective in a direction transverse to that of the optical axis of said objective; photodetection means behind said reticle means for detecting the modulated and filtered radiation and a circuit for processing the detected signals; the said optical splitter device producing in combination with said objective two images of the said field, one for each channel, which are staggered in the plane of the grids in the said direction by an amount substantially equal to the diameter of the target image, the dimension of the said zones in this direction being a multiple of and at least equal to this diameter.

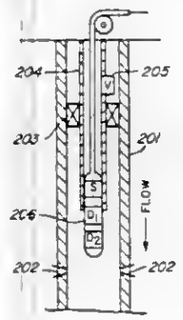
4,028,545
METHOD OF SIMULATING SPHERICAL VOIDS FOR USE AS A RADIOGRAPHIC STANDARD
Billy E. Foster, Oak Ridge, Tenn., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.
Filed Feb. 17, 1976, Ser. No. 658,806
Int. Cl.² G01D *18/00*
U.S. Cl. 250—252 **2 Claims**



1. A method of providing radiographic standards for weld voids comprising the step of radiographing a bead of low atomic number material of a desired size which bead is encased in etched, identical, opposing hemispheres of two plates

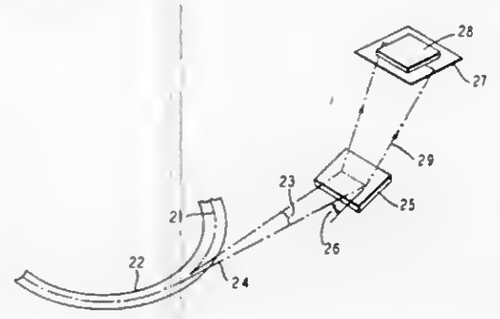
of welding material bonded together, said bead being at a first given distance from an X-ray film, and repeating the above step a plurality of respective times using various other proportional distances between the bead and other X-ray films, whereby the resulting radiographs serve as standards for use in quality control comparisons of voids in actual welds.

4,028,546
BEHIND WELL CASING WATER FLOW DETECTION SYSTEM
Harold E. Peelman, and Oble M. Langford, both of Houston, Tex., assignors to Texaco Inc., New York, N.Y.
Filed Nov. 3, 1975, Ser. No. 628,172
Int. Cl.² G01V *5/00*
U.S. Cl. 250—266 **12 Claims**



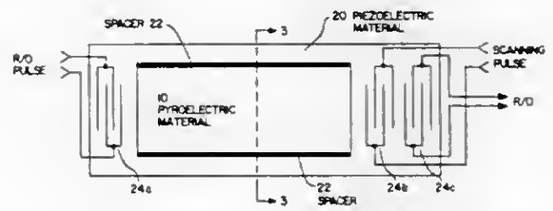
1. Apparatus for detecting undesired behind casing water flow in a producing well comprising:
a modular downhole sonde assembly sized and adapted for passage through a cased well borehole, said modular assembly being fluid tight and pressure resistant when assembled and having at least three modules comprising a first module housing a source of high energy neutrons capable of providing a flux of high energy neutrons at least some of which have energy sufficient to cause the nuclear reaction O^{16} (n,p) N^{16}, a second module housing at least two longitudinally spaced gamma ray detectors and a neutron shielding means for reducing direct irradiation of said detectors ' y said source, and a third module housing control and signal transmission electronic systems for controlling said source or said detectors and for transmitting signals from said sonde to and from surface equipment, said first and second modules being arranged so that they may be connected to each other in end to end relationship with either said first module or said second module above said first module while maintaining approximately the same longitudinal spacing between said source and said detectors.

4,028,547
X-RAY PHOTOLITHOGRAPHY
Peter Michael Eisenberger, Morristown, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed June 30, 1975, Ser. No. 591,695
Int. Cl.² H01J *37/00*
U.S. Cl. 250—272 **3 Claims**



1. Method of photolithographic processing comprising directing a beam of electromagnetic radiation in the wavelength range 1 A to 50 A through a shadow mask, against a device precursor consisting of a substrate and an image forming layer, sensitive to the radiation, producing a change in the cohesiveness of the irradiated portion of the layer **CHARACTERIZED IN THAT** the radiation is directed against the device precursor by means of Bragg reflection from an inhomogeneously reflecting crystalline body, which inhomogeneously reflecting crystalline body consists of a multitude of crystallites whose angular spread of crystalline orientation is from 10^{-4} radians to 10^{-1} radians of angle, which radiation is synchrotron radiation and which crystalline body is shaped so as to compensate for the angular deviation of the synchrotron radiation and produce a more nearly parallel beam.

4,028,548
IR IMAGING WITH SURFACE WAVE READOUT
Marion L. Scott, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.
Filed Mar. 29, 1976, Ser. No. 671,234
Int. Cl.² H01J *31/49*
U.S. Cl. 250—330 **8 Claims**

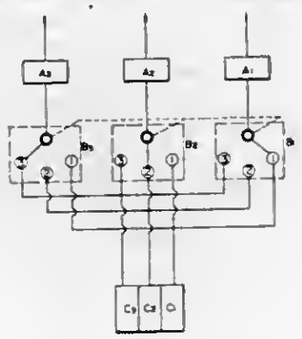


1. A device for IR imaging with surface wave readout comprising:
a pyroelectric stratum which is doped with an impurity to obtain a free carrier concentration in said stratum the free carriers being repelled from the surface of said stratum by a surface charge to form a depletion layer, the density of said surface charge being a function of the temperature of the incident radiation from an IR image;
a piezoelectric substrate parallel to the pyroelectric stratum and separated from it by spacers;
first means for propagating a first acoustic surface wave in the piezoelectric substrate, said wave transversing the substrate such that the electric field of the wave penetrates the pyroelectric stratum;
second means for propagating a second acoustic surface wave in the piezoelectric substrate, said second means located at the opposite end of the substrate from the first means so that second acoustic surface wave travels in the opposite direction from the first acoustic surface wave so as to amplitude modulate the first wave; and
output means for observing the amplitude modulated first wave after it has transversed the pyroelectric stratum located at the same end of the piezoelectric substrate as the second propagating means.

4,028,549
SYNCHRONIZED ACCUMULATING RADIODETECTOR
Shigeo Baba, 7649 Fuchu, Tokyo 183, Japan
Filed Dec. 8, 1975, Ser. No. 638,631
Claims priority, application Japan, Dec. 6, 1974, 49-140719
Int. Cl.² G01T *1/18*
U.S. Cl. 250—336 **1 Claim**

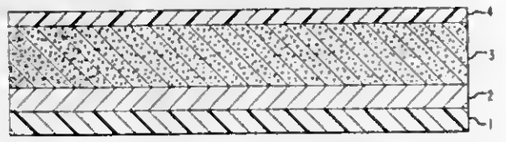
1. A synchronized accumulating radiodetector comprising of a series of counting tubes of equal inner volume, a switching assembly synchronizing with the flow speed of radioactive substance traveling through or along side of said counting tubes, counting accumulators for the detected radioactivity

and an associated output system, wherein said counting tubes are longitudinally connected to each other at a fixed distance



and said switching assembly is composed of a series of switching devices each provided at the corresponding counting tube.

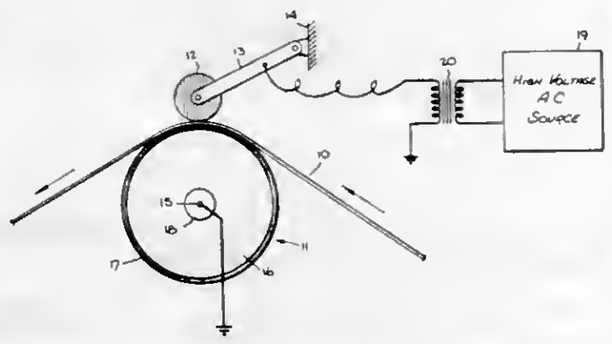
4,028,550
X-RAY SCREENS
James Paul Weiss, Westfield, N.J., and Edward Dyal Smith, Towanda, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.
Filed Dec. 22, 1975, Ser. No. 642,714
Int. Cl.² H01J 1/62; C09K 11/12
U.S. Cl. 250—483 **12 Claims**



1. A luminescent composition comprising a mixture of a europium-activated barium fluorohalide phosphor and an aminocoumarin brightening agent in a binder.

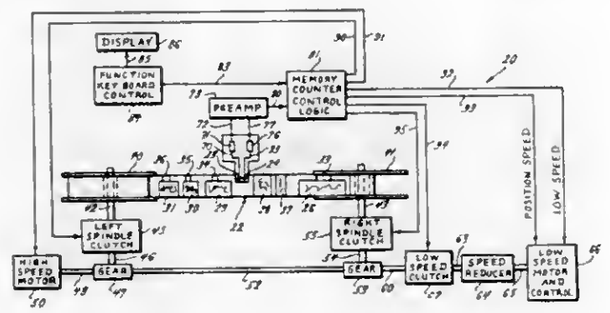
5. An X-ray screen comprising a support bearing a thin layer of europium-activated Ba fluorohalide phosphor mixed with an aminocoumarin brightening agent and dispersed in a film-forming binder.

4,028,551
APPARATUS AND METHOD FOR CORONA DISCHARGE PRIMING A DIELECTRIC WEB
Kenneth P. Thompson, Canton, N.C., assignor to Champion International Corporation, Stamford, Conn.
Filed Oct. 17, 1975, Ser. No. 623,468
Int. Cl.² H01T 19/04; B01K 1/00
U.S. Cl. 250—531 **3 Claims**



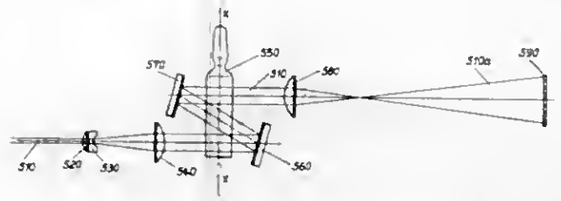
1. Apparatus for corona priming a dielectric web substrate for adhesion to plastic material comprising first and second rolls mounted for rotation on parallel axes, at least one of said rolls being mounted for biased movement towards the other roll, means for training said web between the nip of said first and second rolls for rolling engagement by both of said rolls, one of said rolls having as its entire web engaging surface the radially outer surface of a thin layer of dielectric material and means for effecting electrically conductive contact with substantially the entire radially inner surface of said dielectric layer, the other of said rolls having its entire web engaging surface formed of electrically conductive material, and means for supplying a corona producing voltage between said conductive material and said means for effecting conductive contact.

4,028,552
IMAGE COUNTER
Joseph A. Volk, Jr., Florissant, Mo., assignor to Beta Corporation, Bridgeton, Mo.
Division of Ser. No. 524,034, Nov. 15, 1974, abandoned. This application June 11, 1976, Ser. No. 695,168
Int. Cl.² G06K 7/10
U.S. Cl. 250—570 **18 Claims**



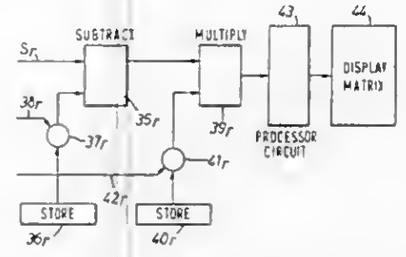
1. In an image counter having means for driving a film having image means thereon in a forward and reverse direction past a sensing means, said image means being defined from other areas of the film by the amount of light that passes therethrough, an automatic control system comprising at least two light sensing means located on one side of the film, one such light sensing means located at least in part ahead of the other relative to the direction of film travel, means for directing light toward the sensing means from the side of the film opposite the light sensing means such that the amount of light impinging on a sensing means varies as the various areas of the film pass between the light directing means and said light sensing means, whereby at least a portion of one of the light sensing means receives a change in the amount of light before any portion of the other light sensing means as each of the image means on the film moves past in either direction, an electrical circuit means, means associated with the electrical circuit means for generating a first electrical signal responsive to the change of light impinging on one of the sensing means, and for generating a second electrical signal in response to the change of light impinging on the other sensing means said first signal being out-of-time phase with said second signal in proportion to the distance the one sensing means is located ahead of the other relative to the direction of film travel, means responsive to a first signal relationship at one instant of time of the out-of-time phase signals for determining the direction of count corresponding to the direction of film travel, means responsive to a second signal relationship at another instant of time of the out-of-time phase signals for counting each image means as it moves past in the determined direction, and means responsive to said first and second electrical signals for stopping the film on a selected image.

4,028,553
APPARATUS FOR CONTROLLING PHARMACEUTICAL AMPOULES
Michel Farcinade, 19, rue des Delices, 1203 Geneva, Switzerland
Filed June 17, 1975, Ser. No. 587,759
Claims priority, application Switzerland, June 27, 1974, 8874/74; May 26, 1975, 6680/75
Int. Cl.¹ G01N 21/26
U.S. Cl. 250—576 **1 Claim**



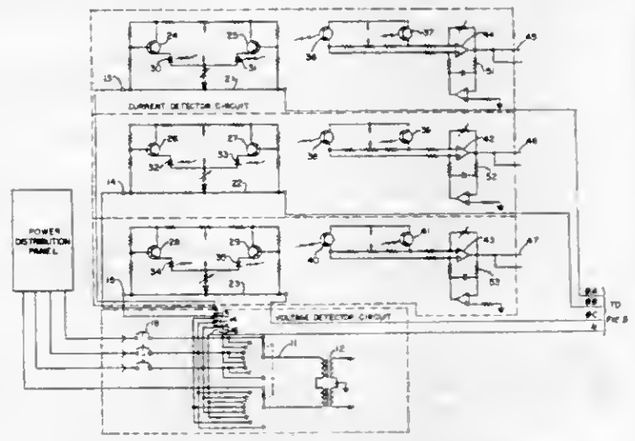
1. An apparatus for examining pharmaceutical ampoules containing an injectable liquid, comprising means for holding an ampoule vertically and for rotating the ampoule prior to an examination and holding it without rotation during the examination, a laser source, optical imaging means between said source and the ampoule to produce a laser beam in a vertical plane passing through the whole length of the ampoule, a multiplicity of photoelectric cells disposed to each receive at least a part of the beam having passed through the ampoule, and electrical means influenced by those cells having received light from the laser beam, for emitting a perceptible signal when the beam intercepts a solid particle in the liquid of an ampoule while the ampoule is at rest, said imaging means having a focal point and a numerical aperture enabling a focalization to produce an Airy spot for a conical beam of maximum length and minimum conicity, and said imaging means comprising a spherical beam-inlet lens and a cylindrical beam-outlet lens arranged to project a luminous bar in a focal axis at the center of an ampoule to be examined, the bar thickness being substantially that of the Airy spot at the focus of each spherical lens and at least one oblique mirror arranged in the path of the beam so that the beam passes through the ampoule at least two times each time at a different location.

4,028,554
RADIOLOGY
Godfrey Newbold Hounsfield, Newark, England, assignor to EMI Limited, Hayes, Middlesex, England
Filed June 5, 1975, Ser. No. 584,172
Claims priority, application United Kingdom, June 7, 1974, 25361/74
Int. Cl.² G01M 23/00
U.S. Cl. 250—445 T **10 Claims**



1. Radiological apparatus comprising source means for irradiating a body along a plurality of substantially co-planar paths, detector means for detecting the amount of radiation emergent from the body along each of said paths and for producing output signals indicative thereof, attenuator means, disposed between said source means and said detector means, constructed of regions of different thickness so as to substantially reduce variations in said output signals due to different lengths of said paths within said body, the material of said attenuator means being such as to alter, as a result of said different thickness, the spectrum of said radiation, and whercin means are provided for operating on said output signals to substantially reduce variations therein due to changes in the amount of radiation detected by said detector means attributable to said alteration in sprectrum.

4,028,555
POWER INTERRUPT TEST EQUIPMENT
Paul John O'Brien, Northfield, N.J., assignor to the United States of America as represented by the Secretary of the Department of Transportation, Washington, D.C.
Filed Nov. 17, 1975, Ser. No. 632,214
Int. Cl.² H01H 9/54
U.S. Cl. 361—76 **8 Claims**

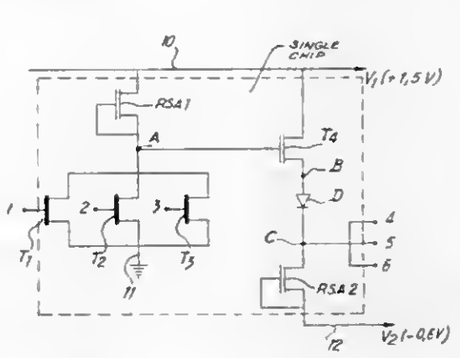


1. A method of determining power interrupted and restoration performance characteristics of electrical equipment comprising the steps of,

detecting the waveforms of the applied power, producing a control signal synchronous with selected phase angles of said waveforms,

and applying said signal to an electronic switch interconnecting said applied power to electrical equipment, whereby the power is interrupted at said selected phase angles.

4,028,556
HIGH-SPEED, LOW CONSUMPTION INTEGRATED LOGIC CIRCUIT
Gérard Cachier, and Jean Paul Puron, both of Paris, France, assignors to Thomson-CSF, Paris, France
Filed Mar. 12, 1975, Ser. No. 557,784
Claims priority, application France, Mar. 12, 1974, 74.08256
Int. Cl.² H03K 19/08, 19/34, 19/36
U.S. Cl. 307—205 **3 Claims**



1. An integrated logic circuit, comprising a plurality of semiconductor elements on a single chip,

a. said plurality of elements include a plurality of input field effect transistors with gates for separately receiving

"high" and "low" logic potential levels symmetrical with respect to the ground potential level, sources connected to the ground terminal, and drains in common connected through a first node and a first saturable load to a first supply source of a predetermined polarity;

b. wherein said input transistors have a first threshold voltage;

c. wherein said plurality of elements further include an output field effect transistor with its gate connected to said first node, its drain directly connected to said first supply source and its source connected to a second node through a diode, said second node being connected through a second saturable load to a second supply source whose polarity is opposite to the polarity of said first supply source;

d. wherein said output transistor has a second threshold voltage greater in absolute magnitude than said first threshold voltage;

e. wherein said second node constitutes the output terminal of the logic circuit on which are to be collected output potential levels respectively corresponding to said "high" and "low" logic potential levels received at the gate of any input field effect transistor;

f. wherein said first and second threshold voltages are arranged so that said output potential levels are the opposite of the algebraic values of said "high" and "low" logic potential levels and of the same absolute magnitude.

4,028,557

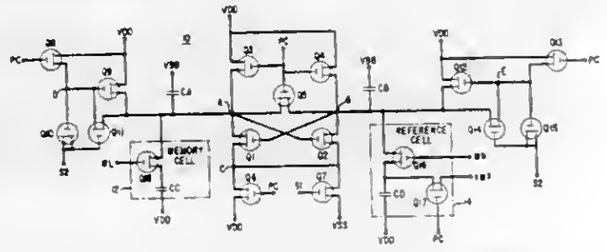
DYNAMIC SENSE-REFRESH DETECTOR AMPLIFIER

Dennis Robert Wilson, Allentown, Pa., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 21, 1976, Ser. No. 688,586

Int. Cl.² H03K *5/20, 3/286, 3/353;* **G11C** *7/06*

U.S. Cl. 307—362 **5 Claims**



1. A sense-refresh detector comprising:

first and second switching devices, each device having a control terminal and first and second output terminals;

first and second input/output terminals, the first output terminal of the first device and the control terminal of the second device being coupled to the first input/output terminal and the first output terminal of the second device and the control terminal of the first device being coupled to the second input/output terminal,

voltage equalization circuit means coupled to both input-/output terminals for periodically essentially equalizing the potentials of both input/output terminals;

first and second essentially identical load-refresh circuits, each load-refresh circuit comprising a capacitor circuit means having first and second terminals and third, fourth, and fifth switching devices each having a control terminal and first and second output terminals;

the control terminal of the third device of each load-refresh circuit being coupled to the first output terminal of the fourth device, the second output terminal of the fifth device, and the second terminal of the capacitor circuit means;

the second output terminals of the third and fourth devices being coupled together and being coupled to one input-/output terminal;

voltage setting circuit means being coupled to the second output terminals of the first and second devices for periodically setting the potential of said terminals to a preselected potential; and

conductive enabling circuit means being coupled to the second output terminals of the first and second switching devices for periodically facilitating conduction through the first and/or second switching device.

4,028,558

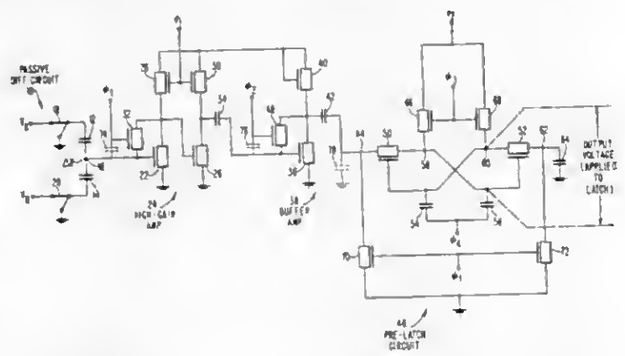
HIGH ACCURACY MOS COMPARATOR

Lawrence Griffith Heller, Brewster; Lewis Madison Terman, South Salem, and Yen Sung Yee, White Plains, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 21, 1976, Ser. No. 698,622

Int. Cl.² H03K *5/20, 3/353;* **H03F** *3/16;* **H04B** *15/00*

U.S. Cl. 307—355 **8 Claims**



1. A voltage comparator comprising

a differencing circuit for producing a difference signal indicating the polarity of the difference between two input signals,

an amplifier having an input node for receiving said difference signal and an output node for manifesting an amplified signal,

first switching means effective when placed in a first state to establish a biasing connection for setting said amplifier at a predetermined operating point which will be maintained after such connection is interrupted and effective when placed in a second state to interrupt such connection, leaving said amplifier biased at said operating point,

output circuitry for receiving signals manifested at the output node of said amplifier, said output circuitry including at least one stage which can be set to a first condition wherein it is incapable of responding to any signal manifested at said amplifier output node and settable thereafter to an alternative condition in which it is responsive to such a signal,

second switching means effective when placed in a first state to set said output stage in said first condition thereof and effective when placed in a second state to set said output stage in an alternative condition wherein it responds to the amplifier output signal,

and control means for causing said first switching means and said second switching means to operate in a timed relationship such that said second switching means is in its first state at the time when said fist switching means changes from its first state to its second state, whereby said output stage assumes its first condition during the time when a transient signal is being generated by interruption of the biasing connection in such amplifier and thereafter assumes an alternative condition responsive to the amplified difference signal at a time when said transient signal does not exist.

4,028,559

REGENERATIVE REPEATER CIRCUIT ARRANGEMENT FOR USE IN DIGITAL DATA TRANSMISSION SYSTEMS

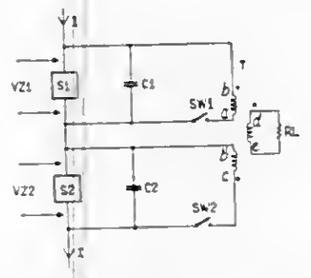
Douglas Stanley Larner, Maidenhead, England, assignor to Plessey Handel und Investments A.G., Switzerland

Filed Jan. 9, 1976, Ser. No. 647,733

Claims priority, application United Kingdom, Jan. 10, 1975, 1047/75

Int. Cl.² H03K *17/64*

U.S. Cl. 307—246 **3 Claims**



1. A transformer-coupled bi-polar pulse generating output stage for use in a digital data line transmission regenerative repeater generating half-width output pulses from a line-powered constant current power feed, said output stage comprising;

an output transformer having two primary windings and a secondary winding, the secondary winding connecting the output stage to the digital data line,

a pair of pulse generating switching device means for generating bi-polar pulses, each switching device means connected in series with a separate one of said primary windings,

a pair of reservoir capacitors, each reservoir capacitor connected in parallel with a separate primary winding and switching device means series circuit,

means for connecting each of said reservoir capacitors in series so that the reservoir capacitors are charged in series by the constant current power feed, and

means for stabilising a voltage drop across each primary winding and switching device means series circuit, comprising a pair of shunt stabiliser devices each connected in parallel with a separate reservoir capacitor.

4,028,560

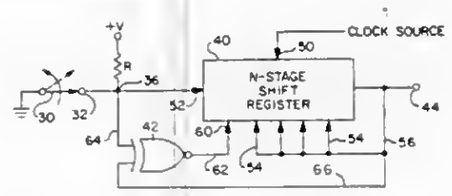
CONTACT BOUNCE TRANSIENT PULSE CIRCUIT ELIMINATOR

James R. Bainter, Scottsdale, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 439,503, Feb. 4, 1974, abandoned. This application Oct. 8, 1975, Ser. No. 620,676

Int. Cl.² H03K *17/56, 5/01*

U.S. Cl. 307—247 A **5 Claims**



1. A circuit for eliminating contact bounce comprising:

a. a single line for transmitting input signals, said input signals comprising a first level and a second level and transient pulses associated therewith, said first and second levels being mutually distinct;

b. logic and memory circuit means having an input terminal and an output terminal, said input terminal being connected to said single line for receiving said input signal at time tO;

c. said logic and memory means being selectively responsive to said input signal for eliminating said transient pulses associated with either said first and second level and for generating a desired output signal level at time, tl, at said output terminal after a predetermined time period, T, said output signal level being representative of said input signal received at tO, where $T = tl - tO$;

d. said logic and memory circuit means further comprising a logic means and a memory means;

e. means for connecting said output terminal to said logic means and to said memory means;

f. said logic means being responsive to compare said input signals and said output signal levels for selectively generating first and second control signals;

g. means for connecting said first and second control signals to said memory means;

h. said memory means being selectively responsive to said first control signal for generating and storing a representation of said input signal and transmitting said representation signal to said output terminal after said predetermined time period, T, for changing the output signal level;

i. said memory means being selectively responsive to said second control signal for maintaining said output terminal at its existing output signal level;

j. said memory means further comprising a shift register having N stages, a serial input terminal, N parallel input terminals, and a serial-parallel write mode select terminal, said serial-parallel write mode select terminal being connected to said logic means;

k. said serial-parallel write mode select terminal being responsive to said first control signal for storing and shifting said representation signal through said N stages in a serial mode for changing said output signal level; and

said serial-parallel write mode select terminal being responsive to said second control signal for writing the existing output signal level into said N stages for maintaining said output terminal at its existing output signal level.

4,028,561

FAST SWITCHING DARLINGTON CIRCUIT

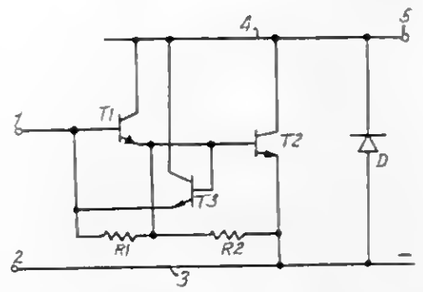
Christopher T. Black, Bedford, and Anthony Lear, Huntingdon, both of England, assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 23, 1976, Ser. No. 669,585

Claims priority, application United Kingdom, Mar. 25, 1975, 12373/75

Int. Cl.² H03K *17/00*

U.S. Cl. 307—300 **6 Claims**



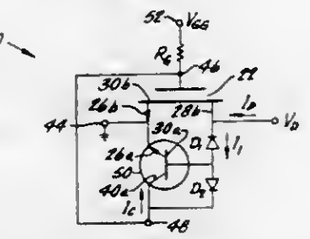
1. A fast switching darlington output circuit having a driver transistor and an output transistor in darlington connection; a first resistor connected between the base and emitter of the driver transistor; a second resistor connected from the emitter of the driver transistor to the emitter of the output transistor; and a speed-up transistor of very low gain having a collector commoned with the collectors of the driver and output transistors, a base connected to the emitter of the driver transistor and an emitter connected to the base of the driver transistor.

4,028,562

NEGATIVE IMPEDANCE TRANSISTOR DEVICE

Rainer Zuleeg, Huntington Beach, Calif., assignor to McDonnell Douglas Corporation, Long Beach, Calif.

Filed June 16, 1975, Ser. No. 587,093
Int. Cl.² H03K 17/60; H03B 17/00
U.S. Cl. 307—303 10 Claims



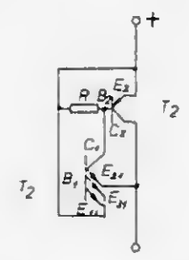
1. A transistor device providing high gain performance and exhibiting negative impedance characteristics, said transistor device comprising:
an enhancement mode insulated gate field effect transistor including a substrate region, a dielectric gate positioned over said substrate region, a source region, and a drain region which is spaced from said source region;
a bipolar transistor structurally integral with said field effect transistor and including a base, an emitter, and a collector;
a bulk region serving as said collector, said substrate region serving also as said base, and said source region serving also as said emitter;
a pn-junction located in proximity to said source and drain regions, said substrate region being separated by said pn-junction from said bulk region and left floating as said base of said bipolar transistor, and said substrate region common to said field effect and bipolar transistors causing interaction therebetween to provide said high gain performance and generate said negative impedance characteristics; and
a source and emitter contact to said source region, a drain contact to said drain region, and a collector contact to said bulk region, said collector contact being normally connected to said gate.

4,028,563

INTEGRATED ZENER DIODE

Ulrich Geisler, Gundelfingen-Wildtal, Germany, assignor to ITT Industries, Inc., New York, N.Y.

Filed June 25, 1976, Ser. No. 699,751
Claims priority, application Germany, July 23, 1975, 2532847
Int. Cl.² H03K 3/26; H01L 29/72, 27/02
U.S. Cl. 307—303 7 Claims



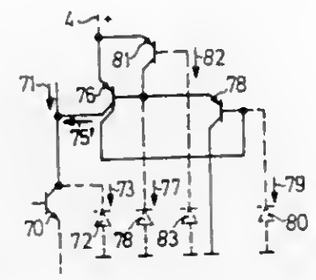
1. An integrated zener diode, comprising:
a first forward-biased load transistor having an emitter, base and collector;
a resistor; and
a second transistor having a collector, base and a plurality of emitters, the base of said first transistor coupled to the collector of said second transistor and, via said resistor, to the emitter of said first transistor and a first emitter of said plurality of emitters, the collector of said first transistor coupled to a second emitter of said plurality of emitters.

4,028,564

COMPENSATED MONOLITHIC INTEGRATED CURRENT SOURCE

Klaus Streit, Tubingen; Adolf Kugelmann, Leonberg, and Hartmut Seiler, Reutlingen, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Division of Ser. No. 289,161, Sept. 14, 1972, abandoned. This application June 13, 1974, Ser. No. 478,974
Claims priority, application Germany, Sept. 22, 1971, 2147179
Int. Cl.² H01L 27/06
U.S. Cl. 307—310 3 Claims



1. Monolithic integrated current source comprising:
a source of power;
a first NPN transistor (70) on a substrate (13), the emitter of which is connected to the negative terminal (2) of said power source, said first NPN transistor (70) having a trough remainder current (73); and
a compensating circuit monolithically integrated on said substrate and connected to the collector of said first NPN transister (70) to compensate said trough remainder current (73) of said NPN transistor (70), said compensation circuit comprising:
a first lateral PNP transistor (76) having two collectors, the first collector of said first lateral PNP transistor (76) being connected to the collector of said first NPN transistor (70), and the emitter of said first lateral PNP transistor (76) being connected directly to the positive terminal (4) of said power source;
a second PNP transistor (78), the emitter of said second PNP transistor (78) being connected to the base of said first lateral PNP transistor (76), the base of said second PNP transistor (78) being connected to the second collector of said first PNP transistor (76), and the collector of the second PNP transistor (78) being connected to said substrate (13); and
a third PNP transistor (81), the base of which is left unconnected, the collector of said third transistor (81) being connected to the base of said first PNP transistor (76) and to the emitter of said second PNP transistor, and the emitter of said third transistor (81) being connected directly to the positive terminal (4) of said power source.

4,028,565

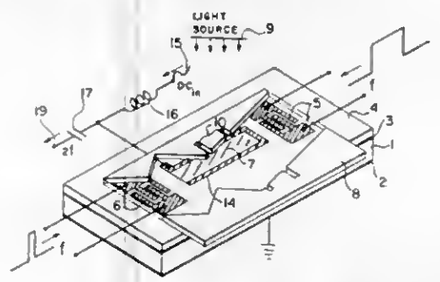
SEMICONDUCTOR VISIBLE IMAGE STORAGE DEVICE

Kenneth L. Davis, Fairfax, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 27, 1975, Ser. No. 591,191
Int. Cl.² H01L 27/20, 31/00
U.S. Cl. 307—311 10 Claims

1. An optical storage system comprising:
a semiconductor substrate having first and second surfaces;

a metal film deposited over the first surface and coupled to ground;
an insulating layer deposited over the second surface;
a piezoelectric semiconductor layer deposited over the surface of the insulating layer having a resistivity enabling the storage of charge patterns;
a semitransparent electrode layer coupled to the surface of said piezoelectric semiconductor layer;



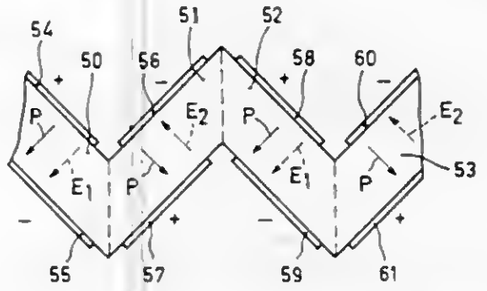
means for applying a bias voltage across said electrode and ground; and
means for projecting an optical image through said semitransparent electrode such that a charge pattern is injected and stored in said piezoelectric layer causing a corresponding accumulation or depletion of charge in said semiconductor substrate.

4,028,566

ELECTROACOUSTIC CONVERSION DEVICE HAVING A DIAPHRAGM COMPRISING AT LEAST ONE OF A PIEZOELECTRIC POLYMER MATERIAL

Nico Valentinus Franssen, Eindhoven, and Frans Josef Maria Frankort, Bocholtz, both of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 23, 1976, Ser. No. 660,696
Claims priority, application Netherlands, Mar. 3, 1975, 7502453
Int. Cl.² H01L 41/04
U.S. Cl. 310—9.5 10 Claims



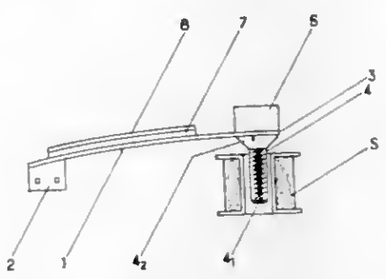
1. A device for converting an electric voltage into acoustic vibrations and vice versa comprising, a diaphragm including at least one layer of a piezo-electric polymer material which is polarized in a transverse direction and which at either side is provided with electrodes, the diaphragm being undulated in at least one orthogonal section, characterized in that each flank of the undulation is polarized in the same direction over its entire width, and in the operating condition the direction of the applied electric field is alternately parallel and anti-parallel relative to the polarizing directions in adjacent flanks.

4,028,567

ELECTROMAGNETIC VIBRATION-DETECTOR DEVICE, IN PARTICULAR FOR ANTI-THEFT PURPOSES

Jean Maillot, Paris, France, assignor to Paulette Guterman, Gif sur Yvette, France

Filed Apr. 9, 1976, Ser. No. 675,513
Claims priority, application France, Dec. 23, 1975, 75.39550
Int. Cl.² H02K 35/06
U.S. Cl. 310—25 8 Claims



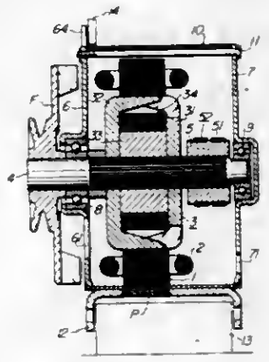
1. An electromagnetic vibration-detector device for anti-theft purposes, comprising a winding, a plunger core in the interior of the winding, a vibrating blade, means for fixing the core to the free end of the blade with the core extending into the winding and being free to vibrate with the blade, means for rigidly securing the other end of the vibrating blade relative to the winding, a thickness of cellular material, and means for securing the cellular material on at least one of the faces of the blade, said thickness of cellular material comprising on its free face a sheet of flexible material.

4,028,568

AC GENERATOR FOR VEHICLES

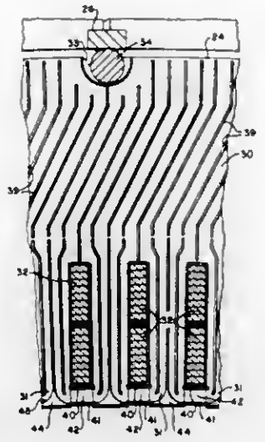
Hideo Tatsumi, Mito, and Yasushi Ohuchi, Katsuta, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Oct. 29, 1975, Ser. No. 626,991
Claims priority, application Japan, Oct. 30, 1974, 49-124470
Int. Cl.² H02K 15/16
U.S. Cl. 310—42 3 Claims



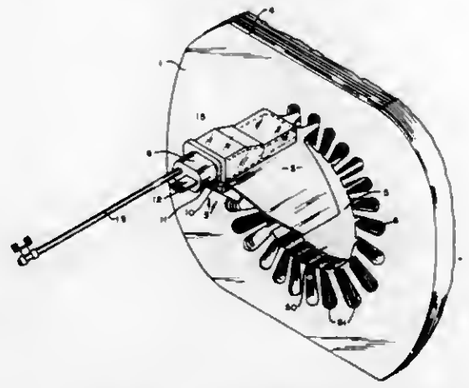
1. In an ac generator driven by the engine of a vehicle comprising a stator including a stator core, a stator winding wound around said stator core, and a stator frame surrounding said stator core, and a rotor including rotary magnetic poles and a field winding and rotatably supported within said stator frame, the improvement wherein said stator frame comprises
a pair of steel plate end covers and a steel plate cylindrical casing confined between said steel plate end covers, and further comprising
a U-shaped generator mounting seat affixed to said stator frame and wherein
said stator core, end covers, cylindrical casing and U-shaped seat are welded together as an integral unit.

4,028,569
VENTILATION SYSTEM FOR DYNAMOELECTRIC MACHINES
Raymond A. Towne, Penn Hills, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed June 16, 1975, Ser. No. 587,766
Int. Cl.² H02K *3/24*
U.S. Cl. 310—64 **7 Claims**



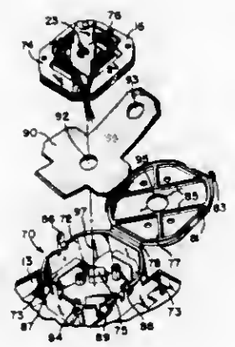
1. A dynamoelectric machine having a stator member and a rotor member separated by an air gap, said rotor member having salient poles and a ventilation system sealed off from the air gap, said stator member including a cylindrical stator core having a central bore with teeth extending longitudinally of said bore to form slots, a plurality of longitudinally spaced vent ducts extending radially through the core, stator windings disposed in said slots, means including two radially spaced members extending through each of the slots for defining longitudinal ducts extending through the slots adjacent the air gap and communicating with said radial vent ducts, means for sealing said longitudinal ducts and radial vent ducts from the air gap, and means for causing ventilating gaseous fluid to flow radially in said vent ducts and longitudinally in said longitudinal ducts from one vent duct to the next.

4,028,570
SELF LOCKING MOLDED THERMOSTAT STRAP
Vernon E. Kieffer, St. Louis, and Billy L. Damon, Manchester, both of Mo., assignors to Emerson Electric Co., St. Louis, Mo.
Filed June 18, 1975, Ser. No. 587,823
Int. Cl.² H02K *11/00*
U.S. Cl. 310—68 C **11 Claims**



1. A device for use in a motor having a stator assembly, said stator assembly including a core having a plurality of winding receiving slots formed in it, comprising:
a molded part having at least one side wall defining a receptacle well in the molded part, the molded part having a main body area, said receptacle well being located in said main body area;
means for releasably locking a protecting device in said receptacle well including at least one locking tab integrally formed along said main body area, said locking tab being mounted for movement between a first position for holding the protecting device in said receptacle well, and a second position for releasing the protecting device, said locking tab being biased toward said first position; and
means for positioning said molded part with respect to the slots of said stator assembly, said positioning means being inserted in the winding receiving slots of said stator assembly.

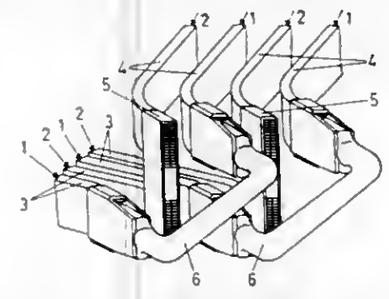
4,028,571
CONTROL MECHANISM FOR REMOTELY MOUNTED MOTOR
Paul A. Dicke, New Bremen, Ohio, assignor to Crown Controls Corporation, New Bremen, Ohio
Filed Feb. 25, 1976, Ser. No. 661,319
Int. Cl.² H02K *5/04*
U.S. Cl. 310—89 **9 Claims**



1. In a control mechanism for a remotely mounted motor comprising
a housing containing an indicator motor, an indicator dial rotatable by said motor, switch means, and a dial assembly for operating said switch means to control the direction of rotation of said motor,
the improvement characterized by
said housing including a base member and a cover,
a motor housing integrally molded within said base member and including
upwardly extending side wall means for orienting and holding said motor in place,
interior bosses for supporting the weight of said motor and to position said motor vertically,
a cover member for said motor housing including means therein defining an opening through which the shaft of said motor extends, and
means for securing said motor housing cover member against said side wall means to hold said motor within said housing.

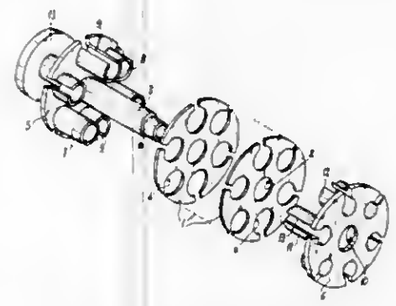
4,028,572
STATOR WINDING STRUCTURE FOR DYNAMO-ELECTRIC MACHINE
Kurt Baltisberger, Birr, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland
Filed May 7, 1975, Ser. No. 575,151
Claims priority, application Switzerland, May 20, 1974, 6855/74
Int. Cl.² H02K *3/04*
U.S. Cl. 310—201 **3 Claims**

1. A stator winding arrangement for a polyphase synchronous electrical machine of the pole-changeable type comprising first and second windings encased within each other and distributed in alternation in upper and lower layers in the stator slots, the respective pitches of said windings differing by an even number of slots, each said winding being composed of rigid conductor rods and including axially projecting ends to be interconnected, at least some of the ends of the rods of said first winding in a lower layer being connected to the ends of



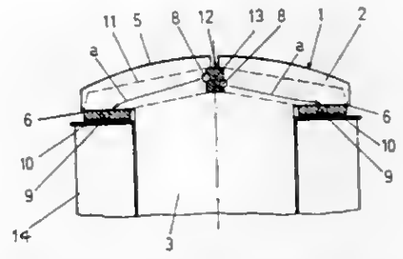
the rods of that winding in an upper layer by means of straight eye rods and at least some of the ends of the rods of said second winding in a lower layer being connected to the ends of the rods of that winding in an upper layer by means of oblique eye rods located axially outward from and which extend around said straight eye rods.

4,028,573
ROTOR FOR AN ELECTRICAL MACHINE
Andre Terrone, Romans, France, assignor to Societe Anonyme des Equipements S.E.I.M., Romans, France
Filed Apr. 26, 1976, Ser. No. 680,169
Claims priority, application France, Apr. 29, 1975, 75.14050
Int. Cl.² H02K *1/06*
U.S. Cl. 310—217 **10 Claims**



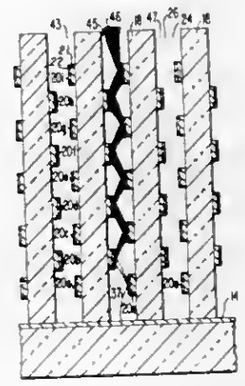
1. A rotor for an electrical machine comprising:
a shaft;
a first flange fixed to said shaft and formed with a plurality of angularly equispaced notches opening toward the periphery of said first flange;
a stack of ferromagnetic sheets on said shaft resting with one side against said first flange and having notches aligned with the notches of said first flange; and
a second flange elastically locked to said shaft and engaging the opposite side of said stack while being formed with a plurality of notches aligned with the notches of said stack, said flanges being formed on their faces turned toward said stack with axially extending alternately long and short hollow lugs received in the notches of said stack, the long hollow lugs of one of said flanges being aligned with the short hollow lugs of the other of said flanges.

4,028,574
SYNCHRONOUS MOTOR STRUCTURE INCORPORATING ROTOR HAVING SOLID POLES
Muzaffer Canay, Birr, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland
Filed Mar. 20, 1975, Ser. No. 560,529
Claims priority, application Switzerland, Apr. 1, 1974, 4497/74
Int. Cl.² H02K *1/24*
U.S. Cl. 310—269 **8 Claims**



1. A synchronous motor structure having a rotor component comprising a longitudinally extending central body portion, a plurality of solid poles extending outwardly from said body portion, each said pole including a shank terminating at its inner end in a claw connection by means of which said pole is secured to said central body portion and a pole shoe located at its outer end, conductor rods extending respectively in a longitudinal direction along opposite sides of said pole below said pole shoe from one end of the pole to the other and thence across opposite ends of the pole towards the center, said conductor rods together with the surface portion of said pole shoe forming single turn quadrature windings providing closed loop conductive paths confined to the pole for currents induced along the pole surface by the time-variable quadrature-field and which causes said currents to close around the quadrature-field, said quadrature windings also forming circuits parallel to the surfaces of said pole which thereby improves the asynchronous torque of the motor at low slip rates and reduces the oscillating torque.

4,028,575
ELECTRON MULTIPLIER IMAGE DISPLAY DEVICE
John A. van Raalte, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.
Filed Nov. 28, 1975, Ser. No. 636,042
Int. Cl.² H01J *43/20, 43/10, 31/48*
U.S. Cl. 313—105 R **11 Claims**



1. An addressable video line generator for a flat image display device comprising:
a substrate;
a planar electron source on one surface of said substrate;
a plurality of substantialy parallel, planar, area electron multipliers on said one surface of said substrate in substantially orthogonal spaced relation to said planar elec-

tron source, each multiplier comprising a substantially linear output aperture and a plurality of dynode members between said electron source and said output aperture for multiplying and controlling the flow of a substantially linear electron beam therebetween, at least one of said dynode members being addressable; and

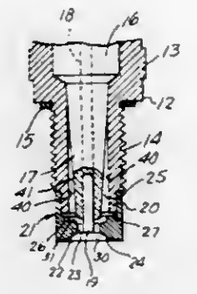
control means for applying an accelerating voltage or an inhibiting voltage to each addressable dynode member and accelerating voltages to the remaining dynode members in response to a control signal.

4,028,576

SONIC SPARK PLUG

David Wolsey, 3368 S. Ulster Court, Denver, Colo. 80231

Filed July 21, 1975, Ser. No. 597,753
Int. Cl.² H01T *13/20*
U.S. Cl. 313—143 **7 Claims**



1. A spark plug comprising a generally tubular conductive main body having a hollow conductive lower end portion exteriorly threaded to engage in an engine block, said hollow end portion having an inwardly projecting rib with a cylindrical inner surface, an insulator axially secured in said main body and having a lower end extending into said hollow end portion, an electrode axially secured in said insulator and having an exposed cylindrical rod-like portion positioned within the space defined by said cylindrical inner surface whereby a ring-like firing space is formed, said hollow end portion being provided with an acoustic cavity above said firing space, defining an acoustic system whose resonant frequency is proportional to the radial width of the ring-like firing space, inversely proportional to the height of the cylindrical inner surface and inversely proportional to the volume of the acoustic cavity, and the values thereof being selected to provide an acoustic resonant frequency of at least ten thousand Hertz, wherein said exposed rod-like portion extends for at least the full height of said cylindrical inner surface of said rib, and wherein said hollow end portion has an annular bottom mouth sloping downwardly and outwardly away from said firing space to define a front horn for said system.

4,028,577

ELECTRIC LAMP WITH INSULATING BASE

Paul E. Gates, Danvers; Stephen F. Kimball, Georgetown, and Stephen J. Leadvaro, Salem, all of Mass., assignors to GTE Sylvania Incorporated, Salem, Mass.

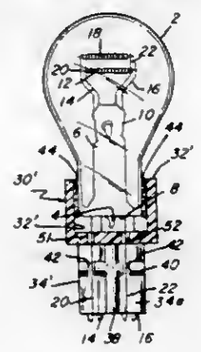
Continuation-in-part of Ser. No. 572,609, April 28, 1975, Pat. No. 3,979,627. This application June 23, 1976, Ser. No. 699,118
Int. Cl.² H01J *5/48, 5/50*
U.S. Cl. 313—318 **10 Claims**

1. An electric lamp comprising, in combination:

an hermetically sealed, light-transmitting envelope containing an energizable source of light and having a sealed portion at one end;

an insulting base member having a cylindrical cavity that is larger than the sealed end portion of said envelope, a wedge-lock portion depending from the bottom of said cavity, said wedge-lock portion having opposed substantially flat sides with locating means, including a transverse lock-in rib, formed on each of said opposed flat sides, and a plurality of channels passing through the bottom of said cylindrical cavity, said sealed end portion of the envelope being secured within said base cavity; and

a plurality of lead-in wires extending through the sealed end portion of said envelope and into the respective channels in the bottom of said cylindrical cavity, each of said lead-in wires having a terminal portion extending outwardly from the bottom of said cavity and proceeding



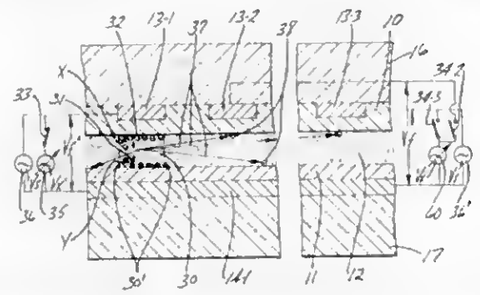
alongside said wedge-lock portion from the top to the bottom thereof, the terminal portion of at least a first one of said lead-in wires extending alongside and approximately parallel to one of said flat sides past the transverse lock-in rib thereon and engaging the bottom of said wedge-lock portion, and the terminal portion of at least a second one of said lead-in wires extending alongside and approximately parallel to the other of said flat sides past the transverse lock-in rib thereon and engaging the bottom of said wedge-lock portion.

4,028,578

GAS DISCHARGE DIELECTRIC CONTAINING A SOURCE OF BORON, GALLIUM, INDIUM, OR THALLIUM

Bernard W. Byrum, Jr.; Michael E. Feln, both of Toledo, and Roger E. Ernsthausen, Luckey, all of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Feb. 16, 1973, Ser. No. 333,091
Int. Cl.² H01J *61/35*
U.S. Cl. 313—221 **20 Claims**



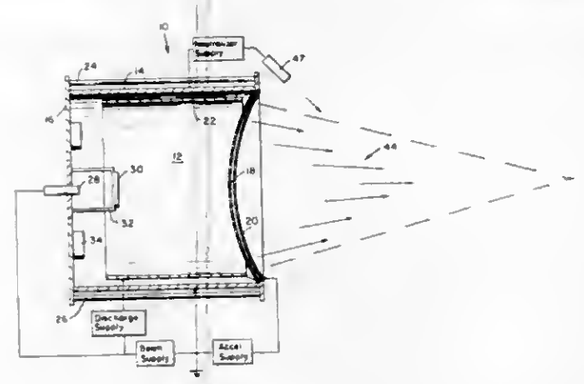
5. In a multiple gaseous discharge display/memory panel having an electrical memory and capable of producing a visual display, the panel being characterized by an ionizable gaseous medium in a gas chamber formed by a pair of opposed dielectric material charge storage members, each of which dielectric members is respectively backed by an array of electrodes, the electrodes behind the opposing dielectric member being oriented with respect to the electrodes behind the opposing dielectric member so as to define a plurality of discrete discharge units, the improvement wherein at least one dielectric member contains a layer of an oxide of gallium.

4,028,579

HIGH CURRENT DENSITY ION SOURCE

Harry J. King, Woodland Hills, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Continuation of Ser. No. 516,718, Oct. 21, 1974, abandoned. This application June 29, 1976, Ser. No. 701,000
Int. Cl.² F03H *5/00;* **H05H** *5/02*
U.S. Cl. 313—361 **8 Claims**



7. An ion source comprising:

an electron bombardment discharge chamber for producing ions of a selected species, said chamber being defined at its outlet by a screen electrode having a plurality of openings therein;

an accelerator electrode positioned adjacent said screen electrode on the opposite side thereof from said discharge chamber, said accelerator electrode having openings therein, said accelerator electrode being connectable to a source of accelerating electric potential so that ions passing through openings in said screen electrode form individual ion beamlets which pass through corresponding openings in said accelerator electrode; and wherein the improvement comprises:

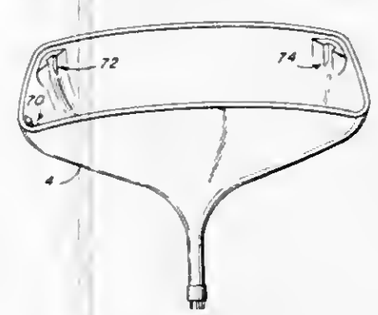
means for positioning said openings in said screen and accelerator electrodes with respect to each other so that said beamlets are each individually directed toward a downstream location to form a selected shaped beam cross section of smaller cross-sectional area at a location downstream from said accelerator electrode than the area at said accelerator electrode to produce a beam at the downstream location having higher current density than at said accelerator electrode.

4,028,580

SHADOW MASK MOUNT AND FUNNEL-FACEPLATE REFERENCING SYSTEM FOR COLOR CRT

Lawrence W. Dougherty, West Dundee, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

Filed Nov. 25, 1974, Ser. No. 527,001
Int. Cl.² H01J *29/07, 31/20*
U.S. Cl. 313—406 **3 Claims**



1. In a rectangular-type color cathode ray tube, the combination comprising:

an approximately rectangular, curved, flangeless faceplate having studs embedded in the four corners thereof and extending from a common concave inner surface of said faceplate, said studs each having a channel shape with a face section flanked by a pair of radially outwardly extending flanges, said studs each having a first end portion embedded in said faceplate and a second portion extending from the faceplate, said second portion having provision in said face section for coupling said stud to a shadow mask, said flanges of said stud constituting spaced faceplate reference surfaces;

a funnel having an approximately rectangular mouth sealed to said faceplate and provided in each of three corners of the mouth in registry with three of said studs, a pair of inside funnel reference surfaces, said pairs of funnel reference surfaces being oriented, located and spaced so as to respectively capture and make referencing engagement with said pairs of faceplate reference surfaces when the faceplate and funnel are mated, said faceplate and funnel reference surfaces uniquely determining the location of said faceplate relative to said funnel; and

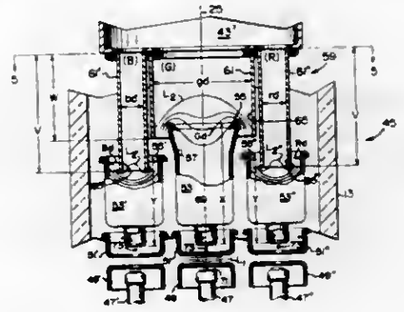
a shadow mask and mounting means on each corner of said mask for retentively engaging said provision on said studs such that said mask is supported adjacent said faceplate inner surface.

4,028,581

PLURAL BEAM ELECTRON GUN ASSEMBLY

Michael G. Stratton, Seneca Falls, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed June 24, 1976, Ser. No. 699,441
Int. Cl.² H01J *29/50, 29/51*
U.S. Cl. 313—414 **9 Claims**



1. A modified cathode ray tube three beam in-line bi-potential electron gun assembly having a longitudinal axis therethrough and including electron generating means formed to emit said respective beams of substantially differing current levels in a substantially common plane coextensive with said axis, said beams being directed from a center and two side-related guns to selectively impinge a spatially related patterned electron responsive screen, said electron gun assembly comprising in sequential order:

cathode means oriented in a common plane;

apertured control electrode means associated with said cathode means oriented in a common plane spatially related thereto;

apertured initial accelerator means positioned adjacent said control electrode means with the apertures thereof being in a common plane proximal to the apertures of said control electrode means;

focusing electrode means each having front and rear apertures with defined electrode lengths therebetween, said rear apertures being in common plane adjacent related apertures of said initial accelerator means, at least one of said focusing electrodes being an alpha member having a front aperture defined by a protruding tubular member having a diameter larger than that of the front apertures of the adjacently related beta focusing electrode members and having a definitive length greater than that of

said beta members to provide an increased object focal length for said alpha focusing electrode, said front alpha aperture being in a plane forward of the respective plane of said related front beta apertures; and

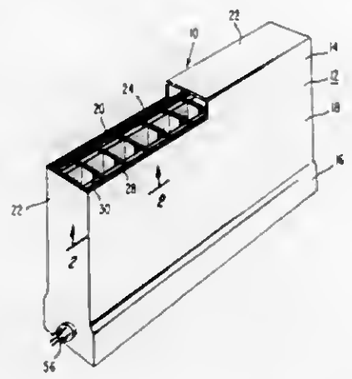
final accelerator means in the form of three in-line cylindrical electrode members each having front and rear apertures with definitive electrode lengths therebetween, said front apertures being in a common plane whereupon a cup-like terminal member is affixed, said cylindrical electrode members being substantially tube-like structures exhibiting at least differing delta and theta diameters and at least differing delta and theta definitive lengths thereby effecting the positioning of the respective rear delta and theta apertures in two parallel planes relative to the respective planes of the front apertures of said alpha and beta focusing electrodes, said delta accelerator member being the shortest in length and evidencing the largest apertural dimension such being larger than that of the related alpha protruding focusing electrode, the terminal portion of said alpha protruding focusing member being spatially and ingressively positioned slightly within the apertural opening of the larger delta accelerator member to provide a partial telescoping arrangement for effecting the forming and shielding of a large focusing lens substantially encompassed within said delta accelerator electrode thereby providing efficient focusing of the beam of highest current level, said side-positioned theta accelerator electrodes being longer cylindrical constructions evidencing rear apertured diameters smaller than said related front apertures of said related beta focusing electrodes wherein said respective theta accelerator members are ingressively oriented to provide a partial telescoping arrangement for effecting the forming and shielding of smaller focusing electrodes thereby providing focusing of the beams of lower current levels.

4,028,582

GUIDED BEAM FLAT DISPLAY DEVICE

Charles Hammond Anderson, Rocky Hill, and Stanley Bloom, Plainfield, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Sept. 22, 1975, Ser. No. 615,353
Int. Cl.² H01J *29/72, 29/08, 31/00*
U.S. Cl. 313—422 **17 Claims**



1. An electron display device comprising

an evacuated envelope having a substantially flat front wall,

a phosphor screen along the inner surface of said front wall,

means in said device for generating a beam of electrons and directing said beam in a first path generally parallel to and across said phosphor screen,

means along said first beam path for selectively deflecting said beam out of said first path at selected points along said first path into a second path extending toward said phosphor screen so that the beam will impinge on said phosphor screen, and

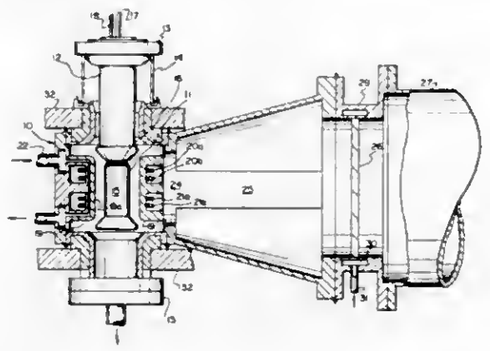
means along said second path for deflecting said beam in a plane transverse to said first path of the beam so that the beam will scan at least a portion of the phosphor screen.

4,028,583

HIGH POWER-DOUBLE STRAPPED VANE TYPE MAGNETRON

Clifford B. Bigham, Deep River, Canada, assignor to Atomic Energy of Canada Limited, Ottawa, Canada

Filed Mar. 10, 1976, Ser. No. 665,621
Claims priority, application Canada, Aug. 7, 1975, 233018
Int. Cl.² H01J *23/22*
U.S. Cl. 315—39.69 **2 Claims**



1. A high power double-strapped, vane-type magnetron comprising:

a. an evacuated housing,

b. an anode structure mounted in the housing and formed of an even number of vanes defining resonant cavities therebetween and at least one pair of circumferential straps passing through openings in the vanes with the straps connected in interleaved relation to alternate vanes, said vanes having cooling channels therein directly behind the anode surface to be bombarded by electrons,

c. a cathode structure mountèd centrally of said anode, said cathode structure comprising a secondary emission cathode surface and a separate starting filament mounted thereon,

d. a coupling slot connecting one of said resonant cavities via a ridged waveguide transition and a window to an output waveguide, and

e. means for applying an axial magnetic field in the region between the anode and cathode.

4,028,584

DRIVING CIRCUIT FOR SELECTING CONTROL CELLS OF A GAS DISCHARGE PANEL BY TRANSISTORS THROUGH DIODES

Masamichi Shutoh, Tokyo, Japan, assignor to Nippon Electric Company, Ltd., Tokyo, Japan

Filed Sept. 17, 1975, Ser. No. 614,188
Claims priority, application Japan, Oct. 18, 1974, 49-120508
Int. Cl.² H05B *41/14;* **H01J** *65/00*
U.S. Cl. 315—169 TV **7 Claims**

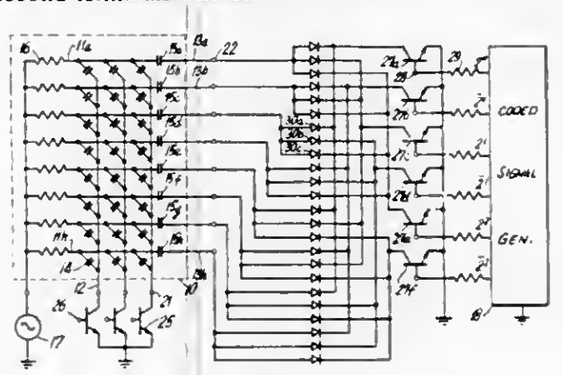
1. A driving circuit for a gas discharge panel comprising a set of first electrodes, a set of second electrodes opposite to the first electrodes, third electrodes opposite and in one-to-one correspondence to the first electrodes, display cells between each of the second electrodes and at least one of the first electrodes, and control cells between the first electrodes and the corresponding third electrodes, said second and third electrodes disposed facing the same surface of said first electrodes, said circuit comprising;

a plurality of first terminals connected to the second electrodes,

a plurality of second terminals connected to the third electrodes,

a group of first switching elements connected to said first terminals,

a plurality of directional circuit elements connected to said second terminals, said directional circuit elements being greater in number than said second terminals, and a plurality of second switching elements connected to said directional circuit elements, the number of said second switching elements being smaller than the number of said second terminals wherein:



a predetermined number of said directional circuit elements are connected to each of said second terminals, and

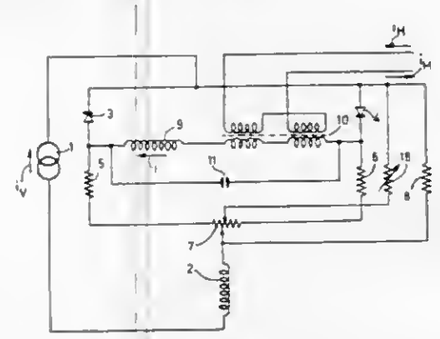
said second switching elements are divided into said predetermined number of subgroups, the directional circuit elements connected to each of said second terminals being connected to one of said second switching elements of the respective subgroups thereof.

4,028,585

CIRCUIT FOR GENERATING A CORRECTION CURRENT FOR CORRECTING FOR DEFLECTION ERRORS ON THE DISPLAY SCREEN OF A COLOR TELEVISION DISPLAY TUBE

Adrianus Hubertus Kantelberg, and Leonardus Albertus Antonius Valkestijn, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 11, 1976, Ser. No. 665,954
Claims priority, application Netherlands, Mar. 27, 1975, 7503666
Int. Cl.² H01J *29/56*
U.S. Cl. 315—371 **9 Claims**



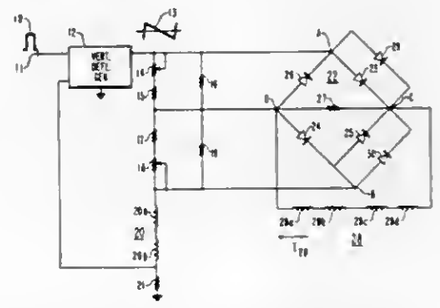
1. A circuit for use with vertical deflection coil having a core and an auxiliary winding means disposed on said core for generating a magnetic quadripolar field substantially in the deflection plane, said circuit comprising an output amplifier means for supplying a deflection current of field frequency to said deflection coil for deflecting in the vertical direction at least one electron beam generated in a display tube, and means for correcting deflection errors of said beam without affecting said field frequency deflection current comprising the circuit being adapted to be coupled in series with the deflection coil and including a bridge circuit comprising diodes and resistors, a resistor coupled in a diagonal branch of the bridge circuit, the auxiliary winding being adapted to be coupled in the other diagonal branch.

4,028,586

PARABOLIC CURRENT GENERATOR

Lewis Irwin Mengle, Lancaster, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Feb. 2, 1976, Ser. No. 654,719
Int. Cl.² H01J *29/70, 29/76*
U.S. Cl. 315—368 **4 Claims**



1. An improved parabolic current generator for providing a convergence correction current in a deflection system utilized in a display system, comprising:

a deflection generator coupled to a deflection winding for providing an alternating current sawtooth scanning waveform therein;

said parabolic current generator including a bridge circuit having its input terminals coupled in series with said deflection winding and its output terminals coupled to a convergence correction winding for providing said parabolic correction current therethrough;

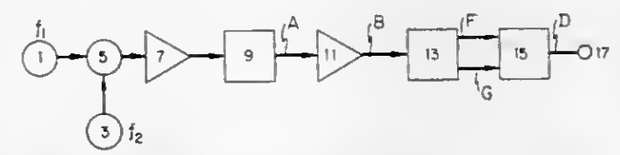
said generator further including first and second impedance networks coupled in series with each other and the two of them coupled in parallel with said input terminals of said bridge, said networks each including a first fixed resistance coupled in parallel with a series coupled potentiometer and a second resistance, the junction of said networks being coupled to one of said output terminals of said bridge for allowing separate adjustment of said correction current during each polarity of said alternating current scanning waveforms and for limiting the amount of correction current flowing through said potentiometer.

4,028,587

MARKER CIRCUIT

Gary Wayne Holmlund, Santa Rosa, Calif., and Toshio Ichino, Hino, Japan, assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Apr. 14, 1975, Ser. No. 567,466
Claims priority, application Japan, Sept. 6, 1974, 49-102570
Int. Cl.² G01R *13/30*
U.S. Cl. 315—377 **6 Claims**



1. A circuit for generating a marker signal comprising:

a first input circuit for receiving a first signal;

a second input circuit for receiving a second signal;

mixing means connected to the first and second input circuit for producing a beat signal having a frequency equal to the difference between the frequencies of the first and second signals;

frequency detecting means connected to the mixing means for detecting when the frequency of the beat signal is below a predetermined threshold frequency and for producing output signals indicating whether the beat signal frequency is above or below the predetermined threshold frequency, the frequency detecting means comprising a pulse generator connected to the mixing means for producing a pulse having a duration equal to one half the period of the threshold frequency, and comparator means connected to the mixing means and the pulse generator for comparing the period of the beat signal with the duration of the pulse and for producing a first output signal when the period of the beat signal is less than twice the duration of the pulse and a second output signal when the period of the beat signal is more than twice the duration of the pulse; and

output means connected to the frequency detecting means for producing an output marker signal in response to receipt of the first output signal but not in response to receipt of the second output signal.

4,028,588

ARRANGEMENT FOR VARYING THE EXCITATION OF A DEFLECTION CIRCUIT IN RESPONSE TO LOAD CHANGES AND THE LIKE

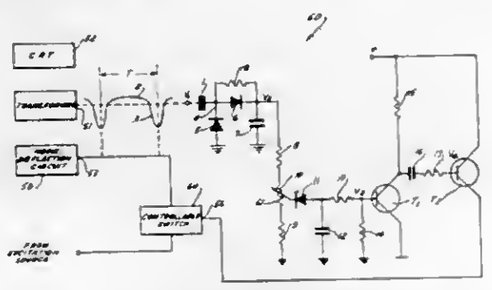
Heinz Kraus, Burggrub, Germany, assignor to Loewe-Opta GmbH., Kronach, Germany

Filed Dec. 17, 1975, Ser. No. 641,644

Claims priority, application Germany, Dec. 19, 1974, 2460014

Int. Cl.² H01J *29/70, 29/76*

U.S. Cl. 315—387 **5 Claims**



1. In an apparatus for varying the excitation of a sweep deflection circuit, the deflection circuit including a transformer exhibiting a repetitive voltage occurring at a first rate and having a first forward sweep portion and a second flyback portion, the apparatus including a thyratron-like switching element associated with the deflection circuit and responsive to a variable-phase trigger control pulse applied to a control electrode of such switching element for varying the excitation of the deflection circuit in proportion to changes in the phase of the control pulse, an improved arrangement for varying the triggering instant of the switching element which comprises, in combination, means coupled to the transformer and responsive to the first voltage portion for generating, at the first rate, a saw-tooth voltage having a constant difference between its maximum and minimum voltage values and further having an effective variable DC component instantaneously proportional to the amplitude of the then-occurring first voltage portion, means coupled to the sawtooth voltage generating means for generating a constant-amplitude control pulse at the instant when the sawtooth voltage exceeds a predetermined amplitude, and means for applying the control pulse to the control electrode of the switching element.

4,028,589

CIRCUIT ARRANGEMENT IN A TELEVISION RECEIVER, PROVIDED WITH A LINE DEFLECTION CIRCUIT AND A SWITCHED SUPPLY VOLTAGE CIRCUIT

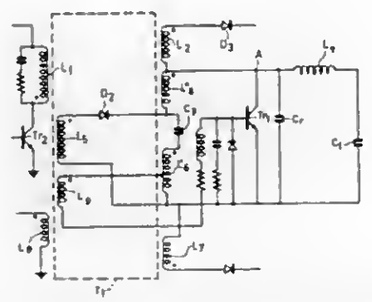
Oswald Johannes Verbeij, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 21, 1976, Ser. No. 651,197

Claims priority, application Netherlands, Feb. 5, 1975, 7501339

Int. Cl.² H01J *29/70, 29/76*

U.S. Cl. 315—408 **3 Claims**



1. A circuit arrangement for use with a television line deflection coil, said circuit arrangement comprising a first switch controllable at the line frequency and a first winding, coupled to said first switch, a supply voltage circuit means also switched at the line frequency for controlling said first switch comprising a second switch controllable at the line frequency and a second winding coupled to said second switch, a first current loop comprising the first winding, a third winding coupled to the second winding, a diode conducting during the cut-off time of the second switch and a capacitor, and a second current loop which comprises a fourth winding coupled to the first winding and a fifth winding coupled to the third winding.

4,028,590

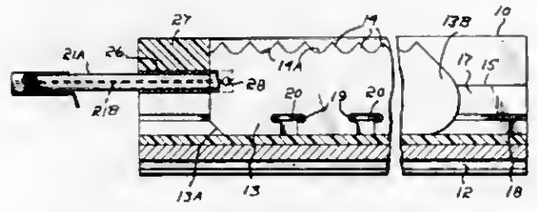
ANTI-STATIC BAR

Peter Bishop, Portland, Maine, assignor to United Industrial Syndicate, Inc., Portland, Maine

Filed Dec. 15, 1975, Ser. No. 640,578

Int. Cl.² H05F *3/04*

U.S. Cl. 361—220 **12 Claims**



1. An anti-static bar including a supporting member having a lengthwise channel, a conductor in the form of a thin metal strip having a serrated edge, insulating means within said channel and secured to said member, means connecting said serrated conductor in said insulating means with said conductor extending lengthwise of said channel parallel to but between the side walls of the member with its serrated edge protruding from said insulating means and exposed adjacent the edges of said walls to provide a series of discharge points, and a cable attached to said member with its conductor connected to the serrated conductor.

4,028,591

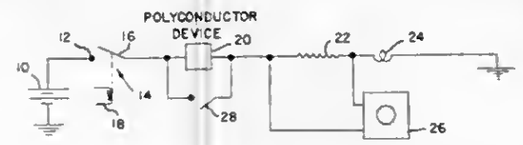
RELAY CONTACT PROTECTOR

David Kahn, Harrisburg, and Howard Richard Peiffer, New Cumberland, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 399,643, Sept. 21, 1973, abandoned, which is a continuation-in-part of Ser. No. 351,716, April 16, 1973, abandoned. This application Oct. 22, 1975, Ser. No. 624,810

Int. Cl.² H02H *3/00*

U.S. Cl. 361—11 **21 Claims**



1. In an electrical circuit having at least two contacts that are systematically mated and unmated, a device to prevent breakdown of said contacts due to current surges causing arcing across said contacts, said device comprising:

a polyconductive member formed of material having a negative temperature-resistance characteristic such that its resistance at temperatures below a predetermined critical temperature is at least several orders of magnitude larger than its resistance at temperatures above the critical temperature; and

means connecting said polyconductor member in series with said contacts,

whereby electrical current passing through the polyconductive material initially encounters a high resistance until sufficient current passes to raise the temperature of the polyconductive material by Joule effect heating to above the critical temperature after a predetermined time period sufficient to allow said contacts to stop bouncing and achieve a stable mated state after which full current is allowed to pass maintaining said polyconductor heated above the critical temperature.

4,028,592

MEANS FOR INCREASING THE STABILITY IN HIGH-VOLTAGE POWER SUPPLY NETWORKS

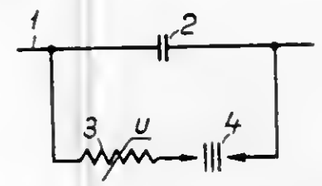
Nils Fahlen, Vasteras, and Asie Schei, Ludvika, both of Sweden, assignors to ASEA Aktiebolag, Vasteras, Swedeo

Continuation of Ser. No. 148,110, Nov. 21, 1973, abandoned. This application Dec. 24, 1974, Ser. No. 536,227

Claims priority, application Sweden, Dec. 22, 1972, 16863/72

Int. Cl.² H02H *7/16*

U.S. Cl. 361—16 **4 Claims**



1. Series capacitor bank for achieving an uninterrupted stabilization of the condition of operation in high-voltage electric power supply networks with a capacitor, and a back-up safety circuit connected in parallel with the capacitor, said safety circuit including means responsive to disturbances of a magnitude which causes overvoltages which may damage the capacitor to short-circuit the capacitor, comprising a first current path in parallel with the capacitor and said safety circuit, said first current path including a spark gap in series with a voltage-dependent resistor for controlling the current through the current path in dependence on the voltage across the capacitor, said resistor means having a very high resistance as long as the voltage across the capacitor is below a predetermined value which is dependent on the electric properties of the capacitor, said value being higher than the operating voltage of the capacitor but lower than the voltage at which said safety circuit becomes effective and short-circuits the capacitor, the resistance of the resistor means decreasing for voltages exceeding said predetermined value, whereby said capacitor is not short-circuited by said safety circuit with voltages between said operating voltage and said predetermined voltage.

4,028,593

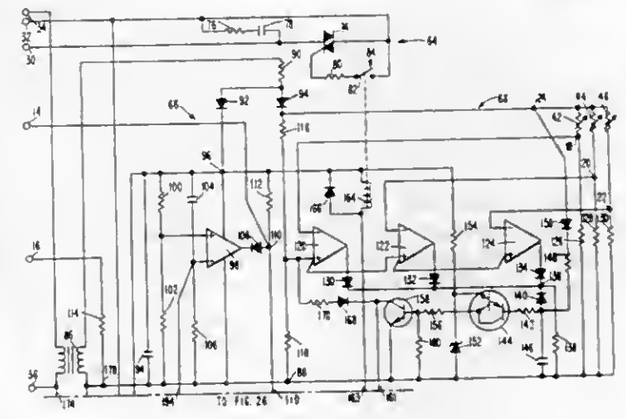
MOTOR CONTROL CIRCUIT

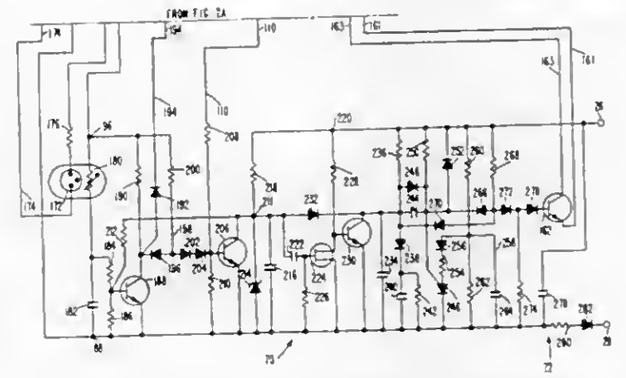
Dennis E. Newell, El Segundo, Calif., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Jan. 15, 1976, Ser. No. 649,291

Int. Cl.² H02H *7/08*

U.S. Cl. 361—27 **21 Claims**





1. In a control circuit for controlling a motor usable in a refrigeration system, the combination comprising

relay means to selectively energize the motor,

first and second transistors both connected to the relay means so that each can inhibit its operation,

a temperature responsive circuit responsive to the temperature inside the motor to cause the first transistor to inhibit operation of the relay means in the event of a high temperature condition,

a delay after break timer to cause the second transistor to inhibit relay means operation for a predetermined period after any shut down of the motor,

a refrigerant pressure responsive circuit to trigger the delay after break timer if the refrigerant pressure is insufficient, and

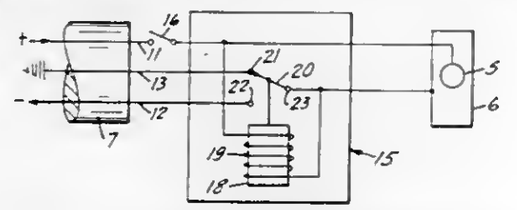
a lock-out circuit responsive to actuation of the temperature responsive circuit or the refrigerant pressure responsive circuit to cause the second transistor to inhibit relay means operation following a fault condition.

4,028,594

SAFETY CIRCUIT FOR ELECTRICAL EQUIPMENT

George W. Schossow, 2316 Lilac Lane, White Bear Lake, Minn. 55110

Filed Nov. 7, 1975, Ser. No. 629,793
Int. Cl.² H02H 3/14
U.S. Cl. 307—326 11 Claims



1. A safety circuit for use with appliances having a load and a three wire cord having a plug, a B+ line, a neutral line, and a ground line, said circuit comprising

manually operated switch means in series with said B+ line for closing a circuit upon operation of said switch means, and

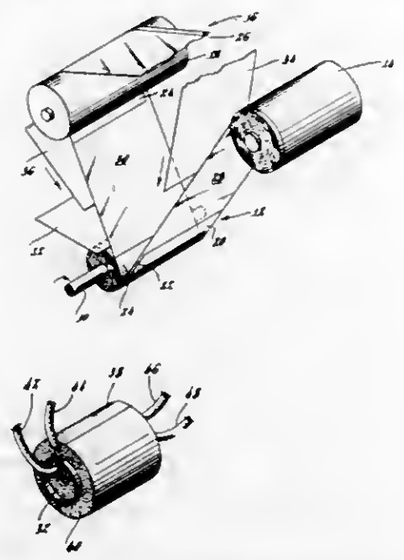
switching means in series with said manually operated switch means and connected to said neutral line and a said ground line to be responsive to the presence of current between said B+ line and ground when said manually operated switch means is operated, said switching means including conducting means which are triggered upon said presence of current for closing a circuit between said B+ line and said neutral line to a load, for placing said switching means in parallel with said load to latch in said switching means and maintain the circuit to said load closed, and for simultaneously opening the ground line to said switching means.

4,028,595

MULTI-VOLTAGE CAPACITOR SECTION

Robert M. Stockman, Brookfield Center, Conn., assignor to American Radionic Co., Inc., Danbury, Conn.

Filed Dec. 2, 1975, Ser. No. 637,091
The portion of the term of this patent subsequent to Nov. 18, 1992, has been disclaimed.
Int. Cl.² H01G 4/38
U.S. Cl. 361—328 6 Claims



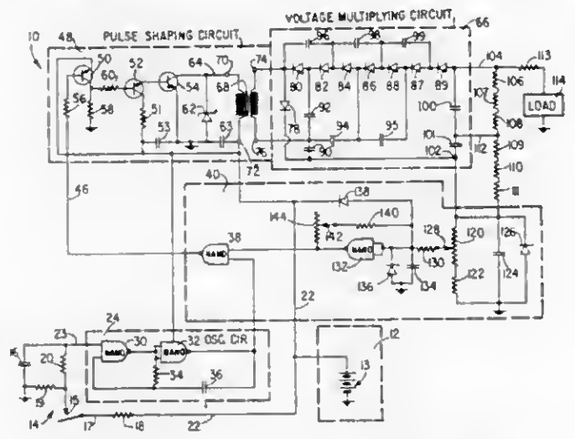
1. A capacitor section comprising: first and second dielectric strips wound together in cylindrical form; first and second conductive plates separated by said first and second dielectric strips, at least one of said plates being interrupted across its length to thereby form at least two electrical capacitors; a non-conductive sheet inserted between said strips and extending outwardly from a first end of said section adjacent said interrupted length to form a circular barrier separating the interrupted portions of said one plate; and supplemental third and fourth dielectric strips adjacent said first and second dielectric strips in one of said capacitors whereby said two capacitors have different voltage ratings.

4,028,596

CORONA POWER SUPPLY CIRCUIT

Harold J. Weber, Sherborn, Mass., assignor to Coulter Information Systems, Inc., Bedford, Mass.

Continuation-in-part of Ser. No. 532,713, Dec. 12, 1974, abandoned, which is a continuation-in-part of Ser. No. 378,136, July 11, 1973, abandoned. This application Oct. 20, 1975, Ser. No. 623,903
The portion of the term of this patent subsequent to Oct. 12, 1993, has been disclaimed.
Int. Cl.² G03G 15/00
U.S. Cl. 361—235 25 Claims



1. A portable power supply for producing a high corona output when coupled to a D.C. power source including in combination:

oscillator means operative to develop first oscillations;

control means coupled to said oscillator means and operative to develop second oscillations in response to said first oscillations and a corona signal indicating a corona output below a predetermined level;

pulse-shaper means coupled to said control means and operative to develop a first voltage pulse having one polarity in response to a first half of each cycle of said second oscillations and to develop a second voltage pulse having the opposite polarity in response to the second half of each cycle of said second oscillations, said pulse-shaper means being operative to draw substantially all operating current during said first half of each cycle of said second oscillations and substantially no operating current during the second half of each cycle of said second oscillations;

multiplier means coupled to said pulse-shaper means and operative only in response to said first and second voltage pulses coupled thereto to develop said corona output;

means for coupling said corona signal from said multiplier means to said control means.

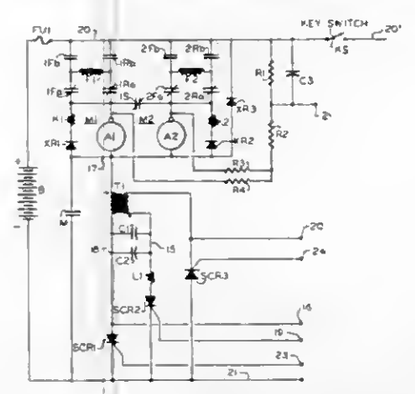
4,028,597

MOTOR CONTROL SYSTEMS

Michael J. Delaney, Greene, and Hiram G. Gilbert, Binghamton, both of N.Y., assignors to The Raymond Corporation, Greene, N.Y.

Filed July 12, 1974, Ser. No. 487,890
Int. Cl.² H02P 3/00
U.S. Cl. 318—87 30 Claims

1. A battery-powered vehicle comprising a base mounted on a pair of non-steerable drive wheels and having a steering wheel; first and second series-field direct-current motors connected to drive respective ones of said drive wheels at mutually relative speeds dictated by the positioning of said steering wheel; first directional contactor means for connecting power from a first circuit terminal through the field of said first motor to a first terminal of the armature of said first motor, second directional contactor means for connecting said first circuit terminal through the field of said second motor to a first terminal of the armature of said second motor; thyristor means and a battery connected in series between a second terminal of each of said armatures and said first circuit terminal; pulse generator means for applying pulses to said thyristor means to turn said thyristor means on and off; timing circuit means for controlling said pulse generator means to vary the conduction duty cycle of said thyristor means; means for sensing whether said motors are being accelerated or plugged; a normally-closed contactor connected between said first terminals of said armatures; and means responsive to adjustment of an operator control and responsive to said sensing means for energizing said normally-closed contactor to open its contacts while said motors are being accelerated and for de-energizing said normally-closed contactor while either one or both of said motors are being plugged.

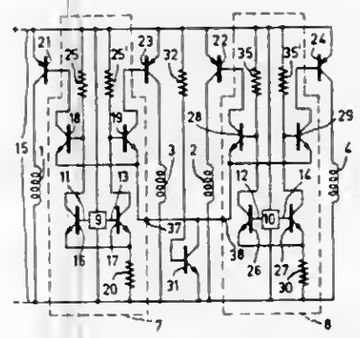


4,028,598

DIRECT-CURRENT MOTOR COMPRISING AN ELECTRONIC COMMUTATOR

Hendrik Jan Bergmans, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 872,158, Oct. 29, 1969, abandoned. This application Jan. 7, 1974, Ser. No. 431,017
Claims priority, application Netherlands, Nov. 1, 1968, 6815585
Int. Cl.² H02K 29/02
U.S. Cl. 318—138 3 Claims



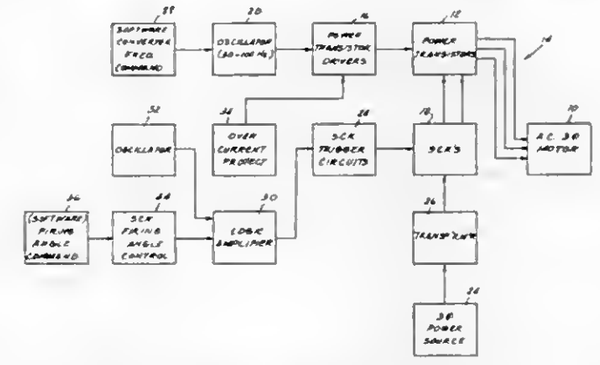
1. A direct-current motor comprising a source of direct voltage, a permanent magnetic rotor, at least two stator windings, an electronic switching device haivng the same number of Hall elements energized by said direct voltage and exposed to the rotor field, at least two control transistors, means connecting the output terminals of said Hall elements individually to the base electrodes of the control transistors, means comprising a plurality of amplifying transistors for individually coupling the control transistors to corresponding stator windings so that the current through the various stator windings is controlled as a function of the position of the rotor, characterized in that the amplifying transistors form at least one group of at least two transistors, a source of substantially constant current comprising a transistor of the same conductivity type as the transistors of the associated group of amplifying transistors, means for energizing the emitter electrodes of the amplifying transistors in common from said source of substantially constant current including, means connecting the collector of said transistor to the emitters of the transistors of said group, and means connecting its emitter to one terminal of a source of forward direct voltage and its base electrode to the other terminal of said source through a resistor, whereby in any position of the rotor only one transistor of each group can be fully conducting and each winding can be fully energized over an angle of at the most 120° relative to a bipolar rotor in a given direction.

4,028,599

METHOD OF CONTROLLING AN A.C. MOTOR

Frank Zankl, Milwaukee; Edward E. Kirkham, Brookfield; Richard E. Stobbe, Greenfield, all of Wis., and John J. Schachte, West Hartford, Conn., assignors to Kearney & Trecker Corporation, West Allis, Wis.

Continuation of Ser. No. 285,813, Sept. 1, 1972, Pat. No. 3,878,445. This application Feb. 19, 1975, Ser. No. 551,145
Int. Cl.² H02P 7/00; G06B 11/14
U.S. Cl. 318—227 2 Claims



1. A method of controlling the application of power to an a.c. motor in a servo system, said motor having a plurality of stator field windings, comprising the step of electronically calculating, from a first parameter representative of motor speed and a second parameter representative of the programmed position of said motor, a quantity for the torque required of said motor and the required position of the stator field of said motor during a succeeding period to perform in accordance with said second parameter, for each calculation of said torque quantity, producing a signal at a time representative of said torque quality, using said signal to actuate at controlled rectifier to produce, from an a.c. voltage, a d.c. voltage having an amplitude representative of said torque quantity, and producing, for each calculation of said stator field position quantity, a signal for controlling application of a source of electrical power to the stator field windings of said motor to cause said stator field to assume a position adjacent to the position represented by said stator field position quantity.

4,028,600

METHOD AND APPARATUS FOR SLOW SPEED OPERATION OF AN INVERTER CONTROLLED ROTATING FIELD MACHINE

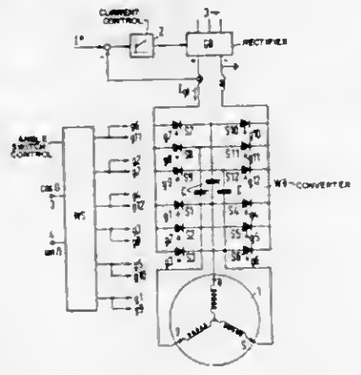
Felix Blaschke, Erlangen, and Herwig Klautschek, Furth, both of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Continuation-in-part of Ser. No. 381,541, Aug. 23, 1973, abandoned. This application May 15, 1975, Ser. No. 577,918

Claims priority, application Germany, Apr. 3, 1975, 2514557

Int. Cl.² H02K *17/02*; **H02P** *8/00*

U.S. Cl. 318—227 **16 Claims**



1. A method for controlling the impressed position of the stator current vector in a convertor driven rotating field machine, which can be energized only to provide a predefined pluraltiy of discrete vector positions, such as to avoid uneven running at low rotation speeds comprising:

a. defining a desired impressed position of the stator current vector; and

b. alternately energizing the two discrete vector positions on each side of said desired position for relative time periods which will result in an average vector position corresponding to said desired position.

4,028,601

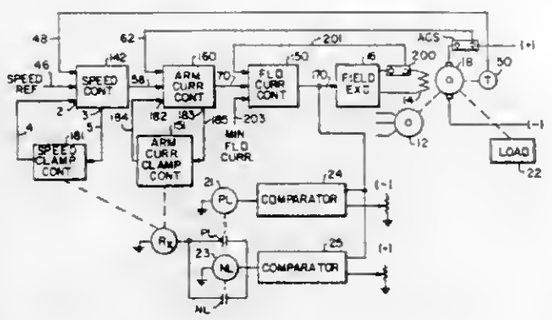
MULTI-LOOP DIRECT CURRENT MOTOR REGULATING SYSTEM PROTECTED AGAINST WINDUP BY A CLAMP CIRCUIT

Robert S. Peterson, Williamsville, N.Y., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 23, 1975, Ser. No. 580,381

Int. Cl.² H02P *7/30*

U.S. Cl. 318—271 **6 Claims**



1. In a motor control system having at least an inner and an outside control loop, wherein said inner loop includes limiter means for holding the output control signal of said control system for said motor within a predetermined control level, the combination of:

means responsive to limiting operation of said limiter means and operative with said outside loop for establishing an overriding error signal in relation to a control level existing in said outside loop upon initiation of said limiting operation; with said outside control loop including an input control signal representing a system variable and an integrator responsive to said input control signal for establishing a continuous integrated voltage characteristic of said control level for said system variable;

with said overriding error signal establishing means including means normally responsive to said integrated voltage for storage thereof as a stored voltage; said storage means becoming non-responsive to said integrated voltage when said limiter means is under limiting operation.

4,028,602

CONTROL CIRCUIT OF AN ELECTRIC MOTOR COMPRISING AN OUTPUT TRANSISTOR OF NPN TYPE

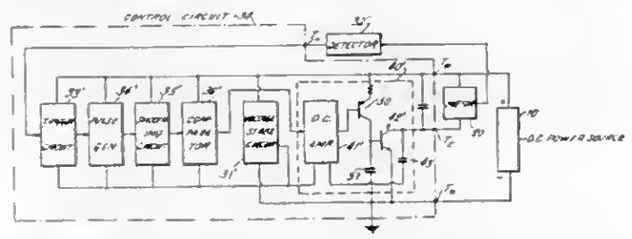
Kazuo Tokuda; Masanobu Tsugita, both of Tokyo, and Hiroshi Minakuchi, Kadoma, all of Japan, assignors to Nippon Electric Company, Ltd. and Matsushita Electric Industrial Co., Ltd., Japan

Filed July 9, 1975, Ser. No. 594,226

Claims priority, application Japan, July 11, 1974, 49-79951

Int. Cl.² H02P *5/12*

U.S. Cl. 318—345 B **9 Claims**



1. A circuit for controlling actual speed of an electric motor, the circuit being provided with first, second, third and fourth terminals, the first and second ones being respectively connected to positive and negative terminals of a d.c. power source, the first and third ones being coupled to the electric motor of which actual speed is supplied to the fourth one in the form of an electric frequency signal, wherein the improvement comprises:

first means connected between said first and second terminals for supplying a stabilized voltage which is stabilized in reference to a potential fed to the first terminal and which is arbitrarily varied relative to ground;

second means connected to the first means and responsive to said frequency signal representative of said actual speed of the electric motor for generating a difference signal for adjusting the actual speed of the motor to a desired value;

third means responsive to said difference signal for amplifying said difference signal and applying the amplified signal to said motor as a control signal, said third means comprising an output transistor of npn type provided with a base, an emitter and a collector and a level shift circuit coupled between said output transistor and said second means, said level shift circuit being resposive to said difference signal to provide a level shifted d.c. signal to the base of said npn transistor, said level shifted d.c. signal being independent of any variation of said power source, said emitter and collector of said output transistor being respectively connected to said second and third terminals.

4,028,603

DEVICE FOR DETECTING AND POSITIONING A MOBILE OBJECT CAPABLE OF MOVING IN AT LEAST ONE GIVEN PATH

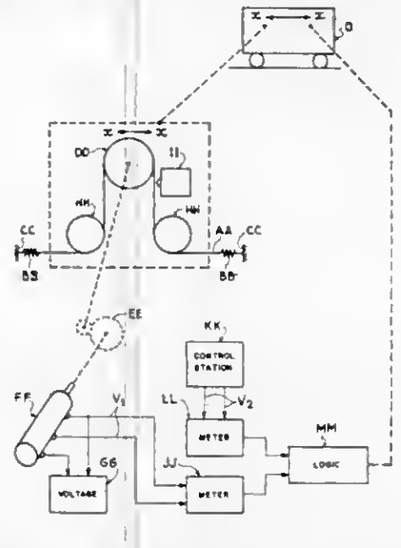
Gabriel Selam, 161, Boulevard Edouard Vaillant, 93 Aubervilliers, France

Continuation-in-part of Ser. No. 381,070, July 20, 1973. This application June 24, 1975, Ser. No. 589,946

Claims priority, application France, July 31, 1972, 72.27550; Dec. 7, 1972, 72.43528

Int. Cl.² G05D *4/00*

U.S. Cl. 318—587 **30 Claims**



1. Apparatus in combination with and for detecting the position of a heavy mobile object, such as a travelling crane, hoisting device or the like, capable of moving along at least one given pathway, said apparatus comprising:

an elongated information-bearing support with means for mounting it so as to extend in a direction parallel with and in the general vicinity of the pathway;

said information-bearing support having distance information data provided thereon;

a distance or position sensor with means for resiliently mounting it on said heavy mobile object so that said information data is capable of being correctly scanned by said sensor when the said object moves along said pathway and irrespective of any irregularities or deformations of pathway due in particular to movement of said heavy mobile object thereon;

means associated with said sensor for producing distance signals relating to the instantaneous position of said heavy object in response to detection of the information by said sensor;

said distance information data being recorded on said information-bearing support in at least two parallel bands having different distance scales, said parallel bands being capable of being scanned by said sensor, and

a control circuit operatively connected to said sensor and capable of using said distance signals to control operation of said heavy mobile object.

4,028,604

SERVO-MOTOR CONTROL SYSTEM

Masaaki Togo, Kawasaki; Masao Shima, Tokyo, and Kiyoshi Mochizuki, Kamakura, all of Japan, assignors to Yamatake-Honeywell Company Limited, Tokyo, Japan

Filed June 25, 1975, Ser. No. 590,209

Claims priority, application Japan, July 9, 1974, 49-75385

Int. Cl.² H02K *37/00*; **G05B** *11/18*

U.S. Cl. 318—596 **6 Claims**

1. A servo-motor control system for driving a servo-motor in an analog servo-system comprising in combination:

a comparator circuit having two input means and an output means;

means for generating a set point signal which periodically and continuously varies between predetermined limits;

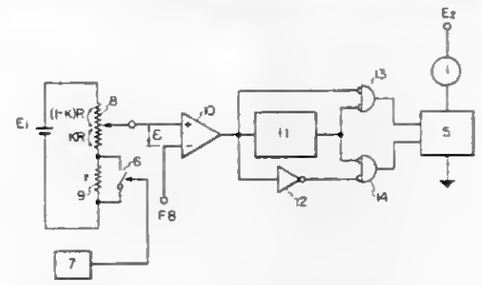
means for coupling said set point signal generator to one input means of said comparator;

means for coupling a feedback signal to the other input means of the comparator;

means for energizing said servo-motor;

means responsive to the output of said comparator for coupling said energizing means to said motor;

said responsive means coupling said energizing means to said motor for rotation in one direction when the difference between the feedback signal and the set point signal exceeds a predetermined percentage of the variation of the set point input to the comparator;



said responsive means coupling said energizing means to said motor for rotation in the opposite direction when the difference between the set point signal and the feedback signal is less than a negative quantity equal to a predetermined percentage of the variation of the set point signal; and

said responsive means disconnecting said energizing means from said motor when the difference between said set point signal and said feedback signal is less than a predetermined percentage of the variation in the set point signal.

4,028,605

SYSTEM FOR PASSING PRODUCTS TO BE TREATED THROUGH A MACHINE

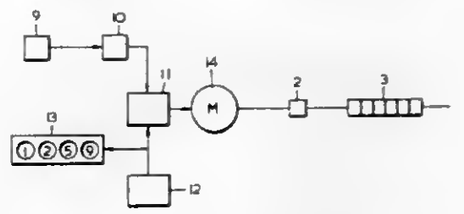
Geurt J. Ruumpol, Wilp, Netherlands, assignor to Veco Beheer Electroformlog/Photo Etching B.V., Eerbeek, Netherlands

Filed Jan. 29, 1975, Ser. No. 545,004

Claims priority, application Netherlands, Feb. 8, 1974, 7401788

Int. Cl.² H02K *37/00*

U.S. Cl. 318—696 **4 Claims**



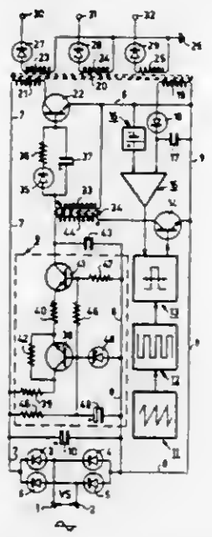
1. In a system for passing products to be treated through a machine, comprising a driving motor of the stepping type, a plurality of rollers driven by said motor, and a regulating circuit for controlling the driving motor, the improvement wherein the regulating circuit comprises a constant frequency oscillator, a fixed divider into which the output of said oscillator is fed, a variable frequency divider subject to the output of said fixed divider for providing a rectangular output for energizing the driving motor, and means for adjusting said variable frequency divider.

4,028,606

CONTROL CIRCUIT FOR A SWITCHED-MODE POWER SUPPLY, PARTICULARLY FOR A TELEVISION RECEIVER

Daniel Beuchée, Paris, and Alain Leclair, Poissy, both of France, assignors to U.S. Philips Corporation, Briarcliff Manor, N.Y.

Filed Dec. 10, 1975, Ser. No. 639,277
Claims priority, application France, Dec. 20, 1974, 74.42250
Int. Cl.² H02M 3/335
U.S. Cl. 321—2 8 Claims



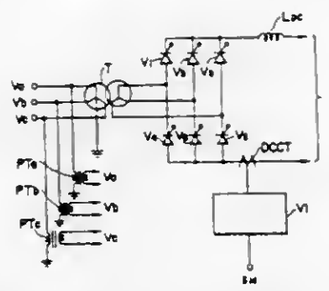
1. A control circuit for a switched-mode power supply, said power supply comprising a non-regulated rectified DC voltage source, a driver transistor, a first transformer having primary and secondary windings, an end of said primary being coupled to the collector-emitter path of said driver transistor, a switching transistor having a base coupled to said secondary, a second transformer having a primary winding coupled in series with said switching transistor, and a plurality of secondary windings, said control circuit comprising a first additional transistor having a collector coupled to the remaining end of the primary winding of the first transformer not connected to the driver-transistor and an emitter coupled to the non-regulated direct voltage source.

4,028,607

INVERTER CONTROL SYSTEM

Atsumi Watanabe, Hitachi, Japan, assignor to Hitachi, Ltd., Japan

Filed Apr. 8, 1975, Ser. No. 566,091
Int. Cl.² H02M 7/00
U.S. Cl. 321—5 8 Claims



1. In a control system for an inverter connected to an A.C. system through a transformer for the inverter, an improved inverter control system comprising:

first means for receiving a control voltage and for generating, at an advanced control angle, phase-shifted gate pulses in synchronism with voltages in-phase with commutation voltages applied to said inverter during the normal condition of said A.C. system, and for applying said gate pulses to respective arms of said inverter at a fixed interval; and

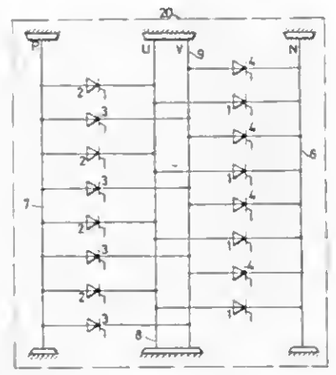
second means, responsive to a change in at least one of the phase voltages and line voltages of said A. C. system, for correcting said control voltage in accordance with said change.

4,028,608

BRIDGE CIRCUIT ARRANGEMENT ON ELECTRICAL FREQUENCY CONVERTERS WHICH CAN BE FED WITH A D.C. CURRENT

Hans Matthes, and Erhard Mauler, both of Wermelskirchen, Germany, assignors to AEG-Elotherm G.m.b.H., Remscheid, Germany

Filed Feb. 19, 1976, Ser. No. 659,403
Claims priority, application Germany, Feb. 20, 1975, 2507316
Int. Cl.² H02M 7/00
U.S. Cl. 321—8 R 3 Claims



1. In a bridge circuit for an electric frequency converter that can be fed with direct current for converting direct current into alternating current comprising:

four contact rails,

means for mounting said rails substantially in parallel to one another and insulated electrically from one another to form a mechanical frame,

said rails forming four corner points of the bridge circuit, two of which as feed rails can be connected with a source of direct current and two of which as load rails can be connected with an output of the frequency converter,

four *n* controllable semiconductor switches *n* of which are always switched conductive in an arm of the bridge circuit in an electrical parallel circuit and are attached at a distance from one another to said contact rails so that between the rails in the plane of said rails, essentially parallel paths of the current flow via the semiconductor switches,

the improvement wherein said semiconductor switches are disposed in the frame of said four rails in such a way that locally adjacent and parallel running paths of the current flow always belong to different arms of the bridge and to arms of the bridge which are adjacent to the two feeder points of the bridge.

4,028,609

DIGITAL FIRING PULSE GENERATOR WITH PULSE SUPPRESSION

Richard L. Detering, Buffalo, N.Y., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

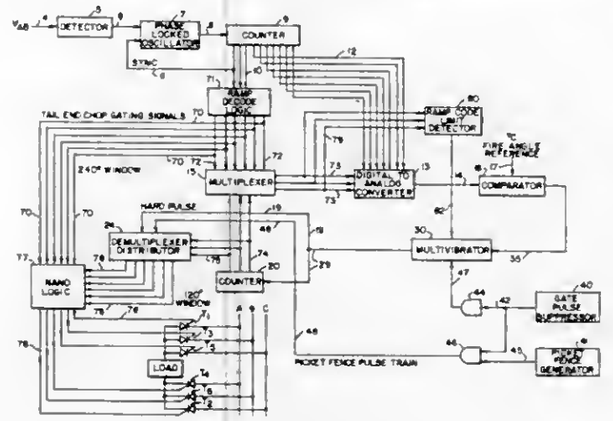
Filed Dec. 22, 1975, Ser. No. 642,809
Int. Cl.² H02M 7/00
U.S. Cl. 321—5 9 Claims

1. Firing pulse generator for igniting sequentially a plurality of thyristors connected across a polyphase power supply, comprising:

timing means for establishing a firing angle by reference to a phase of said power supply;

first means responsive to said firing means for generating a hard pulse of minimum duration to set a selected one of said thyristors into conduction;

second means for freely generating a series of picket fence pulses of short duration relative to said hard pulse; and



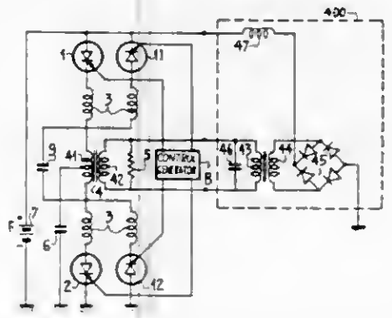
means operative sequentially in relation to said thyristors and responsive to said hard pulse for applying said hard pulse and said picket fence pulses thereafter to said selected thyristor, thereby to establish a period of conduction therefor.

4,028,610

INVERTERS SUPPLYING A HIGH FREQUENCY ALTERNATING CURRENT

Edmond Cord'homme, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Aug. 18, 1975, Ser. No. 605,436
Claims priority, application France, Aug. 22, 1974, 74.28889
Int. Cl.² H02M 1/18
U.S. Cl. 321—14 4 Claims



1. In a D.C. to A.C. power inverter having input terminals connectable to a source of direct current; output terminals connectable to an alternating current load; first circuit means for connecting the input and output terminals, the first circuit means including a first pair of controlled rectifiers connected through first and second inductors; and a capacitor coupled to the midpoint between the first and second inductors and to a ground or reference potential,

second circuit means for connecting the input and output terminals, the second circuit means including a second pair of controlled rectifiers, each controlled rectifier in the second pair of controlled rectifiers being connected across a respective controlled rectifier in the first pair of controlled rectifiers and poled in the opposite direction thereto;

a detector having its output connected to the input terminals; and

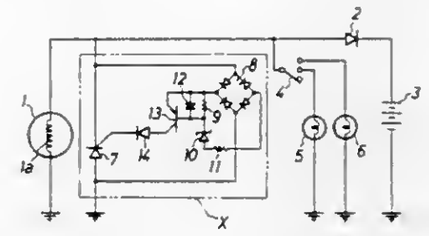
means tuned to the frequency of the alternating current and having a Q factor dependent upon the magnitude of the impedance of the alternating current load for coupling the input of the detector to the output terminals.

4,028,611

VOLTAGE STABILIZING DEVICE OF A MAGNETO ALTERNATING CURRENT GENERATOR

Minoru Tashiro, Yokohama; Shigeru Kimura, Tokyo, both of Japan, assignors to Stanley Electric Co., Ltd., Tokyo, Japan

Filed Aug. 14, 1974, Ser. No. 497,225
Claims priority, application Japan, Aug. 17, 1973, 48-6656[U]
Int. Cl.² G05F 1/44
U.S. Cl. 323—8 14 Claims



1. A voltage stabilizing device for a magneto alternating current generator (1) which is connectable to an alternating current load (5, 6) and which is further connectable to a battery (3) through a rectifier (2), comprising:

a controlled rectifier means (7), having a control electrode, connected directly in parallel with said alternating current generator (1);

a full wave rectifier circuit means (8) connected in parallel with said alternating current generator (1) and in parallel with said controlled rectifier means (7); and

a gate control circuit means coupled to an output of said full wave rectifier circuit means (8) and to said control electrode of said controlled rectifier (7) for phase controlling said controlled rectifier, said gate control circuit means comprising:

means (10, 11) for comparing an output voltage of said full wave rectifier circuit means (8) with a reference voltage and for generating a control signal when said output voltage of said full wave rectifier circuit means exceeds a given voltage level; and

delay means (9, 12) coupled to said comparing means and responsive to said control signal for generating a trigger signal with a predetermined delay after generation of said control signal;

said trigger signal being coupled to said control electrode of said controlled rectifier means (7).

4,028,612

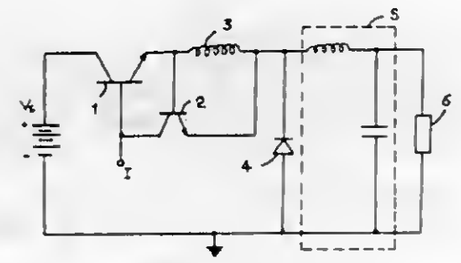
DYNAMIC CURRENT LIMITER FOR SWITCHING VOLTAGE REGULATORS

Luciano Orlando, Milan, Italy, assignor to Honeywell Information Systems Italia, Caluso, Italy

Filed Sept. 3, 1976, Ser. No. 720,151
Claims priority, application Italy, Sept. 10, 1975, 27059/75
Int. Cl.² G05F 1/56
U.S. Cl. 323—17 2 Claims

1. A dynamic current limiting circuit for a power supply, said power supply comprising a power switching transistor including a collector, a base and an emitter; a catch diode including an anode and a cathode; and an accumulator filter including capacitor and inductance means connected in parallel with said diode; said current limiting circuit comprising a feed-back transistor including collector, base and emitter elements; said collector element being connected to the base of said power switching transistor; said emitter element being

connected to the cathode of said diode; said base element being connected to the emitter of said power switching transis-



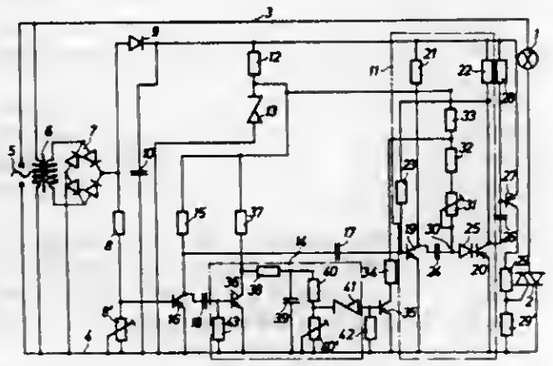
tor; and a feed-back inductance connected between said base and emitter elements of said feed-back transistor.

4,028,613

ARRANGEMENT FOR SUPPLYING A LOAD WITH CONTROLLED CURRENT FROM AN ALTERNATING CURRENT SOURCE

Armin Stiller, and Stefan Borejko, both of Braunschweig, Germany, assignors to Rollei-Werke Franke & Heidecke, Braunschweig, Germany

Continuation of Ser. No. 528,500, Nov. 29, 1974, abandoned. This application Mar. 26, 1976, Ser. No. 670,861
Claims priority, application Germany, Dec. 1, 1973, 2360048
Int. Cl.² G05F 5/00
U.S. Cl. 323—19 26 Claims



1. In an arrangement for supplying a load with constant voltage from an AC source of variable voltage amplitude, said arrangement including bidirectional thyristor means in series with said load and said source, a monostable multivibrator arranged for controlling the conductive period of said thyristor means, and means for providing said monostable multivibrator with a rectified voltage proportional to said voltage amplitude of said source, said arrangement comprising:

a. threshold switch means arranged for changing state in response to each half wave of said rectified voltage crossing a predetermined threshold value;

b. said monstable multivibrator being arranged to change to its metastable state in response to said change of state of said threshold switch means;

c. said monostable multivibrator being arranged for supplying a gating pulse to said bidirectional thyristor means for making said bidirectional thyristor means conductive for a portion of each half wave of said AC source upon the return of said monostable multivibrator to its stable state;

d. R-C circuitry for establishing the reset time for said monostable multivibrator to return to its stable state; and

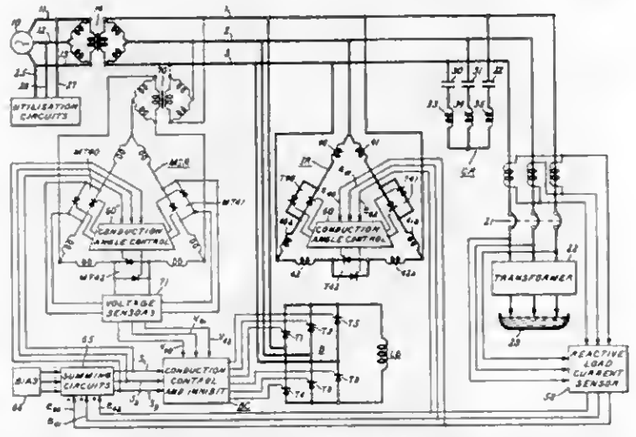
e. said R-C circuitry being connected to a constant DC voltage for varying said reset time as a function of said voltage amplitude of said source.

4,028,614

HIGH SPEED CONTROL OF REACTIVE POWER FOR VOLTAGE STABILIZATION IN ELECTRIC POWER SYSTEMS

Fred William Kelley, Jr., Media, Pa., assignor to General Electric Company, Philadelphia, Pa.

Filed May 3, 1976, Ser. No. 682,544
Int. Cl.² H02J 3/18
U.S. Cl. 323—102 16 Claims



4. Reactive current compensating apparatus for a multiphase alternating current electric power circuit having load terminals and supply conductors subject to varying and unbalanced reactive current demand at said load terminals which comprises; balanced multiphase capacitive impedance means connected in said power circuit, balanced multiphase inductive impedance means connected in parallel circuit relation with said capacitive impedance means, said capacitive and inductive multiphase impedance means drawing from said power circuit a net amount of reactive compensating current, one said multiphase impedance means being controllable variably to counteract the other and having a predetermined maximum reactive current capability supplementary single phase reactive compensating impedance means, switching means for selectably connecting said single phase impedance means in parallel circuit relation across any one selected phase arm of the multiphase impedance means of like reactance thereby to extend beyond said maximum the reactive current capability of said one phase arm, and means responsive to the reactive component of load current in each phase of a multiphase electric load connected to said load terminals for controlling said switching means.

4,028,615

METHOD OF AND DEVICE FOR TESTING HERMETICALLY ENCLOSED REED CONTACTS

Friedrich Ludwig Jansen; Frederik Hendrik Gerritsen, and Johan Hendrik Adolph Glashorster, all of Hilversum, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

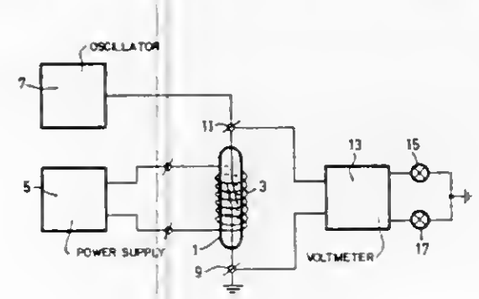
Filed Oct. 16, 1975, Ser. No. 622,997
Claims priority, application Netherlands, Sept. 1, 1975, 7510275
Int. Cl.² G01R 31/02
U.S. Cl. 324—28 RS 8 Claims

1. A method of testing contact surfaces of reed switches having electrically conductive contact reeds comprising a magnetostrictive material and susceptible to torsional movement upon application of a magnetic field by a coil within which the switch is located, comprising

applying an excitation current which is a direct current to said coil so as to close contacts of said switch,

applying an alternating test current through said closed contacts, and

continuously varying the frequency of said test current between a minimum value less than a torsional resonant



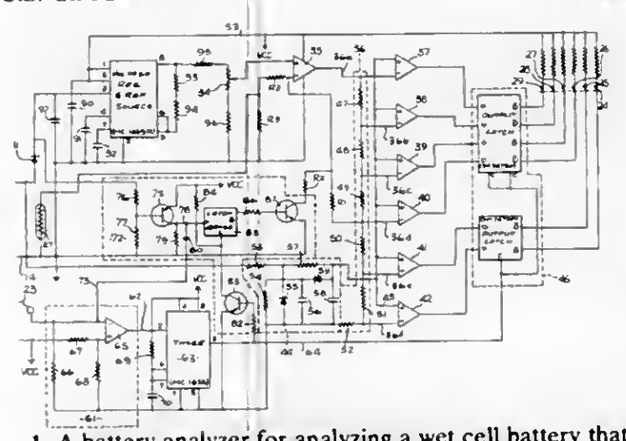
frequency of said contact and a maximum value greater than said torsional resonant frequency.

4,028,616

BATTERY ANALYZER

Carlile R. Stevens, 468 EL Rio Road, Danville, Calif. 94526

Filed Mar. 10, 1976, Ser. No. 665,519
Int. Cl.² G01N 27/42
U.S. Cl. 324—29.5 8 Claims



1. A battery analyzer for analyzing a wet cell battery that is connected to a vehicle engine, including voltmeter means for measuring the voltage from said battery within a narrow range over which the unloaded battery output will vary as a function of specific gravity of the electrolyte of said battery, said voltmeter means comprising:

a resistor voltage divider;

a circuit for providing an input reference voltage across said divider;

a plurality of voltage comparators each receiving as a first input a respective reference voltage obtained from a tap on said divider, said respective reference voltages being of incrementally greater value with respect to each other;

input network means for applying to the other input of each voltage comparator a voltage derived from the output of the battery under test;

a like plurality of indicator lamps;

an output latch connected between the outputs of said comparators and said lamps, said latch, when enabled, causing certain of said lamps to light up to indicate those comparators at which the voltage derived from said battery exceeds the respective reference voltage, said lamps thereby indicating the unloaded battery voltage and hence the electrolyte specific of the battery under test;

said circuit for providing a reference voltage comprises;

an operational amplifier having a fixed reference voltage applied to the non-inverting input, the output of said amplifier being connected across said divider as said input reference voltage;

a feedback resistor connected between a tap of said divider and the inverting input of said operational amplifier to provide negative feedback that stabilizes the voltage at said tap;

a thermistor, mounted to sense the temperature of the electrolyte of said battery under test, and connected to the inverting input of said operational amplifier to correct said input reference voltage, and hence the voltage measurement, for changes in electrolyte temperature;

a range detect and latch circuit for changing the range of said voltmeter means when the battery voltage drops under load, said range detect and latch circuit comprising;

a flip-flop;

means for setting said flip-flop to a first state when the voltage of the unloaded battery is measured, and for setting said flip-flop to a second state in response to reduced voltage from said battery when under load; and

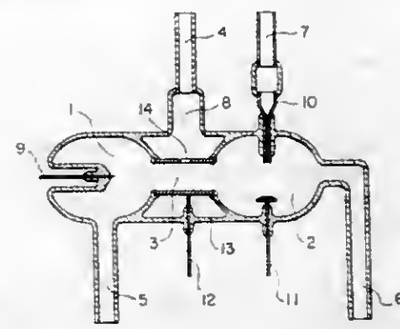
a range-change resistor and means for connecting said range-change resistor to the inverting input of said operational amplifier when said flip-flop is set to said second state, said range-change resistor thereby reducing the input reference voltage applied across said divider so that a lower voltage range is measured, said lower range corresponding to that range over which said battery will vary, when loaded, depending on the battery operational condition.

4,028,617

IONIZATION DETECTOR UTILIZING ELECTRIC DISCHARGE

Tomoichi Kamo, Hitachi, and Miklya Yamane, Kunitachi, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 15, 1976, Ser. No. 649,356
Claims priority, application Japan, Jan. 16, 1975, 50-6356
Int. Cl.² G01N 27/00; H01J 7/24
U.S. Cl. 324—33 17 Claims



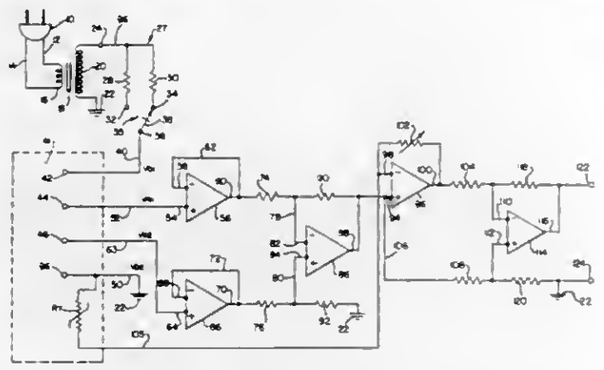
1. An ionization detector, comprising: a first chamber;a second chamber; means forming a communicating path between said first and second chambers to guide the light from said first chamber into said second chamber; means for producing an electric discharge as a light source in said first chamber, which means has a pointed discharge electrode directed toward said communicating path and a second electrode provided on at least one of said first chamber and said means forming a communicating path; inlet means for introducing a discharge gas between said first and second chambers; means for introducing a carrier gas containing a sample gas into said second chamber; outlet means for exhausting the discharge gas in said first chamber; outlet means for exhausting the carrier gas in said second chamber; and means, having a pair of collecting electrodes disposed in said second chamber, to detect the ionic current as caused by the ionization within said second chamber.

4,028,618

CIRCUIT FOR MONITORING THE CONDUCTIVITY OF A SOLUTION

Horace A. Teass, Jr., 36 Highland Terrace, Pleasantville, N.Y. 10570

Filed Jan. 9, 1976, Ser. No. 647,884
Int. Cl.² G01N *27/42*
U.S. Cl. 324—30 R **3 Claims**



1. A circuit for monitoring the conductivity of a solution comprising:

a conductivity cell having first and second drive probes and first and second receiving probes;

a constant current source connected to said first and second drive probes for supplying current thereto;

a first high impedance voltage follower amplifier connected at its input to said first receiving probe and having an output;

a second high impedance voltage follower amplifier connected at its input to said second receiving probe and having an output;

a differential amplifier having first and second inputs and an output for producing a signal proportional to the resistance and conductivity of said solution, said first input being connected to said first voltage follower output and said second input being connected to said second voltage follower output;

an operational amplifier having inverting and noninverting input being connected to said differential amplifier output;

sensing means responsive to temperature changes in said solution for producing a variable impedance; and,

feedback means for said operational amplifier including said sensing means connected between said operational amplifier inverting input and said second drive probe, whereby said operational amplifier responds to said variable impedance for maintaining said signal at a predetermined level.

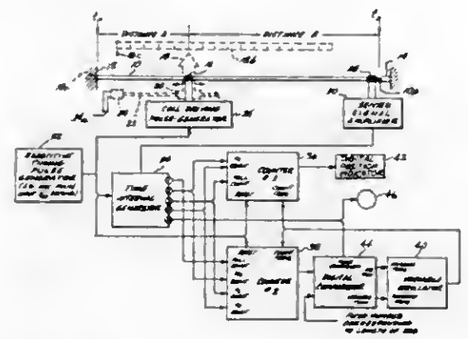
4,028,619

POSITION LOCATING USING DIGITAL LOGIC CONTROLLED BY PULSE PROPAGATION TIME INTERVALS

Gerald L. Edwards, Seattle, Wash., assignor to CX Corporation, Seattle, Wash.

Filed Sept. 22, 1975, Ser. No. 615,387
Int. Cl.² G01R *33/12*
U.S. Cl. 324—34 PS **13 Claims**

1. Apparatus for gauging location of a movable element in longitudinal relation to an elongated wave energy propagative member, comprising in combination a first transducer means positionally associated with said element and operable in energy transfer relationship with said member to induce a wave energy impulse locally in said member that propagates longitudinally therein bidirectionally from the first transducer means location, drive means operable to energize said first transducer means with an impulse having a duration a minor fraction of the time required for propagation of such wave energy impulse from end to end of the member, means terminating said member at one end thereof to reflect incident wave energy therein without phase reversal, the opposite end of said member being terminated to reflect incident wave energy therein with phase reversal, second transducer means in energy transfer relationship with said member responsive to changes in energy state of said member produced by a wave energy impulse traversing said second transducer means, said second transducer means being located adjacent to and spaced from said opposite end by a distance producing additive overlapping responses therein from incident and reflected waves traversing said second transducer means so as to provide a composite single response at substantially the instant the propagating impulse arrives at said opposite end, and time interval measurement means responsively connected to said second transducer means for deriving the location of said element from time events in the occurrences of the second transducer means composite responses first from the wave energy impulse propagating to the second transducer means directly from the first transducer means and second from that propagating to such second transducer means after reflection from said one end of the member.

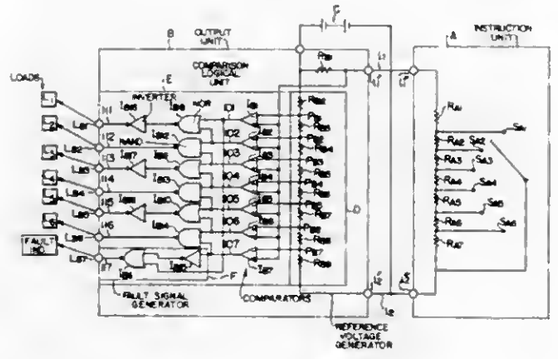


4,028,620

ELECTRICAL WIRING SYSTEM FOR SELECTIVELY ACTUATING ELECTRICAL LOADS

Junji Kitagawa, and Sigeyuki Akita, both of Okazaki, Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Oct. 9, 1975, Ser. No. 621,233
Claims priority, application Japan, Nov. 26, 1974, 49-136935
Int. Cl.² G01R *31/02*; H02J *1/00*; H04Q *1/08*
U.S. Cl. 324—51 **8 Claims**



7. An electrical wiring system for selectively actuating a plurality of loads when connected to respective output terminals, comprising:

a plurality of said output terminals,

electrical power means,

output terminal selection means having a single signal output line and being connected across said power means for selectively applying to said signal line a voltage having an instant magnitude uniquely corresponding to the one of the said output terminals selected by said selection means, and

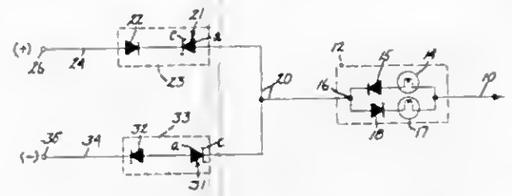
output means connected across said power means and to said signal line for generating on the basis of the instant magnitude of the voltage on said signal line a load actuating output signal at only the one of said output terminals which corresponds to said instant voltage magnitude.

4,028,621

PORTABLE AUTOMOTIVE TEST PROBE

James M. Bloxam, 133 Skyline Drive, St. Paul, Minn. 55110

Filed Dec. 18, 1975, Ser. No. 642,077
Int. Cl.² G01R *31/02, 19/14, 31/28*
U.S. Cl. 324—51 **12 Claims**



1. An automotive trouble-shooting test probe, comprising:

a. an electrically conductive probe member;

b. a first electrical terminal suitable for connection to a positive voltage output terminal of a storage battery;

c. a second electrical terminal suitable for connection to a negative or ground voltage output terminal of a storage battery;

d. a third electrical terminal;

e. a first circuit path electrically connecting said probe member with said third electrical terminal, comprising a first indicator lamp and a first current rectifying device serially connected between said probe member and said third electrical terminal for normally enabling positive current flow therethrough only in the direction from said probe member to said third electrical terminal;

f. a second circuit path electrically connected in parallel with said first circuit path between said probe member and said third electrical terminal, comprising a second indicator lamp and a second current rectifying device serially connected between said probe member and said third electrical terminal for normally enabling positive current flow therethrough only in the direction from said third electrical terminal to said probe member; and

g. a third circuit path, independent of said first and said second circuit paths, electrically connecting said first and said second terminals with said third terminal, comprising reference circuit means responsive to at least a predetermined threshold voltage level between said first or said second electrical terminals and said third electrical terminal, for establishing a fixed voltage reference level at said third electrical terminal, as measured with respect to the voltage levels present at said first and said second electrical terminals.

4,028,622

SELECTIVE INTERMODULATION DISTORTION MEASUREMENT

James Gifford Evans, and Gerald Demarest Haynie, both of Colts Neck, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 28, 1976, Ser. No. 700,537
Int. Cl.² G01R *27/00*
U.S. Cl. 324—57 N **12 Claims**

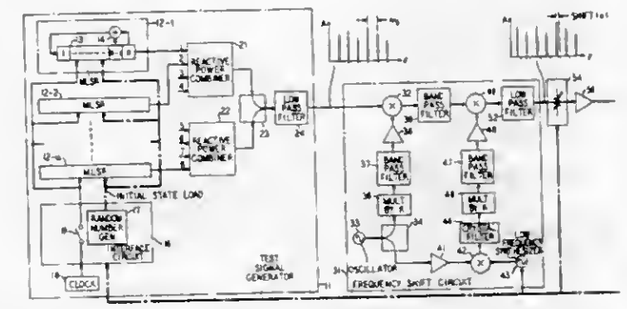
1. Apparatus for obtaining a measure of nonlinearity introduced by transmission apparatus comprising:

generating means for producing a wide bandwidth noise signal having a plurality of spectral components wherein the amplitude differences of the spectral components from the mean amplitude of all the spectral components substantially conform to a normal distribution over the frequency range of the wide bandwidth;

translating means for shifting the frequency of the noise signal by changing the frequency of each of the plurality of spectral components in the noise signal;

filtering means for substantially eliminating the spectral components in a frequency band to produce an output signal having a quiet band in the noise signal provided by said translating means;

means for applying the output of said filtering means to said transmission apparatus;



suppressing means connected to an output of said transmission apparatus for substantially reducing the faithfully delivered portion of the noise signal to reduce its strength relative to the intermodulation distortion products introduced by the nonlinearity of said transmission apparatus, and

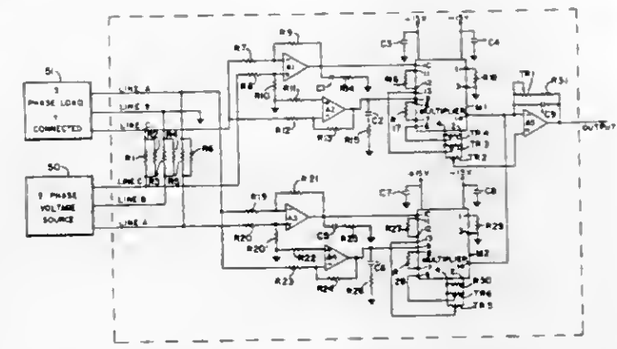
selective detecting means for resolving and indicating the level of one order of the intermodulation distortion products.

4,028,623

THREE PHASE SPIN MOTOR POWER METER

James B. Dowdle, Jr., Orlando, Fla., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 6, 1976, Ser. No. 655,932
Int. Cl.² G01R *21/00*
U.S. Cl. 324—142 **1 Claim**



1. Meter for measuring the energy flows from a 3-phase quasi square excitation source to a 3-phase load with a Y connected floating neutral comprising a plurality of first amplifier means for sensing individual phase voltages; a plurality of second amplifier means for sensing individual phase currents; a plurality of multiplier means having first and second input terminals and an output terminal whereby inputs to the first and second terminals are multiplied by each other and the result fed to an output terminal; said plurality of first amplifier means having outputs connected individually to said first input terminals of the plurality of multiplier means; said plurality of second amplifier means having outputs connected individually to the second input terminal of said multiplier means; averaging means having a plurality of inputs and an output; said

outputs of said plurality of multiplier means being fed to the input terminals of said averaging so that the output of the averaging means will be an average of the outputs of the plurality of multiplier means; resistors connected between the 3-phase source and the 3-phase load; said load having one phase connected to ground; said second means being two differential amplifiers connected individually across different ones of said resistors so as to measure the current flow therein; said first means being two amplifiers connected individually between one side of different ones of said resistors and ground so as to sense two phases of the voltages; said multiplier means are electronic chips; and said averaging means is a current to voltage converter connected to the chips so as to average current outputs from the chips and convert the current to voltage output for the meter.

4,028,624

ELECTRONIC SWITCHING ARRANGEMENT FOR A HOMING AND TRAFFIC RADIO SYSTEM

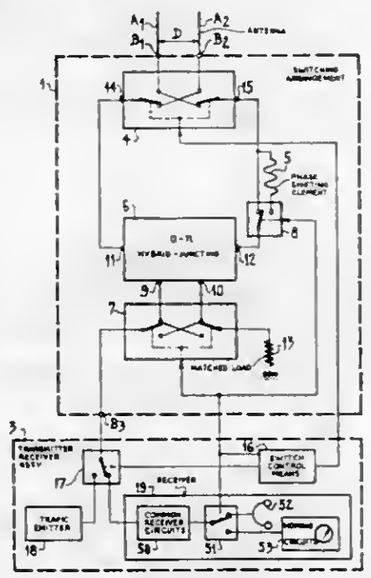
Armand Saint-Lot, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Mar. 10, 1976, Ser. No. 665,392

Claims priority, application France, Mar. 11, 1975, 75.07521

Int. Cl.² H04B *1/52*

U.S. Cl. 325—23 **8 Claims**



1. An electronic switching arrangement which is intended to be fitted to a system for homing radio direction-finding and traffic radio transmission and reception, and to connect in a said system a radiating arrangement having two antennas to a transmitter/receiver to produce the two operating modes, namely homing and traffic, the said switching arrangement comprising: a first and a second terminal for connection to the said antennas respectively; a third terminal for connection to the said transmitter/receiver; and switching and phase-shifting means which are connected to the two paths extending respectively from the said first and second terminals to the said third terminal, to make these paths of the same electrical length in the traffic mode and of different lengths in the homing mode by inserting a phase-shifting device in one path and, in this latter mode, to interchange the connections at the ends of the said paths to the said first and second terminals by means of a first double, two-channel switching device, the said phase-shifting device comprising a line element determined to introduce a phase-shift of $(2\pi D)/\lambda$, λ being the wavelength and D the distance between the said antennas predetermined at most equal to a quarter of the minimum wavelength of the operating band, and a coupling device of the $0 - \pi$ hybrid junction type for coupling the said paths to the said third terminal while introducting a phase-shift of π in the said band in the homing mode and zero phase-shift in the traffic mode.

4,028,625

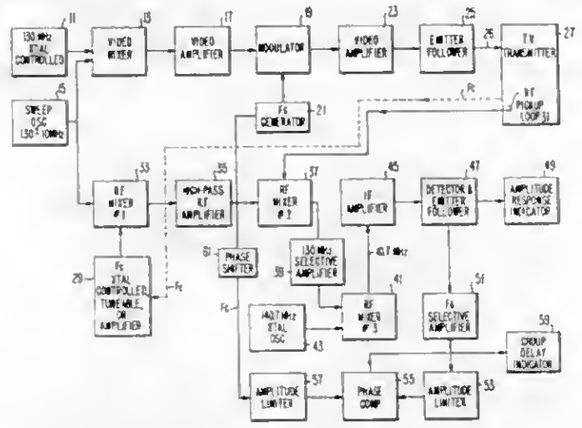
SIDEBAND ANALYZER FOR AM TRANSMITTERS

William Louis Behrend, Pittsburgh, Pa., assignor to RCA Corporation, New York, N.Y.

Filed May 5, 1975, Ser. No. 574,685

Int. Cl.² H04B *1/02*

U.S. Cl. 325—133 **8 Claims**



1. An anayzer for measuring the sideband responsc of an amplitude modulation transmitter under test over a predetermined band of frequencies comprising:

means for generating first and second frequency scan signals, the frequencies scanned over the same time period equalling said predetermined band of frequencies,

tone generator means for generating a tone,

first means responsive to said first frequency scan signal and said tone for amplitude modulating said first frequency scan signal with said tone,

coupling means for applying said first frequency scan signal amplitude modulated with said tone to said transmitter under test to produce transmitted sideband signals at sequentially changing sideband frequencies,

pick-up means to extract the modulated radio frequency signals from said transmitter,

second means including a mixer and frequency selector coupled to said pick-up means and additionally responsive to said second frequency scan signal for sequentially and individually providing at a fixed frequency said transmitted sideband signals as said second frequency scan signal scans said predetermined band of frequencies, and means including a tone detector coupled to said second means and responsive to the transmitted sideband signals at said fixed frequency for detecting the response of said tone amplitude modulated on the individual sidebands to thereby measure the individual sideband response of said transmitter under test.

4,028,626

DIGITAL DATA RECEIVER WITH AUTOMATIC TIMING RECOVERY AND CONTROL

David M. Motley, Santa Ana, and King Y. Cheng, Tustin, both of Calif., assignors to Hycom Incorporated, Irvine, Calif.

Continuation of Ser. No. 405,574, Oct. 11, 1973, abandoned, which is a continuation-in-part of Ser. No. 324,657, Jan. 18, 1973, abandoned. This application Mar. 24, 1975, Ser. No. 561,038

Int. Cl.² H04B *1/10*

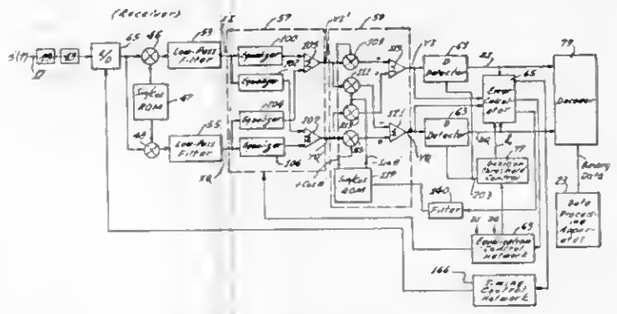
U.S. Cl. 325—324 **23 Claims**

20. A receiver for receiving and detecting a modulated analog data signal comprising:

sampling means for providing a succession of digital samples from the analog signal;

noncoherent demodulated means for producing a demodulated digital signal from the digital samples with the demodulated signal having components in first and second channels;

phase correction means for making corrections in the phase of the demodulated signal to provide a phase corrected signal having components in the first and second channels;



detecting means for providing a detected signal from the phasc corrected signal with the detected signal having components in the first and second channels;

error calculator means responsive to at least one of the phase corrected signal and the detected signal for providing an error signal; and

said phase correction means including means responsive to the error signal to update said corrections so as to reduce the phase error in the phase corrected signal.

4,028,627

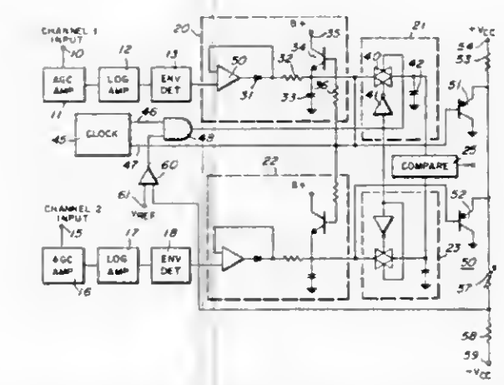
SAMPLE AND HOLD VALLEY DETECTOR

Susumu Cho, Elk Grove Village; Paul Milton Erickson, Oak Park, and Michael William Null, Schaumburg, all of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 29, 1975, Ser. No. 645,003

Int. Cl.² H04B *1/16*

U.S. Cl. 325—349 **8 Claims**



1. An audio signal quality detector comprising sample and hold valley detector means connected to receive an audio signal from the discriminator of a radio receiver, said sample and hold valley detector means comprising:

a. envelope detector means providing an output signal varying in accordance with peaks of the audio signal;

b. resettable valley detector means having an output, a signal input and a reset input for returning signals at the output to a predetermined level when a reset signal is applied to the reset input, said valley detector means including storage means for storing a signal indicative of the lowest valley applied to the signal input thereof subsequent to the last reset signal applied thereto, and the signal input of said valley detector means being coupled to receive the output signal from said envelope detector means;

c. sample and hold gate means having a signal input, an output and a rigger input for operating said gate means to store a signal indicative of the amplitude of a signal present at the signal input when a trigger signal is applied to the trigger input, said signal input being coupled to the output of said valley detector means; and

d. clock means having a first output connected to the reset input of said valley detector means and having a second output connected to the sample and hold gate means trigger input, said clock means supplying first periodic pulses at the first output and second periodic pulses, delayed from the first periodic pulses, at the second output.

4,028,628

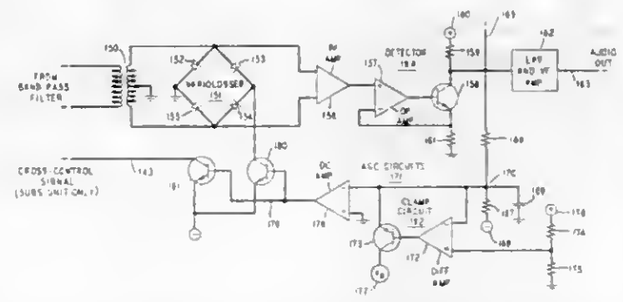
TRANSCEIVERS FOR SINGLE CHANNEL CARRIER TELEPHONE SYSTEMS

Tadikonda Narashimha Rao, Morristown, N.J., and Rouben Toumani, Teheran, Iran, assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 5, 1975, Ser. No. 638,152

Int. Cl.² H04B *1/16*

U.S. Cl. 325—400 **8 Claims**



1. A carrier receiving circuit including a variable attenuation circuit, a detector, and an automatic gain control circuit connecting the output of said detector to said attenuation circuit in order to maintain the average output of said detector at a preselected level, characterized by

a direct current clamp circuit connected to said automatic gain control circuit to clamp the output from said gain control circuit at a value close to the middle of the normal operation range of said automatic gain control circuit,

a differential amplifier for comparing the output of said detector to a preselected value, and

means responsive to said differential amplifier circuit for enabling said clamp circuit.

4,028,629

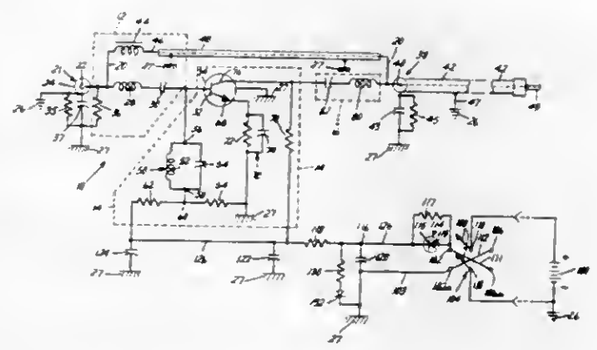
BAND PASS AMPLIFIER

Robert S. Ringland, Burlington, Iowa, assignor to Tandy Corporation, Fort Worth, Tex.

Filed Apr. 26, 1976, Ser. No. 679,882

Int. Cl.² H03F *3/04*

U.S. Cl. 330—2 **10 Claims**



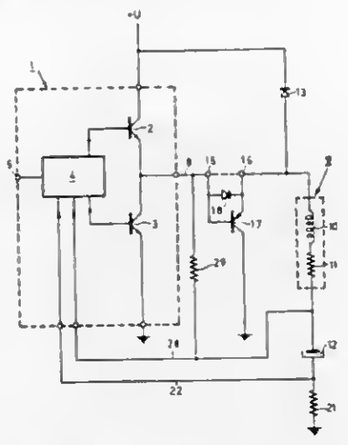
1. Apparatus comprising:

first circuit means for passing a band of frequencies and attenuating all other freqencies;
amplifying means coupled to said first circuit means having an amplifying state for amplifying said band of frequencies and a non-amplifying state;
said first circuit means and said amplifying means having a first gain spread for the frequencies in said band of frequencies, when said amplifying means is in said amplifying state and a second gain spread for the frequencies in said band of frequencies when said amplifying means is in said non-amplifying state;
switch means coupled to said amplifying means for switching said amplifying means between said amplifying state and said non-amplifying state; and
second circuit means coupled to said switch means for making said first gain spread and said second gain spread substantially equal.

4,028,630
PUSH-PULL AMPLIFIER ARRANGEMENT

Wilhelm Graffenberger, and Gerd Onken, both of Hamburg, Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 479,467, June 14, 1974, abandoned. This application Feb. 23, 1976, Ser. No. 660,699
Claims priority, application Germany, June 23, 1973, 2332092; Dec. 11, 1973, 2361525; Mar. 8, 1974, 2411108
Int. Cl.² H03F *3/26*
U.S. Cl. 330—15 **12 Claims**



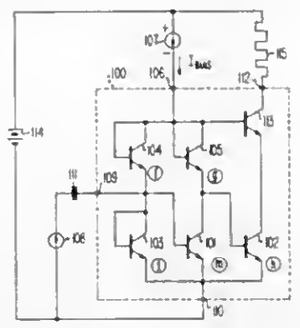
1. An amplifier circuit arrangement comprising a first and a second push-pull controllable transistor both disposed in a monolithic semiconductor body, a connection terminal point coupled to said transistors to which a load can be connected, means for applying an input signal to said transistors, and a push-pull output amplifier comprising the first transistor and a third transistor disposed outside of said body, the second transistor supplying only the base current for the third transistor.

4,028,631
CURRENT AMPLIFIERS

Adel Abdel Aziz Ahmed, Annandale, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Apr. 26, 1976, Ser. No. 680,074
Int. Cl.² H03F *3/343*
U.S. Cl. 330—19 **5 Claims**

3. A current amplifier comprising:
input, output and common terminals;
an even-numbered plurality of semiconductor junctions;
means exclusive of said semiconductor junctions for applying an input signal current between said input and common terminals;
means for forward-biasing each of said semiconductor junctions;
first and second junction transistors of the same conductivity type, each having base and emitter and collector electrodes and being operated at substantially the same temperature;
means for connecting said first transistor as a first common-emitter amplifier, including a connection without intervening elements of its base electrode to said input terminal and a connection of its emitter electrode to said common terminal;
means for connecting said second transistor as a second common-emitter amplifier in direct-coupled cascade after said first common-emitter amplifier, including a

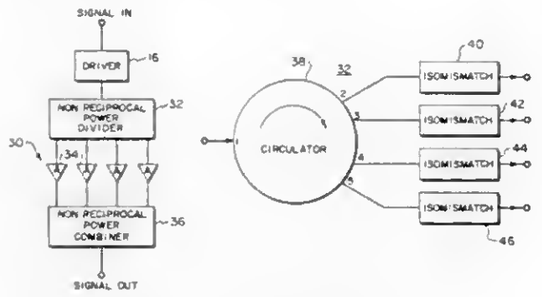


connection of its base electrode to the collector electrode of said first transistor, a connection of its emitter electrode to said common terminal and a connection of its collector to said output terminal; and
a direct coupled current feedback connection of the collector electrode of said first transistor to its base electrode through a series connection of said plurality of semiconductor junctions poled in a first direction within said series connection and the remaining half of said plurality of semiconductor junctions poled in a second direction opposite to said first direction within said series connection.

4,028,632
POWER DIVIDING AND COMBINING TECHNIQUES FOR MICROWAVE AMPLIFIERS

John L. Carter, Ocean, and Joseph McGowan, Spring Lake Heights, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Division of Ser. No. 522,177, Nov. 8, 1974, Pat. No. 3,928,806. This application Sept. 17, 1975, Ser. No. 614,711
Int. Cl.² H03F *3/60;* **H01P** *1/36*
U.S. Cl. 330—53 **3 Claims**



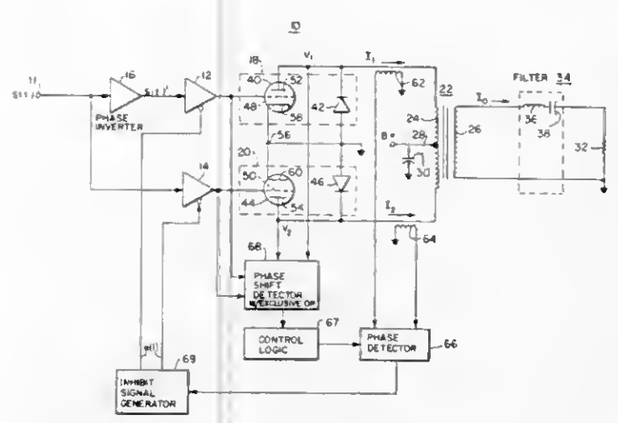
1. A power amplifier comprising:
nonreciprocal means for subdividing the power of an input microwave signal into N fractions and for isolating the N fractions from one another,
N substantially identical solid-state power amplifier units for amplifying the N fractions respectively, and
nonreciprocal means for combining the amplified fractions and emitting them as a single output,

said nonreciprocal combining means including a circulator having a plurality of input ports and one output port and a plurality of isoreflectors each having an input port and an output port,
each of said isoreflectors output ports being connected to corresponding ones of said circulator input ports,
each isoreflector being operable to transmit power received from the corresponding power amplifier unit and incident at the isoreflector input port and operable to reflect all power incident at said isoreflector output port,
said output port of the circulator providing the aforesaid single output.

4,028,633
DRIVE CONTROL TO PREVENT SIMULTANEOUS CONDUCTION IN PUSH-PULL SWITCHING AMPLIFIER

Jimmy Dale Rogers, Dallas, and Michael Earl Creecy, Richardson, both of Tex., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 19, 1976, Ser. No. 706,410
Int. Cl.² H03F *3/28*
U.S. Cl. 330—118 **14 Claims**

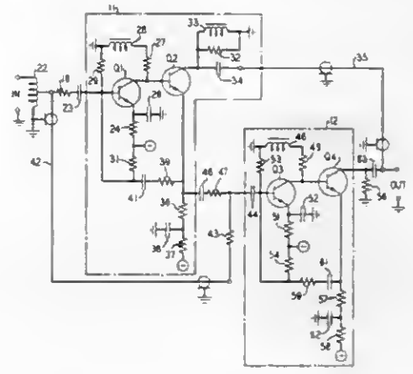


1. A push-pull amplifier comprising:
an input signal source;
first and second switching amplifier elements coupled to said input signal source and an output providing output current signals;
means for inverting said input signal to said first switching amplfier element 180° relative to said input signal applied to said second switching amplifier element;
first drive means coupling the inverted input signal to said first switching amplifier element, and second drive means coupling said input signal to said second switching amplifier element, said first switching amplifier element conducting said inverted input signal only when said first drive means is enabled, and said second switching amplifier element conducting said input signal only when said second drive means is enabled;
phase detection means to detect the phase of said output current signals; and
control means coupled to said phase detection means to provide control signals to enable one of said first and second drive means to conduct while inhibiting the other of said first and second drive means;
whereby said first and second switching amplifier elements will be prevented from simultaneous conduction and will conduct said input signal alternately at approximately 180° intervals.

4,028,634
FEED-FORWARD AMPLIFIER WITH SIMPLE RESISTIVE COUPLING

Kenneth Donald Tentarelli, Atkinson, N.H., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Feb. 11, 1976, Ser. No. 657,087
Int. Cl.² H03F *1/100*
U.S. Cl. 330—151 **7 Claims**



1. A feed-forward amplifier for amplifying electromagnetic wave signals comprising:
signal splitting means for dividing an input signal into first and second portions and applying said portions to first and second paths, respectively,
said first path including a main amplifier for producing an amplified replica of said input signal,
said amplified replica inherently including error components introduced by said main amplifier,
signal tapping means connected to said main amplifier for tapping off a portion of said amplified replica and applying it to a third path,
first signal combining means connected to said second and third paths for effecting subtraction of said second input signal portion from said amplified replica portion to produce an error signal substantially proportional to said error components, and for preventing feedback from said third path to said second path,
error amplifying means connected to said first signal combining means for amplifying said error signal, and
second signal combining means connected to said first path and said error amplifying means for effecting subtraction of said error components from said amplified replica to produce a substantially distortion-free output signal,
CHARACTERIZED IN THAT
said main amplifier has an output port with substantially zero output impedance,
said signal tapping means comprises a resistive splitting junction formed at said output port,
said error amplifying means has an input port with substantially zero input impedance, and
said first signal combining means comprises a resistive summing junction formed at said input port,
said third path introducing substantially zero phase shift between said output and input ports.

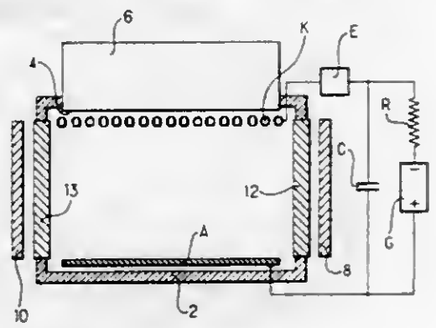
4,028,635
VIBRATION ENERGY TRANSFER LASER

Henry Brunet, L'Hay les Roses, France, assignor to Compagnie Generale d'Electricite, Paris Cedex, France

Filed Dec. 24, 1975, Ser. No. 644,008
Claims priority, application France, Jan. 15, 1975, 75.01176
Int. Cl.² H01S *3/22, 3/097*
U.S. Cl. 331—94.5 G **4 Claims**

1. In an apparatus for the stimulated emission of coherent radiation and comprising: a first gaseous molecular medium; means for exciting said first medium by supplying vibrational energy to its molecules; a second active gaseous molecular

medium; means for mixing said first and second mediums whereby vibrational energy is transferred from said first to said second medium to create a population inversion in said

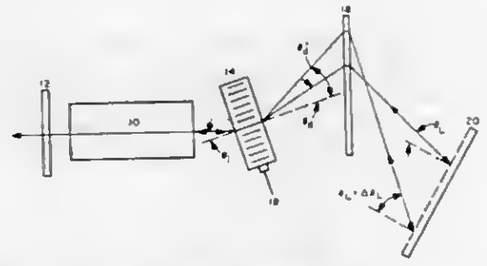


second medium; and means for stimulating the emission of coherent radiation from said second medium; the improvement wherein said second active medium is hydrogen bromide, and said first medium is nitrogen.

4,028,636
ACOUSTO-OPTICAL DEFLECTOR TUNED ORGANIC DYE LASER

Richard Swart Hughes, China Lake, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Continuation of Ser. No. 374,746, June 28, 1973, abandoned. This application Mar. 8, 1976, Ser. No. 664,784
Int. Cl.² H01S *3/10*
U.S. Cl. 331—94.5 C **6 Claims**



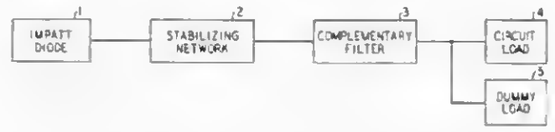
1. A laser tuning system comprising:
a laser cavity having two ends and including a laser cell emitting a band of laser light frequencies;
a laser output mirror bounding one end of said cavity;
an acousto-optic diffraction cell positioned in said laser cavity to diffract said laser light at an angle of diffraction;
means connected to said acousto-optic diffraction cell for controlling the angle of diffraction of the laser light; and
means at the other end of said laser cavity for retroreflecting, in response to said angle of diffraction, only one frequency of said band of laser light frequencies.

4,028,637
PARAMETRICALLY-STABLE NEGATIVE RESISTANCE DIODE CIRCUIT

James Walter Gewartowski, Allentown, and William Edward Schroeder, Coopersburg, both of Pa., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 14, 1976, Ser. No. 695,584
Int. Cl.² H03F *3/10;* **H03B** *5/12*
U.S. Cl. 331—107 R **10 Claims**

1. A parametrically-stable microwave circuit comprising:
a negative resistance diode for generating microwave signals;
a stabilizing network coupled to said diode for presenting to said diode a predetermined impedance over a broad range of frequencies including a low frequency and an operating frequency, thereby suppressing spurious oscillations in the circuit; and

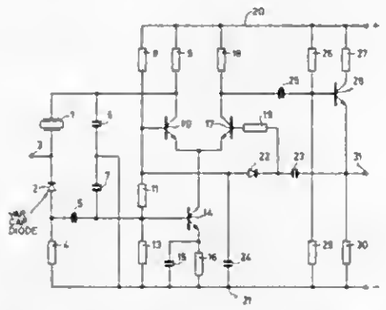


means coupled to said network for selectively coupling said signals to a dummy load or a circuit load and presenting to said network a substantially constant impedance from said low frequency to the operating frequency.

4,028,638
STABILIZED CRYSTAL CONTROLLED OSCILLATOR

Allistair Towle, Willowdale, Canada, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 15, 1976, Ser. No. 666,603
Claims priority, application Canada, Mar. 20, 1975, 222663
Int. Cl.² H03B *3/02, 5/36*
U.S. Cl. 331—109 **6 Claims**



1. An oscillator comprising a first transistor amplifier, a tuned resonant circuit means for feeding an oscillatory voltage to said first transistor amplifier, said amplifier having a low impedance load circuit including a pair of transistors coupled in differential amplifier arrangement, the transistors of the pair having a common emitter circuit, one of said pair of transistors being coupled to feed amplified oscillatory voltage back to said resonant circuit to maintain oscillation therein, a rectifier system, the other of said pair of transistors being coupled for feeding amplified oscillatory voltage to said rectifier system to produce a pair of opposed direct current control voltages, and means to supply said direct current control voltages to the control electrodes of the pair of transistors with such polarity as to reduce the conductivity of said one transistor of the pair and increase the conductivity of the other transistor of said pair.

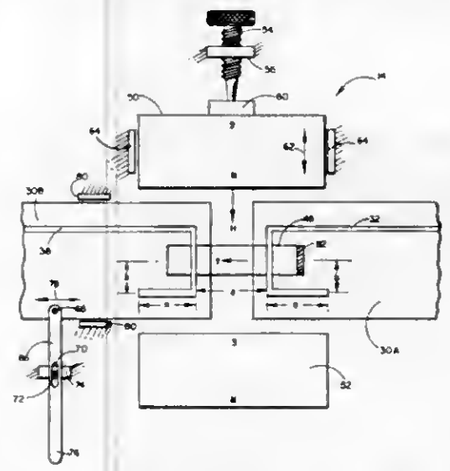
4,028,639
OSCILLATOR USING MAGNETOSTATIC SURFACE WAVE DELAY LINE

Peter J. Hagon, Corona del Mar, and John Haworth, Placentia, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 3, 1975, Ser. No. 619,268
Int. Cl.² H03B *5/32*
U.S. Cl. 331—107 A **2 Claims**

1. A tunable variable frequency oscillator comprising:
amplifier means having an input port and an output port for an electrical signal; and
magnetostatic surface wave delay line means for controlling the frequency of said electrical signal interconnected in a feedback path coupled around said amplifier means from the output port thereof to the input port thereof, said magnetostatic surface wave delay line means comprising:

a magnetostatic surface wave propagating medium having a substantially planar propagation surface,
magnetic means for establishing a bias magnetic field having a magnetic field intensity substantially parallel to said propagation surface;
input microstrip coupling means adjacent said propagation surface for receiving said electrical signal from the output port of said amplifier means and for causing a magnetostatic disturbance on said propagation surface in response to said electrical signal;
said input microstrip coupling means having an orientation with respect to said propagation surface and said magnetic field intensity which causes said magnetostatic disturbance to propagate along said propagation surface in a direction perpendicular to said magnetic field intensity; and
output microstrip coupling means adjacent said propagation surface and displaced from said input coupling means for sensing said magnetostatic disturbance propagated thereto from said input coupling means whereby said electrical signal is re-established in said output



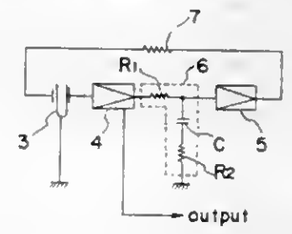
coupling means for connection to the input port of said amplifier means;
said microstrip coupling means each comprising:
a ground plane of conductive material;
a substrate of dielectric material positioned adjacent said ground plane; and
a narrow strip of conductive material deposited on said substrate wherein said substrate is interposed between said strip of conductive material and said ground plane;
means for moving said magnet means relative to said magnetostatic surface wave propagating medium to vary the intensity of the magnetic field at said magnetostatic surface wave propagating medium to vary the frequency of oscillation of said oscillator;
means for moving at least one of said microstrip couplers with respect to the other of one of said microstrip couplers and said magnetostatic surface wave propagating medium to vary the displacement of said microstrip couplers from each other to vary the frequency of oscillation of said oscillator.

4,028,640
PIEZO-ELECTRIC TUNING FORK OSCILLATION CIRCUIT

Takeshi Nakamura, Hakui, Japan, assignor to Murata Manufacturing Co., Ltd., Kyoto, Japan

Filed Mar. 12, 1976, Ser. No. 666,268
Claims priority, application Japan, Mar. 13, 1975, 50-30756
Int. Cl.² H03B *5/36*
U.S. Cl. 331—116 R **5 Claims**

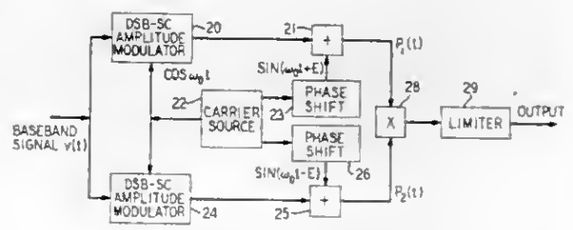
1. A piezo-electric tuning fork oscillation circuit which comprises a piezo-electric tuning fork and an external circuit coupled to said piezo-electric tuning fork, said external circuit being provided with a phase correction-circuit including resistor and capacitor elements, with said phase correction circuit having phase characteristics wherein the oscillation frequency coincides with the center frequency of the piezo-electric tuning fork over a wide frequency range, with the phase shift angle of said phase correction circuit being adapted to increase with increase of the frequency for producing stable oscillation having the maximum oscillation output obtainable from said phase correction circuit.



4,028,641
LINEAR PHASE MODULATOR INCLUDING A PAIR OF ARMSTRONG MODULATORS

William Fred Bodtmann, Middletown, and Clyde Leslie Ruthroff, Holmdel, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 11, 1976, Ser. No. 685,407
Int. Cl.² H03C *3/40*
U.S. Cl. 332—18 **6 Claims**



1. A method of generating a phase modulated signal having essentially no even-order and third-order nonlinearities, comprising the steps of:
a. concurrently modulating an input signal with a first carrier signal in a first and a second suppressed-carrier modulator arranged in separate parallel paths for generating first and second output signals, respectively;
b. adding to each of said first and second output signals a second and a third carrier signal, respectively, for generating respective third and fourth output signals, said second and third carrier signals comprising the same frequency as said first carrier signal while differing in phase from quadrature by preselected equal and opposite amounts; and
c. combining said third and fourth output signals in a multiplier circuit for generating the phase modulated signal having essentially no even-order and third-order nonlinearities.

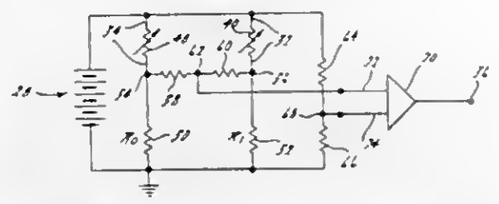
4,028,642
CIRCUIT FOR CONVERTING A TEMPERATURE DEPENDENT INPUT SIGNAL TO A TEMPERATURE INDEPENDENT OUTPUT SIGNAL

Toshimoto Kushida, Dearborn, and Eleftherios M. Logothetis, Birmingham, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 494,269, Aug. 2, 1974, Pat. No. 3,915,135, which is a division of Ser. No. 375,993, July 2, 1973, Pat. No. 3,868,846. This application Oct. 3, 1975, Ser. No. 619,344

Int. Cl.² G01R *17/02*

U.S. Cl. 323—75 B **5 Claims**



1. A bridge circuit, for use in conjunction with a variable resistor whose resistance varies predictably in response to a sensed parameter and which varies by a factor of K_1 in response to a parasitic parameter, to generate an output signal which is independent of the parasitic parameter comprising:

a voltage source connected to the variable resistor;

a first resistance connected in series relationship with the variable resistor and said source operative to provide a first electrical circuit;

a first voltage divider connected to said source in parallel with said first circuit, said first voltage divider having at least one fixed resistance connected in series with at least one variable resistance;

said at least one variable resistance selected to be variable only in response to the parasitic parameters and arranged to provide a voltage at the junction of the at least one fixed resistance and the at least one variable resistance which varies by a factor of K_2 in response to the parasitic parameter, K_2 being inversely related to the voltage variation demonstrated at the junction of the variable resistor and said first resistance in the presence of the parasitic parameter; and

second voltage divider means comprising second and third fixed resistances connected in series to form a signal terminal therebetween, said second fixed resistance also connected to the junction of the variable resistor with said first resistance and said third fixed resistance connected to the junction of said at least one variable resistance with the at least one fixed resistance.

4,028,643
WAVEGUIDE HAVING STRIP DIELECTRIC STRUCTURE

Tatsuo Itoh, Menlo Park, Calif., assignor to University of Illinois Foundation, Urbana, Ill.

Filed May 12, 1976, Ser. No. 685,627

Int. Cl.² H01P *3/16, 3/20, 5/18, 7/00*

U.S. Cl. 333—6 **25 Claims**

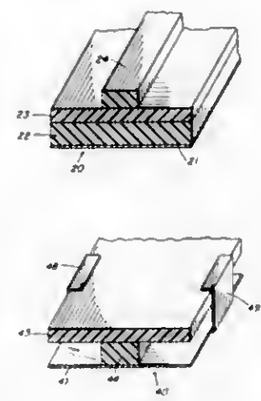
1. A microwave waveguide, comprising:

a conductive ground plane;

a first dielectric layer disposed on a surface of said ground plane;

a second dielectric layer overlaying said first dielectric layer, said second dielectric layer having a higher dielectric constant than said first dielectric layer; and

an elongated dielectric strip formed on said second dielectric layer, said strip having a width which is substantially less than that of said second dielectric layer said strip being formed of material having a dielectric constant



which is less than the dielectric constant of said second dielectric layer.

4,028,644
SYSTEM EQUALIZATION FOR REPEATERED SUBMARINE CABLE SYSTEM

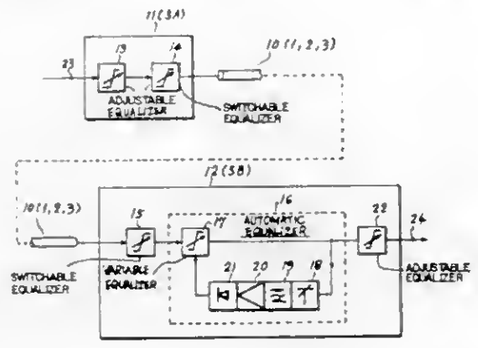
Yasuhiko Niiro, Tokyo, Japan, assignor to Kokusai Denshin Denwa Kabushiki Kaisha, Japan

Filed Dec. 9, 1975, Ser. No. 639,107

Claims priority, application Japan, Dec. 16, 1974, 49-144287

Int. Cl.² H03H *7/16*; **H04B** *3/10*

U.S. Cl. 333—16 **6 Claims**



1. A system equalizer, for use in a repeatered submarine cable system including automatic gain controlled submerged of a temperature following type, comprising:

a switchable equalizer connected to a repeatered submarine cable system including automatic gain controlled submerged repeaters of a temperature following type and switchable to select an optimum one of a plurality of loss-frequency characteristics corresponding to the total of compensation errors in said automatic gain controlled submerged repeaters to compensate for a seasonal misalignment of the repeatered cable system;

an automatic equalizer, including pilot signal detecting means for detecting a pilot signal transmitted through the repeatered cable system and for developing a control signal representative of the detected pilot signal, and connected to said switchable equalizer and having a loss-frequency characteristic proportional to the square root of frequency to compensate for short-term level fluctuations of the repeatered cable system under control of the control signal developed by said pilot signal detecting means; and

an adjustable equalizer connected to said automatic equalizer to compensate for an unknown fixed deviation developed at an output of said automatic equalizer.

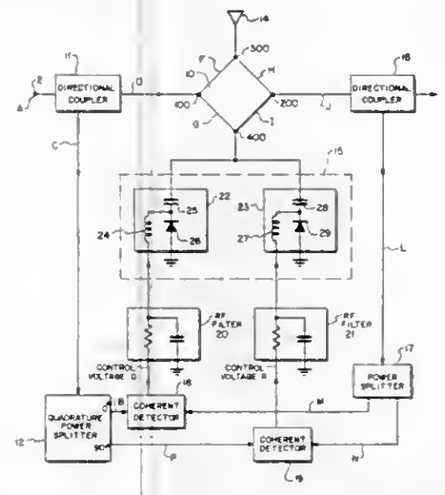
4,028,645
AUTOMATIC IMPEDANCE MATCHING USING RESISTIVE AND REACTIVE DIODES

Frank J. Tressa, Deer Park, N.Y., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed June 21, 1976, Ser. No. 698,447

Int. Cl.² H03H *7/40*

U.S. Cl. 333—17 M **7 Claims**



7. An automatic impedance matching circuit for maintaining isolation between two opposite ports of a four port hybrid in spite of random impedance variations at a third port said hybrid comprising:

means to sample the signals at both of the two said opposite ports;

coherent detector means coupled to said sampling means for deriving two DC signals related to the amount of leakage between said opposite ports;

an electronically variable impedance, connected to the fourth port of said hybrid; and

means to electronically vary said variable impedance in response to said DC signals in such a manner as to minimize the coupling between said opposite ports.

4,028,646
ELASTIC SURFACE WAVE DEVICES AND METHOD FOR MAKING THE SAME

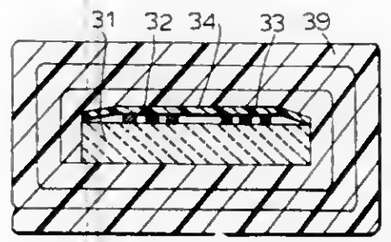
Hiroshi Ikushima, Katano; Yasuo Nakajima, Osaka; Kitokazu Hagiwara, Hirakata, and Takashi Nagata, Ikeda, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Dec. 29, 1975, Ser. No. 645,288

Claims priority, application Japan, Dec. 30, 1974, 50-1021; Mar. 20, 1975, 50-34106

Int. Cl.² H03H *9/26, 9/30, 9/10*; **H01L** *41/22*

U.S. Cl. 333—72 **24 Claims**



1. A surface elastic wave device comprising a resin casing having embedded therein a unitary body comprising: a piezoelectric plate; a transmitting interdigital transducer and a receiving interdigital transducer attached on one major surface of said piezoelectric plate, each transducer comprising a pair of electrodes facing each other, a wave propagation surface for a surface elastic wave being thereby defined on said major surface of said piezoelectric plate between said transducers; a thin film coextensive with said propagation surface and in contact with both of said transducers for preventing said surface elastic wave from being transferred from said wave propagation surface to said resin casing; and two pairs of electrical leads, the leads of one pair of which are respectively connected to the electrodes of said pair of electrodes of said transmitting transducer and the leads of the other pair of which are respectively connected to the electrodes of said pair of electrodes of said receiving transducer, all of said electrical leads being out of contact with said wave propagation surface.

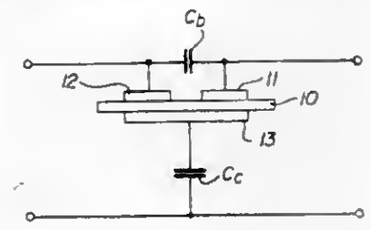
4,028,647
MONOLITHIC CRYSTAL FILTERS

Henry Kai-Hen Yee, Montreal, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Apr. 29, 1976, Ser. No. 681,438

Int. Cl.² H03H *9/26, 13/00, 7/08*

U.S. Cl. 333—72 **9 Claims**



1. A monolithic bandpass filter unit having an upper and a lower stopband comprising a monolithio piezoelectric substrate substrate having two adjacent electrodes on one surface thereof constituting two bilateral terminals of said filter unit, and a common electrode on the other surface opposite said two electrodes, whereby the resulting structure acts as a pair of coupled resonators; predetermined coupling capacitance between said two adjacent electrodes; and a capacitor interconnecting said common electrode and a common terminal of said filter unit and adapted, in cooperation with said coupling capacitance, to introduce a pair of finite poles one in each of the stopbands of said filter unit.

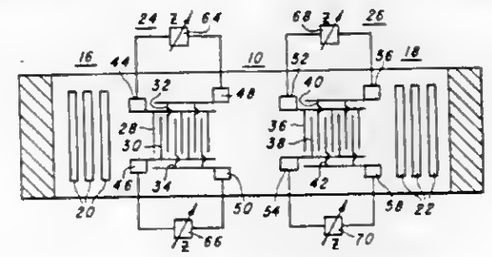
4,028,648
TUNABLE SURFACE WAVE DEVICE RESONATOR

Clinton S. Hartmann, and Robert E. Stigall, both of Richardson, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 8, 1976, Ser. No. 665,015

Int. Cl.² H03H *9/02, 9/26, 9/32, 13/00*

U.S. Cl. 333—72 **18 Claims**



1. A tunable surface wave resonator comprising:

a piezoelectric substrate;

a pair of reflector arrays on said substrate, said reflector arrays being aligned in spaced parellel relation to each other and respectively disposed at the opposite outer extremities of said substrate so as to provide a multiresonant cavity therebetween;

each of said reflector arrays comprising a plurality of spaced parallel discontinuities formed on said substrate,

tuning means formed on the substrate in the miltiresonant cavity, said tuning means being independent of said reflector arrays and selectively positioned as to the reflector arrays to provide selective uniform tuning for all modes of the multiresonant cavity; and

surface acoustic wave transducer means formed on said substrate and disposed between said tuning means and operably associated therewith to generate standing waves at a desired resonant frequency.

4,028,649

SURFACE ACOUSTIC WAVE FILTER

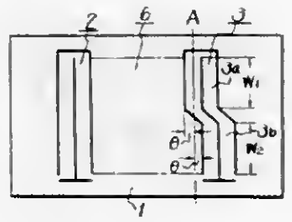
Yasutoshi Komatsu, Ayasemachi, and Yuzuru Yanagisawa, Fujisawa, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Dec. 19, 1975, Ser. No. 642,345

Claims priority, application Japan, Dec. 25, 1974, 50-3867; July 24, 1975, 50-90641

Int. Cl.² H03H *9/04, 9/26, 9/32*; **H01L** *41/10*

U.S. Cl. 333—72 **6 Claims**



1. A surface acoustic wave filter comprising:

a. a piezo-electric substrate having a major surface;

b. input and output transducers formed on the major surface of said substrate, each of said transducer consisting of a plurality of transducer elements; and

c. a plurality of surface acoustic wave propagation channels formed on said substrate between said input and output transducer; in which, when the width of a channel k is taken as W_k, and the phase difference between the length of the channel k and n times the wave length at the center frequency is taken as θ_k(n being a positive integer), the values of θ_k and W_k are selected to satisfy the following condition:

$$\frac{|RR'(\Sigma_k W_k e^{n\theta_k}) + (RQ' + R'Q)(\Sigma_k W_k e^{n\theta_k})(\Sigma_k W_k e^{-n\theta_k}) + QQ'(\Sigma_k e^{-n\theta_k})^2|}{|\Sigma_k W_k e^{n\theta_k}|} < 10^{-3}$$

where R and R′ are, respectively, mechanical reflection coefficients of said input and output transducers, Q and Q′ are, respectively, electrical reflection coefficients of said input and output transducers, and $\Sigma_k W_k$ is normallized as $\Sigma_k W_k = 1$, the transducer elements of said input transducer being located close together and electrically connected, and said plurality of surface acoustic wave propagation channels being formed without an overlapping area.

4,028,650

MICROWAVE CIRCUITS CONSTRUCTED INSIDE A WAVEGUIDE

Yoshihiro Konishi, Sagamihara; Kenichi Konno, Tokyo; Norihiko Yazawa, Kawasaki, and Norio Hoshino, Tokyo, all of Japan, assignors to Nippon Hoso Kyokai, Tokyo, Japan

Continuation of Ser. No. 361,817, May 18, 1973, Pat. No. 3,914,713. This application May 8, 1975, Ser. No. 575,512

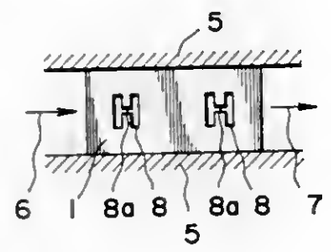
Claims priority, application Japan, May 23, 1972, 47-50993

Int. Cl.² H01P *1/20*

U.S. Cl. 333—73 W **5 Claims**

1. In combination with a waveguide having input and output openings and capable of sustaining an electric field along an E-plane parallel to the longitudinal axis of said waveguide, said waveguide having a predetermined first cut-off frequency,

a single conductive flat member mounted within said waveguide in parallel with said E-plane so as to form a cut-off region having a second cut-off frequency at a position where said single conductive flat member is inserted, said single conductive flat member having substantially the same height along the length of the member as the full inner height of said waveguide and uninterrupted straight edges adjacent the input and output openings of said waveguide,



said single conductive flat member including input and output planar circuit elements on a surface thereof adjacent the input and output openings respectively of said waveguide for coupling electromagnetic energy between said input and output openings at the second cut-off frequency, said second cut-off frequency being approximately double said first cut-off frequency when said conductive flat member is positioned substantially along the longitudinal axis of said waveguide, the input electromagnetic field being attenuated sufficiently at said second cut-off frequency to prevent coupling of electromagnetic energy directly between the input and output openings of said waveguide.

4,028,651

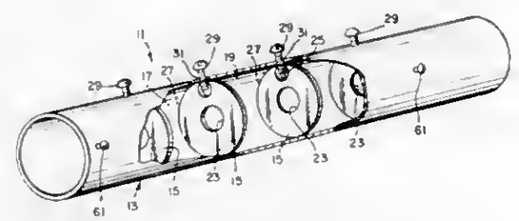
COUPLED-CAVITY MICROWAVE FILTER

Juri G. Leetmaa, Los Angeles, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed May 6, 1976, Ser. No. 683,979

Int. Cl.² H01P *1/20, 5/04, 7/06, 1/16*

U.S. Cl. 333—73 W **6 Claims**



1. A coupled-cavity microwave filter providing a narrow bandwidth with precisely controlled frequency responses, comprising:

a plurality of tandemly disposed, relatively high Q cylindrical cavity filters; and

coupling means including a relatively large non-adjustable primary iris aperture for coupling adjacent ones of said cavities, said coupling means also including a relatively smaller secondary tuning aperture disposed adjacent the outer edge of said irises, each of said secondary tuning apertures containing a tuning screw extending through a wall of an associated one of said cylinders for precisely adjusting the coupling between such adjacent cavities without degrading the cavity Q's thereof.

4,028,652

DIELECTRIC RESONATOR AND MICROWAVE FILTER USING THE SAME

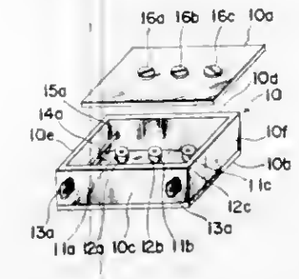
Kikuo Wakino, Muko; Toshio Nishikawa, Nagaokakyo; Sadahiro Tamura, and Youhei Ishikawa, both of Kyoto, all of Japan, assignors to Murata Manufacturing Co., Ltd., Kyoto, Japan

Filed Sept. 5, 1975, Ser. No. 610,780

Claims priority, application Japan, Sept. 6, 1974, 49-107909[U]; Oct. 12, 1974, 49-123304[U]; Jan. 22, 1975, 50-10752[U]; Jan. 27, 1975, 50-12555[U]; Jan. 27, 1975, 50-12556[U]; July 4, 1975, 50-93990[U]

Int. Cl.² H01P *7/06, 1/16, 1/20, 3/16*

U.S. Cl. 333—73 W **9 Claims**



1. A dielectric resonator which comprises a block of dielectric material and at least one aperture formed in said block, said aperture having a diameter selected to be within such a range that a substantial increase in frequency at a spurious mode having a spurious frequency adjacent a frequency at the dominant mode takes place relative to that attained by said dielectric block without said aperture, said diameter range also being such that an increase in frequency at the dominant mode relative to that attained by said dielectric block without said aperture takes place to a negligible extent, the ratio of the spurious frequency attained in the apertured dielectric resonator to that attained by the frequency at the dominant mode in said resonator being greater than about 1.3.

4,028,653

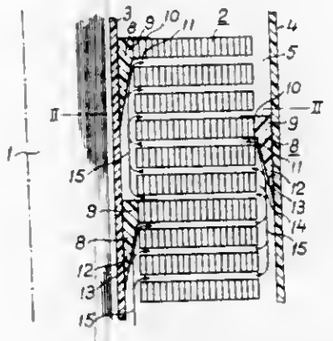
ELECTRICAL EQUIPMENT HAVING RADIAL COOLING CHANNELS WITH MEANS FOR GUIDING COOLING FLUID THROUGH THE CHANNELS

Tage Carlsson, and Wolfgang Lampe, both of Ludvika, Sweden, assignors to ASEA Aktiebolag, Vasteras, Sweden

Filed Apr. 1, 1976, Ser. No. 672,718

Int. Cl.² H01F *27/08*

U.S. Cl. 336—60 **3 Claims**



1. In electrical equipment having inner and outer insulating cylinders and a winding between the cylinders having a plurality of passages therethrough axially spaced with respect to the cylinders for passage therethrough of a cooling fluid, the winding being separated from one of the cylinders by a space, and a cooling fluid guide member in said space having first and second surfaces and having an enlarged head filling the space, said head including upper and lower flanges engaging a layer of said winding for securing said guide member to the winding, one of said surfaces engaging against the cylinder, and having a wedge-formed projection extending axially from the head with respect to the cylinders by a distance at least equal to the axial distance between two of said passages, said projection having the second surface forming with the winding a space decreasing in area towards the head, whereby the flow of cooling fluid is distributed between such passages.

4,028,654

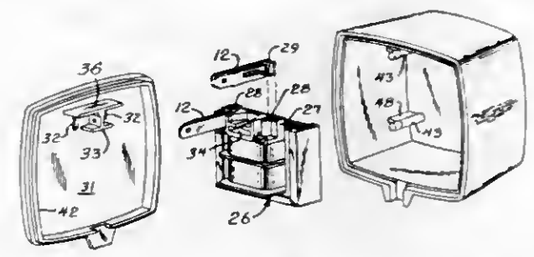
BATTERY CHARGER

Robert G. Bullard, Odell; James P. Plunkett, W. Dundee, and George F. Linning, Des Plaines, all of Ill., assignors to Coils, Inc., Huntley, Ill.

Continuation-in-part of Ser. No. 409,958, Oct. 26, 1973, abandoned. This application Jan. 7, 1976, Ser. No. 646,952

Int. Cl.² H01F *15/10*

U.S. Cl. 336—92 **10 Claims**



1. A voltage-reducing power pack including a case with a base plate having openings therein; a transformer in the case having a bobbin molded of one piece with a mounting head, said mounting head having a pair of spaced, parallel elongated slots therein; a pair of plug-in prongs having shanks respectively received edgewise in said slots; interlocking means between said mounting head and plug-in prongs preventing endwise movement of said prongs when in said slots; sturdy interlocking formations on said base plate and mounting head telescoping together as the plug-in prongs are threaded through said openings in said base plate to project normally for rigidifying the bobbin and the prongs with respect to the base plate; panel means extending from said base plate across open ends of said slots to retain said prongs in said slots; and a cover secured to the base plate and having formations thereon which engage the transformer structure in the direction of its insertion into the base plate to prevent detelescopic movement of said interlocking formations.

4,028,655

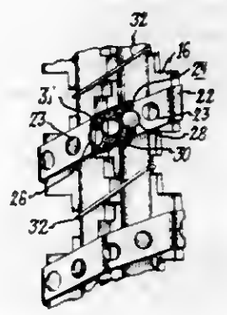
ELECTRICAL CURRENT LIMITING FUSE WITH BOUND SAND FILLER AND IMPROVED LOW CURRENT FAULT CLEARING

Robert E. Koch, Pittsfield, Mass., assignor to General Electric Company

Filed Oct. 9, 1975, Ser. No. 621,060

Int. Cl.² H01H *85/10*

U.S. Cl. 337—160 **8 Claims**



1. An electrical current limiting fuse of the type having an insulating tubular casing sealed at the ends by metal terminal

caps, at least one fusible element connected between the terminal caps and extending along the interior of the casing, and a bound matrix of sand packed inside the casing and surrounding the element, wherein the improvement comprises that;

a segment of said element approximately centrally located between said caps comprises one or more reduced surface area necks which are in addition to any regularly spaced reduced cross-section necks of said element, and

an overlay of metal having a lower fusing temperature than said element on the surface of said segment.

4,028,656

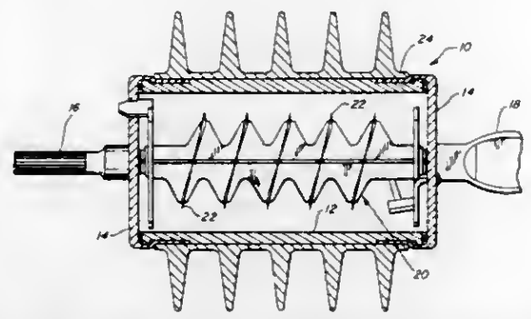
HIGH VOLTAGE FUSE WITH OUTER HEAT-SHRINKABLE SLEEVE

E. William Schmunk, Park Ridge, and Thomas J. Tobin, Morton Grove, both of Ill., assignors to S & C Electric Company, Chicago, Ill.

Filed Nov. 19, 1975, Ser. No. 633,487

Int. Cl.² H01H *85/20*

U.S. Cl. 337—186 **11 Claims**



1. In a high voltage current limiting fuse, the fuse including a relatively short hollow cylindrical housing fabricated from an electrically insulating material, end walls mounted over each end of the housing, a current responsive element positioned within the housing, and means for connecting the current responsive element to an external circuit, said housing being relatively short for the current limiting capabilities of the fuse; wherein the improvement comprises:

a hollow cylindrical sleeve fabricated from an insulating material having a dimensional memory and having surface elongating means formed on the exterior thereof for increasing the external path of the fuse, said sleeve having a coating of thermosetting plastic on the interior surface thereof and being expanded in its radial dimension, positioned around the hollow cylindrical housing and bonded to the housing by causing said sleeve to seek its original radial dimension to form a moisture proof seal therebetween.

4,028,657

DEPOSITED LAYER TYPE THERMOMETRIC RESISTANCE STRUCTURE

Walter G. Reichelt, Hanau, Germany, assignor to W. C. Heraeus GmbH, Hanau am Main, Germany

Filed Oct. 22, 1975, Ser. No. 624,964

Claims priority, application Germany, Oct. 24, 1974, 2450551

Int. Cl.² H01C *1/012*

U.S. Cl. 338—307 **12 Claims**

1. A thermometric electrical resistance structure comprising a carrier substrate consisting chiefly of aluminum oxide, an intermediate layer on said substrate and a patterned platinum layer of a configuration suitable for use as an electrical resistance provided on said intermediate layer, having the improvement that:

the platinum layer has a thickness in the range from 0.1 to 10 μm,

and the intermediate layer has a thickness in the range from 0.1 to 10 μm and is composed of an oxide material selected from the group consisting of oxides of rare earth elements, titanium oxide, iron oxide and mixtures of at least two of said oxides, whereby said oxide material, by providing electrical and mechanical stability to the structure in manufacturing heat treatment, improves the quality and reliability of the thermometric structure.

4,028,658

SAFETY DEVICE FOR AN OIL HYDRAULIC BRAKING SYSTEM

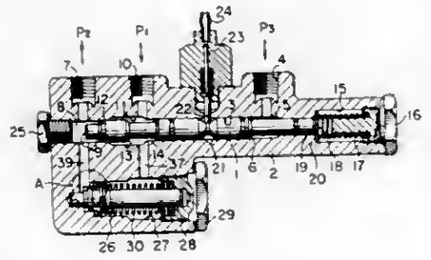
Hiroyuki Nakamura, Gotenba; Hiroshi Kawaguchi, and Kiyoshi Nishiwaki, both of Susono, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Mar. 22, 1974, Ser. No. 453,953

Claims priority, application Japan, Nov. 13, 1973, 48-127454

Int. Cl.² B60T *8/26*

U.S. Cl. 303—6 C **5 Claims**



1. A safety device for an oil hydraulic brake system comprising a housing containing a first bore and a second bore, first, second and third ports opening into said first bore, said first, second and third ports being connected to a front master clinder, and said second and third ports communicating with said second bore through passages formed in said housing, a rear wheel cylinder and a rear master cylinder, respectively, a piston slidably disposed in said first bore, said piston having a first effective pressure-receiving surface of a first area communicating with said first port, said first surface being adapted to receive a first force exerted by the oil hydraulic pressure of the front master cylinder in a first direction, a second effective pressure-receiving surface having a second area larger than said first area and communicating with said second port, said second surface being adapted to receive a second force exerted by the oil hydraulic pressure of the rear wheel cylinder in a second direction opposite to said first direction, a land portion adapted to provide communication between said second port and said third port when said piston is displaced in said second direction, a cam portion adapted to actuate an electrical contact when said piston has been displaced in either direction, a spring adapted to exert a force to said piston in said first direction within a limited stroke, said force being not less than the balance between said second and first forces, and a proportioning means disposed in said second bore and communicating with the rear master cylinder and the rear wheel cylinder through the passages formed in said housing and said second and third ports, said proportioning means adapted to transmit hydraulic pressure of the rear master cylinder to the rear wheel cylinder with a reduced increasing rate when the hydraulic pressure of the rear master cylinder is above a predetermined level.

4,028,659

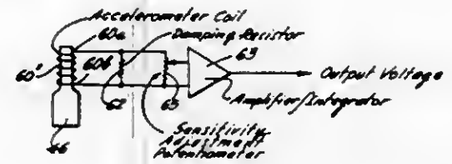
STRONG MOTION ACCELEROGRAPH WITH SELF-STARTER AND ELECTRICAL AS WELL AS LIGHT OUTPUTS

William J. Rihn, San Gabriel, Calif., assignor to Kinemetrics, Inc., San Gabriel, Calif.

Division of Ser. No. 298,536, Oct. 18, 1072, Pat. No. 3,877,256, which is a continuation-in-part of Ser. No. 96,325, Dec. 9, 1970, abandoned. This application July 5, 1974, Ser. No. 485,902

Int. Cl.² G01V *1/18*

U.S. Cl. 340—17 R **1 Claim**



1. Means to produce electrical voltage variations indicative of the intensities of earth tremors in the area in which said means is disposed, and to transmit said voltage variations to a receiving station for recording and observation, said means comprising:

a. a battery power source;

b. a radio frequency transmitter;

c. first switching means, said first switching means being connectedly interposed between said battery power source and said transmitter, and said first switching means having a first and normally set position whereby the flow of current from said battery power source to said transmitter is interdicted, and a second position to which said first switching means may be temporarily switched whereby such current flow may occur thereby to initiate operation of said transmitter;

d. a permanent magnet, said magnet providing a magnetic field about a predetermined axis;

e. a coil of wire, said coil being suspended within said field to oscillate, when jarred, along said axis, and thereby produce a flow of current in said coil;

f. current responsive relay means, the last said means being connected to opposite terminals of said coil and operatively associated with said first switching means in such manner that when current of a predetermined amperage flows in said coil, said switching means is moved from its first to its second position and retained in the latter position for a predetermined interval after current of such predetermined amperage ceases to flow in said coil;

g. second switching means, said second switching means being movable from a normally set first position, to a second position;

h. first resistance element, said first resistance element being normally connected across the opposite terminals of said coil by said second switching means in its first position, to effect electrical damping of oscillations of said coil within said magnetic field until acceleration applied to said coil shall reach a predetermined value, whereupon said first switching means is moved from its first position to its second position;

i. a second resistance element, said second resistance element being connected across the opposite terminals of said coil by said second switching means when in its second position, said second resistance element being of a different ohm value from the first resistance element, thereby to dampen the oscillation of said coil on a lesser basis than the damping effected by the first resistance element; and

j. amplifier integrator means, the input side of said amplifier integrator means being connected across said second resistance element, and the output side of said amplifier integrator means being connected to the input side of said transmitter, thereby to amplify the voltage variations generated in said coil during any oscillation thereof within said magnetic field when the second switching means is in its second position, and to deliver a current with such variations to the transmitter so that radio frequency signals corresponding to said voltage variations may be transmitted by said transmitter to said receiving station.

4,028,660

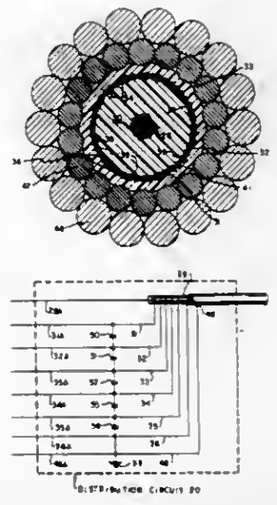
WELL LOGGING METHOD AND MEANS USING AN ARMORED MULTICONDUCTOR COAXIAL CABLE

Robert W. Pitts, Jr., Houston, Tex., assignor to Texaco Inc., New York, N.Y.

Division of Ser. No. 427,156, Dec. 21, 1973, Pat. No. 3,855,468. This application Aug. 5, 1974, Ser. No. 494,577

Int. Cl.² G01V *1/40*

U.S. Cl. 340—18 CM **11 Claims**



1. A well logging system comprising a logging tool adapted to be passed through a borehole in an earth formation, said logging tool includes means for sensing conditions in a borehole and providing at least two signals corresponding to the sensed conditions, one signal having a high frequency and at least one other signal having a low frequency; a transmission system including a shieldless armored multiconductor coaxial cable which comprises an inner conductor, a coaxial first insulator, groups of conductors arranged in a predetermined relationship to said inner conductor and separated from said inner conductor by said first coaxial insulator, means for separating the groups of conductors so as to insulate each conductor group from any other conductor group, a second coaxial insulator, and an outer armor of conductive material separated from said groups of conductors by said second coaxial insulator; the logging tool also includes means connected to the sensing means and to the transmission system for applying the high frequency signal to the inner conductor and to the groups of conductors of the cable and for applying the low frequency signal to one conductor group and to the outer armor of conductive material; and surface electronics adjacent to the borehole for processing the signals transmitted by the transmission system to provide outputs corresponding to the sensed condition.

4,028,661

PAGER SUBSYSTEMS

Thomas J. Mortimer, Amherst, N.H., assignor to Sanders Associates, Inc., Nashua, N.H.

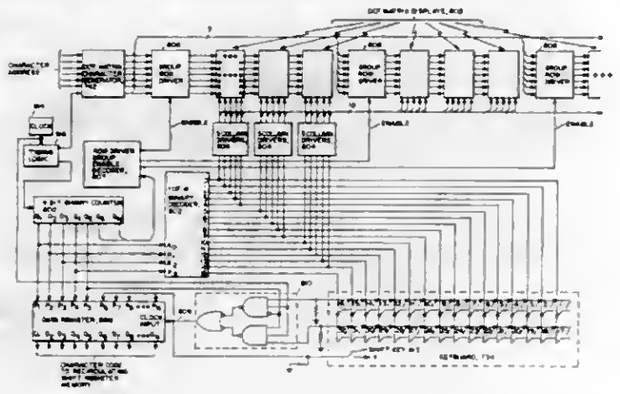
Filed May 22, 1975, Ser. No. 580,092

Int. Cl.² G06F *3/14*

U.S. Cl. 340—324 M **6 Claims**

1. An alpha numeric message encoder including a message

entry keyboard, a memory for storing the message entered from the keyboard, means having columns and rows, the columns of which are sequentially activated by strobing signals for displaying the message stored in the memory, and a



single logic circuit both for decoding the message entered at the keyboard prior to storage in said memory by providing a sequence of strobing signals for reading out the keyboard and for providing the same strobing signals for strobing said display means.

4,028,662

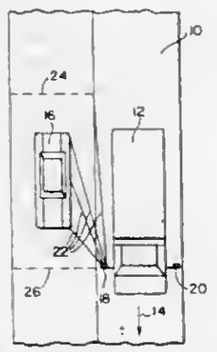
PASSING VEHICLE SIGNALLING APPARATUS

Raymond Donald Young, High St., Meredith, N.H. 03253

Filed May 24, 1976, Ser. No. 689,496

Int. Cl.² G08G *1/00*; G01S *9/66*

U.S. Cl. 340—32 **6 Claims**



1. A passing vehicle signalling apparatus comprising at least one rearwardly directed range detecting apparatus affixed outwardly and along one side of a first vehicle, said range detecting apparatus for detecting the presence of a second vehicle adjacent to and disposed rearwardly a maximum distance from said range detecting apparatus when said second vehicle is disposed outwardly from said one side of said first vehicle, maximum distance adjustment means for manufally adjusting said maximum distance, alarm means for signalling the presence of said second vehicle within said maximum distance, switch means for selectively operating said range detecting apparatus, timing means for permitting said range detecting apparatus to remain operative for a pre-set maximum period of time, said pre-set maximum period of time being capable of being foreshortened when said switch means being manipulated to de-energize said range detecting apparatus.

4,028,663

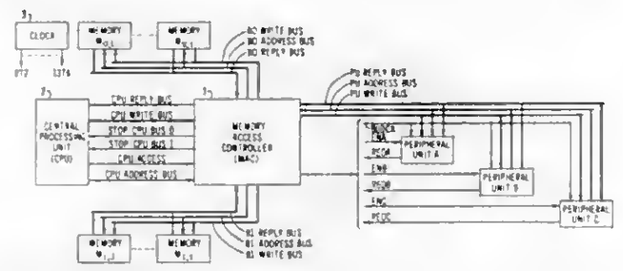
DIGITAL COMPUTER ARRANGEMENT FOR HIGH SPEED MEMORY ACCESS

Robert Dale Royer, Naperville, and Thomas Frank Schwab, Lisle, both of Ill., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 5, 1974, Ser. No. 476,435

Int. Cl.² G06F *13/00*

U.S. Cl. 340—172.5 **15 Claims**



1. A data processing system having a central processor, a plurality of peripheral units arranged in a preassigned priority, a plurality of memories accessible on request by said processor and said units and a memory access controller cooperating with said processor and said units to process conflicting access request for said memories , each one of said units comprising:

timing means startable for generating a first, a second, a third, and a fourth timing signal, each timing signal being generated at a predetermined interval after the start of said timing means;

means responsive to said first timing signal for forwarding to said controller an address designating one of said memories;

means responsive to said second timing signal for sending data from said one unit to said controller; and

means for repetitively generating access requests for said memories, said generating means being responsive to said third timing signal for stopping generation of said access requests;

said memory access controller comprising: a first priority circuit responsive to a first set of access requests generated by said units for starting the timing means in a first unit with the highest priority request in said first set, said set including a single request generated by each unit desiring to access said memories; and

means responsive to an address received from said first unit and to an address received from said processor for sending a blocking signal to stop the timing means in said first unit after said second timing signal is generated and before said third timing signal is generated when said processor and said first unit are requesting simultaneous access to the same memory.

4,028,664

APPARATUS FOR DISPATCHING DATA OF THE HIGHEST PRIORITY PROCESS HAVING THE HIGHEST PRIORITY CHANNEL TO A PROCESSOR

Earnest M. Monahan, Phoenix, and Garvin W. Patterson, Glendale, both of Ariz., assignors to Honeywell Information Systems, Inc., Waltham, Mass.

Filed Mar. 26, 1975, Ser. No. 562,314

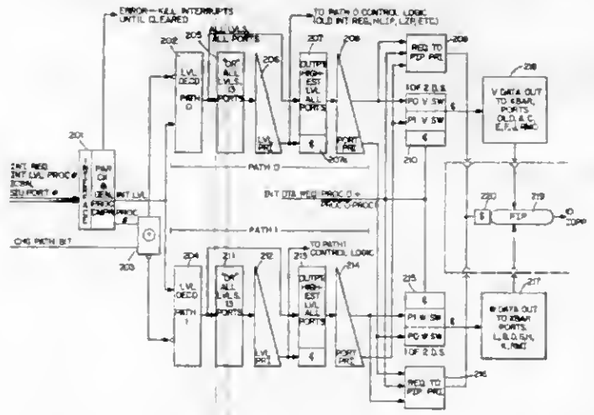
Int. Cl.² G06F *9/18*

U.S. Cl. 340—172.5 **9 Claims**

I. In a data processing system having a system interface unit (SIU), a plurality of peripheral units, a plurality of processors and at least one processor of said plurality of processors executing a first one of a plurality of processes having a first level of priority each of said processes having a priority level based on the relative importance of said plurality of processes, and with any of said processes generating signals for requesting

control of said one processor, said data processing system further including at least one peripheral channel for each one of said peripheral units, each peripheral channel selectivity coupled to said SIU for communication between any one of said peripheral units and said one processor, each peripheral channel having a priority level based on the relative importance of the peripheral unit associated with its peripheral channel, and with any of said peripheral channels also generating signals for requesting assignment to said one processor, a dispatcher mechanism in said SIU for dispatching data to said one processor by any one of said requesting processes based on priority of said peripheral channel of said requesting process and the priority of said requesting process, said dispatcher mechanism comprising:

a. a plurality of processor communication channels, one each of said plurality of processors coupled to said SIU via one each of said processor communication channels for communication between said any one of said plurality of processors and any one of said plurality of peripheral units;



b. first means responsive to a request signal indicative that a second process of said plurality of processes has requested control of said one processor, said first means for selecting one of a plurality of said processor communication channels;

c. second means in each of said processor communication channels for determining the highest priority peripheral channel of the highest priority second process of said group of processes generating signals requesting control of said one processor;

d. third means, coupled to said second means and to said one processor, for determining the higher priority level between said first one of said plurality of processes and said highest priority peripheral channel of the highest priority second process;

e. fourth means, coupled to said plurality of processor communication channels and to said third means, for receiving data required to effect the transfer of control from said first one of said processes to said second process; and

f. fifth means, coupled to said fourth means, for dispatching the data from the highest priority peripheral channel of the highest priority second process to said one processor.

4,028,665

INFORMATION STORE SYSTEM COMPRISING A PLURALITY OF DIFFERENT SHIFT-REGISTERS

Joseph Nageeb Tasso, 18 rue de la Glaciere, 75013 Paris, France

Filed June 3, 1975, Ser. No. 583,402

Claims priority, application France, June 7, 1974, 74.19818

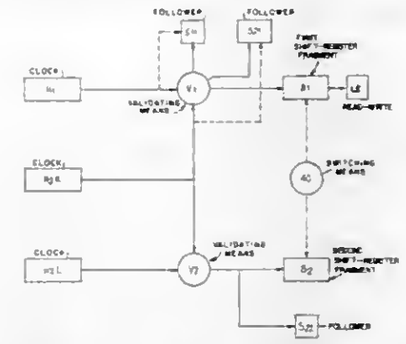
Int. Cl.² G06F *13/02*

U.S. Cl. 340—172.5 **11 Claims**

1. For a program controlled information processing system operating on multi-data blocks, a large capacity store comprising:

a plurality of addressable memory sections, each having simultaneously controllable bit shift-registers equal in number to the number of bits in a data block to constitute a data-block shift-register of addressable block line positions and being individually controllable for a step by step operation;

each said data block shift-register in a memory section being comprised of elementary block shift-registers or fragments having different characteristics, those fragments being selectively serially connectable or adapted to be looped;



read-write means associated with at least one of said fragments;

closing means associated with said at least one fragment in order to form a closed loop;

switching and synchronizing means provided in order to form an overall closed loop with said at least one fragment and the other ones.

4,028,666

DATA TRANSFER SYSTEM

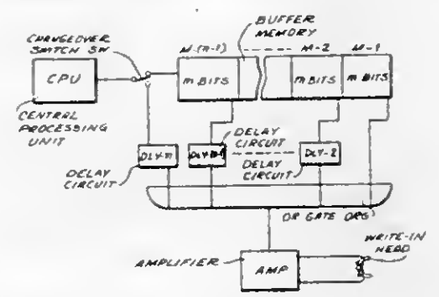
Masao Suzuki, Yokohama, and Kunitoshi Moriya, Kawasaki, both of Japan, assignors to Fujitsu Ltd., Kawasaki, Japan

Filed Oct. 29, 1975, Ser. No. 626,642

Claims priority, application Japan, Oct. 31, 1974, 49-126133

Int. Cl.² G06F *7/00*

U.S. Cl. 340—172.5 **8 Claims**



1. A data transfer system for receiving incoming digital data serially at a predetermined bit rate and transferring said data serially at a different bit rate, said data transfer system comprising

distributing means for distributing the bits of incoming data into a plurality of groups;

delay means connected to the distributing means for delaying the bits of each group by predetermined delay times;

assembly means connected to the distributing means and the delay means for assembling the delayed bits of each group into a group having a bit rate different from that of the incoming data; and

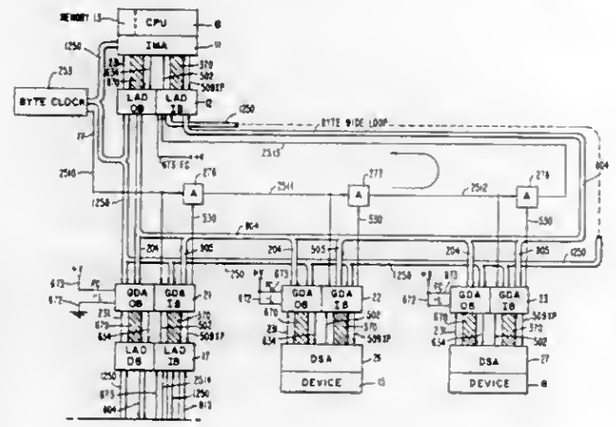
an output coupled to the assembly means.

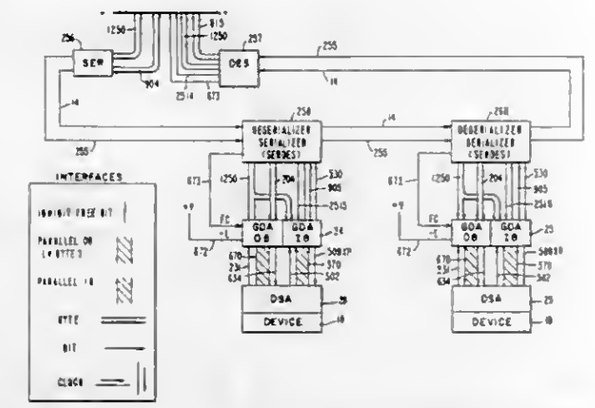
4,028,667

ASYNCHRONOUS, HIERARCHICAL LOOP COMMUNICATION SYSTEM WITH INDEPENDENT LOCAL STATION CONTROL OF ACCESS TO INBOUND TIME PORTIONS WITHOUT CENTRAL CONTROL

Franklin Charles Bresiau, Teaneck, N.J., and Gerald Goertzel, White Plains, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 22, 1975, Ser. No. 643,711
Int. Cl.² H04J *3/08;* **G06F** *3/04*
U.S. Cl. 340—172.5 **13 Claims**





1. A loop data communication system including a loop comprising a transmission medium having an input end and an output end, a central loop terminal interface connected to send data into said input end and to receive data from said output end of said loop,

a message frame generator for generating time division multiplex frame timing and synchronization control signals for devices connected to said loop,

an indirect memory access channel for connecting said central loop terminal interface to data processing hardware adapted to provide data demanded therefrom,

said frame control signals providing synchronization for inbound time and outbound time portions in each frame, for signals inbound to said central interface and outbound from said central interface,

a plurality of interface stations adapted for coupling data processing equipment to said loop for message communication with said access channel, said stations being connected to said loop,

said message frame generator always generating with each frame a free frame signal designating a free inbound time portion without addressing said signal to any specific interface station indicating the availability of said frame for an interface station on a first come, first serve basis,

means adapted for coupling said free frame signal to each of said interface stations in series upon said loop on a one-at-a-time sequential basis,

seizure means associated with each of said interface stations responsive to a free frame signal for seizing a free inbound time portion appearing at any one of said interface stations without first sending a signal to said central interface effective to assign the corresponding inbound time portion of a frame to said interface station associated therewith in response to a free frame signal and to activate said station to send a message on said free inbound time portion to said central interface and to block communication of said free frame signal by said means adapted for coupling to an interface station downstream from said station having seized said frame, and

said central interface having no control over the allocation of access to send messages on said free inbound time portions of frames by said interface stations, but said control over allocation being maintained exclusively by each of said seizure means independently of said central interface or any other interface station and equipment related thereto on a first come, first serve basis.

4,028,668

APPARATUS FOR SELECTIVELY ADDRESSING SECTIONS AND LOCATIONS IN A DEVICE CONTROLLER'S MEMORY

Douglas L. Rilkonen, Westford, Mass., assignor to Honeywell Information Systems, Inc., Waltham, Mass.

Filed Dec. 22, 1975, Ser. No. 643,730
Int. Cl.² G06F *3/04, 13/00*
U.S. Cl. 340—172.5 **15 Claims**

1. In a data processing system comprising a data processing unit, a controller unit for interfacing a plurality of peripheral devices with an electrical bus, only one of which may be active at any given time, and said electrical bus for transferring information between said units; said controller unit including;

A. apparatus for enabling the control and operation of said device, only one of said devices being controlled by said controller unit at any given time, the one of said devices being controlled hereinafter referred to as the active device;

B. means, responsive to said apparatus for enabling, for storing information relating to the control, operation and status of said devices, said means for storing including a plurality of sections equal in number to the potential number of said devices, each of said sections having a unique section address, and each of said sections including a plurality of locations for storing its associated device's information relating to the control, operation and status thereof, each of said sections having the same topology of said information in the respective locations thereof;

C. means for indicating the identity of said active device;

D. first means, responsive to said apparatus for enabling, for computing the address of one of said locations, said first means for computing also including further means for computing the address of one of said sections independent of the identity of the active device so that a said device which is not said active device may have the contents of its corresponding said section updated;

E. means, responsive to the indication of the identity of said active device, for generating the address of the one of said sections corresponding to said active device;

F. means for addressing said locations with the address computed by said first means for computing;

G. means for generating a select signal if a said device, which is not said active device, is to have the contents of its corresponding said section updated; and

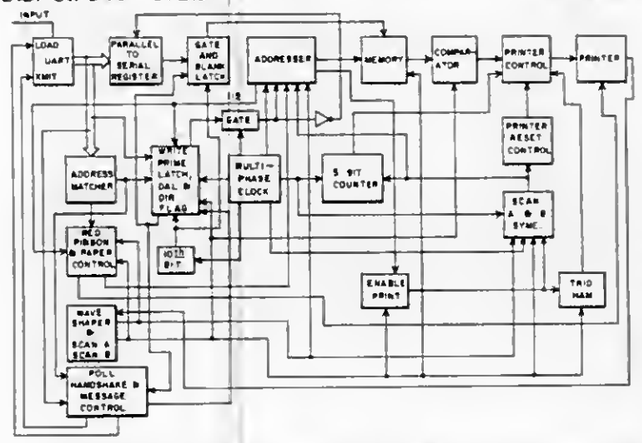
H. means for selecting either said section address computed by said further means for computing if said select signal is generated or said section address generated by said means for generating if said select signal is not generated, for addressing one of said sections.

4,028,669

PRINTER CONTROL SYSTEM

Carlos S. Higashide, Elk Grove Village, Ill., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 19, 1976, Ser. No. 650,230
Int. Cl.² G06F *3/12*
U.S. Cl. 340—172.5 **28 Claims**



1. A printer control system for a rotary drum printer for printing data, said data comprising bits divided into characters to be printed, said rotary drum printer having a plurality of columns of characters distributed in rows therealong for printing said characters of data and having hammers associated with each column being controlled by said system, said system comprising:

storage means for receiving and storing said data;

drum trace means for providing a drum trace signal dependent upon a position of said drum;

comparator means connected to both said storage means and said drum trace means for comparing said data, a character at a time, to said drum trace signal and for providing a match signal when there is a match of said data character and said drum position and a non-match signal where there is no match;

serial shift register means for shifting and storing match and non-match signals, including a serial shift register and means for supplying to said shift register a column finish signal before a comparison operation is started and for supplying said column finish signal out of said serial shift register when said serial shift register is full of match and non-match signals and means responsive to said column finish signal for terminating said comparison operation; and,

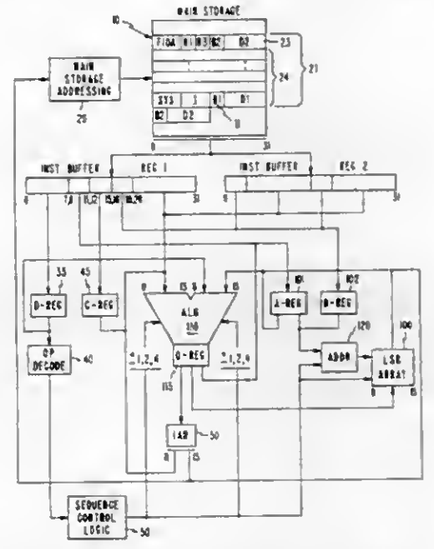
trigger means responsive to said match signals stored in said serial shift register for firing only those hammers corresponding to said match signals after all characters, stored in said storage means, have been compared with said drum position.

4,028,670

FETCH INSTRUCTION FOR OPERAND ADDRESS CALCULATION

Roy Louis Hoffman, Pine Island; William George Kempke, and Frank Gerald Soltis, both of Rochester, all of Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 6, 1976, Ser. No. 655,646
Int. Cl.² G06F *9/06*
U.S. Cl. 340—172.5 **6 Claims**



1. In a computer system having storage for storing executable and non-directly executable instructions and operands, said directly executable instructions including for every non-directly executable instruction a predetermined directly executable instruction having bit fields for performing instruction fetch phase and operand address calculation for an associated non-directly executable instruction, and a central processing unit for fetching and executing instructions from storage, the improvement comprising:

identifying means within said central processing unit for identifying non-directly executable instructions fetched from storage,

means responsive to said identifying means indentifying a non-directly executable instruction for retrieving from storage an associated predetermined directly executable instruction having bit fields for performing instruction fetch phase and operand address calculation of said identified non-directly executable instruction, and

means responsive to bits in said bit fields of said fetched predetermined directly executable instruction to re-fetch said identified non-directly executable instruction, to compute operand addresses for operands in said non-directly executable instruction as specified in said predetermined directly executable instruction and to store said computed operand addresses to facilitate retrieval of said operands.

4,028,671

CHARGE COUPLED STORAGE DEVICE MULTIPLEXER

George S. Leach, Jr., Phoenix, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Filed Oct. 6, 1975, Ser. No. 620,089
Int. Cl.² G11C *11/40*
U.S. Cl. 340—173 R **8 Claims**

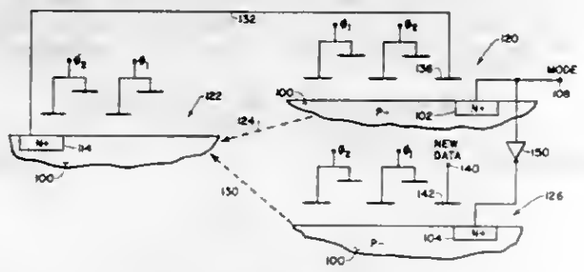
1. A charge coupled device memory having a plurality of charge coupled device stages comprising:

a. a semiconductor substrate,

b. a first and second separated region of a first conductivity type disposed in said substrate each forming respectively a portion of a pair of input stages,

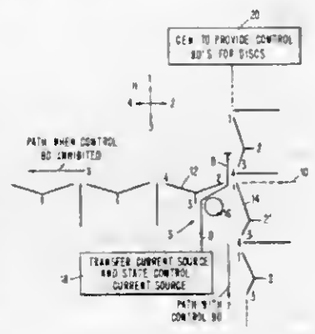
c. a third region of first conductivity type disposed in said

substrate forming a portion of another stage, and said another stage being coupled to both input stages through a plurality of other charge coupled device stages, and



d. enabling means coupled to said first and second regions for selectively recirculating data in a recirculating mode or for entering new data into a write mode of the memory.

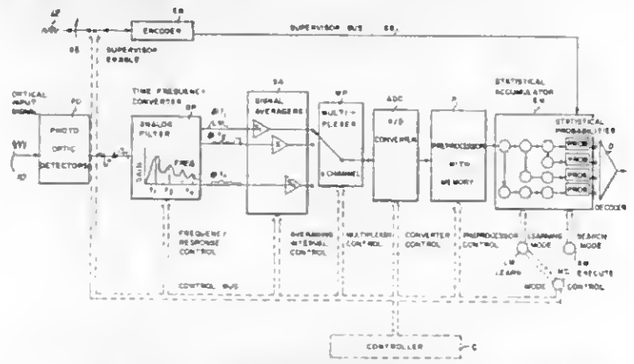
4,028,672
REWRITABLE BUBBLE DOMAIN DECODER
Hsu Chang, Yorktown Heights, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.
Continuation of Ser. No. 429,411, Dec. 28, 1973, abandoned. This application Mar. 24, 1976, Ser. No. 669,778
Int. Cl.² G11C *11/14*
U.S. Cl. 340—174 TF **14 Claims**



1. A rewritable bubble domain decoder for moving magnetic bubble domains in selected propagation paths in a magnetic medium, comprising:
propagation means defining a plurality of said propagation paths for said bubble domains,
rewritable switch means located adjacent to said propagation means for determining the path of said bubble domains in said magnetic medium, said switch exhibiting two stable states each of which is characterized by a different preferred propagation path,
control means for changing the state of said switch and further means for overriding one of said preferred paths when said switch is maintained in the state corresponding to said one preferred path.

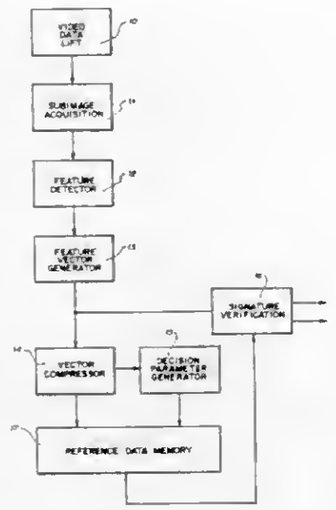
4,028,673
CROSSWIND MEASUREMENTS THROUGH PATTERN RECOGNITION TECHNIQUES
Fredrick J. Taylor, Cincinnati, Ohio; Jack Smith, and Thomas H. Pries, both of El Paso, Tex., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.
Filed Oct. 31, 1975, Ser. No. 627,631
Int. Cl.² G06K *9/00*
U.S. Cl. 340—146.3 R **5 Claims**

1. A pattern recognition method for measuring crosswind parameters comprising the steps of:
a. generating a spectral profile signal of an optical radiation beam passing through a plurality of crosswinds having known parameters;
b. dividing said spectral profile signals for each known crosswind into selected frequency components;
c. averaging said frequency components over a selected period of time;
d. digitizing said selected and averaged frequency components;
e. classifying the digitized frequency components in accordance with crosswind parameters of interest;



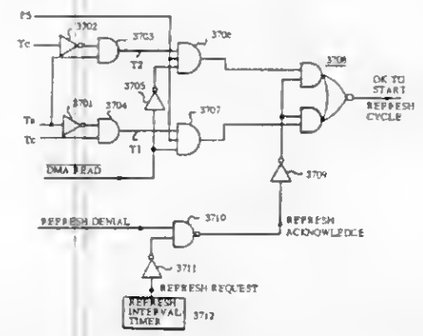
f. storing said classified frequency components as digital retrievable data in a memory;
g. generating a test spectral profile signal of said optical beam passing through crosswind of unknown parameters;
h. performing steps (b) to (f) on said test signal; and
i. matching the test signal parameter data with the closest known parameter data to determine a best estimate of the parameters of the unknown crosswind.

4,028,674
AUTOMATED SIGNATURE VERIFICATION SYSTEM
Ping-Chien Chuang, Irving, Tex., assignor to Recognition Equipment Incorporated, Dallas, Tex.
Filed June 4, 1976, Ser. No. 692,768
Int. Cl.² G06K *9/00*
U.S. Cl. 340—146.3 SY **16 Claims**



1. A method of identifying an authorized signature, which comprises:
a. optically electrical images representative of multiple authorized signatures;
b. scanning said electrical images to locate signature peaks in said authorized signatures;
c. forming feature sets representative of said authorized signatures;
d. forming from said feature sets a composite feature set;
e. assigning weights to said composite feature set;
f. forming a decision threshold from said weights and said composite feature set;
g. collecting said decision threshold, said weights and said composite feature set to form a reference data set;
h. repeating steps (a) through (c) for an unauthenticated signature; and
i. comparing said reference data set with feature sets of said unauthenticated signature.

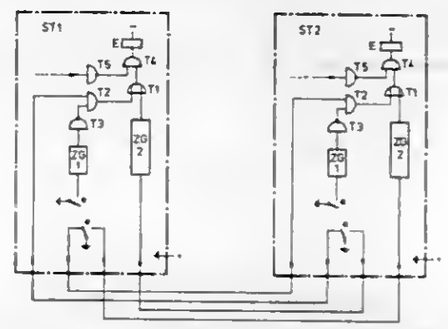
4,028,675
METHOD AND APPARATUS FOR REFRESHING SEMICONDUCTOR MEMORIES IN MULTI-PORT AND MULTI-MODULE MEMORY SYSTEM
Robert J. Frankenberg, San Jose, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.
Filed May 14, 1973, Ser. No. 360,286
Int. Cl.² G06F *9/18;* **G11C** *7/00*
U.S. Cl. 340—172.5 **9 Claims**



1. Method of operating a module of memory circuits with at least two data processors which may be selectively gated thereto through separate signal ports of the module, said memory circuits requiring periodic refreshing of stored logic manifestations in accordance with a sequence of refresh clock signals applied thereto, the method comprising the steps of:
providing sequences of refresh clock signals for each signal port of the module;
selectively gating a sequence of refresh clock signals present at one signal port of the module to the memory circuits for producing a refresh operation thereof; and
preserving an indication of the occurrences of the refresh operations performed on the memory circuits of the module independently of the signal port thereof through which the sequence of refresh clock signals for each such refresh operation is selectively gated for preserving an indication of the status of memory refresh operations as the signal ports are selectively gated.

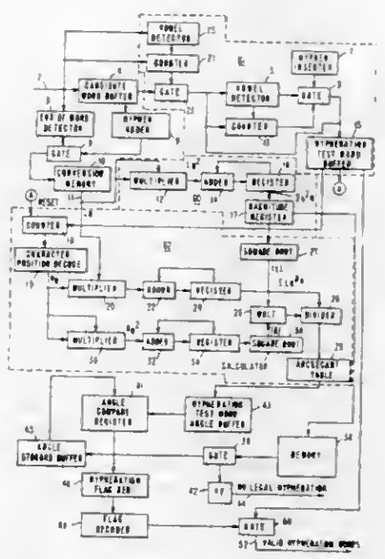
4,028,676
CONTROL OF PERIPHERAL APPARATUS IN TELECOMMUNICATION
Gerhard Wolfer, Oberengstringen, Switzerland, assignor to Siemens-Albis Aktiengesellschaft, Zurich, Switzerland
Continuation of Ser. No. 603,486, Aug. 11, 1975, abandoned. This application Apr. 8, 1976, Ser. No. 675,091
Claims priority, application Switzerland, Aug. 22, 1974, 011480/74
Int. Cl.² H04Q *9/00;* **H01M** *3/00*
U.S. Cl. 340—147 SC **23 Claims**

1. In a method of controlling peripheral units (P1–P20) in a telecommunication system by means of two or more like control apparatus (ST1, ST2, ST3), wherein the peripheral units (P1–P20) are assembled in groups (P1–P5, P6–P10, P11–P15, P16–P20) each of which is associated with its own switching means (S1, S2, S3 or S4) for selectively connecting the particular group (P1–P5, P6–P10, P11–P15 or P16–P20) to a control apparatus (ST1, ST2 or ST3), the improvement comprising in combination the steps of:
effecting the control of all peripheral units (P1–P20) to be controlled at a given time with only one of said like control apparatus (ST1, ST2 or ST3) at that time;
causing each active control apparatus (ST1, ST2 or ST3) to time itself for a first predetermined time as to the duration of its control of said peripheral units (P1–P20), and to initiate a timing cycle in another one of said control apparatus (ST2, ST3 or ST1) for a second predetermined time longer than said first predetermined time;



periodically exchanging the control apparatus (ST1, ST2, ST3) in their control function in response to said self-timing; and
causing in response to a malfunction during the performance of said control function by a particular control apparatus (ST1, ST2 or ST3) the other control apparatus (ST2, ST3 or ST1) in which said timing cycle has then been initiated, to take over the control of said peripheral units (P1–P20) from said particular control apparatus (ST1, ST2 or ST3).

4,028,677
DIGITAL REFERENCE HYPHENATION MATRIX APPARATUS FOR AUTOMATICALLY FORMING HYPHENATED WORDS
Walter Steven Rosenbaum, Silver Spring, Md., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed July 16, 1975, Ser. No. 596,337
Int. Cl.² G06F *5/00;* **G06K** *15/18*
U.S. Cl. 340—172.5 **5 Claims**



1. Apparatus for the automatic hyphenation of alpha words comprising:
buffer means for receiving a word to be hyphenated;
test word generator means connected to said buffer means for forming a set of hyphenated test words from the received word;
conversion means connected to said test word generator

means for converting said set of hyphenated test words into a set of vectors having a common magnitude and a plurality of absolutely unique angles;

memory means containing vector representations for the set of legal hyphenations for a predetermined dictionary of words;

comparison means connected to said conversion means and said memory means for comparing the vector representations for the set of hyphenated test words against the contents of said memory means; and

selection means for selecting the hyphenated test words that compare equal to the contents of said memory means.

4,028,678

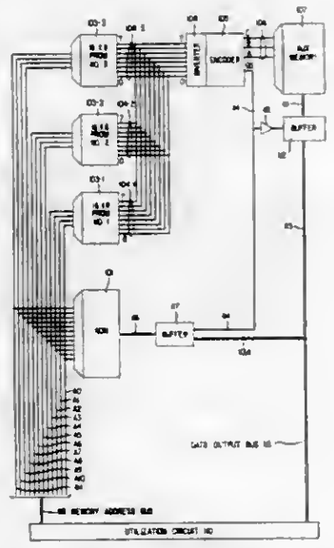
MEMORY PATCHING CIRCUIT

John Christian Moran, Broomfield, Colo., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 16, 1975, Ser. No. 623,133

Int. Cl.² G06F *13/00*

U.S. Cl. 340—172.5 **10 Claims**



1. A circuit for patching defective word locations of an unalterable memory (ROM) contaning invalid information with said circuit being responsive to the receipt of ROM address words specifying said defective locations, said circuit comprising; a plurality of alterable memories (PROMs) having input conductors each of which receives the bit for a different bit order of said address words, means for applying the bit in each bit order of each of said address words to a unique input conductor of a unique one of said PROMs, a plurality of output conductors on each of said PROMs each of which is unique to a different bit order within a PROM, means for connecting in parallel the output conductors representing corresponding bit orders for each of said PROMs, means in said PROMs for uniquely associating each set of said paralleled output conductors with a different one of said ROM address words representing a defective location, said PROMs being jointly responsive to the receipt of each address word specifying a defective ROM location to apply a patch signal to the set of paralleled output conductors uniquely associated with said specified defective location, an auxiliary memory, and means responsive to said patch signal for controlling said auxiliary memory to output valid program information as a substitute for that stored in said specified defective ROM location.

4,028,679

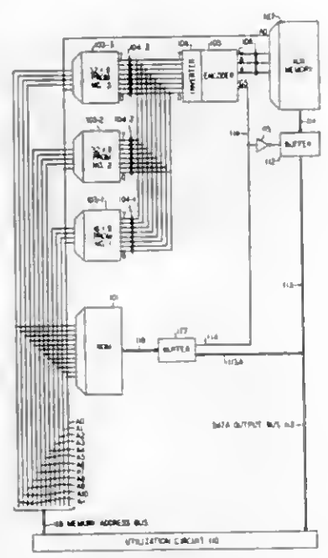
MEMORY PATCHING CIRCUIT WITH INCREASED CAPABILITY

Charles Hamman Divine, Thornton, Colo., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 16, 1975, Ser. No. 622,938

Int. Cl.² G06F *13/00*

U.S. Cl. 340—172.5 **9 Claims**



1. A circuit for patching defective word locations of an unalterable memory containing invalid information with said circuit being responsive to the receipt of ROM address words specifying said defective locations, said circuit comprising; a plurality of alterable mmemories having address inputs, means for applying n bits of said address words to n different inputs on said PROMs taken collectively, means for applying each one of the remainder of the bits of said address words to a different input of each one of said PROMs, a plurality of output conductors on said PROMs each of which corresponds to a different bit order within a PROM, means for connecting in parallel the output conductors representing corresponding bit orders for each of said PROMs, means in said PROMs for uniquely associating each set of said paralled output conductors with a unique combination of said defective locations with each location being associated with only a single set, said PROMs being responsive to the receipt of an address word specifying a defective ROM location to apply a path signal to the one set of said output conductors associated with said specified location, an auxiliary memory, encoder means responsive to said patch signal for applying encoded address information to said auxiliary memory, and means for applying said remainder of said address bits for said specified location to said auxiliary memory, said auxiliary memory being responsive to the concurrent receipt of said encoded address information and said remainder of said address bits for generating valid program information as a substitute for that stored in said specified defective ROM location.

4,028,680

SYSTEM FOR AUTOMATICALLY PROCESSING AND PRINTING THE CONTENTS AND THE FORMAT OF A TEXT

Vittore Vittorelli, Ivrea (Turin), Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Continuation of Ser. No. 494,641, Aug. 5, 1974, which is a continuation of Ser. No. 291,145, Sept. 5, 1972, abandoned. This application May 14, 1975, Ser. No. 577,519

Claims priority, application Italy, Sept. 29, 1971, 70186/71; Apr. 19, 1972, 68214/72; July 14, 1972, 69276/72

Int. Cl.² B41J *5/46, 19/00;* **G06F** *9/16*

U.S. Cl. 340—172.5 **12 Claims**

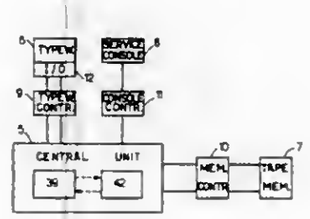
1. A system for automatically processing and printing the contents and the format of a text of lines of characters, the system comprising:

input means for developing character codes corresponding to desired characters to be entered into the system on a line-by-line basis;

printing means receptive of character codes for printing characters in character lines each line having a maximum predetermined length;

storage means receptive of character codes for storing each of the codes associated with entered character lines into one of a plurality of storage blocks and including means for reading out each storage block to apply the character codes therein to the printing means for the printing of same, each block having a capacity for storing the code of one character line of said maximum predetermined length; and

actuatable control means associated with said input means for controlling the operation of said storage means and said printing means to effect the reading of character



codes from the storage blocks and the printing of same by the printing means, said control code of a given storage block with the second service character code of said given storage block and character codes recordable in each block and for developing a first service character code corresponding thereto, means operable with said input means for controlling said storage means to store the first service character code in each of said blocks, means responsive to each character code entered by said input means in each character line for developing a second service character code for each block corresponding to the number of character codes entered in the associated line, first comparison means for comparing the first service character code with said second service character code and print control means responsive to said first comparison means for effecting the printing of said given storage block by said printing means when the first service character code thereof is equal to the second service character code thereof.

4,028,681

SYSTEM FOR AUTOMATICALLY PROCESSING AND PRINTING THE CONTENTS AND THE FORMAT OF A TEXT

Vittore Vittorelli, Ivrea (Turin), Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Continuation of Ser. No. 494,641, Aug. 5, 1974, which is a continuation of Ser. No. 291,145, Sept. 5, 1972, abandoned. This application May 14, 1975, Ser. No. 577,520

Claims priority, application Italy, Sept. 29, 1971, 70186/71; Apr. 19, 1972, 68214/72; July 14, 1972, 69276/72

Int. Cl.² B41J *5/46, 19/00;* **G06F** *9/16*

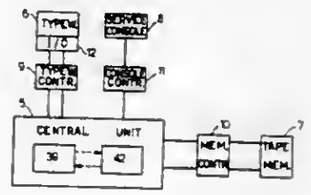
U.S. Cl. 340—172.5 **9 Claims**

1. A system for automatically recording and searching information comprising:

input means for developing character codes corresponding to desired characters to be entered into the system in character lines and including means for developing format label codes and tabulation character codes each corresponding to selected points along each character line;

printing means associated with said input means for printing characters in character lines;

storage means associated with said input means for storing entered information in a recording medium and having means defining a plurality of data storage blocks each having a capacity to store a given number of character codes corresonding to one line of characters and including means for reading out each of the storage blocks for applying data therein to the printing means; and control means associated with said input means for controlling the operation of said storage means and said printing means, said control means comprising means receptive of the tabulation codes and the format label codes from the input means for defining an information format comprising at least two sections of the character line, each section



for one different class of information to be entered by said input means with each class of information corresponding in position in the character line to its associated section and wherein each section has a starting point in the character line corresponding to one tabulation code and has a selectable fixed length corresponding to the length of one format label code, means for effecting storage of the tabulation and label codes in a predetermined storage block and means responsive to the codes to the information format stored in said predetermined storage block for controlling said storage unit to effect the storage of entered information of said two classes of information in the corresponding sections in each of the remaining storage blocks corresponding to the sections of the character line.

4,028,682

CIRCUIT ARRANGEMENT FOR SELECTING THE FUNCTION OF CONNECTION CONTACTS ON CIRCUIT CHIPS

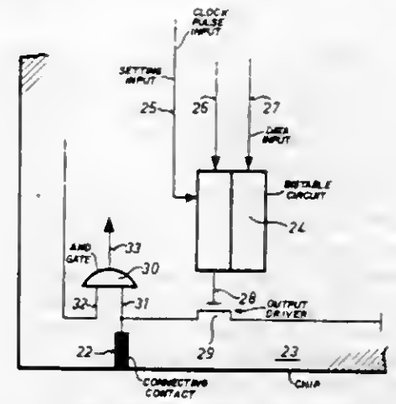
Gerald Weber, and Jurgen Sorgenfrei, both of Braunschweig, Germany, assignors to Olympia Werke AG, Wilhelmshaven, Germany

Filed Dec. 20, 1974, Ser. No. 535,090

Claims priority, application Germany, Dec. 22, 1973, 2364253

Int. Cl.² G06F *3/00, 9/00*

U.S. Cl. 340—172.5 **3 Claims**



1. In a circuit arrangement of at least one highly integrated chip for a microprogrammed data processing device asso-

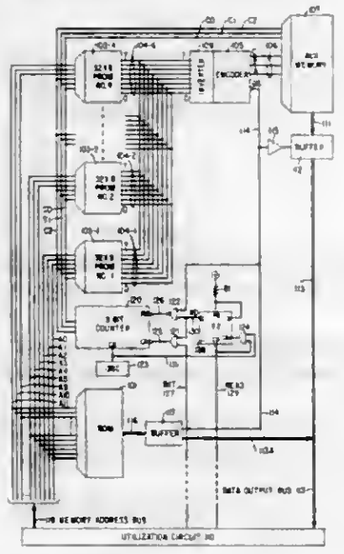
ciated with peripheral units, the chip containing circuit components, the arrangement further including connecting contacts on the chip connecting circuit components thereon to the peripheral units for transfer of signals therebetween, the improvement comprising selecting means connected to said contacts for connecting each said contact to constitute either an input or an output terminal under the control of the microprogram contained in the ROM, said selecting means including, for each said connecting contact: a bistable circuit on the chip on which its respective contact is located and having an output in signal transmitting communication with said connecting contact such that a signal corresponding to the logic state of said bistable circuit is continually applied to said connecting contact, said bistable circuit being connected to be set and reset by the microprogram for maintaining said bistable circuit in a selected logic state when said contact constitutes an input terminal and controlling the logic state of said bistable circuit in accordance with signals produced by at least one circuit component on said chip when said contact constitutes an output terminal; and a gating circuit having a signal input in signal receiving communication with said connecting contact and a gating input connected to be controlled by the microprogram for causing said gating circuit to transmit signals present at its said signal input when said contact constitutes an input terminal and to block transmission of signals present at said signal input when said contact constitutes an output terminal.

4,028,683

MEMORY PATCHING CIRCUIT WITH COUNTER

Charles Hamman Divine, Thornton, and John Francis O'Neill, Boulder, both of Colo., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 16, 1975, Ser. No. 622,939
Int. Cl.² G06F *13/00*
U.S. Cl. 340—172.5 **14 Claims**



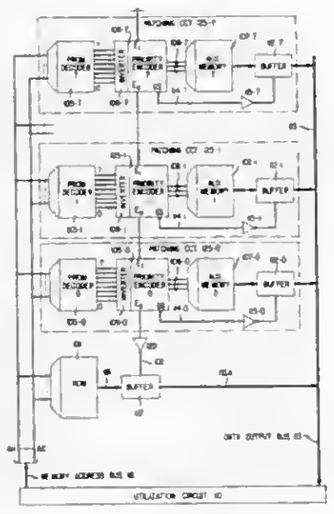
1. A circuit for patching defective locations of an unalterable memory (ROM) containing invalid program information in response to the receipt of ROM address words specifying said defective locations, said circuit comprising; a plurality of alterable memories (PROMs) each having a first and a second group of address inputs, means for applying the bits of said ROM address words to said first group of PROM inputs with each bit being applied to only a single input of said PROMs taken collectively, a plural order counter, means for connecting each order of said counter to a different input of said second group on each one of said PROMs, said connecting means being effective to apply counter output signals representing the current position of said counter to the inputs of said second group, a plurality of output conductors on each of said PROMs each of which corresponds to a different bit order within a PROM, means for connecting in parallel the output conductors representing corresponding bit orders for each of said PROMs, means in said PROMs for associating each set of said paralleled output conductors with a unique combination of said defective locations with each location being associated with only a single set, said PROMs being responsive to the concurrent receipt of an address word specifying a defective ROM location and to said counter output signals to apply a patch signal to the one set of said output conductors associated with said specified location, an auxiliary memory, an encoder responsive to said patch signal for applying encoded address information to said auxiliary memory, and means for applying said counter output signals to said auxiliary memory, said auxiliary memory being responsive to said encoded address information and said counter output signals for generating valid program information as a substitute for that stored in said specified defective ROM location.

4,028,684

MEMORY PATCHING CIRCUIT WITH REPATCHING CAPABILITY

Charles Hamman Divine, Thornton, and John Christian Moran, Broomfield, both of Colo., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 16, 1975, Ser. No. 622,940
Int. Cl.² G06F *13/00*
U.S. Cl. 340—172.5 **15 Claims**



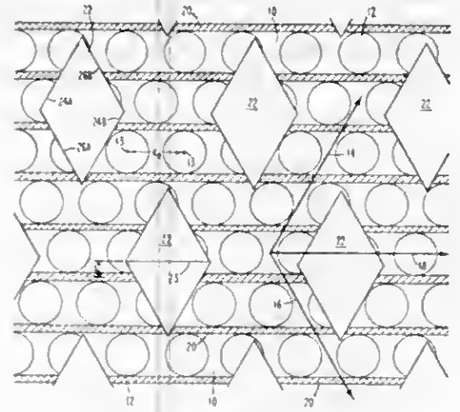
1. A circuit for patching and repatching defective word locations of an unalterable memory (ROM) containing invalid information with said circuit being responsive to the receipt of address words specifying said defective ROM locations, said circuit comprising; an alterable memory (PROM) decoder having inputs for receiving said ROM address words, a plurality of outputs on said decoder, means in said decoder for associating said each one of said defective ROM locations with different ones of said outputs with the address word for at least one of said locations being associated with a plurality of said outputs, said decoder being responsive to the receipt of the address word specifying said one defective ROM location for applying a patch signal to each of said outputs associated with said word for said one location, a priority encoder having inputs arranged in a predetermined order of preference with each input being individually connected to a different one of said decoder outputs, said encoder being responsive to the simultaneous receipt of a patch signal on a plurality of said inputs for encoding only the patch signal on the most preferred one of said inputs that receives a patch signal into address information, an auxiliary memory, and means for applying said encoded address information to said auxiliary memory for generating valid program information as a substitute for that stored in said one defective ROM location.

4,028,685

FIELD ACCESS PROPAGATION OF BUBBLE LATTICE

John Scott Eggenberger, Los Altos, and Otto Voegeli, San Jose, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 15, 1975, Ser. No. 640,510
Int. Cl.² G11C *11/14*
U.S. Cl. 340—174 TF **10 Claims**



1. The combination of a bubble lattice having three principal axes and a rotating field access pattern suitable for the translation of bubbles, said pattern comprising

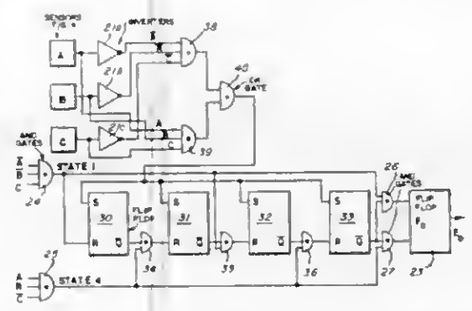
a set of diamond shaped magnetic elements wherein the forces from said elements generated by the application of a rotating in-plane magnetic field will combine with the magnetostatic bubble-bubble interaction forces in the lattice to move the bubbles along a first principal axis of the lattice.

4,028,686

DIGITAL DETECTOR

Michael A. Wilson, and Gordon E. Gee, both of Sarasota, Fla., assignors to Electro Corporation, Sarasota, Fla.

Continuation of Ser. No. 359,463, May 11, 1973. This application May 10, 1976, Ser. No. 684,564
Int. Cl.² G08B *21/00*; G01P *3/48, 3/54*
U.S. Cl. 340—195 **3 Claims**



1. In a speed detector for a rotary member having:

an element with an annular array of alternate slots and teeth of magnetic material,

an odd plurality of magnetic sensor means operably associated with said array of slots and teeth and responsive to relative motion between the array and sensor means,

circuit means to develop alternate digital 1 and 0 outputs from each sensor means, each sensor means being displaced from the other sensor means with respect to the slots and teeth whereby during relative motion the instantaneous outputs of the circuit means have a plurality of sequential states and there is at least one state of the circuit means outputs which does not occur during relative motion but does occur in the absence of such motion,

an AND gate having inputs connected with said circuit means and responsive to one of said plurality of sequential output states to generate a repetitive motion-indicating signal, and

an output circuit actuated by the motion-indicating signal from said AND gate to provide a measure of speed,

an improved inhibiting means for said output circuit, comprising:

an AND gate having inputs connected with the outputs of said circuit means and responsive to said one state of circuit means outputs which does not occur during the motion of the array to generate a fault signal;

means responsive to said fault signal for inhibiting operation of said output circuit; and

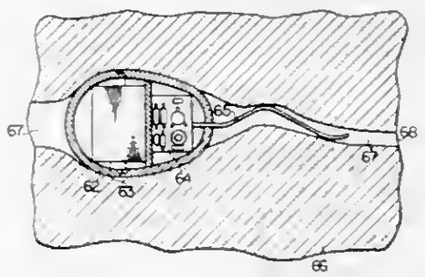
means responsive to repetitive occurrence of one of said plurality of sequential states subsequent to the generation of a fault signal, to enable said output means.

4,028,687

METHOD AND APPARATUS FOR DELIVERY ALARM FOR LIVESTOCK ANIMALS

Sachihiko Hamaguchi; Ikuo Oomura; Tadashi Sato, all of Tokushima, and Hisashi Wada, Takamatsu, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Continuation of Ser. No. 435,245, Jan. 21, 1974, abandoned. This application Sept. 8, 1975, Ser. No. 611,150
Claims priority, application Japan, Feb. 27, 1973, 48-24166; May 17, 1973, 48-55396; May 8, 1973, 48-54391[U]; May 8, 1973, 48-54406[U]; May 15, 1973, 48-57669[U]; May 15, 1973, 48-57670[U]
Int. Cl.² G08B *21/00*
U.S. Cl. 340—201 R **6 Claims**



1. Apparatus for providing an alarm upon the delivery of a livestock animal, comprising

a case for insertion into the birth canal of said livestock animal, said case being pushed out of said birth canal during delivery of a fetus,

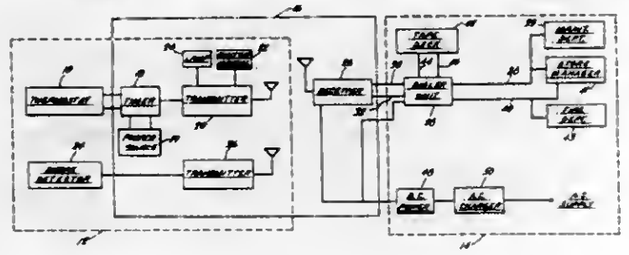
a transmitter including an oscillator located within said case for producing a delivery alarm signal, and

an antenna coupled to said oscillator as a load thereof and extending outside and away from said case and toward the mouth of said birth canal, said oscillator being continuously supplied with electric power and biased such that when the load on said antenna is heavy, the oscillation is substantially stopped near the state where the oscillation is about the start, and when the load on said antenna is relatively high, an oscillation is started; the load on said antenna being heavy when the antenna is within the birth canal, and becoming relatively light causing the antenna to emit a signal from the oscillator when the antenna is pushed out of the birth canal.

4,028,688
REFRIGERATION UNIT AIR TEMPERATURE DETECTION ALARM SYSTEM

Joel B. Goleman, 607 Chelten Hills Drive, Elkins Park, Pa. 19117

Continuation-in-part of Ser. No. 353,340, April 23, 1973. This application Oct. 10, 1975, Ser. No. 621,354
Int. Cl.² G08B *21/00*
U.S. Cl. 340—227.1 **7 Claims**



1. An alarm system for a refrigeration unit whose enclosure contains an energy permeable portion, which may be an opening, comprising

a temperature sensing means within the refrigeration unit including a switch device effectively employing a change of state of contacts, opening or closing, for directly sensing air temperature in the refrigeration unit and producing an indication when air temperature reaches or exceeds a predetermined level,

an integrated circuit timer means containing its own power source independent of a general power source required to operate said refrigeration unit, and directly actuated by the contacts of said temperature sensing means when the air temperature in the refrigeration unit reaches or exceeds the predetermined level and terminated and reset when the temperature drops below the predetermined level,

a communication link means employing energy to which said enclosure portion is permeable responsive to said timer means transmitting an actuating signal to initiate the remote alarm means after the timer means has been actuated continuously for a set predetermined time, and

remote alarm means responsive to said communication linkage means providing a predetermined alarm indicating an abnormal temperature condition in the refrigeration unit.

4,028,689
CALORIMETRIC FLOW MONITOR

Hans Schopp, Altdorf, Germany, assignor to Ellenberger & Poensgen GmbH, Altdorf, Germany

Filed Sept. 18, 1975, Ser. No. 614,596
Claims priority, application Germany, Oct. 5, 1974, 2447617
Int. Cl.² G01F *1/68*; G08B *19/00*
U.S. Cl. 340—239 R **7 Claims**

1. A calorimetric flow monitor for monitoring the flow of a medium through a pipe, comprising, in combination:

a measuring head including

a metallic sleeve having an external thread via which said head can be tightly screwed into a threaded bore of such pipe in a manner such that one end of the said sleeve is directed toward the medium and the longitudinal axis of said sleeve is perpendicular to that of the pipe,

an insulating block tightly closing the one end of said sleeve and protruding from the one end of said sleeve, said block being provided with two through bores extending in the direction of the length of said sleeve,

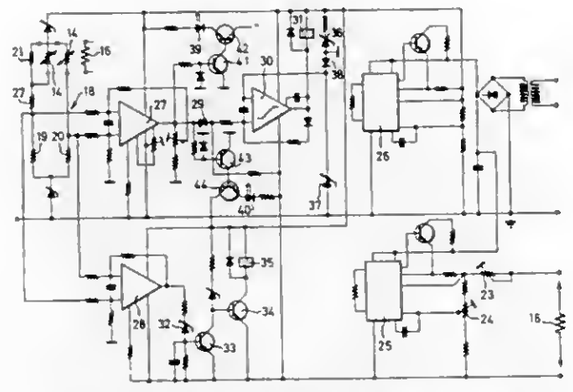
two pins each tightly fitted inot a respective one of said through bores at the end of said block which protrudes from said sleeve, said pins protruding from said block and being of a material having a high thermal conductivity and each said pin being formed to have a blind bore,

first and second tubular, heat conductive sleeves each disposed in a respective one of said blind bores,

first and second thermistors each disposed in a respective one of said blind bores and located within a respective heat conductive sleeve while being insulated therefrom,

a heating coil wound on said first heat conductive sleeve for heating the respective thermistor in said first heat conductive sleeve, and

a casting resin having good heat conductivity filling each of said blind bores for establishing a good thermal communication between each said thermistor and the flow medium when said head is disposed in a pipe through which such medium is flowing, whereby heat



supplied to said first thermistor by said heating coil can be carried off by the medium and said second thermistor can be brought to the temperature of the medium;

means defining an electrical bridge circuit including said thermistors;

first and second differential operational amplifiers each having a pair of inputs connected at selected points of said bridge circuit;

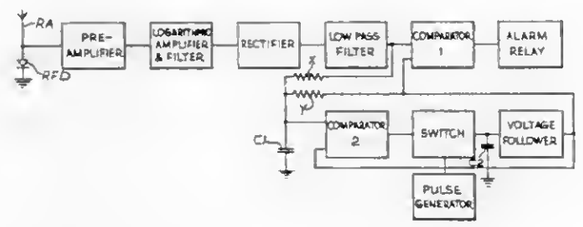
first signal processing means connected to the output of said first differential amplifier for deriving from the output signal therefrom an indication of increases or decreases in the medium flow speed from a predetermined value; and

second signal processing means conducted to the output of said second differential amplifier for deriving from the output signal therefrom an indication of breakages in the connections to said heating coil and said first and second thermistors.

4,028,690
INTRUDER DETECTION DEVICE

Norman Ian Buckley, and Edward Wilson, both of Blackburn, England, assignors to Shorrock Developments Limited, Blackburn, England

Filed Jan. 29, 1976, Ser. No. 653,537
Int. Cl.² G08B *13/24*
U.S. Cl. 340—258 B **5 Claims**

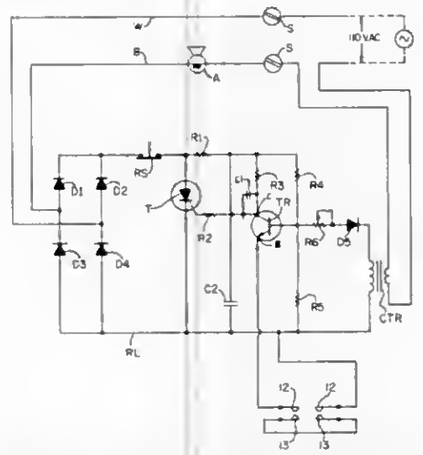


1. A receiver, for an intruder detection system of the kind employing a transmitter to produce a modulated radio frequency emission which is received by a receiver the output level of which is monitored to detect changes in received signal level indicative of the presence of an intruder in the area between the transmitter and the receiver, the receiver comprising: an aerial, a radio frequency detector to demodulate the signal received by the aerial, signal processing means adapted to provide a D.C. signal the level of which is proportional to the amplitude of the demodulated signal, sampling means adapted to sample the level of said D.C. signal at predetermined intervals of time, detector means connected to the signal processing means via the sampling means to detect a change in the D.C. level greater than a predetermined amount during any one of the predetermined intervals and, in the event of detection of such a change, to initiate an alarm, the sampling means including a switch adapted to open and close at predetermined intervals for providing at each side of the switch potentials representative respectively of the D.C. signal and a datum derived from the level of the D.C. signal during a preceding closed interval of the switch.

4,028,691
THEFT DETERRING APPARATUS

Abraham Zeder, c/o Stajer Corp., 8 Winter Green Circle, Andover, Mass. 01810

Filed Apr. 2, 1976, Ser. No. 673,287
Int. Cl.² G08B *21/00*
U.S. Cl. 340—280 **5 Claims**



1. Electrical appliance theft preventing apparatus usable in connection with appliances having a power cord and plug end plugged into an electrical utility power outlet to define a main circuit and comprising,

means defining an auxiliary d.c. circuit with a gated switch whose gating is in a low voltage, low current, portion of the auxiliary circuit and is controlled by an electrical switch thereby with two (cantilevered) spring contact elements both of which are mounted in common at one end,

means interconnecting the power cord plug and springy contacts to establish one state of opening/closing of the electrical switch contacts when the plug is in the outlet and to change the state when the plug is removed,

means defining an alarm device,

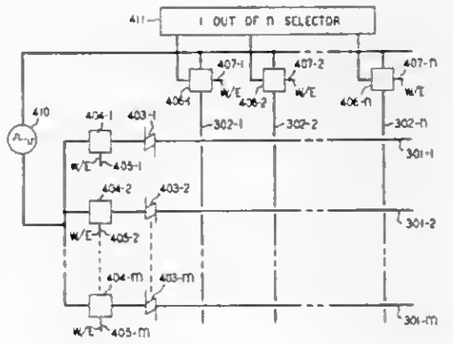
means for activating the alarm device under control of said gated switch in the auxiliary circuit the gating being controlled by said change of state to activate the alarm device,

and means separate from said electrical switch for resetting the circuit and deactivating the alarm device.

4,028,692
LIQUID CRYSTAL DISPLAY DEVICE

Peter Dinh-Tuan Ngo, Colts Neck, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sept. 15, 1975, Ser. No. 613,220
Int. Cl.² G02F *1/13*; H01J *17/48*
U.S. Cl. 340—324 M **9 Claims**



1. Apparatus comprising

a plurality of capacitive display cells, each comprising first and second conductors and a layer of liquid crystal material and one or more additional layers of dielectric material confined between said conductors,

means for initially storing signals in selected ones of said display cells,

a source for repetitive alternating polarity signals, and

switching means unresponsive to said alternating polarity signals alone but responsive to the sum of said alternating polarity signals with signals of at least a predetermined minimum magnitude stored in said selected display cells for repetitively applying said alternating polarity signals to said selected display cells,

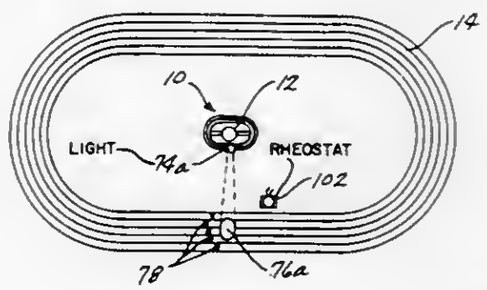
said display cells being disposed in a rectangular matrix, said first conductors comprising a plurality of conductors each common to cells in a plurality of rows of said matrix, and said second conductors comprising a plurality of conductors each common to cells in a plurality of columns of said matrix,

said switching means comprising a plurality of bilateral threshold switches each connected between said source of signals and a respective one of said conductors common to cells in a plurality columns of said matrix, said switching means further comprising means for sequentially connecting each of said conductors common to a plurality of rows of said matrix to said source of signals.

4,028,693
PACE SETTING LIGHT FOR JOGGERS

Ronald W. Kuntz, 4049 56th St., Des Moines, Iowa 50312

Filed Aug. 27, 1975, Ser. No. 608,073
Int. Cl.² G08B *23/00*; A63K *1/00*
U.S. Cl. 340—323 R **3 Claims**



1. A device for projecting a moving spot of light onto a jogging track comprising,

a frame corresponding to the shape of said jogging track,

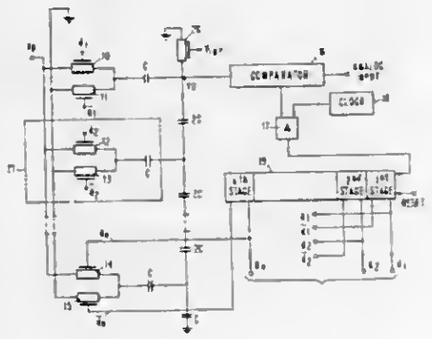
power means mounted to said frame, said power means having a power take-off shaft,
a power gear mounted on said power take-off shaft of said power means,
a first continuous flexible toothed belt meshed with said power gear for constant velocity driven movement thereby,
a driving gear meshed with said power gear,
a second continuous flexible tooth belt meshed with said driven gear for constant velocity movement therewith,
said first and second flexible toothed belts being in parallel spaced apart relationship above said frame, and corresponding to the shape of said frame,
means extending upwardly from said frame to support said first and second flexible toothed belts in said parallel spaced apart relationship,
a light beam source in secured relationship to said first and second toothed belts for constant velocity movement with said belts when said belts are driven, said light beam source being electrically connected to a source of electrical energy.

4,028,694

A/D AND D/A CONVERTER USING C-2C LADDER NETWORK

Peter William Cook, Mount Kisco, and Stanley E. Schuster, Granite Springs, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 10, 1975, Ser. No. 585,629
Int. Cl.² H03K *13/02*
U.S. Cl. 340—347 AD **8 Claims**



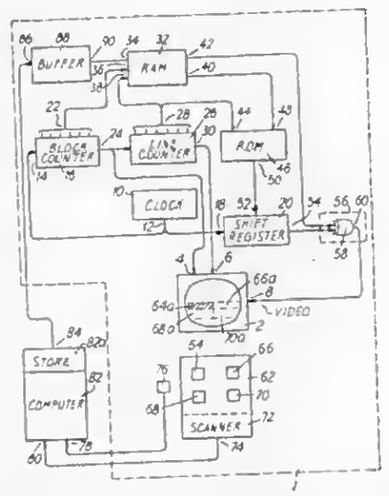
1. An analog-to-digital converter comprising a digital-to-analog converter of the type employing a C-2C switched capacitor ladder network having a plurality of first capacitors having equal first capacitance values, a plurality of second capacitors having equal second capacitance values twice said first capacitance values, said plurality of second capacitors being connected in series between an output terminal of said ladder network and a first reference potential, each of said plurality of first capacitors being connected to respective junctions between each of said plurality of second capacitors, and a plurality of switch means operable to connect respective ones of said plurality of first capacitors to said first reference potential or to a second reference potential, a comparator having first and second input terminals and an output terminal, said first input terminal being connected to the output terminal of said ladder network and said second input terminal being connected to receive an analog signal to be converted, clock means controlled by a signal at the output terminal of said comparator for providing clock pulses, and a counter connected to said clock means for counting said clock pulses, said counter controlling said switched means, the improvement in said switched capacitor ladder network wherein said plurality of first capacitors and said plurality of second capacitors are formed as a monolithic, multi-layer integrated circuit comprising:
a substrate having a plurality of diffused regions formed in one face thereof equal in number to the number of said plurality of first capacitors,
an insulating layer formed over said one face of said substrate and having disposed therein a plurality of conductive layers superposed to said plurality of diffused regions, said conductive layers being separated from said diffused regions by said insulating layer, and
a plurality of metalized regions deposited on said insulating layer and superposed to said plurality of conductive layers, said metalized regions being separated from said conductive layers by said insulating layer,
said plurality of diffused regions, said plurality of conductive layers, and said plurality of metalized regions having graduated areas such that each metalized region lies completely within the area of the corresponding conductive layer and each conductive layer lies completely within the area of the corresponding diffused region, the capacitors formed by said plurality of diffused regions and said conductive layers being said plurality of first capacitors and the capacitors formed by said plurality of conductive layers and said metalized regions being said plurality of second capacitors.

4,028,695

DATA TERMINALS HAVING INTERACTIVE KEYBOARDS AND DISPLAYS AND DATA PROCESSING APPARATUS INCORPORATING SUCH TERMINALS

William George Saich, Camberley, England, assignor to The Solartron Electronic Group Limited, Farnborough, England

Filed July 11, 1974, Ser. No. 487,687
Claims priority, application United Kingdom, July 14, 1973, 33643/73
Int. Cl.² G06F *3/14*
U.S. Cl. 340—365 R **20 Claims**



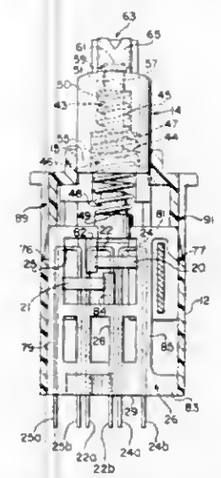
1. A manually-operable data terminal for enabling an operator to communicate with a data processor, the terminal comprising:
a keyboard having a plurality of manually-selectable keys each key including means responsive to such selection to produce a signal representative of a respective message or part of a message to be communicated to the processor;
variable format display means separate from the keyboard having a plurality of zones each corresponding to a respective key of the keyboard, the display means being arranged to display in each zone an indication of the message or part of a message represented by the key corresponding to that zone;
control means responsive to said selection responsive means to change the visual appearance of the display produced by the display means so as to indicate which key is selected; and
means selectably operable by the operator when a desired key has been selected to produce an output signal for communicating the message or part of a message represented by the selected key to the processor.

4,028,696

DOUBLE DEPRESSION MAGNETIC KEYSWITCH

Robert Christen Madland, Mount Prospect; Robert Michael Zielinski, Jr., Schaumberg, and Keith Allen Engstrom, Arlington Heights, all of Ill., assignors to Illinois Tool Works Inc., Chicago, Ill.

Filed Jan. 26, 1976, Ser. No. 652,450
Int. Cl.² G08C *1/00*
U.S. Cl. 340—365 L **12 Claims**



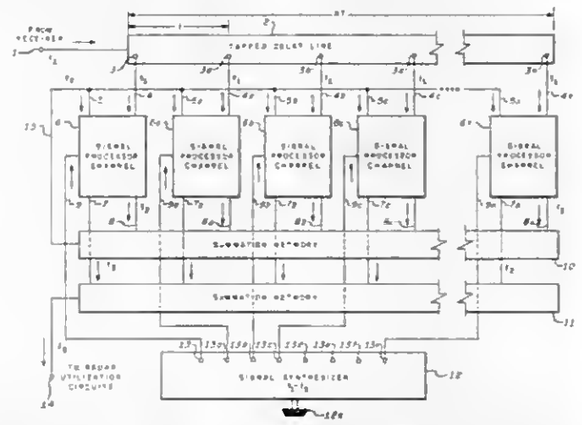
1. A keyboard switch comprising a housing, a depressible actuating member and at least one permanent magnet coupled to said actuating member so as to change the position of said magnet from an unactuated first position to an actuated second position representing a first condition when said actuating member is depressed, and to an actuated third position representing a second condition when said actuating member is further depressed, a unitary support assembly which is removable from said housing comprising first and second toroidal-shaped saturable magnetic cores with said first magnetic core being positioned above second magnetic core, at least one drive wire threaded through both of said cores, at least one sense wire threaded through each of said magnetic cores and a molded electrical insulating support element for supporting said magnetic cores and said drive and sense wires which are molded therein, said drive wires and said sense wires being configurated such that the terminating end of said drive and sense wires which extend out of said housing may be connected to a printed circuit board, a pin which is slideably positionable relative to said actuating member and having a head thereon, first and second spring means for biasing said actuating member to its unactuated position, said first spring means being positioned between said support element and said actuating member and said second spring means being positioned between said head of said pin and said actuating member, both of said magnetic cores being magnetically saturated when said permanent magnet is at its unactuated position, said first magnetic core being magnetically unsaturated and said second magnetic core being magnetically saturated when said permanent magnet is at its second position, at which said first bias spring is compressed and said second bias spring is relatively uncompressed, and said first magnetic core and said second magnetic core both being magnetically unsaturated when said permanent magnet is in its third position, at which both said first and second bias springs are compressed and said head of said pin is restrained against further downward motion by said support element.

4,028,697

ADAPTIVE SIGNAL PROCESSOR FOR CLUTTER ELIMINATION

Angelo P. Albanese, Brooklyn, and David H. Rattiner, Great Neck, both of N.Y., assignors to Sperry Rand Corporation, New York, N.Y.

Filed Sept. 8, 1970, Ser. No. 70,194
Int. Cl.² G01S *9/42*
U.S. Cl. 343—5 R **11 Claims**



8. Apparatus for improving the signal-to-interference characteristic of composite signals comprising desired pulse signals spaced at predetermined intervals, each in the presence of an extended interference signal, said apparatus comprising:
converter means, having plural output means, for placing one each of said desired pulse output means, for placing one each of said desired pulse signals simultaneously on said converter output means,
plural signal processor means each having first, second, and third input means and first and second output means,
means coupling said converter output means to said first input means of said processor means,
first coherent signal summation means having plural input means and output means,
means coupling said first output means of said signal processor means to said plural input means of said first signal summation means,
means coupling said output means of said first summation means to said second input means of said signal processor means,
second coherent signal summation means having plural input means and output means,
means coupling said second output means of said signal processor means to said plural input means of said second summation means, and
means for coupling said output means of said second summation means to utilization apparatus.

4,028,698

DME APPARATUS AND METHOD

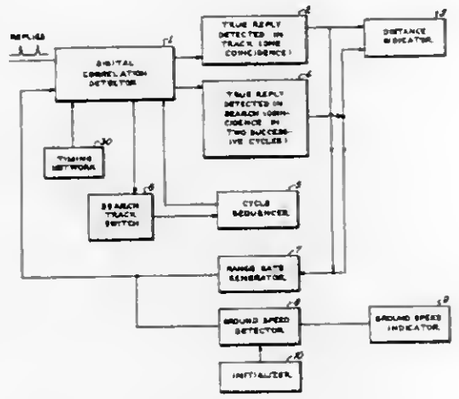
Wayne L. Miller, Stanhope, and Ernest J. Carnicelli, Flanders, both of N.J., assignors to The Cessna Aircraft Company, Wichita, Kans.

Filed Sept. 2, 1975, Ser. No. 609,647
Int. Cl.² G01S *9/56*
U.S. Cl. 343—6.5 LC **26 Claims**

22. A method for determining the distance from a DME transmitter-receiver to a DME station, said transmitter transmitting a jittered interrogation pulse train and said receiver receiving signals from said station which after decoding consist of replies to said transmitted pulses, replies to pulses transmitted by other DME transmitters and squitter, a cycle being the time interval beginning with each interrogation pulse and ending a predetermined duration later during which duration received signals are processed by the apparatus, comprising the steps of

storing information indicative of the times of receipt of all signals received during a first cycle,

determining whether any of said stored times of receipt are identical to the times of receipt of signals received during the cycles following said first cycle for a predetermined number of successive cycles beginning with the second cycle,



providing an information signal or signals indicative of all such times of receipt which are common for said predetermined number of successive cycles, and

deriving a distance measurement signal from the signal indicative of the first occurring of said common times of receipt.

4,028,699

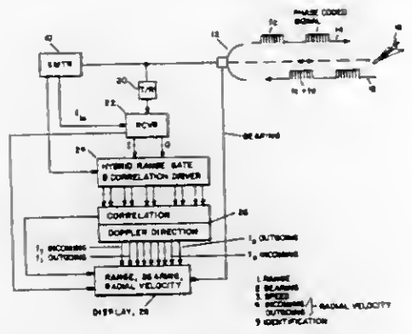
SEARCH RADAR

Robert R. Stevens, Chelmsford, Mass., assignor to Sanders Associates, Inc., Nashua, N.H.

Filed Dec. 13, 1974, Ser. No. 532,344

Int. Cl.² G01S 9/233, 9/44

U.S. Cl. 343—9 **27 Claims**



1. A pulse doppler radar having fine range resolution capability comprising:

means for projecting a pulse of energy including phase coded packets towards a target, the position of each phase coded packet within the pulse correlating to a predetermined range within said pulse,

means for detecting energy returned from said target including phase coded packets reflected by said target and for generating quadrature signals responsive thereto,

means for correlating said quadrature signals with a predetermined range code and a predetermined correlation waveform and for producing output signals responsive to the decoding of both said predetermined code, and said predetermined waveform, and

means responsive to said output signal for producing an indication of the existence of the target at the range corresponding to the number of phase coded packets within a pulse which are decoded by said predetermined range code and the radial velocity of said target.

4,028,700

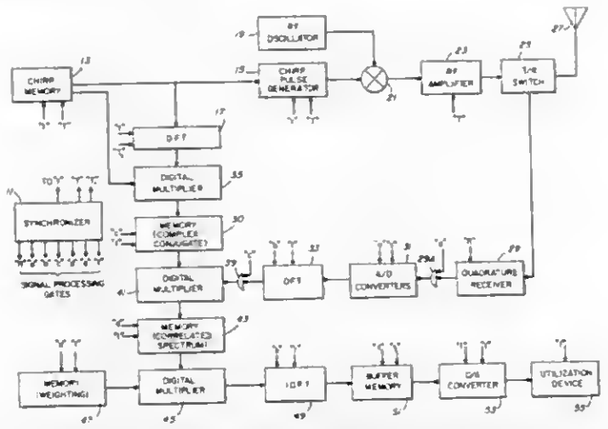
PULSE COMPRESSION RADAR AND METHOD OF OPERATING SUCH A RADAR

David R. Carey, Sudbury; Bertram J. Goldstone, Lexington, and Bernard J. Thompson, Concord, all of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Nov. 16, 1972, Ser. No. 307,287

Int. Cl.² G01S 7/28

U.S. Cl. 343—17.2 PC **2 Claims**



1. In a pulse compression radar wherein an uncompressed transmitted chirp pulse and a selected uncompressed received chirp pulse are digitally processed in the frequency domain, the method of correlating such chirp pulses comprising the steps of:

a. deriving a first set of complex digital numbers representative of a first frequency spectrum corresponding to the frequency spectrum of the uncompressed transmitted chirp pulse, such spectrum containing amplitude ripples;

b. weighting each one of the complex digital numbers in the first set to derive a corresponding second set of complex digital numbers representative of the complex conjugate of the first spectrum modified to contain amplitude ripples equal and opposite to the amplitude ripples in the first spectrum;

c. storing the second set of complex digital numbers;

d. deriving a third set of complex digital numbers representative of the frequency spectrum of the selected uncompressed received chirp pulse; and,

e. multiplying the second and third set of complex digital numbers to derive a fourth set of complex digital numbers representative of a uniformly weighted frequency spectrum corresponding to a compressed received chirp pulse with range sidelobes.

4,028,701

QUASI-CORNER REFLECTORS FOR ELECTROMAGNETIC RADIATION

Jill J. Parks, P.O. Box 325, and Stephen R. Snook, P.O. Box 846, both of Port Hueneme, Calif. 93041

Filed Apr. 5, 1976, Ser. No. 673,568

Int. Cl.² H01Q 15/20

U.S. Cl. 343—18 C **10 Claims**

1. A plural polyhedrical reflective device for electromagnetic radiation, comprising:

a. a plurality of four-sided pyramidal cavities having reflective surfaces;

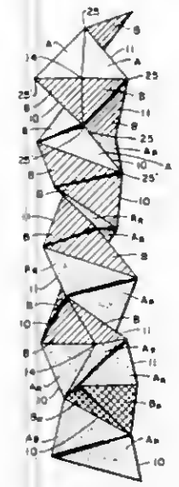
b. the base of each of said four sides being equal in length; the intersection of a plane normal to the vertical axis with the four sides of any one of said pyramidal cavities forming an equal sided parallelogram;

c. the vertex of each pyramidal cavity lying in a first common spiral path;

d. respective base corners of each pyramidal cavity lying in one of respective second and third common spiral paths;

e. said first, second and third spiral paths being symmetrical to each other about a common axis;

f. said plurality of pyramidal cavities being positioned adjacent each other in a side-by-side relationship forming a



long spiral assembly of pyramidal electromagnetic energy reflectors.

4,028,702

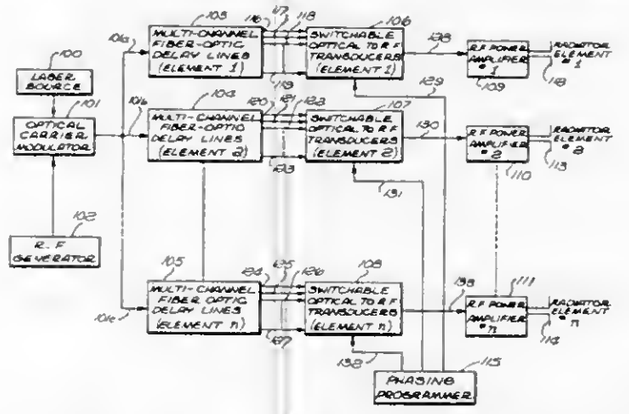
FIBER OPTIC PHASED ARRAY ANTENNA SYSTEM FOR RF TRANSMISSION

Arnold M. Levine, Chatsworth, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed July 21, 1975, Ser. No. 597,417

Int. Cl.² H01Q 3/26

U.S. Cl. 343—100 SA **9 Claims**



1. In a radar system including a plural element antenna array at least some elements of which are individually phase-controlled for forming a relatively narrow beam directive in at least one plane, the combination associated with at least one of said phase-controlled antenna elements comprising:

first means including a radio frequency generator for producing a signal at the RF frequency of operation of said system;

second means comprising a source providing a light energy output;

third means including a modulator connected for modulating said light energy source with the output of said radio frequency generator;

fourth means responsive to the modulated light output of said third means, including a plurality of optical delay lines driven in parallel from said third means, said optical delay lines each having a physical length for producing a discrete phase delay required to excite a corresponding one of said elements according to a predetermined phasing program;

fifth means operatively associated with said fourth means, for selecting a signal as an output, said selected signal passing through a predetermined one of said optical delay lines to provide a signal having said discrete phase delay; and

sixth means responsive to said fifth means for demodulating said light signals and for providing an RF output signal to said corresponding array element.

4,028,703

APPARATUS FOR RADIO POSITION-FIXING OF THE HYPERBOLIC PHASE-MEASUREMENT TYPE

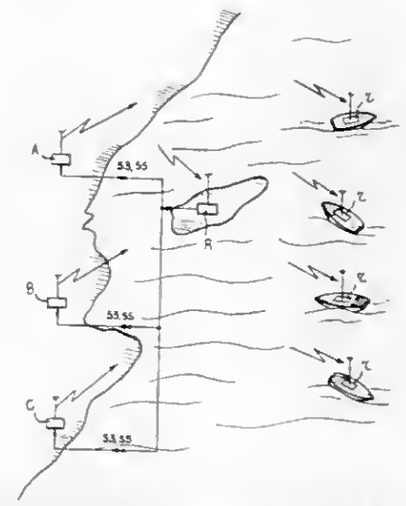
Etienne A. H. Honore, Chatenay-Malabry, and Emile L. G. Torcheux, Paris, both of France, assignors to Societe d'Etude et d'Application des Techniques Nouvelles NEO-TEC, Paris, France

Division of Ser. No. 316,428, Dec. 18, 1972, Pat. No. 3,983,559. This application Mar. 24, 1975, Ser. No. 561,198

Claims priority, application France, Dec. 17, 1971, 71.45492; July 27, 1972, 72.27058; July 27, 1972, 72.27059

Int. Cl.² G01S 1/30

U.S. Cl. 343—105 R **13 Claims**



1. Apparatus for determining the position of a receiver by radio position-fixing comprising:

at least two transmitting stations, each being adapted to radiate

a continuous specific signal of first selected frequency, the frequency of said specific signal radiating from each of said transmitting stations being different from the frequency of said specific signal radiating from all other transmitting stations, and

a sequential signal of second selected frequency, the frequency of said sequential signal being the same at all of said at least two transmitting stations, at most one transmitting station radiating said sequential signal at any time, and

a receiver being adapted to continuously receive at least two of said specific signals and to receive said sequential signal, said receiver including means for decoding said specific signal and said sequential signal to obtain the position of the receiver.

4,028,704

BROADBAND FERRITE TRANSFORMER-FED WHIP ANTENNA

Judd Blass, Herzliah Petuach, Israel, assignor to Beam Systems Israel Ltd., Nof Yam, Israel

Filed Aug. 18, 1975, Ser. No. 605,338

Int. Cl.² H01Q 1/32

U.S. Cl. 343—715 **11 Claims**

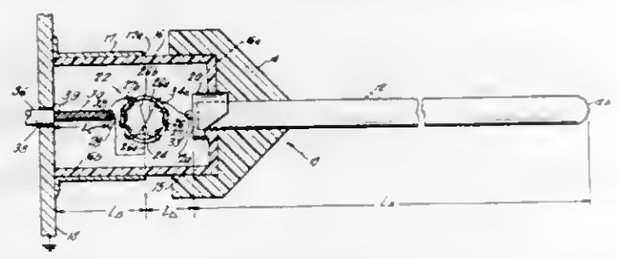
1. A broadband whip antenna having a generally constant impedance across a radio frequency band of greater than 2.5:1, comprising:

a conductive ground plane;

a whip section comprising an elongated cylindrical conduc-

tor of a length approximately equal to 0.185 wavelengths at a lowest frequency in said frequency band and having a length to diameter ratio of the order of 200 or more;

means for positioning said whip section in a plane generally transverse to said ground plane with a first end of said whip section nearest to said ground plane being spaced a predetermined fraction of a wavelength from said ground plane at said lowest frequency to enhance the directivity characteristic of the antenna, said positioning means having a length sufficient to position a second end of said whip section approximately 0.21 wavelengths from said ground plane at said lower frequency;



a coaxial cable having a characteristic impedance between an inner conduetor and an outer conductor thereof across said radio frequeney band; and

broadband transformer means positioned immediately adjacent said whip section first end and having a magnetic core for coupling said coaxial cable inner and outer conductors and said whip section end nearest said ground plane to transform the radiation resistance of said whip section to closely approximate said coaxial cable characteristic impedance, thereby reducing variation of the VSWR of the antenna as measured at the coaxial cable.

4,028,705

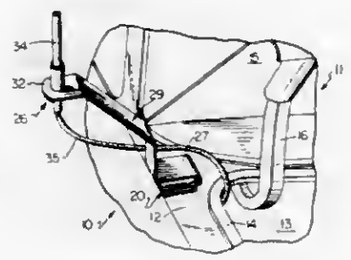
REMOVABLE ANTENNA MOUNT

J. Leslie Loyd, 1524 Elm Ave., S. Pittsburg, Tenn. 37380

Filed Apr. 29, 1976, Ser. No. 681,861

Int. Cl.² H01Q *1/32*

U.S. Cl. 343—715 **3 Claims**



1. An antenna mount for use with a vehicle having a closure member which can be selectively opened and closed, comprising a substantially flat base member, means for mounting said base member on the vehicle in a fixed position underlying a portion of the closure member, said base member having at least one passageway, a body member selectively connected to said base member, said body member having inner, intermediate and outer portions, said inner portion including at least one finger means of a size to be slidably received within the passageway of said base member, said intermediate portion of said body member being elongated and extending outwardly at an angle to said inner portion for positioning adjacent to the vehicle closure member so that the closure member locks said body member to said base member, and said outer portion of said body member having means for receiving a portion of an antenna, whereby said body member is selectively mounted on said base member in a position to support an antenna exteriorly of the vehicle or said body member may be selectively removed from said base member so that no portion of said antenna mount or the antenna is visible when the closure member is closed.

4,028,706

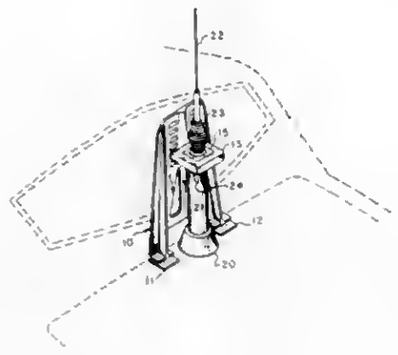
SECURITY LOCK FOR TRUNK MOUNTED ANTENNA

Alvin J. Dolle, 13322 Syracuse, San Antonio, Tex. 78249

Filed Apr. 19, 1976, Ser. No. 678,449

Int. Cl.² H01Q *1/32*

U.S. Cl. 343—715 **6 Claims**



1. A lock and mounting brace for a trunk mounted automobile antenna comprising:

a. a main body having a top portion and a bottom portion,

b. a multiplicity of trunk lid clips constructed in the bottom portion of said main body,

c. an antenna locking arm securing means constructed in the top portion of said main body,

d. an antenna locking arm adapted to securely engage said antenna locking arm securing means, and

e. an antenna locking lug engaged by said antenna locking arm, said antenna locking arm so constructed and arranged as to fit over and engage a radio antenna means.

4,028,707

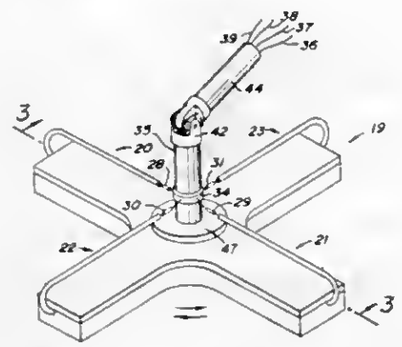
ANTENNA FOR UNDERGROUND PIPE DETECTOR

Jonathan D. Young, Worthington, and Ross Caldecott, Columbus, both of Ohio, assignors to The Ohio State University, Columbus, Ohio

Continuation-in-part of Ser. No. 437,927, Jan. 30, 1974, Pat. No. 3,967,282. This application Mar. 11, 1976, Ser. No. 665,924

Int. Cl.² H01Q *1/04, 21/26*

U.S. Cl. 343—719 **14 Claims**



1. An antenna for transmitting and receiving broad spectrum electromagnetic radiation said antenna comprising a pair of oppositely extending non-resonant, distributively, resistively loaded transmitting arms and a pair of oppositely extending non-resonant, distributively, resistively loaded receiving arms arranged transversely to said transmitting arms, each of said arms comprising an outwardly extending generally

horizontal portion connected at its outer extremity to a return loop portion extending at a higher level than the horizontal portion toward a central common connection and a resistance connecting the interior end of the return loop portion to the said central common connection.

4,028,708

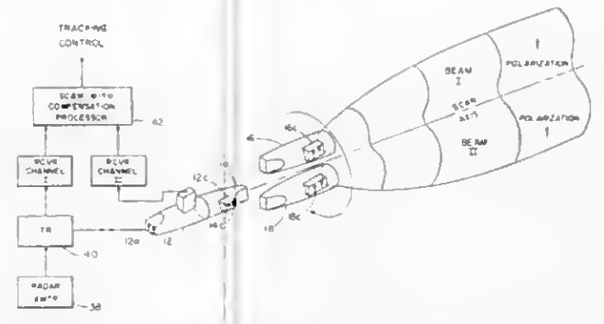
ANTENNA FEED FOR DUAL BEAM CONICAL SCAN TRACKING RADAR

Elmer Donald Woodward, Los Altos, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 10, 1975, Ser. No. 622,283

Int. Cl.² H01Q *3/10*

U.S. Cl. 343—777 **8 Claims**



1. An antenna feed for a dual beam conical scanning radar comprising:

input means for resolving an input signal into its vertical and horizontal polarization components;

first and second means for outputting first and second output signals that are identically polarized to each other and to said input signal and for receiving return signals;

coupling means for coupling said input means to said first and second means and for separating a return signal received by said first and second means into a first component and a second component in quadrature with said first component, said coupling means comprising a non-reciprocal cross connection between said first and second means, whereby said antenna feed provides for control of the plane of polarization of the transmitted and received signals.

4,028,709

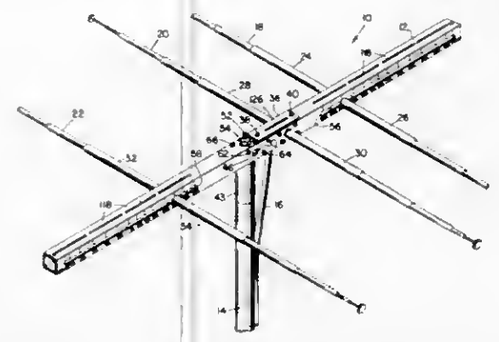
ADJUSTABLE YAGI ANTENNA

Benjamin Berkowitz, Baltimore, Md.; Arthur Luedtke, Marietta, Ga.; William L. Kilpatrick, Austell, Ga., and William F. Bentley, Jr., Smyrna, Ga., assignors to The United States of America as represented by the Field Operations Bureau of the Federal Communications Commission, Washington, D.C.

Filed Sept. 10, 1975, Ser. No. 611,938

Int. Cl.² H01Q *19/30*

U.S. Cl. 343—819 **2 Claims**



1. A yagi antenna comprising a rectangular antenna boom slotted on opposed faces with director and reflector elements coupled to slideable block within said boom through said slots, with half-wave active dipole element affixed to said boom with two insulated blocks on opposed faces and all said director, reflector, and active elements are adjustable in length and the said director and reflector elements are adjustable in spacing with respect to the active element.

4,028,710

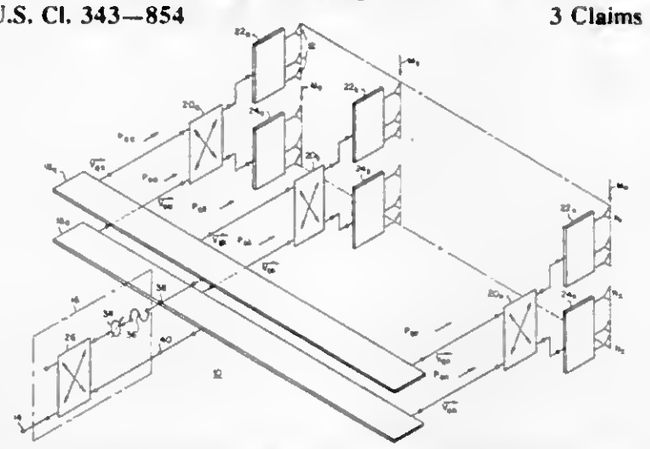
APPARATUS FOR STEERING A RECTANGULAR ARRAY OF ELEMENTS BY AN ANGULAR INCREMENT IN ONE OF THE ORTHOGONAL ARRAY DIRECTIONS

Gary E. Evans, Glen Burnie, Md., assignor to Westingbouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 3, 1976, Ser. No. 663,340

Int. Cl.² H01Q *3/26*

U.S. Cl. 343—854 **3 Claims**



1. In a directional antenna array of the type having radiating elements aligned in a rectangular arrangement of rows and columns, the directional beam of said array being selectively steerable between limit positions spaced apart by at least one predetermined angular inerement in the column plane, the combination:

a. a plurality of radiating elements arranged in a rectangular array in which the elements are aligned in a set of rows and a set of columns, each column of the set of columns comprising first, second and third subsets of radiating elements, said first and second subsets of each column having like numbers of radiating elements and being disposed with bilateral symmetry to one and the other side of the midpoint of the column, said third set of radiating elements being centrally disposed between the first and second subsets and being centered relative to the midpoint of the column,

b. an array input terminal for receiving r.f. energy,

c. first column-plane beam steering means operative to feed a reference unphased voltage component of said r.f. energy to said third subset of radiating elements and operative to derive from said r.f. energy a selected one of first and second invertible relationships of a doublet of first and second conjugal phase shifted voltage components, and to apply said first and second conjugal voltage components to said first and second subsets, respectively.

4,028,711

METHOD OF AND DEVICE FOR ELECTROSTATIC PRINTING

Gerhard Jost; Ulf Rothgordt, both of Norderstedt, and Klaus Witter, Hamburg, all of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 2, 1975, Ser. No. 564,305

Claims priority, application Germany, Apr. 18, 1974, 2418632

Int. Cl.² G03G *13/044, 13/052*

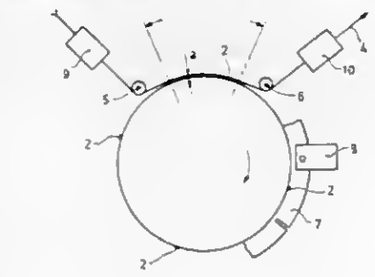
U.S. Cl. 346—153 **10 Claims**

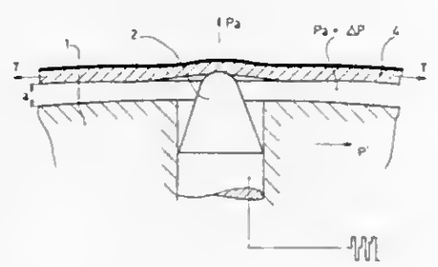
1. A method for electrostatically printing characters which comprises:

providing a record carrier;

providing an electrode which is constructed as a needle having an area of contact dimensioned for forming a predetermined track width on the record carrier;

sliding the electrode against the record carrier under a pressure sufficient to deflect the surface of said record carrier, said sliding step providing no support for the record carrier on the side remote from said electrode and in the immediate region of each of said electrodes;





applying selectively controllable pulses during sliding movement between said electrode and said record carrier;

whereby the area of contact between said record carrier and said electrode determines the width of a recorded track and the charge density applied to said record carrier is linearly dependent on the voltage applied to said electrode.

4,028,712

DISPLAY SYSTEM FOR PHOTOGRAPHIC CAMERA

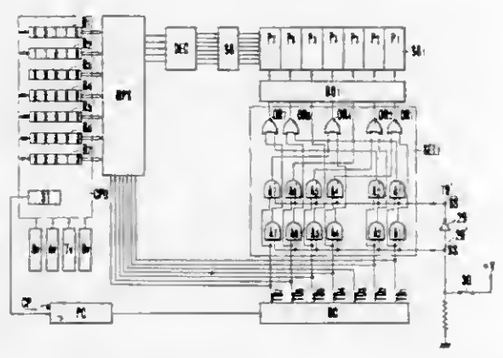
Masaharu Kawamura, Hino; Nobuaki Sakurada, Yokohama; Nobuhiko Shinoda, Tokyo; Tadashi Ito, Yokohama; Fumio Ito, Yokohama, and Hiroyashu Murakami, Tokyo, all of Japan, assignors to Kanon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 26, 1975, Ser. No. 635,370

Claims priority, application Japan, Nov. 27, 1974, 49-136843; Nov. 27, 1974, 49-136844

Int. Cl.² G03B *17/20*

U.S. Cl. 354—23 D **3 Claims**



1. A display system adapted for use in conjunction with an automatic exposure control system of a camera of the type having a shutter preselection and a diaphragm preselection automatic exposure control modes comprising;

a. a first group of registers for storing the preselected exposure control parameter in binary coded decimal form,

b. a second group of registers for storing the computed result in binary coded decimal form,

c. timing pulse generating means,

d. a multiplexer connected to said first and said second groups of registers and receptive of the timing pulses from said timing pulse generating means for causing the data stored in said first and second groups of registers to be read out in sequence,

e. a decoder for converting the outputs of said multiplexer to corresponding coded signals for display,

f. digital readout means comprises of an array of display elements for displaying digit characters corresonding to the outputs of said decoder,

g. preference signal generating means having shutter preference signal generating means and diaphragm preference signal generating means, and

h. display control means cooperative with said timing pulse generating means for controlling the sequence of operation of said display elements in a selected program; said control means including means for selecting one of two programs in response to occurrence of the signal from said preference signal generating means, whereby the digit characters of the preselected exposure control parameter are displayed in constant positions relative to those in which the digit characters of the computed result are displayed regardless of which mode is rendered operative.

4,028,713

DATA RECORDING CAMERA

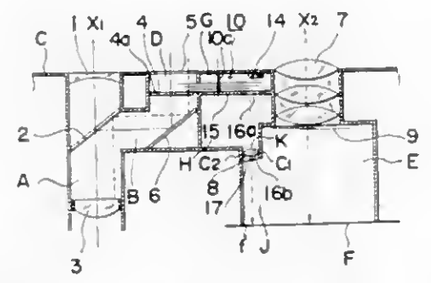
Saichiro Ohashi, Kyoto, and Susumu Fujita, Kobe, both of Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed June 2, 1976, Ser. No. 692,073

Claims priority, application Japan, June 3, 1975, 50-67208; June 3, 1975, 50-67209

Int. Cl.² G03B *17/24*

U.S. Cl. 354—106 **5 Claims**



1. In a camera including an exposure system comprising a main focussing lens system and associated main shutter means actuable to effect exposure of film material at an exposure station to image-wise light reflected from a scene to be photographed and a viewfinder system to permit viewing of a scene to be photographed, the improvement comprising:

data specification means including at least one identical item of data;

externally actuable setting means actuable to move said data specification means to different settings in each of which an item of data is brought to a data projection position and a data reflection position;

optical means actuable simultaneously with actuation of said main shutter means to focus the image of a data item located at said data projection position onto a specific portion of said film material located at said exposure station; and

supplementary optical means for always directing the image of a data item located at said data reflection position to said viewfinder system, whereby content of and position relative to said frame of said data item are viewable in said viewfinder system.

4,028,714

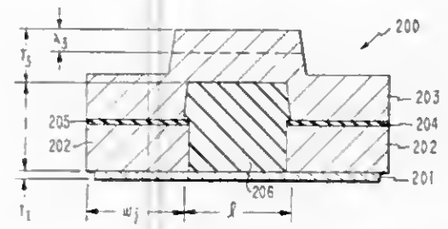
ULTRALOW-POWER, MICRO-MINIATURIZED JOSEPHSON DEVICES HAVING HIGH INDUCTANCE

Walter H. Henkels, Putnam Valley, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 31, 1974, Ser. No. 537,802

Int. Cl.² H01L *39/22, 27/18*

U.S. Cl. 357—5 **22 Claims**



1. A superconductive device for operation at a constant temperature below the critical temperature, T_c, of the superconducting materials of said device comprising at least two Josephson tunneling junctions, and means for providing kinetic inductance interconnecting said at least two Josephson tunneling junctions wherein said kinetic inductance is the self-inductance in addition to the normal magnetic inductance when a material is superconducting, said device having an enhancement ratio, L_K/L_∞, of at least one, at least a portion of said means having a thickness less than the London penetration depth, λ, thereof at absolute zero temperature,

where L_K is the difference between the total inductance, L_T, which said device would have at a temperature of absolute zero, and the inductance L_∞ which said device would have at a temperature of absolute zero if the thickness of said at least a portion of said means and the remainder of said means were very large relative to said London penetration depth at absolute zero temperature.

4,028,715

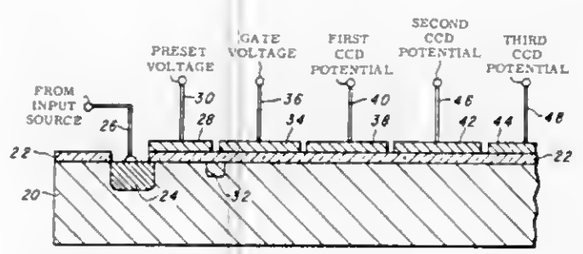
USE OF FLOATING DIFFUSION FOR LOW-NOISE ELECTRICAL INPUTS IN CCD'S

Stephen P. Emmons, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 373,568, June 25, 1973, abandoned. This application Sept. 30, 1975, Ser. No. 618,086

Int. Cl.² H01L *29/78*

U.S. Cl. 357—24 **7 Claims**



1. In a charged coupled device comprising a semiconductor substrate and phase electrodes overlying and insulated from a surface of said substrate, input structure for introducing, under control of input signals applied to said input structure, charge packets into a potential well in said substrate beneath at least one of said phase electrodes, and means for applying clock voltages to said phase electrodes for propagating said electrical charges along said substrate beneath said phase electrodes said input means comprising charge carrier source means defined adjacent said semiconductor substrate surface, said source means connected to an input terminal; a floating doped region having no directly overlying electrode thereby reducing the capacitance C of said floating doped region to less than that of said potential well beneath said one phase electrode and simultaneously reducing the kTC noise associated with said floating doped region wherein k = Boltsman's constant and T = absolute temperature, said floating doped region being of opposite conductivity type from that of said substrate, and disposed at said substrate surface between said charge carrier source means and said one phase electrode; first gating means overlying and insulated from said semiconductor substrate surface and disposed between said charge carrier source means and said floating region for receiving a voltage difference between said input terminal and said first gating means dependent on the amplitude of a signal to be inputted into the charge coupled device such that said floating region receives a quantity of charge carriers substantially free of kTC noise components from said charge carrier source means dependent on the amplitude of said input signal; second gating means overlying and insulated from said semiconductor substrate surface and disposed between said floating region and said one phase electrode for receiving a voltage concurrently with a said clock voltage received by said one phase electrode effective to transfer said quantity of charge carriers from said floating region into the potential well under said one phase electrode to store said quantity of charge carriers in said potential well.

4,028,716

BULK CHANNEL CHARGE-COUPLED DEVICE WITH BLOOMING SUPPRESSION

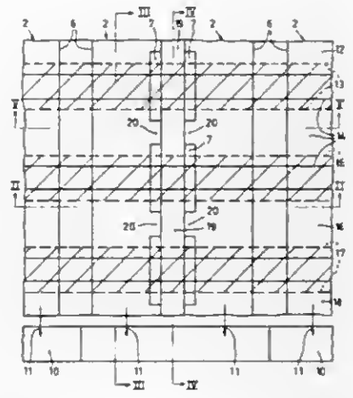
Johannes Gerrit van Santen, and Marnix Guillaume Collet, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 19, 1974, Ser. No. 498,594

Claims priority, application Netherlands, Aug. 23, 1973, 7311600

Int. Cl.² H01L *29/78, 27/14, 31/00;* **G11C** *19/28*

U.S. Cl. 357—24 **13 Claims**



1. A radiant energy sensor of the bulk-channel charge coupled type with blooming suppression, comprising a semiconductor body having an elongated semiconductor layer of first type conductivity and serving as a storage and transfer signal channel for first type majority signal carriers generated by incident radiant energy, means for electrically isolating the layer from its surroundings, means including electrodes arranged adjacent a surface of the body and the signal channel and capable when the electrodes are electrically biased of forming a depletion zone throughout the channel thickness and of forming in the channel a series of potential wells having, within the channel and separated in the transfer direction by potential barriers, potential minima where majority carriers can be stored and further capable of transferring the carriers from well to successive well along the channel interior, and means for draining excess majority carriers comprising a semiconductor drain zone of a first type conductivity arranged in the body alongside the signal channel and directly connected to the signal channel and when electrical bias is applied cooperating with the electrical isolation means to establish between

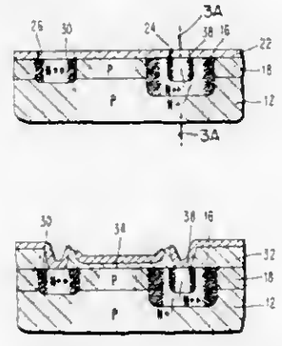
the drain zone and the storage wells an overflow potential barrier which maintains the electrical isolation of the signal channel but whose height at locations each adjacent a storage well is lower than that of the potential barrier between successive wells during storage thereby to preferentially attract excess majority carriers overflowing the storage wells, said isolating means comprising a semiconductor isolation zone of a second opposite-type conductivity which, viewed on the surface, extends in the semiconductor body parallel to and besides the signal channel and separates laterally the signal channel from the drain zone except for localized channels of the first type conductivity which interconnect the signal channel and the drain zone, said channels having a thickness and a doping concentration at which a depletion zone can be established throughout its thickness by means of an electric field so as to obtain said overflow potential barrier.

4,028,717

FIELD EFFECT TRANSISTOR HAVING IMPROVED THRESHOLD STABILITY

Richard C. Joy; Ingrid E. Magdo, both of Hopewell Junction, and Alfred Phillips, Jr., Wappingers Falls, all of N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed Sept. 22, 1975, Ser. No. 615,251
Int. Cl.² H01L 29/78
U.S. Cl. 357—23 **7 Claims**



1. An improved insulated gate field effect transistor comprising
a semiconductor substrate of a first conductivity type having source and drain regions of a second opposite type conductivity formed in a major surface thereof and defining a channel region;
a gate electrode overlying said channel region,
a layer of dielectric material underlying said gate electrode,
at least said drain region having a first region of a second type conductivity wherein the impurity concentration increases with depth, the peak concentration being spaced inwardly from said major surface, said first region defining a side of said channel region, and a second region of said second type conductivity located and encompassed within said first region and having a peak impurity concentration at said major surface, and
a drain electrode in ohmic contact with said second region.

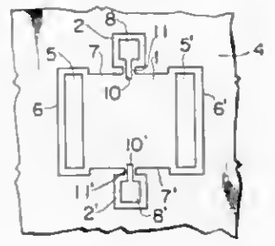
4,028,718

SEMICONDUCTOR HALL ELEMENT

Masatoshi Migitaka, Kokubunji, and Yozo Kanda, Hamamatsu, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Oct. 28, 1975, Ser. No. 626,454
Claims priority, application Japan, Dec. 25, 1974, 49-148052
Int. Cl.² H01L 29/82
U.S. Cl. 357—27 **14 Claims**

1. A semiconductor Hall element comprising:
a semiconductor substrate including a first semiconductor layer of a first conductivity type and having a first surface;
a first semiconductor region of a second conductivity type, opposite said first conductivity type and having a substantially rectangularly shaped surface area, disposed beneath and extending to said first surface of sadi substrate;
a second semiconductor region of said second conductivity type, having a prescribed shaped surface area less than that of said first semiconductor region disposed beneath and extending to said first surface of said substrate, adjacent to, but spaced apart from, a first side of said first semiconductor region;
third and fourth elongated semiconductor regions of said second conductivity type and an impurity concentration higher than that of said first semiconductor region, disposed in said first semiconductor region along second and third parallel sides thereof perpendicular to said first side of said first semiconductor region;



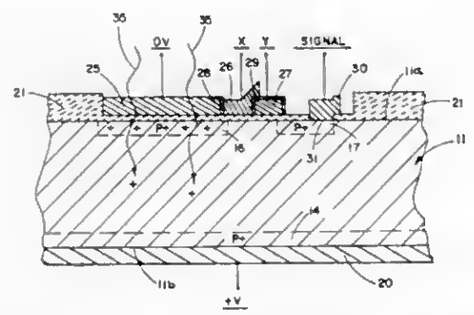
a fifth semiconductor region, of said second conductivity type and having an impurity concentration higher than that of said second semiconductor region, disposed in said second semiconductor region;
a sixth semiconductor region, of said second conductivity type, disposed beneath and extending to said first surface of said substrate and being contiguous with said first and second semiconductor regions; and
a seventh semiconductor region of said second conductivity type and having an impurity concentration higher than that of said first semiconductor region, disposed in said sixth semiconductor region so as to be contiguous with said fifth semiconductor region and overlapping said first side of said first semiconductor region.

4,028,719

ARRAY TYPE CHARGE EXTRACTION DEVICE FOR INFRA-RED DETECTION

Orlie L. Curtis, Culver City, Calif., assignor to Northrop Corporation, Los Angeles, Calif.

Filed Mar. 11, 1976, Ser. No. 666,165
Int. Cl.² H01L 27/14, 29/78
U.S. Cl. 357—30 **9 Claims**



1. An infra-red detector array comprising a plurality of detector elements, each of said elements comprising:
a substrate of an extrinsic semi-conductor material adapted to generate majority carriers in response to infra-red radiation, said substrate having front and back surfaces through either of which such radiation passes,
a plurality of majority carrier diffused regions separated from each other and formed along the front surface of the substrate,
a layer of dielectric material on said front surface,

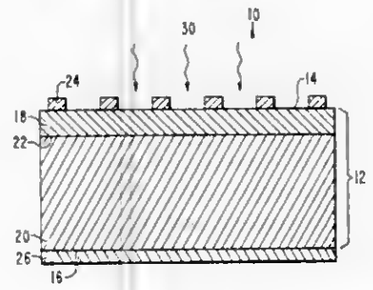
a collector electrode deposited over said dielectric layer opposite one of said diffused regions, thereby forming a storage capacitor,
a conductive signal line deposited on said dielectric layer opposite and making electrical contact with another of said diffusion regions, and
conductive address line means deposited over said dielectric and positioned between said collector electrode and said signal electrode,
a biasing potential being applied to said collector electrode so as to attract the majority carriers generated in said substrate by said radiation toward said collector electrode,
whereby when addressing signals are simultaneously received at both address line means of any detector element, said majority-carrier charge stored in the capacitor formed by the collector electrode, the dielectric layer, and the top surface of the substrate is transferred to the signal line.

4,028,720

PHOTOVOLTAIC DEVICE

Jacques Isaac Pankove, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed May 24, 1976, Ser. No. 689,181
Int. Cl.² H01L 27/14
U.S. Cl. 357—30 **10 Claims**



1. A semiconductor photovoltaic device comprising:
a body of silicon having therein gallium and arsenic paired molecular impurities in a concentration on the order of 10^{18} impurity pairs per cubic centimeter or greater, said body having an incident surface on which solar radiation is capable of impinging, and said body having means for forming a built-in electric field.

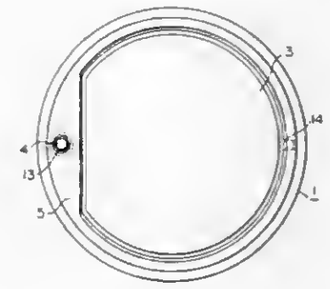
4,028,721

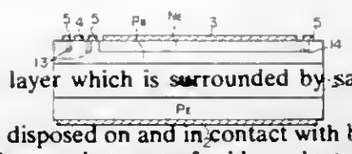
SEMICONDUCTOR CONTROLLED RECTIFIER DEVICE

Tsutomu Yatsuo, and Katsumi Akabane, both of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed July 22, 1974, Ser. No. 490,300
Claims priority, application Japan, Aug. 1, 1973, 48-85827; Aug. 31, 1973, 48-97171
Int. Cl.² H01L 29/74
U.S. Cl. 357—38 **3 Claims**

1. A semiconductor controlled rectifying device comprising:
a semiconductor substrate including
a first layer of a first conductivity type,
a second layer having a second conductivity type, opposite said first conductivity type, and forming a first PN junction with said first layer adjacent thereto,
a third layer having said first conductivity type and forming a second PN junction with said second layer adjacent said third layer,
a fourth layer having said second conductivity type and forming a third PN junction with said third layer, said fourth layer being buried in said third layer with its surface exposed, and
a fifth layer in ring form isolated from said fourth layer by said third layer and buried in said third layer with its surface exposed, said fifth layer forming a fourth PN junction with said third layer and having said second conductivity type, said fifth layer having a smaller area than said fourth layer;
a first main electrode in ohmic contact with at least the surface of said first layer;
a second main electrode in ohmic contact with at least the surface of said fourth layer;
a gate electrode in contact with that part of the surface of





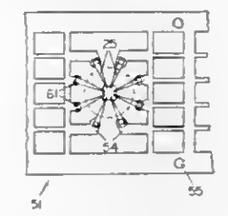
said third layer which is surrounded by said fifth layer; and
a conductor disposed on and in contact with both said third and fifth layers, that part of said conductor disposed on said third layer extending along the periphery of said fourth layer spaced-apart from the periphery thereof by constant distance and a portion of said part of said conductor being in contact with said periphery of said fourth layer.

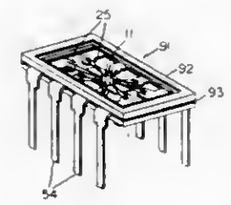
4,028,722

CONTACT BONDED PACKAGED INTEGRATED CIRCUIT

Robert W. Helda, Hollywood, Fla., assignor to Motorola, Inc., Chicago, Ill.

Division of Ser. No. 80,378, Oct. 13, 1970, Pat. No. 3,698,073, which is a continuation of Ser. No. 691,041, Dec. 15, 1967, abandoned. This application Oct. 10, 1972, Ser. No. 296,185
Int. Cl.² H01L 23/48, 29/44; H02G 13/08
U.S. Cl. 357—70 **2 Claims**





1. An encapsulated semiconductor device having metal lead portions inside and outside the encapsulation extending from a semiconductor unit, said metal lead portions being originally a part of two substantially flat metal frame means each said means provided in a generally strip-like configuration and each said means comprising a plurality of identical frame members spaced apart on each said metal frame means and

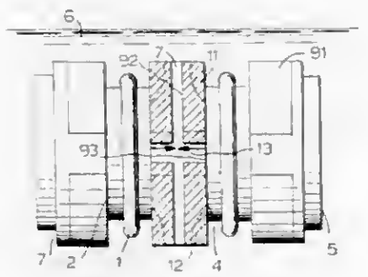
each frame member providing the metal lead portions for an ultimate semiconductor device, with the first of said metal frame means having lead portions each with an inner end portion and an outer end portion adapted to have semi-conductor means bonded to the lead portions thereof and being characterized by a flexibility which permits it to be wound on a spool for storage after semiconductor means are bonded thereto, and with the second of said metal frame means having frame members each of which is larger in area than a frame member of the first metal frame means and being stiffer and less flexible than said first metal frame means and not capable of being wound on a spool, said metal lead portions of said semiconductor device comprising the lead portions in a frame member from said first metal frame means extending outwardly from a central area at the inner end portions of the lead portions thereof, semiconductor means bonded to said first frame means lead portions at said inner end portions and said central area, said metal lead portions in said semiconductor device also having said second metal frame means bonded respectively to the outer end portions of said first frame means lead portions, said semiconductor unit and said first metal frame means lead portions and at least the bonded portion with said second metal frame means lead portions being in said encapsulation, and a portion of each of the latter lead portions extending out of said encapsulation for said device for connection with apparatus with which said semiconductor device is to be operated.

4,028,723

COOLING DEVICE FOR HEAT GENERATION MEMBER

Yoshiro Shikano, and Yasuhiro Ueoka, both of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 24, 1975, Ser. No. 552,145
Int. Cl.² H01L *23/02, 25/04, 23/12*
U.S. Cl. 357—82 **4 Claims**



1. A cooling device comprising:

a plurality of planar semiconductor elements having a pair of flat surfaces on opposite sides thereof;

a plurality of planar cooling members having a pair of flat surfaces on opposite sides therof, each planar cooling member positioned between and abutting the flat surfaces of a pair of said semiconductor elements, and each planar cooling member having a plurality of parallel, vertical first passageways therein between the circumference thereof and at least one second passageway therethrough between said two opposite flat surfaces transverse to and through at least one of said first passageways and opening against the surface of at least one of said semiconductors abutting said cooling member; and

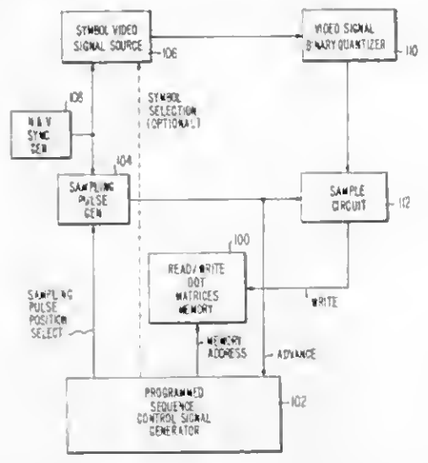
an electrically insulative refrigerant liquid completely surrounding said semiconductor elements and said cooling members and filling said first and second passageways in said cooling member, said refrigerant liquid having a boiling point less than the rated temperature of said semiconductor element.

4,028,724

READ/WRITE CHARACTER GENERATOR MEMORY LOADING METHOD

Ross Chipman Graham, Point Claire, Canada, assignor to RCA Corporation, New York, N.Y.

Filed Nov. 10, 1975, Ser. No. 630,651
Int. Cl.² H04N *5/66*
U.S. Cl. 358—160 **4 Claims**



1. A method for loading a read/write character generator memory with a plurality of different symbols for use in displaying selected ones of said symbols on a display device exhibiting a television raster scan during readout of said memory; said memory storing each respective one of said plurality of different symbols in two-dimensional dot matrix form at a separate address location thereof with all dot matrices having the same size first dimension and the same size second dimension, whereby any dot within any dot matrix is completely specified by the address location of that dot matrix, the ordinal line along the first dimension in which that dot is located and the ordinal position along that line in said second dimension in which that dot is located; said method comprising the steps of:

a. deriving a video signal at a predetermined horizontal sync rate and a predetermined vertical sync rate of a television frame of information including a single given one of said symbols located within a given window of said frame, which window corresponds with a dot matrix having first and second dimensions which are an integral multiple including unity of the first and second dimensions of said dot matrices of said memory, said window covering at least a preselected portion of said frame;

b. quantizing said video signal to produce an output manifesting a first binary value in response to said video signal being at at least a first given level and a second binary value in response to said video signal being below said first given level;

c. deriving at said predetermined horizontal sync rate and vertical sync rate a sampling pulse which occurs at a preselected position within said window of said frame and corresponds with a predetermined ordinal line and a predetermined ordinal position along that line of said window dot matrix;

d. sampling said quantized output with said sampling pulse to determine the binary value of said quantized output sample during the occurrence of said sampling pulse;

e. assigning a given address location in said memory to said given one of said symbols, and

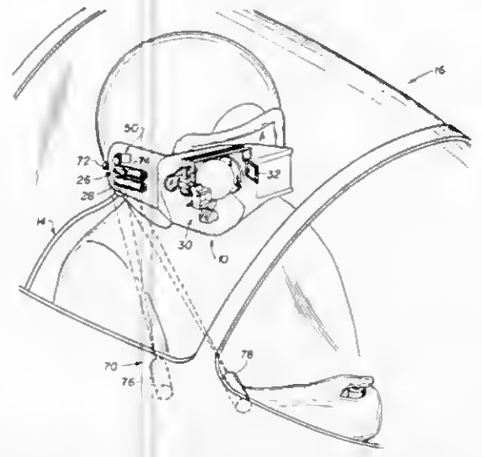
f. storing the binary value of said sampled quantized output at the dot position located at said predetermined ordinal line and predetermined ordinal position along that line of the dot matrix of said memory having said assigned address location.

4,028,725

HIGH-RESOLUTION VISION SYSTEM

Edgar B. Lewis, Garden City, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Apr. 21, 1976, Ser. No. 679,035
Int. Cl.² H04N *7/18*
U.S. Cl. 358—103 **10 Claims**



1. A high-resolution vision system for an observer having a field of view related to a predetermined reference axis comprising:

a helmet worn on the head of the observer;

apparatus on said helmet for mounting eye-tracking display means having an image presentation which is slaved to the eye line of sight of the observer;

a remote source of visual information including at least a first and a second pick-up sensor;

servo means for adjusting the orientation of said remote source with respect to said reference axis, the angular orientation thereof with respect to said axis being related to the angular orientation of said helmet and the eye angle of said observer;

communications means between said remote source and said helmet-mounted display means for transmitting visual information signals and control signals therebetween;

at least a first and a second light projecting means in said display means for producing light-information signals in response to visual information derived from said remote source;

means inserting said light signals from said first projecting means into a selected area of said light signals from said second light projecting means;

angularly adjustable optical means in said display means for superimposing the combined image of said light signals of the field of view of the observer by directing light carrying said signals into at least one eye of the observer with the area of the inserted image having a predetermined relationship with said line of sight;

monitoring means operatively associated with said helmet for measuring angular displacement thereof with respect to said reference axis and for producing control signals indicative of such angular displacement;

monitoring means operatively associated with said display means for measuring angular displacement of said optical superimposing means with respect to said eye line of sight and for producing control signals indicative of such angular displacement;

means responsive to said control signals from said eye line of sight monitoring means for adjusting the orientation of said optical superimposing means such that the orientation of said light information signals viewed by the observer remains substantially constant with respect to said eye line of sight; and

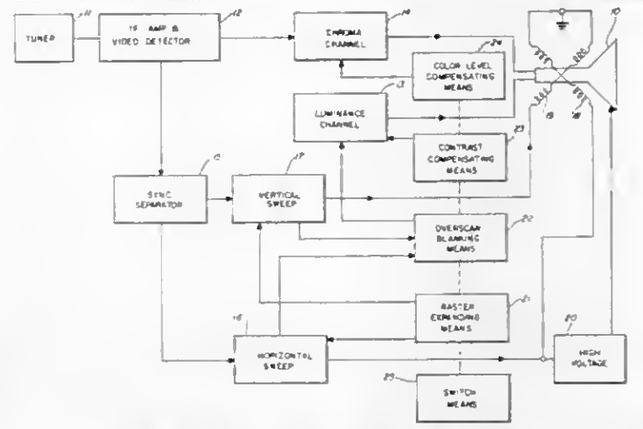
means responsive to the control signals from both said eye line of sight monitoring means and said helmet angle monitoring means for adjusting the angular orientation of said remote visual information source such that the angular orientation thereof remains substantially constant with respect to said line of sight.

4,028,726

TV RECEIVER RASTER EXPANSION SYSTEM

Thomas W. Argy, Chicago, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

Filed Jan. 27, 1975, Ser. No. 544,249
Int. Cl.² H04N *5/44;* **H01J** *29/70*
U.S. Cl. 358—165 **1 Claim**



1. In a television receiver of the type comprising a cathode ray picture tube having an image display screen and means responsive to received television signals including video signal components and horizontal vertical synchronizing components for scanning said screen with one or more electron beams in a rectangular coordinate pattern to produce an image raster having a predetermined aspect ratio, the improvement which comprises:

means for expanding said raster in both horizontal and vertical directions, such raster expansion resulting in overscan of said screen by said one or more electron beams during intervals corresponding to peripheral image portions;

overscan interval blanking means responsive to said horizontal synchronizing component and a vertical deflection component internally derived from said vertical synchronizing component, for developing a composite blanking signal to blank said one more electron beams during said overscan interval, said overscan interval blanking means being a common circuit, comprising:

an adjustable integrating network for reshaping said horizontal synchronizing component;

an adjustable amplitude control means for resizing said vertical deflection component;

diode gate circuitry coupled to said adjustable integrating network and said adjustable amplitude control means for partitioning the positive-going portions from the negative-going portions of said reshaped horizontal synchronizing component and said vertical deflection component;

modifying means coupled to said diode gate circuitry for processing said positive-going portions of said reshaped horizontal synchronizing component and said vertical deflection component;

pulse generating means coupled to said modifying means and said diode gate circuitry means for combining said negative-going portions and said processed positive-going portions of said reshaped horizontal synchronizing component and of said vertical deflection component and for combining said processed reshaped horizontal synchronizing component and said processed vertical deflection component; and

a buffer stage coupled to said pulse generating means for generating said composite blanking signal; and

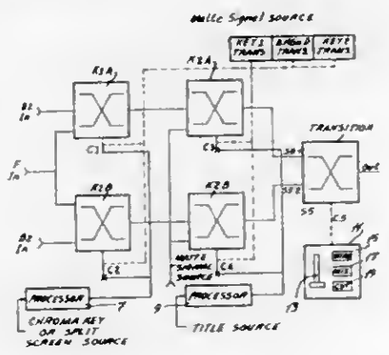
switch means for concomitantly actuating said raster expanding means and overscan interval blanking means.

4,028,727

MIX/EFFECTS SWITCH ARRANGEMENT AND MIX/EFFECTS SWITCHING SYSTEM

Ole Skrydstrup, Pointe Claire, Canada, assignor to Central Dynamics Ltd., Canada

Filed May 7, 1976, Ser. No. 684,360
Int. Cl.² H04N *5/22*
U.S. Cl. 358—181 **11 Claims**



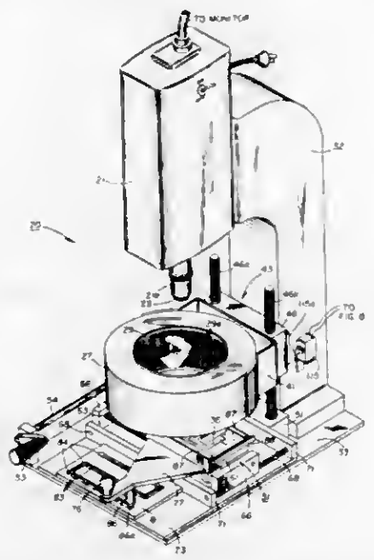
1. A mix/effects switch arrangement comprising:
a plurality of switches, each of said switches comprising two input terminals, an output terminal and a control terminal;
one of said switches comprising an output switch;
a first number of said plurality of switches being serially arranged to provide a first feedline to one input terminal of said output switch;
a second number of said plurality of switches being serially arranged to provide a second, parallel, feedline to the other input terminal of said output switch;
said output switch comprising a soft switch.

4,028,728

METHOD OF AND VIDEO SYSTEM FOR IDENTIFYING DIFFERENT LIGHT-REFLECTIVE SURFACE AREAS ON ARTICLES

Benny H. Sharp, Yukon, Okla., assignor to Western Electric Company, Inc., New York, N.Y.

Filed Apr. 2, 1976, Ser. No. 672,914
Int. Cl.² H04N *7/18*
U.S. Cl. 358—106 **29 Claims**



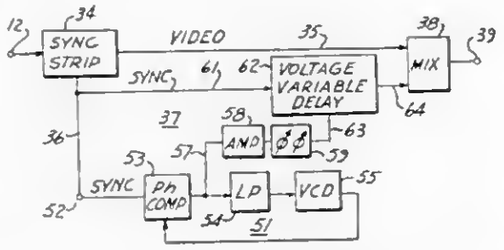
1. A video system for selectively ascertaining the presence and absence of, and for discriminating between, at least two distinctively different types of light-reflective surface areas formed on a common, exposed surface of a prepositioned object, one type of surface area being substantially two-dimensional, and the other type being substantially three-dimensional, said system comprising:
means for illuminating the exposed surface of said object with polarized light that extends across said surface such that in a direction at least substantially perpendicular thereto: (1) reflected light is minimized from those light-reflective areas on said surface having a substantially smooth, planar, two-dimensional profile, and (2) reflected light is maximized from those light-reflective areas on said surface having a three-dimensional profile;
video camera means positioned such that the axis of said lens thereof is oriented substantially perpendicularly to both the exposed surface of the object and the light ray paths of said polarized light for receiving the minimized and maximized patterns of reflected light from said respectively different types of surface areas, and for generating video signals that produce contrasting patterns representative thereof when displayed on the screen of a video monitor, and
a video monitor electrically connected to said camera for producing said contrasting patterns.

4,028,729

PROVISION AND DISPLAY OF VIDEO SIGNALS

Lewis B. Browder, Altadena, Calif., assignor to Bell & Howell Company, Chicago, Ill.

Filed Mar. 25, 1975, Ser. No. 561,958
Int. Cl.² H04N *5/04, 5/785*
U.S. Cl. 358—148 **39 Claims**



23. In apparatus for enhancing flutter in an electrical signal affected by flutter, the improvement comprising in combination:
first phase lock loop means having input means for receiving said flutter-affected signal, first loop filter means, and output means;
second phase lock loop means having input means connected to said output means of the first phase lock loop means, second loop filter means, and output means;
means connected between said first and second said lock loop means for deriving an error signal from sid first phase lock loop means ahead of said first loop filter means and applying said derived error signal to said second phase lock loop means after said second loop filter means; and
means for deriving an output signal with enhanced flutter from said output means of the second phase lock loop means.

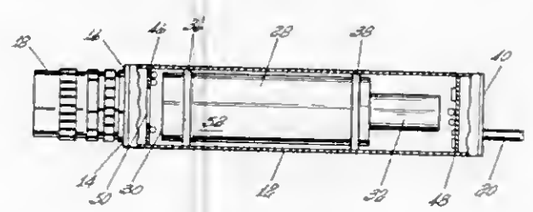
25. In a method of improving the display of video information contained in picture signals affected by flutter and synchronized by synchronizing signals subjected to processing by means for stabilizing synchronizing signals against at least part of said flutter, the improvement comprising the steps of:
compensating said stabilizing function to preserve flutter in said synchronizing signals; and
synchronizing said video signals for said display of vidoe information by synchronizing signals affected by essentially the same flutter as said picture signals;
said stabilization of synchronizing signals including attenuation of signals having flutter frequencies above a predetermined frequency; and
said compensation of said stabilizing function including the step of enhancing the flutter amplitude of said synchronizing signals having said flutter frequencies substantially inversely proportional to said attenuation.

4,028,730

VIDICON CAMERA FOR CLOSED CIRCUIT TELEVISION SYSTEM

Frederick A. Miller, Santa Barbara, Calif., assignor to Circon Corporation, Santa Barbara, Calif.

Filed May 17, 1976, Ser. No. 687,314
Int. Cl.² H04N *3/16*
U.S. Cl. 358—217 **17 Claims**



1. A video camera head for use in a direct wire television system comprising
a video camera tube having an imaging surface for receiving an optical image thereon and for genertng a composite video signal representing a said optical image;
a metal housing having means defining an opening therethrough enabling a said optical image to impinge on said imaging surface, said housing enclosing and supporting said vidicon tube with the imaging surface thereof spaced in axial alignment a predetermined distance from the opening;
a first printed circuit board having an aperture extending axially therethrough of a dimension substantially equal to said opening, said first printed circuit board being positioned in said housing between said opening and said imaging surface with said aperture in axial alignment with said opening and said imaging surface, said first printed circuit board including
preamplifier means electrically connected to said vidicon tube for receiving said composite video signal and for producing an amplified additive composite video signal therefrom;
a second printed circuit board positioned between the end of the vidicon tube opposite to and in axial alignment with said imaging surface and said housing, said second printed circuit board including
amplifier means for amplifying in phase the composite video signal with a predetermined gain;
emitter follower amplifier means electrically connected to said amplifier means and adapted to drive a coaxial cable with said amplified composite video signal; and
conductor means electrically connected between said vidicon tube, said first printed circuit board, said second printed circuit board and a video processor.

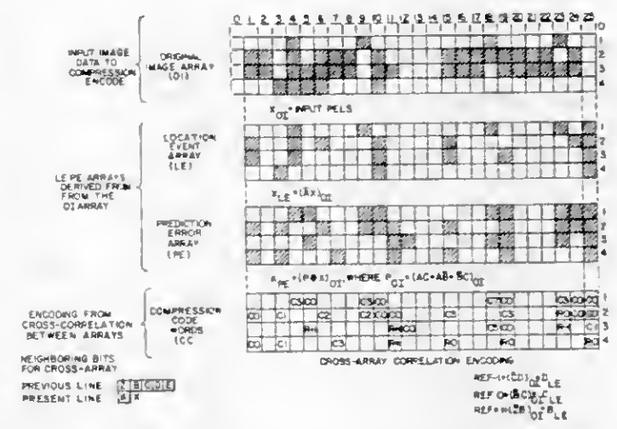
4,028,731

APPARATUS FOR COMPRESSION CODING USING CROSS-ARRAY CORRELATION BETWEEN TWO-DIMENSIONAL MATRICES DERIVED FROM TWO-VALUED DIGITAL IMAGES

Ronald Barthold Arps, Stanford, Calif.; Lalit Rai Bahl, Amawalk, and Arnold Weinberger, Poughkeepsie, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 29, 1975, Ser. No. 617,906
Int. Cl.² H04N *7/12*
U.S. Cl. 358—260 **11 Claims**

1. An apparatus for compression coding a $p \times q$ array of Boolean coded points applied to the apparatus in consecutive raster scan lines, said apparatus comprising:
means **(10, 12, 9)** for forming a high-order $p \times q$ prediction error array and an auxilliary $p \times q$ array of location events from the consecutive raster scan lines of the $p \times q$ array of Boolean coded points;
means **(8, 12, 61, 65, 63)** for counting runs C between consecutive pairs of errors in the prediction error array;
means **(14)** for forming a line difference codeword with difference value v upon the joint event of C>T where T is a threshold and either the single or multiple occurrence of location events in the ith-1 scan line of the location event array within the bit position range of $B \leq r \leq (j+n)$,



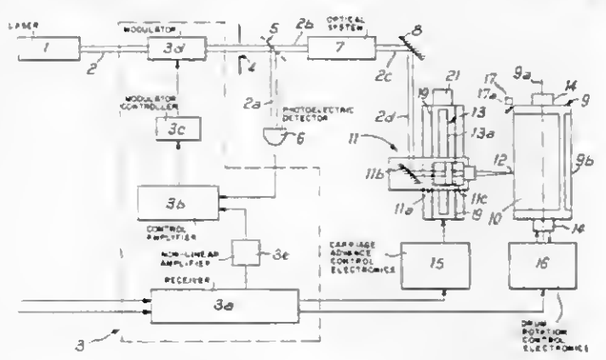
where positive integer B is the greater of function $D(T,v)$ and $(j-n)$, and the number of intervening location events, s, within the bit position range from search start position $D(T,v) \leq q < (j-n)$ not exceeding some limit m, where m, n, q, r and s are positive integers; and
means **(14)** for forming a compression code word from the run-length count C between consecutive errors, in response to the occurrence of each error in the jth bit position of the ith scan line of the prediction error array upon either $C \leq T$ or $C>T$ and there being no occurrence of a line difference encoding for the error, where i, j, C and T are positive integers.

4,028,732

APPARATUS AND METHOD FOR DISPLAY OF IMAGES

Lucien Salter, 9 Allee circulaire, and Gabriel Maincent, 24 Allee circulaire, both of 27200 Foret de Vernon, France

Continuation-in-part of Ser. No. 447,366, March 1, 1974, abandoned. This application Feb. 11, 1976, Ser. No. 657,281
Claims priority, application France, Mar. 2, 1973, 73.07567
Int. Cl.² H04N *1/06*
U.S. Cl. 358—289 **19 Claims**



1. An apparatus for displaying an image tele-transmitted in the form of electric or electromagnetic signals, the image being formed by a plurality of parallel lines each comprising a plurality of points, the apparatus comprising a drum having a cylindrical surface; magnetic bearing means supporting said drum for rotation about its axis of revolution; a carriage; carriage driving means for driving said carriage in stepwise manner for translational movement parallel to said axis of said

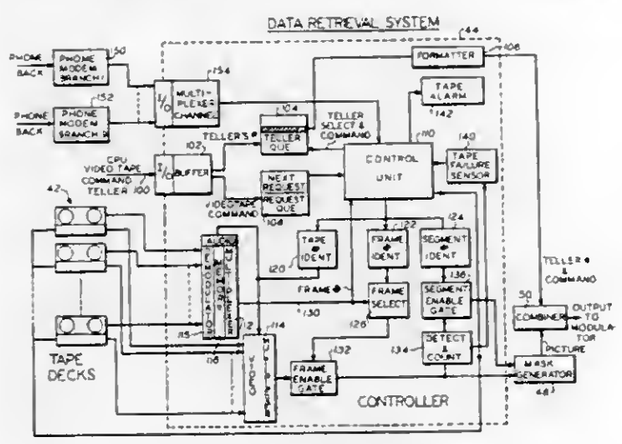
drum; friction means for damping out and rapidly stabilising the carriage position at the end of each movement step; a light source; beam directing means for directing a beam of light from said light source towards said cylindrical surface of said drum; an optical system disposed to lie in the path of the beam from said light source, said beam directing means including means for transmitting the beam along a path parallel to said axis in a direction towards said carriage, means carried on said carriage for intercepting the beam in said path and for deflecting it perpendicularly to said drum axis in a direction towards said drum and means for focusing an image formed in said optical system at the point of impact of the beam on said drum; receiving means responsive to the electric or electromagnetic signals for providing signals representative of an image to be displayed and first synchronizing signals; a light intensity modulator connected to said receiving means to vary the intensity of the beam of light as a function of the signals representative of the image to be displayed; first control means connected to said receiving means and to said carriage driving means to control stepwise movement of said carriage in response to the first synchronzing signals; and second control means connected to said receiving means to control the speed of rotation of said drum.

4,028,733

PICTORIAL INFORMATION RETRIEVAL SYSTEM

Edward M. Ulicki, East Paterson, N.J., assignor to Telebeam Corporation, Paramus, N.J.

Filed July 7, 1975, Ser. No. 593,680
Int. Cl.² H04N *5/785*; **G11B** *15/40*
U.S. Cl. 360—10 **35 Claims**



1. A system for retrievably providing a video display of an information message on a video display means, said system comprising:

a video tape storage media having a plurality of said video displayable messages storable thereon, said video tape storage media having a first audio track having identification information stored therein and a video track having video information stored therein, said video information comprising a plurality of video displayable frames, each of said frames being capable of providing a video signal containing the video displayable information within said frame and comprising a plurality of frame segments, each of said frame segments containing one of said video displayable messages and being capable of providing a portion of said frame video signal containing said one message, said first audio track identification information comprising a plurality of different unique frame identification codes, each frame code being uniquely associated with one frame of said plurality of frames, each of said frame video signals further comprising a plurality of horizontal sync pulses for the video display of said frame video signal, each of said sync pulses being associated with a displayable video scan line, each of said frame segment video signal portions of said frame video signal comprising a predetermined portion of the plurality of displayable video scan lines associated with said frame video display having a corresponding predetermined portion of said plurality of horizontal sync pulses;

means for selecting a unique video displayable message for video display thereof, said selection means providing a unique selection control signal uniquely corresponding to said selected message;

means for scanning said storage media in response to said selection control signal for initiating selection of said unique video displayable message, said scanning means comprising means for subsequently providing said video display from said storage media and means responsive to said first audio track frame identification information for providing a frame location signal;

first condition responsive means operatively connected to said scanning means for retrieving the frame containing said selected message in response to detection of the frame location signal associated with said frame containing said selected message and for counting the horizontal sync pulses in said retrieved frame for providing a display control signal for retrieving said frame segment containing said selected message in response to detection of the count associated with said selected message containing segment; and

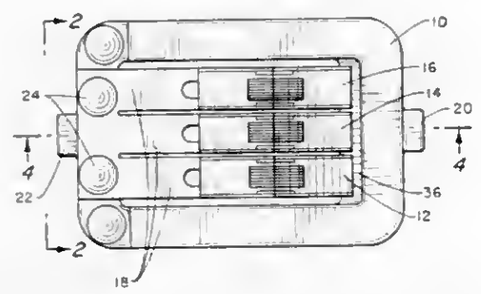
mask generator means operatively connected to said first condition responsive means for providing a composite video displayable output signal to said video display means, said mask generator means providing said single frame segment containing said selected message as said output signal in response to receipt of said display control signal and blanking said entire frame in the absence of receipt of said display control signal; whereby the audio track of a video tape storage media enables a single frame segment to be selectively retrieved from a plurality of frames of video information stored in the video track of said video tape storage media for video display of said frame segment.

4,028,734

PLURAL MAGNETIC HEAD ASSEMBLY WITH INDEPENDENTLY SUPPORTING STRUCTURE

Robert J. Mos, Huntington Beach, Calif., assignor to American Magnetics Corporation, Torrance, Calif.

Continuation of Ser. No. 578,449, May 19, 1975, abandoned. This application Sept. 22, 1976, Ser. No. 725,902
Int. Cl.² G11B *21/16*, *5/48*
U.S. Cl. 360—104 **7 Claims**



1. Signal transducing magnetic head assembly means comprised:

a carrier frame,

mounting means on said frame for pivotally mounting said frame,

a plurality of magnetic heads disposed within said frame,

each said head being mounted to said frame by a plurality of parallelepiped,

each spring having one end fixedly mounted to said frame and the opposite end fixedly mounted to its corresponding head,

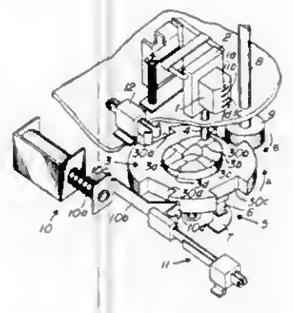
whereby, by flexing of said springs, each said head may translate individually, without rotating, on a line substantially normal to the plane of said frame.

4,028,735

HEAD INDEXING APPARATUS FOR A COMBINED TWO AND FOUR CHANNEL TAPE PLAYER/RECORDER

Toru Miyazaki, Iwaki, Japan, assignor to Alps Motorola, Inc., Tokyo, Japan

Filed Sept. 15, 1975, Ser. No. 613,712
Claims priority, application Japan, Sept. 17, 1974, 49-111888[U]
Int. Cl.² G11B *5/55*, *21/08*, *23/04*
U.S. Cl. 360—106 **9 Claims**



1. In a combined two and four channel tape player, a head indexing apparatus comprising:

a rotary body rotatably into a first number of fixed rotary positions and having a plurality of different cam surfaces;

magnetic head means for monitoring a magnetic tape, said head means coupled to said rotary body and having its position determined by the rotary position of said rotary body;

rotation means coupled to said rotary body for sequentially indexing said body into each of said first number of fixed rotary positions in response to the receipt of an actuation signal;

actuation means coupled to said rotation means for providing an initial actuation signal when a change in the position of the magnetic head means is desired; and

selection means coupled to said rotation means for selectively designating several of said first number of rotary positions as desired positions and controlling, by selectively creating additional actuation signals, the rotation of said rotary body by said rotation means so that said rotary body is sequentially rotated into each of said desired positions in response to the providing of said initial actuation signal by said actuation means, said selection means including a portion of a rotary switch rotated in association with said rotary body and an additional switch electrically connected in series with said rotary switch and being actuated during the rotation of said rotary body into each of said first number of positions, said rotary switch and said additional switch creating said additional actuation signals.

4,028,736

MOTOR PROTECTION CIRCUIT UNIT

James R. Willson, Trumbull, Conn., and Hugh J. Tyler, Santa Ana, Calif., assignors to RobertShaw Controls Company, Richmond, Va.

Filed Dec. 19, 1975, Ser. No. 642,219
Int. Cl.² H02H *7/08*
U.S. Cl. 361—29 **13 Claims**

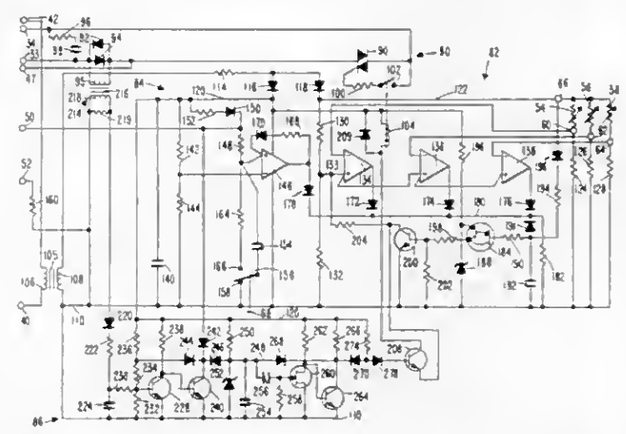
1. A protection circuit unit for connection in a motor system including a contactor having a contactor winding and contacts operated when the contactor winding is energized to connect the motor to an electrical source, the circuit unit comprising

a pair of terminals adapted to be connected in series with the contactor winding across an AC source,

a contactor energization circuit connected between the pair of terminals,

said contactor energization circuit including switch means for controlling the energization of the contactor winding,

said contactor energization circuit further including current sensing means connected in series with the switch means in the contactor energization circuit for producing a



signal only during current flow through the contactor winding,

said current sensing means being independent of which terminal of the pair of terminals the contactor winding is connected with, and

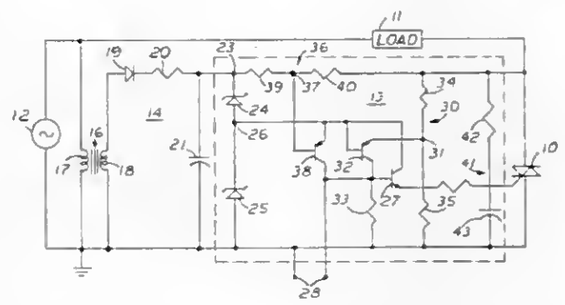
delay after break means responsive to termination of the signal from the current sensing means for preventing operation of the switch means for a predetermined duration after the termination of the signal from the current sensing means.

4,028,737

TRANSIENT VOLTAGE PROTECTION CIRCUIT

Ronald L. Bailey, Rockford, Ill., assignor to Barber-Colman Company, Rockford, Ill.

Filed Apr. 2, 1975, Ser. No. 564,540
Int. Cl.² H02H *3/20*
U.S. Cl. 361—86 **9 Claims**



1. A transient voltage protection circuit for a thyristor connected through the power and common terminals thereof in series with a load controlled thereby and an AC power supply, said circuit comprising a voltage divider and said thyristor through the power and common terminals thereof in parallel circuits, a tap on the voltage divider providing a control voltage as a function of the instantaneous voltage on said AC supply, a source of regulated DC reference voltage at a magnitude below the control voltage corresponding to a thyristor destructive voltage on said AC supply, a source of turn-on voltage, and means for selectively coupling said thyristor through a gate and the common terminal thereof across the source of turn-on voltage in response to said control voltage exceeding the reference voltage.

4,028,738

CENTRAL CIRCUIT CONTROL PLATES FOR AUTOMOTIVE VEHICLES

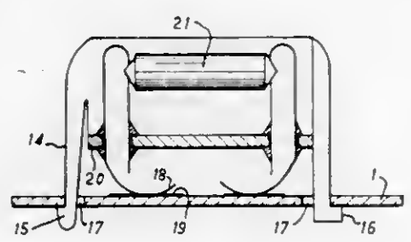
Philippe Rouvre, and Daniel Jean Augello, both of Billancourt, France, assignors to Regie Nationale des Usines Renault and Automobiles Peugeot, both of, France

Filed Apr. 30, 1973, Ser. No. 355,424

Claims priority, application France, May 10, 1972, 72.16824

Int. Cl.² H05K *5/00*

U.S. Cl. 361—403 **1 Claim**



1. A central circuit control plate for the electrical equipment of motor vehicles, the equipment including different control devices on a vehicle dashboard emitting control information, safety devices and load circuits or receivers receiving said information, and a source of current to which said receivers are connected by means of said control devices, wherein said control plate comprises:

a single compact central unit including a predetermined circuit unit for distributing the control information to different load circuits or receivers which are all spaced apart from said control plate, means for transmitting said information, and intermediate safety and control members, connected between said predetermined circuit unit and said means for transmitting, for sending control information from said different control devices to said different load circuits or receivers of the vehicle;

a detachable printed circuit assembly plate having a plurality of controlled circuits, an input connector on the assembly plate connecting the controlled circuits to said source of current and to said means for transmitting, and an output connector connecting said printed circuit assembly plate to the different load circuits or receivers, intermediate safety and control members including fuses, circuit breakers, relays, and a flasher unit for direction indicators;

snap-action means for rapidly fixing to and removing from said assembly plate said intermediate safety and control devices when connecting to and disconnecting from said controlled circuits said safety and control devices; and

wherein said snap-action means comprises resilient legs provided at their free ends with claws and wherein said assembly plate is provided with apertures corresponding to said legs, said claws fitting in a snap fashion into said apertures, said intermediate safety and control devices further comprising resilient metal shoes connected to terminals of said intermediate safety or control devices and engaging corresponding strips of said controlled circuits, said snap-action means being integral with a box for an intermediate safety and control device.

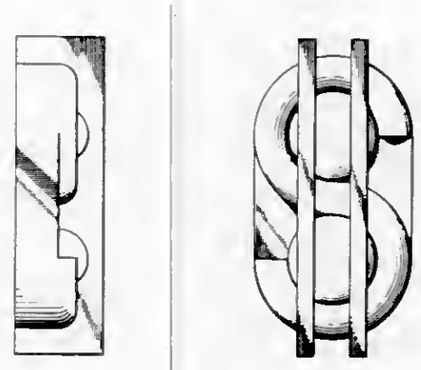
DESIGN PATENTS

GRANTED JUNE 7, 1977

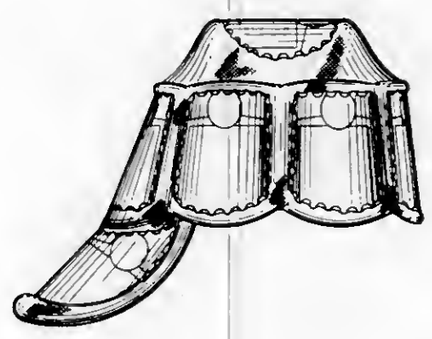
ERRATA

For CLASS	See PATENT NO.
008–367	244,585
013–028	244,610
013–028	244,611
013–024	244,612
014–045	244,613
014–043	244,614
014–068	244,615
014–096	244,616
014–053	244,617
013–005	244,618
027–036	244,619
024–017	244,637
028–051	244,640

244,566
CANDY
John Clinton Evans, Jr., P.O. Box 138, North Olmsted, Ohio 44070, and Harold Eugene Kautz, 5923 Clearview Drive, Parma Heights, Ohio 44130
Filed July 18, 1975, Ser. No. 597,146
Term of patent 14 years
Int. Cl. D1—*01*
U.S. Cl. D1—15

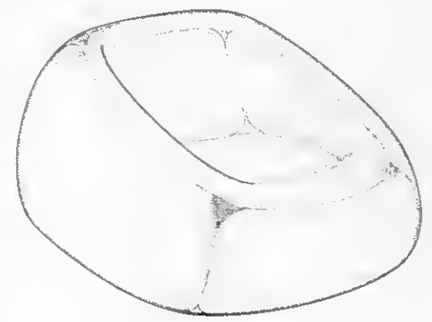


244,567
DISPLAY HAT
Wilhelmina Bocskay, Lake Worth, Fla., assignor to Gregory Ralph Albanese, Eastchester and John Cornelius Bocskay, Yorktown Heights, both of, N.Y.
Filed Apr. 23, 1975, Ser. No. 570,582
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—244

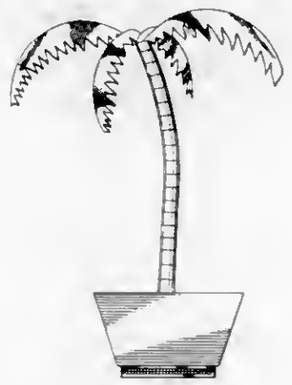


244,568
HAIR BRUSH
Morris G. Lepisto, 3708 Barham Blvd., Los Angeles, Calif. 90028, and Leonard Rabinovitz, 10459 Key West Ave., Northridge, Calif. 91324
Filed Feb. 23, 1976, Ser. No. 660,053
Term of patent 14 years
Int. Cl. D4—*02*
U.S. Cl. D4—35

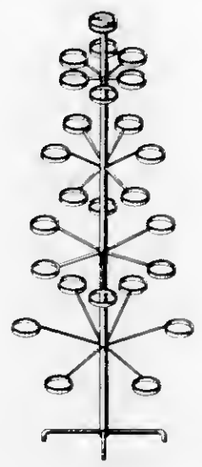
244,569
CHAIR
Eric Laroye, Koningstraat 14-Bus 2, 8400 Oostende, Belgium
Filed June 12, 1975, Ser. No. 586,485
Claims priority, application Belgium, Dec. 20, 1974, 60081
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—67



244,570
COMBINED MERCHANDISE DISPLAY COUNTER AND CEILING AIR CIRCULATOR
Don A. Taylor, 216 Mills St., Wadsworth, Ohio 44281
Filed Mar. 3, 1975, Ser. No. 554,587
Term of patent 14 years
Int. Cl. D20—*02*; D23—*03*
U.S. Cl. D6—153



244,571
STAND FOR POTTED PLANTS
Walter L. Cowan, Jr., 2305 W. Orlando Road, Panama City, Fla. 32405
Filed Nov. 28, 1975, Ser. No. 636,220
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—183



244,572
END SUPPORT FOR A TABLE AND BENCH COMBINATION
Paul F. John, Rte. 3, Box 206F, San Antonio, Tex. 78218
Filed Mar. 1, 1976, Ser. No. 662,716
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—192

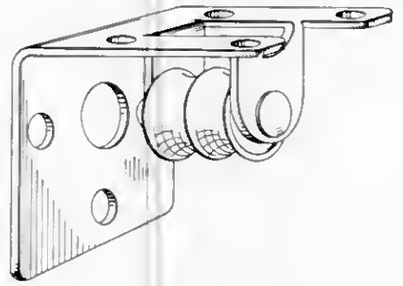
244,573
BOWL OR SIMILAR ARTICLE
James Lloyd Thrush, Lancaster, Ohio, assignor to Anchor Hocking Corporation, Lancaster, Ohio
Filed Sept. 4, 1975, Ser. No. 610,092
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—5

244,574
TORQUE WRENCH
Hiroshi Tsuji, Tokyo, Japan, assignor to Tohnichi Manufacturing Co., Ltd., Japan
Filed Dec. 19, 1975, Ser. No. 642,391
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—24

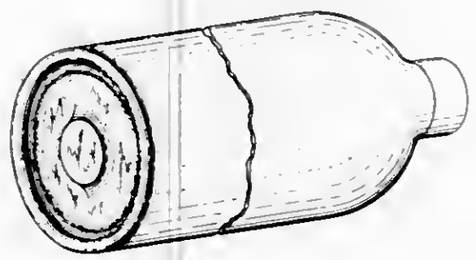
244,575
TOOL FOR OPENING PLASTIC LIDS
Wayne C. Endres, 4495 NW. 1, Des Moines, Iowa 50313, and Robert M. Cain, 1533 Maine, Des Moines, Iowa 50314
Filed Dec. 29, 1975, Ser. No. 644,555
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D8—40

244,576
HANDLE FOR A TIRE CUTTING TOOL
Guy A. Van Alstine, Merrybrook Road, R.D. 1, Collegeville, Pa. 19426
Filed Feb. 19, 1976, Ser. No. 659,567
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—107

244,577
BRACKET FOR HANGING DECORATIVE WOVEN WOOD SHADES
Pero Glumac, 15566 Stetson, Los Gatos, Calif. 95030
Filed Oct. 6, 1975, Ser. No. 619,771
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—363

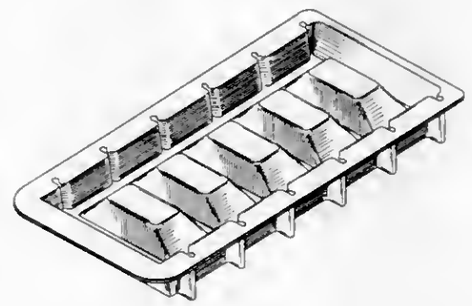


244,578
PRESSURE VESSEL FOR FIRE EXTINGUISHERS OR THE LIKE
Richard A. Avant, 105 Woodbine Ave., Rochester, N.Y. 14619
Filed May 10, 1974, Ser. No. 468,961
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—158

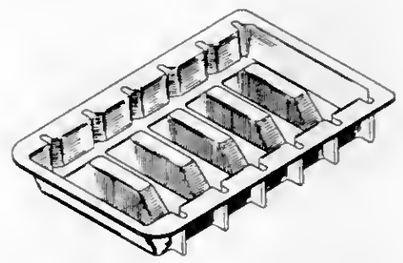


244,579
PERFUME BOTTLE
Pierre Francois Dinand, Levallois, France, assignor to Balenciaga S.A.
Filed Jan. 29, 1976, Ser. No. 653,471
Claims priority, application France, Oct. 23, 1974, 74.38619
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—167

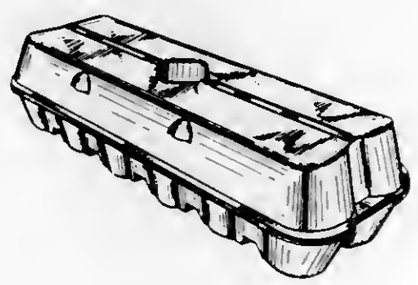
244,580
DISPLAY TRAY
David G. Keough, Greenburg, N.Y., assignor to P. R. Mallory & Co. Inc., Indianapolis, Ind.
Filed Dec. 12, 1975, Ser. No. 640,117
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—189



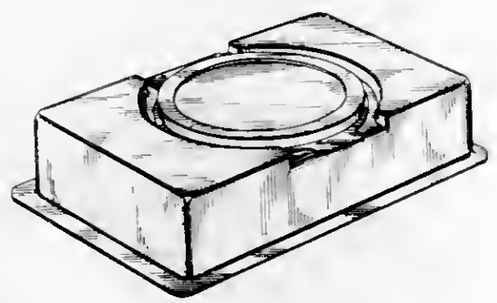
244,581
DISPLAY TRAY
David G. Keough, Greenburg, N.Y., assignor to P. R. Mallory & Co. Inc., Indianapolis, Ind.
Filed Dec. 15, 1975, Ser. No. 640,668
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—189



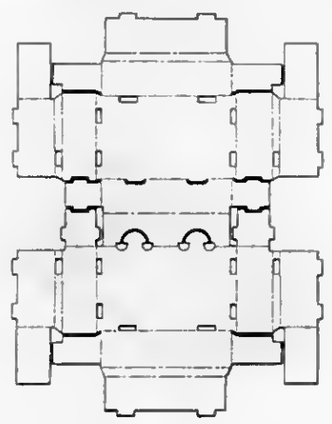
244,582
EGG CARTON
Jørgen Nilaus Petersen, Lyngby, Denmark, assignor to Aktieselskabet Brodrene Hartmann, Lyngby, Denmark
Filed July 17, 1975, Ser. No. 596,633
Claims priority, application Denmark, Jan. 27, 1975, 7575/75
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—190



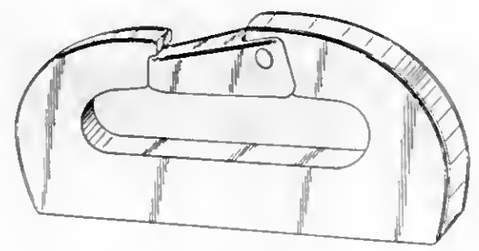
244,583
DISPENSING CONTAINER
Robert A. Barish, Trenton, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.
Filed June 9, 1975, Ser. No. 585,005
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—236



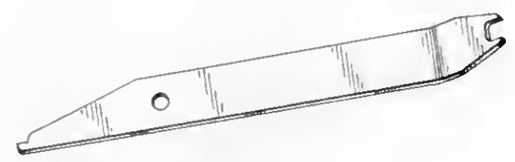
244,584
BOX BLANK
Vernard S. Booth, Albany, Ga., assignor to Olinkraft, Inc., West Monroe, La.
Filed Oct. 1, 1975, Ser. No. 618,524
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—245



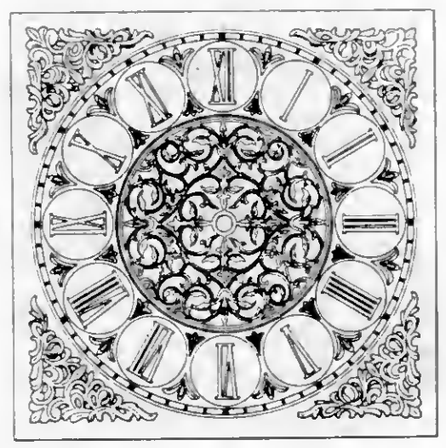
244,585
COUPLING HOOK
Per Erland Jonsson, Smalandsvagen 19, S-826 00 Soderhamn, Sweden
Filed Nov. 8, 1974, Ser. No. 522,182
Term of patent 14 years
Int. Cl. D8—*99*
U.S. Cl. D8—367



244,586
SPARK PLUG GAP MEASURING AND ADJUSTING TOOL
James O. Boord, Toledo, Ohio, assignor to Champion Spark Plug Company, Toledo, Ohio
Filed Apr. 26, 1976, Ser. No. 680,238
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—64



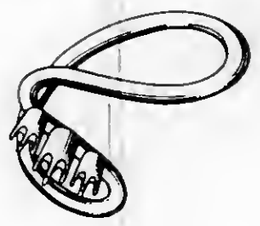
244,587
CLOCK FACE
Jane K. Molyneux, Carmel; Albert J. Day; Regina M. Day, both of San Mateo, all of Calif., and Theo E. Kaiser, Schwenningen, Germany, assignors to Molyneux Clocks, Burlingame, Calif.
Filed Mar. 15, 1976, Ser. No. 666,895
Term of patent 14 years
Int. Cl. D10—*07*
U.S. Cl. D10—125



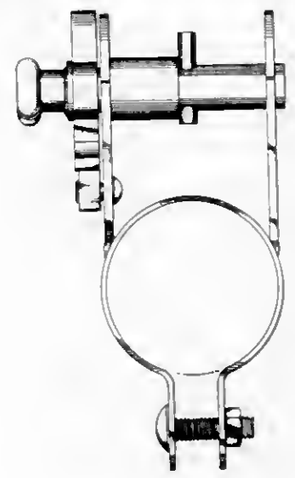
244,588
WATCH FACE
Frederick J. Schwartz, 13330 Bloomfield Ave., Norwalk, Calif. 90650
Filed Dec. 15, 1975, Ser. No. 641,097
Term of patent 14 years
Int. Cl. D10—*07*
U.S. Cl. D10—126

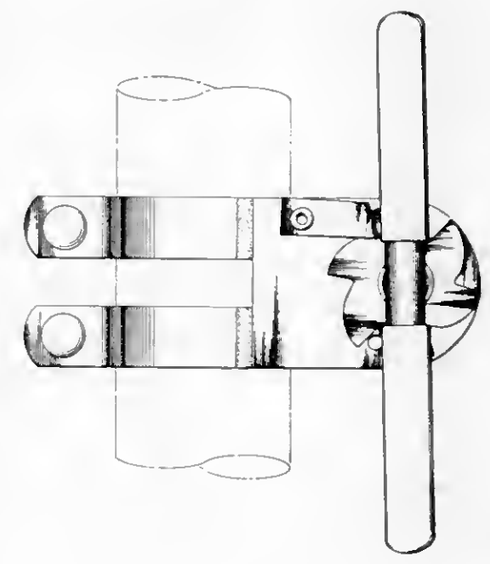
244,589
FINGER RING SETTING
Stanley M. Rosenfeld, 467 Kelton St., Los Angeles, Calif. 90024
Filed Nov. 29, 1976, Ser. No. 745,553
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—34

244,590
FINGER RING SETTING
Stanley M. Rosenfeld, 467 Kelton St., Los Angeles, Calif. 90024
Filed Nov. 29, 1976, Ser. No. 745,954
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—34

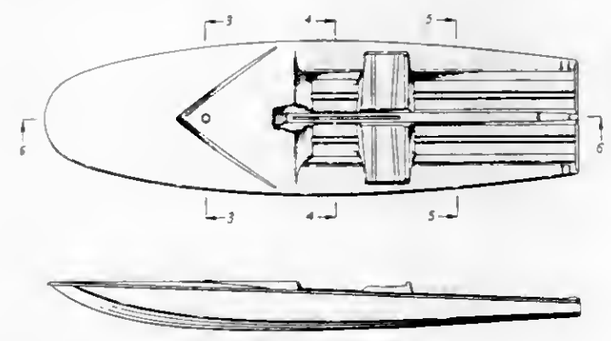


244,591
TIGHTENING WINCH FOR TENNIS NETS AND THE LIKE
Stanley A. Germain, Glendale, Calif., assignor to L.A. Steelcraft Products, Inc., Pasadena,, Calif.
Filed Oct. 14, 1975, Ser. No. 621,734
Term of patent 14 years
Int. Cl. D12—*05*
U.S. Cl. D12—54

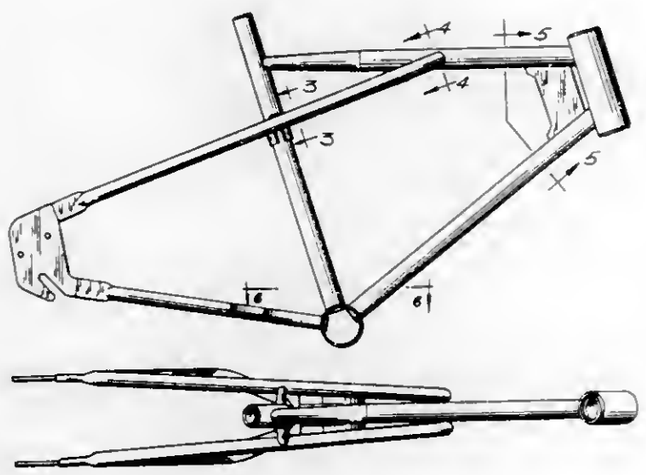




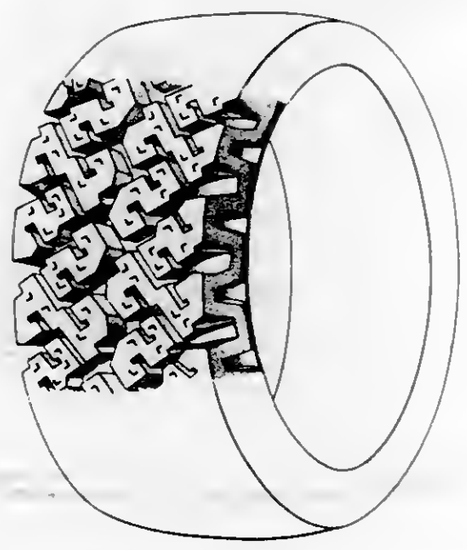
244,592
SAILING BOAT
Douglas B. I. Proctor, Fenmead, Brook Ave., Warsash, Southampton, England (S03 6HN)
Filed Oct. 15, 1975, Ser. No. 622,522
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—64



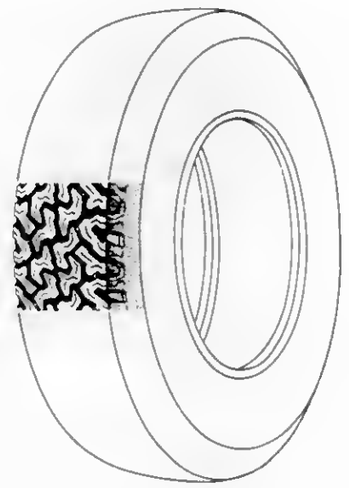
244,593
BICYCLE FRAME
William L. Manofsky, and Dennis C. Patterson, both of Nashville, Tenn., assignors to The Murray Ohio Manufacturing Company, Brentwood, Tenn.
Filed Nov. 6, 1975, Ser. No. 629,553
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—111



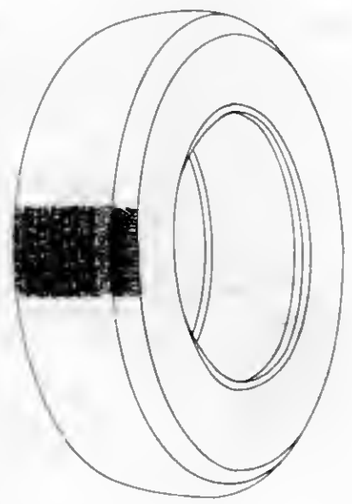
244,594
PNEUMATIC TIRE TREAD AND BUTTRESS
Gerassimos C. Candiliotis, Agawam, Mass., assignor to Uniroyal Inc.
Filed Feb. 2, 1976, Ser. No. 654,682
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—147



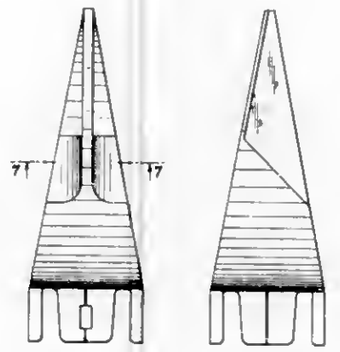
244,595
TIRE
Charles G. Yurkovich, Boardman, Ohio, and Harold D. Fetty, Birmingham, Mich., assignors to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed Feb. 5, 1976, Ser. No. 655,354
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—147



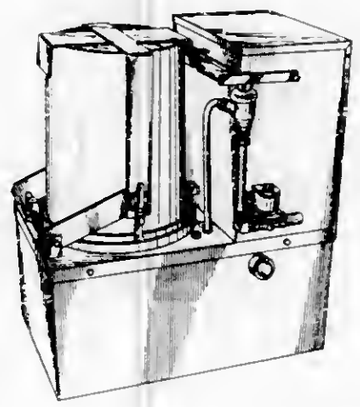
244,596
TIRE
Harold D. Fetty, Birmingham, Mich., and Charles W. Roberts, Akron, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed June 21, 1976, Ser. No. 697,802
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—147



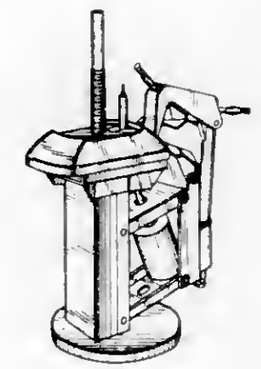
244,597
TOOTH FOR DREDGE CUTTER HEAD OR THE LIKE
Stephen M. Bowes, Jr., Jacksonville, Fla., assignor to Florida Machine & Foundry Co., Jacksonville, Fla.
Filed Jan. 26, 1976, Ser. No. 652,214
Term of patent 14 years
Int. Cl. D15—*04*
U.S. Cl. D15—29



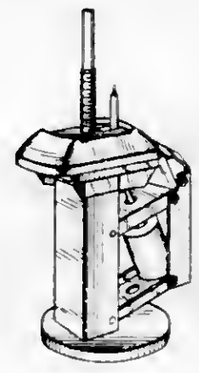
244,598
POWDER DETERGENT DISPENSER FOR USE WITH REMOTELY LOCATED WASHING MACHINES
David L. Nystuen, Bloomington; Robert B. Moffatt, West St. Paul, and Thomas H. Imdieke, Hastings, all of Minn., assignors to Economics Laboratory, Inc., St. Paul, Minn.
Filed Feb. 10, 1975, Ser. No. 548,273
Term of patent 14 years
Int. Cl. D15—*99*, *05*
U.S. Cl. D15—199



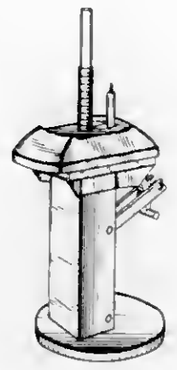
244,599
TIRE CHANGER OR SIMILAR ARTICLE
Charles L. Cunningham, Nashville, and Jimmie L. Holladay, Antioch, both of Tenn., assignors to The Coats Company, Inc., La Vergne, Tenn.
Filed July 26, 1976, Ser. No. 708,705
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D15—199



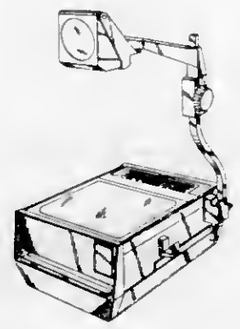
244,600
TIRE CHANGER OR SIMILAR ARTICLE
Charles L. Cunningham, Nashville, and Jimmie L. Holladay, Antioch, both of Tenn., assignors to The Coats Company, Inc., La Vergne, Tenn.
Filed July 26, 1976, Ser. No. 708,706
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D15—199



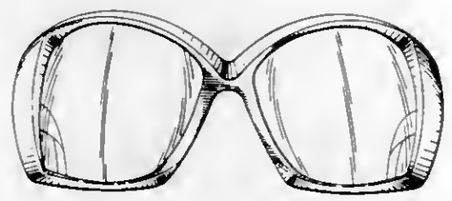
244,601
TIRE CHANGER OR SIMILAR ARTICLE
Charles L. Cunningham, Nashville, and Jimmie L. Holladay, Antioch, both of Tenn., assignors to The Coats Company, Inc., La Vergne, Tenn.
Filed July 26, 1976, Ser. No. 708,707
Term of patent 14 years
Int. Cl. D15—99
U.S. Cl. D15—199



244,602
OVERHEAD PROJECTOR
Joseph R. Mango, Midlothian, and Donald G. Wolfe, Lake Barrington, both of Ill., assignors to Minnesota Mining and Manufacturing Company
Filed Mar. 3, 1975, Ser. No. 554,419
Term of patent 14 years
Int. Cl. D16—*02*
U.S. Cl. D16—24

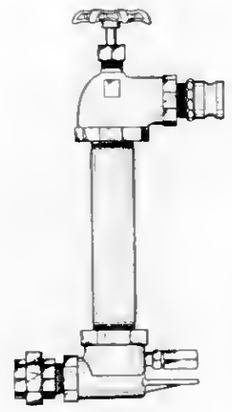


244,603
PAIR OF SPECTACLES
David W. Johnsen, Woodstock, Conn., assignor to American Optical Corporation, Southbridge, Mass.
Filed Oct. 28, 1975, Ser. No. 625,983
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—65



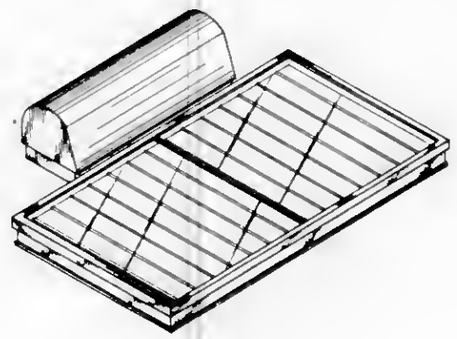
244,604
CORDLESS ELECTRIC PENCIL SHARPENER
Yoshiro Ohta, Tokyo, Japan, assignor to Esquire Trading Co., Ltd., Tokyo, Japan
Filed Dec. 31, 1975, Ser. No. 645,865
Claims priority, application Japan, Oct. 1, 1975, 50-039665
Term of patent 14 years
Int. Cl. D19—*06*
U.S. Cl. D19—73

244,605
FROSTPROOF HYDRANT
H. Ronald Ratnik, 222 Weymouth Drive, Rochester, N.Y. 14625
Filed Nov. 5, 1975, Ser. No. 629,044
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—12

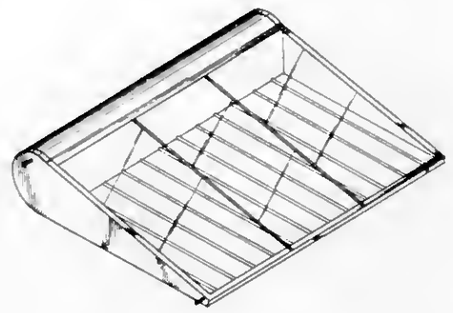


244,606
SOLAR WATER HEATING UNIT
Harry John Riley, Perth, Australia, assignor to S. W. Hart & Co. Pty. Ltd., Australia
Filed Sept. 17, 1975, Ser. No. 614,095
Claims priority, application Australia, July 29, 1975, 67474/75
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—127

244,607
SOLAR WATER HEATING UNIT
Harry John Riley, Perth, Australia, assignor to S. W. Hart & Co. Pty. Ltd., Australia
Filed Sept. 17, 1975, Ser. No. 614,096
Claims priority, application Australia, July 29, 1975, 67473/75
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—127

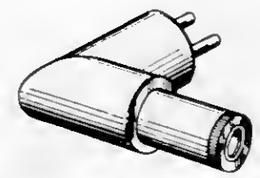


244,608
SOLAR WATER HEATING UNIT
Harry John Riley, Perth, Australia, assignor to S. W. Hart & Co. Pty. Ltd., Australia
Filed Sept. 17, 1975, Ser. No. 614,097
Claims priority, application Australia, July 29, 1975, 67470/75
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—127

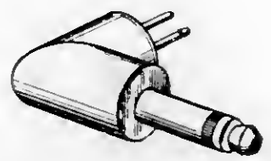


244,609
DENTAL FLOSS HOLDER
Ingram S. Chodorow, Stamford, Conn., assignor to Placontrol, Inc., Stamford, Conn.
Filed Oct. 31, 1975, Ser. No. 627,881
Term of patent 14 years
Int. Cl. D24—*99*
U.S. Cl. D28—64

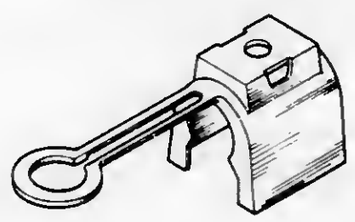
244,610
ELECTRICAL ANGLE PLUG
James J. Gietzen, Smithtown, N.Y., assignor to Dynamic Instrument Corporation, Hauppauge, N.Y.
Filed Oct. 24, 1975, Ser. No. 625,537
Term of patent 7 years
Int. Cl. D13—*03*
U.S. Cl. D13—28



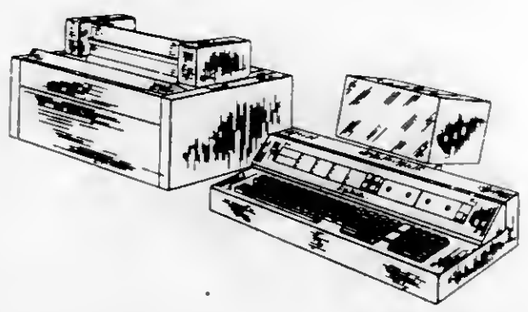
244,611
ELECTRICAL ANGLE PLUG
James J. Gietzen, Smithtown, N.Y., assignor to Dynamic Instrument Corporation, Hauppauge, N.Y.
Filed Oct. 24, 1975, Ser. No. 625,539
Term of patent 7 years
Int. Cl. D13—*03*
U.S. Cl. D13—28



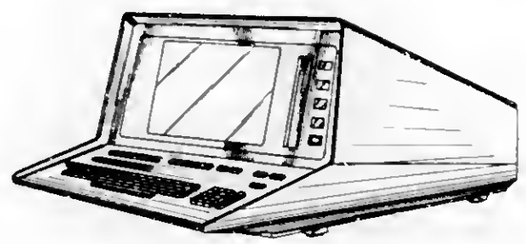
244,612
ELECTRICAL CONNECTOR RETAINING CLIP
Edgar Burns, Los Angeles, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.
Filed Jan. 12, 1976, Ser. No. 648,265
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—24



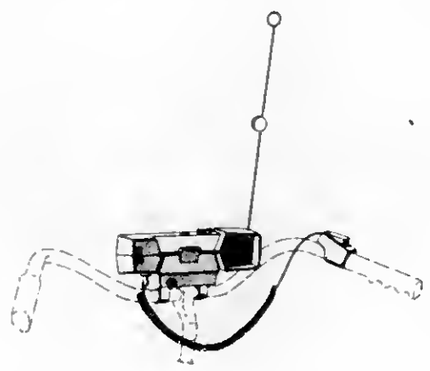
244,613
DESK-TOP ACCOUNTING TERMINAL
Ettore Sottsass, Jr., Milan, Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy
Filed Mar. 12, 1975, Ser. No. 557,738
Claims priority, application Italy, Sept. 18, 1974, 53457/74
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D14—45

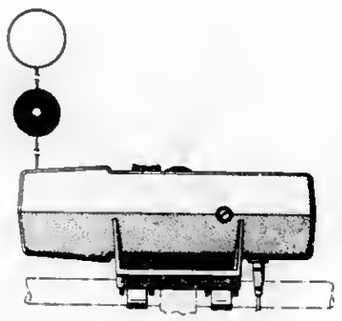


244,614
COMPUTING SYSTEM
Jack Arthur Gilmore, Aloha; Garry Mitchell Burgess, Beaverton; Sidney Hubert Broughton, Portland, and Martha Jane Rowland, Aloha, all of Oreg., assignors to Tektronix, Inc.
Filed Oct. 24, 1975, Ser. No. 625,610
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—43

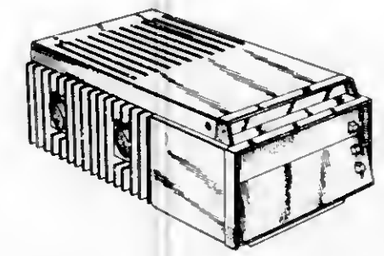


244,615
BICYCLE MOUNTED TRANSCEIVER
James F. Mariol, Cincinnati, Ohio, assignor to Wood, Herron & Evans, Cincinnati, Ohio
Filed Sept. 29, 1975, Ser. No. 617,785
Term of patent 14 years
Int. Cl. D14—*03*; D8—*08*
U.S. Cl. D14—68

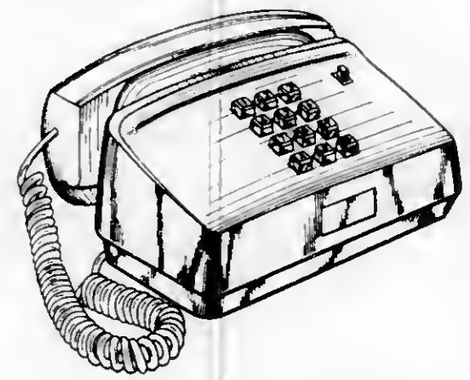


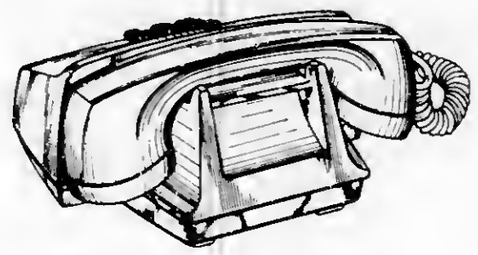


244,616
POWER AMPLIFIER
Stuart Walter Sizer, Harbert, Mich., assignor to Heath Company, Benton Harbor, Mich.
Filed Oct. 28, 1975, Ser. No. 626,506
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—96

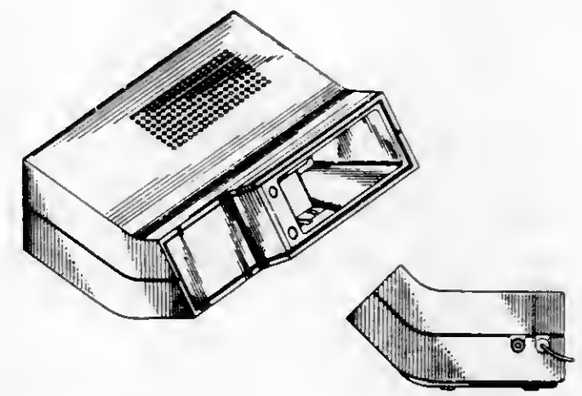


244,617
TELEPHONE INSTRUMENT
Carl-Arne Breger, Stockholm, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden
Filed Mar. 22, 1976, Ser. No. 669,329
Claims priority, application Sweden, Sept. 24, 1975, 75.1867
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—53



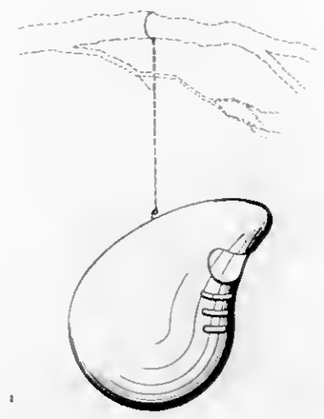


244,618
COMBINATION BATTERY CHARGER, RECEIVER AND AMPLIFIER OR SIMILAR ARTICLE
Arnold Sherwin Goldman, Plantation, and Richard John Toth, Oakland Park, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.
Filed Mar. 8, 1976, Ser. No. 664,854
Term of patent 14 years
Int. Cl. D13—*02*; D14—*03*
U.S. Cl. D13—5

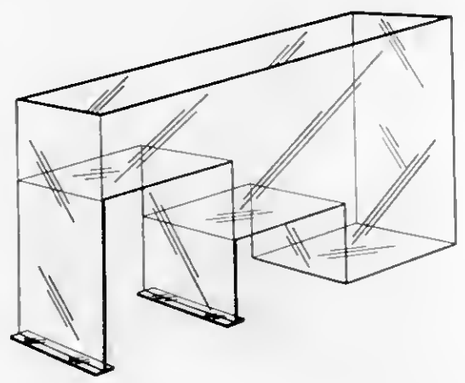


244,619
LIGHTER FOR SMOKERS
Guy Neyret, Francheville, France, assignor to Interfeudor S.A., Geneva, Switzerland
Filed Oct. 14, 1975, Ser. No. 622,180
Claims priority, application France, Apr. 24, 1975, 75.73813
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—36

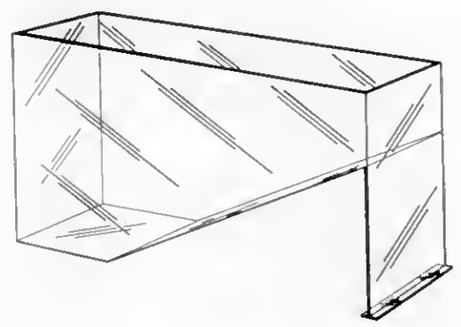
244,620
HANGING BIRDHOUSE
Patrick J. Cudmore, Duxbury, Mass., assignor to Wave-Rider, Incorporated, Duxbury, Mass.
Filed Dec. 29, 1975, Ser. No. 645,313
Term of patent 14 years
Int. Cl. D30—*03*
U.S. Cl. D30—3



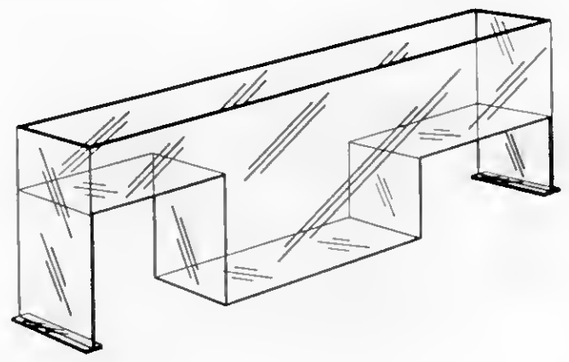
244,621
AQUARIUM
Malcolm R. Braid, 1005 Cumberland Drive, Auburn, Ala. 36830
Division of Ser. No. 408,157, Oct. 19, 1973. This application Nov. 3, 1975, Ser. No. 628,155, Pat. No. D238,687
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—6



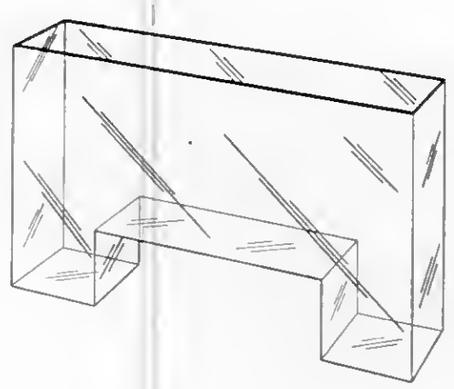
244,622
AQUARIUM
Malcolm R. Braid, 1005 Cumberland Drive, Auburn, Ala. 36830
Division of Ser. No. 408,157, Oct. 19, 1973, Pat. No. D238,687. This application Nov. 3, 1975, Ser. No. 628,156
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—6



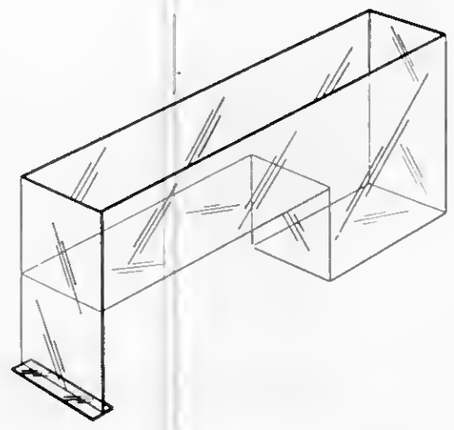
244,623
AQUARIUM
Malcolm R. Braid, 1005 Cumberland Drive, Auburn, Ala. 36830
Division of Ser. No. 408,157, Oct. 19, 1973, Pat. No. D238,687. This application Nov. 3, 1975, Ser. No. 628,157
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—6



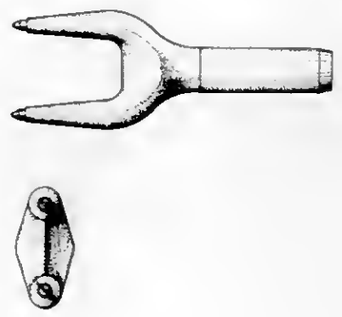
244,624
AQUARIUM
Malcolm R. Braid, 1005 Cumberland Drive, Auburn, Ala. 36830
Division of Ser. No. 408,157, Oct. 19, 1973, Pat. No. D238,687. This application Nov. 3, 1975, Ser. No. 628,364
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—6



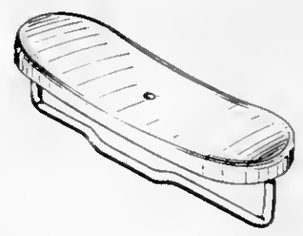
244,625
AQUARIUM
Malcolm R. Braid, 1005 Cumberland Drive, Auburn, Ala. 36830
Division of Ser. No. 408,157, Oct. 19, 1973. This application Nov. 3, 1975, Ser. No. 628,365, Pat. No. D238,687
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—6



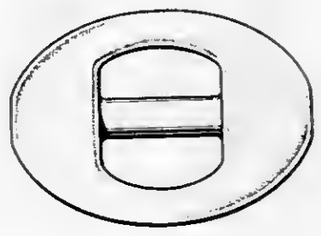
244,626
HEAD FOR A CATTLE PROD OR SIMILAR ARTICLE
James S. Andrews, Westminister, Colo., assignor to The Magrath Company, McCook, Nebr.
Filed June 3, 1976, Ser. No. 692,567
Term of patent 14 years
Int. Cl. D30—*05*
U.S. Cl. D30—32



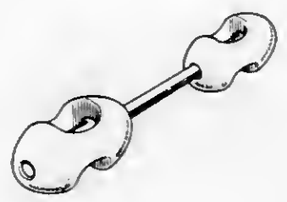
244,627
PLAYGROUND SEAT
Vernon L. Ryan, 6802 Millikin Ave., Austin, Tex. 78723
Filed Oct. 3, 1975, Ser. No. 619,250
Term of patent 14 years
Int. Cl. D21—*03*
U.S. Cl. D34—5 L



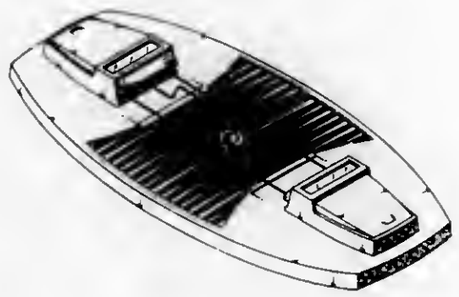
244,628
DUMBBELL
Forrest S. Wright, 2821 Patrick Henry Drive, Apt. 307, Auburn Heights, Mich. 48507
Filed Oct. 24, 1975, Ser. No. 625,440
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 K



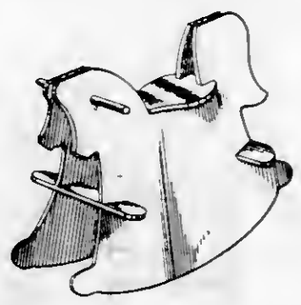
244,629
BARBELL
Forrest S. Wright, 2821 Patrick Henry Drive, Apt. 307, Auburn Heights, Mich. 48507
Filed Oct. 24, 1975, Ser. No. 625,442
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 K



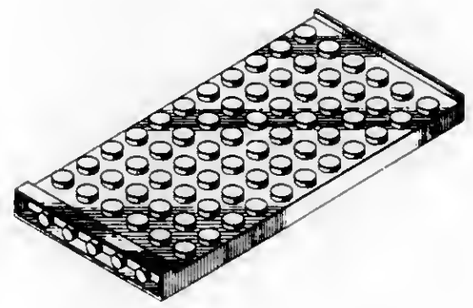
244,630
GOLF CLUB SWING MONITOR
Alois Krawagna, Toronto, Canada, assignor to Ian R. Campbell, Islington, Canada
Filed Jan. 28, 1976, Ser. No. 653,159
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 CB



244,631
ROCKING TOY
Eric Kyte, Ilkley, England, assignor to Bulldog Toy Company Limited, Leeds, England
Filed Dec. 11, 1975, Ser. No. 639,733
Claims priority, application United Kingdom, June 12, 1975, 971459/75
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AE

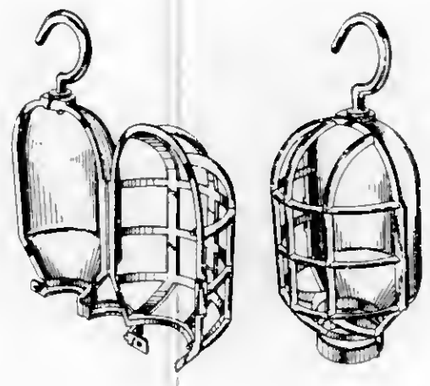


244,632
TOY CONSTRUCTION PIECE
Godtfred Kirk Christiansen, Billund, Denmark, assignor to Interlego A.G., Zug, Switzerland
Filed Sept. 16, 1975, Ser. No. 613,743
Claims priority, application Denmark, Mar. 25, 1975, 253/75
Term of patent 3½ years
Int. Cl. D21—*01*
U.S. Cl. D34—15 GG

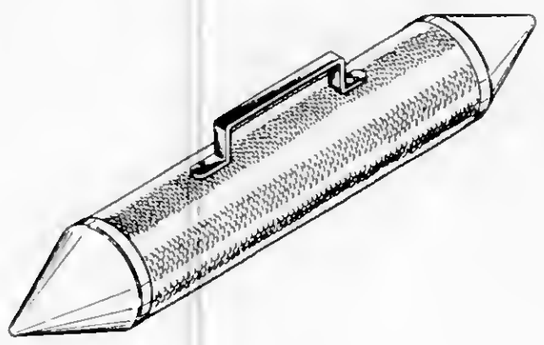


244,633
CANDLE CUP
Robert F. Ball, 2010 Richards Road, Willow Grove, Pa. 19090
Filed Dec. 22, 1975, Ser. No. 643,365
The portion of the term of this patent subsequent to Apr. 8, 1989, has been disclaimed.
Term of patent 14 years
Int. Cl. D26—*01*
U.S. Cl. D48—2

244,634
LAMP GUARD
Bernard J. Tamarin, Philadelphia, Pa., assignor to The Vacuum Cleaner Corporation of America
Filed Dec. 15, 1975, Ser. No. 640,539
Term of patent 14 years
Int. Cl. D26—*02*
U.S. Cl. D48—16 B

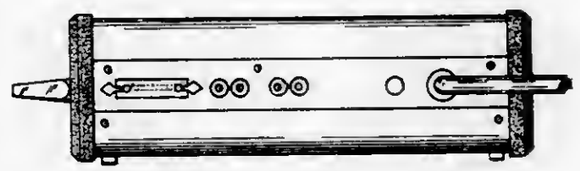


244,635
COMBINED GUIRO AND SHAKER
Martin B. Cohen, 68 Saddlewood Drive, Hillsdale, N.J. 07642
Continuation-in-part of Ser. No. 482,047, June 24, 1974, abandoned. This application Oct. 30, 1975, Ser. No. 627,404
Term of patent 14 years
Int. Cl. D17—*04*
U.S. Cl. D56—1 E



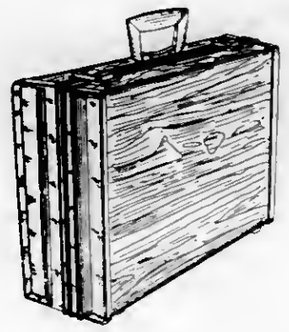
244,636
BASS DRUM STABILIZER OR SIMILAR ARTICLE
Joseph G. Cocuzzo, 84 D Marion Pepe Drive, Lodi, N.J. 07644
Filed Nov. 6, 1975, Ser. No. 629,666
Term of patent 14 years
Int. Cl. D17—*99*
U.S. Cl. D56—1 E

244,637
PULMONARY FUNCTION TESTER COMPUTER
Bernard N. Gray, East Pepperell, Mass., assignor to Life Support Equipment Corporation, Woburn, Mass.
Filed Sept. 13, 1976, Ser. No. 723,048
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D24—17



244,638
TOTE BAG
John A. Artmann, Denver, Colo., and Thomas D. Tweedie, Monrovia, Calif., assignors to Samsonite Corporation, Denver, Colo.
Filed Mar. 21, 1975, Ser. No. 560,335
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—3 F

244,639
CARRYING CASE
Kurt D. Greenbaum, New York, N.Y., assignor to Ikelheimer-Ernst, Inc., New York, N.Y.
Filed Aug. 14, 1975, Ser. No. 604,577
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—5 F



244,640
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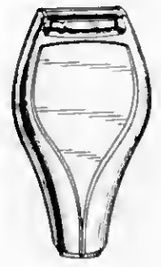
Douglas George Long, Lombard, Ill., assignor to Sunbeam Corporation, Chicago, Ill.
Filed Jan. 29, 1976, Ser. No. 653,438
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—51



LIST OF PATENTEES

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Alig, Leo; Furst, Andor; Keller, Peter; Muller, Marcel; Kerb, Ulrich; and Wiechert, Rudolf. D-homosteroids. 4,028,400, Cl. 260-488.00B.
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Funk, Adolf; and Kuster, Heinz, 4,027,509.
Baxter Laboratories, Inc.: *See—*
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Baxter Travenol Laboratories, Inc.: *See—*
Heavner, Paul William, Jr.; and Long, Gregor Dean, 4,027,664.
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Bayer Aktiengesellschaft: *See—*
Konter, Wolfgang; Witte, Josef; Vehlewald, Peter; and Block, Hans-Dieter, 4,028,434.
Kramer, Wolfgang; Draber, Wilfried; Timmler, Helmut; and Forster, Heinz, 4,028,409.
Muller, Peter; Wagner, Kuno; and Muller, Richard, 4,028,313.
Prinz, Richard; Elghani, Salah Elabd; Fischer, Winfried; and Alberts, Heinrich, 4,028,433.
Rottloff, Gunther; Sundermann, Rudolf; Grigat, Ernst; and Putter, Rolf, 4,028,393.
Schafer, Walter; Wagner, Kuno; and Muller, Hans-Jurgen, 4,028,310.
Schwarz, Hans-Helmut; and Immel, Otto, 4,028,347.
Wagner, Kuno; and Hajek, Manfred, 4,028,306.
Bays, David Edmund; and Foster, Roy Vivian, to Allen & Hanburys Limited. Acetic acid derivatives. 4,028,404, Cl. 260-515.00R.
BBC Brown Boveri & Company Limited: *See—*
Baltisberger, Kurt, 4,028,572.
Canay, Muzaffer, 4,028,574.
Greenwood, John H.; and Robitschek, Emmerich, 4,027,865.
Beam Systems Israel Ltd.: *See—*
Blass, Judd, 4,028,704.
Beatrice Foods Co.: *See—*
Miller, John M.; and Morsn, William F., 4,027,366.
Becker, Kenneth W.: *See—*
Sullivan, Daniel S., 3rd; Strubelt, Charles E.; and Becker, Kenneth W., 4,028,268.
Becker, Mitchell; and Yang, Charles C., to Halcon International, Inc. Recovery of alkylene glycols by distillation with aqueous organic acid. 4,028,195, Cl. 203-38.000.
Beckman Instruments G.m.b.H.: *See—*
Schmider, Paul, 4,027,622.
Beckman Instruments, Inc.: *See—*
Kaye, Wilbur I., 4,027,973.
Beckmann, Georg, to Siempelkamp Giesserei KG. Gravity-type steam accumulator. 4,027,690, Cl. 137-154.000.
Beecham Group Limited: *See—*
Clark, Judith Ann, 4,028,415.
Behrend, William Louis, to RCA Corporation. Sideband analyzer for AM transmitters. 4,028,625, Cl. 325-133.000.
Beinert, Klaus; and Weidner, Herbert, to Wacker-Chemitronic Gesellschaft fur Elektronik-Grundstoffe mbH. Device for making monocrystalline gallium arsenide. 4,028,058, Cl. 23-273.0SP.
Belknap, Donald J. Methods of making incandescent lamps. 4,027,363, Cl. 29-25.150.
Belknap, Donald J. Lamp component transport device. 4,027,804, Cl. 214-1.0BV.
Bell & Howell Company: *See—*
Browder, Lewis B., 4,028,729.
Bell, Robert Joseph; and Simmons, James Almy, to O. M. Scott & Sons Company, The. Fungicide compositions for the control of snowmold. 4,028,464, Cl. 424-273.000.
Bell Telephone Laboratories, Incorporated: *See—*
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Divine, Charles Hamman, 4,028,679.
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Divine, Charles Hamman; and Moran, John Christian, 4,028,684.
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Rao, Tadikonda Narashimha; and Toumani, Rouben, 4,028,628.
Royer, Robert Dale; and Schwab, Thomas Frank, 4,028,663.
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Bendix Corporation, The: *See—*
Hunt, Paulmer D., 4,027,481.
Bendler, Hellmut: *See—*
Hubsch, Gunter; Bendler, Hellmut; Stahlmann, Rudolf; and Gawlick, Heinz, 4,027,592.
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Bennett, Robert F.; Brouwer, Nicholaas L.; and Stricker, David M., to Aluminum Company of America. System for determining tube eccentricity. 4,027,527, Cl. 73-67.80S.
Bentley, Arthur P. Pulse multiplier for surface operated single tube pump. 4,028,013, Cl. 417-390.000.
Bentley, William F., Jr.: *See—*
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Berberich, Norbert J., Jr.: *See—*
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Berendsen, Jules Robert; Pollet, Robert Joseph; Philippaerts, Herman Adelbert; Sels, Francis Jeanne; and Willems, Jozef Frans, to AGFA-GEVAERT, N.V. Development of exposed lith-emulsions. 4,028,110, Cl. 96-66.300.
Berg, Adolf. Fire-resistant walls for use in shipbuilding. 4,027,444, Cl. 52-240.000.
Berg, Albert T., Jr.; and Langlie, Howard. Plastic nail-on electric fence insulator. 4,028,489, Cl. 174-166.00R.
Berger, Frank M. Analgesic compositions comprising dextro-propoxyphene and benzodiazepine and process. 4,028,466, Cl. 424-244.000.
Berger, Frank M. Analgesic compositions comprising levo-propoxyphene and benzo diazepine and process. 4,028,467, Cl. 424-244.000.
Berger, Harald: *See—*
Quentin, Karl-Ernst; Weil, Ludwig; and Berger, Harald, 4,028,233.
Bergmans, Hendrik Jan, to U.S. Philips Corporation. Direct-current motor comprising an electronic commutator. 4,028,598, Cl. 318-138.000.
Berkowitz, Benjamin; Luedtke, Arthur; Kilpatrick, William L.; and Bentley, William F., Jr., to United States of America, Federal Communications Commission. Adjustable yagi antenna. 4,028,709, Cl. 343-819.000.
Berkowitz, Irving L., to Kason Hardware Corporation. Joining device for connecting tubes. 4,027,987, Cl. 403-172.000.
Berkowitz, Murray, to Curtiss-Wright Corporation. Rotary trochoidal compressor with compressible sealing. 4,028,021, Cl. 418-56.000.
Bernard, Clay, II; Matheny, William F., III; and Parker, Billy J., to Clay Bernard Systems International Ltd, Article transfer system. 4,027,833, Cl. 243-31.000.
Berry, Clyde F. Steam track turbine. 4,027,995, Cl. 415-92.000.
Beta Corporation: *See—*
Volk, Joseph A., Jr., 4,028,552.
Beuchee, Daniel; and Leclair, Alain, to U.S. Philips Corporation.

Control circuit for a switched-mode power supply, particularly for a television receiver. 4,028,606, Cl. 321-2.000.

Beumer, Bernhard; and Jendrzey, Wolfram, to B. Beumer Maschinenfabrik KG. Automatic loading apparatus for loading discrete cargo, particularly sacks, onto stationary or mobile loading platforms. 4,027,805, Cl. 214-6.00G.

Bezicot, Robert: *See—*
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Bianchi, Frank Joseph, Jr.: *See—*
Ochodnicky, Samuel Steven; and Bianchi, Frank Joseph, Jr., 4,027,516.

Bibeau, Marcal; and Barrette, Marcellin. Shipping container. 4,027,787, Cl. 222-166.000.

Biddison, John M., to Globe Tool and Engineering Company, The. Automatic armature winding. 4,027,827, Cl. 242-7.05B.

Bigham, Clifford B., to Atomic Energy of Canada Limited. High power-double strapped vane type magnetron. 4,028,583, Cl. 315-39.690.

Bihuniak, Peter P.; and Guile, Donald L., to Corning Glass Works. Method of enhancing the refractoriness of high purity fused silica. 4,028,124, Cl. 106-69.000.

Bilson, Edward A.: *See—*
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Bio-Rad Laboratories: *See—*
Lewin, Nathan; and Wong, Emmy Tong-In, 4,028,465.

Bioresearch Limited: *See—*
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Bishop, Peter, to United Industrial Syndicate, Inc. Anti-static bar. 4,028,590, Cl. 361-220.000.

Bishop, Thomas Desmond, to Deritend Engineering Company Limited, The. Sheet handling apparatus. 4,027,873, Cl. 271-197.000.

Bishop, Thomas R.: *See—*
Slator, Damon T.; Bishop, Thomas R.; and Peil, Archie W., 4,027,816.

Bite, Pal; Moravcsik, Imre; Schafer, Inge; Horvath, Gyula; Mehesfalvi nee Vajna, Zsuzsanna; Borvendeg, Janos; and Hermann nee Szente, Ilona, to Richter Gedeon Vegyeszeti Gyar RT. 6-Amino-5β,19-cyclosandrostane derivatives. 4,028,348, Cl. 260-239.500.

Bitzer, Diethelm; and Lohmann, Dieter, to Ciba-Geigy Corporation. Carbo-nitriding process using nitriles. 4,028,142, Cl. 148-16.500.

Bitzer, Hans Eugen, to C. Terrot Sohne, Firma. Draw-off and take-up arrangement for circular knitting machines. 4,027,506, Cl. 66-149.00R.

Black, Chester A.; and Black, Lester A. Detachable road protecting device for tracked vehicles. 4,027,925, Cl. 305-46.000.

Black, Christopher T.; and Lear, Anthony, to Texas Instruments Incorporated. Fast switching Darlington circuit. 4,028,561, Cl. 307-300.000.

Black and Decker Manufacturing Company, The: *See—*
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Black, Lester A.: *See—*
Black, Chester A.; and Black, Lester A., 4,027,925.

Blackburn, Dale W., to SmithKline Corporation. Cephalosporin purification process. 4,028,355, Cl. 260-243.00C.

Blair, Peter Kenneth, to International Standard Electric Corporation. Vehicle position indicator with radar interrogation each of spaced transponders disposed along a pathway for the vehicle. 4,027,840, Cl. 246-122.00R.

Blanke, Richard H., Jr. Pail assemblies. 4,027,777, Cl. 220-295.000.

Blaschke, Felix; and Klautschek, Herwig, to Siemens Aktiengesellschaft. Method and apparatus for slow speed operation of an inverter controlled rotating field machine. 4,028,600, Cl. 318-227.000.

Blass, Judd, to Beam Systems Israel Ltd. Broadband ferrite transformer-fed whip antenna. 4,028,704, Cl. 343-715.000.

Block, Hans-Dieter: *See—*
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Bloom, Stanley: *See—*
Anderson, Charles Hammond; and Bloom, Stanley, 4,028,582.

Blosam, James M. Portable automotive test probe. 4,028,621, Cl. 324-51.000.

Blue Bird Body Company (Entire): *See—*
Moormen, James H., Jr., 4,027,747.

Bocion, Pierre; De Silva, Wijitha; and Winternitz, Pavol, to Hoffmann-La Roche Inc. Plant growth influencers. 4,028,089, Cl. 71-88.000.

Bodanszky, Miklos; and Shechen, John Timothy, to E. R. Squibb & Sons, Inc. Solid phase synthesis of peptides. 4,028,315, Cl. 260-78.00A.

Bodensieck, Ernest J., to Garrett Corporation, The. Bearing assembly and method. 4,027,930, Cl. 308-202.000.

Bodner, Ernest Robert. Method and apparatus for embossing sheet metal strip and sheet metal panel. 4,027,517, Cl. 72-177.000.

Bodor, Nicolae S.; and Yuan, Sun-Shine, to Interx Research Corporation. Novel intermediates useful in the synthesis of optically active m-acyloxy-α-[(methylamino)methyl]benzyl alcohols. 4,028,368, Cl. 260-295.00R.

Bodtmann, William Fred; and Ruthroff, Clyde Leslie, to Bell Telephone Laboratories, Incorporated. Linear phase modulator including a pair of Armstrong modulators. 4,028,641, Cl. 332-18.000.

Bogan, Richard T.; and Shelton, Claude M., to Eastman Kodak Company. Melt phase process for the preparation of emulsifiable polyethylene waxes. 4,028,436, Cl. 260-878.00R.

Bohlin, Karl Gunnar; Eriksson, Karl Rune; and Gustafsson, Carl-Erik, to SCA Development Aktiebolag. Load-weighing device. 4,027,736, Cl. 177-147.000.

Bohner, Beat: *See—*
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Bolex International SA: *See—*
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Bolto, Brian Alfred; and Eldridge, Robert James, to ICI Australia Limited; and Commonwealth Scientific and Industrial Research Organization. Preparation of polymer composites. 4,028,255, Cl. 210-500.00R.

Bonaddio, Robert M., to PPG Industries, Inc. Force applying device for scoring wheels. 4,027,562, Cl. 83-8.000.

Bond, William C., Jr.; and Wahlborg, Harold J., to Copolymer Rubber & Chemical Corporation. EPDM interpolymers formed with unsaturated organosilanes. 4,028,483, Cl. 526-279.000.

Bondar, Martin Moses: *See—*
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Bonney, Roland W. Rotary valve. 4,027,697, Cl. 137-596.000.

Bonnice, Phillip E., to General Electric Company. Grinding wheel dressing method. 4,027,648, Cl. 125-11.00R.

Booth, Inc.: *See—*
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Border, Gary Clayton: *See—*
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Borejko, Stefan: *See—*
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Borg-Warner Corporation: *See—*
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Radke, Edmund John; and Bair, Joseph Louis, 4,027,757.

Borkowski, Walter L.; and Schneider, Abraham, to Suntech, Inc. Explosive composition containing high density hydrocarbon liquid. 4,028,152, Cl. 149-46.000.

Borror, Alan L., to Polaroid Corporation. Novel chemical compounds. 4,028,353, Cl. 260-240.600.

Borvendeg, Janos: *See—*
Bite, Pal; Moravcsik, Imre; Schafer, Inge; Horvath, Gyula; Mehesfalvi nee Vajna, Zsuzsanna; Borvendeg, Janos; and Hermann nee Szente, Ilona, 4,028,348.

Boudouris, Georges; Kalopissis, Gregoire; Leveque, Jean-Luc; and Roussopoulos, Paul, to L'Oreal. Device for superficially heating an adjacent body. 4,028,518, Cl. 219-10.810.

Boutaille, Daniel; Hardouin, Pierre; and Thomasse, Andre, to La Telemecanique Electrique. System allowing the realization of logic circuits by juxtaposition of pneumatic elements. 4,027,692, Cl. 137-270.000.

Bowen Tools, Inc.: *See—*
Slator, Damon T.; Bishop, Thomas R.; and Peil, Archie W., 4,027,816.

Bowen, Woodrow L.; and Moore, Harlan D. Silver recovery apparatus. 4,028,212, Cl. 204-272.000.

Boyd, David M., to UOP Inc. Systematized method and control of fractionation heat balance. 4,028,194, Cl. 203-2.000.

Boylan, John R.: *See—*
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BP Trading Limited: *See—*
Armstrong, Robert James; and Cook, Boyd Stanley, 4,027,399.

Bram, Georges Eugene, to Pont-A-Mousson S.A. Device for a tensile locking of pipe elements. 4,027,904, Cl. 285-297.000.

Branch, William C.; Cole, Oliver W.; and Kidd, Robert P., to Booth, Inc. Tallying beverage dispenser. 4,027,783, Cl. 222-26.000.

Brandenstein, Manfred: *See—*
Kunkel, Heinrich; Brandenstein, Manfred; Olschewski, Armin; Finzel, Sigismund; Gossmann, Willi; and Horling, Peter, 4,027,932.

Branson Ultrasonics Corporation: *See—*
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Bryant, Ronald K., 4,028,033.

Brant, Robert D., to Palmer Paint Products, Inc. Paint set and teaching aid. 4,027,404, Cl. 35-28.500.

Braukmann, Bernhard W. Valve disc and seat construction. 4,027,852, Cl. 251-333.000.

Braun, Walter; and Hoffmann, Gunter, to Aluminium Norf GmbH. Apparatus for scrubbing of hydrocarbons from gas. 4,028,072, Cl. 55-195.000.

Brehm, Gustav, to Heberlein Maschinenfabrik AG. Process for continuously treating thermoplastic yarns. 4,027,466, Cl. 57-34.0HS.

Bremner, Ean Grant: *See—*
Faktor, Marc Marian; Ambridge, Thomas; and Bremner, Ean Grant, 4,028,207.

Brennemann, Andrew Ernest; and Soo, Suk Suet, to International Business Machines Corporation. Call progress signal detector. 4,028,493, Cl. 179-2.0DP.

Breslau, Franklin Charles; and Goertzel, Gerald, to International Business Machines Corporation. Asynchronous, hierarchical loop communication system with independent local station control of access to inbound time portions without central control. 4,028,667, Cl. 340-172.500.

Breslow, Jeffrey D.; and Frumkin, Mitchell J., to Marvin Glass & Associates. Game device. 4,027,877, Cl. 273-1.00R.

Bretschneider, Edward S.: *See—*
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Breuer, Hermann; and Treuner, Uwe D., to E. R. Squibb & Sons, Inc. Alkenyl and alkinylureido cephalosporins. 4,028,354, Cl. 260-243.00C.

Bridge, Donald John Henry, to Finspa Engineering Co. Limited. Joint construction for connecting together two frame members. 4,027,453, Cl. 403-353.000.

Bridgestone Tire Company Limited: *See—*
Soto, Shigetake; Kurahashi, Suminobu; Okuyama, Toru; and Hamada, Noboru, 4,028,287.

Briggs, Robert L., to Aneomstat Products Division, Dynamics Corporation of America. Fire and impact resistant window assembly. 4,027,443, Cl. 52-202.000.

Bright, Gene Michael, to Pfizer Inc. 6-Acylamido-2,2-dimethyl-3-(pyrimidin-4,6-dione-2-yl)-penams and intermediates therefor. 4,028,360, Cl. 260-256.50R.

Brinkman, Earl W., to Davenport Machine Tool. Method for producing sparking wheels. 4,027,376, Cl. 29-417.000.

Bris, Herman Josef, to Girling Limited. Disc brakes for vehicles. 4,027,752, Cl. 188-73.600.

Bronner, Emanuel H. Contraceptive device. 4,027,670, Cl. 128-261.000.

Brooks & Perkins, Incorporated: *See—*
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Brouwer, Nicholaas L.: *See—*
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Browder, Lewis B., to Bell & Howell Company. Provision and display of video signals. 4,028,729, Cl. 358-148.000.

Brown, Allen C.; Hattes, Neil R.; and Eyrick, Theodore B., to Chemetron Corporation. Humidifier and automatic control system therefor. 4,028,444, Cl. 261-122.000.

Brown, Claude V.: *See—*
Needham, Donald G.; Taylor, Kenneth P.; and Brown, Claude V., 4,028,332.

Brown, George L.; and Tobias, Michael A., to Mobil Oil Corporation. Epoxy modified acrylic latices and method of producing same. 4,028,294, Cl. 260-29.6NR.

Brown, Leonard A.: *See—*
Barto, Robert W.; and Brown, Leonard A., 4,027,499.

Brown, Richard E.; and Unangst, Paul C., to Warner-Lambert Company. Indolopyrones having antiallergic activity. 4,028,383, Cl. 260-326.290.

Brown, William F., to Vast Products Inc. Foamed polyester resin. 4,028,289, Cl. 260-2.50N.

Brownell, Lloyd E.: *See—*
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Brownstein, Arthur M.; and Kerr, David L., to Sun Oil Company. Oxidation of aliphatic and alicyclic hydrocarbons. 4,028,423, Cl. 260-610.00B.

Brubaker, Burton D.: *See—*
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Brucker, Ben B. Hockey glove with improved palm construction. 4,027,339, Cl. 2-16.000.

Brugman, Johannes Antonius Henricus, to Hunter Douglas International N.V. Suspended screen ceiling. 4,027,446, Cl. 52-484.000.

Bruhl, Peter. Device for chill-drying a gas. 4,027,729, Cl. 165-111.000.

Bruins, Antonius Hermanus Nicolaas Maria: *See—*
Panneman, Harm Jan; and Bruins, Antonius Hermanus Nicolaas Maria, 4,028,380.

Brunet, Henry, to Compagnie Generale d'Electricite. Vibration energy transfer laser. 4,028,635, Cl. 331-94.50G.

Brunswick Corporation: *See—*
Rauchle, Roy J.; and Vandenberg, John L., 4,027,555.

Bryans, Alexander Connor, to General Electric Company. Diffuser for a centrifugal compressor. 4,027,997, Cl. 415-207.000.

Bryant, Ronald K., to Branson Ultrasonics Corporation. Apparatus for embossing a plastic workpiece using vibratory energy. 4,028,033, Cl. 425-183.000.

Buchi, George H.; and Wuest, Hans, to Firmenich S.A. Cycloaliphatic unsaturated ketones as fragrance modifying agents. 4,028,278, Cl. 252-522.000.

Buckholtz, Theonda N., Jr. Novelty item. 4,027,874, Cl. 272-1.00R.

Buckley, David A.; and Belli, Frank G., to Xerox Corporation. Migration imaging member employing a surface skin. 4,028,101, Cl. 96-1.500.

Buckley, Norman Ian; and Wilson, Edward, to Shorrock Developments Limited. Intruder detection device. 4,028,690, Cl. 340-258.00B.

Bucyrus-Erie Company: *See—*
Johnston, Roger L.; and Wiencek, Daniel C., 4,027,801.

Bud, Hans; and Alway, Peter, to Bud, Hans. Counting devices. 4,028,530, Cl. 235-144.0HC.

Bueker, Robert A., to Direct Image Corporation. Sheet separation device. 4,027,872, Cl. 271-170.000.

Buffenbarger, John K.: *See—*
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Bujas, Roko, to Commissariat a l'Energie Atomique. Method and device for the fabrication of nuclear fuel compacts. 4,028,446, Cl. 264-.500.

Bullard, Robert G.; Plunkett, James P.; and Linning, George F., to Coils, Inc. Battery charger. 4,028,654, Cl. 336-92.000.

Bumgardner, Jon H. Optical frequency processor. 4,027,974, Cl. 356-74.000.

Bundy, Gordon L., to Upjohn Company, The. 9α,11oor 11o,9αEpoxymethano-prostaglandans and process for their preparation. 4,028,350, Cl. 260-240.00R.

Burdette, George W.; and Couch, Dean H., to United States of America, Navy. Low viscosity-high flash point ramjet and turbojet fuels. 4,028,066, Cl. 44-80.000.

Burge, William G. Theft-prevention screw fastenings. 4,027,572, Cl. 85-32.00R.

Burlington Industries, Inc.: *See—*
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Burpee, Louis W. Detachable windshield wiper assembly for helmet. 4,027,354, Cl. 15-250.300.

Burroughs Corporation: *See—*
Neri, Joseph Dominic; and Williams, John Lewis, 4,028,286.

Burton, Robert S., III: *See—*
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Buskine S.A.: *See—*
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Bustin, Leopold. Free flow grating. 4,027,451, Cl. 52-664.000.

Butcher, Alan George, to Dresser Europe S. A. Control valve. 4,027,694, Cl. 137-495.000.

Butler, James G.: *See—*
Butler, Robert M.; Butler, John T.; and Butler, James G., 4,027,628.

Butler, John T.: *See—*
Butler, Robert M.; Butler, John T.; and Butler, James G., 4,027,628.

Butler, Robert M.; Butler, John T.; and Butler, James G. Automatic feeding system for gestating livestock. 4,027,628, Cl. 119-52.00B.

Byrnes, Herbert P.; and Wahl, Richard, to International Business Machines Corporation. Contact for an electrical contactor assembly. 4,027,935, Cl. 339-48.000.

Byrum, Bernard W., Jr.; Fein, Michael E.; and Ernsthausen, Roger E., to Owens-Illinois, Inc. Gas discharge dielectric containing a source of boron, gallium, indium, or thallium. 4,028,578, Cl. 313-221.000.

C. Reichert Optische Werke AG: *See—*
Steinbatz, Alfred, 4,027,981.

C. Terrot Sobne, Firma: *See—*
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Cabiro, Jorge Canals: *See—*
Jarque, Ricardo Granados; Cartes, Juan Bosch; Cabiro, Jorge Canals; Roldan, Cristobal Martinez; and Peinado, Rabadan, 4,028,371.

Cachier, Gerard; and Puron, Jean Paul, to Thomson-CSF. High-speed, low consumption integrated logic circuit. 4,028,556, Cl. 307-205.000.

Cadillac Rubber & Plastics, Inc.: *See—*
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CAE Machinery Ltd.: *See—*
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equipment having radial cooling channels with means for guiding cooling fluid through the channels. 4,028,653, Cl. 336-60.000.
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Chlystun, Walter K. Blow molded container with nestable pouring spout with improved spout opening and withdrawal means. 4,027,811, Cl. 222-529.000.
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Crepinsek, Alois, to International Top Security Corporation. Safety chain lock for doors. 4,027,908, Cl. 292-264.000.
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David, Klaus: *See—*
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Davidovits, Joseph; and Legrand, Jean Jacques, to Coordination et Developpement de l'Innovation Societe Anonyme en abrege Cordi. Process for agglomerating compressible mineral substances under the form of powder, particles or fibres. 4,028,454, Cl. 264-82.000.

Davies, Donald W., to Andros Incorporated. Gas analyrer method and apparatus. 4,027,972, Cl. 356-51.000.

Davis, Kenneth L., to United States of America, Navy. Semiconductor visible image storage device. 4,028,565, Cl. 307-311.000.

Davis, Raymond R.; Langberg, Alfred M.; and Debus, Alvin P., to Hungerford & Terry, Inc. Apparatus for and method of recovering water used to backwash and rinse a filter. 4,028,241, Cl. 210-60.000.

Davis, Robert Elliott: *See—*
Baldwin, Roger Allen; and Davis, Robert Elliott, 4,028,219.

Dawans, Francois; and Durand, Jean-Pierre, to Institut Francais du Petrole. Process for manufacturing flexible eposide resins. 4,028,432, Cl. 260-836.000.

Dawes, Dag: *See—*
Meyer, Willy; Bohner, Beat; Dawes, Dag; and Rufenacht, Kurt, 4,028,377.

Dawson, Chester H., to Remington Arms Company, Inc. Method and machine for locating variations in tension in a saw blade. 4,027,531, Cl. 73-100.000.

Dawson, David H., to Dow Chemical Company, The. Tube treating and apparatus therefor. 4,028,037, Cl. 425-392.000.

Dayco Corporation: *See—*
White, Jack D., Jr., 4,027,545.

Deal, Bruce E.; and Hu, Daniel C., to Fairchild Camera and Instrument Corporation. Complementary insulated gate field effect transistor structure and process for fabricating the structure. 4,027,380, Cl. 29-571.000.

Debus, Alvin P.: *See—*
Davis, Raymond R.; Langberg, Alfred M.; and Debus, Alvin P., 4,028,241.

De Fellippie, John Charles: *See—*
Chihoski, Russell Alexander; and De Fellippie, John Charles, 4,028,522.

Deines, John L.; Ku, San-Mei; Poponiak, Michael R.; and Tsang, Paul J., to International Business Machines Corporation. Process for forming monocrystalline silicon carbide on silicon substrates. 4,028,149, Cl. 148-175.000.

Deja, Edmund P.: *See—*
Soyder, Robert P.; and Deja, Edmund P., 4,027,538.

Delaney, Michael J.; and Gilbert, Hiram G., to Raymond Corporation, The. Motor control systems. 4,028,597, Cl. 318-87.000.

Dell, Christopher Cambridge, to National Research Development Corporation. Froth flotation. 4,028,229, Cl. 209-164.000.

Deller, Robert J.; and Carmel, Edwin L., to Pullman Incorporated. Axle end oil fill and leakage detector method of charging lubricant. 4,027,743, Cl. 184-6.400.

Deloney, Hugh C.: *See—*
Smith, Randlow; Jones, Henry B.; Jobsis, Adrianus C.; and Deloney, Hugh C., 4,028,139.

De Long, Carol. Serving container for hot liquids. 4,027,779, Cl. 220-23.830.

Demag Aktiengesellschaft: *See—*
Elsner, Wolfgang; Moslener, Jorn; and Langenstuck, Alfons, 4,027,565.

De Marco, Nicholas. Safety cigarette holder and ash retaining device. 4,027,680, Cl. 131-175.000.

Demase, John P., to United Technologies Corporation. Fuel prefill and distributor valve construction. 4,027,474, Cl. 60-39.28R.

De Ment, Robert B.; and Simms, William D., to Kastalon Inc. Sealing device for can testing machines. 4,027,513, Cl. 73-49.800.

Demoute, Jean-Pierre: *See—*
Hainaut, Daniel; and Demoute, Jean-Pierre, 4,028,386.

Deneen, William. Agitator for solids-containing vessels. 4,028,251, Cl. 210-280.000.

Dennie, Richard H.: *See—*
Kane, Thomas J.; and Dennie, Richard H., 4,027,621.

DePree, David O.: *See—*
Katzakian, Arthur, Jr.; and DePree, David O., 4,028,234.

de Putter, Warner Jan, to Wavin B.V. Removal of injection moulded products. 4,028,039, Cl. 425-436.00R.

Deritend Engineering Company Limited, The: *See—*
Bishop, Thomas Desmond, 4,027,873.

Derrick, Danny O., to Shakespeare Company. Locking hinge mechanism for a stepladder. 4,027,741, Cl. 182-22.000.

De Silva, Wijitha: *See—*
Bocion, Pierre; De Silva, Wijitha; and Winternitz, Pavol, 4,028,089.

Desio, Frank B.; and Webb, Samuel Lee, to Illinois Tool Works Inc. Spring contact switch for dual in line multiple switch assembly having momentary actuated lighted indicators. 4,028,515, Cl. 200-276.000.

DeSousa, Peter. Pet elevator. 4,027,626, Cl. 119-15.000.

Detering, Richard L., to Westinghouse Electric Corporation. Digital firing pulse generator with pulse suppression. 4,028,609, Cl. 321-5.000.

Dettmer, Edward V., to Dow Chemical Company, The. Apparatus for mixing. 4,027,858, Cl. 259-4.00R.

Deubel, Bernard S., to Therm-O-Disc Incorporated. Method of manufacturing sealed thermostats. 4,027,385, Cl. 29-622.000.

Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See—*
Asinger, Friedrich; Offermanns, Heribert; and Gluzek, Karl-Heinz, 4,028,406.

Deutsche Vergaser GmbH & Co Kommanditgesellschaft: *See—*
Mundil, Waldemar Dietmar, 4,027,848.

De Weese, Raymond Paul; and Kumpfer, Beverly D., to Roper Corporation. Modular power supply and waveguide construction for microwave oven. 4,028,519, Cl. 219-10.55B.

Dey, Arabinda N., to P. R. Mallory & Co. Inc. Method of construction of an ultraminiature high energy density cell. 4,028,138, Cl. 29-623.200.

Diamond Shamrock Corporation: *See—*
Lewis, David L.; Franks, C. Richard; and Schenker, Barry A., 4,028,215.
Magee, Thomas A., 4,028,413.

Dicke, Paul A., to Crown Controls Corporation. Control mechanism for remotely mounted motor. 4,028,571, Cl. 310-89.000.

Dickey, Clarence A., to Glasrock Products, Inc. Foaming device for high solids content foamable liquids. 4,027,789, Cl. 222-190.000.

Diehl, George D.: *See—*
Shufflebarger, Earl D.; Kish, Edward E.; Boylan, John R.; Diehl, George D.; Gallagher, Bernard J.; and Tobbe, William P., 4,028,254.

Diesel Kiki Co., Ltd.: *See—*
Utsugi, Kazuo, 4,027,500.

Diesner, Ferdinand, to Jakob Muller, Forschungs-und Finanz AG. Shuttleless weaving machine, especially ribbon loom. 4,027,703, Cl. 139-431.000.

Dietschy, Robert; and Hesel, Georges. Stitch presser for knitting machine. 4,027,504, Cl. 66-64.000.

Dikman, Robert J. Paper thrower. 4,027,780, Cl. 221-7.000.

Direct Image Corporation: *See—*
Bucker, Robert A., 4,027,872.

Director-General of the Agency of Industrial Science and Technology: *See—*
Okada, Akira; Iriyama, Keiji; and Shiraki, Masaru, 4,028,217.

Dischinger, Gebhard, to Babolat-Maillot-Witt; and Lipa Lizenz-und Patentverwertungs-ansalt. Device for the insertion of an intermediate member between two crossing strings of a tennis racquet. 4,027,371, Cl. 29-811.000.

Divine, Charles Hamman, to Bell Telephone Laboratories, Incorporated. Memory patching circuit with increased capability. 4,028,679, Cl. 340-172.500.

Divine, Charles Hamman; and O'Neill, John Francis, to Bell Telephone Laboratories, Incorporated. Memory patching circuit with counter. 4,028,683, Cl. 340-172.500.

Divine, Charles Hamman; and Moran, John Christian, to Bell Telephone Laboratories, Incorporated. Memory patching circuit with repatching capability. 4,028,684, Cl. 340-172.500.

Di Vita, Sam; and Vig, John R., to United States of America, Army. Method of treating optical waveguide fibers. 4,028,080, Cl. 65-2.000.

Dixon, Guy E.; Dixon, Thomas M.; and Geyer, Russell I., Jr., to Panelfold Doors, Inc. Hinge strip for dual wall accordion folding door. 4,027,714, Cl. 160-84.00R.

Dixon, Thomas M.: *See—*
Dixon, Guy E.; Dixon, Thomas M.; and Geyer, Russell I., Jr., 4,027,714.

Dockus, Kostas F., to Borg-Warner Corporation. Plating baths for depositing cobalt-lead nickel-lead alloys or combinations thereof and method of coating aluminum articles therewith. 4,028,200, Cl. 204-43.00T.

Dr. Kuhn & Co. GmbH: *See—*
Sickel, Helmut, deceased, 4,028,492.

Dr. Th. Wieland, Firma: *See—*
Strunz, Alfred; and Rohrer, Jurgen, 4,028,047.

Dodds, Andrew D.: *See—*
Krofchalk, Gary F.; and Dodds, Andrew D., 4,027,889.

Doi, Hachiro: *See—*
Takahashi, Katsuhiko; and Doi, Hachiro, 4,027,463.

Doi, Tsunesuke; Komoto, Hiroshi; Chono, Masazumi; Inoue, Akira; Saito, Kazuaki; and Shinozuka, Isao, to Asahi Kasei Kogyo Kabushiki Kaisha. Anti-corrosive agent for metals. 4,028,055, Cl. 21-2.70R.

Dolan, Thomas Albert, to Du Pont de Nemours, E. I., and Company. Yarn support. 4,027,830, Cl. 242-118.320.

Dolle, Alvin J. Security lock for trunk mounted antenna. 4,028,706, Cl. 343-715.000.

Domer, Michel: *See—*
Hauraus, Pierre; and Domer, Michel, 4,027,909.

Domic, Esteban; Sfeir, Albert; and Sandoval, Jorge, to Corporacion de Fomento de la Produccion, represented by Comite de Investigaciones Technologicas. Method of extraction involving the use of solvents and new combination of reactors used. 4,028,462, Cl. 423-24.000.

Domtar Limited: *See—*
Davey, Roger George, 4,028,457.

Donnell, James W. Estruded interior molding. 4,027,452, Cl. 52-716.000.

Dorsey, Geoffrey A., Jr., to Kaiser Aluminum & Chemical Corporation. Surface treatment of aluminum. 4,028,205, Cl. 204-181.000.

Dougherty, Earle T. Adjustably submersible breakwater. 4,027,486, Cl. 61-5.000.

Dougherty, Lawrence W., to Zenith Radio Corporation. Shadow mask mount and funnel-faceplate referencing system for color CRT. 4,028,580, Cl. 313-406.000.

Douglas, David, to Avon Products, Inc. Recloseable container. 4,027,776, Cl. 220-281.000.

Dow Chemical Company, The: *See—*
Ball, Clifford L.; and Smith, Harry A., 4,028,312.
Cheng, Chin Huan; and Brubaker, Burton D., 4,027,379.
Dawson, David H., 4,028,037.
Dettmer, Edward V., 4,027,858.
Gulbenk, Alin H., 4,028,092.
Kroposki, Lorraine M.; Yoshimine, Masao; and Freedman, Harold H., 4,028,439.
Martin, Robert C., 4,028,125.
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Olstowski, Franciszek, 4,028,303.
Olstowski, Franciszek, 4,028,304.
Thompson, James L., 4,028,257.
Treat, Lyle G., 4,027,512.

Dowdle, James B., Jr., to United States of America, Army. Three phase spin motor power meter. 4,028,623, Cl. 324-142.000.

Dowty Meco Limited: *See—*
Lampl, Friedrich; and Paul, Thomas Campbell, 4,027,793.

Dowty Mining Equipment Limited: *See—*
Walker, John Hirst; Sutton, James Anthony; and Waters, John Henry, 4,027,489.

Draber, Wilfried: *See—*
Kramer, Wolfgang; Draber, Wilfried; Timmler, Helmut; and Forster, Heinz, 4,028,409.

Dragerwerk Aktiengesellschaft: *See—*
Hickmann, Karl; and Sahmkow, Dieter, 4,028,445.

Dresser Europe S. A.: *See—*
Butcher, Alan George, 4,027,694.

Driscoll, Gary L., to Sun Ventures, Inc. Additives to improve wettability of synthetic paper pulp. 4,028,452, Cl. 264-51.000.

Drudge, Forrest R. Force absorbing hitch for a vehicle. 4,027,893, Cl. 280-487.000.

Duckworth, Milton Donald, Jr. Aircraft lavatory drain plug. 4,027,701, Cl. 137-800.000.

Duke, Jimmy R.: *See—*
Miller, Walter E., Jr.; and Duke, Jimmy R., 4,027,837.

Duke, Marshall W., to United Merchants and Manufacturers, Inc. Fire retardent fabrics and method for preparation thereof. 4,028,053, Cl. 8-116.00P.

Dukes, Gleno V.; and Stroh, Thomas L., to Cadillac Rubber & Plastics, Inc. Tube separator. 4,027,813, Cl. 225-97.000.

Dumoulin, Jean; and Nicou, Parasko, to Rhone-Poulenc Industries. Organosilicon compositions particularly suitable for the non-stick, rub-resistant treatment of cellulosic and synthetic materials. 4,028,298, Cl. 260-29.1SB.

Dunlop Limited: *See—*
Goodfellow, Anthony Gerald; and Rand, Maurice, 4,028,042.
Kenney, Michael John, 4,027,713.

Dunn, Allan R. Multi-angle U-shaped hub for infusion member. 4,027,668, Cl. 128-214.00R.

Dunn, Maurice J.: *See—*
Kolman, Philip; Dunn, Maurice J.; and Tiersten, David, 4,027,971.

Du Pont de Nemours, E. I., and Company: *See—*
Cramer, Richard David, 4,028,429.
Dolan, Thomas Albert, 4,027,830.
Fang, James C., 4,028,309.
Hannover, Finn, 4,027,903.
Harden, John Charles; and Mastrangelo, Sebastian V. R., 4,028,276.
Livingston, Richard Donnan; and Sauerbrunn, Robert Dewey, 4,028,443.
Moore, Earl Phillip, Jr., 4,028,345.
Tynan, Daniel Gregory, 4,028,302.
Weiss, James Paul; and Smith, Edward Dyal, 4,028,550.

Durand, Jean-Pierre: *See—*
Dawans, Francois; and Durand, Jean-Pierre, 4,028,432.

Duranleau, Roger G.; and Larkin, John M., to Texaco Inc. Preparation of acids. 4,028,388, Cl. 260-413.000.

Durno, Ronald Arthur, to United Technologies Corporation. Analog mixer to vary helicopter rotor phase angle in flight. 4,027,999, Cl. 416-40.000.

Dynamit Nobel Aktiengesellschaft: *See—*
Amort, Jurgen; and Nestler, Heinz, 4,028,343.
Hubsch, Gunter; Bendler, Hellmut; Stahlmann, Rudolf; and Gawlick, Heinz, 4,027,592.
Vahlensieck, Hans-Joachim; Seiler, Claus-Dieter; and Kotzsch, Hans-Joachim, 4,028,384.

Dynapol Corporation: *See—*
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E. R. Squibb & Sons, Inc.: *See—*
Bodanszky, Miklos; and Sheehan, John Timothy, 4,028,315.
Breuer, Hermann; and Treuner, Uwe D., 4,028,354.

East/West Industries, Inc.: *See—*
Spinosa, Dominic J.; and Camillucci, Edward R., 4,027,386.

Eastman Kodak Company: *See—*
Bogan, Richard T.; and Shelton, Claude M., 4,028,436.
Hannie, David Eugene, 4,028,103.
Lamberts, Robert L.; and Nail, Nelson R., 4,028,109.
Sturmer, David M., 4,028,113.

Eberle, William J., to General Battery Corporation. Automatic air leak testing apparatus and method. 4,027,797, Cl. 209-74.00R.

Eck, Bruno. Impeller blade reinforcement. 4,028,005, Cl. 416-186.00R.

Eckert, John S. Tower support plate. 4,028,442, Cl. 261-94.000.

Ediar, Serge: *See—*
Jourdan, Francis; Couderc, Georges; and Ediar, Serge, 4,028,544.

Edstrom, Gene K.: *See—*
Edstrom, Keith G.; and Edstrom, Gene K., 4,027,785.

Edstrom, Keith G.; and Edstrom, Gene K., to Chicago Commutator, Inc. Dual pump colorant dispenser. 4,027,785, Cl. 222-135.000.

Edwards Engineering Corporation: *See—*
Edwards, Ray C., 4,027,495.

Edwards, Gerald L., to CX Corporation. Position locating using digital logic controlled by pulse propagation time intervals. 4,028,619, Cl. 324-34.0PS.

Edwards, Harrison F., to Bennett-Ireland, Inc. Fireplace enclosure. 4,027,650, Cl. 126-140.000.

Edwards, Ray C., to Edwards Engineering Corporation. Vapor recovery system for volatile liquids and vapor condensing epperatus for use therein. 4,027,495, Cl. 62-54.000.

Edwin Cooper & Company Limited: *See—*
Moat, Nicholas Warrington, 4,028,117.

Efremkin, Vladimir Vasilievich: *See—*
Cherednichenko, Vladimir Semenovich; Orlov, Gennady Ivanovich; Mikulinsky, Aron Semenovich; Arzamastsev, Jury Semenovich; Efremkin, Vladimir Vasilievich; Nikitin, Valentin Alexeevich, deceased; Nikitina, Valentine Kuzmimichna, administrator; and Nikitin, Dmitry Valentinovich, administrator, 4,027,861.

Eggenberger, John Scott; and Voegeli, Otto, to International Business Machines Corporation. Field access propagation of bubble lattice. 4,028,685, Cl. 340-174.0TF.

Eichholz, Werner; and Krebs, Gerd, to Phoenis Gummiwerke AG. Winding drum for producing belt inserts for pneumetic tires. 4,028,169, Cl. 156-416.000.

Eichinger, Johann; and Schwibacb, Wilhelm, to Carl Hurth Maschinen-

und Zahnradfabrik. Angle gear drive arrangement. 4,027,553, Cl. 74-801.000.
Eisenberger, Peter Michael, to Bell Telephone Laboratories, Incorporated. X-ray photolithography. 4,028,547, Cl. 250-272.000.
Eisenhardt, Fred W.; and Tonsfeldt, Wayne S. Weed pulling machine. 4,027,733, Cl. 171-58.000.
Eldridge, Robert James: *See—*
Bolto, Brian Alfred; and Eldridge, Robert James, 4,028,255.
Electro Corporation: *See—*
Wilson, Michael A.; and Gee, Gordon E., 4,028,686.
Electronic Engineering Company of California: *See—*
Huntress, Charles B.; and Oabrielian, Henry, 4,028,491.
Elghani, Salah Elabd: *See—*
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Eli Lilly and Company: *See—*
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Ellbrunner, Adalbert; Priewasser, Georg; Georg, Friedrich; and Stock, Horst, to Wacker-Chemitronic Gesellschaft fur Elektronik-Grundstoffe mbH. Process for the quantitative removal of residual melts from crucibles. 4,028,137, Cl. 134-8.000.
Elleuberger & Poensgen GmbH: *See—*
Schopp, Hans, 4,028,689.
Ellerbrock, Francis J.: *See—*
Felty, John T.; and Ellerbrock, Francis J., 4,027,468.
Ellis, Franklin H.; and Andrews, Stephen W., to Sybron Corporation. Method of in vivo sterilization of surgical implantables. 4,027,393, Cl. 32-10.00A.
Ellison Company, Inc., The: *See—*
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Elsner, Wolfgang; Moslener, Joro; and Langenstuck, Alfons, to Demag Aktiengesellschaft. Revolving shears for high speed severing. 4,027,565, Cl. 83-337.000.
Emerson Electric Co.: *See—*
Kieffer, Vernon E.; and Damon, Billy L., 4,028,570.
EMI Limited: *See—*
Hounsfield, Godfrey Newbold, 4,028,554.
Emmons, Stephen P., to Texas Instruments Incorporated. Use of floating diffusion for low-noise electrical inputs in CCD's. 4,028,715, Cl. 357-24.000.
Emond, Robert Earl, to Exxon Research and Engineering Company. Mold release agent for urethane foamed rubber. 4,028,120, Cl. 106-38.240.
Endicott, John Richard: *See—*
McClure, George F.; Endicott, John Richard; Freeman, Lionel D.; Cunningham, Marion L.; and Wells, Joel D., 4,028,500.
Endo, Hajime: *See—*
Hujimori, Masao; Nakajima, Shigeo; Takahashi, Ken; Ito, Tsunetoshi; Shimoda, Toshio; and Endo, Hajime, 4,027,918.
Endo, Shigeru: *See—*
Kawasaki, Kaoru; Sakano, Takeshi; Furuya, Shigeru; and Endo, Shigeru, 4,027,803.
Endo, Takeya: *See—*
Hori, Haruo; Kikuchi, Shoji; Wada, Hajime; Kobayasi, Sadatosi; and Endo, Takaya, 4,028,106.
Engalitcheff, John, Jr., to Baltimore Aircoil Company, Inc. Method and apparatus of multi stage injector cooling. 4,028,440, Cl. 261-23.00R.
Engelhard Minerals & Chemicals Corporation: *See—*
Isaac, Peter A. H.; and Oulton, T. Dixon, 4,028,133.
Engineering & Research Associates, Inc.: *See—*
Floyd, Johnnie E., 4,027,735.
Engler, Edward M.; and Patel, Vishnubhai V., to International Business Machines Corporation. Tetraselenofulvalene, dithiodiselenofulvalene and the TCNQ salts thereof. 4,028,346, Cl. 260-239.00R.
Engstrom, Keith Allen: *See—*
Madland, Robert Christen; Zielinski, Robert Michael, Jr.; and Engstrom, Keith Allen, 4,028,696.
Enomoto, Setoru; Takita, Hitoshi; Wada, Hisayuki; Mukaida, Yutaka; and Yanaka, Mikiro, to Kureha Kagaku Kogyo Kabushiki Kaisha. (1-Methyl-2-vinyl)4,6-heptadienyl-3,8-nonadienoate and a method of manufacturing the same. 4,028,387, Cl. 260-410.90N.
Epstein, Marvin Aaron, to International Telephone and Telegraph Corporation. MSK digital data synchronization detector. 4,028,490, Cl. 178-88.000.
Erdmann, Dietrich: *See—*
Oehlhaus, Jurgen; and Erdmann, Dietrich, 4,028,412.
Erickson, David R., to Swift and Company Limited. Fluid removal in food processing, method and apparatus. 4,027,400, Cl. 34-17.000.
Erickson, Paul Milton: *See—*
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Erickson, Terry D.: *See—*
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Ernsthausen, Roger E.: *See—*
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Esaki, Hiroshi: *See—*
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Esquire, Inc.: *See—*
McReynolds, Oleo Harold, Jr., 4,028,542.
Ethicon, Inc.: *See—*
Mattei, Frank V., 4,027,676.
Euler, Reinhold, to Hoechst Aktiengesellschaft. Apparatus for connecting a moving photoconductive web with a fixed electric potential. 4,027,967, Cl. 355-16.000.
European Plastic Machinery Mfg. A/S: *See—*
Holmberg, Leif, 4,028,244.
Evans, Gary E., to Westingbouse Electric Corporation. Apparatus for steering a rectangular array of elements by an angular increment in one of the orthogonal array directions. 4,028,710, Cl. 343-854.000.
Evans, James Gifford; and Heynie, Gerald Demarest, to Bell Telephone Laboratories, Incorporated. Selective intermodulation distortion measurement. 4,028,622, Cl. 324-57.00N.
Evans, Kenneth W.; Howlett, Mason M.; and Kirkpatrick, David H., to Gleason Works, The. Apparatus and method for reducing drag between clutch or brake components immersed in a liquid. 4,027,755, Cl. 192-18.00A.
Everett, George. Solar prominence adapter. 4,027,943, Cl. 350-17.000.
Exel OY: *See—*
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Extracorporeal Medical Specialties Inc.: *See—*
Morris, Livingston B., 4,028,252.
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Guy, Arthur L., Jr., 4,027,493.
Exxon Research and Engineering Company: *See—*
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F. Jos. Lamb Company: *See—*
Van Deberg, Walter H., 4,027,759.
Fagerhaug, Bjorn; and Oberg, Karl, to Kvaerner Brug A/S. Procedure and device for rapid composting of organic waste. 4,028,189, Cl. 195-109.000.
Fahlen, Nils; and Schei, Asle, to ASEA Aktiebolag. Means for increasing the stability in high-voltage power supply networks. 4,028,592, Cl. 361-16.000.
Failla, Henri; Schaller, Karl; and Vidard, Michel, to Commissariat A l'Energie Atomique. Provision for cooling the top end of a suspended vessel, such as the pressure vessel of a nuclear reactor. 4,028,177, Cl. 176-38.000.
Fairbanks, John B., Jr. Method and structure for curing and/or treating wood. 4,027,401, Cl. 34-16.500.
Fairchild Camera and Instrument Corporation: *See—*
Deal, Bruce E.; and Hu, Daniel C., 4,027,380.
Fairchild Industries Inc.: *See—*
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Faktor, Marc Marian; Ambridge, Thomas; and Bremner, Ean Grant, to Post Office, The. Measuring arrangements. 4,028,207, Cl. 204-195.00R.
Fanciullo, Ralph D.; and Fasolino, Ludwig G., to Polaroid Corporation. Flat battery. 4,028,479, Cl. 429-152.000.
Fang, James C., to Du Pont de Nemours, E. I., and Company. Coating compositions containing esters of dibasic acids, glycols and glycidyl esters, and polyisocyanates. 4,028,309, Cl. 260-77.5AN.
Fantuzzo, Joseph; Ferguson, Robert M.; and Weigl, John W., to Xerox Corporation. Apparatus for interposition environment. 4,027,964, Cl. 355-10.000.
Farcinade, Michel. Apparatus for controlling pharmaceutical ampoules. 4,028,553, Cl. 250-576.000.
Farelli, Mario. Terminal for the fuel filling pipe of a motor vehicle. 4,027,910, Cl. 296-1.00C.
Farfor, James Douglas, to Fictor Pty. Limited. Rotatable concrete profiling means. 4,028,036, Cl. 425-374.000.
Fasolino, Ludwig G.: *See—*
Fanciullo, Ralph D.; and Fasolino, Ludwig G., 4,028,479.
Fassino, Lorenzo. Negative impedance repeater for telephone lines. 4,028,505, Cl. 179-170.00G.
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Feenan, Patrick J.; and Walton, Edward B. Oil cooler control. 4,027,643, Cl. 123-196.0AB.
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Feldl, Erich J. Fireplace damper release mechanism. 4,027,655, Cl. 126-288.000.
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Felix, Thomas R. Rifle scope mount. 4,027,414, Cl. 42-1.0ST.
Felty, John T.; and Ellerbrock, Francis J., to General Time Corporation. Day-date mechanism for travel clock. 4,027,468, Cl. 58-4.00R.

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Ferris, David D.; and Harrison, Kenneth E., to Heyl & Patterson, Inc. Process and apparatus for cleaning very fine ore. 4,028,228, Cl. 209-39.000.
Fessler, Dyrel C.; Heavner, George A.; and Massey, Thomas H., to Morton-Norwich Products, Inc. (Substituted)ureidoacetohydroxamic acids. 4,028,401, Cl. 260-500.50H.
Fessler, Herman Sylvester, to McLean Engineering Midwest. Air conditioner. 4,027,498, Cl. 62-263.000.
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Fiddler, Theodore E. Liquid level actuated electrical switch. 4,028,512, Cl. 200-84.00C.
Fiecchi, Alberto, to Bioresearch Limited. Process of preparing double salts of S-adenosyl-L-methionine. 4,028,183, Cl. 195-28.00N.
Fields, Gerald S., to Parma Industries, Inc. Centrifugal air precleaner for internal combustion engines. 4,028,076, Cl. 55-394.000.
Fillion, Romeo. Automatic food feeding device for fish, fowl and the like. 4,027,627, Cl. 119-51.110.
Finch, Lester M., to United States of America, Energy Research and Development Administration. Support grid for fuel elements in a nuclear reactor. 4,028,180, Cl. 176-78.000.
Fink, Hans-Ferdi; Fritsch, Herwig; Koerner, Gotz; Rossmy, Gerd; and Schmidt, Gunter, to Th. Goldschmidt AG. Defoaming composition and method of defoaming aqueous solutions or dispersions. 4,028,218, Cl. 252-321.000.
Finney, Robert H.; and Schmidt, Warren E., to Lord Corporation. Rotor blade retention system. 4,028,002, Cl. 416-134.00A.
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Fischler, Henryk; Krupka, Yaakov; and Itzchak, Jacov, to Yeda Research & Development Co. Ltd. Heart beat detector. 4,027,663, Cl. 128-2.06R.
Fish, Herbert L. Ratchet-type torque wrenches with extended torque range. 4,027,558, Cl. 81-52.40R.
Fisher, Billie Eugene; and Hodges, Thompson Eugene. Microform viewer for use with a rigid frame. 4,027,959, Cl. 353-77.000.
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Fleckenstein, Erwin; and Mischke, Peter, to Hoechst Aktiengesellschaft. Basic azo amino-phenylene dyestuffs. 4,028,321, Cl. 260-146.00R.
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Flowers, Theodore Robert; and Schaefer, Hermann Reinhold, to Sperry Rand Corporation. Skin treatment appliance. 4,027,348, Cl. 15-22.00R.
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Foldessy, Joseph, Jr. Microfiche marking system. 4,027,411, Cl. 40-106.100.
Foley, Kevin M., to Owens-Corning Fiberglas Corporation. Method of preparing organosilicon carboxylates. 4,028,391, Cl. 260-448.20D.
Folsom, Lawrence R., to Advanced Power Systems. Power systems. 4,027,475, Cl. 60-39.610.
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Ford, James M., to Olin Corporation. Variable gap anode assembly for electrolytic cells. 4,028,213, Cl. 204-286.000.
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Forsberg, John Wesley, to Lubrizol Corporation, The. Method of rerefining oil with recovery of useful organic additives. 4,028,226, Cl. 208-180.000.
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Fowler, John T.; and Furey, Donald R., to Laitram Corporation, The. Single pivot remote reading compass. 4,027,398, Cl. 33-363.00K.
Fox, Daniel Wayne, to General Electric Company. Thermally stable flame-retardant thermoplastic molding composition. 4,028,335, Cl. 260-45.75B.
Fozell, Gunnar. Method and device for simultaneous screening of sets of color-separated half-tone negatives. 4,027,969, Cl. 355-73.000.
Frame, Bruce H., to Raymond Lee Organization, Inc., The, a part interest. Bicycle type ski apparatus. 4,027,891, Cl. 280-7.140.
Franaszek, Peter Anthony; and Thompson, David Allen, to International Business Machines Corporation. Apparatus and method for generating a data code with a spectral null. 4,028,535, Cl. 235-152.000.
Francis, Robert John; and Allen, John Glyn, to Hoffmann-La Roche Inc. Isoquinoline derivatives. 4,028,363, Cl. 260-286.00R.
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Funamo, Hiroshi; Kunihiro, Toshiro; and Murai, Masaaki, to Nippon Electric Company, Ltd. Time division communication system adapted to structural expansion. 4,028,495, Cl. 179-15.0AT.
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Goleman, Joel B. Refrigeration unit air temperature detection alarm system. 4,028,688, Cl. 340-227.100.
Golovkina, Elena Yakovlevna: *See—*
Chachin, Viktor Nikolaevich; Zdor, Gennady Nikolaevich; Zhuravsky, Alexandr Julyanovich; Golovkina, Elena Yakovlevna; and Shaduya, Vladimir Leontievich, 4,027,515.
Golovoy, Amos, to Ford Motor Company. Process for producing powder paint particles from liquid paint I. 4,028,326, Cl. 260-42.220.
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Golumbic, Harvey J., to Vinyl-Chem International, Inc. Precured strip method for repairing flexible materials. 4,028,160, Cl. 156-98.000.
Good, Carleton R., to School Health Supply Company. Eye-testing apparatus. 4,027,954, Cl. 351-17.000.
Goodfellow, Anthony Gerald; and Rand, Maurice, to Dunlop Limited. Moulding apparatus. 4,028,042, Cl. 425-515.000.
Goodman, James A. Automatic packaging apparatus. 4,027,458, Cl. 53-55.000.
Goodyear Tire & Rubber Company, The: *See—*
Jalics, George, 4,028,486.
Thompson, Donald R., 4,027,843.
Throckmorton, Morford C., 4,028,272.
Wolfe, Merritt W., 4,028,168.
Goppel, Joban M.; and Chant, Peter R., to Shell Oil Company. Method of producing an article of thermosetting resin. 4,028,477, Cl. 428-285.000.
Gossmann, Willi: *See—*
Kunkel, Heinrich; Brandenstein, Manfred; Olschewski, Armin; Finzel, Sigismund; Gossmann, Willi; and Horling, Peter, 4,027,932.
Gotaverken Angteknik AB: *See—*
Jansson, Stig, 4,027,604.
Goto, Kenji; Shibata, Norio; and Hashiguchi, Yukihide, to Toyota Jidosha Kogyo Kabushiki Kaisha. Flow rate control mechanism for use in exhaust gas re-circulating system. 4,027,635, Cl. 123-119.00A.
Gottlieb, Nathan, to American Optical Corporation. Illuminated system for vertical fluorescent microscopy. 4,027,944, Cl. 350-91.000.
Gould, Walter M. Method of molding a composite synthetic roofing structure. 4,028,450, Cl. 264-45.500.
Graffenberger, Wilbelm; and Onken, Gerd, to U.S. Philips Corporation. Push-pull amplifier arrangement. 4,028,630, Cl. 330-15.000.
Graham, Ross Chipman, to RCA Corporation. Read/write character generator memory loading method. 4,028,724, Cl. 358-160.000.
Granger, Floyd Randolph; and Granger, Michael Gerard. Solar panel. 4,027,447, Cl. 52-618.000.
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Granger, Floyd Randolph; and Granger, Michael Gerard, 4,027,447.
Grasso's Koninklijke Machinefabrieken N.V.: *See—*
Keijer, Jan T., 4,028,016.
Graube, Andreja, to Hughes Aircraft Company. Infrared hologram recording method. 4,028,104, Cl. 96-27.00H.
Gray, Frederick William, to Colgate-Palmolive Company. Bleaching and brightening detergent composition. 4,028,263, Cl. 252-99.000.
Great Lakes Carbon Corporation: *See—*
Mull, Richard T., 4,027,525.
Greenewald, Herbert, Jr. Porous refractory shapes. 4,028,122, Cl. 106-40.00R.
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Greenwood, John H.; and Robitschek, Emmerich, to BBC Brown Boveri & Company Limited. Reinforced disk springs. 4,027,865, Cl. 267-148.000.
Greiner, Alan: *See—*
Moll, Dean H.; and Greiner, Alan, 4,028,524.
Grigat, Ernst: *See—*
Rottloff, Gunther; Sundermann, Rudolf; Grigat, Ernst; and Putter, Rolf, 4,028,393.
Grimm, Klaus; and Mengele, Alois, deceased (by Mengele, Dieter Kark Paul, legal representative), to Karl Mengele & Sohne. Chopping machine particularly for the harvest of corn cobs and their comminution. 4,027,826, Cl. 241-221.000.
Grindmaster of Kentucky, Incorporated: *See—*
Fuller, Don W., 4,027,824.
Grolman, Bernard: *See—*
Krohn, David A.; Grolman, Bernard; and Siegmund, Walter P., 4,028,082.
Groupe Europeen pour la Technique des Turbines a Vapeur G.E.T.T. S.A.: *See—*
Schwartz, Renc, 4,027,998.
Gruber, Kurt; Keim, Willi; and Hentschel, Klaus, to Mannesmannrohren-Werke AG. Transportation of fossil fuel materials. 4,027,688, Cl. 137-13.000.
Grumman Aerospace Corporation: *See—*
Lewis, Edgar B., 4,028,725.
Oschwend, Heinz Werner, to Ciba-Geigy Corporation. Pyrazolobenzazepines. 4,028,381, Cl. 260-310.00R.
GTE Laboratories Incorporated: *See—*
Kim, Han J.; and Reid, F. Joseph, 4,028,061.
Kim, Han J.; and Reid, F. Joseph, 4,028,063.
GTE Sylvania Incorporated: *See—*
Gates, Paul E.; Kimball, Stephen F.; and Leadvaro, Stephen J., 4,028,577.
Laferty, John M., Jr.; Ritsko, Joseph E.; and Port, David J., 4,028,095.
Stratton, Michael G., 4,028,581.
Gubela, Hans. Apparatus for positioning a pad or book of sheets on the work table of printing apparatus. 4,027,591, Cl. 101-407.0BP.
Gudzenko, Nikolai Vasilievich; Zaichenko, Mikhail Efimovich; and Larin, Konstantin Leonidovich. Jet pump. 4,028,009, Cl. 417-163.000.
Guenther, Robert O.; Huffhines, Donald F.; Krall, James W.; and Rey, Charles D., to Mobil Oil Corporation. Protection means for depth control device. 4,027,616, Cl. 114-244.000.
Guile, Donald L.: *See—*
Bihuniak, Peter P.; and Guile, Donald L., 4,028,124.
Gulbenk, Alin H., to Dow Chemical Company, The. Substituted pyridinylalkoxy-, pyridinylalkylsulfonyl- and pyridinylalkylthiophenylurea herbicides. 4,028,092, Cl. 71-94.000.
Gunther, W. H. H.: *See—*
Chu, Joseph Y. C.; and Gunther, W. H. H., 4,028,203.
Gurtler, Hebert & Co., Inc.: *See—*
Horvath, Lajos (Louis), 4,027,734.
Gustafson, William Roy, to American Cyanamid Company. Hydrotreating of petroleum residuum using shaped catalyst particles of small diameter pores. 4,028,227, Cl. 208-216.000.

Gustafsson, Carl-Erik: *See—*
Bohlin, Karl Gunner; Eriksson, Karl Rune; and Gustafsson, Carl-Erik, 4,027,736.

Gustav F. Gerdts KG: *See—*
Schnetmeyer, Hans; and Schutzer, Gerhard, 4,027,695.
Zimmermann, Heino, 4,027,534.

Gustavsson, Varne Axel Gerhard; and Moberg, Lars-Goran, to AB Bofors. Wet disc clutch and method of force cooling the same. 4,027,758, Cl. 192-113.00B.

Guterman, Paulette: *See—*
Maillot, Jean, 4,028,567.

Gutermann & Co. Aktiengesellschaft: *See—*
Rottleb, Dieter, 4,027,831.

Guthrie, Robert William; and Kierstead, Richard Wightman, to Hoffmann-La Roche Inc. Hydroxycitric acid derivatives. 4,028,397, Cl. 260-468.00G.

Guy, Arthur L., Jr., to Exxon Production Research Company. Method and apparatus for connecting two or more components of an offshore platform. 4,027,493, Cl. 61-96.000.

Guyton, Glen B. Check valve. 4,027,696, Cl. 137-527.400.

H. L. Bouton, Company: *See—*
Hirschmann, Jack B., Jr., 4,027,342.

Haddock, Fred A., to Coburn Optical Industries, Inc. Edging apparatus for ophthalmic lens. 4,027,434, Cl. 51-101.0LG.

Hedtke, Frederick B., to Robert Hain Associates, Inc. Face mask. 4,027,340, Cl. 2-206.000.

Hadtke, Frederick B., to Idex Corporation. Tennis tuner. 4,027,880, Cl. 273-29.00A.

Hagan, Joseph R.: *See—*
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Hagiwara, Kitokazu: *See—*
Ikushima, Hiroshi; Nakajima, Yasuo; Hagiwara, Kitokazu; and Nagata, Takashi, 4,028,646.

Hegon, Peter J.; and Haworth, John, to Rockwell International Corporation. Oscillator using magnetostatic surface wave delay line. 4,028,639, Cl. 331-107.00A.

Hahn, Granville J., to Cosden Oil & Chemical Company. Method and apparatus for blow molding plastic. 4,028,034, Cl. 425-302.00B.

Haigh, Douglas John, to USM Corporation. Rotational moulding machines. 4,028,038, Cl. 425-430.000.

Haineut, Daniel; and Demoute, Jean-Pierre, to Roussel-UCLAF. Novel β-ketone compounds. 4,028,386, Cl. 260-410.90R.

Hajek, Manfred: *See—*
Wagner, Kuno; and Hajek, Manfred, 4,028,306.

Halcon International, Inc.: *See—*
Becker, Mitchell; and Yang, Charles C., 4,028,195.

Hall, James N. Telephone lock. 4,028,508, Cl. 179-189.00D.

Halloran, John D. Apparatus for, and method of, measuring dynamic forces. 4,027,539, Cl. 73-465.000.

Halmeghi, Victor. Cigarette extinguishing and cigar cutting device. 4,027,682, Cl. 131-233.000.

Hamada, Noboru: *See—*
Seto, Shigetake; Kurahashi, Suminobu; Okuyama, Toru; and Hamada, Noboru, 4,028,287.

Hameguchi, Sachihiko; Oomura, Ikuo; Seto, Tadashi; and Wada, Hisashi, to Matsushita Electric Industrial Co., Ltd. Method and apparatus for delivery alarm for livestock animals. 4,028,687, Cl. 340-201.00R.

Hamblin, Leslie Frank, to Lamburn, Alan Salisbury, a part interest. Extensible interlocking structure of multi-lateral cross-section. 4,027,440, Cl. 52-108.000.

Hanebuth, Paul N., to Stewart-Warner Corporation. Method for joining a tip for a flexible shaft and assembly thereof. 4,027,501, Cl. 64-4.000.

Hannie, David Eugene, to Eastman Kodak Company. Processing compositions for color transfer processes comprising alkali metal fluorides and oxalates. 4,028,103, Cl. 96-29.00D.

Hannover, Finn, to Du Pont de Nemours, E. I., and Company. Water-degradable coupling member. 4,027,903, Cl. 285-156.000.

Hansel, William B., to Suntech, Inc. Dispensing nozzle control system. 4,027,708, Cl. 141-209.000.

Harden, John Charles; and Mastrangelo, Sebastian V. R., to Du Pont de Nemours, E. I., and Company. Pressure-sensitive elastic resistor compositions. 4,028,276, Cl. 252-513.000.

Hardouin, Pierre: *See—*
Bouteille, Daniel; Hardouin, Pierre; and Thomasse, Andre, 4,027,692.

Hardwick, Thomas Lee Richard. Receptacle transportiog vehicle. 4,027,808, Cl. 214-313.000.

Harkki, Seppo Untamo: *See—*
Aaltonen, Olavi August; Talonen, Timo Tapani; and Harkki, Seppo Untamo, 4,027,863.

Harrill, Thomas D. Circle cutting attachment for band saw. 4,027,566, Cl. 83-411.00R.

Harrison, Kenneth E.: *See—*
Ferris, David D.; and Harrison, Kenneth E., 4,028,228.

Hart, John Michael; and Varah, James Shadrach, to Kangol Magnet Limited. Buckles for vehicle safety belts. 4,027,362, Cl. 24-230.0AL.

Harter Corporation: *See—*
Saam, Charles W., 4,027,364.

Hartmann, Clinton S.; and Stigall, Robert E., to Texas Instruments Incorporated. Tunable surface wave device resonator. 4,028,648, Cl. 333-72.000.

Hartung, Kuhn & Co. Maschinen fabrik GmbH: *See—*
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Hasebe, Nobutoshi: *See—*
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Hasegawa, Akira: *See—*
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Hasenwinkle, Earl Dean; and Wislocker, Frank, to Weyerhaeuser Company. Machine for conveying sector shaped pieces. 4,027,769, Cl. 198-570.000.

Hashiguchi, Yukihide: *See—*
Goto, Kenji; Shibata, Norio; and Hashiguchi, Yukihide, 4,027,635.

Hashimoto, Makoto; Uehara, Shinzi; Sugita, Tadashi; and Shiina, Naonori, to Furukawa Electric Co., Ltd., The. Method of molding plastics material. 4,028,448, Cl. 264-37.000.

Hassinger, Donald F.: *See—*
Jacob, Keith D., 4,027,953.

Hattes, Neil R.: *See—*
Brown, Allen C.; Hattes, Neil R.; and Eyrick, Theodore B., 4,028,444.

Hauraux, Pierre; and Domer, Michel, to Paulstra. Resilient mounting for vehicle bumper bar. 4,027,909, Cl. 293-88.000.

Hawes, Allen R.: *See—*
Hawes, Edward L.; Hawes, Allen R.; and Hawes, Edward C., 4,027,899.

Hawes, Edward C.: *See—*
Hawes, Edward L.; Hawes, Allen R.; and Hawes, Edward C., 4,027,899.

Hawes, Edward L.; Hawes, Allen R.; and Hawes, Edward C. Motorcycle trailer. 4,027,899, Cl. 280-722.000.

Hawkins, Wallace H. Coupling head for securing a vehicle towing assembly. 4,027,894, Cl. 280-502.000.

Haworth, John: *See—*
Hagon, Peter J.; and Haworth, John, 4,028,639.

Hay, Allan S., to General Electric Company. Process for the preparation of polyphenylene oxides with hydrolytically stable copper catalysts. 4,028,341, Cl. 260-47.0ET.

Hayashi, Hideo: *See—*
Tauchiya, Shozo; Sato, Hisetake; Oshima, Akio; and Hayashi, Hideo, 4,028,291.

Hayashi, Jun: *See—*
Hinata, Masaneo; Takei, Haruo; Sato, Akira; Iwamoto, Atsuo; and Hayashi, Jun, 4,028,115.

Hayashi, Kazuya; Mizunuma, Takeji; and Yokotsuka, Tamotsu, to Kikkomen Shoyu Co., Ltd. Process for producing koji for fermented food products. 4,028,470, Cl. 426-11.000.

Hayes, John C.; and Pollitzer, Ernest L., to UOP Inc. Guard beds in hydrocarbon conversion with an acidic multimetallic catalytic composite. 4,028,223, Cl. 208-91.000.

Hayes, William H., Jr.: *See—*
Lyon, Warren Charles; and Hayes, William H., Jr., 4,027,661.

Hayes, William Roger; and Shikasho, Satoru, to International Telephone and Telegraph Corporation. Solar heating/cooling system. 4,027,821, Cl. 237-1.00A.

Haynes, Gardner S.: *See—*
Cassidy, Stephen; Baboian, Robert; Frechette, Raymond A.; Haynes, Gardner S.; and Ross, John W., 4,028,064.

Haynie, Gerald Demarest: *See—*
Evans, James Gifford; and Haynie, Gerald Demarest, 4,028,622.

Heard, George E.; and McPherson, Thomas Buchanan, IV, to Coors Container Company. Method for processing used emulsion coolant. 4,027,685, Cl. 134-10.000.

Heavner, George A.: *See—*
Fessler, Dyral C.; Heavner, George A.; and Massey, Thomas H., 4,028,401.

Heavner, Paul William, Jr.; and Long, Gregor Dean, to Baxter Travenol Laboratories, Inc. Diagnostic electrode assembly with a skin preparation surface. 4,027,664, Cl. 128-2.06E.

Heberlein Maschinenfabrik AG: *See—*
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Hebert, Elie Loyd, to Celanese Corporation. Apparatus for precision electrostatic pinning. 4,028,032, Cl. 425-174.80E.

Hechtfischer, Gustav: *See—*
Satzinger, Gerherd; and Hechtfischer, Gustav, 4,028,398.

Hegar, Gert; and Angliker, Hans-Joerg, to Ciba-Geigy AG. Process for making azo compounds by coupling with nitrosated heterocyclic primery amines. 4,028,323, Cl. 260-157.000.

Heggie, William S., to Canadian Patents and Development Limited. Transducer for engine fuel injection monitoring. 4,027,536, Cl. 73-398.0AR.

Heilig, Louis F.; and Frazer, Alson C., to Ford Aerospace & Communications Corporation. Missile nozzle configuration. 4,027,834, Cl. 244-3.110.

Helde, Robert W., to Motorola, Inc. Contact bonded packaged integrated circuit. 4,028,722, Cl. 357-70.000.

Heller, Lawrence Griffith; Terman, Lewis Madison; and Yee, Yen Sung, to International Business Machines Corporation. High accuracy MOS comparator. 4,028,558, Cl. 307-355.000.

Henkels, Walter H., to International Business Machines Corporation. Ultralow-power, micro-miniaturized Josephson devices having high inductance. 4,028,714, Cl. 357-5.000.

Henley, John C., III. Process and apparatus for producing printed matter. 4,028,107, Cl. 96-41.000.

Henry, Walton M.: *See—*
Seidl, Maximilian R.; Seidl, Joachim; and Henry, Walton M., 4,027,590.

Hentschel, Klaus: *See—*
Gruber, Kurt; Keim, Willi; and Hentschel, Klaus, 4,027,688.

Herbst, Edward J., to Continental Can Company, Inc. Method for forming container scored metal flap areas. 4,027,612, Cl. 113-121.00C.

Hercules Incorporated: *See—*
Reid, Albert R., 4,028,290.

Herd, Richard S.; and Otto, Ferdinand P., to Mobil Oil Corporation. Process for preparing a metal salt of an oxidized, phosphosulfurized hydrocarbon and lubricant compositions containing same. 4,028,259, Cl. 252-46.700.

Hermann nee Szente, Ilona: *See—*
Bite, Pal; Moravcsik, Imre; Schafer, Inge; Horvath, Gyula; Meheszfalvi nee Vajna, Zsuzsanna; Borvendeg, Janos; and Hermann nee Szente, Ilona, 4,028,348.

Hernandez, Rafael J.: *See—*
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Herndon, Terry O.; and Raffel, Jack I., to Massachusetts Institute of Technology. Integrated circuit packaging. 4,027,383, Cl. 29-577.000.

Herrera-Gutierrez, Jesus. Closure device for bags or similar containers. 4,027,819, Cl. 229-65.000.

Hestermann, Klaus: *See—*
Lippsmeier, Bernd; Hestermann, Klaus; and Reuter, Martin, 4,028,421.

Hetke, Adolf, to Ford Motor Company. Aluminum cylinder head valve seat coating transplant. 4,028,062, Cl. 428-558.000.

Hetzel, Thomas Robert, to Thomas Industries, Inc. Unloader for air compressor with wobble piston. 4,028,015, Cl. 417-415.000.

Heubner, Ulrich: *See—*
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Hewlett-Packard Company: *See—*
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Olander, Emil Edward, Jr.; James, Rex L.; Larson, Ivar W.; Covington, Wayne F.; Walden, Jack M.; Watson, Robert E.; Yockey, Francis J.; Wennioger, Fred, Jr.; and Russell, Homer C., 4,028,538.

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Heyl & Patterson, Inc.: *See—*
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Hickerson, Frederick R., to United States of America, Army. Container for explosive device. 4,027,601, Cl. 109-1.00R.

Hickmann, Karl; and Sahmkow, Dieter, to Dragerwerk Aktiengesellschaft. Apparatus for wetting respiratory gas. 4,028,445, Cl. 261-142.000.

Hidehiko, Kobayashi: *See—*
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Higashide, Carlos S., to Honeywell Inc. Printer control system. 4,028,669, Cl. 340-172.500.

Higginbottom, Harold P., to Monsanto Company. High efficiency stable aqueous resoles. 4,028,367, Cl. 260-29.300.

Hildebrand, Kurt. Safety ski binding. 4,027,897, Cl. 280-631.000.

Hillel, Daniel I. Method and apparatus for conserving soil water. 4,027,428, Cl. 47-58.000.

Hiltebrandt, Siegfried. Forceps. 4,027,510, Cl. 72-37.000.

Hilton, Robert G.: *See—*
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Hinata, Masanao; Takei, Haruo; Sato, Akira; Iwamoto, Atsuo; and Hayashi, Jun, to Fuji Photo Film Co., Ltd. Silver halide photographic emulsion sensitized to red with four carbocyanine dyes. 4,028,115, Cl. 96-124.000.

Hipchen, Donald E.; Skowronski, Michael J.; and Hagen, Joseph R., to Celotex Corporation, The. Structural laminate and method for making same. 4,028,158, Cl. 156-79.000.

Hirai, Masahide; Fujimura, Mikio; Kazigase, Masahiro; and Saito, Minoru, to Unitika Ltd. Phenolic chelate resin. 4,028,284, Cl. 260-2.20C.

Hirakawa, Seishiro; Kanai, Shyuji; Ikeda, Matsuo; and Hirata, Toshinori, to Mitsui Mining & Smelting Co., Ltd. Apparatus for automatically replacing electrodes used for electrolytic refining of metal. 4,028,211, Cl. 204-267.000.

Hirashima, Kenzo; Tsujimura, Harutoshi; Hasegawa, Akira; Tanigami, Takahiko; and Ushiku, Kenichi, to Hitachi, Ltd.; and Nissan Motor Co., Ltd. Acceleration detector switch having magnetic biased conductive oscillating controller. 4,028,516, Cl. 200-61.45M.

Hirata, Toshinori: *See—*
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Murakami, Noboru; Hirosawa, Koichiro; Ohara, Kazuo; and Matsuo, Koichi, 4,027,552.

Hirosawa, Yoshiaki; Nomura, Toshio; and Iiyama, Masahiko, to Honda Giken Kogyo Kabushiki Kaisha. Automatic choke valve apparatus in an internal combustion engine. 4,027,640, Cl. 123-179.00G.

Hirschberger, Leonard: *See—*
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Hittman Corporation: *See—*
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Hockett, Wayne. Sand blasting apparatus. 4,027,433, Cl. 51-410.000.

Hodges, Thompson Eugene: *See—*
Fisher, Billie Eugene; and Hodges, Thompson Eugene, 4,027,959.

Hodler, Fritz. Pressure die-casting block with a venting valve. 4,027,726, Cl. 164-305.000.

Hoechst Aktiengesellschaft: *See—*
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Fleckenstein, Erwin; and Mischke, Peter, 4,028,321.
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Quentin, Karl-Ernst; Weil, Ludwig; and Berger, Harald, 4,028,233.
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Hoerbiger Fluidtechnik KG: *See—*
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Hoerner, Eugen. Advertising lettering and support therefor. 4,027,412, Cl. 40-125.00R.

Hoffman, Herbert H. Planing and cutting tool. 4,027,647, Cl. 125-6.000.

Hoffman, Roy Louis; Kempke, William George; and Soltis, Frank Gerald, to International Business Machines Corporation. Fetch instruction for operand address calculation. 4,028,670, Cl. 340-172.500.

Hoffmann, Gunter: *See—*
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Hoffmann-La Roche Inc.: *See—*
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Fischer, Ulf; and Lorch, Eckehard, 4,028,402.
Francis, Robert John; and Allen, John Glyn, 4,028,363.
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Partridge, John Joseph, Jr.; and Uskokovic, Milan Redoje, 4,028,349.

Hohner, Gary Arlyn; and Hyldon, Roy Godfrey, to Quaker Oats Company, The. Oat groat fractionation process. 4,028,468, Cl. 426-436.000.

Holland, Frank Stanley, to National Development Research Corporation. Method of producing metal powder. 4,028,199, Cl. 204-10.000.

Hollandsche Wegeobouw Zanen B.V.: *See—*
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Hollymatic Corporation: *See—*
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Holmberg, Leif, to European Plastic Machinery Mfg. A/S. Apparatus for establishing contact between a liquid and a gas. 4,028,244, Cl. 210-150.000.

Holmlund, Gary Wayne; and Ichino, Toshio, to Hewlett-Packard Company. Marker circuit. 4,028,587, Cl. 315-377.000.

Holmstrom, Hakan: *See—*
Rausing, Ruben; Nedstedt, Gert; Holmstrom, Hakan; Palm, Lars-Erik; and Stefan, Stjepan, 4,027,455.

Honda Giken Kogyo Kabushiki Kaisha: *See—*
Hirosawa, Yoshiaki; Nomura, Toshio; and Iiyama, Masahiko, 4,027,640.
Yamamoto, Takenori; Tsukisaka, Tauneo; and Tsukahara, Takeshi, 4,027,914.

Hooeywell Inc.: *See—*
Higashide, Carlos S., 4,028,669.
Kasenga, Anthony F., 4,028,145.

Honeywell Information Systems, Inc.: *See—*
Monahen, Earnest M.; and Patterson, Garvin W., 4,028,664.
Riikonen, Douglas L., 4,028,668.

Honeywell Information Systems Italia: *See—*
Orlando, Luciano, 4,028,612.

Honkawa, Yoshinori: *See—*
Tasaka, Tomoyuki; and Honkawa, Yoshinori, 4,027,588.

Honore, Etienne A. H.; and Torcheux, Emile L. G., to Societe d'Etude et d'Application des Techniques Nouvelles NEO-TEC. Apparatus for radio position-fixing of the hyperbolic phase-measurement type. 4,028,703, Cl. 343-105.00R.

Hooker Chemicals & Plastics Corporation: *See—*
Kahn, Heory; and Schall, William L., 4,028,329.

Hooker, Joe B., to Metal Bed Rail Company, division of Leggett & Platt, Inc. Bed frame with detachable and interchangeable components. 4,027,343, Cl. 5-200.00R.

Hopkins, Donald L., to Caterpillar Tractor Co. Reversible, variable-

displacement piston pump with positioner means for automatic return to zero displacement. 4,028,010, Cl. 417-217.000.
Hoppner, Werner F.; Spinelli, Richard A.; and Allis, Robert F., to Xerox Corporation. Multi-mode reproducing apparatus. 4,027,963, Cl. 355-8.000.
Hoppough, Richard Scott, to Bell Telephone Laboratories, Incorporated. Apparatus for applying particular voltages to three-terminal circuits and measuring resulting current flows for the purpose of determining circuit characteristics. 4,028,507, Cl. 179-175.30R.
Hori, Haruo; Kikuchi, Shoji; Wada, Hajime; Kobayasi, Sadatosi; and Endo, Takaya, to Konishiroku Photo Industry Co., Ltd. Method for developing an exposed silver halide color photosensitive material. 4,028,106, Cl. 96-55.000.
Horikoshi, Yoshiji, to Nippon Telegraph and Telephone Public Corporation. Method of epitaxially growing a laminate semiconductor layer in liquid phase. 4,028,148, Cl. 148-171.000.
Horling, Peter: *See—*
Kunkel, Heinrich; Brandenstein, Manfred; Olschewski, Armin; Finzel, Sigismund; Gossmann, Willi; and Horling, Peter, 4,027,932.
Horvath, Gyula: *See—*
Bite, Pal; Moravcsik, Imre; Schafer, Inge; Horvath, Gyula; Mebesfalvi nee Vajna, Zsuzsanna; Borvendeg, Janos; and Hermann nee Szente, Ilona, 4,028,348.
Horveth, Lajos (Louis), to Gurtler, Hebert & Co., Inc. Deviated conductor driving system. 4,027,734, Cl. 175-9.000.
Hosaka, Yukio: *See—*
Yamamoto, Tomio; Sakasegawa, Koji; Ozumi, Atsushi; Hosaka, Yukio; and Yamada, Takeo, 4,027,978.
Hoshino, Norio: *See—*
Konishi, Yoshihiro; Konno, Kenichi; Yazawa, Norihiko; and Hoshino, Norio, 4,028,650.
Hotta, Seiji; Koga, Koichi; Bando, Tomoyuki; and Kondo, Yutaka, to Sumitomo Chemical Company, Limited; and Kyodo Chemical Company, Ltd. Ultra violet absorber. 4,028,331, Cl. 260-45.8NT.
Hounsfield, Godfrey Newbold, to EMI Limited. Radiology. 4,028,554, Cl. 250-445.00T.
House, Aniel Hermas, Jr. Cleat for climbing trees and the like. 4,027,742, Cl. 182-92.000.
Hovagimyan, Norman; Iadicola, Anthony Domenic; and Ianuzzi, William Paul, to RCA Corporation. Universal/assigned night answering system for EPABX. 4,028,499, Cl. 179-18.0BD.
Howlett, Mason M.: *See—*
Evans, Kenneth W.; Howlett, Mason M.; and Kirkpatrick, David H., 4,027,755.
Hrometka, Otto; and Binder, Dieter, to BASF Aktiengesellschaft. Thiophene saccharines. 4,028,373, Cl. 260-301.000.
Hu, Daniel C.: *See—*
Deal, Bruce E.; and Hu, Daniel C., 4,027,380.
Hubbard, David W., to Pitney-Bowes, Inc. Method for printing a manually scannable bar code and articles carrying a vertically extended bar code. 4,027,586, Cl. 101-93.010.
Huber, Rudolf: *See—*
Kuhnelt, Herbert; and Huber, Rudolf, 4,027,744.
Hubsch, Gunter; Bendler, Hellmut; Stahlmann, Rudolf; and Gawlick, Heinz, to Dynamit Nobel Aktiengesellschaft. Propellant charge igniter with striker element. 4,027,592, Cl. 102-70.00R.
Huddleston, Jack M., to National Distillers and Chemical Corporation. Bearing lubricator. 4,027,929, Cl. 308-97.000.
Hufenus, Paul Francis Marcel. Tennis racket with variable balance and weight. 4,027,881, Cl. 273-73.00R.
Huffhines, Donald F.: *See—*
Guenther, Robert O.; Huffhines, Donald F.; Krall, James W.; and Ray, Charles D., 4,027,616.
Hughes Aircraft Company: *See—*
Graube, Andreja, 4,028,104.
Kamath, O. Sanjiv; and Smith, Bradley W., 4,028,147.
King, Harry J., 4,028,579.
Leetmaa, Juri G., 4,028,651.
Zurcher, Rudolf F., 4,028,509.
Hughes, Richard Swart, to United States of America, Navy. Acoustooptical deflector tuned organic dye laser. 4,028,636, Cl. 331-94.50C.
Hugues, Edgard Alfred, to U.S. Philips Corporation. Single optical lens with large aperture and large field. 4,027,952, Cl. 350-189.000.
Hujimori, Masao; Nakajima, Shigeo; Takahashi, Ken; Ito, Tsunetoshi; Shimada, Toshio; and Endo, Hajime, to Taiheiyo Engineering Incorporated. Longwall coal mining machine with plural cutters on subranging arm. 4,027,918, Cl. 299-53.000.
Hulsebos, Jan, to Cities Service Company. Process and apparatus for recovering dissolved copper from solutions containing copper. 4,027,864, Cl. 266-170.000.
Hungerford & Terry, Inc.: *See—*
Davis, Raymond R.; Langberg, Alfred M.; and Debus, Alvin P., 4,028,241.
Hunt, Charles d'A., to Airco, Inc. Electron beam furnace. 4,027,722, Cl. 164-64.000.
Hunt, Paulmer D., to Bendix Corporation, The. Fluid pressure responsive transducer apparatus. 4,027,481, Cl. 60-533.000.
Hunter Douglas International N.V.: *See—*
Brugman, Johannes Antonius Henricus, 4,027,446.
Huntress, Charles B.; and Gabrielian, Henry, to Electronic Engineering Company of California. Transducer switching system. 4,028,491, Cl. 179-1.0SW.
Hurley, Carson Monroe. Recation speed training device. 4,027,875, Cl. 272-76.000.
Hurni, William M.: *See—*
McAleer, William J.; and Hurni, William M., 4,028,190.
Huschka, Hans; Schmutz, Hermann; and Vygen, Peter, to Nukem G.m.b.H. Fuel particles with coatings without property gradients. 4,028,181, Cl. 176-82.000.
Hycom Incorporated: *See—*
Motley, David M.; and Cheng, King Y., 4,028,626.
Hyldon, Roy Godfrey: *See—*
Hohner, Gary Arlyn; and Hyldon, Roy Godfrey, 4,028,468.
I-T-E Imperial Corporation: *See—*
Laubach, Ward E., 4,028,513.
Iadicola, Anthony Domenic: *See—*
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Ianuzzi, William Paul: *See—*
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Ichino, Toshio: *See—*
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ICI Australia Limited: *See—*
Bolto, Brian Alfred; and Eldridge, Robert James, 4,028,255.
Ide, Akira: *See—*
Ogawa, Shinsaku; Ide, Akira; Komatsu, Kazurou; Matsumoto, Sojiro; and Kishimoto, Yasushi, 4,028,392.
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Seki, Kenji; Kimura, Akio; Asahi, Satoshi; and Takeshita, Yasuhiro, 4,028,435.
Idex Corporation: *See—*
Hadtke, Frederick B., 4,027,880.
Igeta, Harutoshi. Seat belt assembly. 4,027,900, Cl. 280-745.000.
Iiyama, Masahiko: *See—*
Hirosawa, Yoshiaki; Nomura, Toshio; and Iiyama, Masahiko, 4,027,640.
Ikeda, Matsuo: *See—*
Hirakawa, Seishiro; Kanai, Shyuji; Ikeda, Matsuo; and Hirata, Toshinori, 4,028,211.
Ikeda, Tadashi: *See—*
Sato, Akira; Ikeda, Tadashi; Sueyoshi, Tohru; Nakamura, Yasuharu; and Shimada, Takeo, 4,028,112.
Ikeda, Tsunemi; and Sezaki, Tamotsu, to Kawasaki Jukogyo Kabushiki Kaisha. Grating apparatus for protecting the draft port of a water-jet propulsion system. 4,027,617, Cl. 115-14.000.
Ikushima, Hiroshi; Nakajima, Yasuo; Hagiwara, Kitokazu; and Nagata, Takashi, to Matsushita Electric Industrial Co., Ltd. Elastic surface wave devices and method for making the same. 4,028,646, Cl. 333-72.000.
Illinois Tool Works Inc.: *See—*
Desio, Frank B.; and Webb, Samuel Lee, 4,028,515.
Madland, Robert Christen; Zielinski, Robert Michael, Jr.; and Engstrom, Keith Allen, 4,028,696.
Imada, Yasuo: *See—*
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Imai, Tetsu: *See—*
Kuroda, Michio; Namura, Kiyoshi; Kato, Fumio; Yamazaki, Yoshiaki; Iwasaki, Tutomu; Ishida, Akira; Sohma, Akio; and Imai, Tetsu, 4,028,006.
Imhof, Hugo, to S.A.F. Societe Agricole et Fonciere S.A. Installation for pelletizing organic waste materials. 4,028,030, Cl. 425-135.000.
Immel, Otto: *See—*
Schwarz, Hans-Helmut; and Immel, Otto, 4,028,347.
Imperial Chemical Industries Limited: *See—*
Gent, Colin William, 4,028,067.
Imperial Metal Industries (Kynoch) Limited: *See—*
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Inagaki, Hiroshi: *See—*
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Ing. C. Olivetti & C., S.p.A.: *See—*
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Sargentini, Enrico; and Carena, Ugo, 4,027,766.
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Vittorelli, Vittore, 4,028,681.
Inoue, Akira: *See—*
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Inspiration Consolidated Copper Company: *See—*
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Institut Francais du Petrole: *See—*
Dawans, Francois; and Durand, Jean-Pierre, 4,028,432.
Interface Biomedical Laboratories Corporation: *See—*
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Interior Fasteners, Inc.: *See—*
Laverty, Richard C., 4,027,573.
International Business Machines Corporation: *See—*
Arps, Ronald Barthold; Bahl, Lalit Rai; and Weinberger, Arnold, 4,028,731.
Brennemann, Andrew Ernest; and Soo, Suk Suet, 4,028,493.
Breslau, Franklin Charles; and Goertzel, Gerald, 4,028,667.
Byrnes, Herbert P.; and Wahl, Richard, 4,027,935.
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Cook, Peter William; and Schuster, Stanley E., 4,028,694.
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Engler, Edward M.; and Patel, Vishnubhai V., 4,028,346.
Franaszek, Peter Anthony; and Thompson, David Allen, 4,028,535.
Heller, Lawrence Griffith; Terman, Lewis Madison; and Yee, Yen Sung, 4,028,558.
Henkels, Walter H., 4,028,714.
Hoffman, Roy Louis; Kempke, William George; and Soltis, Frank Gerald, 4,028,670.
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International Flavors & Fragrances Inc.: *See—*
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International Playtex, Inc.: *See—*
Litt, Morton H.; and Kumar, Narayan Ganesh, 4,028,132.
International Standard Electric Corporation: *See—*
Blair, Peter Kenneth, 4,027,840.
Viohl, Uwe, 4,028,114.
International Telephone and Telegraph Corporation: *See—*
Epstein, Marvin Aaron, 4,028,490.
Hayes, William Roger; and Shikasho, Satoru, 4,027,821.
Krum, Jack Kern; Wollermann, Louis Albert; and Rucker, Dugan Allan, 4,028,471.
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Crepinsek, Alois, 4,027,908.
Interx Research Corporation: *See—*
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Moricca, Larry S.; and Zaker, Gregory A., 4,028,502.
Iori, Shinichi: *See—*
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Irikura, Tautomu, to Kyorin Pharmaceutical Co., Ltd. Novel pyrazolo [1,5-a]pyridines. 4,028,370, Cl. 260-296.00H.
Iriyama, Keiji: *See—*
Okada, Akira; Iriyama, Keiji; and Shiraki, Masaru, 4,028,217.
Isaac, Peter A. H.; and Oulton, T. Dixon, to Engelhard Minerals & Chemicals Corporation. Reduced charge montmorillonite pigment for sensitizing record material. 4,028,133, Cl. 106-288.00B.
Ishida, Akira: *See—*
Kuroda, Michio; Namura, Kiyoshi; Kato, Fumio; Yamazaki, Yoshiaki; Iwasaki, Tutomu; Ishida, Akira; Sohma, Akio; and Imai, Tetsu, 4,028,006.
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Ishihara, Yosuke: *See—*
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Ishii, Tsumoru: *See—*
Sera, Hidefumi; Nagao, Kameji; and Ishii, Tsumoru, 4,028,320.
Ishikawa, Youhei: *See—*
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Ishikawajima-Harima Jukogyo Kabushiki Kaisha: *See—*
Kawasaki, Kaoru; Sakano, Takeshi; Furuya, Shigeru; and Endo, Shigeru, 4,027,803.
Ishiyama, Jiro; Kato, Motohiko; Yoshida, Fumihiko; and Yokotsuka, Tamotsu, to Kikkoman Shoyu Co., Ltd. Process for producing 3',5'-cyclic adenylic acid. 4,028,184, Cl. 195-28.00N.
Ishizawa, Toshitugu: *See—*
Takeuchi, Hiroshi; Ishizawa, Toshitugu; Yamano, Tetuyuki; Chiba, Ko; and Kobayashi, Daisaku, 4,028,022.
Ishizuka, Ichiro: *See—*
Yukinaga, Hisajiro; Sumimoto, Shinzaburo; Ishizuka, Ichiro; and Sugita, Jitsuo, 4,028,376.
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Ito, Akiro: *See—*
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Ito, Fumio: *See—*
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Ito, Masaharu: *See—*
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Ito, Tadashi: *See—*
Kawamura, Masaharu; Sakurada, Nobuaki; Shinoda, Nobuhiko; Ito, Tadashi; Ito, Fumio; and Murakami, Hiroyashu, 4,028,712.
Ito, Terukazu; Nakao, Kiyoharu; Minami, Teruo; and Uenoyama, Masaru, to Kabushiki Kaisha Komatsu Seisakusho. Electronic control apparatus of an automatic speed changing apparatus. 4,027,554, Cl. 74-866.000.
Ito, Tsunetoshi: *See—*
Hujimori, Masao; Nakajima, Shigeo; Takahashi, Ken; Ito, Tsunetoshi; Shimada, Toshio; and Endo, Hajime, 4,027,918.
Itoh, Tatsuo, to University of Illinois Foundation. Waveguide having strip dielectric structure. 4,028,643, Cl. 333-6.000.
Itoi, Kazuo: *See—*
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ITT Industries, Inc.: *See—*
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Fischler, Henryk; Krupka, Yaakov; and Itzchak, Jacov, 4,027,663.
IU Conversion Systems, Inc.: *See—*
Webster, William C.; Hilton, Robert G.; and Cotts, Ronald F., 4,028,130.
Iverson, Myren L., to United States of America, Navy. Optical slip-rings. 4,027,945, Cl. 350-96.00C.
Ivester, J. Harold: *See—*
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Iwamoto, Atsuo: *See—*
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Iwasaki, Masayuki; Misu, Hiroshi; and Miyano, Shizuo, to Fuji Photo Film Co., Ltd. Light-sensitive lithographic printing plate. 4,028,111, Cl. 96-75.000.
Iwasaki, Tutomu: *See—*
Kuroda, Michio; Namura, Kiyoshi; Kato, Fumio; Yamazaki, Yoshiaki; Iwasaki, Tutomu; Ishida, Akira; Sohma, Akio; and Imai, Tetsu, 4,028,006.
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J. M. Voith GmbH: *See—*
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Jack, James: *See—*
Chalmers, Alexander Michael; Jack, James; and Cook, Barry, 4,028,334.
Jackson, J. D. Combined wood burning stove and fireplace. 4,027,649, Cl. 126-4.000.
Jacob, Adir, to LFE Corporation. Process and material for manufacturing thin film integrated circuits. 4,028,155, Cl. 156-643.000.
Jacob, Keith D., to Hassinger, Donald F. Switch controlled adjustable rear view mirror with bimetal means. 4,027,953, Cl. 350-288.000.
Jacobs, Pieter Anton, to U.S. Philips Corporation. Memory with error detection and correction means. 4,028,539, Cl. 235-153.0AM.
Jakob Muller, Forschungs-und Finanz AG: *See—*
Diesner, Ferdinand, 4,027,703.
Jalicz, George, to Goodyear Tire & Rubber Company, The. Alpha-methyl-p-bromo-styrene and method of preparation. 4,028,486, Cl. 526-293.000.
James, Rex L.: *See—*
Olander, Emil Edward, Jr.; James, Rex L.; Larson, Ivar W.; Covington, Wayne F.; Walden, Jack M.; Watson, Robert E.; Yockey, Francis J.; Wenninger, Fred, Jr.; and Russell, Homer C., 4,028,538.
Janome Sewing Machine Co. Ltd.: *See—*
Niikura, Masakatsu, 4,027,610.
Jansen, Friedrich Ludwig; Gerritsen, Frederik Hendrik; and Glashorster, Johan Hendrik Adolph, to U.S. Philips Corporation. Method of and device for testing hermetically enclosed reed contacts. 4,028,615, Cl. 324-28.0RS.
Jansson, Stig, to Gotaverken Angteknik AB. Means for governing the air supply to a furnace. 4,027,604, Cl. 110-182.500.
Japan Synthetic Rubber Co., Ltd.: *See—*
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Jarque, Ricardo Granados; Cartes, Juan Bosch; Cabiro, Jorge Canals; Roldan, Cristobal Martinez; and Peinado, Rabadan, to Laboratorios Made, S.A. The compound 1,3,4-trimethyl-1-(3,4,5-trimethoxybenzyl)-1,2,5,6-tetrahydropyridine chloride. 4,028,371, Cl. 260-297.00R.
Jarvis Products Corporation: *See—*
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Jelling, Murray; Kahn, Alexander; Moore, Ernest George; and Friedman, Michael, to U.S. Dynamics Corporation, a part interest. Floating hook arrangement for an apparatus for bagging garments. 4,027,461, Cl. 53-241.000.
Jendrzey, Wolfram: *See—*
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Jenoptik Jena G.m.b.H.: *See—*
Amon, Georg, 4,027,976.
Jeter, Sheldon M., to Milliken Research Corporation. Loop forming chain. 4,027,792, Cl. 198-618.000.
Jikihara, Kazuo; Iori, Shinichi; Kimura, Ichiro; and Adachi, Kyoichi, to Kumiai Chemical Industry Co., Ltd. Herbicidal composition. 4,028,091, Cl. 71-94.000.
Jobsis, Adrianus C.: *See—*
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John Henry Company, The: *See—*
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John Wyeth & Brother Limited: *See—*
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Cavalla, John Frederick; and Archibald, John Leheup, 4,028,365.
Johns-Manville Corporation: *See—*
Patznick, Richard Arthur; and Border, Gary Clayton, 4,028,083.

Johnson, Clevin R. Expandable tie anchor. 4,027,847, Cl. 249-190.000.

Johnson, George Verne. Sleeper/camper attachment. 4,027,911, Cl. 296-23.00H.

Johnson, James J.; and Loeber, David Y., to Loeber, David Y.; and O'Donoell, Harry B., III. Film covered cut item and process. 4,027,457, Cl. 53-23.000.

Johnson & Johnson: *See—*
Korpman, Ralf, 4,028,292.
Scrivens, George W., 4,027,665.

Johnston, Donald Leroy; Perkins, Manuel Garfield; and Youngberg, Lyan Zaugg, to American Hospital Supply Corporation. Destructible Luer lock syringe and method of destructing same. 4,027,669, Cl. 128-218.00N.

Johnston, Jonathan A., to Gates Rubber Company, The. Method for curing elastomeric articles. 4,027,543, Cl. 74-231.00R.

Johnston, Lyman Clarke. Exercising apparatus. 4,027,876, Cl. 272-133.000.

Johnston, Roger L.; and Wiencek, Daniel C., to Bucyrus-Erie Company. Outrigger system for vehicles. 4,027,801, Cl. 212-145.000.

Jolly, Robert, to United Kingdom Atomic Energy Authority. Welding jigs. 4,027,868, Cl. 269-266.000.

Jones, Clarence O., Jr., to Niagara Machine & Tool Works. Rake angle control for shears and the like. 4,027,567, Cl. 83-624.000.

Jones, Clyde B. Sailboat construction. 4,027,614, Cl. 114-163.000.

Jones, David A., Jr.; Schlatter, James M.; Mikulec, Richard A.; Reuter, Judith A.; and Mazur, Robert H., to G. D. Searle & Co. 2 and 3-substituted enkephalins. 4,028,319, Cl. 260-112.50R.

Jones, Henry B.: *See—*
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Jones, John L.: *See—*
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United States of America, National Aeronautics and Space Administratioo; Creel, Theodore R., Jr.; Jones, Robert A.; Corwin, Richard R.; and Kramer, Joseph S., 4,027,524.

Jordan, William E., to Xerox Corporation. Tracking assembly for an endless belt electrostatic reproduction machine. 4,027,966, Cl. 355-16.000.

Joslyn, Gerald L.: *See—*
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Jost, Gerhard; Rothgordt, Ulf; and Witter, Klaus, to U.S. Philips Corporation. Method of and device for electrostatic printing. 4,028,711, Cl. 346-153.000.

Jouffret, Michel, to Rhone-Poulenc Industries. Process for the preparation of hex-2-enal. 4,028,420, Cl. 260-601.00R.

Jourdan, Francis; Couderc, Georges; and Ediar, Serge, to Thomson-CSF. Radiant energy detection system. 4,028,544, Cl. 250-203.00R.

Joy, Richard C.; Magdo, Ingrid E.; and Phillips, Alfred, Jr., to International Business Machines Corporatioo. Field effect transistor having improved threshold stability. 4,028,717, Cl. 357-23.000.

Julia, Marc, to Agence Nationale de Valorisation de la Recherche (ANVAR). Olefinic sulfones. 4,028,422, Cl. 260-607.0AR.

Jullien, Rene; Perona, Maurice; and Veoot, Robert, to Commissariat a l'Energie Atomique. System for the heat insulation of horizontal closure surfaces for a liquid metal cooled nuclear reactor. 4,028,178, Cl. 176-38.000.

Jungers Verkstads AB of Goteborg: *See—*
Lundstrom, Bengt, 4,028,051.

Junkers, John K. Hydraulic wrench. 4,027,561, Cl. 81-57.390.

K. Loepfe Automation AG: *See—*
Stepan, Jiri, 4,027,557.

K. R. Komarek, Inc.: *See—*
Komarek, Karl R., 4,028,035.

Kablaoui, Mahmoud S.; Reid, Robert E.; and Godfrey, Arthur W., to Texaco Inc. Alkylene oxide adducts of phosphosulfurized N-(hydroxyalkyl) alkenylsuccinimides. 4,028,258, Cl. 252-46.700.

Kabushiki Kaisha Daini Seikosha: *See—*
Nemoto, Hideo; and Koike, Yuuji, 4,027,936.

Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo: *See—*
Sakai, Shuzo, 4,028,186.

Kabushiki Kaisha Komatsu Seisakusho: *See—*
Ito, Terukazu; Nakao, Kiyoheru; Minami, Teruo; and Uenoyama, Masaru, 4,027,554.

Kabushiki Kaisha Shinko Seisakusho: *See—*
Yamaura, Yoshitomo; Kobayashi, Takayoshi; Asanuma, Akira; and Miyazawa, Kuichiro, 4,028,510.

Kabushiki Kaisha Token Kikai Seisakusho: *See—*
Yahara, Satoshi, 4,027,564.

Kabushiki Kaisha Toyota Chuo Kenkyusho: *See—*
Mizutani, Yoshiyuki; Tada, Masaaki; and Imada, Yasuo, 4,028,097.

Kaeser, Arthur L.: *See—*
Parker, Richard W.; and Kaeser, Arthur L., 4,027,788.

Kahan, Frederick M.: *See—*
Kollonitsch, Janos; and Kahan, Frederick M., 4,028,405.

Kahn, Alexander: *See—*
Jelling, Murray; Kahn, Alexander; Moore, Ernest George; and Friedman, Michael, 4,027,461.

Kahn, David; and Peiffer, Howard Richard, to AMP Incorporated. Relay contact protector. 4,028,591, Cl. 361-11.000.

Kahn, Henry; and Schall, William L., to Hooker Chemicals & Plastics Corporation. Process for the bulk polymerization of vinyl halide polymers showing reduced reactor scale formation. 4,028,329, Cl. 260-42.530.

Kaiser Aluminum & Chemical Corporation: *See—*
Dorsey, Geoffrey A., Jr., 4,028,205.

Kajan Specialty Company, Inc.: *See—*
Perkins, Lee E., 4,027,732.

Kakei, Masanori: *See—*
Matsuo, Tadao; Miura, Minoru; Mashimo, Satoshi; Kakei, Masanori; and Mishima, Kyoichi, 4,028,316.

Kakitani, Haruaki; Maekawa, Masao; and Kokubo, Takashi, to Mitsubishi Monsanto Chemical Company. Process for preparing a highly expanded polyvinyl chloride foam product. 4,028,449, Cl. 264-45.300.

Kalopissis, Gregoire: *See—*
Boudouris, Georges; Kalopissis, Gregoire; Leveque, Jean-Luc; and Roussopoulos, Paul, 4,028,518.

Kamada, Naoki; and Hasebe, Nobutoshi, to Hitachi, Ltd. Intake air heating device for use in internal combustion engine. 4,027,642, Cl. 123-122.00G.

Kamatani, Yoshio; Okazaki, Hisayoshi; Imai, Ko; Fujita, Noriaki; Yamazaki, Yoshio; and Ogino, Katsuhiko, to Takeda Chemical Ind., Ltd. Method for producing L(+)-tartaric acid. 4,028,185, Cl. 195-30.000.

Kamath, G. Sanjiv; and Smith, Bradley W., to Hughes Aircraft Company. Liquid phase epitaxial process for growing semi-insulating GaAs layers. 4,028,147, Cl. 148-171.000.

Kamo, Tomoichi; and Yamane, Mikiya, to Hitachi, Ltd. Ionization detector utilizing electric discharge. 4,028,617, Cl. 324-33.000.

Kamp, Heinz, to W. Schlafhorst & Co. Method and device for cleansing spinning turbines of a spinning machine. 4,028,136, Cl. 134-8.000.

Kamyr Aktiebolag: *See—*
Richter, Johan C. F. C., 4,028,171.

Kanai, Shyuji: *See—*
Hirakawa, Seishiro; Kanai, Shyuji; Ikeda, Matsuo; and Hirata, Toshinori, 4,028,211.

Kanda, Yozo: *See—*
Migitaka, Masatoshi; and Kanda, Yozo, 4,028,718.

Kando, Akiyoshi; and Kindai, Ryoichi, to Yoshida Kogyo Kabushiki Kaisha. Element rows coupling tool for a concealed slide fastener. 4,027,369, Cl. 29-766.000.

Kando Incorporated: *See—*
Krofchalk, Gary F.; and Dodds, Andrew D., 4,027,889.

Kane, Thomas J.; and Dennie, Richerd H., to Xerox Corporation. Developing system for electrostatic reproduction machines. 4,027,621, Cl. 118-5.000.

Kanezaki, Kenji, to Maruzen Oil Co. Ltd. Process for preparing p-vinylphenol polymer. 4,028,340, Cl. 260-47.0UA.

Kangol Magnet Limited: *See—*
Hart, John Michael; and Varah, James Shadrach, 4,027,362.

Kennapell, David H., to American Air Filter Company, Inc. Damper assembly for high temperature or corrosive gases. 4,027,654, Cl. 126-285.00R.

Kanon Kabushiki Kaisha: *See—*
Kawamura, Masaharu; Sakurada, Nobuaki; Shinoda, Nobuhiko; Ito, Tadashi; Ito, Fumio; and Murakami, Hiroyashu, 4,028,712.

Kantelberg, Adrianus Hubertus; and Valkestijn, Leonardus Albertus Antonius, to U.S. Philips Corporation. Circuit for generating a correction current for correcting for deflection errors on the display screen of a color television display tube. 4,028,585, Cl. 315-371.000.

Kao Soap Co., Ltd.: *See—*
Murata, Moriyasu; Sai, Fumio; and Fujino, Takashi, 4,028,280.
Murata, Moriyasu; Sai, Fumio; and Fujino, Takashi, 4,028,283.

Karabinos, Joseph V.: *See—*
Karsten, Keoneth S.; and Karabinos, Joseph V., 4,028,394

Karami, Hamzeh, to Colgate-Palmolive Company. Absorbent article with improved pad and method. 4,027,672, Cl. 128-284.000.

Karl Mengele & Sohne: *See—*
Grimm, Klaus; and Mengele, Alois, deceased, 4,027,826.

Karsten, Kenneth S.; and Karabinos, Joseph V., to R. T. Vanderbilt Company, Inc. Antibacterial and fungicidal S-phenylthiocarbamates. 4,028,394, Cl. 260-455.00A.

Kartzmark, Robert: *See—*
MacDonald, John M.; and Kartzmark, Robert, 4,028,224.

Kasenga, Anthony F., to Honeywell Inc. Stoichiometric annealing of mercury cadmium telluride. 4,028,145, Cl. 148-20.300.

Kashio, Toshio, to Casio Computer Co., Ltd. Apparatus for confirming the correct impression of printing characters. 4,027,764, Cl. 197-49.000.

Kashiwada, Toshinobu: *See—*
Okumura, Osamu; Sakatani, Takenobu; Yamane, Izumi; and Kashiwada, Toshinobu, 4,028,282.

Kason Hardware Corporation: *See—*
Berkowitz, Irving L., 4,027,987.

Kastalon Inc.: *See—*
De Ment, Robert B.; and Simms, William D., 4,027,513.

Kaswan, Joseph. Tobacco product. 4,027,679, Cl. 131-9.000.

Kataoka, Takashi: *See—*
Nakasuji, Norikazu; Kataoka, Takashi; Inagaki, Hiroshi; and Nakashima, Sunao, 4,028,118.

Kato, Fumio: *See—*
Kuroda, Michio; Namura, Kiyoshi; Kato, Fumio; Yamazaki, Yoshiaki; Iwasaki, Tutomu; Ishida, Akira; Sohma, Akio; and Imai, Tetsu, 4,028,006.

Kato, Hideo: *See—*
Fujisawa, Michio; Matsumoto, Hatsuo; Sawada, Shuzo; Yamane, Kiyoshi; Kato, Hideo; Shimizu, Takayuki; and Kato, Shigeo, 4,027,345.

Kato, Motohiko: *See—*
Ishiyama, Jiro; Kato, Motohiko; Yoshida, Fumihiko; and Yokotsuka, Tamotsu, 4,028,184.

Kato, Shigeo: *See—*
Fujisawa, Michio; Matsumoto, Hatsuo; Sawada, Shuzo; Yamane, Kiyoshi; Kato, Hideo; Shimizu, Takayuki; and Kato, Shigeo, 4,027,345.

Katsube, Toyonari. Golf swing timing device. 4,027,886, Cl. 273-186.00A.

Katzakian, Arthur, Jr.; and DePree, David O., to Aerojet-General Corporation. Buffering agents. 4,028,234, Cl. 210-37.00R.

Katzman, Allison W.: *See—*
Barlow, Gordon A.; and Katzman, Allison W., 4,027,423.

Kawaguchi, Hiroshi: *See—*
Nakamura, Hiroyuki; Kawaguchi, Hiroshi; and Nishiwaki, Kiyoshi, 4,028,658.

Kawaharazaki, Takashi: *See—*
Shimogawa, Toshiaki; Morita, Masayuki; and Kawaharazaki, Takashi, 4,027,905.

Kawamoto, Kyoji; and Ishihara, Yosuke, to Sumitomo Electric Industries, Ltd. Floating disc brake including air escape structure. 4,027,750, Cl. 188-73.300.

Kawamura, Masaharu; Sakurada, Nobuaki; Shinoda, Nobuhiko; Ito, Tadashi; Ito, Fumio; and Murakami, Hiroyashu, to Kanon Kabushiki Kaisha. Display system for photographic camera. 4,028,712, Cl. 354-23.00D.

Kawarai, Takashi; Sawada, Yuji; Takemoto, Katsumi; and Mikami, Sadao, to Mitsubishi Jukogyo Kabushiki Kaisha. Loading-unloading apparatus for a vehicle. 4,027,823, Cl. 214-38.0CA.

Kawasaki Jukogyo Kabushiki Kaisha: *See—*
Ikeda, Tsunemi; and Sezaki, Tamotsu, 4,027,617.

Kawasaki, Kaoru; Sakano, Takeshi; Furuya, Shigeru; and Endo, Shigeru, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Mechanism for assembling ship's hull. 4,027,803, Cl. 214-1.00H.

Kawawa, Takeho; and Ito, Masaharu, to Nippon Kokan Kabushiki Kaisha. Big-end-down ingot mold for casting metal. 4,027,844, Cl. 249-111.000.

Kaye, Wilbur I., to Beckman Instruments, Inc. Detector apparatus for laser light scattering photometers. 4,027,973, Cl. 356-73.000.

Kazigase, Masahiro: *See—*
Hirai, Masahide; Fujimura, Mikio; Kazigase, Masahiro; and Saito, Minoru, 4,028,284.

KDI Sylvan Pools, Inc.: *See—*
Silverman, Herman, 4,027,442.

Kearney & Trecker Corporation: *See—*
Zankl, Frank; Kirkham, Edward E.; Stobbe, Richard E.; and Schachte, John J., 4,028,599.

Keebler, EveLynne Marie. Convertible handbag. 4,027,710, Cl. 150-28.00A.

Keijer, Jan T., to Grasso's Koninklijke Machinefabrieken N.V. Rotary displacement compressor with capacity control. 4,028,016, Cl. 417-440.000.

Keim, Willi: *See—*
Gruber, Kurt; Keim, Willi; and Heotschel, Klaus, 4,027,688.

Kelder, Raymond: *See—*
Arhuckle, Norman B., 4,027,608.

Keller, Albert G.: *See—*
Morrison, Howard J.; and Keller, Albert G., 4,027,425.

Keller, D. V., Jr.: *See—*
Smith, Clay D.; and Keller, D. V., Jr., 4,027,731.

Keller, Herbert; Krieg, Bruno; and Romer, Ludwig, to Kraftwerk Union Aktiengesellschaft. Turbomachine, such as a steam turbine with high steam inlet temperature, especially. 4,027,996, Cl. 415-116.000.

Keller, Peter: *See—*
Alig, Leo; Furst, Andor; Keller, Peter; Muller, Marcel; Kerb, Ulrich; and Wiechert, Rudolf, 4,028,400.

Kelley, Fred William, Jr., to General Electric Company. High speed control of reactive power for voltage stabilization in electric power systems. 4,028,614, Cl. 323-102.000.

Kellis, Harry Garfield. Razor blade conditioning device. 4,027,387, Cl. 30-90.000.

Kempke, William George: *See—*
Hoffman, Roy Louis; Kempke, William George; and Soltis, Frank Gerald, 4,028,670.

Kendall Company, The: *See—*
Swallow, Roger T.; and Pendergrass, John E., 4,027,667.

Kendzior, Leo J., to Jarvis Products Corporation. Saw blade. 4,027,390, Cl. 30-355.000.

Kennecott Copper Corporation: *See—*
Ammann, Paul R.; Cook, Glenn M.; and Portal, Charles, 4,028,202.

Kennedy, Gordon F.: *See—*
Schaefer, Carl W. D.; Schaefer, Richerd L.; and Kennedy, Gordon F., 4,027,862.

Keoney, Michael John, to Dunlop Limited. Lubricant container assembly. 4,027,713, Cl. 152-330.00L.

Kenworthy, John B. Baled hay loading and transport device. 4,027,773, Cl. 214-766.000.

Kerb, Ulrich: *See—*
Alig, Leo; Furst, Andor; Keller, Peter; Muller, Marcel; Kerb, Ulrich; and Wiechert, Rudolf, 4,028,400.

Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung: *See—*
Lahus, Herwig, 4,028,023.

Kerr, Alexander Fraser, to Singer Company, The. Feed mechanism for sewing machines. 4,027,609, Cl. 112-209.000.

Kerr, David L.: *See—*
Brownstein, Arthur M.; and Kerr, David L., 4,028,423.

Kerr-McGee Corporation: *See—*
Baldwin, Roger Allen; and Davis, Robert Elliott, 4,028,219.

Key, Columbus B., Jr.; and Spaulding, Vincent M. Flashlight marking implement. 4,028,540, Cl. 240-6.460.

Keystone Lamp Manufacturing Corporation: *See—*
Oster, Joseph, 4,028,543.

Kidd, Robert P.: *See—*
Branch, William C.; Cole, Oliver W.; and Kidd, Robert P., 4,027,783.

Kieffer, Vernon E.; and Damon, Billy L., to Emerson Electric Co. Self locking moided thermostat strap. 4,028,570, Cl. 310-68.00C.

Kiener, Karl. Process and apparatus for the production of combustible gas. 4,028,068, Cl. 48-209.000.

Kierstead, Richard Wightman: *See—*
Guthrie, Robert William; and Kierstead, Richard Wightman, 4,028,397.

Kikkawa, Seiichi: *See—*
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Kikkoman Shoyu Co., Ltd.: *See—*
Hayashi, Kazuya; Mizunuma, Takeji; and Yokotsuka, Tamotsu, 4,028,470.
Ishiyama, Jiro; Kato, Motohiko; Yoshida, Fumihiko; and Yokotsuka, Tamotsu, 4,028,184.

Kikuchi, Shoji: *See—*
Hori, Haruo; Kikuchi, Shoji; Wada, Hajime; Kobayasi, Sadatosi; and Endo, Takaya, 4,028,106.

Kilpatrick, William L.: *See—*
Berkowitz, Benjamin; Luedtke, Arthur; Kilpatrick, William L.; and Bentley, William F., Jr., 4,028,709.

Kilroy, Eugene Joseph, Jr.; Crain, Philip Warren; and Woods, James Frank, to Mattel, Inc. Multi-structure animated amusement device. 4,027,424, Cl. 46-116.000.

Kilvert, Charles A. Method of mounting a candle. 4,028,046, Cl. 431-297.000.

Kim, Han J.; and Reid, F. Joseph, to GTE Laboratories Incorporated. Silver-cadmium oxide alloys. 4,028,061, Cl. 75-233.000.

Kim, Han J.; and Reid, F. Joseph, to GTE Laboratories Incorporated. Compacts for preparing silver-cadmium oxide alloys. 4,028,063, Cl. 75-233.000.

Kim, Oh-Kil, to United States of America, Navy. Vinyl polymerization initiator and reducing agent. 4,028,270, Cl. 252-428.000.

Kimball, Stephen F.: *See—*
Gates, Paul E.; Kimball, Stephen F.; and Leadvaro, Stephen J., 4,028,577.

Kimura, Akio: *See—*
Seki, Kenji; Kimura, Akio; Asahi, Satoshi; and Takeshita, Yasuhiro, 4,028,435.
Tsuchiya, Hiroshi; Mukai, Kunio; Kimura, Akio; Taya, Hiroshi; Fujimoto, Keimei; Ozaki, Toshiaki; Yamamoto, Sigeo; Ogawa, Taizo; Ooishi, Tadashi; and Okuno, Yositosi, 4,028,438.

Kimura, Ichiro: *See—*
Jikihara, Kazuo; Iori, Shinichi; Kimura, Ichiro; and Adachi, Kyoichi, 4,028,091.

Kimura, Shigeru: *See—*
Tashiro, Minoru; and Kimura, Shigeru, 4,028,611.

Kindai, Ryoichi: *See—*
Kando, Akiyoshi; and Kindai, Ryoichi, 4,027,369.

Kine, Masayoshi, to Shimano Industrial Company, Limited. Center-pull type caliper brake for a bicycle. 4,027,746, Cl. 188-24.000.

Kinemetrics, Inc.: *See—*
Rihn, William J., 4,028,659.

King, Alan G.; and Levine, Leon. Composite dental material and method of preparing same. 4,028,325, Cl. 260-42.150.

King, Harry J., to Hughes Aircraft Company. High current density ion source. 4,028,579, Cl. 313-361.000.

King, Henry L., to Monsanto Company. Fire retardant polyester fibers. 4,028,330, Cl. 260-45.70P.

King, Jerry A., to United Technologies Corporation. Apparatus for delivering particulate material at a selected rate. 4,027,790, Cl. 222-285.000.

King, William James. Method for cool deposition of layers of materials onto a substrate. 4,028,206, Cl. 204-192.00C.

Kingsley, Ernest James; and Mendgen, Horst Guenter, to Zygon Industries Limited. Fence post assembly. 4,027,856, Cl. 256-47.000.

Kircher, Morton S., to Olin Corporation. Connection means for anode posts in electrolytic diaphragm cells. 4,028,210, Cl. 204-266.000.

Kirkham, Edward E.: *See—*
Zankl, Frank; Kirkham, Edward E.; Stobbe, Richard E.; and Schachte, John J., 4,028,599.

Kirkpatrick, David H.: *See—*
Evans, Kenneth W.; Howlett, Mason M.; and Kirkpatrick, David H., 4,027,755.

Kirsch, Lawrence J. Instrument panel. 4,027,620, Cl. 116-129.00T.

Kish, Edward E.: *See—*
Shuffleberger, Earl D.; Kish, Edward E.; Boylan, John R.; Diehl, George D.; Gallagher, Bernard J.; and Tobbe, William P., 4,028,254.

Kish, Edward E., Jr.: *See—*
Murauskas, Donald J.; Kish, Edward E., Jr.; Cunningham, Frank M.; Gallagher, Bernard J.; and Shufflebarger, Earl D., 4,028,248.

Kishimoto, Yasushi: *See—*
Ogawa, Shinsaku; Ide, Akira; Komatsu, Kazurou; Matsumoto, Sojiro; and Kishimoto, Yasushi, 4,028,392.

Kiss, Sandor G. Jet flow alternator. 4,027,407, Cl. 37-61.000.

Kitagawa, Junji; and Akita, Sigeyuki, to Nippon Soken, Inc. Electrical wiring system for selectively actuating electrical loads. 4,028,620, Cl. 324-51.000.

Kitazawa Shoji Kabushiki Kaisha: *See—*
Nomura, Chifuru, 4,027,576.

Klautschek, Herwig: *See—*
Blaschke, Felix; and Klautschek, Herwig, 4,028,600.

Klebbe, Horst, to Volkswagenwerk Aktiengesellschaft. Door arrangement for a vehicle. 4,027,432, Cl. 49-503.000.

Klein, Gunter, to GESIPA Blindniettechnik Gesellschaft mit beschrankter Haftung. Blind riveter with automatic rivet feed. 4,027,520, Cl. 72-391.000.

Klein, Gunther; and Spohr, Karl, to GESIPA Blindniettechnik Gesellschaft mit beschrankter Haftung. Manual blind riveting tool. 4,027,556, Cl. 81-3.00R.

Kleinschmidt, Roger F.; and Campbell, Robert W., to Phillips Petroleum Company. Transparent polyamide armor. 4,028,476, Cl. 428-220.000.

Knapp, Philip B., to Minnesota Mining and Manufacturing Company. Planter apparatus. 4,027,606, Cl. 111-77.000.

Knappstein, Johannes: *See—*
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Knutti, Dietrich: *See—*
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Kobayashi, Daisaku: *See—*
Takeuchi, Hiroshi; Ishizawa, Toshitugu; Yamano, Tetuyuki; Chiba, Ko; and Kobayashi, Daisaku, 4,028,022.

Kobayashi, Gei; Shikano, Yoshiro; and Yano, Masao, to Mitsubishi Denki Kebushiki Kaisha. Vapor cooling device for semiconductor device. 4,027,728, Cl. 165-105.000.

Kobayashi, Shoichi: *See—*
Ueshima, Takashi; Tanaka, Yasuzi; and Kobayashi, Shoichi, 4,028,482.

Kobayashi, Takashi, to Yamaha Hatsudoki Kabushiki Kaisha. V-belt variable-speed drive. 4,027,544, Cl. 74-230.17E.

Kobayashi, Takayoshi: *See—*
Yamaura, Yoshitomo; Kobayashi, Takayoshi; Asanuma, Akira; and Miyazawa, Kuichiro, 4,028,510.

Kobayasi, Sadatosi: *See—*
Hori, Haruo; Kikuchi, Shoji; Wada, Hajime; Kobayasi, Sadatosi; and Endo, Takaya, 4,028,106.

Kobiske, Gerald F., to Kobiske Industries, Inc. Manure pump having agitator piston. 4,028,017, Cl. 417-489.000.

Kobiske Industries, Inc.: *See—*
Kobiske, Gerald F., 4,028,017.

Koch, Robert E., to General Electric Company. Electrical current limiting fuse with bound sand filler and improved low current fault clearing. 4,028,655, Cl. 337-160.000.

Kodo, Masatsugu: *See—*
Uchii, Jiro; Kodo, Masatsugu; Soga, Tsunehiko; and Morimoto, Yutaka, 4,028,070.

Koerner, Gotz: *See—*
Fink, Hens-Ferdi; Fritsch, Herwig; Koerner, Gotz; Rossmy, Gerd; and Schmidt, Gunter, 4,028,218.

Koga, Koichi: *See—*
Hotta, Seiji; Koga, Koichi; Bando, Tomoyuki; and Kondo, Yutaka, 4,028,331.

Kogaku Ltd.: *See—*
Fukushige, Tatsuzo, 4,027,942.

Koike, Yuuji: *See—*
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Kokubo, Takashi: *See—*
Kakiteni, Haruski; Maekawa, Masao; and Kokubo, Takashi, 4,028,449.

Kokurin, Vyacheslav Alexandrovich; Bakulov, Igor Alexeevich; and Kotlyerov, Vitaly Mikhailovich. Method of thermal disinfection of sewage and plant realizing same. 4,028,242, Cl. 210-71.000.

Kokusai Denshin Denwa Kabushiki Kaisha: *See—*
Niiro, Yasuhiko, 4,028,644.

Kokusai Gijutsu Kaihatsu Kabushiki Kaisha: *See—*
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Kolar, Miloslav: *See—*
Safer, Petr; Langr, Josef; Kolar, Miloslav; and Nosek, Stanislav, 4,027,705.

Kollonitsch, Janos; and Kahan, Frederick M., to Merck & Co., Inc. Fluorinated amino acids. 4,028,405, Cl. 260-534.00C.

Kolmen, Philip; Dunn, Maurice J.; and Tiersten, David. Method of simultaneously counting blood cells. 4,027,971, Cl. 356-36.000.

Komarek, Karl R., to K. R. Komarek, Inc. Frameless briquetting machine. 4,028,035, Cl. 425-363.000.

Komarniski, John Victor. Multiple chemistry analyzer. 4,027,979, Cl. 356-180.000.

Komatsu, Kazurou: *See—*
Ogawa, Shinsaku; Ide, Akira; Komatsu, Kazurou; Matsumoto, Sojiro; and Kishimoto, Yasushi, 4,028,392.

Komatsu, Yasutoshi; and Yanagisawa, Yuzuru, to Sony Corporation. Surface acoustic wave filter. 4,028,649, Cl. 333-72.000.

Komoto, Hiroshi: *See—*
Doi, Tsunesuke; Komoto, Hiroshi; Chono, Masazumi; Inoue, Akira; Saito, Kazuaki; and Shinozuka, Isao, 4,028,055.

Kondo, Toshiyuki, to Aisin Seiki Kabushiki Kaisha. Anti-skid brake control device for vehicles. 4,027,924, Cl. 303-92.000.

Kondo, Yutaka: *See—*
Hotta, Seiji; Koga, Koichi; Bando, Tomoyuki; and Kondo, Yutaka, 4,028,331.

Konishi, Yoshihiro; Konno, Keoichi; Yazawa, Norihiko; and Hoshino, Norio, to Nippon Hoso Kyokai. Microwave circuits constructed inside a waveguide. 4,028,650, Cl. 333-73.00W.

Konishiroku Photo Industry Co., Ltd.: *See—*
Hori, Haruo; Kikuchi, Shoji; Wada, Hajime; Kobayasi, Sadatosi; and Endo, Takaya, 4,028,106.

Konno, Keoichi: *See—*
Konishi, Yoshihiro; Konno, Kenichi; Yazawa, Norihiko; and Hoshino, Norio, 4,028,650.

Konter, Wolfgang; Witte, Josef; Vehlewald, Peter; and Block, Hans-Dieter, to Bayer Aktiengesellschaft. Graft polymers of vinyl phosphonic acid esters. 4,028,434, Cl. 260-874.000.

Koprowski, Hilary: *See—*
Kritchevsky, David; Koprowski, Hilary; and Makolska, Hanna, 4,028,469.

Korfil, Incorporated: *See—*
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Koritsu Kikaikogyo Co., Ltd.: *See—*
Nagayoshi, Konno, 4,028,193.

Korl, Peter: *See—*
Petritsch, Klaus; and Korl, Peter, 4,028,407.

Korpman, Ralf, to Johnson & Johnson. Hot melt adhesive. 4,028,292, Cl. 260-27.00R.

Koski, Kaijo Aatto Matias: *See—*
Christell, Adolf Ragnar Roland Umberto Einarsson; Koski, Kaijo Aatto Matias; and Ljunggren, Knut Lennart, 4,028,267.

Kotche, Ervin, to Kotche, Ervin H. Cleaning pad. 4,027,350, Cl. 15-104.930.

Kotche, Ervin H.: *See—*
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Kotlyarov, Vitaly Mikhailovich: *See—*
Kokurin, Vyacheslav Alexandrovich; Bakulov, Igor Alexeevich; and Kotlyarov, Vitaly Mikhailovich, 4,028,242.

Kotzsch, Hans-Joachim: *See—*
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Kovacs, Bela V.: *See—*
Cole, Gerald S.; Kovacs, Bela V.; Sensoli, Robert A.; and Smartt, Herschel B., 4,028,099.

Kraftwerk Union Aktiengesellschaft: *See—*
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Krall, James W.: *See—*
Guenther, Robert O.; Huffhines, Donald F.; Krall, James W.; and Ray, Charles D., 4,027,616.

Kramer, Joseph S.: *See—*
United States of America, National Aeronautics and Space Administration; Creel, Theodore R., Jr.; Jones, Robert A.; Corwin, Richard R.; and Kramer, Joseph S., 4,027,524.

Kramer, Petrus A.: *See—*
van den Brink, Marinus J.; Austermuhle-Bertola, Helena; and Kramer, Petrus A., 4,028,418.

Kramer, Richard W. Low well yield control system. 4,028,011, Cl. 417-278.000.

Kramer, Wolfgang; Draber, Wilfried; Timmler, Helmut; and Forster, Heinz, to Bayer Aktiengesellschaft. Process for the preparation of α-oxothiodimethylamide compounds. 4,028,409, Cl. 260-551.00S.

Krandex Corporation: *See—*
Slingluff, Eugene L., 4,027,659.

Kraupa, Werner, to Siemens Aktiengesellschaft. Nuclear reactor installation. 4,028,176, Cl. 176-38.000.

Kraus, Heinz, to Loewe-Opta GmbH. Arrangement for varying the excitation of a deflection circuit in response to load changes and the like. 4,028,588, Cl. 315-387.000.

Krauss-Maffei Aktiengesellschaft: *See—*
Lang, Andreas, 4,027,597.

Krauss, Timothy A., to United Technologies Corporation. Torsionally compliant helicopter rotor blade with improved stability and performance characteristics. 4,028,003, Cl. 416-141.000.

Krebs, Gerd: *See—*
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Krenzer, John, to Velsicol Chemical Corporation. Thiadiazolylimidazolidinones. 4,028,375, Cl. 260-306.80D.

Krieg, Bruno: *See—*
Keller, Herbert; Krieg, Bruno; and Romer, Ludwig, 4,027,996.

Kritchevsky, David; Koprowski, Hilary; and Makolska, Hanna. Bread containing alfalfa. 4,028,469, Cl. 426-551.000.

Krofchalk, Gary F.; and Dodds, Andrew D., to Kando Incorporated. Stair-climbing carrier. 4,027,889, Cl. 280-5.220.

Krohn, David A.; Grolman, Bernard; and Siegmund, Walter P., to American Optical Corporation. Method of making artificial intraocular lenses with holes. 4,028,082, Cl. 65-23.000.

Kroposki, Lorraine M.; Yoshimine, Masao; and Freedman, Harold H., to Dow Chemical Company, The. Process for preparing phosphorothioates and phenylphosphonothioates. 4,028,439, Cl. 260-973.000.

Krum, Jack Kern; Wollermann, Louis Albert; and Rucker, Dugan Allan, to International Telephone and Telegraph Corporation. Yeast leavened dough composition. 4,028,471, Cl. 426-22.000.

Krupka, Yaakov: *See—*
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Ku, San-Mei: *See—*
Deines, John L.; Ku, San-Mei; Poponiak, Michael R.; and Tsang, Paul J., 4,028,149.

Kugelmann, Adolf: *See—*
Streit, Klaus; Kugelmann, Adolf; and Seiler, Hartmut, 4,028,564.

Kuhnelt, Herbert; and Huber, Rudolf, to Hoerbiger Fluidtechnik KG. Pneumatic pulse hydraulic controlled valve for controlling a lubricating device. 4,027,744, Cl. 184-7.00F.

Kulker, Otto, to Westfalia Separator AG. Self-cleaning centrifugal drum for the periodical removal of a portion of the solids seperated from a liquid and collecting in the peripheral part of the interior of the drum. 4,027,820, Cl. 233-20.00A.

Kum, Dong Woo. Joint connector for bars. 4,027,988, Cl. 403-218.000.

Kumar, Narayan Ganesh: *See—*
Litt, Morton H.; and Kumar, Narayan Ganesh, 4,028,132.

Kumasaka, Kazuhiro: *See—*
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Kumisi Chemical Industry Co., Ltd.: *See—*
Jikihara, Kazuo; Iori, Shinichi; Kimura, Ichiro; and Adachi, Kyoichi, 4,028,091.

Kummer, Horst: *See—*
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Kumpfer, Beverly D.: *See—*
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Kunesh, John G.: *See—*
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Kunihiro, Toshiro: *See—*
Funamo, Hiroshi; Kunihiro, Toshiro; and Murai, Masaaki, 4,028,495.

Kunkel, Heinrich; Brandenstein, Manfred; Olschewski, Armin; Finzel, Sigismund; Gossmann, Willi; and Horling, Peter, to SKF Industrial Trading and Development Company B.V. Clutch release bearing. 4,027,932, Cl. 308-233.000.

Kuntz, Ronald W. Pace setting light for joggers. 4,028,693, Cl. 340-323.00R.

Kunz, Harold Russell, to United Technologies Corporation. Support material for a noble metal catalyst and method for making the same. 4,028,274, Cl. 252-447.000.

Kurahashi, Suminobu: *See—*
Sato, Shigetake; Kurahashi, Suminobu; Okuyama, Toru; and Hamada, Noboru, 4,028,287.

Kuraray Co., Ltd.: *See—*
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Kureha Kagaku Kogyo Kabushiki Kaisha: *See—*
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Kurode, Michio; Namura, Kiyoshi; Kato, Fumio; Yamazaki, Yoshiaki; Iwasaki, Tutomu; Ishida, Akira; Sohma, Akio; and Imai, Tetsu, to Hitachi, Ltd. Bucket cover attachment. 4,028,006, Cl. 416-191.000.

Kurtz, Donald R.; Popadick, Carl C.; Sofianek, Joseph C.; and Talento, Joseph L., to General Electric Company. High current vacuum circuit interrupter with beryllium contact. 4,028,514, Cl. 200-144.00B.

Kushida, Toshimoto; and Logothetis, Eleftherios M., to Ford Motor Company. Circuit for converting a temperature dependent input signal to a temperature independent output signal. 4,028,642, Cl. 323-75.00B.

Kuster, Heinz: *See—*
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Kutschera, Heinz: *See—*
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Kveerner Brug A/S: *See—*
Fagerheug, Bjorn; and Oberg, Karl, 4,028,189.

Kwest, Theodore Emil; and Smith, Gordon Marlon, to Singer Company, The. Flange spreader. 4,027,373, Cl. 29-256.000.

Kyodo Chemical Company, Ltd.: *See—*
Hotta, Seiji; Koga, Koichi; Bando, Tomoyuki; and Kondo, Yutaka, 4,028,331.

Kyodo Denshi Kogyo Co., Ltd.: *See—*
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Kyorin Pharmaceutical Co., Ltd.: *See—*
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La Telemecanique Electrique: *See—*
Bouteille, Daniel; Hardouin, Pierre; and Thomasse, Andre, 4,027,692.

Labedan, Pierre; Mugnier, Robert; and Chavanel, Hubert, to Rhone-Poulenc. Electrolysis cell. 4,028,209, Cl. 204-252.000.

LaBelle, Harold E., Jr.; and Cronan, Charles J., to Tyco Laboratories, Inc. Multiple dies for ribbon. 4,028,059, Cl. 23-273.0SP.

Laboratorios Made, S.A.: *See—*
Jarque, Ricerdo Granados; Cartes, Juan Bosch; Cabiro, Jorge Canals; Roldan, Cristobal Martinez; and Peinedo, Rabadan, 4,028,371.

Labus, Herwig, to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung. Fluid operable rotary piston device. 4,028,023, Cl. 418-108.000.

Ladney, Michael, Jr.: *See—*
Foster, Edwin E.; and Foster, Thomas E., 4,027,919.

Ladrigan, J. William, to Xerox Corporation. Transfer system for electrostatic reproduction machine. 4,027,960, Cl. 355-3.00R.

Leferty, John M., Jr.; Ritsko, Joseph E.; and Port, David J., to GTE Sylvania Incorporated. Free flowing powder and process for producing it. 4,028,095, Cl. 75-.5AB.

Laitram Corporation, The: *See—*
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LaJovic, Dusan S., to Colgate-Palmolive Company. Method for protectively covering container necks. 4,028,459, Cl. 264-159.000.

LaMarche, Robert Ernest; May, Carl Jerome, Jr.; and Zebo, Timothy James, to Bell Telephone Laboratories, Incorporated. Digital speech detector. 4,028,496, Cl. 179-15.0AS.

Lamberts, Robert L.; and Nail, Nelson R., to Eastman Kodak Company. Photographic transparency for producing a lenticular array. 4,028,109, Cl. 96-116.000.

Lamburn, Alan Selisbury: *See—*
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Lampe, Wolfgang: *See—*
Carlsson, Tage; and Lampe, Wolfgang, 4,028,653.

Lampl, Friedrich; and Paul, Thomas Campbell, to Dowty Meco Limited. Scraper chain conveyor. 4,027,793, Cl. 198-719.000.

Lang, Andreas, to Krauss-Maffei Aktiengesellschaft. Linear induction motor with damping cage. 4,027,597, Cl. 104-148.0MS.

Langberg, Alfred M.: *See—*
Davis, Raymond R.; Langberg, Alfred M.; and Debus, Alvin P., 4,028,241.

Lange, Gerd: *See—*
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Lange, Harold Carl; and MacLeay, Ronald Edward, to Pennwalt Corporation. α-isocyanato and ω-isothiocyanato azos and their derivatives. 4,028,344, Cl. 260-174.000.

Langenstuck, Alfons: *See—*
Elaner, Wolfgang; Moslener, Jorn; and Langenstuck, Alfons, 4,027,565.

Langere, Ronald Francis; and Loeffler, Otto Ernest, to NL Industries, Inc. Stabilized hydrous pentavalent antimony oxide sol composition and its production, production of dry powder from sol composition and resulting dry powder. 4,028,266, Cl. 252-313.00R.

Langford, Obie M.: *See—*
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Langheim, Detlef: *See—*
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Langlie, Howard: *See—*
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Langlois, Roland E., to Owens-Corning Fiberglas Corporation. Method for removing particulate pollutants from stack gases. 4,028,071, Cl. 55-89.000.

Langr, Josef: *See—*
Safer, Petr; Langr, Josef; Kolar, Miloslav; and Nosek, Stanislav, 4,027,705.

Lanpher, Edward J.: *See—*
Morton, Avery A.; and Lanpher, Edward J., 4,028,484.

Lantz, Charles Hunter, to B.F. Goodrich Company, The. In-axle vehicle wheel speed sensing device. 4,027,753, Cl. 188-181.00R.

Lapchenko, Alexandr Mikhailovich: *See—*
Mamvriisky, Alexandr Sergeevich; and Lapchenko, Alexandr Mikhailovich, 4,027,860.

Larin, Konstantin Leonidovich: *See—*
Gudzenko, Nikolai Vasilievich; Zaichenko, Mikhail Efimovich; and Larin, Konstantin Leonidovich, 4,028,009.

Larkin, John M.: *See—*
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Larner, Douglas Stanley, to Plessey Handel und Investments A.G. Regenerative repeater circuit arrangement for use in digital date transmission systems. 4,028,559, Cl. 307-246.000.

Larson, Ivar W.: *See—*
Olander, Emil Edward, Jr.; James, Rex L.; Larson, Ivar W.; Covington, Wayne F.; Walden, Jack M.; Watson, Robert E.; Yockey, Francis J.; Wenninger, Fred, Jr.; and Russell, Homer C., 4,028,538.

Larsson, Hans Evald. Cross-country ski having alternate sliding and holding surfaces. 4,027,895, Cl. 280-604.000.

Latva, Henry F., to Chrysler Corporation. Heat treating atmospheres. 4,028,100, Cl. 75-224.000.

Laubach, Ward E., to I-T-E Imperial Corporation. Steel arcing contact for circuit breaker. 4,028,513, Cl. 200-144.00R.

Lauzier, Rene, to Central Automobile Industry Co., Ltd., The. Guard rail. 4,027,855, Cl. 256-21.000.

Lave Crucible Refractories Company: *See—*
Miller, Eldon D.; and Washburn, Ryan F., 4,028,453.

Laverty, Richard C., to Interior Fasteners, Inc. Self-tapping screw fastener with improved thread construction. 4,027,573, Cl. 85-46.000.

Lavery, Elzie E. Combustion engine driven liquid heater. 4,027,631, Cl. 122-26.000.

Lawbaugh, J. Medley, to Raymond Lee Organization, Inc., The. Disposable ashtray liner and mating bowl. 4,027,683, Cl. 131-235.00R.

Lasague, Jean: *See—*
Cottin, Jean; and Lasague, Jean, 4,028,531.

Leach, George S., Jr., to Motorola, Inc. Charge coupled storage device multiplexer. 4,028,671, Cl. 340-173.00R.

Leadvaro, Stepheo J.: *See—*
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Lear, Anthony: *See—*
Black, Christopher T.; and Lear, Anthony, 4,028,561.

Leesure, William; Garcia, Luis; Reifel, Charles; and Shelton, Jack, to Mira-Pak, Inc. Method and apparatus for opening folded box blanks. 4,027,579, Cl. 93-53.00M.

Le Brasseur, Genevieve, to Societe Chimique des Charbonnages - CdF Chimie. Photodegradable polymer compositions. 4,028,480, Cl. 526-3.000.

LeBus, John W.: *See—*
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Leclair, Alain: *See—*
Beuchee, Daniel; and Leclair, Alain, 4,028,606.

Lee, Arnold S. J., to Milstein Medical Research Foundation, Inc. Automatic blood pressure recorder. 4,027,662, Cl. 128-2.05A.

Leetmaa, Juri G., to Hughes Aircraft Company. Coupled-cavity microwave filter. 4,028,651, Cl. 333-73.00W.

Legille, Edouard, to S.A. des Anciens Etablissements Paul Wurth. Improved tuyere feed device. 4,027,605, Cl. 110-182.500.

Legousse, Maurice: *See—*
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Legrand, Jean Jacques: *See—*
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Le Houezec, Roger: *See—*
Sureau, Claude; Tournaire, Michel; Zorn, Jean-Rene; Sturbois, Gilbert; Chavinie, Jacques; Le Houezec, Roger; and Ripoche, Andre, 4,027,657.

Leonard, William J.: *See—*
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Leonhart, Charles J., to Nuarc Company, Inc. Apparatus for laminating sheet material. 4,028,166, Cl. 156-382.000.

Le Roux, Herve: *See—*
Naudy, Rene; Phoyu, Francois; Robert, Louis; Legousse, Maurice; Audouard, Jean-Marie; and Le Roux, Herve, 4,028,049.

Letchworth, Peter E.: *See—*
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Leveque, Jean-Luc: *See—*
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Levine, Arnold M., to International Telephone and Telegraph Corporatioo. Fiber optic phased array antenna system for RF transmission. 4,028,702, Cl. 343-100.0SA.

Levine, Leon: *See—*
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Levine, Richard F.: *See—*
Collins, Robert Henry; Levine, Richard F.; North, William D.; O'Rourke, Gerald D.; and Parker, Gerald R., 4,028,150.

Levine, Robert Aaron: *See—*
Wardlaw, Stephen Clark; Levine, Robert Aaron; and Massey, James Vincent, III, 4,027,660.

Levinson, Sidney Harry; and Mendelson, Wilford Lee, to SmithKline Corporation. Novel preparation of trifluoromethylthioacetic acid. 4,028,408, Cl. 260-539.00R.

Lewin, Nathan; and Wong, Emmy Tong-In, to Bio-Rad Laboratories. Assay method for serum folate. 4,028,465, Cl. 424-1.000.

Lewis, Adolph L., to United States of America, Navy. Fiber optic cable connector. 4,027,938, Cl. 350-96.00C.

Lewis, David L.; Franks, C. Richard; and Schenker, Barry A., to Diamond Shamrock Corporation. Manganese dioxide electrode. 4,028,215, Cl. 204-290.00F.

Lewis, Edgar B., to Grumman Aerospace Corporation. High-resolution vision system. 4,028,725, Cl. 358-103.000.

LFE Corporation: *See—*
Jacob, Adir, 4,028,155.

Li, Tsi Tieh; and Saxon, Robert, to American Cyanamid Company. Vulcanizable elastomers derived from thiodiethanol. 4,028,305, Cl. 260-75.00S.

Libbey-Owens-Ford Company: *See—*
Rehrig, Donald D.; and Revells, Robert G., 4,028,086.

Liberman, Arthur L.: *See—*
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Liberty Carton Co.: *See—*
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Lind, Earl V., to Schlegel Corporation. Method of extruding a weatherstrip having a pile strip. 4,028,456, Cl. 264-90.000.

Linde Aktiengesellschaft: *See—*
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Lindmayer, Joseph, to Solarex Corporation. Method of impregnating a semiconductor with a diffusant and article so formed. 4,028,151, Cl. 148-189.000.

Lindvay, Michael W., to Velsicol Chemical Corporation. Flame retardant polymeric compositions containing melamine hydrohalides. 4,028,333, Cl. 260-45.8NT.

Linnert, Peter J., to Trane Company, The. Valve plate having improved suction gas flow path. 4,027,853, Cl. 251-361.000.

Linning, George F.: *See—*
Bullard, Robert G.; Plunkett, James P.; and Linning, George F., 4,028,654.

Lion Fat & Oil Co., Ltd.: *See—*
Okumura, Osamu; Sakatani, Takenobu; Yamane, Izumi; and Kashiwada, Toshinobu, 4,028,282.

Liotta, Charles L.; and Muzzy, John D. 6-Fluoro-9-perfluorobutyl purine. 4,028,358, Cl. 260-254.000.

Lipa Lizenz-und Patentverwertungs-ansalt: *See—*
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Lipp, Charles E.; and Young, Teddy R., to Caterpillar Tractor Co. Method of and apparatus for semi-automatic assembly of track-type chain. 4,027,471, Cl. 59-7.000.

Lippsmeier, Bernd; Hestermann, Klaus; and Reuter, Martin, to Hoechst Aktiengesellschaft. Production of tertiary (hydroxymethyl)-methylphosphine oxides. 4,028,421, Cl. 260-606.50P.

Lips B.V.: *See—*
Wind, Jaap, 4,028,004.

Litt, Morton H.; and Kumar, Narayan Ganesh, to International Playtex, Inc. Cellulose solutions and products prepared therefrom. 4,028,132, Cl. 106-163.00R.

Litton Business Systems, Inc.: *See—*
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Liu, Hsing-ching; and Liu, Lan-dih. Novel educational toy. 4,027,402, Cl. 35-9.00R.

Liu, Lan-dih: *See—*
Liu, Hsing-ching; and Liu, Lan-dih, 4,027,402.

Livingston, Richard Donnan; and Sauerbrunn, Robert Dewey, to Du Pont de Nemours, E. I., and Company. Distillation apparatus. 4,028,443, Cl. 261-114.0TC.

Ljunggren, Knut Lennart: *See—*
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Llach, Lorenzo; and Picas, Arturo, to Canton Textile Mills, Inc. Variable speed drive system for carding machine. 4,027,358, Cl. 19-106.00R.

Lloyd, Donald R.: *See—*
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Lobb, Daniel Richard, to Redifon Limited. Optical systems. 4,027,949, Cl. 350-150.000.

Loeber, David Y.: *See—*
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Loeffler, Otto Ernest: *See—*
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Loesser, Ernest W., III. Compressible dispensing container having piercing prongs. 4,027,985, Cl. 401-134.000.

Loewe-Opta GmbH.: *See—*
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Loft, John T., to Amerace Corporation. Filtration apparatus. 4,028,250, Cl. 210-259.000.

Logan, Ralph Andre; Merz, James Logan; Reinhart, Franz Karl; and White, Harry Gregory, to Bell Telephone Laboratories, Incorporated. LPE Technique for fabricating tapered optical couplers. 4,028,146, Cl. 148-171.000.

Logothetis, Eleftherios M.: *See—*
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Lohmann, Dieter: *See—*
Bitzer, Diethelm; and Lohmann, Dieter, 4,028,142.

Lohner, Jacques. Refuse incinerator. 4,027,603, Cl. 110-18.00R.

Long, Gregor Dean: *See—*
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Lonza Ltd.: *See—*
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Lopata, Ira. Leader-pin. 4,027,832, Cl. 242-197.000.

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Loshaek, Samuel, to Wesley-Jessen Inc. Hydrophilic polymer and contact lens. 4,028,295, Cl. 260-29.60H.

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Loyd, J. Leslie. Removable antenna mount. 4,028,705, Cl. 343-715.000.

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Lummus Company, The: *See—*
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Lummus Industries, Inc.: *See—*
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Lund, Norman S.; Young, George Ralph, Jr.; and Lund, Norman W. Liquid purification system. 4,028,246, Cl. 210-151.000.

Lund, Norman W.: *See—*
Lund, Norman S.; Young, George Ralph, Jr.; and Lund, Norman W., 4,028,246.

Lundell, Vernon J. Round hay baler apparatus. 4,027,465, Cl. 56-341.000.

Lundgren, Bengt G. S., to SKF Nova AB. Process for manufacturing a reinforcing material for concrete. 4,027,718, Cl. 164-46.000.

Lundin, Lars Olof, to AB Bofors. Device for co-ordinated driving of a towing vehicle and a towed vehicle. 4,027,738, Cl. 180-14.00A.

Lundstrom, Bengt, to Jungers Verkstads AB of Goteborg. Curing oven for mineral wool. 4,028,051, Cl. 432-144.000.

Luoma, Eino J.: *See—*
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Lupke, Manfred: *See—*
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Lyon, Warren Charles; and Hayes, William H., Jr., to Hittman Corporation. Pressure sensor. 4,027,661, Cl. 128-2.00A.

M-B-W, Inc.: *See—*
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Maass, Helmut A., to M-B-W, Inc. Concrete finisher with retractable guard ring section. 4,027,991, Cl. 404-112.000.

MacDonald, John M.; and Kartzmark, Robert, to Exxon Research and Engineering Company. Process for the preparation of low pour point lubricating oils. 4,028,224, Cl. 208-92.000.

MacFadyen, Donald Edward, to Glyco Chemicals, Inc. Fatty and benzoic acid esters of ethoxylated hydantoins substituted or not in the 5-position. 4,028,378, Cl. 260-309.500.

MacInnes, Hugh, to Roto-Master, Inc. Partially divided turbine housing for turbochargers and the like. 4,027,994, Cl. 415-1.000.

Mackay Center Specialties, Inc.: *See—*
Mathieson, Niall, 4,027,828.

Macken, Elmer N.: *See—*
Ford, James M.; and Macken, Elmer N., 4,028,214.

Mackey, Bruce A., Jr.: *See—*
Mackey, Bruce A., Sr.; and Mackey, Bruce A., Jr., 4,027,992.

Mackey, Bruce A., Sr.; and Mackey, Bruce A., Jr. Boring tool guide device. 4,027,992, Cl. 408-97.000.

MacLeay, Ronald Edward: *See—*
Lange, Harold Carl; and MacLeay, Ronald Edward, 4,028,344.

MacMillan, Kenneth T. Retreading mold with bladder for creating annular vacuum gap. 4,028,029, Cl. 425-23.000.

Madland, Robert Christen; Zielinski, Robert Michael, Jr.; and Engstrom, Keith Allen, to Illinois Tool Works Inc. Double depression magnetic keyswitch. 4,028,696, Cl. 340-365.00L.

Maekawa, Masao: *See—*
Kakitani, Haruaki; Maekawa, Masao; and Kokubo, Takashi, 4,028,449.

Magdo, Ingrid E.: *See—*
Joy, Richard C.; Magdo, Ingrid E.; and Phillips, Alfred, Jr., 4,028,717.

Magee, Thomas A., to Diamond Shamrock Corporation. Ketoxime carbamates. 4,028,413, Cl. 260-566.0AC.

Magni, Antonio, to Axis S.p.A. Device for angularly centering a member having an annular toothed formation. 4,027,375, Cl. 29-282.000.

Maillot, Jean, to Guterman, Paulette. Electromagnetic vibration-detector device, in particular for anti-theft purposes. 4,028,567, Cl. 310-25.000.

Maillous, Louis D., to Xerox Corporation. Color transparency reproducing machine. 4,027,962, Cl. 355-4.000.

Maincent, Gabriel: *See—*
Salter, Lucien; and Maincent, Gabriel, 4,028,732.

Makolska, Hanna: *See—*
Kritchevsky, David; Koprowski, Hilary; and Makolska, Hanna, 4,028,469.

Malloy, John F., to Norton Company. Coated abrasive article containing a polyurethane adhesive splice. 4,027,435, Cl. 51-295.000.

Mamvriisky, Alexandr Sergeevich; and Lapchenko, Alexandr Mikhailovich. Method of controlling the density of a plugging fluid. 4,027,860, Cl. 259-149.000.

Manchak, Frank, Jr. Method and apparatus for treating sumps. 4,028,240, Cl. 210-59.000.

Mannesmann Aktiengesellschaft: *See—*
Pepperhoff, Werner; and Richter, Friedhelm, 4,028,098.

Mannesmannrobren-Werke AG: *See—*
Gruber, Kurt; Keim, Willi; and Hentschel, Klaus, 4,027,688.

Mansell, John Douglas, to PPG Industries, Inc. Removal of monochloroacetylene from chlorinated hydrocarbons. 4,028,426, Cl. 260-652.00P.

Manzini, Ferruccio, to Abred Establishment. Variable ratio hydraulic master-cylinder. 4,027,482, Cl. 60-574.000.

Marcatili, Enrique Alfredo Jose, to Bell Telephone Laboratories, Incorporated. Method for manufacturing helical optical fiber. 4,028,081, Cl. 65-2.000.

Marchese, Anthony: *See—*
Luce, David A.; and Marchese, Anthony, 4,027,569.

Marino, Frank, to Wooster Brush Company, The. Brush construction. 4,027,351, Cl. 15-192.000.

Marsh, David Raymond; and Osofsky, Raymond C., to Singer Company, The. Real-time simulation of point system having multidirectional points as viewed by a moving observer. 4,027,403, Cl. 35-10.200.

Marshall, Manly Ernest. Instrument for taking samples. 4,027,658, Cl. 128-2.00W.

Martin, Francois. Weatherproof decal. 4,028,474, Cl. 428-40.000.

Martin, James F. Multi-chamber muffler. 4,027,740, Cl. 181-68.000.

Martin Marietta Corporation: *See—*
Chihoski, Russell Alexander; and De Fellippie, John Charles, 4,028,522.
McClure, George F.; Endicott, John Richard; Freeman, Lionel D.; Cunningham, Marion L.; and Wells, Joel D., 4,028,500.

Martin, Robert C., to Dow Chemical Company, The. Cement composition. 4,028,125, Cl. 106-89.000.

Martin, Sam M., to Consumers Glass Company Limited. Stackable and nestable container. 4,027,796, Cl. 206-507.000.

Maruzen Oil Co. Ltd.: *See—*
Kanezaki, Kenji, 4,028,340.

Marvin Glass & Associates: *See—*
Allen, Robert K., 4,027,421.
Barlow, Gordon A.; and Katzman, Allison W., 4,027,423.
Breslow, Jeffrey D.; and Frumkin, Mitchell J., 4,027,877.

Marx, Alvin J. Semirigid counterforce brace. 4,027,666, Cl. 128-165.000.

Masaki, Kenji; and Tokura, Naomi, to Nissan Motor Co., Ltd. Multiple-cylinder internal combustion engine. 4,027,478, Cl. 60-285.000.

Maschinen- und Bohrgerate-Fabrik Alfred Wirth & Co., K.G.: *See—*
Wallrafen, Gunter, 4,027,559.

Mashimo, Satoshi: *See—*
Matsuo, Tadao; Miura, Minoru; Mashimo, Satoshi; Kakei, Masanori; and Mishima, Kyoichi, 4,028,316.

Maske, Fred John; and Nordgren, Robert, to General Mills Chemicals, Inc. Plaster of paris using glyoxal treated hydroxyalkyl guar. 4,028,127, Cl. 106-111.000.

Maskell, Richard N., to Container Corporation of America. Vacuum chamber structure and control system therefor. 4,027,707, Cl. 141-66.000.

Mason, Paul B.: *See—*
Stella, Joseph A.; and Mason, Paul B., 4,027,956.

Massa, Frank, to Fred M. Dellorfano, Jr., and Donald P. Massa, Trustees of The Stoneleigh Trust u/d/t. Acoustic amplifier combined with transducer shock mount. 4,028,504, Cl. 179-146.00R.

Massachusetts Institute of Technology: *See—*
Herndon, Terry O.; and Raffel, Jack I., 4,027,383.

Massey-Ferguson Inc.: *See—*
Rahman, Habibur; and Joslyn, Gerald L., 4,027,547.

Massey, James Vincent, III: *See—*
Wardlaw, Stephen Clark; Levine, Robert Aaron; and Massey, James Vincent, III, 4,027,660.

Massey, Thomas H.: *See—*
Fessler, Dyral C.; Heavner, George A.; and Massey, Thomas H., 4,028,401.

Mastrangelo, Sebastian V. R.: *See—*
Harden, John Charles; and Mastrangelo, Sebastian V. R., 4,028,276.

Masuda, Takao: *See—*
Suzuki, Nobuo; Noguchi, Yasuhiro; and Masuda, Takeo, 4,028,129.

Masuyama, Takeshi: *See—*
Matsuura, Mikio; Nishi, Nobuji; Matsuoka, Michio; and Masuyama, Takeshi, 4,028,277.

Material Distributors Corporation: *See—*
Willdorf, Michael E., 4,028,475.

Matheny, William F., III: *See—*
Bernard, Clay, II; Matheny, William F., III; and Parker, Billy J., 4,027,833.

Mather, Byron L.: *See—*
Clark, James L.; and Mather, Byron L., 4,028,156.

Mathieson, Niall, to Mackay Center Specialties, Inc. Perforating machine. 4,027,828, Cl. 242-56.600.

Matsubara, Sueo, to Techno-Venture Co., Ltd. Robot movable in a group. 4,028,533, Cl. 235-151.000.

Matsumoto, Hatsuo: *See—*
Fujisawa, Michio; Matsumoto, Hatsuo; Sawada, Shuzo; Yamane, Kiyoshi; Keto, Hideo; Shimizu, Takayuki; and Kato, Shigeo, 4,027,345.

Matsumoto, Sojiro: *See—*
Ogawa, Shinsaku; Ide, Akira; Komatsu, Kazurou; Matsumoto, Sojiro; and Kishimoto, Yasushi, 4,028,392.

Matsuo, Koichi: *See—*
Murakami, Noboru; Hirosawa, Koichiro; Ohara, Kazuo; and Matsuo, Koichi, 4,027,551.
Murakami, Noboru; Hirosawa, Koichiro; Ohara, Kazuo; and Matsuo, Koichi, 4,027,552.
Sakai, Toshiyuki; Matsuo, Koichi; and Tochio, Yukihiro, 4,028,275.

Matsuo, Tadao; Miura, Minoru; Mashimo, Satoshi; Kakei, Masanori; and Mishima, Kyoichi, to Mitsubishi Belting Limited. Vulcanized acrylate-ethylidene norbornene polymers. 4,028,316, Cl. 260-79.50P.

Matsuoka, Hideoki; and Tsuda, Hiroshi. Knee protector. 4,027,906, Cl. 280-751.000.

Matsuoka, Michio: *See—*
Matsuura, Mikio; Nishi, Nobuji; Matsuoka, Michio; and Masuyama, Takeshi, 4,028,277.

Matsushita Electric Industrial Co., Ltd.: *See—*
Hamaguchi, Sachihiko; Oomura, Ikuo; Sato, Tadeshi; and Wada, Hisashi, 4,028,687.
Ikushima, Hiroshi; Nakajima, Yasuo; Hagiwara, Kitokazu; and Nagata, Takashi, 4,028,646.
Matsuura, Mikio; Nishi, Nobuji; Matsuoka, Michio; and Masuyama, Takeshi, 4,028,277.

Moriyama, Akio; Fukai, Masakazu; Tatsuta, Hiroshi; Takahashi, Hiroaki; and Esaki, Hiroshi, 4,027,950.
Nishioka, Matsuo, 4,027,541.
Tasaka, Junzo; and Nakano, Chikao, 4,028,517.
Tokuda, Kazuo; Tsugita, Masanobu; and Minakuchi, Hiroshi, 4,028,602.

Matsuura, Mikio; Nishi, Nobuji; Matsuoka, Michio; and Masuyama, Takeshi, to Matsushita Electric Industrial Co., Ltd. Voltage-dependent resistor. 4,028,277, Cl. 252-519.000.

Mattei, Frank V., to Ethicon, Inc. Coated sutures. 4,027,676, Cl. 128-335.500.

Mattel, Inc.: *See—*
Kilroy, Eugene Joseph, Jr.; Crain, Philip Warren; and Woods, James Frank. 4,027,424.

Matthes, Hens; and Mauler, Erhard, to AEG-Elotherm G.m.b.H. Bridge circuit arrangement on electrical frequeocy converters which can be fed with a D.C. current. 4,028,608, Cl. 321-8.00R.

Mattson, Gary. Tube dispenser. 4,027,784, Cl. 222-102.000.

Mauler, Erhard: *See—*
Matthes, Hans; and Mauler, Erhard, 4,028,608.

Maurino, William J.; and Putzer, Raymond M., to Precision Flexmold, Inc. Molding apparatus including a flexible mold for making articles having radially inwardly extending projections on an interior surface. 4,027,723, Cl. 164-213.000.

May, Carl Jerome, Jr.: *See—*
LaMarche, Robert Ernest; May, Carl Jerome, Jr.; and Zebo, Timothy James, 4,028,496.

Mazur, Robert H.: *See—*
Jones, David A., Jr.; Schlatter, James M.; Mikulec, Richard A.; Reuter, Judith A.; and Mazur, Robert H., 4,028,319.

Mazzarella, Emil D., to National Starch and Chemical Corporation. Process of making paper. 4,028,172, Cl. 162-164.00R.

Mazzeo, Charles F., to Amerace Corporation. Electrical connector with captive clamping jaw. 4,027,940, Cl. 339-272.00R.

McAleer, William J.; and Hurni, William M., to Merck & Co., Inc. Apparatus for preparing isolated cells from tissue. 4,028,190, Cl. 195-127.000.

McClure, George F.; Endicott, John Richard; Freeman, Lionel D.; Cunningham, Marion L.; and Wells, Joel D., to Martin Marietta Corporation. Mobile unit supervisory control sequencer and method. 4,028,500, Cl. 179-41.00A.

McDonnell Douglas Corporation: *See—*
Zuleeg, Rainer, 4,028,562.

McDougall, Ian Leitch, to Imperial Metal Industries (Kynoch) Limited. Superconductors. 4,028,488, Cl. 174-128.00S.

McElroy, Bennitt, to Fairchild Industries Inc. Seat armrest and process of manufacture thereof. 4,027,916, Cl. 297-194.000.

McGivern, Robert F., to Sybron Corporation. Sewage settling tank. 4,028,249, Cl. 210-242.00R.

McGourty, Thomas K. Push-button combination lock. 4,027,508, Cl. 70-214.000.

McGowan, Joseph: *See—*
Carter, John L.; and McGowan, Joseph, 4,028,632.

McGowan, Melissa A. Protective and/or decorative cover for walking aids. 4,027,687, Cl. 135-66.000.

McKee, William H.; and Schubert, Anthony E., to TRW Inc. Apparatus for making terminal connectors. 4,027,521, Cl. 72-404.000.

McKibben, Gerald H.; and Davich, Theodore B., to United States of America, Agriculture. Air dropped heit dispensers for attracting and killing the cotton boll weevil. 4,027,420, Cl. 43-124.000.

McLean, Edward P.: *See—*
McLean, William B.; and McLean, Edward P., 4,028,487.

McLean Engineering Midwest: *See—*
Fessler, Herman Sylvester, 4,027,498.

McLean, William B.; and McLean, Edward P. Cable terminator and grounding unit. 4,028,487, Cl. 174-78.000.

McMahon, Donald J.: *See—*
Reen, Orville W.; and McMahon, Donald J., 4,028,094.

McMiah Corporation, The: *See—*
Monsky, Jeffrey N.; and Combs, Glen, 4,027,437.

McNeill Favia Co.: *See—*
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McNulty, Patrick J.; and Warner, Harlow L., to Rohm and Haas Company. Derivatives of 3-carboxy pyrid-2-ones. 4,028,084, Cl. 71-94.000.

McPherson, Thomas Buchanan, IV: *See—*
Heard, George E.; and McPherson, Thomas Buchanan, IV, 4,027,685.

McReynolds, Glen Harold, Jr., to Esquire, Inc. Faceted parabolic-type reflector system. 4,028,542, Cl. 240-41.360.

Mead, George N. J.; and Corneliusen, Philip R. Pneumatic cleaning mat and method of making same. 4,027,355, Cl. 15-310.000.

Meckler, Gershon. Solar energy collector. 4,027,653, Cl. 126-271.000.

Mehaffey, Joseph H.; Mills, Edgar C.; and Ivester, J. Harold, to Solid State Systems, Inc. Private automatic branch exchange system and apparatus. 4,028,498, Cl. 179-18.0GE.

Mehesfalvi nee Vajna, Zsuzsanna: *See—*
Bite, Pal; Moravcsik, Imre; Schafer, Inge; Horvath, Gyula; Mehesfalvi nee Vajna, Zsuzsanna; Borvendeg, Janos; and Hermann nee Szente, Ilona, 4,028,348.

Mendelson, Wilford Lee: *See—*
Levinson, Sidney Harry; and Mendelson, Wilford Lee, 4,028,408.

Mendgen, Horst Guenter: *See—*
Kingsley, Ernest James; and Mendgen, Horst Guenter, 4,027,856.

Mengele, Alois, deceased: *See—*
Grimm, Klaus; and Mengele, Alois, deceased, 4,027,826.

Mengele, Dieter Kark Paul, legal representative: *See—*
Grimm, Klaus; and Mengele, Alois, deceased, 4,027,826.

Mengle, Lewis Irwin, to RCA Corporation. Parabolic current generator. 4,028,586, Cl. 315-368.000.

Menssen, Ernst, to Linde Aktiengesellschaft. Screw compressor with involute profiled teeth. 4,028,026, Cl. 418-201.000.

Merck & Co., Inc.: *See—*
Kollonitsch, Janos; and Kahan, Frederick M., 4,028,405.
McAleer, William J.; and Hurni, William M., 4,028,190.

Merck Patent Gesellschaft mit beschrankter Haftung: *See—*
Gehlhaus, Jurgen; and Erdmann, Dietrich, 4,028,412.

Merrill, Charles T. Adjustable curber and sidewalk-forming machine. 4,027,990, Cl. 404-98.000.

Merrill, Duane F., to General Electric Company. Organopolysiloxane release resios useful in cooking and baking processes. 4,028,339, Cl. 260-46.50R.

Merz, James Logan: *See—*
Logan, Ralph Andre; Merz, James Logan; Reinhart, Franz Karl; and White, Harry Gregory, 4,028,146.

Messerschmitt-Bolkow-Blohm GmbH: *See—*
Tuscher, Otto; Tewich, Johann; and Wittich, Willibald, deceased, 4,028,198.
Weiland, Emil; Schwarz, Alois; and Frommlet, Hubert, 4,028,000.

Metal Bed Rail Company, division of Leggett & Platt, Inc.: *See—*
Hooker, Joe B., 4,027,343.

Metallgesellschaft Aktiengesellschaft: *See—*
Theobald, Reiner; and Heubner, Ulrich, 4,027,716.

Metallic Ladder Menufacturing Corporation: *See—*
Carpenter, Charles R., 4,027,492.

Meyer, Harry C.: *See—*
Tanton, George A.; and Meyer, Harry C., 4,027,948.

Meyer, Leonard S., to Sybron Corporation. Method for making fiber reinforced resin grating. 4,028,460, Cl. 264-263.000.

Meyer, Willy; Bohner, Beat; Dawes, Dag; and Rufenacht, Kurt, to Ciba-Geigy Corporation. O,S-dialkyl- and O-alkyl-S-alkosyalkyl-S-1,2,4-oxa-diazolyl-3-methylene dithiophosphates. 4,028,377, Cl. 260-307.00G.

Michalko, Edward, to Universal Oil Products Company. Method for producing an alumioa sol. 4,028,216, Cl. 252-313.00R.

Midcon Pipeline Equipment Co.: *See—*
Clavin, Edward A., 4,027,522.
Clavin, Edward Albert, 4,027,349.

Migitaka, Masatoshi; and Kanda, Yozo, to Hitachi, Ltd. Semiconductor Hall element. 4,028,718, Cl. 357-27.000.

Mikami, Sadao: *See—*
Kawarai, Takashi; Sawada, Yuji; Takemoto, Katsumi; and Mikami, Sadao, 4,027,823.

Mikasa, Yoshio; Nakane, Masami; and Tokura, Yukio, to Minolta Camera Kabushiki Kaisha. Copying machine control mechanism. 4,027,965, Cl. 355-13.000.

Mikulec, Richard A.: *See—*
Jones, David A., Jr.; Schlatter, James M.; Mikulec, Richard A.; Reuter, Judith A.; and Mazur, Robert H., 4,028,319.

Mikulinsky, Aron Semenovich: *See—*
Cherednichenko, Vladimir Semenovich; Orlov, Gennady Ivanovich; Mikulinsky, Aron Semenovich; Arzamastsev, Jury Semenovich; Efremkin, Vladimir Vasilievich; Nikitin, Valentin Alexeevich, deceased; Nikitina, Valentina Kuzminichna, administrator; and Nikitin, Dmitry Valentinovich, administratur, 4,027,861.

Millar, John M.; and Moran, William F., to Beatrice Foods Co. Multilayer coated substrate. 4,027,366, Cl. 428-623.000.

Millard, Ben; and Robie, Susan P., to Scott Paper Company. Metal plate treating solution. 4,028,281, Cl. 252-527.000.

Miller, Adason Morey. Method and apparatus for discharge of hot asphalt tanker. 4,027,782, Cl. 222-1.000.

Miller, Eldon D.; and Washburn, Ryan F., to Leva Crucible Refractories Company. Process for meking refractory shapes. 4,028,453, Cl. 264-67.000.

Miller, Frederick A., to Circon Corporation. Vidicon camera for closed circuit television system. 4,028,730, Cl. 358-217.000.

Miller, Jimmy L.; and Schnell, William J., to Baxter Laboratories, Inc. Dialyzer connector system. 4,028,253, Cl. 210-321.00B.

Miller, Walter E., Jr.; and Duke, Jimmy R., to United States of America, Army. Optical tracking link utiliziog pulse burst modulatien for solid state missile beacoos. 4,027,837, Cl. 244-3.160.

Miller, Wayne L.; and Carnicelli, Ernest J., to Cessna Aircraft Company, The. DME apparatus and method. 4,028,698, Cl. 343-6.5LC.

Milliken Research Corporation: *See—*
Jeter, Sheldon M., 4,027,792.

Millis, Edwin Graham: *See—*
Shortes, Samuel R.; and Millis, Edwin Graham, 4,027,686.

Mills, Edgar C.: *See—*
Mehaffey, Joseph H.; Mills, Edgar C.; and Ivester, J. Harold, 4,028,498.

Milstein Medical Research Foundation, Inc.: *See—*
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Minakuchi, Hiroshi: *See—*
Tokuda, Kazuo; Tsugita, Masanobu; and Minakuchi, Hiroshi, 4,028,602.

Minami, Teruo: *See—*
Ito, Terukazu; Nakao, Kiyoharu; Minami, Teruo; and Uenoyama, Masaru, 4,027,554.

Minnesota Mining and Manufacturing Company: *See—*
Knapp, Philip B., 4,027,606.

Minolta Camera Kabushiki Kaisha: *See—*
Mikasa, Yoshio; Nakane, Masami; and Tokura, Yukio, 4,027,965.

Mio, Mitushi. Method for forming a casting mold and a flexible pattern to be used therefor. 4,027,717, Cl. 164-44.000.

Mira-Pak, Inc.: *See—*
Leasure, William; Garcia, Luis; Reifel, Charles; and Shelton, Jack, 4,027,579.

Mirrex, Incorporated: *See—*
Cummins, James M., 4,027,548.

Mischke, Peter: *See—*
Fleckenstein, Erwin; and Mischke, Peter, 4,028,321.

Misek, Victor A., to Sanders Associates, Inc. Method and apparatus for passive optical fusing and distance measurement. 4,027,970, Cl. 356-4.000.

Miskeen, Lester; and Christopolous, John, to Singer Company, The. Circular knitting machine with disengaging positive yarn feeding means. 4,027,505, Cl. 66-125.00R.

Mishima, Kyoichi: *See—*
Matsuo, Tadao; Miura, Minoru; Mashimo, Satoshi; Kakei, Masanori; and Mishima, Kyoichi, 4,028,316.

Misu, Hiroshi: *See—*
Iwasaki, Masayuki; Misu, Hiroshi; and Miyano, Shizuo, 4,028,111.

Mitchell, Gordon Charles. Seal emplacement tools. 4,027,372, Cl. 29-235.000.

Mitsubishi Belting Limited: *See—*
Matsuo, Tadao; Miura, Minoru; Mashimo, Satoshi; Kakei, Masanori; and Mishima, Kyoichi, 4,028,316.

Mitsubishi Denki Kabushiki Kaisha: *See—*
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Mitsubishi Jukngyo Kabushiki Kaisha: *See—*
Kawarai, Takashi; Sawada, Yuji; Takemoto, Katsumi; and Mikami, Sadao, 4,027,823.
Ueda, Shoji; Ono, Shuzi; Sakaguchi, Hiroshi; and Tsunoda, Hideo, 4,028,455.

Mitsubishi Monsanto Chemical Company: *See—*
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Mitsui Mining & Smelting Co., Ltd.: *See—*
Hirakawa, Seishiro; Kanai, Shyuji; Ikeda, Matsuo; and Hirata, Toshinori, 4,028,211.
Sakai, Toshiyuki; Matsuo, Koichi; and Tochio, Yukihiro, 4,028,275.

Mitsui Petrochemical Industries, Ltd.: *See—*
Yamada, Koichi; Morimoto, Teijiro; and Yoshioka, Yoshioki, 4,028,119.

Mitsui Toatsu Chemicals, Incorporated: *See—*
Shiomura, Tetsunosuke; Ito, Akiro; Morimoto, Yoshio; and Iwao, Tetsuya, 4,028,481.

Mittleman, Herbert, to Baxter Travenol Laboratories, Inc. Flexible hanger member for drainage bags and the like. 4,027,842, Cl. 248-75.000.

Miura, Minoru: *See—*
Matsuo, Tadao; Miura, Minoru; Mashimo, Satoshi; Kakei, Masanori; and Mishima, Kyoichi, 4,028,316.

Miyano, Shizuo: *See—*
Iwasaki, Masayuki; Misu, Hiroshi; and Miyano, Shizuo, 4,028,111.

Miyazaki, Toru, to Alps Motorola, Inc. Head indexing apparatus for a combined two and four channel tape player/recorder. 4,028,735, Cl. 360-106.000.

Miyazawa, Kuichiro: *See—*
Yamaura, Yoshitomo; Kobayashi, Takayoshi; Asanuma, Akira; and Miyazawa, Kuichiro, 4,028,510.

Mizunuma, Takeji: *See—*
Hayashi, Kazuya; Mizunuma, Takeji; and Yokotsuka, Tamotsu, 4,028,470.

Mizutani, Yoshiyuki; Tada, Masaaki; and Imada, Yasuo, to Kabushiki Kaisha Toyota Chuo Kenkyusho. Self-lubricating iron base alloy. 4,028,097, Cl. 75-123.0AA.

Moat, Nicholas Warrington, to Edwin Cooper & Company Limited. Corrosion inhibitors. 4,028,117, Cl. 106-14.000.

Moberg, Lars-Goran: *See—*
Gustavsson, Varne Axel Gerhard; and Moberg, Lars-Goran, 4,027,758.

Mobil Oil Corporation: *See—*
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Guenther, Robert O.; Huffhines, Donald F.; Krall, James W.; and Ray, Charles D., 4,027,616.
Herd, Richard S.; and Otto, Ferdinand P., 4,028,259.
Poloso, Anthony; and Murray, James Gordon, 4,028,485.

Mochizuki, Kiyoshi: *See—*
Togo, Masaaki; Shima, Masao; and Mochizuki, Kiyoshi, 4,028,604.

Moder, Helmut, to Robert Bosch G.m.b.H. Control apparatus for starting internal combustion engines. 4,027,641, Cl. 123-179.00L.

Moede, Earl J., to McNeill Favia Co. Clip for retaining a canvas stretcher frame in a decorative picture frame. 4,027,413, Cl. 40-156.000.

Moffett, Robert Bruce, to Upjohn Company, The. Triazinobenzodiazepines. 4,028,356, Cl. 260-248.0AS.

Moll, Dean H.; and Greiner, Alan, to Singer Company, The. Balancing system for a rotating mass. 4,028,524, Cl. 219-121.00L.

Mominee, David E.; and Vance, Gilbert W., to Reed Irrigation Systems. Apparatus for creating holes in flexible members. 4,028,525, Cl. 219-121.00L.

Monahan, Earnest M.; and Patterson, Garvin W., to Honeywell Information Systems, Inc. Apparatus for dispatching data of the highest priority process having the highest priority channel to a processor. 4,028,664, Cl. 340-172.500.

Monsanto Company: *See—*
Higginbottom, Harold P., 4,028,367.
King, Henry L., 4,028,330.
Tyssee, Donald Armon, 4,028,201.

Monsky, Jeffrey N.; and Combs, Glen, to McMiah Corporation, The. Inflatable building. 4,027,437, Cl. 52-2.000.

Montagut, Jose Salvador. Process and apparatus for the continuous obtainment hy displacement of cylindrical or prismatic hollow bodies produced with fibre-reinforced synthetic resins. 4,028,164, Cl. 156-173.000.

Mooradian, Aram: *See—*
Alexander, Ernest John; and Mooradian, Aram, 4,028,382.

Moore, Earl Phillip, Jr., to Du Pont de Nemours, E. I., and Company. Process for the preparation of azodinitriles from aminonitriles in the presence of a surfactant. 4,028,345, Cl. 260-192.000.

Moore, Ernest George: *See—*
Jelling, Murray; Kahn, Alexander; Moore, Ernest George; and Friedmao, Michael, 4,027,461.

Moore, Harlan D.: *See—*
Bowen, Woodrow L.; and Moore, Harlan D., 4,028,212.

Moore, Robert F.: *See—*
Schulman, Joseph H.; and Moore, Robert F., 4,027,677.

Moorman, James H., Jr., to Blue Bird Body Company (Entire). Wheelchair holding device for vehicles. 4,027,747, Cl. 188-28.000.

Moran, John Christian, to Bell Telephone Laboratories, Incorporated. Memory patching circuit. 4,028,678, Cl. 340-172.500.

Moran, John Christian: *See—*
Divine, Charles Hamman; and Moran, John Christian, 4,028,684.

Moran, William F.: *See—*
Millar, John M.; and Moran, William F., 4,027,366.

Morantz, Herbert; and Morantz, Stanley. Drapery length marking device. 4,027,394, Cl. 33-18.00R.

Morantz, Stanley: *See—*
Morantz, Herbert; and Morantz, Stanley, 4,027,394.

Moravcsik, Imre: *See—*
Bite, Pal; Moravcsik, Imre; Schafer, Inge; Horvath, Gyula; Mehesfalvi nee Vajna, Zsuzsanna; Borvendeg, Janos; and Hermann nee Szente, Ilona, 4,028,348.

Moreau, Marc, to Trefimetaux. Device for continuous extrusion. 4,027,514, Cl. 72-60.000.

Moreland, Stephen T. Manufacture of filled capsules or the like. 4,028,024, Cl. 425-133.100.

Mori, Ikuo; and Shimizu, Yoshiyuki, to Nippon Kogaku K.K. Parfocal low-magnification microscope objective lens systems. 4,027,951, Cl. 350-175.0ML.

Mori, Shigejiro; Uchikawa, Hiroshi; and Uchida, Shunichiro, to Onoda Cement Company, Ltd. Process for manufacturing rapid hardening portland cement clinker. 4,028,126, Cl. 106-100.000.

Moricca, Larry S.; and Zaker, Gregory A., to Inventive Industries, Inc. Apparatus for adapting multi-line telephone instrument for use by the blind. 4,028,502, Cl. 179-99.000.

Morimoto, Teijiro: *See—*
Yamada, Koichi; Morimoto, Teijiro; and Yoshioka, Yoshioki, 4,028,119.

Morimoto, Yoshio: *See—*
Shiomura, Tetsunosuke; Ito, Akiro; Morimoto, Yoshio; and Iwao, Tetsuya, 4,028,481.

Morimoto, Yutaka: *See—*
Uchii, Jiro; Kodo, Masatsugu; Soga, Tsunehiko; and Morimoto, Yutaka, 4,028,070.

Morita, Masayuki: *See—*
Shimogawa, Toshiaki; Morita, Masayuki; and Kawaharazaki, Takashi, 4,027,905.

Moriya, Hisanori; and Osawa, Tadao, to Hitachi, Ltd. Exhaust gas recirculation device. 4,027,638, Cl. 123-119.00A.

Moriya, Kunitoshi: *See—*
Suzuki, Masao; and Moriya, Kunitoshi, 4,028,666.

Moriyama, Akio; Fukai, Masakazu; Tatsuta, Hiroshi; Takahashi, Hiroaki; and Esaki, Hiroshi, to Matsushite Electric Industrial Co., Ltd. Electro-optical display device. 4,027,950, Cl. 350-160.0LC.

Morris, Florin V., to Caywood, Howard E., a part interest. Collapsible dressing hook for animals. 4,027,357, Cl. 17-44.000.

Morris, Livingston B., to Extracorporeal Medical Specialties Inc. Accordion fold flat plate dialyzer. 4,028,252, Cl. 210-321.00B.

Morrison, Howard J.; and Keller, Albert G. Sound actuated figure toys. 4,027,425, Cl. 46-264.000.

Mortimer, Thomas J., to Sanders Associates, Inc. Fager subsystems. 4,028,661, Cl. 340-324.00M.

Morton, Avery A.; and Lanpher, Edward J. Alfin polymerized rubber. 4,028,484, Cl. 526-335.000.

Morton-Norwich Products, Inc.: *See—*
Fessler, Dyrel C.; Heavner, George A.; and Massey, Thomas H., 4,028,401.
Pelosi, Stanford Salvatore, Jr.; and Alaimo, Robert James, 4,028,374.
Schwan, Thomas J., 4,028,359.

Mory, Rudolf, to Ciba-Geigy Corporation. 6-Methylbenzimidazolonylazobarbituric acid pigment. 4,028,322, Cl. 260-154.000.

Mos, Robert J., to American Magnetics Corporation. Plural megnetic head assembly with independently supporting structure. 4,028,734, Cl. 360-104.000.

Moser, Willard W. Tie down brackets for securing bights of flexible members. 4,027,360, Cl. 24-146.000.

Moslener, Jorn: *See—*
Elsner, Wolfgang; Moslener, Jorn; and Langenstuck, Alfons, 4,027,565.

Motley, David M.; and Cheng, King Y., to Hycom Incorporated. Digital data receiver with automatic timing recovery and control. 4,028,626, Cl. 325-324.000.

Motorola, Inc.: *See—*
Bainter, James R., 4,028,560.
Cho, Susumu; Erickson, Paul Milton; and Null, Michael William, 4,028,627.
Helda, Robert W., 4,028,722.
Leach, George S., Jr., 4,028,671.

Motoyama, Shimesu, to Freund Industrial Co., Ltd. Fluid granulating-/coating apparatus utilizing suction air current. 4,027,624, Cl. 118-303.000.

Mott, James R. Combustion system. 4,027,602, Cl. 110-7.00R.

Mounton, William J., Jr. Self-equalizing linkage for well derricks. 4,027,854, Cl. 254-29.00R.

Mueller, Floyd F., to American Hospital Supply Corporation. Combination safety stop and down lock for folding tables. 4,027,600, Cl. 108-113.000.

Mueller, Siegfried. Permanent-wave or water-wave curler. 4,027,684, Cl. 132-40.000.

Mugnier, Robert: *See—*
Labedan, Pierre; Mugnier, Robert; and Chavanel, Hubert, 4,028,209.

Mukai, Kunio: *See—*
Tsuchiya, Hiroshi; Mukai, Kunio; Kimura, Akio; Taya, Hiroshi; Fujimoto, Keimei; Ozaki, Toshiaki; Yamamoto, Sigeo; Ogawa, Teizo; Ooishi, Tadashi; and Okuno, Yositosi, 4,028,438.

Mukaida, Yutaka: *See—*
Enomoto, Satoru; Takita, Hitoshi; Wada, Hisayuki; Mukaida, Yutaka; and Yanaka, Mikiro, 4,028,387.

Mull, Richard T., to Great Lakes Carbon Corporation. Method and apparatus for determining the relative roughness of holes in refractory compositions. 4,027,525, Cl. 73-37.000.

Muller, Fritz. Valve for aggressive fluids. 4,027,849, Cl. 251-30.000.

Muller, Hans-Jurgen: *See—*
Schafer, Walter; Wagner, Kuno; and Muller, Hans-Jurgen, 4,028,310.

Muller, Marcel: *See—*
Alig, Leo; Furst, Andor; Keller, Peter; Muller, Marcel; Kerb, Ulrich; and Wiechert, Rudolf, 4,028,400.

Muller, Peter; Wagner, Kuno; and Muller, Richard, to Bayer Aktiengesellschaft. Process for the production of water-dispersible polyhydroxyl compounds. 4,028,313, Cl. 260-77.5AP.

Muller, Richard: *See—*
Muller, Peter; Wagner, Kuno; and Muller, Richard, 4,028,313.

Muller, Werner Heinrich; and Weil, Tomas, to Hoechst Aktiengesellschaft. Process for the manufacture of cyclohexandione-1,3. 4,028,417, Cl. 260-586.00C.

Mundil, Waldemar Dietmar, to Deutsche Vergaser GmbH & Co Kommanditgesellscheft. Thermally controlled fluid flow regulating or shut-off valves. 4,027,848, Cl. 251-11.000.

Murai, Masaaki: *See—*
Funamo, Hiroshi; Kunihiro, Toshiro; and Murai, Masaaki, 4,028,495.

Murakami, Hiroyashu: *See—*
Kawamura, Masaharu; Sakurada, Nobuaki; Shinoda, Nobuhiko; Ito, Tadashi; Ito, Fumio; and Murakami, Hiroyashu, 4,028,712.

Murakami, Noboru; Hirosawa, Koichiro; Ohara, Kazuo; and Matsuo, Koichi, to Aisin Seiki Kabushiki Kaisha. Speed change gear system. 4,027,551, Cl. 74-759.000.

Murakami, Noboru; Hirosawa, Koichiro; Ohara, Kazuo; and Matsuo, Koichi, to Aisin Seiki Kabushiki Kaisha. Speed change gear system. 4,027,552, Cl. 74-765.000.

Murata Manufacturing Co., Ltd.: *See—*
Nakamura, Takeshi, 4,028,640.
Wakino, Kikuo; Nishikawa, Toshio; Tamura, Sadahiro; and Ishikawa, Youhei, 4,028,652.

Murata, Moriyasu; Sai, Fumio; and Fujino, Takashi, to Kao Soap Co., Ltd. Non-phosphete or reduced phosphate detergent compositions containing mixtures of alkyl ether sulfates. 4,028,280, Cl. 252-526.000.

Murata, Moriyasu; Sai, Fumio; and Fujino, Takashi, to Kao Soap Co., Ltd. Granular or powdery detergent composition. 4,028,283, Cl. 252-551.000.

Murauskas, Donald J.; Kish, Edward E., Jr.; Cunningham, Frank M.; Gallagher, Bernard J.; and Shufflebarger, Earl D., to Nupro Company. Fluid filter. 4,028,248, Cl. 210-232.000.

Murrey, James Gordon: *See—*
Poloso, Anthony; and Murray, James Gordon, 4,028,485.

Muzzy, John D.: *See—*
Liotta, Charles L.; and Muzzy, John D., 4,028,358.

Mygatt, Leonard T., Jr.; and Goldsmith, Edward E., to National Packaging Associates Corporation. Tamper-indicating container and lid therefor. 4,027,775, Cl. 220-266.000.

Myren, Harry Ingemar, to Aktiebolaget Karlstads Mekaniske Werkstad. Apparatus for collecting liquids thrown from a moving member. 4,028,174, Cl. 162-264.000.

N-S-W Corporation: *See—*
Parker, Kenneth Wade, 4,027,560.

Nagano, Masashi, to Shimano Industrial Company, Limited. Derailleur for bicycle. 4,027,542, Cl. 74-217.00B.

Nagao, Kameji: *See—*
Sera, Hidefumi; Nagao, Kameji; and Ishii, Tsumoru, 4,028,320.

Nagata, Takashi: *See—*
Ikushima, Hirosbi; Nakajima, Yasuo; Hagiwara, Kitokazu; and Nagata, Takashi, 4,028,646.

Nagayoshi, Konno, to Koritsu Kikaikogyo Co., Ltd. Coke oven door. 4,028,193, Cl. 202-248.000.

Nagoshi, Kazuo: *See—*
Fukushima, Osamu; Nagoshi, Kazuo; and Iwamoto, Toshiaki, 4,028,161.

Nail, Nelson R.: *See—*
Lamberts, Robert L.; and Nail, Nelson R., 4,028,109.

Nakajima, Shigeo: *See—*
Hujimori, Masao; Nakajima, Shigeo; Takahashi, Ken; Ito, Tsunetoshi; Shimada, Toshio; and Endo, Hajime, 4,027,918.

Nakajima, Yasuo: *See—*
Ikushima, Hiroshi; Nakajima, Yasuo; Hagiwara, Kitokazu; and Nagata, Takashi, 4,028,646.

Nakamura, Akira: *See—*
Arai, Hiroshi; Nakamura, Akira; Sugiura, Akio; Okamoto, Atutoshi; and Toyama, Koichi, 4,027,926.

Nakamura, Hiroyuki; Kawaguchi, Hiroshi; and Nishiwaki, Kiyoshi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Safety device for an oil hydraulic braking system. 4,028,658, Cl. 303-6.00C.

Nakamura, Takeshi, to Murata Manufacturing Co., Ltd. Piezo-electric tuning fork oscillation circuit. 4,028,640, Cl. 331-116.00R.

Nakamura, Yasuharu: *See—*
Sato, Akira; Ikeda, Tadashi; Sueyoshi, Tohru; Nakamura, Yasuharu; and Shimada, Takeo, 4,028,112.

Nakane, Masami: *See—*
Mikasa, Yoshio; Nakane, Masami; and Tokura, Yukio, 4,027,965.

Nakano, Chikao: *See—*
Tanaka, Junzo; and Nakano, Chikao, 4,028,517.

Nakao, Kiyoharu: *See—*
Ito, Terukazu; Nakao, Kiyoharu; Minami, Teruo; and Uenoyama, Masaru, 4,027,554.

Nakashima, Sunao: *See—*
Nakasuji, Norikazu; Kataoka, Takashi; Inagaki, Hiroshi; and Nakashima, Sunao, 4,028,118.

Nakasuji, Norikazu; Kataoka, Takashi; Inagaki, Hiroshi; and Nakashima, Sunao, to Pilot Ink Co., Ltd. Thermochromic materials. 4,028,118, Cl. 106-21.000.

Nakauchi, Shunsaku, to Kokusai Gijutsu Kaihatsu Kabushiki Kaisha. Dot printer. 4,027,762, Cl. 197-1.00R.

Namura, Kiyoshi: *See—*
Kuroda, Michio; Namura, Kiyoshi; Kato, Fumio; Yamazaki, Yoshiaki; Iwasaki, Tutomu; Ishida, Akira; Sohma, Akio; and Imai, Tetsu, 4,028,006.

Nardozzi, Michael A., Jr. Rapid transit system. 4,027,596, Cl. 104-138.00R.

Narosny, Ronald S., to Thomas & Betts Corporation. Termination method and apparatus for flat flexible cable. 4,027,941, Cl. 339-14.00R.

National Development Research Corporation: *See—*
Holland, Frank Stanley, 4,028,199.

National Distillers and Chemical Corporation: *See—*
Huddleston, Jack M., 4,027,929.

National Gypsum Company: *See—*
Rackard, Troy D., 4,027,431.

National Packaging Associates Corporation: *See—*
Mygatt, Leonard T., Jr.; and Goldsmith, Edward E., 4,027,775.

National Research Development Corporation: *See—*
Dell, Christopher Cambridge, 4,028,229.
Turner, David; and Speer, Robert John, 4,027,975.

National Starch and Chemical Corporation: *See—*
Mazzarella, Emil D., 4,028,172.

Naudy, Rene; Phoyu, Francois; Robert, Louis; Legousse, Maurice; Audouard, Jean-Marie; and Le Roux, Herve, to Ciments Lafarge S.A. Method and installation of treating raw material for producing cement. 4,028,049, Cl. 432-14.000.

NCR Corporation: *See—*
Crump, Leslie L.; and Italiano, Victor J., 4,027,765.
Quaif, Richard S., 4,027,761.

Nedstedt, Gert: *See—*
Rausing, Ruben; Nedstedt, Gert; Holmstrom, Hakan; Palm, Lars-Erik; and Stefan, Stjepan, 4,027,455.

Needham, Donald G.; Taylor, Kenneth P.; and Brown, Claude V., to Phillips Petroleum Company. Stabilization of cross-linked polyolefins. 4,028,332, Cl. 260-45.80R.

Nelson, David M., to Ambac Industries, Inc. Gas analyzer. 4,028,057, Cl. 23-254.00E.

Nelson, James P., to Standard Oil Company (Indiana). Poly(cyclohexanedimethylene dibromoterephthalate). 4,028,308, Cl. 260-75.00H.

Nelson, Norman A., to Upjoin Company, The. 2-Decarboxy-2-hydroxymethyl-cis-4,5-didehydro-PGE, compounds. 4,028,419, Cl. 260-586.00R.

Nemoto, Hideo; and Koike, Yuuji, to Kabushiki Kaisha Daini Seikosha. Connector having electro-conductive rubber terminal. 4,027,936, Cl. 339-59.00M.

Neri, Joseph Dominic; and Williams, John Lewis, to Burroughs Corporation. Ink transfer member. 4,028,286, Cl. 260-2.50P.

Nestler, Heinz: *See—*
Amort, Jurgen; and Nestler, Heinz, 4,028,343.

Neuzil, Richard W.; and Rosback, Donald H., to Universal Oil Products Company. Process for the separation of ethylbenzene. 4,028,428, Cl. 260-674.0SA.

Newell, Dennis E., to Robertshaw Controls Company. Motor control circuit. 4,028,593, Cl. 361-27.000.

Neyret, Guy, to Genoud & Cie. Cigarette lighter with presale tamper protection. 4,028,043, Cl. 431-144.000.

Ngo, Peter Dinh-Tuan, to Bell Telephone Laboratories, Incorporated. Liquid crystal display device. 4,028,692, Cl. 340-324.00M.

Niagara Machine & Tool Works: *See—*
Jones, Clarence O., Jr., 4,027,567.

Nickerson, David L., to Korfil, Incorporated. Insulated block. 4,027,445, Cl. 52-405.000.

Nickols, Richard C., Jr.: *See—*
Tuschner, Jerome G.; and Nickols, Richard C., Jr., 4,028,324.

Nicou, Parasko: *See—*
Dumoulin, Jean; and Nicou, Parasko, 4,028,298.

Niemeyer, Willy; and Simon, Helmut, to Windmoller & Holscher. Apparatus for applying contact pressure to packs of tube sections. 4,027,871, Cl. 271-95.000.

Nieskens, Antonius; Slenders, Petrus; and Palmkoeck, Christian, to Robert Bosch G.m.b.H. Sealing machine. 4,027,459, Cl. 53-59.00R.

Niikura, Masakatsu, to Janome Sewing Machine Co. Ltd. Intermittent stitching device for sewing machines. 4,027,610, Cl. 112-275.000.

Niiro, Yasuhiko, to Kokusai Denshin Denwa Kabushiki Kaisha. System equalization for repeatered submarine cable system. 4,028,644, Cl. 333-16.000.

Nikitin, Dmitry Valentinovich, administrator: *See—*
Cherednichenko, Vladimir Semenovich; Orlov, Gennady Ivanovich; Mikulinsky, Aron Semenovich; Arzamastsev, Jury Semenovich; Efremkin, Vladimir Vasilievich; Nikitin, Valentin Alexeevich, deceased; Nikitina, Valentina Kuzminichna, administrator; and Nikitin, Dmitry Valentinovich, administrator, 4,027,861.

Nikitin, Valentin Alexeevich, deceased: *See—*
Cherednichenko, Vladimir Semenovich; Orlov, Gennady Ivanovich; Mikulinsky, Aron Semenovich; Arzamastsev, Jury Semenovich; Efremkin, Vladimir Vasilievich; Nikitin, Valentin Alexeevich, deceased; Nikitina, Valentina Kuzminichna, administrator; and Nikitin, Dmitry Valentinovich, administrator, 4,027,861.

Nikitina, Valentina Kuzminichna, administrator: *See—*
Cherednichenko, Vladimir Semenovich; Orlov, Gennady Ivanovich; Mikulinsky, Aron Semenovich; Arzamastsev, Jury Semenovich; Efremkin, Vladimir Vasilievich; Nikitin, Valentin Alexeevich, deceased; Nikitina, Valentina Kuzminichna, administrator; and Nikitin, Dmitry Valentinovich, administrator, 4,027,861.

Nippon Electric Company, Ltd.: *See—*
Araseki, Takashi; and Ochiai, Kazuo, 4,028,506.
Funamo, Hiroshi; Kunihiro, Toshiro; and Murai, Masaaki, 4,028,495.
Saburi, Akio, 4,028,497.
Shutoh, Masamichi, 4,028,584.
Tokuda, Kazuo; Tsugita, Masanobu; and Minakuchi, Hiroshi, 4,028,602.

Nippon Hoso Kyokai: *See—*
Konishi, Yoshihiro; Konno, Kenichi; Yazawa, Norihiko; and Hoshino, Norio, 4,028,650.

Nippon Kogaku K.K.: *See—*
Mori, Ikuo; and Shimizu, Yoshiyuki, 4,027,951.

Nippon Kokan Kabushiki Kaisha: *See—*
Kawawa, Takaho; and Ito, Masaharu, 4,027,844.
Yamamoto, Tomio; Sakasegawa, Koji; Osumi, Atsushi; Hosaka, Yukio; and Yamada, Takeo, 4,027,978.

Nippon Oil Company Ltd.: *See—*
Tsuchiya, Shozo; Sato, Hisatake; Oshima, Akio; and Hayashi, Hideo, 4,028,291.

Nippon Shokubai Kagaku Kogyo Co., Ltd.: *See—*
Uchii, Jiro; Kodo, Masatsugu; Soga, Tsunehiko; and Morimoto, Yutaka, 4,028,070.

Nippon Soken, Inc.: *See—*
Kitagawa, Junji; and Akita, Sigeyuki, 4,028,620.
Shimogawa, Toshiaki; Morita, Masayuki; and Kawaharazaki, Takashi, 4,027,905.

Nippon Telegraph and Telephone Public Corporation: *See—*
Horikoshi, Yoshiji, 4,028,148.
Tomishima, Hiroshi; Takahashi, Toshio; Ono, Kenichi; and Kumasaka, Kazuhiro, 4,028,144.

Nippondenso Co., Ltd.: *See—*
Arai, Hiroshi; Nakamura, Akira; Sugiura, Akio; Okamoto, Atutoshi; and Toyama, Koichi, 4,027,926.

Nishi, Nobuji: *See—*
Matsuura, Mikio; Nishi, Nobuji; Matsuoka, Michio; and Masuyama, Takeshi, 4,028,277.

Nishida, Takashi: *See—*
Fujita, Yoshiji; Omura, Yoshiaki; Nishida, Takashi; and Itoi, Kazuo, 4,028,385.

Nishikawa, Toshio: *See—*
Wakino, Kikuo; Nishikawa, Toshio; Tamura, Sadahiro; and Ishikawa, Youhei, 4,028,652.

Nishimura, Shigeoki; Sawa, Toshio; Otani, Kouji; and Kikkawa, Seiichi, to Hitachi, Ltd. Method and apparatus for treatment of fluorine-containing waste waters. 4,028,237, Cl. 210-45.000.

Nishioka, Matsuo, to Matsushita Electric Industrial Co., Ltd. Electronic component having a fine adjustment mechanism. 4,027,541, Cl. 74-10.540.

Nishiwaki, Kiyoshi: *See—*
Nakamura, Hiroyuki; Kawaguchi, Hiroshi; and Nishiwaki, Kiyoshi, 4,028,658.

Nissan Motor Co., Ltd.: *See—*
Aono, Shigeo, 4,027,637.
Hirashima, Kenzo; Tsujimura, Harutoshi; Hasegawa, Akira; Tanigami, Takahiko; and Ushiku, Kenichi, 4,028,516.
Masaki, Kenji; and Tokura, Naomi, 4,027,478.
Otsubo, Kizuku; Suyama, Toru; and Udagawa, Masanori, 4,027,633.
Saito, Yuichi, 4,027,923.
Takeuchi, Hiroshi; Ishizawa, Toshitugu; Yamano, Tetuyuki; Chiba, Ko; and Kobayashi, Daisaku, 4,028,022.
Yamamoto, Tadahiro; and Yoneda, Kenji, 4,027,636.

Nixon, C. Bart: *See—*
Sapp, Lawrence G.; Slappey, James F.; and Nixon, C. Bart, 4,027,599.

NL Industries, Inc.: *See—*
Langere, Rooald Francis; and Loeffler, Otto Ernest, 4,028,266.

Noguchi, Yasuhiro: *See—*
Suzuki, Nobuo; Noguchi, Yasuhiro; and Masuda, Takao, 4,028,129.

Nolley, John P., Jr.; and Kunesh, John G., to UOP Inc. Purification and drying of hydrocarbon streams with adsorbents. 4,028,069, Cl. 55-33.000.

Nomura, Chifuru, to Kitazawa Shoji Kabushiki Kaisha. Pump or motor having sealed chambers. 4,027,576, Cl. 91-339.000.

Nomura, Toshio: *See—*
Hirosawa, Yoshiaki; Nomura, Toshio; and Iiyama, Masabiko, 4,027,640.

Norden, Alexander R. Electrical terminal blocks. 4,027,937, Cl. 339-66.00M.

Nordgren, Robert: *See—*
Maske, Fred John; and Nordgren, Robert, 4,028,127.

Norlin Music, Inc.: *See—*
Luce, David A.; and Merchese, Anthony, 4,027,569.
Rendell, Stanley E.; and Schneider, Richard, 4,027,570.

Norris, Alan H., to Champion International Corporation. Resin reclamation in carpet manufacture. 4,028,159, Cl. 156-94.000.

North, Bernard F.; and Lourigan, George H., to Sun Chemical Corporation. Permanent-press system. 4,028,054, Cl. 8-185.000.

North, William D.: *See—*
Collins, Robert Henry; Levine, Richard F.; North, William D.; O'Rourke, Gerald D.; and Parker, Gerald R., 4,028,150.

Northern Electric Company Limited: *See—*
Rittenhouse, Dennis Edwin, 4,028,501.

Northern Telecom Limited: *See—*
Yee, Henry Kai-Hen, 4,028,647.

Northrop Corporation: *See—*
Curtis, Orlie L., 4,028,719.

Norton Company: *See—*
Malloy, John F., 4,027,435.

Nosek, Stanislav: *See—*
Safar, Petr; Langr, Josef; Kolar, Miloslav; and Nosek, Stanislav, 4,027,705.

Nuarc Company, Inc.: *See—*
Leonhart, Charles J., 4,028,166.

Nuclear Supreme: *See—*
Waltrip, Owen R., 4,028,040.

Nudenberg, Walter: *See—*
Rim, Yong S.; and Nudenberg, Walter, 4,028,437.

Nukem G.m.b.H.: *See—*
Huschka, Hans; Schmutz, Hermann; and Vygen, Peter, 4,028,181.

Null, Michael William: *See—*
Cho, Susumu; Erickson, Paul Milton; and Null, Michael William, 4,028,627.

Nupro Company: *See—*
Murauskas, Donald J.; Kish, Edward E., Jr.; Cunningbam, Frank M.; Gallagher, Bernard J.; and Shufflebarger, Earl D., 4,028,248.
Shufflebarger, Earl D.; Kish, Edward E.; Boylan, John R.; Diebl, George D.; Gallagher, Bernard J.; and Tobbe, William P., 4,028,254.

N.V. Spiro Research: *See—*
Roffelsen, Franciscus, 4,027,691.

O. M. Scott & Sons Company, The: *See—*
Bell, Robert Joseph; and Simmons, James Almy, 4,028,464.

Oakley, Thomas J. Betting device. 4,027,884, Cl. 273-148.00R.

Oberg, Karl: *See—*
Fagerhaug, Bjorn; and Oberg, Karl, 4,028,189.

Oberhardt, Bruce J.: *See—*
Snyder, Lloyd R.; Oberhardt, Bruce J.; and Olich, Jack, 4,028,056.

O'Brien, Paul John, to United States of America, Transportation. Power interrupt test equipment. 4,028,555, Cl. 361-76.000.

Occidental Petroleum Corporation: *See—*
Bartel, William J.; and Burton, Robert S., III, 4,027,917.
Wahl, Edward F., III, 4,027,483.

Ochiai, Kazuo: *See—*
Araseki, Takashi; and Ochiai, Kazuo, 4,028,506.

Ochodnicky, Samuel Steven; and Bianchi, Frank Josepb, Jr., to Gem Rad, Inc. Viscometer system. 4,027,516, Cl. 73-57.000.

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Oda, Yasuhiro: *See—*
Futami, Takashi; Tatsukemi, Yoshiharu; Takamoto, Toyoji; Oda, Yasuhiro; and Tomoda, Masayasu, 4,028,431.

O'Doenell, Harry B., III: *See—*
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Offer, Robert J.; and Van Vooren, Bernard J., to Tenneco Inc. Relief valve for a fluid filter assembly. 4,028,243, Cl. 210-130.000.

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Azinger, Friedrich; Offermanns, Heribert; and Gluzek, Karl-Heinz, 4,028,406.

Ogawa, Shinasku; Ide, Akira; Komatsu, Kazurou; Matsumoto, Sojiro; and Kishimoto, Yasushi, to Asahi Kasei Kogyo Kabushiki Kaisha. Isocyanate prepolymers. 4,028,392, Cl. 260-453.0AR.

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Tsuchiya, Hiroshi; Mukai, Kunio; Kimura, Akio; Taya, Hiroshi; Fujimoto, Keimei; Ozaki, Toshiaki; Yamamoto, Sigeo; Ogawa, Taizo; Ooishi, Tadashi; and Okuno, Yositosi, 4,028,438.

Ogino, Katsuhiko: *See—*
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Ogiso, Mitsutoshi: *See—*
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Ohara, Kazuo: *See—*
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O'Hara, Mark J.; and Gleim, William K. T., to UOP Inc. Method of catalyst manufacture. 4,028,273, Cl. 252-432.000.

Ohashi, Saichiro; and Fujita, Susumu, to Fuji Photo Film Co., Ltd. Data recording camera. 4,028,713, Cl. 354-106.000.

Ohio State University, The: *See—*
Young, Jonathen D.; and Celdecott, Ross, 4,028,707.

Ohishi, Tadashi, to Kyodo Denshi Kogyo Co., Ltd. Needle detector for circular knitting machines. 4,027,982, Cl. 356-237.000.

Ohuchi, Yasushi: *See—*
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Okada, Akira; Iriyama, Keiji; and Shiraki, Masaru, to Director-General of the Agency of Industrial Science and Technology. Method for the separation of chlorophyll. 4,028,217, Cl. 260-314.000.

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Arai, Hiroshi; Nakamura, Akira; Sugiura, Akio; Okamoto, Atutoshi; and Toyama, Koichi, 4,027,926.

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Kamatani, Yoshio; Okazaki, Hisayoshi; Imai, Ko; Fujita, Noriaki; Yamazaki, Yoshio; and Ogino, Katsuhiko, 4,028,185.

Okumura, Osamu; Saketani, Takenobu; Yamane, Izumi; and Kashiwada, Toshinobu, to Lion Fat & Oil Co., Ltd. Method of manufacturing granular detergents. 4,028,282, Cl. 252-537.000.

Okuno, Yositosi: *See—*
Tsuchiya, Hiroshi; Mukai, Kunio; Kimura, Akio; Taya, Hiroshi; Fujimoto, Keimei; Ozaki, Toshiaki; Yamamoto, Sigeo; Ogawa, Taizo; Ooishi, Tadashi; and Okuno, Yositosi, 4,028,438.

Okuyama, Toru: *See—*
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Olander, Emil Edward, Jr.; James, Rex L.; Larson, Ivar W.; Covington, Wayne F.; Walden, Jack M.; Watson, Robert E.; Yockey, Francis J.; Wenninger, Fred, Jr.; and Russell, Homer C., to Hewlett-Packard Company. Programmable calculator employing algebraic language. 4,028,538, Cl. 235-156.000.

Olich, Jack: *See—*
Snyder, Lloyd R.; Oberhardt, Bruce J.; and Olich, Jack, 4,028,056.

Olin Corporation: *See—*
Capuano, Italo A., 4,028,197.
Ford, James M., 4,028,213.
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Olin, John Merrill; and Urs, Venkataramaraj Subbaraj, to Olin Corporation. Disintegrating lead shot. 4,027,594, Cl. 102-92.400.

Olschewski, Armin: *See—*
Kunkel, Heinrich; Brandenstein, Manfred; Olschewski, Armin; Finzel, Sigismund; Gossmann, Willi; and Horling, Peter, 4,027,932.

Olsen, Robert A. Method and apparatus for testing spot welds. 4,027,529, Cl. 73-88.00B.

Olson, Gregory J., to Packaging Corporation of America. Shipping container. 4,027,794, Cl. 206-395.000.

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van den Berg, Antoon J., 4,028,293.

Olstowski, Franciszek, to Dow Chemical Company, The. Solid, rapid-setting, rigid polyurethanes. 4,028,296, Cl. 260-30.40N.

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Olympia Werke AG: *See—*
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Fujita, Yoshiji; Omura, Yoshiaki; Nishida, Takashi; and Itoi, Kazuo, 4,028,385.

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Ono, Shuzi: *See—*
Ueda, Shoji; Ono, Shuzi; Sakaguchi, Hiroshi; and Tsunoda, Hideo, 4,028,455.

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Onoda Cement Company, Ltd.: *See—*
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Orlando, Luciano, to Honeywell Information Systems Italia. Dynamic current limiter for switching voltage regulators. 4,028,612, Cl. 323-17.000.

Orlov, Gennady Ivanovich: *See—*
Cherednichenko, Vladimir Semenovich; Orlov, Gennady Ivanovich; Mikulinsky, Aron Semenovich; Arzamastsev, Jury Semenovich; Efremkin, Vladimir Vasilievich; Nikitin, Valentin Alexeevich, deceased; Nikitina, Valentina Kuzminichna, administrator; and Nikitin, Dmitry Valentinovich, administrator, 4,027,861.

O'Rourke, Gerald D.: *See—*
Collins, Robert Henry; Levine, Richard F.; North, William D.; O'Rourke, Gerald D.; and Parker, Gerald R., 4,028,150.

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Osawa, Tadao: *See—*
Moriya, Hisanori; and Osawa, Tadao, 4,027,638.

Oshima, Akio: *See—*
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Osmers, Herman R., to University of Rochester. Method and apparatus for making measurements related to the first normal stress function of viscoelastic fluid material. 4,027,526, Cl. 73-54.000.

Osofsky, Raymond C.: *See—*
Marsh, David Raymond; and Osofsky, Raymond C., 4,027,403.

Oster, Joseph, to Keystone Lamp Manufacturing Corporation. Baseless lamp. 4,028,543, Cl. 240-52.100.

Osterreichische Chemische Werke Gesellschaft m.b.H, Firma: *See—*
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Otsubo, Kizuku; Suyama, Toru; and Udagawa, Masanori, to Nissan Motor Co., Ltd. Ignition timing control system. 4,027,633, Cl. 123-117.00A.

Otto, Ferdinand P.: *See—*
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Ouwerkerk, Anton Van; Chant, Bernard J.; and Liberman, Arthur L., to International Flavors & Fragrances Inc. Novel fragrance compositions containing 2,6,6 trimethyl-1-cyclohexen-1-yl acetaldehyde and phenyl C_6 ketone. 4,028,279, Cl. 252-522.000.

Owens-Corning Fiberglas Corporation: *See—*
Foley, Kevin M., 4,028,391.
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Owens-Illinois, Inc.: *See—*
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P. H. Glatfelter Co.: *See—*
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P. R. Mallory & Co. Inc.: *See—*
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Pacca, Egmar A. Collapsible roof-top camper. 4,027,912, Cl. 296-23.0MC.

Pacesetter Systems, Inc.: *See—*
Schulman, Joseph H.; and Moore, Robert F., 4,027,677.

Packaging Corporation of America: *See—*
Olson, Gregory J., 4,027,794.

Pak, Kyoungsik. Energy conserving bed warming device. 4,027,344, Cl. 5-347.000.

Palm, Lars-Erik: *See—*
Rausing, Ruben; Nedstedt, Gert; Holmstrom, Hakan; Palm, Lars-Erik; and Stefan, Stjepan, 4,027,455.

Palmer Paint Products, Inc.: *See—*
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Palmkoeck, Christian: *See—*
Nieskens, Antonius; Slenders, Petrus; and Palmkoeck, Christian, 4,027,459.

Pan, Peter N. Y.; and Hernandez, Rafael J., to Continental Can Company, Inc. Pulsed powder application system. 4,027,607, Cl. 118-2.000.

Panelfold Doors, Inc.: *See—*
Dixon, Guy E.; Dixon, Thomas M.; and Geyer, Russell I., Jr., 4,027,714.

Pankove, Jacques Isaac, to RCA Corporation. Photovoltaic device. 4,028,720, Cl. 357-30.000.

Panneman, Harm Jan; and Bruins, Antonius Hermanus Nicolaas Maria, to Akzona Incorporated. Hydrazino-imidazole derivatives. 4,028,380, Cl. 260-309.600.

Parham, Harold D. Vacuum type coal separator. 4,028,231, Cl. 209-457.000.

Parker, Billy J.: *See—*
Bernard, Clay, II; Matheny, William F., III; and Parker, Billy J., 4,027,833.

Parker, Gerald R.: *See—*
Collins, Robert Henry; Levine, Richard F.; North, William D.; O'Rourke, Gerald D.; and Parker, Gerald R., 4,028,150.

Parker, Kenneth Wade, to N-S-W Corporation. Power wrenches with two point reaction means. 4,027,560, Cl. 81-57.390.

Parker, Richard W.; and Kaeser, Arthur L., to Parker Sweeper Company. Spreader for fertilizer, seed and the like. 4,027,788, Cl. 222-614.000.

Parker Sweeper Company: *See—*
Parker, Richard W.; and Kaeser, Arthur L., 4,027,788.

Parks, James R. Cargo restraining assembly for use in a vehicle. 4,027,892, Cl. 280-179.00R.

Parks, Jill J.; and Snook, Stephen R. Quasi-corner reflectors for electromagnetic radiation. 4,028,701, Cl. 343-18.00C.

Parma Industries, Inc.: *See—*
Fields, Gerald S., 4,028,076.

Partridge, John Joseph, Jr.; and Uskokovic, Milan Radoje, to Hoffmann-La Roche Inc. Syntheses of 24R,25- and 24S,25-dihydroxycholesterol 24,25-ketals and alkanoyl derivatives thereof. 4,028,349, Cl. 260-239.55D.

Patel, Ashok Z.: *See—*
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Patel, Vishnubhai V.: *See—*
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Paterson Candy International Limited: *See—*
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Patrick, Stanley R. Herbicide applicator. 4,027,986, Cl. 401-138.000.

Petteri, Matti, to Exel OY. Juncture arrangement between the bow of a hearing protection means and a protective helmet. 4,027,341, Cl. 2-423.000.

Patterson, Garvin W.: *See—*
Monahan, Earnest M.; and Patterson, Garvin W., 4,028,664.

Patton, Tad L., to Exxon Research and Engineering Company. Process for the hydrolysis of poly(iminoimidazolidinediones) to polyparabanic acids. 4,028,311, Cl. 260-77.50R.

Patznick, Richard Arthur; and Border, Gary Clayton, to Johns-Manville Corporation. Method and apparatus for controlling temperature within a furnace. 4,028,083, Cl. 65-29.000.

Paul, Thomas Campbell: *See—*
Lampl, Friedrich; and Paul, Thomas Campbell, 4,027,793.

Paulstra: *See—*
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Pavolka, John D.: *See—*
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Pearson, Laurence B., to Pearson's, Inc. Livestock squeeze chute. 4,027,629, Cl. 119-99.000.

Pearson's, Inc.: *See—*
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Peckham, David G., to Trane Company, The. Method and apparatus for absorption refrigeration system. 4,028,078, Cl. 62-101.000.

Peelman, Harold E.; and Laegford, Obie M., to Texaco Inc. Behind well casing water flow detection system. 4,028,546, Cl. 250-266.000.

Peiffer, Howard Richard: *See—*
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Peil, Archie W.: *See—*
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Pelosi, Stanford Salvatore, Jr.; and Alaimo, Robert James, to Morton-Norwich Products, Inc. Antibacterial thiocyanatobenzothiazoles. 4,028,374, Cl. 260-305.000.

Pendergrass, John E.: *See—*
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Pennwalt Corporation: *See—*
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Pepperhoff, Werner; and Richter, Friedhelm, to Maonesmann Aktiengesellschaft. Cryogenic steel. 4,028,098, Cl. 75-126.00B.

Perkins, Charles H., to Robertshaw Controls Company. Reversing valve construction. 4,027,700, Cl. 137-625.660.

Perkins, Lee E., to Kajan Specialty Company, Inc. Tool for washing perforations in cased well bore. 4,027,732, Cl. 166-312.000.

Perkins, Manuel Garfield: *See—*
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Permalock Company, Inc.: *See—*
Abel, Martin L., 4,028,157.

Perona, Maurice: *See—*
Jullien, Rene; Perona, Maurice; and Venot, Robert, 4,028,178.

Persson, Nils Christer. Braking device for ropes and belts, especially lifelines. 4,027,748, Cl. 188-65.400.

Peter Paul Electronics Co., Inc.: *See—*
Allen, Walter E., 4,027,850.

Petersen, Arthur W.; Cimiluca, Arthur; and Hirschberger, Leonard, to Schwarzmann, Frederick G. Tile and grout cleaner and restorer. 4,028,261, Cl. 252-89.00R.

Peterson, Robert S., to Westinghouse Electric Corporation. Multi-loop direct current motor regulating system protected against windup by a clamp circuit. 4,028,601, Cl. 318-271.000.

Petritsch, Klaus; and Korl, Peter, to Osterreichische Chemische Werke Gesellschaft m.b.H, Firma. Method of producing tartaric acid. 4,028,407, Cl. 260-536.000.

Pettibone Corporation: *See—*
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Pfizer Inc.: *See—*
Bright, Gene Michael, 4,028,360.

Philippaerts, Herman Adelbert: *See—*
Berendsen, Jules Robert; Pollet, Robert Joseph; Philippaerts, Herman Adelbert; Sels, Francis Jeanne; and Willems, Jozef Frans, 4,028,110.

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Needham, Donald G.; Taylor, Kenneth P.; and Brown, Claude V., 4,028,332.
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Phoyu, Francois: *See—*
Naudy, Rene; Phoyu, Francois; Robert, Louis; Legousse, Maurice; Audouard, Jean-Marie; and Le Roux, Herve, 4,028,049.

Picas, Arturo: *See—*
Llach, Lorenzo; and Picas, Arturo, 4,027,358.

Piech, Kenneth R.; and Schott, John R., to United States of America, Air Force. Method of obtaining a D(log E) curve. 4,027,980, Cl. 356-203.000.

Pielkenrood, Jacob, to Pielkenrood-Vinitex N.V. Separation device. 4,028,256, Cl. 210-519.000.

Pielkenrood-Vinitex N.V.: *See—*
Pielkenrood, Jacob, 4,028,256.

Pierce, Donald Cameron. Marking gauge for measuring and marking French mats. 4,027,396, Cl. 33-96.000.

Pierce, Harless. Chain anchor. 4,027,989, Cl. 403-291.000.

Pierrepont, Maurice: *See—*
Summers, John Gilbert; and Pierrepont, Maurice, 4,028,140.

Pillar, Walter Oscar, to ARCO Polymers, Inc. Styrene polymer foams having reduced flammability containing allyl ether synergists. 4,028,285, Cl. 260-2.5FP.

Pilot Ink Co., Ltd.: *See—*
Nakasuji, Norikazu; Kataoka, Takashi; Inagaki, Hiroshi; and Nakashima, Sunao, 4,028,118.

Pitelyaev, Grigory Vasilievich; Telpukhovsky, Evdokim Semenovich; Ravin, Boris Iosifovich; and Gladkov, Alexei Grigorievich. Arrangement for erecting and dismounting an elongate object having one end articulated to a foundation. 4,027,441, Cl. 52-116.000.

Pitney-Bowes, Inc.: *See—*
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Pitts, Robert W., Jr., to Texaco Inc. Well logging method and means using an armored multiconductor coaxial cable. 4,028,660, Cl. 340-18.0CM.

Plastronics, Inc.: *See—*
Clark, James L.; and Mather, Byron L., 4,028,156.

Platone, Edoardo: *See—*
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Plessey Handel und Investments A.G.: *See—*
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Plockinger, Erwin; Deghofer, Otto; and Barakat, Farouk, to Vereinigte Edelstahlwerke AG. Method of producing homogeneous ingots of high-melting, nitrogen-containing alloys. 4,027,720, Cl. 164-52.000.

Plunkett, James P.: *See—*
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Polaroid Corporation: *See—*
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Stella, Joseph A.; and Mason, Paul B., 4,027,956.
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Polen, Kerl L., to Alliance Machine Company, The. Gantry crane with plural hoist means. 4,027,800, Cl. 212-14.000.

Pollet, Robert Joseph: *See—*
Berendsen, Jules Robert; Pollet, Robert Joseph; Philippaerts, Herman Adelbert; Sels, Francis Jeanne; and Willems, Jozef Frans, 4,028,110.

Pollington, Bernard M. Workpiece holder. 4,027,867, Cl. 269-94.000.

Pollitzer, Ernest L.: *See—*
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Poloso, Anthony; and Murray, James Gordon, to Mobil Oil Corporation. Non-aqueous removal of soluble hydrogenation catalyst. 4,028,485, Cl. 528-486.000.

Poncy, George W.: *See—*
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Poncy, Mark P.; Poncy, Richard P.; and Poncy, George W. Digitally insertable tampon. 4,027,673, Cl. 128-285.000.

Poncy, Richard P.: *See—*
Poncy, Mark P.; Poncy, Richard P.; and Poncy, George W., 4,027,673.

Pons, Andre, to Saint-Gobain Industries. Raw materials for glass making and method of making them. 4,028,131, Cl. 106-52.000.

Pont-A-Mousson S.A.: *See—*
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Pope, William L.: *See—*
United States of America, National Aeronautics and Space Administration; Smoot, George F.; Pope, William L.; and Smith, Lawrence, 4,027,494.

Popeil Brothers, Inc.: *See—*
Popeil, Samuel J., 4,027,419.

Popeil, Samuel J., to Popeil Brothers, Inc. Fishing rig. 4,027,419, Cl. 43-18.00R.

Poponiak, Michael R.: *See—*
Deines, John L.; Ku, San-Mei; Poponiak, Michael R.; and Tsang, Paul J., 4,028,149.

Port, David J.: *See—*
Laferty, John M., Jr.; Ritsko, Joseph E.; and Port, David J., 4,028,095.

Portal, Charles: *See—*
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Porvair Limited: *See—*
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Post Office, The: *See—*
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Precision Flexmold, Inc.: *See—*
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Putzer, Raymond M., 4,027,845.

Preradovich, Radovan. Shaft liner assembly. 4,027,488, Cl. 61-41.00R.

Pretto, John. Angle of attack indicating device. 4,027,533, Cl. 73-188.000.

Prevedello, Aldo; and Platone, Edoardo, to Snam Progetti, S.p.A. Method for the preparation of octene-nitrile organic compounds and compounds obtained thereby. 4,028,395, Cl. 260-465.400.

Pries, Thomas H.: *See—*
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Priewasser, Georg: *See—*
Ellbrunner, Adalbert; Priewasser, Georg; Georg, Friedrich; and Stock, Horst, 4,028,137.

Prince Manufacturing, Inc.: *See—*
Sweeton, Gerard F., 4,027,646.

Prinz, Richerd; Elghani, Salah Elabd; Fischer, Winfried; and Alberts, Heinrich, to Bayer Aktiengesellschaft. Thermoplastic moulding compounds. 4,028,433, Cl. 260-873.000.

Prull, Phillip Earl. Method for extracting oil from oil shale. 4,028,222, Cl. 208-11.00R.

Pullens, Gedell. Portable battery operated hot-cold storage unit. 4,027,727, Cl. 165-48.000.

Pullman Incorporated: *See—*
Adler, Franklin P.; and Pavolka, John D., 4,027,921.
Deller, Robert J.; and Carmel, Edwin L., 4,027,743.

Puron, Jean Paul: *See—*
Cachier, Gerard; and Puron, Jean Paul, 4,028,556.

Puskes, Imre; and Cengel, John A., to Standard Oil Company (Indiana). Polybutene composition containing halo-carbonyl additives and use thereof. 4,028,264, Cl. 252-182.000.

Putter, Rolf: *See—*
Rottloff, Gunther; Sundermann, Rudolf; Grigat, Ernst; and Putter, Rolf, 4,028,393.

Putzer, Raymond M., to Precision Flexmold, Inc. Flexible mold including rigid encapsulated mandrel. 4,027,845, Cl. 249-142.000.

Putzer, Raymond M.: *See—*
Maurino, William J.; and Putzer, Raymond M., 4,027,723.

Quaif, Richard S., to NCR Corporation. Matris print head impact energy control. 4,027,761, Cl. 197-1.00R.

Quaker Oats Company, The: *See—*
Hohner, Gary Arlyn; and Hyldon, Roy Godfrey, 4,028,468.

Quehen, Andre, to SECIM. Device for restoration of the mechanical characteristics of the metal band in a casting wheel for continuous casting of liquid metal. 4,027,725, Cl. 164-278.000.

Quentin, Karl-Ernst; Weil, Ludwig; and Berger, Harald, to Hoechst Aktiengesellschaft. Water purification process. 4,028,233, Cl. 210-28.000.

Quinlivan, Richard Paul, to General Electric Company. High angle of attack aircraft control system utilizing a pseudo acceleration signal for control purposes. 4,027,839, Cl. 244-195.000.

R. T. Vanderbilt Company, Inc.: *See—*
Karsten, Kenneth S.; and Karabinos, Joseph V., 4,028,394.

Rackard, Troy D., to National Gypsum Company. Single hung window with removable fixed lite. 4,027,431, Cl. 49-458.000.

Radke, Edmund John; and Bair, Joseph Louis, to Borg-Warner Corporation. Compact vibration damper. 4,027,757, Cl. 192-106.200.

Raffel, Jack I.: *See—*
Herndon, Terry O.; and Raffel, Jack I., 4,027,383.

Rahman, Habibur; and Joslyn, Gerald L., to Massey-Ferguson Inc. Single lever control. 4,027,547, Cl. 74-471.0XY.

Rahrig, Donald D.; and Revells, Robert G., to Libbey-Owens-Ford Company. Apparatus for bending and tempering glass sheets by differential cooling. 4,028,086, Cl. 65-273.000.

Ramella, Arnaldo: *See—*
Ramella, Ferdinando; Ramella, Pier Vincenzo; and Ramella, Arnaldo, 4,027,408.

Ramella, Ferdinando; Ramella, Pier Vincenzo; and Ramella, Arnaldo. Digger teeth with interlocking tooth elements. 4,027,408, Cl. 37-141.00T.

Ramella, Pier Vincenzo: *See—*
Ramella, Ferdinando; Ramella, Pier Vincenzo; and Ramella, Arnaldo, 4,027,408.

Rand, Maurice: *See—*
Goodfellow, Anthony Gerald; and Rand, Maurice, 4,028,042.

Rao, Tadikonda Narashimha; and Toumani, Rouben, to Bell Telephone Laboratories, Incorporated. Transceivers for single channel carrier telephone systems. 4,028,628, Cl. 325-400.000.

Rapistan, Incorporated: *See—*
Staes, Daniel, 4,028,528.

Rattiner, David H.: *See—*
Albanese, Angelo P.; and Rattiner, David H., 4,028,697.

Rauchle, Roy J.; and Vandenberg, John L., to Brunswick Corporation. Engine transmission and speed control with warm-up interlock apparatus. 4,027,555, Cl. 74-878.000.

Rausing, Ruben; Nedstedt, Gert; Holmstrom, Hakan; Palm, Lars-Erik; and Stefan, Stjepan, to Tetra Pak Developpement SA. Packing containers with ripping thread opening and packing material webs for the manufacture of the packing containers. 4,027,455, Cl. 53-14.000.

Ravin, Boris Iosifovich: *See—*
Pitelyaev, Grigory Vasilievich; Telpukhovsky, Evdokim Semenovich; Ravin, Boris Iosifovich; and Gladkov, Alexei Grigorievich, 4,027,441.

Ray, Charles D.: *See—*
Guenther, Robert O.; Huffhines, Donald F.; Krall, James W.; and Ray, Charles D., 4,027,616.

Raymond Corporation, The: *See—*
Delaney, Michael J.; and Gilbert, Hiram G., 4,028,597.

Raymond Lee Organization, Inc., The: *See—*
Frame, Bruce H., 4,027,891.
Lawbaugh, J. Medley, 4,027,683.

Raytheon Company: *See—*
Carey, David R.; Goldstone, Bertram J.; and Thompson, Bernard J., 4,028,700.

Razzano, John S., to General Electric Company. Fluorosiloxydiphenylsiloxy block copolymers. 4,028,338, Cl. 260-46.50R.

RCA Corporation: *See—*
Ahmed, Adel Abdel Aziz, 4,028,631.
Anderson, Charles Hammond; and Bloom, Stanley, 4,028,582.
Behrend, William Louis, 4,028,625.
Graham, Ross Chipman, 4,028,724.
Hovagimyan, Norman; Iadicola, Anthony Domenic; and Ianuzzi, William Paul, 4,028,499.
Mengle, Lewis Irwin, 4,028,586.
Pankove, Jacques Isaac, 4,028,720.
van Raalte, John A., 4,028,575.

Recognition Equipment Incorporated: *See—*
Chuang, Ping-Chien, 4,028,674.

Redifon Limited: *See—*
Lobb, Daniel Richard, 4,027,949.

Reed International Limited: *See—*
Thompson, Martin C., 4,027,693.

Reed Irrigation Systems: *See—*
Mominee, David E.; and Vance, Gilbert W., 4,028,525.

Reen, Orville W.; and McMahon, Donald J., to Allegheny Ludlum Industries, Inc. Stainless steel powder. 4,028,094, Cl. 75-.5BA.

Regie Nationale des Usines Renault: *See—*
Rouvre, Philippe; and Augello, Daniel Jean, 4,028,738.

Reichelt, Walter G., to W. C. Heraeus GmbH. Deposited layer type thermometric resistance structure. 4,028,657, Cl. 338-307.000.

Reichen, Willi; and Aate, Robert, to Bolex International SA. Sound-cine-camera. 4,027,955, Cl. 352-72.000.

Reid, Albert R., to Hercules Incorporated. Highly absorbent modified polysaccharides. 4,028,290, Cl. 260-17.4GC.

Reid, F. Joseph: *See—*
Kim, Han J.; and Reid, F. Josepb, 4,028,061.
Kim, Han J.; and Reid, F. Joseph, 4,028,063.

Reid, Robert E.: *See—*
Kablaoui, Mahmoud S.; Reid, Robert E.; and Godfrey, Arthur W., 4,028,258.

Reifel, Charles: *See—*
Leasure, William; Garcia, Luis; Reifel, Charles; and Shelton, Jack, 4,027,579.

Reiher, Wilfred L. Specialized candle. 4,028,045, Cl. 431-289.000.

Reinhart, Franz Karl: *See—*
Logan, Ralph Andre; Merz, James Logan; Reinhart, Franz Karl; and White, Harry Gregory, 4,028,146.

Reiter, Ralph H.: *See—*
Rosen, George; Carlick, Daniel J.; and Reiter, Ralph H., 4,028,204.

Rellico Engineering Limited: *See—*
Collier, Paul Arthur, 4,027,770.

Remington Arms Company, Inc.: *See—*
Dawson, Chester H., 4,027,531.

Rendell, Stanley E.; and Schneider, Richard, to Norlin Music, Inc. Neck-body joint for guitar-like instruments. 4,027,570, Cl. 84-293.000.

Research-Cottrel, Inc.: *See—*
Gleason, Robert Joseph, 4,028,077.

Reuter, Judith A.: *See—*
Jones, David A., Jr.; Schlatter, James M.; Mikulec, Richard A.; Reuter, Judith A.; and Mazur, Robert H., 4,028,319.

Reuter, Martin: *See—*
Lippsmeier, Bernd; Hestermann, Klaus; and Reuter, Martin, 4,028,421.

Reuther, John F., to Westinghouse Electric Corporation. Turbine speed controlling valve operation. 4,028,532, Cl. 235-151.100.

Revells, Robert G.: *See—*
Rahrig, Donald D.; and Revells, Robert G., 4,028,086.

Reynolds, Francis E. Building panel positioner. 4,027,802, Cl. 214-1.0SW.

Rheintechnik Weiland & Kaspar KG: *See—*
Stahler, Theo, 4,028,245.

Rhodes, William A. Hydraulic engine. 4,027,480, Cl. 60-531.000.

Rhone-Poulenc Industries: *See—*
Dumoulin, Jean; and Nicou, Parasko, 4,028,298.
Jouffret, Michel, 4,028,420.

Rhone-Pouleno: *See—*
Labedan, Pierre; Mugnier, Robert; and Chavanel, Hubert, 4,028,209.

Ribback, Erich. Hydraulic press. 4,027,518, Cl. 72-306.000.

Rich, Philip Jay: *See—*
Cherin, Allen Henry; and Rich, Philip Jay, 4,028,162.

Richards, George B., to Fluid Device Corporation. Liquid level control system and carbonator. 4,028,441, Cl. 261-36.00R.

Richter, Friedhelm: *See—*
Pepperhoff, Werner; and Richter, Friedhelm, 4,028,098.

Richter Gedeon Vegyeszeti Gyar RT: *See—*
Bite, Pal; Moravcsik, Imre; Schafer, Inge; Horvath, Gyula; Mehesfalvi nee Vajna, Zauzsanna; Borvendeg, Janos; and Hermann nee Szente, Ilona, 4,028,348.

Richter, Johan C. F. C., to Kamyr Aktiebolag. Method for continuous treatment of fiber material in a vertical array. 4,028,171, Cl. 162-19.000.

Riessberger, Klaus: *See—*
Theurer, Josef; and Riessberger, Klaus, 4,027,397.

Riessen, Richard R. Low level auger spout. 4,027,768, Cl. 198-370.000.

Rigden, Peter Charles Edwin, to Spicers Limited. Dispenser pack for continuous stationery. 4,027,795, Cl. 206-409.000.

Rihn, William J., to Kinemetrics, Inc. Strong motion accelerograph with self-starter and electrical as well as light outputs. 4,028,659, Cl. 340-17.00R.

Riikonen, Douglas L., to Honeywell Information Systems, Inc. Apparatus for selectively addressing sections and locations in a device controller's memory. 4,028,668, Cl. 340-172.500.

Riken Piston Ring Kogyo Kabushiki Kaisha: *See—*
Takeuchi, Hiroshi; Ishizawa, Toshitugu; Yamano, Tetuyuki; Chiba, Ko; and Kobayashi, Daisaku, 4,028,022.

Rim, Yong S.; and Nudenberg, Walter, to Uniroyel Inc. Dodecahalo-9,10-oxedecahydro-1,4:5,8-dimethanoanthracene flame retardants for polymers. 4,028,437, Cl. 260-880.00R.

Ringland, Robert S., to Tandy Corporation. Band pass amplifier. 4,028,629, Cl. 330-2.000.

Ripoche, Andre: *See—*
Sureau, Claude; Tournaire, Michel; Zorn, Jean-Rene; Sturbois, Gilbert; Chavinie, Jacques; Le Houezec, Roger; and Ripoche, Andre, 4,027,657.

Ritchie, James A., to Caterpillar Tractor Co. Oil seal for a rotary engine. 4,028,020, Cl. 418-51.000.

Ritsko, Joseph E.: *See—*
Laferty, John M., Jr.; Ritsko, Joseph E.; and Port, David J., 4,028,095.

Rittenhouse, Dennis Edwin, to Northern Electric Company Limited. Method and apparatus for translating multiple frequency signalling. 4,028,501, Cl. 179-84.0VF.

Robbins, Roland W., Jr. Solar-energy-powered sun tracker. 4,027,651, Cl. 126-270.000.

Roberge, Emile. Fuel tank cap. 4,028,075, Cl. 55-387.000.

Robert Bosch G.m.b.H.: *See—*
Moder, Helmut, 4,027,641.
Nieskens, Antonius; Slenders, Petrus; and Palmkoeck, Christian, 4,027,459.
Streit, Klaus; Kugelmann, Adolf; and Seiler, Hartmut, 4,028,564.

Robert Hain Associates, Inc.: *See—*
Hadtke, Frederick B., 4,027,340.

Robert, Louis: *See—*
Naudy, Rene; Phoyu, Francois; Robert, Louis; Legousse, Maurice; Audouard, Jean-Marie; and Le Roux, Herve, 4,028,049.

Robertshaw Controls Company: *See—*
Newell, Dennis E., 4,028,593.
Ochsner, Rolf H., 4,028,461.
Perkins, Charles H., 4,027,700.
Willson, James R.; and Tyler, Hugh J., 4,028,736.
Wolfe, Denis G., 4,027,689.

Robertson, George Heddle, to Ciba-Geigy Corporation. Pigment dispersions. 4,028,128, Cl. 106-308.00Q.

Robie, Susan P.: *See—*
Millard, Ben; and Robie, Susan P., 4,028,281.

Robin, Michael; and Schulte, Sheldon R., to Ashland Oil, Inc. Hindered phenol amines. 4,028,416, Cl. 260-570.50P.

Robitschek, Emmerich: *See—*
Greenwood, John H.; and Robitschek, Emmerich, 4,027,865.

Rochlitz, Jurgen; and Zunker, Reinhard, to Hoechst Aktiengesellschaft. Diamine condensation products in double layer photoconductive recording elements. 4,028,102, Cl. 96-1.500.

Rockaway Corporation: *See—*
Varga, Leroy M.; and Fitch, Robert B., 4,027,578.

Rocket Research Corporation: *See—*
Schmidt, Eckart W., 4,027,476.

Rockwell International Corporation: *See—*
Hagon, Peter J.; and Heworth, John, 4,028,639.

Roffelsen, Franciscus, to N.V. Spiro Research. Device for venting and aerating closed circulatory water flow systems. 4,027,691, Cl. 137-202.000.

Rogers, Jimmy Dale; and Creecy, Michael Earl, to United States of America, Nevy. Drive control to prevent simultaneous conduction in push-pull switching amplifier. 4,028,633, Cl. 330-118.000.

Rogers, Kenneth A. Golf iron manufacture. 4,027,885, Cl. 273-169.000.

Rohm and Haas Company: *See—*
McNulty, Patrick J.; and Warner, Harlow L., 4,028,084.

Rohr Industries, Inc.: *See—*
Garry, Frederick W., 4,027,737.

Rohrer, Jurgen: *See—*
Strunz, Alfred; and Rohrer, Jurgen, 4,028,047.

Roldan, Cristobal Martinez: *See—*
Jarque, Ricardo Granados; Cartes, Juan Bosch; Cabiro, Jorge Canals; Roldan, Cristobal Martinez; and Peinado, Rabadan, 4,028,371.

Rollei-Werke Franke & Heidecke: *See—*
Stiller, Armin; and Borejko, Stefan, 4,028,613.

Rolls-Royce (1971) Limited: *See—*
Carlisle, Denis Richard, 4,028,044.

Romanin, Bruno, to Cempagnie des Brevets et Applications Industrielles Etablissement. Method and device for dummy shuttle operation on conventional shuttle looms. 4,027,704, Cl. 139-438.000.

Romer, Ludwig: *See—*
Keller, Herbert; Krieg, Bruno; and Romer, Ludwig, 4,027,996.

Rondeau, Henry S. Spray bonding of nickel aluminum and nickel titanium alloys. 4,027,367, Cl. 428-652.000.

Roper Corporation: *See—*
De Weese, Raymond Paul; and Kumpfer, Beverly D., 4,028,519.
Torrey, Sumner H., 4,028,520.
Uyeda, Frederick K.; and Austin, Buddy J., 4,028,521.

Rosback, Donald H.: *See—*
Neuzil, Richard W.; and Rosback, Donald H., 4,028,428.

Roseberg, Harry G. Clothing banger. 4,027,812, Cl. 223-96.000.

Rosen, George; Carlick, Daniel J.; and Reiter, Ralph H., to Sun Chemical Corporation. Photopolymerizable compounds and compositions comprising the product of the reaction of a resin and a polycarboxy-substituted benzophenone. 4,028,204, Cl. 204-159.140.

Rosenbaum, Walter Steven, to International Business Machines Corporation. Digital reference hyphenation matrix apparatus for automatically forming hyphenated words. 4,028,677, Cl. 340-172.500.

Rosenberg, John D. Franchise board game. 4,027,882, Cl. 273-134.0AT.

Rosenblum, Jesse. Vibratory separator screen and method of menufecture. 4,028,230, Cl. 209-403.000.

Rosenfeld, Jerome E. Dry transfer product and process. 4,028,165, Cl. 156-234.000.

Rosenkilde, Hakon. Electromagnetic sound generator. 4,028,503, Cl. 179-115.00R.

Rosinski, Klaus D.; and Schroer, John W., to Owens-Corning Fiberglas Corporation. Method for analysis of treated glass fibers. 4,028,472, Cl. 427-8.000.

Ross, John W.: *See—*
Cassidy, Stephen; Baboian, Robert; Frechette, Reymond A.; Haynes, Gardner S.; and Ross, John W., 4,028,064.

Rossmy, Gerd: *See—*
Fink, Hana-Ferdi; Fritsch, Herwig; Koerner, Gotz; Rossmy, Gerd; and Schmidt, Gunter, 4,028,218.

Rozzler, John J., to Brooks & Perkins, Incorporated. Production of neutron shielding material. 4,027,377, Cl. 29-420.500.

Rothgordt, Ulf: *See—*
Jost, Gerhard; Rothgordt, Ulf; and Witter, Klaus, 4,028,711.

Roto-Master, Inc.: *See—*
MacInnes, Hugh, 4,027,994.

Rottleb, Dieter, to Gutermann & Co. Aktiengesellschaft. Spool for thread. 4,027,831, Cl. 242-125.100.

Rottloff, Gunther; Sundermann, Rudolf; Grigat, Ernst; and Putter, Rolf, to Bayer Aktiengesellschaft. Process for the production of polyfunctional cyanic acid esters. 4,028,393, Cl. 260-453.00P.

Roussel-UCLAF: *See—*
Hainaut, Daniel; and Demoute, Jean-Pierre, 4,028,386.

Roussopoulos, Paul: *See—*
Boudouris, Georges; Kalopissis, Gregoire; Leveque, Jean-Luc; and Roussopoulos, Paul, 4,028,518.

Rouvre, Philippe; and Augello, Daniel Jean, to Regie Nationale des Usines Renault; and Automobiles Peugeot. Central circuit control plates for automotive vehicles. 4,028,738, Cl. 361-403.000.

Royer, Robert Dale; and Schwab, Thomas Frank, to Bell Telephone Laboratories, Incorporated. Digital computer arrangement for high speed memory access. 4,028,663, Cl. 340-172.500.

Rubin, Gerald, to Exxon Research and Engineering Company. Elimination of pinking in vinyl asbestos formulations. 4,028,328, Cl. 260-42.440.

Rubino, Andrew M.; Jones, John L.; and Bretschneider, Edward S., to Armour Pharmaceutical Company. Methods of making basic zirconium complexes. 4,028,390, Cl. 260-429.300.

Rucker, Dugan Allan: *See—*
Krum, Jack Kern; Wollermann, Louis Albert; and Rucker, Dugan Allan, 4,028,471.

Rufenacht, Kurt: *See—*
Meyer, Willy; Bohner, Beat; Dawes, Dag; and Rufenacht, Kurt, 4,028,377.

Ruggiero, Arthur. Multi-face clamp for manufacturing or regluing of drawers, chairs or the like. 4,027,866, Cl. 269-41.000.

Ruiz, Gilbert G. Patient restraint for X-ray studies of infants. 4,027,869, Cl. 269-328.000.

Runfeldt, Nils Harald: *See—*
Wenoberg, Olov Carl Gustav; and Runfeldt, Nils Harald, 4,027,378.

Russell, Homer C.: *See—*
Olander, Emil Edward, Jr.; James, Rex L.; Larson, Ivar W.; Covington, Wayne F.; Walden, Jack M.; Watson, Robert E.; Yockey, Francis J.; Wenninger, Fred, Jr.; and Russell, Homer C., 4,028,538.

Russell, John Xavier, to Babcock & Wilcox Company, The. Pot broaching machine. 4,027,574, Cl. 90-10.000.

Rutherford, Harry Wayne. Tank bottom assembly apparatus. 4,027,374, Cl. 29-256.000.

Ruthroff, Clyde Leslie: *See—*
Bodtmann, William Fred; and Ruthroff, Clyde Leslie, 4,028,641.

Ruumpol, Geurt J., to Veco Beheer Electroforming/Photo Etching B.V. System for passing products to be treated through a machine. 4,028,605, Cl. 318-696.000.

Ryckman, William D., Jr., to General Electric Company. Apparatus for heating dispensable flowable material. 4,027,786, Cl. 222-146.0HA.

Ryobi, Ltd.: *See—*
Tasaka, Tomoyuki; and Honkawa, Yoshinori, 4,027,588.

S.A.F. Societe Agricole et Fonciere S.A.: *See—*
Imhof, Hugo, 4,028,030.

S & C Electric Company: *See—*
Schmunk, E. William; and Tobin, Thomas J., 4,028,656.

Saam, Charles W., to Harter Corporation. Method of making a chair leg base. 4,027,364, Cl. 29-150.000.

Saburi, Akio, to Nippon Electric Company, Ltd. Acquisition technique for time division multiple access communication system. 4,028,497, Cl. 179-15.0BS.

Sachs, Elmer B. Airplane. 4,027,835, Cl. 244-101.000.

Sado, Yukio: *See—*
Yamamoto, Yukio; and Sado, Yukio, 4,027,581.

Safar, Petr; Langr, Josef; Kolar, Miloslav; and Nosek, Stanislav, to Vyzkumny Ustav Bavlnarsky. Strand-braking apparatus. 4,027,705, Cl. 139-450.000.

Sahmkow, Dieter: *See—*
Hickmann, Karl; and Sahmkow, Dieter, 4,028,445.

Sai, Fumio: *See—*
Murata, Moriyasu; Sai, Fumio; and Fujino, Takashi, 4,028,280.
Murata, Moriyasu; Sai, Fumio; and Fujino, Takashi, 4,028,283.

Saich, William George, to Solartron Electronic Group Limited, The. Data terminals having interactive keyboards and displays and data processing apparatus incorporating such terminals. 4,028,695, Cl. 340-365.00R.

St. Clair, Theodore A., to Testron, Inc. Methods and apparatus for proof testing gas meters. 4,027,523, Cl. 73-3.000.

Saint-Gobain Industries: *See—*
Pons, Andre, 4,028,131.

Saint-Lot, Armand, to Thomson-CSF. Electronic switching arrangement for a homing and traffic radio system. 4,028,624, Cl. 325-23.000.

Saito, Kazuaki: *See—*
Doi, Tsuneyuki; Komoto, Hiroshi; Chono, Masazumi; Inoue, Akira; Saito, Kazuaki; and Shinozuka, Isao, 4,028,055.

Saito, Minoru: *See—*
Hirai, Masahide; Fujimura, Mikio; Kazigase, Masahiro; and Saito, Minoru, 4,028,284.

Saito, Yuichi, to Nissan Motor Co., Ltd. Pressure reducer device. 4,027,923, Cl. 303-6.00C.

Sakaguchi, Hiroshi: *See—*
Ueda, Shoji; Ono, Shuzi; Sakaguchi, Hiroshi; and Tsunoda, Hideo, 4,028,455.

Sakai, Shuzo, to Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo. Process for the production of saccharified starch products. 4,028,186, Cl. 195-31.00R.

Sakai, Toshiyuki; Matsuo, Koichi; and Tochio, Yukihiro, to Mitsui Mining & Smelting Co., Ltd. Process for preparing catalytic materials for purifying exhaust gas and catalytic materials prepared thereby. 4,028,275, Cl. 252-466.0PT.

Sakamoto, Minoru. Locking jalousie frame. 4,027,430, Cl. 49-403.000.

Sakamoto, Takashi: *See—*
Ono, Yoshio; and Sakamoto, Takashi, 4,028,105.

Sakano, Takeshi: *See—*
Kawasaki, Kaoru; Sakano, Takeshi; Furuya, Shigeru; and Endo, Shigeru, 4,027,803.

Sakasegawa, Koji: *See—*
Yamamoto, Tomio; Sakasegawa, Koji; Osumi, Atsushi; Hosaka, Yukio; and Yamada, Takeo, 4,027,978.

Sakatani, Takenobu: *See—*
Okumura, Osamu; Sakatani, Takenobu; Yamane, Izumi; and Kashiwada, Toshinobu, 4,028,282.

Sakurada, Nobuaki: *See—*
Kawamura, Masaharu; Sakurada, Nobuaki; Shinoda, Nobuhiko; Ito, Tadashi; Ito, Fumio; and Murakami, Hiroyashu, 4,028,712.

Salter, Lucien; and Maincent, Gabriel. Apparatus and method for display of images. 4,028,732, Cl. 358-289.000.

Salto, Rinaldo, to Ing. C. Olivetti & C., S.p.A. Keyboard for office machines. 4,027,763, Cl. 197-16.000.

Salvatore, Michael. Method of lasting shoe uppers to a last and lasted shoe uppers and articles of footwear produced thereby. 4,027,406, Cl. 36-83.000.

Samis, Philip Lawrence. Positive identification method and structure. 4,027,391, Cl. 32-1.000.

Samuels, W. Edward. Gas-energized liquid transfer and control system. 4,027,791, Cl. 222-396.000.

Sanders Associates, Inc.: *See—*
Misek, Victor A., 4,027,970.
Mortimer, Thomas J., 4,028,661.
Stevens, Robert R., 4,028,699.

Sanderson, William A., to Burlington Industries, Inc. Process for preparing m-aminobenzenephosphonic acid. 4,028,403, Cl. 260-502.500.

Sando Iron Works Co., Ltd.: *See—*
Sando, Yoshikazu; and Ishidoshiro, Hiroshi, 4,027,507.

Sando, Yoshikazu; and Ishidoshiro, Hiroshi, to Sando Iron Works Co., Ltd. Air-and-liquid combined sealing device for high pressure steamer. 4,027,507, Cl. 68-5.00E.

Sandoval, Jorge: *See—*
Domic, Esteban; Sfeir, Albert; and Sandoval, Jorge, 4,028,462.

Sapp, Lawrence G.; Slappey, James F.; and Nison, C. Bart. Unitizing frame for a pallet. 4,027,599, Cl. 108-55.100.

Sargentini, Enrico; and Carena, Ugo, to Ing. C. Olivetti & C., S.p.A. Inking device for the type-carrier element of a calculating machine. 4,027,766, Cl. 197-151.000.

Sato, Akira; Ikeda, Tadashi; Sueyoshi, Tohru; Nakamura, Yasuharu; and Shimada, Takeo, to Fuji Photo Film Co., Ltd. Photographic sensitive materials having a dyed layer. 4,028,112, Cl. 96-84.00R.

Sato, Akira: *See—*
Hinata, Masanao; Takei, Haruo; Sato, Akira; Iwamoto, Atsuo; and Hayashi, Jun, 4,028,115.

Sato, Haruto. Swimming glove. 4,027,347, Cl. 9-308.000.

Sato, Hisatake: *See—*
Tsuchiya, Shozo; Sato, Hisatake; Oshima, Akio; and Hayashi, Hideo, 4,028,291.

Sato, Shigetake; Kurahashi, Suminobu; Okuyama, Toru; and Hamada, Noboru, to Bridgestone Tire Company Limited. Process for continuous preparation of a foam polyamide. 4,028,287, Cl. 260-2.50N.

Sato, Tadashi: *See—*
Hamaguchi, Sachihiko; Oomura, Ikuo; Sato, Tadashi; and Wada, Hisashi, 4,028,687.

Satzinger, Gerhard; and Hechtfischer, Gustav, to Warner-Lambert Company. Process for substituted cyclohexenes and its products. 4,028,398, Cl. 260-471.00A.

Sauerbrunn, Robert Dewey: *See—*
Livingston, Richard Donnan; and Sauerbrunn, Robert Dewey, 4,028,443.

Savarimuthu, Sundar. Reinforcing hole punch device. 4,028,170, Cl. 156-513.000.

Sawa, Toshio: *See—*
Nishimura, Shigeoki; Sawa, Toshio; Otani, Kouji; and Kikkawa, Seiichi, 4,028,237.

Sawada, Shuzo: *See—*
Fujisawa, Michio; Matsumoto, Hatsuo; Sawada, Shuzo; Yamane, Kiyoshi; Kato, Hideo; Shimizu, Takayuki; and Kato, Shigeo, 4,027,345.

Sawada, Yuji: *See—*
Kawarai, Takashi; Sawada, Yuji; Takemoto, Katsumi; and Mikami, Sadao, 4,027,823.

Sawyer, Philip Nicholas; and Stanczewski, Boguslaw, to Interface Biomedical Laboratories Corporation. Endosteal bionic tooth and implantation method. 4,027,392, Cl. 32-10.00A.

Saxon, Robert: *See—*
Li, Tsi Tieh; and Saxon, Robert, 4,028,305.

Sayigh, Adnan A. R.; Sun, Kwok K.; and Ulrich, Henri, to Upjohn Company, The. Process for the purification of MDA. 4,028,361, Cl. 260-570.00D.

SCA Development Aktiebolag: *See—*
Bohlin, Karl Gunnar; Eriksson, Karl Rune; and Gustafsson, Carl-Erik, 4,027,736.

Schaaf, Robert, to Air Filters, Inc. Vacuum cleaner filter bag. 4,028,074, Cl. 55-366.000.

Schachte, John J.: *See—*
Zankl, Frank; Kirkham, Edward E.; Stobbe, Richard E.; and Schachte, John J., 4,028,599.

Schaefer, Carl W. D.; Schaefer, Richard L.; and Kennedy, Gordon F., to Frank W. Schaefer Inc. Metal melting furnace with alternate heating systems. 4,027,862, Cl. 266-160.000.

Schaefer, Hermann Reinhold: *See—*
Flowers, Theodore Robert; and Schaefer, Hermann Reinhold, 4,027,348.

Schaefer, Richard L.: *See—*
Schaefer, Carl W. D.; Schaefer, Richard L.; and Kennedy, Gordon F., 4,027,862.

Schafer, Inge: *See—*
Bite, Pal; Moravcsik, Imre; Schafer, Inge; Horvath, Gyula; Meherfalvi nee Vajna, Zsuzsanna; Borvendeg, Janos; and Hermann nee Szente, Ilona, 4,028,348.

Schafer, Walter; Wagner, Kuno; and Muller, Hans-Jurgen, to Bayer Aktiengesellschaft. Process for the production of polyureas. 4,028,310, Cl. 260-77.5CH.

Schaidle, William J.; and Stewart, Patrick H., to Core-Lube, Inc. Binding resin for foundry sand and catalyst therefor. 4,028,271, Cl. 252-429.00R.

Schall, William L.: *See—*
Kahn, Henry; and Schall, William L., 4,028,329.

Schaller, Karl: *See—*
Failla, Henri; Schaller, Karl; and Vidard, Michel, 4,028,177.

Schaub, Robert Eugene; and Weiss, Martin Joseph, to American Cyanamid Company. 16,16-Spirocycloalkyl prostaglandin derivatives. 4,028,396, Cl. 260-468.00D.

Schei, Asle: *See—*
Fahlen, Nils; and Schei, Asle, 4,028,592.

Scheibel, Edward G., to Suntech, Inc. Cascade refrigeration system. 4,028,079, Cl. 62-335.000.

Schenker, Barry A.: *See—*
Lewis, David L.; Franks, C. Richard; and Schenker, Barry A., 4,028,215.

Schering Aktiengesellschaft: *See—*
Wenzel, Martin; and Langheim, Detlef, 4,028,389.

Schiel, Christian, to J. M. Voith GmbH. Cylinder machine having positive pressure chambers adjacent an outer band. 4,028,175, Cl. 162-274.000.

Schlatter, James M.: *See—*
Jones, David A., Jr.; Schlatter, James M.; Mikulec, Richard A.; Reuter, Judith A.; and Mazur, Robert H., 4,028,319.

Schlegel Corporation: *See—*
Lind, Earl V., 4,028,456.

Schlicker, Heinrich August, to AB Volvo Penta. Hydraulic servo-brake arrangement for double circuit brakes. 4,027,922, Cl. 303-6.00R.

Schloss, Alden. Record-reproduce device for flash cards. 4,027,405, Cl. 35-35.00C.

Schlotman, Walter F., to Stanadyne, Inc. Faucet valve and seal therefor. 4,027,851, Cl. 251-172.000.

Schmelzer Corporation: *See—*
Benjamin, Benjamin C., 4,027,634.

Schmider, Paul, to Beckman Instruments G.m.b.H. Apparatus for doping semiconductors in centrifuge. 4,027,622, Cl. 118-49.500.

Schmidt, Eckart W., to Rocket Research Corporation. Composite catalyst bed and method for making the same. 4,027,476, Cl. 60-218.000.

Schmidt, Gunter: *See—*
Fink, Hans-Ferdi; Fritsch, Herwig; Koerner, Gotz; Rossmy, Gerd; and Schmidt, Gunter, 4,028,218.

Schmidt, Warren E.: *See—*
Finney, Robert H.; and Schmidt, Warren E., 4,028,002.

Schmunk, E. William; and Tobin, Thomas J., to S & C Electric Company. High voltage fuse with outer heat-shrinkable sleeve. 4,028,656, Cl. 337-186.000.

Schmutz, Hermann: *See—*
Huschka, Hans; Schmutz, Hermann; and Vygen, Peter, 4,028,181.

Schnatmeyer, Hans; and Schutzer, Gerhard, to Gustav F. Gerdts KG. Check valve. 4,027,695, Cl. 137-527.000.

Schneider, Abraham, to Suntech, Inc. Explosive composition containing alkyl ethers having high densities. 4,028,153, Cl. 149-46.000.

Schneider, Abraham: *See—*
Borkowski, Walter L.; and Schneider, Abraham, 4,028,152.

Schneider, Richard: *See—*
Rendell, Stanley E.; and Schneider, Richard, 4,027,570.

Schnell, William J.: *See—*
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School Health Supply Company: *See—*
Good, Carleton R., 4,027,954.

Schopp, Hans, to Ellenberger & Poensgen GmbH. Calorimetric flow monitor. 4,028,689, Cl. 340-239.00R.

Schossow, George W. Electrically grounded vaporizer structure. 4,028,526, Cl. 219-295.000.

Schossow, George W. Safety circuit for electrical equipment. 4,028,594, Cl. 307-326.000.

Schott, John P.: *See—*
Piech, Kenneth R.; and Schott, John R., 4,027,980.

Schroeder, Lloyd A. Model aircraft propulsion. 4,027,422, Cl. 46-78.000.

Schroeder, William Edward: *See—*
Gewartowski, James Walter; and Schroeder, William Edward, 4,028,637.

Schroer, John W.: *See—*
Rosinski, Klaus D.; and Schroer, John W., 4,028,472.

Schubert, Anthony E.: *See—*
McKee, William H.; and Schubert, Anthony E., 4,027,521.

Schulman, Joseph H.; and Moore, Robert F., to Pacesetter Systems, Inc. Myocardial lead. 4,027,677, Cl. 128-418.000.

Schulte, Sheldon R.: *See—*
Robin, Michael; and Schulte, Sheldon R., 4,028,416.

Schultz, James J.; and Van Pelt, Vincent J., to Tennessee Valley Authority. Fertilizer processes incorporating scrubbed flue gas sludge byproduct. 4,028,087, Cl. 71-25.000.

Schuplin, Jerome T., to Fastway Fasteners, Inc. Hold down clip for ceiling tile in grid-type ceiling. 4,027,454, Cl. 52-714.000.

Schuster, Stanley E.: *See—*
Cook, Peter William; and Schuster, Stanley E., 4,028,694.

Schutzer, Gerhard: *See—*
Schnatmeyer, Hans; and Schutzer, Gerhard, 4,027,695.

Schwab, Thomas Frank: *See—*
Royer, Robert Dale; and Schwab, Thomas Frank, 4,028,663.

Schwan, Thomas J., to Morton-Norwich Products, Inc. 2-Diethoxyethyl(dimethyl)(2-(2,4-diphenyl-5-pyrimidyl)-2-oxoethyl)ammonium bromide. 4,028,359, Cl. 260-256.40R.

Schwartz, Rene, to Groupe Europeen pour la Technique des Turbines a Vapeur G.E.T.T. S.A. Fixing arrangement for a guide part of a fixed casing on a rotating machine. 4,027,998, Cl. 415-219.00R.

Schwarz, Alois: *See—*
Weiland, Emil; Schwarz, Alois; and Frommlet, Hubert, 4,028,000.

Schwarz, Hans-Helmut; and Immel, Otto, to Bayer Aktiengesellschaft. Method for processing lactam residues which contain boric acid. 4,028,347, Cl. 260-239.30A.

Schwarzmann, Frederick G.: *See—*
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Schweizerische Aluminium AG: *See—*
Theobald, Reiner; and Heubner, Ulrich, 4,027,716.

Schwibach, Wilhelm: *See—*
Eichinger, Johann; and Schwibach, Wilhelm, 4,027,553.

Scott, Marion L., to United States of America, Navy. IR imaging with surface wave readout. 4,028,548, Cl. 250-330.000.

Scott, Norman H., to UOP Inc. Fractionation column with vapor channeling baffles. 4,028,191, Cl. 202-158.000.

Scott Paper Company: *See—*
Millard, Ben; and Robie, Susan P., 4,028,281.

Scrivens, George W., to Johnson & Johnson. Cardiovascular drape. 4,027,665, Cl. 128-132.00D.

SECIM: *See—*
Quehen, Andre, 4,027,725.

Seibel, Julia K. Drag reducing fairing for landing gear. 4,027,836, Cl. 244-103.00R.

Seibu Polymer Kasei Kabushiki Kaisha: *See—*
Tanikawa, Takayoshi, 4,027,902.

Seide, Adolf, to Werner & Pfleiderer. Screw extruder and calender assemblage. 4,028,031, Cl. 425-147.000.

Seidl, Joachim: *See—*
Seidl, Maximilian R.; Seidl, Joachim; and Henry, Walton M., 4,027,590.

Seidl, Maximilian R.; Seidl, Joachim; and Henry, Walton M., to Avery International Corporation. Label, ticket and tag printing machine with interchangeable tape supply and feeder magazines. 4,027,590, Cl. 101-288.000.

Seiler, Claus-Dieter: *See—*
Vahlensieck, Hans-Joachim; Seiler, Claus-Dieter; and Kotzsch, Hans-Joachim, 4,028,384.

Seiler, Hartmut: *See—*
Streit, Klaus; Kugelmann, Adolf; and Seiler, Hartmut, 4,028,564.

Seki, Kenji; Kimura, Akio; Asahi, Satoshi; and Takeshita, Yasuhiro, to Idemitsu, Kosan Kabushiki-Kaisha (Idemitsu Kosan Co., Ltd.). Process for producing block copolymers. 4,028,435, Cl. 260-878.00B.

Selam, Gabriel. Device for detecting and positioning a mobile object capable of moving in at least one given path. 4,028,603, Cl. 318-587.000.

Sels, Francis Jeanne: *See—*
Berendsen, Jules Robert; Pollet, Robert Joseph; Philippaerts, Herman Adelbert; Sels, Francis Jeanne; and Willems, Jozef Frans, 4,028,110.

Sensoli, Robert A.: *See—*
Cole, Gerald S.; Kovacs, Bela V.; Sensoli, Robert A.; and Smartt, Herschel B., 4,028,099.

Sera, Hidefumi; Nagao, Kameji; and Ishii, Tsumoru, to Fujii Photo Film Co., Ltd. Method of hardening gelatin using sulfonyl compounds. 4,028,320, Cl. 260-117.000.

Sezaki, Tamotsu: *See—*
Ikeda, Tsunemi; and Sezaki, Tamotsu, 4,027,617.

Sfeir, Albert: *See—*
Domic, Estehan; Sfeir, Albert; and Sandoval, Jorge, 4,028,462.

Shaduya, Vladimir Leontievich: *See—*
Chachin, Viktor Nikolaevich; Zdor, Gennady Nikolaevich; Zhuravsky, Alexandr Julyanovich; Golovkina, Elena Yakovlevna; and Shaduya, Vladimir Leontievich, 4,027,515.

Shakespeare Company: *See—*
Derrick, Danny O., 4,027,741.

Shand, Kenneth James. Apparatus and method for increasing speed of horses. 4,027,462, Cl. 54-71.000.

Sharp, Benny H., to Western Electric Company, Inc. Method of and video system for identifying different light-reflective surface areas on articles. 4,028,728, Cl. 358-106.000.

Sharp, Donald E.: *See—*
Yanko, William H.; and Sharp, Donald E., 4,028,410.

Shaw, Victor Henry, to Plessey Handel und Investments A.G. Illuminated optical viewers. 4,027,957, Cl. 353-21.000.

Sheehan, John Timothy: *See—*
Bodanszky, Miklos; and Sheehan, John Timothy, 4,028,315.

Shell Oil Company: *See—*
Goppel, Johan M.; and Chant, Peter R., 4,028,477.
van den Brink, Marinus J.; Austermuhle-Bertola, Helena; and Kramer, Petrus A., 4,028,418.

Shelton, Claude M.: *See—*
Bogen, Richard T.; and Shelton, Claude M., 4,028,436.

Shelton, Herbert P. Solar energy operated air compressor. 4,028,008, Cl. 417-52.000.

Shelton, Jack: *See—*
Leesure, William; Garcia, Luis; Reifel, Charles; and Shelton, Jack, 4,027,579.

Shemonaev, Alexandr Tikhonovich; Cherny, Dmitry Grigorievich; Genis, Semen Naumovich; and Vishnitsky, Igor Konstantinovich. Transverse frame of industrial building carcass. 4,027,438, Cl. 52-27.000.

Sherrill, Frank C., to Ellison Company, Inc., The. Loom reed. 4,027,702, Cl. 139-192.000.

Shibata, Norio: *See—*
Goto, Kenji; Shibata, Norio; and Hashiguchi, Yukihide, 4,027,635.

Shigeta, Yoshihiro; Suzaki, Kuniyoshi; and Ogiso, Mitsutoshi, to Canon Kabushiki Kaisha. System for controlling reproduction of audio tape in synchronism with projection of video film. 4,027,958, Cl. 353-26.00A.

Shiina, Naonori: *See—*
Hashimoto, Makoto; Uehara, Shinzi; Sugita, Tadashi; and Shiina, Naonori, 4,028,448.

Shikano, Yoshiro; and Ueoka, Yasuhiro, to Mitsubishi Denki Kabushiki Kaisha. Cooling device for heat generation member. 4,028,723, Cl. 357-82.000.

Shikeno, Yoshiro: *See—*
Kobayashi, Osi; Shikano, Yoshiro; and Yano, Masao, 4,027,728.

Shikasho, Satoru: *See—*
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Shima, Masao: *See—*
Togo, Masaaki; Shima, Masao; and Mochizuki, Kiyoshi, 4,028,604.

Shimada, Takeo: *See—*
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Shimade, Toshio: *See—*
Hujimori, Masao; Nakajima, Shigeo; Takahashi, Ken; Ito, Tsunetoshi; Shimada, Toshio; and Endo, Hajime, 4,027,918.

Shimano Industrial Company, Limited: *See—*
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Shimizu, Takeyuki: *See—*
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Shimizu, Yoshiyuki: *See—*
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Shimogawa, Toshiaki; Morita, Masayuki; and Kawaharazaki, Takashi, to Nippon Soken, Inc. Seat belt system for vehicle. 4,027,905, Cl. 280-746.000.

Shinoda, Nobuhiko: *See—*
Kawamura, Masaharu; Sakurada, Nobuaki; Shinoda, Nobuhiko; Ito, Tadashi; Ito, Fumio; and Murakami, Hiroyashu, 4,028,712.

Shimozuka, Isao: *See—*
Doi, Tsunesuke; Komoto, Hiroshi; Chono, Masazumi; Inoue, Akira; Saito, Kazuaki; and Shinozuka, Isao, 4,028,055.

Shiomura, Tetsunosuke; Ito, Akiro; Morimoto, Yoshio; and Iwao, Tetsuya, to Mitsui Toatsu Chemicals, Incorporated. Production of olefin polymers and novel catalysts therefore. 4,028,481, Cl. 526-142.000.

Shionogi & Co., Ltd.: *See—*
Yukinaga, Hisajiro; Sumimoto, Shinzaburo; Ishizuka, Ichiro; and Sugita, Jitsuo, 4,028,376.

Shiraki, Masaru: *See—*
Okada, Akira; Iriyama, Keiji; and Shiraki, Masaru, 4,028,217.

Shorrock Developments Limited: *See—*
Buckley, Norman Ian; and Wilson, Edward, 4,028,690.

Shortes, Samuel R.; and Millis, Edwin Graham, to Texas Instruments Incorporated. Method and apparatus for cleaning the surface of a semiconductor slice with a liquid spray of de-ionized water. 4,027,686, Cl. 134-33.000.

Showa Denko Kabushiki Kaisha: *See—*
Ueshima, Takashi; Tanaka, Yasuzi; and Kobayashi, Shoichi, 4,028,482.

Shufflebarger, Earl D.; Kish, Edward E.; Boylan, John R.; Diehl, George D.; Gallagher, Bernard J.; and Tobbe, William P., to Nupro Company. Fluid filter. 4,028,254, Cl. 210-447.000.

Shufflebarger, Earl D.: *See—*
Murauskas, Donald J.; Kish, Edward E., Jr.; Cunningham, Frank M.; Gallagher, Bernard J.; and Shufflebarger, Earl D., 4,028,248.

Shutoh, Masamichi, to Nippon Electric Company, Ltd. Driving circuit for selecting control cells of a gas discharge panel by transistors through diodes. 4,028,584, Cl. 315-169.0TV.

Sickel, Helmut, deceased (by Sickel, Liesbet, administrator), to Dr. Kuhn & Co. GmbH. Speech aid apparatus for laryngectomees. 4,028,492, Cl. 179-1.0AL.

Sickel, Liesbet, administrator: *See—*
Sickel, Helmut, deceased, 4,028,492.

Siegmund, Walter P.: *See—*
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Siemens Aktiengesellschaft: *See—*
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Kraupa, Werner, 4,028,176.

Siemens-Albis Aktiengesellschaft: *See—*
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Siempelkamp Giesserei KG: *See—*
Beckmann, Georg, 4,027,690.

Silverman, Herman, to KDI Sylvan Pools, Inc. Method of constructing swimming pools. 4,027,442, Cl. 52-309.400.

Simmons, James Almy: *See—*
Bell, Robert Joseph; and Simmons, James Almy, 4,028,464.

Simms, William D.: *See—*
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Simon, Helmut: *See—*
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Singer Company, The: *See—*
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Marsh, David Raymond; and Osofsky, Raymond C., 4,027,403.
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SKF Industrial Trading and Development Company B.V.: *See—*
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SKF Nova AB: *See—*
Lundgren, Bengt G. S., 4,027,718.

Skowronski, Michael J.: *See—*
Hipchen, Donald E.; Skowronski, Michael J.; and Hagan, Joseph R., 4,028,158.

Skrydstrup, Ole, to Central Dynamics Ltd. Mix/effects switch arrangement and mix/effects switching system. 4,028,727, Cl. 358-181.000.

Slappey, James F.: *See—*
Sapp, Lawrence G.; Slappey, James F.; and Nixon, C. Bart, 4,027,599.

Slator, Damon T.; Bishop, Thomas R.; and Peil, Archie W., to Bowen Tools, Inc. Seal assembly. 4,027,816, Cl. 277-188.00R.

Slenders, Petrus: *See—*
Nieskens, Antonius; Slenders, Petrus; and Palmkoeck, Christian, 4,027,459.

Slingluff, Eugene L., to Krandes Corporation. Radiographic opaque and conductive stripped medical tubes. 4,027,659, Cl. 128-2.00M.

Sloss, Barry L.: *See—*
Stayner, Vance A.; and Sloss, Barry L., 4,028,134.

Sly, Howard M. Water actuated garbage compactor. 4,027,584, Cl. 100-218.000.

Smartt, Herschel B.: *See—*
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Smit Ovens Nijmegen B.V.: *See—*
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Smith, Bradley W.: *See—*
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Smith, Clay D.; and Keller, D. V., Jr., to Otisca Industries, Ltd. Methods of and apparatus for hydrocarbon recovery. 4,027,731, Cl. 166-267.000.

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Smith, Edward Dyal: *See—*
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Smith, Gordon Marlon: *See—*
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Smith, Jack: *See—*
Taylor, Fredrick J.; Smith, Jack; and Pries, Thomas H., 4,028,673.

Smith, Joseph F. Uniroll false twist device and method. 4,027,467, Cl. 57-77.400.

Smith Kline & French Laboratories Limited: *See—*
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Smith, Lawrence: *See—*
United States of America, National Aeronautics and Space Administration; Smoot, George F.; Pope, William L.; and Smith, Lawrence, 4,027,494.

Smith, Peter William: *See—*
Gloge, Detlef Christoph; Smith, Peter William; and Chinnock, Edwin LeRoy, 4,027,814.

Smith, Randlow; Jones, Henry B.; Jobsis, Adrianus C.; and Deloney, Hugh C., to Texaco Inc. Methods and multiple thermocouple support assembly. 4,028,139, Cl. 136-230.000.

SmithKline Corporation: *See—*
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Levinson, Sidney Harry; and Mendelson, Wilford Lee, 4,028,408.

Smoot, George F.: *See—*
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Snell, George J.: *See—*
Sze, Morgan C.; and Snell, George J., 4,028,221.

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Parks, Jill J.; and Snook, Stephen R., 4,028,701.

Snow, John E., to Champion International Corporation. Product processing system with price printer. 4,028,537, Cl. 235-61.90R.

Snyder, Lloyd R.; Oberhardt, Bruce J.; and Olich, Jack, to Technicon Instruments Corporation. Substance separation technique. 4,028,056, Cl. 23-230.00B.

Snyder, Robert P.; and Deja, Edmund P., to Trippensee Corporation. Latch releasing mechanism for water samplers. 4,027,538, Cl. 73-425.40R.

Sobel, Jay E.: *See—*
Carlson, David H. J.; Verachtert, Thomas A.; and Sobel, Jay E., 4,028,269.

Societe Anonyme D.B.A.: *See—*
Gerard, Jean-Louis, 4,027,751.

S.A. des Anciens Etablissements Paul Wurth: *See—*
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Societe Anonyme des Equipements S.E.I.M.: *See—*
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Societe Chimique des Charbonnages - CdF Chimie: *See—*
Le Brasseur, Genevieve, 4,028,480.

Societe d'Etude et d'Application des Techniques Nouvelles NEO-TEC: *See—*
Honore, Etienne A. H.; and Torcheus, Emile L. G., 4,028,703.

Societe d'Etudes de Machines Thermiques: *See—*
Froeliger, Jacques Ernest Maurice, 4,027,365.

Societe Generale de Constructions Electriques et Mecaniques (Alsthom): *See—*
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Societe Les Coffrages Madernes: *See—*
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Sofianek, Joseph C.: *See—*
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Soga, Tsunehiko: *See—*
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Sohma, Akio: *See—*
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Solares Corporation: *See—*
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Solartron Electronic Group Limited, The: *See—*
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Solid State Systems, Inc.: *See—*
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Soltis, Frank Gerald: *See—*
Hoffman, Roy Louis; Kempke, William George; and Soltis, Frank Gerald, 4,028,670.

Solvay & Cie: *See—*
Giacopelli, Umberto, 4,028,208.

Somerville, Robert L. Feed box for liquid-solid mixtures. 4,027,760, Cl. 193-2.00R.

Sony Corporation: *See—*
Komatsu, Yasutoshi; and Yanagisawa, Yuzuru, 4,028,649.

Soo, Suk Suet: *See—*
Brennemann, Andrew Ernest; and Soo, Suk Suet, 4,028,493.

Sorgenfrei, Jurgen: *See—*
Weber, Gerald; and Sorgenfrei, Jurgen, 4,028,682.

Southwest Wheel and Manufacturing Company: *See—*
Steen, Buster M., 4,027,898.

Southwire Company: *See—*
Chia, E. Henry; Powers, Frank M.; and Chadwick, Kenneth E., 4,028,141.

Spanek, Denis C.: *See—*
Spanek, George; and Spanek, Denis C., 4,027,583.

Spanek, George; and Spanek, Denis C. Rack for supporting poultry and meat during roasting. 4,027,583, Cl. 99-421.00H.

Sparlin, Derry D., to Continental Oil Company. Seal assembly for fluid injection pump-down tools. 4,027,730, Cl. 166-156.000.

Spaulding, Vincent M.: *See—*
Key, Columbus B., Jr.; and Spaulding, Vincent M., 4,028,540.

Speer, Robert John: *See—*
Turner, David; and Speer, Robert John, 4,027,975.

Spence-Bate, Harry Arthur Hele. Camera mechanism. 4,027,968, Cl. 355-46.000.

Sperry Rand Corporation: *See—*
Albanese, Angelo P.; and Rattiner, David H., 4,028,697.
Flowers, Theodore Robert; and Schaefer, Hermann Reinhold, 4,027,348.
Young, Robert G., 4,027,815.

Sperti, George S.; and Berberich, Norbert J., Jr. Insertable dispensing capsule. 4,027,671, Cl. 128-272.000.

Spicers Limited: *See—*
Rigden, Peter Charles Edwin, 4,027,795.

Spinelli, Richard A.: *See—*
Hoppner, Werner F.; Spinelli, Richard A.; and Allis, Robert F., 4,027,963.

Spinosa, Dominic J.; and Camillucci, Edward R., to East/West Industries, Inc. Cutting implement. 4,027,386, Cl. 30-53.000.

Spohr, Karl: *See—*
Klein, Gunther; and Spohr, Karl, 4,027,556.

Sprague, James W.; Feldman, Daniel W.; and Veatch, Franklin, to Standard Oil Company. Manganese containing fuels. 4,028,065, Cl. 44-68.000.

Stade, Heinrich; and David, Klaus, to Stade, Heinrich. Self-sinking, axial passage foundation pile and method. 4,027,490, Cl. 61-53.500.

Staes, Daniel, to Rapistan, Incorporated. Code scanning system. 4,028,528, Cl. 235-61.11E.

Stahler, Theo, to Rheintechnik Weiland & Kaspar KG. Arrangement for conversion of foreign matter contained in water. 4,028,245, Cl. 210-151.000.

Stahlmann, Rudolf: *See—*
Hubsch, Gunter; Bendler, Hellmut; Stahlmann, Rudolf; and Gawlick, Heinz, 4,027,592.

Stal-Laval Turbin AB: *See—*
Andersson, Leif; and Singh, Ritindar, 4,027,699.

Stamicarbon B. V.: *See—*
Thoma, Jozef A.; and Stijfs, Petrus A. M. J., 4,028,362.

Stanadyne, Inc.: *See—*
Schlotman, Walter F., 4,027,851.

Stanczewski, Boguslaw: *See—*
Sawyer, Philip Nicholas; and Stanczewski, Boguslaw, 4,027,392.

Standard Oil Company: *See—*
Sprague, James W.; Feldman, Daniel W.; and Veatch, Franklin, 4,028,065.

Standard Oil Company (Indiana): *See—*
Nelson, James P., 4,028,308.
Puskas, Imre; and Cengel, John A., 4,028,264.

Standard Pressed Steel Co.: *See—*
Tambini, Angelo L.; and Wallace, Paul W., 4,027,530.

Stanley Electric Co., Ltd.: *See—*
Tashiro, Miporu; and Kimura, Shigeru, 4,028,611.

Starkweather, Gary K., to Xerox Corporation. Copier/raster scan apparatus. 4,027,961, Cl. 355-3.00R.

Starnes, William Herbert, Jr., to Bell Telephone Laboratories, Incorporated. Technique for stabilization of vinyl chloride polymers. 4,028,337, Cl. 260-45.75S.

Stauffer Chemical Company: *See—*
Baker, Don R.; Walker, Francis H.; and Letchworth, Peter E., 4,028,411.
Chang, Pei K., 4,028,317.
Teach, Eugene G., 4,028,093.

Stauter, John C.; and Um, Richard T., to UOP Inc. Recovery of manganese values. 4,028,463, Cl. 423-52.000.

Stayner, Robert A.; and Lowe, Warren, to Chevron Research Company. Wax-flux composition containing a succinimide salt of an alkylaryl sulfonic acid for soldering. 4,028,143, Cl. 148-23.000.

Stayner, Vance A.; and Sloss, Barry L. Reinforced resin filler compositions. 4,028,134, Cl. 106-291.000.

Stearns, Charles F., to United Technologies Corporation. Fuel control. 4,027,472, Cl. 60-39.28R.

Steen, Buster M., to Southwest Wheel and Manufacturing Company. Level load leaf spring drop axle. 4,027,898, Cl. 280-720.000.

Stefan, Stjepan: *See—*
Rausing, Ruben; Nadstedt, Gert; Holmstrom, Hakan; Palm, Lars-Erik; and Stefan, Stjepan, 4,027,455.

Steigerwald Strahltechnik GmbH: *See—*
Anderl, Peter; Geffcken, Monika; and Geissler, Joachim, 4,028,523.

Steinbatz, Alfred, to C. Reichert Optische Werke AG. Storage circuit for photometer. 4,027,981, Cl. 356-229.000.

Stella, Joseph A.; and Mason, Paul B., to Polaroid Corporation. Apparatus for facilitating engagement between film and film actuated pull-strip. 4,027,956, Cl. 352-130.000.

Stensen, Heinrich P.: *See—*
Verhoeven, Gerardus H. Th. M.; and Stensen, Heinrich P., 4,028,052.

Stepan, Jiri, to K. Loepfe Automation AG. Stripping device for wire, or the like. 4,027,557, Cl. 81-9.50R.

Stepe, Visvaldis A., to Caterpillar Tractor Co. Ground engaging element having a controlled cutting edge. 4,027,409, Cl. 37-142.00R.

Stephens, James R., to Phillips Petroleum Company. Liquid dispensing and vapor recovery system. 4,027,706, Cl. 141-301.000.

Stephenson, Robert Larry; and Colasanti, Arduino, to Allied Chemical Corporation. Flywheel and clutch mechanism for safety belt retractor. 4,027,829, Cl. 242-107.40A.

Sterling Drug Inc.: *See—*
Alexander, Ernest John; and Mooradian, Aram, 4,028,382.
Crounse, Nathan N.; and Ambrosiano, Nicholas A., 4,028,372.
Crounse, Nathan Norman, 4,028,357.
Daum, Sol J.; and Clarke, Robert L., 4,028,188.
Zeaitz, Bernard L., 4,028,366.

Stevens, Carlile R. Battery analyzer. 4,028,616, Cl. 324-29.500.

Stevens, Robert R., to Sanders Associates, Inc. Search radar. 4,028,699, Cl. 343-9.000.

Stewart, Patrick H.: *See—*
Schaidle, William J.; and Stewart, Patrick H., 4,028,271.

Stewart-Warner Corporation: *See—*
Hanebuth, Paul N., 4,027,501.

Stiftelsen Isotopteknisks Laboratoriet: *See—*
Christell, Adolf Ragnar Roland Umberto Einersson; Koski, Kaijo Aatto Matias; and Ljunggren, Knut Lennart, 4,028,267.

Stigall, Robert E.: *See—*
Hartmann, Clinton S.; and Stigall, Robert E., 4,028,648.

Stijfs, Petrus A. M. J.: *See—*
Thoma, Jozef A.; and Stijfs, Petrus A. M. J., 4,028,362.

Stiller, Armin; and Borejko, Stefan, to Rollei-Werke Franke & Heidecke. Arrangement for supplying a load with controlled current from an alternating current source. 4,028,613, Cl. 323-19.000.

Stine, Laurence O.; and Ward, Dennis J., to Universal Oil Products Company. Simulated moving bed reaction process. 4,028,430, Cl. 260-683.430.

Stobbe, Richard E.: *See—*
Zankl, Frank; Kirkham, Edward E.; Stobbe, Richard E.; and Schachte, John J., 4,028,599.

Stock, Horst: *See—*
Ellbrunner, Adalbert; Priewasser, Georg; Georg, Friedrich; and Stock, Horst, 4,028,137.

Stockman, Robert M., to American Radionic Co., Inc. Multi-voltage capacitor section. 4,028,595, Cl. 361-328.000.

Stoll, Mark Steven, to Liberty Carton Co. Self locking container. 4,027,818, Cl. 229-37.00R.

Stoller, Benjamin B.; and Azzolini, John C., Jr. Method and apparatus for the production of spawn. 4,027,427, Cl. 47-1.100.

Stone, G W (Charles), to Agriculture Research Incorporated. Cotton harvesting machine. 4,027,464, Cl. 56-30.000.

Stone, Milton, to Pettibone Corporation. Automatic control of liquid addition to a mixture by power sensing. 4,027,859, Cl. 259-18.000.

Stoner, Eugene M., to Ares, Inc. Ammunition magazine. 4,027,415, Cl. 42-50.000.

Storey, Edwin C., to General Motors Corporation. Dual sensor closed loop fuel control system having signal transfer between sensors during warmup. 4,027,477, Cl. 60-276.000.

Strasser, Jurgen H.: *See—*
Chiu, Tony T.; and Strasser, Jurgen H., 4,027,450.

Stratmann, Josef: *See—*
Bender, Martin; Knappstein, Johannes; and Stratmann, Josef, 4,028,192.

Stratton, Michael G., to GTE Sylvania Incorporated. Plural beam electron gun assembly. 4,028,581, Cl. 313-414.000.

Streifert, Keith L., to Carrier Corporation. Flexible damped bearing support. 4,027,931, Cl. 308-15.000.

Streit, Klaus; Kugelmann, Adolf; and Seiler, Hartmut, to Robert Bosch G.m.b.H. Compensated monolithic integrated current source. 4,028,564, Cl. 307-310.000.

Strempel, Willy, to Ultratek International, Inc. Argon bath induction casting system. 4,027,719, Cl. 164-51.000.

Stricker, David M.: *See—*
Bennett, Robert F.; Brouwer, Nicholaas L.; and Stricker, David M., 4,027,527.

Stroh, Thomas L.: *See—*
Dukes, Glenn V.; and Stroh, Thomas L., 4,027,813.

Strubelt, Charles E.: *See—*
Sullivan, Daniel S., 3rd; Strubelt, Charles E.; and Becker, Kenneth W., 4,028,268.

Struns, Alfred; and Rohrer, Jurgen, to Dr. Th. Wieland, Firma. Photoelectric start-stop controls for gas burner. 4,028,047, Cl. 431-355.000.

Stucker, Donald D., to Gates Rubber Company, The. V-belt display book. 4,027,799, Cl. 211-13.000.

Stuemky, Robert E., to Gates Rubber Company, The. Centering device for tubular flexible element couplings. 4,027,502, Cl. 64-8.000.

Sturbois, Gilbert: *See—*
Sureau, Claude; Tournaire, Michel; Zorn, Jean-Rene; Sturbois, Gilbert; Chavinie, Jacques; Le Houezec, Roger; and Ripoche, Andre, 4,027,657.

Sturhan, Klaus; and Lange, Gerd, to Gebr. Isringhausen. Indication of rotary spindle adjustment. 4,027,619, Cl. 116-124.00A.

Sturmer, David M., to Eastman Kodak Company. Photographic supports and elements utilizing photobleachable O-nitroarylidene dyes. 4,028,113, Cl. 96-84.00R.

Sturtevant, Alfred H.; and Trumbull, Robert L., to Varian Associates. Reproducible mounting of prealigned optical assemblies. 4,027,841, Cl. 248-19.000.

Sueyoshi, Tohru: *See—*
Sato, Akira; Ikeda, Tadashi; Sueyoshi, Tohru; Nakamura, Yasuharu; and Shimada, Takeo, 4,028,112.

Sugita, Jitsuo: *See—*
Yukinaga, Hisajiro; Sumimoto, Shinzaburo; Ishizuka, Ichiro; and Sugita, Jitsuo, 4,028,376.

Sugita, Tadashi: *See—*
Hashimoto, Makoto; Uehara, Shinzi; Sugita, Tadashi; and Shiina, Naonori, 4,028,448.

Sugiura, Akio: *See—*
Arai, Hiroshi; Nakamura, Akira; Sugiura, Akio; Okamoto, Atutoshi; and Toyama, Koichi, 4,027,926.

Sullivan, Daniel S., 3rd; Strubelt, Charles E.; and Becker, Kenneth W., to Exxon Research and Engineering Company. High temperature corrosion inhibitor. 4,028,268, Cl. 252-392.000.

Sumimoto, Shinzaburo: *See—*
Yukinaga, Hisajiro; Sumimoto, Shinzaburo; Isbizuka, Ichiro; and Sugita, Jitsuo, 4,028,376.

Sumitomo Chemical Company, Limited: *See—*
Futami, Takashi; Tatsukami, Yoshiharu; Takamoto, Toyoji; Oda, Yasuhiro; and Tomoda, Masayasu, 4,028,431.
Hotta, Seiji; Koga, Koichi; Bando, Tomoyuki; and Kondo, Yutaka, 4,028,331.
Tauchiya, Hiroshi; Mukai, Kunio; Kimura, Akio; Taya, Hiroshi; Fujimoto, Keimei; Ozaki, Toshiaki; Yamamoto, Sigeo; Ogawa, Taizo; Ooishi, Tadashi; and Okuno, Yositosi, 4,028,438.
Wake, Shigeo; and Futagami, Mikio, 4,028,300.

Sumitomo Electric Industries, Ltd.: *See—*
Kawamoto, Kyoji; and Ishihara, Yosuke, 4,027,750.
Yamamoto, Masachika; and Taniuchi, Yasuhiko, 4,027,749.

Summers, John Gilbert; and Pierrepont, Maurice, to U.S. Philips Corporation. Semiconductor device manufacture. 4,028,140, Cl. 148-1.500.

Sun Chemical Corporation: *See—*
North, Bernard F.; and Lourigan, George H., 4,028,054.
Rosen, George; Carlick, Daniel J.; and Reiter, Ralph H., 4,028,204.

Sun Electric Corporation: *See—*
Trussell, Gerald C.; and Arnston, Robert W., 4,027,532.

Sun, Kwok K.: *See—*
Sayigh, Adnan A. R.; Sun, Kwok K.; and Ulrich, Henri, 4,028,361.

Sun Oil Company: *See—*
Brownstein, Arthur M.; and Kerr, David L., 4,028,423.

Sun Ventures, Inc.: *See—*
Driscoll, Gary L., 4,028,452.

Sundermann, Rudolf: *See—*
Rottloff, Gunther; Sundermann, Rudolf; Grigat, Ernst; and Putter, Rolf, 4,028,393.

Sundin, George Holger, to Conwed Corporation. Pad stacker. 4,027,580, Cl. 93-93.00M.

Sunkel Letelier, Carlos; and Cillero Grafulla, Fernando, to Alter S.A. Preparation of glycol (2-(p-chlorophenoxy)-2-methylpropionate)-2-nicotinate. 4,028,369, Cl. 260-295.50R.

Suntech, Inc.: *See—*
Borkowski, Walter L.; and Schneider, Abraham, 4,028,152.
Hansel, William B., 4,027,708.
Scheibel, Edward G., 4,028,079.
Schneider, Abraham, 4,028,153.

Supreme Farmstead Equipment, Inc.: *See—*
Weihmuller, Walter N., 4,027,806.

Sureau, Claude; Tournaire, Michel; Zorn, Jean-Rene; Sturbois, Gilbert; Chavinie, Jacques; Le Houezec, Roger; and Ripoche, Andre, to Agence Nationale de Valorisation de la Recherche (ANVAR). Foetal heart rate apparatus and method in which average foetal heart rate during non-deceleration periods is compared with the average foetal heart rate over a fewer number of periods. 4,027,657, Cl. 128-2.06F.

Sutton, James Anthony: *See—*
Walker, John Hirst; Sutton, James Anthony; and Waters, John Henry, 4,027,489.

Suyama, Toru: *See—*
Otsubo, Kizuku; Suyama, Toru; and Udagawa, Masanori, 4,027,633.

Suzaki, Kuniyoshi: *See—*
Shigeta, Yoshihiro; Suzaki, Kuniyoshi; and Ogiso, Mitsutoshi, 4,027,958.

Suzuki, Masao; and Moriya, Kunitoshi, to Fujitsu Ltd. Data transfer system. 4,028,666, Cl. 340-172.500.

Suzuki, Nobuo; Noguchi, Yasuhiro; and Masuda, Takao, to Fuji Photo Film Co., Ltd. Heat-developable photosensitive materials. 4,028,129, Cl. 96-114.100.

Swaim, Charles M. Container for air treating material. 4,028,073, Cl. 55-279.000.

Swaim, Gayland Clarence. Lockable rack for fishing rods and the like. 4,027,798, Cl. 211-4.000.

Swallow, Roger T.; and Pendergrass, John E., to Kendall Company, The. Therapeutic stocking. 4,027,667, Cl. 128-165.000.

Swanson, Erik. Manual thrust gauge. 4,027,535, Cl. 73-381.000.

Swatek, Rudolf W. Cartridge loading tray. 4,027,417, Cl. 42-87.000.

Sweeton, Gerard F., to Prince Manufacturing, Inc. Propulsion device for tennis balls and like spherical objects. 4,027,646, Cl. 124-56.000.

Swift and Company Limited: *See—*
Erickson, David R., 4,027,400.

Swilley, Wilson H., to Cincinnati Butchers' Supply Company, The. Stepping conveyor. 4,027,598, Cl. 104-162.000.

Sybron Corporation: *See—*
Ellis, Franklin H.; and Andrews, Stephen W., 4,027,393.
McGivern, Robert F., 4,028,249.
Meyer, Leonard S., 4,028,460.

Sze, Morgan C.; and Snell, George J., to Lummus Company, The. Liquefaction of sub-bituminous and lignitic coal. 4,028,221, Cl. 208-8.000.

Taccone, Ida, to Buskine S.A. Method for the preparation of derivetives of spiro (4,5)-decane and derivatives thus obtained. 4,028,351, Cl. 260-240.00K.

Tada, Masaaki: *See—*
Mizutani, Yoshiyuki; Tada, Masaaki; and Imada, Yasuo, 4,028,097.

Taiheiyo Engineering Incorporated: *See—*
Hujimori, Masao; Nakajima, Shigeo; Takahashi, Ken; Ito, Tsunetoshi; Shimada, Toshio; and Endo, Hajime, 4,027,918.

Takahashi, Hiroaki: *See—*
Moriyama, Akio; Fukai, Masakazu; Tatsuta, Hiroshi; Takehashi, Hiroaki; and Esaki, Hiroshi, 4,027,950.

Takahashi, Katsubiko; and Doi, Hachiro, to Fuso Keigokin Co., Ltd. Lawn mower. 4,027,463, Cl. 56-13.600.

Takahashi, Ken: *See—*
Hujimori, Masao; Nakajima, Shigeo; Takahashi, Ken; Ito, Tsunetoshi; Shimada, Toshio; and Endo, Hajime, 4,027,918.

Takahashi, Toshio: *See—*
Tomishima, Hiroshi; Takahashi, Toshio; Ono, Kenichi; and Kumasaka, Kazuhiro, 4,028,144.

Takamoto, Toyoji: *See—*
Futami, Takashi; Tatsukemi, Yoshiharu; Takamoto, Toyoji; Oda, Yasuhiro; and Tomoda, Masayasu, 4,028,431.

Takeda Chemical Ind., Ltd.: *See—*
Kamatani, Yoshio; Okazaki, Hisayoshi; Imai, Ko; Fujita, Noriaki; Yamazaki, Yoshio; and Ogino, Katsuhiko, 4,028,185.

Takei, Haruo: *See—*
Hinata, Masanao; Takei, Haruo; Sato, Akira; Iwamoto, Atsuo; and Hayashi, Jun, 4,028,115.

Takemoto, Katsumi: *See—*
Kawarai, Takashi; Sawada, Yuji; Takemoto, Katsumi; and Mikami, Sadao, 4,027,823.

Takeshita, Yasuhiro: *See—*
Seki, Kenji; Kimura, Akio; Asahi, Satoshi; and Takeshita, Yasuhiro, 4,028,435.

Takeuchi, Hiroshi; Ishizawa, Toshitugu; Yamano, Tetuyuki; Chiba, Ko; and Kobayashi, Daisaku, to Nissan Motor Co., Ltd.; and Riken Piston Ring Kogyo Kebushiki Kaisha. Oil seal assembly. 4,028,022, Cl. 418-104.000.

Takita, Hitoshi: *See—*
Enomoto, Satoru; Takita, Hitoshi; Wada, Hisayuki; Mukaida, Yutaka; and Yanaka, Mikiro, 4,028,387.

Talbert, Norwood K., to Agway, Inc. Method of prilling material. 4,028,447, Cl. 264-8.000.

Talento, Joseph L.: *See—*
Kurtz, Donald R.; Popadick, Carl C.; Sofianek, Joseph C.; and Talento, Joseph L., 4,028,514.

Talonen, Timo Tapani: *See—*
Aaltonen, Olavi August; Talonen, Timo Tapani; and Harkki, Seppo Untamo, 4,027,863.

Tambini, Angelo L.; and Wallace, Paul W., to Standard Pressed Steel Co. Simplified apparatus for and method of tightening fasteners. 4,027,530, Cl. 73-88.00F.

Tamura, Sadahiro: *See—*
Wakino, Kikuo; Nishikawa, Toshio; Tamura, Sadahiro; and Ishikawa, Youhei, 4,028,652.

Tanaka, Junzo; and Nakano, Chikao, to Matsushita Electric Industrial Co., Ltd. Microwave oven. 4,028,517, Cl. 219-10.55B.

Tanaka, Yasuzi: *See—*
Ueshima, Takashi; Tanaka, Yasuzi; and Kobayashi, Shoichi, 4,028,482.

Tandy Corporation: *See—*
Ringland, Robert S., 4,028,629.

Tanigami, Takahiko: *See—*
Hirashima, Kenzo; Tsujimura, Harutoshi; Hasegewa, Akira; Tanigami, Takahiko; and Ushiku, Kenichi, 4,028,516.

Tanikewa, Takayoshi, to Seibu Polymer Kasei Kabushiki Kaisha. Joint for culvert sections and the like. 4,027,902, Cl. 285-114.000.

Taniuchi, Yasuhiko: *See—*
Yamamoto, Masachika; and Taniuchi, Yasuhiko, 4,027,749.

Tanton, George A.; and Meyer, Harry C., to United States of America, Army. Low loss laser modulator. 4,027,948, Cl. 350-151.000.

Tasaka, Tomoyuki; and Honkawa, Yoshinori, to Ryobi, Ltd. Control mechanism for an offset printing machine. 4,027,588, Cl. 101-144.000.

Tasch, Al F., Jr.; and Frye, Robert C., to Texas Instruments Incorporated. Silicon gate ccd structure. 4,027,381, Cl. 29-578.000.

Tasch, Al F., Jr.; and Frye, Robert C., to Texas Instruments Incorporated. Silicon gate CCD structure. 4,027,382, Cl. 29-578.000.

Tashiro, Minoru; and Kimura, Shigeru, to Stanley Electric Co., Ltd. Voltage stabilizing device of a magneto alternating current generator. 4,028,611, Cl. 323-8.000.

Tasso, Joseph Negeeb. Information store system comprising a plurality of different shift-registers. 4,028,665, Cl. 340-172.500.

Tatsukami, Yoshiharu: *See—*
Futami, Takashi; Tatsukami, Yoshiharu; Takamoto, Toyoji; Oda, Yasuhiro; and Tomoda, Masayasu, 4,028,431.

Tatsumi, Hideo; and Ohuchi, Yasushi, to Hitachi, Ltd. AC Generator for vehicles. 4,028,568, Cl. 310-42.000.

Tatsuta, Hiroshi: *See—*
Moriyama, Akio; Fukai, Masakazu; Tatsuta, Hiroshi; Takahashi, Hiroaki; and Esaki, Hiroshi, 4,027,950.

Taya, Hiroshi: *See—*
Tauchiya, Hiroshi; Mukai, Kunio; Kimura, Akio; Taya, Hiroshi; Fujimoto, Keimei; Ozaki, Toshiaki; Yamamoto, Sigeo; Ogawa, Taizo; Ooishi, Tadashi; and Okuno, Yositosi, 4,028,438.

Taylor, Fredrick J.; Smith, Jack; and Pries, Thomas H., to United States of America, Army. Crosswind measurements through pattern recognition techniques. 4,028,673, Cl. 340-146.30R.

Taylor, Gordon Joseph. Shaft bushes. 4,027,933, Cl. 308-238.000.

Taylor, Kenneth P.: *See—*
Needham, Donald G.; Taylor, Kenneth P.; and Brown, Claude V., 4,028,332.

Taylor, Leonard J. Optical device for providing a three dimensionel view of a two dimensional image. 4,027,947, Cl. 350-144.000.

Teach, Eugene G., to Stauffer Chemical Company. Meta-bis anilide derivatives and their utility as herbicides. 4,028,093, Cl. 71-118.000.

Teass, Horace A., Jr. Circuit for monitoring the conductivity of e solution. 4,028,618, Cl. 324-30.00R.

Technicon Instruments Corporation: *See—*
Adler, Stanford L., 4,027,623.
Snyder, Lloyd R.; Oberhardt, Bruce J.; and Olich, Jack, 4,028,056.

Techno-Veoture Co., Ltd.: *See—*
Matsubara, Sueo, 4,028,533.

Tefft, Franklin A.: *See—*
Barnum, Ronald E.; Tefft, Franklin A.; and Cotton, Louis S., 4,027,838.

Telebeam Corporation: *See—*
Ulicki, Edward M., 4,028,733.

Telpukhovsky, Evdokim Semenovich: *See—*
Pitelyaev, Grigory Vasilievich; Telpukhovsky, Evdokim Semenovich; Ravio, Boris Iosifovich; and Gladkov, Alexei Grigorievich, 4,027,441.

Tenconi, Riccardo. Pattern drum with pattern size increasing apparatus. 4,027,503, Cl. 66-50.00B.

Tenneco Inc.: *See—*
Offer, Robert J.; and Van Vooren, Bernard J., 4,028,243.

Tennessee Valley Authority: *See—*
Schultz, James J.; and Van Pelt, Vincent J., 4,028,087.

Tentarelli, Kenneth Donald, to Bell Telephone Laboratories, Incorporated. Feed-forward amplifier with simple resistive coupling. 4,028,634, Cl. 330-151.000.

Terman, Lewis Madison: *See—*
Heller, Lawrence Griffith; Terman, Lewis Madison; and Yee, Yen Sung, 4,028,558.

Terminal Data Corporation: *See—*
Frech, Roger Alvan; and Bondar, Martio Moses, 4,027,870.

Terrone, Andre, to Societe Anonyme des Equipements S.E.I.M. Rotor for an electrical machine. 4,028,573, Cl. 310-217.000.

Tessler, Arthur N.; Lupke, Gerd; Lupke, Manfred; and Tobias, Myron J. Method and device for removing concretions within human ducts. 4,027,674, Cl. 128-328.000.

Tetra Pak Developpement SA: *See—*
Rausing, Ruben; Nedstedt, Gert; Holmstrom, Hakan; Palm, Lars-Erik; and Stefan, Stjepan, 4,027,455.

Tewich, Johann: *See—*
Tuscher, Otto; Tewich, Johann; and Wittich, Willibald, deceased, 4,028,198.

Texaco Inc.: *See—*
Duranleau, Roger G.; and Larkin, John M., 4,028,388.
Kablaoui, Mahmoud S.; Reid, Robert E.; and Godfrey, Arthur W., 4,028,258.
Peelman, Harold E.; and Langford, Obie M., 4,028,546.
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Thackery, Russell H. Tractor mounted log splitter. 4,027,709, Cl. 144-193.00R.

Thagard, George F., Jr. Apparatus and control system for heating asphalt. 4,028,527, Cl. 219-311.000.

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Therm-O-Disc Incorporated: *See—*
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Theurer, Josef; and Riessberger, Klaus, to Franz Plasser Bahnbaumaschinen-Industrie-Gesellschaft m.b.H. Mobile track surveying apparatus. 4,027,397, Cl. 33-287.000.

Thoma, Jozef A.; and Stijfs, Petrus A. M. J., to Stamicarbon B. V. Process for the preperation of quinolines. 4,028,362, Cl. 260-283.0SY.

Thomas & Betts Corporation: *See—*
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Thomas, Ian M., to Owens-Illinois, Inc. Method for manufacturing silicate glasses from alkoxides. 4,028,085, Cl. 65-134.000.

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Thompson, James L., to Dow Chemical Company, The. Composition and method for reducing the surface tension of aqueous fluids. 4,028,257, Cl. 252-8.55C.
Thompson, John A.; and Torres, Robert V., to Cutter Laboratories, Inc. Bag-making apparatus and process for making ported bags. 4,027,577, Cl. 93-35.0PC.
Thompson, Kenneth P., to Champion International Corporation. Apparatus and method for corona discharge priming a dielectric web. 4,028,551, Cl. 250-531.000.
Thompson, Martin C., to Reed International Limited. Float controlled valves. 4,027,693, Cl. 137-414.000.
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Thorley, Graham R., to Transportation Design & Technology. Wheelchair lift. 4,027,807, Cl. 214-75.00R.
Throckmorton, Morford C., to Goodyear Tire & Rubber Company, The. Process of polymerization of conjugated diolefins using iron catalysts and sulfur ligands. 4,028,272, Cl. 252-429.00B.
Thurman, Merrell E. Freeze-up prevention device for a heat pump. 4,027,497, Cl. 62-156.000.
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Todd, Jackson D.; and Yarger, Francis C. Pipe reamer and capture tray. 4,027,681, Cl. 131-232.000.
Togo, Masaaki; Shime, Masao; and Mochizuki, Kiyoshi, to Yamatake-Honeywell Company Limited. Servo-motor control system. 4,028,604, Cl. 318-596.000.
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Tyree, Bill D. Apparatus for ultrasonic inspection of ferromagnetic materials. 4,027,528, Cl. 73-67.80S.
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van den Brink, Marinus J.; Austermuhle-Bertola, Helena; and Kramer, Petrus A., to Shell Oil Company. Process for the preparation of cyclobutanones. 4,028,418, Cl. 260-586.00C.

Van De Weghe, George W. Currency exchange calculator. 4,028,529, Cl. 235-89.00R.

Van Doorn, Donald W.; and Lloyd, Donald R., to Lummus Industries, Inc. Apparatus for sampling a stream of fibers and the like. 4,027,537, Cl. 73-421.00R.

vanManen, Dick T., to Voplex Corporation. Sealing plunger for cartridge. 4,027,810, Cl. 222-327.000.

van Oostveen, Arie A.; and Wittkampf, Fred H. M., to Vitatron Medical B.V. Pacing system with connector for connecting electrode to pacer. 4,027,678, Cl. 128-419.00P.

Van Pelt, Vincent J.: *See—*
Schultz, James J.; and Van Pelt, Vincent J., 4,028,087.

van Raalte, John A., to RCA Corporation. Electron multiplier image display device. 4,028,575, Cl. 313-105.00R.

Van Royen, Freddy Ghislein, to AGFA-GEVAERT N.V. Free-radical photographic material. 4,028,108, Cl. 96-48.00R.

van Santen, Johannes Gerrit; and Collet, Marnix Guillaume, to U.S. Philips Corporation. Bulk channel charge-coupled device with blooming suppression. 4,028,716, Cl. 357-24.000.

Van Vooren, Bernard J.: *See—*
Offer, Robert J.; and Van Vooren, Bernard J., 4,028,243.

Varah, James Shadrach: *See—*
Hart, John Michael; and Varah, James Shadrach, 4,027,362.

Vargs, Leroy M.; and Fitch, Robert B., to Rockaway Corporation. Device for attaching box handles. 4,027,578, Cl. 93-36.700.

Varian Associates: *See—*
Sturtevant, Alfred H.; and Trumbull, Robert L., 4,027,841.

Vast Products Inc.: *See—*
Brown, William F., 4,028,289.

Vaudaux, Francis: *See—*
Frechin, Jean-Paul; and Vaudaux, Francis, 4,027,896.

Veatch, Franklin: *See—*
Sprague, James W.; Feldman, Daniel W.; and Veatch, Franklin, 4,028,065.

Veco Beheer Electroforming/Photo Etching B.V.: *See—*
Rnumpol, Geurt J., 4,028,605.

Vehlewald, Peter: *See—*
Konter, Wolfgang; Witte, Josef; Vehlewald, Peter; and Block, Hans-Dieter, 4,028,434.

Veloz, Jaime: *See—*
Fountain, Gerald F.; Veloz, Jaime; Bilson, Edward A.; and Cronin, John A., 4,028,235.

Velsicol Chemical Corporation: *See—*
Anderson, Arnold L., 4,028,336.
Krenzer, John, 4,028,375.
Lindvay, Michael W., 4,028,333.

Veneklasen, Mark S. Musical horn construction. 4,027,571, Cl. 84-380.00R.

Venot, Robert: *See—*
Jullien, Rene; Perona, Maurice; and Venot, Robert, 4,028,178.

Verachtert, Thomas A.: *See—*
Carlson, David H. J.; Verachtert, Thomas A.; and Sobel, Jay E., 4,028,269.

Verbeij, Oswald Johannes, to U.S. Philips Corporation. Circuit arrangement in a television receiver, provided with a line deflection circuit and a switched supply voltage circuit. 4,028,589, Cl. 315-408.000.

Verdier, Henri, to Compagnie Generale des Etablissements Michelin, raison sociale Michelin & Cie. Tire filled with lubricant coated cellular particles. 4,027,712, Cl. 152-311.000.

Vereinigte Edelstahlwerke AG: *See—*
Plockinger, Erwin; Daghofer, Otto; and Barakat, Farouk, 4,027,720.

Verhoeven, Gerardus H. Th. M.; and Stensen, Heinrich P., to Smit Ovens Nijmegen B.V. Tunnel furnace for the heat treatment of articles. 4,028,052, Cl. 432-145.000.

Vidard, Michel: *See—*
Failla, Henri; Schaller, Karl; and Vidard, Michel, 4,028,177.

Vig, John R.; and LeBus, John W., to United States of America, Army. Method of cleaning surfaces by irradiation with ultraviolet light. 4,028,135, Cl. 134-1.000.

Vig, John R.: *See—*
Di Vita, Sam; and Vig, John R., 4,028,080.

Vinyl-Cbem International, Inc.: *See—*
Golumbic, Harvey J., 4,028,160.

Viohl, Uwe, to International Standard Electric Corporation. Photochemical system for coating the luminescent screen of a color television picture tube. 4,028,114, Cl. 96-93.000.

Vishnitsky, Igor Konstantinovich: *See—*
Shemonaev, Alexandr Tikhonovich; Cherny, Dmitry Grigorievich; Genis, Semen Naumovich; and Vishnitsky, Igor Konstantinovich, 4,027,438.

Vitatron Medical B.V.: *See—*
van Oostveen, Arie A.; and Wittkampf, Fred H. M., 4,027,678.

Vittorelli, Vittore, to Ing. C. Olivetti & C., S.p.A. System for automatically processing and printing the contents and the format of a text. 4,028,680, Cl. 340-172.500.

Vittorelli, Vittore, to Ing. C. Olivetti & C., S.p.A. System for automatically processing and printing the contents and the format of a text. 4,028,681, Cl. 340-172.500.

Vlahakis, Peter J. Apparatus for alignment of plaid fabric on a cutting table. 4,027,395, Cl. 33-80.000.

Voegeli, Otto: *See—*
Eggenberger, John Scott; and Voegeli, Otto, 4,028,685.

Volesky, Bohumil: *See—*
Zajic, James E.; and Volesky, Bohumil, 4,028,182.

Volk, Joseph A., Jr., to Beta Corporation. Image counter. 4,028,552, Cl. 250-570.000.

Volkmann, Adolf. Skateboard with brake. 4,027,890, Cl. 280-11.200.

Volkswagenwerk Aktiengesellschaft: *See—*
Klebba, Horst, 4,027,432.

Voplex Corporation: *See—*
vanManen, Dick T., 4,027,810.

Vygen, Peter: *See—*
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Vyzkumny Ustav Bavlnarsky: *See—*
Safar, Petr; Langr, Josef; Kolar, Miloslav; and Nosek, Stanislav, 4,027,705.

W. C. Heraeus GmbH: *See—*
Reichelt, Walter G., 4,028,657.

W. Schlafhorst & Co.: *See—*
Kamp, Heinz, 4,028,136.

Wack, Andre; Bezicot, Robert; and Cosset, Andre. Fluid jack with built-in piston operated switch. 4,028,511, Cl. 200-82.00R.

Wacker-Chemitronic Gesellschaft fur Elektronik-Grundstoffe mbH: *See—*
Beinert, Klaus; and Weidner, Herbert, 4,028,058.
Ellbrunner, Adalbert; Priewasser, Georg; Georg, Friedrich; and Stock, Horst, 4,028,137.

Wada, Hajime: *See—*
Hori, Haruo; Kikuchi, Shoji; Wada, Hajime; Kobayasi, Sadatosi; and Endo, Takaya, 4,028,106.

Wada, Hisashi: *See—*
Hamaguchi, Sachihiko; Oomura, Ikuo; Sato, Tadashi; and Wada, Hisashi, 4,028,687.

Wada, Hisayuki: *See—*
Enomoto, Satoru; Takita, Hitoshi; Wada, Hisayuki; Mukaida, Yntaka; and Yanaka, Mikiro, 4,028,387.

Wada, Masahiro; and Date, Masakazu, to Toyo Boseki Kabushiki Kaisha. Polyester fiber treated with anionic polyalkylene oxide emulsified polyester polyether finish. 4,027,346, Cl. 8-30.000.

Wagner, Kuno; and Hajek, Manfred, to Bayer Aktiengesellschaft. Urea or carbonamide containing diisocyanate polyaddition products with phosphoric ester substituents. 4,028,306, Cl. 260-75.0NT.

Wagner, Kuno: *See—*
Muller, Peter; Wagner, Kuno; and Muller, Richard, 4,028,313.
Schafer, Walter; Wagner, Kuno; and Muller, Hans-Jurgen, 4,028,310.

Wagner, Richard C.; and Banike, Ronald A., to Hollymatic Corporation. Meat tenderizer. 4,027,356, Cl. 17-25.000.

Wagner, Walter. Scouring pad with retained contoured stiffener. 4,027,352, Cl. 15-209.00C.

Wagner, William. Air injection engine. 4,027,632, Cl. 123-75.0RC.

Wahl, Edward F., III, to Occidental Petroleum Corporation. Device for converting internal energy of hot fluids to shaft work. 4,027,483, Cl. 60-641.000.

Wahl, Richard: *See—*
Byrnes, Herbert P.; and Wahl, Richard, 4,027,935.

Wahlborg, Harold J.: *See—*
Bond, William C., Jr.; and Wahlborg, Harold J., 4,028,483.

Wake, Shigeo; and Futagami, Mikio, to Sumitomo Chemical Company, Limited. Coating composition. 4,028,300, Cl. 260-31.20R.

Wakino, Kikuo; Nishikawa, Toshio; Tamura, Sadahiro; and Ishikawa, Youhei, to Murata Manufacturing Co., Ltd. Dielectric resonator and microwave filter using the same. 4,028,652, Cl. 333-73.00W.

Walcon Corporation: *See—*
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Walden, Jack M.: *See—*
Olander, Emil Edward, Jr.; James, Rex L.; Larson, Ivar W.; Covington, Wayne F.; Walden, Jack M.; Watson, Robert E.; Yockey, Francis J.; Wenninger, Fred, Jr.; and Russell, Homer C., 4,028,538.

Walker, Brooks. Wheeled suitcase. 4,027,754, Cl. 190-18.00A.

Walker, Francis H.: *See—*
Baker, Don R.; Walker, Francis H.; and Letchworth, Peter E., 4,028,411.

Walker, John Hirst; Sutton, James Anthony; and Waters, John Henry, to Dowty Mining Equipment Limited. Mine roof support. 4,027,489, Cl. 61-45.00D.

Wallace, Paul W.: *See—*
Tambini, Angelo L.; and Wallace, Paul W., 4,027,530.

Wallace, Ray H., to Transworld Adhesive & Chemical Corporation. Method for making hot melt adhesive sticks and other shapes. 4,028,458, Cl. 264-148.000.

Wallding, Wayne A.; and Arrandale, Roy S., to Dart Industries Inc. Pre-labelled coated container. 4,027,426, Cl. 40-310.000.

Wallis, James William, to Wallis Separators Limited. Separator method and apparatus. 4,028,232, Cl. 210-19.000.

Wallis, Marvin E. Modular engine assembly. 4,027,484, Cl. 60-709.000.

Wallis, Marvin E. Modular engine assembly. 4,027,485, Cl. 60-709.000.

Wallis Separators Limited: *See—*
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Wallrafen, Gunter, to Maschinen- und Bohrgerate-Fabrik Alfred Wirth & Co., K.G. Device for actuating screw-threaded bolts. 4,027,559, Cl. 81-57.380.

Walton, Edward B.: *See—*
Feenan, Patrick J.; and Walton, Edward B., 4,027,643.

Waltrip, Owen R., to Nuclear Supreme. Material mixing and compacting apparatus. 4,028,040, Cl. 425-449.000.

Ward, Dennis J.: *See—*
Volk, Joseph A., Jr.; and Ward, Dennis J., 4,028,430.

Ward, Donald H.; and Buffenbarger, John K., to Armco Steel Corporation. Seam forming apparatus. 4,027,611, Cl. 113-54.00R.

Wardlaw, Stephen Clark; Levine, Robert Aaron; and Massey, James Vincent, III. Material layer volume determination. 4,027,660, Cl. 128-2.00F.

Warner, Harlow L.: *See—*
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Warner-Lambert Company: *See—*
Brown, Richard E.; and Unangst, Paul C., 4,028,383.
Satzinger, Gerhard; and Hechtfischer, Gustav, 4,028,398.

Warwicker, Eric Albert, to Porvair Limited. Method of making water vapor permeable polymer sheet material. 4,028,451, Cl. 264-45.800.

Washburn, Ryan F.: *See—*
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Watanabe, Atsumi, to Hitachi, Ltd. Inverter control system. 4,028,607, Cl. 321-5.000.

Watanabe, Eiki, to Mitsubishi Denki Kabushiki Kaisha. Elevator speed control system. 4,027,745, Cl. 187-29.00R.

Watanabe, Katsumi, to Yugen Kaisha Watanabe Kenkyusho. Toy phonograph with automatic pickup arm return means. 4,027,887, Cl. 274-1.00A.

Waters Associates, Incorporated: *See—*
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Waters, John Henry: *See—*
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Watkins, Laurence Shrapnell: *See—*
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Watson, Kenoeth, to Westland Aircraft Limited. Rotor for rotary wing aircraft. 4,028,001, Cl. 416-134.00A.

Watson, Robert E.: *See—*
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Wavin B.V.: *See—*
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Weavell, Jack, to CAE Machinery Ltd. Controlled transversely movable guide means for lumber. 4,027,563, Cl. 83-106.000.

Webb, Jimmy L., to General Electric Company. Novel flame retsrdant polycarbonate compositions. 4,028,297, Cl. 260-37.0PC.

Webb, Samuel Lee: *See—*
Desio, Frank B.; and Webb, Samuel Lee, 4,028,515.

Weber, Gerald; and Sorgenfrei, Jurgen, to Olympia Werke AG. Circuit arrangement for selecting the function of connection contacts on circuit chips. 4,028,682, Cl. 340-172.500.

Weber, Harold J., to Coulter Information Systems, Inc. Corona power supply circuit. 4,028,596, Cl. 361-235.000.

Webster, William C.; Hilton, Robert G.; and Cotts, Ronald F., to IU Conversion Systems, Inc. Disposal method and use of sewage sludge. 4,028,130, Cl. 106-120.000.

Weidner, Herbert: *See—*
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Weigl, John W.: *See—*
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Weihmuller, Walter N., to Supreme Farmstead Equipment, Inc. Reciprocating belt feeder for elongated bins. 4,027,806, Cl. 214-16.00R.

Weil, Ludwig: *See—*
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Weil, Tomas: *See—*
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Weiland, Emil; Schwarz, Alois; and Frommlet, Hubert, to Messerschmitt-Bolkow-Blohm GmbH. Blade connection for helicopter rotor blades. 4,028,000, Cl. 416-107.000.

Weinberger, Arnold: *See—*
Arps, Ronald Barthold; Bahl, Lalit Rai; and Weinberger, Arnold, 4,028,731.

Weinhold, Karl. Valve with generally spherical closure member. 4,027,698, Cl. 137-625.220.

Weiss, James Paul; and Smith, Edward Dyal, to Du Pont de Nemours, E. I., and Company. X-ray screens. 4,028,550, Cl. 250-483.000.

Weiss, Martin Joseph: *See—*
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Wells, Joel D.: *See—*
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Wennberg, Olov Carl Gustav; and Runfeldt, Nils Harald. Removing deposited material from the edge portions of a plate. 4,027,378, Cl. 29-427.000.

Wennerstrom, Jerald Meeker, to Babcock & Wilcox Company, The. Distributor. 4,027,920, Cl. 302-28.000.

Wenninger, Fred, Jr.: *See—*
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Wenzel, Martin; and Langheim, Detlef, to Schering Aktiengesellschaft. Metallocenes and metallocene derivatives having a radioactive central atom. 4,028,389, Cl. 260-429.0CY.

Werner & Pfleiderer: *See—*
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Western Electric Company,: *See—*
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Sharp, Benny H., 4,028,728.

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Evans, Gary E., 4,028,710.
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Westvaco Corporation: *See—*
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Weyerhaeuser Company: *See—*
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Wheeler, David C. Pet commode. 4,027,625, Cl. 119-1.000.

Wheeler, Philip T., to John Henry Company, The. Plant stake. 4,027,410, Cl. 40-10.00C.

White, George Raymond, to Smith Kline & French Laboratories Limited. Process for preparing 2-amino-2-alkylthio-1-nitroethylene compounds. 4,028,379, Cl. 260-309.000.

White, Harry Gregory: *See—*
Logan, Ralph Andre; Merz, James Logan; Reinhart, Franz Karl; and White, Harry Gregory, 4,028,146.

White, Jack D., Jr., to Dayco Corporation. Endless power transmission belt and method of making same. 4,027,545, Cl. 74-233.000.

White, Kenneth N. Router for trimming laminate plastics. 4,027,575, Cl. 90-12.00D.

White, Thomas William. Electrical connector. 4,027,939, Cl. 339-247.000.
Wiechert, Rudolf: *See—*
Alig, Leo; Furst, Andor; Keller, Peter; Muller, Marcel; Kerb, Ulrich; and Wiechert, Rudolf, 4,028,400.
Wiencek, Daniel C.: *See—*
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Wigginton, Hubert L.: *See—*
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Wilcox, Thomas J. Variable contour seating device. 4,027,888, Cl. 297-284.000.
Wildhaber, Ernest. Positive-displacement unit with coaxial rotors. 4,028,019, Cl. 418-36.000.
Wilhelm, Frederick C., to UOP Inc. Hydrocarbon conversion with a sulfided acidic multimetallic catalytic composite. 4,028,225, Cl. 208-139.000.
Willard, Robert. Floor support for sectionalized buildings. 4,027,439, Cl. 52-79.100.
Willdorf, Michael E., to Material Distributors Corporation. Security film for shatterproofing windows. 4,028,475, Cl. 428-215.000.
Willems, Jozef Frans: *See—*
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Williams, John G., to Turbodyne Corporation (Steam Turbine Div.). Cooling and lubrication arrangement for water cooled bearings having self contained lubrication systems. 4,027,928, Cl. 308-77.000.
Williams, John Lewis: *See—*
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Williams, Ross R.: *See—*
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Willson, James R.; and Tyler, Hugh J., to RobertShaw Controls Company. Motor protection circuit unit. 4,028,736, Cl. 361-29.000.
Wilson, Dennis Robert, to Bell Telephone Laboratories, Incorporated. Dynamic sense-refresh detector amplifier. 4,028,557, Cl. 307-362.000.
Wilson, Donald C., to FMC Corporation. Air-free pouch packaging method. 4,027,456, Cl. 53-22.00B.
Wilson, Edward: *See—*
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Wilson, Michael A.; and Gee, Gordon E., to Electro Corporation. Digital detector. 4,028,686, Cl. 340-195.000.
Wind, Jaap, to Lips B.V. Feathering controllable pitch propeller. 4,028,004, Cl. 416-157.00R.
Windmoller & Holscher: *See—*
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Winternitz, Pavol: *See—*
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Wiser, John A. Valet rack. 4,027,934, Cl. 312-321.000.
Wislocker, Frank: *See—*
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Wofsey, David. Sonic spark plug. 4,028,576, Cl. 313-143.000.
Wolfe, Denis G., to Robertshaw Controls Company. Explosion resistant electric heat motor gas valve. 4,027,689, Cl. 137-68.00R.
Wolfe, Merritt W., to Goodyear Tire & Rubber Company, The. Kettle used in the retreading or repair of tires. 4,028,168, Cl. 156-394.000.
Wolfe, Robert W., to Clark Equipment Company. Transmission with shift blocker clutch mechanisms. 4,027,756, Cl. 192-53.00E.
Wolfer, Gerhard, to Siemens-Albis Aktiengesellschaft. Control of peripheral apparatus in telecommunication. 4,028,676, Cl. 340-147.0SC.
Wolff, Otto E., to Polaroid Corporation. Method and apparatus for compressing vaporous or gaseous fluids isothermally. 4,027,993, Cl. 415-1.000.
Wollard, Donald L. Planing boat hull. 4,027,613, Cl. 114-291.000.
Wollermann, Louis Albert: *See—*
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Woodward, Elmer Donald, to United States of America, Navy. Antenna feed for dual beam conical scan tracking radar. 4,028,708, Cl. 343-777.000.
Woodward, John William, to United States of America, Navy. SNAIAS digital data test set. 4,028,536, Cl. 235-153.00A.
Woolworth, Harrison R. Scrap metal preheating apparatus and method. 4,028,048, Cl. 432-5.000.
Wooster Brush Company, The: *See—*
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Worz, Wolfgang, to Werner & Pfleiderer. Screw housing for a screw machine. 4,028,027, Cl. 418-201.000.
Wright, Bruce D. Tennis training device. 4,027,879, Cl. 273-29.00A.
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Kane, Thomas J.; and Dennie, Richard H., 4,027,621.
Ladrigan, J. William, 4,027,960.
Maillous, Louis D., 4,027,962.
Starkweather, Gary K., 4,027,961.
Yaguinuma, Jusuke, to Copal Company Limited. Dating mechanism for calendar clocks. 4,027,469, Cl. 58-6.00R.
Yaguinuma, Jusuke, to Copal Company Limited. Ratchet claw. 4,027,550, Cl. 74-577.00S.
Yahara, Satoshi, to Kabushiki Kaisha Token Kikai Seisakusho. Machine for cutting a moving strip of material. 4,027,564, Cl. 83-328.000.
Yamada, Koichi; Morimoto, Teijiro; and Yoshioka, Yoshioki, to Mitsui Petrochemical Industries, Ltd. Process for preparing resins for use in printing ink. 4,028,119, Cl. 106-32.000.
Yamada, Takeo: *See—*
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Yamaha Hatsudoki Kabushiki Kaisha: *See—*
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Yamamoto, Masachika; and Taniuchi, Yasuhiko, to Sumitomo Electric Industries, Ltd. Latch spring assembly for disc brake pad guide pins. 4,027,749, Cl. 188-73.300.
Yamamoto, Sigeo: *See—*
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Yamamoto, Tadahiro; and Yoneda, Kenji, to Nissan Motor Co., Ltd. Flow rate control apparatus in exhaust gas recirculation system. 4,027,636, Cl. 123-119.00A.
Yamamoto, Takenori; Tsukisaka, Tsuneo; and Tsukahara, Takeshi, to Honda Giken Kogyo Kabushiki Kaisha. Fitting device for windshield. 4,027,914, Cl. 296-78.100.
Yamamoto, Tomio; Sakasegawa, Koji; Osumi, Atsushi; Hosaka, Yukio; and Yamada, Takeo, to Nippon Kokan Kabushiki Kaisha; and Fuji Toyuki Kabushiki Kaisha. Method and apparatus for non-contact measurement of a gauge of a high temperature material. 4,027,978, Cl. 356-156.000.
Yamamoto, Yoshiro: *See—*
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Yamamoto, Yukio; and Sado, Yukio, to Yoshida Kogyo Kabushiki Kaisha. Ventilator. 4,027,581, Cl. 98-98.000.
Yamane, Izumi: *See—*
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Young, Jonathan D.; and Caldecott, Ross, to Ohio State University, The. Antenna for underground pipe detector. 4,028,707, Cl. 343-719.000.
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LIST OF DEFENSIVE PUBLICATIONS

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Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O. G. 687.

Arter, Nelson Kay; Eichhorn, Thomas Franklin; and Jackson, Howard Carl. Dynamic deskewing for a rotating head recording device. T959,012, 6-7-77, Cl. 360-76.000.

Blount, William W., Jr.: *See—*
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Chandra, Bala Perampalam, to Imperial Chemical Industries Limited. Method of treating polymer latices. T959,008, 6-7-77, Cl. 528-500.000.

Clark, Robert Ellis. Spinneret. T959,002, 6-7-77, Cl. 75-126.00C.

Dilks, Charles Heritage, Jr.: *See—*
Kirklaod, Joseph Jack; and Dilks, Charles Heritage, Jr., T959,004.

Du Pont de Nemours, E. I., and Company: *See—*
Kirkland, Joseph Jack; and Dilks, Charles Heritage, Jr., T959,004.

Eichhorn, Thomas Franklin: *See—*
Arter, Nelson Kay; Eichhorn, Thomas Franklin; and Jackson, Howard Carl, T959,012.

Froot, Howard A.; and Singh, Vijendra P. Method of determining yield loss due to a combination of defects in manufacturing method utilizing same. T959,005, 6-7-77, Cl. 235-151.130.

Hansen, David R. Printing ink resin composition. T959,010, 6-7-77, Cl. 260-829.000.

Hull, Joan Helen. Electrostatic process development apparatus. T959,003, 6-7-77, Cl. 118-658.000.

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Jackson, Howard Carl: *See—*
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Jones, Thomas M., to Tennessee Valley Authority. Production of suspension fertilizers from wet-process orthophosphoric acids. T959,001, 6-7-77, Cl. 71-34.000.

Kirkland, Joseph Jack; and Dilks, Charles Heritage, Jr., to Du Pont de Nemours, E. I., and Company. Chromatographic liquid dispensing inlet and method. T959,004, 6-7-77, Cl. 210-31.00C.

McConnell, Richard Leon; and Weemes, Doyle Allen. Process for powdering semi-crystalline polyester pellets. T959,009, 6-7-77, Cl. 260-75.00T.

Sanders, Robert R. Coating compositions. T959,007, 6-7-77, Cl. 260-16.000.

Singh, Vijendra P.: *See—*
Froot, Howard A.; and Singh, Vijendra P., T959,005.

Smith, Robert Clarence. Transparent high-impact polystyrene resins and their manufacture. T959,011, 6-7-77, Cl. 260-876.00B.

Suggs, James L.; and Blount, William W., Jr. Curing system for unsaturated materials. T959,006, 6-7-77, Cl. 526-14.000.

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LIST OF REISSUE PATENTEES

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AMP Incorporated: *See—*
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Appenzeller, Valentin; and Kutz, Johannes, to Eduard Kuesters Maschinenfabrik. Means for continuous dyeing of pile warp textiles especially of carpets. Re. 29,251, Cl. 68-22.00R.

Bryson, James D.: *See—*
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Dolco Packaging Corporation: *See—*
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Joullie, Maurice L.; Maillard, Gabriel; Lakah, Lucien; Muller, Pierre; and Huyen, Vu-Ngoc, to Recherche Pharmaceutiques et Scientifiques. Digestive pharmaceutical composition comprising S-carboxymethyl cysteine for reducing viscosity of respiratory tract secretions, and method of treating therewith. Re. 29,256, Cl. 424-311.000.

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Kilstrom, Lars Gunnar; and Ridderstrom, Goran Arvid Henning, to Aktiebolaget Electrolux. Surface treating attachment device. Re. 29,247, Cl. 15-380.000.

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Braid, Malcolm R. Aquarium. 244,621, 6-7-77, Cl. D30-6.000.

Braid, Malcolm R. Aquarium. 244,622, 6-7-77, Cl. D30-6.000.

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Cohen, Martin B. Combined guiro and shaker. 244,635, 6-7-77, Cl. D56-1.00E.

Cowan, Walter L., Jr. Stand for potted plants. 244,571, 6-7-77, Cl. D6-183.000.

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Cunningham, Charles L.; and Holladay, Jimmie L., to Coats Company, Inc., The. Tire changer or similar article. 244,599, 6-7-77, Cl. D15-199.000.

Cunningham, Charles L.; and Holladay, Jimmie L., to Coats Company, Inc., The. Tire changer or similar article. 244,600, 6-7-77, Cl. D15-199.000.

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Gietzen, James J., to Dynamic Instrument Corporation. Electrical angle plug. 244,611, 6-7-77, Cl. D13-28.000.

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CLASS 193

1 4,027,759
2 R 4,027,760

CLASS 195

28 N 4,028,183
4,028,184
28 R 4,028,182
30 4,028,185
31 R 4,028,186
66 B 4,028,187
96 4,028,188
109 4,028,189
127 4,028,190

CLASS 197

1 R 4,027,761
4,027,762
16 4,027,763
49 4,027,764
133 R 4,027,765
151 4,027,756

CLASS 198

339 4,027,767
370 4,027,768
570 4,027,769
618 4,027,792
719 4,027,793
728 4,027,770

CLASS 200

5 A 4,028,509
61.45 M 4,028,316
61.45 R 4,028,310
82 R 4,028,511
84 C 4,028,512
144 B 4,028,514
144 R 4,028,313
276 4,028,315

CLASS 202

158 4,028,191
227 4,028,192
248 4,028,193

CLASS 203

2 4,028,194
38 4,028,195

CLASS 204

1 T 4,028,196
4,028,197
9 4,028,198
10 4,028,199
43 T 4,028,200
72 4,028,201
106 4,028,202
158 R 4,028,203
159.14 4,028,204
181 4,028,205
192 C 4,028,206
195 R 4,028,207
252 4,028,208
4,028,209
266 4,028,210
267 4,028,211
272 4,028,212
286 4,028,213
4,028,214
290 F 4,028,215

CLASS 206

395 4,027,794
409 4,027,795
507 4,027,796

CLASS 208

8 4,028,219
4,028,220
4,028,221
11 R 4,028,222
91 4,028,223
92 4,028,224
139 4,028,225
180 4,028,226
216 4,028,227

CLASS 209

39 4,028,228
74 R 4,027,797
164 4,028,229
403 4,028,230
457 4,028,231

CLASS 210

19 4,028,232
28 4,028,233
37 R 4,028,234
44 4,028,235
45 4,028,236
4,028,237
53 4,028,238
58 4,028,239
59 4,028,240
60 4,028,241
71 4,028,242
130 4,028,243
150 4,028,244
151 4,028,245
4,028,246
153 4,028,247
232 4,028,248
242 R 4,028,249
259 4,028,250
280 4,028,251
321 B 4,028,252
4,028,253
447 4,028,254
300 R 4,028,255
519 4,028,256

CLASS 211

4 4,027,798
13 4,027,799

CLASS 212

14 4,027,800
145 4,027,801

CLASS 214

1 BV 4,027,804
1 H 4,027,803
1 SW 4,027,802
6 G 4,027,805
16 R 4,027,806
38 CA 4,027,823
75 R 4,027,807
313 4,027,808
353 4,027,809
621 4,027,771
762 4,027,772
766 4,027,773

CLASS 219

10.55 B 4,028,517
4,028,519
4,028,520
10.55 F 4,028,521
10.81 4,028,518
109 4,028,522
121 EM 4,028,523
121 L 4,028,524
4,028,525
295 4,028,526
311 4,028,527

CLASS 220

23.83 4,027,779
63 R 4,027,774
266 4,027,775
281 4,027,776
295 4,027,777
354 4,027,778

CLASS 221

7 4,027,780
105 4,027,781

CLASS 222

1 4,027,782
26 4,027,783
102 4,027,784
135 4,027,785
146 HA 4,027,786
166 4,027,787
190 4,027,789
285 4,027,790
327 4,027,810
396 4,027,791
529 4,027,811
614 4,027,788

CLASS 223

96 4,027,812

CLASS 225

97 4,027,813
104 4,027,814

CLASS 226

194 4,027,815

CLASS 229

14 C 4,027,817
37 R 4,027,818
65 4,027,819

CLASS 233

20 A 4,027,820

CLASS 235

61.11 E 4,028,528
61.9 R 4,028,537
89 R 4,028,529
144 HC 4,028,530
151 4,028,533
151.1 4,028,532
151.35 4,028,534
152 Re.29,257
4,028,535
153 A 4,028,536
153 AM 4,028,539
156 4,028,538

CLASS 236

150.2 4,028,531

CLASS 237

1 A 4,027,821

CLASS 239

305 4,027,822

CLASS 240

6.46 4,028,540
25 4,028,541
41.36 4,028,542
52.1 4,028,543

CLASS 241

152 A 4,027,824
213 4,027,825
221 4,027,826

CLASS 242

7.05 B 4,027,827
56.6 4,027,828
107.4 A 4,027,829
118.32 4,027,830
125.1 4,027,831
197 4,027,832

CLASS 243

31 4,027,833

CLASS 244

3.11 4,027,834
3.16 4,027,837
17.11 4,027,838
101 4,027,835
103 R 4,027,836
193 4,027,839

CLASS 246

122 R 4,027,840

CLASS 248

19 4,027,841
75 4,027,842
375 4,027,843

CLASS 249

111 4,027,844
142 4,027,845
189 4,027,846
190 4,027,847

CLASS 250

203 R 4,028,544
252 4,028,545
266 4,028,546
272 4,028,547
330 4,028,548
336 4,028,549
359 4,028,267
445 T 4,028,534
483 4,028,550
531 4,028,551
570 4,028,552
576 4,028,553

CLASS 251

11 4,027,848
30 4,027,849
141 4,027,850
172 4,027,851
228 Re.29,253
333 4,027,852
361 4,027,853

CLASS 252

8.55 C 4,028,257
46.7 4,028,258
4,028,259
62.2 4,028,260
89 R 4,028,261
4,028,262
99 4,028,263
182 4,028,264
301.1 W 4,028,265
313 R 4,028,216
4,028,266
321 4,028,218
392 4,028,268
428 4,028,269
4,028,270
429 B 4,028,272
429 R 4,028,271
432 4,028,273
447 4,028,274
466 PT 4,028,275
513 4,028,276
519 4,028,277
522 4,028,278
4,028,279
526 4,028,280
527 4,028,281
537 4,028,282
551 4,028,283

CLASS 254

29 R 4,027,854

CLASS 256

21 4,027,855
47 4,027,856

CLASS 259

4 AB 4,027,857
4 R 4,027,858
18 4,027,859
149 4,027,860

CLASS 260

2.2 C 4,028,284
2.3 4,028,288
2.5 FP 4,028,285
2.5 N 4,028,287
4,028,289
2.5 P 4,028,286
17.4 GC 4,028,290
23.7 C 4,028,291
27 R 4,028,292
28.5 AS 4,028,293
29.1 SB 4,028,298
29.3 4,028,367
29.6 H 4,028,295
29.6 NR 4,028,294
30.4 N 4,028,296
4,028,299
31.2 R 4,028,300
31.4 R 4,028,301
32.6 N 4,028,302
33.2 R 4,028,303
33.8 F 4,028,324
33.8 UB 4,028,304
37 PC 4,028,297
42.15 4,028,325
42.22 4,028,326
4,028,327
42.44 4,028,328
42.53 4,028,329
45.7 P 4,028,330
45.75 B 4,028,335
45.75 R 4,028,336
45.75 S 4,028,337
45.8 N 4,028,334
45.8 NT 4,028,331
4,028,333
45.8 R 4,028,332
46.5 R 4,028,338
4,028,339
47 ET 4,028,341
47 UA 4,028,340
4,028,342
59 R 4,028,343
75 H 4,028,308
75 NT 4,028,306
75 R 4,028,307
75 S 4,028,305
77.5 AN 4,028,309
77.5 AP 4,028,313
77.5 AQ 4,028,312
77.5 CH 4,028,310
77.5 R 4,028,311
78 A 4,028,315
78 L 4,028,314
79.5 P 4,028,316
112 R 4,028,317
112.5 R 4,028,318
4,028,319
117 4,028,320
146 R 4,028,321
154 4,028,322
157 4,028,323
174 4,028,344
192 4,028,345
239 R 4,028,346
239.3 A 4,028,347
239.5 4,028,348
239.55 D 4,028,349
240 K 4,028,351
240 R 4,028,350
4,028,352
240.6 4,028,353
243 C 4,028,354
4,028,355
248 AS 4,028,356
249.5 4,028,357
254 4,028,358
256.4 R 4,028,359

256.5 R 4,028,360
283 SY 4,028,362
286 R 4,028,363
293.54 4,028,364
293.61 4,028,365
293.62 4,028,366
295 R 4,028,368
295.5 R 4,028,369
296 H 4,028,370
297 R 4,028,371
299 4,028,372
301 4,028,373
305 4,028,374
306.8 D 4,028,375
307 G 4,028,377
307 H 4,028,376
309 4,028,379
309.5 4,028,378
309.6 4,028,380
310 R 4,028,381
314 4,028,217
315 4,028,382
326.29 4,028,383
347.8 4,028,384
410 4,028,385
410.9 N 4,028,387
410.9 R 4,028,386
413 4,028,388
429 CY 4,028,389
429.3 4,028,390
448.2 D 4,028,391
453 AR 4,028,392
453 P 4,028,393
455 A 4,028,394
465.4 4,028,395
468 D 4,028,396
468 G 4,028,397
471 A 4,028,398
479 C 4,028,399
488 B 4,028,400
500.5 H 4,028,401
501.14 4,028,402
502.5 4,028,403
515 R 4,028,404
534 C 4,028,405
534 S 4,028,406
536 4,028,407
539 R 4,028,408
551 S 4,028,409
553 R 4,028,410
558 R 4,028,411
566 A 4,028,412
566 AC 4,028,413
566 R 4,028,414
570 D 4,028,361
570 R 4,028,415
570.5 P 4,028,416
586 C 4,028,417
4,028,418
586 R 4,028,419
601 R 4,028,420
606.5 P 4,028,421
607 AR 4,028,422
610 B 4,028,423
638 R 4,028,424
645 4,028,425
652 P 4,028,426
659 R 4,028,427
674 SA 4,028,428
680 R 4,028,429
683.43 4,028,430
827 4,028,431
836 4,028,432
873 4,028,433
874 4,028,434
878 B 4,028,435
878 R 4,028,436
880 R 4,028,437
948 4,028,438
973 4,028,439

CLASS 261

23 R 4,028,440
36 R 4,028,441
94 4,028,442
114 TC 4,028,443
122 4,028,444
142 4,028,445

CLASS 264

8 4,028,447
.5 4,028,446
37 4,028,448
45.3 4,028,449
45.5 4,028,450
45.8 4,028,451
51 4,028,452
67 4,028,453
82 4,028,454
89 4,028,455
90 4,028,456
120 4,028,457
148 4,028,458
159 4,028,459
263 4,028,460
297 4,028,461

CLASS 266

149 4,027,861
160 4,027,862
162 4,027,863
170 4,027,864

CLASS 267

148 4,027,865

CLASS 269

41 4,027,866
94 4,027,867
266 4,027,868
328 4,027,869

CLASS 271

65 4,027,870
95 4,027,871
170 4,027,872
197 4,027,873

CLASS 272

1 R 4,027,874
76 4,027,875
133 4,027,876

CLASS 273

1 R 4,027,877
6 4,027,878
14 4,027,883
29 A 4,027,879
4,027,880
73 R 4,027,881
134 AT 4,027,882
148 R 4,027,884
169 4,027,885
186 A 4,027,886

CLASS 274

1 A 4,027,887

CLASS 277

188 R 4,027,816

CLASS 280

5.22 4,027,889
7.14 4,027,891
11.2 4,027,890
179 R 4,027,892
487 4,027,893
502 4,027,894
604 4,027,895
618 4,027,896
631 4,027,897
720 4,027,898
722 4,027,899
745 4,027,900
746 4,027,905
751 4,027,906

CLASS 285

55 4,027,901
114 4,027,902
156 4,027,903
297 4,027,904

CLASS 292

264 4,027,907
4,027,908

CLASS 293

88 4,027,909

CLASS 296

1 C 4,027,910
23 H 4,027,911
23 MC 4,027,912
28 J 4,027,913
78.1 4,027,914

CLASS 297

184 4,027,915
194 4,027,916
284 4,027,888

CLASS 299

2 4,027,917
53 4,027,918

CLASS 301

37 TP 4,027,919

CLASS 302

28 4,027,920
52 4,027,921

CLASS 303

6 C 4,027,923
4,028,658
6 R 4,027,922
92 4,027,924
109 4,027,926

CLASS 305

46 4,027,925

CLASS 307

205 4,028,556
246 4,028,559
247 A 4,028,560
300 4,028,561
303 4,028,562
4,028,563
310 4,028,564
311 4,028,565
326 4,028,594
355 4,028,558
362 4,028,557

CLASS 308

15 4,027,931
72 4,027,927
77 4,027,928
97 4,027,929
202 4,027,930
233 4,027,932
238 4,027,933

CLASS 310

9.5 4,028,566
25 4,028,567
42 4,028,568
64 4,028,569
68 C 4,028,570
89 4,028,571
201 4,028,572
217 4,028,573
269 4,028,574

CLASS 312

321 4,027,934

CLASS 313

105 R 4,028,575
143 4,028,576
221 4,028,578
318 4,028,577
361 4,028,579
406 4,028,580
414 4,028,581
422 4,028,582

CLASS 315

39.69 4,028,583
169 TV 4,028,584
368 4,028,586
371 4,028,585
377 4,028,587
387 4,028,588
408 4,028,589

CLASS 318

87 4,028,597
138 4,028,598
227 4,028,599
4,028,600
271 4,028,601
345 B 4,028,602
587 4,028,603
596 4,028,604
696 4,028,605

CLASS 321

2 4,028,606
5 4,028,607
4,028,609
8 R 4,028,608
14 4,028,610

CLASS 323

8 4,028,611
17 4,028,612
19 4,028,613
75 B 4,028,642
102 4,028,614

CLASS 324

28 RS 4,028,615
29.5 4,028,616
30 R 4,028,618
33 4,028,617
34 PS 4,028,619
51 4,028,620
4,028,621
57 N 4,028,622
142 4,028,623

CLASS 325

23 4,028,624
133 4,028,625
324 4,028,626
349 4,028,627
400 4,028,628

CLASS 330

2 4,028,629
15 4,028,630
19 4,028,631
53 4,028,632
118 4,028,633
151 4,028,634

CLASS 331

94.5 C 4,028,636
94.5 G 4,028,635
107 A 4,028,639
107 R 4,028,637
109 4,028,638
116 R 4,028,640

CLASS 332

18 4,028,641

CLASS 333

6 4,028,643
16 4,028,644
17 M 4,028,645
70 S Re.29,258
72 4,028,646
4,028,647
4,028,648
73 W 4,028,649
4,028,650
4,028,651
4,028,652

CLASS 336

60 4,028,653
92 4,028,654

CLASS 337

160 4,028,655
186 4,028,656

CLASS 338

307 4,028,657

CLASS 339

14 R 4,027,941
48 4,027,935
59 M 4,027,936
66 M 4,027,937
247 4,027,939
272 R 4,027,940

CLASS 340

17 R 4,028,659
18 CM 4,028,660
32 4,028,662
146.3 R 4,028,673
146.3 SY 4,028,674
147 SC 4,028,676
149 A Re.29,259
172.5 4,028,663
4,028,664
4,028,665
4,028,666
4,028,667
4,028,668
4,028,669
4,028,670
4,028,675
4,028,677
4,028,678
4,028,679
4,028,680
4,028,681
4,028,682
4,028,683
4,028,684
173 R 4,028,671
174 TF 4,028,672
4,028,685
195 4,028,686
201 R 4,028,687
227.1 4,028,688
239 R 4,028,689
258 B 4,028,690
280 4,028,691
323 R 4,028,693
324 M 4,028,661
4,028,692
347 AD 4,028,694
365 L 4,028,696
365 R 4,028,695

CLASS 343

5 R 4,028,697
6.5 LC 4,028,698
9 4,028,699
16 R Re.29,260
17.2 PC 4,028,700
18 C 4,028,701
100 SA 4,028,702
105 R 4,028,703
715 4,028,704
4,028,705
4,078,706
719 4,028,707
777 4,028,708
819 4,028,709
854 4,028,710

CLASS 346

153 4,028,711

CLASS 350

10 4,027,942
17 4,027,943
91 4,027,944
96 C 4,027,938
4,027,945
96 WG 4,027,946
144 4,027,947
150 4,027,949
151 4,027,948
160 LC 4,027,950
175 ML 4,027,951
189 4,027,952
288 4,027,953

CLASS 351

17 4,027,954

CLASS 352

72 4,027,955
130 4,027,956

CLASS 353

21 4,027,957
26 A 4,027,958
77 4,027,959

CLASS 354

23 D 4,028,712
106 4,028,713

CLASS 355

3 R 4,027,960
4,027,961
4 4,027,962
8 4,027,963
10 4,027,964
13 4,027,965
16 4,027,966
4,027,967
28 Re.29,254
46 4,027,968
73 4,027,969

CLASS 356

4 4,027,970
36 4,027,971
51 4,027,972
73 4,027,973
74 4,027,974
100 4,027,975
106 R 4,027,976
111 4,027,977
136 4,027,978
180 4,027,979
203 4,027,980
229 4,027,981
237 4,027,982
246 4,027,983

CLASS 357

5 4,028,714
23 4,028,717
24 4,028,715
4,028,716
27 4,028,718
30 4,028,719
4,028,720
31 Re.29,261
38 4,028,721
70 4,028,722
82 4,028,723

CLASS 358

103 4,028,725
106 4,028,728
148 4,028,729
160 4,028,724
165 4,028,726
181 4,028,727
217 4,028,730
760 4,028,731
289 4,028,732

CLASS 360

10 4,028,733
104 4,028,734
106 4,028,735

CLASS 361

11 4,028,591
16 4,028,592
27 4,028,593
29 4,028,736
76 4,028,555
86 4,028,737
220 4,028,590
235 4,028,596
328 4,028,595
403 4,028,738

CLASS 401

28 4,027,984
134 4,027,985
138 4,027,986

CLASS 403

172 4,027,987
218 4,027,988
291 4,027,989
353 4,027,453

CLASS 404

98 4,027,990
112 4,027,991

CLASS 408

97 4,027,992

CLASS 415

1 4,027,993
4,027,994
92 4,027,995
116 4,027,996
207 4,027,997
219 R 4,027,998

CLASS 416

40 4,027,999
107 4,028,000
134 A 4,028,001
4,028,002
141 4,028,003
157 R 4,028,004
186 R 4,028,005
191 4,028,006
212 R 4,028,007

CLASS 417

52 4,028,008
163 4,028,009
217 4,028,010
278 4,028,011
360 4,028,012
390 4,028,013
403 4,028,014
415 4,028,015
440 4,028,016
489 4,028,017
534 4,028,018

CLASS 418

36 4,028,019
51 4,028,020
56 4,028,021
104 4,028,022
108 4,028,023
197 4,028,025
201 4,028,026
4,028,027
219 4,028,028

CLASS 423

24 4,028,462
52 4,028,463

CLASS 424

1 4,028,465
244 4,028,466
4,028,467
273 4,028,464
311 Re.29,256

CLASS 425

23 4,028,029
133.1 4,028,024
135 4,028,030
147 4,028,031
174.8 E 4,028,032
183 4,028,033
302 B 4,028,034
363 4,028,035
374 4,028,036
392 4,028,037
430 4,028,038
436 R 4,028,039
449 4,028,040
459 4,028,041
515 4,028,042

CLASS 426

11 4,028,470
22 4,028,471
436 4,028,468
551 4,028,469

CLASS 427

8 4,028,472
434 E 4,028,473

CLASS 428

40 4,028,474
215 4,028,475
220 4,028,476
285 4,028,477
558 4,028,062
623 4,027,366
652 4,027,367
675 4,028,064

CLASS 429

61 4,028,478
152 4,028,479

CLASS 431

144 4,028,043
158 4,028,044
289 4,028,045
297 4,028,046
355 4,028,047

CLASS 432

5 4,028,048
14 4,028,049
59 4,028,050
144 4,028,051
145 4,028,052

CLASS 526

3 4,028,480
142 4,028,481
271 4,028,482
279 4,028,483
293 4,028,486
335 4,028,484

CLASS 528

486 4,028,485

CLASSIFICATION OF DESIGNS

D1—	15	244,566	D9—	158	244,578		64	244,592		96	244,616			244,608	D34—	5 CB	244,630
D2—	244	244,567		167	244,579		111	244,593	D15—	29	244,597	D24—	17	244,637		5 K	244,628
D4—	35	244,568		189	244,580		147	244,594		199	244,598	D27—	36	244,619			244,629
D6—	67	244,569			244,581			244,595			244,599	D28—	51	244,640		5 L	244,627
	153	244,570		190	244,582			244,596			244,600		64	244,609		15 AE	244,631
	183	244,571		236	244,583	D13—	5	244,618			244,601	D30—	3	244,620		15 GG	244,632
	192	244,572		245	244,584		24	244,612	D16—	24	244,602		6	244,621	D48—	2	244,633
D7—	5	244,573	D10—	64	244,586		28	244,610		65	244,603			244,622		16 B	244,634
D8—	24	244,574		125	244,587			244,611	D19—	73	244,604			244,623	D56—	1 E	244,635
	40	244,575		126	244,588	D14—	43	244,614	D23—	12	244,605			244,624			244,636
	107	244,576	D11—	34	244,589		45	244,613		127	244,606			244,625	D87—	3 F	244,638
	363	244,577			244,590		53	244,617			244,607		32	244,626		5 F	244,639
	367	244,585	D12—	54	244,591		68	244,615									

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4,028,087	4,027,647	4,028,403	4,027,414	4,027,668	4,027,821
4,028,107	4,027,651	4,028,411	4,027,473	4,027,673	4,027,842
4 : Re.29,257	4,027,669	4,028,439	4,027,474	4,027,714	4,027,859
4,027,359	4,027,670	4,028,450	4,027,519	4,027,780	4,027,869
4,027,480	4,027,677	4,028,465	4,027,523	4,027,790	4,027,877
4,027,486	4,027,680	4,028,491	4,027,531	4,028,014	4,027,954
4,027,645	4,027,682	4,028,509	4,027,540	4,028,158	4,027,990
4,027,930	4,027,683	4,028,525	4,027,549	4,028,246	4,027,992
4,028,013	4,027,687	4,028,527	4,027,586	4,028,500	4,028,010
4,028,045	4,027,689	4,028,548	4,027,658	4,028,623	4,028,020
4,028,235	4,027,722	4,028,562	4,027,660	4,028,686	4,028,035
4,028,560	4,027,737	4,028,579	4,027,838	4,028,722	4,028,069
4,028,664	4,027,739	4,028,587	4,027,850	13 : 4,027,358	4,028,073
4,028,671	4,027,754	4,028,593	4,027,943	4,027,525	4,028,116
4,028,711	4,027,776	4,028,616	4,027,999	4,027,537	4,028,134
5 : 4,027,464	4,027,779	4,028,626	4,028,003	4,027,747	4,028,166
4,027,742	4,027,798	4,028,636	4,028,007	4,027,789	4,028,191
6 : Re.29,248	4,027,807	4,028,639	4,028,033	4,027,792	4,028,194
Re.29,249	4,027,812	4,028,643	4,028,041	4,028,029	4,028,200
Re.29,254	4,027,834	4,028,651	4,028,167	4,028,141	4,028,212
4,027,339	4,027,835	4,028,659	4,028,197	4,028,159	4,028,216
4,027,357	4,027,841	4,028,675	4,028,227	4,028,162	4,028,223
4,027,373	4,027,870	4,028,685	4,028,274	4,028,358	4,028,251
4,027,374	4,027,872	4,028,701	4,028,324	4,028,487	4,028,253
4,027,380	4,027,878	4,028,702	4,028,360	4,028,498	4,028,264
4,027,396	4,027,885	4,028,708	4,028,361	15 : 4,027,430	4,028,269
4,027,403	4,027,901	4,028,719	4,028,394	17 : Re.29,253	4,028,271
4,027,405	4,027,912	4,028,729	4,028,437	4,027,356	4,028,273
4,027,413	4,027,915	4,028,730	4,028,461	4,027,400	4,028,295
4,027,424	4,027,938	4,028,731	4,028,595	4,027,407	4,028,308
4,027,427	4,027,941	4,028,734	4,028,736	4,027,409	4,028,319
4,027,443	4,027,945	8 : 4,027,502	01 : 4,027,837	4,027,419	4,028,364
4,027,450	4,027,961	4,027,543	10 : 4,027,462	4,027,421	4,028,375
4,027,452	4,027,972	4,027,685	4,027,903	4,027,423	4,028,414
4,027,456	4,027,973	4,027,799	4,028,276	4,027,425	4,028,428
4,027,479	4,027,974	4,027,917	4,028,290	4,027,429	4,028,430
4,027,483	4,027,979	4,028,076	4,028,302	4,027,448	4,028,441
4,027,484	4,027,989	4,028,095	4,028,345	4,027,458	4,028,463
4,027,485	4,027,994	4,028,179	4,028,443	4,027,468	4,028,468
4,027,494	4,028,040	4,028,286	11 : 4,028,540	4,027,471	4,028,515
4,027,499	4,028,066	4,028,522	12 : Re.29,252	4,027,513	4,028,519
4,027,508	4,028,088	4,028,538	4,027,350	4,027,532	4,028,580
4,027,521	4,028,092	4,028,576	4,027,387	4,027,533	4,028,627
4,027,528	4,028,093	4,028,678	4,027,411	4,027,573	4,028,654
4,027,571	4,028,104	4,028,679	4,027,415	4,027,575	4,028,656
4,027,572	4,028,143	4,028,683	4,027,433	4,027,607	4,028,663
4,027,577	4,028,147	4,028,684	4,027,505	4,027,612	4,028,669
4,027,583	4,028,160	9 : Re.29,261	4,027,535	4,027,625	4,028,696
4,027,598	4,028,205	4,027,348	4,027,568	4,027,667	4,028,726
4,027,608	4,028,222	4,027,370	4,027,599	4,027,672	4,028,737
4,027,614	4,028,234	4,027,388	4,027,613	4,027,707	18 : 4,027,439
4,027,620	4,028,240	4,027,390	4,027,615	4,027,782	4,027,481

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PATENT AND TRADEMARK OFFICE NOTICES

TITLE 37—PATENTS, TRADEMARKS AND COPYRIGHTS

Chapter 1—Patent and Trademark Office

PART 3—FORMS FOR PATENT CASES

AGENCY: Patent and Trademark Office, Commerce

ACTION: Final rule

SUMMARY: Patent and Trademark Office amends Forms for Patent Cases to assist applicants and other parties in complying with changes previously made in the Rules in Patent Cases.

DATES: Effective date -- June 30, 1977.

A period of 60 days after publication of this notice in the Federal Register is set for written comment by the public. The Patent and Trademark Office will evaluate the changes in light of the written comments received within 60 days after the close of the period for comment. The Office will then publish in the Federal Register and Official Gazette an indication of its adherence to or alteration in the forms as here published, as well as any reply to any especially significant comments received.

FOR FURTHER INFORMATION CONTACT: Mr. Louis O. Maassel by telephone at (703) 557-3079, or by mail marked to his attention and addressed to the Commissioner of Patents and Trademarks, Washington, D. C. 20231.

SUPPLEMENTARY INFORMATION:

The Patent and Trademark Office is amending Title 37 of the Code of Federal Regulations by deleting §§3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.21, and 3.25 since §1.61, which required a petition, was revoked on July 2, 1971, by revising §§3.11, 3.11a, 3.12, 3.12a, 3.13, 3.13a, 3.14, 3.14a, 3.16, 3.16a, 3.17, 3.17a, 3.18, 3.18a, 3.23, 3.23a, 3.26, 3.26a, 3.28, 3.29, 3.31, 3.31a, 3.32, 3.32a, 3.33, 3.36, 3.37, 3.39, 3.41, 3.43, 3.46, 3.50, 3.52, 3.53, and 3.54 and by adding a new §3.33a. These sections are suggested forms for use in patent cases.

These revisions conform the language of the forms, where necessary, to changes which have previously been made in Part 1 of this Chapter and also alter the language in the forms where incorrect or inconsistent. These revisions do not effect any changes in practice and do not impose a burden on anyone. Consequently, procedures for public comment prior to the adoption of these revisions are not deemed necessary.

The general nature of the changes in the forms are as follows:

1. The oath and declaration forms for patent applications have been amended to include a reference to the filing and issuance of inventor's certificates. Such a requirement is set forth in current sections 1.65 and 1.67 of Title 37 CFR.

2. The oath and declaration forms for patent applications have been amended to include the statement by applicant acknowledging the responsibility to disclose information to the Patent and Trademark Office. Such statement will be required by section 1.65 effective January 1, 1978, but may optionally be used prior to that date, as suggested in the notice published on January 28, 1977, in the Federal Register, 42 F.R. 5588 at 5590, and on February 22, 1977, in the Official Gazette (Patent Section), 955 O.G. 1054 at 1056.

3. "United States" has been changed to --United States of America-- to give the full name.

4. In many instances the forms were changed to avoid use of only the masculine gender.

Sections 3.28 and 3.29 have been revised to omit the obsolete requirement for a petition.

Section 3.41 has been revised to delete requirements no longer needed under current internal procedures.

Section 3.52 has been amended by reordering the items and by deletion of an outdated item.

Section 3.54 is a revised version of the wording currently found in Section 201.06(a) of the Manual of Patent Examining Procedure.

Pursuant to the authority contained in section 6 of Title 35, United States Code, the following changes are made in Part 3 of Chapter I of Title 37 of the Code of Federal Regulations.

1. The Table of Contents to Part 3 is revised to read as follows:

PART 3 -- FORMS FOR PATENT CASES

3.1 (Deleted)
3.2 (Deleted)
3.3 (Deleted)
3.4 (Deleted)
3.5 (Deleted)
3.6 (Deleted)
3.7 (Deleted)
3.11 Oath to accompany application for patent.
3.11a Declaration to accompany application for patent.
3.12 Oath to accompany application for patent, by an administrator (or executor).
3.12a Declaration to accompany application for patent, by an administrator (or executor).
3.13 Oath not accompanying application.
3.13a Declaration not accompanying application.
3.14 Supplemental oath for amendment presenting claims for matter disclosed but not originally claimed.
3.14a Supplemental declaration for amendment presenting claims for matter disclosed but not originally claimed.
3.16 Combined oath and power of attorney in original application.
3.16a Combined declaration and power of attorney in original application.
3.17 Oath in division or continuation application.
3.17a Declaration in division or continuation application.
3.18 Oath in copending application containing additional subject matter.
3.18a Declaration in copending application containing additional subject matter.
3.21 (Deleted)
3.22 Design patent application; specification.
3.23 Design patent application; oath.
3.23a Design patent application; declaration.
3.25 (Deleted)
3.26 Plant patent application; oath.
3.26a Plant patent application; declaration.
3.28 Reissue application by the inventor, offer to surrender.
3.29 Reissue application by the assignee, offer to surrender.
3.31 Reissue application, oath; by the inventor.
3.31a Reissue application, declaration; by inventor.
3.32 Reissue application, oath; by assignee.
3.32a Reissue application, declaration; by assignee.
3.33 Oath as to loss of letters patent.
3.33a Declaration as to loss of letters patent.
3.36 Power of attorney or authorization of agent, not accompanying application.
3.37 Revocation of power of attorney or authorization of agent.
3.39 Amendment.
3.41 Notice of appeal from the Primary Examiner to the Board of Appeals.
3.43 Disclaimer in patent.
3.44 Interference; preliminary statement of domestic inventor.
3.45 Interference; preliminary statement of foreign inventor.
3.46 Interference; disclaimer during interference.
3.47 Interference; notice of taking testimony.
3.48 Interference; form of deposition.
3.49 Interference; certificate of officer.
3.50 Waiver of patent rights under §1.139.
3.51 Application transmittal letter.
3.52 Amendment transmittal letter.
3.53 Terminal disclaimer in application.
3.54 Division-continuation program application transmittal form.
3.61 Symbols for draftsmen.

AUTHORITY: The provisions of this Part 3 issued under 35 U.S.C. 6, unless otherwise noted.

NOTE: The following forms illustrate the manner of preparing various papers to be filed in the Patent and Trademark Office. Applicants and other parties will find their business facilitated by following them. In special situations such alterations as the circumstances may render necessary may be made provided they do not depart from the requirements of Part 1 of this chapter or of the statute. Before using any form the pertinent sections of Part 1 and sections of the statute should be studied carefully.

2. Section 3.1 is deleted.

3. Section 3.2 is deleted.

4. Section 3.3 is deleted.

5. Section 3.4 is deleted.

6. Section 3.5 is deleted.

7. Section 3.6 is deleted.

8. Section 3.7 is deleted.

9. Section 3.11 is revised to read as follows:

§3.11 Oath to accompany application for patent.

As a below named inventor, being duly sworn (or affirmed), I depose and say that:

my residence, post office address and citizenship are as stated below next to my name; that

I verily believe I am the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural inventors are named below) of the invention entitled: _____

described and claimed in the attached specification; that

I do not know and do not believe that the same was ever known or used in the United States of America before my or our invention thereof, or patentad or described in any printed publication in any country before my or our invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to this application, that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, and that no application for patent or inventor's certificate on this invention has been filed in any country foreign to the United States of America prior to this application by me or my legal representatives or assigns, except as follows: _____

Full name of sole or first Inventor _____

Inventor's signature _____ Date _____

Residence _____

Citizenship _____

Post Office Address _____

_____

Full name of second joint Inventor, if any _____

Inventor's signature _____ Date _____

Residence _____

Citizenship _____

Post Office Address _____

_____

(Supply similar information and signature for third and subsequent joint inventors)

_____ }
_____ } ss:

Sworn to and subscribed before me this _____ day of _____, 19__.

[Seal]

_____
(Signature of notary or officer)

_____
(Official character)

10. Section 3.11a is revised to read as follows:

§3.11a Declaration to accompany application for patent.

As a below named inventor, I hereby declare that:

my residence, post office address and citizenship are as stated below next to my name; that

I verily believe I am the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural inventors are named below) of the invention entitled: _____

described and claimed in the attached specification; that

I do not know and do not believe that the same was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to this application, that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, and that no application for patent or inventor's certificate on this invention has been filed in any country foreign to the United States of America prior to this application by me or my legal representatives or assigns, except as follows: _____

_____

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first Inventor _____

Inventor's signature _____ Date _____

Residence _____

Citizenship _____

Post Office Address _____

_____

Full name of second joint Inventor, if any _____

Inventor's signature _____ Date _____

Residence _____

Citizenship _____

Post Office Address _____

_____

(Supply similar information and signature for third and subsequent joint inventors)

11. Section 3.12 is revised to read as follows:

§3.12 Oath to accompany application for patent, by an administrator (or executor).

I (A) _____

being duly sworn (or affirmed), depose and say that I am a citizen of _____, and a resident of _____, that I am the administrator of the estate (or executor of the last will and testament)

of (B) _____, deceased, late a citizen of _____, and resident of _____, that I verily believe the said (B) _____ to be the original, first and sole inventor of the improvement in _____ described and claimed in the foregoing specification; that I do not know and do not believe that the same was ever known or used in the United States of America before the invention thereof by the said (B) _____, or patented or described in any printed publication in any country before the said invention thereof, or more than one year prior to this application, or in public use or on sale in the United States of America more than one year prior to this application; that said invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by the said (B) _____ or his or her legal representatives or assigns more than twelve months prior to this application; that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, and that no application for patent or inventor's certificate on said invention has been filed by the said (B) _____ or his or her representatives or assigns in any country foreign to the United States of America, except as follows: _____

_____

(A) _____
(Signature)
Administrator, etc.

_____ }
_____ } as:

Sworn to and subscribed before me this _____ day of _____, 19__.

_____
(Signature of notary or officer)

[Seal]

_____
(Official character)

NOTE:
(A) Name of administrator or executor.
(B) Name of deceased inventor.

12. Section 3.12a is revised to read as follows:

§3.12a Declaration to accompany application for patent, by an administrator (or executor).

I, (A) _____, hereby declare that I am a citizen of _____ and a resident of _____, that I am the administrator of the estate (or executor of the last will and testament) of (B) _____, deceased, late a citizen of _____ and resident of _____, that I verily believe the said (B) _____ to be the original, first and sole inventor of the improvement in _____ described and claimed in the foregoing specification; that I do not know and do not believe that the same was ever known or used in the United States of America before the invention thereof by the said (B) _____, or patented or described in any printed publication in any country before the said invention thereof, or more than one year prior to this application, or in public use or on sale in the United States of America more than one year prior to this application; that said invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by the said (B) _____, or his or her legal representatives or assigns more than twelve months prior to this application; that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, and that no application for patent or inventor's certificate on said invention has been filed by the said (B) _____, or his or her representatives or assigns in any country foreign to the United States of America, except as follows: _____

_____.

I hereby declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

(A) _____
(Signature)

_____
Date

NOTE:
(A) Name of administrator or executor
(B) Name of deceased inventor

13. Section 3.13 is revised to read as follows:

§3.13 Oath not accompanying application.

As a below named inventor, being duly sworn (or affirmed), I depose and say that:

my residence, post office address and citizenship are as stated below next to my name; that

I verily believe I am the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural inventors are named below) of the invention entitled: _____

described and claimed in the specification of application Serial No. _____ filed _____; that I do not know and do not believe that the same was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to this application, that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, and that no application for patent or inventor's certificate on this invention has been filed in any country foreign to the United States of America prior to this application by me or my legal representatives or assigns, except as follows: _____

_____

Full name of sole or first Inventor _____
Inventor's signature _____ Date _____
Residence _____
Citizenship _____
Post Office Address _____
_____

Full name of second joint Inventor, if any _____
Inventor's signature _____ Date _____
Residence _____
Citizenship _____
Post Office Address _____
_____

(Supply similar information and signature for third and subsequent joint inventors)

_____ }
_____ } ss.

Sworn to and subscribed before me this _____ day of _____, 19__.

[Seal]

_____
(Signature of notary or officer)

_____
(Official character)

14. Section 3.13a is revised to read as follows:

§3.13a Declaration not accompanying application.

As a below named inventor, I hereby declare that:

my residence, post office address and citizenship are as stated below next to my name; that

I verily believe I am the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural inventors are named below) of the invention entitled: _____

described and claimed in the specification of application Serial No. _____ filed _____; that I do not know and do not believe that the same was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to this application, that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, and that no application for patent or inventor's certificate on this invention has been filed in any country foreign to the United States of America prior to this application by me or my legal representatives or assigns, except as follows: _____

_____

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first Inventor _____
Inventor's signature _____ Date _____
Residence _____
Citizenship _____
Post Office Address _____
_____

Full name of second joint inventor, if any _____ Date _____
Inventor's signature _____
Residence _____
Citizenship _____
Post Office Address _____
_____

(Supply similar information and signature for third and subsequent joint inventors)

15. Section 3.14 is revised to read as follows:

§3.14 Supplemental oath for amendment presenting claims for matter disclosed but not originally claimed.

I, _____(name)_____, as the inventor named in the application for letters patent for an improvement in _____, Serial No. _____, filed in the United States Patent and Trademark Office on or about the _____ day of _____, 19____, being duly sworn (or affirmed) depose and say that the subject matter of the foregoing (1) amendment was part of my invention, was invented before the filing of the original application, above identified, for such invention; that I do not know and do not believe that the same was ever known or used in the United States of America before my invention thereof, or patented or described in any printed publication in any country before my invention thereof, or more than one year before said application, or in public use or on sale in the United States of America more than one year before the date of said application, that said invention has not been patented or made the subject of an inventor's certificate issued before the date of said application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to said application in the United States of America, and has not been abandoned.

_____
(Signature)

_____ }
_____ } ss

Sworn to and subscribed before me this _____ day of _____, 19___.

_____
(Signature of notary or officer)

[Seal]

_____
(Official character)

NOTE: (1) If the supplemental oath does not accompany the amendment, the amendment should be identified. See §1.67.

16. Section 3.14a is revised to read as follows:

§3.14a Supplemental declaration for amendment presenting claims for matter disclosed but not originally claimed.

I, _____(name)_____, the inventor named in the application for letters patent for an improvement in _____, Serial No. _____, filed in the United States Patent and Trademark Office on or about the _____ day of _____,

19___, declare that the subject matter of the foregoing (1) amendment was part of my invention, was invented before the filing of the original application, above identified, for such invention; that I do not know and do not believe that the same was ever known or used in the United States of America before my invention thereof, or patented or described in any printed publication in any country before my invention thereof, or more than one year before said application, or in public use or on sale in the United States of America more than one year before the date of said application, that said invention has not been patented or made the subject of an inventor's certificate issued before the date of said application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to said application in the United States of America, and has not been abandoned.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signature _____

Date _____

NOTL: (1) If the supplemental declaration does not accompany the amendment, the amendment should be identified. See §1.67.

17. Section 3.16 is revised to read as follows:

§3.16 Combined oath and power of attorney in original application.

As a below named inventor, being duly sworn (or affirmed), I depose and say that:

my residence, post office address and citizenship are as stated below next to my name; that

I verily believe I am the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural inventors are named below) of the invention entitled: _____

described and claimed in the attached specification; that

I do not know and do not believe the same was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to this application, that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, and that no application for patent or inventor's certificate on this invention has been filed in any country foreign to the United States of America prior to this application by me or my legal representatives or assigns except as follows: _____.

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith: _____. Address all telephone calls to _____ at telephone no. _____.

Address all correspondence to _____.

Full name of sole or first inventor _____

Inventor's signature _____ Date _____

Residence _____

Citizenship _____

Post Office Address _____

Full name of second joint inventor, if any _____

Inventor's signature _____ Date _____

Residence _____

Citizenship _____

Post Office Address _____

(Supply similar information and signature for third and subsequent joint inventors)

_____ } ss:
_____ }

Sworn to and subscribed before me this _____ day of _____, 19___.

(Signature of notary or officer)

[Seal]

(Official character)

18. Section 3.16a is revised to read as follows:

§3.16a Combined declaration and power of attorney in original application.

As a below named inventor, I hereby declare that:

my residence, post office address and citizenship are as stated below next to my name; that

I verily believe I am the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural inventors are named below) of the invention entitled: _____

described and claimed in the attached specification, that

I do not know and do not believe the same was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to this application, that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, and that no application for patent or inventor's certificate on this invention has been filed in any country foreign to the United States of America prior to this application by me or my legal representatives or assigns, except as follows: ___

_____.

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith: _____. Address all telephone calls to _____ at telephone No. _____.

Address all correspondence to _____.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first Inventor _____

Inventor's signature _____ Date _____

Residence _____

Citizenship _____

Post Office Address _____

Full name of second joint Inventor, if any _____

Inventor's signature _____ Date _____

Residence _____

Citizenship _____

Post Office Address _____

(Supply similar information and signature for third and subsequent joint inventors)

19. Section 3.17 is revised to read as follows:

§3.17 Oath in division or continuation application.

[This form of oath may be used with an application disclosing and claiming only subject matter disclosed in a prior copending application of the same inventor.]

As a below named inventor, being duly sworn (or affirmed), I depose and say that:

my residence, post office address and citizenship are as stated below next to my name; that

I verily believe I am the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural inventors are named below) of the invention entitled: _____

described and claimed in the attached specification; that this application discloses and claims only subject matter disclosed in my or our prior pending application Serial No. _____ filed _____; that

I do not know and do not believe the same was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof or more than one year prior to said prior application, that the same was not in public use or on sale in the United States of America more than one year prior to said prior application, that said invention has not been patented or made the subject of an inventor's certificate issued before the date of said prior application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to said prior application, that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, and that no application for patent or inventor's certificate on said invention has been filed in any country foreign to the United States of America by me or my legal representatives or assigns, except as follows: _____

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first Inventor _____

Inventor's signature _____ Date _____

Residence _____

Citizenship _____

Post Office Address _____

Full name of second joint Inventor, if any _____

Inventor's signature _____ Date _____

Residence _____

Citizenship _____

Post Office Address _____

(Supply similar information and signature for third and subsequent joint inventors)

_____ } ss:
_____ }

Sworn to and subscribed before me this _____ day of _____, 19___.

(Signature of notary or officer)

[Seal]

(Official character)

20. Section 3.17a is revised to read as follows:

§3.17a Declaration in division or continuation application.

As a below named inventor, I hereby declare that:

my residence, post office address and citizenship are as stated below next to my name; that

I verily believe I am the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural inventors are named below) of the invention entitled: _____

described and claimed in the attached specification; that this application discloses and claims only subject matter disclosed in my or our pending application Serial No. _____, filed _____; that

I do not know and do not believe the same was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof or more than one year prior to said prior application, that the same was not in public use or on sale in the United States of America more than one year prior to said prior application, that said invention has not been patented or made the subject of an inventor's certificate issued before the date of said prior application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to said prior application, that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, and that no application for patent or inventor's certificate on said invention has been filed in any country foreign to the United States of America by me or my legal representatives or assigns, except as follows: _____

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of

Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first Inventor _____

Inventor's signature _____ Date ____

Residence _____

Citizenship _____

Post Office Address _____

_____

Full name of second joint Inventor, if any _____

Inventor's signature _____ Date ____

Residence _____

Citizenship _____

Post Office Address _____

_____

(Supply similar information and signature for third and subsequent joint inventors)

21. Section 3.18 is revised to read as follows:

§3.18 Oath in copending application containing additional subject matter.

[This form of oath may be used with an application disclosing and claiming subject matter disclosed in a prior copending application of the same inventor and also disclosing additional subject matter.]

I, _____ (name of inventor) _____, being sworn (or affirmed), depose and say that I am a citizen of _____ and resident of _____, that I verily believe that I am the original, first and sole inventor of the improvement in _____ described and claimed in the foregoing specification; that this application in part discloses and claims subject matter disclosed in my earlier filed pending application, Serial No. _____ filed _____; that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, that, as to the subject matter of this application which is common to said earlier application I do not know and do not believe that the same was ever known or used in the United States of America before my invention thereof or patented or described in any printed publication in any country before my invention thereof or more than one year prior to said earlier application, or in public use or on sale in the United States of America more than one year prior to said earlier application; that said common subject has not been patented or made the subject of an inventor's certificate issued before the date of said earlier application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to said earlier application; and that no application for patent or inventor's certificate on said invention has been filed by me or my representatives or assigns in any country foreign to the United States of America, except as follows: _____; that as to the subject matter of this application which is not common to said earlier application, I do not know and do not believe that the same was ever known or used in the United States of America before my invention thereof or patented or described in any printed publication in any country before my invention thereof or more than one year prior to the date of this application, or in public use or on sale in the United States of America more than one year prior to the date of this application, and that said subject matter has not been patented or made the subject of an inventor's certificate issued in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to the date of this application; and that no application for patent or inventor's certificate on said invention has been filed by me or my representatives or assigns in any country foreign to the United States of America except as follows: ___ _____.

Inventor's full name: _____

_____ (Signature)

_____ } ss:
_____

Sworn to and subscribed before me this ____ day of _____, 19___.

_____ (Signature of notary or officer)

[Seal]

_____ (Official character)

22. Section 3.18a is revised to read as follows:

§3.18a Declaration in copending application containing additional subject matter.

[Sections 1.65 and 1.68 provide for a declaration in lieu or in place of an oath in certain instances.]

[This form of declaration may be used with an application disclosing and claiming subject matter disclosed in a prior copending application of the same inventor and also disclosing additional subject matter.]

I, _____ (name of inventor) _____, declare that I am a citizen of _____ and resident of _____, that I verily believe that I am the original, first and sole inventor of the improvement in _____ described and claimed in the foregoing specification; that this application in part discloses and claims subject matter disclosed in my earlier filed pending application, Serial No. _____, filed _____; that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, that, as to the subject matter of this application which is common to said earlier application, I do not know and do not believe that the same was ever known or used in the United States of America before my invention thereof or patented or described in any printed publication in any country before my invention thereof or more than one year prior to said earlier application, or in public use or on sale in the United States of America more than one year prior to said earlier application; that said common subject matter has not been patented or made the subject of an inventor's certificate issued before the date of said earlier application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to said earlier application; and that no application for patent or inventor's certificate on said invention has been filed by me or my representatives or assigns in any country foreign to the United States of America, except as follows _____, that, as to the subject matter of this application which is not common to said earlier application, I do not know and do not believe that the same was ever known or used in the United States of America before my invention thereof or patented or described in any printed publication in any country

before my invention thereof or more than one year prior to the date of this application, or in public use or on sale in the United States of America more than one year prior to the date of this application, and that said subject matter has not been patented or made the subject of an inventor's certificate issued in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to the date of this application; and that no application for patent or inventor's certificate on said invention has been filed by me or my representatives or assigns in any country foreign to the United States of America, except as follows: _____.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon. Inventor's full name or names _____.

_____ (Signature)

Date _____

23. Section 3.21 is deleted.

24. Section 3.23 is revised to read as follows:

§3.23 Design patent application; oath.

As a below named inventor, being duly sworn (or affirmed), I depose and say that my residence, post office address and citizenship are as stated below next to my name; that I believe I am the original, first and sole inventor (if only one name is listed below), or a joint inventor (if plural inventors are named below) of the design entitled: _____

_____

which is described and claimed in the attached specification, that I do not know and do not believe that the same was ever known or used in the United States of America before my or our invention thereof or patented or described in any printed publication in any country before my or our invention thereof, or more than one year prior to this application, or in public use or on sale in the United States of America more than one year prior to this application, that said design has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than six months prior to this application, that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, and that no application for patent or inventor's certificate on this design has been filed by me or my legal representatives or assigns in any country foreign to the United States of America except as follows: _____.

Full name of sole or first Inventor _____

Inventor's signature _____ Date ____

Residence _____

Citizenship _____

Post Office Address _____

_____

Full name of second joint Inventor, if any _____

Inventor's signature _____ Date ____

Residence _____

Citizenship _____

Post Office Address _____

_____

(Supply similar information and signature for third and subsequent joint inventors)

_____ } ss:
_____

Sworn to and subscribed before me this ____ day of _____, 19___.

_____ (Signature of notary or officer)

_____ (Official character)

25. Section 3.23a is revised to read as follows:

§3.23a Design patent application; declaration.

As a below named inventor, I declare that: my residence, post office address and citizenship are as stated below next to my name; that I believe that I am the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural inventors are named below) of the design entitled: _____

which is described and claimed in the attached specification, that I do not know and do not believe that the same was ever known or used in the United States of America before my or our invention thereof or patented or described in any printed publication in any country before my or our invention thereof, or more than one year prior to this application, or in public use or on sale in the United States of America more than one year prior to this application, that said design has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than six months prior to this application, that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, and that no application for patent or inventor's certificate on this design has been filed by me or my legal representatives or assigns in any country foreign to the United States of America except as follows ___ _____.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Full name of sole or first Inventor _____

Inventor's signature _____ Date ____

Residence _____

Citizenship _____

Post Office Address _____

_____

Full name of second joint Inventor, if any _____

Inventor's signature _____ Date ____

Residence _____
Citizenship _____
Post Office Address _____
_____

(Supply similar information and signature for third and subsequent joint inventors)

26. Section 3.25 is deleted.

27. Section 3.26 is revised to read as follows:

§3.26 Plant patent application; oath.

I, _____,
being sworn (or affirmed) depose and say that I am a citizen of _____ and resident of _____, that I verily believe myself to be the original, first and sole inventor of the new and distinct variety of _____ described and claimed in the foregoing specification; that I have asexually reproduced the said new and distinct variety; that I do not know and do not believe that the same was ever known or used in the United States of America before my invention thereof, or patented or described in any printed publication in any country before my invention thereof, or more than one year prior to this application, or in public use or on sale in the United States of America more than one year prior to this application; that said invention has not been patented or made the subject of an inventor's certificate issued in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to this application; that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, and that no application for patent or inventor's certificate on said new and distinct variety of plant has been filed by me or my representatives or assigns in any country foreign to the United States of America, except as follows: _____.

Inventor's full name: _____
Post Office Address : _____
_____
_____
(Signature)

_____ } as:
_____ }

Sworn to and subscribed before me this _____ day of _____, 19___.

(Signature of notary or officer)

[Seal]

(Official character)

28. Section 3.26a is revised to read as follows:

§3.26a Plant patent application; declaration.

I declare that: my residence, post office address and citizenship are as stated below next to my name; that I verily believe myself to be the original, first and sole inventor of the new and distinct variety of _____ described and claimed in the foregoing specification; that I have asexually reproduced the said new and distinct variety; that I do not know and do not believe that the same was ever known or used in the United States of America before my invention thereof, or patented or described in any printed publication in any country before my invention thereof, or more than one year prior to this application, or in public use or on sale in the United States of America more than one year prior to this application; that said invention has not been patented or made the subject of an inventor's certificate issued in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to this application; that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, and that no application for patent or inventor's certificate on said new and distinct variety of plant has been filed by me or my representatives or assigns in any country foreign to the United States of America, except as follows: _____.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Full name of inventor _____
Residence _____
Citizenship _____
Post Office Address _____
_____

Signature _____ Date _____

29. Section 3.28 is revised to read as follows:

§3.28 Reissue application by the inventor, offer to surrender.

To the Commissioner of Patents and Trademarks:

The undersigned applicant of the accompanying reissue application for the reissue of letters patent for an improvement in _____, No. _____ granted to him _____, 19___, of which he is now sole owner (or of which _____ is now sole owner by assignment, and on whose behalf and with whose assent the accompanying application is made), hereby offers to surrender said letters patent. Filed herewith is an abstract of title, duly certified (or an order for a title report), as required in such cases.

_____
(Signature)

[Assent of assignee to reissue]

The undersigned, assignee of the entire (or of an undivided) interest in the above-mentioned letters patent, hereby assents to the accompanying application.

_____
(Signature)

30. Section 3.29 is revised to read as follows:

§3.29 Reissue application by the assignee, offer to surrender.

To the Commissioner of Patents and Trademarks:

The undersigned applicant of the accompanying reissue application for the reissue of letters patent for an improvement in _____, No. _____, granted _____, 19___, to _____, now deceased, of which he is now owner by assignment of the entire interest, hereby offers to surrender said letters patent. Filed herewith is an abstract of title (or an order for a title report).

_____
(Signature)

NOTE: To be used when the inventor is dead; may also be used with appropriate changes when the reissue application does not seek to enlarge the claims of the original patent.

31. Section 3.31 is revised to read as follows:

§3.31 Reisaue application, oath; by the inventor.

I, _____, being duly sworn (or affirmed) depose and say that I am a citizen of _____, and a resident of _____; that I verily believe myself to be the original, first and sole inventor of the invention described and claimed in lettera patent No. _____ and in the foregoing specification and for which invention I solicit a reissue patent; that I do not know and do not believe that said invention was ever known or used in the United States of America before my invention thereof, that (continue with the statements under paragraphs 5 and 6 of §1.175(a), and at least an allegation under one of the appropriate paragraphs 1-4.) _____

Inventor's full name _____
Post Office address _____
_____

_____
(Signature)

_____ } as:
_____ }

Subscribed and sworn to before me this _____ day of _____, 19___

(Signature of notary or officer)

[Seal]

(Official character)

32. Section 3.31a is revised to read as follows:

§3.31a Reissue application, declaration; by inventor.

(Sections 1.65 and 1.68 provide for a declaration in lieu or in place of an oath in certain instances.)

I, _____, declare that I am a citizen of _____, and a resident of _____; that I verily believe myself to be the original, first and sole inventor of the invention described and claimed in letters patent No. _____ and in the foregoing specification and for which invention I solicit a reissue patent; that I do not know and do not believe that said invention was ever known or used in the United States of America before my invention thereof, that (continue with the statements under paragraphs 5 and 6 of §1.175(a), and at least an allegation under one of the appropriate paragraphs 1-4.) _____

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Full name of sole inventor (include at least one given name) _____
Post Office Address _____
_____

Signature _____ Date _____

33. Section 3.32 is revised to read as follows:

§3.32 Reissue application, oath; by assignee.

I, _____(name of company officer)_____, _____(title)_____ of _____(name of company)_____, being duly sworn (or affirmed), depose and say that I am a citizen of _____ and resident of _____, that the entire title to letters patent No. _____ for _____, granted on _____ to _____(name of inventor)_____ is vested in _____(name of company)_____, that I verily believe said _____(inventor)_____ to be the original, first and sole inventor of the invention described and claimed in the aforesaid letters patent and in the foregoing specification and for which invention I solicit a reissue patent; that I do not know and do not believe that said invention was ever known or used in the United States of America before the invention thereof by said _____(name of inventor)_____; that (continue with the statements under paragraphs 5 and 6 of §1.175(a), and at least an allegation under one of the appropriate paragraphs 1-4.) _____

Assignee's full name _____
Name of officer of assignee _____
Post Office address _____
_____

Signature _____

_____ } as:
_____ }

Sworn to and subscribed before me this _____ day of _____, 19___.

(Signature of notary or officer)

[Seal]

(Official character)

NOTE: May be used only when the reissue application does not seek to enlarge the claims of the original patent.

34. Section 3.32a is revised to read as follows:

§3.32a Reissue application, declaration; by assignee.

I, _____(name of company officer)_____, _____(title)_____ of _____(name of company)_____, declare that I am a citizen of _____ and resident of _____, that the entire title to letters patent No. _____ for _____, granted on _____ to _____(name of inventor)_____ is veated in _____(name of company)_____, that I verily believe said _____(inventor)_____ to be the original, first and sole inventor of the invention described and claimed in the aforesaid letters patent and in the foregoing specification and for which invention I solicit a reissue patent; that I do not know and do not believe that said invention was ever known or used in the United States of America before the invention thereof by said _____(name of inventor)_____; that (continue with the statements under paragraphs 5 and 6 of §1.175(a), and at least an allegation under one of the appropriate paragraphs 1-4.) _____

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of

the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Assignee's full name _____

Name of officer of assignee _____

Post Office Address _____

_____

Signature _____ Date _____

35. Section 3.33 is revised to read as follows:

§3.33 Oath as to loss of letters patent.

I, (inventor or assignee) being duly sworn (or affirmed), depose and say that letters patent No. _____ granted to _____ on _____, 19__, has been either lost or destroyed, that I have made a diligent search for said patent in all places where the same would probably be found, if existing, and that I have not been able to find it.

_____
(Signature)

_____ }
_____ } as:

Subscribed and sworn to before me this _____ day of _____, 19__.

[Seal]

_____
(Signature of notary or officer)

_____
(Official character)

36. Section 3.33a is added which reads as follows:

§3.33a Declaration as to loss of letters patent.

I, (inventor or assignee), hereby declare that letters patent No. _____ granted to _____ on _____, 19__, has been either lost or destroyed, that I have made a diligent search for said patent in all places where the same would probably be found, if existing, and that I have not been able to find it.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

_____ _____
(Date) (Signature)

37. Section 3.36 is revised to read as follows:

§3.36 Power of attorney or authorization of agent, not accompanying application.

[If the power of attorney or authorization of agent be given at any time other than that of making application for letters patent, it will be in substantially the following form:]

To the Commissioner of Patents and Trademarks:

I, the undersigned, having on or about the _____ day of _____, 19__, made application for letters patent for an improvement in _____, aerial number _____, hereby appoint _____ of _____, State of _____, Registration No. _____ and telephone No. _____, as my attorney (or agent), to prosecute said application, and to transact all business in the Patent and Trademark Office connected therewith.

_____ _____
(Date) (Signature)

38. Section 3.37 is revised to read as follows:

§3.37 Revocation of power of attorney or authorization of agent.

To the Commissioner of Patents and Trademarks.

I, the undersigned, having on or about the _____ day of _____, 19__, appointed _____, of _____, State of _____, as my attorney (or agent) to prosecute an application for letters patent, which application was filed on or about the _____ day of _____, 19__, for an improvement in _____, serial number _____, hereby revoke the power of attorney (or authorization of agent) then given.

_____ _____
(Date) (Signature)

39. Section 3.39 is revised to read as follows:

§3.37 Amendment.

Applicant: _____

Serial No.: _____ (Date) _____

Filed _____ Group Art Unit _____

For _____ Examiner _____

To the Commissioner of Patents and Trademarks:

In response to the office letter of _____, 19__, please amend as follows:

Page _____, line _____, change "_____" to --_____--.

Page _____, line _____, after "_____" insert --_____--.

Page _____, line _____, to end, cancel.

Cancel claims _____ inclusive.

Rewrite claim _____ as follows _____.

(See §1.121(b)).

Add the following claims:

REMARKS

(Here state nature and purpose of the amendments and make all explanations necessary for a response to the rejections and objections of record, etc. See §§1.111, 1.115-1.126, 1.135.)

Respectfully,

_____
Applicant

date _____ By _____
His Attorney (or Agent)
(Include telephone number)

40. Section 3.41 is revised to read as follows:

§3.41 Notice of appeal from the Primary Examiner to the Board of Appeals.

In re application of _____ Droup Art Unit _____

Serial No. _____ Examiner _____

Filed _____

For _____

To the Commissioner of Patents and Trademarks:

SIR: Applicant hereby appeals to the Board of Appeals from the decision dated _____ of the Primary Examiner finally rejecting claims _____.

Appeal Fee $50.00:

[ ] Enclosed.

[ ] Not required (fee paid in prior appeal in this application).

[ ] Charge to Deposit Account No. _____. (One additional copy of this Notice is enclosed herewith.)

date _____ _____
(Signature) (§1.191(b))

41. Section 3.43 is revised to read as follows.

§3.43 Disclaimer in patent.

To the Commissioner of Patents and Trademarks:

I, (name of disclaimant), residing at _____ represent that I am (here state) the exact interest of the disclaimant; if assignee, set out liber and page, or reel and frame, where assignment is recorded) of United States Patent No. _____, granted to _____ on the _____ day of _____, 19__, for _____, and that I have reason to believe that without any deceptive intention, claims of said letters patent are too broad or invalid, and therefore hereby disclaim claim(s) _____ of said patent.

Signed at _____, State of _____ this _____ day of _____, 19__.

_____
(Signature)

Name and address of signer _____

_____

_____

42. Section 3.46 is revised to read as follows:

§3.46 Interference; disclaimer during interference.

_____ }
v. } Interference No. _____

In the matter of the above identified interference, under the provisions of and for the purpose set forth in §1.262, I hereby disclaim the subject matter of all the counts of said interference.

_____
(Signature of inventor)

Date _____

I, the undersigned, (full name of officer), (title of office) of _____, assignee of the entire right, title, and interest in the application of _____, Serial No. _____, filed _____, for _____, hereby assents to the foregoing disclaimer.

[Corporate Seal] _____ Company, Inc.

By _____
(Signature of officer and title of office)

Date _____

43. Section 3.50 is revised to read as follows:

§3.50 Waiver of patent rights under §1.139.

Group Art Unit _____

Examiner _____

To the Commissioner of Patents and Trademarks.

I, the undersigned, having on _____ filed an application for patent, Serial No. _____ entitled _____, hereby waive my right to an enforceable patent based on said application or on any continuing application filed after the expiration of thirty (30) months from the earliest U.S. effective filing date of said application and subject to acceptance by the Commissioner, and request that an abstract of the disclosure thereof be published in the Official Gazette, that the complete application be opened to inspection by the general public upon publication of said abstract, and that the application be considered pending for the purpose of interference; and I further expressly abandon said application, the abandonment to take effect five (5) years after the earliest United States effective filing date of the application unless within that period interference proceedings have been initiated.

_____ _____
(Date) (Signature of inventor)

44. Section 3.52 is revised to read as follows:

§3.52 Amendment transmittal letter.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Group Art Unit _____

Serial No. _____ Examiner _____

Filed _____

For:

THE COMMISSIONER OF PATENTS AND TRADEMARKS,

Washington, D.C. 20231

Sir: Transmitted herewith is an amendment in the above-identified application.

The fee has been calculated as shown below.

CLAIMS AS AMENDED

(1)	(2) Claims remaining after amendment	(3)	(4) Highest number previously paid for	(5) Present extra	(6) Rate	(7) Additional fee
Total claims.	*	Minus	** =	X	$2	*
Independent claims.	*	Minus	=	X	10	*
				Total additional fee for this amendment		

*If the entry in Column 2 is less than the entry in Column 4, write "0" in Column 5.

**If the "Highest Number Previously Paid For" in this space is less than 10, write "10" in this space.

1. [ ] No additional fee is required.
2. [ ] A check in the amount of $_____ is attached.
3. [ ] Charge $_____ to Deposit Account No. _____.
   A duplicate copy of this sheet is enclosed.
4. [ ] Please charge any additional fees or credit overpayment to Depost Account No. _____.
   A duplicate copy of this sheet is enclosed.

45. Section 3.53 is revised to read as follows:

§3.53 Terminal disclaimer in application.

In re application of _____ Group Art Unit _____

Serial Number _____ Examiner _____

Filed _____

For _____

To the Commissioner of Patents and Trademarks:

I, (full name of signer), residing at _____ in the county of _____ and State of _____ represent that I am (here state exact interest of the disclaimant and, if an assignee, set out the liber and page or reel and frame where the assignment is recorded) of application Serial No. _____, filed on the _____ day of _____, 19__ for _____. I hereby discleim the terminal part of any patent granted on the above-identified application, which would extend beyond the expiration date of Patent No. _____ and hereby agree that any patent so granted on the above-identified

application shall be enforceable only for and during such period that the legal title to said patent shall be the same as the legal title to United States Patent No. ____ _____, this agreement to run with any patent granted on the above-identified application and to be binding upon the grantee, its successors or assigns.

_____ (Date) _____ (Signature)

45. Section 3.54 is revised to read as follows:

§3.54 Division-continuation program application transmittal form.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Docket No. _____

Anticipated Classification of this application:

Class ____ Subclass ____

Prior application:

Examiner _____

Art Unit _____

THE COMMISSIONER OF PATENTS AND TRADEMARKS

Washington, D.C. 20231.

Sir: This is a request for filing a [ ] continuation [ ] divisional application, under 37 CFR 1.60, of pending prior application Serial No. _____ filed on _____ (Date) of _____ (Inventor currently of record in prior application) for _____ (title of invention).

1. [ ] Enclosed is a copy of the prior application, including the oath or declaration as originally filed.

I hereby verify that the attached papers are a true copy of prior application Serial No. _____ as originally filed on _____ (date), and further that this statement was made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

2. [ ] Prepare a copy of the prior application.

3. [ ] The filing fee is calculated below:

CLAIMS AS FILED IN THE PRIOR APPLICATION, LESS ANY CLAIMS CANCELLED BY AMENDMENT BELOW

For	Number filed	Number Extra	Rate	Fee
Total claims	-10*		x$2*	
Independent Claims	- 1*		x10*	
Basic Fee (minimum amount required)				$55.00
Total filing fee				

4. [ ] The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Account No. _____. A duplicate copy of this sheet is enclosed.

5. [ ] A check in the amount of $_____ is enclosed.

6. [ ] Cancel in this application original claims ____ _____ of the prior application before calculating the filing fee. (At least one original independent claim must be retained for filing purposes.)

7. [ ] Amend the specification by inserting before the first line the sentence: --This is a [ ] continuation, [ ] division, of application serial no. _____, filed _____.

8. [ ] Transfer the drawings from the prior application to this application and abandon said prior application as of the filing date accorded this application. A duplicate copy of this sheet is enclosed for filing in the prior application file. (May only be used if signed by person authorized by §1.138 and before payment of base issue fee.)

8a. [ ] New formal drawings are enclosed.

8b. [ ] Priority of application serial no. _____ filed on _____ in _____ (country) is claimed under 35 U.S.C. 119.

[ ] The certified copy of the priority application has been filed in prior application serial no. ____ _____, filed _____.

9. [ ] The prior application is assigned of record to ____ _____.

10. [ ] The power of attorney in the prior application is to _____ (name, registration number, and address).

a. [ ] The power appears in the original papers in the prior application.

b. [ ] Since the power does not appear in the original papers, a copy of the power in the prior application is enclosed.

c. [ ] Address all future communications to ____ _____.

(May only be completed by applicant, or attorney or agent of record.)

_____ (date) _____ (signature)

Address of signer:

_____

_____

[ ] Inventor(s)

[ ] Assignee of complete interest

[ ] Attorney or agent of record

[ ] Filed under §1.34(a)

* * * * *

Date May 12, 1977

C. Marshall Dann
Commissioner of Patents and Trademarks

Approved:

Date 5/19/77

Jordan J. Baruch
Assistant Secretary for Science and Technology

[42 F.R. 27883]

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

2,830,343, H. F. Shroyer, CAVITYLESS CASTING MOLD AND METHOD OF MAKING SAME; **3,314,116,** Wittmoser, Schade and Krzyanowski, GASIFIABLE CASTING PATTERN; **3,498,360,** same, METHOD OF CASTING IN A MOLD WHICH IS COATED DURING CASTING, **filed** Jan. 10, 1977, D.C., E.D. Mich. (Bay City) Doc. 77-10003, *Thunder Bay Manufacturing Corporation* v. *Full Mold Process, Inc.*

2,976,257, Dawe and Youse, RE-DISPERSIBLE DISPERSION OF POLYTETRAFLUOROETHYLENE, **filed** June 28, 1974, D.C., S.D.N.Y., Doc. 74-2812, *Wallace Clark & Co., Inc.* v. *Acheson Industries, Inc.* Judgment in favor of defendant, entered Jan. 19, 1977.

3,040,968, Long and Crane, WRAPPER FOR PACKAGED PRODUCE, **filed** Apr. 16, 1976, D.C., N.D. Tex. (Dallas) Doc. CA-3-76-0343, *Standun, Inc.* v. *Safeway Stores, Incorporated.* Case is dismissed without prejudice, Jan. 28, 1977.

3,056,719, D. R. Webster, CONTINUOUS WEB FORMING MACHINE, **filed** Mar. 19, 1975, D.C. Del. (Wilmington) Doc. 75-72, *David R. Webster and Aktiebolaget Karlstads Mekaniska Werkstad* v. *Belait Corporation.* The above action is dismissed pursuant to Rule 41(a)(1)(ii) of the Federal Rules of Civil Procedure, Jan. 26, 1977.

3,090,605, Copeland and Neier, FEED MIXER, **filed** Jan. 27, 1977, D.C. Minn. (Minneapolis) Doc. 4-77-C 35, *B/J Manufacturing Co., Inc.* v. *Van Dale, Inc.*

3,311,116. (See 2,830,343.)

3,341,021, K. H. Casson, MAGNETIC SEPARATOR, **filed** Sept. 9, 1976, D.C., N.D. Ill. (Chicago) Doc. 76c3358, *Barnes Drill Co.* v. *Chemaperm Magnetics Inc.*

3,381,801, B. Rastoin, FLEXIBLE CONVEYOR, **filed** June 30, 1976, D.C.N.J. (Newark) Doc. 76-1264, *Transitube Inc.* v. *Flexicon Inc. and William Gill.* Order of dismissal of action, July 1, 1976.

3,399,442, Jones and Greubel, CUTTING INSERT; **3,557,416,** D. G. Jones, **filed** Aug. 18, 1975, D.C., N.D. Ill. (Chicago) Doc. 75c2778, *Kennametal, Inc.* v. *Fansteel Inc.* Defendant is permanently enjoined from infringement, and case is dismissed, entered Jan. 28, 1977.

3,427,997, Brown, Jr., Butler, Carter, Ferik and Ogle, INFLATABLE BULKHEAD FOR RAILROAD CAR; **Re. 27,615,** same, **filed** Feb. 2, 1977, D.C., C.D. Calif. (Los Angeles) Doc. 77-03S6-LEW, *Prcco Incorporated* v. *General Foods Corporation, etc. et al.*

3,478,746, W. Greatbatch, CARDIAC IMPLANTABLE DEMAND PACEMAKER, **filed** Feb. 4, 1977, D.C. Minn. (Minneapolis) Doc. 4-77-C 55, *Cordiac Pacemakers, Inc.* v. *Medtronic, Inc.*

3,498,360. (See 2,S30,343.)

3,557,416. (See 3,399,442.)

3,563,763, Schwall, Rogers and Corbin, SELF-BASTING POULTRY PRODUCTS; **3,835,223,** same, SELF-BASTING POULTRY PRODUCT AND METHOD OF PREPARATION, **filed** June 30, 1976, D.C., N.D. Ill. (Chicago) Doc. 76c239S, *Armour and Company* v. *Hillman's, Inc., Topco Associates, Inc. and Jennie-O-Foods, Inc.* Enter order dismissing counts 1, 2 and 3 of the complaint with prejudice pursuant to stipulation of the parties, Jan. 21, 1977.

3,625,793, Sheridan and Jackson, BALLOON-TYPE CATHETERS AND METHOD OF MANUFACTURE, **filed** Oct. S, 1976, D.C. Pa. (Philadelphia) Doc. 76-3141, *Mallinckrodt Inc.* v. *Air Products and Chemicals Inc. and The Foregger Company, Inc.* Defendants hereby are enjoined and restrained from manufacturing cuffed endotracheal tubes of the kind identified in Exhibit A, Jan. 31, 1977.

3,650,766, Y. Smadar, EXTRUDED FOOD PRODUCTS AND METHOD OF PRODUCING SAME, **filed** Oct. 14, 1976, D.C. Md. (Baltimore) Doc. K-76-1543, *DCA Food Industries, Inc.* v. *Old Salt Seafood Co., Inc.* Case dismissed without prejudice, Feb. 1, 1977.

3,736,584, Hackett and Goble, MOTION DETECTOR AND INTRUDER ALARM SYSTEM, **filed** Jan. 26, 1977, D.C., N.D. Ill. (Chicago) Doc. 77c286, *Pittway Corporation* v. *Detection Systems, Inc. and Westinghouse Security Systems Corporation.*

3,756,296, R. F. West, HANDSAW, **filed** May 28, 1976, D.C. Conn. (Hartford) Doc. H76-218, *The Stanley Works* v. *Consolidated Foods Corp.* Consent judgment entered Feb. 4, 1977.

3,765,015, R. H. Gruner, SWITCH MONITORING CIRCUITRY, **filed** Oct. 23, 1973, D.C. Del. (Wilmington) Doc. 4749, *Data General Corporation* v. *Digital Computer Controls, Inc.* Pursuant to Rule 41(a)(1)(ii), by stipulation this action is hereby dismissed, Feb. 1, 1977.

3,835,223. (See 3,563,763.)

3,877,206, Cody and Sites, MOWING MACHINE, **filed** Sept. 18, 1975, D.C., M.D. Fla. (Orlando) Doc. 75-308-Orl-C-R, *Cosmos Futura, Inc. et al.* v. *Tresca Industries, Inc.* Joint stipulation to dismiss complaint and counterclaim, Feb. 4, 1977.

3,878,903, M. D. Cherrington, APPARATUS AND PROCESS FOR DRILLING UNDERGROUND ARCUATE PATHS; **3,894,402,** same, APPARATUS AND METHOD FOR EMPLACING A CONDUIT ALONG AN UNDERGROUND ARCUATE PATH; **3,967,689,** same, REAMING APPARATUS, **filed** Jan. 27, 1977, D.C., E.D. Tex. (Sherman) Doc. S-77-S-CA, *Tidril Corporation* v. *Martin D. Cherrington.*

3,889,639, Simon and Butz, BLOW-MOLDED DRUM, **filed** Jan. 26, 1977, D.C., C.D. Calif. (Los Angeles) Doc. CV77-0311-RMT, *Advanced Chemical Technology* v. *Born Free Plastics, Inc.*

3,894,402. (See 3,878,903.)

3,924,750, R. S. Dunchock, EYEGLASS DISPLAY UNIT, **filed** May 13, 1976, D.C., N.D. Calif. (San Francisco) Doc. C76-981-CBR, *Optarac Corp.* v. *Optivest Corp. and Farrell Optical Instruments, Inc.* Defendants are hereby permanently enjoined against infringing said patent, Feb. 3, 1977.

3,967,689. (See 3,878,903.)

3,979,148, W. Martin, WINDOW FRAME APPARATUS FOR VEHICLES, **filed** Jan. 28, 1977, D.C., C.D. Calif. (Los Angeles) Doc. CV77-0340-RJK, *Martin Shower Door Company, Inc.* v. *West Custom Windows Incorporated.*

Re. 27,615. (See 3,427,997.)

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,719,031, Re. S.N. 781,897, Filed Mar. 28, 1977, Cl. 55/136, ELECTRIC FIELD DIRECTED CONTROL OF DUST IN ELECTROSTATIC PRECIPITATORS, Peter C. Gelfand, Owner of Record: *Envirotech Corporation, Salt Lake City, Utah,* Attorney or Agent: Thomas S. MacDonald, et al., Ex. Gp.: 177

3,742,908, Re. S.N. 798,321, Filed May 19, 1977, Cl. 119/15, ANIMAL HABITAT, Dennis H. Merino, Owner of Record: *Mattel, Inc., Hawthorne, Calif.,* Attorney or Agent: Stephen L. King, et al., Ex. Gp.: 333

3,769,424, Re. S.N. 790,155, Filed Apr. 22, 1977, Cl. 424/317, COMPOSITION AND METHOD OF TREATING DOPAMINE DEFICIENCY IN BRAIN TISSUE, Gilbert M. Bayne, Owner of Record: *Merck & Co., Inc., Rahway, N.J.,* Attorney or Agent: Carroll G. Harper, et al., Ex. Gp.: 125

3,853,862, Re. S.N. 780,312, Filed Mar. 23, 1977, Cl. 260/243 R, PRODUCTION OF 4-HYDROXY-1,2-BENZOTHIAZINE-3-CARBOXAMIDES, Joseph G. Lombardino, Owner of Record: *Pfizer Inc., New York, N.Y.,* Attorney or Agent: Nicholas E. Oglesby, et al., Ex. Gp.: 121

3,876,420, Re. S.N. 786,037, Filed Apr. 8, 1977, Cl. 75/27, THERMAL INSULATION MOLTEN METAL, Richard C. Phoenix, et al., Owner of Record: *Foseco Trading A.G., Chur, Switzerland,* Attorney or Agent: John W. Malley, et al., Ex. Gp.: 223

3,885,205, Re. S.N. 786,371, Filed Apr. 11, 1977, Cl. 318/302, CONTROLLED ROTOR MOTOR, Robert Helmer, Owner of Record: *Enercon Corporation, Setauket, N.Y.,* Attorney or Agent: Jordan B. Bierman, et al., Ex. Gp.: 217

3,902,920, Re. S.N. 787,533, Filed Apr. 14, 1977, Cl. 429/89, PHOTOVOLTAIC CELL, John F. Jordan, et al., Owner of Record: *Photon Power, Inc., Wilmington, Del.,* Attorney or Agent: Edmund F. Bard, et al., Ex. Gp.: 114

3,920,021, Re. S.N. 783,853, Filed Apr. 1, 1977, Cl. 128/303.17, COAGULATING DEVICES, Siegfried Hiltebrandt, Owner of Record: *Richard Wolf GmbH, Knittlingen, Germany,* Attorney or Agent: William T. Hough, Ex. Gp.: 335

3,923,463, Re. S.N. 784,648, Filed Apr. 4, 1977, Cl. 23/253 R, APPARATUS FOR PERFORMING CHEMICAL AND BIOLOGICAL ANALYSIS, Kenneth Dawson Bagshawe, et al., Owner of Record: *Inventors,* Attorney or Agent: Samuel Scrivener, Jr., et al., Ex. Gp.: 113

3,936,408, Re. S.N. 789,151, Filed Apr. 20, 1977, Cl. 260/29.6 S, WELL CEMENTING COMPOSITION HAVING IMPROVED FLOW PROPERTIES CONTAINING A POLYAMIDO-SULFONIC ADDITIVE, Sally Lee Adams, et al., Owner of Record: *Calgon Corporation, Pittsburgh, Pa.,* Attorney or Agent: Rudolph J. Anderson, Jr., et al., Ex. Gp.: 141

3,964,478, Re. S.N. 786,475, Filed Apr. 11, 1977, Cl. 128/203, INHALER APPARATUS, Georg Kropfhammer, Owner of Record: *Ponta AG, Zurich, Switzerland,* Attorney or Agent: Francis J. Murphy, Ex. Gp.: 335

3,971,289, Re. S.N. 774,862, Filed Mar. 7, 1977, Cl. 85/85, WHEEL NUTS, Joseph W. Chaivre, Owner of Record: *Towne Robinson Fastener Company, Dearborn, Mich.,* Attorney or Agent: Allen M. Krass, et al., Ex. Gp.: 355

4,003,043, Re. S.N. 786,680, Filed Apr. 11, 1977, Cl. 340/403, TIMED BUZZER, Arthur J. Little, et al., Owner of Record: *Stewart-Warner Corporation, Chicago, Ill.,* Attorney or Agent: Augustus G. Douvas, et al., Ex. Gp.: 234

4,011,909, Re. S.N. 789,312, Filed Apr. 20, 1977, Cl. 166/293, METHOD OF USING CEMENTING COMPOSITION HAVING IMPROVED FLOW PROPERTIES, Sally Lee Adams, et al., Owner of Record: *Calgon Corporation, Pittsburgh, Pa.,* Attorney or Agent: Rudolph J. Anderson, Jr., et al., Ex. Gp.: 354

4,012,423, Re. S.N. 787,365, Filed Apr. 14, 1977, Cl. 260/348 R, PROCESS FOR THE PRODUCTION OF EPOXIDES, Arthur M. Brownstein, et al., Owner of Record: *Chem Systems, Inc., New York, N.Y.,* Attorney or Agent: Bert J. Lewen, Ex. Gp.: 121

PATENT NOTICES

Certificates of Correction for the Week of June 14, 1977

Re. 28,982	3,989,803	4,006,796	4,014,575
Re. 29,102	3,990,694	4,007,083	4,014,616
Re. 29,138	3,991,135	4,007,148	4,014,746
Re. 29,153	3,991,212	4,007,360	4,015,001
Re. 29,161	3,992,309	4,007,975	4,015,058
D. 240,299	3,992,482	4,008,078	4,015,061
D. 242,434	3,992,554	4,008,283	4,015,286
D. 243,744	3,992,564	4,008,449	4,015,291
D. 243,858	3,993,282	4,009,253	4,015,333
D. 243,859	3,994,789	4,009,572	4,015,341
3,575,956	3,995,121	4,009,609	4,015,433
3,632,591	3,996,747	4,009,955	4,015,524
3,804,124	3,997,989	4,010,022	4,015,546
3,809,970	3,998,273	4,010,066	4,015,656
3,846,469	3,998,815	4,010,145	4,015,788
3,877,127	3,999,478	4,010,174	4,015,812
3,904,654	3,999,731	4,010,337	4,015,933
3,923,035	4,000,121	4,011,141	4,015,980
3,923,650	4,000,816	4,011,330	4,016,112
3,925,314	4,001,018	4,011,439	4,016,186
3,927,711	4,001,422	4,011,677	4,016,226
3,928,000	4,001,457	4,011,692	4,016,227
3,939,623	4,001,510	4,011,905	4,016,234
3,951,199	4,002,203	4,012,303	4,016,308
3,957,173	4,002,625	4,012,325	4,016,371
3,957,636	4,003,022	4,012,334	4,016,394
3,958,546	4,003,195	4,012,442	4,016,410
3,964,525	4,004,951	4,012,534	4,016,459
3,965,350	4,004,063	4,012,592	4,016,565
3,966,844	4,004,160	4,012,758	4,016,642
3,967,211	4,004,427	4,013,056	4,016,722
3,972,797	4,004,526	4,013,170	4,016,842
3,972,891	4,004,620	4,013,460	4,016,924
3,974,266	4,004,917	4,013,494	4,016,963
3,978,511	4,005,580	4,013,656	4,017,002
3,980,486	4,005,937	4,013,822	4,017,014
3,982,374	4,006,068	4,013,922	4,017,353
3,983,640	4,006,172	4,014,229	4,017,528
3,984,443	4,006,175	4,014,239	4,017,545
3,985,449	4,006,254	4,014,297	4,018,910
3,988,569	4,006,470	4,014,435	
3,988,712	4,006,510	4,014,448	
3,989,723	4,006,768	4,014,517	

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner
WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF MAY 7, 1977

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	8-2-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	7-26-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	5-4-76
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	8-27-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	7-12-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	11-26-75
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	3-15-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	6-1-76
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	11-22-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	5-3-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	10-28-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	5-24-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	9-10-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—O. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	6-1-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	6-11-76
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	10-12-76

Expiration of patents: The patents within the range of numbers indicated below expire during May 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,934,766 to 2,939,144, inclusive
Plant Patents..... Numbers 1,938 to 1,948, inclusive

REISSUES

JUNE 14, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,262

ARRANGEMENT PERTAINING TO A CASE FOR BOTTLES, BOXES OR OTHER STANDARDIZED ARTICLES

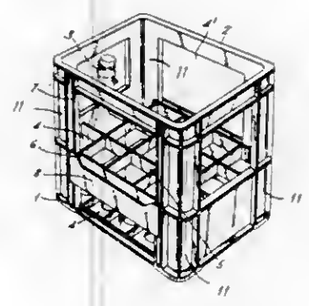
Georg Utz, Bremgarten, Switzerland, assignor to Svein Stromberg & Co. A/S, Lillestrom, Norway

Nov. 9, 1971. Application for reissue Oct. 2, 1975, Ser. No. 618,948

Claims priority, application Switzerland, Nov. 9, 1970, 16612/70

Int. Cl.[2] **B65D** *1/24*; **A47F** *3/14*

U.S. Cl. 220—21 **8 Claims**



1. A case arrangement for the transport and storage of bottles, boxes and other like articles, having a bottom wall, an open top, spaced upstanding corner posts on said bottom wall, side walls extending between adjacent pairs of said posts along all but one side of said bottom wall, a unit located within the case for vertical sliding movement between said posts, said unit including intersecting connected bars forming cells for maintaining the articles stored in the case out of contact with one another, said unit further including a [narrow vertical] *horizontal* bar member secured to one end of said intersecting bars in spaced relationship therewith, said bar member lying outwardly of the remaining side of said bottom wall and slightly overlapping said adjacent pair of said posts at said remaining side thereby forming grooves therewith, inner portions of each of said posts at said remaining side lying within said respective grooves for guiding the vertical movement of said unit, shoulders formed on said portions near said bottom wall, the lower edge of said bar member resting on said shoulders thereby maintaining said intersecting bars spaced from said bottom wall.

Re. 29,263

PROTECTIVE CARTON

Harry I. Roccaforte, Western Springs, Ill., assignor to Hoerner Waldorf Corporation, St. Paul, Minn.

Original No. 3,923,235, dated Dec. 2, 1975, Ser. No. 550,948, Feb. 19, 1975. Application for reissue June 23, 1976, Ser. No. 699,036

Int. Cl.[2] **B65D** *25/14*, *5/58*

U.S. Cl. 229—39 B **7 Claims**

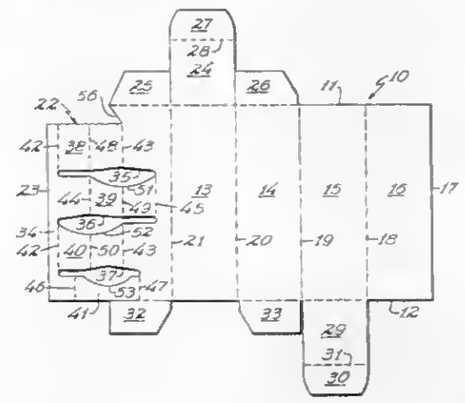
1. In a one-piece carton for shipping and storing fragile articles, said carton made from foldable paperboard or similar sheet-like material and having four side wall panels rectangularly arranged to form an elongated tube and having top and bottom sets of closure flaps for closing the ends of said carton, improved means within said carton for holding said fragile article, said improved means comprising the following:

a cushioning section made from said material and extending between two opposite panels of said four side wall panels, said section extending substantially the length of said carton;

said cushioning section having an upper web member extending between said two opposite panels near one lateral side of said two panels;

said cushioning section also having a middle web member extending generally parallel to said upper web member but positioned below said upper web member and near the opposite lateral side of said two panels;

a lower web member beneath said middle web member and positioned in alignment with said upper web member;



[a tube supporting fourth web positioned below said lower web member and extending between said two opposite panels near the center thereof;]

said members [and said fourth web] connecting in said cushioning section to elongated glue sections connected adjacent to respective opposite lateral edges of said two opposite panels.

Re. 29,264

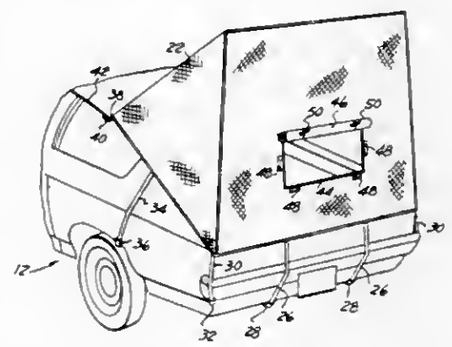
TENT FOR REAR-DOORED VEHICLE

Frederick W. Woodward, Fenton, Mich., assignor to Donald Thornber and Bernice B. Thornber, both of Yale, Mich.

Original No. 3,746,386, dated July 17, 1973, Ser. No. 272,587, July 17, 1972. Application for reissue Feb. 24, 1975, Ser. No. 552,771

Int. Cl.[2] **B60P** *3/34*

U.S. Cl. 296—23 MC **8 Claims**



1. A frameless tent for a passenger type vehicle having a rear door supported in an opening, the vehicle body providing access to the passenger compartment of the vehicle which door is hinged about a horizontal axis at the upper edge of the opening so that when in a closed position its free edges project downward and rearwardly and seal against the edges of the opening and when in an opened position they project upward and rearwardly, said tent comprising: a pair of spaced end

panel portions having a triangle shape formed by first, second and third edges, said second edge forming a base of the triangle and being generally vertically disposed and being substantially longer than the other two edges, said first edge extending downward and forward from the top of said second edge along the edge of the open door, said third edge extending upward and forward from the bottom of said second edge generally along the edge of the door opening, said first and third edges adapted to be connected at the axis of the door and forming an apex of the triangle shape, said second edge of each end panel portion connected together by a first generally vertically disposed quadrangular panel effectively enclosing the space formed within the combined vehicle and tent structure and acting to limit the spacing between the end panels to the width of the vehicle, the first edge of each end panel part connected together by a second generally quadrangular panel and adapted to entirely cover the opened door and to be supported thereby, and fastener means for retaining the third edges of the end panel portions in contact with the vehicle as well as the lower portion of the first quadrangular panel in contact with the vehicle whereby the tent is securely held against the vehicle during movement thereof solely by said fasteners and the door of the vehicle.

Re. 29,265

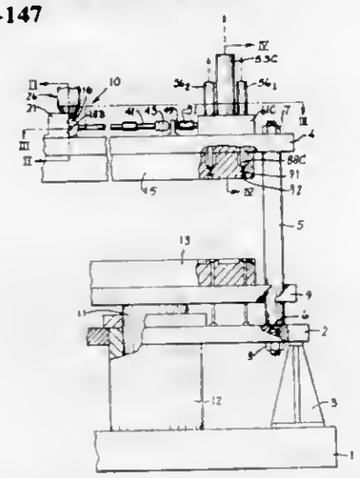
CLOSED CELL FOAM PLASTIC MOLDING MACHINE

James W. Hendry, Holland, Mich., assignor to Ex-Cell-O Corporation, Troy, Mich.

Original No. 3,806,291, dated Apr. 23, 1974, Ser. No. 233,213, Mar. 9, 1972. Application for reissue Mar. 22, 1976, Ser. No. 668,937

Int. Cl.² B29F *1/06*

U.S. Cl. 425—147 **17 Claims**



1. In a plastic foaming and molding device, the combination comprising:

a plasticizing and foaming unit for receiving granular plastic material, said unit including means for causing a gas under pressure to permeate said material, and means for converting the material to plasticized foamed plastic material with said gas entrained therein as bubbles;

a plurality of injection assemblies, each comprising an injection chamber having an injection ram;

plural low pressure passageways providing communication from said plasticizing unit to corresponding ones of said injection assemblies;

power means *operatively connected to and* continuously operating said plasticizing unit for charging a continuous supply of said foamed plastic material into said low pressure passageways at a predetermined, relatively low pressure;

means defining a one-way valve positioned in each said low pressure passageway to permit flow of said foamed plastic material from said unit to the injection chamber of the corresponding injection assembly but preventing reverse flow from said injection chamber toward said unit and other injection assemblies;

plural high pressure passageways *downstream of said low pressure passageways* for conducting said foamed plastic material from each of said injection chambers to a mold cavity and an on-off valve positioned in each said high pressure passageway;

control means *operatively interconnected with said injectian assemblies and* responsive to the appearance of a predetermined amount of plastic material in each of said injection chambers for applying to said injection rams a relatively high pressure in excess of said predetermined pressure and sufficient to close said one-way valve, and for opening said on-off valve to thereby permit said injection ram to drive said foamed plastic material into a mold cavity.

Re. 29,266

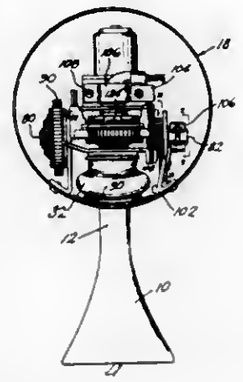
MOTOR CONTROLLED LAMP

Lawrence E. Hessemer; Richard P. Manning, both of Jackson, Mich.; Harry G. Sparks, deceased, late of Jackson, Mich., by Helen W. Sparks, administratrix; and Walter H. Powers, Jackson, Mich., assignors to S-C Liquidating Corporation, Jackson, Mich.

Original No. 3,644,728, dated Feb. 22, 1972, Ser. No. 848,895, Aug. 11, 1969. Application for reissue Jan. 24, 1974, Ser. No. 436,147

Int. Cl.² B60Q *1/06*

U.S. Cl. 240—61.9 **10 Claims**



1. An electric motor-controlled lamp characterized by its compact size, streamlined and unitary appearance and concise relationship of components comprising, in combination, a pedestal support having an *unsupported free* end, an enclosed, hollow lamp housing having an opening defined therein, said pedestal end extending into the interior of said housing through said opening, a first gear connected to said pedestal at said end thereof within said housing having a first axis, a support member rotatably mounted upon said pedestal end adapted to rotate about said first axis, pivot means pivotally supporting said housing upon said support member for oscillation about a second axis perpendicularly disposed to said first axis, a second gear connected to, and within, said housing concentrically disposed about said second axis, first electric motor drive means mounted upon said support member within said housing in operative engagement with said first gear, second electric motor drive means mounted upon said support member within said housing *adjacent said first motor drive means* in operative engagement with said second gear, a lamp mounted upon said housing and control means associated with said electric motor drive means.

PLANT PATENTS

GRANTED JUNE 14, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,059

CHERRY ROOTSTOCK—COLT VARIETY

Henry M. Tydeman, deceased, late of East Malling, England; by Elizabeth Mary Tydeman, executrix, East Malling, England, and William Marcus Tydeman, executor, Bangor, Wales, assignors to National Seed Development Organisation Limited, Newton, England

Filed Apr. 19, 1976, Ser. No. 678,036

Int. Cl.² A01H *5/03*

U.S. Cl. Plt.—37 **1 Claim**

1. A new and distinct variety of cherry tree useful as a dwarfing cherry rootstock substantially as illustrated and described, produced as a seedling by crossing pollen from *Prunus pseudocerasus* Lind. onto flowers of *Prunus avium* L. F 299/2, which when used as an understock induces less growth of the cherry tree, and higher fruit bud production on the scion in the early life of the grafted cherry tree.

4,060

APPLE TREE—MUTATION OF SCARLET STAYMARED

Roy Tuttle, Greenfield, Ind., assignor to Stark Brothers Nurseries and Orchards Co., Louisiana, Mo.

Filed May 27, 1976, Ser. No. 690,388

Int. Cl.² A01H *5/03*

U.S. Cl. Plt.—34 **1 Claim**

1. A new and distinct variety of apple tree which is a mutation of the Scarlet Staymared variety substantially as shown and described, characterized by the presence of less prominent lenticels and apples of a deeper overall red color having a smoother skin and less tendency to crack.

4,061

PLUM ROOTSTOCK—PIXY VARIETY

A. Beryl Beakbane, East Malling, England, assignor to National Seed Development Organisation Limited, Newton, England

Filed June 15, 1976, Ser. No. 696,307

Int. Cl.² A01H *5/03*

U.S. Cl. Plt.—38 **1 Claim**

1. A new and distinct variety of plum tree useful as a dwarfing rootstock selected from seedlings of *Prunus insititia* St. Julien d'Orleans types substantially as illustrated and described which when used as a plum understock induces less growth of the plum tree, and a higher cropping efficiency on the scion.

PATENTS

GRANTED JUNE 14, 1977

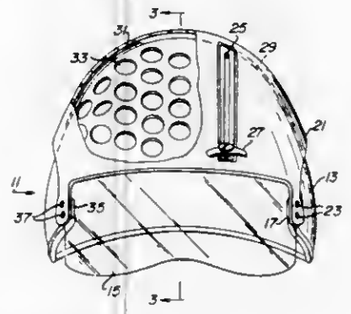
ERRATA

For CLASS	See PATENT NO.
241–073	4,028,779
043–053.5	4,028,825
062–022	4,028,907
090–011 C	4,028,992
224–045 F	4,029,248
250–328	4,029,401
404–025	4,029,425
126–361	4,029,451
075–247	4,029,475
428–676	4,029,476
428–680	4,029,477
428–659	4,029,478
428–660	4,029,479
427–130	4,029,541
426–548	4,029,701
424–316	4,029,731
425–363	4,029,746
358–247	4,029,898
179–002 E	4,029,901
179–015 FD	4,029,902
235–057	4,029,943
361–226	4,029,995
307–326	4,029,996
361–129	4,029,997
361–256	4,029,998
361–386	4,029,999
361–400	4,030,000
361–401	4,030,001
361–151	4,030,002
361–293	4,030,003
361–313	4,030,004
364–200	4,030,074

4,028,739
VENTILATED HELMET WITH SELECTED WEIGHT DISTRIBUTION

Richard L. Bell, Philadelphia, and Matthew J. Lamb, Newtown, both of Pa., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 2, 1976, Ser. No. 701,940
Int. Cl.² A42B *3/00*
U.S. Cl. 2—6 **15 Claims**

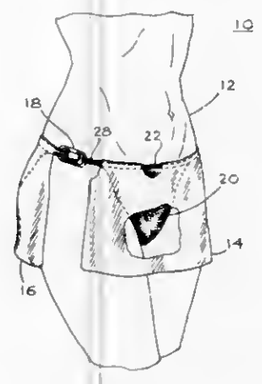


1. A helmet comprising:
a helmet shell having a plurality of holes in the frontal region thereof;
first and second spacing means mounted on either side of the front of said helmet shell, each of said spacing means being provided with at least one aperture for permitting the flow of air therethrough;
a visor guard mounted on said first and second spacing means and covering said plurality of holes; and
a visor located at the front of said helmet and mounted on said first and second spacing means.

4,028,740
CONVERTIBLE BEACH ATTIRE

Adolf Luerken, 26843 Grayslake Road, Palos Verdes, Calif. 90274

Filed Mar. 11, 1976, Ser. No. 666,075
Int. Cl.² A41D *5/00*
U.S. Cl. 2—67 **10 Claims**

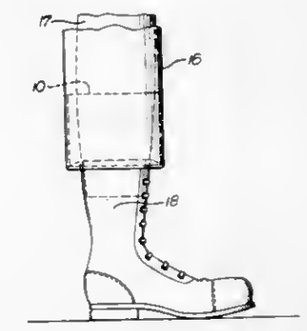


1. Convertible beach attire, which attire comprises, in combination:
a garment adapted to cover the lower portion of the human body;
means for encircling the waist of the human body and supporting the garment in position on the lower portion of the human body;
connector means attached at opposite sides to said encircling means, one connector means at each side of the waist; and
separate first and second flexible panels, each panel having at least two sides and each panel adapted to be releasably connected by its two sides to the connector means selectively at two sides of the waist and at one side of the waist.

4,028,741
PLASTIC BLOUSING BLOCK

William P. Henry, 567-82-9227, Box 80, B Co., 2nd Bn., 6th Inf., A.P.O. New York, N.Y. 09742

Filed May 4, 1976, Ser. No. 682,838
Int. Cl.² A41D *1/06*
U.S. Cl. 2—232 **1 Claim**



1. A military serviceman's pantsleg blousing block comprising:
a split tubular annulus fitting around the leg within a pantsleg just above the top of a boot to gravitate onto said pantsleg to dress the same after the lower end of said pantsleg is tucked into the top of said boot and the latter laced up,
said annulus being integral and invested with a degree of elasticity which spring biases the split ends thereof into engagement when released but permits a gap to be temporarily produced manually between said ends through which the ankle of a leg may be passed in the application of said block to or its removal from said leg,
receptacle means being provided along one of said annulus ends, said means receiving the other of said annulus ends to interlock therewith and closing the split in said annulus,
said receptacle means being provided with flexible wings enclosing a pocket co-extensive therewith,
said other end of said split annulus being provided with a beaded edge adapted to expand said wings and enter said pocket with a snap action thereby locking said annulus ends together until manually sprung apart.

4,028,742
MOTORCYCLE SAFETY BELT

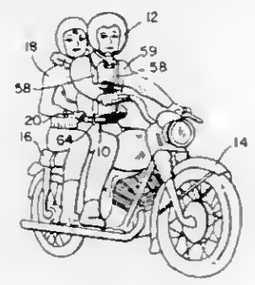
Wilfred Marquis, 132 Baxter St., Pawtucket, R.I. 02861

Filed July 19, 1976, Ser. No. 706,189
Int. Cl.² A41F *19/00*
U.S. Cl. 2—305 **10 Claims**

1. A safety belt adapted to be worn by a driver of a vehicle, said belt comprising:
a. a lower elongated belt band terminating in ends,
b. lower coupling means releasably interconnecting the ends of said lower belt band,
c. an upper elongated belt band terminating in ends,
d. upper coupling means releasably interconnecting the ends of said upper belt band,
e. connecting means joining said lower belt band to said upper belt band in spaced relationship to each other,

f. a pair of shoulder straps extending from said upper belt band,

g. loop means extending from the free end of each of said shoulder straps, said straps adapted to extend over the shoulder of the wearer of the safety belt with said lower belt band extending through said loop means to firmly secure the safety belt around the wearer, and



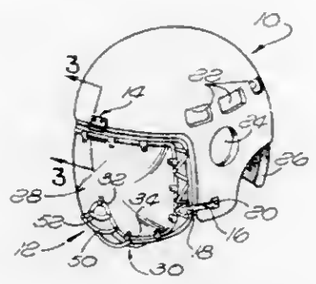
h. handle means to be grasped by a passenger riding in tandem behind the driver wearing the safety belt, said handle means including a pair of spaced apart handles resiliently pivotally connected to said lower belt band such that said handles return to their original position with respect to said lower belt band when said handles are released.

4,028,743

PROTECTIVE HEAD-WEAR

Cai V. Christensen, 8426 Pinelake Drive, Canoga Park, Calif. 91304

Filed Aug. 4, 1975, Ser. No. 601,782
Int. Cl.² A42B *1/08*
U.S. Cl. 2—424 **24 Claims**



1. Protective head-wear comprising:

1. shell means for covering a substantial portion of the head of a wearer and having a peripheral edge adjacent to and extending along the face area of a wearer;

2. face shield means for covering a substantial portion of the face of a wearer and having a peripheral side edge portion; and

3. a soft rubber-like resiliently deformable means defining a slot therein, said peripheral edge of said shell means being received within said slot, said rubber-like means being engaged by said peripheral side edge portion of said face shield means for absorbing a portion of the shock imparted to said face shield means by a blow thereto.

4,028,744

JACKET OF KNITTED JERSEY FABRIC

Pierluigi Rolando, Vicolungo, Italy, assignor to Maglificio Biellese Fratelli Flla S.p.A., Biella, Italy

Filed May 13, 1975, Ser. No. 577,046
Claims priority, application Italy, May 16, 1974, 21180/74[U]
Int. Cl.² A41D *1/02*
U.S. Cl. 2—108 **5 Claims**

1. As a novel article of manufacture, a knitted jersey fabric jacket comprising a rear panel having a shoulder portion, a waist portion, and a pair of inwardly arcuate edge portions extending between said shoulder portion and said waist portion; a pair of side panels each being of one piece and having a waist zone and respectively connected to said edge portions of said rear panel along first seams; a pair of front panels having shoulder regions respectively connected to said shoulder portion of said rear panel along second seams, and lateral edge regions connected to said side panels along third seams so that said rear, side and front panels together constitute a body of said jacket in which said side panels extend between

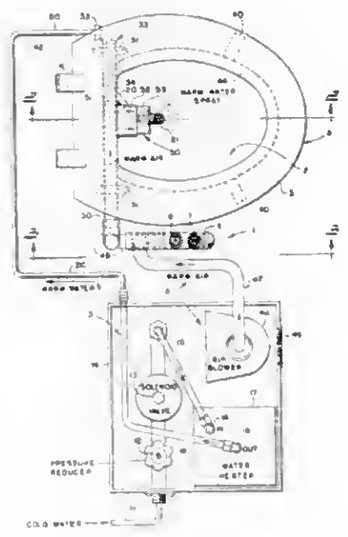
the front and the rear of said body, each of said front panels including a first section having said shoulder region and being of an irregular hexagonal shpae, and a substantially rectangular second section having a waist region and connected to said first section along a fourth seam; and a pair of reinforcing elements of inverted V-shaped configurations respectively connected to said side panels at locations which are spaced from said waist zones and extending toward said rear and front panels, respectively.

4,028,745

SANITARY SPRAY-DRY CLOSET SEAT

Joseph E. Caniglia, 5368 E. 134th St., Garfield Heights, Ohio 44125

Filed May 21, 1976, Ser. No. 688,886
Int. Cl.² A47K *3/22*, *11/08*
U.S. Cl. 4—7 **8 Claims**



1. For a water closet having a generally hollow bowl-like portion and a seat portion above said bowl-like portion, fastened thereto and on which a user may sit, the improvement of a system for washing and drying the body of such a user, comprising:

liquid supply means for supplying warm liquid to said system,

liquid spraying means coupled to said liquid supply means for spraying warm liquid toward the body of such user for washing the same,

air supply means for supplying a flow of air to said system,

air directing means coupled to said air supply means for directing such flow of air toward the body of such user for drying the same,

control means operable by such user for selectively controlling the spraying of such warm liquid and the flow of air respectively from said liquid spraying means and said air directing means,

mounting means for pivotally mounting said liquid spraying means and said air directing means with respect to said water closet proximate the back portion of the bowl-like portion thereof for selective movement by such user between stored and use positions respectively out of alignment and into alignment with the body of such user, said mounting means including an elongated generally tubular member having a longitudinal axis and bracket means for mounting said tubular member between the bowl-like portion and the seat portion for rotation about such longitudinal axis, said tubular member having a hollow portion for coupling a flow of air from said air supply means to said air directing means, and

said liquid spraying means and said air directing means being relatively fixedly supported by said tubular member for rotation therewith, and

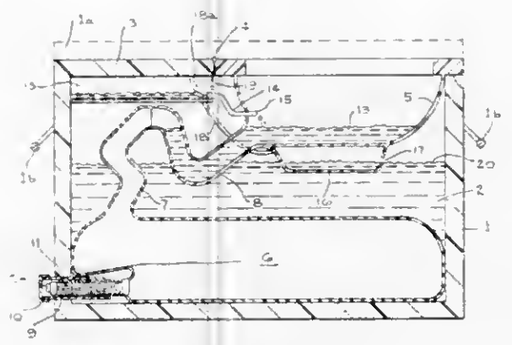
handle means coupled to said tubular member and exposed adjacent the side of the bowl-like portion for access by such user for selectively rotating said tubular member to move said liquid spraying means and said air directing means to such stored and use positions.

4,028,746

PORTABLE TOILET

Gerald N. Huck, 4417 Viking, Houston, Tex. 77018

Filed July 28, 1975, Ser. No. 599,358
Int. Cl.² E03D *5/02*, *5/09*
U.S. Cl. 4—10 **13 Claims**



1. A portable toilet comprising:

housing means, at least a portion of which defines a reservoir for self-contained holding of clean flushing fluid;

a toilet bowl connected to said housing by pivot means from upward pivoting movement from a normal horizontal position, in which flushing fluid and body waste may be retained therein at a predetermined level, to a dumping position, in which said flushing fluid and body waste may be dumped;

a flexible bag container disposed in said reservoir and connected to said toilet bowl for self-contained receiving of said flushing fluid and body waste repeatedly dumped from said toilet bowl upon movement to said dumping position, the outer surfaces of said bag being surrounded and in pressure contact with said clean flushing fluid so that the level of said clean flushing fluid does not fall below its initial level after said repeated dumping of said toilet bowl; and

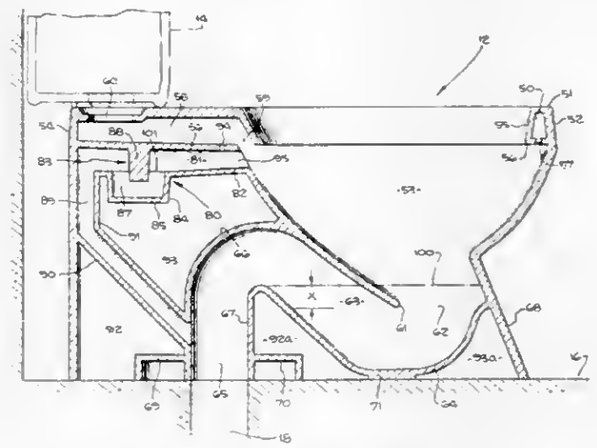
transfer means connected to said toilet bowl and operable, upon its movement to said dumping position and return to said normal position, to transfer flushing fluid from said reservoir to said toilet bowl.

4,028,747

OIL TOILET

Leroy Newton, Marina Del Rey, Calif., assignor to Monogram Industries, Inc., Los Angeles, Calif.

Filed Mar. 26, 1976, Ser. No. 670,990
Int. Cl.² E03D *1/00*, *3/00*, *5/00*
U.S. Cl. 4—10 **11 Claims**



1. In a recirculating toilet system having a bowl emptying into a waste tank having an oil-based flushing fluid of a specific gravity less than water in said tank, flushing fluid recirculating means associated with both said tank and said bowl for selectively removing flushing fluid from said tank and flushing said toilet therewith, the improvement which comprises:

said bowl being of the wash-down type, having a main bowl portion, a flushing manifold encircling at least a portion of the periphery of said bowl portion, a trapway in fluid communication with both the bottom of said bowl portion and a discharge outlet coupled to said waste tank, trap seal means associated with both said bowl portion and said trapway for sealing off odors from said waste tank entering back into said bowl portion, and overflow preventing means integral with said bowl portion in fluid communication with both the upper end of said bowl portion below said flushing manifold and said discharge outlet for removing any waste and oil backing up said bowl portion and returning the same to said discharge outlet, overflow preventing means including an overflow passageway communicating with said discharge outlet, and said trap seal means includes a trap in said passageway for receiving oil therein, and a seal extending transverse of the longitudinal axis of said passageway into said trap spaced above the bottom thereof and below the level of oil therein for providing a seal, said flushing manifold, including a generally horizontally extending passageway in fluid communication with said recirculating means, said first-mentioned passageway including a first portion extending generally parallel to said second-mentioned passageway and inclined downwardly from the horizontal, said first and second passageways being separated by a common wall, said trap being a chamber formed in the bottom wall of said passageway below said common wall, and said seal being an extension portion on said common wall extending down into said chamber.

4,028,748

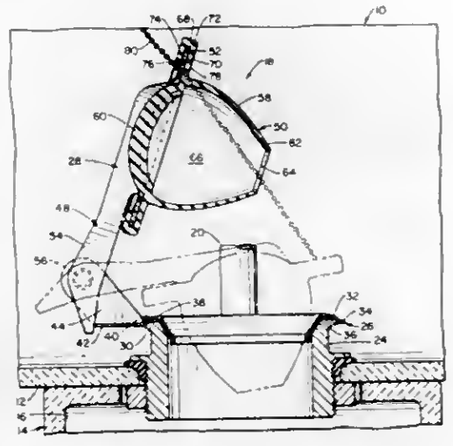
VALVE SEAT OF A FLUSH VALVE USED IN FLUSH TANKS AND THE LIKE

Adolf Schoepe, 1620 N. Raymond Ave., Fullerton, Calif. 92631, and Frederic E. Schmuck, 535 Century Drive, Anaheim, Calif. 92805

Division of Ser. No. 497,524, Aug. 15, 1974, Pat. No. 3,988,785. This application Oct. 23, 1975, Ser. No. 625,194

Int. Cl.² E03D *1/14, 1/34, 3/12*

U.S. Cl. 4—52 **5 Claims**



1. In a flush valve for tanks and the like, the flush tanks being of the type having a flush valve seat portion opening downwardly therethrough with a generally upwardly facing annular end; the combination of: an annular valve seat on the upwardly facing annular end of the flush valve seat portion comprising two radially adjacent generally upwardly facing concentric ring portions each circumscribing said valve seat, each of said ring portions having a generally upwardly projecting and facing sealing surface; a closure member movable downwardly to and upwardly away from said valve seat and having an annular resilient sealing surface overlying and abuttingly sealing against said valve seat in a downwardly closed position; one of said valve seat ring portions projecting upwardly toward said closure member sealing surface a greater distance than the other of said valve seat ring portions when said closure member is in said downward overlying closed position, said closure member sealing surface primarily abuttingly sealing downwardly against said one valve seat ring portion in said closure member downward overlying sealed position during initial use of said closure member, said one valve seat ring portion ultimately permanently resiliently upwardly compressing said closure member sealing surface after continued use of said closure member sufficient to permit abutting sealing against both said valve seat ring portions by said closure member sealing surface in said closure member downward overlying sealed position.

4,028,749

SANITARY CHAIRS

David Richard James, Gloucester, England

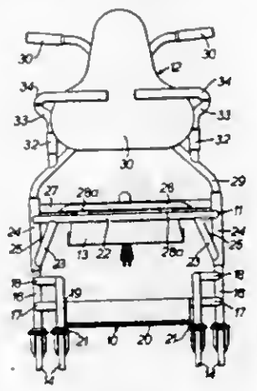
Filed Jan. 13, 1976, Ser. No. 648,774

Claims priority, application United Kingdom, Jan. 21, 1975, 2539/75

Int. Cl.² A47K *11/02, 11/04;* **A61G** *7/02*

U.S. Cl. 4—134 **9 Claims**

1. A mobile sanitary chair having a tubular metal frame comprising a base frame portion and a seat frame portion, said base frame portion having two upstanding seat support members respectively disposed adjacent rear corners of the chair, ground-support wheels mounted below the base frame portion, an apertured toilet seat supported by said seat frame portion, said seat frame portion having two support members respectively engaging said seat support members of the base frame portion to provide two telescopic supports which allow height adjustment of the seat with the seat frame portion supported by the base frame portion in a forwardly cantilevered manner, and separate locking means respectively associated with the two telescopic supports to retain a preset



height adjustment, the frame being open at the rear below the seat and the frame tapering in plan view from front to rear whereby to enable a plurality of similar chairs to be stacked in line nesting one within the other.

4,028,750

COVER FOR WATER-FILLED OUTDOOR SWIMMING POOLS

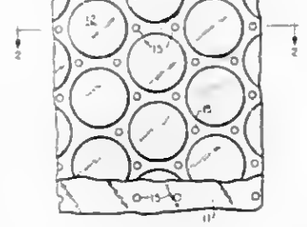
Erik G. Gustafsson, Stocksund, Sweden, assignor to Barracudaverken Aktiebolag, Sweden

Filed Dec. 2, 1975, Ser. No. 636,828

Claims priority, application Sweden, Dec. 5, 1974, 7415255

Int. Cl.² E04H *3/16, 3/18;* **F16L** *22/02*

U.S. Cl. 4—172.12 **10 Claims**



1. A protective cover, for water-filled outdoor swimming pools, comprising

a flexible sheet of size and shape to cover the surface of the water in the pool, said sheet comprising

at least two thin, flexible polymeric films,

a first one of said films having a plurality of laterally spaced pockets which depend from the film when the sheet is in place on the water in the swimming pool,

another of said films overlying said first film so as to extend across said pockets and the portions of said first film which are not occupied by said pockets,

said other film being secured to said portions of said first film to unite said first film and said other film and to seal against entry of water into said pockets,

said pockets, thus sealed, constituting hollow buoyancy cells spaced apart and distributed over the sheet to provide the sheet with an overall positive buoyancy adequate for support of the sheet on the surface of the swimming pool water with the portions of said first film which are not occupied by said pockets then being supported at a level spaced slightly above the surface to the swimming pool water,

there being a plurality of drain apertures spaced apart and distributed over the sheet in areas thereof not occupied by said buoyancy cells, for passage of rain water downwardly through the sheet.

4,028,751

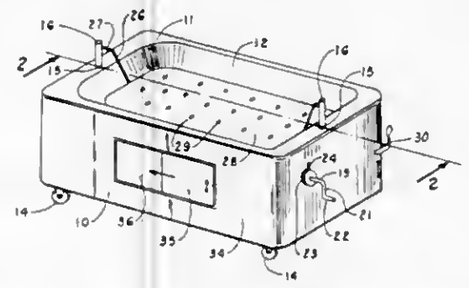
INTENSIVE CARE PORTABLE BATHTUB

Barber Moran, New Orleans, La., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed June 30, 1975, Ser. No. 591,470

Int. Cl.² A47K *3/12*

U.S. Cl. 4—173 R **5 Claims**



1. An intensive care portable bathtub, comprising

a housing having a top, a bottom and sides;

roller means rotatably affixed to the bottom of the housing;

a sunken bathtub mounted in the housing and extending from the top thereof;

a pair of openings in the tip of the housing at opposite ends thereof;

a pair of shafts each positioned substantially vertically in and extending through corresponding one of the openings;

a pair of guide means for the shafts in the housing;

a support rod affixed at its ends to the upper ends of the shafts outside the housing, said support rod being bent and extending within the bathtub;

a perforated duckboard on the support rod in the bathtub; and

control means in the housing coupled to the shafts and extending from the housing for selectively raising and lowering the shafts to selectively raise and lower the duckboard via the support rod, wherein said control means further comprises a pair of substantially linear gears each affixed to a corresponding one of the shafts in the housing, a third longitudinally extending shaft having opposite ends journalled in opposite sides of the housing, one end of the third shaft extending out of the housing, a pair of longitudinally spaced gears affixed to the third shaft in the areas of the opposite ends thereof, said gears being rotatable with said third shaft, each of said gears being drivably coupled to a corresponding one of the substantially linear gears, and crank handle means affixed to the end of the third shaft outside the housing.

4,028,752

LOAD-CARRYING APPARATUS

Hermann Oerthel, Bavariaring 35, D-8000 Munich, Germany

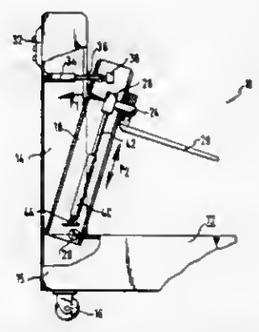
Filed Sept. 11, 1975, Ser. No. 612,586

Claims priority, application Germany, Sept. 25, 1974, 2445764

Int. Cl.² A61G *7/10, 1/02*

U.S. Cl. 5—81 R **8 Claims**

1. A load carrying apparatus, particularly for non-ambulatory patients, comprising a support; an elongated load-carrying shelf; a normally upright elongated supporting member having a longitudinal slit extending along a side thereof and also having a lower end region mounted on said support for pivoting about a substantially horizontal axis which extends lengthwise of said shelf, said shelf being mounted on said supporting member upwardly of said lower end region; means for tilting said supporting member about said axis between vertical and inclined positions so as to impart to said shelf a composite movement having one component in generally vertical direction and another component in generally horizontal direction, whereby to facilitate transfer of a load onto and off said shelf; and moving means for raising and lowering said shelf and having one end connected to said sheld and



provided with a projecting which extends through said slit in a direction transversely of the elongation of said sheld, said moving means having another end pivotally connected to said lower end region of said shelf.

4,028,753

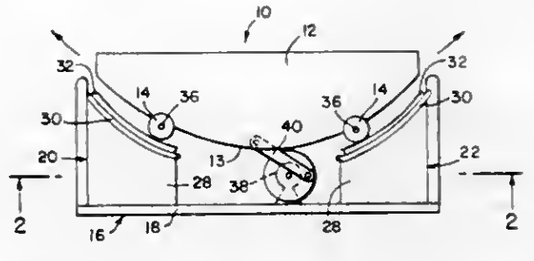
AUTOMATICALLY ROCKABLE INFANT'S CRIB

Augusto Rios, 1815 Grand Concourse, Bronx, N.Y. 10453

Filed Oct. 16, 1975, Ser. No. 623,256

Int. Cl.² A47D *09/02*

U.S. Cl. 5—108 **4 Claims**



1. An automatically rockable crib for infants comprising in combination:

a crib;

a crib support assembly rockably supporting said crib and including a base and a platform stand carried by said base at each corner thereof, each said platform stand being provided with an upwardly facing transversely extending arcuate surface, said crib including a contoured bottom portion at least in the regions overlying said arcuate surfaces, the contour of said contoured bottom portions being complementary to the contours of the underlying arcuate surfaces of said platform stands.

4,028,754

ADJUSTABLE HEAD AND SHOULDER REST

George Daniel Eary, Sr., 8 N. Woodlawn Ave., La Vale, Md. 21502

Continuation-in-part of Ser. No. 559,009, March 17, 1975. This application Dec. 19, 1975, Ser. No. 642,537

Int. Cl.² A47C *21/00*

U.S. Cl. 5—327 B **4 Claims**

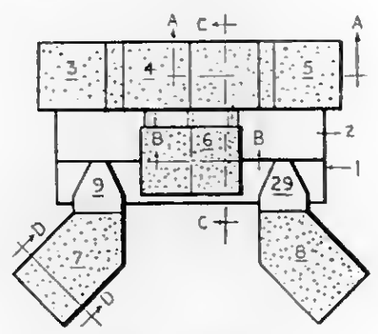
1. An adjustable rest for the head and shoulder portion of the human body comprising:

a. a base member consisting of two inseparable portions that are movable longitudinally and latitudinally in a limited manner relative to each other and rotatable about a vertical axis in a limited manner,

b. a pair of laterally spaced apart resilient shoulder support members, adjustably attached to said base member and adapted to support the shoulders of said human body in a predetermined position,

c. each of said shoulder members being so attached to allow limited rotational movement around a vertical axis,

d. a face support member, rotatable in a limited manner about a horizontal axis, having separate interconnected movable members comprising at least, one for the forehead, configured as a modified "W" and, at least, one for the lower face configured as an inverted, shallow "V", so aligned to provide support for the human head at varying degrees between the vertical and horizontal positions, to the right or left side, providing two surfaces, with one always in reserve,



e. said lower face support member adjustably attached providing means to vary distance between said lower face member and forehead member,

f. means of adjustably raising the rotatable face support member, aided by the upward pressure of one or more properly positioned springs, to a heighth suitable for support of the human head while the user is lying on his or her right or left side,

g. means for varying tension strength of each spring.

4,028,755

METHOD OF REMOVING WAX MOTH LARVAE FROM INFESTED ENCLOSURES

Hayward Gosse Spangler; Norbert Mariner Kauffeld, both of Tucson, Ariz., and Charles Dean Owens, East Falmouth, Mass., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Apr. 30, 1976, Ser. No. 682,069

Int. Cl.² A01K *51/00*

U.S. Cl. 6—1 **4 Claims**

1. A method of removing wax moth larvae from enclosures containing the same, which comprises:

a. tapping the enclosure with a hard object at a frequency of about from 1 to 10 taps per second and with a force sufficient to cause the larvae to move to the surface of the enclosure, and

b. removing the larvae from the surface.

4,028,756

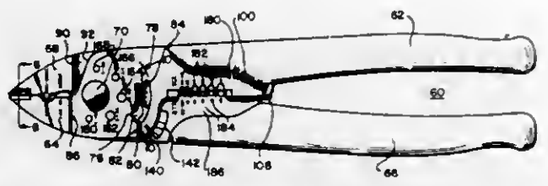
HAND TOOL FOR WORKING ON ELECTRICAL CONDUCTORS

Luis R. Couto, Elizabeth, N.J., assignor to Thomas & Betts Corporation, Elizabeth, N.J.

Filed Apr. 9, 1975, Ser. No. 566,192

Int. Cl.² B25B *7/22*

U.S. Cl. 7—5.5 **12 Claims**



1. A hand tool comprising: a first handle member; a second handle member; pivot means coupling said second handle member to said first handle member to permit selective movement of said first and second handles towards and away from each other in arcs about said pivot means; first jaw means coupled to said first handle means; first crimping means on said first jaw means; indicator means on said first jaw means; second jaw means coupled to said second handle means; second crimping means on said second jaws means and indicia on said second jaw means arranged to be positioned adjacent said indicator means in said first jaw means; said indicia indicating the proper positions for said first and second jaw members to crimp a selected terminal to an appropiately sized conductor placed in said first and second crimping means; the positioning of said indicator means adjacent said indicia permitting a visual determination of a proper crimp of a selected terminal to an appropriately sixed conductor.

4,028,757

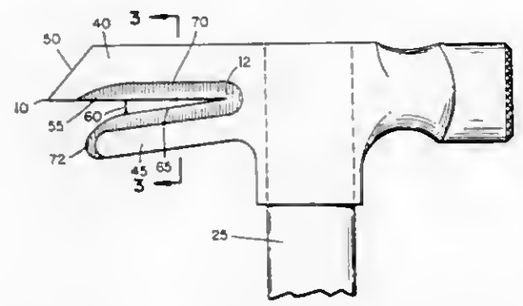
RAKER CLAW HAMMER

Clifford Kenneth Young, P.O. Box 787, Kings Beach, Calif. 95719

Filed May 19, 1975, Ser. No. 578,506

Int. Cl.² B25F *1/00*

U.S. Cl. 7—8.1 R **1 Claim**



1. An improved claw hammer, comprising a hammerhead, a handle mounted in and normal to said hammerhead, and a pair of claws (claw) provided on said hammerhead, comprising at least two blades having their respective planes parallel to the axis of said handle and defining a V-shaped groove therebetween, one of which claws is pointed and one of which claws is rounded, said pointed claw being longer than said rounded claw (and its claw engages the shank of a nail embedded in wood, the nail will be lifted from the wood by inertia rather than leverage) so that when such hammer is swung laterally so that the shank of a nail comes between each of the claws, such that the rounded portion of one of said claws allows the nail to be driven between said claws, the entire nail will be lifted from the wood by inertia rather than leverage.

4,028,758

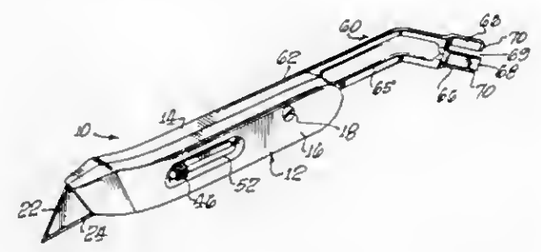
COMBINATION UTILITY KNIFE AND STAPLE REMOVER

John J. O'Connor, 26412 Vla del Sol, Mission Viejo, Calif. 92675

Filed Sept. 22, 1975, Ser. No. 615,346

Int. Cl.² B25F *1/04;* **B26B** *11/00*

U.S. Cl. 7—14.1 R **1 Claim**



1. In combination, a utility knife and staple remover

wherein the knife portion includes a cutting blade therein, said combination comprising:

a split housing having removable top and bottom sections, said sections forming a compartment therebetween, said top section having a longitudinal slot disposed therein;

means for removably securing said top and bottom sections together;

a blade-support bracket having a base member integrally formed therewith and including extending tab members, said bracket being formed of a flexible material and including a plug arranged to be received in said slot of the top section; and wherein said bracket is slidably disposed for longitudinal movement within said compartment, and a spring mounting pin affixed rearwardly thereof;

biasing means attached to said blade-support bracket to automatically retract said blade attached to said bracket, wherein said biasing means comprises a coiled spring having one end connected to said support bracket and the opposite end thereof connected to said housing, and wherein said mounting pin is mounted to said bracket having the coiled portion of said spring affixed thereto;

locking means arranged between said support bracket and one of said sections, whereby said blade is locked into a predetermined position wherein said locking means comprises:

a plurality of notches arranged in the upper section of said housing, at least one of said notches being a forward notch and one being a rearward notch; and

a pair of ears integrally formed in said support bracket arranged to be received in said notches;

staple-removing means secured to one of said sections, said means including pivoting means whereby said staple-removing means is rotated thereon in a side-to-side movement when removing a fixed staple, wherein said staple-remover means comprises:

an elongated, substantially-flat, metal bar secured to said bottom section of said housing, said bar being bent at an obtuse angle relative to said housing;

three forked tongues formed in one end of said bar, the central tongue being offset outwardly from the remaining side tongues, said side tongues having wedge-shaped ends formed thereon, wherein said pivoting means comprises a convex/concave body portion formed longitudinally in said bar, whereby said staple-remover is pivoted from side-to-side when removing staples, and wherein said top and bottom sections of said housing include longitudinal channels therein forming guides, whereby said extended tabs of said support bracket are slidably disposed in respective guides and wherein a track is arranged between said sections to slidably receive said cutting blade therein.

4,028,759

MARINE ANCHOR BUOYS

Earl Lee Toups, Mobile, Ala., assignor to Lee Marine, Inc., Kaplan, La.

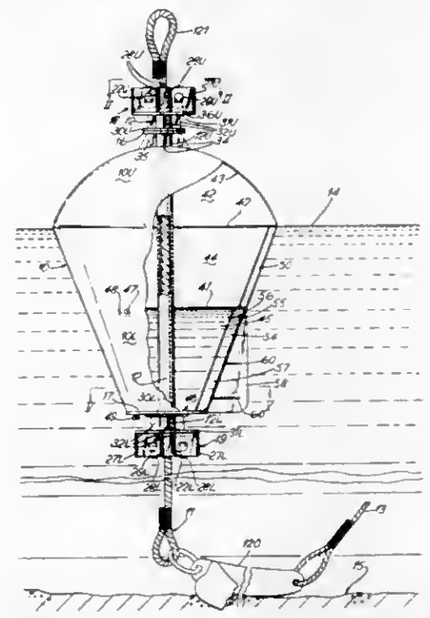
Filed Apr. 26, 1976, Ser. No. 680,505

Claims priority, application United Kingdom, June 25, 1975, 26889/75

Int. Cl.² B63B *21/52*

U.S. Cl. 9—8 R **6 Claims**

1. A buoy for supporting a varying length of cable connectable with an anchor, comprising a buoyancy chamber for containing a flotation medium to float the buoy, means for replacing at least a portion of said buoyancy medium with a heavier medium thereby permitting the buoy to float at a predetermined desired height above the surface of a body of water regardless of the length of cable being supported, the varying length of the cable being supported by the buoy being dependent upon the predetermined height, cable guiding means mounted on said buoyancy chamber for permitting movement of said cable relative to said buoyancy chamber and at least one roller assembly mounted on said cable guiding means, said roller assembly mounted on said cable guiding means, said roller assembly including a plurality of freely



rotatable rollers defining an opening for passage of the cable therethrough in a substantially friction free manner.

4,028,760

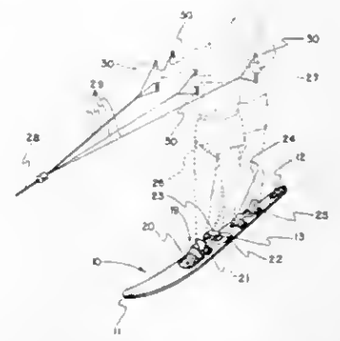
DOUBLE SLALOM SKI

Russell W. Tarlton, Jr., 1109 Athens Drive, Raleigh, N.C. 27606

Filed Aug. 25, 1975, Ser. No. 607,471

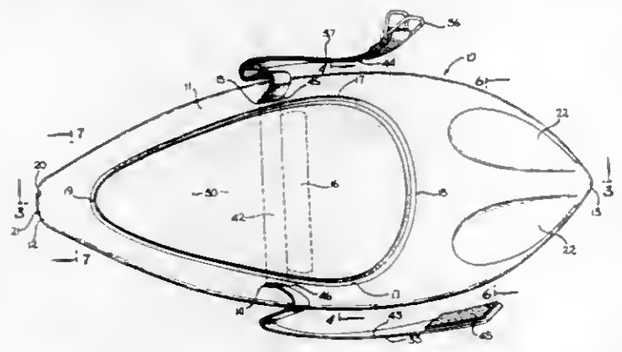
Int. Cl.² A63C *5/00*

U.S. Cl. 9—310 A **9 Claims**



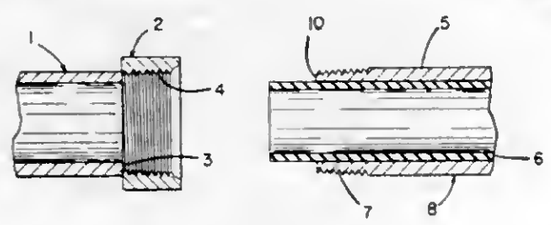
1. A ski device comprising: a slalom type water ski body having a slightly upturned front portion and a relatively flat rear portion; at least four foot retaining means secured to the upper portion of said ski, two of said retaining means being laterally aligned and touching each other with at least one retaining means disposed longitudinally forward thereof and at least one retaining means being disposed longitudinally rearwardly thereof; and means on the bottom portion of said ski to provide lateral directional stability to said ski when in use whereby a slalom type water ski for at least two persons is provided.

4,028,761
MULTIPURPOSE SLIDE
John Taylor, Long Beach, Calif., assignor to Born Free Plastics, Inc., Gardena, Calif.
Continuation of Ser. No. 453,709, March 28, 1974, abandoned. This application Oct. 9, 1975, Ser. No. 621,235
Int. Cl.² A63C 5/02, 15/12
U.S. Cl. 9—310 B 13 Claims



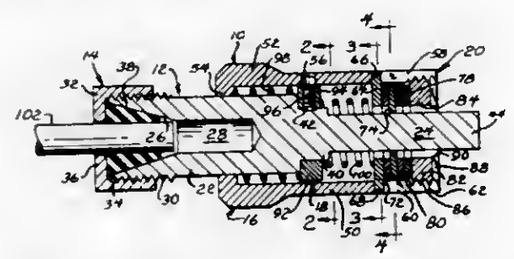
1. A slide for supporting a human passenger during water and snow sports activity, comprising:
an elongated body having a front and rear end, said body being of seamless construction and having spaced apart top and bottom walls which join around the rounded edges of said body, the top wall of said body having a knee well formed therein for accommodating said passenger and an opening at each side of said knee well, said bottom wall having a convex compound curve shape;
a knee strap passing through said openings and under said top wall therebetween; and
plastic foam substantially filling said body.

4,028,762
METHOD OF THREADING SHORT SPOOL PIECES
Dale Allen Jueckstock, Sanford, and Thomas Wayne Hindman, Sr., Gladwin, both of Mich., assignors to Robert L. McKellar, Midland, Mich., a part interest
Filed Feb. 25, 1976, Ser. No. 661,293
Int. Cl.² B23G 1/02, 1/52
U.S. Cl. 10—1 B 5 Claims



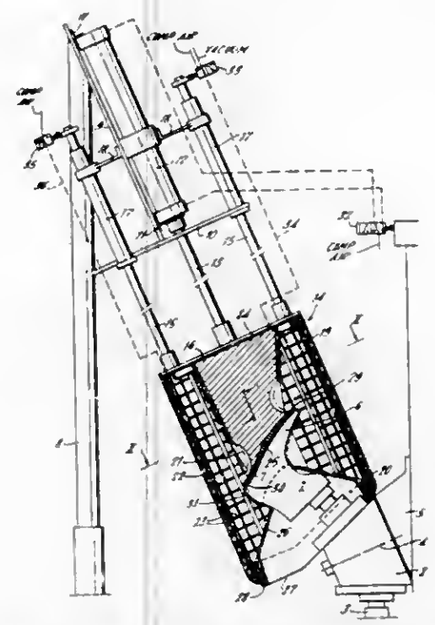
1. An improved method of threading short spool pieces of lined pipe which method consists of
inserting one end of a segment of lined pipe in a conventional threading machine,
cutting a predetermined section from the other end of the pipe while leaving the lining intact,
threading the pipe segment on the end which contains the exposed lining,
cutting the pipe to the desired length including the threaded and exposed lining,
reversing the threaded pipe in the threading machine so that a second end is in contact with the threading dies,
cutting a second predetermined section of the pipe while leaving the lining intact,
threading the pipe segment on the second end whereby a short spool piece is produced,
wherein the improvement comprises centering and maintaining the short spool piece in the conventional threading machine by mounting said short spool piece in a device which protects the exposed lining during the cutting and threading of the second end of said short spool piece,
said device consisting of a hollow stabilizer and guide bar having a length of 9 inches or greater, an outside diameter of from 1⅜ to 6⅝ inches and an inside diameter of from one-eigth to one-fourth inches smaller than the outside diameter,
a workholder which is circular in structure and which has an outside diameter greater than the outside diameter of the stabilizer and guide bar and which has a standard threaded inside diameter of one-eighth to one-fourth inch greater than the inside diameter of the stabilizer and guide bar, said workholder having a length which is dependent on the diameter of the short spool piece being processed, which in turn is dependent upon the length of exposed lining that is desired in the short spool piece, said workholder being axially aligned and permanently affixed to one end of the hollow stabilizer and guide bar.

4,028,763
TAP HOLDER
Al Jenner, 222 Grand Canyon Parkway, Hoffman Estates, Ill. 60172
Filed Sept. 20, 1974, Ser. No. 507,730
Int. Cl.² B23G 1/16, 5/16
U.S. Cl. 10—135 R 1 Claim



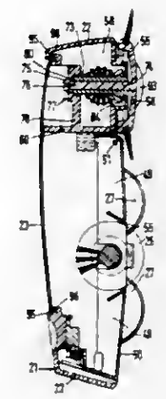
1. A tap holder particularly adapted for use on a numerical-controlled machine comprising, an elongated tap holder shaft, a tap holder collet on one end of said shaft for releasably holding a tap, the elongated tap holder shaft has an integral non-circular cross-section drive tail on the end of the shaft opposite to the end having the tap holder collet; a tap holder body rotatably mounted on the tap holder shaft and being adapted for releasable driving connection to a tool holder of a numerical-controlled machine, said tap holder body including a pair of opposed slots at one end of an internal thread at said end, a drive rate compensating assembly connecting the tap holder body and the tap holder shaft and allowing relative axial movement therebetween, said drive rate compensating assembly including a spring collar releasably mounted on said shaft, a set screw holding the spring collar on said shaft, a first coil spring having one end connected to the spring collar and the other end connected to the tap holder body, and a second coil spring having one end connected to the spring collar and the other end connected to the tap holder body, said first and second coil springs having substantially equal spring rates, whereby the springs allow axial displacement of the shaft relative to the body; and said tap holder body has a screw aperture contained therein, alignable with the set screw to provide a means of access for manipulating the set screw, and a limited drive torque assembly drivingly connecting the tap holder shaft to the tap holder body for turning the tap holder shaft at a torque under a selected maximum amount, said limited drive torque assembly includes a substantially flat body drive plate having a pair of ears extending into the slots of the body for driving rotation with the body, a substantially flat shaft drive plate having an aperture mateably receiving the drive tail of the tap holder shaft and being axially movable along the drive tail, a substantially flat brass washer positioned between the shaft drive plate and the body drive plate and frictionally engaging said shaft drive plate and the body drive plate to provide a frictional driving connection between the shaft drive plate and the body drive plate, a second brass washer frictionally engaging the body drive plate, a steel washer frictionally engaging the second brass washer, and an end cap threadedly mounted in the tube and engaging the steel washer to determine the normal force between the first brass washer and the body drive plate and the shaft drive plate to determine the maximum torque transmitted between the tap holder body and the tap holder shaft; and said drive rate compensating assembly including a spring collar releasably mounted on the tap holder shaft, a first coil spring having one end engaging the spring collar and the other end engaging the body, and a second coil spring opposed to the first spring, said second coil spring having one end engaging the spring collar and the other end engaging the body drive plate, said springs having equal spring rates, whereby the springs allow axial displacement of the tap holder shaft relative to the tap holder body.

4,028,764
APPARATUS FOR LASTING FOOTWEAR UPPERS
Gerard J. M. Wilms, Son, and Hendrik C. J. Joosten, Eindhoven, both of Netherlands, assignors to Bata Shoe Company, Inc., Belcamp, Md.
Filed Jan. 22, 1976, Ser. No. 651,437
Claims priority, application United Kingdom, Jan. 22, 1975, 2859/75
Int. Cl.² A43D 00/00
U.S. Cl. 12—1 W 7 Claims



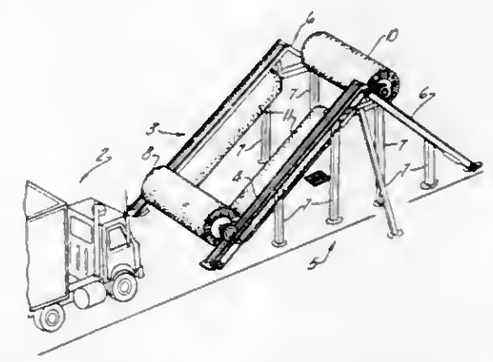
1. Apparatus for shaping and lasting footwear uppers, comprising a chamber formed by a tubular flexible diaphragm and an end plate at one end thereof, a last mounted on a last support, the last support being adapted to sealingly engage the other end of said tubular diaphragm to close the chamber with the last inside, means for connecting the interior of said chamber to a vacuum source, and a pleat guide mounted within the chamber on the end plate.

4,028,765
FLOOR OR CARPET SWEEPER
Johannes Liebscher, Nassau, Lahn, Germany, assignor to Leifheit International Gunter Leifheit GmbH, Nassau, Lahn, Germany
Filed July 19, 1976, Ser. No. 706,564
Claims priority, application Germany, July 24, 1975, 2533071
Int. Cl.² A47L 11/32
U.S. Cl. 15—42 13 Claims



1. A carpet or floor sweeper comprising: a housing displaceable forwardly and oppositely backwardly in a normal direction of travel and having an open bottom; a plurality of floor-engaging wheels rotatable on said housing; a cover plate closing said bottom of said housing and formed with a central hole and forming to at least one side of said hole a dust-catching receptacle; means pivoting said plate on said housing about an axis extending transverse to said direction; a rotatable brush elongated transverse to said direction extending through said hole; means mounting the elongated brush on said cover plate for rotation of said elongated brush about its longitudinal axis; and means operatively connecting said brush to said wheels for rotation of said brush by said wheels.

4,028,766
DOUBLE OVERHEAD BRUSH ASSEMBLY
David J. Bivens, Danville, Va., assignor to Bivens Winchester Corporation, Danville, Va.
Filed Mar. 11, 1976, Ser. No. 666,123
Int. Cl.² B60S 13/06
U.S. Cl. 15—53 AB 11 Claims



1. A machine for washing the exterior of vehicles comprising, in combination, frame means adapted for relative movement between the frame means and a vehicle in the direction of the length of the vehicle, the frame means comprising first guide means inclined upwardly in the direction of the said relative movement and comprising second guide means inclined downwardly in the direction of the said relative movement; first and second rotary brushes each mounted for rotation about a substantially horizontal axis substantially normal

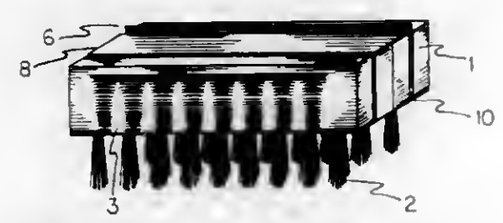
to the said relative direction, the first and second rotary brushes being guided for translation along the first and second guide means, respectively; the first brush being adapted to engage the end of the vehicle which is forward and the second brush the end which is rearward in the direction of said relative movement, and both brushes being adapted to engage the upper surface of the vehicle, the brushes being individually controlled in such translation by engagement with the respective ends of the vehicle; power means for rotating the said brushes about their respective axes, the first brush being rotated in such sense as to be biased upwardly by engagement with the said forward end of the vehicle; first power traverse means coupled to the first brush operable to translate the brush upwardly along its guide means, the said power traverse means being operable to raise the brush from the vehicle; means effective to lower the brush along its guide means after passage of the vehicle; second power traverse means coupled to the second operable to translate the brush upwardly along its guide means and to hold the brush in an elevated position; means responsive to entry of the vehicle into the machine effective to lower the second brush against the top of the vehicle and to free the brush to translate downwardly in contact with the said rearward end of the vehicle; means effective upon completion of the downward translation of the second brush to actuate the second power traverse means to return the second brush to its elevated position and retain it there until freed by entry of a subsequent vehicle into the machine.

4,028,767

FOLDABLE BRUSHES

Ren Judkins, P.O. Box 8342, Salt Lake City, Utah 84108

Filed Oct. 29, 1975, Ser. No. 620,126
Int. Cl.² A46B *7/02, 15/00*
U.S. Cl. 15—203 **6 Claims**



1. A collapsible brush comprised of a plurality of rectangular segments in which the thickness of the edges is smaller than the width and also the length of the faces; means to articulate said segments such that said segments can be fan folded (accordian) face to face in a stack and unfolded edge to edge; bristle tufts mounted in at least one adjacent edge of each segment, said bristle tufts staggered with respect to the bristle tufts extending from the edge of the adjacent segment; a plurality of hollow depressions formed in at least one face of each segment, the depressions being adapted to receive the bristle tufts of an adjacent segment when the brush is unfolded.

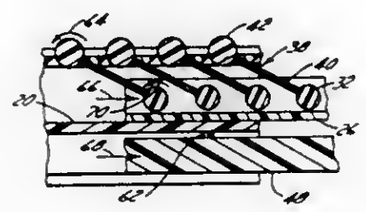
4,028,768

RETRACTABLE BRUSH

Brian W. Pascal, 182 Northcoat Drive, Pincourt, Quebec, Canada

Filed Jan. 14, 1976, Ser. No. 649,160
Claims priority, application Canada, Nov. 6, 1975, 239268
Int. Cl.² A46B *9/10, 17/06*
U.S. Cl. 15—203 **13 Claims**

1. A self-cleaning retractable brush structure comprising a body portion, a movable bristle bed within said body portion, a plurality of bristle members secured to said bristle bed, rotatably mounted guide members, said guide members having a plurality of apertures therein, each of said apertures being sized to snugly receive at least one bristle member, and means for moving said bristle bed from a first position wherein said bristle members are in an erect condition, to a second position wherein said bristle members are in a retracted condition with the free end of each bristle member being within its



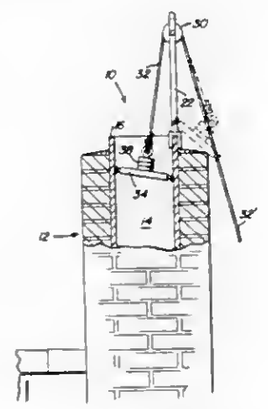
aperture, such that said bristle members are drawn through said apertures while said guide members rotate whereby an extraneous material is removed from the bristle members and remains on a surface of said guide members.

4,028,769

APPARATUS FOR CLEANING CHIMNEY FLUES

Louis M. Coviello, and Claire V. Coviello, both of R.R. No. 1, Cook, Minn. 55723

Filed Feb. 26, 1976, Ser. No. 661,803
Int. Cl.² F23J *3/00*
U.S. Cl. 15—249 **8 Claims**



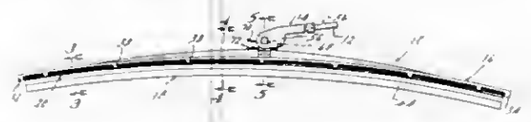
1. A chimney cleaning apparatus comprising: sweep means for movement up and down within the inside of the chimney for cleaning same, said sweep means including a flexible member shaped to provide a plurality of outer edges and being slightly larger than the inside of circumference of said chimney which will permit the outer edges of said flexible member to flex in an up and down direction while the sweep means is in operation, at least two or the outer edges of said flexible member being provided with rectangular strips fastened thereto, a removable platform mount for the top of the chimney, a flexible line connected to the sweep means and associated with the mount for operation by an operator on the base level outside of said chimney, additional means provided on the removable platform mount for enabling the operator to quickly and easily store the sweep means on the removable mount when the sweep means is not in use, the additional means on the removable platform mount for enabling the operator to store the cleaning sweep means consists of an inverted angle iron structure mounted on the top of the platform mount with the point upwardly to present a sharp pointed upwardly directed edge for catching and retaining the flexible member of the sweep means for storage purposes.

4,028,770

WINDSHIELD WIPER ASSEMBLY

Walter D. Appel, 4350 Commerce Road, Orchard Lake, Mich. 48033

Filed Sept. 15, 1975, Ser. No. 613,075
Int. Cl.² B60S *1/38*
U.S. Cl. 15—250.42 **1 Claim**



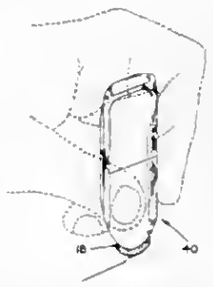
1. A windshield wiper blade assembly comprising,
an elongated flexible arcuate-shaped one-piece superstructure fabricated of a molded plastic material,
said superstructure having a uniform radius of curvature,
connector means located adjacent a central portion of said superstructure for securing the same to an associated wiper arm,
said superstructure having a first retaining means formed intergrally thereon and spaced longitudinally therealong the entire length thereof,
said first retaining means comprising a plurality of downwardly projecting fingers formed integrally of said superstructure and defining a longitudinally extending recess, said fingers being spaced along said superstructure and each having an inwardly projecting distal end portion,
a wiper blade including a resilient windshield engaging wiping lip portion and an upwardly extending mounting portion,
an elongated flexible retaining member fabricated of a molded plastic material secured to and coextensive of said blade,
said retaining member having a first portion insertable into said recess and a pair of laterally opposed longitudinal slots adapted to receive said distal ends of said fingers for securing said retaining member to said superstructure, and a second portion defining a longitudinally extending slot formed along the undeside of said member and adapted to receive said upwardly projecting mounting portion of said blade, whereby said blade assumes said arcuate shape of said superstructure and is thereby adapted to exert a uniform wiping pressure against said windshield,
means for limiting longitudinal sliding movement of said retaining member and said blade relative to said superstructure,
said means for limiting relative movement of said retaining member comprising a pair of integral end stops projecting downwardly from the longitudinally opposite ends of said superstructure and adapted for engagement with the longitudinally opposite ends of the assemblage of said retaining member and blade for limiting longitudinal sliding movement thereof, and means for providing torsional stiffness at the opposite ends of said superstructure and comprising a pair of generally uniform rectangular crosssectional shaped end protions on said superstructure so as to maintain the opposite ends of said blade in wiping engagement with the associated windshield during oscillatory movement of said assembly, each of said end protions extending inwardly to a location approximately one third of the distance beytween said end stops and the central portion of said superstructure, said one peice superstructure being formed with an integral upwardly projecting reinforcing rib having a maximum thickness at said central portions of said superstructure and gradually tapering to a minimum thickness at said inward locations of said end protions.

4,028,771

THIN FLAT ERASER AND HOLDER

Jau-Guang Lin, 103 Elmere Rd., Owings Mills, Md. 21117

Filed Mar. 15, 1976, Ser. No. 666,972
Int. Cl.² B43L *19/00*
U.S. Cl. 15—434 **4 Claims**



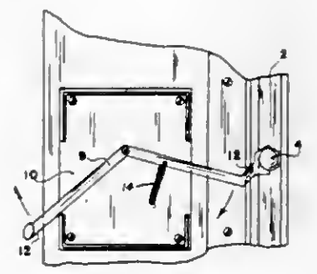
1. In an eraser device, the combination of: a thin flat eraser having two broad parallel faces, two narrow round side faces and a horizontally curved front face; means for holding the thin flat eraser in adjustable protrusion therefrom including a stiff eraser holder having a horizontally rounded open front end and comprising a front cover of inverted trough shape, a rear cover of inverted trough shape, a holder bottom of upright trough shape for assembly together with said front and rear covers so as to form an erasure enclosure, means for removably snapping the front cover and the rear cover in attachment with the holder bottom, the front cover having means for gripping said eraser upon attachment of the front cover to the holder bottom, the holder bottom having, at a forward location, inward sidewall protrusion for constricting the spacing between the side walls and laterally gripping the eraser, and the holder bottom having lug structure located for preventing the rear cover from sliding out of place forwardly during use of the erasing device.

4,028,772

SLIDING DOOR SAFETY DEVICE

Michael T. Salerno, Oakland, N.J., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Apr. 26, 1976, Ser. No. 680,434
Int. Cl.² E05F *5/02*
U.S. Cl. 16—86 A **1 Claim**



1. A sliding door safety device for a sliding door slidably mounted in a door frame having a track slidably accommodating the door, said safety device comprising
a resilient ball; and
mounting means affixed to the door frame and supporting the ball in a manner whereby the ball is positionable in spaced relation with the door and the frame when the door is closed thereby permitting the door to be securely closed and is interposed between the door and the frame when the door is open thereby preventing the door from closing and protecting the fingers of unsuspecting people from being crushed between the door and the frame, said mounting means comprising a bell crank arm pivotally affixed intermediate the ends to a supporting surface adjacent the frame and having spaced opposite first and second ends, said ball being affixed to the arm at the first

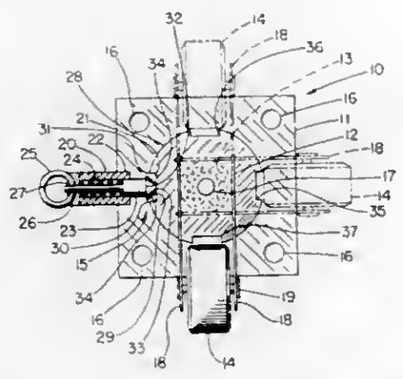
end thereof, a spring affixed at one end to said supporting surface and at its other end intermediate said arm, and said arm being movable by the action of the spring at the second end thereof to selectively move the ball into position between the door and the frame.

4,028,773

SWIVEL CASTER

Lawrence M. Morgan, Anoka, Minn., assignor to The Cornelius Company, St. Louis Park, Minn.

Filed Oct. 28, 1975, Ser. No. 626,122
Int. Cl.² B60B *33/00*
U.S. Cl. 16—35 R **1 Claim**



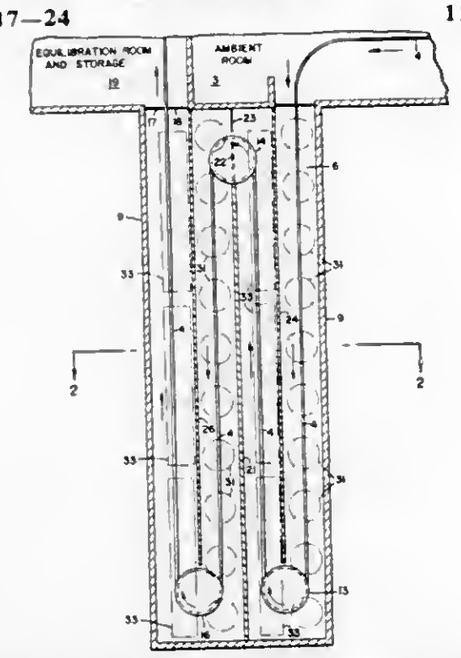
1. An improved swivel caster having a mounting plate, a swivel yoke, a swivel bearing connecting the yoke to the plate, and a wheel mounted on the yoke with the axis of the wheel spaced from the axis of the swivel bearing, the improvement comprising means for automatically indexing and de-indexing the yoke with respect to the mounting plate, said automatic indexing and de-indexing means having
   a. a cam formed of round disc rigidly mounted on the yoke co-axially with and in a plane perpendicular to the axis of the swivel bearing, said cam being co-rotatable with the yoke and having
      1. a circular surface concentric to the axis of the swivel bearing
      2. a plurality of radial cam ramps extending radially from the circular surface, said radial cam ramps being spaced every ninety degrees from each other about the circular surface,
      3. a pair of biasing surfaces in each radial ramp, there being a biasing surface on each side of each ramp, and
      4. a central index surface in each ramp and between a respective pair of biasing surfaces, each index surface being in a plane parallel to the axis of the swivel bearing;
   b. a latch mechanism mounted upon the mounting plate, said latch having
      1. a cam follower reciprocably displaceable within the latch, said cam follower having a cam engaging follower surface having
         a flat face surface lying in a plane parallel to the axis of the swivel bearing, said face surface having a width less than the width of said cam central index surface, and
         a follower flank surface on each side of the face surface, and
      2. means for resiliently biasing the cam follower into engagement against the cam, with
         a follower flank surface being angularly cammingly engagable with and against a respective cam biasing surface during rotation of the yoke with respect to the mounting plate, said latch being operable for radially biasing the yoke into a position of index upon contact of a follower flank surface against a cam biasing surface, and said cam being operable for displacing the cam follower from a radial ramp to the circular surface upon application of a predetermined torque between the yoke and the plate which torque is sufficient to overcome the pressure of the biasing means through the angular camming engagement between a cam biasing surface and a follower flank surface; and
   c. an arcuate width between the cam biasing surfaces, which arcuate width is greater than a corresponding width of the follower flank surfaces so that when the yoke is in a position of radial index with respect to the mounting plate, the yoke is held in a position of index solely by engagement of the follower face surface directly against the cam central index surface under pressure from the biasing means, with there being an arcuate spacing between each respective follower flank surface and cam biasing surface, said arcuate spacing providing a limited amount of resilient radial movement between the yoke and mounting plate to either direction from a position of index and prior to contact of a follower flank surface against a respective cam biasing surface, such radial movement being in response to a low torque between the yoke and plate, which low torque is less than the predetermined torque required to displace the follower from the cam radial ramp to the circular surface.

4,028,774

METHOD OF AND APPARATUS FOR CARCASS COOLING

John H. Allan; Jerrold L. Ball; Charles B. Dull; Leo A. Gabriel, all of Stockton; Richard E. Curtis, Foster City, and Victor J. Dervin, Cupertino, all of Calif., assignors to James Allan & Sons, Inc., Stockton and NPI Corporation, Burlingame, both of, Calif., part interest to each

Continuation of Ser. No. 545,138, Jan. 29, 1975, abandoned. This application July 2, 1976, Ser. No. 702,353
Int. Cl.² A22B *5/00*
U.S. Cl. 17—24 **11 Claims**



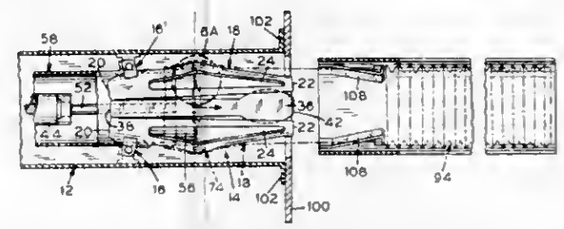
1. A device for cooling animal carcasses comprising an enclosure having an entrance and an exit, means including side walls, a floor and a partition wall dividing said enclosure into a horizontally sinuous passageway having at least a pair of adjacent aisles each of a width only slightly more than the width of one of said carcasses, said passageway opening at one end to said entrance and at the other end to said exit, means for vertically suspending and advancing animal carcasses through said passageway from said entrance to said exit, said carcasses advancing along first one of said aisles and then along the other of said aisles, a source of cooling air, a blower for blowing said cooling air downwardly in one of said aisles over carcasses hanging therein and for then drawing said cooling air upwardly in the other of said aisles over carcasses therein, the bottom of said partition wall being spaced upwardly from said floor to provide a path for flow of said air from said one aisle to said other aisle.

4,028,775

APPARATUS FOR INSERTING A SIZING DISC INTO A TUBULAR CASING

Oliver Joseph Tysver, Flossmoor, Ill., assignor to Union Carbide Corporation, New York, N.Y.

Filed May 4, 1976, Ser. No. 682,958
Int. Cl.² A22C *7/00*
U.S. Cl. 17—49 **24 Claims**



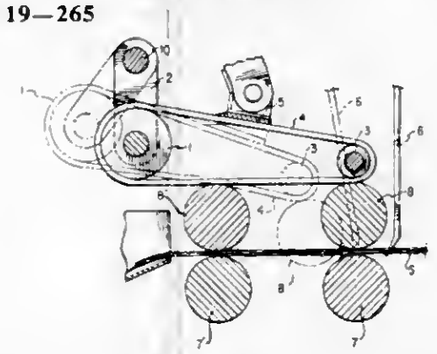
1. An apparatus for implanting a sizing disc into an unshirred open end portion of a shirred tubular casing wherein the sizing disc has a larger external periphery than the inflated inner periphery of said unshirred casing which, comprises in combination:
   a. a frame;
   b. casing spreader means positioned on said frame adapted for insertion into an unshirred open end portion of a casing for expanding said unshirred end portion, being further adapted for accommodating a sizing disc advanced into said unshirred end portion of said casing, and operable for uniformly contacting and locally stretching unshirred casing that surrounds the disc as the disc advances through said unshirred portion while maintaining fore and aft portions of casing adjacent to said surrounding casing in a relaxed condition; and,
   c. disc advancing means for advancing a disc through said casing spreader means and into said unshirred portion of said casing.

4,028,776

SWINGING INTERMITTENT DRIVE REVOLVING CLEARER

Yoshio Murao, 55, Masuizumimati Kanazawa Ishikawa, Japan

Filed Jan. 30, 1974, Ser. No. 437,864
Claims priority, application Japan, May 29, 1973, 48-63177
Int. Cl.² D01H *5/60*
U.S. Cl. 19—265 **3 Claims**



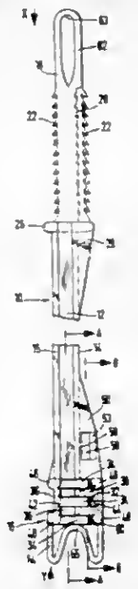
1. A revolving clearer for cleaning the upper drafting rollers of a textile machine wherein at least one of said drafting rollers is movable during a combing operation, wherein a top comb and said one drafting roller move in the same general direction, comprising:
   first and second rollers;
   an endless clearer cloth around said first and second rollers, said clearer cloth adapted to engage both of said upper drafting rollers; and
   a pair of spaced arms pivotally connected at their upper ends to the textile machine, one of said first and second rollers being rotatably supported in the lower portions of said arms.

4,028,777

CLAMPING RING AND CLOSURE MEANS

Alfred Schobel, and Wilhelm Schobel, both of D-7212, Deisslingen 2-Lauffen, Germany

Filed Feb. 3, 1976, Ser. No. 654,734
Claims priority, application Germany, Feb. 8, 1975, 2505425
Int. Cl.² B65D *63/00*
U.S. Cl. 24—16 PB **15 Claims**



1. A clamping ring and closure means made of plastics material comprising a closure head integrally formed at one end of a clamping ring of U-shaped section and which has a passage into which the opposite end of the clamping ring, which opposite end has the form of a tongue, can be inserted, and interlocking sawteeth or locking teeth provided on the side edges of the tongue and on the side walls of the passage, said closure head having side walls connected together by non-overlapping spacer webs which bound the passage on the upper side of the closure head and at the exterior of the base of the clamping ring, the sawteeth on the two side walls being in each case disposed opposite one another at the points of attachment of the spacer webs, the locking teeth disposed on the tongue, extending outwards at an acute angle in relation to the longitudinal axis of the clamping ring, and at their end surfaces extending approximately perpendicularly to said longitudinal axis, along one side edge of the tongue there being formed a reinforcing strip which projects in the direction of the open section side of the clamping ring and whose inner side is provided with sawteeth, while the locking teeth formed on this side edge are widened over its outer side, the lower spacer webs lying at the exterior of the base of the clamping ring section having in each case a portion which lies at the extremities of the limbs of the U-section and being offset in step form and which bounds a deeper portion of the passage corresponding to the reinforcing strip, and a bent-over portion of the spacer webs having a sawtooth facing the deeper portion of the passage.

4,028,778

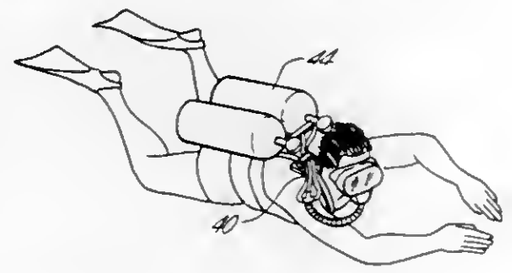
UNDERWATER BELT AND HOSE CLIP

Thomas J. Bardoni, 459 Poplar, Wyandotte, Mich. 48192, and William Markarian, 5970 Weddel, Taylor, Mich. 48180

Filed July 7, 1975, Ser. No. 593,719
Int. Cl.² A44B *11/00, 21/00*
U.S. Cl. 24—79 **7 Claims**

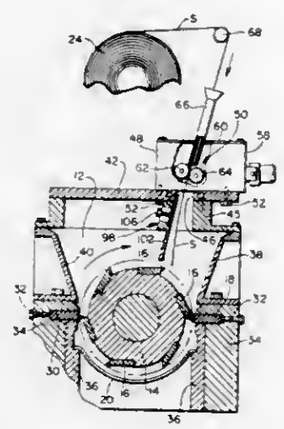
1. In an underwater swimming apparatus of the type having an oxygen tank, a hose leading from the tank to a central mouthpiece and a belt extending from the tank and being secured about the body of an underwater swimmer, a clip for retaining the belt and the hose, comprising:

a. a base having an upper surface and a lower surface, a recess being formed in the lower surface of the base,
b. means for receiving the belt formed in the base such that the belt extends through the clip and sets flush against the body of the user, the portion of the belt disposed beneath the base being nested in the recess,



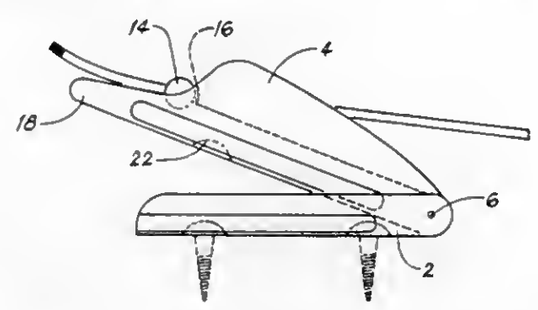
c. means for retaining the hose disposed on the base and comprising a U-shaped member having one leg rotatably secured to the base, and
wherein the clip prevents the hose from drawing back against the throat of the user.

4,028,779
FILM GRANULATOR
Sunil C. Shah, Cranston, R.I., assignor to Leesona Corporation, Warwick, R.I.
Filed Dec. 17, 1975, Ser. No. 641,827
Int. Cl.² B02C *18/22*
U.S. Cl. 241—73 **9 Claims**



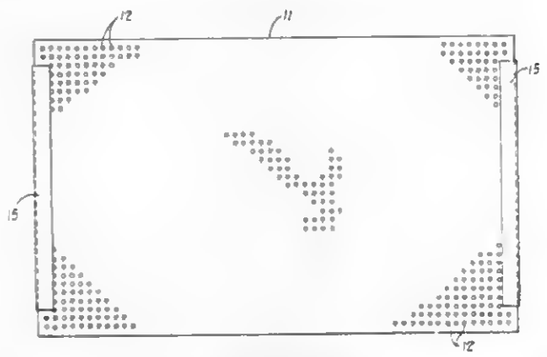
1. In combination with a granulator for size reduction of material, a feeding device for feeding sheet material thereto, said granulator including a chamber, a rotor mounted for rotation about an axis within said chamber, cutting means affixed on said rotor, bed knife means mounted for projection into said chamber at least on the downstroke side thereof for cooperative cutting relationship with said cutting means as said rotor is driven, screen means forming a lower portion of the boundary of said chamber whereby material reduced in size by said cooperative cutting relationship passes through said screen and is discharged from said chamber, said chamber being closed except for a narrow slot in the top thereof, said slot extending longitudinally along said axis and opening into said chamber on the downstroke side of said rotor, means adapted to positively drive sheet material directly into said chamber generally radially towards said rotor, including a longitudinally orientated baffle downwardly extending into said chamber from said chamber top, said baffle positioned proximate said slot and on the upstroke side thereof, said baffle approaching said rotor but spaced therefrom.

4,028,780
LINE RELEASING CLAMP
Kenneth O. Vernon, 2001 Stanwood Drive, Santa Barbara, Calif. 93103
Filed Feb. 10, 1976, Ser. No. 656,958
Int. Cl.² F16G *15/00*
U.S. Cl. 24—116 R **8 Claims**



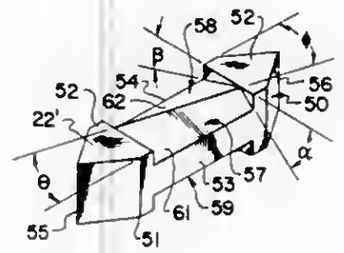
1. A clamp for holding a line, the clamp including a saddle incorporating a channel shaped to receive a line and means for releasably securing the line to the saddle,
a clip for holding the saddle, the clip including means for securing it to an element to resist tension on the line received in the saddle,
means pivotally attaching the saddle to the clip, the pivot being spaced from the axis of the channel in the saddle which receives the line, and
means releasably attaching the saddle to the clip so that when the saddle is released by the clip, the saddle is free to pivot substantially unrestricted by the clip, the line securing means releasing the line as the saddle pivots about the clip.

4,028,781
SURFACING TOOL
Joseph D. Konrad, 6340 Stumph Road, Apt. 311-B, Parma Heights, Ohio 44130
Filed July 21, 1976, Ser. No. 707,366
Int. Cl.² B23D *71/00*; **B21K** *21/00*
U.S. Cl. 29—78 **10 Claims**



1. A surfacing tool consisting essentially of a rectangular metal sheet ranging in thickness from about 0.008 to about 0.02 inch having a flat central portion and opposed end portions,
said flat central portion being perforated with holes all punched in the same direction in said portion, each hole having a minimum lateral dimension of about 0.03 inch and a maximum lateral dimension of about 0.16 inch, the total area of said punch holes being no greater than the total area of non-perforated metal, the minimum distance between the edge of any hole and the edge of any adjacent hole being no less than about 0.75 times the smallest lateral dimension of the smaller of the two holes nor more than about four times the minimum lateral dimension of the larger of the two holes, the burrs produced from the punching of said holes ranging in length from about 0.03 to about 0.13 inch, and
said opposed end portions being adapted for attachment to a motor-powered reciprocating drive means such that said burrs are fully exposed.

4,028,782
CUTTING INSERT AND TOOL HOLDER ASSEMBLY THEREFOR
Donald Edward Stansak, Wyano, Pa., assignor to Teledyne Mid-America Corporation, Los Angeles, Calif.
Continuation-in-part of Ser. No. 494,379, Aug. 5, 1974, abandoned. This application Feb. 13, 1976, Ser. No. 658,002
Int. Cl.² B26D *1/00*
U.S. Cl. 29—95 R **16 Claims**

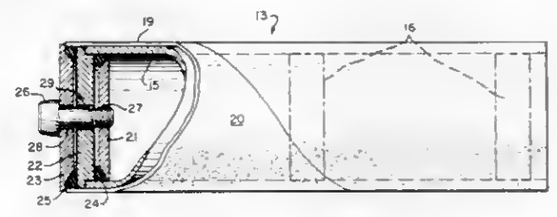


1. A cutting insert comprising:
A. a body of hard wear resistant material having first and second opposed major surfaces, at least one indexing surface capable of precision indexing of the body in a tool holder and at least one cutting edge at an end portion for cutting metal;
B. at least one notch in said first major surface adapted to rigidly hold the body in a tool holder with the indexing surface and a bridge clamp, said notch having an engaging surface forming a compound angle with said first major surface defined by an angle of greater than about 10° and less than about 30° to the indexing surface and an angle of greater than about 3° to a plane defined by the first major surface.

9. A tool holder assembly comprising:
A. a tool holder having a cut-out therein for precision indexing of a cutting insert for the cutting of metal;
B. a bridge clamp for holding a cutting insert in said cut-out of the tool holder, said bridge clamp being removably fastened to said tool holder;
C. a cutting insert of hard wear resistant material having first and second opposed major surfaces, at least one indexing surface capable of precision indexing of the insert in the cut-out of the tool holder and at least one cutting edge at an end portion for cutting material; and
D. at least one notch in said first major surface adapted to rigidly hold the cutting insert in the cut-out of the tool holder with the indexing surface and the bridge clamp, said notch having an engaging surface forming a compound angle with said first major surface defined by an angle greater than about 10° and less than about 30° to the indexing surface and an angle greater than about 3° to a plane defined by the first major surface.

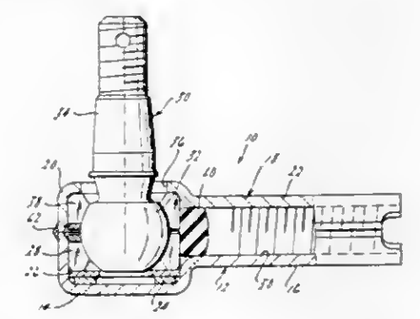
4,028,783
IDLER ROLL FOR PRINTING PRESS DRYING STAGE
Homer G. Buck, Newport, Oreg., assignor to King Label Company, El Segundo, Calif.
Continuation of Ser. No. 562,260, March 26, 1975, abandoned. This application May 14, 1976, Ser. No. 686,370
Int. Cl.² B41F *13/02*
U.S. Cl. 29—117 **4 Claims**

1. An idler roll for engaging a printed side of a running web trained thereover comprising:
a unitary rotatable support member of a rigid material having a hard smooth cylindrical external surface;
a sleeve of hollow cylindrical configuration made of stiff material with an internal surface telescopically matingly engaged with the external surface of said support member and having an external surface that is coated with grit for contacting a printed side of a web to be trained thereover;
and means at one end of said support member detachably interconnecting said support member and said sleeve at said one end for keying them together against both relative angular and relative axial displacement of said support member and said sleeve during operation of the idler roll, said means being actuable to disconnect said support member and said sleeve to permit said sleeve to be slideably withdrawn axially endwise over said one end of said support member;



said rotatable support member being of tubular configuration and said sleeve having an end portion projecting axially beyond an adjacent end of said support member;
said keying means comprising a coaxial series of an inner disc receivable within said member, a median disc formed with an annular shoulder seatable on an end of said support member within said projecting end portion of said sleeve, and an outer disc engageable with an end of said sleeve;
said keying means further comprising a first radially expandable and radially retractable element intermediate said inner and median discs and a second radially expandable and radially retractable element positioned between said median and outer discs.

4,028,784
PRELOADED TIE ROD END ASSEMBLY
William D. Allison, Grosse Pointe Farms, Mich., assignor to Ford Motor Company, Dearborn, Mich.
Division of Ser. No. 593,808, July 7, 1975. This application Apr. 12, 1976, Ser. No. 675,655
Int. Cl.² B21D *53/10*
U.S. Cl. 29—149.5 B **4 Claims**



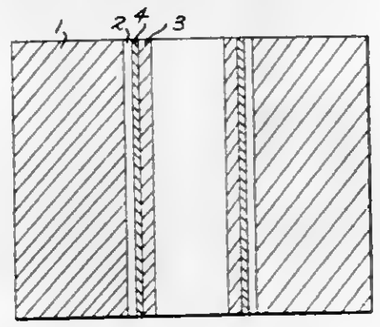
1. A method of making a preloaded tie rod end assembly comprising:
forming a first housing and a second housing each with a socket part and a stem part;
assembling a one-piece frangible bearing and the ball of a ball stud between said socket parts of said first and said second housings;
exerting a load on said first and second housings causing said bearing to fracture into a plurality of bearing elements;

securing said first and second housings together by welding while maintaining said load on said bearing.

4,028,785
TUBULAR PRODUCTS

Kenneth Thomas Jackson, Leeds, and Lance Porter, Walton, near Wakefield, both of England, assignors to Yorkshire Imperial Metals Limited, Leeds, England

Filed May 30, 1974, Ser. No. 474,857
Claims priority, application United Kingdom, June 6, 1973, 26988/73
Int. Cl.² B23P *15/26*
U.S. Cl. 29—157.3 R **15 Claims**

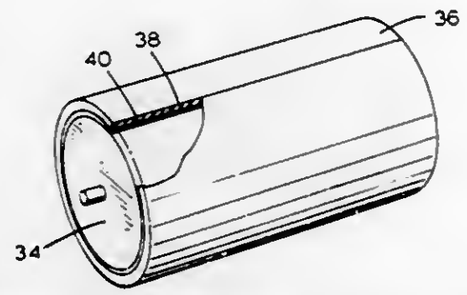


1. A method of producing a composite tubular product comprising assembling concentrically a first tubular member of a highly corrosion resistant reactive metal which is selected from the group consisting of titanium, tantalum and zirconium and a second tubular member of a highly thermally conductive metal which is selected from the group consisting of copper and copper alloy with a relatively narrow annular gap therebetween, there being a layer of coating of a metal selected from the group consisting of copper and nickel on the surface of the first member facing towards the second member, heating the assembly to an extrusion temperature at which diffusion occurs at the interface between the reactive metal and the layer or coating thereon, and then extruding the assembly at that temperature to bond the layer or coating to the highly thermally conductive metal, a diffusion bond being formed between the reactive metal and said coating.

4,028,786
PRINTING AND LIKE ROLLERS

William Boyd Dempster, Mississauga, Canada, assignor to Canathane Roller Corporation Limited, Downsview, Canada

Division of Ser. No. 513,185, Oct. 8, 1974, Pat. No. 3,997,645. This application July 14, 1976, Ser. No. 705,185
Int. Cl.² B21B *31/08*
U.S. Cl. 29—132 **5 Claims**

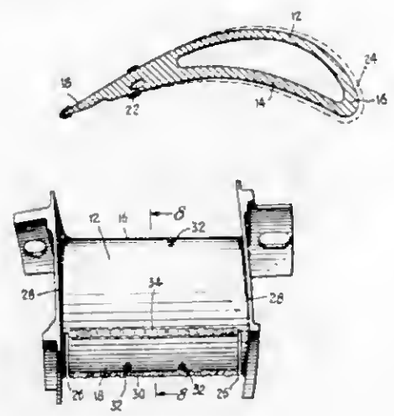


1. A roller for applying varnish, lacquer, ink and the like to sheet material, the roller comprising a magnetic cylindrical former, and a cover which is applied to the curved surface of the former and is magnetically retained thereon, the cover comprising a hollow cylindrical casting having an inside diameter equal to the outside diameter of the former and comprising an outer layer made from a castable material which is selected from the group comprising liquid polymeric systems and liquid prepolymeric systems capable of forming macromolecular structures having elastomeric properties and an inner layer made from a material which is selected from said group, which is capable of bonding with the outer layer and which has particles of a magnetic material dispersed therein.

4,028,787
REFURBISHED TURBINE VANES AND METHOD OF REFURBISHMENT THEREOF

Salvatore J. Cretella, 180 Fitch St., North Haven, Conn. 06473; Matthew Bernardo, 62 Lee St., West Haven, Conn. 06516, and Ralph T. De Musis, 547 Foxon Road, North Branford, Conn. 06471

Filed Sept. 15, 1975, Ser. No. 613,479
Int. Cl.² B23P *15/04, 7/00*
U.S. Cl. 29—156.8 B **1 Claim**



1. The method of refurbishing a turbine vane, which includes the steps of welding cracks in the vane surface, slitting portions of the vane at the two ends of the trailing edge to relieve stresses in the vane, welding the trailing edge of the vane to build up the same, welding an elongate surface portion of the vane spaced from and substantially coextensive with the trailing edge to reinforce the vane, welding the slitted portions closed, plasma spraying molten metal or eroded surfaces of the vane to build up the same beyond the original surfaces, and grinding down the built-up surfaces to refinish the same to conform with the original vane surfaces.

4,028,788
METHOD OF REFURBISHING TURBINE BLADE AIR SEAL FLANGES

Ralph T. DeMusis, 547 Foxon Road, North Branford, Conn. 06471

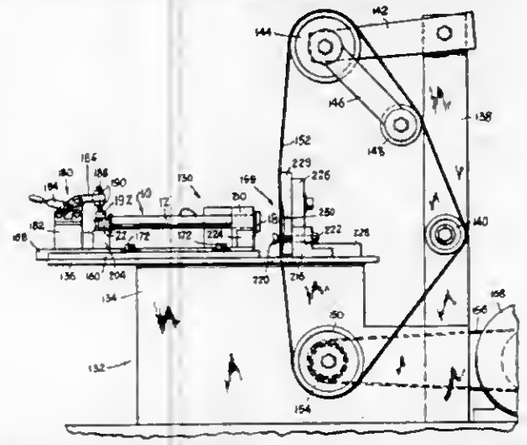
Filed Jan. 12, 1976, Ser. No. 648,388
Int. Cl.² B23P *15/02, 7/00*
U.S. Cl. 29—156.8 B **2 Claims**

1. The method of refurbishing the elongate air seal flanges of worn turbine blades, which includes the steps of:

a. adding a bead of welding material to worn areas of the air seal flange of a blade so as to build up portions thereof which have been worn away, and thereafter in a machine having a work-performing station, a power driven abrasive belt adjacent the station and a contoured back-up shoe having a planar front surface containing an elongate recess characterized by a curved surface with a profile resembling that of the original geometry of the air seal flange of a turbine blade but of greater length than said flange whereby portions of the belt occupying said recess can have a length in excess of the length of the air seal flange, said shoe being engageable with the back of the belt such that the latter can yield and conform to the profile when its abrasive surface is engaged by a workpiece, and having a slide advanceable toward the work-performing station, the steps of:

b. clamping the blade onto said slide, with its air seal flange facing said work-performing station and extending substantially parallel to that portion of the belt at said station, and

c. advancing the slide and blade a sufficient distance toward the work-performing station to cause the edge of the air seal flange to engage the abrasive surface of said belt and force the latter to yield an extent and conform to the



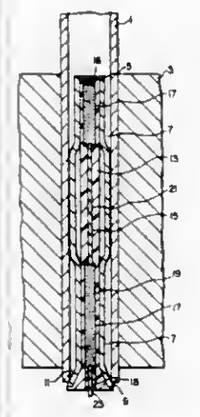
particular curved profile of the recess in the back-up shoe while it removes a portion of the welded material, thereby to restore the flange edge to its original curved geometry closely resembling the curved profile of the recess of said back-up shoe,

d. the advance of the slide and blade being sufficiently large to bring the foremost edge of the flange of the blade into the recess of the back-up shoe and past the planar front surface thereof.

4,028,789
METHOD OF INSTALLING A SLEEVE IN ONE END OF A TUBE

Emil P. Loch, Tampa, Fla., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 29, 1976, Ser. No. 671,885
Int. Cl.² B21D *39/06;* **B23P** *15/26*
U.S. Cl. 29—157.4 **18 Claims**



1. The method of installing a sleeve in one end of a tube disposed in a tube sheet of a heat exchanger, said method comprising the steps of:

forming the sleeve so that it has an outer diameter sufficiently smaller than the inner diameter of the tube to provide an annular space therebetween,

flaring one end of the sleeve to such an extent that the flared end is larger in diameter than the inside diameter of the tube,

inserting the sleeve in the one end of the tube so that the flared end wedges itself against the tube to position the sleeve in the tube and form an annular space therebetween,

forming an insert of resilient material so that it fits snugly within the sleeve and has a relatively large diameter cylindrical chamber disposed adjacent the flared end of the sleeve and a smaller diameter cylindrical chamber extending from the larger diameter cylindrical chamber and away from the flared end of the sleeve,

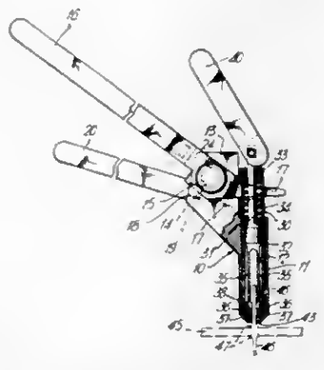
placing explosive material in the chambers, and

detonating the explosive materials, whereby the flanged end of the sleeve is explosively welded to the tube and the sleeve adjacent the smaller diameter cylindrical chamber is explosively expanded into engagement with the tube, and forming a metallurgical bond between the end of the sleeve opposite the flared end and the tube.

4,028,790
REMOVAL OF CONNECTOR PINS

Jean Marcel Dupuis, Ottawa, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Mar. 25, 1976, Ser. No. 670,538
Int. Cl.² H05K *3/00*
U.S. Cl. 29—764 **2 Claims**



1. Apparatus for removing a pin extending from a panel and soldered to at least one surface thereof, comprising:

a main body member including a hollow bottom portion and an offset top portion, said bottom portion including an inwardly extending annular flange having a bottom face for positioning against said panel;

a fixed handle attached to said top portion and extending laterally therefrom;

a moveable handle pivotally mounted on said top portion, moveable about a pivot extending normal to the axis of said fixed handle, said moveable handle including a main portion on one side of said pivot and overlying said fixed handle and also including an extension on the other side of said pivot;

a tubular member mounted in said hollow bottom portion for axial movement therein, said tubular member including a tapered bore at a lower end, said tapered bore extending downwardly and inwardly, and at least one protrusion at an upper end, said protrusion in engagement with said extension on said moveable handle, the lower end of said tubular member resting against said annular flange of said bottom portion of said body member;

a gripping member mounted in said tubular member for axial movement therein, said gripping member comprising a central part a close sliding fit in said tubular member for guidance of said gripping member, a lower part of hollow form and split longitudinally to form two opposed gripping surfaces, and an upper part of reduced diameter and extending up through the upper end of said tubular member beyond said extension on said moveable hand and said protrusion on said tubular member, said central part forming a lower abutment for a spring;

an abutment at the upper end of said tubular member and a compression spring extending between said abutments; and

a cam lever pivotally mounted on the upper end of said upper part of said gripping member, said cam lever pivotal about an axis normal to the longitudinal axis of said

gripping member, said cam lever engaging with the upper end of said tubular member, pivotal movement of said cam lever lifting said gripping member axially relative to said tubular member to open said lower part of said gripping member and retains said pin;

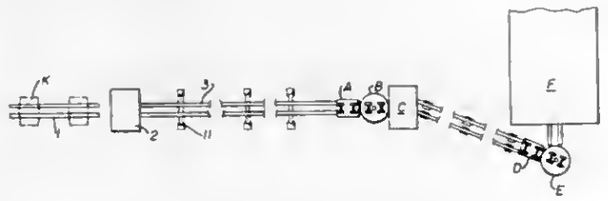
the arrangement such that pivoting of said moveable handle to move said main portion toward said fixed handle, moves said extension in a direction away from said bottom portion of said body member, said extension in engagement with said protrusion to move said tubular member axially, initial movement of said tubular member forcing said extremity of said gripping member into engagement with a pin within said gripping member, further movement pulling said tubular member, gripping member and pin from said panel, shearing the solder joint, reaction on said body member holding said bottom face in contact with said panel.

4,028,791

KEG HANDLING APPARATUS AND METHOD

Ernest J. Hodgetts, Spruce Grove, Canada, assignor to The Molson Companies Limited, Spruce Grove, Canada

Filed Aug. 10, 1976, Ser. No. 713,118
Claims priority, application Canada, May 13, 1976, 252504
Int. Cl.² B23P *19/02*
U.S. Cl. 29—427 **6 Claims**



1. A method of conveying empty beer kegs through one keg handling apparatus to other keg handling apparatus including the steps of:

a. elevating each keg to the uppermost one of a plurality of superposed conveyor belts;

b. conveying said kegs along said uppermost conveyor belt to a deflector located at the distal end thereof;

c. conveying said kegs along the next successive belt to the terminal end thereof, the belts of each superposed pair thereof, where they face one another, being so tensioned that they engage the periphery of each keg and urge it along the path of travel; and

d. transferring said kegs from said lowermost conveyor belt to said other keg handling apparatus, which is adapted to remove and object from one end of each keg.

4,028,792

METHOD OF ERECTING A TOWER CRANE FROM TWO GROUPS OF MODULAR TOWER SECTIONS DIFFERING IN CROSS SECTION

Hans Tax, Munich, and Klaus Hösler, Eichenau, both of Germany, assignors to Hans Tax, Munich, Germany

Filed Apr. 29, 1976, Ser. No. 681,436
Claims priority, application Germany, May 9, 1975, 2520717
Int. Cl.² E04H *12/34*
U.S. Cl. 29—431 **10 Claims**

1. A method of erecting a tower crane from a boom assembly, a plurality of first modular tower sections, a plurality of second, tubular, modular tower sections of larger cross section than said first sections, and a base, which comprises the steps of:

a. mounting said boom assembly on a hollow climbing section dimensioned to be received in each of said second sections and defining a cavity dimensioned to receive each of said first sections, said cavity being open in at least one direction;

b. securing one of said first sections on said base in an upright position, and receiving the upright section in said cavity;

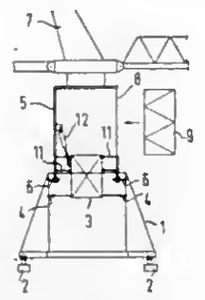
c. raising said climbing section relative to said one first section by interposed hoisting means;

d. partly enveloping the raised climbing section by one of said second sections;

e. securing said one second section to said base and to said raised climbing section for transmitting weight therebetween, and releasing said one first section from said base;

f. raising the released first section relative to said climbing section by interposed hoisting means and securing the raised first section to the secured second section;

g. releasing said climbing section from said one second section and raising said climbing section by interposed hoisting means relative to the raised first section;



h. thereafter enveloping said climbing section by another second section and securing said another second section to said one second section in vertically offset relationships and to said climbing section;

i. releasing said one first section from said one second section, raising the released first section relative to said climbing section by interposed hoisting means, and securing the raised first section to said another second section;

j. releasing said climbing section from said another second section and raising the released climbing section relative to said first section by interposed hoisting means until a portion of said cavity intermediate said boom assembly and said one first section is cleared;

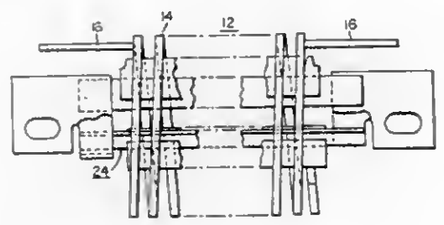
k. inserting another first section in said portion of said cavity, and securing the inserted other first section to said boom assembly and to said one first section in weight transmitting relationship.

4,028,793

METHOD OF ASSEMBLING HELICAL RESISTOR

Marvin E. Liebler, Tonawanda, and Eugene J. Lum, Williamsville, both of N.Y., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Division of Ser. No. 591,246, June 27, 1975, Pat. No. 4,001,761. This application Sept. 13, 1976, Ser. No. 722,834
Int. Cl.² H01C *17/04*
U.S. Cl. 29—618 **6 Claims**



1. A method for assembling a resistor having a helical resistance element and an internal insulating assembly supporting said resistance element at a plurality of points, comprising the steps of:

forming a ribbon of resistance material into an edge-wound helix;

welding each end of a first support bar to corresponding first arms of first and second asymmetrical spreaders each having a plurality of radially extending arms;

affixing insulating means to said first support bar;

affixing insulating means to a plurality of additional support bars;

placing a first subassembly comprising said first support bar, said insulating means, and said spreader members into the interior of said helix;

inserting additional subassemblies comprising all but one of said additional support bars and insulating means into the interior of said helix and welding each end of said all but one additional support bars to corresponding radially extending arms of said first and second spreaders;

inserting a last subassembly comprising the last of said additional support bars and said insulating means into the interior said helix;

spreading said last subassembly radially outward along corresponding empty arms of said first and second spreader members against the interior of said helix to firmly position each of said subassemblies against the interior of said helix; and

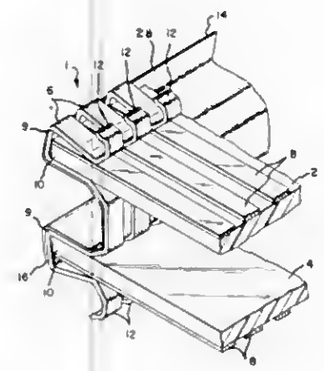
welding each end of said last support bar to said corresponding empty radially extending arms of said spreaders.

4,028,794

LAMINATED CONNECTOR

Leon Thomas Ritchie, and Robert George Harwood, both of Mechanicsburg, Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Division of Ser. No. 504,579, Sept. 9, 1974, abandoned, which is a continuation-in-part of Ser. No. 432,121, Jan. 9, 1974, abandoned. This application Jan. 7, 1976, Ser. No. 647,012
Int. Cl.² H02G *15/00*
U.S. Cl. 29—629 **6 Claims**



1. A method for making a free standing and self-supporting multi-terminal electrical connector, comprising the steps of:

cutting a plurality of elongated contacts from a continuous sheet of electrically conductive resilient spring material;

laminating at least one continuous web of flexible insulative support material to intermediate portions of each of said contacts to hold them in fixed parallel spaced relationship, each said contact having at least one end projecting beyond a marginal edge of said web, said web being sufficiently rigid to prevent relative flexure between adjacent contacts while allowing individual outward flexing of the free ends of the contacts; and

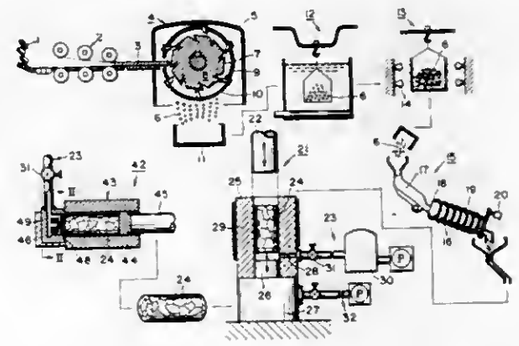
bending portions of said metal contacts into permanent curvilinear shapes to define at least one substantially U-shaped end portion adapted to grippingly receive a mating member therein, said contacts being separated from one another lengthwise along said insulative support material, said contacts being of sufficient metal thickness to be free standing and self-supporting and to provide resilient spring action for applying pressure at said contact end portions.

4,028,795

METHOD OF MANUFACTURING EXTRUDED STRUCTURAL PROFILES FROM ALUMINUM BASED METAL SCRAPS

Toshiro Takahashi; Toshihiro Nagano; Katsuhiko Nakamura, all of Shizuoka, and Masaru Kikuchi, Fuji, all of Japan, assignors to Riken Keikinzoku Kogyo Kabushiki Kaishi, Shizuoka, Japan

Filed July 8, 1975, Ser. No. 593,996
Claims priority, application Japan, Dec. 10, 1974, 49-141893
Int. Cl.² B21C *23/01*, *23/04*
U.S. Cl. 29—403 **1 Claim**



1. A method of manufacturing extruded structural profiles from aluminum based metal scrap materials comprising;

passing and lapping the aluminum based scrap materials through and between rollers to form a laminated sheet plate,

breaking the laminated sheet plate into chip materials,

heating the chip materials to a temperature sufficient to effect a hot press and a hot extrusion,

charging the heated chip materials into a press housing,

evacuating the interior of the press housing to exhaust air from between and about the chip materials,

compacting the chip materials into a substantially cylindrical body in the press housing by applying a pressure force to the chip materials in the press housing in the range of about 0.4 to 2 ton/cm², the cylindrical body having a density greater than 70 percent of that of an aluminum material,

inserting the compacted body of chip materials into an extruder housing,

disposing a blind die in air-tight relation with the extruder housing,

evacuating air from in and about the body of chip materials and in the extruder housing while the blind die lies in such air-tight relation with the extruder housing so that the reduced pressure in the housing is in the range of about 20 to 50 mmHg.

replacing the blind die by an open die having a desired extruder opening therein under the evacuated condition in the interior of the housing,

compressing the cylindrical body into a semi-solid consolidation body to be deformed in air-tight contact with the extruder housing, and

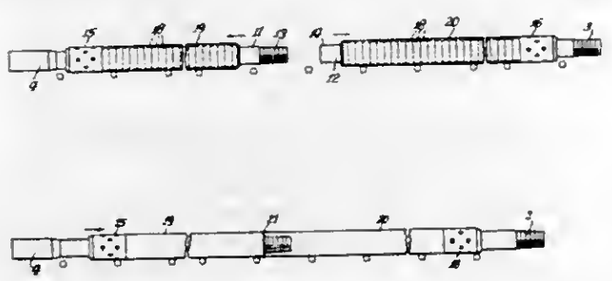
extruding the semi-solid consolidation body through the extruder die opening to form the desired shape.

4,028,796

METHOD OF MAKING A BLAST JOINT

Arthur Everett Bergstrom, 5410 Bergstrom Lane, Houston, Tex. 77088

Division of Ser. No. 600,616, July 31, 1975. This application June 23, 1976, Ser. No. 699,194
Int. Cl.² B23P *17/00*
U.S. Cl. 29—416 **7 Claims**



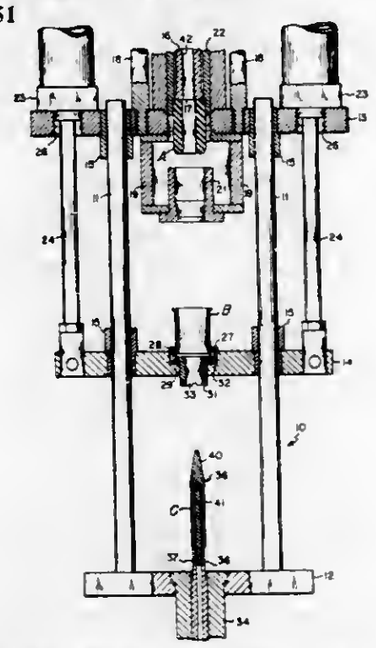
6. The method of producing a carbide protected blast joint of flow tubing which comprises forming two sections of flow tubing with adjacent ends formed into cooperating parts of a threaded flush joint and their remote ends into a pin joint and a box joint respectively, passing a longitudinally adjustable clamping ring over each of said sections to a point adjacent the outer ends of said sections, threading an array of cylindrical ended tungsten carbide rings over each of the said adjacent ends of flow tubing, passing a protective outer metallic sleeve endwise over each of said array of rings, then threading the flush joint threaded parts of the two sections of flow tubing together, then moving said rings and their protective metallic sheath sections endwise into a compact body and then welding the adjacent ends of the outer metallic sleeve together.

4,028,797

METHOD FOR ASSEMBLING RESILIENT BUSHINGS

Harvey E. Miller, Logansport, Ind., assignor to The General Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 248,097, April 27, 1972, abandoned. This application Oct. 17, 1975, Ser. No. 623,515
Int. Cl.² B23P *11/02*
U.S. Cl. 29—451 **2 Claims**



1. In a method for assembling a resilient bushing having an outer sleeve, an inner sleeve and an annular elastomeric insert radially compressed between said sleeves comprising:

mounting said insert in compression within said onter sleeve, and,

expanding the interior of said insert when mounted within said outer sleeve and mounting said inner sleeve within said insert as expanded to place said insert in radial compression between said sleeves with means including an expanding mandrel preceding said inner sleeve through said insert and expanding the interior of said insert at a predetermined rate of expansion to mount said inner sleeve within said insert when so expanded;

the movement wherein: said expanding mandrel is provided with a radial profile conforming to the relation:

$$X_7' = \tfrac{1}{2}\left(X_6^2 - \frac{Q}{+t_u^n R}\right)^{\frac{1}{2}} \text{ where}$$

$$\frac{Q}{(X_6^2 - X_0^2)}$$

X_7' = the radius of said mandrel at every point t_u extending from the leading end of said mandrel along the entire length t_1 thereof; and where

$$R = \left(\frac{Q}{(X_6^2 - X_7^2)} - \frac{Q}{X_6^2 - X_0^2}\right)\frac{1}{t_1^n}; \text{ and}$$

$$Q = (X_1 + X_2)(X_3^2 - X_5^2) + X_2(X_4^2 - X_5^2);$$

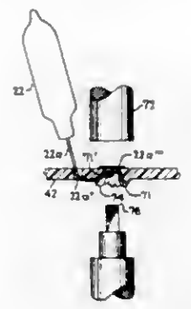
X_0 = inner diameter of said insert when compressed within said outer sleeve;
X_1 = effective length of said insert
X_2 = length of any extension portion to said insert when uncompressed which contributes to its elongation;
$X_2 = 0$ without contribution to elongation;
X_3 = outer diameter of said insert when uncompressed;
X_4 = leading diameter of X_2; $X_4 = 0$ when $X_2 = 0$;
X_5 = inner diameter of said insert when uncompressed;
X_6 = inner diameter of said outer sleeves and outer diameter of said insert when compressed therein;
X_7 = outer diameter of said inner sleeve and inner diameter of said insert when compressed between said sleeves; and
n = a positive integer selected from the numbers 1 and 2; whereby the force required for assembling the inner sleeve in the insert is held to a minimum.

4,028,798

METHOD OF MAKING ELECTRICAL CONNECTIONS

Conrad E. Bechard, Chagrin Falls; John M. Davenport, Euclid; William H. Herrmann, East Cleveland, and Steven N. Lovrekovic, Cleveland, all of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed Apr. 9, 1976, Ser. No. 675,617
Int. Cl.² H01R *43/00*
U.S. Cl. 29—628 **20 Claims**



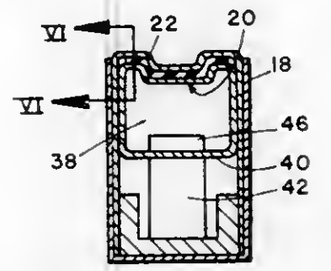
1. A method of connecting an elongated conductive member to a conductor carried by an insulative member, comprising the steps of positioning said conductive member alongside said insulative member in alignment with said conductor, and driving and bending one or more portions of the conductive member sideways into the insulative member to cause the conductive member to engage against and make electrical contact with said conductor and to be embedded and held in position by flow and subsequent solidification of material of the insulative member around said conductive member at one or more regions thereof.

4,028,799

SHARPENERS FOR ELECTRIC SHAVERS

James E. Rookus, 505 Cherry, SE., Grand Rapids, Mich. 49503

Continuation-in-part of Ser. No. 478,645, June 12, 1974, Pat. No. 3,935,638, which is a continuation-in-part of Ser. No. 436,174, Jan. 24, 1974, abandoned. This application Dec. 17, 1975, Ser. No. 641,661
Int. Cl.² B26B *19/38*
U.S. Cl. 30—37 **7 Claims**



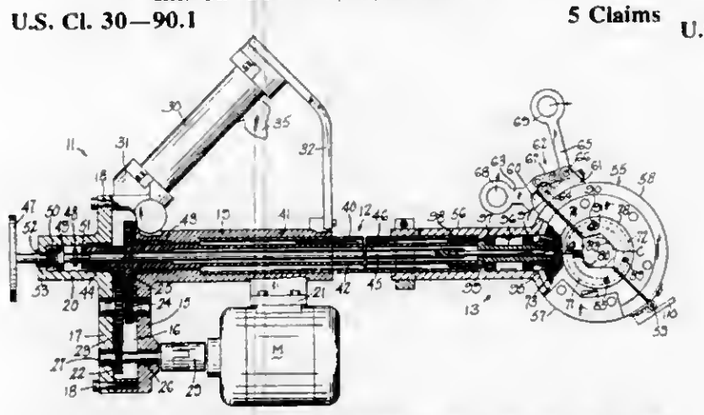
7. In an electric shaver having an elongated head portion and a housing, the head portion having a cutter blade and a shear plate and resilient means normally biasing said cutter blade against said shear plate, means for sharpening the cutter blade, an elongated blade member positioned in and mounted for reciprocation with respect to the inner surface of said shear plate, and means securing said head portion in position on the shaver housing, said securing means including means engaging said head portion at the ends thereof comprising: a thin sheet seated between said blade and said shear plate and pressed by said cutter blade against the inner surface of said shear plate, said thin sheet having a lower surface overlying and engaging the entire cutting surface of said blade; said thin sheet having a length corresponding to the spacing between said engaging means at the ends of said head portion and being locked therebetween and held stationary; a layer of abrasive material on the lower face of that portion of said thin sheet which overlies the cutting surface of said blade whereby said blade is sharpened when it is reciprocated.

4,028,800

CABLE SHAVING TOOL

James J. Matthews, East Haddam, Conn., assignor to Utility Tools Corporation, Cromwell, Conn. and Utility Tools Corporation, Cromwell, Conn.

Filed Oct. 2, 1975, Ser. No. 618,749
Int. Cl.² B21F *13/00*; **B26B** *27/00*
U.S. Cl. 30—90.1 **5 Claims**



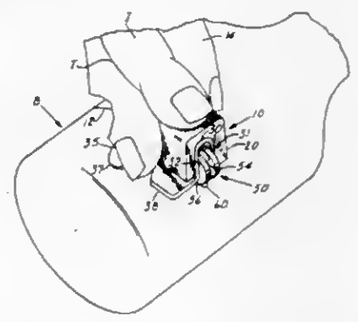
1. A cable shaving tool comprising a shaving head having a fixed portion and a relatively rotatable portion, a shaving blade mounted on the rotatable portion and rotatable therewith, means for rotating the rotatable portion which means includes gears in the shaving head and remotely located means for driving said gears, the rotatable portion including one of said gears, the shaving head and at least one gear being split on a diametrical plane, the parts being hinged together, and a releasable lock being provided to bolt together the hinged parts, means retaining the split gear portions in operative relation to the split shaving head portion, whereby the shaving head is adapted to be applied in open position to a cable to be shaved and closed around said cable with the shaving blade and gears in operative position.

4,028,801

HAND-HELD GLASS CUTTER

Ephrem J. Gelfman, R.F.D. No. 1, Sparta, Wis. 54656

Filed Apr. 12, 1976, Ser. No. 675,545
Int. Cl.² B26B *25/00*
U.S. Cl. 30—164.95 **9 Claims**



1. A hand-held glass cutter for scoring flat and curved surfaces comprising:

a housing, including finger gripping surfaces thereon and a cutter wheel support generally disposed at the bottom of said housing substantially along a central axis thereof and provided with a front portion and a rear portion;

a cutter wheel assembly including at least one rotatably journaled cutter wheel disposed at the front portion of said cutter wheel support, said cutter wheel having a sharpened cutting edge around its peripheral surface; and

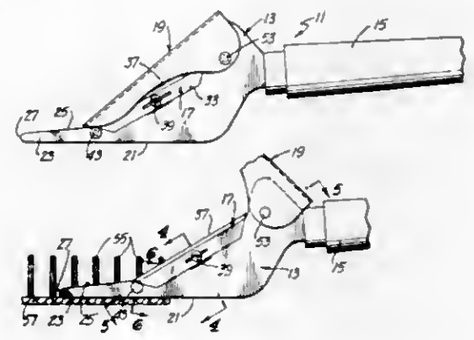
spaced support means extending downwardly from the rear portion of said cutter wheel support on opposite sides of the central axis defining laterally spaced points of support rearwardly of said cutter wheel.

4,028,802

LOOP CUTTING TOOL

George L. Houghton, Santa Ana, and Fred F. Fredensberg, Newport Beach, both of Calif., assignors to Rug Crafters, Santa Ana, Calif.

Filed Nov. 6, 1975, Ser. No. 629,325
Int. Cl.² B26B *5/00*, *29/00*
U.S. Cl. 30—294 **11 Claims**



1. A loop cutting tool for cutting loops comprising:

a body member of sheet material, said body member having

an elongated nose at one end of the body member and a guiding edge forming one edge of said nose, said nose having a second edge;

handle means on the body member at the other end thereof;

a region of the sheet material of said body member between said handle means and said elongated nose defining a blade supporting section, said blade supporting section including a side wall and a ledge and having a recess with a substantially open side with said side wall being opposite said open side and said ledge extending along an edge of the recess;

a blade having first and second opposite sides, a cutting edge, and a noncutting edge;

means for attaching said blade to said side wall with said blade being received in said recess, said first side of said blade confronting said side wall, at least a portion of said noncutting edge confronting said ledge, said cutting edge being exposed and extending substantially to the second edge, said second side of said blade being exposed through the open side of said recess, and said cutting edge forming an acute angle with said guiding edge;

means adjacent the intersection of said cutting edge and said second edge cooperating with said side wall and said ledge to define a channel for receiving the region of said blade lying closely adjacent said second edge and for preventing the material of the loops from being caught between the blade and the body member during use of the tool; and

a guard positionable over said cutting edge.

4,028,803

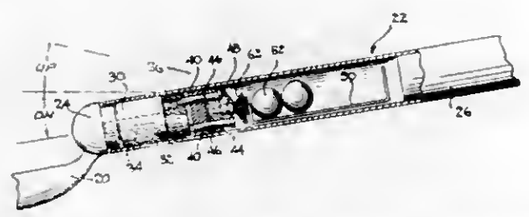
LOCKING MECHANISM

Phillip V. Currie, 19702 Sacramento Lane, Huntington Beach, Calif. 92646

Filed July 6, 1976, Ser. No. 702,418

Int. Cl.² B26B *1/04*

U.S. Cl. 30—321 17 Claims



1. A locking mechanism for controllably locking a first assembly to a second assembly against relative rotation about an axis comprising:

a first means rotationally coupled to said first assembly having a first plurality of openings distributed about said axis;

a second means rotationally coupled to said second assembly, said second means having a second plurality of openings distributed about said axis, said second plurality of openings being different in number from said first plurality of openings;

a plurality of locking members, each of said locking members being disposed in one of said openings in said second member; and

means for selectively encouraging said locking members toward engagement with said openings in said first member.

4,028,804

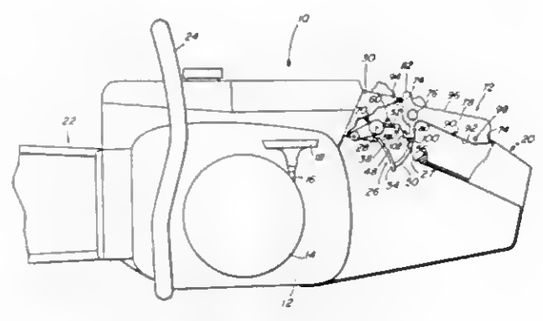
CHAIN SAW WITH THROTTLE CONTROL

Walter J. Hammond, Lakewood, Calif., assignor to McCulloch Corporation, Los Angeles, Calif.

Filed Apr. 19, 1976, Ser. No. 678,133

Int. Cl.² B27B *17/02*

U.S. Cl. 30—382 1 Claim



1. In a chain saw including

chain saw engine means;

chain saw cutter chain means;

chain saw drive means operable to provide a driving connection between said chain saw engine means and said chain saw cutter chain means;

chain saw hand grip means having spaced apart first and second exterior surfaces positioned to be engaged by an operator's hand gripping the hand grip means; and

chain saw throttle actuator means positioned adjacent said first exterior surface to be engageable by a digit of an operator's hand gripping the hand means, said throttle actuator means biased toward a first, slow engine idle position and movable, in response to pressure from said operator's digit, to open-throttle positions;

the improvement comprising a safety interlock system for preventing movement of said throttle actuator means unless an operator's hand is properly gripping said chain saw grip means, said safety interlock system comprising a

pivotally mounted stop member on said chain saw, and biasing means that bias the stop member toward a first position in which an abutment portion thereof prevents movement of the throttle actuators means from its first, slow engine idle position and in which a release portion of said stop member protrudes through an opening in said second exterior surface of said chain saw hand grip means; said stop member being movable, in response to pressure exerted on said release portion by an operator's hand gripping the chain saw hand grip means, to a second position in which said abutment portion is moved away from its first position to permit abutment of said throttle actuator in response to pressure applied by said digit of an operator and in which its abutment portion is closer to the pivot axis of the throttle actuator means than when the stop member is in its first position, thereby facilitating a compact arrangement of said throttle actuator means and said safety interlock system;

said stop member further including integral hook means for holding said throttle actuator means in a fast idle positon that is displaced from its first, slow engine idle position, said hook means being engagable with said throttle actuator means in a third position of said stop member, said stop member further including a lever portion that is accessible to the chain saw operator when the stop member is in its second position, thereby enabling an operator to move said stop member to its third position said lever portion is located with respect to said hand grip means so as to be movable by another digit of the operator's hand that grips the hand grip means, thereby enabling a single hand of the operator to cause engagement of said throttle actuator means with said hook means.

4,028,805

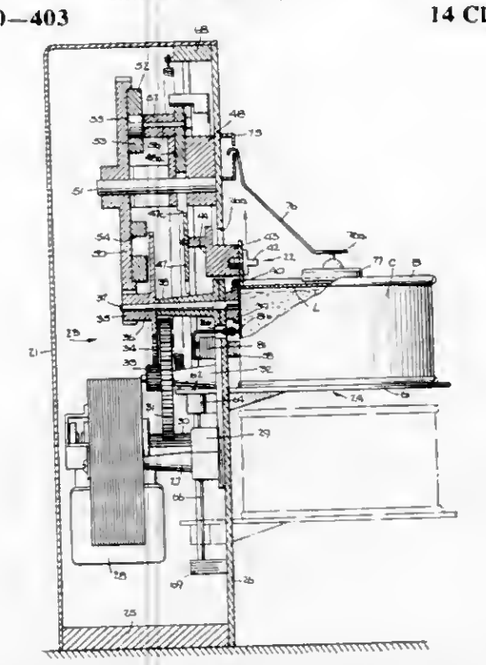
CAN OPENER

Anthony G. Figlia, Rego Park, N.Y., assignor to F. G. Walde, Inc., New York, N.Y.

Filed Aug. 30, 1976, Ser. No. 718,766

Int. Cl.² B67B *7/38*

U.S. Cl. 30—403 14 Claims



1. A can opener for use with hermetically sealed cans of foodstuffs and other materials, comprising a cutter blade mounted for reciprocal movement into and out of a cutting location, motor means for revolving a can to be opened when the same is disposed at said cutting location, power means operable conjointly with said motor means for sequentially reciprocally displacing said cutter blade so as to first force said cutter blade through the lid of said can concomitantly with the revolution thereof and, after the lid has been severed, then retract said cutter blade from said can to release the latter, and a platform structure for yieldingly supporting the opened can upon release thereof and for displacing it away from said cutting location while retaining it secure until removed by the user.

4,028,806

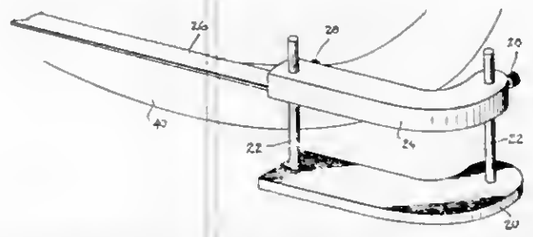
LAYERING KNIFE ASSEMBLY

Allen Sheldon, 1818 S. Barry Ave., Apt. No. 111, Los Angeles, Calif. 90025

Filed Feb. 20, 1976, Ser. No. 659,928

Int. Cl.² B26B *29/00*

U.S. Cl. 30—290 5 Claims



1. A knife assembly for slicing baked goods, fruits, vegetables and the like comprising:

a knife having a handle portion coupled to an elongated knife blade;

a base assembly, said base assembly having a bottom surface for resting on and sliding over a substantially flat work surface, said base assembly further having base slide means comprising a pair of cylindrical posts disposed in a parallel spaced apart disposition which are generally directed upward and perpendicular with respect to said bottom surface, said handle portion of said knife having handle slide means comprising a pair of holes through said handle for providing a slip fit on said cylindrical posts, said base slide means and said handle slide means being cooperative means to allow said knife to be slideably disposed on said base assembly with said knife blade substantially parallel to said bottom surface and at more than one elevation; and

means for locking said slide means and said handle slide means with respect to each other for disposing said knife blade at a selected elevation, wherein said knife assembly with said knife blade fixed at a particular elevation may be slid over work surface, thereby imparting a cutting motion to said knife blade.

4,028,807

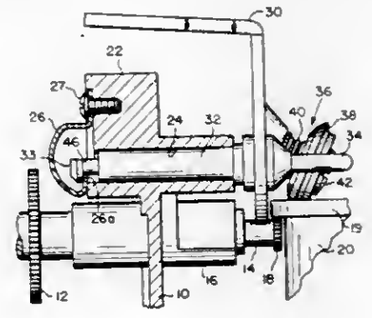
CAN OPENER LATCH FOR RELEASING CUTTING ASSEMBLY

Richard E. DeSisto, and Murray M. Mikituk, both of Welland, Canada, assignors to General Signal Corporation, Rochester, N.Y.

Filed Jan. 8, 1976, Ser. No. 647,389

Int. Cl.² B67B *7/38*

U.S. Cl. 30—419 16 Claims



1. In a can opener mechanism having a frame member, a drive wheel, a means for rotating said drive wheel and in combination therewith:

a. a hand lever carrying a cutting element and a shaft;

b. said shaft coupled to said hand lever at one end and having an undercut section proximate to the other end thereof;

c. a bore in said frame member for journaling said shaft;

d. a keeper intersecting a portion of said bore and supported for movement away from intersection with said bore in response to insertion of said shaft into said bore and then to return to intersection with said bore for engagement with said undercut section to inhibit axial removal of said shaft; and wherein

e. said shaft has a segment removed therefrom between said undercut section and said other end for enabling axial removal of said shaft only when said shaft is in a predetermined angular orientation such that the removed segment creates a condition of non-engagement between said keeper and said shaft.

4,028,808

CROZAT APPLIANCE AND METHOD OF MANUFACTURING SAME

Robert Schwartz, 1271 Westfield Ave., Rahway, N.J. 07065

Filed May 17, 1974, Ser. No. 470,732

Int. Cl.² A61C *7/00*

U.S. Cl. 32—14 E 5 Claims

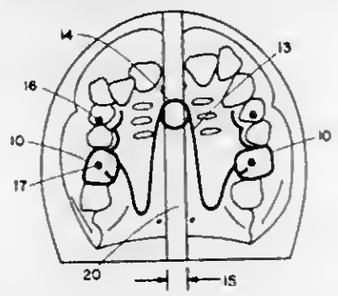
1. A method of fabricating a Crozat appliance useful in the treatment of dental malocclusion which comprises:

a. longitudinally sectioning a dental cast to form lateral cast halves;

b. restructuring said cast halves by locating said cast halves laterally of each other such that the cross-arch width distance between anatomical features of said cast halves

correspond substantially to the cross-arch width distance of an ideal arch structure; and

c. constructing a Crozat appliance in substantial conformance to said reconstructed cast comprising forming clasp means having anterior and interior portions to engage at least a portion of the outer periphery of a molar or



premolar on each side of the arch of said reconstructed cast and interconnecting the interior portions of said clasp means with a body wire, said body wire having an essentially flat spiral spring formed in a segment thereof and adapted to exert a spring extension force against said clasp means.

4,028,809

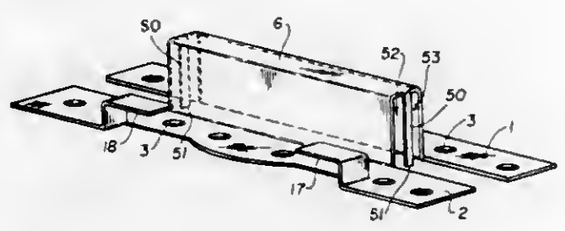
BUCCAL END TUBE

Melvin Wallshein, 8645 Bay Parkway, Brooklyn, N.Y. 11214

Continuation-in-part of Ser. No. 574,569, May 5, 1975, Pat. No. 3,988,831. This application Mar. 30, 1976, Ser. No. 672,012

Int. Cl.² A61C *7/00*

U.S. Cl. 32—14 A **18 Claims**



1. A buccal end tube device for selectively orienting an orthodontic arch wire relative to a tooth, the buccal end tube device being adapted for mounting to a buccal surface of the tooth, the device comprising: at least two arch wire positioning means spaced apart from each other in the axial direction of said buccal end tube, one of said arch wire positioning means defining at least one aperture and the other of said arch wire positioning means defining at least two apertures which are spaced apart from each other in the occlusal-gingival direction, said apertures being adapted to receive spaced portions of the arch wire, said other of said arch wire positioning means comprising a dividing tab member connected to said buccal end tube forming means and extending across said buccal end tube in a direction substantially perpendicular to the occlusal-gingival direction of said tube, said dividing tab member cooperating with said buccal end tube for defining at least two apertures spaced apart from each other in said occlusal-gingival direction, whereby the arch wire may be disposed in a predetermined orientation within an occlusal gingival plane by positioning the arch wire in selected apertures of said at least two spaced apart arch wire positioning means and maintained in the selected orientation against the action of external forces applied both to the arch wire and to the buccal end tube device.

4,028,810

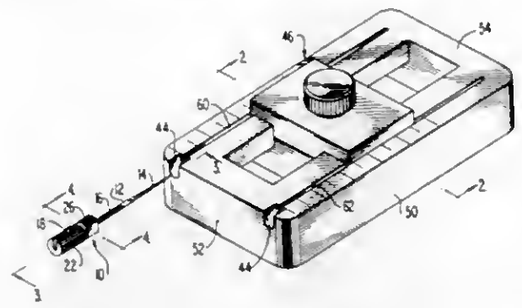
ROOT CANAL FILE

Bobby C. Vice, Augusta, Ga., assignor to Karl F. Klnkel, Augusta, Ga.

Filed Aug. 11, 1975, Ser. No. 603,470

Int. Cl.² A61C *5/02*

U.S. Cl. 32—57 **3 Claims**



1. An apparatus for determining the working length of a root canal file assembly of the type in which an elongated file has its shaft releasably mounted in a chuck of a handle assembly adapted to clamp the shaft in any desired position, said chuck including a nut threaded onto movable jaws of the handle assembly and operable to clamp and unclamp said shaft, the improvement wherein said apparatus comprises a body member, a measuring scale fixed on said body member, stop means mounted on said body member for movement along said scale, means releasably fixing said stop means in any desired position of adjustment along said scale, an elongated groove in said body and extending along said scale from said shoulder means, said groove being dimensioned to receive said root canal file therein, and jig means on said body for receiving said nut and cooperating therewith to prevent rotation thereof upon rotation of said handle assembly, said jig means including shoulder means for fixing the position of said nut relative to said scale and in alignment with said stop.

4,028,811

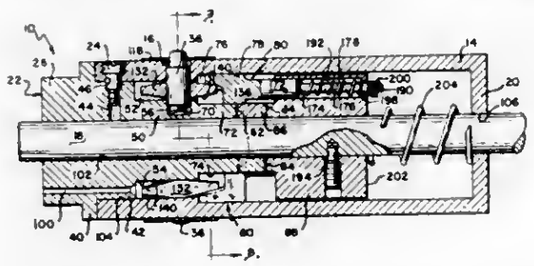
TUBULAR GAGE FOR A LIQUID-METAL-COOLED FAST BREEDER REACTOR

Ernest Hutter, Wilmette, and Leroy A. Tuma, Naperville, both of Ill., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Mar. 2, 1976, Ser. No. 663,179

Int. Cl.² G01B *3/00*; **G21C** *17/00*; **G01B** *5/12*

U.S. Cl. 33—174 L **10 Claims**



1. A gage for measuring internal dimensions of a polygonal tube comprising:

a housing;

means cooperating with a female socket at one end of the polygonal tube to center the housing within the polygonal tube;

a rod moveable axially within the housing;

a plunger for each side of the polygonal tube disposed radially about the axial rod and extending through holes in the housing to contact the sides of the polygonal tube;

plunger springs disposed to urge the plungers outwardly against the sides of the polygonal tube;

a locking cam including an opening therethrough surrounding each plunger; and

means responsive to axial movement of the rod for tilting the locking cam to lock the plungers in any position against the action of the plunger springs.

4,028,812

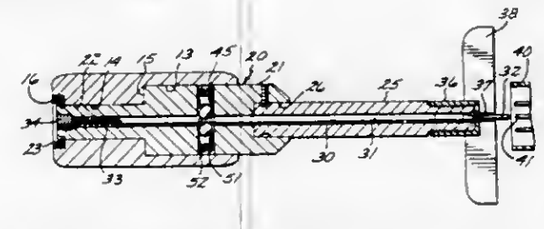
CONTACT RETENTION TEST TOOL

Russell F. Fleberg, 5431 Cerulean Ave., Garden Grove, Calif. 92645

Filed Jan. 21, 1976, Ser. No. 651,121

Int. Cl.² G01B *3/28*; **G01N** *3/14*

U.S. Cl. 33—169 B **8 Claims**



5. Apparatus for checking the insertion alignment of pins in a connector having peripheral edges, comprising:

a cylindrical probe;

handle means including a central bore for partly receiving said cylindrical probe on the interior thereof;

a peripheral groove formed around the exterior of said handle means;

a plurality of bores communicating between said groove and said central bore;

a peripheral ball seat formed on said probe in underlying proximity with said bores;

a corresponding plurality of balls received in said bores;

urging means disposed in said groove and bores for urging said balls against said probe; and

advancing means mounted in said handle for urging said probe out of said handle.

4,028,813

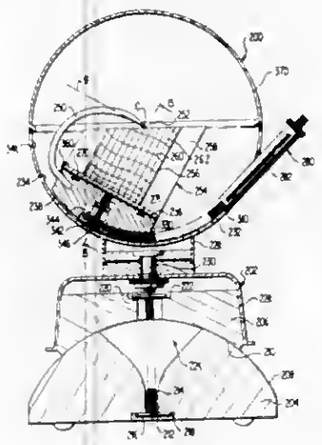
SUN COMPASS

Albert M. Eldridge, 4711 Chaperro Trail, Austin, Tex. 78731

Continuation-in-part of Ser. No. 577,176, May 14, 1975, abandoned. This application Oct. 22, 1975, Ser. No. 624,904

Int. Cl.² G04B *49/02*, *49/04*

U.S. Cl. 33—270 **16 Claims**



5. A manually portable sun-actuated instrument comprising:

a base including a hemispherical base member, said member presenting a hemispherical support surface;

a body including a curved bottom wall corresponding to the shape of said support surface and seated thereon;

a plate being mounted for movement on said body, said plate including a cylindrically curved face of fixed radius;

a plurality of generally parallel equally spaced time lines designating the hours of the day, said time lines being disposed on said face and extending generally longitudinally of the longitudinal axis of said face;

a gnomon connected to said body and having a tip substantially coinciding with the center of said hemispherical member and cylindrical a shadow on said cylindrical face dependent upon the hour angle and declination of the sun;

the tip of said gnomon casting a shadow which, upon falling on or between said time lines at a location corresponding to the time of day indicates that the longitudinal axis of said plate and the polar axis of the earth together define a plane extending essentially north and south through the earth;

first guide means, on one of said body and said plate and engaging the other thereof, for guiding said plate for movement in a first predetermined path along said body;

second guide means, on one of said body and said base member and engaging the other thereof, for guiding said body for movement in a second predetermined path on said hemispherical support surface;

first adjusting means manually accessible externally of said hemispherical base member and operatively connected to said body to shift said body along said second path to adjust the latitudinal position of said plate;

second adjusting means manually accessible externally of said hemispherical base member and operatively connected to shift said plate along said first path to adjust the longitudinal position of said plate;

a transparent hemispherical top rotatably mounted on said hemispherical base member, said transparent top having an arc line which bisects said top, the ends of which arc intersect a 360 degree indicia scale situated around the upper edge of said hemispherical base member at points spaced 180° apart.

12. A manually portable sun-actuated instrument comprising:

a body;

a cylindrical plate mounted on said body, said plate including a pair of cylindrical, mutually spaced inner and outer walls formed of transparent material and defining a chamber therebetween;

said chamber being partially filled with a quantity of opaque, essentially cling-free liquid;

a plurality of time lines designating the hours of the day, said time lines being disposed on one of said walls; and

a gnomon connected to said body and having a tip substantially coinciding with the center of said cylindrical plate and casting a shadow on said cylindrical plate dependent upon the hour angle and declination of the sun;

the tip of said gnomon casting a shadow which, upon falling on or between said time lines at a location corresponding to the time of day indicates that the longitudinal axis of said plate and the polar axis of the earth together define a plane extending essentially north and south through the earth.

4,028,814

PIVOTING RULE

Peter Andrews, 190 Gebhardt Road, Penfield, N.Y. 14526

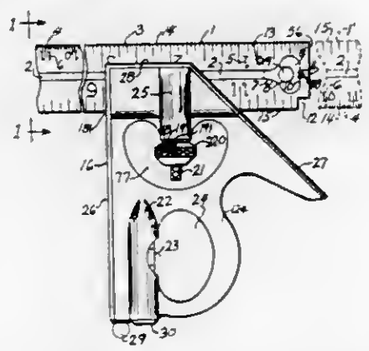
Continuation-in-part of Ser. No. 13,015, Feb. 20, 1970, abandoned, which is a continuation-in-part of Ser. No. 699,199, Jan. 19, 1968, Pat. No. 3,510,950, which is a continuation-in-part of Ser. No. 167,609, Jan. 24, 1962, Pat. No. 3,364,581. This application June 28, 1971, Ser. No. 157,774

Int. Cl.² B43L *7/06*

U.S. Cl. 33—94 **15 Claims**

1. A rule member for a subcombination head means of a combination tool means, comprising: an elongated graduated and groove rule member having graduations and corresponding indicia along at least one longitudinal face edge portion

thereof; said member having a longitudinally extending groove in at least one face edge portion thereof and an enlarged opening is provided in at least one said face edge portion of said member and having said groove terminating into said opening for forming an enlarged dead-end portion of said groove terminating a short-distance from an outer edge portion of said member while a second end of said groove having an open-end and substantially exiting through one portion of a second end edge portion of said member wherein a second enlarged opening is provided in at least one face edge portion of said member and being spaced a short-distance from said second end edge portion of said member and having said groove leading substantially into and out of said second opening for forming a short groove on one side of said second opening; said member is so constructed that when at least one portion of a nib means of a grooved rule releasably clamping means is slidingly engaged in at least one portion of said



groove for being, in one operation, either substantially slidingly engaged in said dead-end portion of said groove for allowing said member to be substantially pivoted 180° substantially on said nib means and substantially in said head means for presenting a different set of said graduations and said indicia to at least one side edge portion of said head means or be slidingly slipped substantially through said second end edge portion of said member and out of said open-end of said groove for slidingly disconnecting said head means substantially along an axial length of said groove and from said member and without disassembling any portion of said rule releasably clamping means for releasably clamping said member substantially to said head means and said member can be substantially pivoted 180° on either end thereof by use of said enlarged openings and when said nib means is engaged therein and which nib means may also be slidingly slipped out through said short groove for disconnecting said member from said head means.

4,028,815

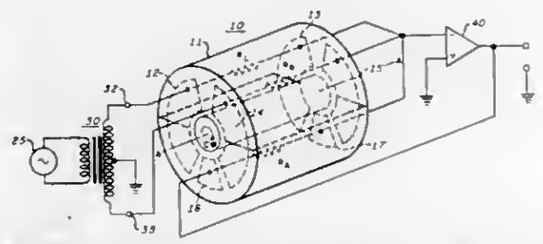
TEMPERATURE COMPENSATED TOROIDAL ACCELEROMETER

Charles G. Buckley, Phoenix, Ariz.; Ghanshyam A. Bhat, Matawan, N.J., and Harold L. Swartz, Glendale, Ariz., assignors to Sperry Rand Corporation, New York, N.Y.

Filed Nov. 18, 1974, Ser. No. 524,594

Int. Cl.² G01C *9/06*

U.S. Cl. 33—366 **13 Claims**



1. An electrical tilt sensor of the liquid level type having a normal tilt range comprising

non-conductive housing means defining a closed chamber of generally annular, symmetrical internal configuration about a reference axis corresponding to the horizontal axis of the sensor,

first and second electrode means fixed in said housing means and oppositely disposed with respect to each other about said axis,

third electrode means fixed between said first and second electrodes within said housing means,

fourth electrode means fixed in said housing means having corresponding portions equidistant from said first, second and third electrode means respectively,

electrolytic fluid means having volumetric and impedance characteristics which vary with ambient temperature, partially filling said chamber, partially immersing said first, second and said corresponding portions of said fourth electrode means, and completely immersing said third electrode means and said corresponding portion of said fourth electrode means for the normal tilt range of the sensor, and

circuit means coupled to said first, second, third and fourth electrode means respectively for providing an output signal proportional to the tilt of said sensor about said reference axis in accordance with the relationship:

$$\theta = R_A \left(\frac{1}{R_L} - \frac{1}{R_R} \right)$$

θ is the tilt angle,

R_L is the electrolyte resistance between said first and fourth electrode means,

R_R is the electrolyte resistance between said second and fourth electrode means, and

R_A is the electrolyte resistance between said third and fourth electrode means,

whereby said output signal is compensated for variations in volume and impedance of said electrolytic fluid means produced by changes in temperature.

4,028,816

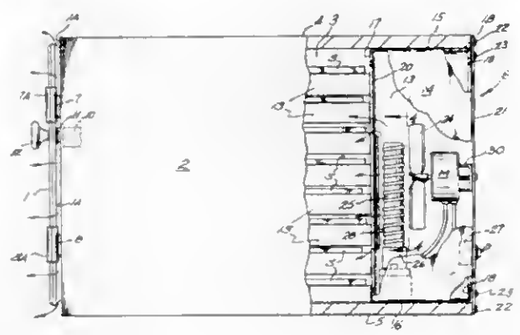
FOOD DRYER

Frank D. Macy, 420 S. Holly, Canby, Oreg. 97013; Harold E. Hawthorne, 401 N. James, and Harold L. Norton, Rte. 1, Box 291B, both of Silverton, Oreg. 97381

Filed Dec. 12, 1975, Ser. No. 640,178

Int. Cl.² F26B *11/18*

U.S. Cl. 34—195 **5 Claims**



1. A food dryer comprising in combination,

a dryer cabinet,

a door supported by the front end of said cabinet,

means mounting the door to said front end of said cabinet in a uniformly offset manner to provide an exhaust passageway extending about the door edges, and

a noncombustible housing module fully occupying the rearward end of said cabinet, said housing adapted to mount electrical components including a fan and motor of the dryer in a manner isolating said components from the cabinet, said housing having a reticulated closure at its forward end.

4,028,817

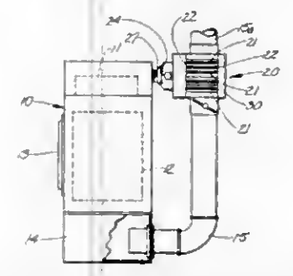
APPARATUS FOR RECOVERY OF HEAT FROM EXHAUST GASES OF DRYER

Frank H. Winstel, Newtown, Ohio, assignor to Auto-Heat, Inc., Cincinnati, Ohio

Filed Sept. 29, 1975, Ser. No. 617,747

Int. Cl.² F26B *19/00*

U.S. Cl. 34—86 **1 Claim**



1. Apparatus for recovery of heat in a laundry dryer having a heat chamber means, a drying chamber, a lint removal chamber, and an exhaust conduit, comprising:

heat exchange means positioned in said exhaust conduit, said heat exchange means including a plurality of tubes open to a source of fresh air at one end thereof, means securing said tubes in spaced apart, substantially parallel staggered relation transverse to flow of heated exhaust gases through said exhaust conduit and preventing escape of said exhaust gases from said exhaust conduit, a helically twisted elongated strip inside each said tube;

suction fan means adjacent the other ends of said plurality of tubes to draw fresh air through said tubes, said fresh air being heated in transit by said exhaust gases;

plenum means surrounding said fan means and communicating with said other ends of said tubes for receiving said fresh air drawn therethrough while preventing intermingling of said exhaust gases therewith;

conduit means communicating with said plenum means for conducting said heated fresh air into said heat chamber means or into said drying chamber of said dryer;

first damper means in said exhaust conduit regulating the flow of exhaust gases therethrough; and

second damper means in said conduit means regulating the flow of heated fresh air therethrough.

4,028,818

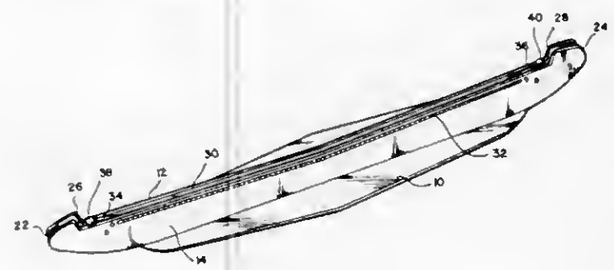
TRACKED INCLINE TEACHING APPARATUS

H. Burt Warner, 1713 S. Walnut Leaf Drive, Walnut, Calif. 91789, and Earl Cameron Kruger, Jr., 5601 Sorrento Drive, Long Beach, Calif. 90803

Filed Oct. 29, 1976, Ser. No. 736,915

Int. Cl.² G09B *23/10*

U.S. Cl. 35—19 R **12 Claims**



1. A tracked incline teaching apparatus for illustrating the laws of physics by facilitating the observation of movement of balls on an incline, comprising: a pair of spaced apart members defining a track for said balls in the shape of two declivities of equal length, slanting toward each other at symmetrical angles of inclination with respect to a horizontal plane, and a center portion smoothly joining said declivities, a detent disposed on each of the opposite ends of said track and movable between a first, ball-retaining position and a second position for release of balls placed thereon for movement of said balls along said track in the direction toward each other, and trigger means for synchronously simultaneously moving said detents from said first to said second position.

4,028,819

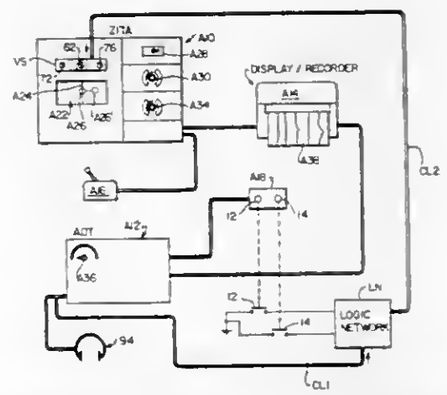
METHOD FOR MEASURING TASKS AND MEANS FOR GENERATING COORDINATED AUDIO-VISUAL STIMULI AND ERROR INDICIA FOR SAID SECONDARY TASKS

Norman K. Walker, 6613 Sulky Lane, Rockville, Md. 20852

Filed July 12, 1974, Ser. No. 488,072

Int. Cl.² G09B *19/00*

U.S. Cl. 35—22 R **11 Claims**



1. Means for generating multiple modes of command stimuli for dictating performance of specific tasks and monitoring the correctness of responses thereto, comprising:

clock pulse generating and timing means providing clock pulses and timing signals at regular predetermined intervals;

random stimuli selection signal generating means enabled by said timing signals from said timing means to provide first and second stimuli selection signals at regular intervals and in random sequence;

first and second signal generating means providing first and second audio output frequencies, respectively;

gate means having inputs driven by said timing means, said first and second audio outputs and said first and second random stimuli selection signals and selectively enabled thereby to pass said first and second audio outputs in random sequence at regular intervals;

audio output means in circuit with said gate means driven by and providing first and second discernible tones in response to said audio output frequencies;

first and second light emitting means in circuit with said random stimuli selection signal generating means energized, respectively, by said first and second stimuli selection signals and in synchronous correlation, respectively, with said first and second discernible tones to produce first and second visual stimuli such that related ones of said tones and said visual stimuli provide a dual command stimulus for a given task to be performed;

response means comprising first and second input devices to be actuated in response to and in correlation with said first and second discernible tones and/or said first and second visual stimuli;

detector circuit means enabled by said timing means and responsive to the actuation of said first and second input

devices to provide first and second response signals, respectively;

error detecting gate means having respective inputs enabled by said clock pulse means, said first and second random selection signals and said first and second response signals providing an error output in response to errors comprising a lack of actuation of either of said input devices within said regular predetermined interval between said clock pulses and said tones and/or visual stimuli and in response to actuation of said input devices out of correlation with said tones and/or visual stimuli; and

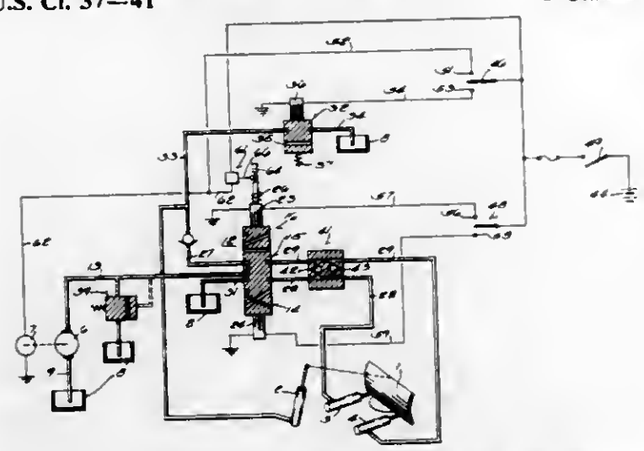
indicating means responsive to said error output to indicate the occurrence of a said error.

4,028,820

HYDRAULIC SVSTEM FOR VEHICLE MOUNTED SNOWPLOW BLADE

George D. Simonds, Jr., Mequon, Wis., assignor to Douglas Dynamics Corporation, Milwaukee, Wis.

Filed Dec. 31, 1975, Ser. No. 645,512
Int. Cl.² E01H 5/00; E02F 3/76
U.S. Cl. 37—41 **3 Claims**



1. A hydraulic system for selectively raising, lowering, and angling a snowplow blade and comprising, in combination,

lift means in the form of a first single acting hydraulic cylinder,

angle means in the form of second and third single acting hydraulic cylinders,

a pump,

hydraulic fluid reservoir,

conduit means connecting said pump, reservoir, lift means and angle means for transferring fluid between said reservoir and said lift and angle means,

a single valve connected in said conduit means and controlling power fluid flow from said reservoir to said lift means and angle means,

said valve having a plurality of operative states, a first operative state connecting said pump to said lift means and being movable from said first state to connect said pump to said angle means,

actuating means connected to said valve for manipulating said valve to achieve a selective one of said operating states,

valve means separate from said single valve,

conduit means defining a flow from said lift cylinder through said valve means to said reservoir separate from said single valve,

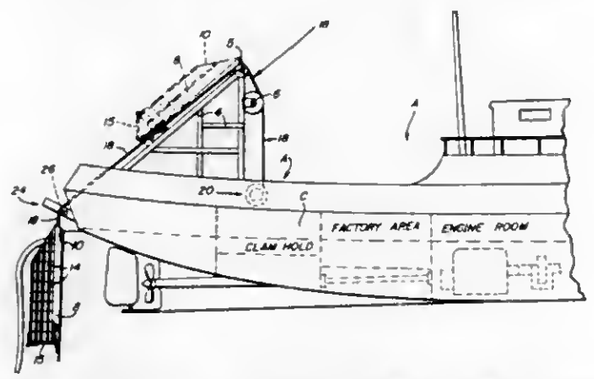
and actuating means for said valve means selectively operable to close said valve means and interrupt flow to said reservoir and open said valve means to permit flow to said reservoir.

4,028,821

APPARATUS FOR DREDGING FROM THE STERN OF MARINE VESSELS

Fletcher Hanks, Hanks Seafood Co., Inc., P.O. Box 70, Easton, Md. 21601

Continuation-in-part of Ser. No. 442,604, Feb. 14, 1974, abandoned. This application July 1, 1975, Ser. No. 592,224
Int. Cl.² E02F 5/00
U.S. Cl. 37—55 **9 Claims**



1. The combination with a marine vessel having a bow-wise inclined ramp mounted adjacent its stern, of a scoop-type dredge for shell fish etc.,

said dredge comprising a generally rectangular water-pervious cage having a leading open end for scooping-up shell fish etc.,

a gate mounted at the trailing end of said cage and adapted for free swinging movement about a horizontal axis from a pivotal connection with said cage,

a pair of substantially spaced and transversely parallel cable receiving blocks attached to said cage adjacent its leading end

a reciprocable support mounted on said vessel and, disposed beneath said ramp

said support including a pair of rigidly connected, Y-shaped elements with their diverging members extending sternwise and upwardly inclined with respect to said vessel

a sheave mounted at the intersection of the, diverging members of each of said rigidly connected Y-shaped elements

a fluid cylinder mounted on said vessel to extend, fore-and-aft with the outer end of its piston rod operatively connected to said support

a winch, mounted on said vessel

a cable having both of its ends secured to said winch

said cable defining a loop which extends through the cable receiving blocks adjacent the leading end of the aforementioned cage and,

means mounted on said vessel for guiding the intermediate portions of said cable between said winch and the aforementioned blocks on said cage.

4,028,822

MANUALLY OPERABLE DEPTH CONTROL FOR TRENCHERS

Ted L. Teach, Dayton, Ohio, assignor to Laserplane Corporation, Dayton, Ohio

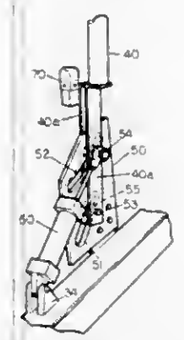
Filed Apr. 20, 1976, Ser. No. 678,694
Int. Cl.² E02F 5/06; B27G 23/00
U.S. Cl. 37—86 **5 Claims**

1. In a trencher of the type having an elongated digging frame having one end thereof pivotally mounted on a vehicle for movement in a vertical plane parallel to the path of movement of the vehicle, said digging frame having two spaced sprockets traversed by an endless chain carrying a plurality of spaced digging scoops, means on the vehicle for driving the forward sprocket and power means on the vehicle for varying the pivotal angle of said digging frame relative to the horizontal, thereby determining the depth of the trench being dug by said blades, the improvement comprising:

1. stationary sighting bar means disposed along the path of travel of the vehicle, said means defining a visual plane of known height relative to the desired depth of the trench to be dug;

2. an upstanding mast having its bottom end pivotally mounted on said digging frame adjacent the free end thereof for movement in a vertical plane;

3. means for maintaining said mast in a true vertical position irrespective of the angular position of said digging frame,



said last mentioned means concurrently effecting a change in the effective height of said mast as a trigonometric function of the angle of said digging frame relative to the true horizontal and,

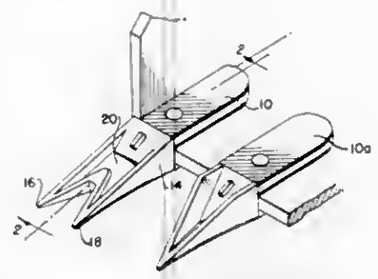
4. a horizontal sighting bar vertically adjustably mounted on said mast to permit said bar to be visually aligned with said stationary sighting bar means when said digging frame is initially forced into the ground to the desired starting depth for the trench to be dug.

4,028,823

DIGGING TOOTH

Gerald D. Edwards, Rte. 1, Box 15a, Dubberly, La. 71024, and Floyd B. Edwards, Rte. 3, Box 436, Canton, N.C. 28716

Filed Oct. 31, 1975, Ser. No. 627,686
Int. Cl.² E02F 9/28
U.S. Cl. 37—142 R **3 Claims**



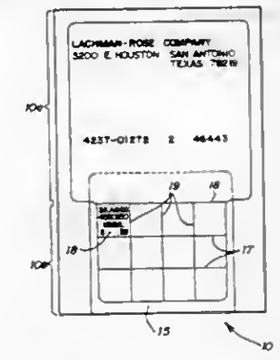
1. A tooth for a power digger having a socket to receive a shank mounted on a digging bucket or the like comprising a rearward portion in which the socket is formed and a forward portion, a top, a bottom and two side surfaces, said top surface sloping downwardly to meet said bottom surface at the forward end of said forward portion, said forward portion comprising two elongated forwardly extending points separated by a cleft, the outer sides of said tooth points being substantially parallel. Said top surface being also formed with a depression extending across said rearward portion and having a portion of said depression extending forwardly in the top surfaces of said elongated points whereby the tooth presents a generally W form when viewed from a position toward which it is moved when in use.

4,028,824

MAILING-PRICE LABEL

Harold R. Miller, Ferris, Tex., assignor to Data Documents, Inc., Dallas, Tex.

Filed Oct. 18, 1976, Ser. No. 733,165
Int. Cl.² A44C 3/00
U.S. Cl. 40—2 R **6 Claims**



1. A mailing-price tag label which comprises:

a blank of two adjacent substantially rectangular areas one of which is of width greater than the second so as to extend beyond opposed edges of the second area, said blank having an adhesive coated back surface,

a peelable backing paper overlaying and protecting said adhesive coated back surface, and

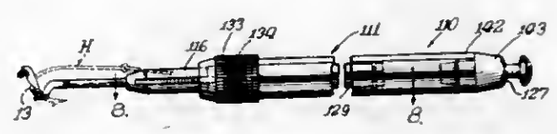
said backing paper being cut into two sections and with one section overlaying the second area of the blank and extending into the section overlaying the first area for removal from the back paper from the first area independently of removal from said first area.

4,028,825

FISH HOOK REMOVER

Siegfried K. Tetzner, 5307 W. Lake Shore Drive, Wonder Lake, Ill. 60097

Filed July 18, 1975, Ser. No. 597,040
Int. Cl.² A01K 97/00
U.S. Cl. 43—53.5 **14 Claims**



1. A tool for removing from a fish a barbed hook attached to line, comprising: means defining a handle portion; and a generally helical extractor portion extending axially forwardly from one end of said handle, said extractor portion having a forward helical surface defining a distal end and a forwardly opening notch intetrally formed in said extractor portion surface adjacent said distal end for receiving the bight of a hook being removed from a fish, said notch being defined by a helically rearward stop surface extending generally parallel to the axis of the extractor portion and a forward guide surface extending at a small angle to the helical extent of the extractor portion forward helical surface for guiding the hook bight into abutment with said stop surface as an incident of manipulation of the handle rotatively about said axis with the extractor portion urged forwardly against the bight and coaxially of the shank of the hook being removed from the fish.

2. A tool for removing from a fish a barbed hook attached to a line, comprising: means defining a handle portion; and a generally helical extrator portion extending axially forwardly from one end of said handle, said extractor portion having a forward helical surface defining a distal end and a forwardly opening notch integrally forced in said extractor portion surface adjacent said distal end for receiving the bigbt of a hook

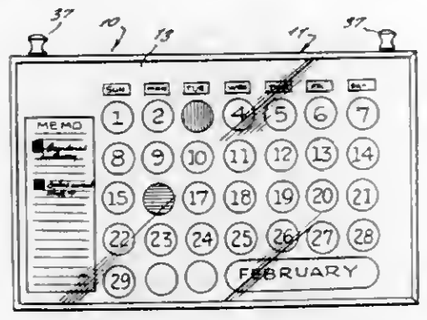
being removed from a fish and at least one additional notch in said extractor portion surface helically from said first named notch.

4,028,826

PERPETUAL MEMORY BANK CALENDAR

Angelo Brandifino, and Frances Brandifino, both of 10 Sheridan St., Huntington, N.Y. 11743

Filed Mar. 15, 1976, Ser. No. 666,863
Int. Cl.² G09D *3/00*
U.S. Cl. 40—110 **1 Claim**



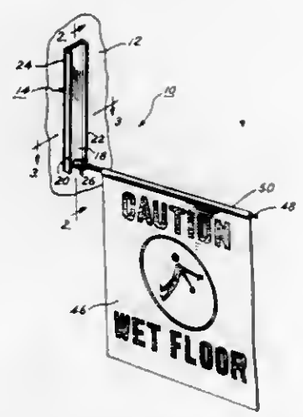
1. A perpetual memory bank calendar, comprising in combination, a case consisting of a frame fitted with front window and rear panel enclosing a central chamber containing removable six month cards each having a name of a different month imprinted on each side thereof, said month card sides being selectively placable in said chamber to face said window, wherein each said month card side additionally includes imprinted thereupon the numerical dates of said month, arranged in rows, each said month card side additionally includes a memorandum space for being written upon by an erasable marker, a surface of each said month card side being glazed, wherein a mechanism inside said case includes an endless belt having names of the days of a week imprinted thereupon, said belt being movable for alignment of said day names respective to said numerical dates on said month card sides wherein different colored stickers of self adhesive type are mounted upon said month card sides and corresponding to stickers on said memorandum space and over said numerical dates.

4,028,827

SIGN

Austen B. Hufton, Glen Ellyn, Ill., assignor to Servicemaster Industries Inc., Downers Grove, Ill.

Filed Jan. 15, 1976, Ser. No. 649,270
Int. Cl.² G09F *7/22*
U.S. Cl. 40—128 **3 Claims**



1. An improved warning sign which may be quickly and easily mounted on and dismounted from a metal doorframe or the like in an institutional building, such as a hospital, for the purpose of alerting persons to temporary, potential hazards relating to maintenance work and the like begin done in the vicinity, the improved warning sign comprising:

a base member having first and second, parallel, generally rectangular surfaces which are substantially flat and which are disposed back to back to each other and having integral, longitudinal, lateral edges which are disposed substantially perpendicular to the planes of the first and second surfaces and which project from the plane of the second surface, the first surface being adapted to face the metal doorframe and the second surface being adapted to face away from the metal doorframe when the sign is mounted on the metal doorframe;

means for mounting the base member on the metal doorframe, the mounting means including a magnet which is secured to the first surface of the base member and which has a size and shape so that the magnet overlies substantially all of the first surface and so that when the first surface faces the metal doorframe, the magnet is adjacent to and in contact with the metal doorframe;

an elongated, telescopable rod which has a first end and a second end and which is constructed so that its second end may be selectively moved longitudinally with respect to its first end so as to permit the length of the elongated, telescopable rod to be varied;

a rod end holder integrally formed as a part of the base member, adjacent to one end of the base member, for selectivity receiving and holding the first end of the elongated, telescopable rod so that when the first end of the elongated, telescopable rod is being held by the rod end holder, the elongated, telescopable rod extends and projects from the second surface of the base member at a preselected, acute angle with respect to the second surface of the base member;

a piece of material having a cautionary warning message thereon; and

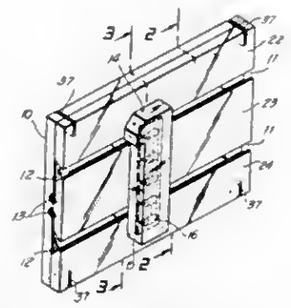
means for selectivity mounting the piece of material on the elongated, telescopable rod at a point between the first and second ends of the elongated, telescopable rod.

4,028,828

LIGHTING DISPLAY SYSTEM

Albert Chao, and Ethel Chao, both of 407 Glendale Road, Northvale, N.J. 07647

Filed Apr. 2, 1976, Ser. No. 673,307
Int. Cl.² G09F *13/00*
U.S. Cl. 40—130 D **2 Claims**



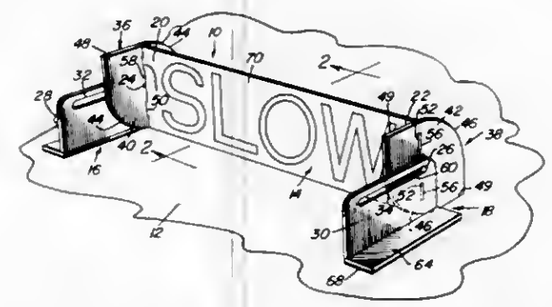
1. A lighting display system comprising; a display board to be supported on a wall, desk, or other surface; and a set of letters, numerals, or other characters to be secured to said display board for illumination; said characters comprise a hollow molded translucent top and a flat base of matching configuration having a printed circuit on the top surface thereof; illumination means comprising miniature light bulbs mounted on said top surface of said flat base; said display board having two channels running longitudinally across the surface thereof, conductive strips at the base of each channel and running the length of said channels; said conductive strips attached to sockets at each end of the display board; said sockets thereof are used for connection to an electrical supply or for connecting successive display boards to each other conductive extensions on the rear surface of said base character of a shape complementary to the shape of said channels; said extensions fitting securely in said channels and making adequate electrical connection with said conductive strips in said channels, connecting pins for carrying power from one display board to the next; said connecting pins are conductive and fit into said sockets on adjoining lateral edges of connecting display boards; said connecting pins being removable when unnecessary; clips to strengthen the joint of adjoining boards and slots provided across the top and bottom edges at each end of the display boards; said clips are attached to the adjoining display boards at the top joints and have extensions which fit into said slots on the top and bottom edge of each display board to provide lateral and vertical support to the joint.

4,028,829

WARNING DEVICE FOR VEHICLES

Michael F. Murray, 189 Cedar Ave., Oroville, Calif. 95965

Filed May 5, 1975, Ser. No. 574,322
Int. Cl.² G09F *7/00*
U.S. Cl. 40—129 C **8 Claims**



1. An inertia-actuated warning signal device for vehicles, comprising, in combination:

a. an inertia member; and

b. support means arranged on a vehicle for mounting the inertia member for limited reciprocating movement in a path extending along a direction of motion of the vehicle during deceleration and acceleration of the vehicle, and for rotating movement about the path of movement simultaneously with movement along the path of movement, and the inertia member is a longitudinally extending planar member having longitudinally spaced ends, and trunnions extending coaxially in opposite directions from the spaced ends, and the support means includes a pair of spaced, substantially parallel, upstanding panels, each of the panels provided with a longitudinal support slot arranged substantially parallel to each other and extending parallel to the direction of movement of the vehicle, the trunnions being disposed in the slots for sliding movement therein.

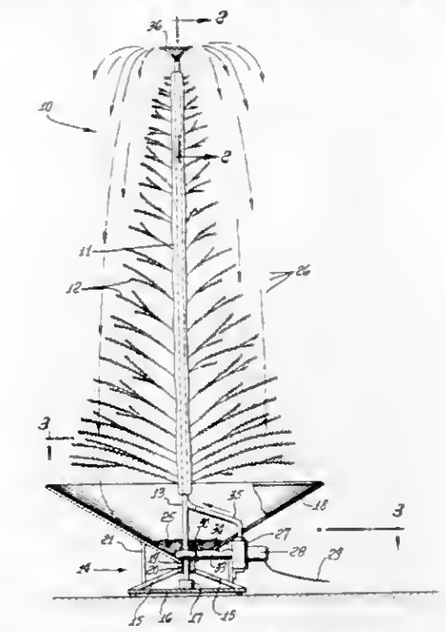
4,028,830

SNOWING FIXTURE

Dwight M. Ottinger, 1777 Wren St., Corona, Calif. 91720

Filed Apr. 5, 1973, Ser. No. 348,006
Int. Cl.² G09F *19/02*
U.S. Cl. 40—106.25 **7 Claims**

1. A fixture for simulating falling snow particles comprising a reservoir of individual simulated snow particles forming a catch basin with a wall structure sloping laterally inwardly toward a lowermost area, said particles being in quantity forming a mass in said catch basin with a constantly present upper surface above said lowermost area, a pump, a motor having an operating connection to the pump, a distributor conduit connected to the outlet side of the pump, said distributor conduit having constantly open particle outlet means at a fixed location elevated relative to a supporting surface and substantially in vertical alignment with said catch basin, a pump intake conduit of substantially uniform size having a particle inlet means emersed in said mass at a location adjacent said lowermost area of the catch basin and below said upper surface, and a constantly open pure air intake of fixed



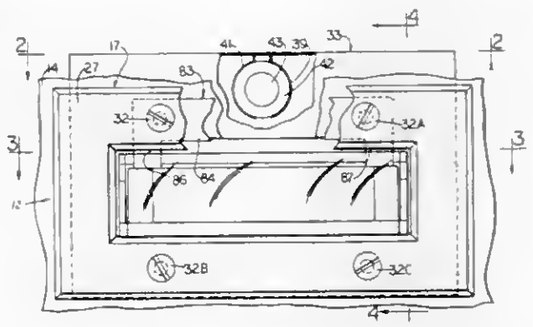
size in said intake conduit intermediate said particle inlet means and the pump, said air intake having a fixed position exteriorly with respect to said catch basin and below said upper surface, said pure air intake is a port exceeding the particle inlet means in size and is located at a level below said upper surface of the mass of particles and at substantially the same level as said particle inlet means.

4,028,831

SERVICE INDICATING DEVICE

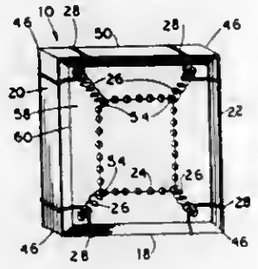
Asger K. Hahne, 160 Broadway, Batavia, Ohio 45103

Filed Oct. 9, 1975, Ser. No. 621,038
Int. Cl.² G09F *13/18*
U.S. Cl. 40—130 K **3 Claims**



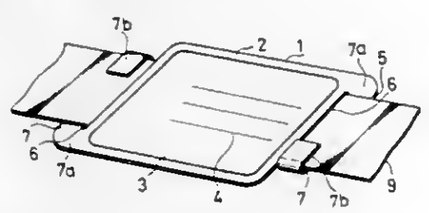
1. A service indicating device which includes a casing, a drawer slidably received in the casing, said drawer having a transparent front panel, a plurality of indicator element blocks of translucent material mounted in the drawer tandemwise with a front face of one of the indicator element blocks adjacent the front panel of the drawer, indicia on front faces of the indicator element blocks for viewing through the front panel of the drawer, and a lamp mounted above the drawer and arranged to illuminate the one of the indicator element blocks having its face adjacent the front panel of the drawer.

4,028,832
CORNER HOOK FRAME
Celia Wu, 295 W. 11th St., New York, N.Y. 10014
Filed May 24, 1976, Ser. No. 689,500
Int. Cl.² G09F 1/12
U.S. Cl. 40—155 3 Claims



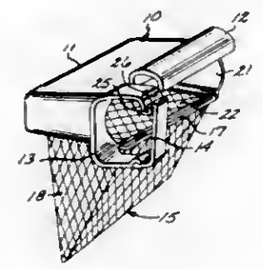
1. A corner hook frame assembly for detachably securing a picture to a panel member, which comprises:
a. a plurality of hook shaped anchoring members, each said anchoring member including a pair of legs adapted to be removably secured onto one corner of a combination of said panel and said picture, each said anchoring member including a large V-shaped section having a common juncture between said legs, an intermediate section integrally joined at an obtuse angle to an outer free end of each said leg, an L-shaped section perpendicularly joined to an outer free end of each said intermediate section, and a hook shaped section integrally joined to each said juncture of each said V-shaped section;
b. a plurality of spring members, one said spring member detachably secured to one said hook shaped section of one of said anchoring members; and
c. a closed loop member, said closed looped member removably communicating with each said spring member causing a tension to be placed on each said spring member.

4,028,833
METALLIC TAG
Chiharu Kai, No. 3-4, 2-chome, Kita, Koenji, Shuginami, Tokyo, Japan
Filed June 2, 1975, Ser. No. 582,824
Int. Cl.² G09F 3/00
U.S. Cl. 40—316 1 Claim



1. A metallic tag for fitting around a binding, said tag comprising:
a thin, bendable, rectangular metal plate having two spaced, parallel, straight cutout slots therein extending from one edge of said plate partially thereacross, said binding fitting through said slots, and said plate further having bendable edge strips formed between said slots and the edges of said plate adjacent said slots adapted to bend over against said binding fitted through said slots, whereby said plate is secured to said binding; and
inscription portion means on said metal plate between said parallel slots for inscribing information thereon.

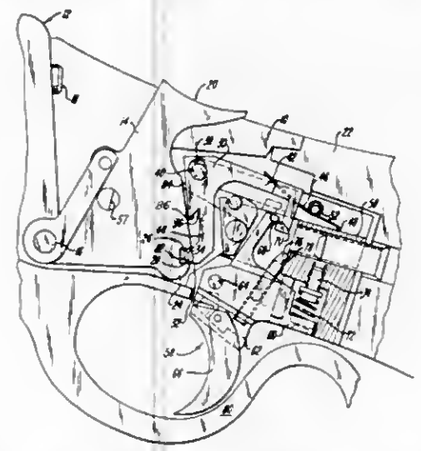
4,028,834
SPENT CARTRIDGE COLLECTOR
Allan E. Dobson, 4653 Beverly Blvd., Los Angeles, Calif. 90004
Filed Feb. 26, 1976, Ser. No. 661,442
Int. Cl.² F41C 27/00
U.S. Cl. 42—1 T 5 Claims



1. In combination with a firearm that has an ejection port from which spent cartridge shells are discharged, an apparatus for collecting spent cartridge shells ejected from said ejection port, said apparatus comprising:
a. hollow enclosure defining means formed from a thin wall sheet material, said hollow enclosure defining means having an upper surface, a lateral surface and a bottom surface, a first opening in said lateral surface that surrounds said ejection port, a second opening in said bottom surface, and two opposed grooves formed on the exterior of said bottom surface and disposed along two opposed edges of said second opening;
b. hanger means attached to said hollow enclosure defining means adjacent said first opening, said hanger means extending away from said hollow enclosure defining means along a plane substantially coincident with said upper surface, said hanger means so removably engaging said firearm that said hollow enclosure defining means is removably supporting from said firearm with said first opening in alignment with said ejection port;
c. receptacle means releasably secured to said hollow enclosure defining means in a position below said second opening for collecting said spent cartridge shells therein, said receptacle means including projections formed thereon for slidable receipt within said grooves, and said receptacle means comprising a rectangular frame having two first opposed segments that define projections for receipt in said grooves, a wire cage extending from said frame, and a wire mesh wrapping surrounding said cage; and
d. securing means attached to said hollow enclosure defining means for attachment of the latter to said firearm.

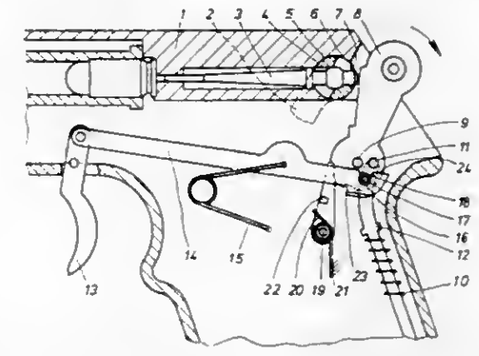
4,028,835
TRIGGER MECHANISM FOR RIFLES
Mathew H. Canjar, Denver, Colo., assignor to M.H. Canjar Company, Denver, Colo.
Filed Aug. 8, 1975, Ser. No. 603,128
Int. Cl.² F41C 19/00
U.S. Cl. 42—69 R 4 Claims

1. For use with a rifle action of the type having a trigger mechanism; a firing pin; a hammer mounted for pivotal movement from a cocked position forwardly through a half-cocked position into a fired position against said firing pin, said hammer including a tooth projecting rearwardly from the rear edge thereof and means defining an upwardly-facing ledge above said tooth; and, spring means biasing said hammer forwardly into its fired position, said trigger mechanism comprising: a pivot pin positioned behind the hammer; a sear loosely mounted on said pivot pin for relative movement rearwardly thereof and for pivotal movement from a retracted inoperative position forwardly into either of two extended operative positions, said sear including a forwardly-extending projection positioned and adapted in the first of its forwardly-extended operative positions to engage the upwardly-facing ledge of the hammer and releasably latch the latter in its cocked position, said sear having a forwardly-opening notch positioned and adapted in the second of its forwardly-extended operative positions to receive the tooth of the hammer when in its half-cocked position and prevent the latter from engaging the firing pin, said sear when in its first extended position having a first cam surface in sliding engagement with the tooth of the hammer as the latter moves from its cocked position toward its fired position, and said sear including a second cam surface located beneath the notch therein positioned for engagement by the hammer tooth upon movement of the hammer from extended into retracted position; a sear return spring connectable to the sear for normally biasing it into one of its extended positions; a trigger mountable for pivotal movement from a released position rearwardly into a triggered position, said trigger being positioned and adapted in its released position to engage the sear in its first extended operative position and prevent retraction thereof, said trigger being operative upon actuation thereof from its released position into its triggered position to disengage said sear for movement from its first extended operative position into its second extended or retracted positions, and said trigger being inoperative in either its released position or its triggered position to retract said sear in the second extended operative position thereof; and, means comprising a trigger spring connectable to the trigger for normally biasing it into its released position, said first cam surface being shaped to coact with the hammer tooth as the latter slides forwardly therealong under the unrestrained bias of the hammer spring to retract said sear far enough and for an interval long enough to permit said hammer tooth to by-pass the notch in said sear before the sear return spring can return said sear to either of its extended positions upon actuation of the trigger with said sear in its first extended operative position, and said second cam surface and hammer tooth coacting upon movement of the hammer from extended into retracted position to move said sear rearwardly relative to its pivot pin into a position where it will by-pass the trigger in triggered position.

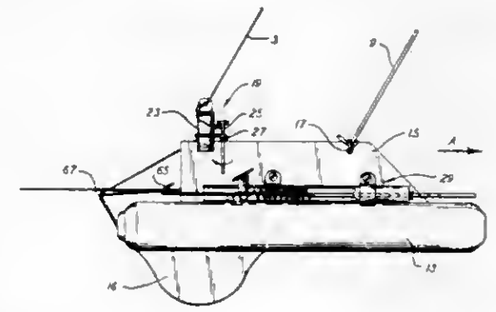


4,028,836
COCKING MECHANISM FOR HAND FIREARMS
Dieter Keppeler, Langenau, Germany, assignor to Carl Walther, Sportwaffenfabrik, Ulm (Danube), Germany
Filed Apr. 7, 1976, Ser. No. 674,624
Claims priority, application Germany, Apr. 17, 1975, 2517002
Int. Cl.² F41C 19/14
U.S. Cl. 42—69 B 1 Claim

1. In a cocking mechanism for small firearms, the combination of a pivotally mounted hammer engageable with a firing pin and having a roller thereon, a trigger rod pivotally connected to a trigger and having a notch engagable by said hammer roller, spring means acting upon said trigger rod to urge said notch into temporary engagement with said roller during cocking of the hammer said trigger rod having a surface and said notch is in said surface, and a laterally projecting pin on said hammer and engageable with said trigger rod surface during cocking to urge said trigger rod away from said roller to disengage said notch therefrom.



4,028,837
RELEASE MECHANISM FOR FISHING APPARATUS
Norman E. Clark, 59 E. Utica St., Oswego, N.Y. 13126
Filed June 3, 1976, Ser. No. 692,447
Int. Cl.² A01K 91/00, 95/00
U.S. Cl. 43—43.12 11 Claims

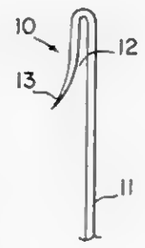


1. A release mechanism for securing a fishing line to fishing apparatus, for releasing the fishing line from the apparatus in response to a strike by a fish, said release mechanism comprising:
fishing line holding means having a gripping condition for gripping the fishing line and a releasing condition for releasing the fishing line from restraint by the fishing apparatus;
ejection means actuable for transferring said fishing line holding means from the gripping condition to the releasing condition; and
trigger means responsive to forces exerted on the fishing line and actuable for actuating said ejection means in response to the sensing of a release force on the fishing line corresponding to a strike by a fish.

4,028,838
CLAMPER FISHHOOK
Alva E. Flower, 603 S. 14th Ave., Bozeman, Mont. 59715
Filed Dec. 2, 1975, Ser. No. 637,101
Int. Cl.² A01K 83/00
U.S. Cl. 43—43.16 9 Claims

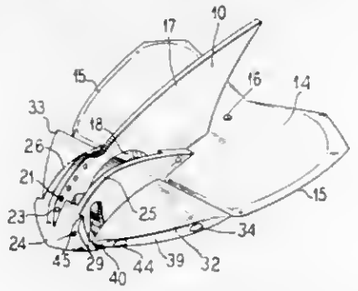
4. A fishhook having a shank end and a hook end connected thereto,
said hook end comprising
a wire bent back upon itself to form a narrow constricted throat or passage between the ends of said wire with a first portion of said wire extending from a pointed end to a connecting bent portion and a second portion of said wire extending from said connecting bent portion to said shank end with an intermediate portion of each

said first and second portions of said wire forming said narrow constricted throat or passage,



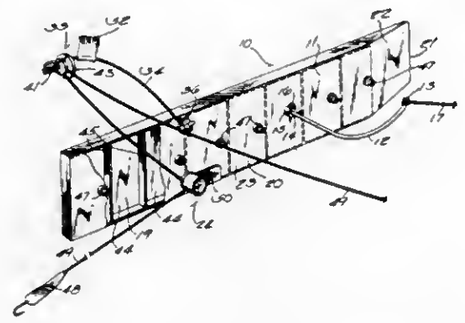
and means to wedge and hold the tissue of a fish in said narrow constricted throat or passage when a fish is caught on the fishhook.

4,028,839
DEPTH CONTROL DEVICE FOR USE WHILE FISHING
Robert A. Stubblefield, 539 W. 300 North, Salt Lake City, Utah 84116
Filed Oct. 21, 1975, Ser. No. 624,438
Int. Cl.² A01K *95/00*
U.S. Cl. 43—43.13 **11 Claims**



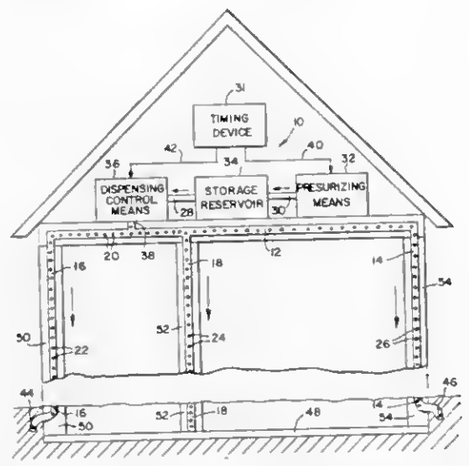
1. A trolling depth control device for use in troll fishing comprising,
a body portion,
first vertical fin means extending out of said body portion and forming fixed vertical water action surfaces to stabilize the device,
said vertical fin means having formed thereon attaching means for connecting said device to trolling lines,
second horizontal fin means extending out of said body portion and forming fixed horizontal hydrofoil surfaces,
a depth control fin,
means rotatably mounting said depth control fin on said body portion so that said depth control fin forms a movable control surface adjacent to said horizontal hydrofoil surfaces which is movable through a common plane relative to said horizontal fin means,
said depth control fin being rotatably movable to selectively inclined positions relative to said hydrofoil surface to change the angle to attack of the device during trolling, and
thermal control means connected between said depth control fin and said body portion to adjustably move said depth control fin automatically as a function of the thermal variations of the water,
whereby said device may be used to tow a fishing line to selected depths of water.

4,028,840
TROLLING SKI
Mark E. Wille, 2954 N. 124th St., Wauwatosa, Wis. 53222
Filed Apr. 23, 1976, Ser. No. 679,827
Int. Cl.² A01K *93/00*
U.S. Cl. 43—43.13 **8 Claims**



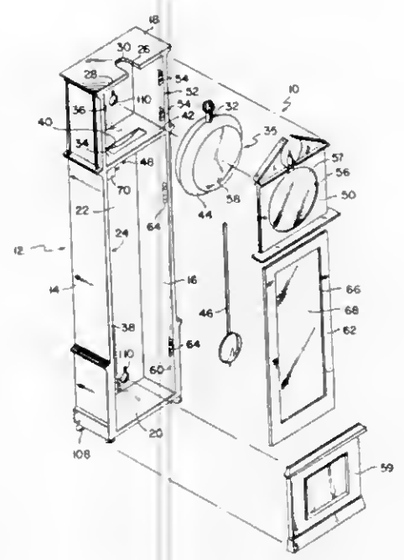
1. A trolling ski adapted to be towed by a boat and to carry a fishing line laterally away from the boat comprising:
a. a buoyant elongated body;
b. first means on the body for attaching a tow line extending from the boat thereto;
c. second means on the body for demountably attaching a fishing line at a point on the line intermediate the boat and the end of the line;
d. at least a portion of the body defining a hollow closed interior; and,
e. closure means providing communication with the hollow closed interior for the addition and removal of ballast.

4,028,841
DISTRIBUTION SYSTEM FOR VERMIN CONTROL COMPOSITION
Carl Lundwall, Maspeth, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest
Filed May 24, 1976, Ser. No. 689,567
Int. Cl.² A01M *1/24*
U.S. Cl. 43—124 **7 Claims**



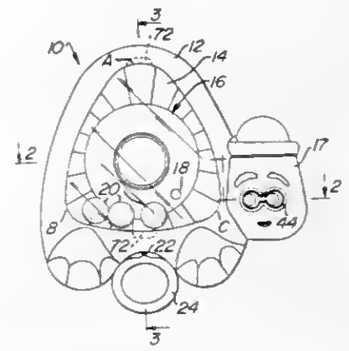
1. A distribution system for a fluid vermin control composition comprising pipe means disposed in a building, said pipe means operatively connected to means for automatically and periodically delivering a fluid vermim control composition through said pipe means, means in said pipe means for releasing said fluid from said pipe means.

4,028,842
POCKET WATCH DISPLAY KIT
John W. Adams, 4901 Riverton Lane, Bowie, Md. 20815
Filed May 4, 1976, Ser. No. 683,009
Int. Cl.² A63H *33/00*
U.S. Cl. 46—1 R **8 Claims**



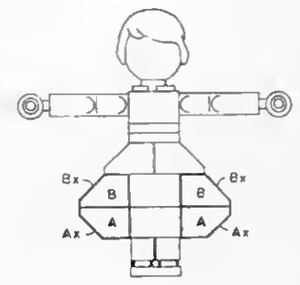
1. Pocket watch display kit comprising:
a hollow box like housing including lateral side portions, an upper lateral portion and a lower lateral portion each fixedly secured to a back portion and to adjacent portions forming an open ended chamber therein, said upper lateral portion having a semioblongitudinal notch in the free edge thereof extending toward said back portion, the internal edges of said notch adapted to accommodate a pocket watch crown therebetween, said internal edges permitting the free rotation of said crown;
a lateral support shelf affixed within said chamber substantially parallel to said upper lateral portion and adjacent thereto, said latcral support shelf dividing said chamber into an upper chamber and a lower chamber, said lateral support shelf having an arcuate groove disposed in the surface thereof opposite said upper lateral portion, said arcuate groove adapted to accommodate the circular edge of a pocket watch, said lateral support shelf thereby supporting said pocket watch within said first chamber when said circular edge thereof is placed in said arcuate groove and said crown is placed within said notch;
a pendulum element disposed within said lower chamber and pivotally affixed by a pivot to said lateral support shelf, the longitudinal axis of said pivot substantially normal to said back portion;
a first door element hingedly affixed over the opening in said upper chamber by first hinge means, said first door element having an opening and a first transparent window element disposed therein, said first window element permitting visual access to the face of said pocket watch;
a lower panel element fixedly secured to said housing partially covering the opening in the lowermost portion of said lower chamber; and
a second door element hingedly affixed by second hinge means to said housing over the opening in said lower chamber above said front panel, said second door element having an opening and a second transparent window element therein, said second transparent window permitting viewing of said pendulum element.

4,028,843
CHILD'S TOY
Mel Appel, Livingston, N.J., assignor to Gabriel Industries, Inc., New York, N.Y.
Filed May 12, 1976, Ser. No. 685,562
Int. Cl.² A63H *33/00*
U.S. Cl. 46—1 R **17 Claims**



1. A child's toy, comprising:
a frame having a recess therein;
a hub rotatably mounted on said frame within said recess, said hub having a flexible projecting member for yieldingly striking at least one ball located within said frame recess upon rotation of said hub with respect to said frame;
means for rotating said hub from a rest position with respect to said frame;
means for automatically returning said hub to said rest postion; and
a dome secured to said frame, said dome covering said recess and said hub.

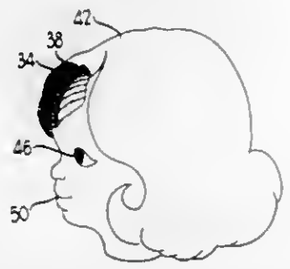
4,028,844
TOY BUILDING BLOCK FOR SUPPLEMENTING EXISTING BLOCK SETS
Erling Thue Dideriksen, and Jens Nygaard Knudsen, both of Billund, Denmark, assignors to Interlego A.G., Switzerland
Filed May 17, 1976, Ser. No. 687,218
Claims priority, application Denmark, May 23, 1975, 2288/75
Int. Cl.² A63H *33/08*
U.S. Cl. 46—22 **2 Claims**



1. A toy building block having means for joining with other blocks of known design having complementary means, said block having a square face, a pair of opposing trapezoid end faces disposed at right angles to the bottom face, a rectangular side face disposed at right angles to the bottom face and the trapezoid end faces, a rectangular top face extending parallel to the bottom face, an inclined face extending from the top face towards the bottom face intermediate the trapezoid end faces, said joining means including four projections extending normally from said bottom face and disposed symmetrically with respect to the center of said square, a rectangular recess in the top face and a projection within said recess extending co-axially with the centre of said recess, the width of said

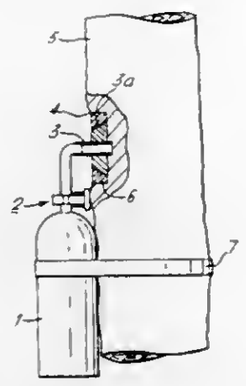
projection being equal to the spacing between the projections in the bottom face and the width of the latter projections being equal to the width of the recess in the top face.

4,028,845
LAYERED SKIN DOLL
Gunars Licitis, Lombard, Ill., assignor to Marvin Glass & Associates, Chicago, Ill.
Filed Jan. 21, 1976, Ser. No. 650,894
Int. Cl.² A63H 3/00
U.S. Cl. 46—164 8 Claims



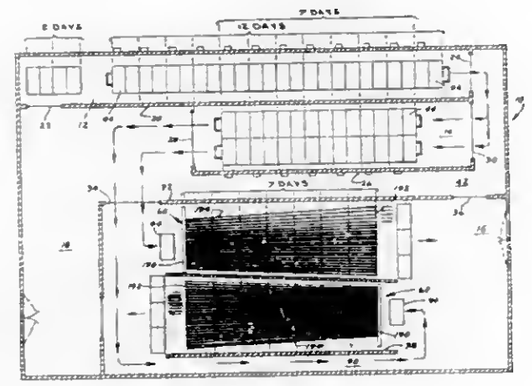
1. A multiple layered figure toy, comprising:
a pliable impervious outer smooth molded plastic skin of predetermined shape defining the exterior features of the figure toy; and
a substantially rigid impervious inner molded plastic layer of similar material, interiorly cured with said outer skin retaining said outer skin in its predetermined shape and defining an internal cavity within the figure toy.

4,028,846
PLANT TREATMENT
John Francis Leslie Floyd, and James Robert Charles Elliott, both of 3 Woodside Ave., Chesham Bois Amersham, Buckinghamshire, England
Filed Jan. 13, 1976, Ser. No. 648,718
Int. Cl.² A01G 29/00
U.S. Cl. 47—57.5 2 Claims



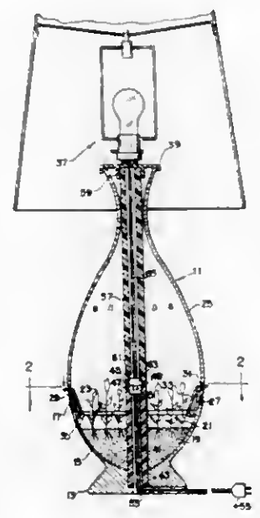
1. A method of treating a plant to combat disease or pest infestation comprising the steps of:
producing an opening in said plant;
inserting a wedge-shaped collar in said opening of the plant;
hermetically securing a pipe having an annular sloping plug thereabout in said collar;
connecting a pressurized container having a spring biased nozzle valve to said pipe for delivering energized droplets of a liquid to said plant with said spring biased valve compressed against said plant and thereby releasing said energized droplets through said pipe into said plant.

4,028,847
APPARATUS FOR PRODUCING PLANTS
Noel Davis, Wayzata; William M. Dreier, and Stanley C. Rustad, both of Golden Valley, all of Minn., assignors to General Mills, Inc., Minneapolis, Minn.
Filed Feb. 19, 1976, Ser. No. 659,311
Int. Cl.² A01G 31/02
U.S. Cl. 47—65 30 Claims



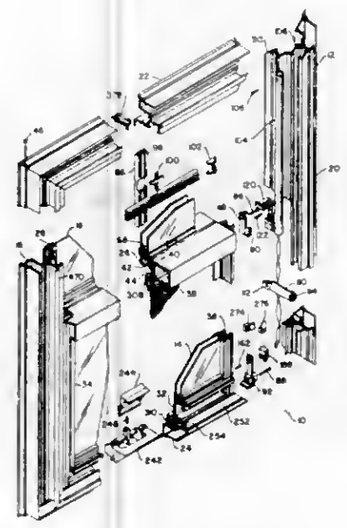
1. Apparatus for growing plants comprising an elongated housing having at least one chamber therein, said chamber having first and second ends, a plurality of elongated track means having an inlet end and a discharge end, means for mounting said track means within said chamber so that they extend generally longitudinally therein, said track means being arranged relative to each other so that they diverge outwardly so as to form a fan-shaped array of pathways extending from one end of the chamber to the other end, the discharge ends of said track means being spaced apart a greater distance than the inler ends, means for holding said plants in a prescribed manner so that they can be introduced into the inlet end of the track means, and means for moving said plants from said inlet end of said track means to the discharge end at a prescribed speed.

4,028,848
LAMP PEDESTAL WITH TERRARIUM BOWL
David E. Murray, Detroit, Mich., assignor to Michael D. Murray, Farmington, Mich., a part interest
Filed May 21, 1976, Ser. No. 688,845
Int. Cl.² A01G 9/02
U.S. Cl. 47—69 5 Claims



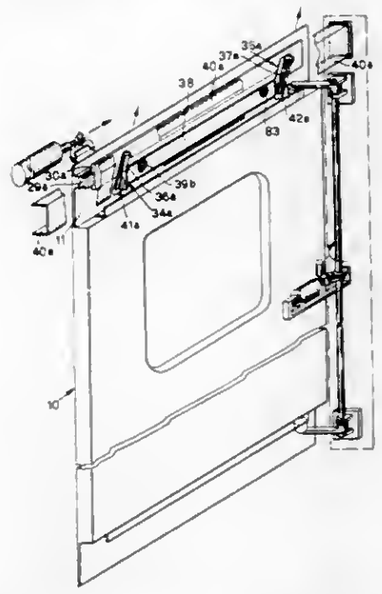
1. In a lamp including a base, a bowl, a bulb socket, and wiring joined to said socket and adapted for connection to a power source; the improvement comprising:
a terrarium lower bowl of transparent material forming a part of and projecting from said base terminating in an annular rim defining an open end;
said bowl adapted to hold soil material and growing plants;
an upper bowl of transparent material open at its lower end and formed with an inset annular flange bearing against and extending into said lower bowl annular rim with said upper bowl supported upon and forming a continuation of said lower bowl;
said wiring extending through said upper and lower bowls and exiting from said base;
an annular bead upon the interior of said lower bowl rim below its open end;
said base flange being formed with an external groove retainingly receiving said bead.

4,028,849
WINDOW STRUCTURE
Richard N. Anderson, Owensboro, Ky., assignor to V. E. Anderson Mfg. Co., Owensboro, Ky.
Division of Ser. No. 121,985, March 8, 1971, Pat. No. 3,795,076, and a continuation-in-part of Ser. No. 36,303, June 22, 1970, Pat. No. 3,711,995. This application Mar. 5, 1974, Ser. No. 448,257
Int. Cl.² E05D 15/22
U.S. Cl. 49—181 22 Claims



1. Window structure for installation both as a single-hung window or as a hopper window and as a right or left hand glider window including a frame having a fixed frame rail, guiding frame rails, a locking frame rail and a frame check rail, at least one movable sash secured within the frame for selective movement in the plane of the window frame and tilting out of the plane of the window frame about one edge of the sash including a tilt rail, guide rails having longitudinal recesses therein and a lock rail, and sash guide and pivot structure positioned at least partly within the longitudinal recesses of the sash guide rails and secured to opposite corners of the movable sash, spacing the movable sash from the frame rails, finishing the ends of the movable sash guide rails at the ends of the sash lock rail to prevent damage to weather stripping on pivoting of the movable sash about the lock rail thereof and providing a pivot axis for the movable sash on pivoting thereof, which sash guide and pivot structure is operable to lock the movable sash in a pivoted position with respect to movement of the movable sash along the frame, which sash guide and pivot structure includes a rectangular portion adapted to fit within the movable sash guide rail at the end thereof adjacent an end of the sash lock rail, an L-shaped flange extending over perpendicular sides of the rectangular portion for engaging the side and one end of the guide rail of the movable sash and an elongated pivot portion extending on the opposite side of the flange from the rectangular portion of the sash guide and pivot structure and away from the sash guide rail and into the guiding frame rail in installation on a movable sash installed in the window structure and having a larger dimension in the plane of the window structure than transversely of the window structure whereby on tilting of the movable window sash the pivot portion of the sash guide and pivot member extending within the guiding frame rail engages portions of the rail to lock the movable sash in the frame with respect to movement of the sash along the frame.

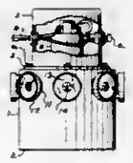
4,028,850
SLIDING-WING DOOR FOR VEHICLES
Alessandro Marzocco, Milan, Italy, assignor to Socimi Societa Costruzioni Industriali Milano S.p.A., Milan, Italy
Filed Oct. 16, 1975, Ser. No. 623,083
Claims priority, application Italy, May 7, 1975, 23115/75
Int. Cl.² E05D 15/10
U.S. Cl. 49—212 2 Claims

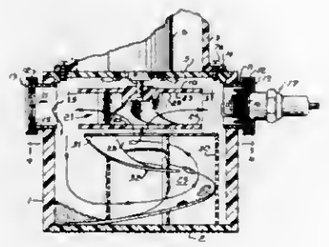


1. A sliding-wing door for vehicles, comprising at least one door panel suspended to a first member of a telescopic guide, a second member of which is carried by at least two liner ejectors having a slidable member fixed to said second member and a stationary member attached to a rigid structure affixed to the vehicle, rolling bearings being inserted between said members of the telescopical guide and between said members of each linear ejector, each bearing being mounted on a pin which is solid with one of said members and is slidingly coupled to and guided by a rectilinear pathway of the other member through said bearing, the stationary members of said linear ejectors being fixed to a supporting structure which is attached to said rigid structure by means of a swingable arm equipped with a clamping member and mounted on a vertical pin carried by said rigid structure and by means of a locking bolt spaced from said arm, the structures being equipped with passageways, with side clearance, for said arm and said bolt and with respective curved resting surfaces faced to said passageways, the resting surface for the locking bolt being adjustable by means of a spreading member which is screwed in the supporting structure and is axially passed through with side clearance by the locking bolt, the locking bolt being also arranged to axially pass with side clearance through an abutting member with curved surface engaged with said spreading member and through a further member which is displaceable along an opposite surface of said abutting member, the locking bolt having a head and an associated

locking nut which rests on said displaceable member and said spreading member through respective washers having a spherical seat.

4,028,851
SPARKPLUG CLEANER
Roy A. Fricke, 1034 Ashland Ave., River Forest, Ill. 60305
Filed June 3, 1976, Ser. No. 692,341
Int. Cl.² B24C *3/34*
U.S. Cl. 51—412 **15 Claims**

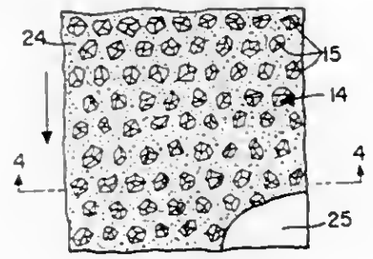




1. In a portable sparkplug cleaner a closed cylindrical vessel having a vertical axis and comprisng two communicating but functionally separate, vertically aligned cylindrical chambers, a driving motor having a vertical shaft disposed in the upper chamber and having a centrifugal, rotatably mounted impeller in the upper chamber, there being a series of tubular radially disposed flexible self-sealing sparkplug holders mounted radially in the cylindrical walls of the first chamber and being arranged in a concentric array and being adapted to receive and hold the threaded electrode ends of sparkplugs to be cleaned, said centrifugal impeller in the upper part of said vessel being journaled in said vessel and being driven by said motor, and having means for discharging particulate against the electrodes of the sparkplugs from various tangential directions, the lower part of the vessel providing a receiving chamber for receiving spent particulate gravitating into said chamber.

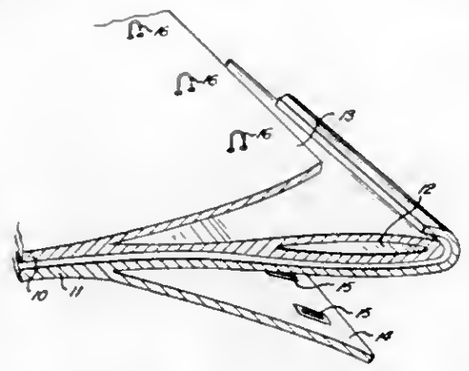
4,028,852
ABRASIVE SEED DEFIBERIZATION
Cecil F. Harrington, Corinth, Miss.; James M. Johnson, and Howard T. Prince, both of Memphis, Tenn., assignors to The Procter & Gamble Company, Cincinnati, Ohio
Division of Ser. No. 516,514, Oct. 21, 1974, Pat. No. 3,943,604. This application Nov. 10, 1975, Ser. No. 630,384
Int. Cl.² B24D *5/02*
U.S. Cl. 51—206 R **3 Claims**

1. A defiberizing cylinder having a seed delinting face on a radially outwardly facing cylindrical surface, said face comprising an open pattern of unpiled, spaced apart abrasive particles which abrasive particles are adhered in contacting relation with said cylindrical surface and with spaced apart relations among said abrasive particles, said open pattern comprising from about 40 to about 80 said abrasive particles



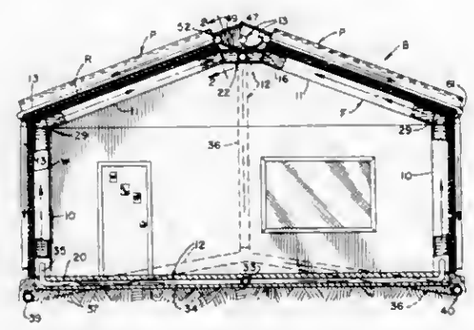
per square inch which abrasive particles are in the size range of U.S. Sieve Series numbers of from about 12 to about 40.

4,028,853
SEALING TOGETHER OF FLEXIBLE SHEETS
Christopher Daniel Dowling Hickey, 5 Heathside, Hinchley Wood, Esher, Surrey, England
Filed June 16, 1976, Ser. No. 696,721
Claims priority, application United Kingdom, July 17, 1975, 30087/75
Int. Cl.² E04B *1/34*
U.S. Cl. 52—2 **16 Claims**



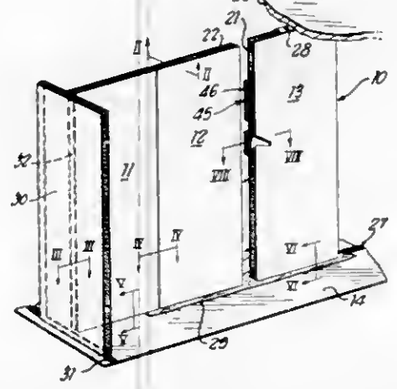
1. A method of sealing together peripheral portions of two flexible sheets comprising the steps of putting together the peripheral portions of the two sheets in overlying relationship together with an inflatable tube extending along the whole length of said peripheral portions, securing the peripheral portions in this position and then inflating the tube.

4,028,854
FIREPROOF MODULAR BUILDING
Richard E. Diggs, 12A Road, Carthage, Mo. 64836
Division of Ser. No. 577,359, May 14, 1975, Pat. No. 4,000,850. This application May 14, 1976, Ser. No. 686,274
Int. Cl.² E04B *1/92*
U.S. Cl. 52—93 **11 Claims**



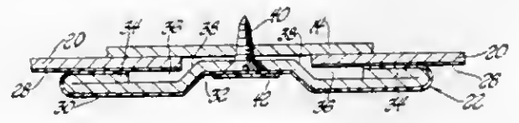
1. A fireproof modular building, comprising a frame including prefabricated non-flammable tubular wall columns and prefabricated non-flammable tubular roof beams supported on the columns, the columns and the beams being adapted to pass non-flammable fluid therethrough, first fluid circulating means connected with the columns and beams to circulate a first non-flammable fluid therethrough, a plurality of rigid, fireproof prefabricated insulated panels secured to and supported on the columns and beams in spanning relationship defining wall and roof structures, respectively, enclosing the building, and load bearing column plates secured to said columns and load bearing roof plates secured to said roof beams, said plates being secured to said columns and roof beams at ends thereof which are adjacent each other and connecting those columns and beams to adjacent structure of the building in a load supporting manner, the plates each having fluid flow passages defined therein which cooperate with flow passages in adjecent plates, said fluid flow passages being aligned to fluidly connect the end adjacent columns and beams via said plate fluid flow passages.

4,028,855
PARTITION WALL JOINTS
John R. Prewer, London, England, assignor to Pallisade Domain Limited, London, England
Filed Dec. 22, 1975, Ser. No. 643,137
Claims priority, application United Kingdom, Dec. 24, 1974, 55670/74
Int. Cl.² E04B *1/38*
U.S. Cl. 52—272 **4 Claims**



1. A method of erecting a partition wall in a building, comprising the steps of
providing a plurality of substantially rigid, substantially straight self-supporting fibres on the top and bottom horizontal edge surfaces of the panel so that the fibres project from the edge surface substantially normally thereto;
providing a plurality of substantially rigid, substantially straight self-supporting fibres in a lower band along the floor surface of the building and in an upper band along the ceiling surface of the building so that said fibres on the floor and ceiling surfaces project substantially normally thereto;
aligning the panel between the upper and lower bands of fibres;
moving the floor and ceiling surfaces relative to one another so as to clamp the panel between the floor and ceiling surfaces and cause the fibres on the top edge surface of the panel to intermesh with the fibres on the ceiling surface and the fibres on the bottom edge surface of the panel to intermesh with the fibres on the floor surface, whereby shear movement between the top and bottom edge surfaces of the panel and the ceiling and floor surfaces, respectively, are substantially prevented.

4,028,856
COVER WALL CONSTRUCTION
Peter M. Dalbec, Clawson, Mich., assignor to Mallyclad Corporation, Madison Heights, Mich.
Filed Jan. 26, 1976, Ser. No. 652,567
Int. Cl.² E04B *2/76*
U.S. Cl. 52—281 **1 Claim**

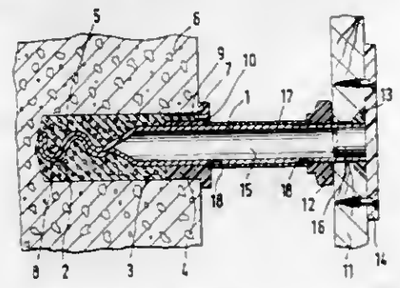


1. Cover wall construction for shipboard modernization and other uses, and comprising;
cribbing for providing a wall supporting structure in front of an older wall to be modernized and including channel members of relatively greater width than depth disposed at baseboard levels, overhead heights and vertically therebetween,
panel members for covering and enclosing said cribbing therebehind and including aluminum sheet stock having a vinyl clad exterior surface and a relative size for spanning baseboard to overhead heights and between next adjacent vertically disposed channel members, means for retaining said panel members in engagement with said cribbing including panel retaining members of extended length and minimal width formed to provide, in cross-section, an inwardly offset center portion for fastener engagement to said channel members and reversely bent side edges for overlapping fastenerless engagement with a panel member edge received thereunder,
fastener means for engaging said panel retaining members to said channel members at spaced intervals both between next adjacent panel members and at baseboard and overhead heights for both a functional and decorative use,
said panel retaining members being formed from like vinyl clad aluminum stock as said panel members and having said vinyl cladding provided over the reversely bent side edges thereof,
the center portion of said panel retaining members being set inwardly sufficiently to extend rearwardly less than a panel thickness beyond the reversely bent side edges thereof for both double and single panel edge engagement use,
inside and outside corner covering members having each right angle portion of comparable cross-section to said panel retaining members,
and pressure-sensitive adhesive coated decorative tape for use with said retaining and corner covering members in obscuring and protecting the headed ends of said fastener means as used within the inwardly set center portions thereof.

4,028,857
METHOD AND ARRANGEMENT FOR MOUNTING AN OBJECT AT A DISTANCE FROM A SUPPORT STRUCTURE
Artur Fischer, Weinhalde 34, D-7241 Tumlingen Gde. Waldachtal, Germany
Continuation-in-part of Ser. No. 616,072, Sept. 23, 1975. This application Apr. 8, 1976, Ser. No. 675,053
Claims priority, application Germany, Sept. 26, 1974, 2445897; Apr. 12, 1975, 2516015; Apr. 22, 1975, 2517761; Sept. 10, 1975, 2540197
Int. Cl.² E04B *1/56, 1/40*
U.S. Cl. 52—309.2 **16 Claims**

1. An arrangement for mounting an object at a distance from a support structure, particularly a low-strength structure having a mounting surface and an anchoring hole, comprising

an anchoring member having a leading anchoring portion for insertion into said hole with clearance, and a trailing elongated mounting portion extending outwardly of said hole in a predetermined orientation relative thereto beyond said mounting surface upon insertion; means for fixing said anchoring portion in said hole, including means for admitting a hardenable substance into said clearance so as to form a plug about the exterior of said anchoring portion and thereupon fix the anchoring member in position in said hole upon hardening of the substance, and a cap member mounted in said hole and



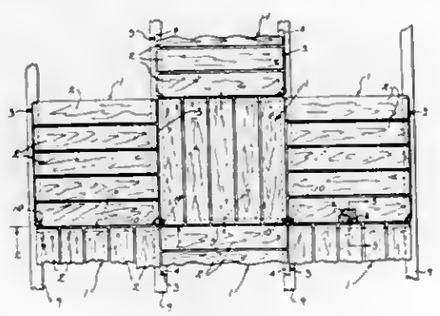
having a cover part which overlies and seals said hole from escape of hardenable substance, and a retaining part which surrounds and retains the anchoring member in said orientation so as to hold the anchoring member against displacement out of said orientation by gravity while said substance is hardening; and means for mounting an object on said mounting portion at any of a plurality of locations spaced lengthwise of said mounting portion, said mounting means comprising means for positioning the object at a predetermined distance from the support structure and means for holding the object in place at a selected predetermined distance.

4,028,858

DECK BLOCK

Erwin G. Rehbein, P.O. Box 80A, Waupaca, Wis. 54981

Filed Mar. 5, 1976, Ser. No. 664,156
Int. Cl.² E04F *13/08*; **E04C** *1/10*
U.S. Cl. 52—384 **4 Claims**



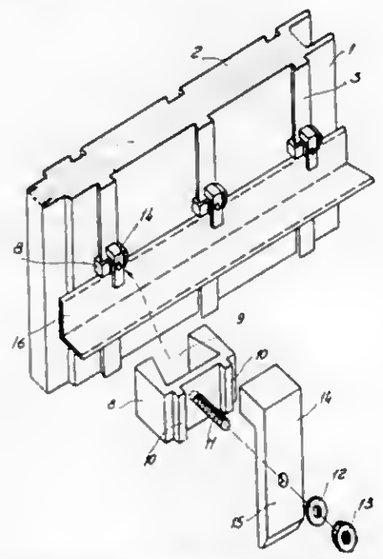
1. A deck block comprising a plurality of strips of wood of equal length disposed side by side in loosely spaced relation with their ends in a common plane, and channel members extending one each across the corresponding aligned ends of said strips each of said channel members including a body and internal side flanges with one inturned side flange of said member frictionally embedded in a groove substantially parallel to the common plane of the strips and extending inwardly from the ends in all of said strip ends and with the body of each said member bearing substantially tightly against the corresponding aligned ends of said strips, and with the other inturned side flange of each of said members frictionally engaging said strips, whereby each said channel member totally engages and retains said strips in spaced position.

4,028,859

HEAT-INSULATING PANELS

Pietro Bellagamba, Via A Porta 4, 29100 Piacenza, Italy

Filed May 6, 1976, Ser. No. 683,856
Claims priority, application Italy, May 14, 1975, 23335/75
Int. Cl.² E04B *2/32, 2/88*
U.S. Cl. 52—393 **6 Claims**



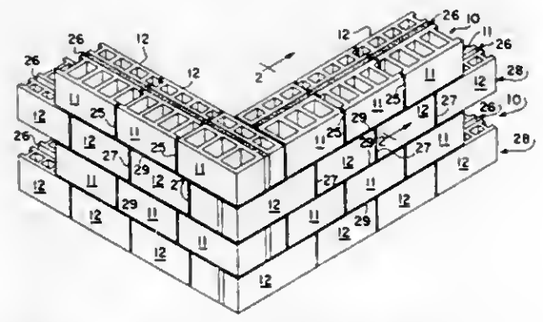
1. A heat-insulating panel, particularly adapted for walls of buildings, including two parallel thin ribbed metal sheets covering an intermediate layer, consisting of a heat-insulating resin, in which the said covering metal sheets show in positions corresponding to each other and at a regular distance undercut reliefs projecting on one face whereat there are inserted coupling organs of the said metal sheets, consisting of material having a low thermal conductivity, and one each projecting relief there are fixed movably fastening means to the support structures and the end portions of the two metal sheets are folded over and shaped so as to build a concave edge and a convex edge, which may be coupled by embedding with each other and provided on their inner surfaces with gaskets having a series of longitudinal lamellar reliefs, placed in intercalated positions.

4,028,860

WALL CONSTRUCTION

Henry F. Hope, and Stephen F. Hope, both of 2548 Wyandotte Road, Willow Grove, Pa. 19090

Filed Jan. 15, 1976, Ser. No. 649,224
Int. Cl.² E04B *1/02*
U.S. Cl. 52—565 **5 Claims**



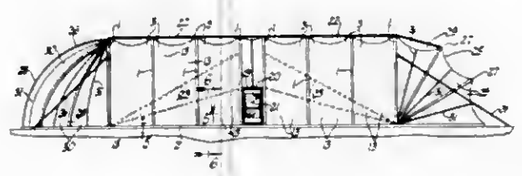
1. A masonry wall construction comprising
a plurality of successive vertically disposed horizontal courses of masonry blocks,
one of said horizontal courses having on the exterior thereof in succession a plurality of first hollow rectilinear blocks of a predetermined size with flat faces on the top and bottom thereof and vertical interior openings connecting said flat faces and with vertical mortar joints between the ends of said first blocks,
said first blocks having vertical ribs bounding said interior openings,
said first blocks having their outer exposed side faces in a vertical outer wall plane,
said one horizontal course having in succession a plurality of second rectilinear blocks of a small predetermined size spaced from the first blocks with flat faces on the top and bottom thereof and vertical interior openings connecting said flat spaces and with vertical mortar joints between the ends of said second blocks,
said second blocks having vertical ribs bounding said interior openings,
said second blocks having their exposed side faces in a vertical inner wall plane spaced from the outer wall plane,
the next succeeding horizontal course having on the interior thereof in succession a plurality of said first blocks with vertical mortar joints between the ends thereof and in transversely overlapping relation to the first blocks of said one course and with their exposed faces in the vertical outer wall plane,
said succeeding horizontal course having in succession a plurality of second blocks with vertical mortar joints between the ends thereof spaced from said first blocks of said succeeding course and with their exposed side faces in the vertical inner wall plane,
the ribs of blocks of successive horizontal courses being offset and out of contact with each other.

4,028,861

ERECTION METHOD FOR A VAULTED MEMBRANE STRUCTURE

Carl Frederick Huddle, Pleasant Ridge, Mich., assignor to Tension Structures Co., Pleasant Ridge, Mich. and Jon D. Vredevoogd, Lansing, Mich., part interest to each

Continuation-in-part of Ser. No. 597,970, July 21, 1975, which is a continuation-in-part of Ser. No. 399,333, March 8, 1973, abandoned, which is a continuation-in-part of Ser. No. 93,293, Nov. 27, 1970, abandoned. This application June 29, 1976, Ser. No. 700,846
Int. Cl.² E04G *21/00*
U.S. Cl. 52—745 **20 Claims**



1. A method of constructing a vaulted membrane structure comprising a frame of substantially vertical arches with curved bights spaced apart with their respective ends aligned and mounted on a base to permit horizontal movement; a flexible roof membrane extending between and operatively attached to said arches and said base that is tensioned to a stiffened state with an inward concave curvature between the bights of said arches, said inward concave curvature having been formed by said membrane having a shorter circumference in a vertical plane midway between adjacent arches than its circumference where it is operatively attached to said adjacent arches and means to fix said arches in their erected position to maintain tension in said roof membrane; said method of erection comprising the following steps:
a. Prefabricating said roof membrane in sections or as a whole such that its circumferential length is a vertical plane midway between adjacent vertical arches is less than its circumferential length where it is operatively attached to said adjacent vertical arches,
b. Assembling and disposing said vertical arches, comprising at least one section of said shelter frame, on the base in recumbent positions with their corresponding ends aligned and their crowns similarly oriented but spaced apart sufficiently to facilitate attaching said membrane,
c. Operatively attaching said roof membrane to at least a portion of the crown of said arches,
d. Raising at least two arches, while abutting each other, to an upright position,
e. Moving said arches apart and tensioning the membrane as the arches are moved to their final position,
f. Fixing said arches apart to maintain tension in said membrane,
g. Securing the lower portion or edge of said membrane between said adjacent arches.

4,028,862

PACKAGING CLAMP AND METHOD

John L. Harris, Bettendorf, Iowa, and Bror H. Nelson, Moline, Ill., assignors to Aluminum Company of America, Pittsburgh, Pa.

Division of Ser. No. 493,383, July 31, 1974, Pat. No. 3,971,469. This application Jan. 2, 1976, Ser. No. 646,062
Int. Cl.² B65B *27/00*
U.S. Cl. 53—3 **1 Claim**

1. A packaging method, comprising the steps of placing clamps at a plurality of locations on a material to be packaged, with each clamp bearing against a bottom portion and a top portion of the material to be packaged, and tying lines between the clamps for securing the clamps on the material; wherein the material to be packaged is a plurality of curved plates, the step of placing clamps including arranging clamp lower halves at desired locations on the bottom of the plate which is to form the bottom plate of the final package, the inside of the curvature of the bottom plate facing downwards, the step of tying lines including tying lines between the bottom halves of the clamps, the lines passing over the outside of the curvature of the bottom plate, the step of placing further including placing the remainder of the plates over the bottom plate, the insides of the curvatures of said remainder of the plates facing downwards, putting clamp top halves in position against the top plate of the package, and connecting the top and bottom halves of each clamp together for maintaining the bearing relationship of the top and bottom halves of the clamps against the top and bottom portions of the piled plates, and the step of tying lines further including tying lines between the clamps and passing over the outside of the curvature of the top plate.

4,028,863

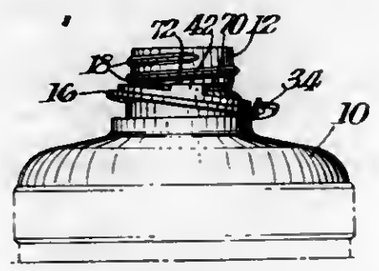
METHOD OF MANUFACTURING CONTAINER SAFETY CLOSURE SYSTEM

Frank S. Nixdorff, Baltimore, Md., assignor to Anchor Hocking Corporation, Lancaster, Ohio

Division of Ser. No. 522,619, Nov. 11, 1974, Pat. No. 3,958,709. This application Feb. 25, 1976, Ser. No. 661,272
Int. Cl.² B65B *7/28*
U.S. Cl. 53—15 **8 Claims**

1. A method of assembling a safety closure system on a container having an open neck through which the contents are dispensed comprising mounting a locking ring around the container neck for rotation in only the locking direction, providing a locking tooth on a hinged portion of the locking ring, providing a cap for closing the neck with the cap having complementary locking elements for engagement by the hinged tooth on the locking ring, providing complementary

contact elements on the cap and locking ring, mounting the cap on the container neck by rotation in the locking direction until the complementary contact elements contact each other, continuing the locking rotation of the cap while simultaneously rotating the ring in the locking direction with the locking tooth properly registered with respect to the complementary locking elements until the cap has closed the neck dispensing opening.

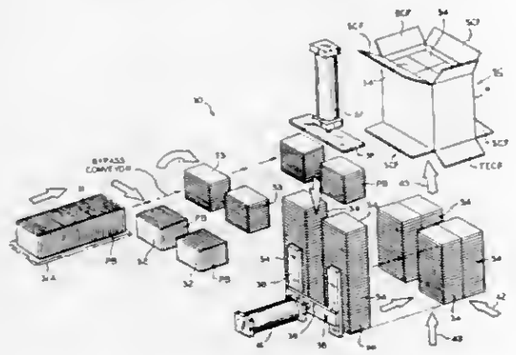


4,028,864

MACHINE AND METHOD FOR PACKAGING FLAT ARTICLES SUCH AS PAPERBACK BOOKS OR THE LIKE

John T. Bell, St. Charles, Ill., assignor to Container Corporation of America, Chicago, Ill.

Filed Mar. 16, 1976, Ser. No. 667,253
Int. Cl.² B65B *5/06, 35/50, 63/02*
U.S. Cl. 53—24 **16 Claims**



1. Apparatus for packaging flat articles, such as books or the like, arranged in one or more adjacent stacks of equal numbers in a shipping container, said apparatus comprising:

a. means for placing said articles in side-by-side stacks with the sides of said articles in contact with each other;

b. means for imposing a controlled pressure load on the stacks to compress the articles so that a predetermined number of articles of each stack has a constant dimension;

c. means for removing a predetermined number of articles from said stacks thus constituting removed articles, said means including means for restraining the articles remaining in said stacks;

d. means for enclosing the removed articles in a shipping container having closure flaps thereon;

e. means for selectively adding additional articles to said enclosed removed articles to provide a desired number of articles within said container;

f. means for closing the closure flaps of said shipping container.

12. The method of packaging flat articles such as books or the like in a shipping container with a base number of said articles or in multiples of said base number in said container, said articles being stacked in said container in a plurality of side-by-side individual stacks, said method comprising the steps of:

a. placing said articles in side-by-side stacks with the sides of said articles in contact with each other;

b. imposing a load of a controlled amount whereby the number of articles within a given dimension of the stack is a constant;

c. removing a constant number of articles from said stacks and restraining the articles remaining in said stacks for subsequent removal;

d. enclosing the removed stacks in a container having a closure flaps thereon;

e. adding articles to said enclosed stacks selectively to provide a desired number of said articles within said container;

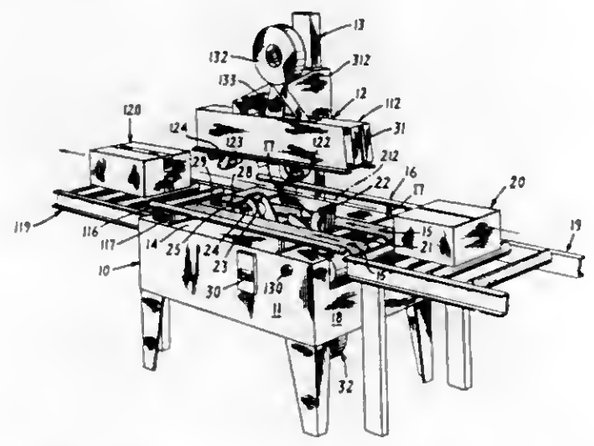
f. closing the closure flaps of said container.

4,028,865

CONTROL MECHANISM FOR CARTON SEALING MACHINE ELEVATOR HEAD

Winton Loveland, Fort Salonga; Horst J. Hanemann, Manhasset, both of N.Y., and Saul Warshaw, Hawley, Pa., assignors to The Loveshaw Corporation, Deer Park, N.Y.

Filed Jan. 14, 1976, Ser. No. 648,916
Int. Cl.² B65B *57/02*
U.S. Cl. 53—76 **5 Claims**



1. A tape sealing machine elevator head control equipment which avoids tipping up a loaded and tape-sealed carton as it is being advanced to the machine discharge end for withdrawal of its trailing end from beneath the lowered elevator head which bears by forces including gravity down on the flaps closing top of this carton during the application of the tape thereto, comprising

(1) powered means to raise the elevator head above the forward travel path of said flaps closing carton top and then to dictate the gravity loading thereof down on the carton top as the carton is being advanced through the machine for application of tape thereto, and

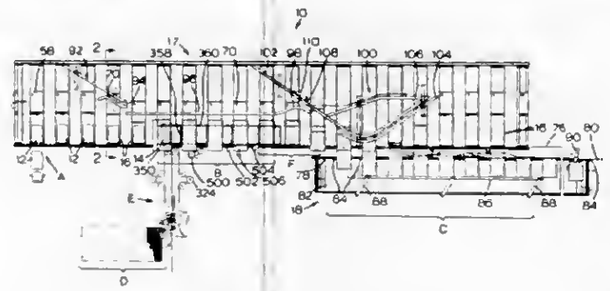
(2) control means responsive to the forwardly traveling carton in the vicinity of the machine discharge end section to activate said powered means for raising the elevator head up from the taped carton top for a relatively short period of time sufficient to relieve the carton back end of the load of the head as this carton back end is withdrawn from therebeneath and then as this taped carton travels beyond said head, drop the latter back down to its initial position for cooperation with the succeeding carton.

4,028,866

WRAP-AROUND CARTON FORMING MACHINE

Marinus J. M. Langen, Rexdale, Canada, assignor to H. J. Langen & Sons Ltd., Rexdale, Canada

Division of Ser. No. 553,269, Feb. 26, 1975, Pat. No. 3,968,623. This application Sept. 29, 1975, Ser. No. 617,310
Int. Cl.² B65B *11/22*
U.S. Cl. 53—195 **1 Claim**



1. In a wrap-around forming machine for forming cartons from carton blanks of the type having main body portions of different length and end closure flaps projecting from first and second edges of the main body portion, the improvement of

a. first longitudinally elongated conveyor means having a longitudinally elongated first end flap closure station extending in a first datum plane at a first longitudinal edge thereof, said first longitudinally elongated conveyor means being continuously driven through said first end flap closure station,

b. a second longitudinally elongated conveyor means having a longitudinally elongated second end flap closure station at a longitudinal edge thereof in a second datum plane which is disposed paralell to and laterally spaced from said first datum plane, said second longitudinally elongated conveyor being continuously driven through said second end flap closure station,

c. said first conveyor means having carton forming mandrels extending inwardly from said first datum plane on the side thereof remote from said second datum plane to receive carton blanks of various lengths with said first end edges of said main body portion thereof disposed in said first datum plane,

d. said second conveyor means having a longitudinally elongated upwardly directed support surface extending in an edge-to-edge spaced parallel relationship to said first longitudinally elongated conveyor means and disposed inwardly from said second datum plane on the side thereof remote from said first datum plane for receiving the carton blanks after closure of the first end thereof from said first conveyor and locating said second end edges of said main body portion in said second datum plane,

e. first end closure means in said first end flap closure station and operating in said first datum plane for closing said first end of said cartons as they are moved through said first end closure station by means of said first conveyor means,

f. said second end closure means in said second end flap closure station and operative in said second datum plane for closing said second ends of said cartons as they are moved through said second end closure station by means of said second conveyor means,

g. means for moving said partially closed cartons laterally from said first conveyor means to said second conveyor means, and

h. a longitudinally elongated rail having a length which is greater than twice the width of the cartons to be formed in the machine, said longitudinally elongated stop rail being disposed above said second conveyor means and extending longitudinally thereof parallel to said second datum plane, said stop rail being located inwardly from said second datum plane for engaging the first closed end of the carton as it is transferred onto said second conveyor means, and restraining the carton against lateral movement away from the second datum plane as the carton is driven continuously through the second end closure station,

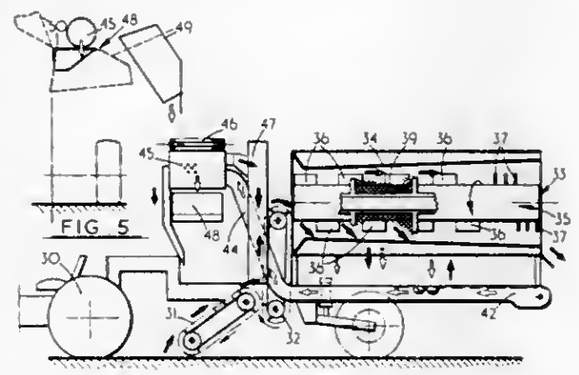
i. support means supporting said guide rail for movement towards and away from said second datum plane whereby the second end edge of main body portions of different lengths may be located in said second datum plane as said second conveyor moves said cartons through said second end closure station.

4,028,867

VINERS

Harold Wolstenholme, Bolton, England, assignor to Mather & Platt Limited, Manchester, England

Continuation of Ser. No. 589,828, June 24, 1975, abandoned, which is a continuation of Ser. No. 487,403, July 10, 1974, abandoned, which is a continuation of Ser. No. 386,901, Aug. 9, 1973, abandoned, which is a continuation of Ser. No. 208,266, Dec. 15, 1971, abandoned. This application Apr. 9, 1976, Ser. No. 675,407
Int. Cl.² A01D *45/24*
U.S. Cl. 56—12.8 **7 Claims**



1. In a mobile viner comprising coaxial rotatable riddle and beater drums defining therebetween a riddling and beating chamber for separating the edible crop from the vines, other vegetable matter, stones, and soil (hereinafter simply called "non-crop material"), the improvements wherein:

a. the non-crop material is discharged directly from the riddling and beating chamber onto the ground and

b. the ratio of the riddle drum diameter to the riddle drum length is between 1:2.60 and 1:3.20.

4,028,868

TOWABLE LAWN COMBER

Claude D. Zehrung, Jr., Lakewood, Colo., assignor to Bluebird International, Inc., Englewood, Colo.

Filed Feb. 23, 1976, Ser. No. 660,109
Int. Cl.² A01D *35/24*
U.S. Cl. 56—17.2 **6 Claims**

1. In a towable yard maintenance apparatus connectable to a tow bar which includes a transversely disposed powered shaft carrying rotatable working elements, with the shaft being supported in bearings at opposite end walls of an openbottom transverse hood, the improvement comprising:

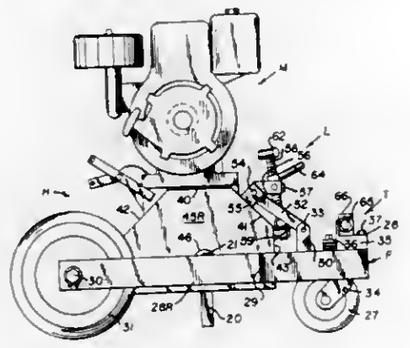
a. a wheel mounted frame structure embracing the hood, having a front member in front of the hood whose width is essentially the same as the width of the hood;

b. side members having forward portions extending rearwardly and outwardly from the ends of the front member and rearward portions extending alongside and rearwardly beyond the ends of said hood, with each side member forming a deflector to engage and to deflect the maintenance apparatus around obstructions encountered as the apparatus is being towed, and with the rearward

portion of each side member being spaced laterally and outwardly from the adjacent end wall of the hood to space the working elements away from the base of an obstruction which may be encountered;

c. front caster wheels underneath the front member supporting the front end of the frame;

d. rear wheels supporting the rear end of the frame mounted within structural pockets in the aforesaid side spaces formed by placing the side members laterally and outwardly from the adjacent end wall of the hood whereby to protect the rear wheels from engagement with obstructions alongside the apparatus;



e. means to lower and raise the hood and working element therein with respect to the frame and

f. a transversely axised tow bar connector at the front member permitting a tow bar connected thereto to swing in a vertical plane whereby the apparatus will ride upon the front and rear wheels at all times as it is pulled over uneven ground.

4,028,869

SPINNING MACHINE WITH AUTOMATIC SERVICE CARRIAGE

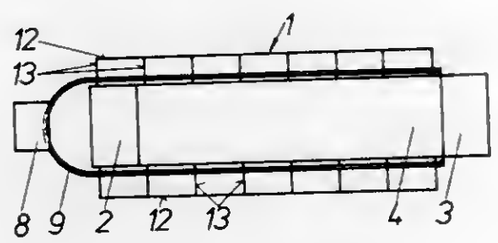
Augustin Schäfer, and Klaus Mogg, both of Ebersbach, Germany, assignors to Zinser Textilmaschinen GmbH, Ebersbach, Germany

Filed Nov. 24, 1975, Ser. No. 634,336

Claims priority, application Germany, Nov. 23, 1974, 2455495

Int. Cl.² D01H *13/16, 13/14, 15/00*

U.S. Cl. 57—34 R **6 Claims**



1. In a spinning machine which includes a plurality of spinning locations and including at least one servicing device capable of movement along said spinning locations, the improvement comprising:

control means for sending control signals from said spinning machine to said servicing device for effecting the movement of the servicing device including optionally servicing said locations during the movement; whereby the operation of said servicing device is dependent on operational states of said spinning machine.

4,028,870

METHOD AND DEVICE FOR PREVENTING CREATION OF FUZZY FIBERS OF YARN DURING TWISTING OPERATION OF THE MULTIPLE TWISTER

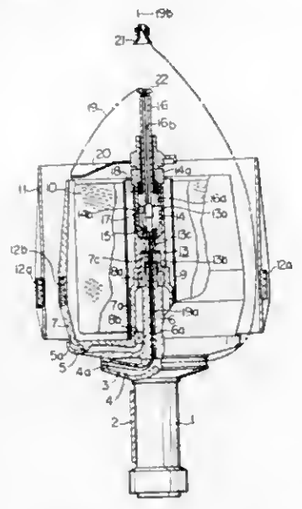
Nobumitsu Kawasumi, Nagoya; Shigeru Muramatsu, Okazaki; Mamoru Suzuki, Aichi, and Yoshiharu Yasui, Kariya, all of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Japan

Filed Aug. 4, 1975, Ser. No. 601,300

Claims priority, application Japan, Aug. 3, 1974, 49-89309; Dec. 27, 1974, 49-3645; Dec. 28, 1974, 49-2078

Int. Cl.² D01H *7/86*

U.S. Cl. 57—58.84 **18 Claims**



5. In a multiple twister provided with at least a first twisting zone and a second twisting zone successively arranged, a disc for reserving yarn on the peripheral surface thereof, means for introducing a yarn into said first twisting zone, said first twisting zone defined by a spindle provided with a hollow yarn passage coaxially arranged at a position below said yarn introducing means, said second twisting zone defined by said reserve disc rigidly mounted on said spindle and a yarn guide member disposed at a position above said yarn introducing means, said second twisting zone of said reserve disc being connected to a bottom of said hollow yarn passage of said spindle and provided with an outlet opening formed at an outer edge of said reserve dics, a device for eliminating the presence of fuzzy fibers of yarn during a twisting operation comprising, in combination, means for imparting tension to said yarn introduced into said yarn introducing means at a position upstream of said spindle, means for stroking fuzzy fibers projecting from a main body of said yarn against said main body while said yarn in said first twisting zone at a downstream position thereof with said tension imparting means, and second means for stroking fuzzy fibers projecting from a main body of a first twisted yarn delivered from said first twisting zone in said second twisting zone.

4,028,871

PROCESS AND APPARATUS FOR PRODUCING SPUN YARN

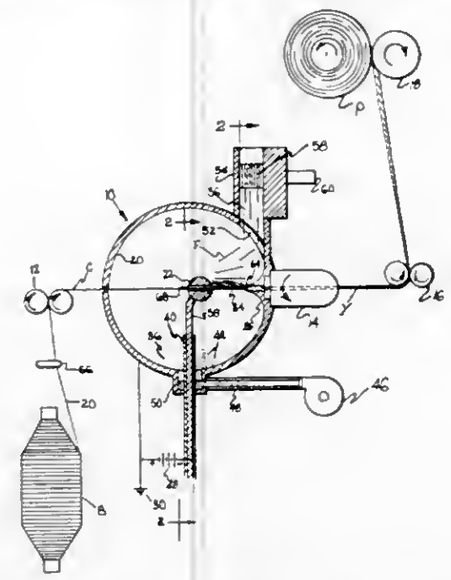
Frank A. Aschenbrenner, Matthews, N.C., assignor to Cor, Inc., Charlotte, N.C.

Filed Aug. 23, 1976, Ser. No. 716,824

Int. Cl.² D01H *1/12*

U.S. Cl. 57—58.89 **37 Claims**

16. Apparatus for producing spun yarn from staple fibers comprising means for producing an electrostatic field having a linear zone of increased field intensity, means for continuously feeding fibers to said electrostatic field for electrostatic migration of fibers by said field to said zone, said electrostatic field producing means including means for physically and electrically shielding said fibers in said linear zone from external disturbances, and means for twisting and withdrawing said fibers from said zone in the form of a spun yarn.



4,028,872

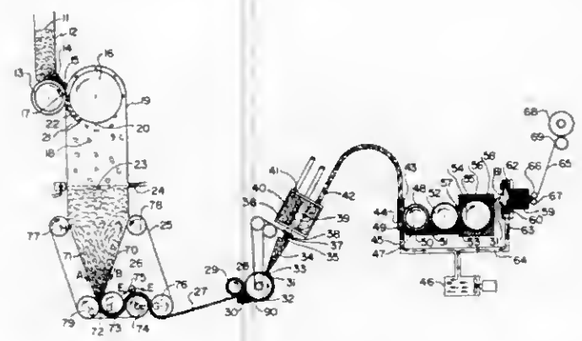
METHOD AND APPARATUS FOR PRODUCING YARN FROM FIBROUS TUFTS

James I. Kotter, Mandeville, and Craig L. Folk, New Orleans, both of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Apr. 30, 1976, Ser. No. 681,961

Int. Cl.² D01H *1/12;* **D01G** *15/00, 21/00*

U.S. Cl. 57—58.91 **9 Claims**



4. Apparatus for continuously producing yarn from fibrous tufts comprising in combination:

a. a means of forming textile fibers and tufts into a fibrous mass,

b. a means of plucking said fibrous mass from said textile forming means, thereby producing smaller tufts of fibrous material and separating foreign matter from said tufts,

c. a vertical chute with a minimum of air generated to receive and form small tufts into a verticle column of fiber tufts;

d. electronic sensors to maintain the density of said tufts of column (c) said sensors controlling a feed cylinder in an on-off mode of operation, thus controlling the tuft height and thus the density;

e. a low-force lap forming means to transform the column of fiber tufts of (c) into a lap;

f. a licker-in type intermediate opener means where said lap of (e) is drawn into and converted into opened fibers;

g. a pneumatic cleaning means to receive and clean the opened fibers of (f);

h. a pneumatic doffing means to doff said fibers of (g);

i. a transitional duct to feed said opened fibers by means of balanced equal air velocity gradients across said duct;

j. a distributing means to receive and equally disperse said fibers of (i);

k. a chamber to receive said dispersed fibers and wherein said fibers are blended and subdivided in said chamber;

l. said chamber comprising in combination a plurality of outlets to subdivide and equally disperse said fibers;

m. a multiplicity of mini-condensers to condense the fibers, said condenser comprising a means of separating the air stream from the fibers and allowing the air to be exhausted through a suction source;

n. an assembly means to assemble said fibers into identical fibrous ribbons;

o. open end spinners for further processing the ribbons into yarn.

4,028,873

RING SPINNING OR TWISTING MACHINE

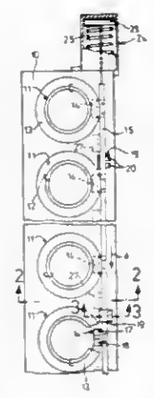
Günter Schulz, and Wolfgang Igel, both of Ebersbach, Germany, assignors to Zinser Textilmaschinen GmbH, Ebersbach, Germany

Filed Aug. 20, 1976, Ser. No. 716,152

Claims priority, application Germany, Aug. 29, 1975, 2538420

Int. Cl.² D01H *7/56*

U.S. Cl. 57—124 **12 Claims**



1. In a ring spinning or twisting machine which includes at least one row of rotatably mounted spinning or twisting rings having flanges, and including permanent magnet devices associated with the rings for generating eddy currents in said flanges when said rings are rotating to effect a reduction in the speed of rotation thereof, the improvement comprising:

movable carrier means for mounting thereon said permanent magnet devices, said carrier means being movably attached to said spinning machine so as to permit displacement of said permanent magnet devices in such a manner that the magnetic field from said permanent magnet devices penetrates said flanges in a first position during maximum eddy current generation and can be moved to at least one second position located substantially laterally adjacent to said flanges.

4,028,874

ROVING AND PROCESS FOR ITS MANUFACTURE

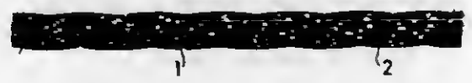
Fritjof Maag, Kelkheim, Taunus; Friedrich Unger, Hofheim, Taunus, and Wilhelm Mohr, Kelkheim, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Oct. 6, 1975, Ser. No. 620,149

Claims priority, application Germany, Oct. 7, 1974, 2447715

Int. Cl.² D02G 3/26, 3/38

U.S. Cl. 57—144 7 Claims



1. A roving consisting of a strand of spun fibers and at least one filament yarn wrapped around said strand, wherein the spun fibers are untwisted and unsized and the strand has a total titer of from about 1,000 to 30,000 dtex and the filament yarn has an elongation at break of less than 50%, the roving has a cohesion length of 15 to 500 meters and the number a wrappings of the filament yarn around the fiber strand is in the range of from 20 to 300 times per meter.

4,028,875

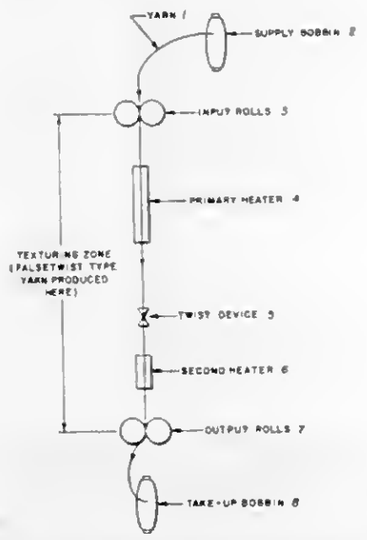
FALSE-TWIST TEXTURING PROCESS

Jing-Pelr Yu, and Donald G. Gilmer, both of Pensacola, Fla., assignors to Monsanto Company, Decatur, Ala.

Filed Mar. 13, 1975, Ser. No. 558,033

Int. Cl.² D01H 7/92; D02G 1/02

U.S. Cl. 57—157 TS 25 Claims



1. A method of processing thermoplastic multifilament feed yarn comprising first heatsetting the yarn in a twisted state at a given temperature under correlated tension to preclude ductility in the cooled yarn, thereby producing a torque yarn; thereafter, continuously and at a tension varying with the correlated tension only to the extent caused by heating and twisting, permitting the yarn to cool, causing the yarn to detwist, and thereafter reducing the torque with a second heat treatment the said yarn not being subjected to tension control between said first heatsetting and said second heat treatment.

4,028,876

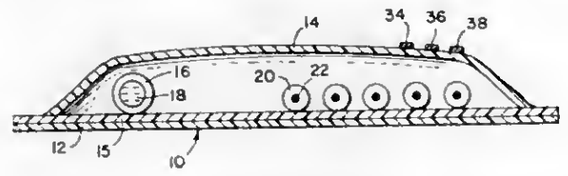
APPARATUS FOR VISUALLY INDICATING ELAPSED TIME BY A COLOR CHANGE

Jorge M. Delatorre, Leisure City, Fla., assignor to Lawrence Peska Associates, Inc., New York, N.Y.

Filed Mar. 5, 1976, Ser. No. 664,307

Int. Cl.² G04F 13/00

U.S. Cl. 58—1 R 7 Claims



1. Apparatus for visual indication of elapsed time by a color change comprising a transparent flexible enclosed receptacle means having a ruptureable sealed container therein, a first fluid chromophoric compound in said container, second chromophoric compound enclosed in a transparent organic film matrix within said receptacle, said first compound and said second compound comprising reactants that form a color body when contacted with one another, said organic film matrix being permeable by said first compound.

4,028,877

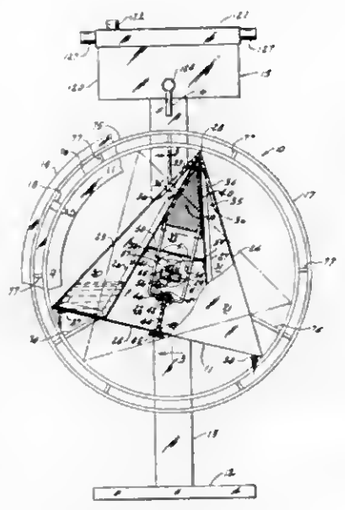
FLUID OPERATED CLOCK

Oskar F. Vatterott, Pacific, Mo., assignor to Jackson J. Shinkle, St. Louis, Mo.

Filed May 3, 1976, Ser. No. 682,713

Int. Cl.² G04B 45/00

U.S. Cl. 58—2 10 Claims



1. A fluid clock comprising:

a. support means.

b. pallet means including opposed fluid compartments each having an inlet opening and a discharge opening and a balance weight means,

c. pivot means mounting said pallet means to said support means for oscillative movement about a pivot center disposed below the combined center of gravity of said pallet means including the balance weight means,

d. a pair of limit means operatively engageable by said pallet means to determine the oscillative travel of said pallet means,

e. fluid supply means disposed to supply fluid to one of said inlet openings when the pallet means engages one of said limit means and to supply fluid to the other of said inlet openings when the pallet means engages the other of said limit means,

f. indicator means mounted in movable relation to the support means, and

g. drive means actuated by the pallet means to move the indicator means in time indicating relation.

4,028,878

CONTROL DEVICE FOR AN ELECTRONIC WRIST WATCH

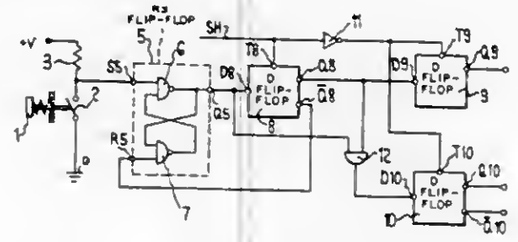
Willy Droz, Hauterive, and Jean-Luc Beguin, Neuchatel, both of Switzerland, assignors to Ebauches S.A., Neuchatel, Switzerland

Filed Nov. 25, 1975, Ser. No. 635,090

Claims priority, application Switzerland, Dec. 11, 1974, 16372/74

Int. Cl.² G04C 3/00

U.S. Cl. 58—23 R 6 Claims



1. A control device for electronic watches, comprising a push-button switch for providing a control signal, memory means having an input for receiving said control signal and an output, a memory signal appearing at said output of the memory means at least as long as said control signal is applied to said memory means, clock-controlled transfer means connected to said output of said memory means, said transfer means having output means connected to a reset input of said memory means for clock-controlled resetting of said memory means upon release of said switch and disappearance of said control signal, respectively, said output of said memory means and said output means of said transfer means being connected to a signal-combining circuit, and a first output circuit connected to said signal-combining circuit and a second output circuit connected to the output means of said transfer means, the state of the two output circuits varying in accordance with the duration of actuation of the pushbutton.

4,028,879

SWITCHING ARRANGEMENT FOR SETTING TIME-MEASURING APPARATUS

Gerhard Moegen, Neubaldham, Germany, and Edward Y. Tang, Los Altos, Calif., assignors to Eurosil G.m.b.H., Munich, Germany

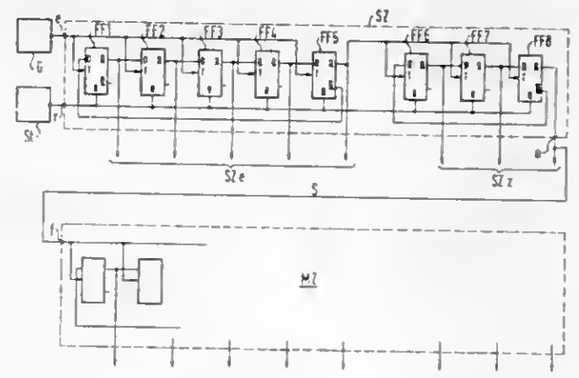
Filed July 24, 1975, Ser. No. 598,849

Claims priority, application Germany, July 26, 1974, 2436129

Int. Cl.² G04C 3/00

U.S. Cl. 58—23 R 14 Claims

1. A switching arrangement for setting or respectively adjusting a time-measuring device comprising at least two counters connected one after the other, of which a first counter changes counter position by count-pulses emitted by a generator circuit at successive intervals of time and the second counter receives a signal from the first counter upon transition of the first counter from one defined counter position into another defined counter position to cause an onward count of the second counter, and a control device for resetting the first counter, characterized in that the counting-range of the first counter is divided into two partial ranges of preferably at least approximately equal size, in one of which the first counter emits a defined first output signal and in the other of which the first counter emits a defined second output signal, and the control device being connected for resetting of the first counter out of a counter position lying in the first partial range into a first reset counter position lying in this first partial range for setting the time measuring device backward and resetting



of the said first counter out of a counter position lying in the second partial range into a second reset counter position likewise lying in the first partial range for setting the time-measuring device forward.

4,028,880

LIFE DISPLAY DEVICE OF A CELL INCORPORATED INTO AN ELECTRONIC TIMEPIECE

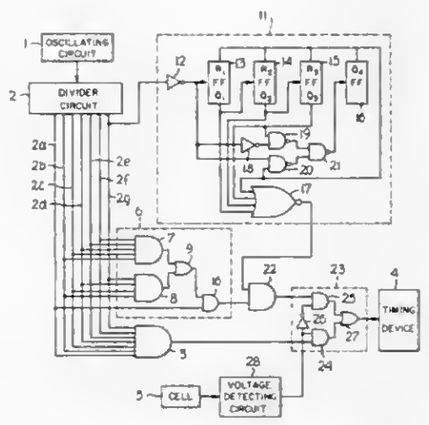
Takashi Ueda, Tokyo, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed Dec. 19, 1975, Ser. No. 642,338

Claims priority, application Japan, Dec. 25, 1974, 50-3562

Int. Cl.² G04C 3/00; G08B 21/00

U.S. Cl. 58—23 BA 6 Claims



1. In an electronic timepiece powered during use by a cell: an oscillating circuit for generating a high frequency output signal; a multi-stage divider circuit connected to said oscillating circuit for receiving therefrom the high frequency output signal and dividing it at successive stages to lower frequency output signals and providing at its last stage standard pulses suitable as a time standard; first gate circuit means connected to the stages of said multi-stage divider circuit for receiving the divided signals therefrom and gating therethrough higher frequency pulses than that of said standard pulses; control pulse generating circuit means for generating a given number of control pulses having a predetermined pulse width in successive predetermined periods; second gate circuit means connected to receive at its input both the higher frequency pulses and said control pulses and operative to gate therethrough a number of higher frequency pulses corresponding in number to said predetermined period within the duration of said predetermined pulse width; a timing device responsive to pulses applied thereto for indicating time; voltage detecting

circuit means connected to the cell for detecting the cell output voltage and providing one signal when the cell voltage is above a predetermined voltage level and another signal when the cell voltage drops below said predetermined voltage level; and third gate circuit means responsive to said one signal for gating said standard pulses to said timing device and responsive to said another signal for gating said higher frequency pulses to said timing device.

4,028,881

MECHANISM FOR CORRECTING CALENDAR IN A WATCH

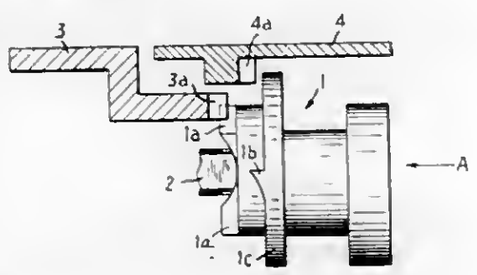
Yasuichi Nakagawa, Kashiwa, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed July 17, 1975, Ser. No. 596,607

Claims priority, application Japan, July 26, 1974, 49-85899[U]

Int. Cl.² G04B 19/24

U.S. Cl. 58—58 2 Claims



1. In a calendar watch: a rotatable date wheel having teeth therearound; a rotatable day wheel having teeth therearound; an axially slidable winding stem mounted for rotation; and means including a correcting wheel mounted for axial sliding movement on said winding stem and having a first set of teeth engageable with teeth on said date wheel when said winding stem is in a predetermined axial position for effecting rotational movement of said date wheel to make a date correction in response to turning of said winding stem in one rotational direction and having a second set of teeth engageable with teeth on said day wheel when said winding stem is in said predetermined axial position for effecting rotational movement of said day wheel to make a day correction in response to turning of said winding stem in the other rotational direction.

4,028,882

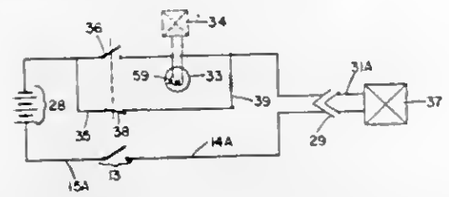
AWAKENING SYSTEM WITH MEANS ADAPTED TO RELAX TENSE MUSCLES

Hrand M. Muncheryan, 1735 N. Morningside St., Orange, Calif. 92667

Filed Feb. 19, 1976, Ser. No. 659,323

Int. Cl.² G04B 47/00; G04C 23/12

U.S. Cl. 58—152 B 21 Claims



1. An awakening system with means adapted to relax tense muscles, comprising: a first electrical unit and a second electrical unit connected theretogether through an elongated connecting means; said first electrical unit comprising a housing having therein a timing mechanism provided with a movable lever means actuated thereby, said timing mechanism receiving a current for operation thereof from an external current source, a current-switching means disposed in said housing and mechanically connected to said movable lever means for actuation thereby and electrically connected to said elongated connecting means; said timing mechanism having means adapted to set the timing of said timing mechanism to any predetermined time of the day; said second electrical unit having a housing containing therein an electrical circuit and means for producing resonant pulsations disposed in said electrical circuit and intimately connected to said housing; an electric source disposed within the electric circuit of said means for producing resonant pulsations and connected thereto for providing an energization current transmitted thereto through said current-switching means, said means for producing resonant pulsations comprising, in the circuit thereof, a vibratory means and a current interrupter means; a current bypass means is connected in the circuit of said means for producing resonant pulsations in electrically parallel relation to said current interrupter means; said current-switching means actuated by said movable lever means is provided with means to electrically connect and disconnect the current to said means for producing resonant pulsations in the housing of said second electrical unit; a current control means having a current-channeling means is disposed in one wall of the housing of said first electrical unit and connected in the electrical circuit of said means for producing resonant pulsations and is adapted to switch the current supplied thereto from one of interrupted mode of operation through said current interrupter means to one of continuous mode of operation by disconnecting the current in said current interrupter means and channeling said current through said current bypass means into said means for producing resonant pulsations; said means for producing resonant pulsations is adapted to be placed under the pillow of a sleeper desirous of waking up at a predetermined time of the day, whereby when said current-switching means located within the housing of said timing mechanism is actuated by the movable lever means of said timing mechanism at the predetermined time of the day to which said timing mechanism has been set to actuate said movable lever means, said means for producing resonant pulsations receives a current from the electric source, disposed within the circuit thereof, through said current interrupter means and produces repeated resonant pulsations which are transmitted through the pillow to the sleeper, and, when said current control means is switched in a manner to electrically isolate said current interrupter means from the circuit of said means for producing resonant pulsations, said latter means receives through said current bypass means a continuous current transmitted thereto from said electric source in the circuit thereof and resonants with a steady, recurring vibratory pulsations, which when transmitted to the tired muscles of a person produces in the muscles microcontractions and relaxations and thereby soothes the muscles thereof to a relaxed physical condition.

4,028,883

GENERATING PLANT AND METHOD OF STARTING UP A GENERATING PLANT

Helmut Meyer-Kahrweg, Wuppertal-Langerfeld, Germany, assignor to Steag Aktiengesellschaft, Essen, Germany

Filed July 28, 1975, Ser. No. 599,384

Claims priority, application Germany, Aug. 6, 1974, 2437782

Int. Cl.² F02C 3/26, 7/26

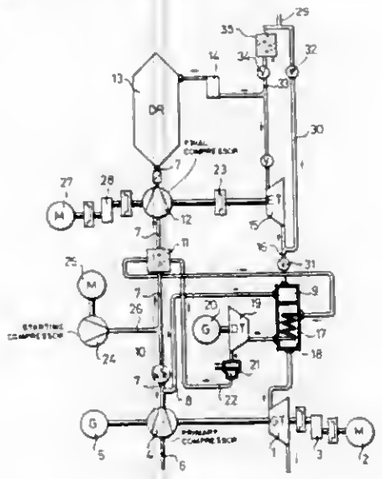
U.S. Cl. 60—39.04 9 Claims

1. A method of starting up a generating plant, a generator of which is driven by a gas turbine operable by combustion gases produced from gas coming from a carbon pressure reactor, the carbon pressure reactor obtaining the combustion air necessary for its operation from a primary compressor driven by the gas turbine and a final compressor connected at the outlet side of the primary compressor and driven by an external power source and an expansion turbine connected between the pressure reactor and a combustion chamber which produces the combustion gases, said plant having a starting compressor for providing combustion air to the final compressor during start up, said method comprising the steps of:

energizing the starting compressor to compress auxiliary air for the carbon pressure reactor;

energizing the final compressor with the external power source independently of the expansion turbine to further compress the auxiliary air and provide same to the carbon pressure reactor;

operating the carbon pressure reactor responsive to the supply of compressed auxiliary air to produce combustible gases;



accelerating the expansion turbine toward operating speed with the combustible gases;

supplying the combustible gas to the combustion chamber when the quantity of gas produced exceeds a predetermined level and burning it there to produce combustion gases;

driving the gas turbine and primary compressor with the combustion gases from the chamber;

deenergizing the starting compressor; and

transferring the energization of the final compressor from the external power source to the expansion turbine in accordance with the supply of combustible gases from the carbon pressure reactor.

4,028,884

CONTROL APPARATUS FOR CONTROLLING THE OPERATION OF A GAS TURBINE INLET GUIDE VANE ASSEMBLY AND HEAT RECOVERY STEAM GENERATOR FOR A STEAM TURBINE EMPLOYED IN A COMBINED CYCLE ELECTRIC POWER GENERATING PLANT

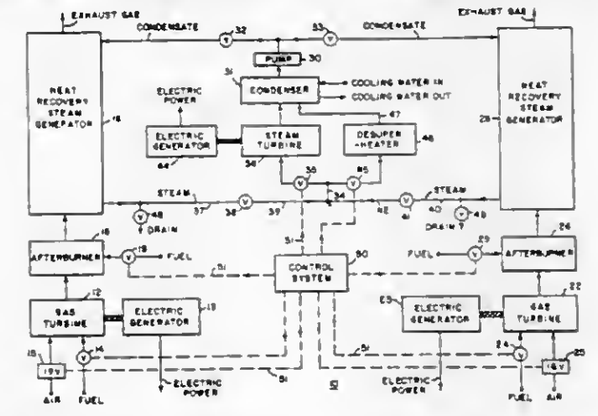
Lyle F. Martz, Verona; Jack R. Smith, Pittsburgh; Francis A. Lebonette, Swarthmore; Robert A. Putnam, Elverson, and Paul A. Berman, Plymouth Meeting, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 27, 1974, Ser. No. 537,036

Int. Cl.² F02C 7/02

U.S. Cl. 60—39.18 B 14 Claims

1. A load control system for a combined cycle electric power plant including a gas turbine having an exit through which heated exhaust gases pass, a variable inlet guide vane assembly for controlling the flow of air to said gas turbine and actuating means therefor, means for generating steam coupled to said gas turbine exit for transferring heat from the exhaust gases to a fluid passing through said steam generating means, a steam turbine coupled to said steam generating means and driven by the steam by the steam supplied thereby, means for generating electric power by the driving power of each of said turbines, an afterburner for supplying additional heat to the exhaust gases passing from said gas turbine to said steam generating means, and valve means for controlling the fuel flow to said afterburner, said load control system comprising means for controlling the fuel flow to said gas turbine in response to inputs including a plant load demand to provide for plant load changes between gas turbine minimum load and gas turbine base load at a relatively fast rate limited by gas turbine limitations until minimum afterburner firing occurs and at a slower rate limited by steam turbine limitations after minimum afterburner firing, means for controlling the position of said



afterburner fuel valve means to provide steam under predetermined temperature conditions as the gas turbine loading is increased at the gas turbine limited rate between the gas turbine minumum load and a first higher gas turbine load at and above which minimum afterburner firing occurs, means for controlling the position of the gas turbine inlet guide vanes, and means for controlling the flow of steam to said steam turbine in a follow mode.

4,028,885

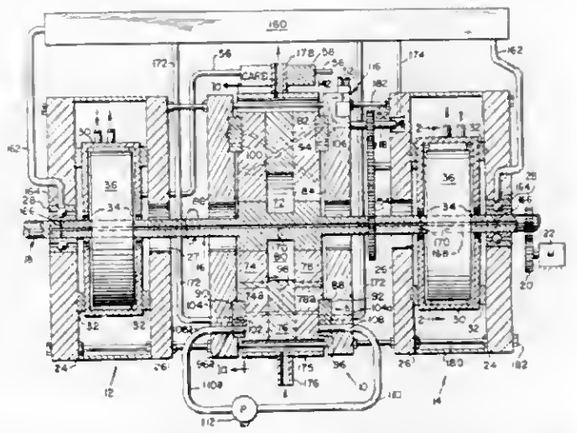
ROTARY ENGINE

Thomas J. Ganley, 46-08 195th St., Flushing, Queens County, N.Y. 11358, and Eamon P. Cronin, 116 Prospeck Park West, Brooklyn, N.Y. 11215

Continuation-in-part of Ser. No. 163,020, July 15, 1971, abandoned. This application Apr. 22, 1974, Ser. No. 463,132

Int. Cl.² F02C 5/06

U.S. Cl. 60—39.75 13 Claims



1. A rotary engine comprising a stationary housing for having a drive rotor and a compressor, a drive shaft journalled in said housing concentrically mounting said drive motor for rotation therewith, said drive rotor comprising at least one rotating plate having a plurality of separate transverse holes extending the entire width of said drive rotor, a rotary compressor mounted on said drive shaft for rotation therewith near said drive rotor, a source of combustible fluid, means connecting said source of combustible fluid with said rotary compressor for directing said combustible fluid to said one rotary compressor, feed means mounted between said rotary compressor and said drive rotor for sequentially feeding discrete portions of said combustible fluid from said one rotary

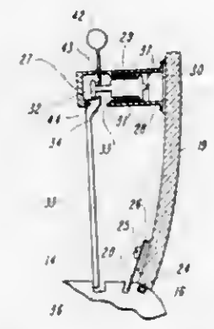
compressor to said drive rotor in timed relationship with the passage of predetermined ones of said holes of said drive rotor, means for igniting the discrete portions of said combustible fluid prior to reaching the associated one of said holes of said drive rotor, said feed means comprising a collector chamber having one movable wall for varying the volume of said collector chamber, a rotatable hollow control shaft having at least one opening formed on the circumference thereof for allowing compressed combustible fluid stored in said collector chamber to enter into the interior of said hollow control shaft upon the alignment of said at least one opening with said collector chamber, first gear means mounted about said hollow control shaft and second gear means mounted about said drive shaft near said first gear means and meshing therewith, whereby the rotation of said hollow control shaft is controlled in timed relation with said drive shaft so that compressed combustible fluid is supplied to said means for igniting in timed sequence, conduit means connecting said means for igniting said combustible fluid with said drive rotor for delivering the ignited fuel to said predetermined ones of said holes rotatably driving said drive rotor, means for lubricating said drive rotor, said drive shaft, and said at least one rotary compressor, and housing means housing said drive rotor and said rotary compressor.

4,028,886

PASSIVE CHAMBER WALL FRAGMENTER

Robert D. Hackett, Florissant, Mo., assignor to McDonnell Douglas Corporation, St. Louis, Mo.

Filed Oct. 23, 1975, Ser. No. 624,784
Int. Cl.² F02K 9/04, 7/10
U.S. Cl. 60—245 **10 Claims**



1. In a chamber separator wall fragmenter, the combination of a body having adjacent chambers subject to different pressure conditions, a separator wall positioned in said body to interrupt communication between said body chambers, releasible means engaged with one surface of said separator wall and with the surface of one chamber, release by said releasible means permitting said separator wall to move bodily into the other of said adjacent chambers, and means carried by said separator wall in position to fragment said separator wall upon predetermined bodily movement thereof into said other chamber.

4,028,887

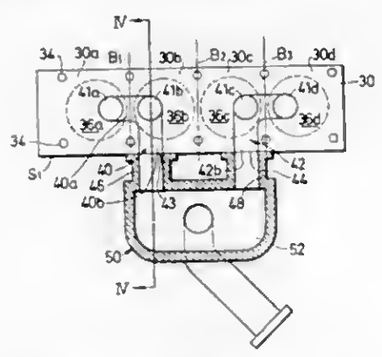
INTERNAL COMBUSTION ENGINE WITH IMPROVED EXHAUST PORT

Saburo Tsutsumi, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Mar. 12, 1976, Ser. No. 666,317
Claims priority, application Japan, Mar. 15, 1975, 50-31571
Int. Cl.² F01N 3/00
U.S. Cl. 60—282 **14 Claims**

1. An internal combustion engine having two cylinders in the cylinder block of the engine, comprising:

a cylinder head secured to the top portion of the cylinder block by head bolts and defining at bottom portion thereof two combustion chambers which are respectively communicated with the two cylinders, said cylinder head having an exhaust port formed therein, said exhaust port including a first portion connectable between said two combustion chambers and a second portion connecting at one end thereof to the first portion and at the other end thereof opening to a longitudinal side of said cylinder



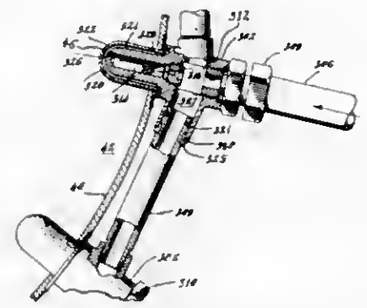
head for forming an opening through which the exhaust gases are emitted out of the cylinder head, the opening being located at one of the two portions of the cylinder head which two last mentioned portions are separated by an imaginary intermediate vertical plane, perpendicular with respect to the longitudinal axis of the cylinder head, between the adjacent two combustion chambers.

4,028,888

FUEL DISTRIBUTION MANIFOLD TO AN ANNULAR COMBUSTION CHAMBER

Karol Pilarczyk, Loudonville, N.Y., assignor to Norwalk-Turbo Inc., Latham, N.Y.

Division of Ser. No. 466,877, May 3, 1974. This application Apr. 25, 1975, Ser. No. 571,791
Int. Cl.² F02C 7/22
U.S. Cl. 60—39.32 **3 Claims**



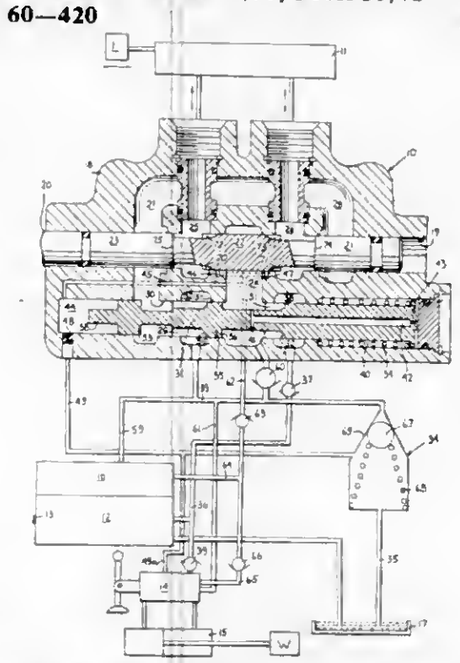
1. A fuel distribution manifold system for feeding fuel to an annular combustion chamber of a gas turbine comprising an assembly of a plurality of individually removable fuel nozzles positioned about the periphery of the combustion chamber, fuel distributing tubes interconnecting the adjacent fuel nozzles for passage of fuel between the removable fuel nozzles, nozzle coupling means integrally formed with the nozzles for slidably receiving the ends of the fuel distributing tubes for sliding movement of the fuel distributing tubes along their longitudinal axes while the nozzles remain in position to permit the ready removal of any individual nozzle means in the assembly by disconnecting it from interconnection with adjacent nozzles without disturbing any other nozzle in the assembly, each nozzle coupling means including two oppositely disposed annular flange means to receive, in sliding arrangement, the ends of fuel distributing tubes, at least one of the annular flange means having sufficient length to allow sufficient sliding movement of the end of the tube received thereby so that the opposite end of the same tube disengages the annular flange means of an adjacent fuel nozzle, and means for feeding fuel to the assembly.

4,028,889

LOAD RESPONSIVE FLUID CONTROL SYSTEM

Tadeusz Budzich, 80 Murwood Drive, Moreland Hills, Ohio 44022

Continuation-in-part of Ser. Nos. 559,818, March 19, 1975, Pat. No. 3,984,979, and Ser. No. 655,561, May 2, 1976. This application Oct. 5, 1976, Ser. No. 729,696
Int. Cl.² F15B 11/16; F16H 39/46
U.S. Cl. 60—420 **26 Claims**



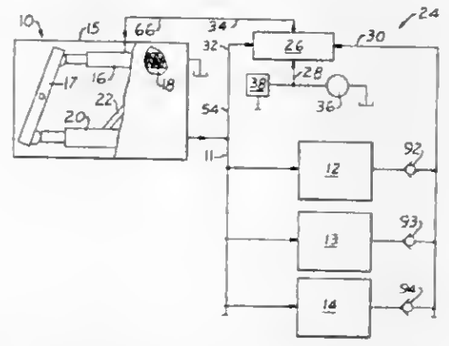
1. Multiple load responsive valve assemblies each comprising a housing having a fluid inlet chamber connected to pump means, a fluid supply chamber, first and second load chambers, outlet fluid conducting means, and fluid exhaust means connected to reservoir means, first valve means for selectively interconnecting said fluid load chambers, said fluid supply chamber and said fluid exhaust means, pressure sensing port means selectively communicable with said load chambers by said first valve means, variable metering orifice means responsive to movement of said first valve means and operable to throttle fluid flow between said fluid supply chamber and said load chambers, second valve means having inlet fluid throttling and fluid isolating means between said fluid inlet chamber and said fluid supply chamber, said second valve means responsive to pressure differential acting across said variable orifice means, fluid replenishing means to interconnect for fluid flow said fluid supply chamber and said fluid exhaust means when said fluid isolating means isolates said fluid supply chamber from said fluid inlet chamber and third control valve means connected to said inlet chambers of said valve assemblies, control line means interconnecting said third control valve means with said control signal passage means of said valve assemblies, control signal direction phasing means in each of said control line means, said third control valve means responsive to highest pressure in any of said load chambers of valve assemblies operating loads and operable to vary fluid flow delivered from said pump means to said load system to maintain a constant pressure differential between pressure in said inlet chambers and said maximum pressure in said load chamber.

4,028,890

PISTON PUMP ASSEMBLY UTILIZING LOAD PRESSURE CONTROL

Cyril W. Habiger, and Donald L. Hopkins, both of Joliet, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Jan. 23, 1976, Ser. No. 651,887
Int. Cl.² F04B 1/26
U.S. Cl. 60—443 **6 Claims**



1. In a piston pump assembly having a housing, an angularly adjustable swash plate for controlling the volume of fluid discharging from the pump to work element, a servo valve having a biasing means and being positioned in contact with the swash plate at a location sufficient for biasing the swash plate toward one of a maximum or minimum fluid discharge position, and means positioned in contact with the swash plate at a location sufficient for biasing the swash plate toward the other fluid discharge position, said means being in communication with fluid discharging from the pump for biasing the swash plate in response to the pressure of the discharging fluid, the improvement comprising:

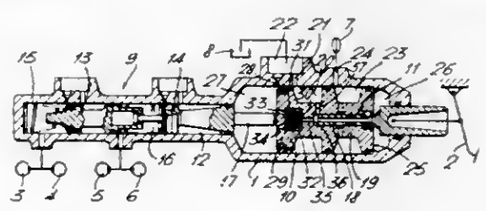
control means for imparting a resultant biasing force directly onto the servo valve of the swash plate for biasing the swash plate through the servo valve in response to the resultant biasing force, said resultant biasing force being a substantially constant pressure control fluid stream as modified by a load pressure acting in opposition to fluid discharging from the pump.

4,028,891

BOOSTER BRAKE UNIT

Juan Belart, Walldorf, Germany, assignor to ITT Industries, Inc., New York, N.Y.

Filed Nov. 7, 1975, Ser. No. 630,116
Claims priority, application Germany, Dec. 23, 1974, 2461295
Int. Cl.² B60T 13/16
U.S. Cl. 60—550 **10 Claims**



6. A booster brake unit comprising:

a master cylinder having a longitudinal axis;

at least one master-cylinder piston having a given diameter disposed in said master cylinder coaxial of said axis;

a booster housing connected to said master cylinder coaxial of said axis;

a booster piston disposed in said booster housing coaxial of said axis for displacing said master-cylinder piston, said booster piston having a diameter greater than said given diameter and an actuation surface at one end thereof remote from said master-cylinder piston;

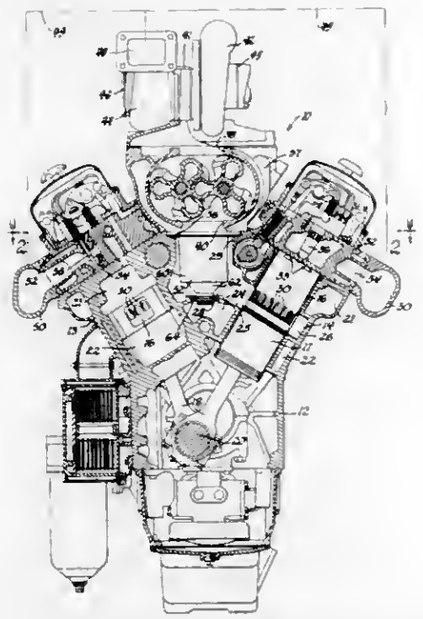
a pressure source;
a brake pedal;
a pressure-control valve coupled between said source and said actuation surface, said pressure-control valve being coupled to said brake pedal to control pressure applied to said actuation surface from said source by said brake pedal;
a pressure chamber disposed within said booster housing coaxial of said axis between adjacent ends of said master-cylinder piston and said boster piston for hydraulic transmission of the force of said booster piston to said master-cylinder piston;
a feed chamber disposed in a wall of said booster housing;
a two-position valve; and
a connection within said booster housing connecting said pressure chamber to said feed chamber via said two-position valve;
said two-position valve being held in a closed position by the force of a spring and said pressure of said source;
said two-position valve including
a spring-loaded member disposed in said booster piston adjacent the other end thereof coaxial of said axis, said member being in pressure communication with said pressure chamber on one side thereof and said valve on the other side thereof.

4,028,892

TURBOCHARGED TWO-CYCLE ENGINE WITH POSITIVE BLOWER AND INTERNALLY MOUNTED AFTERCOOLER

Stanley J. Hinkle, Union Lake, Mich., assignor to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 504,089, Sept. 9, 1974, abandoned. This application Jan. 10, 1975, Ser. No. 540,122
Int. Cl.² F02B *29/04, 33/38, 75/02*
U.S. Cl. 60—599 **1 Claim**



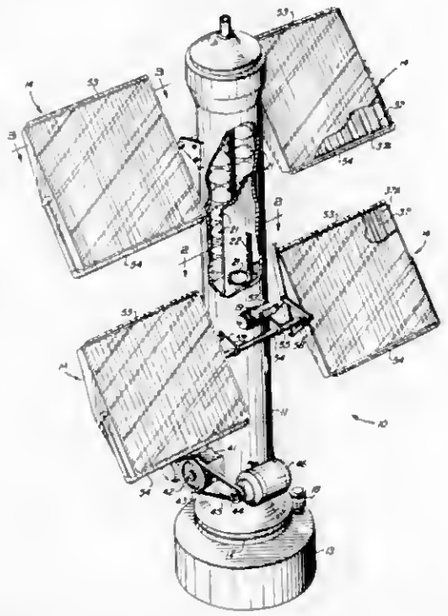
1. A two-cycle diesel engine including a cylinder block,
a plurality of cylinders in said block arranged in two angularly disposed banks, said cylinders having air inlet ports intermediate the ends thereof, said block defining an air chamber adjacent said inlet ports and extending around said cylinders and between said banks above a bottom wall, and a coolant chamber extending around said cylinders and beneath said air chamber bottom wall between said cylinders,
cylinder heads mounted one on each of said banks and closing the ends of said cylinders, said heads having valve controlled exhaust ports connecting with each of said cylinders,
a crankshaft carried for rotation in said cylinder block,
pistons reciprocably disposed in said cylinders and connected with said crankshaft for delivery of power thereto,
a positive displacement blower mounted on said block between said heads and connected with said crankshaft for rotation therewith, said blower having an outlet connected to deliver air directly to said block defined air chamber and operative to supply air thereto upon rotation of said crankshaft,
a turbocharger including a turbine connected with said exhaust ports and a dynamic compressor driven by said turbine and connected to supply pressurized air to said positive displacement blower, and the improvement comprising
an aftercooler mounted in said block beneath said blower at its outlet and within said air chamber to receive air from said blower, said aftercooler being connected with said coolant chamber to receive engine coolant therefrom to cool the air passing from said blower to said air chamber, said after-cooler including a plurality of airflow passages and a plurality of coolant passages arranged in heat exchange relation with said air passages, said airflow passages having a total cross-sectional area not greater than that of said blower outlet so as to provide a high airflow velocity in said air passages to obtain efficient heat transfer and avoid plugging, said air passages being directed toward said bottom wall and terminating thereabove such that the outlet air is directed against said bottom wall for further cooling and then outwardly toward said cylinders, the space between said bottom wall and the ends of said aftercooler passages being small enough to maintain an airflow velocity in said space adequate to prevent pressure pulsations at the cylinder ports from causing flow reversals in the portion of the air chamber under the cooler, thereby avoiding backflow of carbon and other foreign matter from the cylinders to the aftercooler.

4,028,893

OPEN CYCLE SOLAR ENERGY SYSTEM UTILIZING BUOYANCY AS A CONVERSION FORCE

John B. Shaw, 1812 E. Marlette, Phoenix, Ariz. 85016

Filed Apr. 3, 1975, Ser. No. 564,763
Int. Cl.² F03G *7/02*
U.S. Cl. 60—641 **8 Claims**



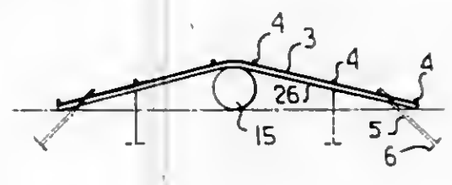
1. A method of generating mechanical movement from the buoyancy effect of a gas comprising the steps of:
compressing a relatively low temperature gas in a sequence of containers as they move from substantially the top to substantially the bottom of a conveyor through a substantially vertically positioned first liquid containing column means,
removing most of the heat energy of compression from the gas as it is being compressed in its movement from the top to the bottom of the first liquid,
extracting the compressed gas from the first liquid containing column means,
adding heat energy to said gas, and
injecting the compressed and heated gas into a second liquid containing column adjacent its base and into a sequence of interconnected gas retaining containers mounted on an endless conveyor positioned in said second column longitudinally of its length and moving from the bottom to the top of said second liquid containing column,
said gas buoyantly expanding in the containers casuing said containers and said endless conveyor to move around a fixed path thereby generating useful mechanical movement, and
releasing the expanded gas from said containers at a substantially topmost point along the fixed path of movement of the conveyor to atmosphere.

4,028,894

APPARATUS FOR PREVENTING EROSION OF THE SEABED IN FRONT OF HYDRAULIC STRUCTURES

Ole Fjord Larsen, 62-Fasanvaengent P.O. Box 604 DK 6700, Eshjerg, Denmark

Filed Aug. 14, 1975, Ser. No. 604,837
Int. Cl.² E02B *3/04*
U.S. Cl. 61—3 **7 Claims**



1. A device for producing and protecting deposits of sedimentary material on the floor of a body of water and specifically preventing the undermining of an elongated marine structure, said device including at least a single longitudinally extending sheet, said single longitudinally extending sheet being composed of at least two layers of perforate material, means joining said layers together at selected points, and said single longitudinally extending sheet having first and second opposite longitudinally extending side portions, a first of said longitudinally extending side portions being contiguous of said elongated marine structure remote from said floor, a second of said longitudinally extending side portions being contiguous of said elongated marine structure adjacent said floor, said sheet diverging in a direction toward said floor away from said elongated marine structure at an angle to said floor of between generally 10–30 degrees, means for maintaining said side portion so positioned relative to said floor, and an uppermost of said layers being taut relative to a looser lowermost of said layers whereby relative upward movement of the lowermost layer toward the upper most layer is permitted.

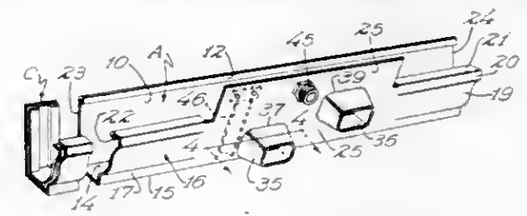
4,028,895

RAIN GUTTER ATTACHMENT

Alvin W. Franzmeier, 1042 E. Jenks Ave., St. Paul, Minn. 55106

Filed Nov. 14, 1975, Ser. No. 631,819
The portion of the term of this patent subsequent to June 17, 1992, has been disclaimed.
Int. Cl.² E02B *9/04;* **E04D** *13/06*
U.S. Cl. 61—14 **10 Claims**

1. An attachment for a rain gutter of substantially uniform cross section and including an inner side adapted for attachment to the eaves of a building, a bottom side, and an outer side of other than flat form, said attachment including a gutter section including end portions conforming to the cross sectional shape of the rain gutter, and a flat central portion on the outer side of said attachment, said flat central portion having



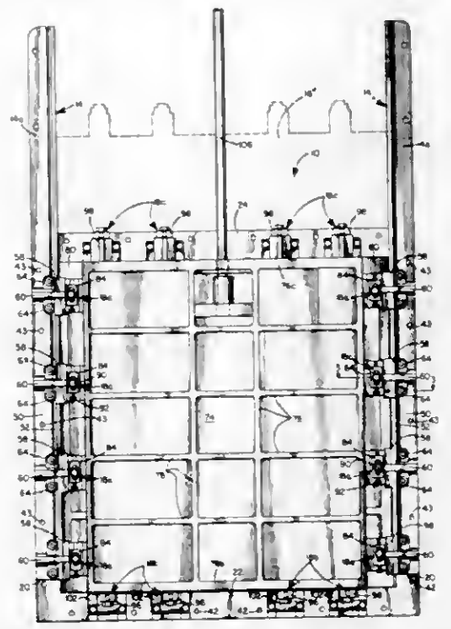
a pair of spaced apertures extending therethrough, one of said apertures being adjacent to the bottom wall of said attachment and the other aperture being above the level of, and offset from, the first mentioned aperture.

4,028,896

SLUICE GATE ASSEMBLY

George E. Whipps, Athol, Mass., assignor to Rodney Hunt Company, Orange, Mass.

Filed Mar. 4, 1976, Ser. No. 663,842
Int. Cl.² E02B *7/28*
U.S. Cl. 61—28 **5 Claims**



1. A sluice gate assembly comprising in combination: an integrally cast frame surrounding an opening and having a generally L-shaped cross-section defined by coplanar side, bottom and top flange sections with inner side, bottom and top walls protruding from the inner edges thereof, the inner side walls on said side flange sections extending along opposite sides of said opening, with a plurality of spaced bosses on said frame at the juncture between said inner side walls and said side flange sections; a pair of elongated guide members having base and guide flanges, said base flanges being secured to the upper surfaces of said bosses, said guide flanges having guide grooves formed exclusively thereon and extending along opposite sides of said opening and above said opening along upper sections of said guide members which upper sections protrude above said frame; a gate disc having side edges received in sliding engagement in said guide grooves, said gate disc being movable between an open position in part at least above said opening and closed position lying across said opening; and, wedge members on said gate disc cooperating with seat members on said frame and said guide members for wedging said gate disc into sealing engagement with said frame when said gate disc is in said closed position.

4,028,897

SOIL STABILIZATION COMPOSITION

Donald Alfred Bennett, Nailsworth, England, assignor to The International Synthetic Rubber Company, Limited, Southampton, England

Filed June 7, 1976, Ser. No. 693,929

Claims priority, application United Kingdom, June 10, 1975, 24806/75

Int. Cl.² E02D 3/12

U.S. Cl. 61—36 C 8 Claims

1. A process for stabilisation of soil or other particulate matter which comprises applying a composition formed from a natural or synthetic rubber latex, of solids content at least 40% by weight, and a compatible oil characterised in that the composition is prepared by admixing the oil and the latex in the presence of a non ionic surfactant as additional emulsifier and in the substantial absence of added water.

4,028,898

PIT PROP ASSEMBLY

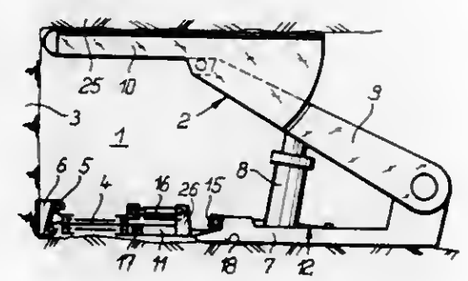
Günter Blumenthal, Westerholt, and Hans-Ferdinand Bemmerl, Herne, both of Germany, assignors to Bochumer Eisenhutte Heintzmann & Company, Bochum, Germany

Filed May 11, 1976, Ser. No. 685,163

Claims priority, application Germany, May 17, 1975, 2522117

Int. Cl.² E21D 15/44

U.S. Cl. 61—45 D 15 Claims



1. In a mining assembly comprising: a face conveyor extending along a mine floor; an elongated slide defining a longitudinal direction transverse to the direction of extension of said conveyor and having a front end pivoted on said face conveyor and a rear end turned away from said face conveyor; a pair of pit props having floor-engaging elongated bases flanking said slide and each having a front end turned said conveyor and a rear end turned away from said conveyor; displacement means including a longitudinally extending fluid-operated ram pivoted on said front ends of said bases and on said rear end of said slide for longitudinally relatively displacing said slide and said bases, whereby when said face conveyor is fixed said ram can longitudinally displace said props and when said props are fixed said ram can longitudinally displace said conveyor; and positioning means on said front end of said slide and connected to said face conveyor for vertically displacing said conveyor relative to said front end of said slide, whereby upward displacement of said conveyor by said positioning means urges said front end of said slide downwardly and said rear end of said slide upwardly and downward displacement of said conveyor by said positioning means urges said front end of said slide upwardly and said rear end of said slide downwardly, the improvement wherein each of said bases has at its rear end a side turned toward said slide and said slide has at its rear end opposite lateral sides each turned toward and forming a pair with the confronting side of the respextive base, each pair of confronting sides having interengaging formations one of which engages over and under the formation of the other side of the respective pair, one of said formations being elongated in said longitudinal direction.

4,028,899

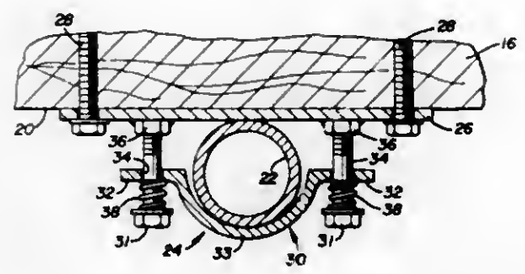
ANCHORING SYSTEM FOR A FLOATING DOCK

Daniel A. Carmichael, III, P.O. Box 112, Cedarville, Mich. 49719

Filed Jan. 14, 1976, Ser. No. 648,976

Int. Cl.² E02B 3/20

U.S. Cl. 61—48 1 Claim



1. In combination; a bouyant floating dock having a substantially horizontal deck and opposite, vertical side walls; a pair of relatively spaced apart parallel and substantially stationary cylindrical piles extending vertically upwardly and closely adjacent the opposite side walls of said dock; vertically elongated substantially flat bearing plates secured to the respective side walls of said dock and arranged for vertically extended line contact with said piles along one side thereof; vertically elongated clamps having inner arcuate bearing surfaces of greater radius of curvature than the cylindrical surface of said piles and disposed in vertically extended line contact with said piles along the sides thereof opposite said bearing plates; and means connecting said clamps with said bearing plates and for maintaining said clamps and bearing plates in sliding, line contact with said piles, said bearing plates and clamps permitting said dock to rise and fall between said piles with gradual changes in water level while holding said dock against rocking movement in response to wave action.

4,028,900

PILE WITH A FOOT

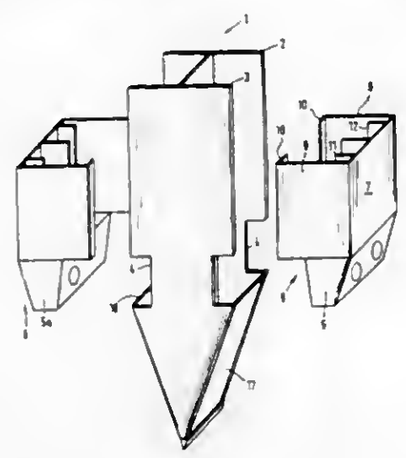
Günther Müller, 3550 Marburg, L-Wehrda, Germany

Filed Feb. 24, 1976, Ser. No. 660,984

Claims priority, application Germany, Feb. 24, 1975, 2507903

Int. Cl.² E02D 5/54

U.S. Cl. 61—53 8 Claims



1. A piling pole for driving into the ground, said piling pole comprising in combination:

an elongate pole terminating at its end to be driven into the ground in a generally wedge-shaped portion; displacement means for laterally displacing ground penetrated upon driving of the pole, said displacement means including at least two parts complementarily shaped and surrounding the pole radially spaced apart therefrom and to be parallel to the lateral surfaces of said wedge-shaped end of the pole; mounting means connecting said displacement parts and securing the same to the pole adjacent to the wedge-shaped end thereof, said mounting means including oppositely disposed cut-outs in the pole adjacent to the wedge-shaped end thereof; and protrustions on said parts inserted into said cut-outs and retained therein.

4,028,901

METHOD AND APPARATUS FOR ASSEMBLING SHEET PILING

Stanley Barber, 3310 S. 27th St., Fort Smith, Ark. 72901

Continuation-in-part of Ser. No. 532,218, Dec. 12, 1974, abandoned. This application Nov. 19, 1975, Ser. No. 633,466

Int. Cl.² E02D 13/04

U.S. Cl. 61—63 19 Claims

1. A method of connecting a loose sheet piling section to a set sheet piling section standing in an upright position, said loose and set piling sections having mating longitudinal margins adapted to telescopically interlock, said method comprising the steps of:

positioning the loose piling section longitudinally alongside the set piling section;

positioning securely a gripping mechanism to the upper end of the set piling section;

engaging continuously and rotatively the loose piling section with said gripping mechanism at a location above the top end of the set piling section to retain the margin of the loose piling section in close proximity to the margin of the set piling section and to permit longitudinal displacement of the loose piling section.

raising longitudinally the loose piling section above the set piling section as the loose piling section is positionally maintained adjacent the upper end of the set piling section by said gripping mechanism;

shifting the loose piling section laterally to vertically align the margin thereof above the mating margin of the set piling section after the bottom end of the loose piling section has cleared the top end of the set piling section; and

lowering the loose piling section to interlock the margin thereof with the margin of the set piling section.

4,028,902

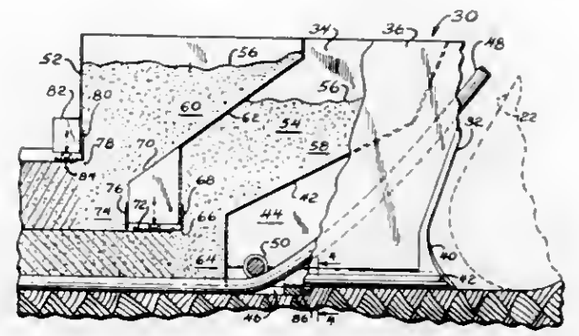
APPARATUS FOR LAYING ELONGATED FLEXIBLE TUBING

Thomas G. Courson, Mansfield; William L. Schlueter, Rantoul, and Thomas T. Kelly, Champaign, all of Ill., assignors to Central Illinois Tile co., Champaign, Ill.

Filed Oct. 1, 1976, Ser. No. 728,556

Int. Cl.² E02F 5/10; E02B 11/00

U.S. Cl. 61—72.6 7 Claims



1. Apparatus for laying elongated flexible tubing in a trench adapted to be secured to a trenching boom carried by a vehicle, said apparatus comprising:

an upwardly open hopper having a forward end adapted to be secured to a trenching boom in trailing relation thereto, and a trailing end;

a first partition adjacent said forward end defining a flexible tubing tunnel, said tunnel opening to the top and bottom of said hopper so that flexible tubing may enter the top of said hopper and exit the bottom thereof behind said trenching boom;

a second partition in said hopper rearwardly of said first partition defining first and second fill material receiving compartments, said compartments opening upwardly to receive fill material such as sand and downwardly to release fill material rearwardly of said tunnel, said second compartment opening downwardly at a level above the downward opening of said first compartment;

a first compactor carried by said hopper rearwardly of said first compartment and forwardly of said second compartment for compacting fill material released from said first compartment;

a second compactor carried by said hopper rearwardly of said second compartment for compacting fill material released from said second compartment; and

a groover carried by said hopper at the bottom thereof forwardly of said tunnel for cutting a groove in the bottom of the trench dug by the trenching boom to which said apparatus may be attached, said groover being configured to cut a groove having a cross section substantially equal to that of the lower third of the flexible tubing being laid.

4,028,903

METHOD AND APPARATUS FOR MANEUVERING PIPE ENDS IN A SUBSEA LOCATION

Dave S. Dietrich, Magnolia, Tex., assignor to HydroTech International, Inc., Houston, Tex.

Filed Nov. 12, 1975, Ser. No. 631,101

Int. Cl.² B23P 19/04

U.S. Cl. 61—110 10 Claims

1. In a method of maneuvering onto general axial alignment the ends of two axially spaced apart pipes supported on the seabottom under a body of water, the combination of steps comprising;

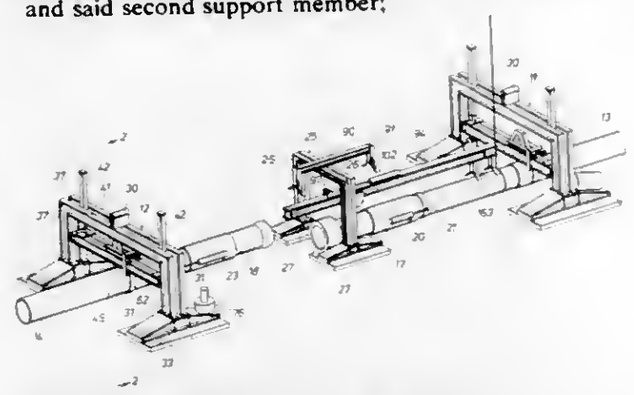
mounting a first support frame adjacent to one of said pipe and supporting said first frame on said seabottom;

securing connecting means between said one pipe and said first support frame;

raising said one pipe by applying a lifting force to said connecting means;

mounting a separate second support frame adjacent to the other of said pipes and supporting said second frame on said seabottom, said second support frame being independent of and axially spaced apart from said first frame;

securing another connecting means between said other pipe and said second support member;



raising said other pipe by applying a lifting force to said other connecting means;

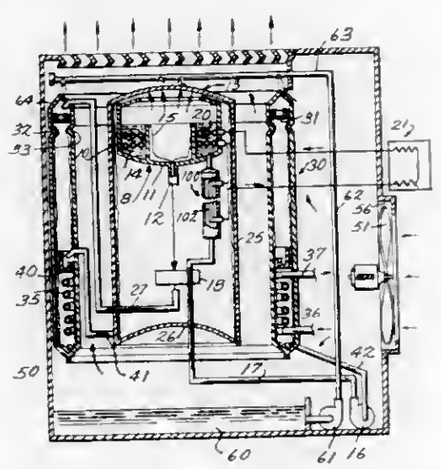
and moving said pipe ends laterally and vertically relative to each other while said pipes are supported by said frames, to thereby move said pipe ends to positions where the axes of said pipes generally intersect.

4,028,904

PREHEATER FOR WEAK ABSORBENT

Philip P. Anderson, Newburgh, Ind., assignor to Arkla Industries Inc., Evansville, Ind.

Filed Dec. 24, 1975, Ser. No. 644,200
Int. Cl.² F25B *15/06*
U.S. Cl. 62—2 4 Claims



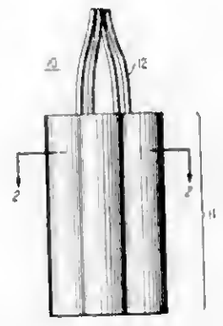
1. In an absorption refrigeration system having a refrigerant condenser, an evaporator, an absorber for absorbing refrigerant vapor from the evaporator into a liquid absorbent to thereby form a relatively cold solution rich in refrigerant, a generator for boiling off refrigerant vapor from the solution obtained from the absorber to thereby form a solution weak in refrigerant, said generator including means for passing a relatively hot stream of heat exchange fluid from a source thereof in heat exchange relationship with the solution in the generator,means for conducting the refrigerant vapor from the generator to the refrigerant condenser, and means for returning the solution weak in refrigerant to the absorber, the improvement which comprises a preheater for passing the solution about to enter the generator in heat exchange relationship with the stream of heat exchange fluid after the latter has left the generator.

4,028,905

PrNi$_5$ AS A CRYOGENIC REFRIGERANT

Klaus Andres, Berkeley Heights, and Paul Herman Schmidt, Chatham, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 20, 1975, Ser. No. 623,808
Int. Cl.² F25B *21/02*; B01J *23/10*
U.S. Cl. 62—3 9 Claims



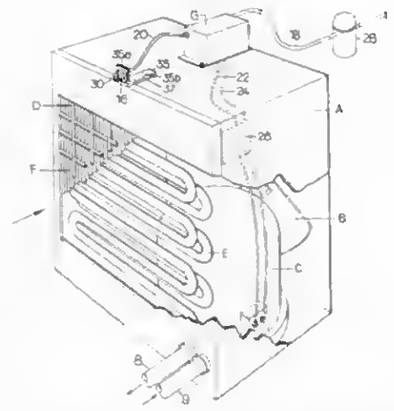
1. A cryogenic cooling sill comprising at least one first body of a refrigerant material, bonded by means of a metallic bonding agent to at least one second body of thermal conductor material extending beyond the first body CHARACTERIZED IN THAT the refrigerant material consists essentially of $PrNi_5$.

4,028,906

FOGGING DEVICE FOR COOLING A CONDENSER COIL

Albert Gingold, Altamont Springs, Fla., and Charles E. Upchurch, Greenville, S.C., assignors to Charles E. Upchurch, Greenville, S.C.

Filed July 14, 1975, Ser. No. 595,379
Int. Cl.² F25B *39/04*
U.S. Cl. 62—183 6 Claims



1. A fogging device for cooling a condenser coil in a central air condition system having an outdoor compressor unit, a housing for said compressor unit containing a fan, an opening in said housing through which a stream of air is created flowing across said condenser coil carried within said housing adjacent said opening and extending thereover, said condenser coil receiving refrigerant fluid from a compressor motor, said device comprising:

a control valve having an inlet port connected to a source of pressurized water;

nozzle means connected to an outlet port of said control valve receiving a flow of water from said source when said is in an open position;

means for moving said control valve to said open position in response to said compressor motor being energized; and

said nozzle means having an opening and orifice formed therein for highly atomizing said water into a mist of finely divided water particles, said nozzle means projecting a metered amount of water in the form of said atomized mist as a fan-shaped curtain across an area substantially coextensive with and adjacent to said housing opening, said curtain of mist being received by said air stream prior to passing across said coil as to be mixed and further atomized therein for fogging and enveloping said condenser coil with said mist;

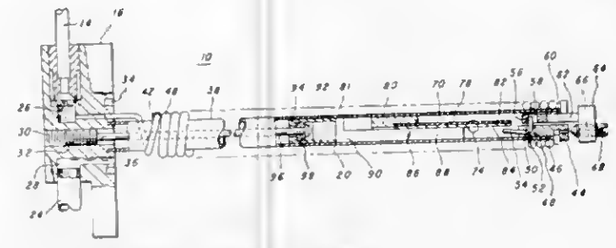
whereby said mist of minute water particles adheres more readily to said coil and is more effectively and completely evaporated by the heat from said condenser coil, cooling said coil more efficiently while reducing the amount of residual runoff water.

4,028,907

ADJUSTABLE-JOULE-THOMSON CRYOGENIC COOLER WITH DOWNSTREAM THERMAL COMPENSATION

Rodney E. Herrington, Dallas, and Carol O. Taylor, Anna, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 15, 1975, Ser. No. 640,524
Int. Cl.² F25B *41/04*
U.S. Cl. 62—222 12 Claims



1. A cryogenic cooler comprising:

a. source of cryogen;

b. a heat exchanger connected to the source of cryogen;

c. a valve means attached to the heat exchanger for controlling the flow of cryogen from the heat exchanger;

d. an expansion chamber having a cold end, a body portion and a hot end, said cold end connected to the heat exchanger for receiving and expanding the cryogen flowing from the heat exchanger, said body portion having a length sufficient to receive the flowing cryogen for absorbing heat from the heat exchanger to form a thermal gradient between the cold and hot ends, and said hot end formed at the hot end of the body portion for venting the heated cryogen; and

e. a thermal compensation mechanism positioned downstream of the cold end at a preselected location in the body portion of the expansion chamber, said thermal compensation mechanism connected to the valve means for actuating the valve means responsively to a selected temperature of the thermal gradient whereby the thermal compensation mechanism is independent of the pressure forces at the cold end of the expansion chamber and the cold end is maintained at a substantially constant preselected temperature.

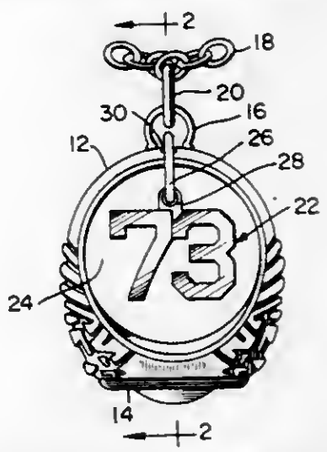
4,028,908

SCHOOL RING CHARM WITH DANGLING SCHOOL INDICIA

John Graham Michael, c/o Brown Wholesale Company, 2095 N. 63rd St., Wynnewood, Pa. 19151

Filed Feb. 21, 1974, Ser. No. 444,335
Int. Cl.² A44C *25/00*
U.S. Cl. 63—23 10 Claims

1. A school ring charm comprising a school ring having a shank and a ring top defining a finger aperture, display means on the ring for displaying information of school-related significance, dangling means for making eye-catching movement in said finger aperture, and mounting means for dangling said dangling means within the finger aperture of said ring, said dangling means being framed and protected in the finger aperture by the ring shank and top to permit said dangling eye-catching movement, said mounting means being connected to said ring shank at a central location thereof to support said dangling means so that said dangling means dangles within the finger aperture of said ring when said ring is in



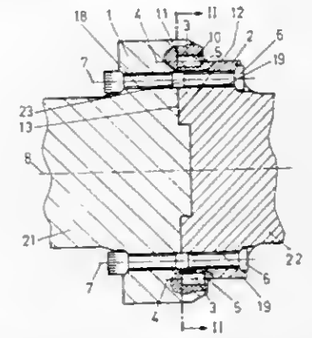
an inverted position with the ring top facing downwardly, said dangling means comprising a dangling member which showcases school indicia.

4,028,909

COUPLING, PARTICULARLY FOR USE IN TURBOGENERATORS

Gojko Jancic, Nussbaumen; Pierre Meylan, Neuenhof, and Alexandre Portmann, Nussbaumen, all of Switzerland, assignors to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Oct. 8, 1975, Ser. No. 620,700
Claims priority, application Switzerland, Oct. 25, 1974, 14298/74
Int. Cl.² F16D *8/00*
U.S. Cl. 64—28 R 10 Claims



1. A coupling for connecting together the end of one shaft with the end of another shaft, particularly for use in turbogenerators, comprising:

a large coupling flange fixedly secured to said end of said one shaft;

a small coupling flange fixedly secured to said end of said other shaft;

connecting means for connecting said shafts together and exerting thrust forces upon said coupling flanges, and for transmitting the torques developed during operation,

the free end of said smaller coupling flange being disposed within a bore defined within said larger coupling flange; and

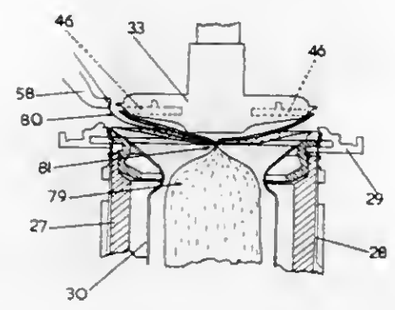
said connecting means comprises a plurality of shear elements extending, in the axial direction of said coupling, within recesses defined within the outer periphery of said small coupling flange and the inner periphery of said large coupling flange and having their longitudinal axes disposed upon a circular locus having a diameter substantially equal to the diameter of said bore and shear areas extending in the axial direction of said shear elements, and a plurality of shearable bolts connecting said two flanges to one another and having axes which define an angle, with the coupling axis, which may be within the range of 0° – 35°.

4,028,910

TUBULAR KNITTED FABRIC

Harry Wignall; William Ewart Alan Shelton, and John Michael Klee, all of Leicester, England, assignors to The Bentley Engineering Company, Ltd., England

Filed Oct. 23, 1968, Ser. No. 769,840
Claims priority, application United Kingdom, Oct. 27, 1967, 48922/67
Int. Cl.² D04B 9/10, 9/40, 9/06
U.S. Cl. 66—26 14 Claims



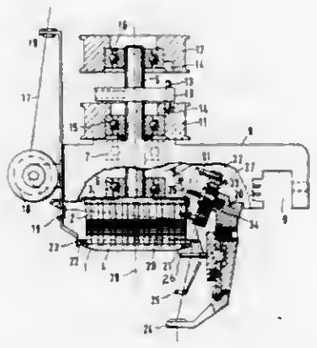
1. A method of knitting an end portion of a tubular knit fabric article using a circular knitting machine, said method comprising knitting an initial portion, knitting a plurality of courses to form a length of tubular fabric while supporting said initial portion above the level of knitting, looping a yarn under tension around said length of tubular fabric while said initial portion is supported to form a constricting loop that confines the portion of said length of tubular fabric thereat to a substantially reduced tubular size, and knitting a subsequent course of said tubular fabric with said initial portion knit therein to form said length of fabric in a two ply construction with an end at which said constricting loop yarn is disposed between said plies.

4,028,911

INCLINED PIN WHEEL FOR YARN STORAGE DRUM

Josef Fecker, Steinhofen-Bisingen, and Gustav Memminger, Freudenstadt, both of Germany, assignors to Firma Gustav Memminger Yerfabrenstechnik fuer die Maschenindustrie, Freudenstadt, Germany

Filed Dec. 19, 1975, Ser. No. 642,655
Claims priority, application Germany, Dec. 28, 1974, 2461746
Int. Cl.² D04B 15/48; B65H 51/20
U.S. Cl. 66—132 R 7 Claims



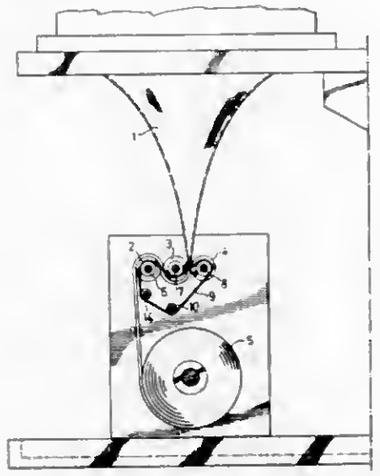
1. Yarn delivery apparatus for textile machines such as a knitting machine having a support (8), a rotatable storage drum (1) journalled on the support to rotate about a driven axis (28) and formed with a corrugated surface for winding thereon a yarn (17) in a plurality of windings to form yarn storage windings (20) upon rotation of the drum, and permitting pull-off of the yarn over an axial end thereof, means (5) rotating said drum,
and means axially moving the storage windings comprising;
a pin-wheel or stub-tooth gear (27) to feed the windings of the yarn about the drum axially thereof, the pin-wheel or stub-tooth gear having projecting pins or teeth (31) extending towards the drum, said wheel or gear having a fixed axis of rotation,
and bearing means (33) freely journalling said pin wheel or stub tooth gear (27) on the support (8) with the axis of rotation (30) thereof being inclined with respect to the axis of rotation (28) of the drum (1) and with the projecting pins or teeth (31) thereof engaging the corrugations of the drum (1)
to provide for free rotation of said pinwheel or stub tooth gear (27) upon engagement with the corrugated surface of the storage drum (1),
the yarn being supplied to the drum (1) beneath the pins or teeth (31) of the pin wheel or stub tooth gear (27).

4,028,912

FABRIC TAKE-UP MECHANISM

Richard Schneck, Deizisan, Germany, assignor to Sulzer Morat GmbH, Bonlanden, Germany

Filed Dec. 17, 1975, Ser. No. 641,652
Claims priority, application Germany, Dec. 27, 1974, 2461638
Int. Cl.² D04B 15/88, 27/34
U.S. Cl. 66—149 R 10 Claims



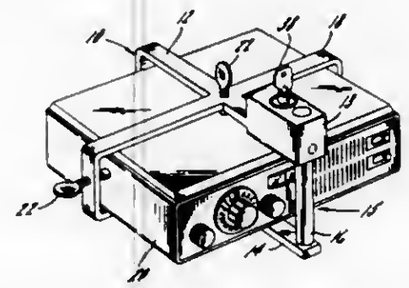
1. A fabric drawing-off mechanism for knitting machines comprising, a first and at least a second draw-off roller, said rollers having parallel axles, a driving means for positively rotating said first and said second draw-off roller, said rollers having parallel axles, a driving means for positively rotating said first and said second draw-off rollers at the same speed; bearing means for at least one of said draw-off rollers, said bearing means providing relative motion between said draw-off rollers in a direction perpendicular to the parallel axles of said rollers during rotation of said rollers, guiding elements fixed to said draw-off rollers, and tightening means for resiliently pressing together said draw-off rollers in said direction, said driving means and said tightening means including a common endless tension member which at least partially passes around said guiding elements, around at least said driving means and around at least one tensioning element so that said tension member will at least drive said second draw-off roller and press both draw-off rollers together so that the distance between said draw-off rollers is variable in dependence on fabrics of varying thicknesses.

4,028,913

CB RADIO LOCKING DEVICE

Sidney Falk, River Grove, Ill., assignor to Fort Lock Corporation, River Grove, Ill.

Filed Aug. 13, 1976, Ser. No. 714,189
Int. Cl.² E05B 73/00
U.S. Cl. 70—58 3 Claims



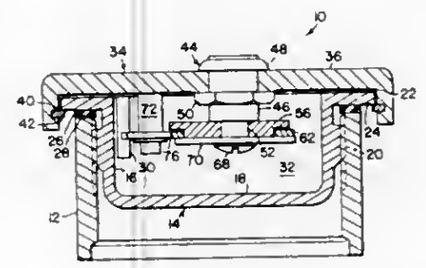
1. A locking device for attachment to a stationary structure of a vehicle for receiving and securing a CB radio and the like comprising, in combination, a frame structure including a C-shaped bar member having first and second free ends with a spaced opening therebetween, a rectangular bar member transversely fixed to said C-shaped bar, one free end of the C-shaped bar including a lock casing having a key actuated lock therein, means defining a transverse passage through said lock casing, a spindle adapted to pass through said lock case passage means and having coupling means at a first end, means disposed in said other free end of the C-shaped bar for receiving said spindle first end coupling means and locking bolt means operated by said key actuated cylinder for securing the spindle to said lock casing.

4,028,914

LOCKABLE CONTAINER SPOUT CLOSURE

Arvid Harlan Saele, and Michael Pier Hutton, both of Dubuque, Iowa, assignors to Deere & Company, Moline, Ill.

Filed June 14, 1976, Ser. No. 695,637
Int. Cl.² B65D 41/04; B67D 5/32; E05B 65/52
U.S. Cl. 70—165 4 Claims



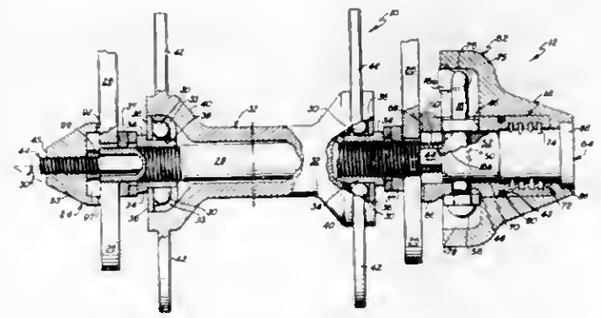
1. In a lockable closure for a container spout including a dished inner cap defined by an upright cylindrical side wall and a bottom wall and having a central axis about which it is adapted for rotation to and from closing relationship relative to an open container spout end, an outer cap completely covering said inner cap and cooperating therewith to define a cavity, connecting means securing the outer cap to the inner cap for preventing separation of one from the other but permitting relative rotation therebetween about the central axis, a key-operable lock mounted in the outer cap and including a cylinder projecting into the cavity and having a key-operable barrel located therein and projecting therethrough into the cavity, a stop means formed integrally with the upright cylindrical side wall of the inner cap and located in said cavity, a lock member, means operatively connecting the lock member to the barrel for radial reciprocation, in response to selected rotation of the barrel, between a lock position wherein it rotates clear of the stop means when the outer cap is rotated and an unlock position wherein it engages its stop means and causes the inner cap to be rotated with the outer cap when the latter is rotated, the improvement comprising: a guide member fixed to the outer cap and projecting into the cavity at a distance from the central axis which is less than the distance the stop means is from the central axis; and said lock member having an elongated guide slot therein and positioned with said guide member located in said guide slot, whereby when the lock member is in its unlock position, the guide member will serve to transmit rotation of the outer cap to the inner cap by way of the locking member.

4,028,915

LEVER ARM LOCK FOR QUICK RELEASE HUB ASSEMBLY

Michael A. Stahl, Miami Beach, Fla., assignor to Far Out Products Ltd., Hollywood, Fla.

Filed Feb. 17, 1976, Ser. No. 658,541
Int. Cl.² B62K 25/00, 25/02
U.S. Cl. 70—233 19 Claims



1. The combination comprising:
a. a quick release mechanism for releasably securing a hub assembly to a vehicle frame member;
b. said mechanism including a lever arm movable between a first position for securing said hub with respect to said frame member and a second position for releasing said hub with respect to said frame member;
c. locking means detachably securable to said mechanism for locking said lever arm in said first position;
d. said hub assembly includes a hub rotatably mounted on an axle;
e. first and second end nuts being located respectively adjacent opposite ends of said axle and spaced apart from said hub for receiving said frame member;
f. said lever arm being operative to adjust a distance between said end nuts; and
g. said locking means is securable to said first end nut with said hub being effective to rotate on said axle.

4,028,916

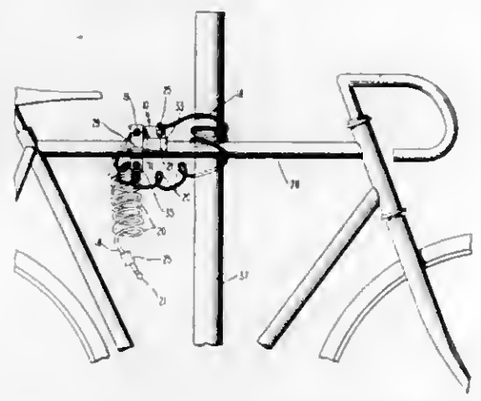
LOCK FOR BICYCLES AND THE LIKE

David R. Pender, 1018 Marion St., Columbia, S.C. 29201

Filed Apr. 13, 1976, Ser. No. 676,636
Int. Cl.² B62H 5/00
U.S. Cl. 70—233 4 Claims

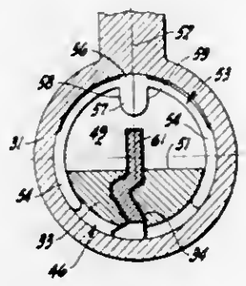
1. In a locking means for a bicycle or the like having a frame member, a key-operated lock unit having a receiver and an active locking element in said receiver, means for securing said lock unit permanently to said frame member, a flexible tether having one end permanently secured to said lock unit, and a passive plug-in element secured to the other end of the tether and adapted to enter said receiver of the lock unit and to interlock therein with said active locking element, said lock unit comprising the body of a removable shackle lock, and

said one end of the flexible tether being engaged through a receiver bore of said lock body, and a fitting on said one end



of the tether abutting a face of said body at one end of said receiver bore.

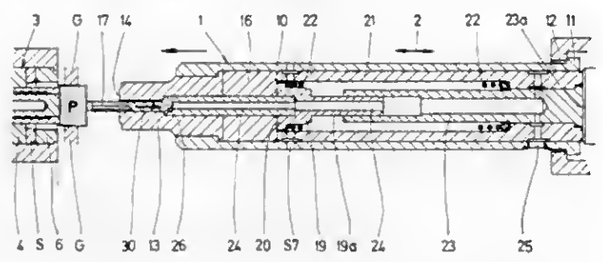
4,028,917
KEY RETAINING CYLINDER FOR A LOCK
Ernest L. Schlage, Burlingame, Calif., assignor to Schlage Lock Company, San Francisco, Calif.
Filed Apr. 12, 1976, Ser. No. 676,213
Int. Cl.² E05B *11/00*
U.S. Cl. 70—389 **13 Claims**



1. A key retaining cylinder lock device comprising a cylinder body having a bore therein extending along an axis, a plug rotatable in said bore about said axis, means in said plug forming a keyway extending in an axial direction and adapted to receive therein a key provided with an edge notch partly defined by an inner wall oriented at least partially transversely of said axis, and blocking means within said body bore and on said plug movable between a first position out of said keyway and a second position in said keyway in the withdrawal path of said inner wall during withdrawal of said key from said keyway.

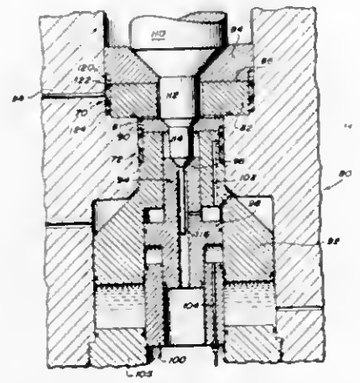
4,028,918
ASSEMBLY FOR APPLYING LUBRICANT TO THE WORKING AREA OF A PUNCHING DEVICE
Hans Kuhn, Hofstetten, Switzerland, assignor to Hatebur Umformmaschinen AG, Basel, Switzerland
Filed Jan. 14, 1976, Ser. No. 649,084
Int. Cl.² B21J *3/00*
U.S. Cl. 72—45 **14 Claims**

1. An assembly for the noncutting forming of metal components wherein lubricant is applied to the working area of a working tool, said assembly comprising:
a. a die,
b. a punch means positioned opposite and coaxial with the die and being reciprocatingly driven to move toward the die during a working stroke and away from the die during a return stroke,
c. said punch means including a working surface, a holding pin means and a punch member having a central bore,
d. said holding pin means being disposed to move within the central bore between an extended holding position and a retracted position in a direction parallel to the reciprocating movement of the punch means,
e. said central bore having a lubricant discharged portion at an outer end of the punch member and a lubricant pumping portion adjacent the lubricant discharge portion,
f. said holding pin means having a front section movably operating in the lubricant discharge bore portion and a rear section movably operating in the lubricant pumping bore portion,
g. channel means extending along the lubricant discharge bore portion,
h. means providing a supply of lubricant under pressure to said central bore, and



i. biasing means being effective to maintain no relative movement between the holding pin means and the punch member during the working stroke of the punch means until said front section engages a workpiece,
j. said punch member being movable forwardly with respect to the holding pin means with the relative movement therebetween causing lubricant to flow into the lubricant pumping bore portion ahead of said rear section of the holding pin means,
k. said biasing means being effective to move said rear section of the holding pin means forwardly with respect to the punch member during said return stroke of the punch means to cause lubricant to flow from the lubricant pumping bore portion through said channel means into said working area.

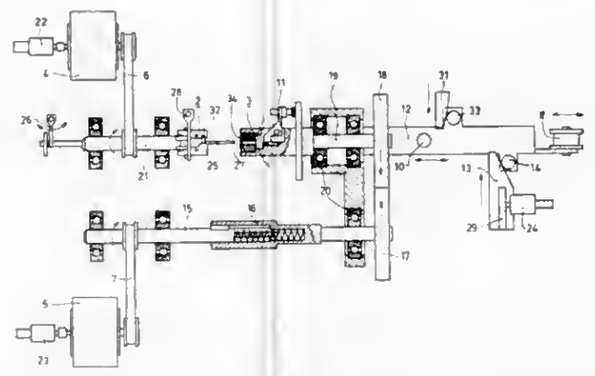
4,028,919
METHOD FOR EXTRUSION
Alfred R. Austen, 744 Georgia Ave., Reading, Pa. 19605
Continuation-in-part of Ser. No. 642,907, Dec. 22, 1975, Pat. No. 3,999,415. This application Aug. 9, 1972, Ser. No. 712,673
Int. Cl.² B21D *26/02*; **B21C** *3/06*
U.S. Cl. 72—56 **12 Claims**



1. A method for hydrostatic extrusion of a billet including the steps of:

extruding a portion of the billet through a first die ths forming a primary extrusion section of the billet;
stopping said primary extrusion followed by extruding the primary extrusion section through a secondary die, thus forming a secondary extrusion defining said desired size and shape of the finished extrusion;
stopping said secondary extrusion while simultaneously initiating extrusion of the billet to form a second primary extrustion section; and
alternately extruding said billet and said primary extrusion sections until said billet is extruded to the desired cross-section size, shape, and length.

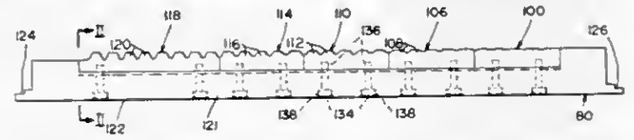
4,028,920
APPARATUS FOR HIGH SPEED WINDING OF COILS
Georg Zander, Stolberg, Germany, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Dec. 8, 1975, Ser. No. 638,509
Claims priority, application Germany, Dec. 12, 1974, 2458721
Int. Cl.² B21D *11/06*; **B21F** *3/04*, *45/00*
U.S. Cl. 72—66 **6 Claims**



1. An apparatus for winding coils in which wire is guided by a winding drum having an eccentric axially extending bore movable in the direction of winding about a retractable mandril to a winding head, comprising
a winding head having an axis,
a slide mounted for relative movement with respect to said winding head in a direction parallel to said axis,
a winding drum mounted on said slide coaxially with said winding head for rotation about said axis, said drum having an eccentric axially extending bore,
means for supplying wire to be wound to and through said bore, at least a part of said supplying means being adjacent said drum
means on said winding head for clamping a wire end thereto,
a mandril mounted coaxially in said winding head,
means connected to said mandril for moving said mandril axially with respect to said winding head, and
means connected to said winding head and said drum for rotating said winding head and said drum about said axis in opposite directions, said winding head being rotated at a speed between approximately 50% and 150% of the speed of the drum.

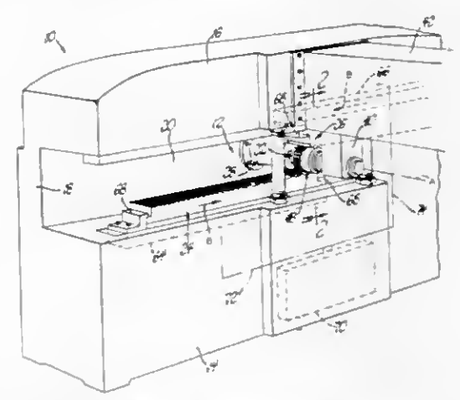
4,028,921
TOOTH FORMING RACK WITH REPLACEABLE INSERTS
Donald E. Blue, Decatur, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.
Filed Feb. 13, 1976, Ser. No. 657,773
Int. Cl.² B21H *5/02*
U.S. Cl. 72—88 **10 Claims**

1. In a tooth forming machine for selectively deforming a rotatably supported cylindrical workpiece, including a housing, a powered member slidably mounted on said housing for movement substantially transversely of such a workpiece, the improvement comprising forming die means mounted on said powered member in tangential tooth forming relation with the periphery of said workpiece including an elongated insert holder defining a top surface and holder mounting means mounting said insert holder on said powered member, a stepped series of descrete tooth forming sections and section



mounting means mounting said tooth forming sections on the top surface of said insert holder, and further including a raised flange on said top surface on one end of said tooth forming sections in contacting relation therewith for lateral retention, whereby individual tooth forming sections may be removed and thrown away when worn thereby saving on tooling costs and prolonging the useful life of the forming die means.

4,028,922
APPARATUS AND METHOD FOR SPLINING POWER TRANSMISSION MEMBERS
James Thomas Killop, Warren, Mich., assignor to Anderson-Cook, Inc., Fraser, Mich.
Filed Oct. 15, 1976, Ser. No. 732,682
Int. Cl.² B21D *9/14*, *53/28*
U.S. Cl. 72—88 **14 Claims**



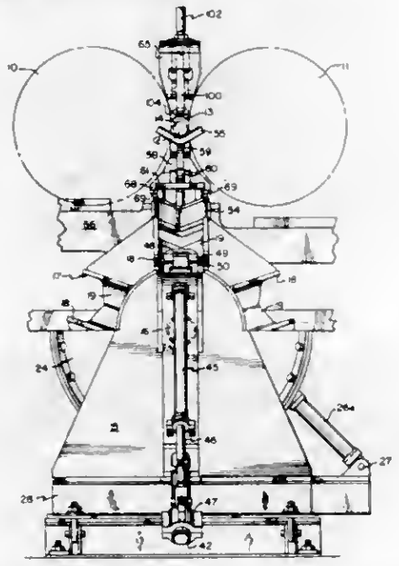
11. A method for splining an annular thin wall power transmission member, the method comprising: positioning the power transmission member on a toothed pinion type mandrel; meshing die teeth and the mandrel with the power transmission member therebetween to form a first set of splines therein; meshing die teeth with the first set of splines in the power transmission member while concomitantly meshing die teeth and the mandrel between the first set of splines with the power transmission member therebetween to form a second set of splines intermediate the first set; and meshing die teeth with the formed splines while skipping at least alternating locations between the splines to correct any out of roundness of the splined member.

4,028,923
PLUG AND SHOE CHANGING IN PIERCING AND REELING MILLS
William R. Scheib, Sewickley, and James W. Schuetz, Pittsburgh, both of Pa., assignors to Aetna-Standard Engineering Company, Ellwood City, Pa.
Filed May 4, 1976, Ser. No. 682,964
Int. Cl.² B21B *19/06*
U.S. Cl. 72—97 **23 Claims**

1. A plug changer mechanism for a piercing or reeling mill

or the like having horizontally opposed working rolls and upper and lower workpiece guide structures, which comprise

a. a plug magazine mounted on the discharge side of said working rolls and below the pass line of the mill,
b. said plug magazine having a plurality of plug pockets therein and being controllably indexable to bring said successive pockets into a predetermined working position below said pass line,
c. said plug pockets, when in said working position being disposed on a sufficiently steep incline to accommodate return by gravity of a used plug,



d. inclined guide trough means leading from said working position toward the pass line of the mill on the discharge side of said working rolls,
e. said guide trough means including a removable transfer trough section adapted for discharge with said lower guide structure to accommodate mandrel plugs of different diameter,
f. a plug pusher ram aligned with the plug pocket in said working position and controllably operable to elevate a plug along said guide trough,
g. said pusher ram having an abutment plate which, when the ram is retracted, effectively forms part of the magazine pocket at said working position.

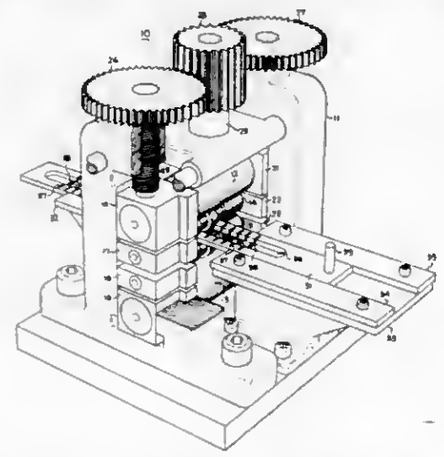
4,028,924

APPARATUS FOR CROSS-ROLLING WIRE LEADS

George J. Calevich, Cleveland; John E. McMillan, and Grant W. Ticknor, both of Kirtland, all of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed Apr. 9, 1976, Ser. No. 675,687
Int. Cl.² B21B *39/14*
U.S. Cl. 72—252 **10 Claims**

1. A roll press for forming a lenticular cross section in a portion of a plurality of lead wires comprising:
first and second drive rolls;
first and second work rolls for forming said lenticular cross section positioned between said drive rolls, wherein the axes of said rolls are substantially parallel;
holder means adapted to carry a plurality of lead wires for conveying said lead wires between said work rolls; and
pressure means for causing said work rolls to subject said



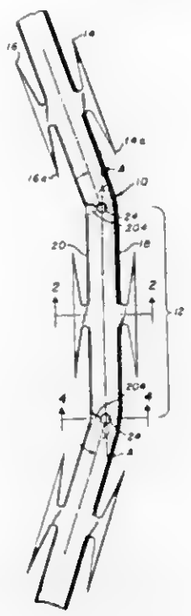
lead wires to a predetermined pressure as said lead wires are conveyed therebetween.

4,028,925

APPARATUS AND METHOD FOR FORMING BARBED TAPE

Michael R. Mainiero, Monroe, Conn., assignor to Man Barrier Corporation, Ansonia, Conn.

Filed Apr. 22, 1976, Ser. No. 679,326
Int. Cl.² B21F *25/00;* **B21D** *28/04*
U.S. Cl. 72—294 **47 Claims**



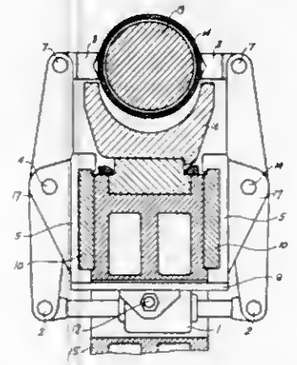
1. A method of making a coil from a strip of metal stock and comprising the steps of providing a substantially planar linear strip of metal stock, forming spaced openings along a longitudinal axis of the strip, positioning the strip by means of its openings for subsequent edge bending, and edge bending the strip in the plane of the strip adjacent its opening to form the strip into angularly displaced adjoining linear segments.

4,028,926

HANDLING DEVICE FOR SLIPPING TUBES ON THE MANDREL OF BENDING MACHINES

Jaroslav Olešovský, Ricmanice, Czechoslovakia, assignor to Prvni Brnenska Strojirna, Narodni Podnik, Brno, Czechoslovakia

Filed Dec. 4, 1974, Ser. No. 529,463
Int. Cl.² B21D *9/05, 43/00;* **B25J** *5/02;* **B65G** *65/02*
U.S. Cl. 72—422 **4 Claims**



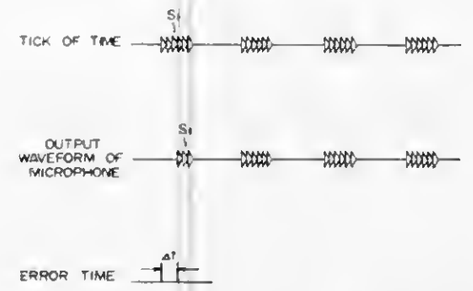
1. A device for slipping a tube to be bent on the mandrel of a bending machine, said device comprising support means, a pair of slide means slidably mounted on opposite sides of said support means for movement in a direction parallel to the axis of said mandrel, a lever pivotally mounted on each of said slide means about axes parallel to said axis, first cylinder means connected between first ends of each of said levers for moving said first ends of said levers in directions perpendicular to the axis of said mandrel independently of the movement of the slide means, a pair of gripping jaws, holder means for mounting a separate one of said gripping jaws to the other end of each of said levers, said holder means being pivotally connected to said other ends of said levers for movement about axes parallel to the axis of said mandrel independently of the pivotal motion of said levers, second cylinder means for moving said slide means in said direction, and further comprising spring means for resiliently bidirectionally biasing said holder means towards determined angular positions with respect to said other ends of said levers, thereby restricting pivotal motion of the jaws and the holder means about said other ends of said levers, said gripping jaws being removably affixed to said holder means.

4,028,927

HIGH PRECISION TIMEPIECE PACE MEASURING DEVICE

Akira Kikuyama, and Kazutoshi Ichinose, both of Ena, Japan, assignors to Ricoh Watch Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 603,302, Aug. 11, 1975, abandoned. This application May 10, 1976, Ser. No. 684,535
Int. Cl.² G04D *7/12*
U.S. Cl. 73—6 **2 Claims**



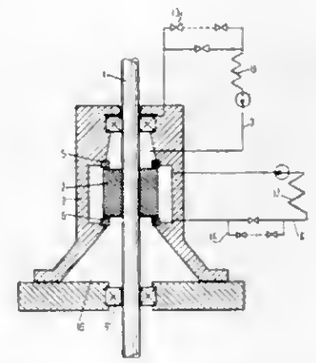
1. A high precision timepiece pace measuring device, comprising:
a first mask circuit for inhibiting a first signal of said timepiece so as to initiate a measurement of said pace of said timepiece from a second signal of said timepiece;
a second mask circuit for inhibiting timepiece signals and external noises from entering during a predetermined period from a time at the initiation of the measurement to a time immediately before termination thereof;
a counter circuit which receives said timepiece signals as its inputs;
a nine's complement presetting circuit, a carry detecting circuit, and normal and nine's complement circuits, said presetting circuit, detecting circuit and normal and nine's complement circuits each being connected to said counter circuit, said normal and nine's complement circuits being respectively selected in accordance with presence and absence of a carry in said counter circuit; and
a counter matrix circuit for feeding back output pulses of said counter circuit so as to set said mask period of said second mask circuit.

4,028,928

METHOD OF DETECTING VERY SMALL GAS LEAKAGES THROUGH A LIQUID SEAL AROUND A PASSAGE

Adrianus van Dalen, Schoorl, and Johannes W. H. van der Bergh, Bergen N. H., both of Netherlands, assignors to Neratoom B.V., The Hague, Netherlands

Filed Mar. 3, 1975, Ser. No. 554,695
Claims priority, application Netherlands, Mar. 11, 1974, 7403213
Int. Cl.² G01M *3/20*
U.S. Cl. 73—40.7 **7 Claims**



1. Method of detecting very small gas leakages through a liquid seal around an element, at which element at the same time a gas space is present, comprising applying a gas or gas mixture capable of being activated by neutrons to one side of the said liquid seal in the gas space, and thereafter determining the concentration of this gas or gas mixture in the sealing liquid as a function of time by means of neutron activation.

4,028,929

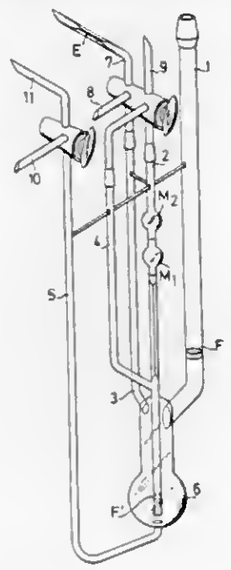
MODIFIED UBBELOHDE VISCOSIMETER

Ludwig Böhm, Mainz, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Mar. 5, 1976, Ser. No. 664,255
Claims priority, application Germany, Mar. 7, 1975, 2509916
Int. Cl.² G01N *11/06*
U.S. Cl. 73—55 **1 Claim**

1. In a viscosimeter including a reservoir, a side tube connected in communication with the reservoir and having an upper end portion for introducing liquid to be measured into the reservoir; a hollow capillary tube communicating with said reservoir including a lower end within the reservoir near its bottom and an upper end above the reservoir; said capillary tube including a measuring bulb and a separate upper bulb therein between said reservoir and said upper end thereof; and

a pressure compensating tube having a lower end communicating with said capillary tube near the top of the reservoir and an upper end communicating with the capillary tube near the upper end thereof; wherein the improvement comprises a separate pressure tube having a lower end communicating with said reservoir near its upper end and extending upwardly therefrom adjacent said capillary tube; and a double three-way cock valve connected to the upper ends of said pressure tube and said capillary tube at its connection with the upper end of said compensating tube and having three short tubes secured thereto, one aligned with the upper end of the capillary tube, one aligned with the upper end of the pressure tube and one in the plane of the pressure tube extending at an angle thereto; said double three way cock valve having two separate port arrays therein respectively associated with *i*) said capillary tube, the short tube associated therewith and the pressure compensating tube and *ii*) the pressure tube and the two other short tubes; to selectively control fluid and gas flow therethrough; and a suction tube connected at one end to the bottom of the reservoir and including, at its other end, a separate three-way cock valve having two short tubes extending therefrom.



4,028,930

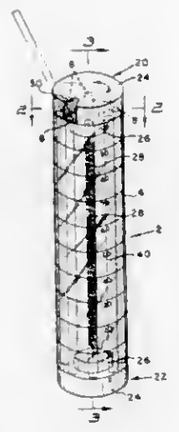
MULTIPLE HOLDER FOR DETERMINING HEMATOCRIT

Enrique Moreno, Box 1750, Mayaguez, P.R. 00708

Filed Apr. 8, 1976, Ser. No. 675,163

Int. Cl.² G01N *33/16*

U.S. Cl. 73—61.4 **1 Claim**



1. A device for receiving and holding a plurality of blood samples for centrifuging to determine hematocrit percent, comprising an elongated transparent annular body defining a central open-ended opening, a plurality of elongated holes formed in the body and arranged in an annular series within the body and extending longitudinally thereof and each having at least one open end, a head at each end of the annular body normally closing the central opening and the ends of the holes, resilient means extending through the central opening and connected at its ends to the two heads to permit rotational movement of at least one of the heads with respect to the annular body, at least one of the rotatable heads having a slot in its edge portion of sufficient radial depth to successively uncover an open end of each hole as the head is rotated with respect to the annular body, and a scale marked on the annular body and extending from end to end of the container holes for direct reading of hematocrit percent after centrifuging.

4,028,931

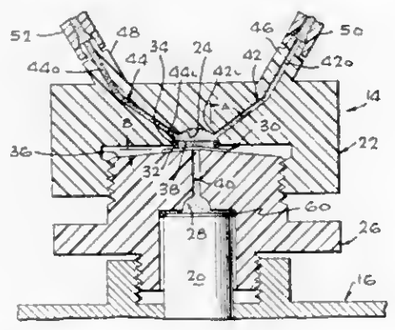
OSMOTIC PRESSURE SENSING HEAD

Jose Bisera, Camarillo; James Howard Carrington, Los Angeles, and Max Harry Weil, Beverly Hills, all of Calif., assignors to Cardio Pulminary Laboratory Research Foundation, Los Angeles, Calif.

Filed Feb. 13, 1976, Ser. No. 657,837

Int. Cl.² G01N *13/04*

U.S. Cl. 73—64.3 **3 Claims**



1. An osmotic sensing head comprising:

first walls forming a sample chamber for holding a sample fluid;

second walls forming a reference chamber for holding a reference fluid, said reference chamber including a passage with a narrow first end which opens toward said sample chamber and with a second end, said narrow first end being narrower than the area of the sample chamber;

an osmotic membrane disposed over said narrow first end of said reference chamber passage; and

pressure measuring means coupled to said second end of said reference chamber passage;

the narrow first end of said reference chamber passage forming a region in contact with said membrane which is narrower than the region of said sample chamber which is in contact with said membrane; and

the walls forming said reference chamber including a pair of conduits for carrying fluid to and from said sample chamber, at least a first of said conduits having an end angled to direct fluid entering said reference chamber against the portion of said membrane which lies directly over said narrow first end of said reference chamber passage, whereby to flush away debris lying on the portion of the membrane which lies over the narrow end of the reference chamber.

4,028,932

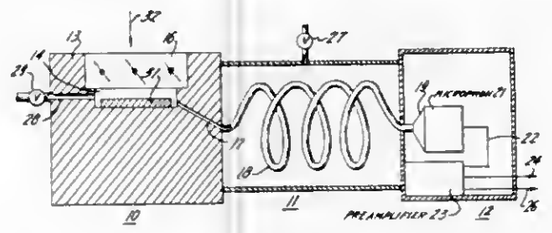
PHOTO ACOUSTIC CELL

Allan Rosencwaig, Summit, N.J., assignor to Hoffman-La Roche, Inc., Nutley, N.J.

Continuation-in-part of Ser. No. 370,526, June 17, 1973, Pat. No. 3,948,345. This application Apr. 14, 1975, Ser. No. 567,640

Int. Cl.² G01N *21/24*

U.S. Cl. 73—67.2 **25 Claims**



1. An apparatus for use in analyzing a solid or quasi-solid sample including:

first means for defining a sample chamber to hold said sample to be analyzed and for enclosing a fluid therein; said sample chamber defining means including a portion thereof for passing radiant energy having a periodically varying magnitude; said sample chamber defined having a predetermined volume;

second means responsive to pressure variations in said fluid for providing an electrical signal;

third means for fluidly connecting said sample chamber to said second means; said third means having a volume between one half and ten times said predetermined volume; and

said predetermined volume being between 1 and 50 cubic centimeters.

4,028,933

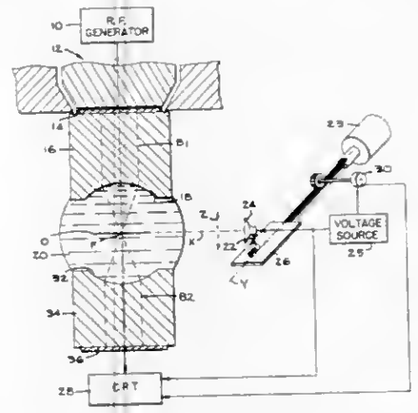
ACOUSTIC MICROSCOPE

Ross A. Lemons, Mountain View, and Calvin F. Quate, Los Altos Hills, both of Calif., assignors to The Board of Trustees of Leland Stanford Junior University, Stanford, Calif.

Continuation of Ser. No. 442,782, Feb. 15, 1974, abandoned. This application June 18, 1975, Ser. No. 587,817

Int. Cl.² G01N *29/04*

U.S. Cl. 73—67.6 **34 Claims**



1. An acoustic microscope for producing an image of an object of interest utilizing high frequency acoustic wave energy, comprising:

a. transducer means for generating acoustic energy at a frequency of at least 100MHz.

b. means forming a first solid acoustic energy propagating medium having a predetermined acoustic velocity C1 disposed adjacent said acoustic energy generating means, said transducer means and propagating medium forming a collimated beam of acoustic energy;

c. a first acoustic lens means disposed adjacent the other end of said acoustic energy propagating medium, said acoustic means forming a focal point outside of said acoustic energy propagating means, said lens having a predetermined *f* number;

d. a fluid acoustic energy propagating medium having a predetermined acoustic velocity C2, disposed adjacent said acoustic lens means and within which an object to be observed may be positioned, said fluid medium having an acoustic velocity to provide a wavelength of said acoustic energy of about 15 microns or less in said medium and substantially less than the acoustic velocity of said acoustic energy propagating medium, said velocity C1 and C2 being chosen such that their ratio produces an acoustical optical system having negligible spherical aberration;

e. means for moving, relatively, said object to be observed with respect to the beam such that the focal point of said acoustic lens occurs on the surface or within the object to be observed;

f. a second solid acoustic energy propagating medium in contact with the fluid medium and having a concavity therein forming a second acoustic lens whose focal point is coincident with said first acoustic lens; and

g. a piezoelectric transducer located on the end of said second acoustic propagating medium remote from said second acoustic lens for detecting the acoustic energy perturbed by said object so that an image of the object of interest is obtainable.

4,028,934

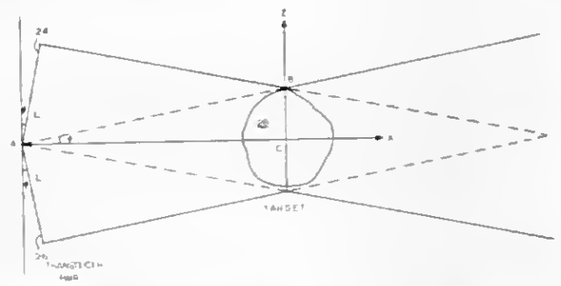
ULTRASONIC STEREOSCOPIC IMAGING DEVICE

Bruce D. Sollish, Rehovot, Israel, assignor to Yeda Research & Development Co. Ltd., Rehovot, Israel

Filed Nov. 4, 1975, Ser. No. 628,751

Int. Cl.² G01N *29/04*

U.S. Cl. 73—67.8 S **7 Claims**



1. An ultransonic imaging device for undistorted three-dimensional visualization of an object comprising:

generating means for producing high voltage electrical signals;

a scanning head containing two, cylindrically focused transducers, each of said cylindrically focused transducers being connected to said generating means, and wherein each of said transducers converts said electrical signals into mechanical energy, transmits said mechanical energy toward the object, receives reflected mechanical energy signals from material of the object, and converts the received mechanical energy into electrical pulses;

scanning means connected to said transducers for scanning the object and producing respective ultrasonic perspectives thereof from each of said transducers;

display means connected to said scanning means for displaying each of said ultrasonic perspectives; and

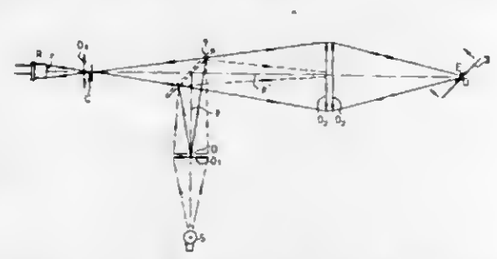
stereo viewing means attached to said display means for visualizing a three-dimensional, undistorted image formed by said ultrasonic perspectives.

4,028,935

METHOD, APPLIANCE AND INSTALLATION FOR THE OPTICAL DETERMINATION OF SMALL DISPLACEMENTS OF POINTS ON THE SURFACE OF A SOLID BODY

Michel Eric Philbert, Paris, and Jean Marcel Surget, Joinville-le-Pont, both of France, assignors to Office National d'Etudes et de Recherches Aerospatiales (O.N.E.R.A.), Chatillon, France

Filed Apr. 1, 1974, Ser. No. 456,888
Claims priority, application France, Apr. 6, 1973, 73.12519
Int. Cl.² G01B *9/00*
U.S. Cl. 73—71.3 **21 Claims**



1. A system for the determination of the displacement along a direction of a "point" on the surface of a solid body comprising:
   a small element whose outer face is constituted of a catadioptric retroreflecting material, said element being applied to the "point" whose displacement is to be measured; an appliance which includes:
   projecting means for projecting onto said element a stationary light beam non-parallel to said direction;
   occultation means in the path of reflected light off of said element concealing a portion of the reflected light which arrives to one side of a given plane while passing light which arrives to the other side of the given plane;
   photosensitive means to the rear of said occultation means for receiving the non-occulted portion of the reflected light; and
   measuring means adjacent to said photosensitive means for measuring the quantity of light occulted by said occultation means.

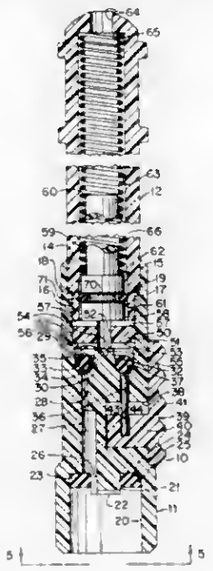
4,028,936

PRESSURE GAUGE

Billy Lynn Guy, 240 Shady Lane, Lexington, Ky. 40503

Filed Sept. 29, 1975, Ser. No. 617,697
Int. Cl.² B60C *23/02*; **G01L** *7/16*
U.S. Cl. 73—146.8 **39 Claims**

1. A pressure gauge for obtaining the fluid pressure at a source of pressure including:
   a body;
   said body having a chamber therein;
   communicating means to provide communication between said body chamber and the source of pressure to supply pressurized fluid from the source of pressure to said body chamber;
   retaining means to retain the pressurized fluid within said body chamber when communication between said body chamber and the source of pressure is stopped;
   said communicating means including:
      means in said body to open a valve controlling communication to the source of pressure;
      and fluid conveying means in said body to convey fluid from the source of pressure to said body chamber;
      said fluid conveying means including:
         a receptacle in said body to receive the pressurized fluid from the source of pressure;
         and passage means in said body connecting said receptacle and said body chamber;
   said retaining means including means to block communication between said passage means and said body chamber when fluid is not being supplied to said passage means from the source of pressure, said blocking means comprising a valve;
   release means to release the pressurized fluid from said body chamber;
   said release means including:
      a passage in said body, said passage extending from said body chamber to exterior of said body;
      closing means to close said passage, said closing means being disposed within said body chamber and comprising a valve;
      and means to activate said closing means;
   a first valve seat disposed within said body chamber and surrounding the end of said passage means of said fluid



conveying means, said valve of said retaining means engaging said first valve seat to block communication between said passage means and said body chamber when fluid is not being supplied to said passage means from the source of pressure;
   a second valve seat disposed within said body chamber and surrounding the end of said passage of said release means, said valve of said release means engaging said second valve seat to close said passage of said release means;
   resilient means within said body chamber, said resilient means comprising said valve of said retaining means and said valve of said release means;
   and means to indicate the pressure of the fluid within said body chamber.

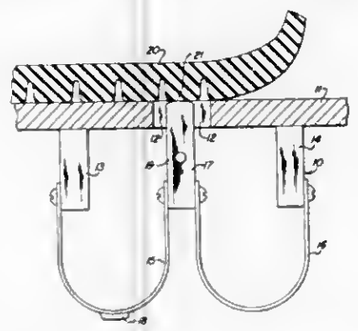
4,028,937

NONDESTRUCTIVE TESTING OF TIRE WEAR

Richard N. Crane, Akron, Ohio, assignor to The General Tire & Rubber Company, Akron, Ohio

Continuation-in-part of Ser. No. 578,564, May 19, 1975, abandoned, which is a continuation of Ser. No. 457,041, April 1, 1974, abandoned, which is a continuation of Ser. No. 288,210, Sept. 11, 1972, abandoned. This application Aug. 24, 1976, Ser. No. 717,301
Int. Cl.² G01M *17/02*
U.S. Cl. 73—146 **10 Claims**

1. An apparatus for qualitatively determining relative tread wear of pneumatic tires comprising:
   a. a flat bearing surface plate having an opening therethrough:
   b. a pair of spaced apart depending bearing members mounted to the nonbearing surface of said bearing plate and in spaced away aligned relation to said plate opening;
   c. a pair of deflection members, one end of each deflection member being secured to a different bearing member;
   d. a movable follower member positioned within said plate opening to contact the tread of a tire resting on the plate and secured to each of said previously nonsecured ends of each deflection member; said follower being pivoted to prevent motion in the radial direction of the tire but to allow the translation of lateral motion; and



   e. a strain gauge or gauges mounted on at least one of said deflection members and capable of detecting the lateral deflection of the movable follower member.

4,028,938

ACOUSTICAL FLOW METER

Calvert F. Eck, Osterville, Mass., assignor to Ocean Research Equipment, Inc., Falmouth, Mass.

Filed Jan. 26, 1976, Ser. No. 652,291
Int. Cl.² G01F *1/66*
U.S. Cl. 73—194 A **14 Claims**

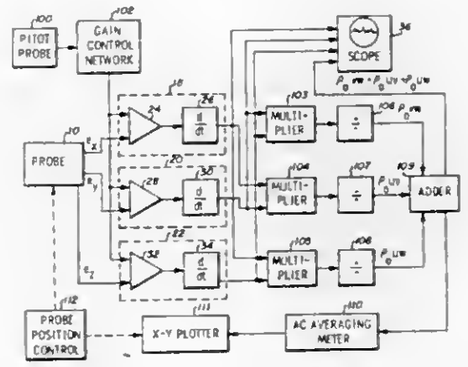
1. Apparatus for determining the flow rate of a fluid medium through a channel of the type comprising first and second transducer means for transmitting and receiving acoustical signals along a path through the fluid medium, the acoustical signals oscillating in magnitude with a series of positive-going and negative-going peaks, said first transducer means being positioned upstream relative to said second transducer means, means for measuring the difference between upstream and downstream transit times of the acoustical signals transmitted between said first and second transducer means, said measuring means being responsive to a selected one of the peaks of the acoustical signals received by said first and second transducer means, respectively, and means responsive to said measuring means for deriving an output signal indicative of the flow rate of the fluid medium through the channel, said apparatus being characterized by
   A. Means for determining whether the selected peak in the acoustical signals received by said first and second transducer means respectively, has a magnitude at least equal to a predetermined normal level, and
   B. Means for generating a flag signal indicative of the presence and absence of said predetermined normal magnitude in the selected peak.

4,028,939

SYSTEM FOR MEASURING THREE FLUCTUATING VELOCITY COMPONENTS IN A TURBULENTLY FLOWING FLUID

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Dah Yu Cheng, Palo Alto, Calif.

Filed Mar. 15, 1976, Ser. No. 667,010
Int. Cl.² G01P *5/02*
U.S. Cl. 73—189 **10 Claims**



1. A system for measuring Reynolds stress wave in a turbulent fluid comprising:
   an electromagnetic sensor with a probe movable about a mainstream direction x and about two orthogonal transverse directions y and z, said sensor having means for generating first, second, and third signals representative of the time varying drag forces on said probe about said x, y, and z directions, respectively; and
   circuit means for converting said first, second and third signals into a signal proportional to the Reynolds stress wave $\rho_0 vw + \rho_0 \mu v + \rho_0 \mu w$ wherein ρ_0 is the average density of the fluid, u is the instantaneous velocity of the fluid in the x direction, v is the instantaneous velocity of the fluid in the y direction, and w is the instantaneous velocity of the fluid in the z direction.

4,028,940

LEVEL SENSOR

William T. Sweeney; Dennis F. Keller; Gary R. Harris, and Calvin N. Armstrong, all of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Filed July 19, 1976, Ser. No. 706,987
Int. Cl.² G01F *23/14*
U.S. Cl. 73—299 **11 Claims**

1. A sensor apparatus for determining fluid levels and pressures in a fluid-containing vessel, said sensor comprising:
   a. a mounting means including a first fluid passageway positioned therethrough, said first fluid passageway having a first and a second end;
   b. a pressure sensing means in pressure sensing contact with said first end of said first fluid passageway;
   c. a pressure fluctuation dampening means positioned in fluid communication with said second end of said first fluid passageway, said dampening means comprising:
      1. a second fluid passageway having a first and a second end and positioned in fluid communication with said second end of said first fluid passageway so that said second end of said first fluid passageway joins said second fluid passageway between said first and second ends of said second fluid passageway;

2. a third passageway, having a first and a second end, positioned in fluid communication with said first end of said second fluid passageway so that said first end of said second fluid passageway joins said third fluid passageway between said first and second ends of said third fluid passageway;

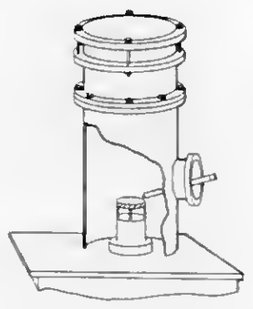
3. a fourth fluid passageway, having a first and a second end, positioned in fluid communication with said second end of said second fluid passageway so that said first end of said second fluid passageway joins said fourth fluid passageway between said first and second ends of said fourth fluid passageway; so that fluid pressure is communicated through said third and fourth fluid passageways, said second fluid passageway, and said first passageway to said pressure sensing means.

4,028,941

SENSORS FOR LOW TEMPERATURE APPLICATION

Timothy M. Henderson, and Gilbert H. Wuttke, both of Ann Arbor, Mich., assignors to KMS Fusion, Inc., Ann Arbor, Mich.

Filed Oct. 4, 1974, Ser. No. 513,333
Int. Cl.² G01K 11/02
U.S. Cl. 73—339 R 4 Claims



1. A method of determining the temperature of a body or of a specific region of a system or component of a system which comprises:

a. disposing a plurality of gas filled glass microspheres in an observation area on a part, the temperature of which is to be determined, the spheres being selected to have varying phase change characteristics by reason of differences in gas and pressure of contained gas, and

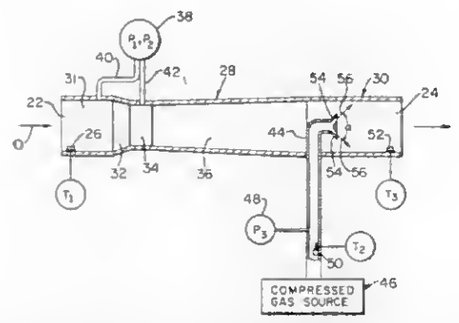
b. observing any change of phase from gas to condensate in the respective spheres to determine the ambient temperature of the part.

4,028,942

HYGROMETER

Frank J. Gardiner, 3 Ledge Road, Cumberland Foreside, Maine 04110

Filed Jan. 19, 1976, Ser. No. 650,115
Int. Cl.² G01N 25/56
U.S. Cl. 73—335 21 Claims



1. A device for measuring the absolute humidity in a sample stream of gas, said device comprising:

means for measuring the mass flow rate of said sample,

means for changing the heat energy per unit mass of said sample stream of gas by a predetermined amount;

means for measuring the temperature of said sample before the heat energy per unit mass of said sample is changed; and

means for measuring the temperature of said sample after the heat energy per unit mass of said sample is changed;

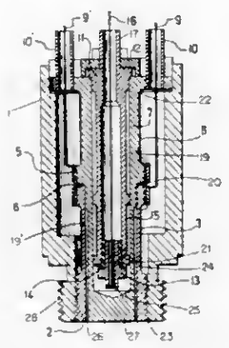
whereby said absolute humidity is determinable as a function of the measurements of (1) said mass flow rate, (2) said temperature of said sample before the heat energy per unit mass is changed, (3) said temperature of said sample after the heat energy per unit mass is changed, and (4) said predetermined amount of heat energy per unit mass of said sample stream.

4,028,943

PRESSURE AND TEMPERATURE SENSING DEVICE

Blanka Hyanova, No. 1 Sazavska, and Vladimir Plasil, No. 25 Narodni, both of Prague, Czechoslovakia

Filed July 28, 1975, Ser. No. 599,532
Claims priority, application Czechoslovakia, July 30, 1974, 5420/74
Int. Cl.² G01K 1/26
U.S. Cl. 73—345 3 Claims



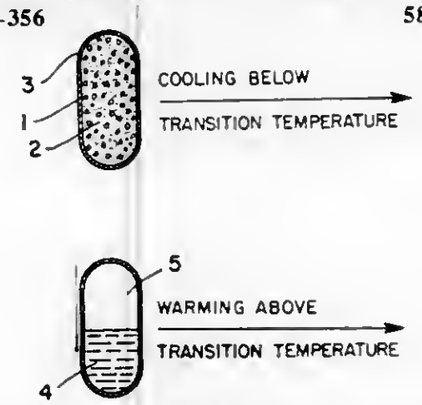
1. In a device for simultaneously sensing pressure and temperature of a test apparatus, an elongated case having a lower end, means for connecting the lower end of the case to the test apparatus, a measuring tube extending downwardly within the case, the measuring tube having a lower portion in contact with the lower end of the case and terminating flush with the lower end of the case, the measuring tube having a central portion disposed above the lower portion thereof and spaced from the case, and active strain gauge winding disposed on the central portion of the measuring tube, a protecting tube extending downwardly within the case and having a lower portion disposed within and spaced from the lower portion of the measuring tube, the lower end of the protecting tube terminating in alignment with the lower end of the measuring tube to define, between the lower portions of the measuring tube and the protecting tube, a gap providing open and unobstructed communication between the interior of the test apparatus and the central portion of the measuring tube, a compensating strain gauge winding disposed on an upper portion of the protecting tube, and sensing means disposed inside and in contact with the protecting tube for detecting the temperature of the test apparatus when the lower end of the case is connected thereto.

4,028,944

DEVICE FOR RECORDING TEMPERATURE MINIMUMS

Robert Allan Erb, Valley Forge, Pa., assignor to The Franklin Institute, Philadelphia, Pa.

Filed Oct. 31, 1975, Ser. No. 627,697
Int. Cl.² G01K 11/16, 11/18; C09K 3/00
U.S. Cl. 73—356 58 Claims



1. In a device for determining a drop below a temperature threshold point which includes a container holding a polymer-containing aqueous gel in a continuous phase,

the improvement which comprises a dispersed phase in the continuous gel, which gel liquifies from gel to liquid below a first temperature point and is reversible from liquid to gel above a temperature point,

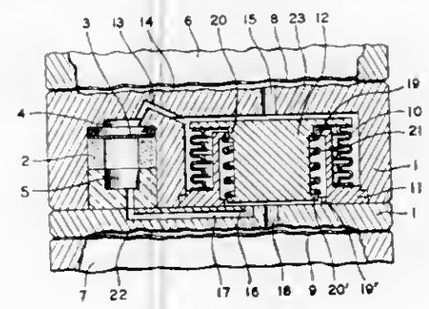
the device being thereby capable of detecting a decrease of the temperature below the first temperature point by liquifying and by a change of position of the dispersed phase relative to the gel in the continuous phase.

4,028,945

PROTECTION SYSTEM FOR THE OVERPRESSURES OF A SILICIUM WAFER SENSOR USED IN A DIFFERENTIAL PRESSURE TRANSMITTER

Giorgio Bergamini, Corso Sicilia, Italy, assignor to Nuovo Pignone, S.p.A., Italy

Filed Nov. 20, 1975, Ser. No. 633,858
Claims priority, application Italy, Nov. 21, 1974, 29682/74
Int. Cl.² G01L 7/08, 9/06
U.S. Cl. 73—395 8 Claims



1. A protection system for a silicium wafer sensor used in a differential pressure transmitter which prevents the pressure difference from reaching values which can damage the sensor, comprising:

a transmitter having a body with two opposed, spaced seats,

two wave protection membranes connected to said body and normally spaced from said seats for protecting the sensor from the fluids to be measured and for transmitting the pressure of the fluids in contact with said membranes to the sensor,

two spaced zones within said body between said seats and between which the sensor is mounted for measuring the pressure differential of the fluids,

a cavity in said body spaced from said zones and between said seats having housed therein expansion bellows polarized by a single spring within said bellows which is precharged to a prefixed value and which is always in compression when said bellows are moved in either direction, said cavity being in communication with said spaces between said membranes and said seats and with said zones, and

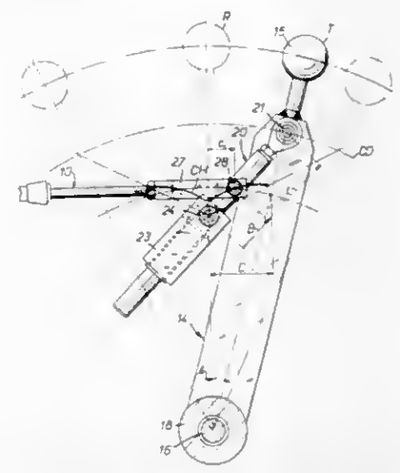
an inert liquid in said zones and cavity which transmits the fluid pressure on said membranes to said sensor and which causes said bellows always to move toward the low pressure side of the system to allow said wave separation membrane on the high pressure side of the system to move to its seat when the pressure differential exceeds the value of the pre-charge of said spring under compression, to thereby prevent the pressure differential in said zones from reaching values which can damage the sensor.

4,028,946

CONTROL LEVER ASSEMBLY

Michel Paramythioti, Chantilly, France, assignor to Albaret S.A., France

Filed Feb. 18, 1976, Ser. No. 659,030
Claims priority, application France, Feb. 20, 1975, 75.05245
Int. Cl.² G05G 1/04, 7/04
U.S. Cl. 74—522 9 Claims



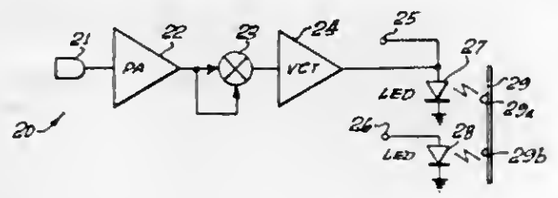
1. A control lever assembly for controlled reciprocation of an operating member, comprising a control lever pivotally mounted about a first fixed pivot, an intermediate lever, first pivot means pivotally connecting said intermediate lever to said control lever, second pivot means pivotally connecting said operating member to said intermediate lever, a sleeve member pivotally mounted about a second fixed pivot spaced from the first fixed pivot, said intermediate lever being received for relative sliding movement in said sleeve member.

4,028,947

FILM-RECORDING NOISE DOSIMETER

Steven J. Cowen, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 10, 1976, Ser. No. 684,527
Int. Cl.² G01H 3/12
U.S. Cl. 73—557 **7 Claims**



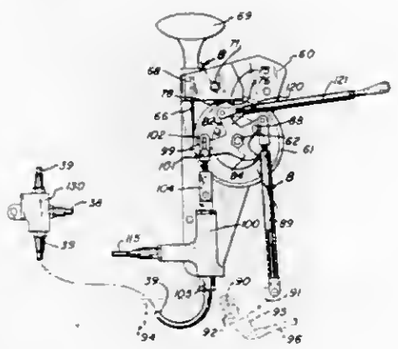
1. An apparatus for determining the exposure to noise energy over a period of time comprising:
means responsive to the noise level for generating representative voltage signals;
means coupled to the generating means for creating current signals from the representative voltage signals; first means coupled to creating means for radiating electromagnetic energy proportional to the current signals;
means disposed to receive the radiated electromagnetic energy for changing its transmissivity in a first location proportional to the quantity of the radiated electromagnetic energy impinging thereon to thereby provide an indication of the exposure to noise energy; and
second means for radiating a datum level of electromagnetic energy on a second location on the changing means to create a preestablished transmissivity thereby providing a basis from which the relative magnitude of the radiated electromagnetic energy of the first radiating means is compared.

4,028,948

ACTUATING MECHANISM FOR SEAT RESTRAINT DIVESTMENT SYSTEM

Richard H. Frost, Littleton, and Ronald L. Criley, Lake City, both of Colo., assignors to Frost Engineering Development Corporation, Englewood, Colo.

Division of Ser. No. 509,253, Sept. 25, 1974, Pat. No. 3,954,234. This application Jan. 23, 1976, Ser. No. 651,733
Int. Cl.² G05G 17/00, 9/00; B64D 17/30
U.S. Cl. 74—2 **14 Claims**



1. A single point actuating mechanism for use in sequentially actuating a multiple unit system, comprising in combination, a rotary rewind spring biased cable driven sheave having a pull cable secured thereto and terminating in a pull bandle, a stiffly releasable detent means engaging said sheave for initially restraining said sheave against unintended rotation, a rotatable multi-armed bell crank mounted for coaxial rotation with respect to said sbeave, lug means on said sheave for operative driving engagement with said bell crank after partial rotation of said sheave, link means operatively coupling said bell crank arm to selected units of the system to be actuated as said bell crank is turned by said cable driven sheave, and said detent means engaging and locking said bell crank to positively bold said bell crank in its fully rotated position upon completion of the pull on and subsequent release of the pull handle.

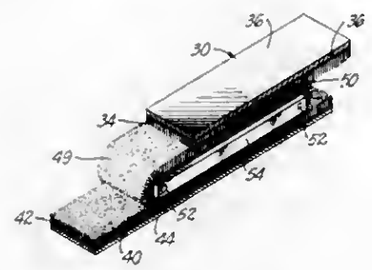
6. An actuating mechanism as defined in claim 1 further including a firing mechanism for igniting a rapid deflagrating cord comprising, in combination, a tubular housing, means at one end of said housing for receiving the ignition end of a rapid deflagrating cord, a firing pin slideably mounted in said housing for operative engagement with said ignition end, a spring for driving said firing pin into igniting relationship with said ignition end, means for releasably holding said firing pin in cocked position, and means coupling said releasably holding means to said bell crank for releasing said firing pin in response to rotation of said bell crank by said pull cable driver sheave.

4,028,949

METHOD AND MEANS FOR OPERABLY INTERCONNECTING MOVABLE PARTS

Magnus F. Hagen, 3713 Twilight Drive, Fullerton, Calif. 92632

Continuation of Ser. No. 466,782, May 3, 1974, abandoned. This application Dec. 3, 1975, Ser. No. 637,414
Int. Cl.² F16H 21/44, 7/00
U.S. Cl. 74—25 **20 Claims**



1. A synchronizing mechanism comprising:
a flat strip of friction material;
means operably supporting said strip;
a second flat strip of friction material in spaced substantially parallel, aligned relationship to the first mentioned strip;
means operably supporting said second strip of friction material;
interconnecting means operably disposed between said strips;
said interconnecting means including a longitudinally extending endless flexible planar belt of friction material;
and spaced means operably supporting said endless belt of friction material planarly for effecting random engagement and operable mesning of respective planar parts of said endless belt of friction material with both strips of friction material, and for disengagement with said strips of friction material.

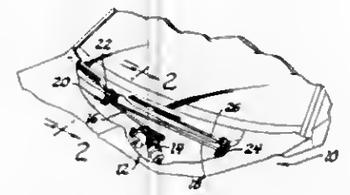
4,028,950

DEPRESSED PARKING LINKAGE FOR WINDSHIELD WIPER MECHANISMS

John R. Osterday, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Jan. 28, 1976, Ser. No. 652,908
Int. Cl.² F16H 21/40
U.S. Cl. 74—70 **3 Claims**

1. A windshield wiper drive mechanism comprising: a drive motor; a transmission link operatively connected to said drive motor; a wiper drive shaft; and a parking linkage disposed between said transmission link and said wiper drive shaft including an idler link rotatably supported on said wiper drive shaft, a control link pivotally connected to said idler link, a drive member secured to said control link and being drivingly connected to said transmission link, a drive link drivingly connected to said wiper drive shaft and operatively drivingly connected to said control link through said drive member, and means for selectively connecting said drive link directly to said control link and disconnecting said drive link from said control link whereby said drive shaft, idler link, control link and drive link are oscillated in unison by said transmission link and drive motor through a predetermined arc about the axis of said drive shaft when said drive link and control link are selectively connected and said drive link and said drive shaft are driven through an additional arc about the axis of said drive shaft and angularly displaced relative to said idler link by said transmission link and drive motor when said drive link and said control link are selectively disconnected.

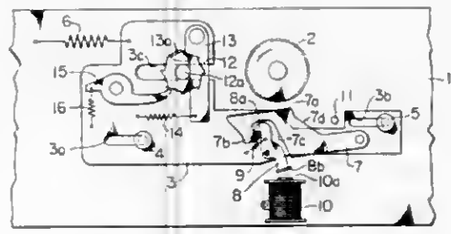


4,028,951

MOTION TRANSFORMING MECHANISM

Nobuyoshi Matsuzawa, Tokyo, Japan, assignor to Copal Company Limited, Tokyo, Japan

Filed May 8, 1975, Ser. No. 575,696
Claims priority, application Japan, May 9, 1974, 49-52483[U]; July 12, 1974, 49-82320[U]; Nov. 11, 1974, 49-136407[U]
Int. Cl.² F16H 27/02
U.S. Cl. 74—128 **6 Claims**



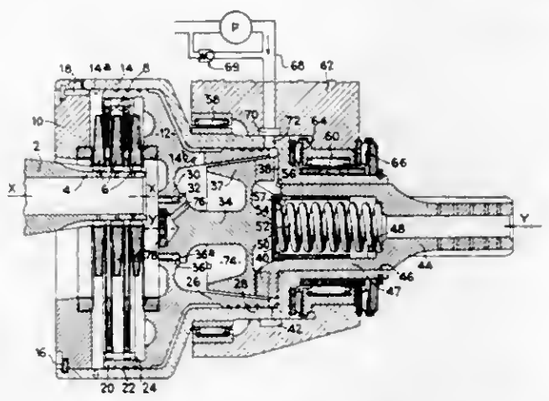
1. A motion transforming mechanism comprising a base plate, a driving gear rotatably borne by said base plate, a sliding plate slidably supported on said base plate, a spring connected between said base plate and sliding plate to bias said sliding plate to its rest position, a rack lever supported rotatably on said sliding plate and having a rack portion capable of meshing with said driving gear, a trigger lever supported rotatably on said sliding plate and engageable with said rack lever, an electromagnet secured on said base plate and capable of attracting said trigger lever, said rack lever being arranged so as to be meshed with said driving gear when said electromagnet is energized with one electric pulse and arranged so as to be disengaged from said driving gear only when said rack lever is pushed by an external force after de-energization of said electromagnet, and a member provided on said base plate and engageable with said rack lever, said rack lever being pushed by said trigger lever with only the force of rotation of said trigger lever and thereby said rack portion being meshed with said driving gear, when said trigger lever is attracted by said electromagnet, said rack portion being disengaged from the driving gear when said rack lever engages with said member, and said rack lever being held as disengaged by said trigger lever and said sliding plate being returned by said spring to its rest position when said rack lever is disengaged from said driving gear;
a ratchet wheel rotatably borne by said base plate, a ratchet lever supported rotatably on said sliding plate and engageable with said ratchet wheel, and a holding lever supported rotatably on said sliding plate and engageable with said ratchet wheel, said holding lever engages with said ratchet wheel while said sliding plate is stationary, and said holding lever is disengaged from said ratchet wheel and said ratchet wheel is rotated by one tooth by said ratchet lever when said sliding plate is moved.

4,028,952

SPEED VARIATOR EMPLOYING FRICTION HAVING AN IMPROVED FRICTION ELEMENTS-TIGHTENING DEVICE

René Leveque, Orgeval, France, assignor to Automobiles Peugeot, Paris, France

Filed Nov. 18, 1975, Ser. No. 633,095
Claims priority, application France, Nov. 18, 1974, 74.37871
Int. Cl.² F16H 15/08
U.S. Cl. 74—199 **9 Claims**



1. In a speed variator comprising a housing, a first shaft, a second shaft parallel to the first shaft, friction elements, a first series of said friction elements connected to rotate with the first shaft, a second series of said friction elements connected to rotate with the second shaft, the first series of elements being tightenable between the second series of elements, means for varying the eccentricity between the axes of rotation of the two shafts, and a device for tightening the friction elements against each other comprising a support member fixed to the housing at a first end of the friction elements, a tightening member mounted to be movable in the housing in a direction parallel to the shafts and located adjacent a second end of the friction elements opposed to said first end and movable to exert a pressure on said second end of the friction elements to urge the friction elements against the support member, pre-tightening means cooperable with the tightening member to exert a pre-tightening force on the tightening member substantially just enough to tighten the friction elements together and render them sufficiently effective when starting to transmit torque through the variator, and main tightening means cooperable with the tightening member for exerting a force on the tightening member which is proportional to the torque transmitted; the improvement comprising for constituting the pre-tightening means at least one piston and cylinder arrangement defining a chamber and interposed between the housing and the tightening member, a source of lubricating oil for the variator, lubricating oil path means putting said source in communication with surfaces of the variator which need to be lubricated, means connecting said lubricating oil path means to the chamber, a lubricating oil discharge path means connected to the chamber, the discharge path means having a sufficiently small cross section

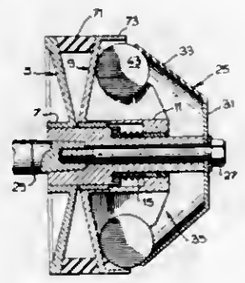
with respect to the rate of flow of the lubricating oil from the source to ensure that the lubricating oil contained in the chamber is maintained under pressure for exerting a pre-tightening force on the tightening member prior to the exertion of the tightening force by the main tightening means.

4,028,953

VARIABLE DIAMETER PULLEY

Real Lavallee, Drummondville, Canada, assignor to Gilles Soucy, Drummondville, Canada

Filed Jan. 7, 1976, Ser. No. 646,999
Int. Cl.² F16H *55/56*
U.S. Cl. 74—230.17 E **5 Claims**



1. A centrifugally-operated, variable diameter pulley, including:
a rotatable axle;
a first pulley flange fixed on said axle;
a second pulley flange rotatably mounted on said axle outwardly of said first pulley flange, and movable axially therealong toward and away from said first pulley flange;
a cover member fixed to said axle outwardly of said second pulley flange, and including an outer annular wall portion arranged to angle inwardly toward said axle and the periphery of said second pulley flange;
means on the outer face of said second pulley flange defining at least two circumferentially spaced sets of radially extending grooves arranged to face said cover member, each of said grooves including a pair of generally parallel, axially extending side walls, and a base wall inclined toward said axle and said cover member, at least the radially outer portions of said base walls being inclined toward said axle and said cover member at an angle that differs for each set of grooves;
and a circular disc received in each groove of a selected one of said sets of grooves, said circular discs being unattached to said second pulley and said cover member, and being constrained by said generally parallel side walls of their associated grooves to movements only in a radial direction;
said circular discs being moved radially outwardly in their respective grooves by centrifugal force when said axle is rotated in engagement with said inclined base walls of their respective grooves and said inclined annular wall portion of said cover member, whereby said rotatable and slidable second pulley flange is moved toward said fixed first pulley flange.

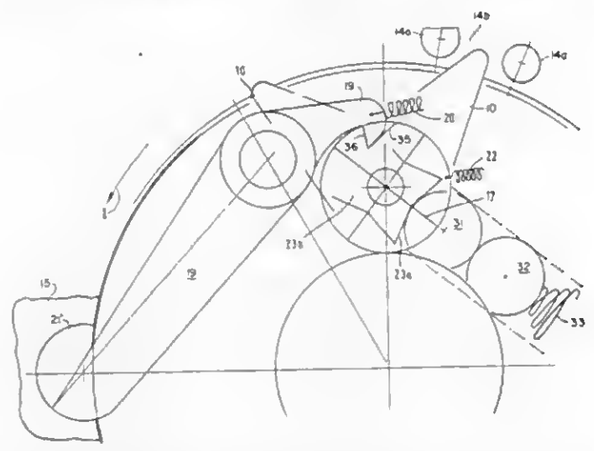
4,028,954

SLIP-FREE SHEAVE OR PULLEY

Walter Mehnert, Ottobrunn, Germany, assignor to Institut fuer Industrielien Fortschritt AG, Liechtenstein

Filed Mar. 15, 1976, Ser. No. 666,675
Claims priority, application Germany, Mar. 19, 1975, 2511889
Int. Cl.² F16H *55/36;* **G05G** *1/00;* **F16D** *13/04*
U.S. Cl. 74—230.01 **11 Claims**

1. A rope or belt pulley comprising, a housing (15), a circumferential groove in said housing, a cavity located centrally in said housing, a control ring (14) in said cavity, gear means (14*a*) in said control ring, force ring means (21) supported for limited angular movement in said cavity substantially adjacent to said control ring, pawl means (19) having a latching end and a locking end, journal means journaling said pawl means intermediate said ends, control means also journaled in said cavity for cooperation with said gear means of said control ring and with said latching end of said pawl means, inwardly facing recesses in said force ring means (21) for cooperation with said locking end of said pawl means, first spring bias means (20) biasing said pawl means (19), second spring bias



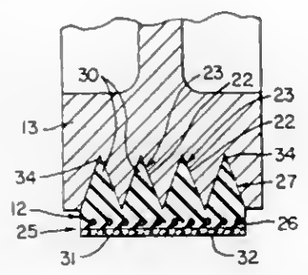
means (22) biasing said control means, said circumferential groove having walls with inwardly protruding curved ridges for controlling the position of the rope or belt means in said circumferential groove depending on the direction of rotation of said pulley housing, whereby a pull on said rope or belt means in the respective reverse direction changes an existing state of the pulley into the opposite state so that such states may be rapidly changed by repeated pulling on said rope in the respective reverse direction.

4,028,955

ENDLESS POWER TRANSMISSION BELT DRIVE SYSTEM

David G. Fisher, and Robert G. Gladden, both of Springfield, Mo., assignors to Dayco Corporation, Dayton, Ohio

Division of Ser. No. 551,477, Feb. 20, 1975, Pat. No. 3,951,006, which is a continuation of Ser. No. 390,448, Aug. 22, 1973, abandoned. This application Apr. 2, 1976, Ser. No. 673,181
Int. Cl.² F16G *5/00*
U.S. Cl. 74—234 **10 Claims**



1. A method of driving a plurality of driven sheaves disposed in a single plane with a driving sheave arranged coplanar therewith, said method comprising the steps of, providing a plurality of grooves in said driving sheave and at least one of said driven sheaves, providing a right circular cylindrical surface free of side flanges on at least another of said driven sheaves, operatively engaging an endless power transmission belt with said sheaves, providing said belt with a flat driving portion and an oppositely arranged driving portion which has a plurality of spaced projections, wrapping said flat driving portion against said right circular cylindrical surface through a substantial arc of at least 180°, and disposing said projections

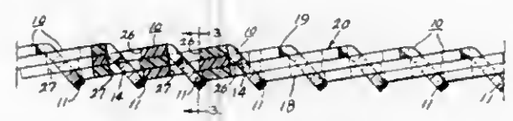
of said oppositely arranged driving portion within said grooves of said grooved sheaves with each of said projections engaging opposed sheave surfaces defining an associated groove, said step of providing a plurality of grooves in said driving sheave and said one driven sheave comprises providing a plurality of circumferential annular grooves in each sheave which are arranged in parallel relation along the axis thereof, said step of providing said belt with said spaced projections comprises providing a plurality of spaced longitudinal ribs extending along the length of the belt, said operatively engaging step comprising disposing each rib within an associated circumferential groove of each of the grooved sheaves, each of said ribs being of substantially uniform cross section at each location throughout its entire length and extending in a continuous uninterrupted manner along the full endless path of said belt, each of said sheaves being arranged so that said belt operates in said single plane, said step of providing said belt comprises providing said belt having a comparatively thin cross section which during said operatively engaging step increases belt life by reducing hysteresis, reduces belt weight which reduces centrifugal tension loss, allows easy flexing around said sheaves, and allows backside bending enabling easy engagement of said flat driving portion against said right circular cylindrical surface through said substantial arc to assure the driven sheave which has said right circular cylindrical surface is driven in a non-slipping manner.

4,028,956

TRANSMISSION BELT

Lawrence M. Thompson, Lancaster, Pa., assignor to The Arbee Corporation, Manheim, Pa.

Continuation-in-part of Ser. No. 616,768, Sept. 25, 1975, Pat. No. 4,009,620. This application Nov. 1, 1976, Ser. No. 731,459
Int. Cl.² F16G *51/80*
U.S. Cl. 74—236 **9 Claims**



1. A transmission belt comprising a series of links arranged in superimposed successive overlapping relation, each of said links having a body portion with at least two longitudinally-aligned apertures, and an integral fastening means comprising a laterally constricted neck portion and a locking tab connected to said body portion through said neck portion, said integral fastening means being longitudinally aligned with said apertures and extending through a forward aperture in the succeeding link and a trailing aperture in the next succeeding link whereby said plurality of links are secured together in overlapping relation to thereby form a belt, said body portion, neck portion and locking tab comprising a homogeneous material consisting of a segmented thermoplastic polyester containing long chain polyester units derived from dicarboxylic acid and long chain glycol and short chain ester units derived from dicarboxylic acid and low molecular weight diol and having a durometer higher than 40D (92A) and lower than 72D.

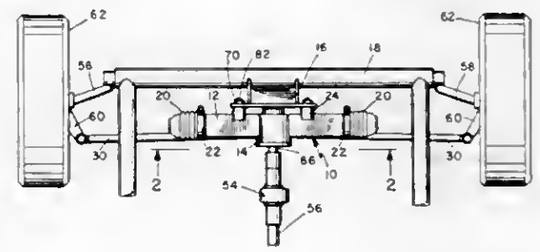
4,028,957

RACK AND PINION STEERING UNIT

Cecil Edward Wright, 8 Prospect Court, Chula Vista, Calif. 92011

Filed Oct. 31, 1975, Ser. No. 627,552
Int. Cl.² B62D *3/12*
U.S. Cl. 74—422 **4 Claims**

1. A rack and pinion steering unit for mounting on the front end of a vehicle and connected to the steering shaft of the vehicle comprising:
housing means adapted for mounting between the steered wheels of a vehicle,
a pinion gear rotatably mounted in said housing means,
a rack adapted to be driven by the steering shaft of the vehicle mounted in said housing means for engagement with said pinion gear and for reciprocal translation within said housing means,
said housing means comprising an elongated rack sub-housing receiving said rack and having a downwardly facing elongated opening,
said rack sub-housing including a bearing plate having an elongated slot mounted at the lower terminal portion of



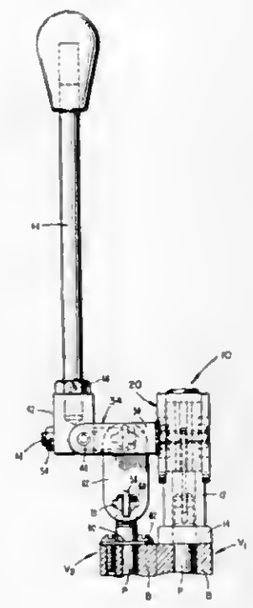
said elongated sub-housing and having a substantial bearing area in contact with said rack,
tie rod mounting means for connection to two tie rods for transmitting the translational movements of said rack into steering movements into the steered wheels of said vehicle,
said tie rod mounting means for being positioned substantially equidistant between the steered wheels of a vehicle and for mounting substantially equal length tie rods,
said tie rod mounting means comprising a flange depending substantially vertically downwardly from the central, lower surface of said rack and through said slot in said bearing plate.

4,028,958

SINGLE LEVER CONTROL FOR ACTUATING CONTROL VALVES AND THE LIKE

Kenneth W. Schuermann, and Vernon C. Slaton, III, both of Perry, Okla., assignors to The Charles Machine Works, Inc., Perry, Okla.

Filed Aug. 14, 1975, Ser. No. 604,657
Int. Cl.² G05G *9/04*
U.S. Cl. 74—471 XY **11 Claims**



1. A single lever control for actuating spaced control devices such as hydraulic valves comprising:
a housing having means to mount it on the body of one

control device and support the actuating mechanism for another adjacent control device exteriorly of said housing, a hub rotatably supported on said housing having a connector interiorly of said housing and pivotally secured to said hub offset from the rotation axis of said hub which connector is connectible to actuate the one control device upon rotation of said hub relative to said housing;

support means on said hub pivotally supporting a control lever remote from said hub on an axis perpendicular to and intersecting the rotation axis of said hub, said lever being pivotable relative to said hub and operable to rotate said hub relative to said housing by movements of said control lever;

an extension member extending generally perpendicular to the pivot axis of said control lever; and

linkage means pivotally connected to said extension member and pivotally connectible to the other control device to actuate such other control device through said linkage means and extension member upon movement of said control lever about its pivot axis.

4,028,959

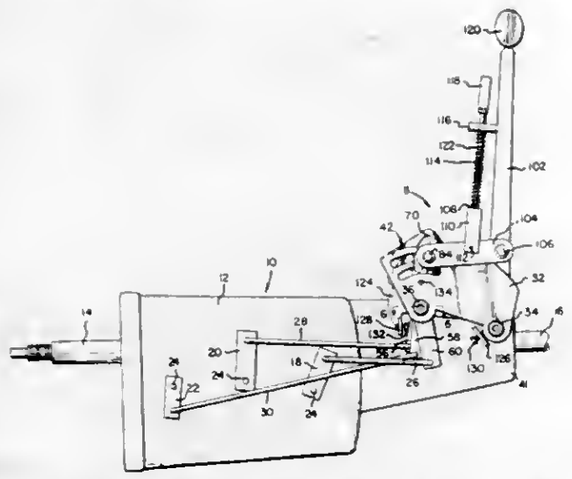
STRAIGHT ACTION GEAR CHANGING MECHANISM

Leonard Clarence Long, R.D. No. 2, Annville, Pa. 17003

Filed June 25, 1976, Ser. No. 699,800

Int. Cl.² G05G 9/08

U.S. Cl. 74—473 R **9 Claims**



1. A gear changing mechanism intended for use on an automative transmission having at least four forward speeds and a reverse speed, said mechanism comprising:

a first, second, and third speed change levers, said levers being pivotally mounted intermediate their ends on a common axis means, each of said levers having an actuator arm portion and a control arm portion, said control arm portions extending in one common direction from said axis, said actuator arm portions extending in another direction from said common axis,

said control arm portion of said first lever having a free end which is at a maximum distance from said common axis, said control arm portion of said second lever having a free end which is at an intermediate distance from said common axis, and said control arm portion of said third lever having a free end which is at a minimum distance from said common axis,

a first lever camming pin slot extending in said control arm portion of said first lever, a second lever camming pin slot extending inwardly from said free end of said second lever, a third lever camming pin slot extending inwardly from said free end of said third lever, said slots extending towards said common axis,

a first lever clearance opening in said control arm portion of said first lever, said first lever camming pin slot extending to said first lever clearance opening, said first lever clearance opening extending laterally in both directions from said camming pin slot and extending towards said common axis to substantially said minimum distance,

a second lever clearance opening in said control arm portion of said second lever, said second lever camming pin slot extending to said second lever clearance opening, said second lever clearance opening extending towards said common axis to substantially said minimum distance and extending laterally in both directions,

a camming pin extending parallel to said common axis, static camming means for guiding said camming pin along a path extending from a first location in said first lever camming pin slot to a second location in said second lever camming pin slot and to a third location in said third lever camming pin slot, said camming means also having means for guiding said pin laterally in both directions when said pin is in any one of said locations, and

manually controllable gear shift lever means for moving said camming pin whereby,

upon mounting said mechanism proximate to a transmission and connecting control means of said transmission to said actuator arm portions of said levers, the gear ratios in said transmission can be rapidly changed upon manipulation of said gear shift lever means.

4,028,960

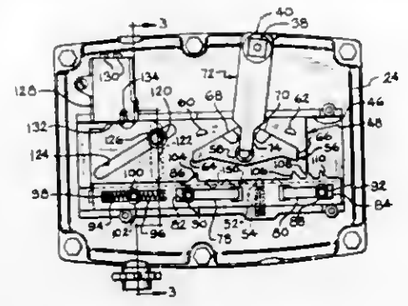
TRANSMISSION SHIFT MECHANISM

Hans Hauser, and Ronald N. Jones, both of Fredericktown, Ohio, assignors to The J. B. Foote Foundry Co., Fredericktown, Ohio

Filed June 23, 1975, Ser. No. 589,479

Int. Cl.² G05G 13/00; B60K 20/08

U.S. Cl. 74—477 **28 Claims**



1. A transmission comprising a housing, a cover on said housing, movable shift means pivotally mounted on said housing within said cover, a pawl carrier movable in a path and having a plurality of positions corresponding in number to the number of in-gear and neutral positions of the transmission, pawl means movably mounted relative to said carrier and engagable by said shift means for movement relative to said carrier, stop means for limiting continuous movement of said pawl carrier in one direction, a shift lever removably connected with said movable shift means and located outside said cover for moving said movable shift means, said pawl carrier, and said pawl means, a plurality of toothed members within said housing, and means responsive to the position of said carrier for individually connecting said toothed members with input and output shafts of said transmission.

9. A transmission comprising a housing, movable shift means, a pawl carrier movable in a path and having a plurality of positions corresponding in number to the number of in-gear and neutral positions of the transmission, pawl means movably mounted relative to said carrier and engagable by said shift means for movement relative to said carrier, a shifter fork within said housing, said fork having projecting means extending through said housing and engagable in a slot in said carrier which is located transversely to the direction of movement of said carrier, a shaft within said housing, a plurality of toothed members rotatably carried on said shaft, and means engagable by said shifter fork for individually connecting said toothed members and said shaft.

4,028,961

SHOCK ABSORBING STEERING ASSEMBLY FOR AUTOMOTIVE VEHICLES

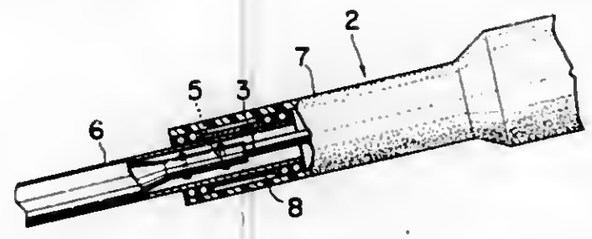
Masatuki Utsumi; Munetaka Toda, and Akitada Kuroda, all of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Aug. 8, 1974, Ser. No. 495,907

Claims priority, application Japan, Aug. 30, 1973, 48-101065[U]

Int. Cl.² B62D 1/18

U.S. Cl. 74—492 **3 Claims**



1. A shock absorbing steering assembly for an automotive vehicle including a steering wheel and a steering mechanism, said assembly comprising, in combination, a collapsible steering shaft operably interconnected between said steering wheel and said steering mechanism, a first and a second supporting tube for said steering shaft, said first and second supporting tubes extending coaxially about said steering shaft, with the diameter of one of said tubes being larger than the diameter of the other of said tubes, said tubes being interfitted with their ends extending in overlapping relationship with said smaller diameter tube extending to within said larger diameter tube, a shock absorbing tube coaxially interposed between said first and second support tubes along their overlapping portions, said shock absorbing tube having a pair of thicker wall portions at each axial end thereof with a thinner wall portion intermediate said thicker wall portions, and bearing balls mounted in said shock absorbing tube at both said thicker wall portions, said balls having a diameter larger than the thickness of said thicker wall portions to extend beyond the surface of said shock absorbing tube into abutment with the inner surface of said larger diameter support tube and the other surface of said smaller diameter support tube whereby said support tubes may be collapsibly mounted to telescope relative to each other upon impact of a body against said steering wheel.

4,028,962

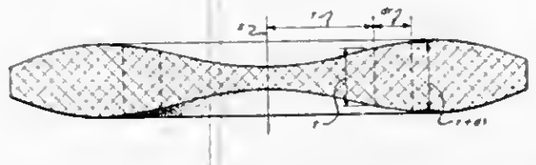
DESIGN AND CONSTRUCTION OF FLYWHEELS FROM ANISOTROPIC MATERIALS

Edwin B. Nelson, 1408 Georgia, N.E., Albuquerque, N. Mex. 87110

Filed Dec. 24, 1975, Ser. No. 644,420

Int. Cl.³ G05G 1/00, 3/00

U.S. Cl. 74—572 **4 Claims**



1. An energy storing flywheel comprised of a body of anisotropic material shaped symmetrically about a central axis of rotation, and in which:

a. the major strength axes of the anisotropic material are oriented circumferentially about the central axis of rotation.

b. the minor strength axes of the anisotropic material are oriented perpendicularly to the central axis of rotation, (i.e., radially).

c. the thickness of the body of anisotropic material is defined by the formula:

$$t = C\, r^{2m} e^{-\alpha^2 r^2}$$

wherein:

$$C = t_m\, \alpha^{2m}\, e^m m^{-m}$$

$$m = \frac{1}{2}\left(\frac{S_\theta}{S_r} - 1\right)$$

$$\alpha^2 = \frac{\rho \omega^2_o}{2S_r}$$

t = the thickness of the body of anisotropic material measured parallel to and at a distance r from the central axis of rotation.

r = the radial distance measured perpendicularly from the axis of rotation, at which distance the thickness of the flywheel is equal to t.

e = the base of "natural" logarithms with the approximate value 2.71828.

S = the maximumallowable unit tensile stress in the circumferential direction of the anisotropic material of which the flywheel is composed, with S_θ having a larger value than S_r.

S_r = the maximum allowable unit tensile stress in the radial direction of the anisotropic material of which the flywheel is composed, with S_r having a lesser value than S_θ.

ρ = the density of the anisotropic material of which the flywheel is composed.

ω_o = the angular velocity sufficient to induce the stresses S_θ and S_r throughout the body of anisotropic material.

t_m = the maximum thickness of the flywheel, which occurs at the radium $r_m = \sqrt{\frac{m}{\alpha}}$

4,028,963

ENGINE BALANCER

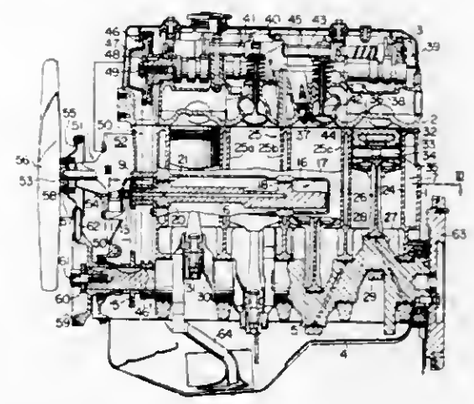
Hirokazu Nakamura; Mitsutaka Kinoshita, and Seizo Iwasa, all of Kyoto, Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Japan

Filed July 9, 1975, Ser. No. 594,232

Claims priority, application Japan, July 16, 1974, 49-82043

Int. Cl.² F16F 15/10

U.S. Cl. 74—604 **11 Claims**



7. An engine, comprising;

a cylinder block having cylinders therein;

pistons reciprocatable in the cylinders;

a crankshaft drivably connected with the pistons;

a pair of balance shafts, one disposed on either side of the crankshaft and substantially parallel thereto, to balance loads imposed on the crankshaft by reciprocation of the

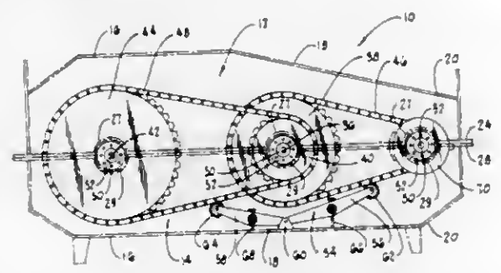
pistons, each balance shaft having two end portions, and having a journal on each end portion;
drive means connected with the crankshaft for rotating the balance shafts, in directions opposite to one another, at a speed equal to twice a speed of the crankshaft;
a bearing for each journal, in the cylinder block; and
a balance weight on each balance shaft, integral with one of the end portions and consisting of two balance weight portions, one portion being disposed on either side of the corresponding journal to minimize vibration of the cylinder block on rotation of the balance shafts.

4,028,964

SPEED REDUCER BOX FOR DRIVING A PUMP JACK

Gomer W. Jones, Rose Hill, Kans., assignor to Bird Oil Equipment Ltd., Calgary, Canada

Filed Jan. 14, 1976, Ser. No. 648,934
Int. Cl.² F16H *57/02, 7/06, 7/12*
U.S. Cl. 74—606 R **4 Claims**



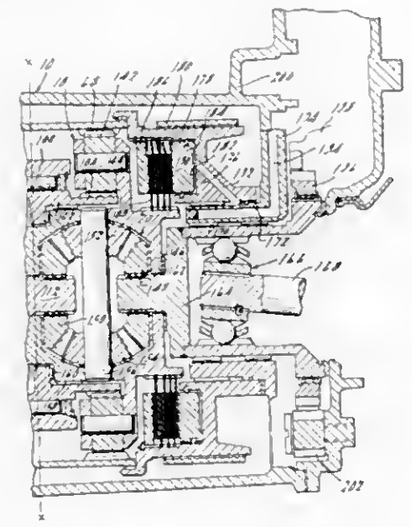
1. A speed reducer box for driving a pump jack, the box attached to a drive motor or the like and reducing the speed therefrom to the pump jack, the box comprising:
an elongated housing having a front portion, a center portion, and a rear portion, said housing further including a separate upper housing and a separate lower housing so that said upper housing can be removed for performing maintenance on the speed reducer box;
an input shaft rotatably attached to the rear portion of said lower housing and said upper housing, said input shaft rotatably attached to the drive motor;
an input shaft sprocket mounted on said input shaft;
an idle shaft rotatably attached to the center portion of said lower housing and said upper housing;
a first idle shaft sprocket and a second idle shaft sprocket mounted on said idle shaft;
an output shaft rotatably attached to the front portion of said lower housing and said upper housing, said output shaft rotatably attached to the pump jack;
an output shaft sprocket mounted on said output shaft;
a first endless sprocket chain connecting said input shaft sprocket and said first idle shaft sprocket for driving said idle shaft;
a second endless sprocket chain connecting said second idle shaft sprocket and said output shaft sprocket for driving said output shaft; and
a chain tightener having a pair of chain tightening arms attached at one end to a pivot housing, said pivot housing attached to the bottom of said lower housing, the other end of said tightening arms attached to chain tightening sprockets, said chain tightening sprockets biased against said first sprocket chain and said second sprocket chain to tighten said chains when the speed reducer box is in operation.

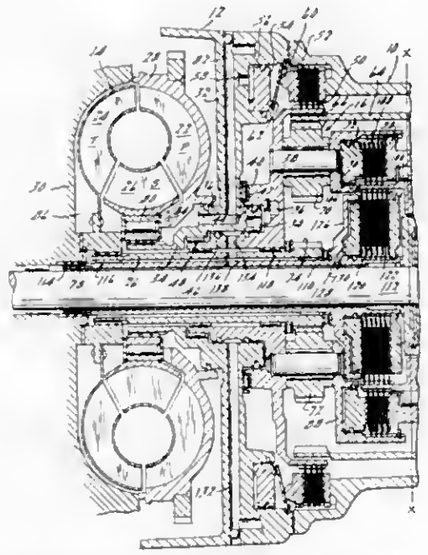
4,028,965

MULTIPLE RATIO POWER TRANSMISSION MECHANISM ADAPTED FOR IMPROVED ENGINE FUEL ECONOMY AND HIGH/LOW RATIO TRACTION

Thomas R. Stockton, Ann Arbor, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 9, 1974, Ser. No. 531,132
Int. Cl.² F16H *57/10*
U.S. Cl. 74—765 **6 Claims**





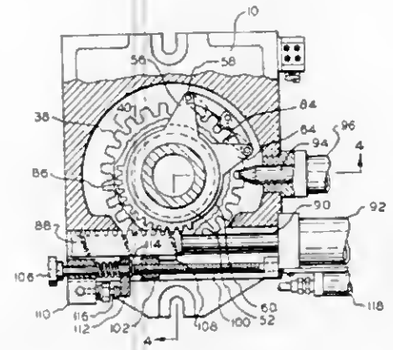
1. A transmission mechanism for an automotive vehicle comprising a hydrokinetic unit having an impeller and a turbine situated in toroidal fluid flow relationship, a pair of planetary gear units, a first of said planetary gear units having compound planet pinions rotatably mounted on a common carrier, a sun gear and a ring gear meshing with said compound planet pinions, the other gear unit being a simple planetary gear unit having a ring gear, a sun gear, a carrier and planet pinions mounted on the carrier in meshing engagement with said last mentioned ring and sun gears, first brake means for anchoring the common carrier of said first gear unit during first and second speed ratio operation, other brake means for anchoring the ring gears of said gear units during operation in the third speed ratio and reverse drive ratio, first coupling means for connecting driveably said compound carrier to the sun gear of said second gear unit during first speed ratio operation, second clutch means for locking up said second gear unit during intermediate speed ratio operation, high speed ratio clutch means for connecting directly said impeller to the sun gear of said second gear unit during third speed ratio operation thereby effecting a solid mechanical drive that bypasses said hydrokinetic unit, and reverse clutch means for connecting together said compound carrier to the sun gear of said second planetary gear unit during reverse drive operation, the carrier for said second gear unit being connected to a driven portion of said mechanism, said first coupling means being an overrunning clutch adapted to connect the compound carrier of said first gear unit and the sun gear of said second gear unit and to accommodate torque transfer from the former to the latter in one direction while accommodating freewheeling motion in the opposite direction.

4,028,966

ROTARY INDEX TABLE

Robert L. Taylor, Michigan Center, Mich., assignor to Universal Vice & Tool Co., Parma, Mich.

Filed Dec. 19, 1975, Ser. No. 642,451
Int. Cl.² B23B *29/24;* **B23Q** *17/00*
U.S. Cl. 74—822 **13 Claims**



1. A rotary index table comprising, in combination, a base, a table rotatably mounted upon said base for rotation about an axis, an index wheel operatively connected to said table for rotation therewith about said axis having a periphery, a plurality of radially oriented detent receiving recesses defined on said periphery evenly spaced thereabout, detent support means mounted for rotation about said axis, a detent, mounting mean mounting said detent upon said support means permitting radial displacement of said detent with respect to said axis for selective engagement of said detent with one of said recesses, drive means connected to said support means for reversibly oscillating said support means about said axis in indexing and return directions, said mounting means radially displacing said detent inwardly for engagement with a recess during rotation of said support means in said indexing direction and radially displacing said detent outward from engagement with said recesses during rotation of said support means in said reversing direction.

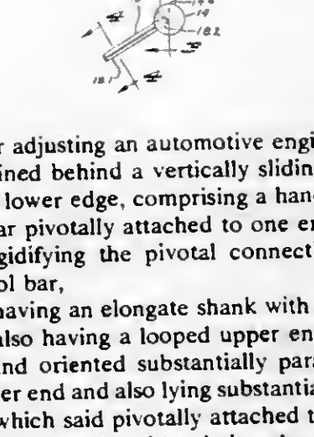
4,028,967

WATCH JEWELING TOOL

Henry B. Fried, 69-53 180 St., Fresh Meadows, N.Y. 11365

Filed Mar. 30, 1976, Ser. No. 672,003
Int. Cl.² B23P *5/00;* **G04D** *3/04*
U.S. Cl. 81—7 **7 Claims**

1. A watch-jeweling tool, comprising:
a standard having a base portion, an anvil supported upon said base portion, an upstanding neck portion fixedly secured upon said base portion the free end of which over-hangs said anvil, and a guide post fixedly secured to the free end of said over-hanging neck portion so as to be disposed above said anvil;
an elongated punch having a central portion slidably disposed within said guide post of said standard, a member fixedly secured to said central portion at one end thereof, and a threaded portion fixedly secured to said central portion at the other end thereof, said member, said central portion, and said threaded portion being disposed serially along the longitudinal axis of said punch;
a pusher disposed within said threaded end portion of said punch and adapted to cooperate with said anvil of said standard in performing a press-fitting operation;
a manually operable nut threadedly engaged upon said threaded portion of said punch and adapted to abut the lower portion of said guide post; and



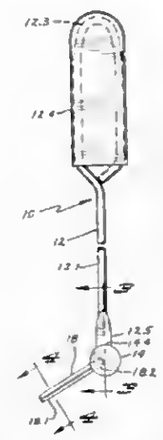
a clamp having means slidably engaging said member of said punch and additional means engaging said neck portion of said standard for preventing rotation of said punch as said nut is rotated in order to threadedly actuate said punch and move the same along the longitudinal axis thereof when said nut abuts said lower portion of said guide post and said pusher is operatively engaged with said anvil.

4,028,968

DISTRIBUTOR ADJUSTMENT TOOL

Ferdinando DeAmicis, 294 Hodder Ave., Thunder Bay, Ontario, Canada

Filed Dec. 24, 1975, Ser. No. 644,345
Int. Cl.² B25B *13/48*
U.S. Cl. 81—71 **1 Claim**



1. A tool for adjusting an automotive engine ignition point assembly confined behind a vertically sliding guillotine door with a flanged lower edge, comprising a handle, a hexagonal-headed tool bar pivotally attached to one end of the handle, and means rigidifying the pivotal connection between the handle and tool bar,
the handle having an elongate shank with a flattened lower end and also having a looped upper end to be manually gripped and oriented substantially parallel to said flattened lower end and also lying substantially parallel to the plane in which said pivotally attached tool bar swings,
the hexagonal-headed tool bar being elongate and linear in

shape and lying in a plane parallel to and at one side of the handle and of the flattened lower end thereof, the tool bar including a cylindrical hub located entirely at one side of the flattened lower end of the handle and projecting significantly transversely outwardly from said flattened lower end, the hub also including a reduced neck rotatable in and affixed to said flattened lower end of the handle, there being a peripheral space around said neck and between the hub and the flattened end of the handle, the cylindrical hub and neck having a common axis extending perpendicular to the plane of the handle and of said flattened lower end, and

said rigidifying means including a resilient friction washer surrounding said neck and located in said peripheral space, and bearing resiliently and under pressure against both the flattened lower end of the handle and against the cylindrical hub and creating a significant frictional relationship to retain the hub and tool bar in any desired position relative to the handle, the hub being continuously located at the same position relative to the handle and with a prefixed orientation relative to the loop and the flattened lower end of the handle to permit the hub to effectively lift the guillotine door, regardless of the vertical inclination of the handle while allowing the tool bar to immediately swing into the ignition point assembly for making the desired adjustment.

4,028,969

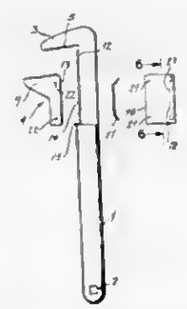
ADJUSTABLE WRENCH

Roscoe J. Politte, 2422 Shady Drive, Arnold, Mo. 63010

Continuation of Ser. No. 324,536, Jan. 17, 1973, abandoned, which is a continuation of Ser. No. 112,697, March 30, 1971, abandoned. This application Oct. 8, 1974, Ser. No. 513,099

Int. Cl.² B25B *13/24*; **F16F** *1/18*

U.S. Cl. 81—146 **1 Claim**



1. An adjustable wrench for use in gripping a workpiece comprising a handle means having at one end an acutely inclined fixed jaw angled downwardly towards the handle means and forming an angle of less than 90° therewith, said fixed jaw incorporating a workpiece gripping surface, a movable jaw incorporating a gripping surface and being normally in parallel alignment with the gripping surface of the fixed jaw and being positioned in slidable engagement with said handle means, the gripping surface of both the fixed and movable jaws being serrated to enhance the capability of said wrench for gripping a workpiece, the serrations of the fixed jaw being angled inwardly towards the handle means, the serrations on the movable jaw being angled outwardly, and together said serrated jaws providing cooperating serrations for achieving said enhanced grip, said handle means having a series of teeth formed upon its surface disposed towards the movable jaw, said movable jaw having a series of teeth formed proximate its locations of slidable engagement with the handle means teeth whereby said sets of series of teeth normally intermesh to retain the movable jaw stationary with respect to the fixed jaw and arranged for gripping a workpiece to be manipulated, said movable jaw having a jaw portion and a channel portion joined together and therein providing an opening through which the handle means is slidably disposed, a leaf spring means disposed intermediate the oppositely disposed surfaces of the handle means and the jaw opening for normally maintaining said sets of series of teeth in engagement for thereby fixing the movable jaw with respect to said handle means, the channel portion having a back forming the opposite surface of the jaw opening, said opposite surface of the jaw opening having a milled elongated slot therein and being disposed for loosely seating and retaining the ends of said leaf spring and urging said spring in a biasing relationship against the contiguous surface of the handle means, said back of the movable jaw having a tapering thickness narrowing towards its edge disposed closest to the fixed jaw of the handle means thereby normally providing greater spacing intermediate said opposite surface of the jaw opening and the handle means at this location than the spacing provided intermediate the other end of said surface of said jaw opening and the contiguous handle means, whereby pressure exerted against said movable jaw and against the bias of the leaf spring widens the entrance spacing between the normally parallel fixed and movable jaws gripping surfaces for facilitating their gripping and wedging a workpiece therebetween, and the back side of said movable jaw including a grooved surface to facilitate its adherence as the jaw is being forced towards the handle means and as said jaw is being moved with respect to the fixed jaw.

4,028,970

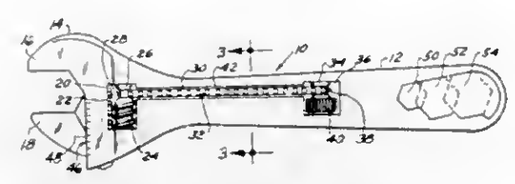
ADJUSTABLE WRENCH

Stanley J. Pelczar, 131 Green Manor Drive, East Hartford, Conn. 06118

Filed Feb. 9, 1976, Ser. No. 656,120

Int. Cl.² B25B *13/16*

U.S. Cl. 81—165 **5 Claims**



1. An adjustable jaw wrench comprising:

body means, said body means including an integral handle and a head portion, said head portion defining a stationary jaw;

a movable jaw reciprocally mounted in said body means head portion in alignment with said stationary jaw, said movable jaw including a rack;

driven means mounted in said body means head portion, said driven means being operably connected to said movable jaw and causing movement of said movable jaw relative to said stationary jaw, said driven means including:

a worm gear rotatably mounted in said body means head, said worm gear engaging said movable jaw rack; and

first sprocket means integral with said worm gear, said first sprocket means being rotatable with said worm gear and including a plurality of outwardly extending projections, said first sprocket means and at least a portion of said worm gear being positioned in an aperture in said body means head portion whereby said first first sprocket means is accessible from opposite sides of said body means;

drive means mounted in said body means handle, said drive means comprising:

second sprocket means rotatably mounted in said handle, said second sprocket means including a plurality of outwardly extending projections;

a thumb wheel coupled to said second sprocket means for causing rotation thereof, said thumb wheel and a portion of said second sprocket means being positioned in an aperture in said body means handle, said thumb wheel extending outwardly from said opposite sides of said body means handle, access to said second sprocket means being afforded from said opposite sides of said body means; and

an endless drive belt, said drive belt being perforated and extending between said first and second sprocket means, said drive belt perforations being engaged by said sprocket means projections.

4,028,971

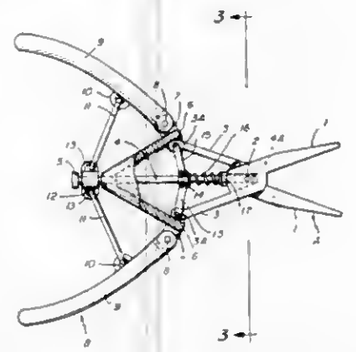
PLIERS

Charles R. Budrose, Melrose, Mass., assignor to Upaya, Inc., Saugus, Mass.

Filed June 21, 1976, Ser. No. 698,412

Int. Cl.² B25B *7/12*

U.S. Cl. 81—383.5 **17 Claims**



1. A plier comprising;

a jaw assembly including a pair of jaws and means pivotally securing the jaws with each jaw having a gripping end and an operating end,

a handle assembly including a pair of handles, concave means, means connecting the handles to the concave means, and linkage means,

and a shaft means coupled through an aperture in the concave means having one end coupled to the jaw assembly and means for operatively coupling the other end of the shaft means to the linkage means,

said linkage means also coupled to and operative by squeezing the handles to move the shaft means and in turn carry the jaw assembly into the concave means with the operating ends of the jaws being closed upon movement into the concave means thereby causing the gripping ends to close.

4,028,972

SIMPLIFIED LATHE

Glenn B. Morse, 321 Fountain St., NE., Apt. No. 1, Grand Rapids, Mich. 49503

Division of Ser. No. 397,396, Sept. 14, 1973, Pat. No. 3,903,765. This application Sept. 8, 1975, Ser. No. 611,516

Int. Cl.³ B23B *19/02*

U.S. Cl. 82—28 R **1 Claim**

1. In a machine having a frame, a spindle carried by said frame and rotatable about a first axis, and a motor mounted in fixed position relative to said frame and said spindle and having an output shaft rotatable about a second axis offset from and parallel to said first axis; the improvement comprising:

fulcrum means on said frame defining a third axis parallel to said first and second axes and spaced from the plane containing said first and second axes;

an idler arm having one end mounted in said fulcrum means, said idler arm being pivotally moveable about said third axis;

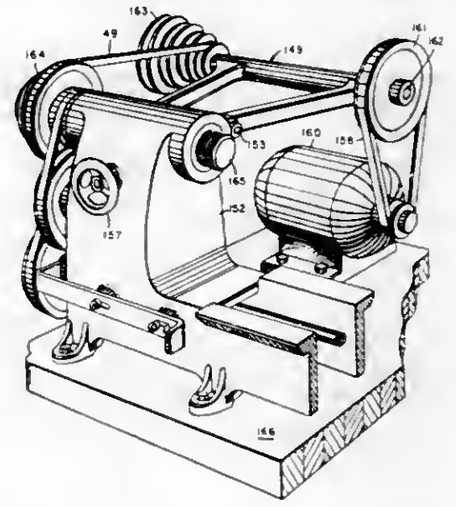
an idler shaft journalled at the opposite end of said idler arm, the axis of said idler shaft being parallel to and substantially coplaner with said first and third axes, the length of said idler arm being such that the plane containing said idler shaft axis and said second axis is substantially perpendicular to the plane containing said first and third axes;

a first sheave on said spindle;

a second sheave on said motor output shaft;

third and fourth sheaves on said idler shaft and aligned, respectively, with said first and second sheaves;

a first drive belt entrained on said first and third sheaves;



the axis of said fulcrum means lying within the confines of said first drive belt;

a second drive belt entrained on said second and fourth sheaves; and

adjustment means mounted on said frame and contacting said idler arm to induce rotation of said idler arm about said third axis to adjust the tension of said second belt.

4,028,973

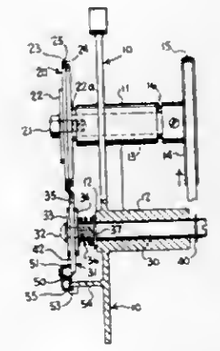
CUTTING DEVICE

John J. Bogdanski, Stamford, and Harold Silverman, Norwalk, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed Aug. 25, 1975, Ser. No. 607,449

Int. Cl.² B26D *7/08*

U.S. Cl. 83—169 **1 Claim**



1. In an envelope opening device having

a frame;

a first shaft rotatably mounted on said frame;

a first cutting disc secured to said shaft and having a peripheral cutting edge formed thereon;

means for driving said shaft and said cutting disc;

a second shaft rotatably mounted on said frame;

a second cutting disc secured to said second shaft and having a peripheral cutting edge formed thereon which cooperates with the said peripheral cutting edge of the first disc so that a sheet of material moving between said discs may be cut;

a block member, said member having a surface comprising a solid polytetrafluoroethalene lubricant material; and

support means carried by said frame and carrying said block member for yieldably biasing said block member into engagement with said second disc, said surface of said block member thus being yieldably urged into engagement with that radial face of said second disc which contacts the corresponding face of said first cutting disc whereby lubrication of, and dampening of vibrations in, both of said discs may be simultaneously achieved.

4,028,974

APPARATUS FOR CUTTING BITUMEN CAKES

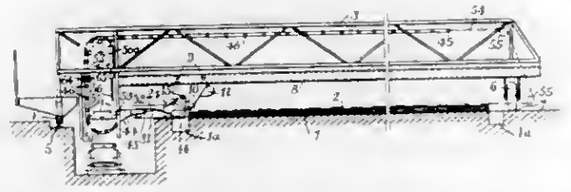
Jean-Jacques Collet, 760 Chemin de Cleres, 76230 Bois Guillaume, France

Filed Dec. 30, 1974, Ser. No. 537,338

Claims priority, application France, Jan. 16, 1974, 74.01446; Nov. 29, 1974, 74.38032

Int. Cl.² B26D *7/10*

U.S. Cl. 83—171 **10 Claims**



1. Apparatus for cutting cakes of bitumen or other similar products out of a sheet of said product during the cooling thereof in a basin in which it was previously cast, comprising a transverse, substantially horizontal girder spanning said basin, wheels for supporting and guiding either end of said girder on longitudinal races disposed on either side of said basin, means for feeding said girder step by step on said wheels, a carriage suspended from said girder, means for driving said carriage with a continuous motion in a forward direction corresponding to the cutting of a transverse strip of product out of said sheet and for driving said carriage step by step in a return direction corresponding to the removal of said cut strip, a heated cutter suspended from said carriage, means for lowering said cutter to an operative position and enabling same to cut a transverse strip out of said sheet or product when said carriage travels in said forward direction, means for raising and holding said cutter in an inoperative position when said carriage travels in said return direction, a pusher arm carried by said carriage and having one end adapted to slip on the strip of product during the cutting thereof when said carriage travels in said forward direction and to push the end of the freshly cut strip in front of said pusher arm when said carriage travels in said return direction, a wedge member adapted to roll transversely on said basin bottom, means for drivingly coupling said wedge member to said carriage so as to cause said wedge member to raise said strip of product as it is cut out of said sheet, a transverse belt run adapted to support and carry along transversely said transverse strip of product when said strip has been cut completely out of said sheet, means connected to said carriage for unrolling said belt run under said strip, behind said wedge member, as said carriage moves in a forward direction and as said strip is cut out of said sheet while avoiding any relative movement between said strip and said belt run, and a longitudinal cutter adapted to cut a cake of product out of said strip each time said strip is stopped during its step by step travel in said return direction.

4,028,975

BLADE GUARD LIFT FOR POWER SAW

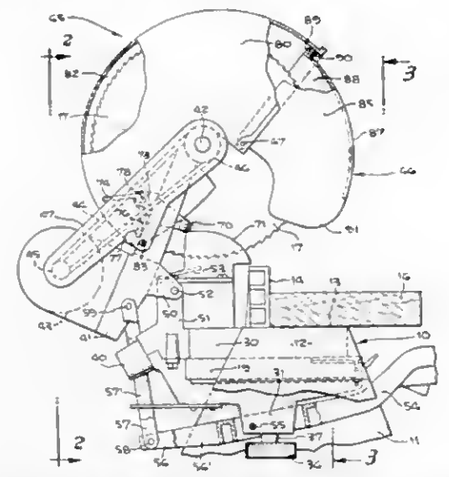
James C. Bennett, Carlsbad, Calif., assignor to Ralph S. Rosen, Los Angeles, Calif.

Continuation-in-part of Ser. No. 654,933, Feb. 3, 1976. This application July 22, 1976, Ser. No. 707,488

Int. Cl.² B27B *5/18;* **B23D** *45/14*

U.S. Cl. 83—397 **10 Claims**

1. A guard device for a power operated bench saw wherein a frame is provided with a work surface for supporting a work piece and a motor actuated saw blade is carried by a movable structure on the frame by means of a manually actuatable leverage having attachments respectively to the frame and the movable structure for moving the saw blade between an elevated non-operating position above the work surface and a progressively lowered cutting arc for advancing the blade past the work surface,



said movable structure including a guard device comprising

a main plate means having a tiltable mounting on said movable structure,

a cam follower on said guard device spaced from the tiltable mounting and a cam track in fixed position on said table receptive of said cam follower, said cam having a contour productive of a progressive relative movement of said plate means resulting in a clearance between said guard device and the work piece as the blade is advanced through said cutting arc.

4,028,976

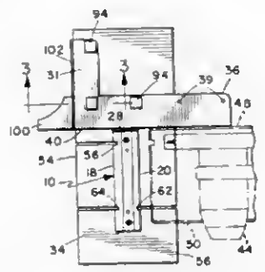
CUTTING TOOL GUIDANCE SYSTEM

Peter Kundikoff, Rte. 4, Box 870, Escondido, Calif. 92025

Filed June 5, 1975, Ser. No. 584,134

Int. Cl.² B27B *9/04*

U.S. Cl. 83—745 **15 Claims**



1. A straight edge for use in guiding a power tool for cutting a straight line on work stock, having a top surface, a side edge and a work stock corner formed by the intersection between the top surface and the side edge, such straight edge comprising:

a planar cross member adapted to overlie said work stock parallel to the direction of cutting said work stock,

said cross member comprising a guiding edge for said power tool,

a planar back plate member connected to said straight edge to be coplanar with said cross member and extending orthogonal to the direction of cutting said work stock in overlying relation with regard to said work stock, said cross back plate having an outer terminal edge and an inner terminal edge spaced apart from said outer terminal edge and located in the plane containing said plate and cross members,

flange means formed on said outer terminal edge and projecting beyond both sides of the plane containing said back plate and cross members to abut the work stock side edge to position said back plate member on the work stock top surface with said inner edge located above and in contact with the top surface so that said back plate is supported on top of the work stock top surface whereby the straight edge is supported in guiding orientation on the work stock by the work stock top surface, said flange means being tapered toward said guiding edge to avoid obstruction with an overhang of the power tool.

4,028,977

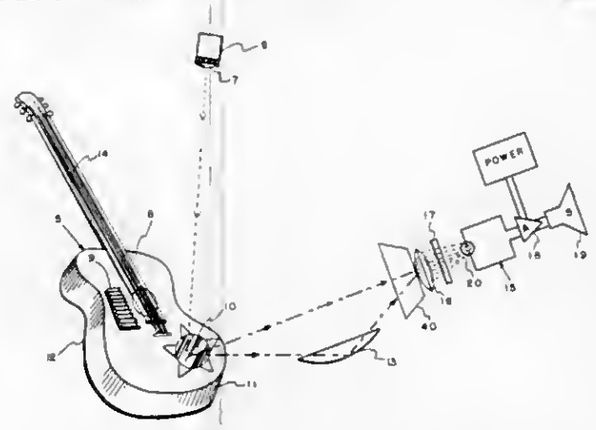
OPTOELECTRONIC SOUND AMPLIFIER SYSTEM FOR MUSICAL INSTRUMENTS

John Joseph Ryeczek, R.D. No. 1, Box 190C, Point Marion, Pa. 15474

Filed Nov. 17, 1975, Ser. No. 632,306

Int. Cl.² G10H *3/00*

U.S. Cl. 84—1.16 **12 Claims**



1. In combination, a musical instrument and a sound amplifier system, comprising:

A. an acoustical guitar having a front face adjacent the strings thereof and a back face defining a sound box therebetween and light reflecting means coupled to one of said faces thereof adapted to vibrate responsive to the musical vibrations of the acoustical guitar said light reflecting means further adapted to modulate and reflect light rays transmitted from a source remote from the musical instrument; and;

B. receiving means at a point remote from the acoustical guitar including a photo-electric device to receive the modulated light rays from the reflecting means to produce electronic signals corresponding to musical tones associated with the modulated light rays and also including means to amplify said electronic signals in an audible range.

4,028,978

SYNTHESIZER TYPE ELECTRONIC MUSICAL INSTRUMENT WITH VOLUME ENVELOPE DECAY TIME CONTROL

Elsaku Okamoto, Hamakita, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Filed Dec. 19, 1975, Ser. No. 642,615

Claims priority, application Japan, Dec. 26, 1974, 50-156898[U]; Dec. 26, 1974, 50-156899[U]

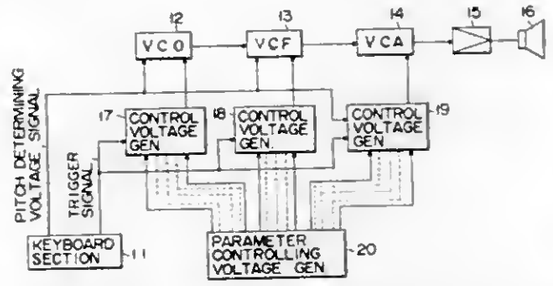
Int. Cl.² G10H *1/02*

U.S. Cl. 84—1.26 **5 Claims**

1. An electronic musical instrument comprising:

a keyboard section including a keyboard having keys and means responsive to actuation of a key on the keyboard to produce a pitch determining voltage signal whose voltage value is a function of the note of the key being actuated and a trigger signal indicating a depression and a release of a key;

tone signal generating means coupled to receive the pitch determining voltage signal from said keyboard section for producing a tone signal having a frequency corresponding to the key being actuated, said tone signal generating means continuing to produce the tone signal of said frequency after release of the key;



envelope providing means coupled to receive the tone signal from said tone signal generating means and the pitch determining voltage signal and the trigger signal from said keyboard section for providing the tone signal with an envelope which decays with a decay time after said trigger signal indicates the release of the key, said decay time being a function of the pitch determining voltage signal.

4,028,979

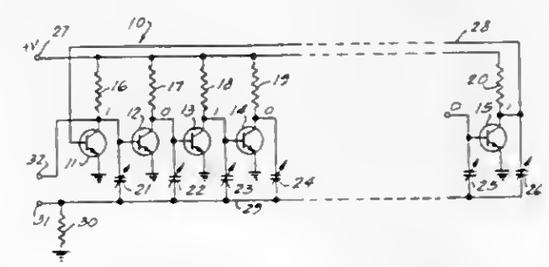
MULTIPLEXER FOR ELECTRONIC MUSICAL INSTRUMENT

David A. Luce, Clarence Center, N.Y., assignor to Norlin Music, Inc., Lincolnwood, Ill.

Filed June 19, 1975, Ser. No. 588,359

Int. Cl.² G10H *1/02;* **G10F** *1/00;* **G10C** *3/12*

U.S. Cl. 84—1.24 **13 Claims**



1. A multiplexer for an electronic musical instrument having a keyboard, comprising a plurality of stages connected in series so that all of such stages operate successively, each of said stages having a time constant determining circuit for establishing a period of delay between operation of such stage and operation of a following stage, said time constant determining circuit having circuit means controlled by operation of an associated key of said keyboard so that operation of a key varies said period of delay, and decoding means connected with all of said stages and responsive to a variation in said delay of any stage for producing output signals which uniquely identify operated ones of said keys.

4,028,980

SOSTENUTO PIANO ACTION

Robert S. Hill, and Lewis F. Herwig, both of Holly Springs, Miss., assignors to The Wurlitzer Company, Chicago, Ill.

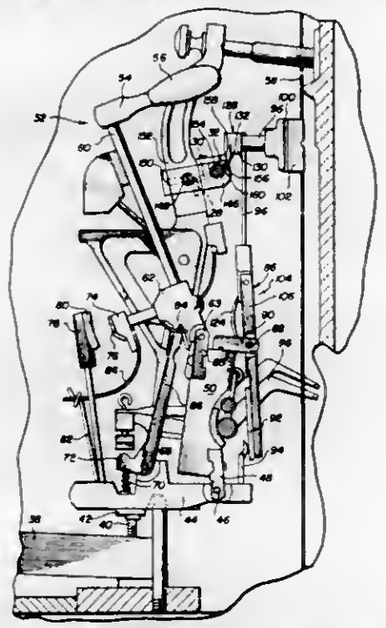
Filed Nov. 10, 1975, Ser. No. 630,266

Int. Cl.² G10C *3/00*

U.S. Cl. 84—218 **3 Claims**

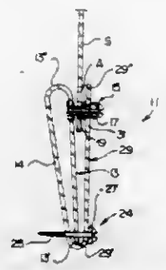
1. A sostenuto system system for an upright piano having a damper which is retracted from a string upon playing a respective note comprising an upstanding damper lever having a damper wire mounting said damper at the top of said lever said damper including a damper block with a damper pad on

the front thereof and a rearwardly extending cylindrical rod receiving said damper wire substantially diametrically thereof, a screw threaded into the rear of said rod and bearing against said wire to lock said damper rod and block in place on said wire, and an elastomeric sostenuto fitting comprising a hollow cylindrical body receiving and secured to the rear of said rod, said fitting being apertured to accommodate said screw and



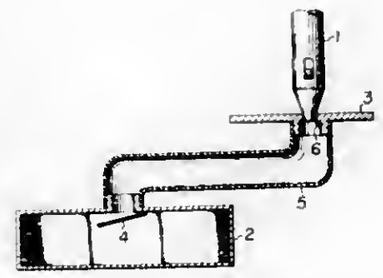
having a lateral tab thereon, damper restraining means adjacent said damper and adjacent the top of said damper lever and having a portion thereof normally disposed out of the path of said tab, and manually operable means for moving said restraining means portion into said path to engage behind the tab of a retracted damper to prevent return of said damper into damper engagement with a respective string.

4,028,981
CONNECTING DEVICE
Cecil W. Cravens, 28 Ayers, Jackson, Tenn. 38301
Filed Dec. 9, 1975, Ser. No. 639,243
Int. Cl.² G10G *5/00*
U.S. Cl. 84—327 **4 Claims**



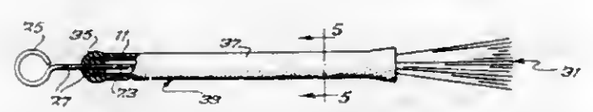
1. A connecting device for securing a supporting strap to a musical instrument, said connecting device comprising a flexible, elongated strip means including a first end for fixed attachment to the musical instrument and including a second end for removable attachment to the supporting strap, said second end being located remote from said first end, at least one end of the supporting strap including a buttonhole-like aperture; retaining means for fixed attachment to said second end of said strip means, said retaining means including a button-like member for coacting with the buttonhole-like aperture in the supporting strap to removably attach the supporting strap to said second end of said strip means; and cover means for coacting with said retaining means to securely attach the supporting strap to said retaining means, said cover means including first and second ends, said first end of said cover means being attached to said first end of said strip means, said second end of said cover means including a buttonhole-like aperture for fitting over said button-like member of said retaining means after the buttonhole-like aperture of the supporting strap has been fitted thereover to prevent the supporting strap from being inadvertently removed from said retaining means without the removal of said cover means therefrom; said retaining means including a stud-like member having a first end and a second end, said first end of said stud-like member being attached to said second end of said strip means, said second end of said stud-like member being attached to said button-like member of said retaining means, said stud-like member including a flange portion intermediate said first and second ends thereof for providing a barrier between said second end of said cover means and the supporting strap when both are fitted over said button-like member of said retaining means.

4,028,982
PIPE ORGAN
Hisashi Sase, Chiba, Japan, assignor to Toho Plastics Co., Ltd. and Mitsubishi Pencil Co., Ltd., both of Tokyo, Japan
Filed May 6, 1976, Ser. No. 683,755
Claims priority, application Japan, June 11, 1975, 50-70583
Int. Cl.² G10B *3/00*
U.S. Cl. 84—331 **1 Claim**



1. A pipe organ comprising, in combination, a wind-chest, a sound-board formed separately from said wind-chest, at least one pipe supported on said sound-board, said wind-chest having at least one valve adapted to permit air efflux to flow out from said wind-chest, each of said valves having associated therewith a flexible tube adapted to deliver said air efflux to said pipe.

4,028,983
ADJUSTABLE DRUM BRUSH
Joseph D. Calato, 8685 Rivershore Drive, Niagara Falls, N.Y. 14304
Filed Oct. 6, 1975, Ser. No. 619,670
Int. Cl.² G10D *13/00*
U.S. Cl. 84—422 S **15 Claims**

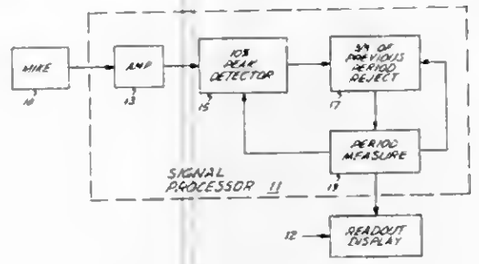


1. In a drum brush comprising a casing, a plurality of wire bristles at least partially within said casing and movable to selected positions in which portions of said bristles extend outwardly from one end of said casing, and a control rod operatively connected to said bristles and adapted to move said bristles to and from said selected positions, the improvements which comprise: said casing having an open end through which said bristles may be wholly removed, and a cap adhesively held on said open end having a bore through which said control rod extends and having a groove into which said open end of said casing extends.

4,028,984
MUSICAL APPARATUS
Edward J. Sanchez, 727 Richland Ave., Baton Rouge, La. 70896
Filed May 3, 1976, Ser. No. 682,383
Int. Cl.² G10D *13/00*
U.S. Cl. 84—422 R **1 Claim**

1. A foot operated apparatus for playing a cymbal, drum or similar instrument which comprises a striking stick flexibly, pivotedly mounted on a rigid arm member attached to a foot pedal assembly that moves said arm member up and down, said rigid arm member comprising a first straight rod to which said stick is mounted parallel to said rod, second rods perpendicularly attached to said first rod and springs attached to one end of said stick said apparatus and to said second rods.

4,028,985
PITCH DETERMINATION AND DISPLAY SYSTEM
Lauren V. Merritt, 95 Monte Vista Lane, Sierra Madre, Calif. 91024
Filed Feb. 17, 1976, Ser. No. 658,366
Int. Cl.² G10G *7/02*
U.S. Cl. 84—454 **10 Claims**



1. An improved pitch determining and display system comprising, in combination:

a. signal generating means for providing a signal which corresponds to pitch produced by a musician said signal generating means comprising a microphone for picking up the sounds produced by a musician and translating the sounds into corresponding electronic signals;

b. signal processing means for determining the pitch produced said means being connected to the signal generating means and driven by the electronic signals generated by said microphone, said signal processing means comprising:

i. amplifier means connected to the microphone for amplifying the signal produced by the microphone:

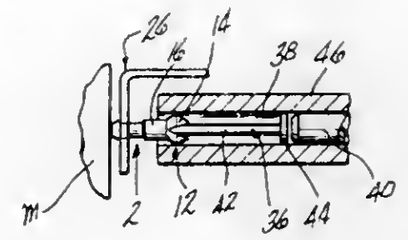
ii. peak detector means connected to the amplifier means for providing an output pulse when an input peak pulse from the amplifier means exceeds a previous input pulse less an amount proportional to the time that has elapsed since the previous input pulse;

iii. inhibit means connected to the peak detector means for inhibiting the transmission of pulses which arrive during a period immediately following each accepted pulse, while transmitting onward acceptable pulses, the period being approximately ⅝ of the time between acceptable pulses; and

iv. period measuring means connected to the inhibit means and the peak detector means for providing a signal proportional to the time between peak detector means-input pulses, the single being fed back to the inhibit means; and

c. display means connected to the signal processing means for translating the determined pitch into convenient musical notation, said display means being adapted to receive the signal from said period measuring means.

4,028,986
CONNECTOR MEMBER FOR TIP OF FASTENER
Richard John Beton, South Blackburn, Australia, assignor to Olin Corporation, New Haven, Conn.
Filed Mar. 24, 1976, Ser. No. 670,032
Int. Cl.² E04G *3/00*; **F16B** *15/00*
U.S. Cl. 85—10 E **2 Claims**

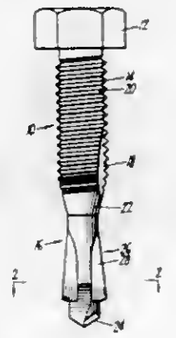


1. A disintegrating connector member for use in providing a temporary connection between an elongated fastener shank and a bracket having at least one aperture therethrough, said member comprising: an axially elongated body formed from an elastically deformable material, said body having a forward nose portion sized to engage the bracket aperture for retention of the bracket on the connector member, a bore extending axially of the body sized to snugly receive and retain the fastener shank therein, and a rearward part of said body being formed with a plurality of radially outwardly and rearwardly extending wings which are radially deflectable to provide means for snugly engaging a plurality of different diameter bores, said wings being joined to said body along a circumferential hinge line to facilitate said radial deflection, each of said wings being separated from the adjacent wings by intervening substantially V-shaped slots.

4,028,987
SELF-DRILLING SCREWS
Robert Neil Wilson, Surrey Hills, Australia, assignor to Illinois Tool Works Inc., Chicago, Ill.
Continuation of Ser. No. 485,475, July 3, 1974, abandoned.
This application Dec. 5, 1975, Ser. No. 638,220
Int. Cl.² F16B *25/00*
U.S. Cl. 85—46 **5 Claims**

1. A self-drilling thread forming screw having first and second shank portions, a head at one extremity adjacent the first portion and a drill tip at the other extremity adjacent the second portion, the first portion being of greater cross-sectional size than the second portion, the first portion including thead convolutions formed thereon and including means to form complementary threads in the material within which the screw is to be engaged, the drill tip including a pilot drill portion having laterally extending cutting edges with a maximum transverse dimension not greater than the maximum transverse dimension of the second shank portion and flute regions extending generally longitudinally of the second shank

portion from the laterally extending cutting edges, the second shank portion being generally cruciform in cross-sectional configuration, such a configuration being formed by wing portions terminating in secondary cutting edges extending transverse the axis of the fastener intermediate the pilot tip cutting edges and the first shank portion and further including arm portions extending in a plane generally perpendicular to the plane including the wing portions and in substantial axial alignment with the plane including the lateral cutting edges of the pilot drill, the extremities of the arms adjacent the drill portion terminating above the secondary cutting edges and merging with the uppermost extremity of the flute regions of

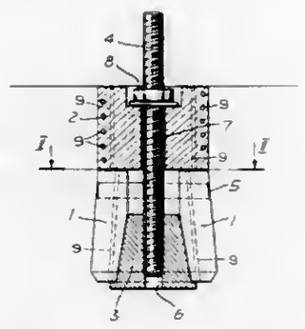


the pilot drill so that the material removed by the drilling action of the pilot point may flow unimpeded into the region above the secondary cutting edges, the transverse dimension of the arm portions being less than the transverse dimension of the secondary cutting edges, the secondary cutting edges having a transverse dimension greater than that of the pilot cutting edges and substantially equal to the root diameter of the thread convolutions, a tapered shank portion interconnecting the first shank portion and second shank portion, the wing portions tapering outwardly from a position beneath the tapered shank portion toward the secondary cutting edges and thereby providing a clearance angle above said secondary cutting edges.

4,028,988
DOWEL

Heinrich B. Schäfers, Wachmannstrasse 22, Bremen, Germany (2800)

Filed Jan. 13, 1976, Ser. No. 648,754
Claims priority, application Germany, Jan. 18, 1975, 2501925
Int. Cl.² F16B 13/00
U.S. Cl. 85—87 5 Claims

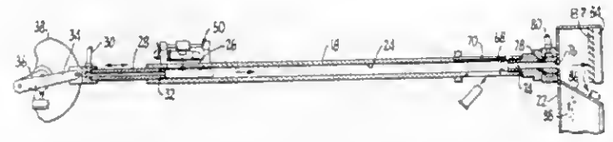


1. In a dowel comprising a threaded bolt having an inner and outer end, a head element surrounding said bolt and having two ends which face to said inner and outer ends of said bolt, respectively, a spreading element which surrounds said bolt and is connected to said bolt adjacent said inner end, said spreading element having a tapered end which faces said outer end of said bolt, at least one pressure element arranged around said bolt between said head element and said spreading element and a nut mounted on said bolt near said end of said head element facing said outer end of said bolt for shifting said pressure element on said spreading element, the improvement comprising said head element being made of artificial stone.

4,028,989
BULLET EXTRACTOR

Alphonse C. Vassallo, 1439 Wayland, San Francisco, Calif. 94134

Filed July 24, 1975, Ser. No. 598,555
Int. Cl.² C06B 21/00
U.S. Cl. 86—1 A 4 Claims

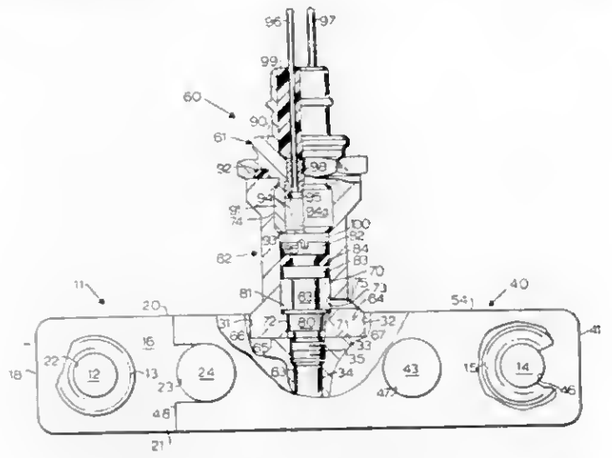


1. A device for disassembling cartridges wherein said cartridge consists of a casing containing a propellant with a bullet therein, said casing having an extraction rim larger than the body of the casing, said device having a barrel, said barrel having a breech adjacent the entrance end, said barrel having a diameter sufficient to pass an entire cartridge case, means for propelling said catridge through said barrel and a reduced portion at the terminal end of said barrel, said reduced portion being of sufficient diameter to pass the cartridge body but to not pass the extraction rim of the cartridge, whereby the extraction rim is engaged and stopped and the projectile and the powder is extracted from said case by inertia.

4,028,990
EXPLOSIVELY ACTUATED RELEASE DEVICE FOR CALL BUOYS AND THE LIKE

Gene Terry Waide, Gilroy, Calif., assignor to Holex Incorporated, Hollister, Calif.

Filed July 15, 1976, Ser. No. 705,557
Int. Cl.² F42B 3/00
U.S. Cl. 89—1 B 10 Claims



5. An explosively actuated release device, including in combination:

a first connection member having means for attachment to a primary body,

a second connection member having means for attachment to a secondary body which is eventually to be removed from proximity to the primary body,

means providing a separating force urging said primary and secondary bodies apart, at least in the vicinity of the primary body,

said first and second connection members being aligned and longitudinally overlapped through part of their lengths, in side-by-side relationship, and located in between the primary and secondary bodies,

means associated with the first and second connection members for preventing relative lateral movement of the two members, and for preventing relative rotational movement of the two members,

a retaining block positioned at corresponding adjacent outer edges of the two connection members, and means associated with the retaining block and with said adjacent outer edges for interengaging the block with both edges to prevent relative longitudinal movement of the two connection members,

means normally holding the retaining block in the interengaged position,

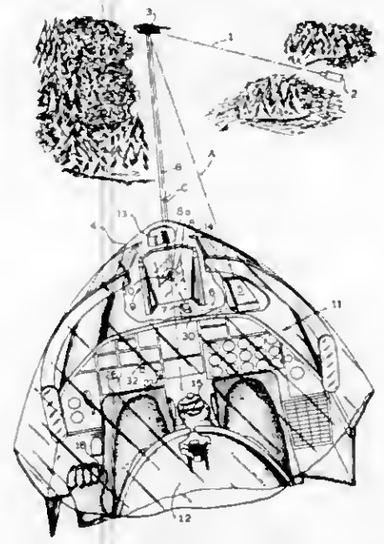
explosively actuated means for driving the retaining block outwardly away from the connection member edges when separation of the primary and secondary bodies is desired, to thereby separate the interengaging means by moving the retaining block to a disengaged position, and

means connecting the retaining block, when disengaged, to one of the connection members.

4,028,991
WEAPON SYSTEM

Milton Kuby, Huntington Station, N.Y., assignor to Fairchild Industries Inc., Germantown, Md.

Filed Oct. 10, 1975, Ser. No. 621,499
Int. Cl.² F41G 3/02
U.S. Cl. 89—41 ME 4 Claims

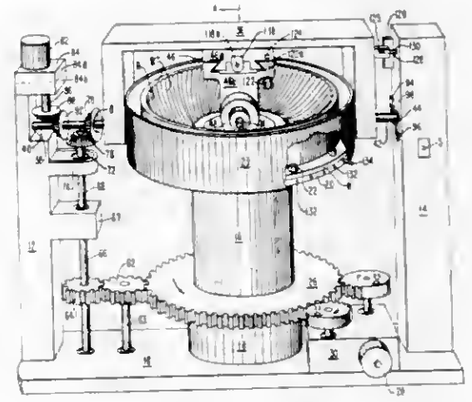


1. A weapon system adapted to fire projectiles in rapid succession comprising in combination, a weapon, means operatively connected and operable to fire the weapon, sight means operatively associated with the weapon to facilitate alignment of the weapon with a target and provide an indication thereof, said sight means including a transparent member, beam generating means operatively connected to the weapon system, and adapted to illuminate a target with the beam, receiving means operatively connected to the weapon system and receptive to a reflection of the beam from the illuminated target, said receiving means adapted to provide an indication of the relative position of the target with respect to the receiving means, comparator means adapted to receive said indications from said sight means and said receiving means and operate said weapon firing means, said sight means and said receiving means including means to compare said indications and locate and display target reticles on said transparent member in response thereto, the location of said target reticles displayed on said transparent member being responsive to the signals provided by said comparing means.

4,028,992
METHOD AND MEANS FOR MAKING HELICAL RACES

Manfred R. Kuehnle, 6 Linmoor Terrace, Lexington, Mass. 02173

Filed Nov. 20, 1975, Ser. No. 633,642
Int. Cl.² B23C 3/18, 3/34
U.S. Cl. 90—11 C 6 Claims



1. The method of forming helical grooves in a work-piece defining a toroidal enclosure having an axis of symmetry and a circular axis perpendicular to the axis of symmetry and defining a diametric plane through the enclosure comprising the steps of

A. rotating the work-piece about a first axis corresponding to the axis of symmetry of the toroidal enclosure and perpendicular to the diametric plane of the enclosure.

B. positioning a cutting tool adjacent to the work-piece so that its cutting end engages the enclosure wall,

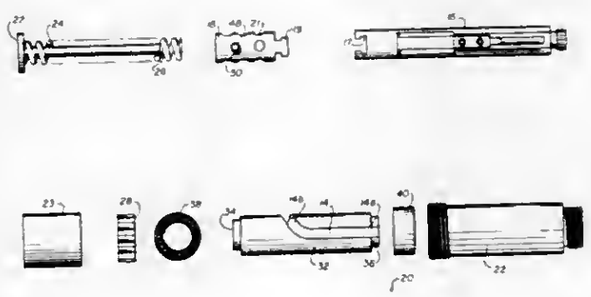
C. rotating the cutting tool about a second axis perpendicular to the first axis and coincident with the circular axis of the enclosure from an initial position adjacent one point on the wall to a final position adjacent another point on the wall, and

D. rotating the work-piece and tool in synchronism about their axes of rotation so as to maintain the cutting tool at a constant attack angle against the enclosure wall from said initial position to said final position so that the tool cuts a groove in the enclosure wall having a uniform cross section along its length.

4,028,993
CYCLE FIRING RATE REDUCING ASSEMBLY FOR AUTOMATIC WEAPONS

George L. Reynolds, Cambridge, Ill., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 23, 1976, Ser. No. 660,191
Int. Cl.² F41D 11/12
U.S. Cl. 89—130 6 Claims



1. In an automatic weapon system having a gun tube with recoil and counterrecoil cycles and a linearly movable bolt carrier, the improvement comprising:

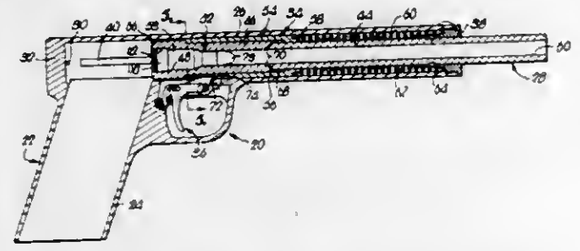
a rotatable drum having a curved cam surface,
cam follower means carried by the bolt carrier for tracking in said cam surface of the drum to sequentially rotate the drum in opposite directions and dissipate thereby energy generated by the bolt carrier during recoil and counterrecoil movements of the bolt carrier, and,
means for storing recoil energy of the bolt carrier to initiate counterrecoil movement of the bolt carriage,
said cam surface including a straight portion adjacent the muzzle end of the weapon system gun tube and a helically curved portion adjacent to the breech end of the system.

4,028,994

MICRO-PRECISION TIMED FIRING HANDGUN

Benjamin A. Feriuga, 3814 Leavenworth Road, Kansas City, Kans. 66104

Filed Oct. 29, 1975, Ser. No. 626,980
Int. Cl.² F41C *5/02*
U.S. Cl. 89—161 **14 Claims**



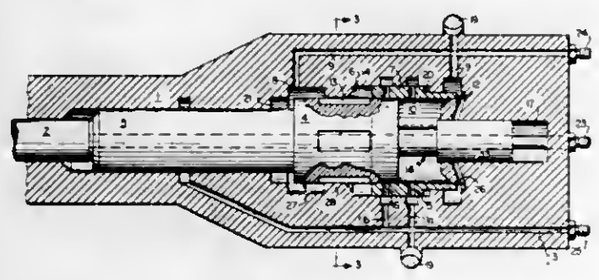
12. In a gas operated handgun of the drop barrel type:
a frame comprised of a fixed, elongate tube in which a barrel is reciprocably carried,
said tube being closed at its normally rearwardmost end to present a breech plate having a fixed firing pin positioned to project into said tube axially thereof,
said barrel having a cartridge chamber at its normally rearwardmost end;
a trigger operated actuator mechanism coupled with said barrel for propelling the same with a cartridge in the chamber from a position spaced forwardly of said firing pin rearwardly into engagement with said firing pin; and
means incorporated with said mechanism for utilizing gases from said cartridge upon discharge thereof for holding said barrel seated against said breech plate until the gas pressure from said cartridge is dissipated,
said mechanism further including barrel return means for returning said barrel to said first position upon the dissipation of said gases.

4,028,995

HYDRAULIC STRIKING APPARATUS

Pekka Salmi, and Pentti Raunio, both of Tampere, Finland, assignors to Oy Tampella AB, Finland

Filed Apr. 18, 1975, Ser. No. 569,531
Claims priority, application Finland, Apr. 25, 1974, 1267/74; Feb. 17, 1975, 750425
Int. Cl.² F01B *7/18*; **F01L** *25/04, 17/00*
U.S. Cl. 91—276 **7 Claims**



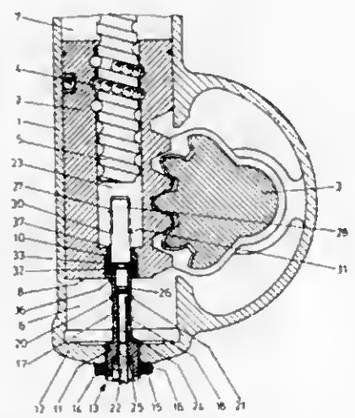
1. An hydraulically operated striking means, comprising:
body means having an axial, generally cylindrical, interior space, said body means having a radially inwardly protruding annular member;
cylindrical piston means axially slidable between a first position and a second position within said cylindrical space, said piston means having an annular flange, the outer cylindrical surface of the flange of said piston means being in sliding contact with the inner surface of said protruding annular member, said piston means having means defining canal means in the outer cylindrical surface of said piston means flange;
said body means, said annular member and said piston means flange defining a first annular space and a second annular valve space axially separated by said protruding annular member, said protruding annular member being adjacent said piston means; and
annular distributing valve means slidably disposed in said second annular valve space and being axially slidable between a first position and a second position, said valve means and said annular member surrounding a portion of said piston means so that in all operating positions of said piston means said flange is in contact with the inner surfaces of said distributing valve means and said annular member,
said first annular space communicating with said second annular valve space by means of said canal means when said piston means is in said first slidable position, said annular member and said flange preventing communicating between said spaces when said piston means is in said second slidable position.

4,028,996

ADJUSTABLE BYPASS VALVE TO EFFECT STEERING LIMITS IN BOOSTER POWER STEERING SYSTEM

Erich Jablonsky, Boblingen, Rems, Germany, assignor to Zahnradfabrik Friedrichshafen AG, Germany

Filed Jan. 12, 1976, Ser. No. 648,526
Claims priority, application Germany, Jan. 30, 1975, 2503676
Int. Cl.² F15B *15/22*
U.S. Cl. 91—401 **5 Claims**



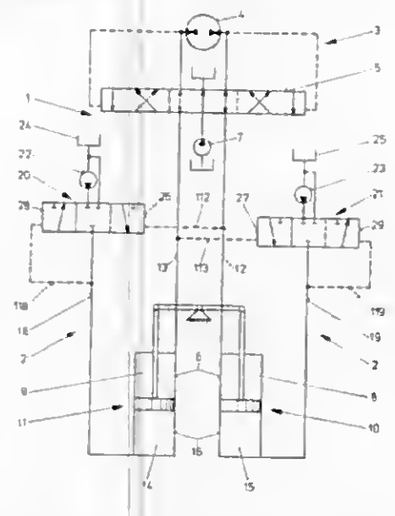
1. In a booster steering device having
a double acting cylinder with opposed pressure chambers divided by a reciprocal piston comprising a wall with faces exposed to pressure in respective chambers whereby said piston may be directionally actuated by pressurizing of one chamber and exhausting the other chamber for steering a vehicle, the improvement comprising:
bypass valve means secured to said cylinder and passing slidably and sealingly through said piston wall to block flow between said pressure chambers when said piston is intermediate limits of piston travel;
said bypass valve means having flow passages disposed on opposite sides of said piston wall when said piston is intermediate limits of piston travel and said flow passages being then exposed to pressure only in respective pressure chambers; and flow passages being of a length to span between said pressure chambers through said piston wall to effect flow between said pressure chambers at respective limiting positions of said piston to bypass pressure from a pressurized chamber to a chamber being exhausted to drop booster pressure in a pressurized chamber thus determining limiting positions of said piston;
said bypass valve means comprising an elongated body;
a hushing through the wall of piston and carried thereby and said elongated body passing through said bushing;
means permitting axial play of said bushing in said wall within limiting positions;
said flow passages being of a length to span said bushing between chambers to effect bypass flow;
said bushing and flow passages having respective cut-off edges coacting by relative movement for cut-off of bypass flow between chambers upon pressure actuation of said bushing within said axial play limiting positions whereby when either chamber is pressurized at a limiting position of said piston actuating booster pressure for reverse travel of side piston is effected.

4,028,997

MOTOR VEHICLE STEERING

Armin Lang, Schwaebisch Gmuend, Germany, assignor to Zahnradfabrik Friedrichshafen AG, Friedrichshafen, Germany

Filed May 2, 1975, Ser. No. 573,883
Int. Cl.² B62D *5/08*; **F15B** *11/16, 13/06*
U.S. Cl. 91—412 **11 Claims**



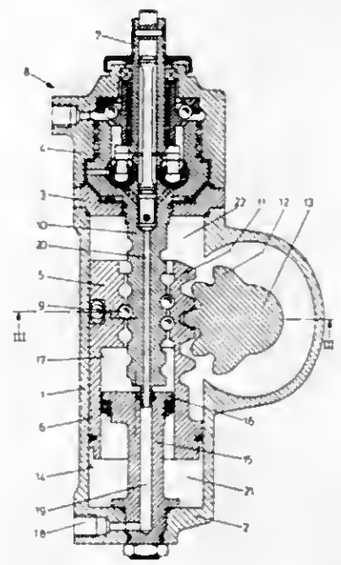
1. In combination with a steering system including a source of pressurized fluid, a control valve (5) connected to said source, servo motor means (6) having pressure control chambers (8 and 9) and fluid pressure lines (12 and 13) connecting said pressure control chambers to the control valve for power assist purposes, means for reducing vibrations produced in the system because of inertia forces, comprising a servo motor assembly (16) having regulated pressure chambers (14 and 15) respectively opposing said pressure control chambers of the servo motor means, a source of pressure medium (22 and 23) connected to said servo motor assembly, and a pair of pilot valve assemblies (20 and 21) responsive to pressure differentials between the pressure control chambers and the regulated pressure chambers for regulating the pressures of the pressure medium in the regulated pressure chambers associated with the servo motor assembly, each of said pilot valve assemblies including a valve piston (35 or 36) having opposed pressure faces (26–28) or 27–29) and a valve body (30) within which the valve piston is movable, conduit means (18 or 19) for establishing fluid communication between one of the pressure faces (28 or 29) and the regulated pressure chamber (14 or 15) opposing one of the pressure control chambers associated with the servo motor means, passage means (12–112 or 12–113) for establishing continuous fluid communication between only the other of the pressure faces (26 or 27) and the other of the pressure control chambers associated with the servo motor means, and ports (32 and 34) establishing fluid communication between the source of pressure medium and the regulated pressure chambers.

4,028,998

AUXILIARY POWER STEERING GEAR FOR MOTOR VEHICLES HAVING A COMMON HYDRAULIC SYSTEM

Erich Jabionsky, Boblingen, Germany, assignor to Zahnradfabrik Friedrichshafen AG, Germany

Filed Dec. 2, 1975, Ser. No. 637,072
Int. Cl.² F01B *9/00*; **F15B** *9/10*
U.S. Cl. 92—107 **3 Claims**



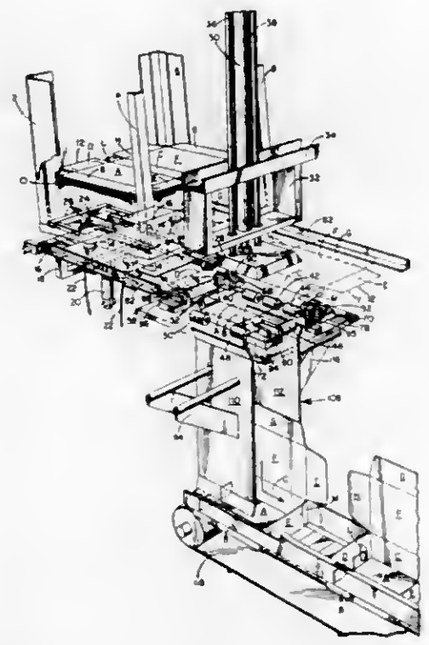
1. In an auxiliary power steering servomotor:
a housing (1) having a double acting pressure cylinder comprising pressure chambers (21, 22) and a movable piston (6) in said cylinder having opposite end surfaces in respective pressure chambers and being reciprocally movable by pressurization of respective chambers;
steering mechanism drive means comprising a gear rack (11) on said movable piston and a gear sector (12) supported in said housing to drive a steering mechanism responsive to movement of said movable piston;
a bore (17) in said movable piston, and said housing carrying a fixed piston (15) extending slidably into and terminating within said movable piston bore and seal means on said fixed piston for effecting a continuous seal with said bore between said pressure chambers;
said fixed piston having opposed faces of areas predetermined relative to respective opposite end surfaces of said movable piston to reduce the effective pressurized areas thereof for reduction of the effective drive force of said movable piston to a predetermined degree required to operate the steering mechanism;
said fixed piston being constructed and arranged so that the respective effective area of each end surface of said movable piston is determined by the difference between respective diameters of said movable and fixed pistons for predetermining the pressure force exerted by said movable piston on said steering mechanism to maintain said predetermined reduced driving force exerted by said movable piston on said steering mechanism when either chamber is pressurized;
said bore in said movable piston having an axis offset from the axis of said movable piston in a direction away from said gear rack to effect increased end surface areas for said fixed piston.

4,028,999

CARTON FORMING MACHINE

Richard G. Lee, Boston, Mass., assignor to Econocorp, Inc., Needham Heights, Mass.

Filed Nov. 4, 1975, Ser. No. 628,738
Int. Cl.² B31B 3/60, 1/50
U.S. Cl. 93—51 R 8 Claims



1. Apparatus for forming a carton blank comprised of a bottom, front and back panels with end tabs, end panels with slits therein adapted to receive said end tabs, and a lid with front and end flaps, into carton form with the lid in open vertical position and with the lid end flaps extending in the plane of the lid,

said apparatus comprising a plurality of spring pressed rollers arranged to define a rectangular opening slightly smaller than the said bottom,

means for feeding flat blanks horizontally from a supply source to a supported position over said opening,

said feeding means arranged to direct said blanks sideways so that in reaching the position over said opening, only one end panel and the said bottom pass over said opening,

first means for initially opening said slits in said end panels while said flat blank is being moved sideways to position over said opening,

a mandrel arranged to descend to engage the said bottom to force said blank downward past said rollers whereby said front, end and back panels will engage said rollers and will be bent to vertical position,

other means for maintaining said slits in open position as the said end panels are being bent toward said vertical position,

means adjacent but spaced laterally from said other slit opening means to cause the said end tabs to be bent toward and to enter said open slits from the outer sides of said end panels as the bending of said front, end and back panels toward vertical is proceeding,

and vertical passages between the other slit opening means and the said tab bending means that are adjacent the ends of said back panel through which the end flaps extending from the lid may pass when the back and lid together have been bent to vertical position and said now erected carton is being moved downwardly by said mandrel past said rollers.

4,029,000

INJECTION PUMP FOR INJECTING MOLTEN METAL

Hiromi Nakamura; Yosizo Komiyama, both of Numazu; Mitsuo Yamashita, and Masaji Ishii, both of Tokyo, all of Japan, assignors to Toshiba Kikai Kabushiki Kaisha and Denki Kagaku Kogyo Kabushiki Kaisha, both of Tokyo, Japan

Continuation-in-part of Ser. No. 427,856, Dec. 26, 1973, abandoned. This application June 12, 1975, Ser. No. 586,283
Claims priority, application Japan, Dec. 28, 1972, 48-2150; Dec. 17, 1973, 48-141609; Dec. 17, 1973, 48-141610; Dec. 17, 1973, 48-141611; Dec. 17, 1973, 48-141612; Dec. 17, 1973, 48-141613
Int. Cl.² F01B 11/02; C04B 35/56, 35/58
U.S. Cl. 92—170 9 Claims

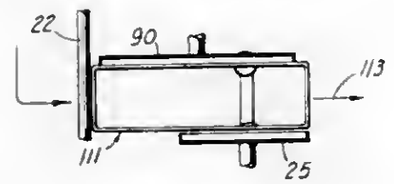
1. In an injection pump including a cylinder and a piston slidably received in said cylinder for injecting molten metal, the improvement wherein at least one of said cylinder and said piston are made of a composite sintered body consisting essentially of a mixture of 10–90% by weight of boron carbide and at least one compound selected from the group consisting of 5–90% by weight of titanium diboride, 5–90% by weight of zirconium diboride and 0.5–30% by weight of boron nitride.

4,029,001

CASE ERECTOR

Donald G. Reichert, Tarpon Springs, Fla., assignor to A-B-C Packaging Machine Corporation, Tarpon Springs, Fla.

Division of Ser. No. 496,028, Aug. 9, 1974, Pat. No. 3,952,636. This application Jan. 21, 1976, Ser. No. 651,073
Int. Cl.² B31B 1/80
U.S. Cl. 93—53 M 2 Claims



1. A method of opening a flattened case blank having one side and one end disposed along a first plane and an opposite side and an opposite end disposed along a second plane closely paralleling said first plane and with each end being of substantially equal width, said method comprising the steps of:

a. urging said case blank between first and second suction cup means by first flight chain and bar means;

b. gripping the one side with said first suction cup means and the opposite side with said second suction cup means;

c. pivoting said second suction cup means about a vertical axis in a first direction in an arc greater than 90° but less than 180° of a circle of radius approximating said end width;

d. moving said second suction cup about said axis in a second direction which is opposite to said first direction until each of said ends assumes a substantially right angle orientation with respect to each of said blank sides;

e. releasing the case blank sides from the first and second cup means; and

f. urging the case from between said first and second suction cup means by second flight chain and bar means.

4,029,002

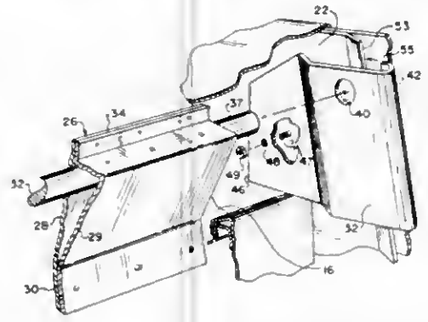
KITCHEN VENTILATOR DAMPER CONSTRUCTION

Edward B. Vandas, St. Louis, Mo., assignor to McGraw-Edison Company, Elgin, Ill.

Filed Dec. 8, 1975, Ser. No. 638,502
Int. Cl.² F23J 11/00
U.S. Cl. 98—115 K 2 Claims

1. In a kitchen venting system having an exhaust duct and a power fan means therein, the combination of interconnected opposing pairs of side walls defining an air inlet open to the kitchen that communicates through internal passage means

with the exhaust duct, a damper, means to pivot the damper to one of the pairs of side walls to move between a closed position across the inlet and an open position removed from the inlet, said damper having end edges spaced apart less than the distance between the one pair of side walls and said pivot means including stub shafts projecting beyond the end edges of the damper, said pivot means further including bearing means to receive and journal the respective stub shafts, each said bearing means being in the form of a flat relatively thin plate having when shaped a first portion with an opening therein for receiving and journalling one of the stub shafts and



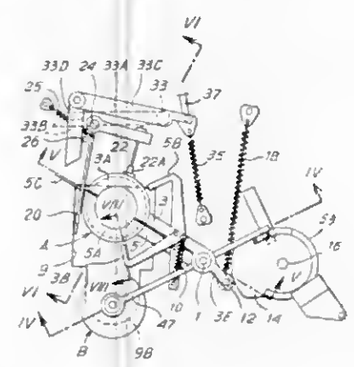
having a laterally offset end portion, said offset end portions of the plates abutting the one pair of the side walls and maintaining the first portions of the plates at the shaft opening spaced from the one pair of the side walls, means for releasably securing each bearing means plate to the adjacent side walls to allow the ready installation and removal of the damper relative to the side wall, each wall of the one pair of side walls terminating along a free edge generally proximate the inlet, each plate on the end thereof opposite the offset portion being folded over almost on itself to define a lip, and said lip overlying and covering the free edge of the side wall when the bearing means plate is secured to the side wall.

4,029,003

DEVICE FOR THE EXTEMPORARY PREPARATION OF BEVERAGES

Adriana Manaresi, Via delle Porte Nuove 12, Florence, Italy

Filed Feb. 24, 1976, Ser. No. 661,048
Int. Cl.² A47J 31/00
U.S. Cl. 99—295 4 Claims



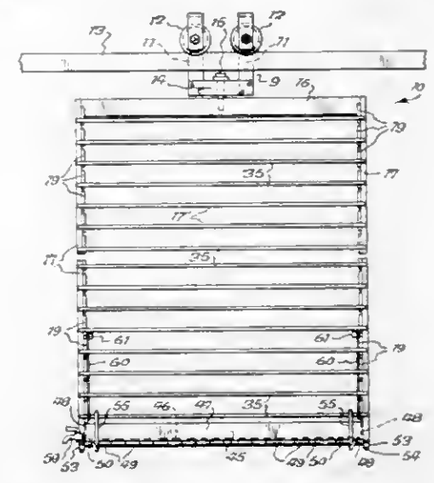
1. A device to carry out extemporary preparation of beverages with a liquid in doses, which passes through a glass-like capsule containing a charge to be diluted with the solvent, said capsule having an upper opening, a removable lower hollow extension and a thin covering plate for said opening, the device comprising: a first station to receive said capsule and to shear said extension thereof, including a capsule arrival chute; a second, beverage delivery station, including a seat for a beverage container and a unit which can be lowered to perforate at least one portion of said capsule and to cause a nozzle for the solvent to penetrate thereinto; a conveying collet having two diverging arms, angularly movable between said first and said second stations, and forming with said arms in a closed position an annular supporting seat for said capsule; a removable shearing unit including a blade to shear said capsule extension and an upper projection which can be removed into a retaining position of said capsule in said seat; collet movement means between said first and said second stations; means for temporarily diverging said collet in its return stroke from said second into said first station, for abandoning said capsule when exhausted; and means for checking the several operations in a desired sequence; further comprising an ejecting projection on each of said collet arms, with a tooth facing its own arm and acting on an edge of said capsule to pick it out from a semi-seat formed by the other arm.

4,029,004

MEAT CURING RACK

Edward Isenberg, 122 Jeanmoor Road, Tonawanda, N.Y. 14150

Filed Oct. 9, 1973, Ser. No. 404,403
Int. Cl.² A23B 4/04
U.S. Cl. 99—477 11 Claims



1. A meat smoking rack comprising a frame including a pair of spaced frame members, a plurality of pairs of shelf sections oriented vertically relative to each other, and bracket means for supporting each pair of said shelf sections on said frame members so that each of said pairs of shelf sections can be oriented to lie in substantially the same plane to form a substantially horizontal shelf or can be inclined to a more vertical position to cause the rack to have less width than when said shelf sections are oriented substantially horizontally.

4,029,005

STEMMING MACHINE

Edward J. Derderian, 4514 N. Wilson Ave., Fresno, Calif. 93704

Continuation-in-part of Ser. No. 435,829, Jan. 23, 1974, abandoned. This application Apr. 28, 1975, Ser. No. 571,916
Int. Cl.² A23N 15/02
U.S. Cl. 99—639 8 Claims

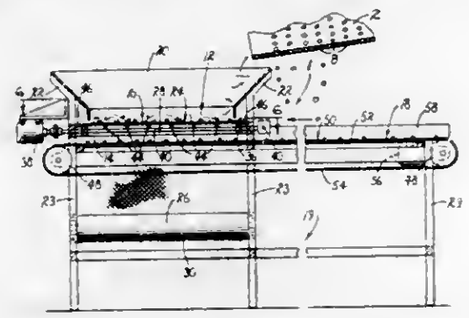
1. A stemming machine for separating raisins from mother stems comprising:

A. first means including a tumbler for fracturing raisin-bearing mother stems comprising a drum of a substantially open-end, cylindrical configuration supported for rotation about an inclined axis, and means defining in the wall of said drum a plurality of radially extended openings suitably dimensioned for accommodating gravitational discharge from the drum;

B. second means including an endless belt for receiving from said tumbler raisins adhered to fractured mother stems comprising a flat, open-mesh belt including a myriad of openings for accommodating gravitational discharge of raisins therethrough;

C. third means for separating raisins from fractured mother

stems including a vibrator comprising a horizontally oriented shaker frame disposed beneath the upper horizontal run of the belt of said open-mesh belt, in engaged relation therewith; and



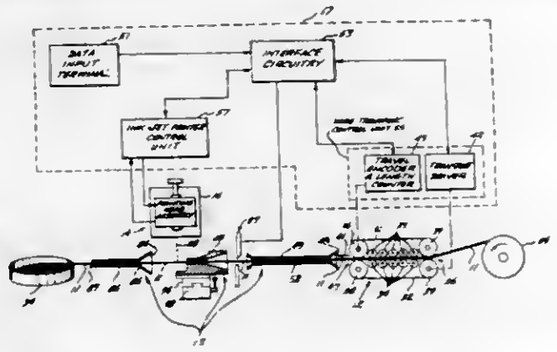
D. fourth means for receiving raisins separated from the mother stems including an endless belt angularly related to the open-mesh belt having an upper horizontal run passing beneath said shaker frame.

4,029,006

METHOD AND APPARATUS FOR PRINTING INDICIA ON A CONTINUOUS, ELONGATE, FLEXIBLE THREE-DIMENSIONAL MEMBER

Paul W. Mercer, Redmond, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed June 26, 1975, Ser. No. 590,462
Int. Cl.² B41F 17/00
U.S. Cl. 101—35 20 Claims



1. In an apparatus for marking multi-character, alphanumeric, identification codes on a substantially continuous length of electrical wire or the like having a three-dimensional exterior surface, and including means for advancing said wire lengthwise past a printing station, the improvement comprising:

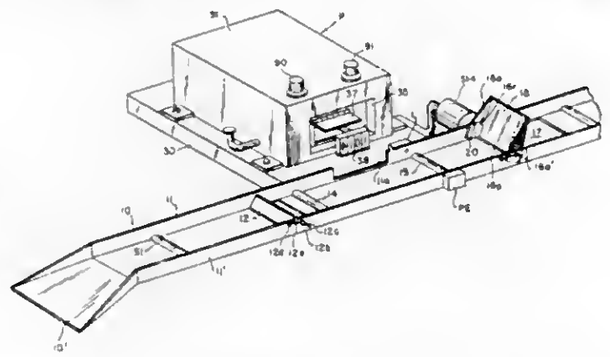
ink jet printing means disposed at said printing station for directing a selectively and electrostatically deflectable jet of droplets of printing ink to impinge and be deposited on the exterior surface of the advancing wire, said printing means being so arranged relative to the wire and being so responsive to the rate of longitudinal advancement of the wire as to cause said droplets of said printing ink to be deposited on the exterior surface of said wire in the form of alpha-numeric characters.

4,029,007

AUTOMATIC DATE-STAMPING SYSTEM FOR VEHICLES ENTERING PARKING AREAS

Armand L. Levinson; Donald W. Heinerichs, both of Baltimore, and George Ruck, Towson, all of Md., assignors to Armand L. Levinson, Baltimore, Md.

Filed Oct. 24, 1975, Ser. No. 625,566
Int. Cl.² B41F 17/00
U.S. Cl. 101—42 15 Claims



1. In a toll-operated parking area, in combination with blocking means against entry of an incoming automotive vehicle thereinto,

a. means for stamping the date of entry on the side-wall of a tire of the vehicle body in invisible ink, and

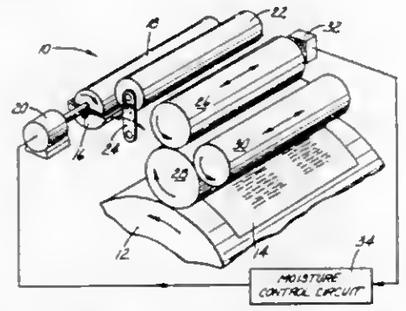
b. means for releasing said blocking means in response to the completion of the operation of said stamping means.

4,029,008

MOISTURE CONTROL SYSTEM

Saied Abd-Elrahman Mabrouk, Macedonia, Ohio, assignor to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed May 24, 1976, Ser. No. 689,165
Int. Cl.² B41F 7/26, 7/36; B41L 25/02, 25/14
U.S. Cl. 101—148 23 Claims



1. A moisture system for a lithographic duplicator having a rotary master-carrying cylinder comprising:

a moisture sensing roll with a hydrophilic surface,

means for carrying moisture between said sensing roll and the surface of a master on the master cylinder including a roll with an ink-receptive surface,

means for maintaining on the surface of said ink-receptive roll a continuous film of lithographic ink,

means for driving said ink-receptive roll in a predetermined time relationship with the master cylinder of the duplicator,

means for presenting a supply of moisture to the ambit of said sensing roll surface at a controlled rate,

means for maintaining said sensing roll in nip-forming driven surface contact with said ink-receptive roll with the ink-receptive roll providing, through the medium of the ink and moisture at said nip, the sole driving agent for said moisture sensing roll, whereby the rotational speed thereof is dependent upon the extent of moisture appearing at the nip, and

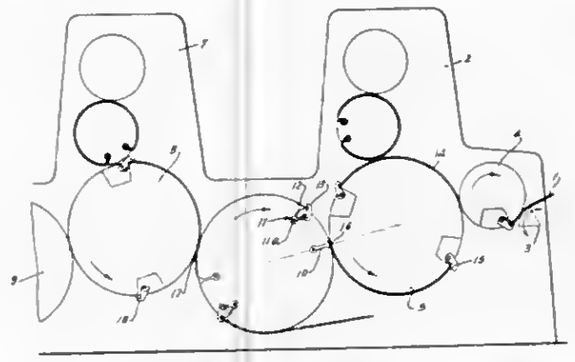
control means operatively connected to said sensing roll for controlling the rate at which moisture is supplied by said moisture supply means as a function of the rotational speed of said moisture sensing roll.

4,029,009

PRINTING MACHINE CONSTRUCTION

Wilfried Kühn, Dresden, and Wilfried Micklausch, Coswig, both of Germany, assignors to VEB Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen, Leipzig, Germany

Filed July 17, 1975, Ser. No. 596,325
Int. Cl.² B41F 21/06
U.S. Cl. 101—231 6 Claims



1. In a printing machine, a combination comprising a first printing roller for printing on one side of a sheet; a second printing roller for printing on the opposite side of said sheet; and means for transferring said sheet from said first to said second printing roller, comprising a transfer roller intermediate said first and second printing rollers and forming with said first printing roller a tangent point, hollow suction bar means on said transfer roller extending over the axial length thereof and operative for engaging a trailing edge of said sheet by suction over the entire elongation of said trailing edge in the direction of said axial length of said transfer roller and for lifting said trailing edge off said first printing roller as said trailing edge travels through said tangent point, means mounting said suction bar means for movement between a position adjacent the periphery of said transfer roller and a position inwardly of said periphery, and combined suction-and-mechanical gripper system means for taking over said trailing edge from said suction bar means and having a row of individual suction grippers for receiving said trailing edge and moving it away from said suction bar means and a plurality of individual mechanical grippers adapted to engage and take over said trailing edge from said suction grippers only after said trailing edge has been received away from said suction bar means by said switch grippers so as to avoid interference between the latter and said mechanical grippers, whereupon said mechanical grippers present said trailing edge to said second printing roller so that it becomes the leading edge when said sheet is on said second printing roller.

4,029,010

ELECTROMAGNETIC PRINTING DEVICE

Horst Gürgen Deisting, Berlin, Germany, assignor to Pitney-Bowes, Inc., Stamford, Conn.

Filed Jan. 23, 1976, Ser. No. 651,775
Claims priority, application Germany, Jan. 31, 1975, 2504017; Apr. 16, 1975, 2516808
Int. Cl.² B41F 1/06
U.S. Cl. 101—316 8 Claims

1. A printing device of the type where a printing plate, such as a credit card, is used to imprint upon a printing assembly, the combination comprising:

a longitudinal housing having a laterally extending first opening and a second opening longitudinally spaced relative to one another;

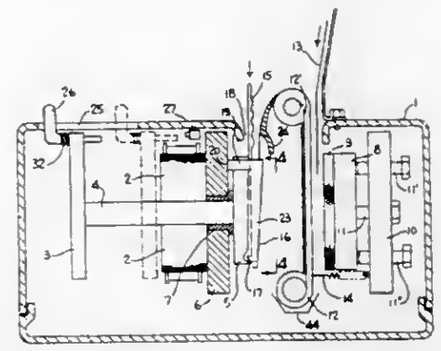
a longitudinally extending support rod slidably supported in said housing intermediate the longitudinal location of said openings;

a printing anvil secured to one end of said rod and having a flat surface generally in alignment with said first opening;

means for holding a printing plate adjacent to said printing anvil flat surface;

an armature plate secured to the second end of said rod in general alignment with said second opening;

a handle resiliently secured to said armature plate and having a portion which extends through said second opening whereby said rod may be manually slid within said housing toward said first opening;



an electromagnet securedly disposed within said housing intermediate said printing anvil and said armature plate;

a switch secured within said housing in general alignment with said handle whereby said switch is engageable by said handle to be closed thereby as said rod is slid within said housing toward said first opening;

means for enabling said electromagnet upon the closing of said switch thereby causing said armature plate to operatively engage said electromagnet;

a printing pad disposed within said housing and having a flat surface opposed to said flat surface of said printing anvil;

means disposed within said housing at said first opening for supporting an ink ribbon intermediate said printing anvil and said printing pad; and

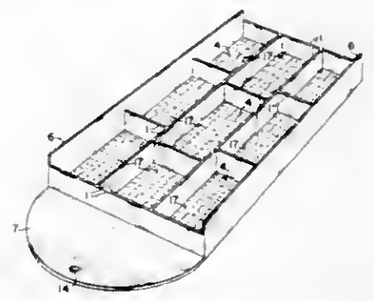
means for holding a printing assembly intermediate said printing anvil and said printing pad.

4,029,011

MULTI COLOR WELLS PROCESS

Ebbert Franklin Kurner, 2500 NE. 192 St., N. Miami, Fla. 33180

Filed May 16, 1975, Ser. No. 578,160
Int. Cl.² B41K 1/22, 1/46, 1/54
U.S. Cl. 101—330 1 Claim



1. A multi color printing apparatus including in combination:

a. a multi color ink tray having parallel end and side walls defining a rectangularly shaped closed area, a floor ex-

tending normal to said end and side walls, and a plurality of partitions extending normal to said floor and extending longitudinally and transversly within said closed area, said partitions, floor, end and side walls defining closed sub areas, said sub areas comprising printing ink compartments which contain printing ink, the ink in some of said compartments being of different color than the ink in other said compartments;

b. a cylindrical color pad roller having a surface layer composed of a foam-like ink retentive and ink absorbant material and having the periphery thereof divided by slots therein into a plurality of discrete areas, such that when said surface layer is developed onto a plane, said discrete areas correspond in size, shape and relative location with said sub-areas of said ink tray;

c. a cylindrical design roller having a design pattern upon the cylindrical surface thereof and having the same diameter and length as the color pad roller;

d. means for removably positioning said design roller and said color pad roller in side by side relationship with their longitudinal axes parallel to each other and with their outer surfaces in ink-transfering and rotation-transmitting contact with each other, said positioning means supporting each of said rollers for rotation about their longitudinal axes;

e. each of said design and color pad rollers being provided with notch marks on one end face thereof so that by alignment of said notch marks prior to rotation of the respective rollers, each spot on the periphery of said design roller will, upon rotation of said rollers, contact a predetermined spot on said color pad roller to ensure that the different color inks absorbed in said discrete areas of said color pad roller are constantly transferred to the same design areas;

f. whereby upon rotation of said color pad roller over, and in contact with said compartments, said ink tray compartments are operative to cooperate with said color pad slots and discrete areas respectively, to consistantly transfer a predetermined color ink contained in said compartments to said discrete areas; and

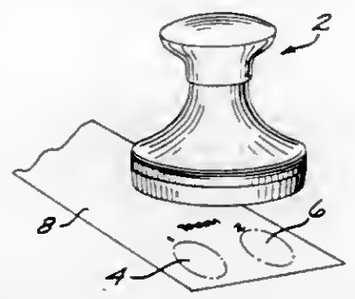
g. whereby upon rotation of said design roller periphery in contact with a workpiece the color pad roller will rotate in contact with said design roller and transfer ink to said design roller which will inturn transfer said ink to said workpiece.

4,029,012

TWO-PART INKLESS APPLICATOR FOR FINGERPRINTS

Jay Smith, III, Pacific Palisades, and Virgle L. Hedgcoth, Santa Monica, both of Calif., assignors to Identicator Corporation, San Bruno, Calif.

Filed Dec. 18, 1975, Ser. No. 642,165
Int. Cl.² B41K *1/00*; **B42D** *15/00*
U.S. Cl. 101—368 **45 Claims**



1. Identification apparatus for preparing a porous medium, such as a check and the like, to retain an identifiable fingerprint comprising:

first means for applying a quanitity of a first liquid developer solution to the medium, the developer solution as applied having sufficient film thickness on the porous medium to contact and adhere to substantially only the ridge pattern of a finger when the finger is applied to the coated medium; and

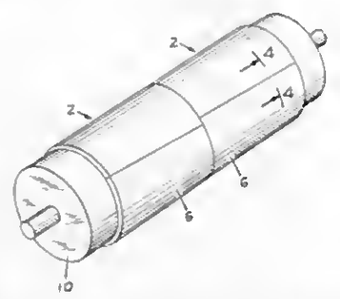
second means for applying a quanitity of a second liquid reagent solution to the medium, the second liquid reagent having a significantly higher penetration rate into the medium than the first liquid developer solution, the first liquid developer solution and second liquid reagent solution capable of chemically interacting to provide a perceivable coloraant product representative of a fingerprint ridge pattern whereby a finger can be first applied to the liquid developer coating on the medium to coat substantially only the ridge pattern and then subsequently applied to the liquid reagent on the medium to provide a colorant product representative of the fingerprint ridge pattern.

4,029,013

WRAP AROUND GRAVURE PRINTING APPARATUS

Harvey F. George, West Hempstead; Jitendra N. Shah, Hicksville, and Robert H. Oppenheimer, Glen Cove, all of N.Y., assignors to Gravure Research Institute, Inc., Port Washington, N.Y.

Continuation of Ser. No. 565,783, April 7, 1975, abandoned, which is a continuation of Ser. No. 398,707, Sept. 19, 1973, abandoned. This application May 11, 1976, Ser. No. 685,359
Int. Cl.² B41F *27/00*
U.S. Cl. 101—382 MV **6 Claims**



1. A rotogravure printing cylinder for use in rotogravure printing, including:

a cylindrical core;

a plurality of printing plates shaped to conform with the contour of the surface of said cylindrical core, each of said printing plates including the entire image to be printed on a single printed page and having a backing,

a layer of material suitable for etching engraving affixed to said backing, said layer having printing recesses formed therein for receiving printing ink;

said printing plates being magnetically held in a fixed position on said cylindrical core with said backings in contact with the surface of said cylindrical core, said printing plates being readily individually removable or replaceable as desired to change the image to be printed on a particular page of printing or the order of the printed pages;

said printing plates being mounted on said cylindrical core with adjacent printing plates in direct abutting contact with one another forming single joints therebetween, and with the edges of each printing plate which extend in the direction of the longitudinal axis of said cylindrical core being parallel to each other and disposed at an angle of approximately 5° relative to the longitudinal axis of said cylindrical core to minimize paper waste during printing.

4,029,014

SAFETY IGNITER FOR FLARES

Donald J. Cunningham, North Ogden, Utah, assignor to Thiokol Corporation, Newtown, Pa.

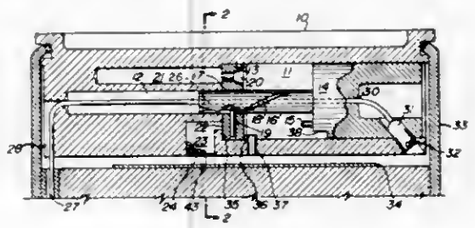
Filed Feb. 23, 1976, Ser. No. 660,097
Int. Cl.² F42B *4/12*
U.S. Cl. 102—35 **12 Claims**

1. A safety igniter for installation adjacent the ignition surface of an illuminant candle, for ignition thereof, in an aerial flare having a parachute and a lanyard operatively connecting the parachute to the safety igniter, the safety igniter comprising:

a housing having two contiguous bores of different diameters, creating a shoulder at their juncture, a duct leading from the bores to the exterior of the housing for passage of the lanyard, and a pyrotechnic-charge chamber having an inlet port communicating with the larger bore and a discharge port for directing flaming gases onto the ignition surface of the illuminant candle;

a pyrotechnic material in the pyrotechnic-charge chamber;

a primer-charge holder, movable in the larger bore;



a primer charger fixed to the primer-charge holder and being alignable with the inlet port of the pyrotechnic-charge chamber;

means for retaining the primer-charge holder adjacent the shoulder between the bores;

a firing-pin holder, movable in the larger bore, operatively attachable to the lanyard;

a firing pin fixed to the firing-pin holder and extending toward the primer-charge holder;

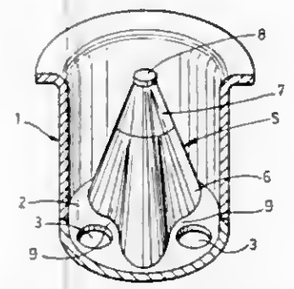
means for rotating at least the primer-charge holder, as the firing-pin holder is moved toward it by the lanyard, so that the primer charge, normally out of alignment with the inlet port of the pyrotechnic-charge chamber and with the firing pin, is brought into alignment therewith before being struck by the firing pin.

4,029,015

PRIMING CHAMBER FOR CARTRIDGES

Maurice Lachaussée, rue de l'Yser, 360, 4300 Ans, Belgium, and André Maigret, 4, Avenue de la Grange, Saint-Maur-des-Fosses, France

Filed Dec. 24, 1975, Ser. No. 644,084
Claims priority, application Belgium, July 8, 1975, 45083
Int. Cl.² F42C *19/10*
U.S. Cl. 102—45 **4 Claims**



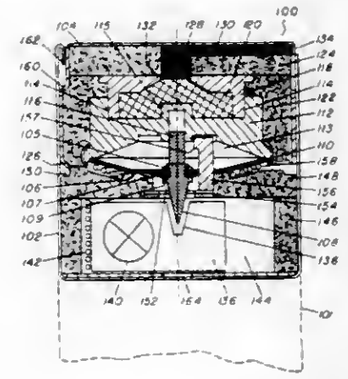
1. A priming chamber for a cartridge, comprising a cylindrical envelope having a flat bottom portion, an inwardly projecting anvil upstanding from said flat bottom portion, the flat bottom portion being formed with vent holes therein, said inwardly projecting anvil comprising a tapered lower portion integral with said flat bottom portion and a tapered upper portion having an upper outer flat end, said lower portion of the anvil having a plurality of ribs extending lengthwise of the anvil and spaced 120° from each other about said lower portion of the anvil.

4,029,016

PLURAL MODE FUZE

Lewis C. Cole, Chester, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed June 29, 1976, Ser. No. 700,992
Int. Cl.² F42B *13/50*, *25/16*; **F42C** *9/00*
U.S. Cl. 102—69 **12 Claims**



1. A fuze providing delay arming, impact functioning, random time functioning and/or self-destruct functioning of a munition, which comprises in combination:

a cup containing a detonator charge and a safing and arming means;

a striker cup, slidably nested in said detonator containing cup;

a bimetallic spring delay module, fixedly mounted in said striker cup, comprising

a bimetallic spring containing a firing pin, and

a pyrotechnic charge for heating said spring, wherein said spring inverts by heat from a first stable position to a second stable position after expiration of a first predetermined delay period following ignition of said pyrotechnic charge, and reverts to said first stable position on cooling after expiration of a second predetermined delay period;

a biasing means intermediate said cups for moving the cups oppositely, whereby the fuze is converted from a safe condition to an armed condition via said safing and arming means;

a means for locking the bimetallic spring when it inverts, so that during such inversion the bimetallic spring overcomes said biasing means without contact of the integral firing pin with the detonator, and thereby moves and seats the striker cup against the detonator containing cup so as to prevent further movement of the striker cup toward the detonator; whereby

a. prior to the expiration of the first delay period required to invert the bimetallic spring, impact of the fuze with the ground overcomes said biasing means and thereby drives the firing pin into the detonator; and

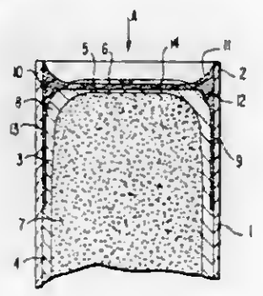
b. after the expiration of said first delay period, the bimetallic spring inverts while held by said locking means, thereby overcoming said biasing means and seating the striker cup against the detonator containing cup so as to prevent movement of the striker cup toward the detonator, whereby the fuze cannot function on impact with the ground but self-destruct functions when the bimetallic spring reverts on cooling after expiration of said second delay period and thereby drives the firing pin into the detonator.

4,029,017

PROPELLANT CHARGE IGNITER

Günter Hübsch, Kalchreuth; Hellmut Bendler, Stein, and Rudolf Stahlmann, Furth, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Germany

Filed Feb. 6, 1976, Ser. No. 655,979
Claims priority, application Germany, Feb. 6, 1975, 2504906
Int. Cl.² F42C 19/08
U.S. Cl. 102—70 R 8 Claims



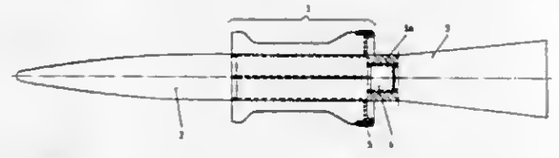
1. A propellant charge igniter which comprises an outer sleeve, open at a front end, an inner sleeve inserted within the outer sleeve and provided adjacent to the front end with a closed bottom portion having predetermined bursting zones, said inner sleeve containing a booster propellant charge, an expansion ring of a pressure-resistant material of low tensile strength arranged adjacent to the front end of the outer sleeve between the outer sleeve and a transition zone between the bottom portion and a wall portion of the inner sleeve.

4,029,018

SABOT FOR SUBCALIBRE PROJECTILE

Björn Ove Björnson, Karlskoga, Sweden, assignor to AB Bofors, Bofors, Sweden

Filed Aug. 11, 1975, Ser. No. 603,900
Claims priority, application Sweden, Aug. 21, 1974, 7410607
Int. Cl.² F42B 13/16
U.S. Cl. 102—93 4 Claims



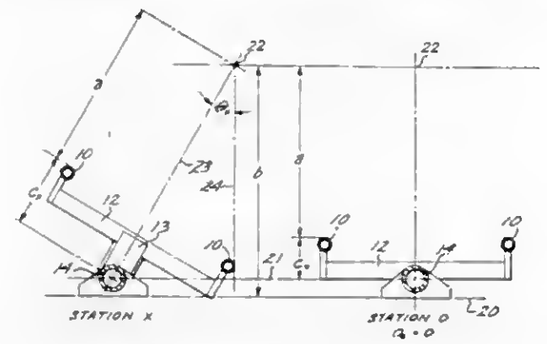
1. A unitary device adapted to be attached to a subcalibre projectile for performing the functions of centering the projectile in a gun barrel and obturating said barrel against expulsion gases developed in said barrel at the time of firing to effect propulsion of said projectile from said barrel, and so constructed that said unitary device is fractured into plural pieces by centrifugal and/or airflow forces imposed on said unitary device when said projectile has been fired, said unitary device comprising an elongated generally cylindrical tubular portion adapted to be disposed about said projectile in coaxial relation thereto, said cylindrical portion having a plurality of elongated generally axially directed slots therein disposed in spaced relation to one another, each of said slots extending completely through said cylindrical portion in a radial direction and each of said slots opening into the forwardmost end of said unitary device and extending in an axial direction rearwardly from said forwardmost end to a position closely adjacent, but terminating short of, the rearwardmost end of said unitary device, whereby said slots define therebetween a plurality of spaced, elongated, axially directed segments which have spaced, free ends at said forwardmost end of said unitary device and which segments are integrally joined to one another only at a comparatively thin unslotted portion of said device adjacent its said rearwardmost end, said unslotted portion of said device acting to hold said spaced segments in position relative to one another along said barrel before said projectile is fired, said unslotted portion including an integral, generally axially directed, threaded outer peripheral surface coaxial with and spaced from said projectile, a driving band disposed at the rearwardmost end of said device about said unslotted portion of said device and having an inner threaded surface in thread engagement with said threaded outer peripheral surface of said unslotted portion, said unslotted portion defining, as an integral part thereof, a surface located at the rearwardmost end of said device extending transverse to the axis of said projectile and operative to obturate said barrel when said projectile and said unitary device are inserted into said barrel for firing, the thickness of said unslotted portion in an axial direction being a small fraction of the axial length of said spaced segments whereby centrifugal and/or airflow forces acting on said elongated, spaced segments after said projectile has been fired are operative to effect a pivotal motion of the free ends of said segments about the rearwardmost end of said unitary device to break said unslotted portion of said unitary device into pieces and thereby effect separation of said device from said projectile.

4,029,019

TRACK FOR VEHICLES

William M. Watkins, West Covina, Calif., assignor to Walt Disney Productions, Burbank, Calif.

Filed Nov. 14, 1975, Ser. No. 631,892
Int. Cl.² B61B 12/00, 5/04; E01B 25/22
U.S. Cl. 104—124 6 Claims



1. A track for vehicles comprising a pair of spaced parallel track rails connected to a backbone member disposed beneath said track rails, said track having a plurality of curved sections in which the plane of said track rails extends at varying bank angles around a course line coextensive with and at a constant perpendicular distance thereto, the distance between the plane of said track rails and said backbone member in said curved sections varying in direct relationship to the bank angle of the curve, while the vertical distance between two parallel planes containing, respectively, said backbone member and said course line remains constant.

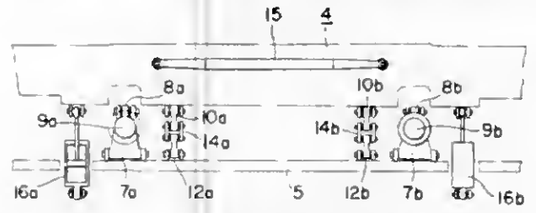
4,029,020

MAGNETICALLY LEVITATED VEHICLE WITH MODULE CONSTRUCTION OF SUSPENSION AND PROPULSION MEANS

Shinji Nakamura, Kawasaki, and Kiyoshi Mihirogi, Odawara, both of Japan, assignors to Japan Air Lines Co., Ltd., Tokyo, Japan

Filed Dec. 15, 1975, Ser. No. 640,781
Claims priority, application Japan, Dec. 13, 1974, 49-142442
Int. Cl.² B61B 13/08
U.S. Cl. 104—148 MS 5 Claims

1. A magnetically levitated vehicle comprising: a body; a plurality of modules arranged on said body symmetrically in two rows with reference to the longitudinal vertical plane traversing the body, each module including a frame and at least one attractive electromagnet for magnetically levitating said vehicle; and a suspension structure disposed between said body and each said module for connecting said body and said



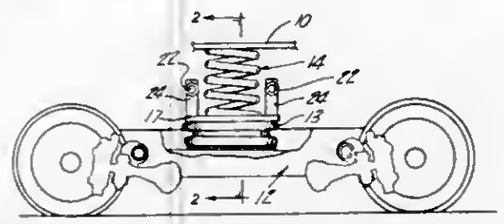
module, said suspension structure including a first link means for preventing rolling motion of said module relative to said body about the longitudinal axis of said electromagnet, and a second link means for preventing the longitudinal movement of said module relative to said body, wherein said first and second link means permit pitch, yaw, vertical and lateral movement of said module relative to said body.

4,029,021

COIL AND PNEUMATIC SPRING ASSEMBLY

John M. Peul, Holland, Pa., assignor to The Budd Company, Troy, Mich.

Filed Dec. 24, 1975, Ser. No. 644,274
Int. Cl.² B61F 5/06, 5/10, 5/14, 5/50
U.S. Cl. 105—199 R 1 Claim



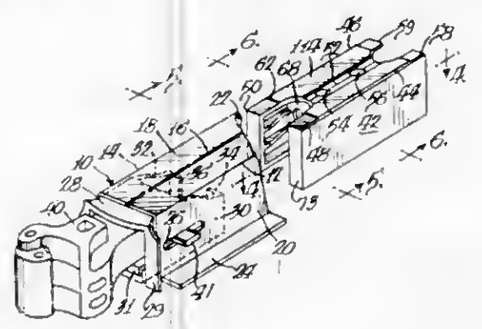
1. Spring means for supporting a vehicle body on a truck bolster, comprising in combination, pneumatic spring means carried by the truck bolster, an intermediate plate with projecting anchor means disposed on the upper end of both sides of said pneumatic spring means, coil spring means carried upon said intermediate plate and supporting a vehicle body, and transverse lateral stabilizing means between the truck bolster and the anchor means of said pneumatic spring means.

4,029,022

CENTER BRACE CASTING

Carl D. McClurg, Lockbourne, Ohio, assignor to Buckeye International, Inc., Columbus, Ohio

Filed July 7, 1975, Ser. No. 593,197
Int. Cl.² B61D 17/00
U.S. Cl. 105—420 3 Claims



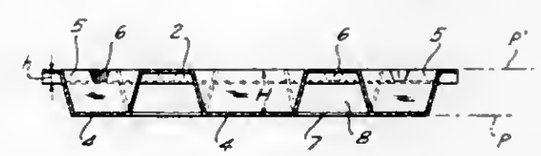
1. An elongated center brace for use in a railway hopper, gondola or box car having an associated truck centerline spaced a respective distance dependent on the type of car from a striker assembly carried by a center sill associated with said car, the improvement comprising, in combination, rear draft lugs on said center brace spaced longitudinally along said center sill a standard distance from said striker assembly irrespective of the type of car, a first king pin hole in said center brace for receiving a truck king pin, said first king pin hole being spaced longitudinally of said rear draft lugs a first predetermined distance corresponding to one type of car, a second king pin hole in said center brace positioned longitudinally of said first king pin hole and in alignment therewith at a second predetermined distance from said rear draft lugs corresponding to another type of car for receiving a truck king pin spaced at said second distance from said rear draft lugs, said first king pin hole being adapted to receive a truck king pin associated with a hopper car and said second king pin hole being adapted to receive a truck king pin associated with a box or gondola car while said striker assembly is retained at said standard distance from said rear draft lugs, and said center brace being formed substantially symmetrical about a horizontal plane so that said center brace may be secured to said center sill with either side up and still permit use of either of said first and second king pin holes.

4,029,023

FOUR-WAY PALLET

Horst Rosewicz, and Werner Klein, both of Ludwigshafen, Germany, assignors to Furnier- und Sperrholzwerk Werzalit-Pressholzwerk J. F. Werz Jr. KG, Oberstenfeld, Germany

Filed Feb. 24, 1976, Ser. No. 661,027
Claims priority, application Germany, Aug. 20, 1975, 2440242
Int. Cl.² B65D 19/24
U.S. Cl. 108—51.1 10 Claims



1. A four-way pallet comprising a generally rectangular unitary plate having two pairs of opposite edges and two opposite faces, said plate being unitarily formed inwardly of each edge of one of said pairs with a row of three separate edge bosses projecting and tapering from one of said faces and spaced apart in a direction parallel to said edges of said one pair, said bosses constituting feet for said plate and defining a pair of parallel ways across said plate at said one face and inset from and perpendicular to said direction, said plate further being formed between and parallel to said rows with a row of two separate middle bosses projecting and tapering from said one face and each formed with apertures in line with said ways, said middle bosses being spaced apart in said direction and offset to said edge bosses, whereby tines of a lift fork can pass under said pallet standing on said bosses between said edge bosses and through said apertures of said middle bosses.

4,029,024

WORK BENCH STRUCTURE

David Kiltzky, 5107 N. Francisco, Chicago, Ill. 60625

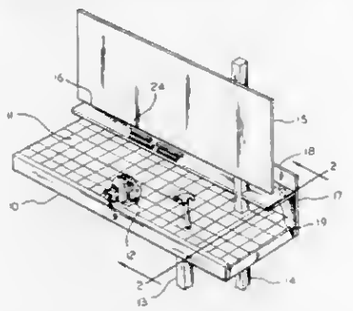
Filed Apr. 16, 1976, Ser. No. 677,704
Int. Cl.² A47B 57/00
U.S. Cl. 108—60 10 Claims

1. A workbench structure comprising:
a substantially horizontal continuous work surface;
support means extending through and supporting said work surface;
first partition means fixedly attached to said support means;
said first partition means having a lower edge,

said first partition means being positioned above said work surface a sufficient distance so as to allow the passage of handicraft items beneath said lower edge to and from said work surface;

second partition means attached to said work surface,

said second partition means having an upper edge extending



above said lower edge of said first partition means, so as to prevent vision past said first and second partition means,

said first and second partition means being spaced a sufficient distance apart horizontally so as to allow continuous access over said second partition means and beneath said first partition means to said work surface.

4,029,025

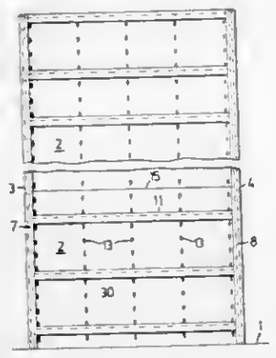
SHELVING STRUCTURE

Harald Lundqvist, En Quarroz, CH-1807 Blonay, Switzerland

Filed June 4, 1976, Ser. No. 692,769

Int. Cl.² A47B 9/00

U.S. Cl. 108—108 **8 Claims**



1. A shelving structure comprising two upright side-pieces, a back plate and a plurality of movable shelves each of which comprises a thin sheet whose leading edge is reinforced by a reinforcing means having the form of a generally horizontal sheet-metal channel member mounted on said shelf, the thickness of which channel member is greater than the thickness of the shelf and which is securedly clamped thereto, said shelf being connected to the side pieces at the ends of the sheet-metal channel member and to the back plate at the rear edge portion of the shelf, characterized in that vertical sheet-metal channel members are mounted on leading edges of said side-pieces to laterally reinforce such edges; supporting means connect the ends of said horizontal sheet-metal channel member to said vertical channel members, each supporting means being received in a recess in said horizontal channel member and being arranged for minimum play to resist relative separation between the shelf and the side pieces; means are provided for holding the back plate pressed against the rear edges of the shelves so as to reinforce the back plate by means of the shelves fixed by the vertical sheet-metal channel members of the side pieces, said means imparting to the shelving structure the requisite diagonal rigidity, the rigidity of said back plate being otherwise insufficient to support the trailing edges of the shelves.

4,029,026

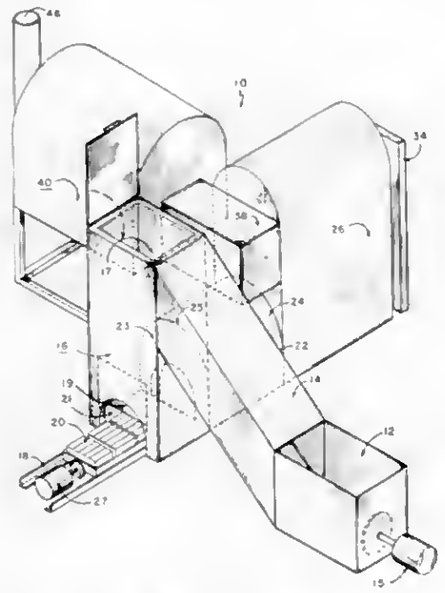
INCINERATOR

Lludas Normantas, Hiram, Maine 04041

Filed Mar. 18, 1976, Ser. No. 629,758

Int. Cl.² F23G 5/00

U.S. Cl. 110—8 A **7 Claims**



1. An improved incinerator for complete combustion of waste materials comprising:

a loading hopper for the insertion of waste materials into said incinerator,

a loading chute operably connected to said hopper for loading said waste materials from said hopper to said incinerator;

a loading chamber operably connected to said loading chute to receive waste materials for movement into said incinerator;

means to force said waste material from said hopper through said chute and into said loading chamber;

an elongated, inverted U-shaped structure serving as a section of a primary combustion chamber, one end of which opens directly into said loading chamber;

a second elongated, inverted U-shaped structure having a wider vase and greater height than said first structure, but shorter than the first;

said second structure positioned partially over said first structure and having one end wall connecting to said first structure and one full end wall;

said second structure serving as the termination of said primary combustion chamber;

a set of tracks running the length of said loading chamber and said primary combustion chamber, at the base thereof, entering through said loading chamber and exiting through the end wall of said second structure;

trays to move along said tracks to carry waste materials from said loading chamber through said primary combustion chamber;

means to move said trays along said tracks,

dampers to control the flow of air at the openings through which said trays enter and exit on said tracks;

a vapor collection chamber in communication with said second U-shaped structure to receive the vapors emanating therefrom;

an air baffle in communication with said collection chamber to filter said vapors, collect any residual particulate matter and cool said vapors;

a stack in communication with the opposite end of said air baffle to permit the flow of vapors into the atmosphere.

4,029,027

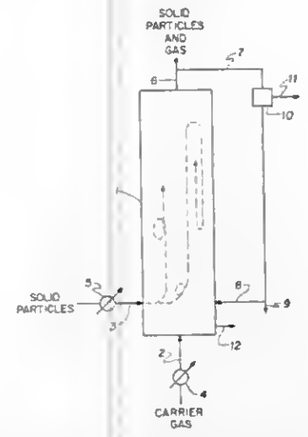
METHOD FOR GENERATING HEAT

Robert H. Smith, Plano, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Oct. 20, 1975, Ser. No. 623,614

Int. Cl.² F23B 7/00

U.S. Cl. 110—28 J **9 Claims**



1. A method for generating heat from oil shale particles that carry a deposit of carbon, comprising providing an upstanding heating chamber, heating said particles in said chamber to cause combustion of said carbon, lifting said particles during said heating from a lower portion to an upper portion of said chamber using a carrier gas and removing a substantial majority of said particles from said upper portion of said chamber, controlling said carrier gas so that at any given time during said lifting step a substantial amount of said particles fall downwardly for a finite distance thereby causing internal backmixing of heated falling particles with relatively cooler rising particles, said backmixing taking place at varying locations over essentially the full length of said chamber between said lower and upper portions, said carrier gas being introduced into said chamber at a rate of at least 10 feet per second at a pounds of particles/cubic foot of carrier gas ratio of from about 2/1 to about 20/1, and said particles being predominantly less than 60 mesh.

4,029,028

DEVICE FOR METERING GRANULAR MATERIAL

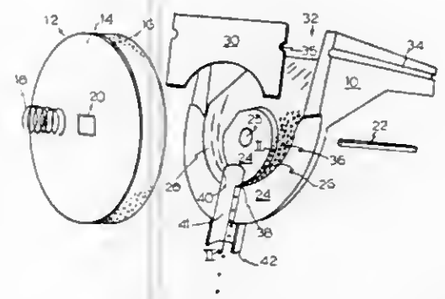
Peter Murray Griffiths, 19 Cuba St., Marton, New Zealand

Filed Apr. 19, 1976, Ser. No. 678,038

Claims priority, application New Zealand, Apr. 18, 1975, 177280

Int. Cl.² A01C 5/04, 7/12

U.S. Cl. 111—86 **16 Claims**



1. A device for metering granular material comprising a non resilient solid member having a slot passing therethrough defining a passage and a complementary conveying rotor in association therewith,

said slot being open at both ends and along at least a portion of one side over the length thereof, one said open end of said slot having a smaller cross sectional area than the other said open end, said open end of smaller cross sectional area being a discharge orifice, said open end of larger cross sectional area being a feed orifice,

said rotor having a resilient surface and being mounted to rotate relative to said non resilient solid member, said resilient surface being engageable with said open side portion of said slot throughout each rotation of said rotor,

the arrangement being such that in use said rotor frictionally engages granular material in said slot to convey said granular material towards said discharge orifice in said slot whereby said granules are arranged for metered discharge.

4,029,029

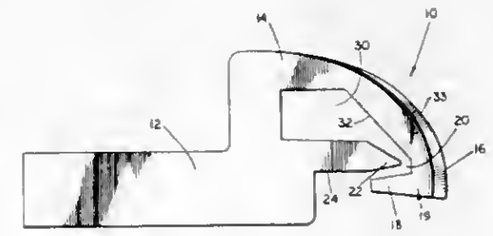
METHOD AND APPARATUS FOR TUFTING HIGH AND LOW CUT PILE IN THE SAME ROW

Aud J. Franks, Rocky Face, and Harold E. Hawkins, Chatsworth, both of Ga., assignors to Patrick F. Henry, Sr., Atlanta, Ga.

Filed July 22, 1974, Ser. No. 490,763

Int. Cl.² D05C 15/22, 15/32

U.S. Cl. 112—79 R **25 Claims**



1. In a tufting machine: means for feeding a base fabric in one direction, a needle for carrying yarn to penetrate the base fabric and form long and short loops therein, means for reciprocating the needle thru the base fabric, means for feeding yarn to said needle and means for controlling said yarn including tensioning or drawing thereof to form longer and shorter yarn loops, a looper element mounted on said machine having an end facing in the direction opposite to the direction of the fabric feed for reciprocation to enter a succession of long and short loops and said end comprising an upper forwardly extending portion terminating in an inwardly turned bottom member, a bottom projecting finger defining with said bottom member an entrance for short loops along the bottom of the looper, there being a space between the bottom member and said projecting finger for short yarn loops to pass through into said space when the looper moves rearwardly with respect to the fabric in the same direction as the direction of movement of the feeding of the fabric, said entrance permitting the passage into the space of a short loop through the entrance when sufficient tension is exerted upon the loop, and means for reciprocating said looper element.

4,029,030

PATTERNED CUT PILE TUFTING MACHINE

Randel P. Smith, Chattanooga, Tenn., assignor to The Singer Company, New York, N.Y.

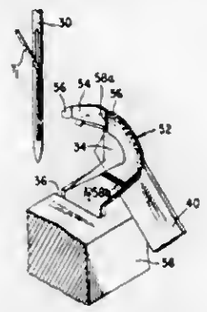
Filed May 17, 1971, Ser. No. 144,038

Int. Cl.² D05C 15/34

U.S. Cl. 112—79 A **2 Claims**

1. In an apparatus for producing patterned cut pile fabrics, a yarn carrying needle means supported for endwise movement for penetrating a base fabric to deposit loops of yarn therethrough, looper means for seizing the loop of yarn during the withdrawal of the needle through the base fabric, cutting means cooperating with said looper means for cutting the loop of yarn and operable for cutting the loop substantially immediately after it is seized by said looper, means for selectively backrobbing one leg of the cut loop whereby the cut loop is

formed with one relatively long leg and one relatively short leg, and said looper means including a looper member and an oscillating looper support means, said looper member disposed in a slot in said oscillating looper support means, a clip member disposed in the same slot as said looper member, said clip member being resilient and having a bill portion including a retaining portion, and a bent portion disposed away from the free end of the bill, said retaining portion disposed in close



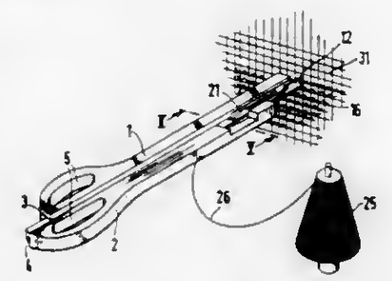
juxtaposition with a yarn carrying portion of the looper member for retaining one leg of a cut loop between said clip member and said looper member such that when the loop is cut a leg thereof connected with the needle will be yieldably restrained by said retaining portion of the clip member and said looper member, said bent portion forming a hollow space between said bill portion and said looper member to permit disposal of lint and loose fibers picked up from the yarn.

4,029,031

DEVICE FOR PROVIDING RUGS AND THE LIKE WITH TUFTS

Hartmut Scholz, Wolfsteiner Strasse 10, 8501 Allersberg, Germany

Filed Mar. 10, 1976, Ser. No. 665,436
Claims priority, application Germany, Mar. 14, 1975, 2511266
Int. Cl.² D05C *15/06*
U.S. Cl. 112—80 **25 Claims**



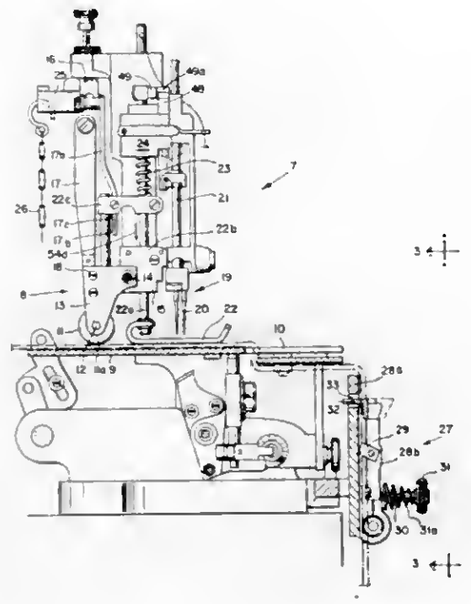
15. Apparatus for manually tufting rugs and the like comprising, in combination: two arms located next to each other; dovetailed joint means for connecting said arms to each other and guiding said arms movably relative to each other in a longitudinal direction between two extreme positions; stop means for defining said two extreme positions; leading contact surface means on each of said arms for alternately contacting the base fabric; a needle carried by one of said arms and projecting from its respective contact surface means, said needle penetrating the base fabric and holding thread; a blade carried by the other arm and projecting from its respective contact surface means, said blade cutting the thread after formation of a loop at the head of the loop; a guidance member for the other arm, said blade having means engaging said guidance member for opening said blade; closure means on said blade and triggered in the leading extreme position of the arm carrying said blade; and spring means; said closure means closing said blade under spring action when triggered in said extreme position.

4,029,032

TIE SEWING MACHINE

Joseph M. Medynski, 18 Park St., Ramsey, N.J. 07446, and John B. Medynski, 680 Knollwood Road, Franklin Lakes, N.J. 07417

Filed May 13, 1976, Ser. No. 686,171
Int. Cl.² D05B *23/00*
U.S. Cl. 112—121.22 **8 Claims**



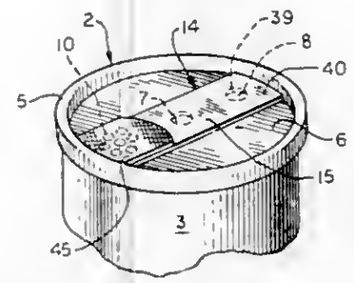
1. A sewing machine comprising in combination: a substantially flat base plate having a substantially planar upper surface with at least one needle hole therein; needle means for aligning a needle with said needle hole and for sewing feed-material passed along said planar upper surface over said needle hole beneath a needle end of said needle; fabric-advancing roller means for providing a roller surface; means biasing said roller surface angularly forwardly toward said needle means and downwardly toward said planar upper surface; a presser foot drive and gear means for driving the needle axially along a longitudinal axis in directions in said needle hole and for lifting said pressure foot intermittently and for concurrently driving rotatably said roller surface of the roller means advancingly of a lower surface of the roller surface in a direction away from said needle hole, the lower surface of said roller being advanceable of said feed-material rearwardly during a phase in which the needle and foot are spaced-above the needle hole such that the feed-material is advanceable beneath the needle end; feed-material guide means for guiding the feed-material from a predetermined forward point rearwardly along a linear path toward said needle hole and said fabric-advancing means, and for placing a predetermined restraining torque on the feed-material, the feed-material guide means including spring-biased structure having a pressure-applying face shaped and positioned such that said restraining torque is lesser for a narrow width than for a wide width at differing points axially along and of said feed-material; and the flat base plate, the needle means, the fabric-advancing roller means, the drive and gear means, and the feed-material guide means being mounted in fixed relationships to one-another.

4,029,033

CONVENIENCE OPENING OF CONTAINERS FOR LIQUID PRODUCTS

Joseph E. Kerwin, Western Springs, and Paul M. Erlandson, Palos Park, both of Ill., assignors to The Continental Group, Inc., New York, N.Y.

Division of Ser. No. 507,036, Sept. 18, 1974. This application Oct. 14, 1975, Ser. No. 622,302
Int. Cl.² B67B *7/00*
U.S. Cl. 113—121 C **8 Claims**



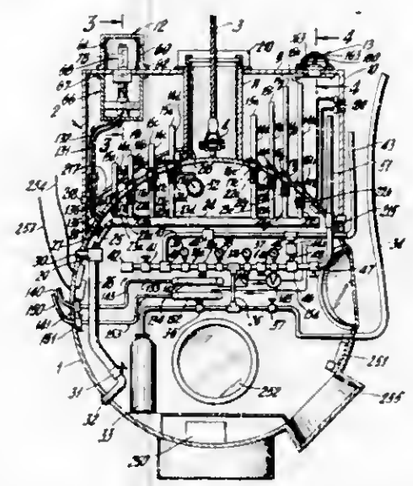
1. A method of attaching a tape over plural closely spaced small openings in a metal container wall comprising:
the steps of applying an enamel to the wall,
then punching said openings in said wall to thereby expose uncoated metal edges forming the margins of said openings,
then applying a film of adhesive to the wall in areas about respective openings,
then applying a tape at least a portion of which is thermoplastic material to the wall,
then pressing the tape with the thermoplastic material covering the openings and applying sufficient pressure to extrude the thermoplastic material as bosses into respective openings each having a relatively thick disk-shaped center section and torus-shaped marginal portion pressed within the edges of respective openings to form relatively thick pressure-resistant islands within the openings.

4,029,034

METHOD AND APPARATUS FOR BUOYANCY CONTROL OF SUBMERGIBLE CHAMBERS

Burton Hoster Mason, P.O. Box 504, Covington, La. 70433

Filed Feb. 25, 1976, Ser. No. 661,148
Int. Cl.² B63G *8/22*
U.S. Cl. 114—16 E **12 Claims**



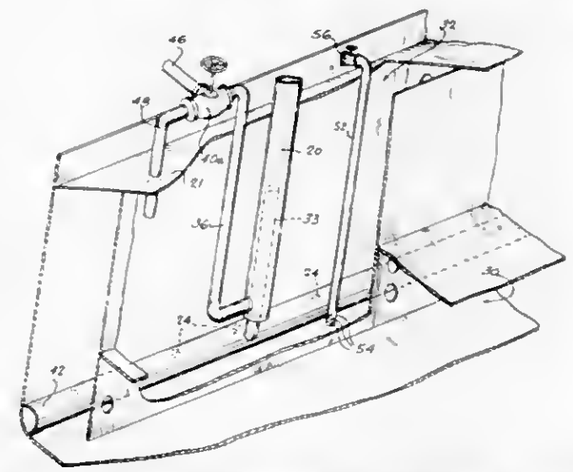
1. In combination with a submergible apparatus comprising a chamber, an apparatus for controlling the bouyancy of the first said apparatus, comprising a tank mounted on the chamber, fluid conduit means comprising a plurality of pipes extending vertically upward into said tank for communicating from the interior of said tank to the outside ambient environment below said tank, each of said pipe means having valve means operatively mounted therewith, and means within said chamber to selectively actuate each of said valve means, gas conduit means connected to said tank for providing a gas thereto, and discharge valve means mounted on said tank to discharge a gas therefrom to the outside ambient environment above said tank, whereby gas is supplied through the gas condit means and displaces water in the tank through the fluid conduit means until the level of the water in the tank reaches about the top of the fluid height in one of the pipes.

4,029,035

SHIP'S HULL AND METHOD OF BUBBLING HOT GAS THEREFROM

William H. German, 20180 Lakeshore Rd., Baie d'Urfe, Quebec, Canada (H9X 1P7)

Filed Apr. 13, 1976, Ser. No. 676,429
Int. Cl.² B63B *1/38, 35/08*
U.S. Cl. 114—67 A **13 Claims**



9. In combination, a ship's hull having sides and a plurality of small holes arranged in at least one row located well below the ship's water line and extending along said sides, and apparatus for generating and supplying hot compressed gas to said holes on a continuous basis at a gas pressure sufficient to produce continuous gas bubbling from said holes for the purpose of assisting in ice-breaking in ice-laden waters using the effect of said bubbles at the surface of the water, said apparatus comprising:
a. at least one chamber having an inlet and an outlet;
b. means for continuously supplying air under pressure to said at least one chamber through said inlet;
c. mixing means for continuously mixing fuel with said compressed air introduced into said chamber;
d. ignition means for igniting said fuel/air mixture in said chamber to continuously generate hot gas at a pressure at least as high as said pressure sufficient to produce gas bubbling; and
e. pipe means for receiving said hot gas continuously issuing from said outlet of said at least one chamber and for supplying said gas directly to said holes in the hull whilst maintaining the pressure of said gas at least as high as said sufficient pressure at said holes.

4,029,036

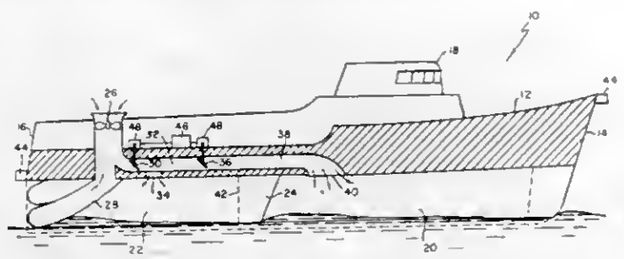
STABILIZATION AND MOTION ALLEVIATION OF AIR CUSHION BORNE VEHICLES

Allen H. Magnuson, 2014 Hanover St., Silver Spring, Md. 20910

Filed Mar. 23, 1976, Ser. No. 669,793
Int. Cl.² B63B *1/34*
U.S. Cl. 114—67 A **8 Claims**

1. An automatic pitch stabilization and motion alleviation system for air cushion borne vehicles comprising:

means on the vehicle hull for supplying pressurized air to the air cushion system comprising a forward and an aft air cushion compartment, and a seal system means for sealing said air cushion system, said seal system means further comprising transverse seal means for dividing the air cushion into the forward air cushion compartment and the aft air cushion compartment, side seal means for sealing the sides of the air cushion compartments, bow seal means for sealing the bow of the forward air cushion compartment, and stern seal means for sealing the stern of the aft air cushion compartment;



means for causing a controllable pressure drop from said aft air cushion compartment to said forward air cushion compartment, said means further comprising an air ducting system feeding pressurized air to the seal sytem means and to the forward and aft air cushion compartments, a control valve operating in said ducting system and regulating the differential over-pressure of said seal means, bow seal means, and stern seal means relative to the aft air cushion compartment, and a pressure differential control valve operating in said ducting system regulating differential over-pressure of the aft cushion compartment relative to the forward cushion compartment.

4,029,037

PROCESS FOR REINFORCING PLASTIC MATERIAL AND PRODUCTS THEREFROM

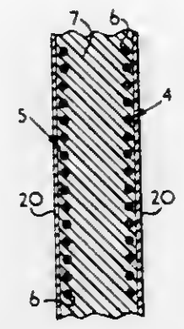
Brian Patrick Hogan, Milton Keynes, England, assignor to Aquatech Composite Materials Limited, United Kingdom

Filed Sept. 16, 1975, Ser. No. 613,920

Claims priority, application United Kingdom, Sept. 18, 1974, 40748/74

Int. Cl.² B63B *3/38*; **B32B** *5/12*

U.S. Cl. 114—127 **11 Claims**



1. A plastics structure comprising a core of a foamed plastics material having two opposite surface, wherein there is contained in a surface layer of said foamed plastics material at least one array of parallel spaced high tensile steel reinforcing elements having a diameter of from about 0.040 to about 0.125 inches and a yield strength of not less than 200,000 psi to which the foamed plastics material adheres, said wires located at not less than 0.06 inches below the surface layers the said surface layer having a smooth outer surface and the high tensile steel reinforcing elements being aligned substantially parallel to the said outer surface.

9. A structure according to claim 1 wherein the structure is the centre board for a sailing dingy.

4,029,038

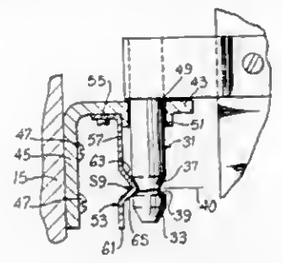
RELEASABLE RUDDER LOCK

Kurt J. Pfahl, 3077 Hayes Ave., Costa Mesa, Calif. 92626

Filed Dec. 22, 1975, Ser. No. 642,908

Int. Cl.² B63H *25/06*

U.S. Cl. 114—162 **8 Claims**



1. An apparatus for pivotally mounting a rudder on a boat, said apparatus comprising:

a bracket attachable to the rudder;

a pintle;

means for attaching the pintle to the bracket with at least a portion of the pintle projecting away from the bracket;

a mounting member attachable to the boat and having an aperture sized to receive the pintle, said pintle being insertable in said aperture to at least assist in mounting the rudder for pivotal movement relative to the boat;

a resilient lock element carried by said mounting member and engageable with said pintle when the pintle is received in said aperture;

cooperating surface means on said resilient lock element and said pintle for retaining the pintle against withdrawal from the aperture of the mounting member, said resilient lock element being resiliently movable to allow withdrawal of the pintie from the aperture; and

said mounting member having a collar at least partly defining said aperture and said resilient lock element having an attaching flange and a resilient arm, said attaching flange being attached to the mounting member and a portion of said arm being closely adjacent said collar, and said arm and said collar extending from said mounting member in the same general direction.

4,029,039

MOORING MEANS, PARTICULARLY FOR CARRYING OUT PRODUCTION TESTS FOR GAS AND OIL DRILLING ON THE HIGH SEAS

Willem Jan van Heijst, Monte-Carlo, Monaco, assignor to N.V. Industrieele Handelscombinatie Holland, Rotterdam, Netherlands

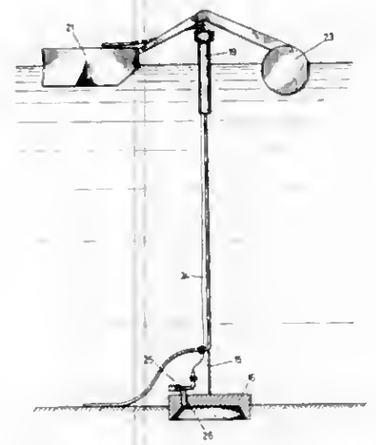
Filed Oct. 31, 1975, Ser. No. 627,913

Claims priority, application Netherlands, Nov. 5, 1974, 7414432

Int. Cl.² B63B *21/52*

U.S. Cl. 114—230 **6 Claims**

1. Mooring means comprising a vessel, rigid arms pivotally mounted on the vessel for vertical swinging movement relative to the vessel about a horizontal axis, a buoy that intersects the surface of the water with a small cross section and that has a height substantially greater than its width and that has a taut but flexible connection with an anchor on the sea floor located directly vertically below the buoy under normally calm sea conditions, universal joint means between the arms and the



buoy, and a float connected to said arms at a distance from the buoy and floating in the water.

4,029,040

ANCHOR

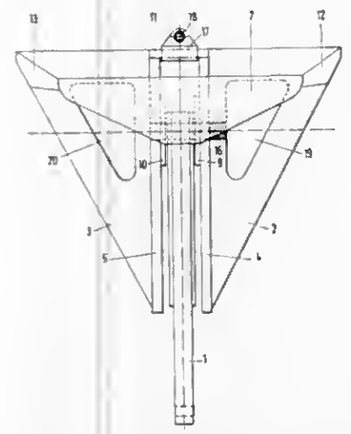
Petrus Jozef Klaren, Frankenrade 3, Nieuwerkerk a/d, IJssel, Netherlands

Filed Nov. 4, 1975, Ser. No. 628,765

Claims priority, application Netherlands, Nov. 6, 1974, 7414485

Int. Cl.² B63B *21/38*

U.S. Cl. 114—304 **13 Claims**



1. An anchor in particular for anchoring special purpose vessels, dredgers, off-shore drilling platforms and the like, said anchor having two flukes arranged on both sides of an axis of symmetry so as together to form a delta shape, a shank mounted between said flukes for pivoting movement in a plane containing said axis of symmetry, and trim plates or head faces disposed on either side of the flukes, the width of said trim plates being less than the total width of the flukes, characterized in that the outer ends of both trim plates are connected to the outer edges of the flukes by means of stabilizing plates which enclose an acute angle both with the plane of the flukes and with the pivot plane of said shank, the width of the stabilizing plates increasing toward the flukes.

4,029,041

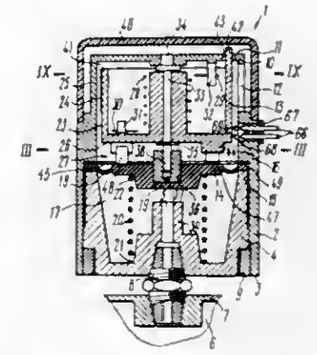
BLOCKAGE INDICATOR FOR INTERNAL COMBUSTION ENGINE AIR CLEANER ELEMENT

Eduard Matveevich Genshpring, ulitsa 2-Gazovaya, S, kv. 316; Zigmund Genrikhovich Bljumshtein, ulitsa Pavljukhina, 85, kv. 25, both of Kazan; Veniamin Evnovich Maev, Chernomorsky bulvar, 4, kv. 266; Fedor Alexeevich Bondarenko, Presnensky val, 40, kv. 101, both of Moscow; Anatoly Lvovich Gutman, ulitsa Eniseiskaya, 6, kv. 14, and Vladimir Alexandrovich Presman, pereulok Kozlova, E, kv. 10, both of Minsk, all of U.S.S.R.

Filed Jan. 8, 1976, Ser. No. 647,361

Int. Cl.² G01L *19/12*

U.S. Cl. 116—114 AE **17 Claims**



1. A blockage indicator for an internal combustion engine air cleaner element, comprising: a cylindrical housing; a bottom head at one end of said housing, said bottom head having a hole for the indicator to communicate with the air cleaner involved; at least one ported portion provided on the side wall of the housing, in close proximity to an other end of said housing; a resilient member constructed in the form of a spring-loaded diaphragm, secured around the periphery of said housing and being inside the housing; a sealed-off chamber being defined between said diaphragm and said bottom head and arranged to communicate with the air cleaner; a stationary shaft mounted on said other housing end axially in line with the housing axis; an indicator drum accommodated inside said housing and mounted on said stationary shaft, the bottom wall of said indicator drum facing toward said diaphragm; a locating element fixing said indicator drum axially in said housing; painted signalling areas on an external side surface of said indicator drum; a spring mounted inside said indicator drum and adapted to turn the indicator drum to a warning position in which the painted signalling surface shows through the housing ported portion; a locking device to hold said indicator drum in position relative to said housing, said locking device being located between the indicator drum bottom wall and the diaphragm and being arranged to interact with the diaphragm and the indicator drum in such a manner as to lock the indicator drum in a normal position where the painted signalling surface of the indicator drum does not show through the housing ported portion.

4,029,042

DIFFERENTIAL PRESSURE INDICATOR DEVICE

Charles Juhasz, Caldwell, N.J., assignor to Aircraft Systems Corporation, West Caldwell, N.J.

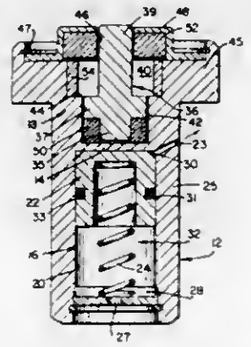
Filed Feb. 17, 1976, Ser. No. 658,369

Int. Cl.² G01D *13/00*

U.S. Cl. 116—114 PV **8 Claims**

1. Differential pressure indicator device for use with high and low fluid pressure sources comprising: a casing having a relatively thin partition wall dividing the casing interior into an indicator housing and fluid chamber, magnetically soft sealing means axially movable in said fluid chamber dividing said fluid chamber into a first chamber adaptable for connection to said high fluid pressure source and a second chamber adaptable for connection to said low fluid pressure source, an indicator

element axially movable in said indicator housing having a first permanent magnet secured to said indicator element, and



a second permanent magnet in said indicator housing spaced from said partition wall.

4,029,043

POSITION INDICATOR FOR VALVES AND THE LIKE

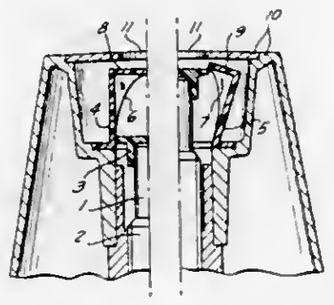
Jürgen Nothdurft, Behringersdorf, Germany, assignor to Klein, Schanzlin & Becker Aktiengesellschaft, Frankenthal, Germany

Filed Dec. 8, 1975, Ser. No. 638,891

Claims priority, application Germany, Dec. 10, 1974, 2458279

Int. Cl.² F16K *37/00*

U.S. Cl. 116—125 **13 Claims**



1. In a valve, a combination comprising a valve housing having a fluid-flow passage and an opening spaced from said passage; means for changing the effective cross-section of said fluid-flow passage, including a portion movable relative to said passage; and indicating means visually observable through said opening for indicating the position of said portion relative to said passage and thereby the effective cross-section of said passage, said indicating means comprising a member displaceable in a path substantially normal to the plane of said opening as a function of the movement of said portion, at least one jaw extending at least partially about said member in elastically yieldable contact therewith, and cam means for yieldingly and steplessly displacing said jaw relative to said member to a plurality of intermediate positions and end positions as a function of the movement of said member along said path.

4,029,044

DEVICE FOR SENSING UNDRIED TIRE CORD FABRIC TREATED WITH A BONDING AGENT

Edward E. Hunter, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Sept. 17, 1975, Ser. No. 614,725

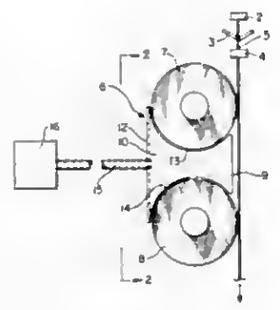
Int. Cl.² B05C *11/04*

U.S. Cl. 118—9 **8 Claims**

1. An apparatus for sensing wetness of supposedly dry fabric treated with a vaporizable solvent carrier and coating agent, comprising:

a. a pair of parallel, elongated idler rolls for contacting a moving, supposedly dry fabric and carrying vapor from the fabric into a chamber in which the vapor accumulates;

aa. means for mounting the idler rolls for contacting the same side of the fabric and for rotating freely about axes which are parallel to the moving fabric and transverse to the direction in which the fabric moves past the idler rolls;



b. means for forming adjacent the fabric a confined chamber, in which vapor from wet fabric can accumulate, the chamber designed to at least partially include the idler rolls; and

c. means for drawing from the chamber, vapor accumulating therein, said means including a conduit for carrying vapor away from the chamber; and

cc. gas analyzer means connected to the conduit for detecting vapor drawn from the chamber.

4,029,045

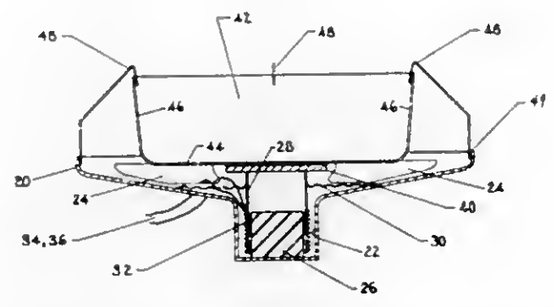
APPARATUS FOR APPLYING COATINGS

Dennis E. Cielaszyk, and Andrew J. Meyer, both of Ann Arbor, Mich., assignors to KMS Fusion, Inc., Ann Arbor, Mich.

Continuation-in-part of Ser. No. 463,858, April 5, 1974, abandoned. This application Mar. 29, 1976, Ser. Nn. 671,294

Int. Cl.² C23C *13/12*

U.S. Cl. 118—49 **2 Claims**



1. An apparatus for coating small particles to be introduced into a coating chamber which comprises:

a. a dish support in said chamber of light material with a weight of 1/15 to 1/30th of an ounce having a support bottom and retaining side walls,

b. means in said chamber to confine said support wherein it may have an unrestrained vertical motion in a direction normal to said support bottom,

c. means in said chamber to vibrate said support in a direction normal to said bottom at a rapid rate comprising a magnetic drive coil of an audio speaker, and

d. control means outside said chamber connected electrically to said drive coil including a frequency oscillator and an amplifier to control the magnitude of the oscillations to cause particles on the support to pulse vertically into the space above said support bottom.

4,029,046

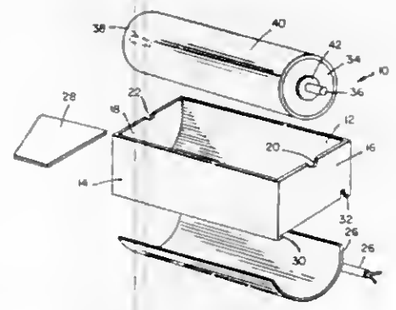
SKI HOT WAX APPLICATOR

Terry J. Hertel, 20065 Northwind Square, Cupertino, Calif. 95014

Continuation of Ser. No. 459,492, April 10, 1974, abandoned. This application Nov. 13, 1975, Ser. No. 631,552

Int. Cl.² B05C *1/02*

U.S. Cl. 118—202 **6 Claims**



1. Apparatus for applying hot wax to the bottom of skis, said apparatus comprising:

an upwardly opening heat conductive tub having a substantially semi-cylindrical configuration and planar end walls and defining a chamber adapted to contain ski wax;

a cylindrical roller having oppositely directed axial struts adapted to engage the respective end walls of the heat conductive tub so that the roller is rotably mounted on said end walls of said tub and the lower portion only of the radial surface of the roller projects into the tub, the radial surface of said roller and the axial struts being constructed of heat conductive material and said roller including heat conducting means connecting the axial struts with said radial surface so that a preselected portion of the heat from the end walls of the tub is conducted through the axial struts to the radial surface of the roller;

a resilient, deformable silicone rubber covering mounted on the radial surface of the cylindrical roller, for picking up wax from said tub and applying it to the bottom of a ski in contact with said covering, said covering being about one-eighth of an inch thick, said dimension being critical in maintaining the proper temperature at the point of contact of said ski with said covering, said covering further having a softness in the range of 30 to 50 durometers inclusive, said softness in combination with said thickness of one-eighth of an inch acting in combination to press wax picked up from said tub into the pores of the bottom surface of said ski as it moves past the point of contact with said covering, said roller being further provided with raised shoulders to prevent said covering from directly contacting said end walls; and

a two-dimensional heater mounted to the exterior surface of the tub and adapted to heat the ski wax in the tub to about 250°–300° F to melt the wax without substantially altering its chemical composition and to heat said covering by conduction of a preselected portion of the heat from the heater through the end walls of the tub, the struts and said heat-conducting means to substantially 200°–225° F to open the pores in the bottom of a ski passing over said covering so the hot wax will be applied to the bottom of the ski uniformly across its entire surface to uniformly fill the pores in the bottom of the ski.

4,029,047

TONER HANDLING SYSTEM

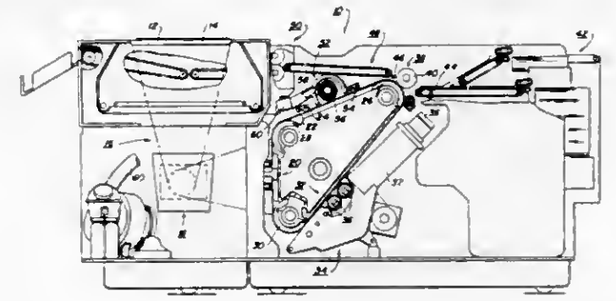
George E. Bell, Ontario, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 28, 1975, Ser. No. 626,588

Int. Cl.² G03G *15/08*

U.S. Cl. 118—652 **4 Claims**

1. An improved toner handling system having means for developing a latent electrostatic image on a photoreceptor, and means for removing and reclaiming residual toner from the photoreceptor, the reclaiming means including a brush in contact with the photoreceptor and a receptacle into which the residual toner is deposited, wherein the improvement comprises:



means forming a first unfiltered opening in the receptacle, means for conveying toner from the brush to the first unfiltered opening, means forming a second filtered opening in the receptacle, and means for closing the second filtered opening while residual toner is being deposited in the receptacle.

4,029,048

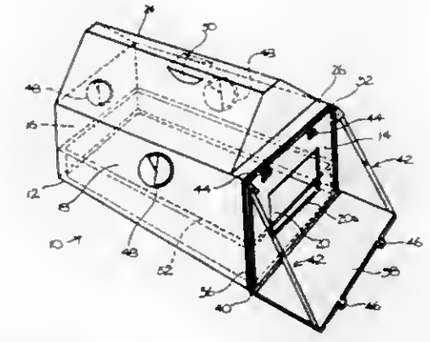
INDOOR-OUTDOOR TOILET FOR SMALL ANIMALS

George Gersbbein, 30 W. 69th St., New York, N.Y. 10023

Filed Aug. 25, 1975, Ser. No. 607,220

Int. Cl.² A01K *1/035*

U.S. Cl. 119—1 **18 Claims**



1. A litter box for animals comprising a generally enclosed housing having a front wall provided with an opening dimensioned to normally permit substantially free passage of an animal therethrough, said housing extending rearwardly of said front wall; waste receiving means disposed within said housing; and mounting means for mounting said housing through a wall of a dwelling to cause said housing to extend outwardly and to dispose the major portion thereof outside the dwelling, while said opening in said housing permits the animal to move between said housing and the dwelling, said housing further including means for ventilating to the outside for permitting air flow through said housing and for permitting odors therein to escape therefrom to the outside of the dwelling.

4,029,049

FISH BARRIER

Albert John Hillier, 1154 Old Baptist Road, North Kingstown, R.I. 02852

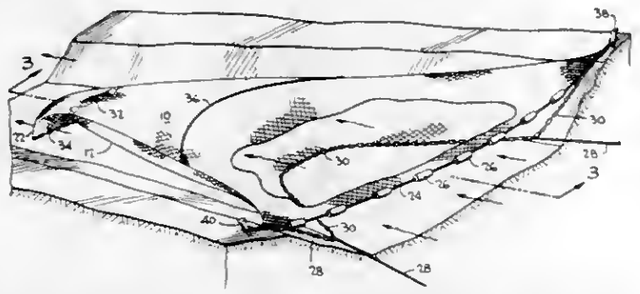
Filed Apr. 29, 1976, Ser. No. 681,733

Int. Cl.² A01K *61/00*; **E02B** *8/08*

U.S. Cl. 119—3 **4 Claims**

1. A fish barrier comprising a generally tapered pocket shaped net adapted to extend across a stream to thereby prevent the passage of fish up said stream, said tapered pocket

shaped net having a large end and a small end, said large end comprising an open mouth having opposed sides and a bottom adapted respectively to contact the sides and bottom of said stream and a top portion adapted to be supported across the surface of said stream, the small end of said net being adapted to be positioned downstream from said mouth and having an



opening formed therein, said opening having an open and closed position, and means releasably holding said opening in its closed position, said opening being adapted to be opened by pressure from trash or debris carried by said stream and to be closed by said means after said trash or debris has passed therethrough.

4,029,050

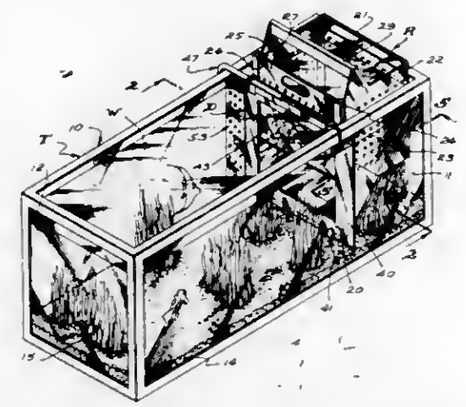
FISH HANDLING APPARATUS

Earl Wilfred Genest, 5716 Geyser Ave., Tarzana, Calif. 91356

Filed Apr. 27, 1976, Ser. No. 680,718

Int. Cl.² A01K *63/02*

U.S. Cl. 119—5 **10 Claims**



1. An apparatus for collecting, segregating and removing fish in aquarium tanks comprising an upwardly opening box-like receiver with flat vertical front, rear and side walls and a bottom wall with a substantially horizontal rear portion and a forwardly and downwardly inclined front portion cooperating to define a fish and plant accommodating recess below the lower rear portion of the receiver, said front portion converging with the front wall and defining a narrow transverse lower tank bottom opposing forward edge, the portion of the side and rear walls occuring above a horizontal plane located a limited predetermined distance above the plane of the rear portion of the bottom wall being perforated, a gateway in the upper portion of the front wall above said horizontal plane, a laterally inwardly and upwardly opening channel about the gateway and a flat vertical perforated gate slidably engaged in the channel and shiftable vertically into and out of closed engagement with the gateway, said receiver being engageable in water in an aquarium tank with its top above the surface of the water in the tank and with its gateway extending below the surface of the water in the tank whereby fish in the tank can be herded through the gateway and into the receiver when the gateway is open and are retained in the receiver when the gateway is closed, the perforated gate and portions of the side and rear walls permitting free circulation of water into and out of the receiver above said horizontal plane therefrom, the portion of the receiver below said horizontal plane defining a sump to retain a predetermined volume of tank water and fish when the receiver is removed from the tank.

4,029,051

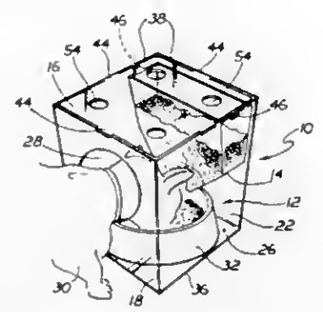
ANIMAL FEEDING AND PROTECTIVE DEVICE

Roy L. McKinney, 3000 Bird Ave., Coconut Grove, Fla. 33133

Continuation-in-part of Ser. No. 443,458, Feb. 19, 1974, abandoned. This application July 14, 1975, Ser. No. 595,908

Int. Cl.² A01K *5/00*

U.S. Cl. 119—52 R **5 Claims**



1. An animal feeding and protective device comprising a transparent housing having a floor, upwardly extending side walls from said floor enclosing a space, a feeding dish for an animal in said space and on said floor, a dispenser for food positioned at least partially within said space and above said feeding dish, food contained in said dispenser and passing by gravity into said dish from said dispenser, an access opening located above said floor and closely adjacent to said feeding dish, said access opening being in one of said side walls and being sufficiently small to allow said animal to bring its head to said feeding dish for feeding purposes, but to prevent the animal from otherwise entering said housing, and the space between said side walls being essentially closed at the top by a removable cover to maintain within said space any odor from food in the food dish and prevent animal access from the top, said side walls being inclined convergingly downwardly at an acute angle, said food dispenser having at least one side inclined at esstentially the same acute angle whereby said food dispenser is matingly supported against one of said inclined side walls and above said feeding dish.

4,029,052

CONVEYING AND WEIGHING SYSTEM

James Mark Launder, 207 Louella, Nokomis, Fla. 33555

Filed Nov. 11, 1975, Ser. No. 631,138

Int. Cl.² A01K *5/02*

U.S. Cl. 119—52 AF **21 Claims**

1. Apparatus for feeding fluent solid material, such as animal feed, comprising:

a conveying line for conveying material in a downstream path of travel;

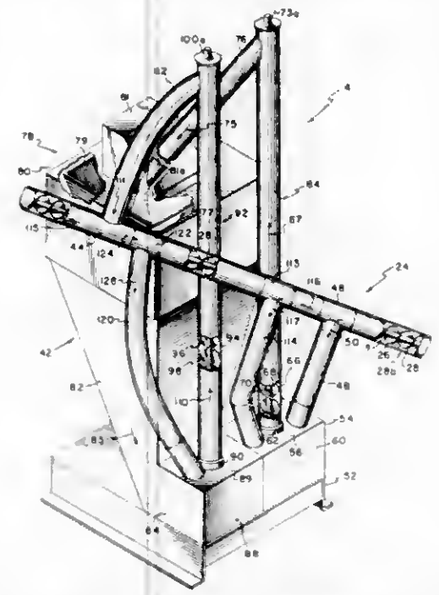
means for weighing the conveyed material;

conveyor bypass means including

a feed supply line connected to an upstream portion of said conveying line and to said weighing means for directing feed from said conveying line to said weighing means; and

a feed discharge line connected to said weighing means and a downstream portion of said conveying line for returning weighed feed from said weighing means to said conveying line for continued movement by said conveying line in said downstream path of travel;

said conveying line including means for passing said material from said upstream portion to said downstream



portion if said conveyor bypass means is inadvertently rendered inoperative.

4,029,053

COOLING BOX FOR METALLURGICAL FURNACE

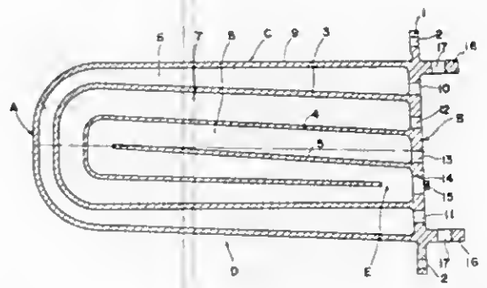
Masaaki Higuchi, Fukuyama, Japan, assignor to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 24, 1976, Ser. No. 670,004

Claims priority, application Japan, Mar. 28, 1975, 50-40876[U]

Int. Cl.² F22B *37/00*

U.S. Cl. 122—6.5 **5 Claims**



1. A cooling box of depressed shape having a front end part (A) for a metallurgical furnace having a plurality of partition walls, a plurality of cooling water channels being defined therein said cooling box comprising a tail flange, a first side plate having an inner side, a first cooling water channel (6), being provided along the inner side of said side plate (9), formed itself into a loop in the front end part (A) of said cooling box and turning back to said tail flange (1), said first cooling channel starting from said tail flange, a second cooling water channel (7), provided along the inner side of said first cooling water channel (6), starting from said tail flange (1), forming itself into a loop at a position near said front end part (A) of said cooling box and turning back to said tail flange (1), and a third cooling water channel (8), provided along the inner side of said second cooling water channel (7), having one end thereof communicating with one end of said second cooling water channel (7), passing around the forward end of one of said partition walls (5) and turning back to said tail flange (1), the width of said first cooling water channel along the front end part of said cooling box being narrowed, whereby cooling water flows smoothly and at high speeds in said cooling channels.

4,029,054

WASTE HEAT BOILER

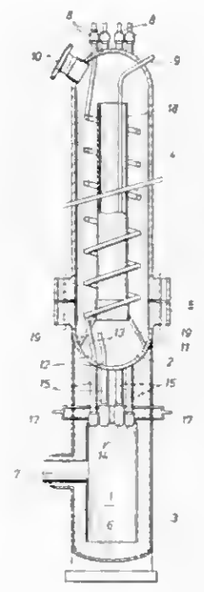
Pieter J. Schuurman, The Hague, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Nov. 12, 1975, Ser. No. 631,246

Claims priority, application Netherlands, Jan. 17, 1975, 7500554

Int. Cl.² F22B *1/18*; **F28F** *13/00*

U.S. Cl. 122—7 R **4 Claims**



1. A heat exchanger comprising, a first cooling chamber and a second gas supply chamber, the first chamber being vertically aligned above the second chamber, the first chamber and second chamber being commonly bounded by a separation plate at the bottom of the first chamber and the top of the second chamber, the second chamber having an inlet for hot gases;

at least one primary coolant supply line disposed in the first chamber, the first chamber also having at least one primary coolant discharge outlet;

lines for discharging hot gases from the second chamber through the separation plate into the first chamber, and

cooling pipes disposed in the first chamber, each of the pipes being in communication at one of their ends with the lines for discharging gases, the other ends of the pipes communicating with outlets for the gases;

cooling jackets surrounding the lines for discharging gases, the cooling jackets contacting the separation plate and the lines in such manner that annular spaces are formed between the lines and the jackets, respectively, and the spaces are in communication with the first chamber through annular openings surrounding each line, but not with the second chamber;

tubular conductive bodies respectively disposed axially around the lines in said spaces, near the entrance of the lines, the conducting bodies containing, respectively, axial annular chambers having outflow openings arranged around the inner circumferences of the conductive bodies;

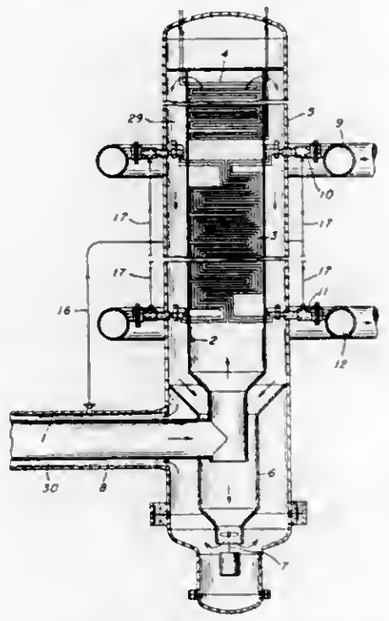
and a secondary coolant supply line, in communication with the annular chambers of the conducting bodies in such fashion that coolant may flow from the secondary coolant supply line to the annular chambers and thence to the annular spaces.

4,029,055

BOILER APPARATUS

Egon Haese, Bochum, Germany, assignor to Dr. C. Otto & Comp. G.m.b.H., Bochum, Germany

Filed Oct. 8, 1975, Ser. No. 620,558
Claims priority, application Germany, Oct. 11, 1974, 2448466
Int. Cl.² F22B 1/02
U.S. Cl. 122—32 4 Claims



1. A boiler including the combination of an outer boiler wall consisting of weldable material, an inner chamber including heat exchanger means spaced inwardly from said outer boiler wall to thereby define an annular flow space for conduecting a gaseous medium at a lowec temperature than the temperature of the gaseous medium fed into said inner chamber, a feed pipe to deliver the gaseous medium into said inner chamber while forming a continuation of said annular flow space, conduit means coupled to said heat exchanger means and extending through openings in said outer boiler wall for supplying and discharging a gaseous medium at temperatures greater than the permissible operating temperature of the weldable material forming the outer boiler wall, each of said conduit means including a tube coupled to said heat exchanger means, said tube extending from said annular flow space through an opening in the outer boiler wall, a sleeve-like jacket welded to said outer boiler wall to project externally of the boiler in a surrounding relation with said tube to thereby define an annular jacket space between the jacket and the tube, and gas-conducting means for feeding a cooling gas along said annular jacket space to pass into said annular flow space without interfering with the process within the boiler.

4,029,056

COMPACT INDIRECT HEATING VAPOR GENERATOR

Leon Jacques Wanson, 118 Avenue Isidore Gheyskens, 1600 Brussels, Belgium

Filed Jan. 16, 1976, Ser. No. 649,675
Int. Cl.² F22B 1/02; F22D 7/12; F22B 27/08
U.S. Cl. 122—34 10 Claims

1. A vapor generating apparatus comprising:

a. heater means comprising a plurality of similarly shaped tube means circulating a heat transfer fluid, arranged in at least one coaxially extending layer, each layer being comprised of a number of successive sets of adjacent coils, the most internal layer defining a fire box having a cylindrical side wall and having first and second ends,

a central burner means adjacent to said first end of the fire box and having at least one inlet for combustion-supporting air,

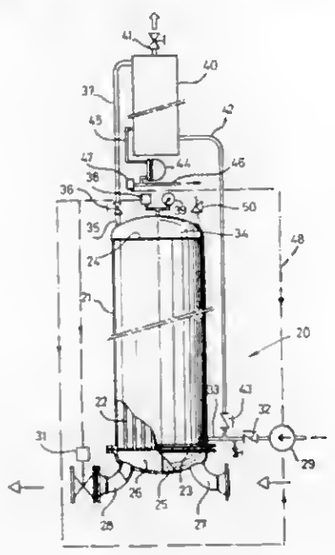
a first end wall for said fire box connected to said side wall at the second end thereof,

an annular chamber means surrounding said tube means and extending lengthwise thereof for circulating said combustion-supporting air to said inlet therefor in heat exchange relationship with the combustion gases thereby to preheat said air prior its intake into the burner means,

exhaust means connected to the fire box for exhausting the combustion gases from the fire box,

discharge means connected to said tube means for the heat transfer fluid, and

b. boiler means comprising heat exchanger means including tank means for the liquid to be evaporated, feed pump means for said liquid, and a bundle of vertically extending



tubes connected to said discharge means for circulating the heat transfer fluid discharged from said heater means, said bundle of tubes lying within said liquid,

separator means having its upper portion connected to the upper portion of said tank means for accepting the liquid/vapor compound discharged from said heat exchanger means and having its lower portion connected to an inlet for the feed liquid, said separator means further having exhaust means for vapor, and

control means responsive to the presence and/or pressure of produced vapor for controlling said feed pump means for the liquid such that dry vapor is continuously exhausted from said separator means without any separation plane between liquid and vapor phases being formed at any time in said heat exchanger means.

4,029,057

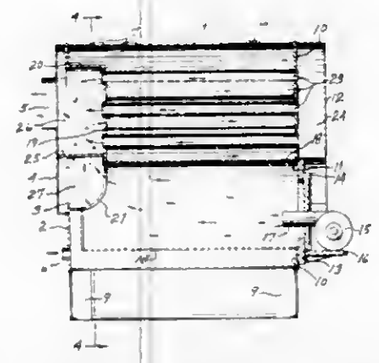
BOILER CONSTRUCTION

Jeannette Frechette nee Bussieres, 1250 15th Street North, Charny, Canada

Filed Nov. 25, 1975, Ser. No. 635,011
Claims priority, application Canada, Mar. 6, 1975, 221390
Int. Cl.² F22B 7/12
U.S. Cl. 122—149 3 Claims

1. A boiler comprising a shell operatively defining a longitudinal direction and including a pair of opposite end wall extending transversely of said longitudinal direction, a pair of partitions extending transversely of said longitudinal direction inwardly of said opposite end walls and confining flue spaces against the inner side of said end walls respectively and an intermediate space between the partitions, an upwardly extending partition dividing one of said flue spaces into a pair of flue chambers laterally juxtaposed transversely of said shell, an elongated firebox longitudinally extending lengthwise of said shell and communicating at one end with one of the laterally juxtaposed flue chambers, a first set of fire tubes

connected between said transverse partitions in communication with said one flue chamber and the other of said flue spaces, a second set of fire tubes connected between said transverse partitions in communication with said other flue space and the other of the flue chambers, said transverse partitions cooperatively forming with said tubes a fluid-tight chamber around the latter inside said shell adapted to be filled with a heated fluid medium, said firebox defining a longitudi-



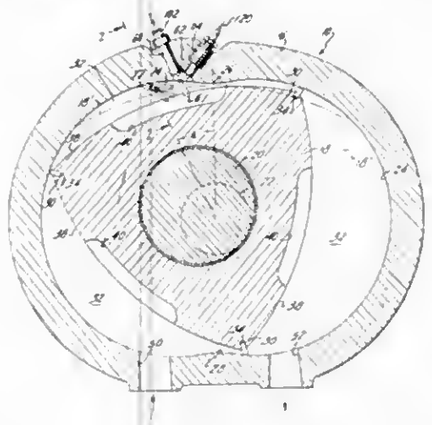
nal axis and said fire tubes being positioned lengthwise of said axis and above the latter, said upwardly dividing partition having a generally V-shaped transverse outline forming a transversely triangular flue chamber constituting said other flue chamber and having an apex downwardly pointing toward the longitudinal axis of the firebox, and the fire tubes of both sets are downwardly spread substantially coextensively in both flue chambers.

4,029,058

STRATIFIED CHARGE ROTARY ENGINE WITH SIDE HOUSING FUEL INJECTION

Charles Jones, Hillsdale, N.J., assignor to Curtiss-Wright Corporation, Wood-Ridge, N.J.

Filed Mar. 15, 1976, Ser. No. 666,792
Int. Cl.² F02B 53/10, 53/12
U.S. Cl. 123—8.09 5 Claims



1. A rotary combustion engine comprising:

a. an outer body having a pair of end walls and an intermediate peripheral wall to define an internal cavity, the inner peripheral surface of said intermediate wall having a multi-lobe profile;

b. an inner body of generally polygonal profile mounted for relative rotation within said outer body, the apex portions of said inner body having sealing cooperation with said multi-lobe peripheral surface to define a plurality of working chambers which vary in volume in response to said relative rotation;

c. a first fuel nozzle mounted on said outer body for discharging fuel into each working chamber after the air therein has been substantially compressed;

d. an igniter mounted on said outer body adjacent to said first fuel nozzle for igniting fuel promptly as it discharges from said first nozzle; and

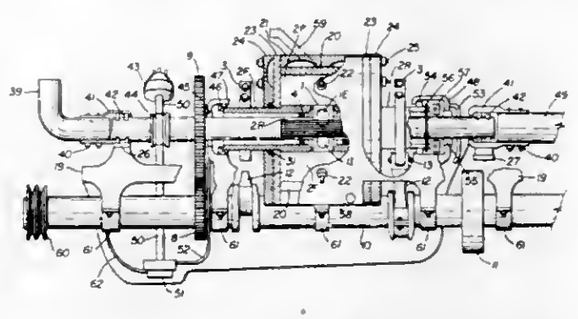
e. a second fuel nozzle mounted on an end wall of said outer body for discharging additional fuel into each working chamber also after the air charge therein has been substantially compressed, said second nozzle having its discharge end disposed close to the multilobe inner peripheral surface of the intermediate wall at a point on its end wall which is spaced from the adjacent lobe junction in a direction opposite to the direction of rotation of the inner body such that the angle subtended about the engine axis by the distance between said second nozzle and the adjacent lobe junction is at least about 15° but is no greater than about 60°, said second nozzle being arranged to discharge its fuel into each working chamber in a direction inclined to the direction of rotation of the inner body so as to discharge generally across and toward the leading end of said chamber with at least a portion of its fuel being discharged in generally the same region as the fuel discharge from the first nozzle so that the ignited fuel discharged by the first nozzle functions as a pilot flame for promptly igniting the fuel as it discharges from the second nozzle.

4,029,059

OSCILLATING PISTON ROTARY MACHINE

Semer H. Coston, 17052 Bernardo Oaks Drive, San Diego, Calif. 92128

Filed Jan. 20, 1975, Ser. No. 542,285
Int. Cl.² F02B 53/00
U.S. Cl. 123—18 R 18 Claims

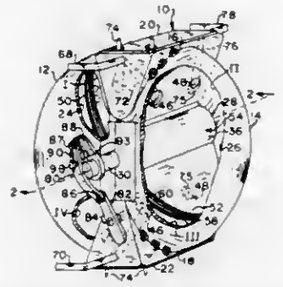


1. A rotary machine of oscillating piston type comprising a hollow shaft, means for mounting said hollow shaft for full circle rotation about its axis, divider means within said shaft to provide separate inlet and outlet passages therein, an enclosing structure disposed about said shaft having continuous chamber defining walls positioned as generatrices about the axis of said hollow shaft, a plurality of independently movable piston elements rotatably disposed on said hollow shaft and interiorally of said chamber walls for effectively dividing the space therebetween into a plurality of separate circumferentially disposed reaction chambers, said hollow shaft further providing separate port openings through the walls thereof at positions adjacent said separate piston elements for cyclical flow communication between said reaction chambers and the inlet and outlet passages of said hollow shaft as the shaft is rotated, and means for regulating the rotational movement patterns of said separate piston elements and said hollow shaft whereby adjacent pistons are oscillated one with respect to the other to effectively change the volumetric displacement of the defined reaction chambers disposed therebetween to provide intake and compression cycles with said piston elements and hollow shaft ports moving cooperatively toward an earlier open flow position when initiating said intake cycle.

4,029,060
OSCILLATING VANE ENGINE

Dan H. Dane, 416 Wake Forest Drive, Wake Village, Tex. 75501

Filed May 21, 1976, Ser. No. 688,851
Int. Cl.² F02B *53/00*
U.S. Cl. 123—18 R **5 Claims**



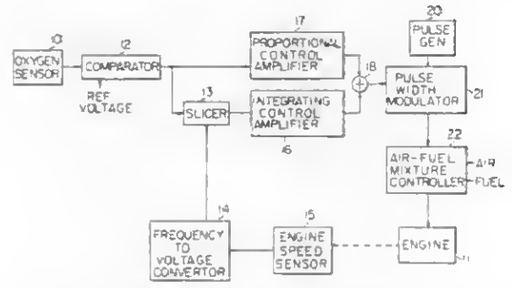
1. An internal combustion engine of the oscillating vane-type comprising:
- a cylindrical casing having end walls and a first shaft extending coaxially through the casing and supported for rotation by said end walls, said first shaft extending outward from at least one of said end walls for connection to a power takeoff assembly;
- a second shaft spaced parallel to said first shaft and rotatably mounted on said casing;
- a pair of vanes affixed to said second shaft within said casing, said vanes being in sealed, sliding engagement with the inside surface of said casing and end walls;
- a pair of blocking members extending inwardly from the inside surface of the casing to said second shaft and dividing the interior of said casing into two compartments, each of said vanes variably dividing a compartment into two compression chambers;
- means for cyclically applying and igniting a fuel mixture in each said compression chamber;
- exhaust means for cyclically removing products of combustion from each said chamber;
- a first crank mounted on said first shaft, and a second crank mounted on said second shaft;
- a link pivotally connecting ends of said cranks; and
- spring biasing means connected between said second crank and said link and responsive to the position of said first crank for receiving a compressive force from said first crank when said vanes approach the end of oscillating travel and to provide a rotational biasing force to said first shaft, whereby torque is provided to said first shaft directly by a said vane during movement of a said vane and from said spring biasing means to said first shaft when said vanes conclude a stroke.

4,029,061
APPARATUS FOR CONTROLLING THE AIR-FUEL MIXTURE RATIO OF INTERNAL COMBUSTION ENGINE

Masaharu Asano, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Oct. 14, 1975, Ser. No. 622,056
Claims priority, application Japan, Oct. 21, 1974, 49-121166; Oct. 21, 1974, 49-121167; Mar. 18, 1975, 50-31870
Int. Cl.² F02B *3/00*
U.S. Cl. 123—32 EE **7 Claims**

1. Apparatus for controlling the air-fuel mixture ratio of internal combustion engines having means for adjusting the ratio of air to fuel supplied to the engines, comprising:
- means for sensing the composition of the exhaust gases and providing a composition representative signal having one of two discrete values depending upon whether the sensed composition is above or below a predetermined value;
- means for sensing an operating parameter of said engine and providing a parameter representative signal;
- means connected to said composition sensing means and to said parameter sensing means for slicing the amplitude of said composition representative signal as a function of said sensed parameter, the sliced amplitude being proportional to the parameter of the engine;
- an integrating controller connected to said amplitude slicing

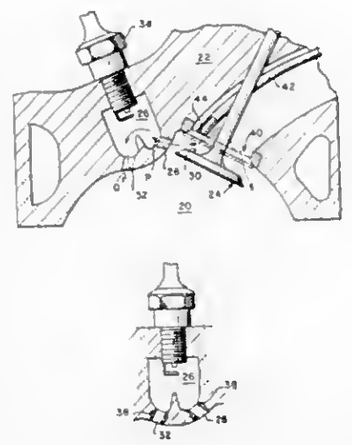


means for integrating the sliced signal to generate a control signal which is continuously variable with respect of time;
- means for generating a series of pulses; and
- means connected to said pulse generating means and to said integrating controller for modulating the duration of said pulses as a function of the value of said control signal, said modulated pulses being connected to said air-fuel ratio adjusting means.

4,029,062
AUXILIARY COMBUSTION CHAMBER FOR INTERNAL COMBUSTION ENGINE

Masaaki Noguchi, Nagoya; Yukiyasu Tanaka, Okazaki; Setsuro Sekiya, and Katsuhiko Motosugi, both of Toyota, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Nov. 6, 1975, Ser. No. 629,221
Claims priority, application Japan, Nov. 13, 1974, 49-130012
Int. Cl.² F02B *19/10, 19/16*
U.S. Cl. 123—32 ST **2 Claims**

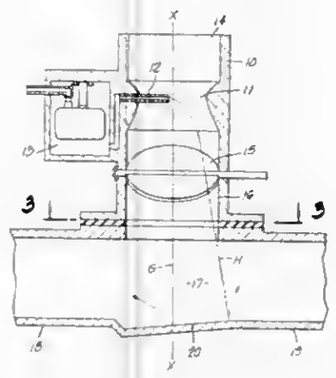


1. In an internal combustion engine having a main combustion chamber defined by a cylinder, a cylinder head and a piston, an auxiliary combustion chamber integrally cast in the wall of the cylinder head having an unvalved inlet port and an unvalved outlet port through the wall of the cylinder head for communicating between the auxiliary combustion chamber and the main combustion chamber, an intake port disposed in the cylinder head for supplying a lean air/fuel mixture into the main combustion chamber, an auxiliary passage disposed in the intake port for supplying a rich air/fuel mixture, an intake valve operably disposed in the intake port for controlling the flow of the air/fuel mixtures, and an ignition spark plug provided in the auxiliary combustion chamber, the improvement comprising:
- tubular insert means of heat and corrosion-resistant material fixed in the wall of the cylinder head within the inlet and outlet ports.

4,029,063
INTAKE APPARATUS FOR INTERNAL COMBUSTION ENGINE

Minoru Tanaka, Chofu, and Sakuji Arai, Wako, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 16, 1976, Ser. No. 677,670
Claims priority, application Japan, Apr. 24, 1975, 50-49088
Int. Cl.² F02B *75/18*
U.S. Cl. 123—52 M **3 Claims**

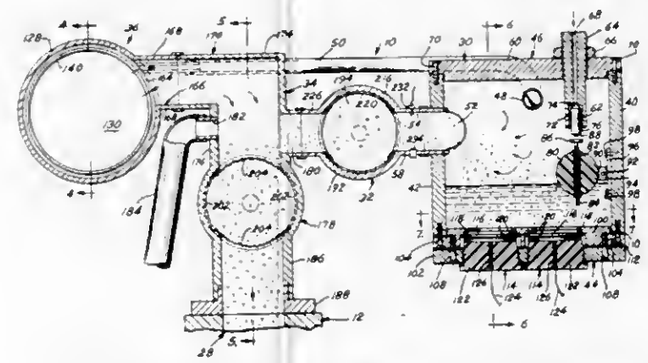


1. Apparatus for delivering an air-fuel mixture to an internal combustion engine having a plurality of cylinders, comprising: a carburetor having a venturi passage with a substantially vertical axis, a fuel nozzle projecting into the venturi passage at right angles to said axis, a distribution chamber receiving an air-fuel mixture generated in said venturi passage, a first branch pipe leading from said distribution chamber in one direction for supplying air-fuel mixture to one of the engine cylinders, a second branch pipe leading from said distribution chamber in the opposite direction for supplying air-fuel mixture to another cylinder of the engine, said distribution chamber having a wall remote from said carburetor against which the air-fuel mixture from the carburetor impinges, said wall being inclined with respect to said axis to equalize fuel concentrations in the air-fuel mixtures delivered to each of said branch pipes.

4,029,064
CARBURETION SYSTEM FOR INTERNAL COMBUSTION ENGINES

Gabor Csaszar, and Gernot Oehley, both of Chicago, Ill., assignors to Irving J. Grace and Geraldine Grace

Filed Mar. 18, 1976, Ser. No. 668,147
Int. Cl.² F02M *27/08;* **B05D** *3/14*
U.S. Cl. 123—119 E **18 Claims**

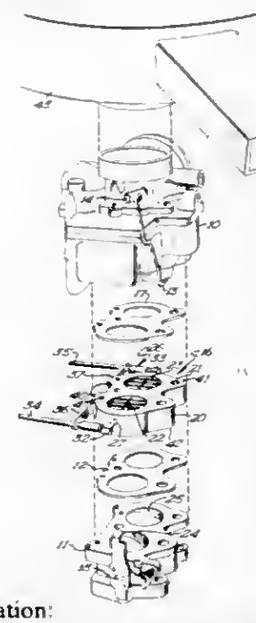


1. A device for carbureting a liquid fuel for combustion in an internal combustion engine, said apparatus comprising, in combustion, a chamber for receiving said liquid fuel, means for ultrasonically vaporizing said fuel in said chamber, a chamber for temporarily storing said vaporized liquid fuel, means for communicating said receiving chamber with said storing chamber and for passing said vaporized liquid fuel from said receiving chamber to said storing chamber, means for monitoring the amount of vaporized fuel passing to said storing chamber from said receiving means, means responsive to said monitoring means for controlling said ultrasonic vaporizing means for vaporizing the said fuel needed by said engine, means for collecting air, means for communicating said air collecting means with said vaporized fuel storing chamber and for mixing said air with said vaporized fuel, means for regulating the amount of mixed air and vaporized fuel for use in said engine for combustion, and outlet means for passing said regulated mixture of air and vaporized fuel to said engine for combustion.

4,029,065
CARBURETOR

Kenneth L. Wood, 4719 4th St. NE., Columbia Heights, Minn. 55424

Filed Oct. 2, 1975, Ser. No. 618,748.
Int. Cl.² F02M *31/00*
U.S. Cl. 123—122 AA **1 Claim**



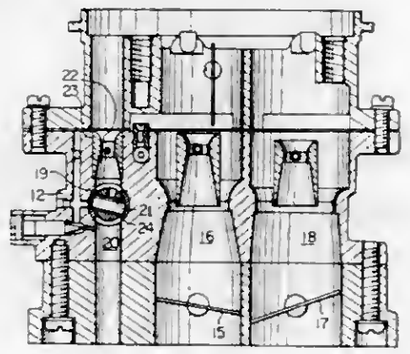
1. In combination:
- A carburetor main body including at least one nozzle discharging a directed jet of fuel;
- a carburetor throttle body including at least one throttle valve for controlling the flow of combustion air past said nozzle;
- a heat exchanger having a conduit for liquid flow and plurality of spaced fins carred by said conduit in heat conducting relation thereto;
- housing means for mounting said heat exchanger between said main body and said throttle body so that fuel discharged by said nozzle flows over and between said fins before reaching said throttle valve;
- and means for connecting said conduit and said heat exchanger for circulation of a fluid therethrough;
- in which said housing means comprises a block of metal aperture to provide passage between said nozzle and said throttle valve, and in which the conduit of said heat exchanger extends transversely across said opening in a first direction, and said fins extend transversely there across in a second direction orthogonal with said first direction, and vary in a first dimension in accordance with their positions along said conduit, to agree with the transverse configuration of said passage means; and
- in which said fins extend beyond said housing means, in the direction of said passage means, towards said nozzle, and terminate somewhat within said housing means, in the direction of said passage means toward said throttle

valve, so that in use said conduit is at a desired position between said nozzle and said throttle.

4,029,066
CARBURETOR

Yoshio Iwasa, Nagareyama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed June 24, 1975, Ser. No. 589,904
Claims priority, application Japan, July 9, 1974, 49-77900
Int. Cl.² F02M *13/06*
U.S. Cl. 123—127 **3 Claims**



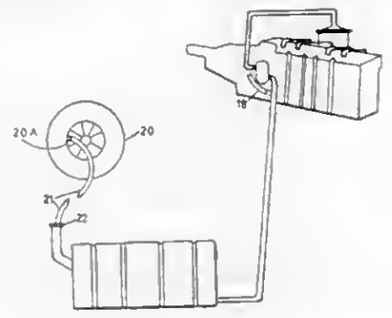
1. An internal combustion engine comprising:
a cylinder head;
a cylinder closed off by said cylinder head;
a piston within said cylinder;
a main combustion chamber formed within said cylinder between said cylinder head and said piston;
an auxiliary combustion chamber;
a torch nozzle establishing communications between said chambers;
a main carburetor communicating only with said main combustion chamber for supplying a relatively lean combustible mixture only to said main combustion chamber;
an auxiliary carburetor communicating only with said auxiliary combustion chamber for supplying a relatively rich combustible mixture only to said auxiliary combustion chamber, said auxiliary carburetor having an induction passage communicating only with said auxiliary combustion chamber and provided with a venturi forming a throat, and a rotary valve rotatably disposed in said induction passage downstream of said venturi with respect to flow of air through said induction passage, said rotary valve having an opening extending therethrough, the cross sectional area of said opening of said rotary valve being smaller than the cross sectional area of said throat of said venturi, whereby there is a reduction of the variation of air quantity induced into the auxiliary combustion chamber through the auxiliary carburetor responsive to the variation of the throttle opening; and
means for igniting the relatively rich combustible mixture in said auxiliary combustion chamber to project a flame through said torch nozzle.

4,029,067
FUEL INDUCTION SYSTEM FOR INTERNAL COMBUSTION ENGINE

Guy Giammattei, 1523 Chapel St., New Haven, Conn. 06511

Filed Mar. 29, 1976, Ser. No. 671,168
Int. Cl.² F02M *59/00*
U.S. Cl. 123—136 **5 Claims**

1. A fuel induction system for feeding fuel to an internal combustion engine comprising:
a fuel tank operatively connected to said engine,
means for pressurizing said fuel tank to provide a positive pressure therein for feeding fuel to said engine,

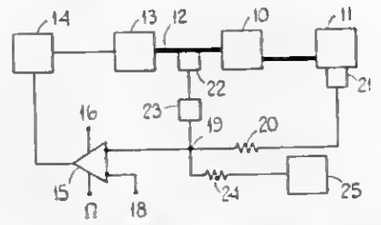


said means for pressurizing said fuel tank comprising a source of compressed air,
wherein said source comprises an inflated tire.

4,029,068
FUEL SYSTEMS FOR INTERNAL COMBUSTION ENGINES

Christopher Robin Jones, Alcester; Malcolm Williams, Solihull, and Authony John Adey, Gravesend, all of England, assignors to Cav Limited, Birmingham, England

Filed Feb. 13, 1976, Ser. No. 658,125
Claims priority, application United Kingdom, Feb. 25, 1975, 7753/75
Int. Cl.² F02M *39/00*
U.S. Cl. 123—139 E **5 Claims**

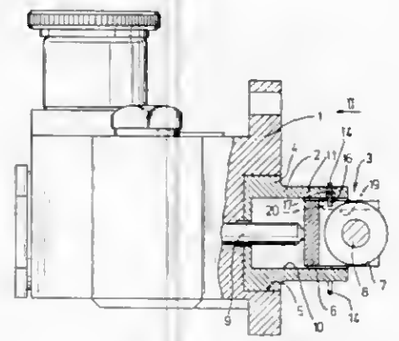


1. A control system for the fuel supply system of an internal combustion engine, the fuel supply system comprising a fuel pump for delivering fuel to the engine and control means movable to adjust the quantity of fuel supplied by the pump, the control system including an electrical device operable to control the setting of said control means and an electronic control circuit for providing a control signal to said device, the electronic control circuit including an operational amplifier the output of which is utilized to determine the signal applied to said electrical device, engine speed sensing means for providing a first signal to a summing junction connected to an input of the amplifier, second means providing a second signal which is representative of the setting of said control means, third means for providing a third signal to said summing junction representative of demanded speed, and circuit means interposed between said second means and the summing junction for adjusting the amplitude of the second signal, and for ensuring that a derivative of said second signal is always supplied to said summing junction, said circuit means defining two paths, the first of which is resistive and the second of which includes a capacitor so that only the derivative of the second signal passes along said second path to the summing junction, said first path including a variable element operable to adjust the amplitude of the second signal passing along the first path to the summing junction, and including a variable element operable to determine the amplitude of the derivative of the second signal passing along the second path to the summing junction, said variable elements being resistors defined by a potentiometer, the opposite ends of the resistance element of which are connected to points in said paths respectively, said potentiometer having a slider connected to an earthing point and to the other input terminal of the amplifier.

4,029,069
FUEL SUPPLY PUMP

Walter Häfele, Fellbach, and Rudolf Kleeberger, Munich, both of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Aug. 27, 1975, Ser. No. 608,247
Claims priority, application Germany, Sept. 4, 1974, 2442261; July 12, 1975, 2531188
Int. Cl.² F02M *39/00*
U.S. Cl. 123—139 R **13 Claims**

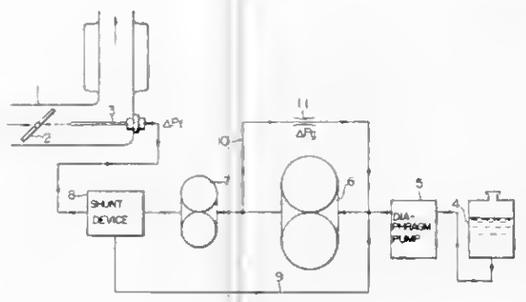


1. A fuel supply pump for the pre-supply of fuel to the fuel injection pump of an internal combustion engine, said fuel supply pump including a housing and an externally actuated axially movable roller shaft, said roller shaft having a substantially rectangular cross section and flat external surfaces, said fuel pump further including releasable means for holding and securing said roller shaft to prevent unintentional release thereof, the improvement comprising:
A. a guide bushing, fixedly attached to said housing and capable of receiving and axially guiding said roller shaft; and
B. said releasable means including stop means, extending into said guide bushing and capable of engaging a recess in said roller shaft, thereby limiting the axial motion thereof.

4,029,070
FUEL SUPPLY SYSTEM FOR INTERNAL COMBUSTION ENGINE

Akira Kobayashi, Nagoya, Japan, assignor to Kabushiki Kaisha Toyota Chuo Kenkyusho, Nagoya, Japan

Filed Aug. 6, 1975, Ser. No. 602,314
Claims priorlty, application Japan, Aug. 7, 1974, 49-90606
Int. Cl.² F02M *39/00*
U.S. Cl. 123—139 AN **5 Claims**

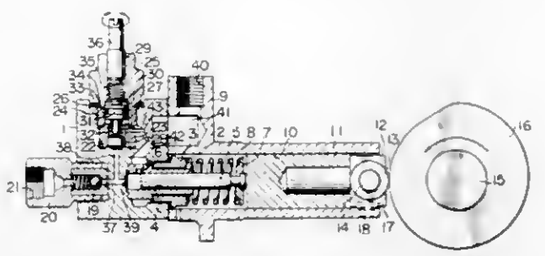


1. In an internal combustion engine of the type in which the air is supplied substantially in proportion to the engine speed and the opening degree of a throttle valve and the fuel to be mixed with said air is injected through a fuel injection nozzle, a fuel supply system comprising
a. pump means which discharges the fuel in proportion to the engine speed, said pump means including:
a gear type governor pump driven at a speed in proportion to the speed of the engine, a gear type fuel injection pump the suction port of which is hydraulically connected to the discharge port of said governor pump, which is driven at a speed in proportion to the speed of said engine, and which has the discharge rate half as much as that of said governor pump, and
a recirculation line hydraulically interconnecting between the suction and discharge ports of said governor pump and having therein disposed a governor nozzle the diameter of the nozzle hole of which is equal to that of said fuel injection nozzle; and
b. a fuel shunt device for supplying a part of the fuel supplied from said pump means to said fuel injection nozzle while recirculating the remaining fuel to said pump means, said fuel shunt device having
first valve means for automatically controlling the area of the opening of a passage hydraulically connecting said fuel shunt device to said fuel injection nozzle in proportion to the discharge rate of said pump means, and second valve means for automatically controlling the area of the opening of a return line hydraulically connecting said fuel shunt device to said pump means in inverse proportion to the opening degree of said throttle valve,
whereby the air-fuel mixture with a substantially constant air-fuel ratio independently of the speed and load of the engine may be charged into said engine.

4,029,071
FUEL INJECTION PUMP FOR DIESEL ENGINES

Atsushi Saito, Nagahama, and Minoru Shimada, Kohoku, both of Japan, assignors to Yanmar Diesel Engine Co., Ltd., Osaka, Japan

Filed June 18, 1975, Ser. No. 587,859
Claims priority, application Japan, Apr. 14, 1975, 50-44994
Int. Cl.² F02M *39/00*
U.S. Cl. 123—139 AS **2 Claims**



1. In a fuel injection pump for Diesel engines comprising plunger means installed in the pump body, a delivery valve, and injection-quantity control means provided in the pump body between the plunger means and delivery valve, said control means having a piston slidably disposed in the pump body, with the space adjacent to one end thereof communicated with the plunger means and delivery valve, the improvement wherein said injection-quantity control means further comprises a regulator spindle means for displacing said piston in direct response to the speed of rotation of the engine, said regulator spindle engaging a regulator piece disposed between said spindle and the other end of said piston in coaxial relationship therewith, said regulator piece being axially adjustable by said regulator spindle to press the piston against the pump body through the agency of a spring located on the other end of the piston, the maximum volume displaced by the piston being determined by the injection-quantity control means and being preset to a range not less than the volume injected initially at the engine start.

4,029,072

IGNITING APPARATUS FOR INTERNAL COMBUSTION ENGINES

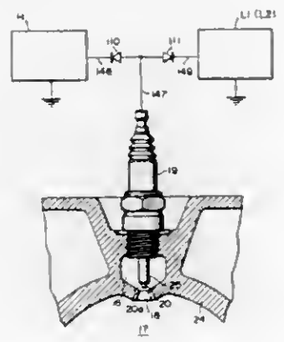
Kenji Goto, and Daisaku Sawada, both of Shizuoka, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

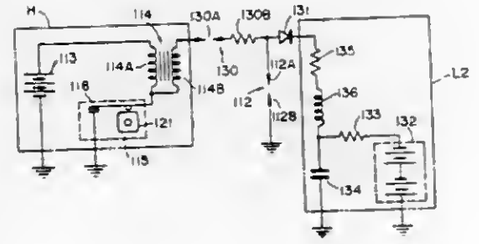
Filed July 9, 1974, Ser. No. 487,212

Claims priority, application Japan, Aug. 27, 1973, 48-96016; Nov. 6, 1973, 48-124640

Int. Cl.² F02B *23/00*; **F02P** *23/00*

U.S. Cl. 123—191 S **6 Claims**





1. An ignition apparatus for internal combustion engines comprising:

a main combustion chamber connected to receive a lean fuel mixture;

an auxiliary combustion chamber dimensioned to receive a lean mixture from said main combustion chamber;

a communicating opening for inter-connecting said auxiliary and main combustion chambers wtih each other;

a spark generating means located close to and forming a spark gap at said communicating opening; and

an igniting electric source means for generating an electric discharge spark in the spark gap to ignite the lean mixture within said auxiliary combustion chamber and to supply energy to the combustion gas when said combustion gas is passing through said communicating opening;

said igniting electric source means including a high voltage electric source device comprising an electric source, an ignition coil connected to said electric source and a contact breaker connected in series to a primary winding of said ignition coil to feed an initial high voltage surge to said spark gap, and a low voltage electric source device comprising a second electric source, a capacitor connected to said second electric source through a first resistor forming a charging path and a second resistor connected to said capacitor to form a discharging path and to determine a discharging time constant, said capacitor having a capacity of a value sufficient to maintain the electric discharge generated in said spark gap by said high voltage electric source device until the time when the combustion gas generated within said auxiliary combustion chamber passes through said communicating opening, these said electric source devices being connected to said spark gap in parallel to each other through reverse current breakers respectively for preventing a current leakage occurring between both said electric source devices.

4,029,073

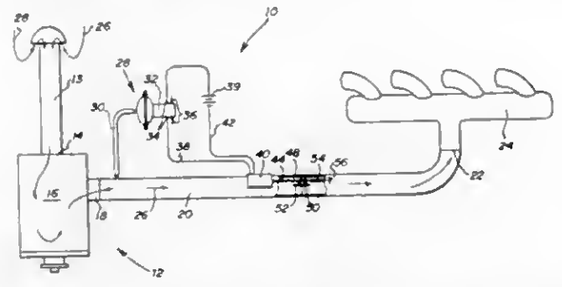
AUTOMATIC MOTOR KILL SYSTEM FOR PREVENTING DAMAGE TO A HEAVY EQUIPMENT MOTOR DUE TO A DIRTY AIR FILTER

James Dey, 1101 Woodlark, Tyler, Tex. 75701

Filed July 14, 1975, Ser. No. 595,804

Int. Cl.² F02B *77/00*

U.S. Cl. 123—198 D **8 Claims**



1. A dirty air cleaner responsive engine shut off system for use with an internal combustion engine in a heavy construction vehicle having an air cleaning system connected by a connection pipe to the intake manifold of the engine comprising:

means for sensing a pressure decrease including a normally open vacuum switch connected in an air tight manner to the connection pipe in a region near the air cleaning system and responsive to the pressure level within the air cleaning connection pipe, said vacuum switch operable to close in response to a decrease in the pressure level to a predetermined level which occurs when the air cleaning system becomes obstructed to the point that damage could occur to the engine, and

means responsive to closing of said switch for automatically completely shutting off the engine before damage occurs to the engine due to the obstruction of the air cleaning system.

4,029,074

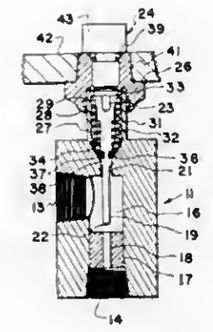
FUEL VALVES

Boyd Paul Sliger, Concord, Tenn., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Dec. 4, 1975, Ser. No. 637,497

Int. Cl.² F02B *77/08*

U.S. Cl. 123—198 D **2 Claims**



1. In an internal combustion engine including means for supplying fuel to said engine in a fuel line and means for circulating a liquid coolant through said engine including a radiator and fan to dissipate the heat of combustion from said engine up to a rated torque output of said engine, a temperature responsive fuel supply valve comprising:

a valve body having an inlet and an outlet connected in said fuel line, said inlet being transverse to said outlet;

means in said valve forming an orifice in said outlet, said orifice providing a maximum metered flow of fuel through said valve at the rated torque output of said engine;

a movable plug of smaller diameter than said orifice supported within said valve body and adapted for insertion into said orifice, the end of said movable plug received in said orifice being configured so as to maintain a linear relationship between the movement of said plug into said orifice and the resulting rate of fuel flow through said orifice;

spring means for holding said movable plug clear of said orifice; and

thermal power means including a displaceable stem operatively connected to said plug and responsive to said temperature of said coolant for inserting said plug into said orifice thereby linearly reducing the flow of fuel through said orifice to vary the maximum torque output of said engine thereby reducing the radiator fan speed.

4,029,075

COMBUSTION APPARATUS FOR AN INTERNAL COMBUSTION ENGINE

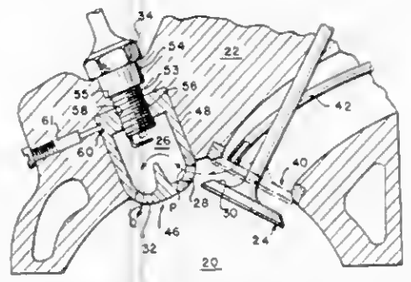
Masaaki Noguchi, Nagoya; Yukiyasu Tanaka, Okazaki; Setsuro Sekiya, and Katsuhiko Motosugi, both of Toyota, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Nov. 6, 1975, Ser. No. 629,227

Claims priority, application Japan, Nov. 13, 1974, 49-130009; Nov. 13, 1974, 49-130010

Int. Cl.² F02B *19/10*

U.S. Cl. 123—75 B **12 Claims**



1. Combustion apparatus for an internal combustion engine comprising:

a main combustion chamber, including a cylinder head;

an auxiliary combustion chamber including a cavity in said cylinder head having an opening into said main combustion chamber;

an aperture in said cylinder head interconnecting with said cavity;

an auxiliary combustion chamber shell fitted into said cavity from the main combustion chamber through said opening, said shell including a threaded aperture; and

a spark plug inserted through said aperture in said cylinder head and threaded into said aperture in said shell, said spark plug threadedly retaining said shell in said cavity.

4,029,076

FIREPLACE OPENING ENCLOSURE

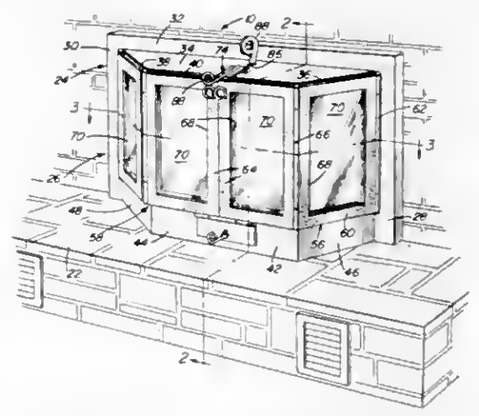
Jack F. Simington, Box 141, Star Route, Chiloquin, Oreg. 97624

Filed Nov. 17, 1975, Ser. No. 632,799

Int. Cl.² F24C *15/04*

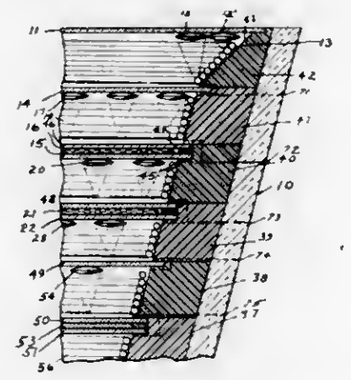
U.S. Cl. 126—140 **6 Claims**

1. In combination with a fireplace opening including opposite side walls, a top wall and a lower hearth extending outwardly beyond said opening, an enclosure for said opening, said enclosure comprising a downwardly opening frame including a pair of upstanding opposite side members extending along the outer faces of said side walls and an upper horizontal member extending and connected between the upper ends of said upstanding members, said upper member extending along and conforming to the general contour of the front face of said top wall extending between the upper ends of said side walls, an elongated horizontal top panel extending along and supported from the lower marginal portion of said horizontal member and projecting outwardly of the latter, the opposite and edge portions of said top panel being angled outwardly toward the remote ends thereof, said top panel including an outer marginal edge extending between the outer ends of said end edge portions generally paralleling the front face of said top wall, a lower partial front wall closely overlying said hearth, spaced below said top wall and including a central portion generally paralleling said outer marginal edge and angled opposite end sections spaced below and generally paralleling said end edge portions with the remote ends of said angled end sections anchored to the lower ends of said side members, a pair of door assemblies, each door assembly comprising first and second door sections pivotally joined together along adjacent upstanding edges thereof, the upstanding edge of each first door section remote from the corresponding second door section being hinged from a corresponding side member of said frame and each door assembly being swingable into and out of position with its first door section closing that portion of the spacing between the adjacent angled end



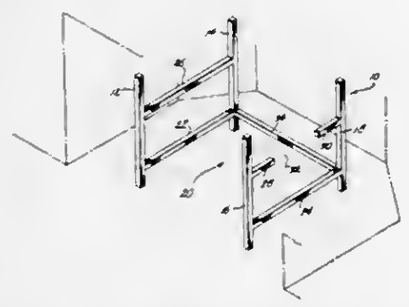
edge of said top wall and the corresponding lower front wall end section and its second door section bridging the adjacent ends of said top panel outer marginal edge and said lower partial front wall central portion, said door sections having openings formed therethrough closed by means of heat resistant transparent panels, the ends of upper marginal portions of the second door sections remote from the corresponding first door sections and said top panel including coacting latch means operative to releasably retain said door assemblies in the closed positions thereof, said lower partial front wall including a draft opening formed therethrough, said top panel outer marginal edge and said lower front wall central portion being substantially straight throughout their horizontal extent and the upstanding edges of said second door sections remote from the corresponding first door sections are disposed in at least close juxtaposition said door assemblies are in their closed positions, said coacting latch means including a single latch element shiftably supported from said top panel and simultaneously engageable with said second door sections, said single latch element and the upper marginal portions of said second door sections including coacting cam surfaces functioning to draw the upstanding edges of said second door sections toward each other as a result of said latch means being actuated to retain said door assemblies in the closed positions thereof.

4,029,077
SOLAR ENERGY COLLECTOR
Jerry Gorniak, 2317 E. 43rd St., Erie, Pa. 16510
Filed June 13, 1975, Ser. No. 577,259
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 12 Claims



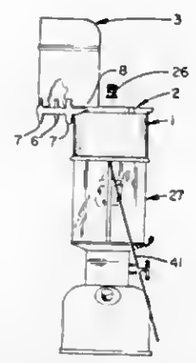
1. A solar collector comprising a fluid path for a liquid having a plurality of turns disposed generally in a hollow pyramidial body,
- a plurality of first lenses,
- a first sheet means supporting said lenses,
- said first lenses having spaced from them a first fluid path for liquid,
- said first fluid path for liquid being disposed a distance substantially equal to the focal length of said first lenses,
- means to conduct said liquid from said fluid path to a heat battery,
- said fluid path comprising a first coil of tubing,
- a second sheet of rigid material disposed generally parallel to said first sheet,
- and a third sheet of rigid material spaced from said second sheet generally parallel to said first sheet of material supporting a sheet of water,
- a plurality of second lenses fixed to said second sheet of material to the underside thereof,
- said second lenses being spaced from said sheet of water a distance substantially equal to the focal length of said second lenses.

4,029,078
ANDIRON FOR CONTROLLED BURNING OF LOGS
Robert E. Eller, 234 SW. 129th, Seattle, Wash. 98188
Filed Aug. 30, 1976, Ser. No. 718,944
Int. Cl.² F24B 13/00
U.S. Cl. 126—298 8 Claims



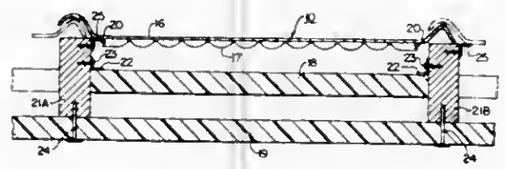
1. An andiron supportable on a fireplace floor, comprising four corner posts spaced apart to define a combustion space between them;
- a first continuous lower log support bar extending between, and connected at its ends to, a first front corner post and a first rear corner post located behind it;
- a second continuous lower log support bar extending between, and connected at its ends to, a second front corner post and a second rear corner post located behind it;
- said first and second lower log support bars together constituting a lower support means for supporting a plurality of logs in a generally horizontal position spaced above the fireplace floor;
- a continuous upper log support bar extending between, and connected at its ends to, the first front corner post and the first rear corner post, above the said first continuous lower log support bar;
- an open centered upper log support bar means spaced above the second continuous lower log support bar, comprising a pair of log support bar sections connected to the said second front corner post and said second rear corner post, and projecting inwardly from said posts in cantilever fashion towards each other, with a substantial open space existing between their free ends;
- said log support bar sections and said continuous upper log support bar constituting a support for a plurality of upper level logs, serving to support such logs in a generally horizontal position spaced above the lower level of logs, and said open space between said two upper bar sections being sized to permit at least one log to be placed diagonally with one end thereof supported on the center portion of the upper continuous log support bar and the opposite end thereof supported on a lower level log within the region of said open space, so that such sloping log will more easily burn at the start of combustion and will promote the generation of a larger flame which will better ignite the upper level logs; and
- means interconnecting the two rear corner posts, so that said andiron is a unitary structure.

4,029,079
LANTERN STOVE DEVICE ATTACHMENT
Joseph F. Elder, 1040 Bristol Circle, Garland, Tex. 75041
Filed Oct. 15, 1975, Ser. No. 622,683
Int. Cl.² F24C 5/04
U.S. Cl. 126—258 6 Claims



1. A stove device attachment for lanterns including a skirt, a grate, and a shield in which the skirt is adapted to fit over and around the draft hood of a conventional lantern of the combustion-type, the grate is adapted to removeably pressure fit within and be supported on the top of the skirt and to be removeably secured to the lantern by means of the lantern central connection and the draft hood connection nut of the lantern, and the shield is adapted to removeably pressure fit within structure on the back of the grate, in which the means for pressure fitting the grate within the top of the skirt includes crimping in the top of the skirt and recessed surfaces on the bottom of the grate to form a pressure interface with the crimped surface and other portions of the inner circumference of the top of the skirt, the means for supporting the grate on top of the skirt includes projections above the recessed surfaces and around the back of the grate, the means for securing the grate to the lantern includes structure defining a hole in the grate so that the hole in the grate is adapted to fit over the central connection of a conventional lantern, and the structural means for pressure fitting the shield on the back of the grate includes staggered tiers of prongs extending at right angles above and below the surface of the back of the grate.

4,029,080
THERMAL COLLECTOR OF SOLAR ENERGY ADAPTED FOR HIGH TEMPERATURE OPERATION
Roger W. Warren, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Jan. 27, 1975, Ser. No. 544,605
Int. Cl.² F24J 3/02
U.S. Cl. 126—270 15 Claims

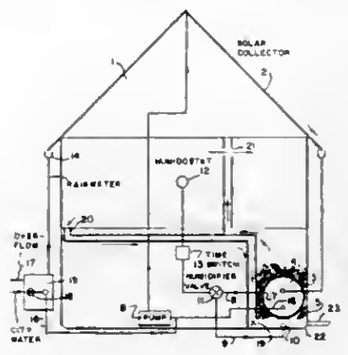


1. A thermal collector of solar energy adapted for high temperature operation, comprising,
- a relatively thin thermally conductive backing having relatively low thermal inertia and being disposed for transferring collected heat to an external coolant,
- a translucent and relatively stiff window to transmit solar radiation,
- an energy-absorbing material carried by said backing to absorb energy of solar radiation and transfer the heat of such absorbed energy to said backing,
- first means for supporting said window relative to said backing generally about the window periphery to expose said energy-absorbing material to solar radiation that is transmitted by said window, means for sealing an evacuated space between said window and said backing, and second means for supporting said window relative to said backing over at least one area within the window periphery so as to strengthen said thin backing against pressure differentials resulting from evacuation while limiting leakage of absorbed heat to said window to a relatively low value.

4,029,081
SOLAR ENERGY TRANSPORT SYSTEM
John D. Strong, 136 Gray St., Amherst, Mass. 01002
Filed Nov. 14, 1975, Ser. No. 631,877
Int. Cl.² F24J 3/02
U.S. Cl. 126—270 12 Claims

1. A solar energy collector comprising
- a heat conducting sheet having surface for exposure to the sun
- an enclosed air space abutting said sheet,
- a system of liquid-receiving, open-top troughs in said air space in thermal contact with said sheet,
- liquid supply means for delivering liquid to said troughs and drain means for receiving any liquid overflowing said troughs,
- inlet and outlet air conduits communicating with said air space, and
- means for causing a flow of air through said air space;
- whereby the heat of vaporization of the quantity of liquid vaporized is transferred from said sheet to said outlet air conduit in addition to the heat transferred by the temperature rises of the air and the vapor.

4,029,082
HEAT AND COLD STORAGE APPARATUS
Harry E. Thomason, and Harry Jack Lee Thomason, Jr., both of 609 Cedar Ave. (Fort Washington, Md.), Washington, D.C. 20022
Filed June 19, 1974, Ser. No. 480,752
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 10 Claims

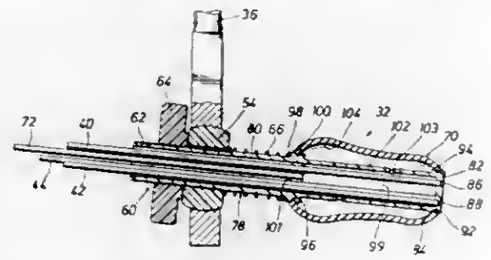


1. Apparatus for storing heat, recovering heat from storage and humidifying air for home or other space heating needs comprising, a storage bin having heat storage material therein, means to channel air in sequence as follows; from a space to be warmed to enter and flow through said storage bin to pick up heat from storage at low temperature to warm the air and return the warm air to the space to be warmed; water supply means to introduce water to dampen said heat storage material and add moisture to the low temperature air, said water, upon vaporizing and adding moisture, extracting heat from said storage material at low temperature and transferring said low temperature heat and moisture to the space to be warmed, said water supply means being within the bin and acting as further heat storage material.

4,029,083
PROBE FOR AUDIOMETRIC APPARATUS
Carl S. Baylor, P.O. Box 567, Livingston, Tex. 77351
Filed May 12, 1975, Ser. No. 576,249
Int. Cl.² A61B 10/00
U.S. Cl. 128—2 Z 4 Claims

1. A probe for penetrating an auditory canal of a patient, said probe comprising:
- sleeve means for carrying a plurality of smaller diameter conduit means, said sleeve means extending along substantially an entire length of said probe;
- disposable inflatable bladder means carried by said sleeve means for circumferentially expanding when pressurized fluid is introduced into said bladder means to provide a closed chamber within the auditory canal of the patient, said bladder means being removably attached to said sleeve means;
- said sleeve means comprising groove means circumferen-

tially extending around an outside surface of said sleeve means, and said inflatable bladder means comprising flange means circumferentially extending around an inside surface of said inflatable bladder means, said groove means being cooperable with said flange means to provide a substantially fluid tight seal therebetween;



said groove means further comprising a first groove positioned around a circumference of a perforated disc, said perforated disc being arranged to provide a support for said smaller diameter conduit means, and a second groove displaced from said first groove.

4,029,084

ULTRASOUND APPLICATOR WITH GUIDE SLOT FOR PUNCTURING CANNULA

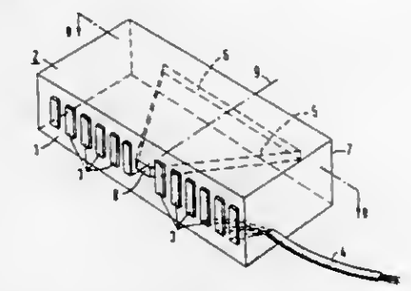
Richard Soldner, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Muoich, Germany

Filed Dec. 9, 1975, Ser. No. 639,170

Claims priority, application Germany, Dec. 23, 1974, 7442924[U]

Int. Cl.² A61B *10/00*

U.S. Cl. 128—2 V **12 Claims**



1. In an ultrasound applicator for ultrasonic-echo planigraphic imaging apparatus, said applicator including a carrier portion having an application surface adapted to be located on the body surface of a patent; and a plurality of ultrasound transducer elements mounted on said application surface in at least one row, the improvement comprising: said carrier portion including a guide slot for a puncturing cannula extending across said row of transducer elements in the longitudinal direction thereof, said guide slot reducing from a predetermined maximum slot length at the surface of said carrier portion opposite to said application surface to a minimum slot length at said application surface, said guide slot terminating in the application surface of said carrier portion in the center of said row of transducer elements, said row of transducer elements having a void of at least one transducer element at the location where said guide slot terminates in said application surface said transducer elements each having a maximum width of about 1.3 mm, a spacing of about 0.2 mm maximum between the individual transducer elements of a row of transducer elements and a slot length of about 2 mm at the application surface, and said row of transducer elements having a center void of a total of two transducer elements.

4,029,085

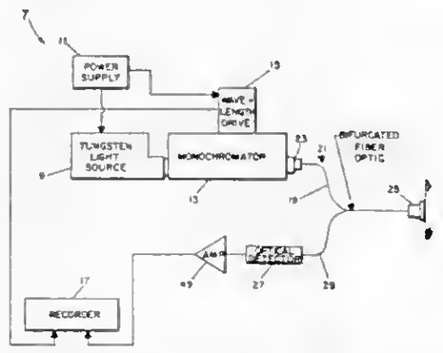
METHOD FOR DETERMINING BILIRUBIN CONCENTRATION FROM SKIN REFLECTANCE

David P. DeWitt; Robert E. Hannemann, both of West Lafayette, Ind., and John F. Wiechel, Houston, Tex., assignors to Purdue Research Foundation, West Lafayette, Ind.

Filed Mar. 26, 1976, Ser. No. 670,838

Int. Cl.² A61B *5/00*

U.S. Cl. 128—2 R **13 Claims**



1. A method for detecting jaundice in a patient, said method comprising:

measuring the spectral reflectance of the skin of a patient; and

determining from said measured reflectance the bilirubin concentration in the blood of said patient.

4,029,086

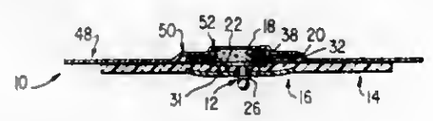
ELECTRODE ARRANGEMENT

Eugene R. Corasanti, New Hartford, N.Y., assignor to Consolidated Medical Equipment, Inc., Utica, N.Y.

Filed Aug. 11, 1975, Ser. No. 603,505

Int. Cl.² A61B *5/04*

U.S. Cl. 128—2.06 E **11 Claims**



1. An electrode arrangement for making an electrical contact with the skin of the body of a patient comprising, in combination:

an electrode element including a base flange with upper and lower surfaces and a central post upstanding from said upper surface, said electrode element being conductive;

a flexible adhesive pad for adhering to the body, said adhesive pad including a foam pad member having upper and lower surfaces and an adhesive layer provided on, and coextensive with, said lower surface of said foam pad member, said adhesive pad having a central aperture received by said central post, said central post extending through said central aperture such that a portion of said central post extends above said upper surface of said adhesive pad, said upper surface of said base flange disposed adjacent to, and adhering to, said adhesive layer, said adhesive pad extending beyond the periphery of said base flange

a flexible, foam, O-ring-shaped member adhering to said adhesive layer of said adhesive pad such that said O-ring-shaped member circumscribes said base flange of said electrode element; and

a shielding means comprising a dome-shaped annular washer, comprised of a tough, rigid material, received by said central post adjacent said upper surface of said adhesive pad, said shielding means for shielding said base flange from forces to which said electrode arrangement

can be exposed, said annular washer having an outside diameter generally equivalent to the outside diameter of said O-ring-shaped member for deflecting the forces away from said base flange to said O-ring-shaped member without decreasing the flexibility and the ability of said adhesive pad to conform to the body of a patient.

4,029,087

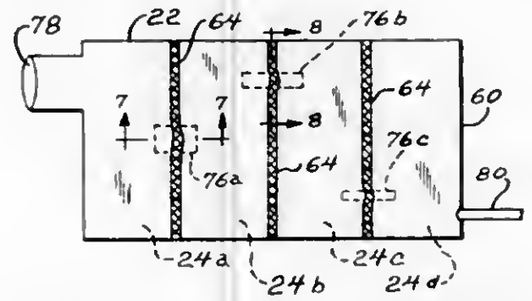
EXTREMITY COMPRESSION DEVICE

John F. Dye, Reedsburg, Wis., and Charles R. Memhardt, Morton Grove, Ill., assignors to The Kendall Company, Boston, Mass.

Filed Oct. 28, 1975, Ser. No. 625,967

Int. Cl.² A61H *1/00*

U.S. Cl. 128—24 R **27 Claims**



1. A device for applying compressive pressures against a patient's limb from a source of pressurized fluid comprising:

an elongated pressure sleeve for enclosing a length of the patient's limb, said sleeve having a plurality of separate fluid pressure chambers progressively arranged longitudinally along the sleeve from a lower portion of the limb to an upper portion of the limb proximal the patient's heart relative said lower portion;

means for filling said chambers from said source during periodic compression cycles while applying a greater pressure in each inflated lower chamber than the pressure in any upper inflated chamber to apply a compressive pressure gradient against the patient's limb by the sleeve which progressively decreases from said lower to upper limb portions throughout the compression cycles, said filling means including means for connecting the source to a lower first chamber in said sleeve;

means for distributing fluid from said first chamber to progressively located upper chambers at progressively decreasing pressures; and

means for emptying said chambers during periodic decompression cycles between said compression cycles.

4,029,088

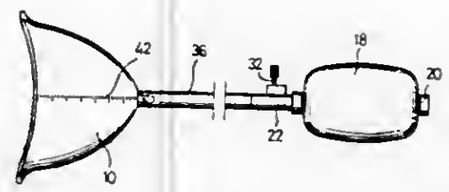
BIOLOGICAL TISSUE STRENGTHENING DEVICE

An-Chuan Wu, No. 217, Chien Kuo S. Rd., Taipei City, China /Taiwan

Filed June 18, 1975, Ser. No. 588,168

Int. Cl.² A61H *1/00*

U.S. Cl. 128—38 **2 Claims**



1. A device for strengthening biological tissue, particularly tissue of the female human breast, comprising a shape-retaining cup of transparent synthetic plastic material having an open side for placement over a human breast with clearance so as to define an interior space therewith, said cup having an edge portion at said open side which is formed with a recess having a curvature which curves in direction away from said open side; air-evacuating means including a pumping element operative for evacuating air from said space to thereby draw the breast further into said cup, said pumping element having resilient wall portions bounding an interior region; indicating means on said cup for indicating the distance through which the breast is drawn into said cup; flexible conduit means having an interior passage intermediate said cup and said pumping element; inlet valve means for establishing communication between said interior passage of said flexible conduit means and said interior region of said pumping element, including a substantially ball-shaped valve member and an air flow passage in which said valve member is mounted, said air flow passage having an annular valve seat intermediate said interior passage and said interior region which is normally out of engagement with said valve member so as to admit air from said interior space into said interior region via said interior passage; outlet valve means for establishing communication between said interior region of said pumping element and the ambient atmosphere at the exterior region of said element, including another substantially ball-shaped valve member and another air flow passage in which the latter is mounted, said other air flow passage having an annular valve seat intermediate the interior and exterior regions of said element which is out of engagement with said other valve member when said resilient wall portions are urged towards each other so as to permit air in the interior region of said element to pass towards the exterior region of the latter; and means on said flexible conduit means for adjustably admitting ambient air into said interior space so as to release the vacuum condition in said cup caused by operation of said valve means and said pumping element, said air-admitting means including a bypass passage communicating said interior passage with the ambient atmosphere and being formed with an auxiliary annular valve seat, and an adjustable element mounted for turning movement on said conduit means and having a tapered leading end portion movable between respective positions in which said leading end portion is moved into and out of engagement with said auxiliary valve seat so as to regulate the amount of air entering said interior passage and thereby vent the vacuum in said cup.

4,029,089

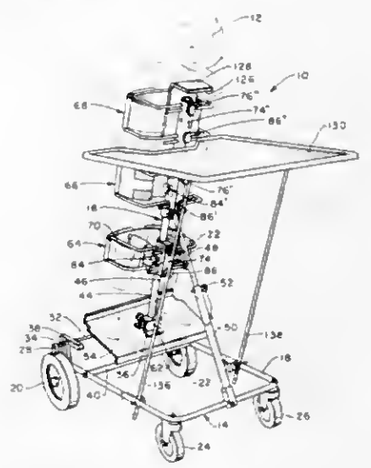
PRONE STANDER

Lawrence K. Mulholland, 985 Ann Arbor, Ventura, Calif. 93003

Filed June 14, 1976, Ser. No. 695,767

Int. Cl.² A61F *3/00*

U.S. Cl. 128—80 R **15 Claims**

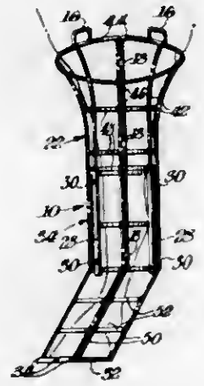


1. A prone stander comprising:

a base assembly adapted to rest upon a planar supporting surface;

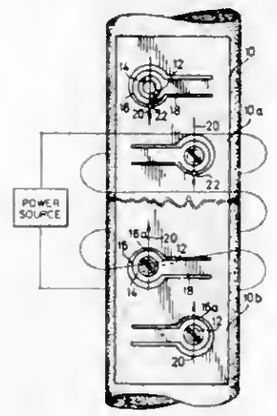
a center post assembly mounted upon said base and extending upwardly therefrom;
a brace assembly interconnecting said center post assembly and said base assembly, said brace assembly to maintain an established position of said center post assembly upon said base assembly;
at least three in number of supports mounted upon said center post assemblies with there being a knee support and a hip support and a chest support, said chest and knee supports being separately longitudinally adjustable upon said center post assembly and fixable in a selected position, each of said supports including lateral adjustment means for providing lateral separate adjustment of each said support in respect to said center post assembly, each said support having an outer side wall structure for providing lateral support for the user in the outerward direction; and
strap means connected to each said support for securing the user in position within said support.

4,029,090
HORSE FORELEG BRACE
Garrett W. Dawson, Jr., Triple D Farm (Box 187 A), Greensboro, Md. 21639
Filed July 26, 1976, Ser. No. 708,744
Int. Cl.² A61F *5/04*
U.S. Cl. 128—87 R **6 Claims**



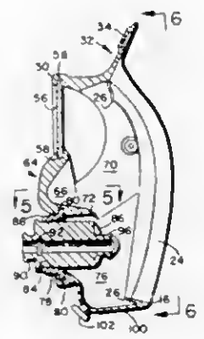
1. A weight bearing foreleg brace for a quadruped for keeping weight off an injured foreleg comprising:
a. a framework of circumferentially arranged vertical rod members shaped to correspond to the silhouette of a quadruped foreleg and foot, extending from the shoulder to beneath the foot of the quadruped;
b. horizontal ring members, said ring members being spaced vertically between the shoulder and the foot, each ring member encircles the corresponding portion of the foreleg, each ring member being attached to the vertical rod members by fastening means, said ring members including an uppermost ring member adapted to engage the shoulder of the quadruped and support the weight of the quadruped, each ring member being adapted to open and close for placement or removal of the brace from said foreleg;
c. hinge means deposed vertically on the periphery of the brace to allow ring members to open and close;
d. latch means deposed vertically on the periphery of the brace to hold the brace in the closed position after it has been placed on a foreleg; and
e. plate means attached to the bottom ring member to close the bottom of the brace.

4,029,091
OSTEOSYNTHESIS
Götz-Dietrich von Bezold, 34 Ammerseestr., Gauting, and Werner Kraus, 13 Bauerstr., Munich, both of Germany
Filed Aug. 11, 1975, Ser. No. 603,562
Claims priority, application Germany, Aug. 12, 1974, 2438669
Int. Cl.² A61B *17/18;* **A61F** *5/04*
U.S. Cl. 128—92 D **8 Claims**



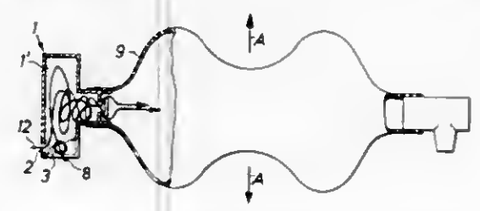
7. An osteosynthesis plate for application across a fractured site of a fractured bone, said plate having at least two screw holes spaced in a longitudinal direction of said plate wherein resilient means including magnetic materials is provided between said screw holes allowing a mutual displacement of said screw holes upon application of a magnetic field, said movement being restricted essentially to said longitudinal direction; and means generating a magnetic field and located to act on said magnetic materials.

4,029,092
COMPARTMENTALIZED FULL FACE MASK
Bevly Boone Morgan, Santa Barbara, Calif., assignor to U. S. Divers Co., Santa Ana, Calif.
Filed Sept. 17, 1973, Ser. No. 397,824
Int. Cl. A62b *7/02*
U.S. Cl. 128—141 R **9 Claims**



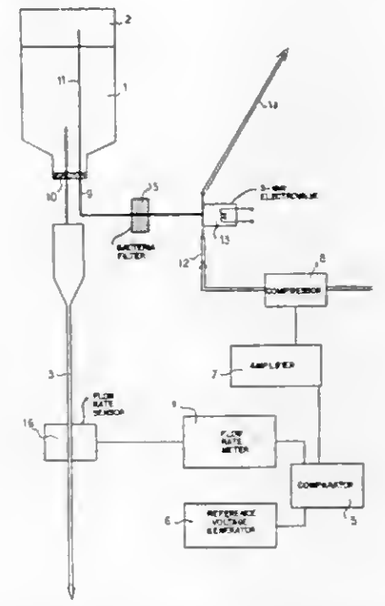
1. A diving mask comprising:
a major casing having a wall portion defining a major cavity of said mask and a trailing edge thereof wherein said wall surfaces at the trailing edge are adapted for placement against a user's face;
a partition dividing the major cavity into upper and lower portions of the cavity providing upper and lower cavities substantially separated from each other during usage by a diver with a frontal opening in the lower cavity having a flanged groove surrounding the interior surface thereof;
a substantially stiffened member with less flexibility than said casing having a passage therein held in the frontal opening of the lower cavity in the flanged groove for sealing the frontal area thereof and adapted to receive a source of breathing gas through the opening in said member; and,
a conduit passing through the passage of said substantially stiffened member and engaging the walls of said passage on the outer surface of said conduit to prevent the passage of water between said conduit and passage interface which is adapted to be connected at one end to a source of breathing gas, and which can slide inwardly and outwardly therethrough for removal and adjustment thereof with respect to a user's mouth.

4,029,093
GAS SUPPLY DEVICE
Øle Bjørn Køhnke, Kgs. Lyngby, Denmark, assignor to Ruth Lea Hesse, Rungstead Kyst, Denmark
Filed Sept. 19, 1975, Ser. No. 614,954
Claims priority, application Sweden, Sept. 20, 1974, 7411882
Int. Cl.² A61M *16/00*
U.S. Cl. 128—145.7 **9 Claims**



1. In a device for administering to a patient a mixture of a first gas and at least one second gas in a desired, predetermined ratio between 0 and 100%, the first gas being supplied to the device by a non-pressurized system and the second gas being supplied to the device under pressure; the device including a self-expanding, lung-venting bladder having an inlet through which the gases are introduced into the bladder and an outlet through which the gases are administered to a patient; a check valve disposed in the zone of the bladder inlet for preventing the gases from escaping from the bladder through the bladder inlet; the bladder being adapted to expand for drawing the gases thereinto through the bladder inlet; the bladder being adapted to be compressed for discharging the gases therefrom through the bladder outlet; the improvement comprising a suction valve having
a. a housing means defining a chamber having a first wall and a second wall parallel-spaced from said first wall and a circular wall adjoining said first and second walls;
b. means defining, in said housing means, a valve outlet disposed in said first wall centrally with respect to said chamber, said valve outlet being connected to said bladder inlet for maintaining communication between said chamber and said bladder inlet;
c. means defining, in said housing a suctional intake opening positioned radially outwardly of said valve outlet and being in continuous communication with the non-pressurized system; said bladder, during its expansion, generating a pressure drop from said suctional intake opening to said valve outlet; and
d. at least one inlet nozzle extending through said circular wall and supported adjacent said suctional intake opening and being oriented tangentially with respect to said chamber and substantially perpendicular with respect to said valve outlet for injecting said second gas tangentially into said chamber; said inlet nozzle being arranged for controlling, with said second gas, the intake of said first gas by changing said pressure drop in an inverse relationship to the intake of said second gas.

4,029,094
DEVICE FOR REGULATING PERFUSION FLOWRATE
Bernard Winickl, Neuilly sur Seine, France, assignor to Union Chimique Continentale - U.C.C. Societe Anonyme, Puteaux, France
Filed Feb. 17, 1976, Ser. No. 658,718
Claims priority, application France, Mar. 4, 1975, 75.06677
Int. Cl.² A61M *5/14*
U.S. Cl. 128—214 F **5 Claims**

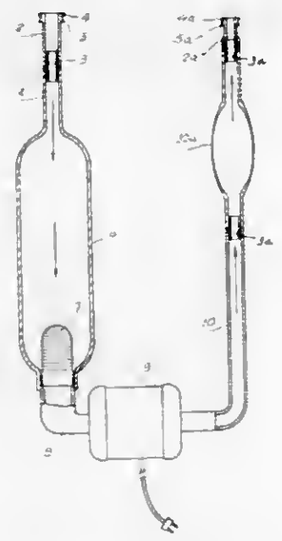


1. A device for regulating perfusion flow rate, notably of a rapid perfusion flow rate, comprising:
an air compressor;
an air pipe fed by said compressor;
a perfusion reservoir, air-fed by said pipe;
a perfusion tubing, liquid-fed by said reservoir;
a flow rate sensor connected to said tubing;
a flow rate meter driven by said sensor and furnishing a measuring voltage;
reference voltage generator means for furnishing a perdetermined reference voltage corresponding to the desired flow rate;
comparator means for comparing said measuring voltage with said reference voltage and for furnishing a differential voltage; and
control means, driven by said differential voltage, for controlling the speed of said compressor relative to said differential voltage.

4,029,095
DEVICE FOR CIRCULATING TREATING FLUID THROUGH THE NASAL FOSSAE
Jose Baya Pena, Paseo Generalisimo 98, Masnou (Barcelona), Spain
Filed Jan. 9, 1976, Ser. No. 647,788
Claims priority, application Spain, Jan. 10, 1975, 208987
Int. Cl.² A61M *7/00*
U.S. Cl. 128—250 **10 Claims**

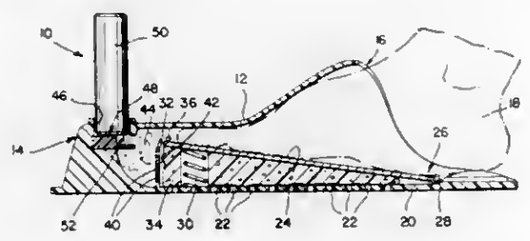
1. In a device for circulating a treating fluid through the nasal fossae, pump means having separate from each other a suction inlet and pressure outlet, suction tubular means communicating with said suction inlet and pressure tubular means communicating with said pressure outlet, said pump means cooperating with said suction and pressure tubular means for creating suction in said suction tubular means and pressure in said pressure tubular means, said suction and pressure tubular means respectively having distant from said pump means end portions which respectively carry a pair of means for placing said end portions respectively in communication with the nasal fossae, so that when a treating fluid is situated in one of

said tubular means, said pump mean may be operated for circulating in a closed circuit in only one direction the treating fluid through the nasal fossae with the treating fluid entering under pressure from said pressure tubular means into one



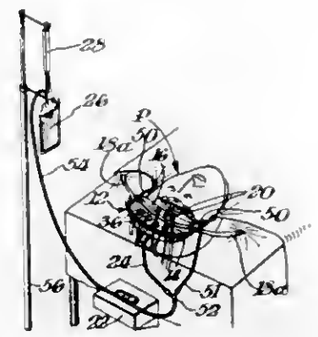
nasal fossa and being withdrawn through the other nasal fossa while entering from the latter into the suction tubular means to again be delivered by said pump means to said pressure tubular means.

4,029,096
FOOT POWDER DISPENSING DEVICE
George Fust, 44 Kunigunda Place, Islip Terrace, N.Y. 11752
Filed Aug. 3, 1976, Ser. No. 711,257
Int. Cl.² A61M *35/00*
U.S. Cl. 128—265 5 Claims



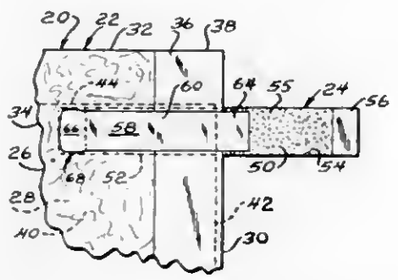
1. A foot powder dispensing device comprising in combination:
- a housing open at one end thereof for reception of a foot and including a base having a plurality of apertures therein;
- a substantially air-impermeable treadle element pivotably mounted at one end thereof on said base within said housing;
- a spring member interposed between said base and said treadle element and adapted to bias the free end of such treadle element upwardly;
- an upstanding wall having a plurality of apertures therein positioned within said housing adjacent the free end of said treadle element and defining together with the surrounding inner surfaces of said housing a powdering chamber;
- an opening adjacent the other end of said housing adapted to receive the support a container for foot powder; means for selectively effecting communication between the container and said powdering chamber; whereby actuation of said treadle element by a foot effects the flow of a stream of air through said apertured wall and into said powdering chamber and the entrainment of a quantity of foot powder therein and the application of the powder-laden air to and between the toes of the foot.

4,029,097
SURGICAL SPONGE COLLECTOR AND DRAINAGE SYSTEM
Pierre L. LeRoy, Wilmington, Del., assignor to New Research and Development Laboratories, Inc., Wilmington, Del.
Filed July 25, 1975, Ser. No. 599,016
Int. Cl.² A61M *1/100*
U.S. Cl. 128—276 16 Claims



1. A surgical sponge collector and drainage system comprising a tray having a bottom wall and side walls and terminating at its top in a peripheral rim, one of said side walls having a smooth concave contour for fitting against the body of a patient, a flat horizontal shelf in said tray disposed between said bottom wall and said peripheral rim, a fluid-tight closed compartment being between said shelf and said bottom wall, said shelf comprising support means for used sponges, a plurality of perforations in said shelf whereby fluid may drain from said sponges through said shelf and into said compartment formed between said shelf and said bottom wall, strap means on said tray extending laterally beyond said contoured side for urging and maintaining said contoured side in contact with the patient, said strap means comprising the sole fastening means for suspending said tray away from the patient and being supported only at said contoured side in cantilevered fashion, and said strap means being adjustable to provide a means for cantilevered leveling the orientation of said tray.

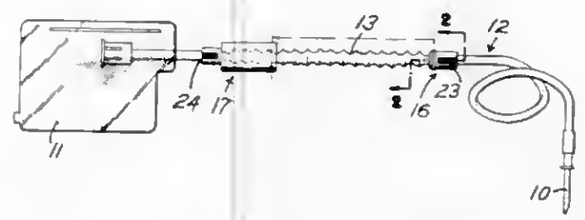
4,029,098
TAPE FASTENER FOR DISPOSABLE DIAPER
Hamzeh Karami, Crystal Lake, Ill., assignor to Colgate-Palmolive Company, New York, N.Y.
Filed Nov. 10, 1975, Ser. No. 630,398
Int. Cl.² A61F *13/16*
U.S. Cl. 128—284 21 Claims



1. A disposable diaper, comprising:
- an absorbent pad assembly having an absorbent pad, opposed surfaces, and at least one side edge; and
- a tape fastener comprising, a pressure-sensitive tape strip having an outer securement section for securing the diaper about an infant, and a release sheet associated with the securement section and having an inner portion permanently joined to one of said surfaces of the pad assembly over the pad as a unitary piece by being fused with a heat sensitive plastic material, with said sheet extending

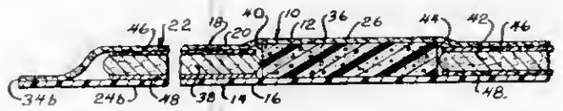
from said inner portion toward said side edge of the pad assembly.

4,029,099
URINE DRAINAGE APPARATUS
Loretta Alice Fifield, 609 Schwab Road, Hatfield, Pa. 19440
Filed Dec. 4, 1975, Ser. No. 637,538
Int. Cl.² A61F *5/44*
U.S. Cl. 128—295 4 Claims



1. A urinary drainage apparatus which comprises a urinary drainage catheter, a urine holding container, a continuous tube on the order of four feet in length connecting them together and through which urine flows from the catheter directly to and into the container, said tube having a bellows-like section which is expansible so the tube will be long and permit the wearer to move about without dislodging the catheter and is collapsible so the tube will be short and relatively free of entanglement if the person's movement is restricted, and coacting means which engage the tube at the ends of said section and which can be brought together in an interlocking relationship to retain said section in collapsed formation.

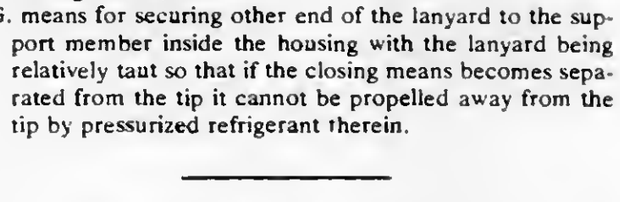
4,029,100
SHAPE RETAINING DIAPER
Hamzeh Karami, Crystal Lake, Ill., assignor to Colgate-Palmolive Company, New York, N.Y.
Filed Jan. 5, 1976, Ser. No. 646,702
Int. Cl.² A61F *13/16*
U.S. Cl. 128—284 16 Claims



1. A disposable diaper comprising, an absorbent pad assembly having a pair of waistline portions, a crotch portion intermediate said waistline portions, a backing sheet, a fluid pervious cover sheet, and absorbent pad means positioned between the backing and cover sheets, said pad means comprising a first absorbent pad including a hydrophilic material and defining a front surface of the pad means between the crotch portion and waistline portions of the pad assembly, and a second pad in said crotch portion of a material which has a large wet resiliency relative said first pad to maintain the shape of said crotch portion when wetted and placed under loads during use of the diaper.

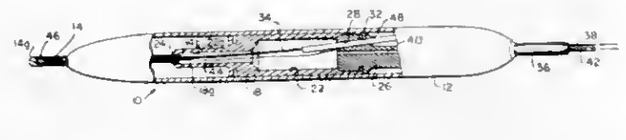
4,029,101
ABSORBENT ARTICLE
Sheldon R. Chesky, Algonquin, and Donald Patience, Barrington, both of Ill., assignors to Colgate-Palmolive Company, New York, N.Y.
Division of Ser. No. 503,887, Sept. 6, 1974, Pat. No. 3,954,107. This application Nov. 13, 1975, Ser. No. 631,768
Int. Cl.² A61F *13/16*
U.S. Cl. 128—290 R 9 Claims

1. Absorbent pad means for the perineum comprising, an elongated absorbent base pad having a front surface, a back surface, and a pair of outer side surfaces connecting said front and back surfaces, a pair of elongated top pads disposed in a side-by-side relationship and overlying the front surface of the base pad, said top pads being separate from said base pad and having a front surface for facing the perineum, a back surface facing the front surface of the base pad, and inner and outer side surfaces connecting the front and back surfaces, a fluid impervious sheet covering the back and outer side surfaces of the base pad and the outer side surfaces of the top pad, and a fluid pervious outer top sheet covering the fluid impervious



sheet, the front, inner side, and back surfaces of the top pads and the front surface of the base pad, said fluid impervious and top sheets connecting said top pads to the base pad adjacent said outer side surfaces and the respective portions of said top sheet covering the inner side surfaces of the top pads being free of attachment in a fluid receiving region of the pad to permit relative free movement of the top pads aways from each other in the fluid receiving region and enlargement of a fluid receiving channel between the top pads.

4,029,102
CRYOSURGICAL PROBE TIP
J. P. Barger, Winchester, Mass., assignor to Dynatech Corporation, Burlington, Mass.
Filed Sept. 9, 1975, Ser. No. 611,630
Int. Cl.² A61B *17/36*
U.S. Cl. 128—303.1 2 Claims



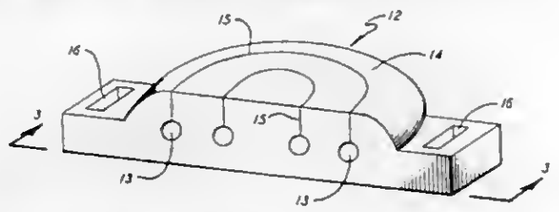
1. A cryosurgical probe comprising
- A. housing,
- B. a support member inside the housing,
- C. a tubular probe tip having
  1. one end connected to the support member inside the housing,
  2. its opposite end projecting an appreciable distance from the housing, and
  3. for receiving refrigerant under pressure.
- D. means closing the exposed end of the tip to form a tip end having a polished finished exterior surface,
- E. an inextensible lanyard having good tensile strength extending into the probe tip,
- F. means for securing one end of the lanyard directly to the closing means, and
- G. means for securing other end of the lanyard to the support member inside the housing with the lanyard being relatively taut so that if the closing means becomes separated from the tip it cannot be propelled away from the tip by pressurized refrigerant therein.

4,029,103
ANCHORING PLATE FOR MEDICAL TUBES
Francis P. McConnell, 515 Brook St., Mamaroneck, N.Y. 10543
Filed Aug. 11, 1975, Ser. No. 603,301
Int. Cl.² A61M *25/00*
U.S. Cl. 128—348 14 Claims

1. A device for anchoring through an interference fit and

directing medical tubing comprising a multi-faced plate of flexible, resilient material having

a. at least one internal curved passageway with a cross sectional area at least in segments thereof no longer than the cross sectional area of the tubing to be anchored, open at its ends to at least one face of said plate, and
b. a slit communicating a face of said plate with said passageway along its entire length, wherein the plate is provided with two slots remote from each other and from the passageway and extending completely through the plate, and wherein the device further comprises a belt adapted to pass through one slot, over the slit face of the plate which is in communication with the passageway, through the other slot, and around a convenient member of a patient, so as to provide an additional safeguard against accidental freeing of the tubing from the passageway.

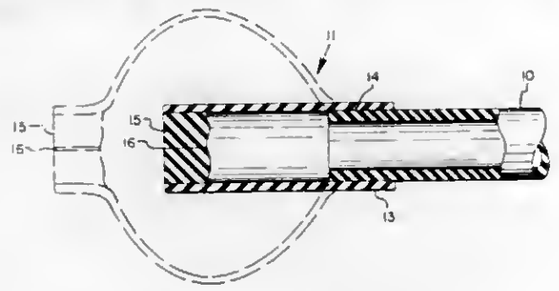


4,029,104

CALIBRATED LEAK BALLOON MICRO-CATHETER

Charles W. Kerber, 3728 SW. Beaverton Ave., Portland, Oreg. 97201

Filed Mar. 8, 1976, Ser. No. 664,503
Int. Cl.² A61M 25/00
U.S. Cl. 128—348 6 Claims



1. A single lumen flow guided balloon catheter for use in small blood vessels in a body organ such as a brain or kidney, comprising a limp single lumen tube, a balloon having a proximal end connected to the distal end of said tube with the balloon extending beyond the end of said tube, said balloon comprising an imperforate hollow cylinder of silicone rubber, a deposit of liquid silicone rubber which cures to form a plug in the distal end of said cylinder, and a restricted orifice cut through said plug to discharge fluid from said lumen, said orifice maintaining sufficient back pressure in fluid supplied under pressure through said lumen to inflate the balloon for pulling the catheter through a blood vessel by the flow of blood in the vessel.

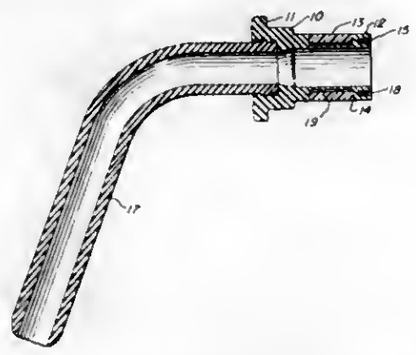
4,029,105

TRACHEOSTOMY AND ENDOTRACHEAL UNITS

Robert C. Faust, Greenfield, Wis., assignor to Will Ross, Inc., Milwaukee, Wis.

Filed Nov. 26, 1975, Ser. No. 635,684
Int. Cl.² A61M 25/00
U.S. Cl. 128—351 4 Claims

1. In a tracheostomy tube strap having a portion adapted for retention on a patient and an integral, resilient tubular connector having a ferrule on the outer surface thereof for operable engagement with respiratory apparatus, the improvement which comprises a non-resilient annular member contained within the wall of the tubular connector at a position intermediate the ferrule and the distal end of the connector, whereby said annular member prevents removal of the ferrule.



4,029,106

AROMATIC COMPOSITIONS

Edouard Demole, Geneva, Switzerland, assignor to Firmenich S.A., Geneva, Switzerland

Division of Ser. No. 482,776, June 24, 1974, Pat. No. 3,920,027, which is a division of Ser. No. 219,136, Jan. 19, 1972, Pat. No. 3,840,023. This application June 12, 1975, Ser. No. 586,310
Claims priority, application Switzerland, Jan. 19, 1971, 773/71; June 23, 1971, 9156/71; Jan. 11, 1972, 380/72
The portion of the term of this patent subsequent to Feb. 10, 1993, has been disclaimed.
Int. Cl.² A24B 15/04
U.S. Cl. 131—17 R 3 Claims

3. A tobacco flavouring composition which comprises 3-isopropyl-cyclopent-2-en-1-one. comprises 3-isopropyl-cyclopent-2-en-1-one.

4,029,107

AROMATIC COMPOSITIONS

Edouard P. Demole, Geneva, Switzerland, assignor to Firmenich S.A., Geneva, Switzerland

Division of Ser. No. 482,776, June 24, 1974, Pat. No. 3,920,027, which is a division of Ser. No. 219,136, Jan. 19, 1972, Pat. No. 3,840,023. This application June 12, 1975, Ser. No. 586,382
Claims priority, application Switzerland, Jan. 19, 1971, 773/71; June 23, 1971, 9156/71; Jan. 11, 1972, 380/72
The portion of the term of this patent subsequent to Feb. 10, 1993, has been disclaimed.
Int. Cl.² A24B 15/04
U.S. Cl. 131—17 R 3 Claims

3. A tobacco flavoring composition which comprises nonane-2,5,8-trione.

4,029,108

AROMATIC COMPOSITIONS

Edouard P. Demole, Geneva, Switzerland, assignor to Firmenkh SA, Geneva, Switzerland

Division of Ser. No. 482,776, June 24, 1974, Pat. No. 3,920,027, which is a division of Ser. No. 219,136, Jan. 19, 1972, Pat. No. 3,840,023. This application June 12, 1975, Ser. No. 586,383
Claims priority, application Switzerland, Jan. 19, 1971, 773/71; June 23, 1971, 9156/71; Jan. 11, 1972, 380/72
The portion of the term of this patent subsequent to Feb. 10, 1993, has been disclaimed.
Int. Cl.² A24B 15/04
U.S. Cl. 131—17 R 3 Claims

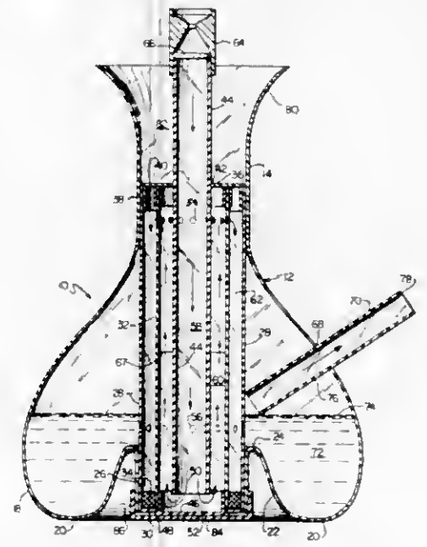
3. A tobacco flavouring composition which comprises 2-methyl-5-(α-methyl-α-hydroxyethyl)-cyclohex-2-en-1-one.

4,029,109

FLUID-COOLED SMOKING DEVICE

Richard W. Kahler, Box 61 Rte. No. 1, Rock Cave, W. Va. 26234

Filed Jan. 28, 1976, Ser. No. 653,198
Int. Cl.² A24F 1/14, 1/30
U.S. Cl. 131—173 29 Claims



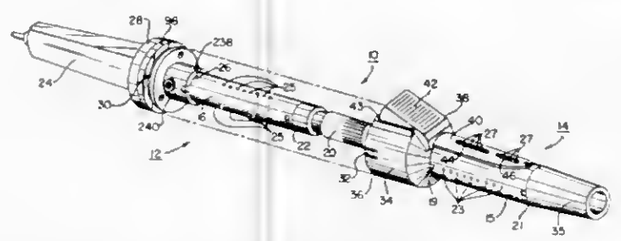
1. A fluid-cooled smoking device comprising:
housing means for containing a volume of fluid;
means for containing a supply of tobacco to be smoked;
means operatively connected to said tobacco container means for introducing smoke into said housing;
means operatively connected to said housing and projecting outwardly therefrom for withdrawing said smoke from said housing;
means interposed between said smoke introducting means and said smoke withdrawal means, and partially disposed within said fluid for defining an elongated serpentine flow path for said smoke, whereby said smoke is cooled due to the travel of the same through said elongated path and said fluid; and
ash receptacle means disposed within said serpentine flow path for accumulating ash deposits.

4,029,110

HAIR STYLING IMPLEMENT

Francis B. Hyland, Scituate, Mass., assignor to The Gillette Company, Boston, Mass.

Filed June 20, 1975, Ser. No. 588,768
Int. Cl.² A45D 2/12
U.S. Cl. 132—33 R 9 Claims



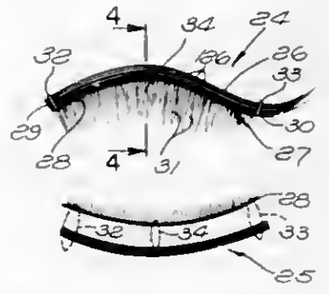
1. Hair styling apparatus comprising:
heat and steam generating means;
a handle having one end connected to said heat and steam generating means;
a cylindrical adaptor tube means having a plurality of apertures for discharging a vapor;
hair clamping means pivotally mounted on said adaptor tube for clamping a tress of hair against said adaptor tube; and
means for detachably coupling said adaptor tube and hair clamping means to said one end of said handle, said adaptor tube and hair clamping means being in thermal contact with said heat and steam generating means and rotatable about a longitudinal axis of said adaptor tube independent of rotational movement of said heat and steam generating means.

4,029,111

ARTIFICIAL EYELINER AND EYELASH STRUCTURE

Barbara J. Barton, 4261 Cahuenga Blvd. Apt. 1, North Hollywood, Calif. 91602

Filed Sept. 29, 1975, Ser. No. 617,415
Int. Cl.² A41G 3/00
U.S. Cl. 132—53 14 Claims



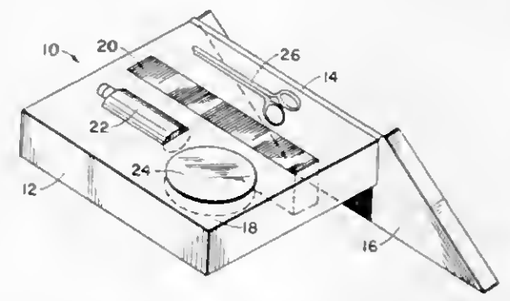
1. An eye make-up device comprising:
an elongated eyelash carrier;
a series of artificial eyelashes forming loops extending about said carrier at different locations along its length and projecting generally transversely therefrom;
a bundle of natural hair or artificial hair-simulating filaments extending generally parallel to and near said eyelash carrier at the outside of said loops formed by said eyelashes; and
means connecting said carrier and said bundle filaments together for handling as a unit and for attachment as a unit to the eyelid of a user in a position of extension longitudinally along the edge of the eyelid, with said bundle of filaments being exposed to view and being wide enough to serve as a readily visible eyeliner accentuating the appearance of the eyelashes.

4,029,112

MUSTACHE KIT

Michael Anthony Boose, Chicago, Ill., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Sept. 8, 1976, Ser. No. 721,461
Int. Cl.² A45D 40/00
U.S. Cl. 132—79 R 3 Claims



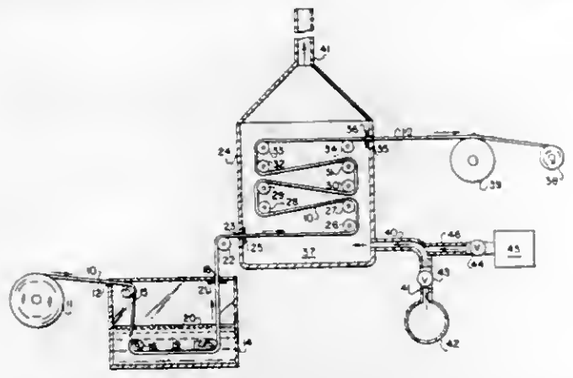
1. A mustache kit comprising box means having a lid, a tray means in said box, artificial mustaches, scissors, mustache adhesive dispensing means and mustache wax dispensing means supported on said tray.

4,029,113

WAXED DENTAL TEXTILE MATERIAL AND METHOD OF PREPARING AND USING THE SAME

William Cecil Guyton, 922 Porter Ave., Ocean Springs, Mich. 39564

Filed Feb. 20, 1975, Ser. No. 551,417
Int. Cl.² A61C 15/00
U.S. Cl. 132—91 12 Claims



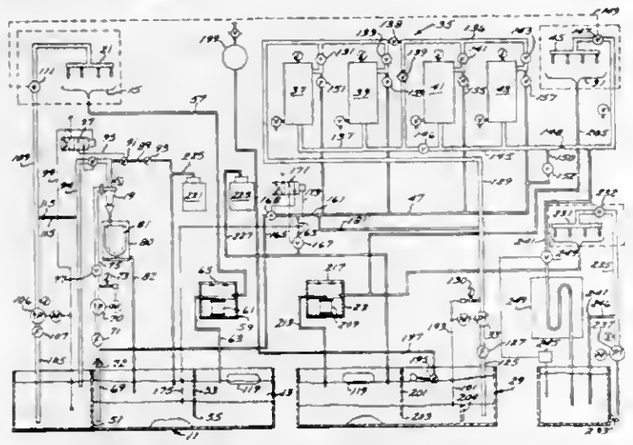
1. A method of preparing waxed dental textile material for use in removing food deposits from teeth and the gingiva comprising applying a coating of wax to dental textile material to thereby produce waxed dental textile material, the wax coating being water insoluble and solid at room temperature, the wax coating encompassing the dental textile material and having a fluorine-containing compound distributed therein which provides fluoride ion in a therapeutic amount of inhibit the formation of dental caries when the waxed dental textile material is intimately contacted with the teeth and gingiva to remove food deposits therefrom, the wax coating being applied in an amount whereby particles thereof are deposited on the teeth at the points of contact and in the general area of the gingiva and fluoride ion is slowly released therefrom over a substantial period of time, and the said fluorine-containing compound being present in the wax coating in an amount to provide about 0.0001–2% by weight of fluoride ion based upon the weight of the wax coating.

4,029,114

BACK FILTER AUTOMATIC VEHICLE WASH WATER RECLAIM SYSTEM

Dale E. Wiltrout, Wyckoff, N.J., assignor to The Allen Group Inc., Melville, N.Y.

Filed Apr. 26, 1976, Ser. No. 680,216
Int. Cl.² B08B 3/02
U.S. Cl. 134—104 5 Claims



1. A back wash filter automatic vehicle wash water reclaim systems comprising:

wash spray means for spraying water onto a vehicle passing through a wash bay formed in a vehicle path;

wash sump means disposed below the level of said vehicle path for collecting used water from said vehicle path and including partition means separating said sump means into a collector compartment and a clean water compartment;

wash drain means for draining water from said vehicle path into said collector compartment;

wash conduit means connected between said clean water compartment and said wash spray means and including wash pump means for drawing water from said sump and spraying it through said spray means;

a sludge separator for separating water from sludge;

separator conduit means leading from said collector compartment to the inlet of said sludge separator and including separator pump means;

clean water conduit means leading from the water outlet of said sludge separator to said clean water compartment;

primary rinse spray means for spraying rinse water on a vehicle passing through a rinse bay formed in said veicle path forwardly along said path from said wash bay;

rinse sump means including partition means separating said rinse sump means into a rinse water collector compartment and a rinse clean water compartment;

drain means for draining used rinse water from said rinse bay to said rinse sump means;

rinse conduit means leading from said clean rinse water compartment and including a rinse pump means;

a plurality of reverse flow filter tank sets having a forward and reverse flow direction;

filter conduit means leading from the discharge side of said rinse pump and connecting said filter tank sets in series with one another and the outlets of each set with the inlet of each other set and connecting the outlet of at least the last set of the series with said rinse spray means:

back wash conduit means connecting said filter tank inlets with one of said rinse sump means;

individual valve means in said filter and back wash conduit means for controlling flow from said rinse pump means to the inlets of said respective filter tank inlets and operative during filtering of said wash water to direct water forwardly in series through said tank sets and to said rinse spray means, said valve means being further operative during back wash of said tanks to selectively direct flow forwardly through selected ones of said sets and in the reverse direction through another of said filter tank sets; and

control means for controlling said wash pump, separator pump, wash and rinse pumps and valve means and having a rinse mode operative to direct water through said rinse pump and in series through said sets of filter tanks to said rinse spray means, said control means further having a back wash mode operative to direct water through said rinse pump means and forwardly through one of said sets and in a reverse direction through the other of said filter tank sets through said back wash conduit means to said one of said sumps.

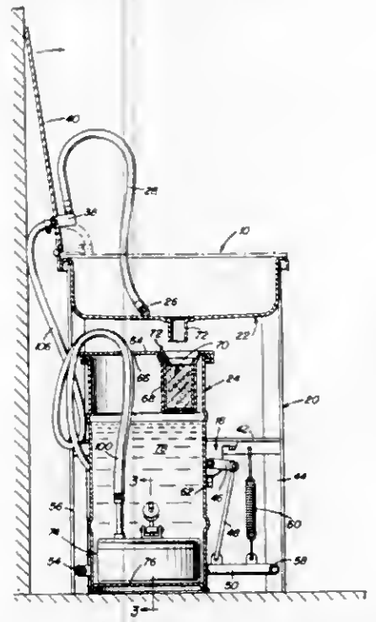
4,029,115

PARTS WASHER

Edison L. Wheeler, Monticello, Ark., assignor to Ted Wheeler and Elmer Lewis, both of Benton, Ark., part interest to each

Filed Sept. 3, 1975, Ser. No. 609,935
Int. Cl.² B08B 3/00
U.S. Cl. 134—111 1 Claim

1. A parts washer comprising a washbasin in the form of a shallow receptacle defined by a bottom wall and an upstanding peripheral wall, a base frame supporting said washbasin in elevated position above a support surface, a solvent dispensing tube having a discharge nozzle thereon supported on said washbasin to enable parts placed in the washbasin to be washed by directing the discharge nozzle toward the parts, a drain in the bottom of the washbasin to drain solvent and entrained material therefrom, a tank disposed below the washbasin and in vertical spaced relation to the bottom thereof, said tank including a quantity of liquid solvent and a cover having an inlet opening aligned with said drain, a generally cylindrical holder supported below the inlet opening, a filter cartridge positioned within the holder for filtering solvent passing therethrough by gravity flow, the lower end of the holder being open and the upper end flaring outwardly to form a funnel shaped guide for solvent discharged from the drain, said cartridge being disposed above the liquid level in the tank, means within said tank communicated with said tube and discharge nozzle for discharging pressurized solvent from the nozzle, and control means exteriorly of the tank for manually controlling operation of said solvent discharge means, said solvent discharge means including a container disposed in the bottom of said tank and including a top disposed below the level of liquid solvent in the tank, a solvent inlet opening in the container for gravity flow of solvent into the container, valve means closing said inlet opening, a discharge conduit extending from the bottom portion of the container to the solvent dispensing tube, and an air pressure line communicated with said container for pressurizing the container for pressure



discharge of solvent and air through the discharge tube, said control means including an air valve in said air line selectively pressurizing and venting said container, said valve means in the container being automatically opened by the head of liquid solvent in the tank when the container is vented and at least partially empty and being closed when the container is filled and pressurized, said valve means including a plate disposed interiorly of the container, an upwardly extending and laterally extending lever attached to said plate, means pivotally supporting said lever from the exterior of the top of the container, a counterweight mounted on said lever on the opposite side of the pivot from the plate to normally retain the plate in closed position until the head of liquid solvent in the tank above the plate is greater than the combined force exerted by the counterweight and any pressure in the container, said air valve including a foot-operated pedal positioned adjacent the front lower end of the base frame for access by a person manipulating parts and nozzle in the washbasin.

4,029,116

GERMINATING TANK FOR GERMINATING AND SOFTENING OF MALT

Paul Beyer, Maienstrasse 2, 7057 Nellmersbach, Germany

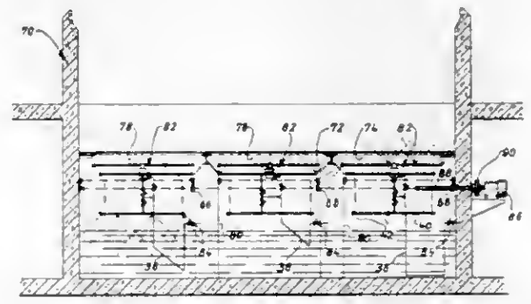
Filed Nov. 13, 1975, Ser. No. 631,704
Claims priority, application Germany, Nov. 13, 1974, 2453673
Int. Cl.² B08B 3/02, 9/00
U.S. Cl. 134—167 R 15 Claims

1. A germinating tank for germinating and softening malt supported on a grating, said tank having an aerating chamber situated below the grating, the improvement comprising in combination,

spray cleaning means operatively movably mounted in said tank below said grating;

a cleaning fluid high pressure source; and

at least partially flexible conduit means connecting said fluid high pressure source to said spray cleaning means; whereby said spray cleaning means is adopted to spray



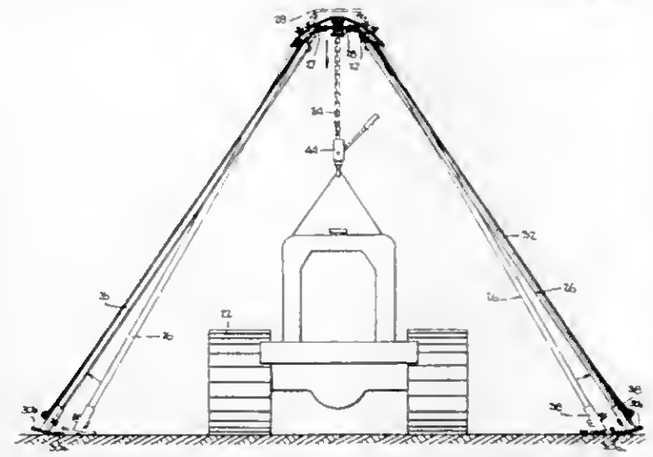
cleaning fluid onto said grating and into said aerating chamber; said spray cleaning means include a carriage movable operatively mounted in said aerating chamber, at least a pair of spray pipes supported on said carriage and being connected to said fluid high pressure source, one of said spray pipes conducting fluid to be sprayed upwardly and the other spray pipe conducting fluid to be sprayed downwardly.

4,029,117

SHELTER STRUCTURE

Lloyd Howard Rain, Lexington, Ky., assignor to Irvin Industries, Inc., Greenwich, Conn.

Filed Jan. 26, 1976, Ser. No. 652,553
Int. Cl.² A45F 1/16
U.S. Cl. 135—4 C 8 Claims



1. A shelter comprising:

a plurality of at least three rigid columns arranged relative to one another to form the edges of a pyramidical structure,

a top plate,

said columns extending out and down from said top plate, each of said columns being pivoted in solely one plane about said top plate to permit radial movement of the base of said columns,

a central tension member connected to and extending down from said top plate, said tension member being connected to an anchoring means,

a pyramidical canopy connected to said columns and having a plurality of flexible panels, one of said panels extending across each of the surfaces of said pyramid defined by said columns,

a plurality of flexible base tension members, each of said base tension members having first and second ends connected respectively to the bases of adjacent columns,

each of said base tension members being connected along its entire length on a curved line across an associated one of said panels of said canopy between adjacent ones of said columns, and

base means at the foot of each of said columns to permit radial movement of said columns in response to compressive loading of said columns,

said base tension members and said canopy being the sole restraints on radial outward movement of said columns,

loads on said canopy tending to spread said columns and cause said base tension members to decrease in curvature and to exert an increased substantially uniform tension across said panels of said canopy,

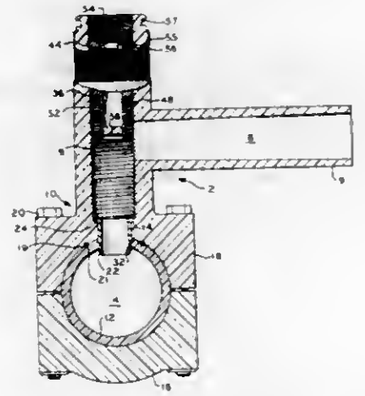
thereby preventing canopy flutter and extending canopy life.

4,029,118

TAPPING APPARATUS AND METHOD

John H. Merideth, Dallas, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed July 3, 1975, Ser. No. 593,091
Int. Cl.² F16K *43/00*; F16L *55/10*
U.S. Cl. 137—15 **18 Claims**



1. Apparatus for tapping a conduit, said apparatus comprising:

a body means having first, second, and third passageways extending therethrough, said first passageway being adapted for accepting and maintaining a conduit to be tapped and being in communication with a first end portion of said second passageway, said first end portion of said second passageway additionally being in communication with a first end of said third passageway for providing fluid communication between said first end portion of said second passageway and a second end of said third passageway, said body means also having a seat means located on the inside wall of said first end portion of said second passageway at a location between the opening to said first passageway and the opening to said third passageway;

a sleeve means having a generally cylindrical tubular body with a first end and a second end and having an annular outwardly extending flange at said first end thereof, said flange being mateable with said seat means; and

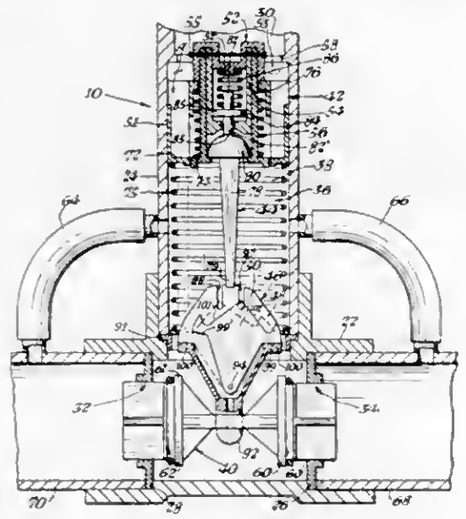
a cutter means for cutting an opening within a conduit located within said first passageway and for inserting said second end of said sleeve means into said opening, said cutter means having a generally cylindrical first end portion which is insertable into said sleeve means and a second end portion which is adapted to engage the inside wall of said second passageway, said cutter means having a passageway extending therethrough from said first end portion to said second end portion thereof.

4,029,119

VALVE AND VALVE SYSTEM

Hal Klieves, P. O. Box 5850, Pompano Beach, Fla. 33064

Filed Apr. 30, 1975, Ser. No. 573,095
Int. Cl.² F16K *31/363*
U.S. Cl. 137—119 **4 Claims**



1. An automatic valve comprising;

a body including

a fluid inlet for receiving incoming fluid,

an intermediate portion connected to said fluid inlet and,

two separate fluid outlets connected to said intermediate portion for alternately distributing the fluid, each of said outlets including valve seats,

a fluid control mechanism connected in said intermediate portion, said fluid control mechanism including

an actuating means connected in said inlet and reciprocally moveable during each cycle of incoming fluid that enters said inlet, the incoming fluid cycle begins with the initial entry of fluid, continues through the fluid flow, and ends with the termination of the fluid flow into said inlet, and

a cycling means connected to said actuating means and driven through one half of the distribution cycle by said actuating means during each incoming fluid cycle,

a drive arm connected between said actuating means and said cycling means,

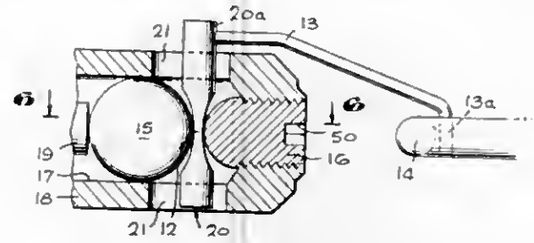
a moveable valve gating means connected in said body in a normally neutral position with both outlets open, said valve gating means connected to said cycling drive means and driven by said cycling drive means for movement of said valve gating means alternately into and out of engagement with said valve seats to open one fluid outlet and close the other fluid outlet during the first half cycle, and to close the second outlet and open the first outlet during the second half cycle, said cycling means includes a cam means and a pivotable base member for relative movement between said cam means and said base member, said drive arm contacts said cam means to drive said base member for driving said valve gating means from a neutral position to open one outlet and close the other outlet and to cock said cam means into another position to receive said drive arm from the neutral position to drive said base member during the next half-cycle, said cycling means includes a biasing means to move said base member and said valve gating means back into a neutral position.

4,029,120

LINKAGE FOR THE DEMAND REGULATOR OF A BREATHING APPARATUS

Raymond A. Christianson, P.O. Box 1513, Manhattan Beach, Calif. 90266

Division of Ser. No. 508,580, Sept. 23, 1974, abandoned. This application June 30, 1975, Ser. No. 591,711
Int. Cl.² F16K *31/12*
U.S. Cl. 137—494 **13 Claims**



10. In a demand regulator for a breathing apparatus, the improvement comprising;

a flow valve for controlling the flow of breathable gas from a source to a mouthpiece, said flow valve having a control element extending therefrom, and

a diaphragm for sensing inhalation demand, and

a linkage between said diaphragm and said flow valve control element, said linkage comprising;

a first, relatively movable member having a arcuate surface, said control element being moved by said first member,

a second, relatively fixed member having an arcuate surface facing the arcuate surface of said first member, and

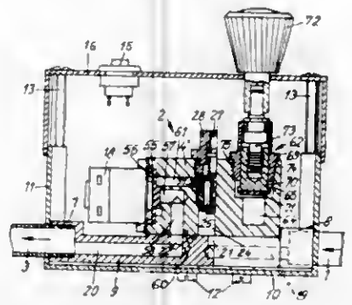
a lever situated between said two arcuate surfaces and linked to said diaphragm so that displacement of said diaphragm causes said lever to pivot about said arcuate surfaces, thereby moving said first member and imparting movement to said control element to operate said flow valve.

4,029,121

VALVE CONSTRUCTION FOR CONTROLLING A LIQUID SUPPLY TO ONE OR MORE DISCHARGE POINTS

Gunter Buzzi, Schiltach, Schwargwold, Germany, assignor to Fa.Hans Grohe KG., Germany

Filed Sept. 2, 1975, Ser. No. 609,484
Claims priority, application Germany, Sept. 5, 1974, 2442482
Int. Cl.² F16K *19/00*
U.S. Cl. 137—545 **9 Claims**



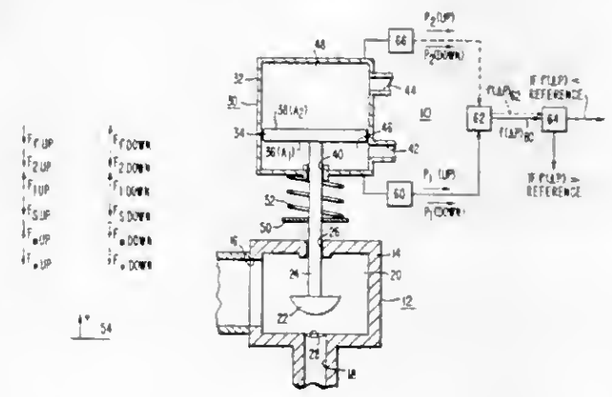
1. A valve arrangement for controlling the water supply to at least one discharge line, comprising housing means having an inlet passage, at least one discharge passage spaced from said inlet passage and having a flow control chamber between and in communication with said inlet and discharge passages, a closure member movable in said control chamber having relatively fixed respective opposite spaced apart closing surfaces adjacent respective ends thereof, guide ring means in said control chamber for said closure member defining oppositely directed axially spaced seat surfaces, a tubular screen coaxial with and surrounding a portion of said closure member, an electromagnetic valve flow passage connected between said control chamber and said discharge passage, said closure member defining with the interior said flow control chamber, when the closing surfaces are not engaged on said seat surfaces; a flow passage from said inlet passage around one of said closing surfaces through said screen to said electromagnetic flow passage, a screw cap coaxial with said screen and said closure member and engaged with said housing and closing one end of said flow control chamber and holding said screen in said flow control chamber, and a set screw coaxially threaded to said screw cap and being adjustably engageable with said closure member.

4,029,122

APPARATUS AND METHOD FOR DETERMINING FRICTION FORCES IN POSITION MODULATED VALVES

Karl O. Jaegtnes, Chester Heights, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 11, 1976, Ser. No. 665,822
Int. Cl.² F16K *37/00*
U.S. Cl. 137—551 **4 Claims**



2. In a valve for modulating the flow of a fluid having a casing, an inlet and an outlet therein, a valve plug movable from open to seated position movably mounted relative to said casing on a valve stem, said stem extending through said casing and pressurized actuator means connected to the stem for moving the valve plug, wherein said improvement comprises a device for indicating whether the friction force generated between said valve stem and said casing exceeds a predetermined value, said device comprising:

first means for generating a first signal proportional to the magnitude of a pressure force required by said actuator to move said stem a first predetermined distance in a first direction,

second means for generating a second signal proportional to the magnitude of a pressure force required by said actuator to move said stem a second predetermined distance in a second direction opposite to said first direction,

means for generating a third signal proportional to the difference between said first and second signals and functionally related to said friction force, and,

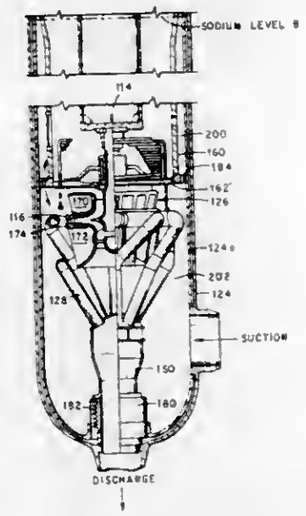
means for comparing the third signal functionally related to the friction force to a predetermined reference signal.

4,029,123

PUMP TANK DIVIDER PLATE FOR SUMP SUCTION SODIUM PUMPS

John A. George, Greensburg, and Donald R. Nixon, Murrysville, both of Pa., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Aug. 20, 1975, Ser. No. 606,043
Int. Cl.² F04D 9/02, 13/16
U.S. Cl. 137—565 4 Claims



3. In a liquid pumping system comprising:
an enclosed, elongated, vertically oriented pump tank provided with a liquid inlet passageway; and
a centrifugal sump suction pump mounted within said pump tank, said pump having a discharge passageway extending outside said tank, and a suction inlet communicating with the interior of said pump tank, the improvement comprising means dividing the interior of said pump tank into an upper zone and a lower zone, said means positioned above said suction inlet ad adapted to restrict fluid flow between said upper and lower zones, and said liquid inlet passageway to said pump tank being in fluid communication with said lower zone.

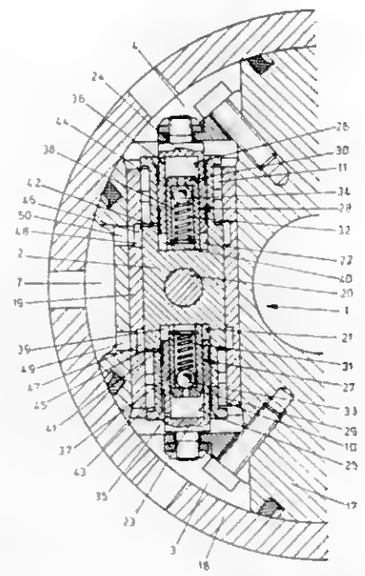
4,029,124

POWER STEERING CONTROL VALVE

Manfred Keller, Schwaebisch Gmuend, and Dieter Elser, Boegingen, both of Germany, assignors to Zahnradfabrik Friedrichshafen AG, Friedrichshafen, Germany

Filed May 9, 1975, Ser. No. 576,147
Int. Cl.² F15B 13/14
U.S. Cl. 137—596.12 12 Claims

1. A power steering control valve for servopump and double acting servomotor systems, comprising:
a piston valve (2) and means (20) for manually and bidirectionally shifting said piston valve under control of a vehicle driver;
a housing means (17, 18, 19) for said piston valve;
said piston valve having ends and said piston valve and housing means having relatively high pressure inlet means (4) wherein the ends of said piston valve are constantly exposed to inlet pressure;
said piston valve and housing means having relatively low outlet pressure return means (7) and having coacting flow control and return passage elements (47, 49) (48, 50) including passages (12, 13) whereby a shifted position of said piston valve in a respective direction directs high inlet pressure to a respective chamber of a double acting servomotor cylinder while exhausting low outlet pressure from the opposite chamber;
means defining reaction chambers (39, 40) at each end of said piston valve;
said reaction chambers having respective relief valves (27, 28) (327, 328) constantly exposed to inlet pressure and openable at a predetermined rise in inlet pressure;
means (4, 7, 10, 11, 41, 42, 51, 52, 55, 56) whereby said piston valve in shifted position is subjected to opposing pressures in said reaction chambers to effect steering resistance by unbalance of forces on said piston valve;
said means comprising passages (41, 42, 51, 52) for inlet and outlet pressure flow to said reaction chambers to effect said unbalance of forces in said shifted position of said piston valve by mixing of inlet and outlet pressures in



either reaction chamber acting against said piston valve at one end upon opening of the respective relief valve, to act against opposed inlet pressure in the other reaction chamber acting against the other end of said piston valve;
said passages (41, 42, 51, 52) comprising for each reaction chamber a restricted bore communicating between said inlet means and said reaction chamber and also having a restricted bore communicating between said reaction chamber and said return means, said bores effecting flow throttle passages.

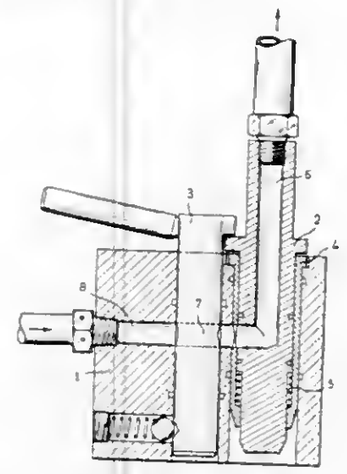
4,029,125

SNAP-FITTING PIPE CONNECTING DEVICE

Guy Steydle, and Bernard Poisson, both of Boulogne-Billancourt, France, assignors to Regie Nationale des Usines Renault, Hauts de Seine and Automobiles Peugeot, Paris, both of France

Filed Mar. 4, 1975, Ser. No. 555,105
Claims priority, application France, Mar. 6, 1974, 74.07600; Feb. 3, 1975, 75.03216
Int. Cl.² F16L 29/00
U.S. Cl. 137—614.06 2 Claims

1. A snap-fitting pipe connecting device especially usahle for directing high pressure fluids, said device comprising:
a body having an inlet fluid passage and a cavity arranged perpendicularly and being adapted to be secured to a machine structure;
a connecting member having a fluid passage formed therein and adapted to be inserted into said cavity in said body;
said fluid passage in said connecting member comprising a main section coaxial to said connecting member and a short radial section directed at right angles to said main section and arranged such that upon insertion of said connector into said cavity said radial section is axially aligned with and in communication with said inlet fluid passage whereby upon directing a fluid into said inlet fluid passage no force is exerted in a direction tending to expel said connector from said cavity;
locking means consisting of a socket adapted to slide on the outer surface of said connecting member, spring means for urging said socket, whereby when said connecting member is disconnected from said body into a release position, said socket is moved to a position in which the fluid passage in said connecting member is sealed and when said connecting member is inserted into said cavity in a lock position said socket is moved to a position to permit fluid flow from said inlet fluid passage to said axially aligned radial section; and



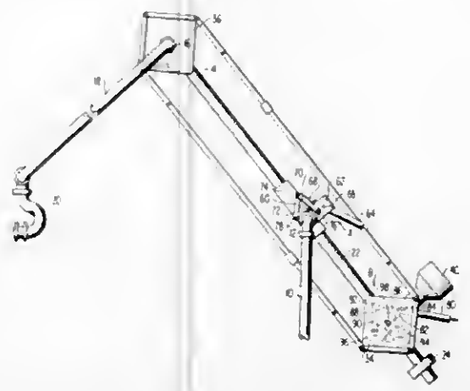
a rotatable bolt having a fluid passage therein and secured to said body for valving said inlet fluid passage and adapted to lock said connecting member in said lock position and to permit fluid flow through said inlet fluid passage and rotatable to a release position corresponding to said connecting member release position wherein said inlet fluid passage is closed.

4,029,126

ARM DRIVING DEVICE FOR FLUID LOADING APPARATUS

Nobuto Miyazaki, and Tadaya Tokahashl, both of Kanagawa, Japan, assignors to Nigata Engineering Co., Ltd., Tokyo, Japan

Filed Jan. 19, 1976, Ser. No. 650,403
Claims priority, application Japan, Mar. 14, 1975, 50-34424; June 5, 1975, 50-76340
Int. Cl.² B67D 5/00
U.S. Cl. 137—615 5 Claims



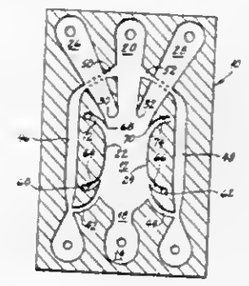
1. In a fluid loading apparatus, comprising a hollow inboard arm having one end connected for rotation in three-dimensions to a hollow stand pipe implanted on land and having an extension member to form an inner balance arm, a hollow outboard arm connected at one end thereof to the other end of said inboard arm for rotation in a vertical plane with respect thereto and having at the other end thereof a three dimensionally rotatable joint, an outer balance means and an operation means for controlling the angle between said inboard arm and said stand pipe, an improvement characterized in that said operation means comprises a first hydraulic cylinder supported rotatably by said inboard arm and having a piston rod; and a first V-link comprised of a pair of first and second link arms connected rotatably with each other at one end thereof, said first hydraulic chamber cylinder having a projecting end of said piston rod rotatably connected to a suitable portion of said link arms, the other end of said first link arm being connected rotatably to a suitable portion of said inboard arm, and the other end of said second link arm being connected rotatably to said stand pipe.

4,029,127

FLUIDIC PROPORTIONAL AMPLIFIER

Raymond V. Thompson, Simsbury, Conn., assignor to Chandler Evans Inc., West Hartford, Conn.

Continuation of Ser. No. 1,147, Jan. 7, 1970, abandoned. This application Apr. 27, 1972, Ser. No. 248,330
Int. Cl.² F15C 1/14
U.S. Cl. 137—806 10 Claims



1. A fluidic device comprising:
a reaction chamber, said chamber having first and second ends and being defined by side walls;
means for establishing a stream of a first fluid across said reaction chamber from a first end thereof;
at least a pair of outlet ports positioned in said second end of said reaction chamber to receive said first fluid stream;
fluid collecting means associated with each of said outlet ports;
conduit means coupling each of said outlet ports to its respective collecting means;
means for establishing a control flow of a second fluid, said control flow establishing means communicating with at least a first side wall of said reaction chamber, said second fluid being dissimilar to said first flow and being withdrawn from the region between said stream of first fluid and reaction chamber wall whereby a variable transverse pressure differential is created and the position of said stream of first fluid with relation to said outlet ports is regulated; and
means for establishing a fluid curtain across at least one of said conduit means.

4,029,128

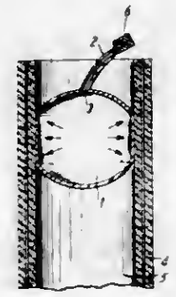
DEVICE FOR PLUGGING A HOLLOW OF A CONCRETE PILE

Shigeharu Yamagishl, No. 296, Nakakawahara, Namerikawa, Toyama, Japan

Continuation of Ser. No. 495,311, Aug. 7, 1974, abandoned. This application July 7, 1975, Ser. No. 593,190
Claims priority, application Japan, Aug. 10, 1973, 48-90187
Int. Cl.² F16L 15/10
U.S. Cl. 138—89 1 Claim

1. A method for plugging the center of a vertical hollow concrete pile driven into the ground comprising introducing into the hollow pile an air bag made of a flexible material impervious to air, inflating said bag from a source of air under pressure in an amount sufficient to force the bag into tight engagement with the interior side walls of said pile, disconnecting the bag from the source of air and closing the same while under pressure, and introducing concrete onto the top

of the pile to subject the inflated bag to the weight of the concrete to compress the confined air therein and thereby



urge the bag into tighter frictional engagement with said interior side walls during the plug formation.

4,029,129

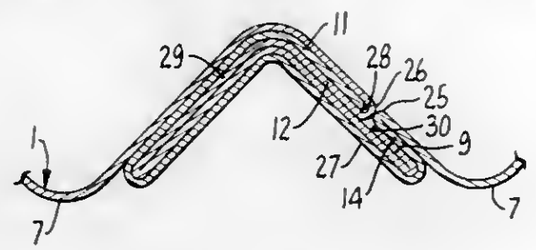
HELICAL PIPE LOCK SEAM

Laffie Harper, Box 276, San Bruno, Calif. 94066

Filed Mar. 26, 1976, Ser. No. 670,775

Int. Cl.² F16L *11/16*

U.S. Cl. 138—135 **3 Claims**



1. In a pipe formed from a helically coiled strip of ductile material having a main body connected along its longitudinally extending edges by a seam, said seam comprising:

a. first and second marginal portions respectively along and parallel with said edges having adjacent return bends at opposite sides of a plane extending between and parallel with said bends;

b. said marginal portions including flattened loops disposed at the same side of said plane, each extending from one of said bends to substantially the other, with one of said loops enclosed within the other;

c. said loops being bent along a line spaced from and parallel with said bends forming a generally V-shaped corrugation in cross sectional contour transversely of said bends with said bends positioned in one of the sides of said corrugation and with flattened portions of said loops extending across and along opposite sides of the apex of said corrugation.

4,029,130

WEFT YARN GRIPPING ELEMENT FOR LOOMS

Graziano Genini, Stabio, Switzerland, assignor to Albatex A.G., Vaduz, Liechtenstein

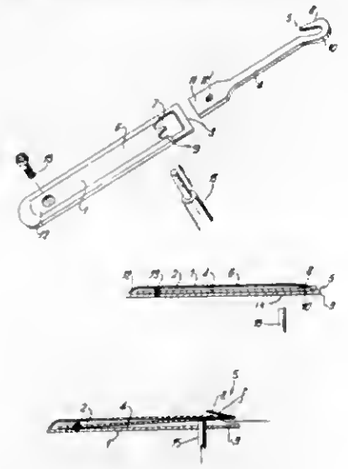
Filed Sept. 23, 1975, Ser. No. 616,060

Claims priority, application Switzerland, Sept. 23, 1974, 12833/74

Int. Cl.² D03J *5/06*

U.S. Cl. 139—196.2 **4 Claims**

1. Weft yarn gripping and transporting element comprising an elongated flat body of aerodynamic shape comprising yarn gripping means at its extremity, said yarn gripping means comprising a hooked blade resiliently urged against a lower extension of the body, said body having upper and lower parts disposed above and below said blade, respectively, said upper part at its end adjacent the hook of the blade having a recess for reception of said hook, said blade having a part by which it is connected to said hook, said upper part of said body



having therein a further recess for the reception of said connecting part.

4,029,131

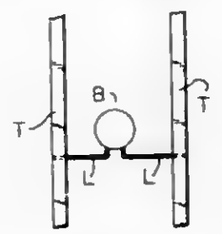
NON-AXIAL LEAD ELECTRICAL COMPONENT PREPPER-TAPER APPARATUS

Albert W. Zemek, Windsor; Robert H. Holmes, and David L. Merithew, both of Binghamton, all of N.Y., assignors to Universal Instruments Corporation, Binghamton, N.Y.

Division of Ser. No. 650,674, Jan. 20, 1976, Pat. No. 3,987,528. This application Sept. 1, 1976, Ser. No. 719,516

Int. Cl.² B21F *45/00*

U.S. Cl. 140—105 **8 Claims**



1. A device for removing non-axial lead electrical components from a manufacturing strip and forming the leads into a substantially axial lead configuration comprising:

a base;

support means mounted to said base to locate and support said manufacturing strip;

holder means slidably mounted to said base;

gripper means mounted to said holder means for engaging the leads of said electrical component and removing said electrical component from said manufacturing strip by lateral movement of said holder means;

forming means mounted to said holder means for bending the axial leads into a substantially axial lead configuration; and

drive means connected to said holder means, gripper means and forming means for causing said gripper means to engage said leads, said holder means to move laterally to remove said components from the manufacturing strips and said forming means to bend said leads.

4,029,132

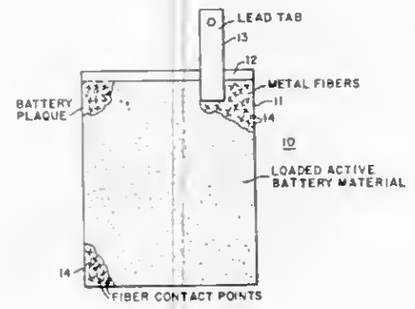
METHOD OF PREPARING HIGH CAPACITY NICKEL ELECTRODE POWDER

John F. Jackovitz, Monroeville, and Earl A. Pantier, Verona, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 24, 1976, Ser. No. 689,624

Int. Cl.² H01M *4/32, 4/52*

U.S. Cl. 141—1.1 **20 Claims**



1. A method of producing a battery electrode plate containing active battery material, comprising the steps of:

a. mixing NiO and Na_2O_2 in a weight ratio of NiO:Na_2O_2 of between about 1:1.20 to about 1:1.60 with an amount of an oxygen containing alkali metal fluxing material selected from the group consisting of alkali metal molybdates, alkali metal tungstates, alkali metal vanadates, alkali metal carbonates, alkali metal nitrates and mixtures thereof, effective to allow fuse-melting of the NiO and Na_2O_2 at temperatures of between about 650° C to about 925° C;

b. heating the mixture of NiO, Na_2O_2 and fluxing material between about 650° C to about 925° C to melt-fuse the mixture and to form $NaNiO_2$;

c. hydrolyzing the $NaNiO_2$ in water at between about 20° C to about 95° C to form active battery material;

d. maintaining the activity of the battery material by maintaining the temperature of the material below about 65° C; and

e. applying the battery material to a porous metallic plaque.

15. A method of making an active battery electrode powder, comprising the steps of:

a. mixing an admixture of nickel oxide and Na_2O_2, in a weight ratio of nickel oxide:Na_2O_2 of between about 1:1.20 to about 1:1.60 with an amount of an oxygen containing, alkali metal fluxing material selected from the group consisting of alkali metal molybdates, alkali metal tungstates, alkali metal vanadates, alkali metal carbonates, alkali metal nitrates and mixtures thereof, effective to allow fuse-melting of the nickel oxide and Na_2O_2 at temperatures between about 650° C to about 925° C;

b. heating the admixture at a reaction temperature of between about 650° C to about 925° C, to melt-fuse the admixture and form a reaction product comprising $NaNiO_2$; and

c. hydrolyzing the reaction product comprising $NaNiO_2$ in water at between 20° C to about 95° C, forming a battery material comprising Ni hydroxide forms.

4,029,133

PROCESS FOR MECHANICALLY EMPTYING POWDERY SUBSTANCES INTO A CONTAINER, AND DEVICE FOR CARRYING OUT THE PROCESS

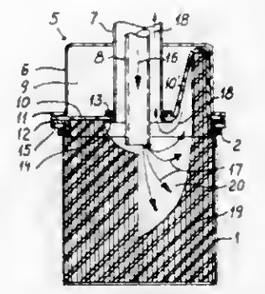
Robert Rottermann, Adliswil, and Marcel Rottermann, Gattikon, both of Switzerland, assignors to Gericke AG, Maschinenfabrik, Regensdorf, Switzerland

Filed Oct. 17, 1975, Ser. No. 623,365

Claims priority, application Switzerland, Nov. 26, 1974, 15660/74

Int. Cl.² B65B *1/24*

U.S. Cl. 141—12 **6 Claims**



1. A process for mechanically emptying powdery substances into a rotating container wherein the filling space rotates during the filling process, characterized by the steps of:

introducing said substance in an amount corresponding to the nominal volume of the container into a filling space;

simultaneously enlarging said filling space by an additional volume, during rotation of said container in comparison with the nominal volume of the container; and

subsequently compressing said amount of said substance into the container by reducing said filling space by said additional volume.

4,029,134

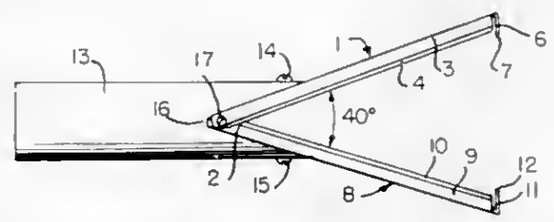
DEVICE FOR REMOVING CIRCUMFERENTIALLY BARK FROM PLANTS

Ralph M. Cook, deceased, late of Hialeah; Ruth Nelson, Personal Representative of the Estate Cook, 6060 W. 10th Ave., Hialeah, Fla. 33012, and Don T. Roach, 951 E. 33rd St., Hialeah, Fla. 33013

Filed Feb. 3, 1976, Ser. No. 654,778

Int. Cl.² B27L *1/00*

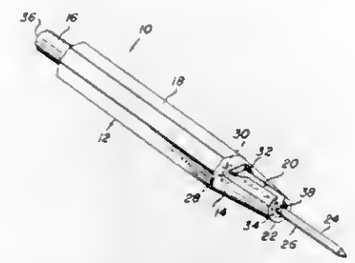
U.S. Cl. 144—208 C **4 Claims**



1. A hand operable device for circumferentially removing a secion of bark from plants, characterized by an upper and a lower jaw, said jaws being jointed at one end forming an angle at its base therebetween sufficiently large to permit the introduction of the plant with bark thereon between the jaws, the upper and lower jaws respectfully having a substantially flat roof portion and flat floor portion, the said jaws each having parallel blades extending approximately vertical toward one another from the roof and the floor of the respective jaws, said blades each having a cutting edge, the outer extremity of the upper jaws having a blade with a cutting edge extending the width between its said parallel blades and downwardly at a slight inward angle to a distance beyond the width of the parallel blades of that jaw being, the joined end of the jaws attached to a handle and affixed firmly thereto, the device

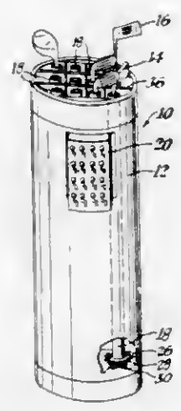
being rotatable around the circumference of the plant being treated.

4,029,135
NAIL DRIVING TOOL
George H. Searfoss, Jr., 14121 Franklin St., Woodbridge, Va. 22191
Filed Oct. 24, 1975, Ser. No. 625,872
Int. Cl.² B25C *3/00*
U.S. Cl. 145—46 16 Claims



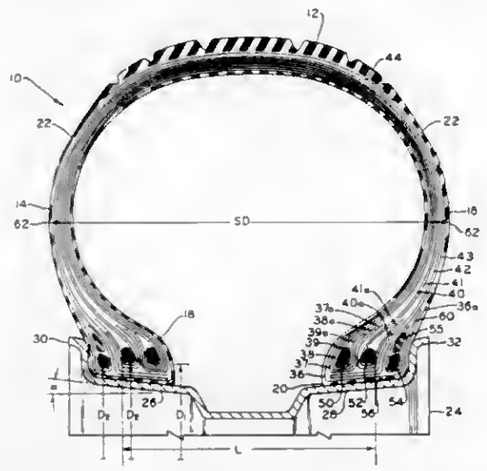
1. A nail driving tool comprising:
an elongated driving member including a rear end portion having a striking surface substantially perpendicular to the longitudinal axis of said member,
a transverse notch in said member near the forward end thereof,
an axial recess in said member rearwardly of said notch and contiguous thereto, said recess extending rearwardly along the longitudinal axis of said member,
said recess and said notch being dimensioned to receive the head of a nail,
said recess including a nail impacting surface substantially parallel to said striking surface,
a longitudinal slot in the forward portion of said member contiguous to said notch and extending to said forward end of said member,
said slot being narrower than said recess and dimensioned to receive the shank of a nail,
a nail fulcrum within said slot forwardly of said notch,
said nail fulcrum, said nail impacting surface and said striking surface being substantially collinear.

4,029,136
SELECTIVE GOLF CLUB DISPENSER
Raymond C. Jacoby, 299 SW. 7th Ave., Royal Oak Hills, Boca Raton, Fla. 33432
Filed Feb. 9, 1976, Ser. No. 656,379
Int. Cl.² A63B *55/00*
U.S. Cl. 150—1.5 R 5 Claims



1. A golf club receptacle having an individual club selector for selective positioning of a particular club within the receptacle comprising:
a golf club receptacle having an open end;
at least one individual club receiving means disposed in said receptacle;
selective club positioning means connected to said receptacle and said club receiving means for moving a particular club receiving means from a first position to a second position;
said selective club positioning means for moving said club receiving means includes a selector panel having indicia representative of individual golf clubs, and individual movement actuating means connected to said panel and said club receiving means.

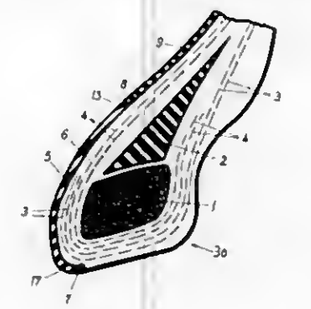
4,029,137
PNEUMATIC TIRE
Robert D. Suydam, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohin
Filed Dec. 15, 1975, Ser. No. 640,596
Int. Cl.² B60C *15/04, 15/06, 9/02*
U.S. Cl. 152—362 R 6 Claims

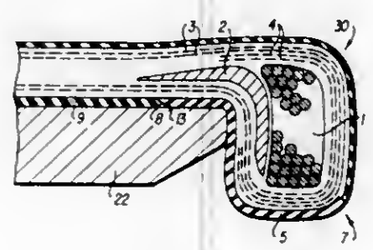


1. In an aircraft tire comprising a tread portion, a pair of sidewall portions, a pair of spaced-apart bead portions each having an axially outwardly facing flange engaging surface, a plurality of carcass plies extending circumferentially about the tire from bead portion to bead portion, and at least three inextensible bead cores disposed side-by-side in each bead portion and spaced-apart axially, the improvement comprising: at least one carcass ply wrapped around, and anchoring to said tire, each of the bead cores other than the axially outermost bead cores closest said flange engaging surfaces, the radially innermost carcass ply being wrapped around the bead cores of each bead portion and the carcass plies anchoring the bead cores other than the axially outermost bead cores, said innermost carcass ply extending from the axially outermost bead cores radially outwardly beyond the flange engaging surfaces and terminating short of the point of maximum axial width of said tire to hold the bead cores of each bead portion together and the axially outermost bead cores to said tire.

4,029,138
TIRE BLANK FOR A VEHICLE TIRE WITH TIRE BEAD PLY MEANS AND IMPROVED VEHICLE TIRE FORMED THEREFROM
Erich Kresta, Perchtoldsdorf, Austria, assignor to Semperit Aktiengesellschaft, Vienna, Austria
Division of Ser. No. 304,208, Nov. 6, 1972, Pat. No. 3,878,013. This application Jan. 20, 1975, Ser. No. 542,275
Claims priority, application Austria, Nov. 10, 1971, 9717/71
The portion of the term of this patent subsequent to Apr. 15, 1993, has been disclaimed.
Int. Cl.² B60C *15/06*
U.S. Cl. 152—362 R 14 Claims

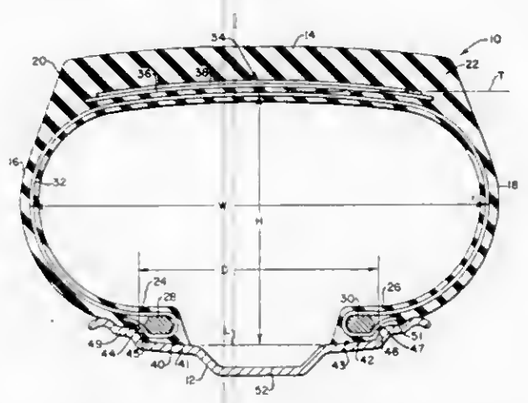
1. A tire blank for a vehicle tire comprising two tire bead portions, carcass means for interconnecting the tire bead portions, an inner plate bearing against the carcass means at the inner surface of the tire, a respective ply arranged at the inner surface of the tire at each tire bead portion, each ply being arranged to confront a tire build-up drum and being formed of a rubber mixture which is selectively harder than





either the rubber mixture employed at the other regions of the tire bead portions or the inner plate, or both, in order to reinforce confronting regions of the tire beads and to at least minimize the danger of damage at such tire bead regions during bellowless vulcanization of the tire blank.

4,029,139
TIRE AND RIM ASSEMBLY
John R. Abbott, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed Jan. 5, 1976, Ser. No. 646,715
Int. Cl.² B60C *15/02*
U.S. Cl. 152—379.1 11 Claims

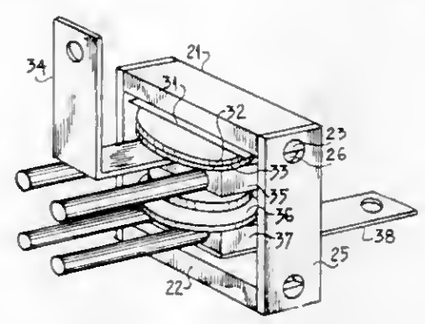


1. In a radial ply pneumatic tire and rim assembly;
a. a rim including a pair of spaced annular bead seat surfaces, a first annular register surface extending generally radially outwardly from the axially outer edge of each bead seat surface, and an annular stabilizer flange surface extending generally axially outwardly from the radially outer edge of each said first annular register surface;
b. a pneumatic tire of the open-bellied type having a tread portion, a pair of sidewall portions, a pair of axially spaced apart bead portions each having an annular inextensible bead core, a carcass structure of inextensible cords extending continuously from one bead core to the other bead core and having a neutral contour line, and a circumferentially extending belt structure disposed circumferentially about said carcass ply; and
c. a second annular register surface extending from the axially outer edge of said stabilizer flange surface and having an arcuate configuration such that the spacing between said carcass structure and the rim is substantially constant in the area of the stabilizer flange surface and is less in the area of the second bead register surface than in the area of the stabilizer flange surface.

4,029,140
METHOD OF AND MEANS FOR OBTAINING WHITE CAST IRON
William Simmons, Birmingham, England, assignor to The British Cast Iron Research Association, Birmingham, England
Filed Feb. 10, 1976, Ser. No. 656,872
Claims priority, application United Kingdom, Apr. 1, 1975, 13141/75; May 14, 1975, 20454/75
Int. Cl.² B22D *27/20*
U.S. Cl. 164—72 10 Claims

1. A method of making an iron casting containing at least a region of white iron comprising coating at least a portion of the internal surface of a mold with a material containing a white-iron-promoting material selected from the class consisting of tellurium and bismuth and compounds thereof and containing in addition a mineral substance which contains water in a loosely chemically combined form, said water being bound sufficiently tightly within said mineral substance to withstand drying heat of said mold but capable of being liberated from said mineral substance at the temperature of the molten iron, drying said coating, and pouring molten iron into said mold whereby said water is liberated to produce at least a region of white iron.

4,029,141
COOLING DEVICE FOR COMPONENTS WHICH DISSIPATE LARGE AMOUNTS OF HEAT
Alain Ferrari, and Vito Suppa, both of Paris, France, assignors to Thomson-CSF, Paris, France
Filed Dec. 15, 1975, Ser. No. 640,912
Claims priority, application France, Dec. 17, 1974, 74.41523
Int. Cl.² F28F *3/08*
U.S. Cl. 165—80 2 Claims



1. A forced flow liquid heatsink assembly for cooling electrical components which dissipate large amounts of heat, comprising in a stacked relation:
a first horizontally disposed holding cross-piece (22);
an electrical current conducting lug (38) supported upon said first cross-piece;
a first cooling device (37) supported upon said conducting lug and having defined therein a heatsink which comprises inlet (3) and outlet (4) duct means for fluidically conducting a forced flow liquid coolant into and out of a first heatsink cooling chamber (6) which has an opening (5) defined within the top portion thereof;

at least one electrical component (36) of a press-pack type supported upon said first cooling device, the base or lower surface of said electrical component closing the opening (5) of said chamber and therefore being in direct contact with the liquid coolant within said first chamber;

a second cooling devide (35) supported upon the upper surface of said first electrical component and having defined therein a heatsink which comprises inlet (3) and outlet (4) duct means for fluidically conducting a forced flow liquid coolant into and out of a second heatsink cooling chamber (6) which has an opening (5) defined within the lower portion thereof, the upper surface of said electrical component closing said opening of said chamber of said second cooling device and therefore being in direct contact with the liquid coolant within said second chamber;

a second conductive supply lug (34) operatively connected to said second cooling device;

an assembly comprising a deformably resilient metal disc (33) cooperating with a pressure disc (32) and an insulating plate (31) supported upon said supply lug for imparting a spring-type biasing force to said stacked elements;

a second horizontally disposed holding cross-piece (21) disposed in contact with and supported upon the assembly formed by said resilient and pressure discs and said insulating plate;

the two cross-pieces at the opposite ends of the thus formed stack being assembled and held together by two vertically disposed ties (24, 25);

said cross-pieces being provided with stud members integrally provided therewith and projecting laterally from the opposite ends thereof; and

said tie pieces are provided with apertures within the upper and lower ends thereof which are adapted to mate with said stud members of said cross-pieces;

whereby said tie and crosspiece members form a simple collapsible framework for said heatsink assembly with the stacked components thereof compressedly restrained between said cross-pieces, and said stud members likewise compressedly maintained within said apertures of said tie members under the biasing force of said deformable resilient metal disc.

4,029,142

HEAT EXCHANGER

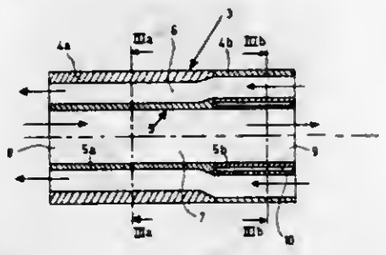
Henricus Cornelis Johannes Van Beukering, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 19, 1975, Ser. No. 633,216

Claims priority, application Netherlands, Feb. 4, 1975, 7501273

Int. Cl.² F28D *15/00*

U.S. Cl. 165—105 **3 Claims**



1. A heat exchanger, particularly suitable as a preheater for hot-gas engines, hot gas turbines and the like, comprising two series connected sections each comprising at least one hollow tubular member defining a duct through which a flue gas to be cooled can flow, a flue gas inlet connected to one end of said member in one of said sections, a flue gas outlet connected to the other end of said member in the other of said sections, at least one tube defining a duct through which a medium to be heated can flow, heat-transmitting partitions separating the flue gas duct and the medium duct, the partitions of the section the flue gas duct of which connects to the flue gas outlet being of a double-walled construction defining intermediate spaces there between, and a vaporizable heat transport medium in said intermediate spaces for isothermalizing said partitions in the flow direction during operation by way of an evaporation/condensation cycle.

4,029,143

POLYMERIZATION REACTOR WITH GILLED-TUBE RADIATOR AND AXIAL AGITATOR

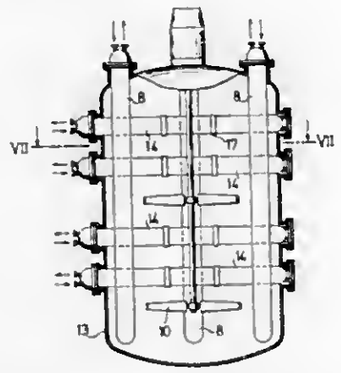
Paul Goebel, Altona, Australia, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Aug. 27, 1975, Ser. No. 608,258

Claims priority, application Germany, Aug. 29, 1974, 2441302; Feb. 6, 1975, 2504926

Int. Cl.² F28F *13/12*

U.S. Cl. 165—109 **4 Claims**



1. A polymerization reactor comprising, in combination, a hollow reaction vessel having top, bottom and side walls, axial agitator means for circulating polymerization products in the reactor along a flow path which ascends along said side walls from said bottom wall to said top wall and descends from said top wall towards said bottom wall in the central portion of the reaction vessel, and a plurality of separate internal cooling units mounted on the top wall of said vessel in a predetermined, uniform array near the side walls of the vessel and extending downwardly from said top wall towards said bottom wall, each of said cooling units including a header mounted on said top wall, defining separate inlet and outlet chambers, a plurality of hollow generally U-shaped heat transfer tubes each of which has a pair of generally parallely extending legs respectively connected in communication with said inlet and outlet chambers and a bight portion connecting the legs and being located near said bottom wall, a plurality of separate metal plates connecting the legs of said tubes to each other and to the legs of other tubes in the unit and to other plates, said plates maintaining a predetermined spacing between said tubes and interrupting flow about said tubes to enhance mixing and cooling, and a plurality of cooling units mounted on the side wall of the vessel and extending horizontally through said vessel transversely to the vertically extending cooling units.

4,029,144

HEAT EXCHANGER ASSEMBLIES

Peter John Harris, Birmingham, England, assignor to GKN Birwelco Limited, Birmingham, England

Filed Dec. 6, 1974, Ser. No. 530,387

Claims priority, application United Kingdom, Dec. 8, 1973, 57002/73

Int. Cl.² F28B *1/06*

U.S. Cl. 165—124 **8 Claims**

1. A cooling tower assembly, comprising a tower having a chimney part and apertured support means between the lower end of the chimney part and the ground, and a heat-exchanger assembly within the lower part of the tower and spaced above the ground, the plan area of the lower part of the tower being bounded by a curved outer periphery, the heat exchanger assembly comprising a plurality of finned tubes, the tubes being grouped together in banks, each bank comprising a plurality of parallel tubes arranged side by side with their ends received in headers, the banks being arranged in side-by-side pairs so that each pair forms a V-frame or A-frame with the banks diverging upwardly or downwardly from the apex of the V or A and with the tubes of each bank having their longitudinal axes running parallel to the apex of the frame, wherein the apex of each frame lies in a plane of a set of parallel planes, and wherein the banks of which the heat exchanger assembly is essentially comprised are of different lengths but are otherwise substantially identical, such banks being arranged within said plan area to fill a major part thereof and so that the outer periphery of the plan area of the heat exchanger assembly is bounded by two sets of parallel lines, the lines of one set being perpendicular to the lines of the other set, each set having at least six lines, the support means and the heat exchanger assembly being arranged so that air can pass through the support means and through the heat exchanger assembly from beneath the assembly into the tower.

4,029,145

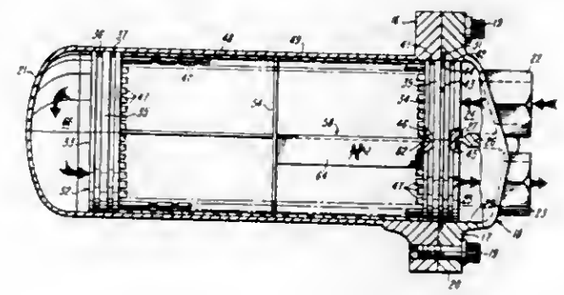
BRAZELESS HEAT EXCHANGER OF THE TUBE AND SHELL TYPE

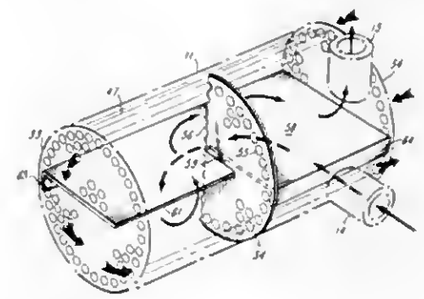
Robert R. Pfouts, Dayton; Thomas E. Earl, and Charles B. Mort, both of Findlay, all of Ohio, assignors to United Aircraft Products, Inc., Dayton, Ohio

Filed Mar. 5, 1976, Ser. No. 664,397

Int. Cl.² F28F *9/22*

U.S. Cl. 165—161 **12 Claims**





1. A brazeless heat exchanger of the tube and shell type, including

a. a tubular shell,

b. spaced apart apertured headers in said shell,

c. resilient O-ring means in peripherally encircling relation to said headers and in a sealing contacting relation to an inner wall of said shell,

d. heat exchange tubes positioning longitudinally in said shell and having their ends received in apertures in said headers,

e. said tubes forming a tube assembly peripherally spaced from the said inner wall of said shell to be substantially unsupported thereby and said tube assembly and said headers forming a core unit,

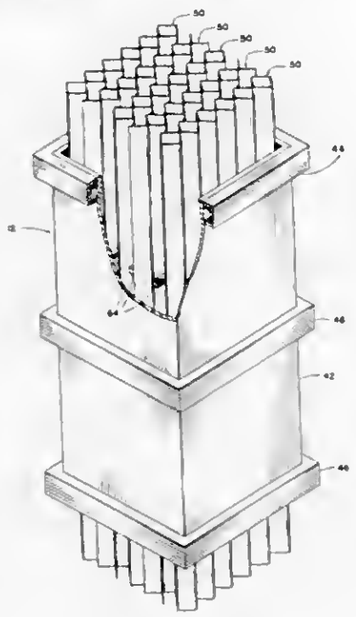
f. a seal by-pass member in an encircling relation to said tube assembly and occupying the space between said tube assembly and the said inner wall of said shell in substantially mutually contacting relation to said inner wall and to at least some of the peripherally positioning tubes of the tube assembly,

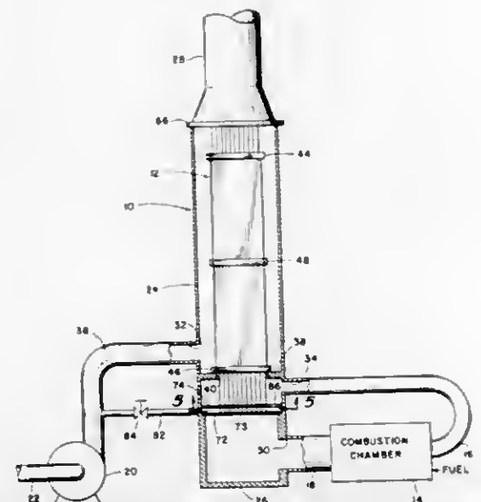
g. said seal by-pass member being made of a flexible yielding material cooperating with said O-ring means in a cushioning of the core unit, inlet and outlet ports in said shell for a first fluid and positioning between said headers whereby said first fluid entering said shell by way of said inlet port may flow over and around said tubes and exit by way of said outlet port, said O-ring means inhibiting the escape of said first fluid over the periphery of said headers and said seal by-pass member inhibiting by-passing flow of said first fluid around said tube assembly,

j. and baffle means installed in said core unit anchoring said seal bypass member to said core unit and guiding said first fluid in its flow between said inlet and said outlet for advantageous use of available heat transfer surface in said tube assembly,

k. another fluid flowing through said tubes and being in heat transfer relation through the tube walls with said first fluid.

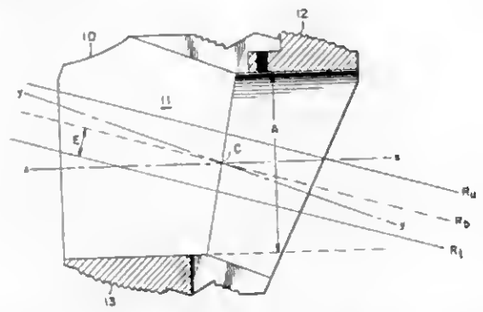
4,029,146
CORRUGATED SHEET HEAT EXCHANGER
Wallace F. Hart, and Ralph A. Koenig, both of Tulsa, Okla., assignors to John Zink Company, Tulsa, Okla.
Continuation of Ser. No. 457,065, April 1, 1974, abandoned. This application July 18, 1975, Ser. No. 596,984
Int. Cl.² F28F 3/08
U.S. Cl. 165—166 6 Claims





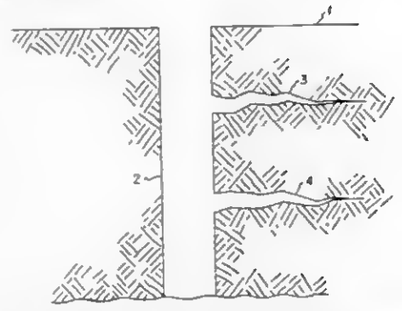
1. A counter-flow heat exchanger for effecting heat transfer between longitudinally flowing first low pressure gas of one temperature and second, relatively higher pressure gases at another temperature comprising:
a longitudinal rectangular elongated housing;
a plurality of elongated fluid channel units disposed within the housing and extending beyond the ends of said housing, each said channel unit comprising spaced first pair and a second pair of elongated corrugated plates, each of said plates corrugated transversely to said elongated housing in an oscillatory wave pattern having symmetrical peaks and valleys of constant period, the plates of each pair positioned so that the peaks of one plate unconnectably abut the peaks of the other to create a plurality of distinct longitudinal straight flow passageways through the space created between said valleys for said first gas, said first pair of plates being spaced from said second pair of plates by straight transverse separator rods and said first pair of plates displaced from said second pair of plates 180 degrees out of phase with said wave pattern to create longitudinal counter flow channels on each side of each pair for said second gas;
a tube sheet secured at each end of said channel units closing the ends of said longitudinal flow channels and having a plurality of apertures therethrough to permit inlet and outlet of said first gas through said flow passageways;
an annular inlet housing means to communicate said second gas with the space between one of said tube sheets and one end of said elongated housing, and to flow said second gas through said longitudinal flow channels; and
an annular outlet housing means between the other of said tube sheets and the other end of said elongated housing from which said second gas is withdrawn.

4,029,147
GRIPPING MEMBER FOR WELL PACKER
Marion Barney Jett, Dallas, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.
Filed Oct. 23, 1975, Ser. No. 625,355
Int. Cl.² E21B 23/00
U.S. Cl. 166—217 5 Claims



1. A unitary tubular gripping member having an intersecting-axis bore passage therethrough and exterior gripping means thereon, said gripping means further comprising a plurality of angular teeth having a curved tooth profile, with said teeth having varying face angles according to their angular displacement from the axis intersection of said bore passage.

4,029,148
WELL FRACTURING METHOD
Leonard W. Emery, Plano, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.
Filed Sept. 13, 1976, Ser. No. 722,452
Int. Cl.² E21B 43/26, 47/10
U.S. Cl. 166—254 4 Claims



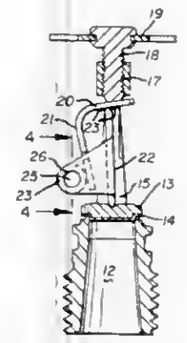
1. In a well fracturing method wherein a plurality of solid particles are employed as propping agent, the improvement comprising the employing color-coded propping agent particles so that if propping particles are subsequently produced out of one or more propped fractures the recovery of such propping particles at the earth's surface gives an indication because of said color-coding as to the nature of the problem in the fractured area.

4,029,149
PROPPING SUBTERRANEAN FORMATION FRACTURES
Larry F. Perkins, Duncan Falls, Ohio, assignor to Halliburton Company, Duncan, Okla.
Filed July 11, 1975, Ser. No. 594,994
Int. Cl.² E21B 43/26
U.S. Cl. 166—280 9 Claims

1. A method of fracture stimulating a subterranean formation penetrated by a well bore comprising the steps of:

a. introducing a highly viscous fluid into said formation at a rate sufficient to create and extend one or more fractures therein;
b. introducing at least one slug of a hardenable liquid into said formation;
c. introducing additional highly visous fluid into said formation so that said slug of hardenable liquid is carried into and held in said fractures in said formation;
d. terminating the introducing of said highly viscous fluid so that said fractures are held open while said slug of hardenable liquid is permitted to set thereby propping said fractures; and
e. recovering said highly viscous fluid from said formation.

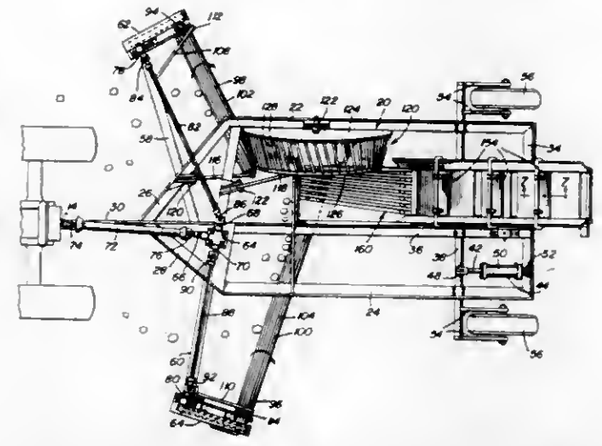
4,029,150
SPRINKLER
Earl M. Goodsell, Jr., Hudson, Ohio, assignor to A-T-O Inc., Willoughby, Ohio
Filed Mar. 5, 1976, Ser. No. 664,187
Int. Cl.² A62C 37/08
U.S. Cl. 169—39 7 Claims



1. A sprinkler comprising a body member having a fluid delivery passageway therethrough, oppositely disposed arms on said body member forming a frame outwardly of said fluid passageway and joined at their outer ends, a compression fitting positioned through a secondary passageway in said joined arms on the axial center line of said fluid delivery passageway, a deflector on said compression fitting and a closure on said fluid delivery passageway, an assembly comprising an inverted L-shaped lever having a substantially horizontal portion and a substantially vertical portion and a straight strut, said assembly positioned between and in engagement with said compression fitting and closure and normally retaining said closure on said fluid delivery passageway, said straight strut being positioned substantially on said axial center line, a pair of spaced oppositely disposed sidewardly extending apertured arms on said straight strut and a horizontally disposed fusible material retaining means positioned between said apertured arms and partially engaged in the apertures therein, said substantially vertical portion of said inverted L-shaped lever being normally positioned between said apertured arms and spaced therefrom and between said straight strut and said fusible material retaining means and in engagement with said fusible material retaining means, said fusible material retaining means normally preventing relative motion of said lever with respect to said strut in said assembly and acting to free said lever from said strut upon attainment of a predetermined temperature.

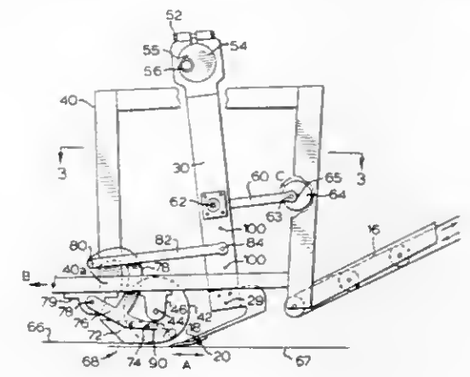
4,029,151
STONE GATHERER WITH DISCHARGE CONVEYOR
Herbert Hehr, Rte. 1, Fredonia, N. Dak. 58440
Filed Jan. 16, 1976, Ser. No. 649,793
Int. Cl.² A01B 43/00
U.S. Cl. 171—65 12 Claims

1. A stone gatherer including a main frame, a hollow generally truncated cone-shaped wheel journaled from said frame for rolling along the ground surface over which said frame is advanced, the major and minor diameter axial ends of said wheel being closed and open, respectively, means supported from said frame for engagement with and laterally deflecting windrowed stones along which said frame is advanced into said open minor diameter end of said wheel, the axis of rotation of said wheel lying in a substantially vertical plane generally normal to the direction of intended movement of said frame and said axis being inclined relative to the horizontal an amount substantially equal to the angle of displacement of the slant height of the wheel relative to the wheel center axis with the lowermost slant height of the wheel horizontally disposed, a rotary disk, support means journaling said disk from said



main frame for rotation about an axis generally paralleling the axis of rotation of said wheel and with said disk disposed closely outwardly of and closing the rear lower quadrant portion of the open minor diameter end of said wheel said wheel including circumferentially spaced lift members disposed about and supported from outer peripheral portions of the interior of the wheel for engaging rocks received into the lower periphery of the open minor diameter axial end of said wheel and elevating the engaged rocks upon rotation of said wheel, said support means including means mounting said disk for limited axial shifting along its axis of rotation, and means yieldingly biasing said disk toward its limit position of shifting toward said wheel.

4,029,152
SOD CUTTING MACHINE WITH OPPOSITELY RECIPROCATING UNDERCUTTING AND SIDE CUTTING KNIVES
Theodorus Petrus Hubertus Gerrits, Newmarket, Canada, assignor to Brouwer Turf Equipment Limited, Keswick, Canada
Filed Oct. 1, 1975, Ser. No. 618,593
Int. Cl.² A01B 45/04
U.S. Cl. 172—19 6 Claims



3. In a sod cutting machine adapted for travel forwardly along a path of travel to cut a strip of sod, improved means for

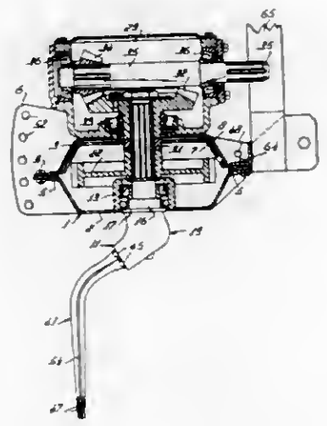
cutting beneath said strip and for cutting the edges of said strip, comprising:

a. a frame,
b. an undercutting blade,
c. a pair of first support arms one connected to each side of said undercutting blade and supporting said undercutting blade in an orientation in which said undercutting blade extends across said path of travel, for cutting beneath said strip,
d. means pivotally connecting said first support arms to said frame for reciprocation of said undercutting blade in a direction having a horizontal component parallel to said path of travel,
e. a pair of side cutting blades,
f. a pair of second support arms one connected to each of said side cutting blades and supporting said side cutting blades in vertical planes parallel to said path of travel and substantially aligned with the outer edges of said undercutting blade for cutting the edges of said strip,
g. means pivotally connecting said second support arms to said frame for reciprocation of said side cutting blades in a direction having a substantial vertical component and having a horizontal component parallel to said path of travel,
h. a single rotary power source mounted on said frame for providing power to reciprocate said first and second arms,
i. and a mechanical linkage connecting said power source to said first and second arms for reciprocating said undercutting blade and said side cutting blades oppositely in continual mechanical synchronization, so that said side cutting blades move forwardly when said undercutting blade moves rearwardly and so that said side cutting blades move rearwardly when said undercutting blade moves forwardly.

4,029,153
ROTARY HARROWS

Cornelis van der Lely, 7 Bruschenrain, Zug, Switzerland

Filed Mar. 6, 1975, Ser. No. 556,149
Claims priority, application Netherlands, Mar. 7, 1974, 7403070
Int. Cl.² A01B 33/06
U.S. Cl. 172—59 7 Claims

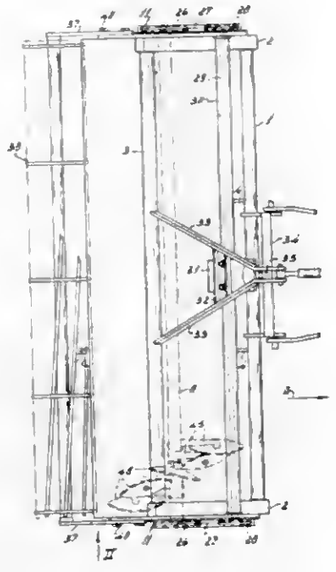


1. A rotary harrow comprising a frame having an elongated frame portion that extends transverse to the direction of travel, a plurality of soil working members being mounted on corresponding upwardly extending shafts and said shafts being journalled in said frame portion, said frame portion being hollow and having opposing upper and lower shaped portions that are substantially identical in cross-section configuration, said upper and lower portions having outer rims that adjoin one another substantially midway between a top and bottom of said frame portion that are defined by the bases of said upper and lower portions respectively, said shafts being connected to driving means housed within said frame portion, said driving means including corresponding pinions on said shafts and said pinions having teeth in mesh with one another, the teeth of said pinions being located at substantially the same level as said rims of the upper and lower portions of said frame portions.

4,029,154
SOIL CULTIVATING MACHINES

Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland

Filed Oct. 15, 1975, Ser. No. 622,451
Claims priority, application Netherlands, Oct. 15, 1974, 7413513
Int. Cl.² A01B 33/02, 33/14, 35/27
U.S. Cl. 172—91 12 Claims

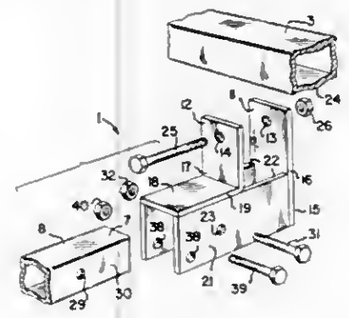


1. A soil cultivating machine comprising a frame and a driven soil cultivating member comprising support means, that is rotatable about a substantially horizontal axis of rotation that extends transverse to the normal direction of travel, a plurality of disc-shaped soil cultivating means connected to said support means and positioned around said axis of rotation, said cultivating means each being freely rotatable about a corresponding further axis of rotation spaced from said first mentioned axis of rotation, said further axis being non-perpendicularly inclined to a plane containing said horizontal axis of rotation, said cultivating means being mounted on arms that extend outwardly from said support means and said arms being arranged on a bracket connected to said support means, said arms being angularly spaced apart from one another around the axis of rotation of said support means and a plurality of brackets with corresponding cultivating means being mounted along the length thereof, the last arm on one of said brackets being angularly spaced around said support means from a first arm on an adjacent bracket, said arms extending from said support means and being arranged in at least one helical row, the outer ends of said arms carrying stub shafts and said stub shafts having longitudinal axes that define said further axes of rotation, successive soil cultivating means, considered lengthwise along said rotary support means, being inclined alternately forwardly and rearwardly relative to the normal operative direction of rotation of said cultivating member from the planes that contain said horizontal axes.

4,029,155
FLOATING MOUNT FOR AGRICULTURAL FINISH TOOLS

Calvin B. Blair, Barnard; Lee J. Brinker, Glen Elder, and Thomas W. Ankenman, Tipton, all of Kans., assignors to Kent Manufacturing Co. Inc., Tipton, Kans.

Filed June 23, 1975, Ser. No. 589,124
Int. Cl.² A01B 23/04, 49/02
U.S. Cl. 172—763 6 Claims



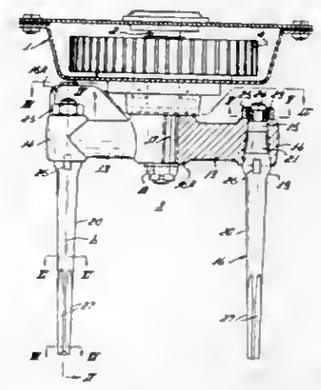
1. In combination, a transverse draw frame bar, a trailing tillage tool support member, and a mounting device attaching a forward end of said tool support member to said draw frame bar; said mounting device comprising:

a. means pivotally attaching said tool support member to said draw frame bar for limited pivotal movement thereof with respect to said bar in a substantially vertical and rearwardly projecting plane; said pivotal attaching means being disposed normally below said draw frame bar and including:
   1. a top panel having an upper surface, a lower surface, and a rearward end;
   2. first and second side panels depending from and connected with said top panel; said side panels being substantially parallel and spaced apart; said tool support member being disposed longitudinally between said side panels;
   3. means pivotally connecting said support member with said side panels at a point on said support member spaced rearwardly and apart from the forward end thereof; the forward end of said tool support member, when pivoted in one direction a sufficient distance, engaging a surface generally in the plane of the lower surface of said top panel, thus forming a first stop to limit said pivotal movement in one direction;
   4. said tool support member having an upper surface area thereof disposed rearwardly of said point of pivot; said support member upper surface area engaging the lower surface of said top panel at a point thereon disposed adjacent to the rearward end thereof, when said forward end of said support member is pivoted a sufficient distance in the other direction, thus forming a second stop, the pivotal movement of said support member being limited in the other direction upon sufficient pivotal movement in said other direction, said pivotal movement being limited between said first and second stops to an acute angle;
b. clamping means securing said mounting device to said draw frame bar and including:
   1. an upstanding front plate having an aperture adjacent an upper free edge thereof, and a lower edge thereof connected with a forward end of said mounting device, so as to be fixed with respect to said top panel;
   2. an upstanding rear plate having an aperture adjacent an upper free edge thereof and a lower edge thereof connected with said top panel; said rear plate aperture being aligned with said front plate aperture;
   3. said front and rear plates being spaced apart to closely receive therebetween said frame bar; and
   4. means received in said front and rear plate apertures and urging the same tightly into frictional engagement respectively with leading and trailing surfaces of said draw frame bar.

4,029,156
SOIL WORKING TINES

Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland

Filed Jan. 29, 1975, Ser. No. 545,005
Claims priority, application Netherlands, Jan. 31, 1974, 7401322
Int. Cl.² A01B 33/06
U.S. Cl. 172—765 9 Claims



1. A tine for a rotary harrow and adapted for movement in a circular path through the soil, comprising a longitudinal upper fastening portion with a substantially circular cross section and an upper end, an elongated lower soil working portion being integral with the fastening portion at a junction and lugs being located diametrically opposite to one another adjacent said junction, each of said portions having longitudinal axes and these axes extending generally in the same direction as one another, said fastening portion tapering inwardly from said junction towards said upper end, said soil working portion having a generally oval cross-section region for part of its length below said junction and said oval cross-section region progressively merging into a substantially polygonal cross-section region towards a lower free end, the cross-section of said free end being substantially rectangular and grooves extending upwardly from said free end, said grooves being generally parallel to the longitudinal axis of said soil working portion, said grooves being located between corners of said polygonal region, said oval region and polygonal region each having perpendicular diagonals of different lengths and the longer diagonals of said regions being in alignment with one another and fixable to extend in the same direction as said circular path during operation.

4,029,157
MATERIAL PUSHING VEHICLE HAVING PIVOTAL BLADE PORTION

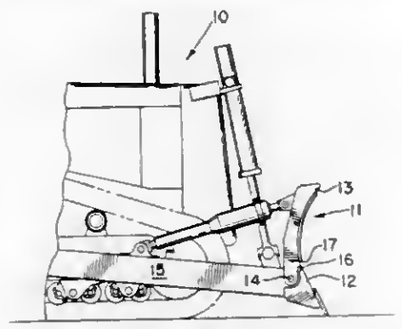
Gary P. Freese, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed May 28, 1976, Ser. No. 691,123
Int. Cl.² E02F 3/76
U.S. Cl. 172—801 4 Claims

1. In a work vehicle of the material pushing type having a material pushing blade fixed to the vehicle, the improvement comprising:

a push arm assembly having an opening and being connected to the vehicle;
said blade having first and second generally horizontally extending portions each having faces of a construction sufficient for contacting and pushing material, said first blade portion being connected to the push arm assembly;
means for pivotally connecting the blade portions one to the other for pivotal movement of the second blade portion between a first position at which the faces of the blade portions define an arc of preselected configuration and a

second position at which portions of the second blade portion face are spaced from said first position in response to forces subjected upon said second blade por-



tion, said means including a pin extending through the opening of the push arm assembly; and

means for urging the second portion of the blade toward the first position.

4,029,158

PILE DRIVING APPARATUS

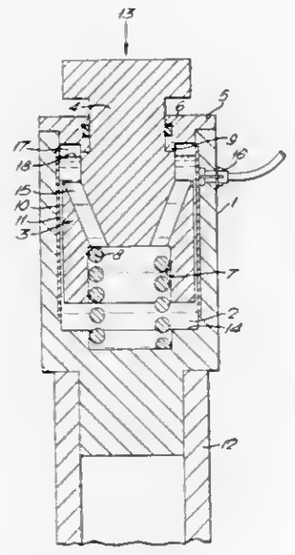
Arthur Gerrish, Burgess Hill, England, assignor to Laser Engineering Development Ltd., London, England

Filed Aug. 4, 1975, Ser. No. 601,433

Claims priority, application United Kingdom, Aug. 9, 1974, 35192/74

Int. Cl.² E02D *11/00*

U.S. Cl. 173—131 **11 Claims**



1. Pile driving apparatus comprising a housing including an elongate enclosed chamber containing an electro viscous fluid, the housing being adapted to be mounted on the upper end of a pile to be driven with the chamber longitudinally orientated in the direction in which the pile is to be driven; and means for simultaneously transmitting, to a pile to be driven, a linear force produced by a hammer blow and a vibrating force which is generated by the application of the hammer blow, said means comprising a transfer hammer having a part which slidingly extends into the chamber through the housing for transmitting the linear force produced by a hammer blow applied to the transfer hammer to the pile to be driven by movement of said part of the transfer hammer into the chamber along the length of the chamber, and means for developing a vibratory force when the said part of the transfer hammer moves along the chamber as a result of a hammer blow, said means comprising a gap containing said electro viscous fluid surrounding the said part of the transfer hammer between said part of the transfer hammer and the walls of the chamber and means for applying an alternating electrical field across the gap.

4,029,159

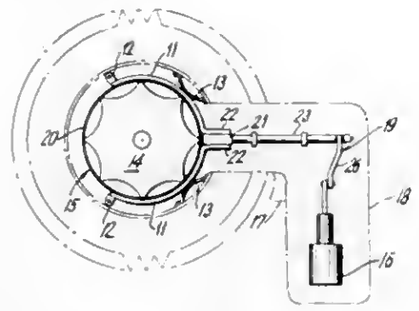
BRAKE CONTROL FOR ROTARY ELECTRIC TOOLS

Svend Nymann, 68 E. Hartsdale Ave., Hartsdale, N.Y. 10530

Continuation-in-part of Ser. No. 476,474, June 5, 1974, abandoned. This application Sept. 22, 1975, Ser. No. 615,358

Int. Cl.² E21B *3/00*

U.S. Cl. 173—163 **6 Claims**



1. In a rotary tool having a motor with a rotating armature and a brake drum mounted thereabout, a brake control device comprising:

a pair of curved brake shoes pivotably mounted at one end about the brake drum and each brake shoe having a projecting portion extending outwardly from the armature and in a substantially parallel spaced relation,

spring means normally biasing the brake shoes into engagement with the brake drum, said means comprising a separate leaf spring engaging each brake spring,

a cam element mounted between the projecting portions of the break shoes,

a solenoid fixedly mounted within the tool,

a linkage connected at one end to the solenoid and connected at the other end to an end portion of the cam element, and

means for activating the solenoid and the motor wherein the solenoid actuates the cam element to cam the projecting portions of the brake shoes outwardly against the bias of the spring means thereby releasing the brake drum and associated armature and wherein the armature is immediately halted when the solenoid is deactivated by camming the brake shoes into engagment with the brake drum under urging of the spring means.

4,029,160

DRILLING MACHINE

Gustav Martin Leidvik, Bromma, Sweden, assignor to Stabilator AB, Bromma, Sweden

Filed Sept. 8, 1975, Ser. No. 611,421

Claims priority, application Sweden, Sept. 16, 1974, 7411647

Int. Cl.² E21C *7/02, 7/12*

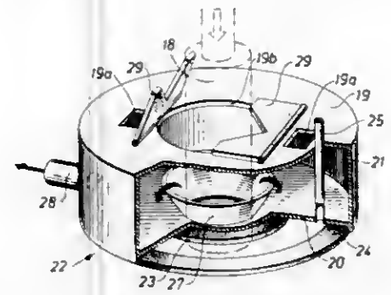
U.S. Cl. 175—210 **11 Claims**

1. A drilling machine for drilling holes in structural building elements, such as concrete floors or walls, comprising

a. a frame structure (2, 3) in which a drilling bar (18) having a cutting bit is displaceably mounted for movement relative to the structural element;

b. a container (22) which at least partially surrounds said drilling bar (18) and which is adapted to collect the cooling liquid used to cool said cutting bit of said drilling bar and to collect the slurry formed during a drilling operation, said container (22) including a bottom plate (20) arranged to face towards the structural element and having a circular opening (20*a*) which receives said drilling bar (18);

c. a collar (27) arranged in said opening (20*a*) having an inner surface for blocking the cooling liquid and slurry mixture thrown off by said drilling bar, said collar further having an upper edge over which the mixture is fed to the



interior of said container (22) to form a substantially stationary reservoir therein; and

d. an outlet (28) in said container (22) for draining the reservoir from said container (22).

4,029,161

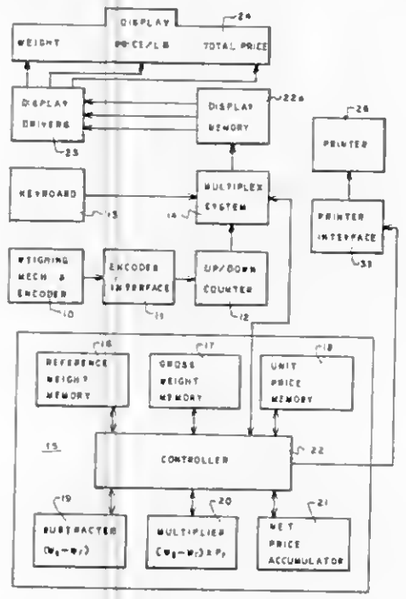
DIGITAL SCALE

Colin E. Foster, Bensenville, and Edward C. Karp, Belvidere, both of Ill., assignors to Sanitary Scale Company, Belvidere, Ill.

Continuation-in-part of Ser. No. 564,416, April 2, 1975, abandoned. This application Sept. 4, 1975, Ser. No. 610,170

Int. Cl.² G01G *19/413, 23/18*

U.S. Cl. 177—25 **33 Claims**



1. A weighing and computing system of the type which determines a net weight and net price for each commodiy in a series of commodities to be weighed and a total net price for the entire series of commodities, said system comprising:

a weighing mechanism including a platform upon which commodities to be weighed are placed for providing reference and gross weight signals responsive to the load on said platform;

unit price means selectively operable for providing a read signal corresponding to a unit weight price for each commodity to be weighed;

reference weight memory means for storing said reference weight signals developed by said weighing mechanism, said reference weight signals corresponding to the total load on the platform immediately prior to the weighing of the next commodity in the series;

gross weight memory means responsive to said gross weight signals developed by said weighing mechanism for storing said gross weight signals, said gross weight signals corresponding to said reference weight plus the weight of the next commodity in the series placed on said platform;

means for determining the difference between said gross weight signals and said reference weight signals to provide a net weight for said next commodity in the series of commodities;

means for multiplying said net weight by said rate signal for providing a net price for each of said commodities in the series:

net price accumulating means for accumulating said net prices; and

display means coupled to said net price accumulating means for displaying the sum total of said net prices.

4,029,162

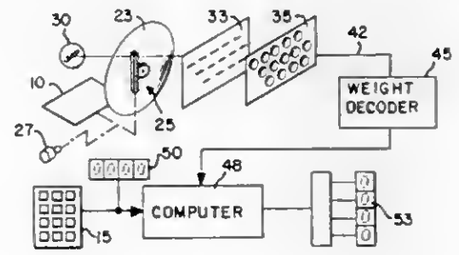
ZERO RETURN TARE GUARD

James J. Krolick, deceased, late of Dayton, Ohio, by Arline Krolick, executrix, and Edwin E. Boshinski, Dayton, Ohio, assignors to Hobart Corporation, Troy, Ohio

Filed Oct. 15, 1975, Ser. No. 622,723

Int. Cl.² G01G *23/14*

U.S. Cl. 177—165 **10 Claims**



1. In a system for weighing a load in a container, the combination comprising:

a weighing mechanism adapted to determine the difference between the weight of a load applied thereto and the tare weight of the load container,

tare adjusting means for entering said tare weight into said weighing mechanism,

manually operable means for controlling said tare adjusting means,

signal means for producing a tare warning indication,

first sensing means for determining when said manually operable means is manually touched, and second sensing means for determining when said manually operable means changes the tare weight, and

control circuit means, responsive to said first and second sensing means, for causing said signal means to produce a warning indication when said manually operable means is manually touched while said weighing mechanism has a substantial load supplied thereto, and for terminating said tare warning indication when said manually operable means changes said tare weight while said weighing mechanism does not have a substantial load applied thereto.

4,029,163

WEIGHING APPARATUS

Clifford Edwin Allen, Cwmbran, Great Britain, assignor to Isca Electronics Limited, Newport, Great Britain

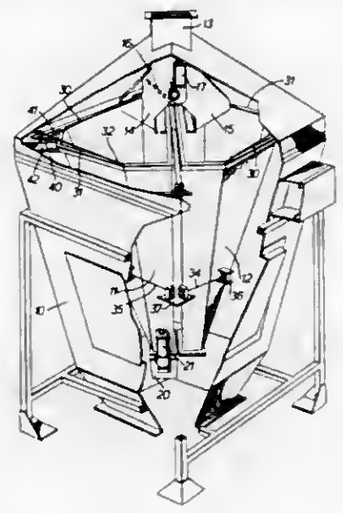
Division of Ser. No. 593,029, July 3, 1975, Pat. No. 3,966,000, which is a division of Ser. No. 490,261, July 22, 1974, abandoned. This application May 28, 1976, Ser. No. 690,981

Int. Cl.² G01G *21/24*

U.S. Cl. 177—255 **7 Claims**

1. Apparatus for weighing materials, comprising a hopper with an inlet opening at its upper end, and a controlled outlet opening at its lower end, means for supporting said hopper to permit limited vertical movement thereof, comprising an upper flexible tension element extending horizontally in one direction from a point on the hopper adjacent the upper end

thereof, to a fixed point at the same level, and a lower flexible tension element extending horizontally in another generally opposite direction from a point on the hopper adjacent the



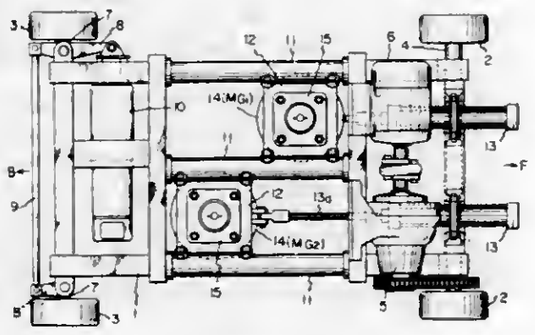
lower end thereof to a fixed point at the same level, and an electro-mechanical transducer for sensing the weight of the hopper, situated at a position offset laterally from a vertical line through the centre of the hopper.

4,029,164

MOVABLE APPARATUS ADHERING TO THE SURFACE OF A WALL

Fukashi Urakami, Fukuoka, Japan, assignor to Sanko Co., Ltd., Fukuoka, Japan

Filed Dec. 22, 1975, Ser. No. 643,398
Claims priority, application Japan, Dec. 28, 1974, 50-50315
Int. Cl.² B62D *63/02*; **B60S** *3/02*
U.S. Cl. 180—1 VS **14 Claims**



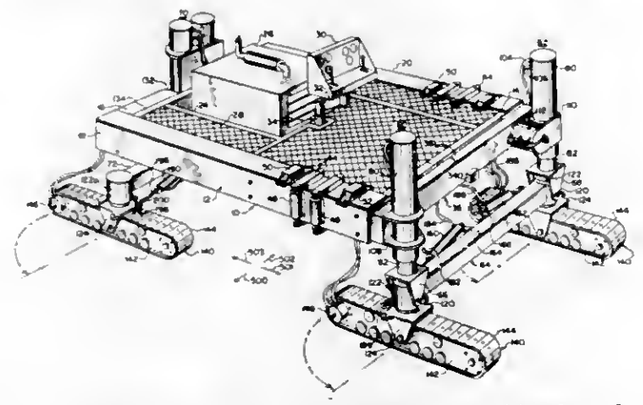
1. Apparatus movably adhering to an upright wall comprising a body, driven wheels mounted on said body adapting said body to travel along said wall, wall-adhering devices selectively operable to an adhering condition or a releasing condition, operable means for extending and retracting said wall-adhering devices relative to said body in a direction generally perpendicular to said wall, and actuating means movably mounting said wall-adhering devices on said body for movement in the general traveling direction of said body, whereby said body in the direction of travel travels along said wall on said driven wheels as one wall-adhering device in its adhering and extending condition adheres to said wall and another wall-adhering device while in its released and retracted condition is moved relative to said body in the direction of travel by said actuating means.

4,029,165

CONVERTIBLE CONSTRUCTION MACHINE

David J. Miller, and Charles P. Miller, both of McHenry, Ill., assignors to Miller Formless Co., Inc., McHenry, Ill.

Filed Feb. 5, 1976, Ser. No. 655,389
Int. Cl.² B62D *11/04*, *11/20*
U.S. Cl. 180—6.48 **33 Claims**



1. In a mobile construction machine the combination of:
a main frame adapted to carry a working tool;
a pair of vertically adjustable main frame support means spaced along one side of said main frame;
a first walking beam extending along said one side of said main frame and pivotally mounted to each said main frame support means;
one of said main frame support means being pivotally mounted to said main frame and a horizontal axis above and in substantially the same plane as its respective pivotal mount on said first walking beam;
a second vertically adjustable main frame support means on the other side of said main frame;
a second walking beam extending along said other side of said main frame;
said second main frame support means being pivotally mounted on an axis transverse and substantially central of the longitudinal axis of said second walking beam; and
ground engagement means adapted to transport said machine pivotally mounted on means defining individual vertical steering axes at the ends of each of said walking beams to steer said machine.

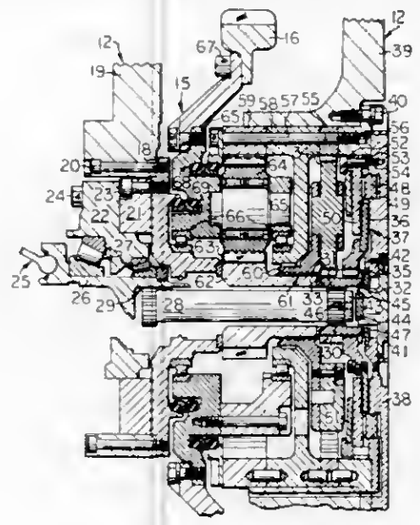
4,029,166

FINAL SPROCKET DRIVE FOR TRACK-TYPE VEHICLES

Willard J. Haak, Peoria; Howard A. Marsden, Pekin, and Rollin P. Van Zandt, Peoria, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed May 13, 1975, Ser. No. 577,135
Int. Cl.² B62D *55/12*
U.S. Cl. 180—9.62 **20 Claims**

1. In a track-type vehicle of the type having a main frame, a sub-frame mounted on each side of said main frame and an endless track assembly mounted on said sub-frame, said sub-frame solely mounted on said main frame by resilient mounting means operatively interconnected between said main frame and said sub-frame and disposed forwardly of said sprocket towards a forward end of said vehicle for permitting independent movement of said sub-frame relative to said main frame, a sprocket rotatably mounted on said sub-frame and operatively engaged with said track assembly for selectively driving the same and a final drive means operatively connected to said sprocket for selectively rotating the same, said final drive means comprising at least one planetary gear set mounted on said sub-frame and having an annular carrier



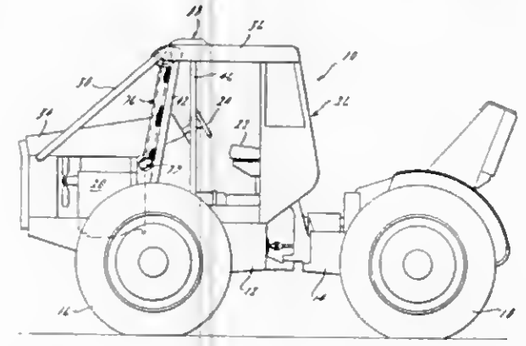
thereof rotatably mounted on said sub-frame and attached directly to said sprocket for rotation therewith.

4,029,167

EXHAUST SYSTEM

Anthony E. Fox, Ann Arbor, and Marcello Bargellini, Westland, both of Mich., assignors to Massey-Ferguson Inc., Detroit, Mich.

Filed Apr. 11, 1975, Ser. No. 567,209
Int. Cl.² B60K *13/04*
U.S. Cl. 180—64 A **9 Claims**



1. An exhaust system for a mobile vehicle having a wheel supported main frame and an operator station, the combination of; a protective frame structure for said operator station including longitudinally extending side frame members supported in elevated position relative to said main frame above said operator station, an elongated housing extending transversely between and to the front of said side frame members and being rigidly connected thereto, a muffler disposed in said housing, an exhaust duct connected to one end of said muffler and extending along one side of the frame structure to connect to the engine of said vehicle, and outlet pipe means connected to the other end of said muffler and forming an exhaust outlet at one end of said housing.

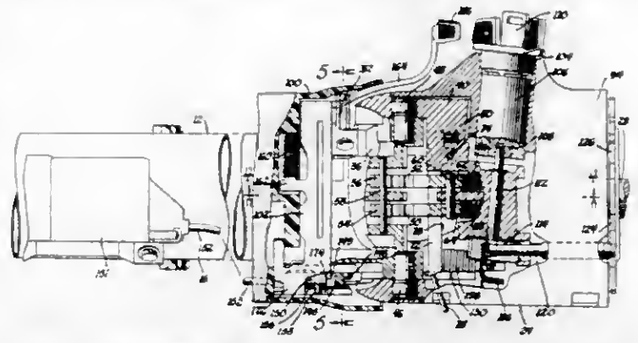
4,029,168

STEERING COLUMN LOCK INHIBITOR

Richard L. Kramer, Saginaw, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed July 14, 1975, Ser. No. 595,624
Int. Cl.² B60R *25/02*
U.S. Cl. 180—114 **2 Claims**

1. In a vehicle steering column, a support assembly secured at the upper end of said column, a tiltable head portion, pivot means pivotally connecting said head portion to said support assembly, a tiltable manual steering wheel operatively mounted adjacent to the upper end of said head portion, rotatable steering shaft means extending through said head portion and said support assembly and operatively connected to said steering wheel, said steering shaft means having pivot means therein to permit said head portion and said steering wheel to be tilted, ignition switch means operatively mounted on said column below said support assembly, a key actuated operator assembly rotatably mounted in said head portion of said steering column, locking bolt means in said head portion longitudinally movable in a first direction for locking said steering wheel and steering shaft means from rotation in response to a first predetermined rotary movement of said operator assembly, said locking bolt means movable longitudinally in a second direction for unlocking said steering wheel and steering shaft means in response to a second and opposite predetermined rotary movement of said operator assembly, said operator assembly having gear means fixed thereto, rack means drivingly connected to said gear means and longitudinally movable thereby in said first and second directions, ignition switch rod means, arcuate track means interconnecting said ignition switch rod means and said rack means to permit said head portion and said steering wheel to be tilted with respect to said support assembly, said switch rod means



being movable in said first direction to close said ignition switch means as said locking bolt means is moved in said second direction, said switch rod means being further longitudinally movable in said second direction to open said ignition switch means as said locking bolt means is moved in said first direction, a locking bolt inhibitor mounted for limited rotation within said column, said inhibitor having a manual lever extending to a terminal point closely adjacent to said key actuated operator assembly, said switch rod means terminating in an abutment end portion, said inhibitor having an abutment shoulder normally positioned to engage said abutment end portion and thereby limit movement of said ignition switch rod means in said second direction and thereby prevent rotary movement of said operator assembly in one direction and the resultant locking movement of said locking bolt means in said first direction, said inhibitor having slot means adjacent to said shoulder which accommodates said abutment end portion and permits movement of said ignition switch rod means in said second direction when said inhibitor is rotated to a predetermined position by manually depressing said lever, and said slot means having a contact surface at one end thereof which contacts said abutment end portion and inhibits movement of said ignition switch rod means in said first direction to close said ignition switch means.

4,029,169

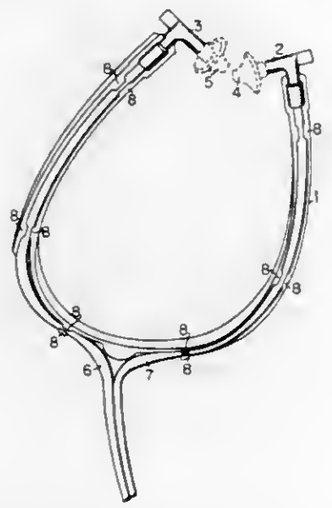
ACOUSTIC YOKE

Charles B. Huntress, Orange, Calif., assignor to Electronic Engineering Company of California, Santa Ana, Calif.

Filed Jan. 28, 1976, Ser. No. 653,052
Int. Cl.² A61B *7/02*
U.S. Cl. 181—135 **5 Claims**

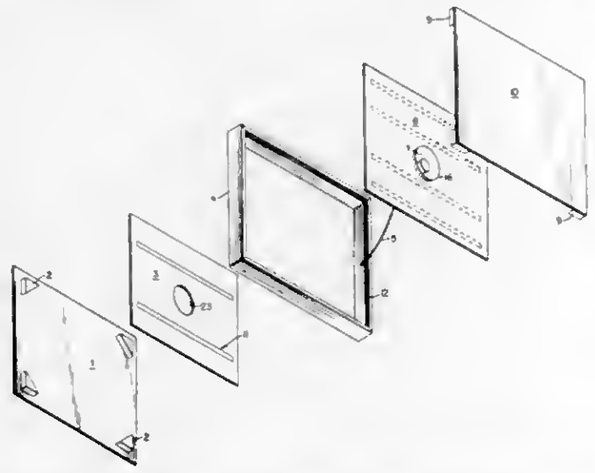
1. A yoke for retaining a pair of acoustic ear couplers in the ears of a wearer, comprising;

a. a U shaped in cross-section yoke (1) to retain a pair of flexible tubes (6 & 7),
b. an open surmounting socket (12) upon each extremity of the U shaped yoke,
each said socket having a circumference greater than a semicircle, and



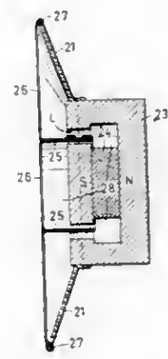
c. a hollow ear horn (3), which has a boss (11) that rotatably and removably fits within a said socket (12),
coaxially accepts a said flexible tube (6 or 7) at the boss end,
and accepts a said ear coupler (5) at the other end.

4,029,170
RADIAL SOUND PORT SPEAKER
Jesse O. Phillips, Albuquerque, N. Mex., assignor to B & P Enterprises, Inc., Oklahoma City, Okla.
Filed Sept. 6, 1974, Ser. No. 503,953
Int. Cl.² H05K *5/00;* **G10K** *13/00*
U.S. Cl. 181—155 **6 Claims**



1. An audio frequency speaker assembly for housing a conventional speaker of the type having a larger forward end and a smaller diameter rear end constituted of the magnet structure, such speaker assembly being of generally thin form for adaptation to wall surface mounting, the speaker assembly comprising:
frame means for geometrically regular character having parallel front and back sides and defining an interior space having a predetermined transverse area;
mounting panel means secured to the front side of said frame means which is of rigid construction and extending over said predetermined transverse area, said mounting panel means having a centrally located aperture which is adapted to receive the forward end of the speaker therein in secure affixure with the rear end extending within the frame means interior space, said mounting panel means further including a plurality of first elongate rib members secured to one side thereof and extending into the frame means interior space;
back panel means of rigid structure secured to the back side of said frame means and being of said predetermined transverse area;
baffle panel means of rigid structure which is similar in transverse shape but lesser than said predetermined transverse area, said baffle means having a centrally located aperture for receiving the speaker magnet end therethrough in non-interfering relationship and having a plurality of second elongate rib members disposed thereon in parallel to said first rib members as said baffle panel means is rigidly supported between said back panel means and said mounting panel means within the interior space of said frame means with said first and second rib members facing toward each other in parallel, non-interfering relationship; and
front panel means of rigid structure and having said predetermined transverse area, which means is secured in spaced relationship to the front of said frame means and mounting panel means.

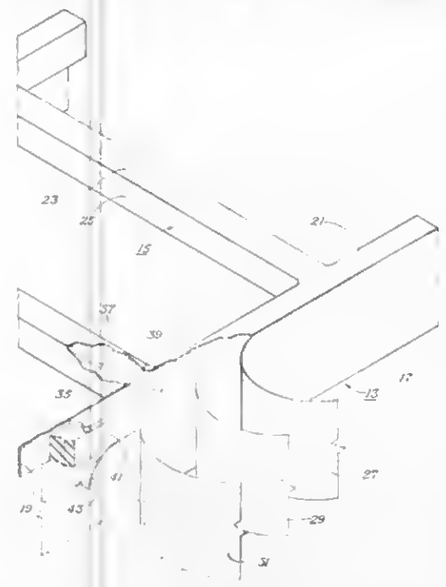
4,029,171
MEMBRANE FOR ELECTROACOUSTIC CONVERTER SYSTEMS
Josef Wilhelm Manger, Karlstadter Strasse, 8725 Arnstein, Germany
Filed Aug. 11, 1975, Ser. No. 603,310
Claims priority, application Germany, Jan. 7, 1975, 2500397
Int. Cl.² G10K *13/00;* **H04R** *7/00*
U.S. Cl. 181—167 **9 Claims**



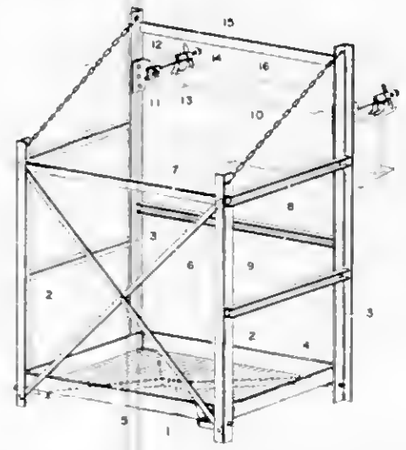
1. Diaphragm having substantial viscoelastic properties for an electroacoustic transducer system and coupled to a driving means therefor, consisting of a flat multi-layer body which has at least one layer of a substantially viscoelastic material with a substantially constant maximum damping factor over a temperature range of substantially more than 10° C and at least one layer of foil with a modulus of elasticity of more than 10,000 kg/cm².

4,029,172
FIBERGLASS LADDER AND METHOD OF CONSTRUCTING SAME
Andrew Green, Fort Worth, Tex., assignor to Composite Technology, Inc., Fort Worth, Tex.
Filed July 12, 1976, Ser. No. 704,250
Int. Cl.² E06C *1/06, 7/08*
U.S. Cl. 182—46 **10 Claims**

1. A fiberglass ladder comprising:
a pair of rails, each of the rails having a continuous layer of fiberglass filaments, the filaments extending substantially parallel to the length of the rail;
a plurality of rungs disposed between and interconnecting the rails at selected intervals, each of the rungs having a continuous layer of fiberglass filaments, the filaments extending substantially parallel to the length of the rung;
the fiberglass filaments in the rails and rungs bending at the intersections between the rails and the rungs, with a portion of the filaments in each rung also extending along each rail in one direction and another portion of the filaments in each rung also extending along each rail in the opposite direction, thereby defining a continuous layer of fiberglass filaments at the intersection.

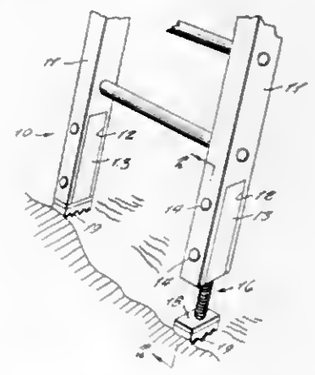


4,029,173
FOLDABLE SCAFFOLD DEVICES
Hidenori Wakabayashi, 41-227, Ohtakacho, Chiba, Japan
Filed Dec. 23, 1975, Ser. No. 643,818
Claims priority, application Japan, Dec. 30, 1974, 49-2582; Dec. 30, 1974, 49-2583
Int. Cl.² A47L *3/02;* **E04G** *3/08*
U.S. Cl. 182—150 **4 Claims**



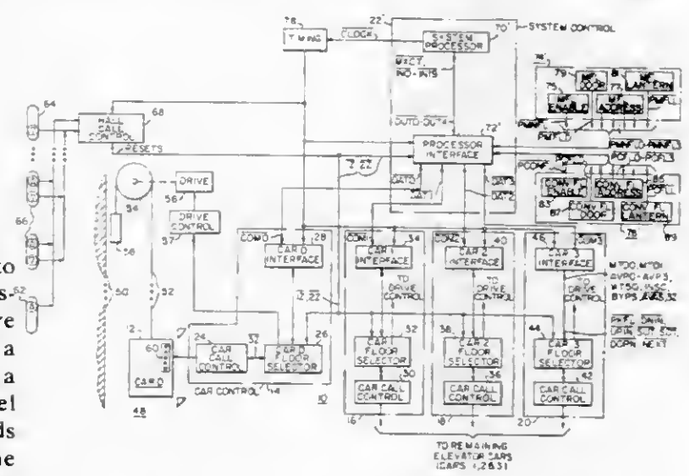
1. An erectable and transportable scaffold cage adapted to be engaged upon and supported on a suppport beam, comprising a rear frame structure, means on said rear frame structure for securing said rear frame structure to the support beam, a front frame structure shorter than rear frame structure, a plurality of lateral braces arranged in vertically spaced parallel relationship and pivotally connected at their respective ends to the respective said rear frame structure and said front frame structure, a reinforcing frame pivotally connected to each side of said rear frame structure and said front frame structure adjacent the bottom ends thereof, a flexible member connected between the tops of corresponding respective ends of said rear and front frame structures and supporting said front frame structure in an erected position spaced outwardly from said rear frame structure and also in a collapsed position with said front frame juxtaposed in respect to said rear frame, in the erected position said front and rear frames structures and said side braces defining a cage therewithin, and a scaffold plate supported on said reinforcing frame and forming a scaffold floor in the erected position.

4,029,174
ADJUSTABLE LEGS FOR LADDER
James L. Planck, c/o George Spector 3615 Woolworth Building, 233 Broadway, and George Spector, 3615 Woolworth Building, 233 Broadway, both of New York, N.Y. 10007
Filed Apr. 6, 1976, Ser. No. 674,115
Int. Cl.² E06C *7/44*
U.S. Cl. 182—204 **2 Claims**



1. In an improved ladder for standing upon inclined or other terrain, the combination of a pair of spaced apart legs with a plurality of rungs therebetween, a lower end of each leg having a notch, a metal block rigidly affixed in each said notch a threaded vertical opening in each said block, and adjustable extension means screwed in each said threaded opening wherein said extension means comprises a threaded shank supported freely rotatable at its lower end in a horizontal arm of an L-shaped extension that includes a vertical arm slidable alongside said metal block, said vertical arm having a sideward rung rigidly affixed hereto.

4,029,175
ELEVATOR SYSTEM
Charles L. Winkler, Worthington, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed May 5, 1975, Ser. No. 574,766
Int. Cl.² B66B *1/18*
U.S. Cl. 187—29 R **24 Claims**



1. An elevator system for a building having a plurality of floors, comprising:
a plurality of elevator cars,
means mounting said plurality of elevator cars for movement relative to the floors,

means registering calls for elevator service for the up and down service directions of the floors,

averaging means periodically providing a first limiting average responsive to the status of a predetermined parameter of the elevator system,

traffic detector means operable between first and second conditions in response to the demand for elevator service, with said traffic detector means being operated to its second condition in response to a predetermined demand for elevator service in a predetermined direction,

and control means responsive to said traffic detector means and said averaging means, said control means periodically assigning up and down service directions from the floors, including floor service directions which do not have a registered call, by dividing them among the elevator cars within predetermined constraints which include said first average, said control means normally limiting the number of such floor service direction assignments to each car according to said first average, with the control means modifying the normal effect of said first average when the traffic detector means is in its second condition to enable more elevator cars to receive floor service direction assignments in said predetermined service direction than the first limiting average would otherwise permit.

4,029,176

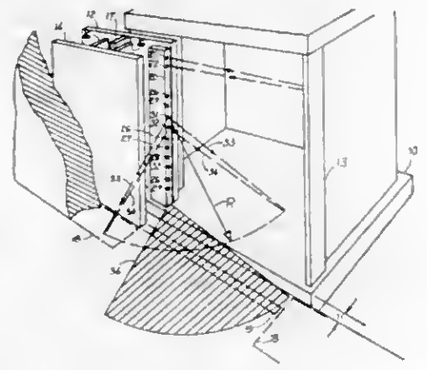
DOORWAY SAFETY DEVICE

Gerald W. Mills, 163 Arch St., Ramsey, N.J. 07446

Filed Oct. 6, 1975, Ser. No. 619,731

Int. Cl.² B66B *13/26*

U.S. Cl. 187—52 R **14 Claims**



1. In an elevator system, a structure including a hoistway having one or more landings, a hoistway door for each landing, an elevator car arranged for movement in said hoistway from one to another of said landings, said car having a door movable from an open position to a closed position against a strikepost, means for opening and closing said car door, mechanical means for coupling said hoistway door to said car door so that both doors move concurrently from an open position to a closed position or vice versa, the improvement which comprises electrical means for sensing and being responsive to objects in a predetermined zone at any position of the car door, whereby upon detecting an object in said zone said opening and closing means is energized to prevent further closure of said car door, said sensing means including transmitting and receiving means for locating a leading edge of the car door relative to the strike post, and second transmitting and receiving means positioned at a predetermined angle on the leading edge of the car door in cooperation with said locating means for detecting objects at an angle with respect to an outside surface of the car door during movement of the car door.

4,029,177

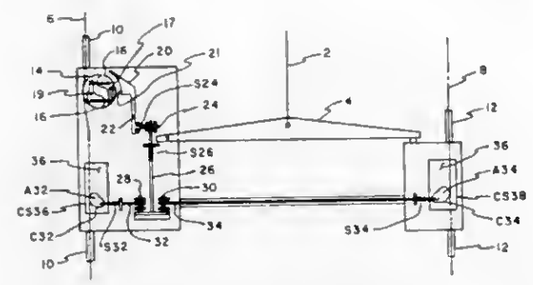
OVERSPEED BRAKE FOR A LIFT CAR

Robert A. Fiss, Red Wing, Minn., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Continuation of Ser. No. 568,793, April 16, 1975, abandoned. This application July 30, 1976, Ser. No. 710,252

Int. Cl.² B66B *5/24*

U.S. Cl. 187—89 **8 Claims**



1. A braking system in association with a lift platform having a movable lift cable for translating said lift platform and having at least one stationary guide member separate and spaced apart from said lift cable for aligning said lift platform, said system comprising a governor mounted to said lift platform and operatively engaging said guide member and said governor being coupled through a linkage to brake means, said linkage including a plurality of spring loaded elements locked together by pin means and terminating in said brake means, said brake means including a first cam surface element pivotally mounted to said lift platform and operable by said linkage to lock said guide member between said first cam surface and a second cam surface element fixedly mounted to said lift platform, said governor responding to the translation of said lift platform when the speed of said lift platform relative to said guide member exceeds a predetermined maximum, to release said pin means and permit springs associated with said spring loaded elements to apply a force through said linkage to said brake means thereby to rotate said first cam surface element into engagement with said guide means and stop motion of said lift platform.

4,029,178

HIGH-IMPACT FORCE DAMPING DEVICE

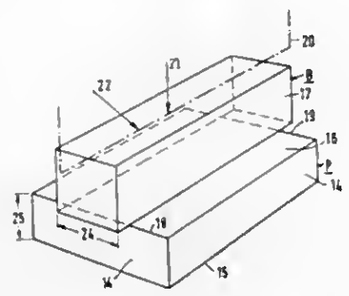
Ludwig Tschift, Vienna, Austria, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Apr. 17, 1974, Ser. No. 461,758

Claims priority, application Germany, Apr. 19, 1973, 2320258

Int. Cl.² F16F *7/12*

U.S. Cl. 188—1 C **4 Claims**



1. A high-impact force absorbing and damping device comprising an element for receiving the impact and supported by a metal body which with increasing force strains elastically and then plastically; wherein the improvement comprises said body being in the form of a flat plate having free and unrestrained edges, and said element comprises an elongated bar made of metal harder than said metal body, said plate having a flat pressure-receiving side surface and said bar having a flat pressing side surface engaging said pressure-receiving surface, said bar's pressing surface being of substantially less width than said pressure-receiving surface, said plate being precompressed throughout the area of its said pressure-receiving surface engaged by said pressing surface of said bar.

4,029,179

DISK BRAKE WITH AXIALLY FLOATING CASING

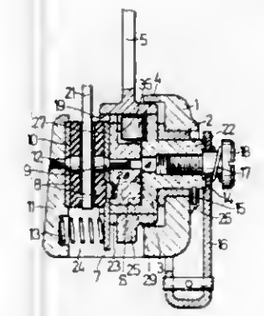
Hans Butz, Schwebheim, Germany, assignor to Fichtel & Sachs A.G., Schweinfurt am Main, Germany

Filed May 19, 1976, Ser. No. 687,696

Claims priority, application Germany, May 22, 1975, 2522622

Int. Cl.² B62L *1/02*; **F16D** *55/08*

U.S. Cl. 188—71.8 **10 Claims**



1. a disk brake comprising:

a. a support including a tubular guide bounding a passage.

1. said passage having an axis, being of circular cross section and axially open;

b. a disk member mounted on said support for rotation in a plane transverse to said axis;

c. first and second actuator members mounted in said passage for axial movement;

d. operating means for angularly moving said first actuator member about said axis;

e. securing means securing said second actuator member against angular movement about said axis;

f. cam means interposed between said actuator members for moving said second actuator member axially in said passage in response to said angular movement of the first actuator member;

g. a casing mounted on said first actuator member for limited axial movement and partly enveloping said guide,

1. said casing being formed with an opening in said plane receiving a portion of said disk member; and

h. engagement means on said casing and on said second actuator member having respective engagement faces receiving said portion of said disk member axially therebetween for braking engagement when said first actuator member is moved by said operating means.

4,029,180

TUBULAR WHEEL SPEED SENSOR FOR AN ANTI-SKID SYSTEM

Thomas A. Gee, Allen Park, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Division of Ser. No. 460,325, April 12, 1974, Pat. No. 3,938,112. This application Jan. 28, 1976, Ser. No. 653,061

The portion of the term of this patent subsequent to Dec. 17, 1991, has been disclaimed.

Int. Cl.² G01P *3/48*

U.S. Cl. 188—181 R **1 Claim**

1. An anti-skid system for regulating braking forces applied to a rotatable body comprising:

control circuit means for providing a skid signal in response to a signal representative of the velocity of said body;

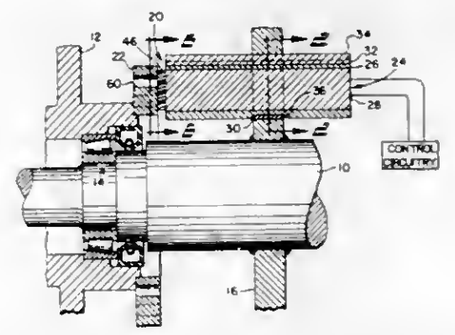
a rotor affixed to and rotatable with said body, said rotor having at least one array of apertures on the outer periphery thereof;

sensing means mounted proximate to said rotor and cooperating with said rotor to establish an air gap, said sensing means including a magnetic flux source and means for producing a split magnetic flux path, said producing means having first and second pole pieces positioned relative to said magnetic flux source so as to be parallel to and equidistant from said magnetic flux source, said magnetic flux source and said first and said second pole pieces being retained in a tubular housing permitting axial and angular movement of said sensing means to obtain the proper orientation of said sensing means for different rotor sizes and/or aperture spacings, said proper orientation of said sensing means occurring when said first and said second pole pieces are alternatively in register with said apertures in said rotor resulting in the interruption of said split magnetic flux path by said apertures when said rotor is rotated causing a flux change;

means for mounting said sensing means, said mounting means permitting axial movement of said sensing means relative to said rotor while preventing angular movement of said sensing means after said proper orientation of said sensing means is established;

gauging means adjacent said sensing means, said gauging means projecting from said sensing means and in communication with said rotor for limiting axial movement of said sensing means; and

coil means producing an output signal resulting from said flux change, said coil means being minimally responsive to any flux change resulting from relative axial movement between said sensing means and said rotor.



4,029,181

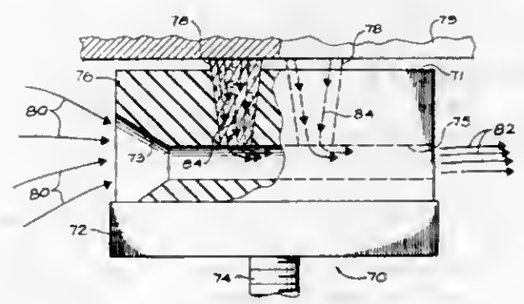
CAPILLARY ACTION BRAKE SHOE

Nathanial Henry Lewis, Box 20424, Los Angeles, Calif. 90006

Filed May 17, 1976, Ser. No. 679,606

Int. Cl.² F16D *69/00*

U.S. Cl. 188—250 B **2 Claims**



1. A brake shoe for a rim brake assembly of a bicycle having a wheel rim, said brake shoe comprising an elongated body member of frictional material and having one face thereof with a plurality of cleat inserts embedded therein, said cleat

inserts being made from an absorbent material having capillary action and frictional properties, said cleat inserts having a first face thereof exposed on said face of said body member to contact said rim, said body member having a longitudinal hole extending therethrough from end to end thereof and being parallel to said face of said body member, said cleat inserts having a second face adjacent and communicating with said longitudinal hole, thereby upon movement of said bicycle and rotation of said wheel rim air is forced through said longitudinal hole causing a suction of heat and liquid vapor through said cleat inserts when said rim is wet and said brake shoe is in contact with said rim.

4,029,182

OVERHEAD ELECTRIC TRACTION SYSTEMS

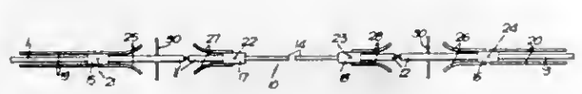
Stanley Harold Russell Proud, Marlow, England, assignor to Bicc Limited, London, England

Filed Dec. 30, 1975, Ser. No. 645,334

Claims priority, application United Kingdom, Dec. 31, 1974, 56249/74

Int. Cl.² B60M *1/18*

U.S. Cl. 191—39 **19 Claims**



1. A neutral section of an overhead electric traction system wherein a contact wire and at least one catenary wire of one of two adjacent sections of the overhead electric traction system which are to be electrically separated by the neutral section are secured to one end of an elongate insulated runner; the contact wire and at least one catenary wire of the other of said two sections of the system are secured to one end of a second elongate insulated runner; at least one elongate metallic member separates and is connected to other ends of said insulated runners, the undersurfaces of the contact wires, said insulated runners and said elongate metallic member lying in a substantially common plane; and, at each of a plurality of spaced positions along the length of the neutral section, means is provided for suspending the neutral section from a supporting structure, each of at least some of said suspension means being of such a form as to resist any torsional load to which the insulated runners may be subjected and at least said suspension means at each end of the neutral section being so resiliently loaded as to assist in lifting of the neutral section to a height similar to that of the adjacent contact wires as a current collector runs through.

4,029,183

CONTROL VALVE FOR STEERING CLUTCH AND BRAKE

Akihiro Toyomura, Hirakata, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

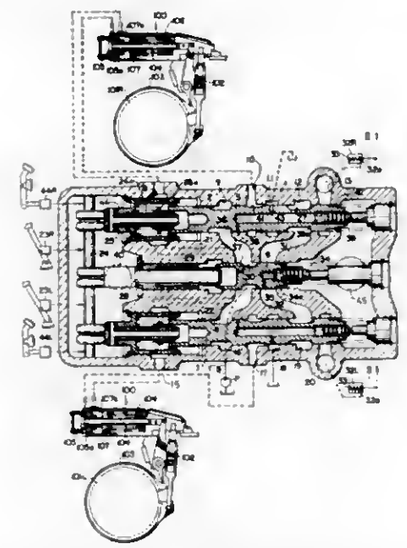
Continuation of Ser. No. 481,476, June 20, 1974, abandoned. This application Feb. 23, 1976, Ser. No. 660,370

Claims priority, application Japan, June 20, 1973, 48-72206

Int. Cl.² F16D *67/04*

U.S. Cl. 192—13 R **2 Claims**

1. A control valve for a hydraulically actuated steering clutches and steering brakes, comprising a valve housing having a plurality of bores therein; first, second and third spools slidably disposed within said respective bores; right and left hand operating rods operatively connected to said first and third spools respectively, and both rods mechanically connected to said second spool; means for disengaging either one of the steering clutches by supplying hydraulic fluid by two of said spools into a pressure chamber thereof when either one of the right and left operating rods is moved along a predetermined stroke to operate said second spool and one of said first and third spools; and means for applying either one of the steering brakes by supplying hydraulic fluid by one of said first and third spools into a pressure receiving chamber for the brake thereof when said operating rod is further moved



along a second predetermined stroke to further operate said one of said first or third spools.

4,029,184

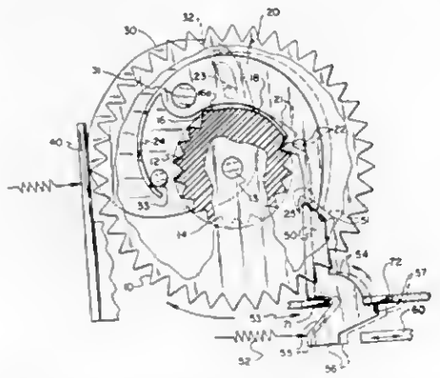
PAWL AND RATCHET CLUTCH

Guilford Edwin Kindig, Rochester, and Henry Stanislaus Adamski, Webster, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 9, 1976, Ser. No. 675,102

Int. Cl.² F16D *11/06*

U.S. Cl. 192—28 **12 Claims**



1. An improved pawl and ratchet clutch, comprising a pawl, a rotatable ratchet wheel including a plurality of generally similarly sized teeth adapted to engage the pawl and rotate with the pawl in coupled engagement, pawl releasing means locatable in the path of the pawl when it is coupled with the wheel to uncouple the pawl from coupled engagement with the wheel, and the improvement which comprises:

means on the ratchet wheel and extending further radially outwardly beyond the radial extent of the generally similarly sized teeth for moving the uncoupled pawl away from the wheel; whereby the pawl releasing means holds the uncoupled pawl out of contact with the generally similarly sized teeth of the ratchet wheel as the wheel is rotated relative to the uncoupled pawl.

4,029,185

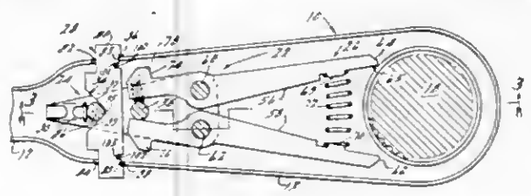
TORQUE TRANSMITTING AND INDICATING DEVICE

Michael M. Walsh, Northville, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Nov. 3, 1975, Ser. No. 628,000

Int. Cl.² F16D *41/16;* **B25B** *23/142;* **G08B** *3/02*

U.S. Cl. 192—30 W **23 Claims**



1. A torque transmitting and indicating device comprising:

A. a rotatable input drive member having a housing portion encompassing its rotational axis;

B. an output drive member rotatable about said input drive rotational axis and adapted to be connected to a load;

C. a carrier member disposed within said housing portion;

D. means mounting said carrier member within said housing portion for pivotal movement relative to said housing portion about an axis parallel to but displaced from said input drive rotational axis;

E. pawl drive means having a load engaging portion at one end thereof;

F. mounting means for carrying said pawl drive means for pivotal movement with said carrier member and for permitting pivotal movement of said pawl drive means relative to said carrier member about an axis parallel to said input drive rotational axis between a first operative position and a second indicating position;

G. means pivotally biasing said pawl drive means into said first position; and

H. means pivotally biasing said carrier member and thereby said pawl drive means into driving engagement with said output drive member at a point thereon displaced from a plane containing said pawl drive and carrier pivotal axes whereby rotation of said input drive member in one direction effects the transmission of torque to said output member and a resultant force reaction at said point of engagement acts against said carrier biasing means and said pawl biasing means to pivot said pawl drive means to said second indicating position when said torque exceeds a predetermined magnitude.

4,029,186

RADIALLY MOVABLE CLUTCH RELEASE BEARING

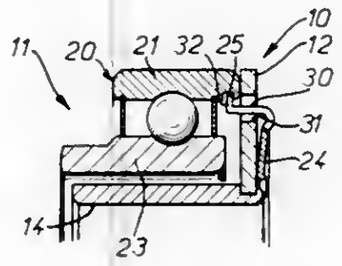
Gerard De Gennes, Senlis, France, assignor to Societe Anonyme Francaise du Ferodo, Paris, France

Filed Mar. 9, 1976, Ser. No. 665,320

Claims priority, application France, Mar. 21, 1975, 75.08847

Int. Cl.² F16C *19/00, 33/30*

U.S. Cl. 192—98 **21 Claims**



1. A clutch release bearing of the kind comprising an actuating element having means for cooperation with clutch actuating means, and a drive element having a surface portion for cooperation with a clutch release member, said clutch release bearing having an axis, a self-centering connecting means of one-piece resilient construction connecting said actuating element and drive element together and permitting relative movements in all directions in a plane perpendicular to the axis of said clutch release bearing, and said self-centering connecting means comprising an axially acting resilient clamping Belleville washer bearing on one periphery thereof against one of said elements, and integral fastening claws disposed around and projecting from said other periphery of said Belleville washer in spaced relation, said fastening claws being engaged with said other element and acting in tension thereon while said Belleville washer axially resiliently urges said elements towards each other.

4,029,187

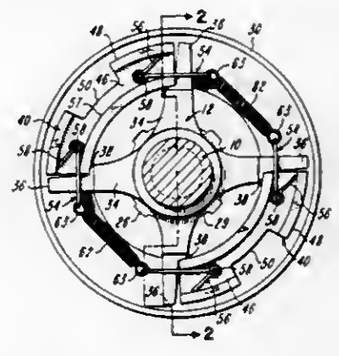
CLUTCH WITH CENTRIFUGALLY ACTUATED SPRINGS

Marion H. Davis, and John W. Cleghorn, both of Hagerstown, Ind., assignors to Pay-Bak, Inc., Hagerstown, Ind.

Filed June 16, 1975, Ser. No. 587,254

Int. Cl.² F16D *43/14*

U.S. Cl. 192—105 BA **19 Claims**



1. In a centrifugal clutch of the type comprising a driven drum rotatable about a rotary axis, a driving spider rotatable about the same axis and disposed concentrically within said drum, said spider having plural arms radiating outwardly toward the interior wall of said drum, clutch shoes received between diametrically opposite pairs of said arms, and yielding means connected between said shoes to resist centrifugal actuation of said shoes toward said interior wall on rotation of said spider; the improvement wherein said yielding means comprise spring means disposed to opposite sides of said rotary axis, said spring means drawing said clutch shoes radially inwardly toward said rotary axis in the absence of spider rotation, said spring means sized as to mass and force constant to bow outwardly away from said rotary axis toward the interior wall of said drum to positions in which said spring means draw said clutch shoes primarily in a circumferential direction about said rotary axis, the size and mass of said spring means predetermined to cause said spring means to shift the direction in which said spring means draw said clutch shoes from a radial direction to a circumferential direction at substantially the same angular velocity of said spider as required to centrifugally actuate said clutch shoes to engagement with the interior wall of said drum.

4,029,188

CONTROL APPARATUS OF STEERING CLUTCH FOR TRACTOR

Toshikatsu Okano, Mikawamachi, Japan, assignor to Kabushiki Kaishi Komatsu Seisakusho, Tokyo, Japan

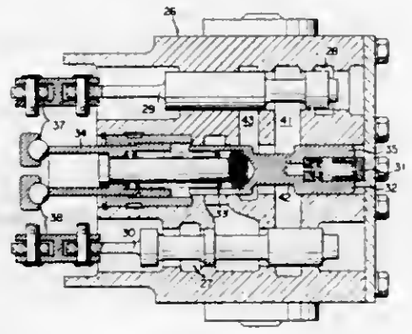
Filed Nov. 18, 1975, Ser. No. 633,103

Int. Cl.² F16D *25/10*

U.S. Cl. 192—109 F **3 Claims**

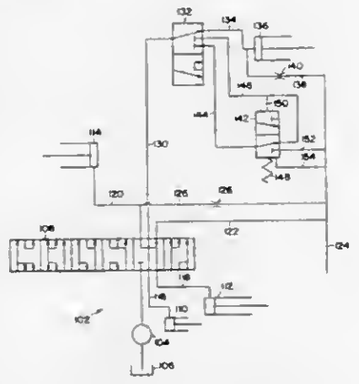
1. A control apparatus in a steering clutch for a tractor comprising

a pair of steering clutches,
a pair of yokes mounted on said steering clutches to release and connect said steering clutches,
a pair of rocking levers engaged with said yokes at one end thereof,
a pair of piston means connected to said pair of rocking levers at the opposing ends of said rocking levers, each of said piston means having a chamber contained therein, and valve means connected to said chambers of said



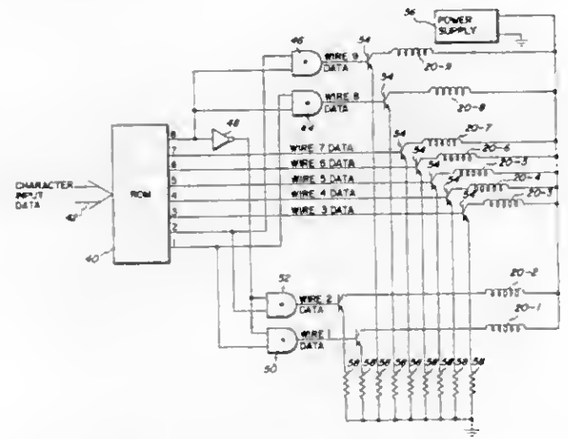
piston means with said valve means comprised of a valve body,
a first spool slidably disposed in said valve body, a second spool slidably disposed in said valve body, and a relief valve slidably disposed in said valve body, and an operator connected to each said first and second spools and both operators connected to said relief valve for selectively releasing and connecting said pair of clutches and controlling the pressure thereto.

4,029,189
WINCH CLUTCH PRESSURE REDUCING VALVE AND LUBRICATION SYSTEM
Thomas William Freiburger, Dubuque, Iowa, assignor to Deere & Company, Moline, Ill.
Filed May 5, 1975, Ser. No. 574,554
Int. Cl.² F16D *13/72*
U.S. Cl. 192—113 B **4 Claims**



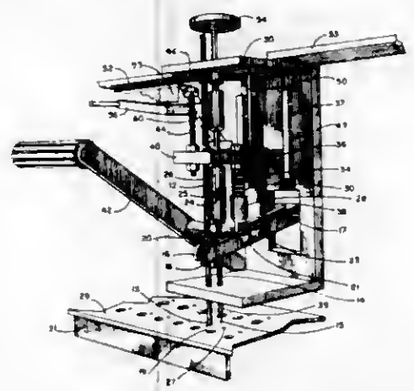
1. In a combination of a hydraulically operable clutch and hydraulic control system therefor wherein the clutch includes friction elements and a hydraulic actuator for effecting full engagement of the friction elements in response to receiving operating fluid as a predetermined minimum pressure and wherein the control system includes a source of fluid pressure connected to a direction control valve operative for selectively connecting or disconnecting the source of fluid pressure to or from a clutch line, and a lubrication fluid passage means connected in fluid communication with the friction elements of and including a primary lubrication feed line connected to the actuator of the clutch, the improvement comprising: a pressure reducing valve means connected to the clutch line and to the hydraulic actuator of the clutch; said clutch line being connected only between the direction control valve and the pressure reducing valve means; said lubrication fluid passage means including a supplemental lubrication fluid feed line means connected to the pressure reducing valve means; and the pressure reducing valve means being selectively operable, only when at least said minimum pressure exists in the clutch line, to establish a normal first operating condition for connecting fluid pressure in the clutch line to the actuator so as to establish full pressure engagement of the clutch while blocking fluid communication between the clutch line and the supplemental lubrication fluid feed line means, and to establish a second operating condition for connecting fluid pressure in the clutch line to the actuator so as to establish partial pressure engagement of the clutch and to connect the clutch line to the supplemental lubrication fluid feed line means.

4,029,190
FONT CONVERSION APPARATUS
Robert A. Ragen, Hayward, and Carl E. Herendeen, Danville, both of Calif., assignors to Xerox Corporation, Stamford, Conn.
Filed June 28, 1976, Ser. No. 700,418
Int. Cl.² B41J *3/50*
U.S. Cl. 197—1 R **18 Claims**



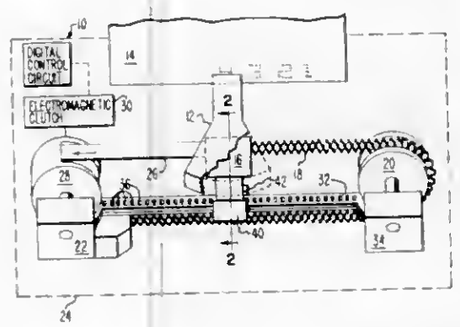
1. Apparatus for energizing a selected one or more of a plurality of actuating devices in order to cause a printing element associated with each selected actuating device to strike on adjacent recording medium, said apparatus comprising:
memory means responsive to a predetermined address signal for supplying a plurality of data bits and a conversion bit together identifying those actuation devices selected for energization;
a plurality of switches respectively coupled to said plurality of actuation devices, each switch capable of energizing its respective actuation device in response to receipt of a data bit of a first state;
first means coupled to said memory means and to first and second predetermined ones of said switches and being responsive to said conversion bit being of a first state for supplying a first predetermined data bit to said first predetermined switch and responsive to said conversion bit being of a second state for supplying said first predetermined data bit to said second predetermined switch; and
second means coupled to said memory means and to other ones of said switches for respectively supplying other ones of said data bits to said other ones of said switches.

4,029,191
VARIABLE SPACING PRINTING APPARATUS
Edward J. Klem, Las Vegas, Nev., assignor to Angelina M. Klem and Robert B. Pahor, both of Las Vegas, Nev., part interest to each
Filed May 1, 1975, Ser. No. 573,617
Int. Cl.² B41J *1/16, 19/00, 3/28*
U.S. Cl. 197—2 **12 Claims**



1. In a printing apparatus having a movable platen for securing a material to be printed on and a type case positioned above said platen and enclosing a plurality of types for printing on said material, the improvement comprising:
a first reciprocating rod having a lower end for being received in a selected one of a plurality of first type case cover orifices and actuating one of said types when said rod is depressed;
a second reciprocating rod having a lower end for being received in a selected one of a plurality of second type case cover orifices and means for adjusting the elevation of said second rod;
handle means for reciprocally depressing and elevating the first and second rods;
a movable rack and a rigid arm member secured to both the rack and said movable platen whereby movement of said rack causes movement of said platen;
a retractable pawl cooperating with said handle means for being retracted along said rack when the handle is depressed and engaging and advancing said rack and concomitantly said arm and platen when said handle is elevated; and
means cooperating between said pawl and said second rod whereby the retraction of said pawl along said rack is changed by adjusting the elevation of the second rod.

4,029,192
DIGITAL CIRCUIT FOR CONTROLLING THE RETURN SPEED OF A BUSINESS MACHINE CARRIAGE
Chockalingam Manthiram, Plymouth, Mich., assignor to Burroughs Corporation, Detroit, Mich.
Filed Feb. 27, 1975, Ser. No. 553,536
Int. Cl.² B41J *5/30*
U.S. Cl. 197—19 **10 Claims**



1. A digital circuit for selectively activating a clutch mechanism for limiting the return speed of a business machine carriage having a spring biased carriage return mechanism, said circuit comprising:
means for producing a continuous output pulse in response to input sync pulses indicating the return speed of the carriage along its return path, the pulses having intervals therebetween, the intervals signalling that the return speed of the carriage has exceeded a predetermined maximum speed; and
means for coupling said continuous output pulse producing means to the clutch mechanism, said clutch being activated by the continuous output pulse to thereby limit the return speed of the carriage to the predetermined maximum speed.

4,029,193
PRINTER HAVING A PLATEN WITH RESILIENT SEGMENTS
Okun Kwan, Trumbull, Conn., assignor to Bunker Ramo Corporation, Oak Brook, Ill.
Filed Mar. 31, 1975, Ser. No. 563,528
Int. Cl.² B41J *11/20*
U.S. Cl. 197—149 **2 Claims**

1. A printer platen for alternatively providing a printer support surface for single sheets, multiple sheets or documents of varying thickness, comprising:
an elongated support means for mounting other platen components thereto;
first and second document contacting members overlying the support means and normally positioned in aligned spaced relation to each other;
a third document contacting member overlying the support means normally positioned in intermediate aligned abutting relationship with the first and second document carrying members;
a plurality of spring means, each connected between the support means and a respective document contacting member;
means connected between the support means and the document contacting members for normally maintaining a continuous surface between all of the members;
wherein the continuous surface is planar for a document of uniform thickness and further wherein the third member may yield relative to the first and second members for supporting the bulge of a document centerfold while first and second flat portions of a document are supported by the first and second members, in a manner permitting continuous line printing across the centerfold.

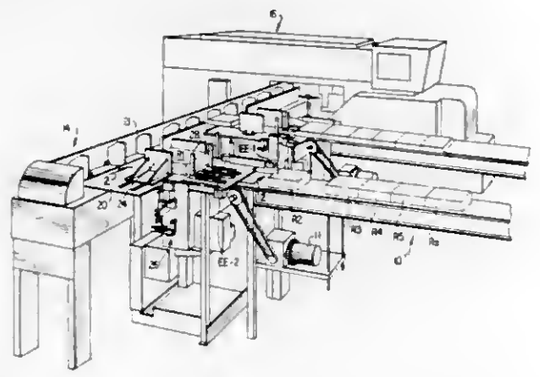
4,029,194
AUTOMATIC INDEXING AND TRANSFERRING APPARATUS
Ludwig J. Feurstein, Sheboygan; Otis E. Meives, Cleveland, and Roger E. Schelk, Sheboygan, all of Wis., assignors to Pemco, Inc., Sheboygan, Wis.
Continuation of Ser. No. 469,562, May 13, 1975, abandoned. This application Apr. 23, 1975, Ser. No. 570,912
Int. Cl.² B65G *47/42*
U.S. Cl. 198—358 **5 Claims**

1. An article transferring apparatus, comprising:
a transfer table for receiving articles to be transferred from an infeed conveyor;
a transferring member for individually moving said articles across said table onto an outfeed conveyor;

means connected to said transferring member for elevating it behind each individual article and for pushing each individual article with said transferring member across said table onto said outfeed conveyor;

first control means for actuating said elevating means to elevate said transferring member behind an individual article in position for pushing that article in response to movement of that article onto said table;

means for monitoring the presence of a preceding article on said outfeed conveyor in the path of a following article,



said monitoring means comprising an enclosed volume having an orifice opening in a wall thereof, said opening being positioned to be covered by a preceding article located on said outfeed conveyor in the path of a following article; means for admitting fluid under pressure to said volume; switch means responsive to a preselected pressure rise in said volume when said orifice is covered; and

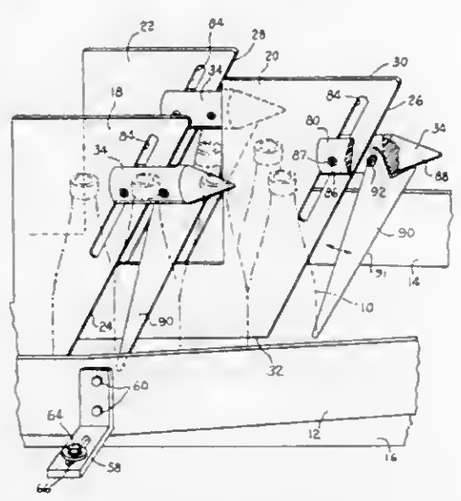
means responsive to said switch means for temporarily preventing actuation of said infeed conveyor and said elevating means.

4,029,195

GUIDE APPARATUS FOR AN ARTICLE CONVEYING MACHINE

Thomas P. Hartness, 305 Bridgewater Drive, and Robert G. Hartness, 203 Wilmington Road, both of Greenville, S.C. 29607

Filed Sept. 24, 1975, Ser. No. 616,427
Int. Cl.² B65G *47/24*
U.S. Cl. 198—399 **8 Claims**



1. For use in bottle handling machines and the like wherein bottles are conveyed on a conveyor in a co-mingled mass to a guide apparatus for aligning the bottles in parallel rows to be conveyed in rows, said guide apparatus comprising:

a pair of outside guide rails carried above said conveyor upon which the bottles travel,

at least one intermemdiate guide rail carried above a longitudinal portion of said conveyor,

an inclined leading edge carried by said intermediate guide rail being inclined downwardly in the direction of conveyance from adjacent the top edge to the bottom edge of said guide rail for engaging a body portion of said bottle when in a tilted position,

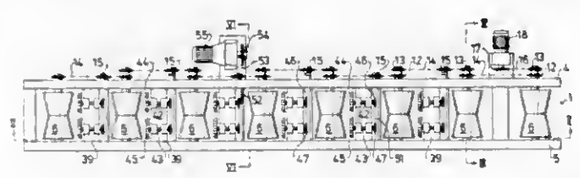
a wedging device carried by said intermediate guide rail for separating the bottles into parallel aligned rows between said guide rails, and said inclined leading edge positioning any tilted bottles to an upright position while being moved by said conveyor.

4,029,196

DEVICE FOR ROTATING PIECES OF LUMBER

Rolf Ekholm, Nyland, Sweden, assignor to A.B. Hammars Mekaniska Verkstad, Nyland, Sweden

Filed Sept. 19, 1975, Ser. No. 614,883
Claims priority, application Sweden, Oct. 7, 1974, 7412583
Int. Cl.² B65G *47/24*
U.S. Cl. 198—413 **3 Claims**



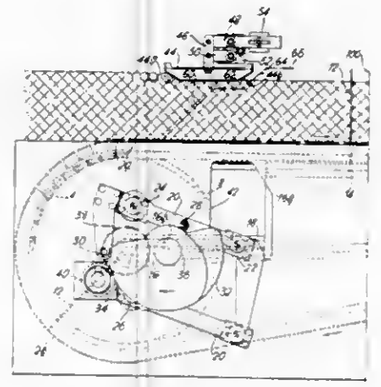
1. Lumber conveying and inspection apparatus comprising, in cooperative combination, an elongated conveyor for longitudinally receiving and longitudinally transporting pieces of lumber, and a lumber rotating device for selective rotation of the conveyor transported pieces of lumber about the longitudinal axes thereof; said elongated conveyor including a series of spaced transversely oriented transport rollers aligned therealong and defining a supporting plane for the pieces of lumber, and means continuously rotating said rollers in a common direction for the longitudinal transporting of the pieces of lumber; said rotating device comprising a lifting frame underlying and paralleling said conveyor, said frame supporting a plurality of pairs of spaced lumber turning wheels, one pair of wheels being located between each pair of adjacent conveyor rollers, the wheels of each pair being mounted on individual shafts for continuous rotation in a common direction about axes parallel to the length of the conveyor, and means for vertically moving said frame between a first position wherein the lumber rotating wheels are oriented below the roller defined supporting plane, and a second position wherein the wheels are oriented above the roller defined supporting plane for a raising of the lumber above the plane for directly supporting the lumber by the wheels for a rotation of the lumber about the longitudinal axis thereof, said lifting frame includes two horizontal lifting beams, each of said lifting beams including a short downwardly extending leg substantially at each end of said beams, each of said legs being connected to a first lever, said first levers being connected to transverse shafts connecting one of said legs on each of said beams, said conveyor including a pair of support beams and said shafts being supported by bearings mounted on said support beams, a free end of each of said levers being attached to a second lever, said second levers connected to one shaft being connected by a rod to said second levers of the other shaft, one of said second levers and rod being connected to a piston rod and hydraulic cylinder means for lifting said lifting beams and said frame, said hydraulic cylinder means being mounted to said supporting beams by a universal joint.

4,029,197

APPARATUS FOR HANDLING CIGARETTES OR OTHER ROD-LIKE ARTICLES

Peter Alec Clarke; Stanley Victor Starkey, and William Alfred Stone, all of Deptford, England, assignors to Molins Limited, England

Filed Jan. 5, 1976, Ser. No. 646,845
Claims priority, application United Kingdom, Jan. 17, 1975, 2075/75
Int. Cl.² B65G *47/22*
U.S. Cl. 198—425 **14 Claims**



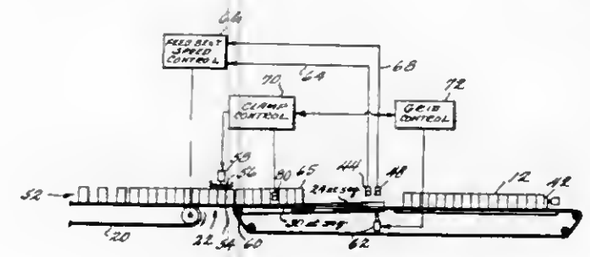
10. Apparatus for dividing a stream consisting of a stack of rod-like articles, comprising conveyor means for supporting and moving the stream, dividing means associated with the conveyor means and arranged to be projected upwards into the stream from a lower position retracted below the conveyor means, guide means for causing movement of the dividing means from the lower position to an upper position in which the dividing means is fully projected through the stream, and pressure means for exerting a pressure on top of the stream over at least part of the region where the dividing means is moving through the stream, wherein the dividing means and guide means are arranged so that the dividing means is projected into the stream in at least two distinct stages, the stages being separated by a dwell zone during which the dividing means remains at the same level above the conveyor means.

4,029,198

METHOD AND APPARATUS FOR FORMING GROUPS OF BRICKS

Hans Lingl, Jr., Paris, Tenn., assignor to Lingl Corporation, Paris, Tenn.

Filed July 5, 1973, Ser. No. 376,302
Int. Cl.² B65G *47/26*
U.S. Cl. 198—425 **25 Claims**



1. Apparatus for rapidly and accurately grouping block-like articles into predetermined lengths having at least one such article in each length, said apparatus comprising:

first transport means for supplying a moving series of said articles,

accumulating means disposed to receive said articles from said first transport means and for frictionally engaging such articles so as to slow but not stop their further motion thereon and to cause them to accumulate thereon in closed-up formation,

sensor means for detecting when said predetermined length of at least one article has been accumulated on said accumulating means and for producing a control signal in response thereto,

second transport means disposed to cooperate with said accumulating means for transporting said predetermined length therefrom, and

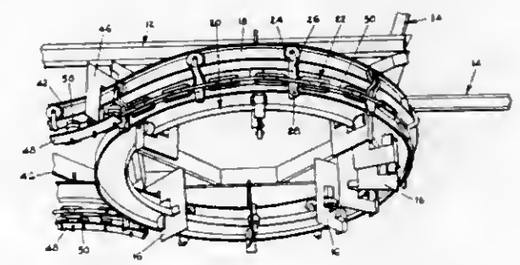
second transfer control means, for effectively disengaging said accumulating means from said predetermined length and for engaging said second transport means therewith in response to said control signal.

4,029,199

OVERHEAD CONVEYOR AND GUIDE LOOP

Frank D. Reens, Grand Rapids, Mich., assignor to Planet Corporation, Lansing, Mich.

Filed Sept. 15, 1975, Ser. No. 613,067
Int. Cl.² B65G *15/60*
U.S. Cl. 198—678 **11 Claims**



1. In an overhead conveyor apparatus having:

a track forming a closed loop, at least a portion of said track forming an arcuate track portion;

a continuous conveyor supported by said track, said conveyor including wheels which roll on said track, work supports secured to the wheels and flexible connectors connecting each of the supports to an adjacent support; and

guide means in engagement with the work supports for guiding the work supports around the arcuate track portion to maintain the conveyor in a taut condition;

the improvement in said guide means comprising:

a circular guide ring having a circular outer circumferential surface and a completely open central portion free from structural interference from the guide means mounting structure and adapted to allow spray equipment to pass vertically therethrough;

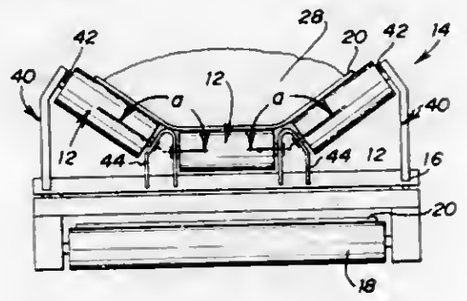
means inwardly of said guide ring circumferential surface at said arcuate track portion for mounting said circular guide ring for rotation about an axis coincidental with the center of curvature of the arcuate track portion and for maintaining said guide ring in a predetermined lateral position, said mounting means positioning said circular guide ring circumferential surface in contact with at least the work supports so that said circular guide ring rotates as said conveyor passes through said arcuate track portion;

said mounting means and said maintaining means defining a completely open central area including at least portions of said guide ring open central portion to allow spray equipment and the like to pass therethrough;

whereby said conveyor is smoothly guided through said arcuate track portion.

4,029,200
TROUGHED ROLLERS FOR BULK MATERIAL HANDLING

Jan J. Dillon, Irving, Tex., assignor to F.E.I., Inc., Dallas, Tex.
Filed Nov. 3, 1975, Ser. No. 628,213
Int. Cl.² B65G 15/08
U.S. Cl. 198—830 7 Claims

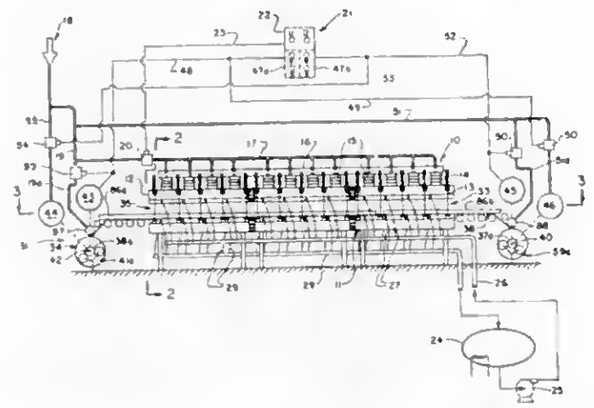


1. A heavy-duty self-lubricating roller for use in a belt conveyor system employing troughed rollers comprising:
an outer elongated hollow cylindrical tube for supporting an advancing conveyor belt;
an inner elongated hollow cylindrical tube dimensioned to be concentrically disposed within said outer tube;
a pair of cylindrical plastic end pieces each having a right circular cylindrical aperture extending through the center thereof;
said plastic end pieces being dimensioned so that each end of said inner tube is closely received within the aperture of one of said end pieces and the exterior cylindrical surface of each of said end pieces is closely received within each end of said outer tube;
means for rigidly interconnecting said outer and inner plastic tubes to said cylindrical end pieces;
self-lubricating plastic cylindrical bearing members dimensioned to be closely received within said aperture of each of said cylindrical end pieces;
said cylindrical bearing members having annular flanges formed on the outer end thereof to regulate the seating depth of said cylindrical bearing members within said cylindrical end pieces; and
a blind socket formed in the center of the outer end of said cylindrical bearing members, said blind socket being dimensioned to closely receive a generally spherical bearing.

4,029,201
CONVEYOR APPARATUS

Bernard H. Davis, Stoney Creek, Canada, assignor to H. H. Robertson Company, Pittsburgh, Pa.
Filed Oct. 2, 1975, Ser. No. 618,926
Int. Cl.² B65G 21/12
U.S. Cl. 198—858 17 Claims

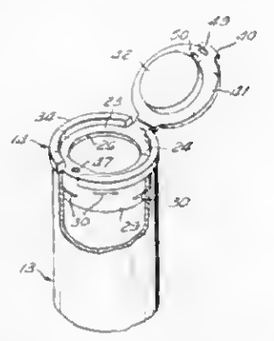
1. Conveyor apparatus comprising:
a horizontal, generally rectangular, stationary bed;
a feed roll positioned at one end of said bed;
a take-up roll positioned at the opposite end of said bed;
conveying means extending from said feed roll over said bed to said take-up roll;
first cradle means at each end of said feed roll supporting the same for rotation about a first roll axis extending transversely of said bed;
second cradle means at each end of said take-up roll supporting the same for rotation about a second roll axis substantially parallel to said first roll axis;
first drive means for rotating said take-up roll about said second roll axis, thereby to move said belt means over said bed in a forward direction;
second drive means operable independently of said first drive means for rotating said feed roll about said first roll axis, thereby to move said belt means over said bed in a reverse direction;
first clutch means for operatively connecting said first drive means to said take-up roll during movement of said belt means in said forward direction, and for disconnecting said first drive means from said take-up roll during movement of said belt means in said reverse direction; and



second clutch means for operatively connecting said second drive means to said feed roll during movement of said belt means in said reverse direction and for disconnecting said second drive means from said feed roll during movement of said belt means in said forward direction.

4,029,202
CONTAINER WITH PLASTIC CAP AND DISPLAY RACK THEREFORE

Lawrence E. Lasich, Twinsburg, and Charles Tecco, Northfield, both of Ohio, assignors to Weatherchem Corporation, Twinsburg, Ohio
Filed May 26, 1976, Ser. No. 673,073
Int. Cl.² B65D 1/36
U.S. Cl. 206—562 12 Claims

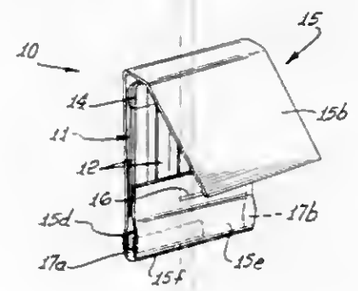


1. In combination, a paper fiber tube, a plastic end closure, and a display rack; said paper fiber tube being a longitudinally extending tube of cylindrical lateral cross sectional configuration and having an inner wall and an outer wall and a first end and a second end, said first end being closed, and said first end having an outer peripheral portion and a longitudinally inwardly recessed center portion spaced longitudinally inwardly from said outer peripheral portion; said plastic end closure being of one-piece construction and including a generally flat annular base, said base having a top wall and a bottom wall, an annular skirt portion connected to said bottom wall of said base and extending longitudinally away from said base, said skirt portion being received within said second end of said tube, a tab movable between an open position and a closed position, said tab being hingedly connected to said base, said tab being a generally disc shaped member, said tab including a longitudinally inwardly recessed center portion; said display rack including a display board and an open cavity in said display board, said cavity having a first end and a second end,

a resilient finger at said first end and at a said second end of said cavity, said fiber tube and said plastic end closure being received within said cavity, said resilient finger at said first end of said cavity projecting longitudinally into said recessed center portion of said tube at said first end of said tube, and said resilient finger at said second end of said cavity projecting longitudinally into said recessed center portion of said tab.

4,029,203
MATCH BOOK

Nelson G. Shawn, 8406 Hollywood Blvd., Los Angeles, Calif. 90069; Anthony L. Gabrio, and Iris G-S Gabrio, both of 348 N. Windsor Blvd., Los Angeles, Calif. 90004
Filed Feb. 26, 1976, Ser. No. 661,659
Int. Cl.² A24F 27/18, 27/00, 27/12
U.S. Cl. 206—108 5 Claims

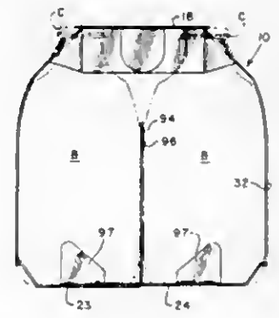


1. In a match book resistant to right-handed children, the combination comprising
a. a parallel match cluster having friction ignitable heads
b. protective cover means for the cluster and defining a fold attached to the cluster remotely from said heads, the cover means including a back and a front flap attached thereto to extend over the heads and toward the fold for releasable retention thereby, and
c. said fold defining a transverse through slot having a left end opening and a right end opening relative to the book when viewed frontally toward said front flap,
d. and abrasive ignition material bonded to at least one inner surface of the fold extending transversely between said left end opening and a locus proximate the medial portion of the slot, all inner surfaces of the slot extending between said locus and the right end opening being entirely free of said material defining a decoy slot extent therebetween, said decoy slot extent being open to receive a match head inserted from the right end of the slot, whereby a match head may be ignited only after insertion into said fold via said left end opening, and withdrawal from said slot via said left end opening accompanied by pressural contact with said material.

4,029,204
BOTTLE PACKAGE

Guelfo A. Manizza, Blauvelt, N.Y., assignor to Federal Paper Board Company, Inc., Montvale, N.J.
Filed June 23, 1975, Ser. No. 589,242
Int. Cl.² B65D 65/12, 85/30
U.S. Cl. 206—140 4 Claims

1. An elongate blank of foldable sheet material cut and scored for wrapping about a group of articles in the form of bottles arranged in double row, transversely paired relation, so as to enclose the articles in a tubular container, said blank being divided by longitudinally spaced, transverse score lines into a top wall forming panel adapted to be positioned on the tops of the articles, adjoining side wall forming panels adapted to be positioned on the outermost sides of the articles and end panels adapted to be connected beneath the articles so as to form a bottom wall, the score lines separating the top wall forming panel from the adjoining side wall forming panels being interrupted by transversely spaced apertures adapted for receiving top portions of the articles, the bottom wall forming panels and the adjoining side wall forming panels having apertures spaced transversely of the blank which interrupt the score lines separating the same and which are formed for receiving bottom portions of the articles, one of said bottom wall forming end panels having transversely spaced locking tab members and longitudinally aligned latching fingers arranged in paired relation with the tab member and latching finger of each pair thereof being spaced longitudinally of the blank, and the other one of said bottom wall forming end panels having transversely spaced locking apertures in which said locking tabs and latching fingers are engaged when the container is formed, said locking apertures each being aligned longitudinally of the blank with a pair of the locking tab and latching finger members and having a dimension longitudinally of the blank which enables the locking tab and the associated latching finger to be engaged therein, said blank having a panel forming an extension of the end panel in which said transversely spaced apertures are located, which extension panel is separated from the bottom wall forming portion of the associated end panel on a cutting line having portions thereof extending transversely of the blank and adjoining portions extending in a generally longitudinal direction which are in paired spaced relation and disposed between the portions of said end panel in which said apertures are located, the longitudinal portions of each pair of said cutting line portions terminating at opposite ends of hinge forming score lines which extend between said longitudinal cutting line portions and which are aligned transversely of the blank so as to provide a hinge connection for said partition panel, said hinge forming score lines being spaced from the transverse edge of said



apertured portions of said end panel which are defined by the transversely extending portions of said cutting line, whereby said longitudinal partition forming panel is derived in part from the adjoining bottom wall forming end panel, and said longitudinal partition forming panel having an overall dimension in the direction longitudinally of the blank and extending from said hinge forming score lines which is greater than the corresponding dimension of the apertured portions of said end panel and which is less than the height of said articles, said dimension being sufficient, when said partition forming panel is hinged to an upstanding position between the two rows of articles in the container, to separate otherwise contacting portions of the articles and to provide for holding the rows of articles in non-contacting, separated relation.

2. A package comprising a group of articles in the form of bottles arranged in double row, transversely paired relation and enclosed in a tubular container formed by wrapping a single blank of foldable sheet material about the group of bottles, said container comprising a top wall forming panel overlying the tops of said bottles in the two rows thereof, adjoining side wall forming panels extending down along the outermost sides of said bottles and bottom wall forming panels having their margins overlapped and connected by interengaging locking and latching elements, means at the juncture of said top wall forming panel and said adjoining side wall forming panels for holding the top portions of said bottles against movement in the direction of the ends of the tubular container and means at the juncture of said bottom wall forming panels and said side wall forming panels for bolding the bottom

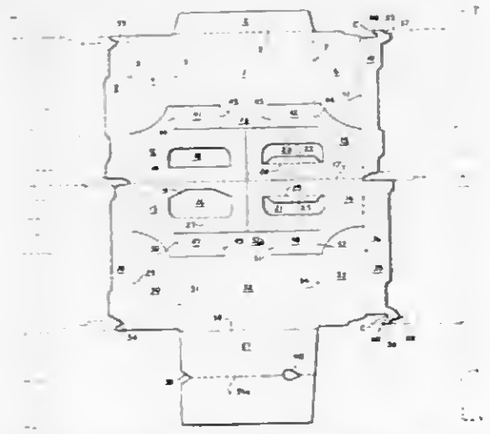
portions of the bottles against movement in the direction of the ends of the tubular container, and said bottom wall panels having an associated, hingedly connected, bottle separating panel disposed in upstanding relation between the rows of bottles which separating panel is of sufficient dimensions to extend to a point above the center portions of the bottles and to provide a center longitudinal partition for holding the rows of bottles in non-contacting, separated relation, said upstanding separating panel having a double thickness portion at the top margin which is provided by folding over a marginal strip portion and securing the same to adjoining portions of said panel by latching tab members cut from said panel and having free edge portions positioned to overlie the margin at the free edge of said marginal strip portion.

4,029,205

ARTICLE CARRIER

Prentice J. Wood, Hapeville, Ga., assignor to The Mead Corporation, Dayton, Ohio

Filed June 28, 1976, Ser. No. 700,227
Int. Cl.² B65D *5/48, 75/00, 81/00*
U.S. Cl. 206—173 **7 Claims**



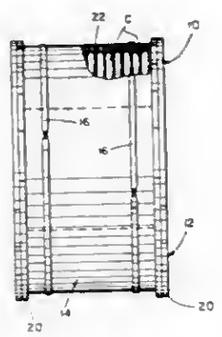
1. An article carrier blank comprising a bottom wall, a first side wall foldably joined at a side edge of said bottom wall, a first pair of end wall panels foldably joined respectively to the end edges of said first side wall, a first pair of riser panels foldably joined respectively to said first pair of end wall panels along the edges thereof remote from said first side wall, a first pair of handle panels foldably joined along their outer end edges respectively to said first pair of riser panels, a second pair of handle panels foldably joined respectively to the top edges of said first pair of handle panels, a second pair of riser panels foldably joined respectively to said second pair of handle panels along the outer end edges thereof, a second pair of end wall panels foldably joined respectively to said second pair of riser panels along the inner edges thereof, a second side wall foldably joined respectively along the end edges thereof to the edges of said second pair of end wall panels remote from said second pair of riser panels, a pair of locking notches formed respectively in the riser panels at one end of the carrier blank, a pair of stabilizing tabs integral respectively with the riser panels at the other end of the carrier blank and each comprising a heel portion and a toe portion and a notch, said toe portions extending inwardly with respect to said blank and each of said notches opening inwardly with respect to said blank, said heel portions extending outwardly beyond the end edge of said blank at said other end of the carrier blank and adapted respectively to nest with the locking notches of an adjacent blank, and a locking aperture formed in said bottom wall, said adjacent blank being struck from the same sheet of material as said article carrier blank.

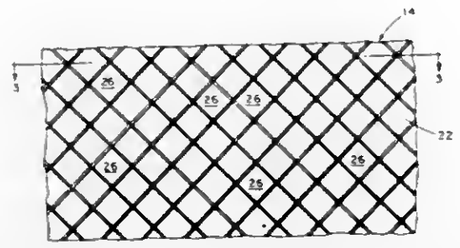
4,029,206

CABLE STORAGE PACKAGE

Laurie G. Mykleby, Palos Park, Ill., assigoor to Coronet Container, Lombard, Ill.

Filed Sept. 22, 1975, Ser. No. 615,473
Int. Cl.² B65D *85/67;* **B32B** *29/00*
U.S. Cl. 206—400 **6 Claims**





1. A flexible packing material comprising only a continuous outer flexible sheet, and a plurality of upright walls in closely adjacent relationship defining adjacent cells and each wall having a first edge and a second edge, said first edges only being rigidly secured to one surface of said outer flexible sheet so that portions of said walls secured to said sheet are substantially incompressible towards each other, and said second edges of said walls being movable towards and away from each other along said second edges.

4. A package for the storage of insulated multi-strand cable, said package comprising, in combination a rigid core, a pair of spaced flanges rigidly interconnected to said core in spaced relationship to each other, a cable receiving space defined between said flanges and on said core, cable being wound around the core between the flanges in said space, a flexible cable cover means for protecting said insulated cable, said cover means being wrapped around said cable and between said flanges, said cover means comprising only a continuous outer flexible sheet and a plurality of upright walls having a first edge and a second edge and defining a plurality of adjacent upright cells, said walls being secured to said sheet only along said first edge and not along said second edge and said second edge being positioned against the outer layer of said cable, and means for rigidly securing said cover around said cable.

4,029,207

CARRIER CARTON

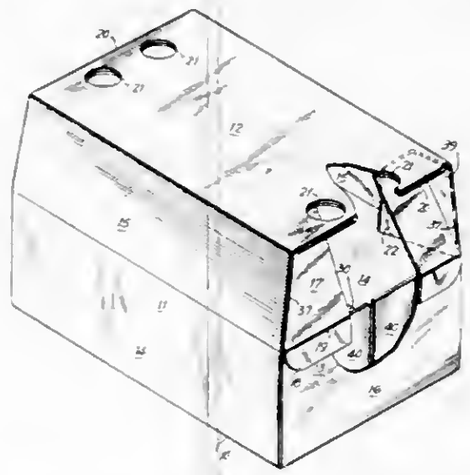
Robert L. Gordon, Monroe, N.Y., assignor to International Paper Company, New York, N.Y.

Filed Nov. 18, 1975, Ser. No. 632,929
Int. Cl.² B65D *65/12, 65/22, 5/46*
U.S. Cl. 206—427 **10 Claims**

1. A carrier carton, for packaging a plurality of similar articles, formed from an essentially flat blank of paperboard, comprising:

a. an opposed pair of end walls;
b. an opposed pair of side walls;

c. a top wall;
d. a bottom wall;
e. each of said walls being foldably connected along a score line with at least a portion of at least one other adjacent wall of said walls to form said essentially flat blank when said carton is in the unerected condition;
f. said top wall extending beyond at least the upper portion of the first of said end walls defining an eave-like projection of said top wall over said upper portion of said first end wall when said carton is in the erected condition;
g. said eave-like projection including an opening therethrough sufficiently large to accept a human finger, said opening passing essentially only through said projection whereby light is essentially prohibited from entering said



carton and said carton may be lifted by use of said opening, said eave-like projection being comprised of two layers of said paperboard wherein the lowermost layer of said two layers is formed from an extension of said top wall folded downwardly upon itself along a score line to define the lower surface of said eave-like projection; and
h. at least the first of said end walls including two flaps, a first of said flaps defining at least part of the upper portion of said first end wall, the second of said flaps defining at least part of the lower portion of said first end wall, said flaps meeting each other in said end wall, and one of said flaps including a pull tab connected with the end thereof by a score line, said pull tab overlying the other of said flaps and being adhesively secured thereto.

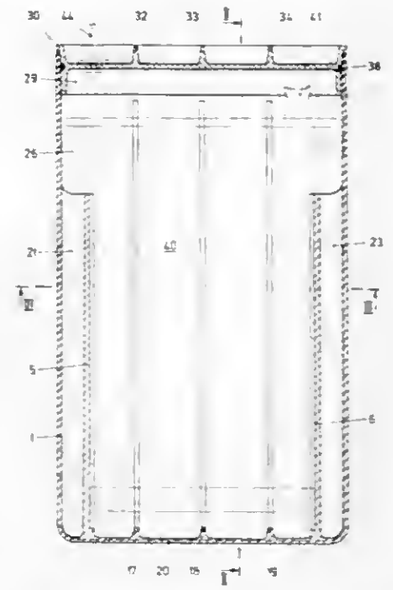
4,029,208

PACKAGING RECEPTACLE FOR PRINTED BOARDS

Hans Fickler, Winterthur, and Walter Frankhauser, Kusnacht, both of Switzerland, assignors to Aktiengesellschaft Fur Rationelle Verpackung, Affoltern a. A., Switzerland

Filed Dec. 1, 1975, Ser. No. 636,575
Claims priority, application Switzerland, Dec. 6, 1974, 16218/74; Nov. 10, 1975, 14539/75
Int. Cl.² A47G *19/08;* **A45C** *11/26;* **B65D** *85/54*
U.S. Cl. 206—454 **9 Claims**

1. A packaging receptacle for printed boards comprising: internal guide means for supporting at least one printed planar board and for restraining said board against displacement in the plane of the board and for affording lateral slideable play of said printed board perpendicular to the plane defined by the printed board, said internal guide means comprising a pair of spaced apart, generally parallel walls, a first groove in one of said walls for receiving a first edge of the board and a second groove in the other of said walls, opposite said first groove and for receiving a second edge of said board opposite said first edge, said grooves each having a bottom receiving said board thereagainst, the bottoms of said first and second



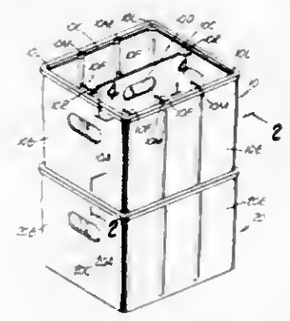
grooves being spaced apart by a dimension substantially equal to the width of said board.

4,029,209

STACKABLE CARRYING CASE

Carl E. Frahm, and Shirley E. Frahm, both of 133 Maple Ave., Monrovia, Calif. 91016

Filed May 3, 1976, Ser. No. 682,525
Int. Cl.² B65D *21/02, 25/04, 1/24*
U.S. Cl. 206—510 **6 Claims**



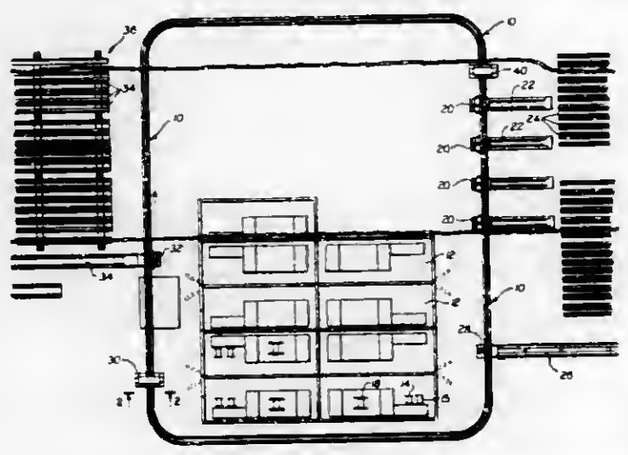
1. A generally rectangular stackable carrying case having a pair of end walls and a pair of side walls joined to said end walls; a center divider partition member extending between and joined to said end walls; said end walls and said side walls each being formed with an internal ledge portion; each of said ledge portions being joined to provide a continuous generally rectangular ledge located an equal distance below the top edge of each of said end and said side walls; said partition member being generally planar and extending (above the top edge) above said top edge of each of said end and side walls; said partition member terminating near the bottom of said case at an elevation above the bottom edges of said end and said side walls; said bottom edges of said end and said side walls terminating in a plane which is below the bottom of said partition member; means extending inwardly from said end and said side walls and forming a channel means with the lowermost portion of said partition member; said channel means being receptive to and serving as a guide means for the uppermost extending portion of a partition member of a like case, said uppermost extending portion cooperating with said channel means to guide movement of said case when said case is tilted upwardly from engagment with the ledge portions of

said end walls and is slid on the ledge portions of said side walls.

4,029,210
BOBBIN SPACER FOR CONVEYOR SYSTEM

Walter F. Thompson, and Dennis M. Redo, both of Somerville, N.J., assignors to General Cable Corporation, Greenwich, Conn.

Filed Sept. 10, 1975, Ser. No. 611,909
Int. Cl.² B07C 5/04
U.S. Cl. 209—82 15 Claims

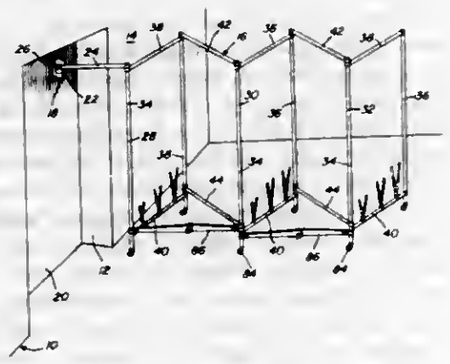


1. A bobbin conveyor for a wire making plant including in combination an endless belt conveyor on which the flanges of flanged bobbins are placed at a loading location for transfer to another location, said conveyor being of a width less than the diameter of the flanges of the bobbins, bobbin spacing apparatus at a station between the loading location and the other location, said bobbin spacing apparatus comprising means for contacting the flange of a trailing bobbin that is closer to a leading bobbin than a predetermined minimum distance lengthwise of the conveyor to hold said trailing bobbin from moving with the conveyor belt and to thereby increase the spacing of successive bobbins from one another, said means being located on opposite sides of the conveyor in positions over which bobbin flanges, projecting beyond the sides of the conveyor, travel as they move with the conveyor, and motion transmitting apparatus for moving said means into and out of the path of the bobbin flanges.

4,029,211
FOLDING CLOTHES RACK WITH STABILIZING HINGES AND SHOE SUPPORTS

Mary L. Marshall, 142 E. Wilkinson, Shreveport, La. 71104

Filed Feb. 12, 1974, Ser. No. 441,844
Int. Cl.² A47F 5/10
U.S. Cl. 211—104 1 Claim

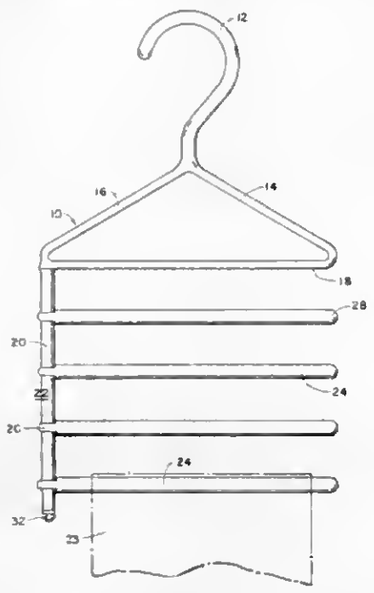


1. A folding clothes rack comprising at least two pairs of upright standards spaced along a horizontal zig-zag path, upper and lower generally horizontal brace members extending between and rigidly secured to the upper and lower ends of each pair of standards, a pair of upper and lower elongated and generally horizontal spacing and support members extending between upper and lower end portions of the adjacent standards, along said path, of said pairs of standards with the opposite ends of said spacing and support members anchored to said adjacent standards for relative displacement about the center longitudinal axes of said adjacent standards, and elongated articulated link means connected between adjacent pairs of standards with the link means connected at one end to one standard of a first pair of standards and at the other end to another standard spaced two standards along said path from said one standard, said articulated link means comprising a pair of link sections having one pair of ends pivotally secured together for relative angular displacement about a horizontal axis extending transversely of said link sections, the other pair of ends of said link sections including anchor portions pivotally secured thereto for oscillation about axes generally paralleling said horizontal axis and supported from said one standard and said second standard spaced therefrom at points adjacent but spaced above the lower ends thereof for angular displacement relative thereto about axes extending longitudinally therealong, said link sections being pivotally connected at said one pair of ends thereof for relative angular displacement of said link sections between first limit positions with said link sections generally paralleling each other in side-by-side upstanding relation with said other pair of ends thereof uppermost and second limit positions with said link sections disposed in generally end aligned relation, said anchor portions including partial cylindrical spring clamp members snap fittingly and rotatably engaged with said one standard and said second standard spaced therefrom.

4,029,212
CLOTHES HANGER

Ronald Uadiski, Box 17, Seward, Pa. 15954

Filed Mar. 4, 1976, Ser. No. 664,053
Int. Cl.² A47F 7/19
U.S. Cl. 211—113 7 Claims

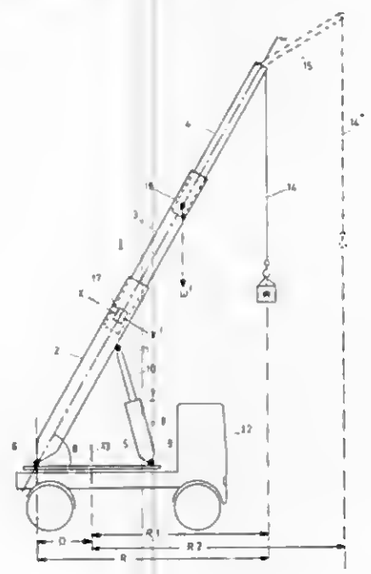


1. A clothes hanger adapted to support a plurality of articles of clothing, comprising a body portion having an upwardly extending hook means and depending therefrom a pair of diverging side sections, a base section integral with and engaging said side sections thereby forming a triangular body, one of said side sections having a downwardly extending substantially vertical side support section having a predetermined external diameter, a plurality of hollow internally threaded cylindrical spacer members having an internal diameter larger than the external diameter of said side support section and adapted to receive the same therethrough, a plurality of horizontally disposed clothing support members, each of said clothing support members terminating at one distal end in a ring member, said ring member having an internal diameter larger than the external diameter of said side support section, said ring member adapted to receive said support section in slidable and rotational engagement whereby said clothing support members are adapted to rotate 360° about said side support member, at least the distal end section of said side support member being externally threaded, internally threaded locking means adapted to engage said distal end section whereby said spacers and support members are retained in position.

4,029,213
CRANE LOAD INDICATING ARRANGEMENT

Willie Ellis Thompson, and Timothy John Archer Davis, both of Westcliff on Sea, England, assignors to Pye Limitrd, Cambridge, England

Filed Apr. 2, 1975, Ser. No. 564,307
Claims priority, application United Kingdom, Apr. 10, 1974, 15845/74
Int. Cl.² B66C 13/48
U.S. Cl. 212—39 MS 13 Claims



1. A crane load indicating arrangement for use with cranes having a boom which is pivoted at one end for luffing movement by a boom supporting means and is adapted to support a load at its other end, comprising measuring and reference circuits for providing an indication of the additional available lifting capacity a strain transducer adapted to be symmetrically mounted on the boom at a location for measuring only the shear stress in the boom but substantially independent of any bending stress in the boom at said boom location, the strain transducer supplying a first output signal to the measuring and reference circuits which is proportional to the shear stress produced in the boom by the weight of that part of the boom between the said location and the outer end of the boom, together with the shear stress produced by the weight of any load suspended at said outer end of the boom.

4,029,214
STOCK HANDLING APPARATUS

Andrew G. Benedict, Quakerstown; Thomas E. Marker, Wind Gap, both of Pa., and Herbert J. Schmidt, Glen Head, N.Y., assignors to MCP Facilities Corporation, Glen Head, N.Y.

Filed Sept. 2, 1975, Ser. No. 609,509
Int. Cl.² B65G 47/26
U.S. Cl. 214—1 P 9 Claims

1. Stock handling apparatus for temporarily storing and transporting bar stock including,

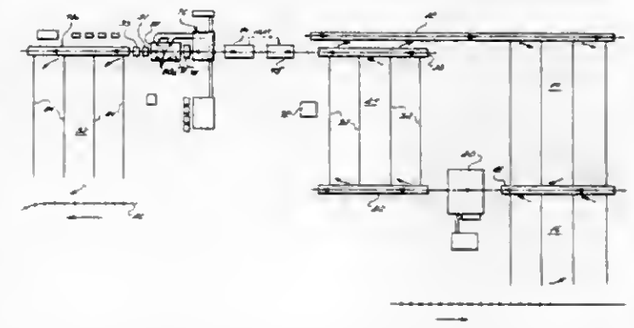
conveyor means to receive and transport the stock,

serial loader means including a plurality of loading spaces for serial loading a plurality of stock pieces, said loading spaces being defined between a plurality of fingers that are in a spaced configuration,

means to feed the stock to said serial loader means to be stored therein and positioned thereby in spaced configuration for concomitant movement therefrom, and

transport roller means having means to receive and position a plurality of stock pieces in spaced configuration as they are received in said loading spaces.

7. A method of handling bar stock during the coating thereof,



conveying the stock from a loading zone by means of a first conveyor,

feeding the stock onto an approach ramp,

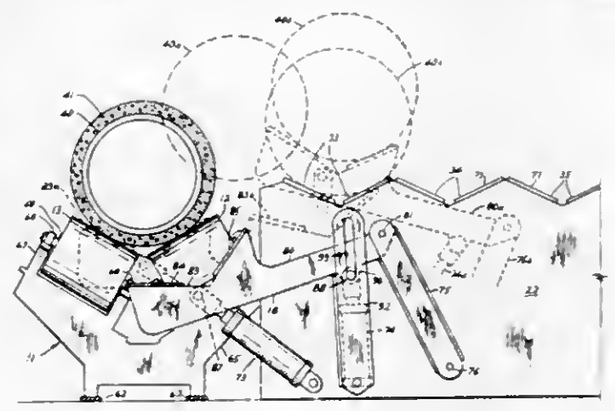
depositing the stock from the approach ramp onto a serial loader having a plurality of movable fingers and lifting the fingers in a sequential manner to load the stock pieces into the serial loader in a spaced array, and

moving the plurality of stock concomitantly from the loader so that said plurality of stock can be coated simultaneously.

4,029,215
PIPE HANDLING APPARATUS FOR PIPE LAYING BARGES

J. C. Birdwell, Houstoo, Tex., assignor to Midcoo Pipeline Equipment Co., Houston, Tex.

Division of Ser. No. 592,170, July 1, 1975, Pat. No. 3,984,007.
This application June 10, 1976, Ser. No. 694,885
The portion of the term of this patent subsequent to Oct. 5, 1993, has been disclaimed.
Int. Cl.² B65G 25/02, 47/82; B23Q 5/22
U.S. Cl. 214—1 P 11 Claims



1. Pipe lifter conveyor apparatus, comprising generally horizontally disposed bar means having pivotal connection means at one end thereof, pivot bar means disposed generally transversely downward from one end of said bar means having its upper end pivotally connected to said pivotal connection means of said bar means and having its lower end pivotally connected to a fixed support, upwardly facing pipe seat means at the other end of said bar means, first drive cylinder means pivotally connected to said bar means beneath said seat means

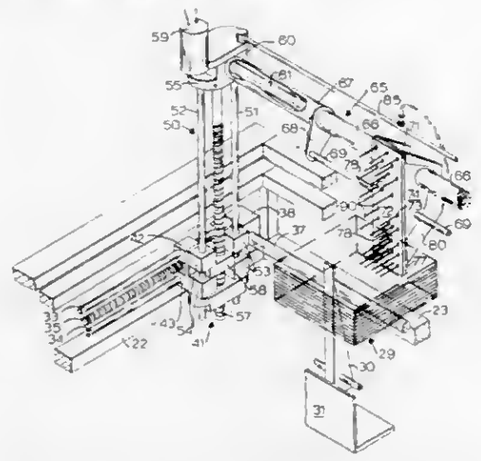
at its upper end and pivotally connected to a fixed support at its lower end for moving said bar means generally longitudinally in one direction and for raising and lowering said seat means to move said seat means between a first location and a second location, second drive cylinder means pivotally connected downwardly between an intermediate point of said bar means and a fixed support for lifting and supporting said seat means and for moving said bar means generally longitudinally in the other direction during its said movement between said first location and said second location.

4,029,216

METHOD AND APPARATUS FOR MOVING A STACK OF CORRUGATED SHEETS FROM A STACKER TO A DESIRED LOCUS

Clifton G. Adams, Baldwin Park; Carl B. Dallas, Buena Park, and George E. Coltrin, El Monte, all of Calif., assignors to Georgia-Pacific Corporation, Portland, Oreg.

Filed May 7, 1975, Ser. No. 575,204
Int. Cl.² B65G *47/90*
U.S. Cl. 214—1 BB **17 Claims**



1. An apparatus for relocation of a stack of corrugated board sheets aligned to expose on a side of said stack a series of many end openings for each said sheet formed by the corrugations thereof, the combination of:

an upright plate defining multiple series of horizontal perforation therethrough, one series having a multiplicity of said perforations being alignable with some of a said series of end openings of the bottom sheet of said stack and other of said series of perforations then being aligned with end openings of other sheets dispersed over said side of said stack,

pin-supporting means supporting multiple series of horizontal pins, each being sized and positioned in relation to a said perforation and a said end opening for movement therethrough and for an effective distance beyond said perforation and into said opening for use in lifting said stack in cooperation with said other pins.

lift means supporting said pin-supporting means, for lifting a stack into which said pins have been inserted, and

pin projecting and retracting means attached to said pin-supporting means for extending said series of pins through said plate and into a said stack and for retracting said pins from said stack.

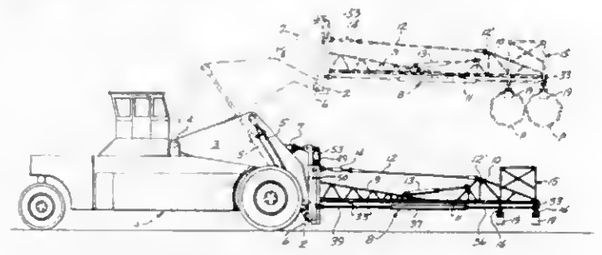
4,029,217

PIPE-HANDLING CRAMPON

Charles Richard Morse, P.O. Box 1561, Anchorage, Alaska 99510

Filed Jan. 15, 1975, Ser. No. 541,264
Int. Cl.² B65G *41/00*
U.S. Cl. 214—1 P **26 Claims**

1. A length-handling crampon for a lift truck having a boom projecting from and supported by the lift truck, comprising an elongated length-spanning frame carried by the boom with its length extending transversely of the length of the boom and its opposite end portions projecting substantial distances beyond opposite sides of the boom, powered frame-carrying means for



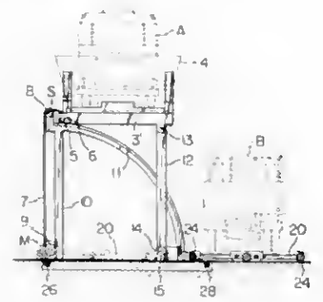
moving said length-spanning frame transversely of its length along the boom toward and away from the lift truck, and remotely actuated power gripping means carried by said frame and engageable with a length to be handled for gripping such length.

4,029,218

TWO-STORIED PARKING APPARATUS FOR AUTOMOBILES

Takashi Matsuura, 28-4, Izumi 2-chome, Suginami, Tokyo, Japan

Filed Feb. 21, 1975, Ser. No. 551,770
Int. Cl.² E04H *6/06*
U.S. Cl. 214—16.1 R **6 Claims**



1. An elevated parking apparatus for automobiles, comprising:

a pair of frames stationarily fixed to and projecting upwardly from the ground, said frames being spaced from one another;

said pair of frames defining a pair of substantially parallel, arcuate guide rails fixedly associated with the respective frames, each said guide rail defining thereon an arcuate guide surface disposed substantially within a vertical plane, one end of said guide surface being disposed closely adjacent the ground, the other end of said guide surface being spaced vertically upwardly a substantial distance above the ground and horizontally offset with respect to said one end;

pulley means rotatably supported on each of said frames adjacent the upper end of the respective arcuate guide rail;

an upper pallet adapted to have a vehicle positioned and supported thereon, said pallet extending between said frames and having a pair of roller means mounted thereon and disposed in rolling engagement with said pair of guide rails, whereby said roller means rollingly engage said arcuate guide surfaces, said roller means being rotatably supported on said pallet adjacent one edge thereof;

a pair of elongated support members having the lower ends thereof pivotally connected to and supported adjacent the ground so that said support members are swingably movable within vertical planes which are substantially parallel to the vertical planes defined by said arcuate guide surfaces, each of said support members being positioned in the vicinity of one of said frames, said support members having the upper ends thereof pivotally connected to said pallet at a location thereon spaced sidewardly from said roller means, said location being disposed more closely adjacent the opposite edge of said pallet, said frames and said supporting members maintaining said pallet in a substantially horizontal orientation at all times;

drive means for moving said pallet between a lowered position wherein the pallet is disposed adjacent the ground for permitting a vehicle to be positioned on or removed from the pallet and an elevated position wherein the pallet is disposed vertically upwardly a substantial distance above said ground, said drive means including a drive motor stationarily mounted with respect to said frame and positioned adjacent the ground, and a pair of elongated flexible cables having the lower ends thereof connected to said drive motor, said cables passing upwardly from said drive motor and over said pulley means so that the other ends of said cables are connected to said pallet;

auxiliary force means coacting directly with said support members to assist in controlling the swinging movement of said support members when said pallet is being raised or lowered, said auxiliary force means including fluid pressure cylinder means interconnected to said support members for controlling the swinging movement thereof; and

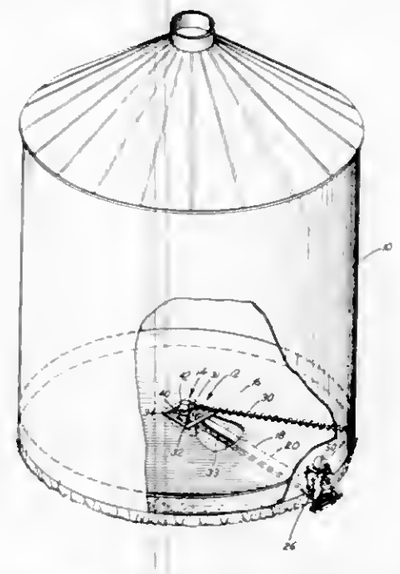
said pallet when in said elevated position having the weight thereof supported solely by said frames and said pair of elongated support members, said pallet when being moved between said elevated and lowered positions being constrained for movement along a preselected path due to said roller means being disposed in rolling engagement with said arcuate guide surfaces simultaneous with the vertical swinging movement of said support members between a position wherein they extend substantially vertically upwardly when the platform is in said elevated position and a position wherein they project substantially horizontally and are disposed closely adjacent the ground when the platform is in said lowered position.

4,029,219

BOTTOM GRAIN UNLOADER

Donald E. Rutten, Plainfield, and Richard A. Davis, Joliet, both of Ill., assignors to P & D Manufacturing Co., Inc., Plainfield, Ill.

Filed Dec. 17, 1975, Ser. No. 641,509
Int. Cl.² B65G *65/46*
U.S. Cl. 214—17 DA **4 Claims**



1. An improved auger discharge construction for removal of material from the bottom of a bin, comprising, in combination:

a hopper at the bottom of the bin substantially at the center thereof;

a removal tube extending from the hopper to outside the bin;

a removal auger in the removal tube having a shaft;

drive means outside the bin;

a first drive linkage from the drive means drivably connected to the shaft of the removal auger;

a sweep auger extending from the hopper into the bin;

a sweep auger drive shaft from the hopper to outside the bin;

gear means in the hopper connecting the drive shaft to the sweep auger;

a second drive linkage from the removal auger shaft drivably connected to the sweep auger drive shaft, including a drive sprocket keyed to the sweep auger drive shaft, an idler sprocket on the removal auger shaft free-wheeling therefrom, and a drive chain connecting the idler sprocket with the drive sprocket; and

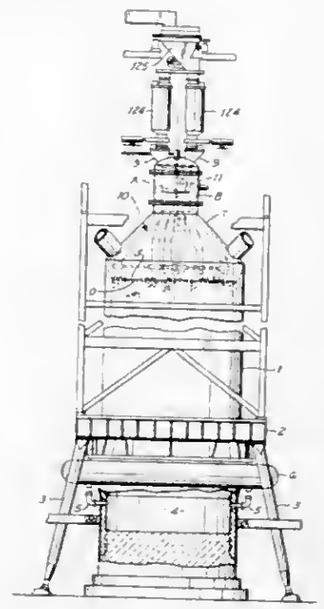
a clutch intermediate the first drive linkage and the second drive linkage, including a driven clutch member unitary with the idler sprocket and a driving clutch member slidable longitudinally along the axis of the discharge auger shaft and keyed for rotation therewith, said driving clutch member having a circumferential slot around the periphery, and a clutch drive arm having opposed members with opposed pins which extend into the circumferential slot of the driving clutch member, said clutch drive arm for sliding the driving clutch member into and out of engagement with the driven clutch member.

4,029,220

DISTRIBUTOR MEANS FOR CHARGING PARTICULATE MATERIAL INTO RECEPTACLES

Melvin J. Greaves, 9995 Cliff Drive, Cleveland, Ohio 44102

Filed Nov. 28, 1975, Ser. No. 636,165
Int. Cl.² F23K *3/18*
U.S. Cl. 214—35 R **20 Claims**



1. Apparatus for charging particulate charge material into a receptacle, comprising a receptacle adapted to have particulate charge material deposited therein in a body having an upwardly facing stock line; and charge distributing means for distributing charge material in said receptacle, said charge distributing means being rotatable about an upright axis and comprising hopper means rotatable about said axis and having an upper portion adapted to have charge material discharged therein and having at its lower portion a plurality of discharge

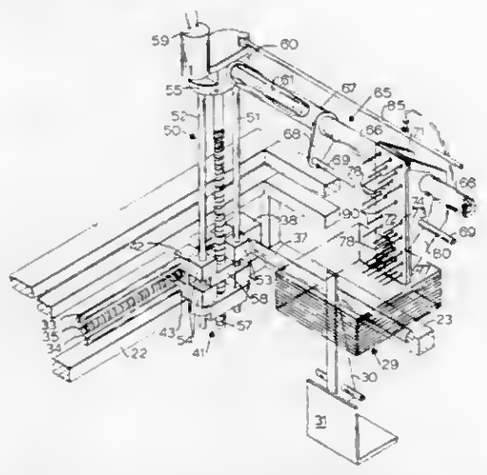
at its upper end and pivotally connected to a fixed support at its lower end for moving said bar means generally longitudinally in one direction and for raising and lowering said seat means to move said seat means between a first location and a second location, second drive cylinder means pivotally connected downwardly between an intermediate point of said bar means and a fixed support for lifting and supporting said seat means and for moving said bar means generally longitudinally in the other direction during its said movement between said first location and said second location.

4,029,216

METHOD AND APPARATUS FOR MOVING A STACK OF CORRUGATED SHEETS FROM A STACKER TO A DESIRED LOCUS

Clifton G. Adams, Baldwin Park; Carl B. Dallas, Buena Park, and George E. Coltrin, El Monte, all of Calif., assignors to Georgia-Pacific Corporation, Portland, Oreg.

Filed May 7, 1975, Ser. No. 575,204
Int. Cl.² B65G 47/90
U.S. Cl. 214—1 BB 17 Claims



1. An apparatus for relocation of a stack of corrugated board sheets aligned to expose on a side of said stack a series of many end openings for each said sheet formed by the corrugations thereof, the combination of:

an upright plate defining multiple series of horizontal perforation therethrough, one series having a multiplicity of said perforations being alignable with some of a said series of end openings of the bottom sheet of said stack and other of said series of perforations then being aligned with end openings of other sheets dispersed over said side of said stack,

pin-supporting means supporting multiple series of horizontal pins, each being sized and positioned in relation to a said perforation and a said end opening for movement therethrough and for an effective distance beyond said perforation and into said opening for use in lifting said stack in cooperation with said other pins.

lift means supporting said pin-supporting means, for lifting a stack into which said pins have been inserted, and

pin projecting and retracting means attached to said pin-supporting means for extending said series of pins through said plate and into a said stack and for retracting said pins from said stack.

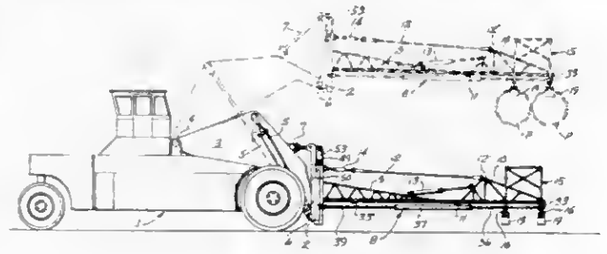
4,029,217

PIPE-HANDLING CRAMPON

Charles Richard Morse, P.O. Box 1561, Anchorage, Alaska 99510

Filed Jan. 15, 1975, Ser. No. 541,264
Int. Cl.² B65G 41/00
U.S. Cl. 214—1 P 26 Claims

1. A length-handling crampon for a lift truck having a boom projecting from and supported by the lift truck, comprising an elongated length-spanning frame carried by the boom with its length extending transversely of the length of the boom and its opposite end portions projecting substantial distances beyond opposite sides of the boom, powered frame-carrying means for



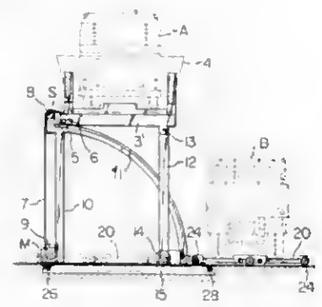
moving said length-spanning frame transversely of its length along the boom toward and away from the lift truck, and remotely actuated power gripping means carried by said frame and engageable with a length to be handled for gripping such length.

4,029,218

TWO-STORIED PARKING APPARATUS FOR AUTOMOBILES

Takashi Matsuura, 28-4, Izumi 2-chome, Suginami, Tokyo, Japan

Filed Feb. 21, 1975, Ser. No. 551,770
Int. Cl.² E04H 6/06
U.S. Cl. 214—16.1 R 6 Claims



1. An elevated parking apparatus for automobiles, comprising:

a pair of frames stationarily fixed to and projecting upwardly from the ground, said frames being spaced from one another;

said pair of frames defining a pair of substantially parallel, arcuate guide rails fixedly associated with the respective frames, each said guide rail defining thereon an arcuate guide surface disposed substantially within a vertical plane, one end of said guide surface being disposed closely adjacent the ground, the other end of said guide surface being spaced vertically upwardly a substantial distance above the ground and horizontally offset with respect to said one end;

pulley means rotatably supported on each of said frames adjacent the upper end of the respective arcuate guide rail;

an upper pallet adapted to have a vehicle positioned and supported thereon, said pallet extending between said frames and having a pair of roller means mounted thereon and disposed in rolling engagement with said pair of guide rails, whereby said roller means rollingly engage said arcuate guide surfaces, said roller means being rotatably supported on said pallet adjacent one edge thereof;

a pair of elongated support members having the lower ends thereof pivotally connected to and supported adjacent the ground so that said support members are swingably movable within vertical planes which are substantially parallel to the vertical planes defined by said arcuate guide surfaces, each of said support members being positioned in the vicinity of one of said frames, said support members having the upper ends thereof pivotally connected to said pallet at a location thereon spaced sidewardly from said roller means, said location being disposed more closely adjacent the opposite edge of said pallet, said frames and said supporting members maintaining said pallet in a substantially horizontal orientation at all times;

drive means for moving said pallet between a lowered position wherein the pallet is disposed adjacent the ground for permitting a vehicle to be positioned on or removed from the pallet and an elevated position wherein the pallet is disposed vertically upwardly a substantial distance above said ground, said drive means including a drive motor stationarily mounted with respect to said frame and positioned adjacent the ground, and a pair of elongated flexible cables having the lower ends thereof connected to said drive motor, said cables passing upwardly from said drive motor and over said pulley means so that the other ends of said cables are connected to said pallet;

auxiliary force means coacting directly with said support members to assist in controlling the swinging movement of said support members when said pallet is being raised or lowered, said auxiliary force means including fluid pressure cylinder means interconnected to said support members for controlling the swinging movement thereof; and

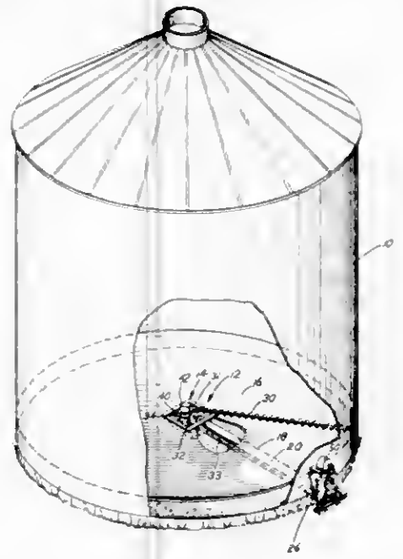
said pallet when in said elevated position having the weight thereof supported solely by said frames and said pair of elongated support members, said pallet when being moved between said elevated and lowered positions being constrained for movement along a preselected path due to said roller means being disposed in rolling engagement with said arcuate guide surfaces simultaneous with the vertical swinging movement of said support members between a position wherein they extend substantially vertically upwardly when the platform is in said elevated position and a position wherein they project substantially horizontally and are disposed closely adjacent the ground when the platform is in said lowered position.

4,029,219

BOTTOM GRAIN UNLOADER

Donald E. Rutten, Plainfield, and Richard A. Davis, Joliet, both of Ill., assignors to P & D Manufacturing Co., Inc., Plainfield, Ill.

Filed Dec. 17, 1975, Ser. No. 641,509
Int. Cl.³ B65G 65/46
U.S. Cl. 214—17 DA 4 Claims



1. An improved auger discharge construction for removal of material from the bottom of a bin, comprising, in combination:

a hopper at the bottom of the bin substantially at the center thereof;

a removal tube extending from the hopper to outside the bin;

a removal auger in the removal tube having a shaft;

drive means outside the bin;

a first drive linkage from the drive means drivably connected to the shaft of the removal auger;

a sweep auger extending from the hopper into the bin;

a sweep auger drive shaft from the hopper to outside the bin;

gear means in the hopper connecting the drive shaft to the sweep auger;

a second drive linkage from the removal auger shaft drivably connected to the sweep auger drive shaft, including a drive sprocket keyed to the sweep auger drive shaft, an idler sprocket on the removal auger shaft free-wheeling therefrom, and a drive chain connecting the idler sprocket with the drive sprocket; and

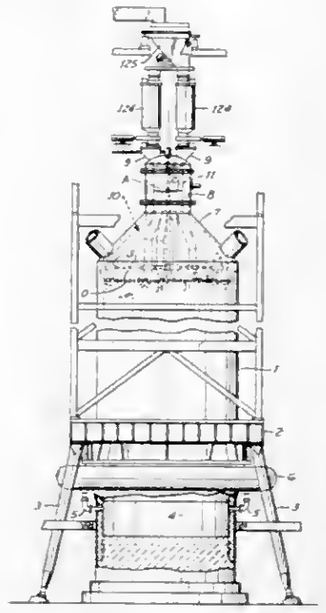
a clutch intermediate the first drive linkage and the second drive linkage, including a driven clutch member unitary with the idler sprocket and a driving clutch member slidable longitudinally along the axis of the discharge auger shaft and keyed for rotation therewith, said driving clutch member having a circumferential slot around the periphery, and a clutch drive arm having opposed members with opposed pins which extend into the circumferential slot of the driving clutch member, said clutch drive arm for sliding the driving clutch member into and out of engagement with the driven clutch member.

4,029,220

DISTRIBUTOR MEANS FOR CHARGING PARTICULATE MATERIAL INTO RECEPTACLES

Melvin J. Greaves, 9995 Cliff Drive, Cleveland, Ohio 44102

Filed Nov. 28, 1975, Ser. No. 636,165
Int. Cl.² F23K 3/18
U.S. Cl. 214—35 R 20 Claims



1. Apparatus for charging particulate charge material into a receptacle, comprising a receptacle adapted to have particulate charge material deposited therein in a body having an upwardly facing stock line; and charge distributing means for distributing charge material in said receptacle, said charge distributing means being rotatable about an upright axis and comprising hopper means rotatable about said axis and having an upper portion adapted to have charge material discharged therein and having at its lower portion a plurality of discharge

chutes rigidly fixed to said hopper means, and being adapted to have charge material flow from said hopper means through said chutes, each of said chutes having an upper entrance opening and a lower discharge portion that moves in a circular path concentric with and transverse to said axis of rotation as said charge distributor means rotates, the discharge portions of said plurality of chutes being located so they discharge material in concentric generally circular zones that have predetermined areas of essentially the same cross-sectional areas and that are radially offset in the receptacle so that the material discharged from said discharge portions is discharged over at least a major portion of cross section to said stock line, and means between said hopper means and the entrance openings of said chutes for dividing charge material discharged into said chutes into portions that pass into said chutes and are proper to fill said areas of said circular zones as said hopper means rotates.

4,029,221

METHOD AND APPARATUS FOR FEEDING A CIGARETTE TRAY TRANSPORTING VEHICLE

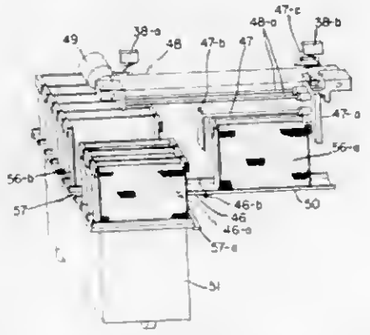
Saburo Nakai, and Nobuyuki Koyama, both of Tokyo, Japan, assignors to The Japan Tobacco & Salt Public Corporation, Tokyo, Japan

Filed Sept. 2, 1975, Ser. No. 609,680

Claims priority, application Japan, Aug. 30, 1974, 49-103356[U]

Int. Cl.² B65G *67/28*

U.S. Cl. 214—38 BB **6 Claims**



1. In an apparatus for loading and unloading cigarette trays with cigarettes from a cigarette manufacturing machine comprising:

a. a plurality of cigarette tray transporting vehicle means for carrying a plurality of said cigarette trays, said vehicle means including a plurality of feed pins, each feed pin corresponding to one of said plurality of cigarette trays and drive means for moving said vehicle means;

b. a feeding means for feeding said cigarette trays between said vehicle means and said cigarette manufacturing machine, said feeding means including feed pawl means for engaging said feed pins and moving said vehicle means relative to said manufacturing machine, and pusher means for transferring said cigarette trays between said vehicle means and said cigarette machine;

c. first sensor means for sensing the transfer of a full cigarette tray from said machine to said vehicle means and for operating said feed pawl means to engage one of said feed pins and move said feed pin a distance equal to the distance between adjacent feed pins, whereby said vehicle means is moved said distance;

d. second sensor means for sensing the movement of said feed pawl means and for operating said pusher means, thereby transferring a succeeding cigarette tray from said vehicle means to said cigarette machine; and

e. third sensor means for sensing the filling of said succeeding cigarette tray and for operating said pusher, thereby transferring said full succeeding cigarette tray from said cigarette machine back to said vehicle means, whereby all of said plurality of cigarette trays on one of said vehicle means are successively automatically filled, said first, second and third sensor means each including a cam and a corresponding cam operated switch;

the improvement comprising:

f. fourth sensor means for sensing one of said vehicle means at a first predetermined position and for operating the drive means of the succeeding vehicle means to move said succeeding vehicle means to a second predetermined position;

g. fifth sensor means for sensing the arrival of said succeeding vehicle means at said second predetermined position and for deenergizing said drive means thereof; and

h. sixth sensor means for sensing when the last cigarette tray of said one vehicle means is full and for energizing said drive means thereof, whereby said one vehicle means moves away from said feeding means, said fourth, fifth and sixth sensor means including magnetic sensors.

4,029,222

APPARATUS FOR LOADING SHEET MATERIAL ON A PLURALITY OF SHELVES ON A BOOK TRUCK

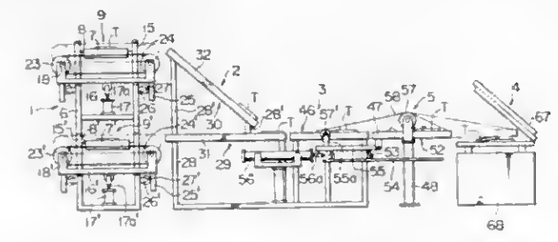
Eizi Yano, Higashimurayama; Shunjiro Ohkawa, Iruma; Tadaaki Komatsu, Akigawa, and Masami Adachi, Higashimurayama, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Filed Apr. 21, 1975, Ser. No. 570,163

Claims priority, application Japan, Apr. 30, 1974, 49-49195; Apr. 30, 1974, 49-49196; June 21, 1974, 49-71680

Int. Cl.² B65G *67/04*

U.S. Cl. 214—41 R **11 Claims**



1. An apparatus for loading sheet materials on a plurality of shelves piled on a book truck comprising:

a loading mechanism including conveyor means movable toward and away from the upper surface of each of said shelves on said truck, actuator means for moving said conveyor means toward and away from the upper surface of each of said shelves, and a driving unit including an endless member for drivable engagement with said conveyor means, a drive source for driving said endless member, a one-way clutch member passed on by said endless member, and a movable frame connected to said conveyor means and supporting said clutch member so that when said conveyor means is moved away from the upper surface of each of said shelves by said actuator means, said drive source is not driven and said one-way clutch member is disengaged to drive said conveyor means relatively to said sheet materials to transfer said sheet materials onto each of said shelves and when said conveyor means is moved toward the upper surface of each of said shelves by said actuator means, said drive source is driven and said one-way clutch member is engaged so as not to drive said conveyor means relative to said sheet materials;

a waiting mechanism adjacent an end of said loading mechanism remote from said book truck for conveying said sheet materials onto said loading mechanism when said loading mechanism has no sheet material thereon and for holding said sheet materials thereon when said loading mechanism has said sheet materials thereon; and

a lining-up mechanism adjacent an end of said waiting mechanism remote from said loading mechanism for lining up said sheet materials and conveying said sheet materials onto said waiting mechanism.

4,029,223

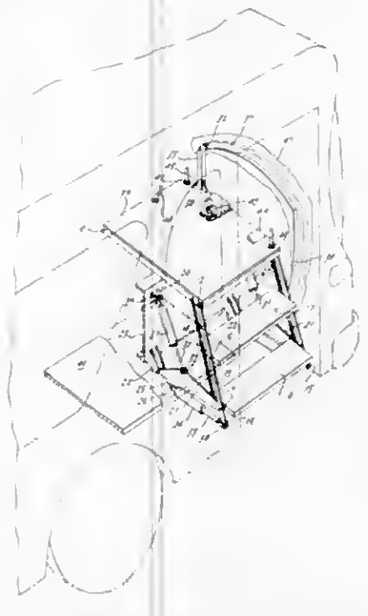
BUS LOADER

Donald F. Adamski, Danville, and David M. Anderson, Lafayette, both of Calif., assignors to MB Associates, San Ramon, Calif.

Filed July 25, 1975, Ser. No. 599,063

Int. Cl.² B60P *1/48*

U.S. Cl. 214—77 R **10 Claims**



1. In a bus loader, a platform, a movable support for said platform located in the entrance way at the front of the bus after the steps were removed therefrom, means actuating said movable support to raise the platform from the ground and advance it forwardly onto the floor of the bus, upper and lower step plate means at the underside of the platform and connected thereto and movable to step loading position as the platform is moved from the ground to the position within the bus, said bus having a frame member at the side, brackets secured to the bottom of said frame member, operating arms pivoted on said brackets, pivot means securing the opposite ends of the operating arms to the lower step plate means, a pair of rams pivoted to brackets at the upper part of said frame member and the operating arms for raising said platform from the ground upwardly adjacent to the plane of the bus floor.

4,029,224

TAILGATE FOR A REAR LOADING REFUSE VEHICLE

William A. Herpich; George W. Palmer, both of Galion, and Francis H. Pittenger, Shelby, all of Ohio, assignors to Peabody International Corporation, Galion, Ohio

Filed May 24, 1976, Ser. No. 689,082

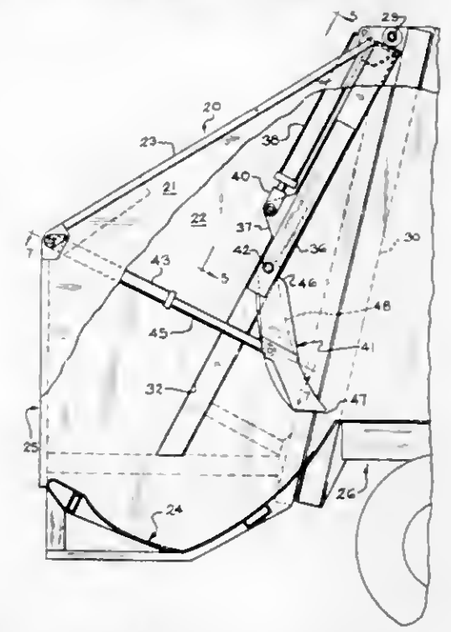
Int. Cl.² B65F *3/00*

U.S. Cl. 214—83.3 **15 Claims**

11. In a tailgate for a rear loading refuse vehicle said tailgate having parallel, spaced side walls and a hopper-like bottom, and having a packer blade and a mechanism for actuating said packer blade comprising upwardly and forwardly inclined guide tracks in said side walls, packer blade support means extending across said tailgate and including elements reciprocable in said guide tracks, a generally rectangular packer blade extending across said tailgate that is pivoted at its upper horizontal edge to said support means, the improvement comprising, in combination,

a. first hinge elements at the upper front corner of said tailgate and second cooperating hinge elements at the upper rear corner of the body of said vehicle,

b. a pair of hydraulic packing cylinders and piston rods the bases of said cylinders being pivotally mounted on the first said elements and extending therefrom downwardly along the associated one of said guide tracks with each of said rods being pivotally connected at its lower end to said packer blade support means, and



c. a pair of hydraulic sweep cylinders and piston rods, said rods being pivotally connected at their lower ends to said packer blade for swinging said packer blade angularly relative to said support means.

4,029,225

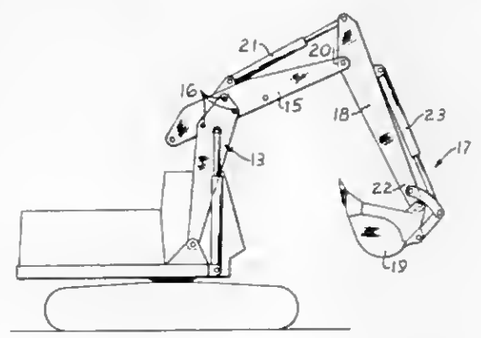
BOOM-STICK ADAPTER FOR TWO-PIECE BOOM

Leon A. Wirt, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Apr. 16, 1976, Ser. No. 677,575

Int. Cl.² E02F *3/32*

U.S. Cl. 214—138 R **9 Claims**



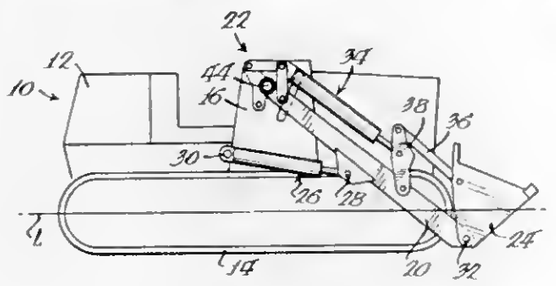
1. In a material handling apparatus having a stub boom provided with means for connecting a fore boom thereto to form a two-piece boom, means for selectively swingably positioning the stub boom about a first axis, and a work implement, an improved joint means for swingably connecting the work element to said stub boom comprising: an adapter having a mounting portion and a joint portion; first mounting means cooperating with said stub boom connecting means for mounting said adapter mounting portion to said stub boom; second mounting means swingably mounting said adapter joint portion to said mounting portion to pivot about an axis parallel to said first axis; third mounting means fixedly mounting said work element to said adapter joint portion; and positioning means mounted to said stub boom and connected to said adapter joint portion for selectively swingably positioning said portion relative to said mounting portion for selectively positioning the work element.

4,029,226

LINKAGE SUPPORT SYSTEM FOR MATERIAL HANDLING UNIT

David H. Seaberg, Davenport, Iowa, assignor to J. I. Case Company, Racine, Wis.

Filed Apr. 12, 1976, Ser. No. 675,992
Int. Cl.² E02F 3/70
U.S. Cl. 214—139 4 Claims



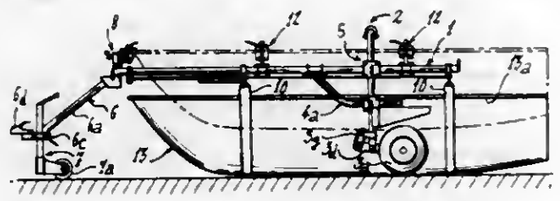
1. In a material handling implement including a vehicle body, a boom pivotally supported on one end on said body with a boom fluid ram between said body and boom for pivoting said boom and a material handling unit pivoted on a free end of said boom by a unit fluid ram, the improvement comprising an arm supported on said body by a first pivot with said boom supported on said arm by a second pivot spaced from said first pivot; linkage means including first and second links pivotally interconnected at one end, said first link having an opposite end connected to said arm by a third pivot spaced from said first and second pivots and said second link having an opposite end connected to said boom at a location spaced from said second pivot, said unit fluid ram including a first element pivotally connected to said one end of said first and second links and a second element operatively connected to said material handling unit; and guide means between said body and said boom for guiding said boom during pivotal movement thereof, said guide means and pivots being positioned to pivot said arm between first and second extreme pivoted positions with said material handling unit being moved toward said vehicle as said arm is moved from said first extreme position toward said second extreme position, said arm being in said second extreme position when said boom is at an intermediate position generally parallel to a longitudinal axis of said vehicle body to minimize the moment arm for said boom at said intermediate position, said links being configured to maintain said material handling unit generally at the same angular attitude as said boom is moved from an extreme lower position to an extreme raised position.

4,029,227

ROAD TRAILER FOR TRANSPORTING A BOAT

Jacques Martinez, Fresnes, France, assignor to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly-sur-Seine, France

Filed Apr. 22, 1975, Ser. No. 570,473
Claims priority, application France, Apr. 25, 1974, 74.14501
Int. Cl.² B60P 3/10
U.S. Cl. 214—396 4 Claims



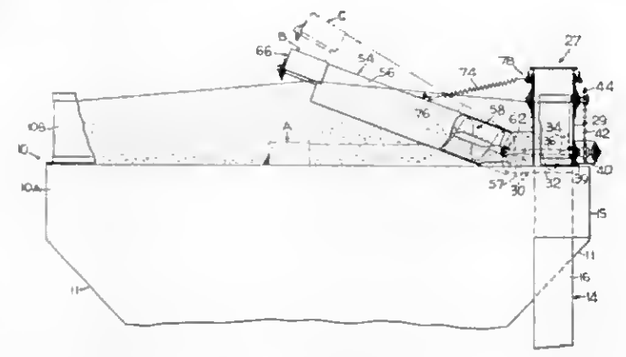
1. A vehicle of the road trailer type for handling, displacing and transporting a load such as a boat which has a peripheral edge, said vehicle comprising a structure adapted to be placed above the load and to surround it, said structure comprising at least one longitudinal frame element having at least two side-members interconnected at their forward ends by means of at least one cross-member and also interconnected by at least one transverse frame element which in use is above the load, gripping means disposed at intervals along the length of said longitudinal frame element and capable of gripping the edge of the load, means on said vehicle for lifting the load, the last-named means being mounted on a said frame element, at least one wheel system for the vehicle mounted on a said transverse frame element, means for modifying the width of the longitudinal frame element as a function of the width of the load, and means for displacing the transverse frame element with respect to the longitudinal frame element and with respect to itself so as to accommodate loads of various lengths and widths.

4,029,228

SELF-RAISING BIN LOADING AUGER FOR COMBINES

J. Lyle Shaver, Blue Springs, Mo., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Sept. 26, 1975, Ser. No. 617,101
Int. Cl.² B60P 1/40
U.S. Cl. 214—522 2 Claims



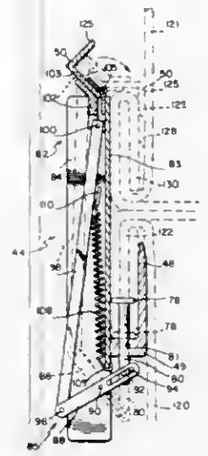
1. In combination, a grain storage tank means adapted to be mounted on an agricultural combine, an elevating conveyor adapted to deliver grain to an upper portion of said storage tank means, a grain conveyor positioned contiguous but beneath the upper end of said storage tank means, said grain conveyor comprising an auger tube and an auger conveyor mounted for rotation in said auger tube, said auger tube being adapted to receive grain discharged by said elevating conveyor and to convey grain thus received to a substantially downwardly directed discharge outlet of said auger tube in overlying relation to the interior of said storage tank means, a drive means for said auger conveyor, said auger conveyor being rotatably drivingly connected to said drive means through a universal connecting means whereby said auger conveyor remains connected in driven relation to said drive means at changing angular positions of said auger tube relative to the horizontal plane, and support means supporting said auger tube for pivotal movement about a horizontal axis coincident with the center of said universal connecting means, the reaction force of the grain being discharged from said substantially downwardly directed discharge outlet of said auger tube against the upper surface of the already loaded grain in said storage tank means urging said auger tube to swing upwardly about its horizontal pivotal axis and thus to cause at least the discharge end of said auger tube to always float on the upper surface of the already loaded grain in said storage tank means when the level of grain in said storage tank means exceeds a predetermined level.

4,029,229

LIFT BLADE APPARATUS

Lloyd L. Hobson, 312 N. East St., Elnora, Ind. 47529

Filed Feb. 23, 1976, Ser. No. 660,336
Int. Cl.² B66F 9/18
U.S. Cl. 214—654 10 Claims



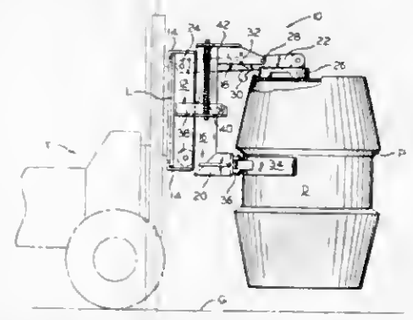
1. In a lift truck an apparatus for lifting at least two vertically stacked top and bottom containers, said apparatus comprising a lifting blade for engaging the bottom container, the improvement comprising a second blade disposed upwardly from said lifting blade for engaging said top container, means for sensing the engagement of said lifting blade with the bottom container in said stack in response to vertical movement of the lifting blade relative to said bottom container, and transmitting means for operatively connecting said sensing means to said second blade for causing said second blade to engage said top container for clamping said two containers securely in stacked relationship to lift them together.

4,029,230

DRUM HANDLING ATTACHMENT

Wayne J. Bolduc, Claymont; Vernon E. Cave, Newark, both of Del., and Edward J. Chase, San Pedro, Calif., assignors to Container Corporation of America, Chicago, Ill.

Filed May 21, 1976, Ser. No. 688,754
Int. Cl.² B66F 9/18
U.S. Cl. 214—654 7 Claims



1. In an attachment mounted for movement on a lift of a lift truck, or the like, said attachment comprising:

a. a mounting bracket secured to said lift and movable therewith;

b. a frame member operatively connected to said mounting bracket and having upper and lower horizontal extensions;

c. an arm having one of its ends pivotally mounted on said mounting bracket and having:

i. a first article engaging element movably secured to the opposite end of said arm;

ii. a pin member pivotally connecting said arm to said frame member at said upper horizontal extension;

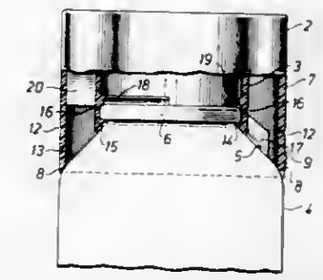
d. a second article engaging element secured to said lower horizontal extension.

4,029,231

PILFERPROOF CLOSURE FOR BOTTLES, TUBES AND SIMILAR CONTAINERS

Knut Johan Vilhelm Jonsson, Kungalv, Sweden, assignor to AB Wicanders Korkfabriker, Alvangen, Sweden

Filed Nov. 20, 1975, Ser. No. 633,788
Claims priority, application Sweden, Nov. 21, 1974, 7414621; May 9, 1975, 7505380
Int. Cl.² B65D 41/32
U.S. Cl. 215—256 7 Claims



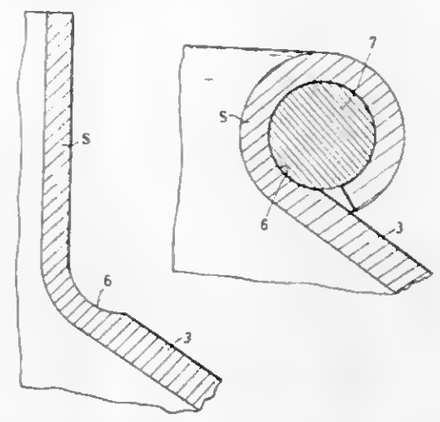
1. A pilferproof closure for bottles, tubes and similar containers, having an opening at its top surrounded by a retaining rim, comprising a cap having an inner skirt adapted for repeated sealing of the opening provided with inwardly directed projections to engage with said retaining rim, an outer skirt surrounding said inner skirt and adapted to extend about said inner skirt when said cap is initially closed on said container to prevent movement of said inner skirt permitting the disengagement of said projections with said rim, said inner and outer skirts being provided with detachable sections along the free edges thereof, means for permanently connecting said detachable sections, and an enervation line at a distance from the free edge of the inner skirt arranged to permit said detachable section to be torn from the inner skirt on detachment of the outer skirt.

4,029,232

SINGLE-PIECE ALUMINIUM CONTAINER FOR AEROSOLS

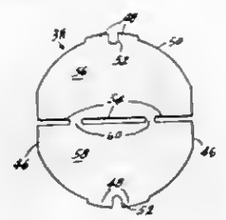
Carlo Maniá, Milan, Italy, assignor to Broggi-Izar Fabbriche Italiane Riunite S.p.A., Milan, Italy

Filed Nov. 18, 1975, Ser. No. 632,895
Claims priority, application Italy, Nov. 25, 1974, 29782/74
Int. Cl.² B65D 7/42
U.S. Cl. 220—73 5 Claims



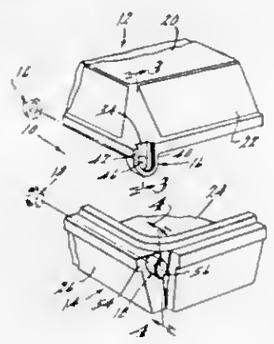
1. In a single-piece aluminum container for aerosols having a body and a mouth formed by curling the container edge the improved mouth construction wherein the edge is curled around and in contact with a reinforcing ring and wherein the thickness of the curled edge is less than the thickness of the adjoining metal.

4,029,233
SONOBUOY RETAINER PLATE
James W. Widenhofer, Jackson, Mich., assignor to Sparton Corporation, Jackson, Mich.
Division of Ser. No. 345,871, March 29, 1973, Pat. No. 3,921,120. This application Sept. 12, 1975, Ser. No. 612,698
Int. Cl.² B63D 21/00; H04B 11/00
U.S. Cl. 220—89 A 3 Claims



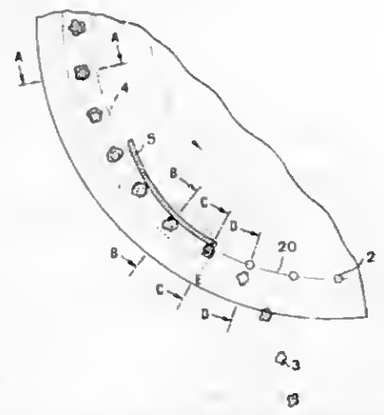
1. A retainer plate for a sonobuoy comprising a generally planar body member of deformable material having a generally circular periphery, a pair of locking tabs radially extending from said body periphery located at substantially diametrically opposed locations on said body member, and a weakened hinge line defined on said body member intermediate said locking tabs facilitating and controlling deformation of said body member upon a deforming force being applied to said body member transverse to the general plane thereof, said hinge line being diametrically defined on said body member on a diameter transversely related to a diameter intersecting said locking tabs, said hinge line comprises at least one elongated opening diametrically defined in said body member defining hinge portions of the material of said body member, the length of said opening being substantially perpendicular to a diameter intersecting said locking tabs.

4,029,234
PLASTIC HINGE CONSTRUCTION
Edward M. Johnson, Jr., Matteson, Ill., and John T. Stone, Saylorsburg, Pa., assignors to The Triangle Corporation, Grant Park, Ill.
Filed Sept. 10, 1976, Ser. No. 721,935
Int. Cl.² B65D 43/16, 25/18; B29C 17/07, 11/00
U.S. Cl. 220—337 9 Claims



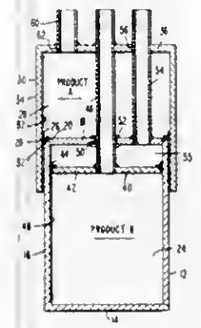
1. A plastic blow molded container blow molded from an extruded, hollow parison of thermoplastic material and including a lid and a base and being connected together for relative pivotal movement by a hinge structure, with each of the lid and base having side walls, said hinge structure comprising:
a pin structure molded integrally with one of the lid and base, and a journal structure molded integrally with the other of the lid and the base, said pin structure being rotatably supported by said journal structure,
said pin structure comprising a generally solid pair of pin members each having a generally circular cross-section and being formed by the compression molding of the material generally from a double wall of the parison to form said circular cross-section, said pin members being axially aligned and extending axially outwardly from opposite first side walls, each of said first side walls having a first indented portion with the associated ones of said pins extending outwardly from said first indented portion whereby said one pin terminates proximately within the confines of said first indented portion,
said journal structure comprising a pair of journal members defining a pair of coaxially aligned openings for receiving said pin members, each of said journal members depending from opposite second side walls, each of said second side walls having a second indented portion terminating in a generally non-indented strap portion and having a support portion located axially inwardly from said strap portion and from said second indented portion, said strap portion defining a first generally semicircular opening and said support portion defining a second generally semicircular opening axially offset from and facing in a direction towards said first generally semicircular opening whereby a pin opening is defined by each of said journal members, each said pin opening being in axial alignment with the other and being of a size to rotatably supportingly receive one of said pins,
said journal members generally located within the confines of the periphery of said second side walls,
said strap portion having a generally solid cross-section and being formed by compression molding of the material generally from a double wall of the parison to form said cross-section to have an axial width greater than that of a single thickness of the parison,
said first indented portion being of a depth sufficient to receive the total width of the associated one of said journal members whereby each of said journal members and said pins are located within the periphery of said first and second side walls,
said support portion being of a solid construction and being formed by compression molding of the material generally from a double wall of the parison,
said strap portion being of a flexible construction whereby assembly onto an associated one of said pins is facilited and each of said pins can be readily located in the associated one of said pin openings.

4,029,235
ONE-BY-ONE PNEUMATIC SEEDER
Xavier Roger Grataloup, Montereau, France, assignor to Nodet-Gougis, France
Filed Mar. 15, 1976, Ser. No. 666,969
Claims priority, application France, Mar. 27, 1975, 75.09766
Int. Cl.² A01C 7/04
U.S. Cl. 221—211 13 Claims



1. In a one-by-one pneumatic seeder including a hopper with a rotary dispenser disc forming a wall portion thereof, said rotary dispenser disc having a series of equidistant holes arranged in an annular zone concentric with the axis of rotation of said dispenser disc, a part-circular suction chamber adapted to be connected to a source of partial vacuum and disposed along the face of said dispenser disc remote from said hopper and in alignment with said annular zone on said disc, said suction chamber having first and second ends in the direction of said holes opposite said part-circular suction chamber at any given time being subjected to the partial vacuum while said holes beyond the ends of said part-circular suction chamber are subjected to atmospheric pressure, wherein the improvement comprises seed dislodging means for gradually rocking each seed loose in its hole before each seed arrives at said second end of said suction chamber with all seeds being released for substantially identical successive drop trajectories, said seed dislodging means being disposed on the side of said dispenser disc remote from said suction chamber and arranged along and juxtaposed to the annular zone of said dispenser disc, the annular zone being relatively rotatable with respect to said dislodging means, said dislodging means gradually approaching but without crossing the circle defined by the centers of said holes in said annular zone, the portion of said dislodging means closest to said circle being disposed substantially at and opposite the second end of said partcircular suction chamber.

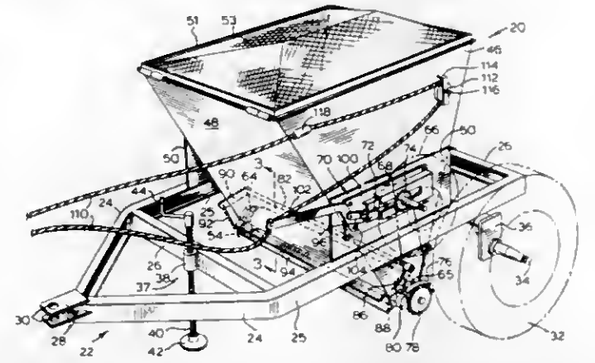
4,029,236
TWO PRODUCT DISPENSER WITH COOPERATING TELESCOPING CYLINDERS
John C. Carson, Jr., Manasquan Park; Robert T. Hall, Trenton; Divaker B. Kenkare, South Plainfield, and Clarence R. Robbins, Piscataway, all of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.
Filed May 17, 1976, Ser. No. 686,843
Int. Cl.² B67D 5/56
U.S. Cl. 222—135 10 Claims



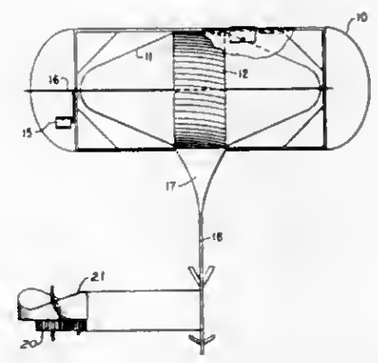
1. A product dispenser comprising a first cylinder having an end wall, a piston plate in said cylinder having hollow piston rod extending slidably through said end wall for communicating and dispensing the contents of said cylinder outwardly of said cylinder, a second cylinder having a forward wall provided with a delivery tube therein and a vent tube communicating with the interior of said first cylinder, said first cylinder functioning as a piston for said second cylinder, said piston rod being fixedly secured to said forward wall so that movement of said end wall toward said forward wall will move said piston plate away from said end wall to force a first product in said first cylinder outwardly through said piston rod and to force a second product in said second cylinder out through said delivery tube.

4,029,237
SAND SPREADER
Pietro Miconi, 78 Aviemore Drive, Weston, Ontario, Canada
Filed Mar. 20, 1975, Ser. No. 560,669
Claims priority, application Canada, May 23, 1974, 200656
Int. Cl.² E01C 19/20
U.S. Cl. 222—614 8 Claims

1. A sand spreader comprising:
a frame;
ground wheels coupled to and supporting the frame for movement over the ground in use;
a sand hopper mounted on the frame and having an opening at its lower end through which sand can be dispensed;
a rotary auger mounted in the hopper and positioned in said opening therein for controlling the flow of sand from the hopper in use; and,
a driving wheel which is drivably coupled with the auger;
a slide supporting the driving wheel for movement between an operative position in which the wheel is in peripheral engagement with one of the ground wheels supporting the frame of the spreader, whereby rotation of that ground wheel as the spreader moves over the ground in use drives the auger by way of the driving wheel, and an inoperative position in which the driving wheel is clear of the relevant ground wheel;
a lever for moving the slide between a first position in which the driving wheel is in its said operative position and a second position in which the driving wheel is in its said inoperative position; and,
an over-centre linkage coupling the lever to the slide, said linkage being adapted to lock the slide in said first position when the lever is moved in the appropriate direction.

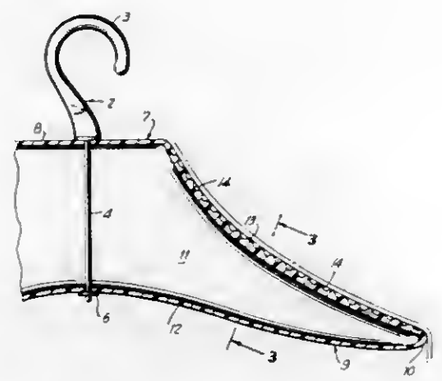


4,029,238
PNEUMATIC PLANTER
Leon C. Jalas, R.R., Sutherland, Iowa 51058
Filed Mar. 25, 1976, Ser. No. 666,741
Int. Cl.² B67D 5/24
U.S. Cl. 222—193 9 Claims



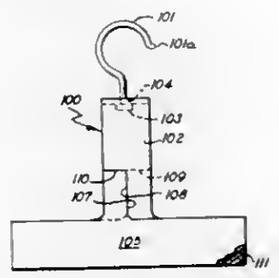
1. Seed planting means comprising a pressurized tank, seed container means in said tank, power driven rotating means connected with said seed container means, said rotating means being formed to provide seed carrying openings, said tank including an outlet, said seed carrying openings being movable by said rotating means to pass said outlet whereby seeds are delivered individually to said outlet, and nozzle means leading from said outlet through which said seeds are accelerated and from which they are discharged.

4,029,239
CLOTHES HANGER
John E. Dolan, Old Orchard St., Harrison, N.Y. 10528
Filed Jan. 26, 1976, Ser. No. 652,231
Int. Cl.² A47J 51/097
U.S. Cl. 223—85 3 Claims



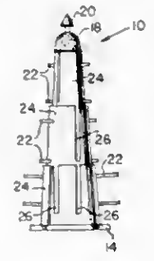
1. A clothes drying hanger comprising a unitary completely enclosed, hollow plastic body having a central truncated conical section and a pair of downwardly diverging arms, said body including substantially spaced front and back walls curving from a normal vertical plane, the upper surfaces of each of said arms being upwardly convex in the transverse direction;
the lower web or bottom wall of said enclosed, hollow plastic body extending from each end in an upward inclination toward the central vertical axis thereof;
a series of transverse, closely spaced, grooves in a substantially continuous, sinuous cross-sectional configuration along the length of said arms, said grooves being inclined along the length of said arms and being integrally formed to follow the transverse convex contour of said upper surfaces and to be defined by ridges flush with said upper surfaces.

4,029,240
GARMENT HANGER
Paul J. George, P.O. Box 86, Brecksville, Ohio 44141, and M. Ted Raptes, 2111 Jefferson Davis Hwy., Arlington, Va. 22202
Continuation-in-part of Ser. No. 401,292, Sept. 27, 1973, Pat. No. 3,923,213. This application Oct. 8, 1975, Ser. No. 620,719
Int. Cl.² A47J 51/14
U.S. Cl. 223—96 7 Claims



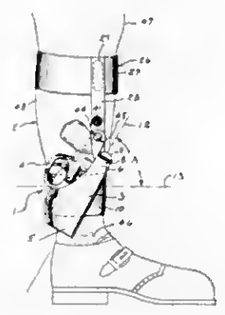
1. A hanger for gripping and suspending a garment permitting it to hang freely, said hanger formed from a unitary plastic development member which is substantially planar and has a generally I-configuration, said development member comprising an intermediate longitudinal yoke member and a transverse gripper member at each extremity of said yoke means, said yoke means comprising a longitudinal cutout section adjacent each yoke extremity, said cutout sections being on opposite longitudinal sides of said yoke means, said gripper members comprising frictional gripping surfaces having a planar dimensional area disposed on the same side of said planar development member, said development member looped on itself with said gripper members crossed over on each other and said cutout sections are engaged and in abutment with each other, whereby said yoke means is maintained in a generally longitudinal arcuate looped form having a spring biasing action, and whereby said gripping surfaces of said gripper members are maintained in a face to face parallel closed position with each other by said spring biasing action, a removable suspending means for said development member connected to the upper portion of said arcuate yoke means, whereby said gripper members can be separated by a squeezing action on both sides of said arcuate yoke means to thereby enable a garment to be inserted between said gripping surfaces of said gripper members and to be frictionally held therebetween by said gripping surfaces upon release of said squeezing action on said arcuate yoke means.

4,029,241
SPOOL STAND
Harry Krake, 3617 Farmington Road, Minnetonka, Minn. 55343
Filed Aug. 3, 1976, Ser. No. 711,169
Int. Cl.² A41H 31/00
U.S. Cl. 223—106 4 Claims



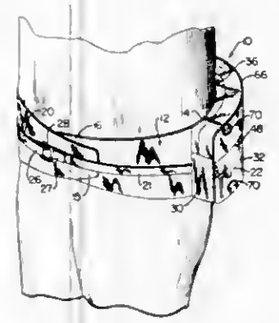
1. A spool stand having a longitudinal axis, a base and a top, comprising:
a pin cushion disposed on said top;
a handle disposed on said pin cushion;
a plurality of arms extending transversely to said axis along the circumference of the spool stand, and a plurality of concentrically disposed sections, and wherein at least two of said arms extend from each of said sections, one of said sections being a base section, the remaining of said sections being substantially collapsible into said base section.

4,029,242
LEG HOLSTER
Martin J. Stoesser, 2407 Springdale Rd., Apt. 7C, Waukesha, Wis. 53186
Filed Dec. 21, 1973, Ser. No. 427,229
Int. Cl.² F41C 33/02
U.S. Cl. 224—2 B 13 Claims



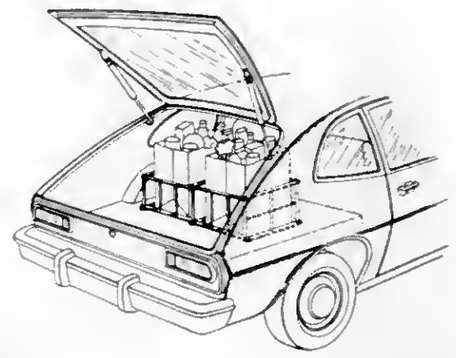
1. An apparatus removably securing a hand gun to a human leg, comprising a holster having an opening and removably retaining a hand gun, a first leg encircling member selectively connected about said leg near an ankle bone and well below a calf and connected to said holster, a second leg encircling member selectively connected about said leg slightly below a knee cap and at or slightly above the calf and spaced substantially from said gun retaining opening, and a connector assembly including means connecting said first leg encircling member and said second leg encircling member and essentially eliminating bouncing of said holster and turning of said first leg encircling member through leg movement and securing and stabilizing said hand gun to said human leg.

4,029,243
INTEGRATED BELT-SUPPORTED BACKPACK
Alan H. Zerobnick, Estes Park, and David J. Cole, Denver, both of Colo., assignors to Samuel Zerobnick, Denver, Colo.
Filed Feb. 28, 1975, Ser. No. 553,930
Int. Cl.² A45F 3/00
U.S. Cl. 224—8 R 8 Claims



1. A belt-supported backpack adapted to be worn around a person's waist, comprising in combination:
an elongated flexible belt of unitary construction consisting of a relatively wide intermediate section and forwardly tapered free ends extending away from opposite ends of said intermediate section,
fastener means at the free ends of said belt for releasably and adjustably securing said free ends together,
a flexible pack including a main compartment affixed to the intermediate section of said belt, said intermediate section of said belt defining the inner wall of said main compartment, said compartment traversing the entire width and length of said intermediate section, said main compartment having inner and outer walls separated by opposite sides, top and bottom walls interconnecting said inner and outer walls in spaced parallel relation to one another, and an access opening into the interior of said main compartment extending continuously across said top wall and at least the upper portions of said opposite side walls,
an auxiliary compartment affixed to the external surface of the outer wall of said main compartment and substantially coextensive with said main compartment, said auxiliary compartment provided with an upper access opening into said auxiliary compartment, a releasable closure across said upper opening, and a separate side access opening into said auxiliary compartment including a separate releasable closure therefor, and
said belt being sized to be fastened around a person's waist with the wider intermediate section of said belt curving around the lower back and terminating on opposite sides of the person's waist, said main compartment conforming to the contour of said intermediate section when worn around a person's waist.

4,029,244
COLLAPSIBLE RECEPTACLE TYPE STAND FOR USE IN TRANSPORTING LOADED GROCERY BAGS
Izora M. Roberts, 7215 NE. 175th, Sp 124, Botbell, Wash. 98011
Filed Dec. 29, 1975, Ser. No. 644,720
Int. Cl.² B60R 5/00; B65D 7/24
U.S. Cl. 224—42.42 R 5 Claims

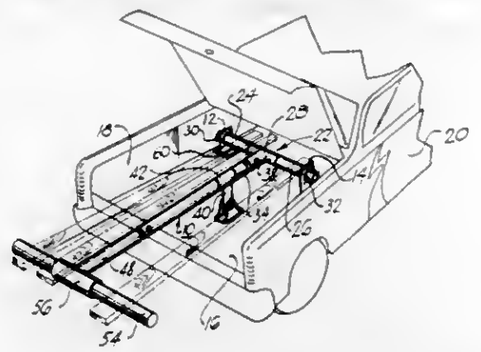


1. A collapsible stand for maintaining loaded grocery bags, or the like, in an upright position even when subjected to sudden inertial forces such as those caused by the stopping, starting or turning of the vehicle in which the grocery bags are being transported, comprising:
spaced apart, open-worked end and side walls defining an enclosure, wherein each end wall comprises an upper and lower end rail, and wherein each side wall comprises two upper side rails placed in end-to-end relation and two lower side rails placed in end-to-end relation;
first pivotal means to pivotally interconnect the end and side walls;
second pivotal means to pivotally interconnect the two upper side rails and the two lower side rails of each side wall;
an open worked intermediate wall, extending between the spaced apart side walls to divide the enclosure into a pair of adjacent compartments having the intermediate wall as a common wall, and comprising an upper and lower intermediate rail, wherein each end of the intermediate wall is pivotally connected to its respective side wall by its respective side wall's second pivotal means;
whereby the first and second pivotal means enable each adjacent compartment to be moved between an open position, for receiving a grocery bag which is prevented from tipping by bearing against the end, side and intermediate rails which surround it, and a collapsed position for more compact storage when not in use, wherein when both adjacent compartments are collapsed, the collapsed length of the stand is substantially equal to the length of the end wall plus one half of the length of one side wall.

4,029,245
AUTOMOBILE MATERIAL CARRIER
David L. Berlin, 10503 S. 198th E. Ave., Broken Arrow, Okla. 74012
Filed Jan. 14, 1976, Ser. No. 648,966
Int. Cl.² B60R 11/00
U.S. Cl. 224—42.43 5 Claims

1. A carrier for an automobile trunk compartment comprising:
a. a first tubular cross member;
b. a pair of hinged brackets adapted to be mounted at opposite sides of the trunk floor, said brackets including means for supporting said cross member above said floor between said brackets;
c. a longitudinal tubular member, means for connecting one end of said longitudinal member to said first cross member;

d. a second tubular cross member, means for connecting the other end of said longitudinal member to said second cross member, said longitudinal member being of a length such that said other end extends out of said trunk compartment, and a vertical support member adapted to rest



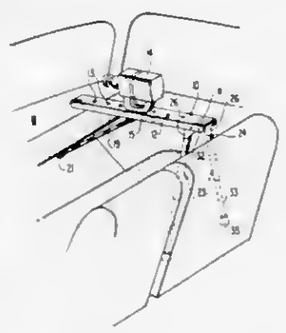
on said trunk floor to support said longitudinal member above said floor, said longitudinal member includes a plurality of longitudinal sections and means for securing said sections together, whereby said carrier is utilized to provide support for elongated articles greater in size than said compartment.

4,029,246

ADJUSTABLE STABLE CAMERA SUPPORT FOR VEHICLES

Robert L. Woodruff, P.O. Box 1008, Florissant, Mo. 63031

Filed Apr. 13, 1976, Ser. No. 676,521
Int. Cl.² B60R *11/04*
U.S. Cl. 224—42.45 B **2 Claims**



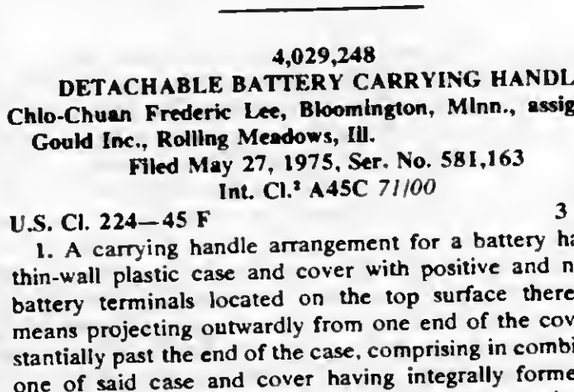
1. A stable adjustable camera support for vehicles comprising an elongated camera supporting channel beam having a plurality of longitudinally spaced openings in its top web and having downturned side flanges, the forward end of said channel beam during use adapted to rest on top of a vehicle instrument panel, a camera engaging eye screw engageable selectively through any of said openings from below the channel beam to secure a camera in a selected adjusted position fixedly on top of the channel beam, an elastic flexible holddown and stabilizing means for the channel beam having opposite end hooks, one hook engageable with the vehicle instrument panel and the other hook engageable with said eye screw, a pair of rear telescopically adjustable foldable support legs for the rear end of said channel beam adapted to rest on a vehicle front seat cushion in laterally divergent relationship, heads secured to the tops of said legs and each said head having outer parallel faces which lie immediately inwardly of said side flanges when the legs are in a vertical use position, a pivot pin for said heads connected to and extending between said side flanges, the heads being apertured to loosely receive said pin, and an expansion spring on said pivot pin engaging said beads and urging them outwardly into contact with said side flanges, whereby when said legs are extended for usage to the vertical use position the channel beam may be leveled or set at any desired angle to the horizontal by merely adjusting the lengths of the support legs and when said legs are moved toward each other from the laterally divergent relationship to a nearly parallel position said legs may then be pivoted on said pin into a folded stored relationship in said channel beam and between said downturned side flanges.

4,029,247

STRIP FEEDING MECHANISM

Douglas M. Sakariason, Minneapolis, Minn., assignor to Pako Corporation, Minneapolis, Minn.

Filed Aug. 25, 1975, Ser. No. 607,679
Int. Cl.² B65H *25/04*
U.S. Cl. 226—43 **5 Claims**



1. A device for supplying a relatively stiff strip of photographic print paper from a roll in response to the demand of a machine for processing said strip comprising,
a drive roller for withdrawing the strip of photographic print paper from the supply roll,
a pressure roller for maintaining a positive driving connection between the strip and said drive roller,
an electric motor connected to said drive roller,
circuit means for supplying electric power to said motor,
an electric switch in said circuit means for controlling the electric power to said motor,
a generally U-shaped guide plate positively defining a loop guide path for said strip downstream from said drive roller to engage the strip from said drive roller and positively form a doubled back tension free slack loop downstream from drive roller, said plate having an opening therein,
a loop sensing switch-actuating element extending through said plate opening and connected to said switch for controlling actuation thereof and mounted in said guide path for sensing the presence of said loop and positioned to close said switch when said loop becomes shorter than a predetermined length, and opening said switch when said loop becomes longer than a predetermined length, and
means for receiving the tension free portion of the strip from said loop and guiding the portion into the machine for processing.

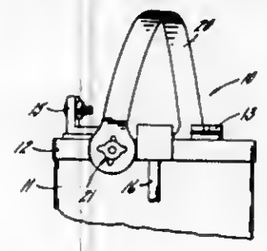
4,029,248

DETACHABLE BATTERY CARRYING HANDLE

Chio-Chuan Frederic Lee, Bloomington, Minn., assignor to Gould Inc., Rolling Meadows, Ill.

Filed May 27, 1975, Ser. No. 581,163
Int. Cl.² A45C *7/00*
U.S. Cl. 224—45 F **3 Claims**

1. A carrying handle arrangement for a battery having a thin-wall plastic case and cover with positive and negative battery terminals located on the top surface thereof and means projecting outwardly from one end of the cover substantially past the end of the case, comprising in combination, one of said case and cover having integrally formed rigid plastic posts protruding horizontally from opposite vertical surfaces thereof at either end and laterally offset in equal and opposite directions from the longitudinal center line of said case such that a vertical plane passing through the center of said posts also passes substantially through the center of gravity of the battery, each of said posts having a hollow stem portion with a closed inner end secured to said surface and a hollow non-circular head spaced from said surface a predetermined distance, said non-circular head having a predetermined angular orientation with respect to a vertical plane



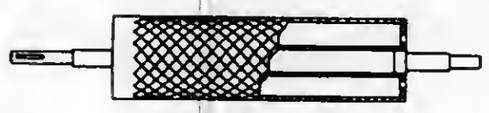
passing axially through said post, and an elongated handle adapted to span the length of said cover without substantial interference with said battery terminals and said projecting means and having at each end thereof an aperture shaped to receive one of said non-circular heads and having an angular orientation with respect to the center line of said handle different than said predetermined angular relation of said head to said vertical plane, said ends of said handle having a thickness adjacent said apertures adapted to fit within said predetermined distance without substantial end play.

4,029,249

ROLLER SYSTEM FOR CONTINUOUS TRANSPORT OF WEBS OF SHEETING

Peter Nagel; Werner Grau, both of Willstaett; Hermann Maier, Ludwigshafen; Heinrich Wittkamp, Mannheim; Roland Falk, Achern, and Paul Willmann, Renchen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Sept. 12, 1975, Ser. No. 612,757
Claims priority, application Germany, Sept. 12, 1974, 2443663
Int. Cl.² B65H *17/30*
U.S. Cl. 226—95 **4 Claims**



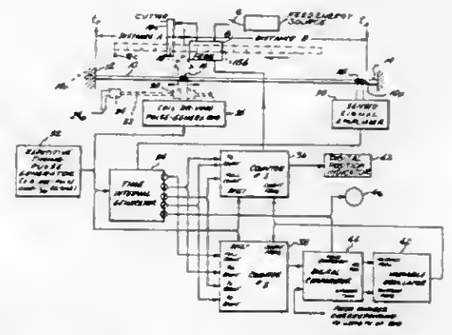
1. An apparatus for transporting and accelerating or decelerating webs of thin sheeting by means of a number of rollers, said apparatus comprising:
a suction roller having a rotational axis, said roller acting as a control point and having a rhombic pattern of grooves formed on its surface, said grooves being obliquely disposed with respect to the axis of said roller
perforations formed on said surface at the points of intersection of said grooves, and
the ratio of total cross-sectional area of said perforations to the effective surface area of said roller being at least 0.7 to not more than 3%.

4,029,250

PHOTOGRAPHIC STRIP TRANSPORT INTERVAL CONTROL

Leonard H. Tall, Mercer Island, Wash., assignor to CX Corporation, Seattle, Wash.

Filed Sept. 23, 1975, Ser. No. 616,017
Int. Cl.² B65H *17/26*
U.S. Cl. 226—136 **5 Claims**



1. Apparatus for processing of photographic strips and the like including an intermittently activatable operating device stationed along a feed path of longitudinal advancement of the strip, stepwise feed means responsive to an electrical command signal and operable to advance the strip by a plurality of successive fixed increments totalling a predetermined feed distance between successive actuations of said operating device, the number of such increments and thereby said feed distance being determined by a digital count command signal applied to said feed means, a movable indication element positioned along said feed path in advance of said operating device and selectively adjustable at will along said strip into selected positional relationship with a desired operative point on the strip, thereby to selectively vary the distance between such element and said operating device, distance measurement means operatively associated with such movable element for deriving an electrical command signal in the form of a digital count corresponding in value to said distance, and means applying said derived command signal to said feed means to control the number of fixed increments produced thereby corresponding to said digital count between successive actuations of said operating device.

4,029,251

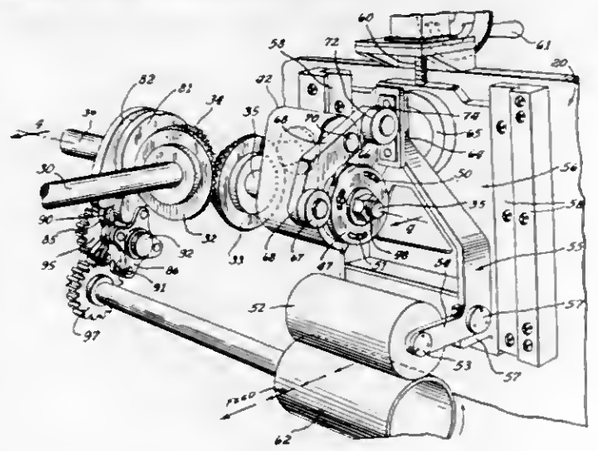
ROLL FEED WITH MODULAR ROLL LIFTER MECHANISM

Keoneth C. Johnson, Des Plaines, Ill., assignor to F. J. Littell Machine Company, Chicago, Ill.

Filed Mar. 15, 1976, Ser. No. 667,134
Int. Cl.² B65H *17/22*
U.S. Cl. 226—154 **5 Claims**

1. In roll feeding apparatus of the character as described, in combination, a pair of feed rolls including a lower driven roll and an upper idler roll, frame structure providing a journalling hub portion, a drive shaft extending through the hub portion to project beyond the same and being journalled for rotation by the hub portion, an idler roll adjusting plate supported by the frame structure for slidable movement in a direction towards and from the lower driven roll, a pivotal bracket mounted on the plate, means provided by the pivotal bracket for journalling the upper idler roll and for positioning the same above and in approximate vertical alignment with the lower

driven roll, and an actuating cam mounted on the projecting end of the drive shaft and having rotation with the shaft for



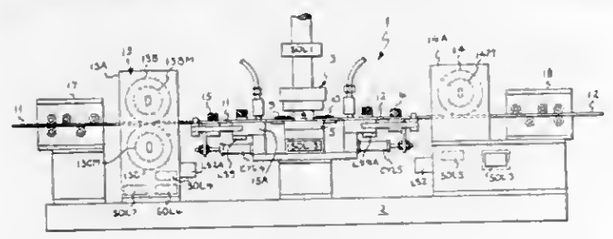
periodically rocking the pivotal bracket to lift the upper idler roll with respect to the lower driven roll.

4,029,252

APPARATUS FOR MAKING A COPPER-ALUMINUM TRANSITION JOINT

Kenneth G. Hawkins, Burnt Hills, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed May 17, 1976, Ser. No. 687,068
Int. Cl.² B23K *21/00*
U.S. Cl. 228—3.1 **8 Claims**



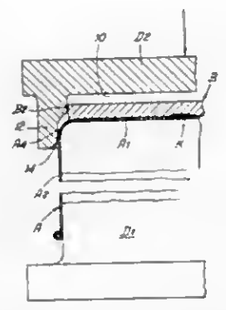
1. Apparatus for making a copper-aluminum transition joint comprising a press having relatively movable first and second dies, the second one of which is a double-acting die including a punch, and having first and second metal shears positioned respectively on opposite sides of said second die and operable to shear strips of metal, first and second rotatable abrading brushes mounted respectively on opposite sides of said press, brush drive means operatively coupled to selectively rotate said brushes, first and second wire feeders mounted respectively on opposite sides of said press between the dies and the brushes, said first wire feeder being operable to intermittently move an aluminum wire past the first brush in abrading relationship therewith and feed the aluminum wire to a position ove the punch, said second wire feeder being operable to intermittently move a copper wire past the second brush in abrading relationship therewith and feed the copper wire into overlapping relationship with the aluminum wire positioned over said punch, first and second brush drive control means responsive respectively to movement of an aluminum wire or a copper wire by said wire feeders to actuate the brush drive means to move said brushes into abrading relationship with said wires and to rotate said brushes, said press being operable responsive to movement of a copper and an aluminum wire into overlapping relationship over the punch to drive said first die toward the punch and the shears therby to shear the copper and aluminum wires and force the overlapped portions of both wires around the punch thereby to form a cold welded intermetallic transition joint between the wires, said first and second wire feeders being operable respectively to retract the aluminum wire and the copper wire predetermined distances back from the shearing edges of said shears responsive to completion of the shearing movement of said first die to shear said wires, and ejecting means mounted on said press and operable to drive a transition joint from between the retracted ends of the aluminum and copper wires and out the press responsive to movement of said first die away from the punch.

4,029,253

METHOD OF HEAT AND PRESSURE BONDING OF PLATES OF HEAT CONDUCTIVE METAL ONTO STAINLESS STEEL SURFACES

Nando Cartossi, Novara, Italy, assignor to Walter Cartossi S.p.A., Ornavasso, Novara, Italy

Continuation of Ser. No. 343,840, March 22, 1973, abandoned. This application Aug. 18, 1975, Ser. No. 605,540
Claims priority, application Italy, Apr. 22, 1972, 23434/72; Aug. 4, 1972, 27923/72
Int. Cl.² B23K *1/04*
U.S. Cl. 228—175 **10 Claims**



1. A method of heat and pressure bonding a bottom plate of heat conductive metal onto the bottom surface of a stainless steel container having a peripheral wall of larger diameter than the bottom surface and a connecting surface sloping from the bottom surface to the peripheral wall, the method comprising:

placing into laminar assembly with said bottom surface a plate of heat conductive metal of an original diameter substantially the same as the diameter of said bottom surface and with the edge of the plate spaced from the diameter of said peripheral wall by substantially the width of said connecting surface;

heating the assembly to nearly the fusion temperature of the heat conductive metal of said plate;

while the assembly is at said temperature applying bonding pressure uniformly over the full area of the plate to effect fusion bonding of the plate to said bottom surface;

closely confining the perimeter of the plate for firmly retaining the edge substantially against spreading from its original diameter and holding said plate and said bottom surface against relative displacement while applying said bonding pressure whereby to assure uniformity of pressure and bonding of the plate throughout its area to said bottom surface.

4,029,254

METHOD OF DIFFUSION BONDING AND BRAZING OF MATERIALS

Winford Blair, La Mesa, and Melvin M. Schwartz, La Jolla, both of Calif., assignors to Rohr Industries, Inc., Chula Vista, Calif.

Filed Aug. 9, 1976, Ser. No. 712,710
Int. Cl.² B23K *31/02*
U.S. Cl. 228—181 **14 Claims**

1. A method of bonding honeycomb core material to its facing sheets wherein said core and facing sheets have been formed into a substantially semi-circular configuration and wherein said core and facing sheets are made of similar material and the edges of said core and said facing sheets or both

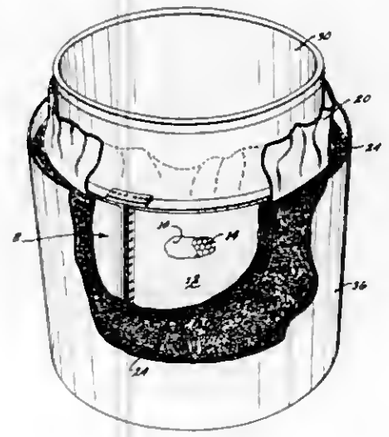
have had deposited thereon a laminate formed of diffusion bridge or braze alloy material which comprises the steps of:

a. positioning together the faying surfaces of the facing sheets and core to be bonded with the core located between the facing sheets thereby forming a generally tubular assembly;

b. inserting a mandrel into the interior of the tubular assembly wherein the diameter of the mandrel is slightly smaller than the interior diameter of the tubular assembly and wherein the mandrel is formed from a metal having a thermal coeffecient of expansion greater than that of the material of the facing sheets and core;

c. inserting the combined mandrel and tubular assembly of step (b) into a container having an open top surface wherein the height of the container is greater than the height of the tubular assembly and wherein the width of the container is greater than the width of the tubular assembly thereby forming a chamber surrounding the tubular assembly within the container;

d. filling the chamber formed in step (c) with pellets at least to the height of the tubular assembly to produce a positive



pressure against the surface of the outer facing sheet thereby subjecting the faying surface to sufficient pressure to maintain position and alignment for joining;

e. heating the container and all the items placed in it in steps (c) and (d) from ambient temperature to a higher temperature wherein joinder occurs at a temperature lower than the beta transus of any of the metals involved in the process and while this heating is continuing, the expansion of the mandrel will be exerting kinetic pressure against the interior of the tubular assembly and the pellets located within the chamber will be transferring at least a portion of said pressure against the outer surface of the tubular assembly while the lack of a confining surface against the pellets from the top of the chamber allows the level of the pellets to rise and fall as a safety valve against undue pressures being exerted against the walls of the tubular assembly;

f. maintaining the temperature at a controlled rate at a predetermined level and holding it for a sufficient length of time to cause bonding of the materials, and;

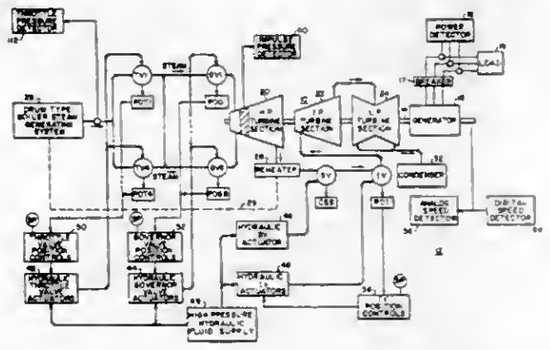
g. lowering the temperature by a predetermined cooling period to ambient.

4,029,255

SYSTEM FOR OPERATING A STEAM TURBINE WITH BUMPLESS DIGITAL MEGAWATT AND IMPULSE PRESSURE CONTROL LOOP SWITCHING

Richard S. Heiser, Pittsburgh, and Anthony I. Scott, Greensburg, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 247,854, April 26, 1972, abandoned. This application Oct. 16, 1973, Ser. No. 407,025
Int. Cl.² F01D *17/02*; **G05B** *15/00*
U.S. Cl. 235—151.21 **16 Claims**



1. A control system for a large electric power steam turbine having a plurality of turbine sections to which steam is supplied through at least one throttle valve and a plurality of governor valves, said control system comprising means for electrohydraulically controlling the position of the throttle and governor valves in response to setpoint signals and signals representative of the valve positions, means for generating signals representative of the turbine speed and the turbine impulse pressure, means for generating signals representing a valve setpoint for application to said electrohydraulic position controlling means to position the value for load control after synchronization in response to a load reference in a load control loop, means for normally generating a speed corrected load reference as a function of the speed signal and the load reference, means for generating an impulse pressure load reference as a function of the impulse pressure signal and a setpoint derived from the speed corrected load reference, means for connecting and disconnecting said inpulse pressure reference generating means in the load control loop, means for setting the load reference to a post-connection value or a post-disconnection value which enable the valve setpoint to have the same value just before and just after a connecting or disconnecting action by said connecting and disconnecting means, and means for setting the impulse pressure reference and the impulse pressure setpoint to respective values which enable the valve setpoint to have the same value just before and just after a connecting action by said connecting and disconnecting means.

4,029,256

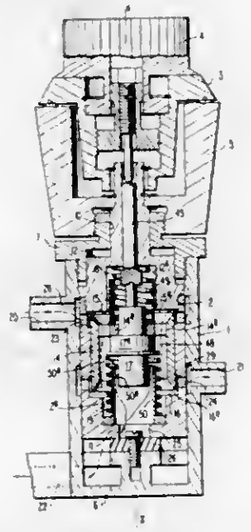
THERMOSTATIC MIXER VALVE

Bernard Dauga, Selchamps, France, assignor to Pont-A-Mousson S.A., Nancy, France

Filed Dec. 19, 1975, Ser. No. 642,633
Claims priority, application France, Dec. 20, 1974, 74.42270
Int. Cl.² G05D *11/16, 23/13*
U.S. Cl. 236—12 R **7 Claims**

1. In a thermostatic mixer valve for mixing hot and cold water, said valve including a cylindrical valve body, a cylindrical cartridge slidably mounted in said body, said body and said cartridge each having axially spaced, circumferentially aligned hot water and cold water inlets, a mixed water outlet, an axial flow passage within said cylindrical cartridge leading to said mixed water outlet, a flow rate regulation control member supported by the body for axially shifting said cartridge between two positions in one of which communication between

the mixed water outlet of the cartridge and body is prevented, a temperature regulation control member supported by said body, a temperature regulating means including a thermosensitive element connected to said temperature regulation control member for regulating the mixed water temperature by varying the relative proportions of hot and cold water in the mixture, said cartridge defining an annular mixing chamber into which the hot and cold water inlets open radially, said temperature regulating means further comprising a slide valve secured to the thermostatic element and positioned within said mixing chamber, said cartridge further defining axially spaced abutment surfaces facing respective ends of said slide valve and cooperating with the ends of said slide valve to define a cold water passage and a hot water passage respectively leading from said cold and hot water inlets to the inter-



ior of said slide valve, the interior of said slide valve being open and forming said axial passage leading to said mixed water outlet of said cartridge, a pair of coil springs acting on opposite sides of said thermostatic element, the improvement comprising: annular, hollow deflectors located within respective ends of said mixing chamber, radially opposite said radial hot water and cold water inlets and radially spaced from said slide valve forming annular flow path therewith and extending axially beyond the ends of said hot and cold water inlets and being axially spaced relative to each other so as to deflect the radial inlet flows of the hot and cold water to axial flows so as to flow towards each other prior to flowing radially between said deflectors via a radial passage therebetween and finally through the center of the mixing chamber within said axial flow passage leading to said mixed water outlet for said cartridge.

4,029,257

THERMALLY ACTUATED VALVE

Patrick A. Jenkins, and Ronald E. Reinke, both of Decatur, Ill., assignors to Borg-Warner Corporation, Chicago, Ill.

Filed Oct. 8, 1975, Ser. No. 620,625

Int. Cl.² F16K *31/56;* **G05D** *23/10*

U.S. Cl. 236—48 R **6 Claims**

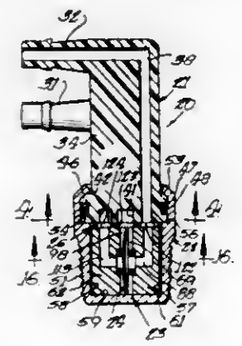
1. A thermally actuated valve comprising:

a cup member including a pocket defining a bottom wall and a side wall having an annular shoulder spaced from said bottom wall, said cup member being adapted for contact with a heat source;

a thermally conductive cartridge received within said pocket having a bottom surface engaging said bottom wall of said pocket, said cartridge including a centrally disposed common channel communicable with a pair of secondary channels disposed on opposite sides of said common channel, each of said common and secondary channels opening through an upper surface of said cartridge;

a thermally responsive bimetal snap action valve member disposed in said common channel having a portion movable from sealing engagement with one of said secondary channels into sealing engagement with the other of said secondary channels for controlling communication between said common channel and said secondary channels in accordance with temperature change in said cartridge;

a resilient gasket disposed in said pocket overlying said upper surface of said cartridge including a pattern of openings communicating with said common and secondary channels;



a crown member including a common passage and a pair of secondary passages opening through a lower surface thereof communicating with said pattern of openings in said gasket, said lower surface having portions engaging said gasket and said annular shoulder of said cup member; and

means securing said crown member to said cup member whereby said gasket is compressed between said upper surface of said cartridge and said lower surface of said crown members for resiliently urging said cartridge into heat transfer engagement with said bottom wall of said cup member while maintaining a seal around said channel and passage openings.

4,029,258

SOLAR ENERGY COLLECTOR

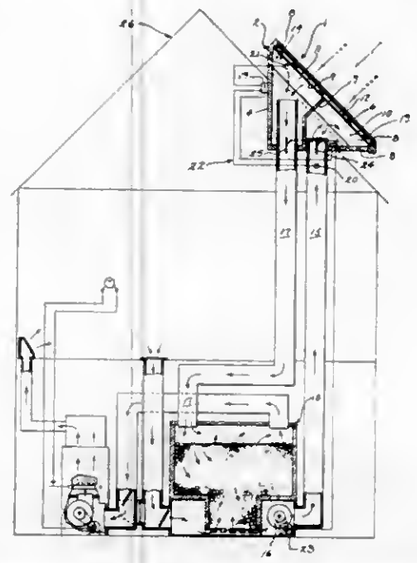
Glenn F. Groth, Sheboygan, Wis., assignor to Sun Unlimited Research Corporation, Sheboygan, Wis.

Filed Nov. 14, 1975, Ser. No. 631,938

Int. Cl.² F24D *0/00*

U.S. Cl. 237—1 A **10 Claims**

1. A solar energy collector system comprising a flat-plate collector unit having an air inlet and an air outlet, means for removing heat from air, and means to circulate air from said heat removal means to said collector inlet and from said collector outlet to said heat removal means; said collector unit comprising a heat insulated housing having a transparent face exposed to the rays of the sun, a flat-plate collector spaced from said transparent face in said housing and extending to the sidewalls of said housing, a partition in said housing supporting the back of said flat-plate collector and dividing the portion of said housing behind the flat-plate collector into separate inlet and outlet chambers connected respectively to said air inlet and air outlet, and passage means for the flow of air from said inlet chamber into and upwardly through the space between said transparent face and said flat-plate collector to said outlet chamber, a substantial part of the back side of said



collector plate being exposed directly to the air in said chambers.

4,029,259

ARRANGEMENT FOR WASHING TRANSPARENT PARTS OF VEHICLES

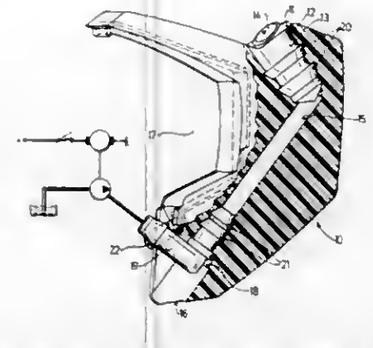
Eckhard Ursel, Buhl, and Peter Kessler, Buhlertal, both of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Jan. 22, 1976, Ser. No. 651,393

Claims priority, application Germany, Jan. 30, 1975, 2503730

Int. Cl.² B60S *1/46*

U.S. Cl. 239—284 A **18 Claims**



1. In a vehicle, an arrangement for washing lens shields of vehicle lamps, comprising a bumper having a bumper guard, said guard having a portin of solid cross-section; supply means for washing liquid; a spray nozzle means mounted on said bumper guard of the vehicle so as to face towards the lens shield; a channel passage extending through said solid portion of the bumper guard and connecting said liquid supply means with said nozzle means; and means for propelling said liquid towards said nozzle means.

4,029,260

CLEANING AND SANITIZING APPARATUS

George A. Herrick, Rte. 1, Box 297, Waskom, Tex. 75692

Filed Oct. 2, 1975, Ser. No. 619,040

Int. Cl.² B05B *15/06;* **B08B** *7/30;* **B05B** *3/08*

U.S. Cl. 239—282 **5 Claims**

1. A portable, water operated cleaning and sanitizing apparatus removably secured to a mounting board comprising:

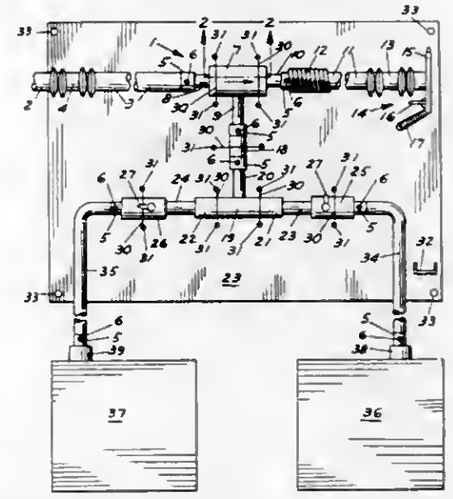
a. a mixing valve having an inlet fitting, an outlet fitting and a first tee fitting and including a ball check means;

b. an inlet hose having one end removably fitted to said inlet fitting and the opposite end to the faucet of a conventional water supply system;

c. an outlet hose having one end removably fitted to said outlet fitting;

d. a second tee fitting having a first tee leg nipple, a second tee leg nipple and a tee discharge;

e. a chemical inlet hose connecting said first tee fitting and said tee discharge of said second tee fitting;



f. at least one chemical hose having one end removably fitted to said first tee leg nipple of said second tee fitting, and having the opposite end connected to at least one chemical reservoir;

g. at least one valve in cooperation with said at least one chemical hose between said chemical reservoir and said second tee fitting to control the flow of chemical through said chemical hose and said chemical inlet hose to said mixing valve; and

h. a spray nozzle in cooperation with the opposite end of said outlet hose.

4,029,261

PISTON DISPLACEMENT LIQUID SPRAY PUMPS

Jaime Olegnowicz, Aguilar y Seljas No. 50-502, Mexico, D.F., Mexico (10)

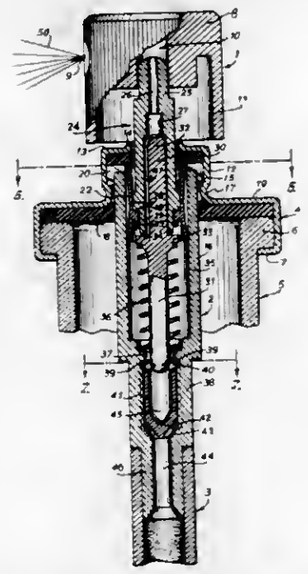
Filed Apr. 30, 1976, Ser. No. 681,919

Int. Cl.² B05B *11/02*

U.S. Cl. 239—333 **6 Claims**

1. A piston displacement liquid spray pump comprising in combination a container; a pump supporting ferrule engaged on the neck of said container; a hollow cylindrical housing having an upper end provided with an outwardly extending lip, the lower edge of said lip being supported on said ferrule and its upper edge pressing a packing washer against the cover portion of said ferrule, at least one outwardly directed radial slit being provided through said lip of the housing whereby venting of the said container is permitted through said at least one slit to the atmosphere; a stem within said housing; a hollow stem extension telescopically engaged outwardly of the upper section of said stem; an actuator engaging the upper end of said stem extension and capable of biasing the same and said stem downwardly, said actuator being provided with an outlet passage and nozzle in communication with the bore of said hollow stem extension; a check valve comprising a valve chamber, a valve seat at the lower end of said valve chamber, and a bullet-shaped hollow floating valve member cooperating with said valve seat and within which the lower end of said stem is received on its downward movement; a longitudinal groove along the upper section of said stem and forming a passage with the complementary bore of said hollow stem extension communicating the interior of said housing with said

nozzle; a piston slidably movable within said housing and forming therewith a pumping chamber and a venting chamber, said piston being mounted on the lower end of said hollow stem extension with a longitudinal lost motion engagement thereto; an outwardly directed annular flange on the middle portion of said stem; the lower end of said stem extension being spaced from the upper surface of said annular flange so as to form a span communicating said groove with said pump-



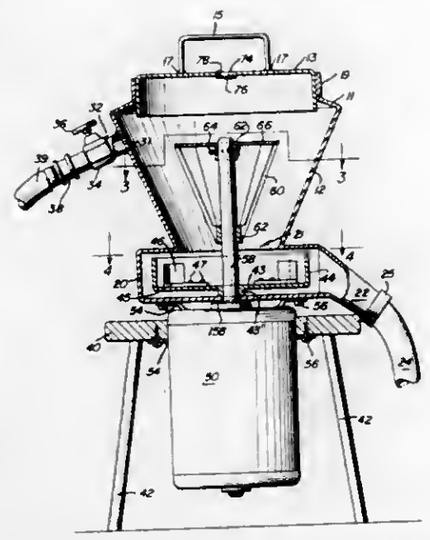
ing chamber; said lost motion engagement of the piston enabling said piston to fully obstruct said span during its upward or charging stroke and to clear the same during its downward or pumping stroke; said piston when the stem is at its uppermost position, being capable of firmly bearing against the lower surface of said packing washer thus blocking said at least one slit to prevent leakage from the container; and spring means to bias said stem and said stem extension upwardly in unison.

4,029,262

ANIMAL EXCREMENT DISPOSAL APPARATUS

Radovan P. Lazich, 2735 Kroy Way, Sacramento, Calif. 95817, and Adolph P. Cascardo, 2233 Mission Ave., Carmichael, Calif. 95608

Filed Apr. 13, 1976, Ser. No. 676,546
Int. Cl.² B02C *23/36*
U.S. Cl. 241—43 **8 Claims**



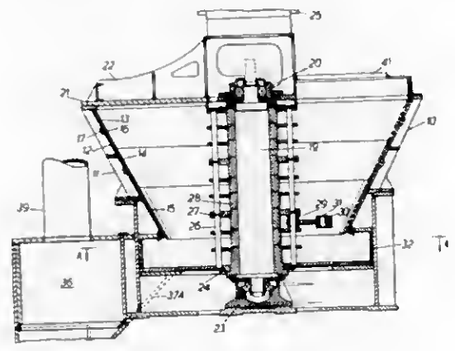
1. An animal excrement disposal apparatus comprising; portable means for emulsifying and holding animal excrement so it may be used for liquid fertilizer including a primary receptacle of conical configuration having a large opening at the top thereof, a closure means for said top opening, means rotatably within the receptacle for breaking up solid excrement, means for admitting liquid to the receptacle, further means for exhausting the liquid fertilizer from the receptacle, the means rotatably mounted within the receptacle for breaking up solid excrement includes a motor attached to the bottom of the receptacle, a drive shaft extending from the motor into the receptacle, means on the drive shaft for cutting the excrement into pieces, additional means associated with the drive shaft for emulsifying the excrement, and the means on the drive shaft for cutting the excrement includes a conically shaped rotor formed of a plurality of cutter blades having an overall shape which complements the interior shape of the primary receptacle.

4,029,263

BALLISTIC PULVERISER SEPARATOR

Albert Edward Roy Wilkinson, Sheffield, and Nigel Dane Quartano Candler, Hungerford, both of England, assignors to Tollemache Environmental Engineers Limited, Surbiton, England

Filed Mar. 31, 1975, Ser. No. 563,511
Int. Cl.² B02C *13/282*
U.S. Cl. 241—188 R **6 Claims**



1. A pulveriser separator comprising, in combination:
a. a housing;
b. an upwardly divergent funnel portion consisting of a plurality of imperforate pulveriser plates disposed to provide a polygonal cross-sectional inner perforate for the funnel, said plates comprising inner skin plates and outer skin plates, the inner skin plate of each face of the polygon being formed by a plurality of axially adjacent plate portions.
c. a downwardly depending skirt portion of said housing extending downwardly from said funnel portion; and
d. at least one hammer mounted for rotation about the substantially vertical axis within said housing.

4,029,264

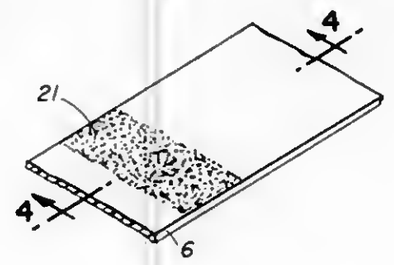
CLING FILM ROLL HAVING A NODULOSE LEADING EDGE PORTION AND THE METHOD AND APPARATUS FOR PRODUCING IT

Ronald Griffith Reese, La Salle, Ill., assignor to Union Carbide Corporation, New York, N.Y.

Filed May 3, 1976, Ser. No. 682,533
Int. Cl.² B65H *81/00*
U.S. Cl. 242—1 **4 Claims**

1. In a roll of consumer type plastic wrapping cling film having a relatively high tendency to cling to itself, the improvement comprising the leading edge portion of the film having a plurality of surface disturbances consisting of small

stretched areas projecting from the surface of the film thus forming a substantially nodulose leading edge portion which is



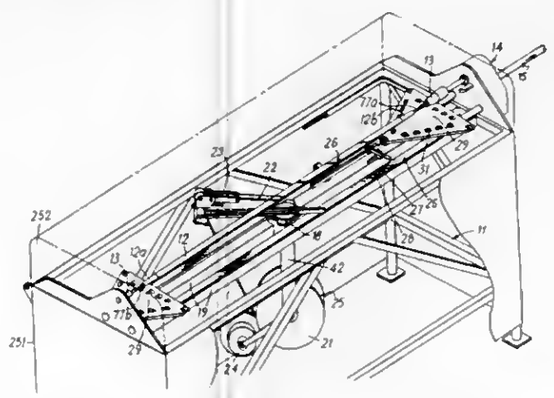
readily identifiable and adapted for easy grasping to initiate start of the roll.

4,029,265

WINDING FLEXIBLE STRIP MATERIAL ON CORES WITH FRUSTO-CONICAL ENDS

Leslie Herbert Piper, Fareham, England, assignor to High Temperature Engineers Limited, England

Filed Mar. 25, 1975, Ser. No. 561,975
Claims priority, application United Kingdom, Mar. 25, 1974, 13163/74
Int. Cl.² B65H *81/06*
U.S. Cl. 242—7.23 **9 Claims**



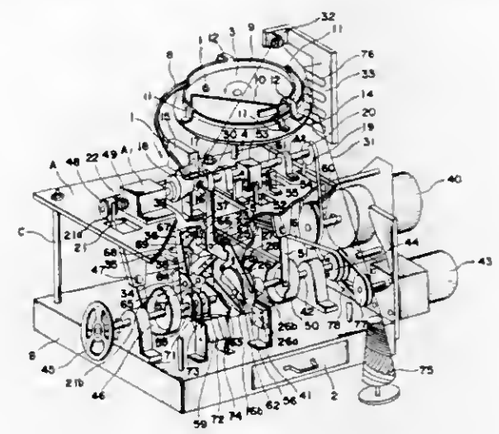
1. An apparatus for winding a strip or strand of flexible material on a frustum-forming portion of a rotatable core, comprising means for rotatably mounting and for rotating a core about an axis, a carriage mounted for reciprocal movement longitudinally of the core, carriage drive meand for longitudinally moving the carriage, a feed arm for feeding the strip or strand from a spool to the core, the feed arm being mounted on the carriage for swinging movement about an instantaneous axis transverse to the core axis, and means for coordinating the longitudinal movement of the carriage and the swinging movement of the feed arm to increase the angle that the strip or strand makes to the axis of the core as the carriage moves in the direction towards the smaller end of the frustum, said carriage stopping and reversing direction as said arm passes through an approximately 90-degree angle with respect to the core axis, and to continue to swing the feed arm in the same angular direction during return movement of the carriage towards the larger end of the frustum in such a manner that successive turns of the flexible material deposited on the frustum have progressively changing angles with respect to the axis of the core.

4,029,266

AUTOMATIC THREAD WINDING APPARATUS

Takashi Mori, Yamatokoriyama; Michio Kato, Hirakata; Koichi Mizu, and Yoshikazu Nishida, both of Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Continuation-in-part of Ser. No. 435,575, Jan. 22, 1974, abandoned. This application Nov. 6, 1975, Ser. No. 629,782
Claims priority, application Japan, Jan. 26, 1973, 48-11447; Jan. 26, 1973, 48-11452; June 15, 1973, 48-68050; June 15, 1973, 48-68052; Dec. 20, 1973, 48-2778
Int. Cl.² B65H *54/00*
U.S. Cl. 242—20 **9 Claims**



1. An automatic thread winding apparatus for successively winding thread on double-flanged bobbins, which comprises in combination:
a bevel-shaped dish for arbitrarily receiving a plurality of the bobbins therein, said bevel-shaped dish being rotatably supported in a horizontal position, rotating means coupled to said dish for continuously rotating said dish in one direction, a guide wall extending fixed in position slightly above said dish and around a part of the circumference of the dish slightly inwardly of the periphery of the dish, and a wire guide fixed in position around and just above the peripheral edge of said dish;
winding means including a pair of axially aligned first and second holding means for firmly holding each one of the empty bobbins in a winding position between said first and second holding means in readiness for winding operation;
a pair of spaced parallel wires, one extending from said wire guide and the other from an end of said guide wall adjacent the periphery of said bevel-shaped dish, said spaced parallel wires extending to a position adjacent to and spaced from said winding position;
said guide wall and said guide wire guiding the bobbins placed on said dish towards and onto said spaced parallel wires during rotation of said dish;
a guide block supported in position at said position adjacent to and spaced from said winding position and including a bobbin passage formed therein, said spaced parallel wires being coupled to said guide block at one end of said bobbin passage;
a bobbin transfer member supported in position for pivotal movement between first and second positions, said bobbin transfer member having a bobbin receiving seat which is aligned with the other end of said bobbin passage in said guide block when said transfer member is in said first position and is brought to said winding position when said transfer member is in said second position, said bobbin transfer member further having a portion therein which moves past said other end of said bobbin passage in said guide block during pivotal movement of said transfer member between said first and second positions for

blocking the movement of the next bobbin on said bobbin passage from falling out of said bobbin passage;
thread anchoring means adjacent said holding means for anchoring the thread to the bobbin that is held in position between said holding means;
first means operatively coupled to one of said holding means for rotating said one of said holding means;
second means operatively associated with one of said holding means for axially moving said one of said holding means which is associated therewith, said one of said holding means associated with said second means being moved close to the other of said holding means for first tightly holding each bobbin that has been transferred by said bobbin transfer means onto said winding means in position between said holding means and then withdrawing slightly from the transferred bobbin, said axially movable holding means having an axially retractable mounting spindle carried thereby for axial movement in a direction aligned with the holding means independent of the axial movement of said axially movable holding means, and being inserted into the center of the transferred bobbin during movement of the axially movable holding means toward the bobbin and remaining within said bobbin during said slight withdrawing movement, and said each bobbin and said holding means of said pair being synchronously rotated by said first means through said one of said holding means which is coupled with said rotating means, thereby winding the thread thereon;
detecting means adjacent said holding means and coupled to said rotating means for detecting whether or not the bobbin has had a predetermined quantity of thread wound thereon and for interrupting operation of said rotating means upon attainment of the predetermined quantity;
doffing means coupled to said holding means and operable upon completion of the winding operation for axially moving said one of said bolding means to release the full bobbin, said doffing means including a severing means for severing the thread to separate the thread wound on the bobbin from that leading from a thread supply device; and
a storage receptacle beneath said doffing means for receiving the filled bobbins after the severing operation has been completed; and
temporary storage means positioned below said winding means and between said winding means and said storage receptacle and substantially adjacent to said severing means for receiving the full bobbin from said holding means under the effect of gravity and temporarily storing the filled bobbin therein to assist said severing means, and for ejecting the filled bobbin into said storage receptable after said severing operation is completed.

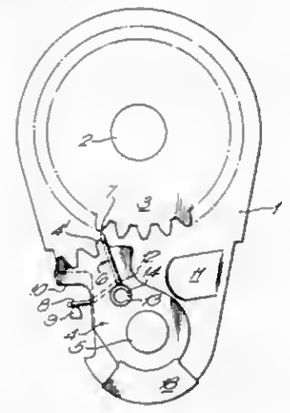
4,029,267

LOCKING SAFETY BELT REELS

John Richard Slipper, Chichester, England, assignor to Wingard Limited, England

Filed Dec. 23, 1975, Ser. No. 643,650
Claims priority, application United Kingdom, Jan. 9, 1975, 973/75
Int. Cl.² B65H *75/48*; A62B *35/02*
U.S. Cl. 242—107.4 A **13 Claims**

1. An improvement in a mechanically operable safety belt retractor, of the type comprising a belt storage reel, means biasing said reel in a belt retraction direction, toothed means mounted for rotation with said storage reel, a pawl, means mounting said pawl for movement from an inoperative first position to an operative second position engaging said toothed means for locking said reel, and an inertia responsive mass for moving said pawl from said first position to said second position when a predetermined minimum acceleration is exceeded, the improvement comprising a flexible member connected to said pawl and supported thereby for movement in the direction of motion of said pawl, said flexible member being:
   a. directly engageable with said mass for causing engagement of said flexible member with said toothed means,
   b. spaced from said pawl by a predetermined distance to ensure correct phased engagement between said pawl and said toothed means, and



   c. flexurally movable relative to said pawl to absorb the impact between any tooth of said toothed means and said flexible member

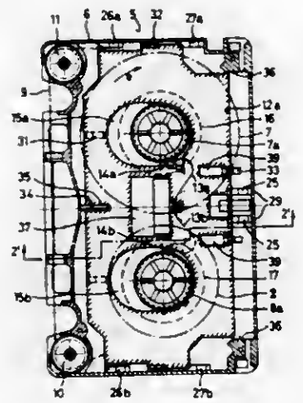
whereby a reaction is avoided on said mass due to engagement between said flexible member and said toothed means when rotating, said pawl being subsequently urged into correct phased engagement with said toothed means for locking said reel.

4,029,268

TAPE RECORDER AND MAGNETIC TAPE CASSETTE

Klaus Schoettle, Heidelberg; Heinrich Wittkamp, Mannheim; Lothar Gliniorz, Frankenthal, and Peter Dobler, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Sept. 30, 1975, Ser. No. 618,042
Int. Cl.² G11B *23/10*
U.S. Cl. 242—198 **7 Claims**



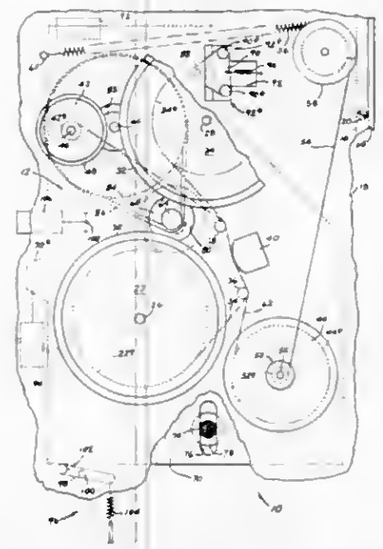
1. In a magnetic tape cassette which comprises a substantially rectangular housing having a bottom wall, a top wall, a front wall and side walls and containing
   a pair of hubs each provided with a circular toothed portion and adapted to carry packs of magnetic tape, said bottom and/or top walls having therein apertures at least some of which are disposed to accommodate the drive spindles and capstans of a tape recorder, said front wall baving therein at least one opening for accommodating tape-scanning means and at least one pressure roller carried by said tape recorder, said opening being arranged so that said pressure roller bears against the length of tape passing along the front wall of the cassette and on the inside thereof;
   resilient means; and
   control means movable against the action of said resilient means in a plane substantially parallel to the cassette plane, between a first, off-recorder position in which said control means rendor said length of tape taut along said front wall and clamp said hubs in place, and a second, on-recorder in which said control means release said length of tape as well as said hubs; the improvement
   that said bottom and top walls of the cassette housing are provided with cam portions; and
   that said control means include two slide plates each having an actuating portion engageable through one of said apertures and each having secured thereto a pawl disposed in cooperating relationship with the circular tooth portion of one of said hubs, said plates substantially overlying opposite sides of the two hubs and being yieldingly urged against the cam portions of said bottom and top walls, respectively, for longitudinal sliding movement on said cam portions, in a direction perpendicular to said front wall, between said first and second positions,
   such that said plates, as they are slidably moved by said actuating portion from their first to their second positions, impart by way of said pawls, a rocking movement to the circular toothed portions of the corresponding hubs, thereby to render said length of tape taut, and in riding up on the respective cam portions incident to their sliding movement, are displaced in a direction substantially perpendicular to the cassette plane, thereby to clamp said hubs between them.

4,029,269

TAPE DRIVE WITH FLOATING-PLATE-MOUNTED DRIVE SPINDLES

Glenn E. Clarridge, Portland, Oreg., assignor to Ford Industries, Inc., Portland, Oreg.

Filed Nov. 28, 1975, Ser. No. 636,059
Int. Cl.² G11B *15/30*
U.S. Cl. 242—201 **5 Claims**



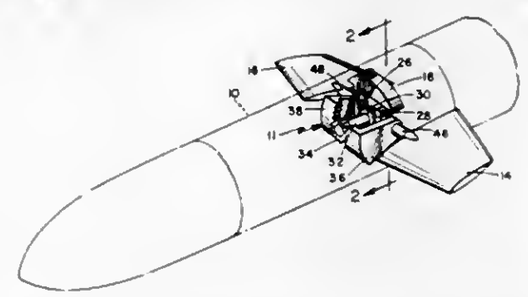
1. Tape drive apparatus comprising
   a generally planar main deck,
   tape support means mounted on said deck for supporting a length of recording tape for reversible movement, said support means including a pair of rotary elements with one being drivable in a selected direction to transport supported tape in one direction, and the other being drivable in a selected direction to transport supported tape in the reverse direction,
   a generally planar subdeck,
   means mounting said subdeck in parallel-planar spaced relation on said main deck, said mounting means being constructed to accommodate both pivoting and translating of the former (in its plane) relative to the latter,
   translating means operatively connected to said subdeck for producing selected, reversible, limited translation thereof,
   interaction means operatively interposed between said main deck and subdeck, operable to cause pivoting of the latter in one direction with operation of said translating means to produce translation of the subdeck in one direction, and pivoting of the subdeck in the opposite direction with operation of the translating means to produce translation of the subdeck in the opposite direction,
   a pair of spaced, power-operated rotary drive spindles mounted on said subdeck and projecting toward said main deck to positions laterally adjacent said pair of rotary elements one of said spindles being engageable with said one element, and being constructed and operable when so engaged to drive said one element at one speed in its said selected direction, and the other spindle being engageable with said one element, and being constructed and operable when so engaged to drive said one element at a speed greater than said one speed in its said selected direction, and further being engageable with said other element to drive it in its said selected direction, and
   biasing means acting between said main deck and subdeck normally urging the two toward relative positions wherein said one spindle engages said one rotary element, and said other spindle is disengaged from both rotary elements,
   pivoting of said subdeck in said one direction under the influence of said translating and interaction means causing disengagement of said one spindle and rotary element and engagement of said other spindle and said one element, and pivoting of the subdeck in the opposite direction under the same influence causing disengagement of said one spindle and rotary element, and engagement of said other spindle and said other rotary element.

4,029,270

MECHANICAL ROLL RATE STABILIZER FOR A ROLLING MISSILE

Byron M. Niemeier, Claremont, Calif., assignor to General Dynamics Corporation, Pomona, Calif.

Filed Aug. 11, 1975, Ser. No. 603,403
Int. Cl.² F42B *15/14*
U.S. Cl. 244—3.21 **7 Claims**



1. A rolling stabilizer system for use with an aerodynamic body having pivotal control surfaces projecting therefrom comprising:
   inertia means comprising at least two relatively high mass members supported in the aerodynamic body for radial displacements,
   an actuator means connected and responsive to the radial displacements of said high mass members for corresponding rotational displacements,
   means for adjusting the orientation of the control surfaces responsive to the rotation of said actuator means and operative to rotate the control surfaces in increments corresponding to the rotation of said actuator means and to cause a corresponding increase and decrease in the roll rate of the aerodynamic body.

said means for adjusting the orientation comprising a first drive means connected to each of said high mass members and active to impart rotational displacements of said actuator means proportional to said radial displacements of said high mass members and second drive means axially offset from said high mass members,

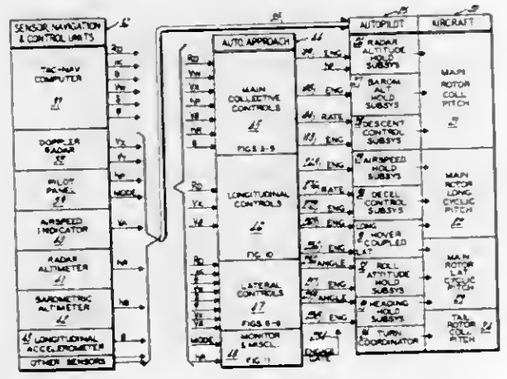
said means for adjusting the orientation comprising second driven means operatively engaged by said second drive means and driven thereby for rotational displacements.

4,029,271

AUTOMATIC APPROACH TO HOVER SYSTEM

Richard D. Murphy, and Lou S. Cotton, both of Monroe, Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Apr. 7, 1976, Ser. No. 674,705
Int. Cl.² G05D *1/00*
U.S. Cl. 244—17.13 **18 Claims**



1. In an aircraft including an autopilot system and having navigation means providing signals indicative of aircraft flight parameters and the course and distance to a destination and a pilot set means for providing a desired hover altitude at said destination, a hover approach control system responsive to signals from said navigation means and said pilot set means to control aircraft flight through said autopilot system, comprising:

course means providing course control signals to control the heading of the aircraft to place said aircraft on a course toward said destination at a point downwind therefrom;

speed means for providing speed control signals to control the speed of said aircraft to decelerate from its speed at said point to standstill at said destination; and

altitude means responsive to said speed means for providing altitude signals to control the altitude of said aircraft for descent from its altitude at said point to said desired altitude, said altitude means generating said altitude control signals as a function of said speed control signals and range to destination throughout traverse of said aircraft from said point to said destination.

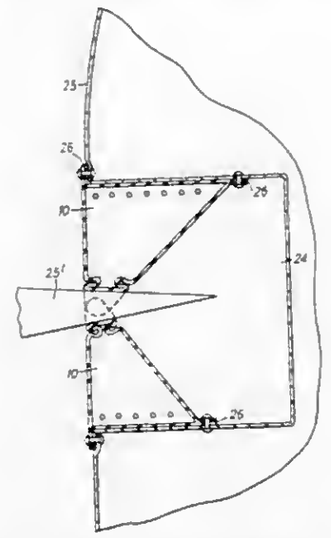
4,029,272

VARIABLE-GEOMETRY AIRCRAFT SEAL

Jeffrey Charles Broadhurst, Burton-on-Trent, England, assignor to Woodville Rubber Company Limited, England

Filed Mar. 8, 1976, Ser. No. 665,157
Claims priority, application United Kingdom, Mar. 10, 1975, 9875/75; July 22, 1975, 30687/75
Int. Cl.² B64C *1/34, 3/40*
U.S. Cl. 244—46 **10 Claims**

1. A variable geometry aircraft provided with a seal between a surface of an aerofoil and the fuselage, the seal comprising an elongated, inflated, flexible bag bridging a gap between the aerofoil and the fuselage, the bag being mounted in a recess in the fuselage with one wall of the bag serving as a continuation of the fuselage-surface across the gap to the aerofoil, all the longitudinal walls of the bag being of flexible material and including a flexible-base-wall affixed along two longitudinal edges to the aircraft fuselage, the bag further having a multiplicity of internal, substantially parallel, closely-spaced, flexible, transverse diaphragms, each said diaphragm having flanges along its edges and being attached by said flanges to corresponding longitudinal walls of the bag, each



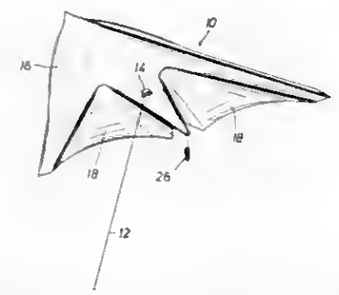
said diaphragm being constructed of a plurality of major parts of elastomeric sheet material affixed to one another, each major part being individually reinforced by a reinforcing web so arranged as to render each said diaphragm substantially inextensible, and each said diaphragm being apertured to permit the passage of inflating gas therethrough.

4,029,273

KITE

Julius M. Christoffel, Jr., 5323 Yarwell, Houston, Tex. 77035

Continuation of Ser. No. 507,342, Sept. 19, 1974, abandoned, which is a continuation of Ser. No. 320,470, Jan. 2, 1973, abandoned. This application Nov. 13, 1975, Ser. No. 631,534
The portion of the term of this patent subsequent to Apr. 9, 1988, has been disclaimed.
Int. Cl.² B64C *31/06*
U.S. Cl. 244—153 R **10 Claims**



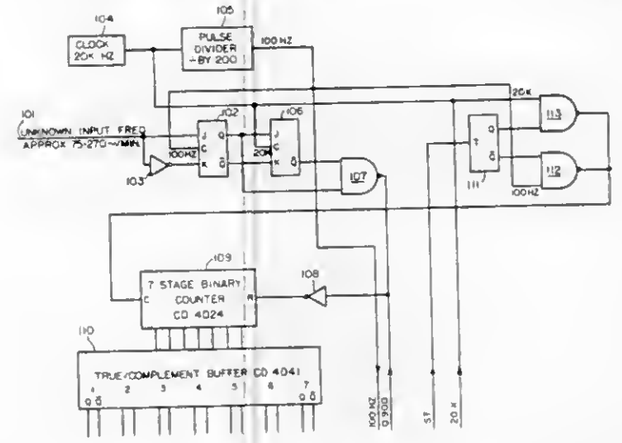
1. An inflatable kite formed of two layers of plastic having an outline forming the configuration of the kite, the two layers being secured together to form at least one inflatable air chamber, the kite having a central longitudinal axis, a string attaching member formed of an elongated member having an arm portion and a stem portion extending downwardly from the underside laterally along an axis perpendicularly intersecting the central longitudinal axis approximate the flying point of the kite, the stem portion having a plurality of string attaching locations spaced along its length.

4,029,274

TRAIN CONTROL SIGNALLING SYSTEM

Henry C. Sibley, Adams Basin, N.Y., assignor to General Signal Corporation, Rochester, N.Y.

Filed Apr. 12, 1976, Ser. No. 676,079
Int. Cl.² B61L *23/16*
U.S. Cl. 246—187 B **25 Claims**



1. A train control system for causing a train to respond in a predetermined manner to signals of predetermined cycle durations, as received on-board the train from the wayside, and having on on-board decoder which includes counting means for sensing the time duration of cycles of the received signal and wherein further on-board means is provided for checking the operation of the decoder comprising:

a. a counter for counting uniform intervals of elapsed time;

b. counter control means for activating said counter at a first rate in response to the start of a cycle of a received signal and for resetting said counter at the end of the cycle;

c. a plurality of elapsed time memory devices sequentially activated in response to said counter being advanced to predetermined counts indicative of successively larger intervals of elapsed time as measured from the start of the received signal which activated said counter;

d. control means coupling said memory devices for deactivating a previously activated memory device when a successive memory device is activated; and

e. verifying means for determining that only one of said memory devices is activated before said train is caused to respond to the decoded signal.

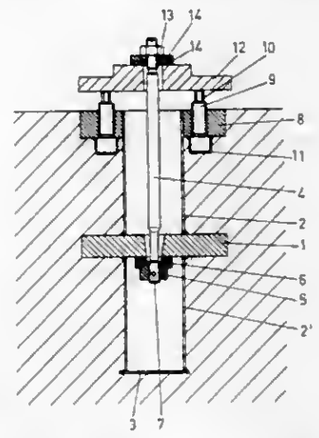
4,029,275

ANCHORING ASSEMBLY FOR A MACHINE BASE

Oskar Erismann, Baden, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Apr. 9, 1976, Ser. No. 675,262
Claims priority, application Switzerland, May 7, 1975, 5868/75
Int. Cl.² F16B *5/02, 39/00*
U.S. Cl. 248—25 **2 Claims**

1. A foundation anchor assembly for fastening machines upon a foundation by attachment of said anchor assembly between said foundation and a base of said machine, said assembly comprising, in combination: a generally cylindrical vertically oriented pipe member defining an opening extending downwardly into said foundation to a given depth; a first plate member extending transversely across said pipe member through said opening at a location intermediate the depth thereof, said first plate member extending laterally beyond said pipe member in an embedded position within said foundation; means defining an orifice through said first plate member; an anchor bolt having a bottom end and a top end, said anchor bolt extending with said bottom end below said first plate member through said orifice in said first plate member and with said top end above said machine base through an opening in said machine base; universal joint means attaching said bottom end of said anchor bolt to said first plate member, said universal joint means comprising a washer extending about said orifice on the underside of said first plate member, said washer having a downwardly directed arcuate surface, a nut attached to said bottom end of said anchor bolt having an upwardly directed arcuate surface in sliding engagement with said downwardly directed arcuate surface of said washer, said universal joint means constituting a slued connection enabling pivotal movement of said anchor bolt thereabout; adjustment means for adjustably positioning over said opening the base of a machine to be fastened upon said foundation by said foundation anchor assembly, said adjustment means comprising a second plate member extending about the upper end of said pipe member and embedded in said foundation adjacent the upper surface thereof, and a plurality of carrying bolts threadedly engaged within said second plate member and extending upwardly therefrom with a crowned top for engagement with the underside of said machine base; a clamping nut attaching said top end of said anchor bolt to the upper side of said machine base; and compensating means comprising a pair of rings having a wedge-shaped sectional configuration taken in the axial direction thereof, said compensating means being interposed between said clamping nut and said machine base.

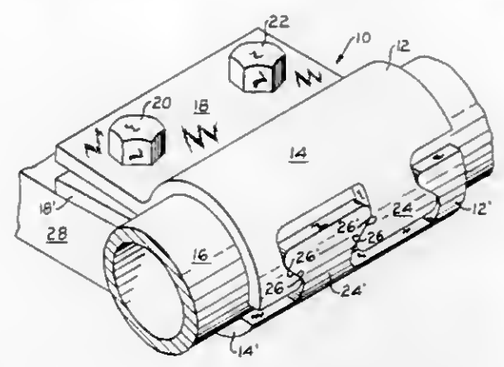


4,029,276

MOUNTING BRACKET FOR TUBULAR MEMBERS

Richard C. Zielie, North Aurora, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Continuation of Ser. No. 282,350, Aug. 21, 1972. This application Feb. 8, 1974, Ser. No. 440,804
Int. Cl.² F16L *3/10*
U.S. Cl. 248—74 R **1 Claim**



1. A rigid strap member for use in mounting tubular members, said strap member being generally rectangular with parallel edges at opposite ends joined by parallel sides;

the opposed major surfaces of said strap member defining parallel planar surfaces at one end of said strap member and parallel curved surfaces at the other end of said strap

member, said curved surfaces at said other end of said strap member defining half of an annular clamping means for encircling and engaging a tubular member;

dovetail means consisting of one or more dovetail slots identical to each other and a portion only of not more than one further identical dovetail slot at one side of said strap member extending through said curved surfaces at the edge of said other end of said strap member, said slots being spaced from each other to provide one or more identical dovetail tabs of slightly smaller dimensions than said slots and a portion only of not more than one further identical dovetail tab at the other side of said member;

each said slot defining a pair of mirror image elongated rectilinear side surfaces extending toward each other from respective first points spaced from the bottom of said slot to respective second points spaced from the edge of said other end of said strap member said first points being spaced further from the bottom of said slot than the spacing between said second points and said edge of said other end of said strap member; and

said strap member having a pair of apertures through said planar surfaces at said one end thereof, said apertures being equally spaced from said one end of said strap member and from the longitudinal center line of said strap member;

whereby a first one of said strap member may be inverted with respect to a second one of said strap member and said dovetail means of said first and second ones of said strap member secured together under tensile stress about a tubular member and to supporting means by passing fastening means through said apertures in said other end of each of said first and second ones of said strap member.

4,029,277

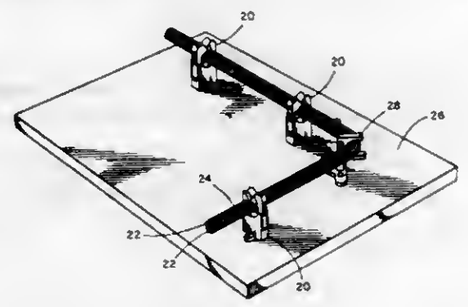
APPARATUS FOR HOLDING AND FORMING A PLURALITY OF OBJECTS INTO A BUNDLE

John J. Bolanda, New Lenox, Ill., assignor to Panduit Corporation, Tinley Park, Ill.

Filed Mar. 15, 1976, Ser. No. 666,548

Int. Cl.² F16G *11/00*; **A44B** *21/00*

U.S. Cl. 248—74 R **20 Claims**



1. Apparatus for forming a plurality of elongate objects such as wires into a bundle of circular cross section, said apparatus comprising:

a base adapted to be securely affixed to a mount such as a panelboard;

a frame for mounting on said base comprising a pair of arms extending generally upwardly from adjacent said base, each arm terminating in an end portion, said end portions being movable relative to one another between a retaining position wherein the spacing between said end portions is less than the diameter of one of said objects and a release position wherein the spacing is at least as great as the object diameter wherein said end portions define an object-receiving opening, said arms being biased toward their retaining position;

and a length of elastomeric material removably carried by said frame and free of said base, said length including a portion bridging said arms adjacent said free ends, said portion cooperating with said end portions to hold said bundle therebetween, said frame and said base comprising attachment means for releasably mounting said frame on said base and operable to remove said frame therefrom whereby upon damage to said length of elastomeric material, it can be removed from said base without removal of said base from said support.

4,029,278

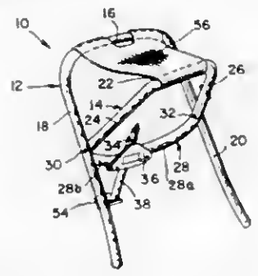
FOLDING STOOL WITH LEVELING LEG

Frank Napoleon, 902 Third Ave., Elizabeth, N.J. 07202

Filed June 21, 1976, Ser. No. 698,019

Int. Cl.² H05B *1/00*; **A47C** *13/00*

U.S. Cl. 248—188.2 **1 Claim**



1. A folding stool comprising: a first member of inverted U shape having a first rail and a pair of first legs projecting downward from opposite ends of said first rail; a second member of generally trapezoidal shape having a second rail directed parallel to said first rail; a pair of diverging arms projecting downward from opposite ends of said second rail to a position between said first legs; a third rail interconnecting the lower ends of said arms; said third rail being generally parallel to said second rail; pivot means at said position coupling said first legs to said pair of arms for relative rotation; an elongated flexible seat respectively secured at its opposite ends to said first and second rails; a generally tubular leveling leg having a plurality of apertures in its wall spaced apart along the length of said leveling leg; a guide carried at the mid-point of said third rail for slideably receiving said leveling leg; and means carried on said guide for engaging a selected one of said apertures.

4,029,279

DEVICE FOR HOLDING EACH OF THE LEGS OF A TRIPOD

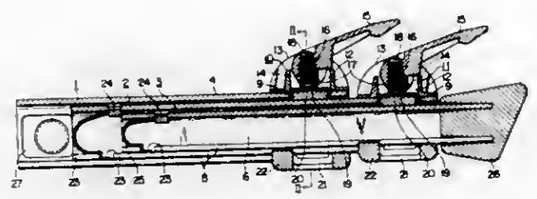
Koma Nakatani, 81, Sakae-cho, Kodaira, Tokyo, Japan

Filed June 21, 1976, Ser. No. 698,163

Claims priority, application Japan, July 25, 1975, 50-103687[U]

Int. Cl.² A45B *1/04*, *19/04*; **F16B** *7/14*

U.S. Cl. 248—188.5 **3 Claims**



1. A holding device for use in the tripod comprising:

at least two rods, each having a similar section and each of the rods being arranged in telescopic manner and provided with a through-hole at the lower end thereof except the one of the smallest diameter which is contained in the inner-most side;

holding frames, each being attached around the outer circumference of the lower end of each of the rods so as to face the through-hole;

attaching members formed integral to both sides of the holding frame;

engaging grooves formed in the attaching members and extending from the inner center of the attaching member to the holding frame, respectively;

fastening levers, each having engaging pins projected from both sides thereof, and said engaging pins being freely rotatably engaged with the engaging grooves;

pressing portions, each being formed integral to each of the fastening levers and arranged to be pressed against a face of each of the inner rods through the through-hole by turning the fastening lever; and

an adjusting screw threadably engaged in each of said pressing portions for adjustable abuttment against the respective face of said inner rods.

4,029,280

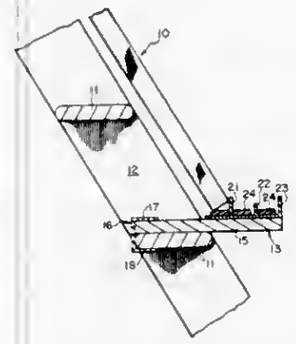
STEP LADDER ATTACHMENT

Rollin L. Golz, 1708 Peterson Ave., Janesville, Wis. 53545

Filed Oct. 13, 1976, Ser. No. 732,079

Int. Cl.² E06C *7/14*

U.S. Cl. 248—210 **6 Claims**



1. A pair of attachments adapted to be detachably mounted at opposite sides respectively of a step of a step ladder for supporting screen or storm sash each attachment comprising: a substantially rectangular wooden block the length of which is greater than the width of the step of said step ladder such that when mounted on said step the forward end of said block extends beyond the front edge of said step, a substantially U-shaped sheet metal clamp constructed and arranged to be fixedly secured at its upper reach to the rear end of said block, the lower reach of said clamp arranged to releasably engaged the rear edge of said step, and sash holding means constructed and arranged to be permanently secured to the top of said block adjacent the forward end thereof said sash holding means comprising a metal base-plate extending longitudinally of said block, said base-plate having a plurality of upstanding lugs arranged in spaced relationship longitudinally thereof, and anti-slip material mounted on said base-plate between each pair of lugs.

4,029,281

RECEPTACLE MOUNTING BRACKET

John A. Marshall, 416 Devonshire Lane, Bolingbrook, Ill. 60439

Filed July 19, 1976, Ser. No. 706,172

Int. Cl.² A47G *23/02*; **A47B** *3/00*; **A47F** *5/00*

U.S. Cl. 248—220.3 **8 Claims**

1. A bracket for mounting a receptacle to a support surface, the receptacle having a rim portion extending above the top at one end thereof and a bottom at the other end comprising:

a. retaining means adapted to be detachably secured to the rim of the receptacle and to the support surface so as to maintain the top of the receptacle in a relatively fixed position

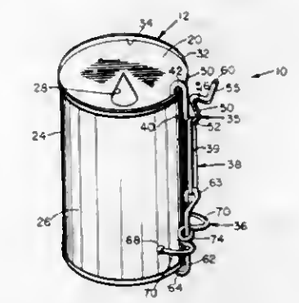
b. supporting means adapted to be suspended from said retaining means for engagement with the bottom and the side wall of the receptacle; and

c. elastic means for connecting said retaining means and said supporting means to provide axial restraint therebetween for supporting the receptacle in a relatively fixed position and permitting removal of the receptacle from the bracket by stretching said elastic means to permit release therefrom;

d. said retaining means includes:

1. a body portion for engagement with the rim or side wall of the receptacle;

2. a hook extending from said body portion in spaced relation thereto to engage the rim interiorly of the receptacle; and



3. a gripping member extending outwardly from said body portion in substantially the opposite direction to said hook for securement of said retaining means to the support surface;

e. said body portion includes:

1. a first shank portion integrally formed with said hook; and

2. a second shank portion integrally formed with said gripping member and joined together with said first shank portion thereof at a loop with a vertical spacing therebetween, said loop adapted to retain said elastic means in fixed relation thereto.

4,029,282

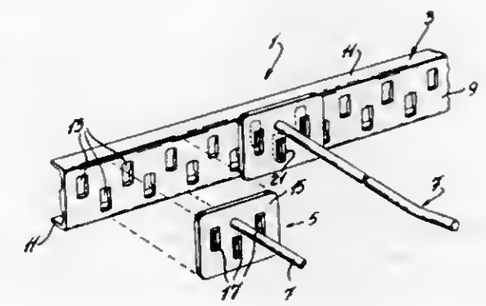
WALL BRACKET AND CLIP ARRANGEMENT

Michael F. Dauth, Montreal, Canada, assignor to Metalworks Limited, Quebec, Canada

Filed May 2, 1975, Ser. No. 573,986

Int. Cl.² A47F *5/00*

U.S. Cl. 248—221.1 **5 Claims**



1. An assembly for supporting objects on a wall surface, said assembly being adapted to be mounted on said wall surface, and comprising, a longitudinally extending rail for mounting on said wall surface and comprising a front member having a front surface substantially parallel with said wall surface and spaced from said wall surface by first and second side walls at opposite ends of said front member, said first and second side walls extending at substantially 90° to said front member;

said front member comprising a material of a first thickness;

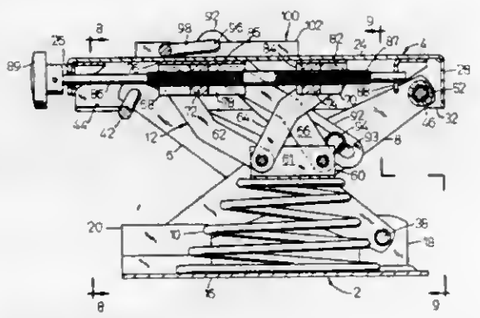
said front member comprising a plurality of spaced open-

ings, said spaced openings being disposed along an upper row and a lower row, the opening in any row being disposed between two adjacent openings in the other row;
a clip means for mounting on said rail and comprising:
a base member having a first surface and a second surface;
hanger means extending from said first surface;
three spaced hook means extending from said second surface, the spacing of said hook means matching the spacing of said openings for engaging in said openings of said rail, said three hook means being disposed in an upper row and a lower row, said upper row comprising two of said hook means, the third hook means being disposed in said lower row between said hook means in said upper row;
the spacing between the inner surface of each hook means and the second surface of the base member being less than the first thickness of the material of the front member of said rail.

4,029,283
SEAT SUPPORTING ASSEMBLY

Richard F. Swenson, Milwaukee; Shawn H. Eimen, Menomonee Falls, and John J. Gryga, Jr., Milwaukee, all of Wis., assignors to Milsco Manufacturing Company, Milwaukee, Wis.

Filed Feb. 2, 1976, Ser. No. 654,570
Int. Cl.² F16M *13/00*
U.S. Cl. 248—399 **9 Claims**

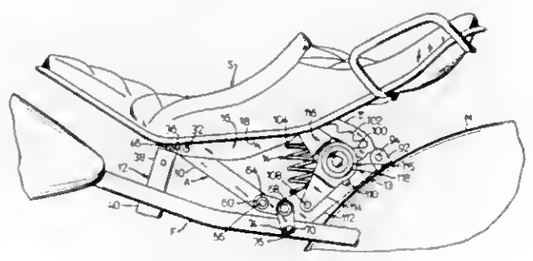


1. A seat supporting assembly comprising:
a base member;
a seat support positioned above said base member and supported for vertical movement;
at least one pair of arms disposed between said base member and said seat support and movable to permit vertical movement of said seat support;
resilient supporting means and height adjustment means disposed in vertically stacked adjacent relationship and between said base member and said seat support, said height adjustment means including a plurality of pivotal linkages, each of said pivotal linkages opposite ends, one of said ends being pivotably connected to said resilient supporting means, and including means for causing relative movement of at least two of the other of said ends toward each other whereby said height adjustment means expands vertically moving said seat support upwardly; and
means for limiting the vertical movement of said seat support, said means for limiting the vertical movement of said seat support being adjustable for selectively adjusting the extent of vertical movement of said seat support and including connecting means for operably connecting said seat support and at least one of said pair of arms and for limiting movement of said one of said pair of arms with respect to said seat support, said connecting means being shiftably connected to said seat support for movement with respect to said seat support and said one of said pair of arms slideably engagable with said connecting means.

4,029,284
SEAT SUPPORT ASSEMBLY FOR A RECREATIONAL VEHICLE

Richard F. Swenson, Milwaukee, Wis., assignor to Milsco Manufacturing Company, Milwaukee, Wis.

Filed Mar. 12, 1976, Ser. No. 666,492
Int. Cl.² A45D *19/04*; F16M *13/00*
U.S. Cl. 248—399 **9 Claims**



1. A seat supporting assembly for use in a recreational vehicle to resiliently support a seat, said seat supporting assembly comprising:
at least a pair of spaced apart pivotable arms, including a forward arm and a rearward arm, each of said arms including an upper end pivotably connected to said seat and a lower end pivotably connectable to said vehicle, said arms each being inclined forwardly and upwardly and supporting said seat for generally vertical movement, and said rearward arm including a longitudinally extending slot therein; and
a spring assembly for resiliently supporting said seat and including a lower end pivotably supportable by said vehicle intermediate said lower ends of said forward arm and said rearward arm, and including an upper end shiftably supported by said longitudinal slot wherein said spring assembly is moveable between a substantially vertical position wherein said seat is resiliently supported by said spring assembly to a position wherein said spring extends rearwardly and wherein said upper end of said spring assembly is received adjacent to said lower end of said rearward arm wherein the resilient support of said seat by said spring assembly is reduced, a second spring assembly rigidly supportable by said vehicle, said seat including a forward end and a rearward end, said second spring assembly being connected to said forward end of said seat for resiliently supporting said forward end.

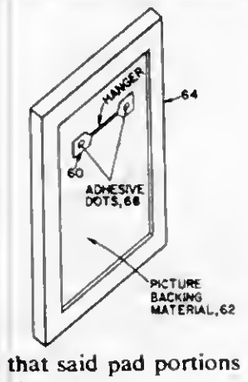
4,029,285
WALL HANGER

Robert Kanof Tendler, Buckridge Drive, Amherst, N.H. 03031

Continuation-in-part of Ser. No. 400,662, Sept. 25, 1973, Pat. No. 3,868,086, which is a continuation-in-part of Ser. No. 235,174, March 16, 1972, Pat. No. 3,788,588. This application Jan. 17, 1975, Ser. No. 541,934
The portion of the term of this patent subsequent to Jan. 29, 1991, has been disclaimed.
Int. Cl.² A47F *7/14*
U.S. Cl. 248—467 **5 Claims**

1. In combination, a hanger for use in the hanging of structures to a wall comprising a unitary one piece molded structure of resinous material including two flat separated pad portions lying substantially in one plane, and a flexible member between said pad portions.

a structure to be hung, and
means for adhesively attaching said hanger to said structure



to be hung such that said pad portions are in horizontal spaced apart relation.

4,029,286
APPARATUS FOR THE CONSTRUCTION OF CEILING IN MULTI-STORY CONCRETE BUILDINGS

Bernard Ahl, Bonner Wall 37, 5 Cologne 1, Germany

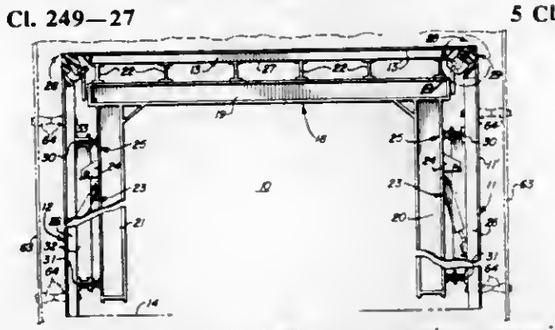
Filed Apr. 16, 1973, Ser. No. 351,435
Claims priority, application Germany, Nov. 16, 1972, 2256262
Int. Cl.² E04G *11/20*, *11/38*
U.S. Cl. 249—19 **4 Claims**

1. Apparatus for constructing ceilings during the construction of a multi-story building after the completion of peripheral walls of the building comprising means for installing ceilings sequentially from building top to building bottom, said ceiling installing means including platform means for receiving thereon flowable and settable material, means for supporting the platform means until the flowable material has set, means for lowering the platform means to be a next lower position for subsequent molding operations, means for anchoring said platform means during the setting of the flowable material, said anchoring means are rigid bars, first means for coupling said bars to said platform means, second means for coupling said bars to a next uppermost earlier formed ceiling, said supporting means are flexible cables, third means for coupling an end of each cable to said platform means, and said bars and cables being disposed one each as an immediately adjacent pair at spaced points of said platform means whereby said platform means in the area of each pair of a bar and cable is jointly suspendingly supported thereby.

4,029,287
APPARATUS FOR FORMING MODULAR BUILDING STRUCTURES

Harold D. Burdett, 3802 Grandview, Tempe, Ariz. 85282

Division of Ser. No. 510,507, Sept. 30, 1974, Pat. No. 3,993,720. This application Mar. 11, 1976, Ser. No. 666,066
Int. Cl.² E04G *11/02*
U.S. Cl. 249—27 **5 Claims**



1. An expandable form for hollow core castings comprising:
a pair of spaced substantially parallelly arranged vertically positioned side members forming platens one on each side of a longitudinal axis,
a second frame member coaxially aligned with said platens and comprising at least one pair of spaced vertically positioned legs one on each side of said longitudinal axis and a top laterally positioned on the top of said legs,
each of said legs being attached to and supported by the juxtapositioned platen in one position and pivotally movable relative to the platen to another position,
actuating means mounted to extend between said platens and said legs of the associated juxtapositioned frame member,
the side edges of said top cooperating with the top edges of said platens to form corner openings,
a plurality of inside corner forming members pivotally mounted on and extending along the top edges of said platens, and
means connected to said corner forming members for pivoting said corner forming members into said corner openings to close said corner openings and to pivot said corner forming members away from said corner openings previous to actuation of said actuating means,
said actuating means when energized moving said platens inwardly toward each other and said top downwardly to collapse the expandable form,
said inside corner forming members each comprising a flexible filler piece having plane surfaces which extend laterally to each other to form the corners between the juxtapositioned edges of said top and the top edges of the associated platens,
said flexible filler piece comprising a mass split into two pieces along its center line to a point adjacent the intersection of said planar surfaces, and
said split being increased in size when said corner forming member is extended and positioned in said corner opening to completely close said opening.

4,029,288
CONCRETE FORM BRACKET

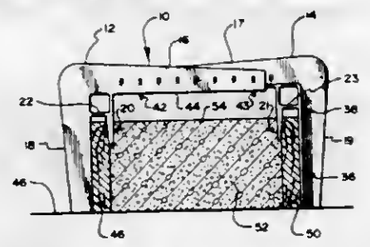
Ivin S. Murphy, 9207 Solena Way, and Melvin H. Murphy, 9916 S. 2600 East, both of Sandy, Utah 84070

Filed Jan. 5, 1976, Ser. No. 646,467
Int. Cl.² E04G *17/06*, *17/14*
U.S. Cl. 249—216 **7 Claims**

1. A bracket for holding side form walls for concrete in a fixed relative position comprising:
a horizontal crosspiece;
a vertically depending leg at each end of the crosspiece, each leg being adapted to render vertical support of a form wall engaged by the bracket against forces tending to move the form wall outwardly with respect to the bracket;
an inside support means at each end of the crosspiece inside of the corresponding leg adjacent the angle formed be-

tween the crosspiece and the depending leg, the support means accommodating restraining the form wall against forces tending to move the form wall inwardly with respect to the bracket; and

means located at each angle formed between the crosspiece



and the depending leg and integrally connected to the depending leg and spaced from the crosspiece for supporting the crosspiece an incremental distance above from walls engaged by the legs and the inside support means.

4,029,289

CONTROL SYSTEM FOR GATE-VALVES

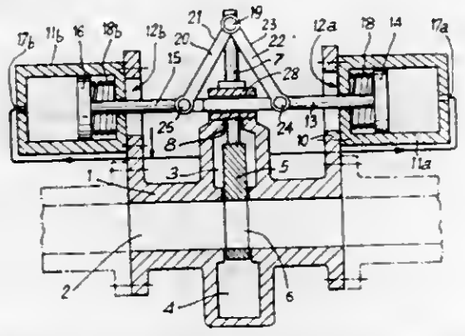
Hubert Miffre, Elancourt, France, assignor to Institute Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Elf, Paris, France

Filed Dec. 11, 1974, Ser. No. 531,782

Claims priority, application France, Dec. 11, 1973, 73.44113

Int. Cl.² F16K *31/122*

U.S. Cl. 251—58 **5 Claims**



1. A device for operating an automatic safety gate valve comprising a valve member movable transversely of a valve passage and connected to a valve rod, said device including:

valve actuating means comprising:

two hydraulically controlled pistons mounted on piston rods with axes parallel to said valve passage, and movable between first and second positions, and

means connecting each of said piston rods to the valve rod, which connecting means converts said movement of said pistons parallel to said valve passage into longitudinal movement of said valve rod transverse to said passage between valve-open and valve-closed positions, and

means biassing said valve actuating means toward a position in which said valve is closed.

4,029,290

IN SERVICE EXERCISABLE TILT DISC CHECK VALVE

Anatole N. Karpenko, San Francisco, Calif., assignor to Anchor/Darling Valve Company, Bala Cynwyd, Pa.

Filed May 21, 1975, Ser. No. 579,695

Int. Cl.² F16K *15/18*

U.S. Cl. 251—82 **8 Claims**

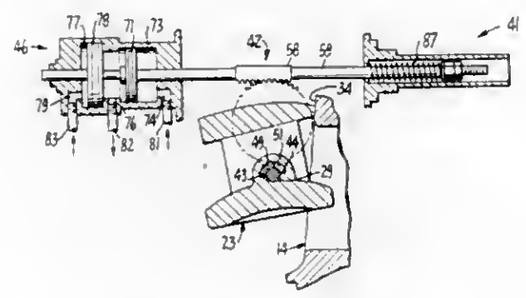
1. A tilt-disc check valve, comprising

a valve body having valve seat means therein,

tilt-disc valve means within said valve body adapted to cooperate with said valve seat means,

means positioned substantially centrally on one face of said tilt-disc valve means for both supporting said valve means and for positively rotating said valve means in both directions about an axis located substantially centrally with respect to said one face and parallel thereto,

said supporting and rotating means being adapted to positively rotate said valve means between a closed position in contact with said seat means and a partially open position out of contact with said seat means, and



lost-motion means included in said supporting and rotating means rendering said valve means free for rotational movement between the closed position and a fully open position when said supporting and rotating means is in mid-position between the limits of its travel corresponding to the closed and partially open positions of said valve means.

4,029,291

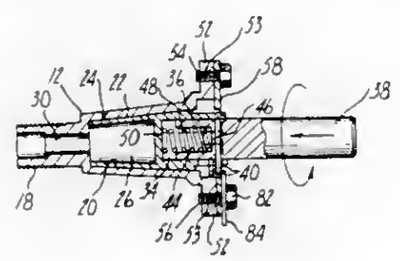
LOCKING-TYPE GAS VALVE

Everett W. Carlson, Detroit, Mich., assignor to Lincoln Brass Works, Inc., Detroit, Mich.

Filed Apr. 2, 1976, Ser. No. 673,098

Int. Cl.² F16K *35/02*

U.S. Cl. 251—96 **10 Claims**



1. In a gas valve having a body with a plug rotatable therein between off and on positions, the plug having an operating stem shiftable axially thereon to disengage a projection on said stem from an opening in a cap on said body against a spring bias to facilitate rotation of the plug from off to on position, improved structure wherein,

said cap is secured to said body at least in part by a screw, said opening being disposed adjacent said screw,

and washer means on said screw overlying at least a portion of said opening and forming an obstruction to axial movement of said projection through said opening beyond said cap under said spring bias.

4,029,292

GLOBE VALVE CONSTRUCTION

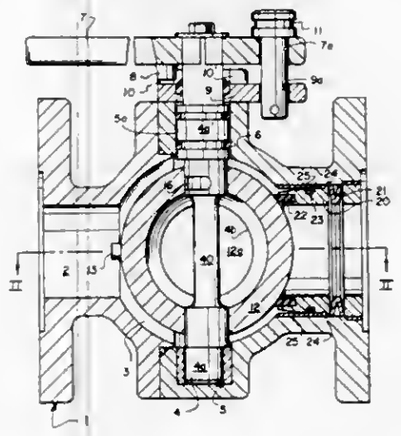
Rolf Kramer, Siegen, and Felix Schneider, Netphen, both of Germany, assignors to Eisenbahn-Verkehrsmittel AG, Germany

Filed Apr. 6, 1976, Ser. No. 674,082

Int. Cl.² F16K *25/00*

U.S. Cl. 251—163 **6 Claims**

1. A valve construction comprising a valve housing having a housing flow passage therethrough, said flow passage including an intermediate valve chamber therein, a pivot member having concentric and journal portions rotatably mounted in said housing and having an intermediate eccentric portion offset from said end journal portions located in said valve chamber, an annular sealing bushing located in said housing flow passage adjacent an end thereof and carrying an annular seal at the end thereof facing said valve chamber, a globe valve member having a spherical surface on a side facing said bushing and having a valve flow passage therethrough opening at respective diametrically opposite ends of said globe valve member, said globe valve member being rotatably supported on said eccentric portion of said pivot, said eccentric portion extending through diametrically opposite walls of said globe valve member and having an axis which is at right angles to the axis of said globe valve flow passage, means connected to said pivot to rotate said pivot through an angle of approximately



180° and to return it through the same angle, limit means defined between said housing and said globe valve member to permit pivotal movement between an open position in which said globe valve flow passage aligned with said housing flow passage and to a closed position in which said globe valve flow passage is moved out of alignment with said housing flow passage, and a lost motion connection between said pivot and said globe valve member effecting combined rotation of said globe valve member and said pivot during a portion of the rotation of said pivot and a separate relative rotation of said pivot and said globe valve member during a remaining portion of the movement, said globe valve member being shiftable due to the eccentricity of said eccentric portion during a portion of the rotation of said pivot, so as to be shifted into engagement with said annular seal on said bushing during that period in which said globe valve is not rotated relative to said pivot.

4,029,293

CONTROL VALVE

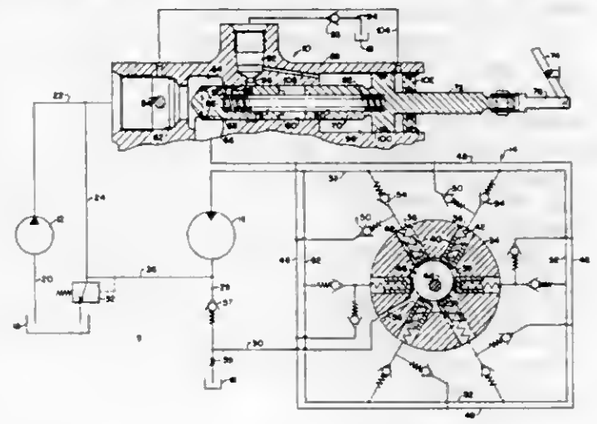
Raymond Richard Meysenburg, Cedar Falls, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Sept. 4, 1975, Ser. No. 610,232

Int. Cl.² F16K *21/04, 15/18*

U.S. Cl. 251—282 **4 Claims**

1. A pump displacement control valve comprising: a valve body having a valve bore therein; an inlet port in the valve body in communication with one end of the valve bore and adapted to be connected to a substantially constant pressure source of fluid; an outlet port in the valve body in communication with the bore intermediate the ends thereof and adapted to be connected to a pump inlet; a valving piston slidably mounted in the valve bore for movement between fluid blocking and fluid passing positions; one end of the valving piston forming in combination with the one end of the valve bore first servo means responsive to fluid pressure therein to bias the valving piston toward its fluid passing position; plunger means slidably mounted in the valve bore adjacent the second end thereof; the second end of the valving piston forming in combination with the valve bore and plunger means second servo means responsive to fluid pressure to bias the valving piston toward its fluid blocking position; means providing fluid communication between the outlet port and the second servo means; said plunger means including a manually operable control rod extending from the one end of the valve bore affording manual positioning of the plunger means; compression spring means in the valve bore between the valving piston and plunger means and acting on the valving means to bias the same toward its fluid blocking position with a force dependent on the position of the plunger means; third servo means responsive to fluid pressure therein to bias the plunger means toward the valving means; and means providing fluid communication between the first and third servo means.



4,029,294

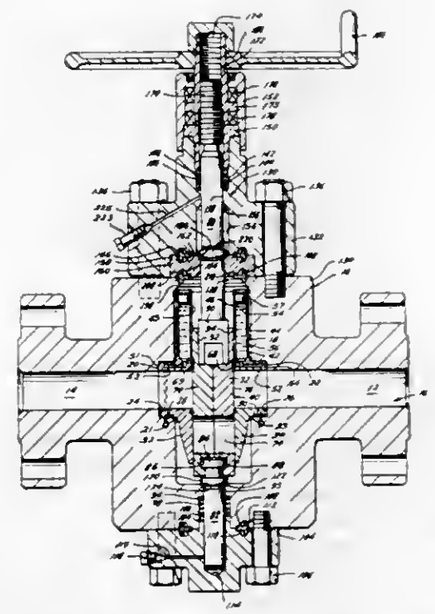
HIGH PRESSURE VALVE

John Walton McCaskill, Houston; Robert D. Barnett, Magnolia and David P. Herd, Houston, all of Tex., assignors to McEvoy Oilfield Equipment Co., Houston, Tex.

Filed Oct. 4, 1974, Ser. No. 512,092

Int. Cl.² F16K *5/22, 41/14*

U.S. Cl. 251—282 **15 Claims**



1. A valve, comprising:

a valve body having an inlet and an outlet and upper and lower apertures with a chamber therebetween;

a closure member preventing flow in the closed position and permitting flow in the open position;

a seat disposed within the chamber and housing the closure member;

seal means for sealing between said seat and said body at the outlet;

means for moving said closure member between the open and closed positions;
first and second cap members for closing said upper and lower apertures;
first metal-to-metal seal means for sealing between said first cap member and said valve body;
second metal-to-metal seal means for sealing between said second cap member and said valve body;
said closure member extending through said chamber and said upper and lower apertures and into said first and second cap members;
double seal ring means on said closure member providing a metal-to-metal sealing engagement with said first cap member in both the open and closed positions;
single seal ring means on said closure member providing a metal-to-metal sealing engagement with said valve body at said lower aperture in one of the open and closed positions, and
a lost motion connection in said closure member intermediate said single seal ring means and said double seal ring means to allow limited relative axial movement of said seal ring means.

4,029,295

FLUID-FLOW VALVES

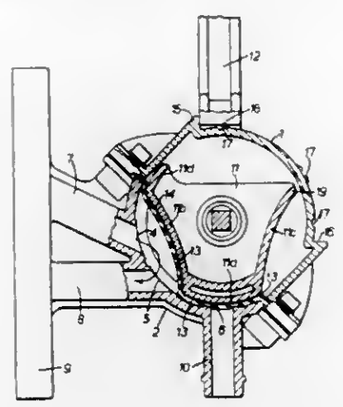
Werner Wassmer, Grenzach, Germany, assignor to Hansen GmbH KG, Germany

Filed Oct. 2, 1975, Ser. No. 618,847

Claims priority, application Germany, Oct. 3, 1974, 2447173

Int. Cl.² F16K *7/18*

U.S. Cl. 251—297 **5 Claims**



1. In a valve, means defining a multi-part casing, said casing comprising a first casing part, a second casing part, and at least two fluid flow connections, a membrane located in the casing between the first and second casing parts and acting as a dividing wall between these parts, a switching member mounted in the casing, said switching member having at least one curved switching surface bearing against the membrane, and first and second curved surface portions adjacent the switching surface, said first and second surface portions being curved in the opposite direction to the switching surface and said switching member being movable into a plurality of switching positions to provide a selected communication between, or closure of, the connections, means for moving the switching member between the switching positions, and means defining a projection at the end of the first curved surface portion to prevent the membrane from bulging when the membrane is subjected to pressure and cannot bear against the said first curved surface portion.

4,029,296

DIAPHRAGM VALVE ARRANGEMENT

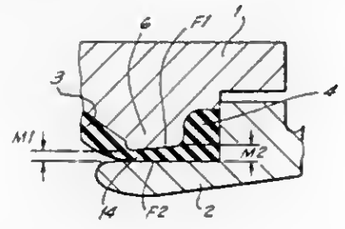
Ewald Hartmann, Cologne, Germany, and Hendrik De Blick, Bereldange, Luxembourg, assignors to Fonderie et Ateliers de Mersch S.A., Mersch, Luxembourg and Clouth Gummiwerke AG, Cologne, Germany

Filed Nov. 21, 1975, Ser. No. 634,235

Claims priority, application Germany, Nov. 22, 1974, 2455329

Int. Cl.² F16K *7/16*

U.S. Cl. 251—331 **14 Claims**



1. In a diaphragm valve arrangement, a combination comprising a pair of clamping members having respective juxtaposed surfaces which define with one another a gap and which bound an interior space, one of said surfaces having a projecting portion extending across said gap towards the other of said surfaces; and a diaphragm of resilient material, including an inner portion spanning said interior space and having a first region of substantially uniform thickness and an outer portion adapted to be clamped in said gap, said outer portion having a marginal second region spaced exteriorly of and being of greater thickness than said first region, and a recessed third region intermediate of and of lesser thickness than both of said first and second regions in unclamped condition so as to bound with said first and second regions a three-sided recess in which said projecting portion is lodged, said recessed region having relatively lesser material than said other regions due to the lesser thickness of said recessed region, to thereby substantially reduce the tendency of the material of said recessed region to flow towards said other regions when in clamped condition.

4,029,297

WINCHES FOR USE WITH HIGH MASTS

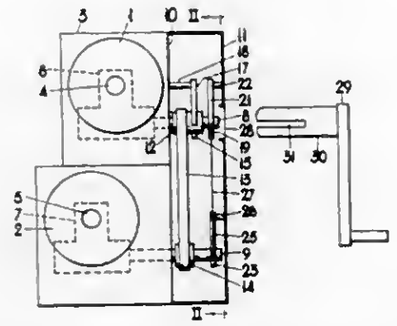
Maurice Hewlett Mounsdon, London, England, assignor to The General Electric Company Limited, London, England

Filed Oct. 8, 1975, Ser. No. 620,642

Claims priority, application United Kingdom, Oct. 11, 1974, 44105/74

Int. Cl.² B66C *23/60*

U.S. Cl. 254—139 **5 Claims**



1. A winch designed for use with a high mast and to receive a pair of ropes which in use pass up the mast and over pulleys to support a load for raising and lowering the load, and which includes a primary drum arranged for receiving one of said ropes provided with driving means to which a winch-operating tool can be connected for operating the winch, a secondary drum arranged for receiving the other rope, a primary pulley member rotatably mounted on the drive shaft of the primary drum, a secondary pulley member mounted on and keyed to the shaft of the secondary drum, and an endless band passing round and drivably linking the pulley members, the primary pulley member being provided with engagement means which can be engaged by the winch-operating tool simultaneously with the engagement of that tool with the drive shaft of the primary drum so that the secondary drum and the primary drum are then drivable together by the winch-operating tool, but when said tool is disengaged from the primary pulley member the secondary drum is disconnected from the primary drum and the latter can be driven by the winch-operating tool without the secondary drum being driven.

4. A combination comprising a hollow tubular high mast lighting column having a compartment at the foot thereof, a winch in said compartment, a pair of ropes passing up the interior of said column, pulleys carried by said mast and over which the ropes are trained to support a load in the form of a lantern carriage, said ropes being driven by said winch to raise and lower the load, said winch including a primary drum arranged for receiving one of said ropes provided with driving means to which a winch-operating tool can be connected for operating the winch, a secondary drum arranged for receiving the other rope, a primary pulley member rotatably mounted on the drive shaft of the primary drum, a secondary pulley member mounted on and keyed to the shaft of the secondary drum, and an endless band passing round and drivably linking the pulley members, the primary pulley member being provided with engagement means which can be engaged by the winch-operating tool simultaneously with the engagement of that tool with the drive shaft of the primary drum so that the secondary drum and the primary drum are then drivable together by the winch-operating tool, but when said tool is disenaged from the primary pulley member the secondary drum is disconnected from the primary drum and the latter can be driven by the winch-operating tool without the secondary drum being driven.

4,029,298

ESCAPE DEVICE

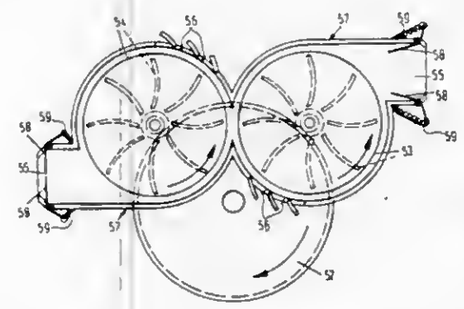
Jakob Lassche, Weerseloseweg 255, Enschede, Netherlands

Filed July 17, 1975, Ser. No. 596,719

Claims priority, application Netherlands, July 18, 1974, 7409766

Int. Cl.² A62B *1/12*

U.S. Cl. 254—158 **7 Claims**



1. An escape device comprising a frame with fastening members, a reel rotatably journalled in said frame and having a cable wound on it, said cable having a free end adapted to be connected to a load, a spiral spring constantly loading the reel in the cable winding-up sense and a brake means for limiting the speed by which the cable winds off the reel, characterized in that in the rest state the spiral spring is fastened by the inner end to a rotatable shaft and by the outer end to a rotatable shaft, which is coupled by a transmission with the reel so that, when the cable is winding off the reel, the spring is wound on said shaft with a curve opposite the curve in the rest position and in that the brake means comprises an element engaging said cable between said reel and the free end of the cable and at least one wheel carrying projecting wind blades which wheel is uncoupled from said element when the cable is in its winding direction but is coupled to said element when the cable is unwinding so as to brake said element, said wheel carrying blades are accommodated in a housing provided with an air inlet and an air outlet in at least one of which is arranged at least one flap movable against spring force.

4,029,299

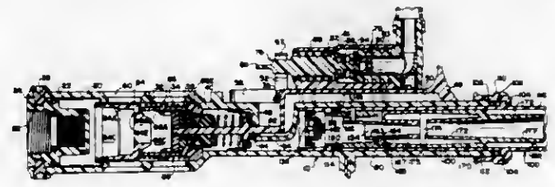
MULTI-STAGE SOLUTION PROPORTIONER DISPENSER

Valentine Hechler, IV, 26 Meadowview Drive, Northfield, Ill. 60093

Division of Ser. No. 615,800, Sept. 22, 1975, which is a continuation-in-part of Ser. No. 520,676, Nov. 4, 1974, Pat. No. 3,984,053, which is a continuation-in-part of Ser. No. 443,831, Feb. 27, 1974, Pat. No. 3,933,179. This application Dec. 8, 1975, Ser. No. 638,529

Int. Cl.² B01F *15/00;* **F04F** *5/22*

U.S. Cl. 259—4 R **11 Claims**



1. The multi-stage method of mixing and dispensing a solute with a pressurized solvent and dispensing the solution with solvent pressure comprising:
converting pressure of a flowing stream of solvent of predetermined cross-sectional flow area to kinetic energy, transferring kinetic energy to a free flowing solute at substantially atmospheric pressure to form a flowing stream of primary solution of a larger flow area and converting the flow energy of the primary solution to pressure;
converting solvent pressure of a another flowing stream of solvent of predetermined cross-sectional flow area to kinetic energy and transferring therefrom kinetic energy to said primary solution at approximately the pressure of said primary solution to form a second solution having a flow area larger than said flowing stream of primary solution and converting the flow energy thereof to pressure; and
discharging the second solution to a lower pressure environment through an opening having a flow area at least as large as the last said larger flow areas.

4,029,300

EXTRUDER OF THE DEGASSING AND MODIFICATION TYPE

Yukimasha Morishima, Kure; Minoru Yoshida, and Kimiyasu Hanaki, both of Hiroshima, all of Japan, assignors to The Japan Steel Works Ltd., Tokyo, Japan

Filed May 3, 1976, Ser. No. 682,778

Claims priority, application Japan, Oct. 17, 1975, 50-124424

Int. Cl.² B29B *1/10*

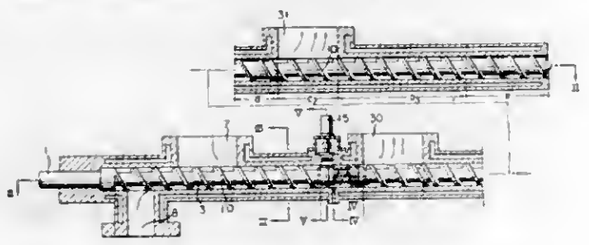
U.S. Cl. 259—192 **11 Claims**

1. In an extruder of the degassing and modification type wherein two adjoining screws are mounted in a cylinder so that they are parallel to each other and rotate in opposite directions, the improvement comprises:
said cylinder having at least one hopper orifice and at least one vent opening at its upper part in order from the rear end;
each of said adjoining screws being formed with at least one feed section, a kneading section, at least one mixing

section and a pressurizing section in order from the rear end, whereby said feed and mixing sections are located substantially below said hopper orifice and said vent opening of said cylinder, respectively;

one of said adjoining screws being further formed with a metering section in series with said pressurizing section;

said feed, mixing pressurizing and metering sections of said adjoining screws are formed respectively from a substantially continuous flight having the same outer diameter and the directions of said flights of said respective sections being different between said adjoining screws; and



each of said kneading sections of said adjoining screws being formed by an adjusting ring and a gate ring secured thereto at the rear and front ends, respectively, with a distance being left therebetween and a kneading means provided on said screw between said rings, whereby the outer diameter of said adjusting ring being substantially the same as that of said flight and the outer diameter of said gate ring being somewhat larger than that of said adjusting ring, and said adjusting and gate rings of said adjoining screws being transversely aligned so as to be substantially circumscribed with each other respectively.

4,029,301

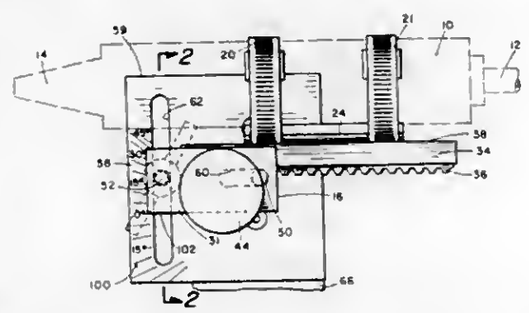
CONNECTIVE MEANS FOR PROVIDING VARIABLE ATTITUDE

Perceptimus J. Mighton, Tulsa, Okla., assignor to H & M Pipe Beveling Machine Co., Tulsa, Okla.

Filed Sept. 7, 1976, Ser. No. 721,056

Int. Cl.² B23K *7/10*

U.S. Cl. 266—77 **8 Claims**



1. Connective means providing a variable attitude between a torch and a pipe beveling machine, comprising a movable saddle supporting said torch, a fixed plate attached to said pipe beveling machine and provided with a flat surface having a central slot therein, said central slot having a first longitudinal center line, an outer slot in said flat surface having a second longitudinal center line, said first center line being perpendicular to said second center line, a pin attached at one end to said saddle and having another end opposite to said one end thereof received in said central slot at a right angle to said flat surface, said pin being slideably movable longitudinally along said central slot, a bolt attached at one end to said saddle and having another end opposite to said one end thereof passing through said outer slot at a right angle to said flat surface, said bolt being slideably movable along said outer slot, said saddle resting against and movable on said flat surface for allowing the attitude of said torch with respect to said beveling machine to be varied.

4,029,302

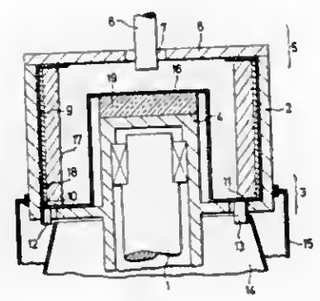
DEVICE FOR SEPARATION OF MIXTURES OF AT LEAST PARTIALLY MOLTEN METALS AND/OR METALLIC COMPOUNDS INTO AT LEAST TWO PHASES OF DIFFERENT DENSITY

Helmut Winterhager, Aachen; Roland Kammel, Berlin, and Michael Lucke, Witten, all of Germany, assignors to Kloeckner-Humboldt-Deutz AG, Germany

Filed June 6, 1974, Ser. No. 476,799

Int. Cl.² C22B *9/02*

U.S. Cl. 266—204 **5 Claims**



1. A device for separation of mixtures of at least partially molten metals and/or metal compounds into at least two phases of different density comprising:

a rotatably mounted centrifugal drum having two opposite end walls and a connecting side wall;

supply means for said mixture in one of said end walls;

a first outlet opening of a predetermined limited size for a first phase of greater density and a second outlet opening of a predetermined limited size for a second phase of less density each opening being in the other end wall, the first outlet opening being disposed at a greater distance from the axis of rotation of the drum than the second outlet opening, said outlet openings being of short axial length;

first and second axially extending guide plates for said first and second outlet openings respectively, said plates positioned in the area of the outer edge of the openings with respect to the axis of rotation and configured so that deposits on the guide plates cannot stop the flow through the openings; and

first and second annular stationary collection housings positioned with said guide plates extending axially beyond the edges of the housings so that said phases will enter said collection housings.

4,029,303

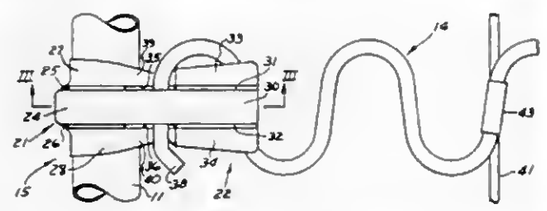
SPRING-FRAME CONSTRUCTION FOR SEATS AND THE LIKE

Howard M. Quakenbush, Apple River, Ill., assignor to Flexsteel Industries, Inc., Dubuque, Iowa

Filed Jan. 9, 1976, Ser. No. 647,880

Int. Cl.² F16F *3/02*

U.S. Cl. 267—110 **6 Claims**



6. In a spring-frame assembly for seats or the like, a pair of spaced parallel horizontal frame members having generally

cylindrical outer surfaces, a spring extending transversely between said frame members, and a pair of clips securing opposite end portions of said spring to said frame members, said spring being formed of wire bent into a generally sinuous form and including a pair of end portions generally parallel to the axes of said cylindrical outer surfaces of said frame members and an additional pair of portions parallel to said end portions and spaced inwardly therefrom, said clips having openings receiving said end portions and including inwardly projecting retaining arm sections having downwardly facing surfaces engaging upper surfaces of said additional pair of portions, said clips further including hook portions extending outwardly over said frame members thence downwardly about the outside of said frame members and thence inwardly to terminal ends and having frusto-cylindrical inner surfaces in bearing engagement with and having substantially the same radial dimension as said generally cylindrical outer surfaces, said spring being pre-formed to extend when in an unstressed condition in an arc having a predetermined radius of curvature with the straight line chordal distance between said end portions thereof being then substantially less than the distance between said frame members and being resiliently deformed when secured by said clips to said frame members to extend in an arc about an axis below the plane of said frame members and then having a radius of curvature substantially greater than said predetermined radius of curvature with said clips forming extensions of the arc formed by said spring, said spring being effective to apply forces urging said clips toward each other to engage said hook portions with said frame members and also being effective to apply torques to said clips with forces being exerted between said additional pair of portions of said springs and said downwardly facing surfaces of said retaining arm sections, and said bearing engagement between said inner surfaces of said hook sections and said outer surfaces of said frame members being effective to allow pivotal movement of said clips about the axes of said frame members in response to downward forces applied to central portions of said springs.

4,029,304

SHOCK ABSORBER FOR BUMPERS

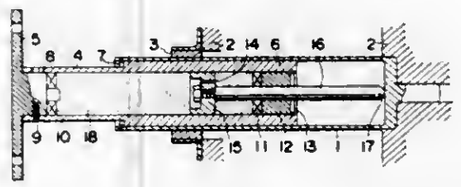
Takumi Sakaguchi, and Toshifumi Yamamoto, both of Gyoda, Japan, assignors to Showa Manufacturing Co., Ltd., Tokyo, Japan

Filed May 30, 1975, Ser. No. 582,222

Claims priority, application Japan, Dec. 26, 1974, 50-148442

Int. Cl.² F16F *9/346*

U.S. Cl. 267—64 R **4 Claims**



1. A shock absorber for bumpers comprising an outer cylinder with opposed ends having means for attachment to a car body, said outer cylinder provided at one of its ends with a closed bottom surface and at its other end with an opening, an inner cylinder slidably fitted into said opening in said outer cylinder and having means at its front end to which a bumper is to be fitted, a projection provided on the outer periphery of said inner cylinder and a stopper element on said outer cylinder co-acting with said projection on said inner cylinder so as to prevent said inner cylinder and outer cylinder from pulling apart, a rod guide fitted to said inner cylinder and having a center hole, a piston slidably fitted in sealing relationship in said inner cylinder and having a damping force generating hole, a piston rod connected with said piston and having its end part extending through said center hole of said rod guide to collide with the bottom surface of said outer cylinder and a compressive fluid enclosed in said inner cylinder, said inner cylinder being pressed into said outer cylinder so as to compress the fluid in said inner cylinder by the volume of the piston rod inserted in said inner cylinder when said inner cylinder engages said outer cylinder by said stopper, whereby on impact said piston and rod telescope into said inner cylinder thereby compressing said fluid.

4,029,305

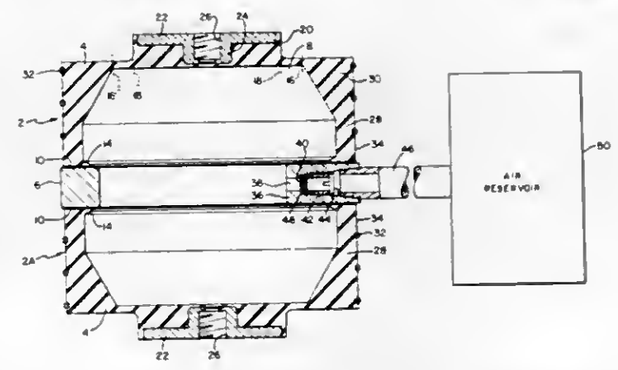
PNEUMATIC VIBRATION ISOLATOR AND SUSPENSION SYSTEM

Dale W. Schubert, Sudbury, and Charles M. Salerno, Wayland, both of Mass., assignors to Barry Wright Corporation, Watertown, Mass.

Filed Oct. 10, 1975, Ser. No. 621,509

Int. Cl.² F16F *3/67*

U.S. Cl. 267—65 R **19 Claims**



1. A device for insertion between two elements for the purpose of providing a low resonant frequency, elastically yieldable vibration isolating mount between said elements, said device comprising:

first and second hollow cylindrical blocks each having a longitudinal axis and first and second ends spaced along said axis, said first ends being open and facing one another, and each block having a substantially planar elastically deformable diaphragm attached to and closing off its second end; and

a stiff metal ring member disposed between said first ends of said blocks and securing said blocks together in tandem, said ring having an inner surface which defines an inner space that communicates with the interior spaces of said blocks and coacts with said interior spaces to form a single sealed chamber between said diaphragms capable of being pressurized with a compressible fluid;

said blocks being made of an elastically deformable material so that they can shorten under a compressive load applied parallel to said axis; said diaphragms and the fluid under pressure in said chamber coacting as a pneumatic spring having a spring stiffness along said axis less than that of said blocks; and said ring member being provided with an opening leading to said chamber for introducing compressible fluid to and withdrawing compressible fluid from said chamber.

4,029,306

SHOCK ABSORBER FOR BUMPERS

Takumi Sakaguchi, and Toshifumi Yamamoto, both of Gyoda, Japan, assignors to Showa Manufacturing Co., Ltd., Tokyo, Japan

Filed May 30, 1975, Ser. No. 582,224

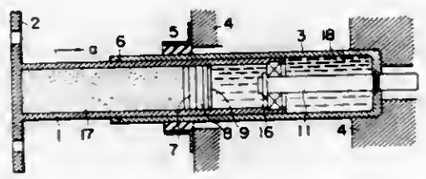
Claims priority, application Japan, Dec. 26, 1974, 50-148441

Int. Cl.² F16F *5/00*

U.S. Cl. 267—116 **7 Claims**

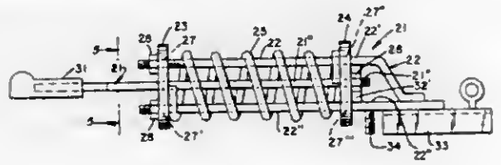
1. A shock absorber for bumpers which comprises an inner cylinder including means at the closed front end thereof for

fitting the shock absorber to a bumper, a fixed outer cylinder having a bottom surface and an open top into which the rear end of said inner cylinder is slidably engaged, a free piston slidably engaged in said inner cylinder, a high pressure fluid enclosed between said free piston and said closed front end of said inner cylinder, oil located between said bottom surface of said outer cylinder and said free piston in said inner cylinder, a tubular column engaged at the base end thereof to said bottom surface of said outer cylinder and flexibly engaged at the front end thereof to the rear end of said inner cylinder, a



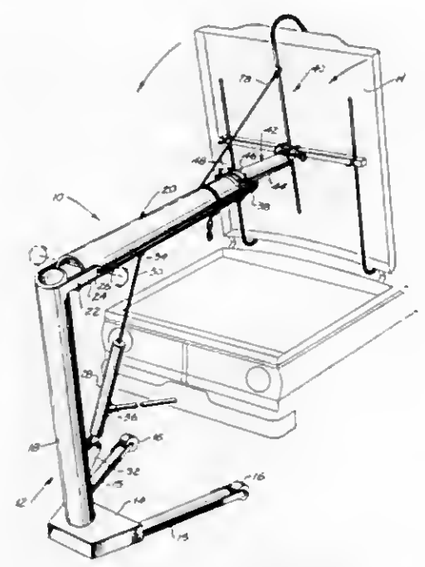
plurality of holes parallel to the axis of said tubular column and extending inwardly to an oil passage which leads to the area between the rear end of said inner cylinder and said free piston, and between the base end of said inner cylinder and the bottom surface of the outer cylinder to provide a damping force, and a plate-shaped valve slidably fitted on said tubular column and opposed to the rear end of said inner cylinder, said holes being substantially smaller than the cross-section of said tube wherein said liquid passes from said inner cylinder into said tubular column during compression.

4,029,307
CUSHIONING DEVICE
Carl J. Nielson, 926 Fourth St. SE., Minot, N. Dak. 58701
Filed Oct. 28, 1975, Ser. No. 625,894
Int. Cl.² B60D *1/00*
U.S. Cl. 267—138 **1 Claim**



1. A cushioning device comprising a first pair of parallel rods means laterally connecting said rods together at their one forward ends, a second pair of parallel rods parallel to said first pair, means laterally connecting said second pair of parallel rods together at their other rearward ends, said lateral connecting means of said first pair of rods being positioned between said second pair of rods, said lateral connecting means of said second pair of rods being positioned between the said first pair of rods, a first rod member mounted to said lateral connection on said one forward ends of said first pair of parallel rods and extending longitudinally forward away with means at the forward end of said first rod member to attach said rod member to a towing vehicle, a second rod member mounted to said lateral connection on the rearward ends on said second pair of parallel rods and extending longitudinally rearward with means on the rear end of said second rod member to attach said second rod member to a vehicle to be towed, a pair of disc members having bores, said rods being slidably mounted in said bores in said discs to slide axially in said bores, a compressable spring between said discs urging said discs apart, threaded nut means adjacent the outside of the discs and larger than the bores in said discs, and threaded onto the outer one ends of the first pair of rods and the outer other ends of the second pair of rods opposite their respective lateral connections, said laterally connecting means being adjacent outside of the discs, said nut means limiting the space between the discs, said nut means being adjustable toward one another to slightly compress the spring, so that when said device is being towed with only a moderate pulling or pushing action upon the first relative to the second rod member upon the one pair of rods relative to the other pair of rods will not cause movement of the rods, and the outer ends of both pairs of rods are free of any connection to said other structure whereby in the event a significant pushing action occurs upon the first relative to the second rod member which exceeds the expansive force of the spring the first pair of rods can slide toward the second pair of rods, with the lateral connecting means between the rods engaging and pushing the discs toward one another with the outer ends of the rods sliding outward from the discs over the opposite lateral connecting means of the respective opposing pairs of rods a distance in length of at least twice the width of the rods to significantly compress the spring and significantly cushion the pushing action and after the pushing action the spring will push the discs apart and will move the rods and rod members away from one another back to their original adjustable positions, and whereby in the event of a significant pulling action occurring upon the first relative to the second rod member which exceeds the expansive force of the spring the first pair of rods can slide away relative to the second pair of rods, with the nut means on the rods engaging and pulling the discs toward one another a distance longitudinally at least equal to twice the width of the rods thereby significantly compressing the spring and significantly cushioning the pulling action and after the pulling action passes the spring will push the discs apart and causing the rods to move toward one another back to their original adjusted positions.

4,029,308
DEVICE PARTICULARLY SUITED FOR USE IN HANDLING HOODS OF MOTORIZED VEHICLES
E. H. Mathers, Rte. 1 No. Box 138, Ward, Ark. 72176
Filed June 7, 1976, Ser. No. 693,499
Int. Cl.² B23Q *3/00*
U.S. Cl. 269—17 **3 Claims**

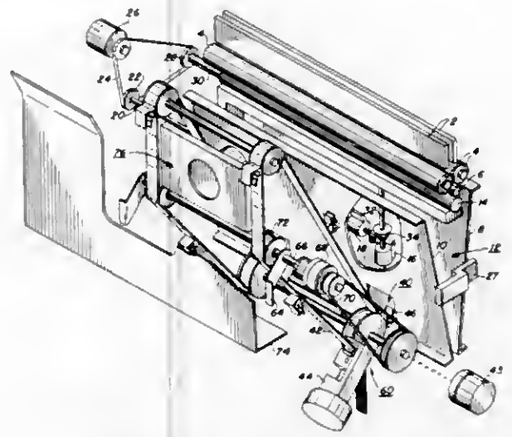


1. An article handling device particularly suited for use in the removal and installation of hoods for motorized vehicles, such as automobiles and the like, comprising:

A. hood support means adapted to be attached to a hood of a selected vehicle at a plurality of mutually spaced points including a bar adapted to be extended transversely of the hood, a pair of suspension rods arranged in substantial parallelism and extended in a common direction from the opposite ends of said bar, each of said rods being characterized by an angulated end portion adapted to engage the hood at one end thereof and support the hood in a captured relationship, and stabilizing means for stabilizing the hood as it is supported by the suspension rods including a retainer rod extended in substantial parallelism with said pair of suspension rods having an end portion of an angulated configuration adapted to engage and capture the hood at the end thereof opposite said one end; and

B. transport means connected in supporting relation with the hood support means for repositioning the hood relative to a given vehicle including a head having a base plate, means pivotally coupling the base plate to said bar, a pivotal boom mounted on a horizontally movable dolly, and means for removably connecting the base plate to the boom near one end thereof.

4,029,309
SET TRANSPORT AND STACKER
Thomas Lynch, and Larry L. Leiter, both of Fairport, N.Y., assignors to Xerox Corporation, Stamford, Conn.
Filed Oct. 29, 1975, Ser. No. 626,959
Int. Cl.² B42B *2/00*
U.S. Cl. 270—53 **5 Claims**



1. A sheet finishing apparatus including a compiler comprising opposed substantially vertical side walls for stacking sheets thereon, the top portion of said walls forming an entrance therebetween for directing sheets downwardly between said walls;

a movable sheet deflector disposed midway between said opposed side walls at the entrance thereof, movement of said deflector to a first position causing the sheets supplied to the compiler to be deposited against one of said opposed walls, movement of said deflector to a second position causing the sheets supplied to the compiler to be deposited against the other of said opposed walls to enable compiling of the sheets received therein against either wall, depending on the position of said deflector,

first and second rotary paddle means disposed centrally between said opposed side walls, said first paddle means being adapted to urge sheets received between said first paddle means and said sides in a downward direction, said second paddle means being oriented 90° from said first paddle means; and,

drive means adapted to rotate said paddle means in a first direction when said deflector is in said first position, said drive means being reversible to rotate said paddle means in a reverse direction when said deflector is in said second position to urge the sheets in the same direction irrespective of the side wall of the compiler against which the sheets are deposited.

2. A sheet finishing apparatus including a compiler comprising opposed substantially vertical side walls for stacking sheets thereon, the top portion of said walls forming an entrance therebetween for directing sheets downwardly between said walls; and,

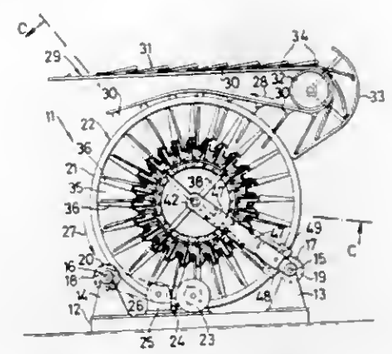
a movable sheet deflector disposed midway between said opposed side walls at the entrance thereof, movement of said deflector to a first position causing the sheets supplied to the compiler to be deposited against one of said opposed walls, movement of said deflector to a second position causing the sheets supplied to the compiler to be deposited against the other of said opposed walls to enable compiling of the sheets received therein against either wall, depending on the position of said deflector,

binding means adapted to receive sets of copy sheets from said compiler and secure the sheets of each set together;

stacking means adapted to receive sets of copy sheets from said binding means for collecting and retaining the completed sets therein; and

transport means including endless conveyor means having a plurality of clamps thereon adapted to clamp the compiled sets and transport the clamped sets from said compiler to said binding means and from said binding means to said stacking means.

4,029,310
APPARATUS FOR FOLDING PRINTED PRODUCTS
Walter Reist, Hinwil, Switzerland, assignor to Ferag AG, Hinwil, Switzerland
Filed Mar. 25, 1976, Ser. No. 670,457
Claims priority, application Switzerland, Apr. 1, 1975, 4065/75
Int. Cl.² B65H *45/16*
U.S. Cl. 270—63 **22 Claims**



22. An apparatus for folding products, especially printed products, comprising a cell wheel, means for rotatably driving the cell wheel, said cell wheel incorporating a plurality of compartments each of which is capable of receiving a product to be folded, a folding blade for each compartment for folding of the product located therein, means for driving to-and-fro the folding blade between a work stroke and a return stroke in axial direction of the cell wheel, a common stationarily arranged folding rail provided for the compartments for initiating folding of each product about its associated folding blade, the folding blade prior to the start of its work stroke moving past the common folding rail, product contact means arranged in each of the compartments and cooperating with the folding blade of the associated compartment for completion of folding of the product in the associated compartment, and infeed means for delivering a product to a folding blade prior to the start of its work stroke in its compartment.

4,029,311
INVALID WALKER WITH BRAKES
Hal Chanslor, 435 S. Parker, Orange, Calif. 92668; Rodes C. Bullock, 119 W. Kanikaula, Apt. 104B, Hilo, Hawaii 96720, and William H. Bullock, 435 S. Parker, Orange, Calif. 92668
Filed May 1, 1975, Ser. No. 573,731
Int. Cl.² A61H *3/00*
U.S. Cl. 272—70.3 **10 Claims**

1. A steerable invalid walker comprising

a front structure,

means for movably supporting the front structure,

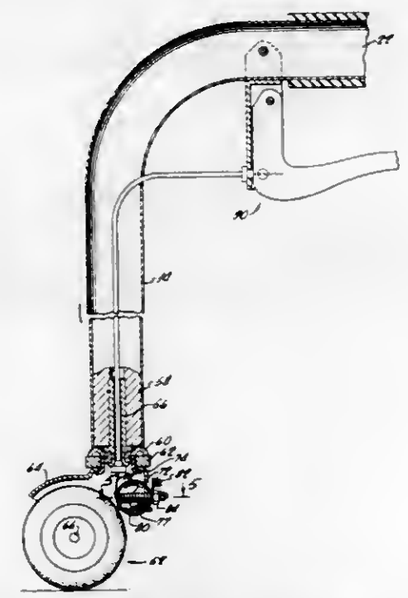
first and second rear posts,

first and second mutually spaced side structures respectively interconnecting said first and second posts with said front structure,

first and second wheels rotatably carried at lower ends of said first and second posts, respectively, for rotation about substantially horizontal axes fixed relative to said posts, and

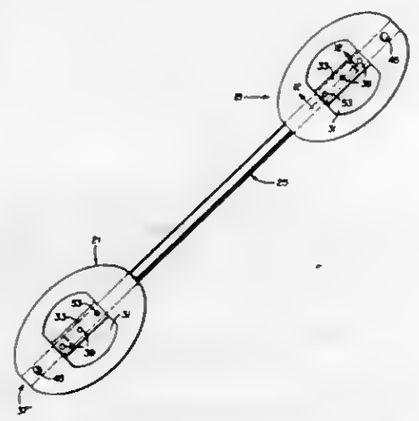
means for independently restraining rotation of said first and second wheels,

one of said wheels including a frame having a depending skirt,



said means for restraining motion of at least one of said first and second wheels comprising a cylindrical braking element positioned below and against a lower edge of said skirt and in close proximity to the periphery of said one wheel, whereby said cylindrical braking element is fulcrumed against said skirt, said braking element being free of connection with said wheel frame, and means for forcibly pivoting said braking element upon said fulcrum to press said braking element against the periphery of said wheel.

4,029,312
EXERCISING DEVICE
Forrest S. Wright, Apt. 307, 2821 Patrick Henry Drive, Auburn Heights, Mich. 48057
Filed Dec. 22, 1975, Ser. No. 642,901
Int. Cl.² A63B *11/02, 13/00*
U.S. Cl. 272—123 **14 Claims**



1. An exercising device adapted for being held in one hand comprising a generally egg-shaped housing having a longitudinal axis and having a central aperture extending through said housing in a direction normal to said longitudinal axis, said aperture being adapted to receive said hand therein, an elongated tubular handle portion interior to said egg-shaped housing and being provided with inner and outer cylindrical surfaces, said handle portion extending from one end of said housing across said aperture to the other end of said housing, said tubular handle portion having an axis which is aligned with said longitudinal axis, said handle portion being adapted to be gripably engaged by said received hand, said housing and said handle portion comprising a single unitary piece, said housing including compartments on both sides of said aperture which are adapted to receive foreign materials for increasing the mass of the device, the portion of said handle portion adjacent said central aperture of said housing being provided with a plurality of longitudinally spaced openings which extend through the inner and outer cylindrical surfaces thereof, said openings permitting the exercising device to be adjustably connected to a weight lifting bar.

4,029,313
POOL TABLE CANOPIES
Herminio Angulo, 10563 Chaney Ave., Downey, Calif. 90241
Filed Dec. 9, 1975, Ser. No. 639,070
Int. Cl.² A63D *15/00*
U.S. Cl. 273—2 **11 Claims**

1. A pool table canopy for the storage and readily accessibility of pool balls, comprising:

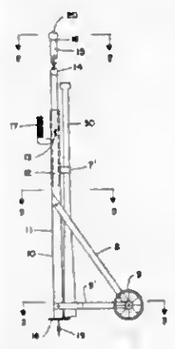
a pair of complementary but opposite facing end members inclined inwardly 15° to 20° from the vertical;

a pair of complementary but opposite facing side members, inclined inwardly 15° to 20° from the vertical, and attached to said end members forming an obelisk shaped structure;

a pair of complementary support braces attached to the inward face of said end members and said side members, traversing between the upper portion of said side members, and providing structural members for said canopy to support light fixtures thereon, each said end member and said side member having at least one aperture complementarily placed thereon, said aperture being used to hold and store a pool ball within said canopy and centrally above a pool table, the diameter of said aperture being slightly larger than the diameter of a conventional pool ball, said aperture being inwardly inclined to force the pool ball to traversely roll toward a central position of said canopy

a substantially C-channel shaped, opaque translucent shield mounted behind said aperture on the said side members and end members, said shield preventing a stored ball from rolling through said aperture, said shield preventing direct lighting of the area surrounding the pool table by diffusing said light and permitting only indirect and subdued lighting of said area.

4,029,314
GOLF GAME APPARATUS AND METHOD
John J. Dalzell, P.O. Box 316, Walhalla, N. Dak. 58282, and James E. Stover, 2250 Dorothy Ave., Boise, Idaho 83706
Filed Jan. 2, 1976, Ser. No. 646,090
Int. Cl.² A63B *57/00*
U.S. Cl. 273—32 R **1 Claim**



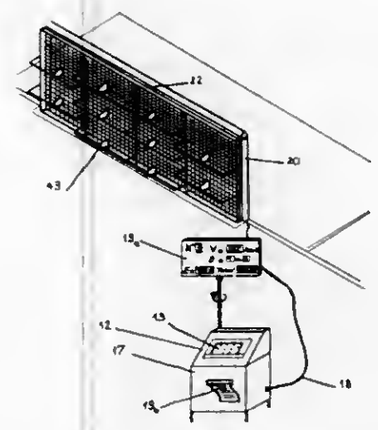
1. Gold game apparatus comprising:

a golf ball;

a portable, extensible, golf ball stand including a base having a downwardly depending spike, a tubular frame vertically mounted on said base, said frame adapted to receive telescopically a proximally located tube, a proximally located extensible tube telescopically engaging said tubular frame, said extensible tube containing at its uppermost end a socket for receiving a ball, a resilient tube containing a ball at its lowermost end for mating with the socket of said extensible tube and containing a seat at its uppermost end for supporting said golf ball, and a pair of axially aligned wheels divergently attached to a lower portion of said frame adjacent said base; and

a bat having four planar striking surfaces parallel to the longitudinal axis of said bat and having a trapezoidal cross section across the striking surfaces, said bat adapted for rotation in the hands.

4,029,315
DEVICE FOR AUTOMATICALLY EVALUATING THE BALL THROWING EFFICIENCY OF A FOOTBALL PASSER
Michel- Julien- Marius- Auguste Bon, 27 avenue Godefroy Cavaignac, 94100 Saint-Maur, France
Filed June 19, 1975, Ser. No. 588,317
Claims priority, application France, June 27, 1974, 74.22370
Int. Cl.² A63B *67/00*
U.S. Cl. 273—55 R **6 Claims**



1. A ball game practice and computing system in which a ball is thrown by a player from a normal rest position towards a goal surface and reaches the goal surface with an instantaneous speed, said system comprising:

a target generator for providing a visible target on the goal surface;

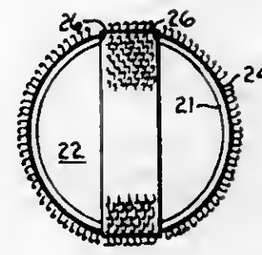
means to control said target generator, whereby the visible target appears in a selected area of the goal surface;

means for measuring the distance between the visible target and a point on the goal surface which is impacted by the ball thrown by the player;

means for measuring a parameter related with the instantaneous speed of the ball at said impact point;

means connected to the two said measuring means for computing a given relation between the parameter related to said speed and said distance, whereby the ratio of said parameter and of said distance is a data characterizing efficiency of the player.

4,029,316
GAME BALL
William Arthur Clarke, 1001 Linden Ave., Erie, Pa. 16505
Filed Feb. 19, 1976, Ser. No. 659,372
The portion of the term of this patent subsequent to Mar. 2, 1993, has been disclaimed.
Int. Cl.² A63B *65/00*
U.S. Cl. 273—58 K **18 Claims**



1. A ball adapted to stick to a target of burr adherent material, said ball consisting of two intersecting rims of impact resistant plastic in planes at right angles to each other, means for fixing said rims in the aforesaid relation, each of said rims having a substantially flat rigid outer surface and tapes having a substantially non stretchable backing and a face of synthetic burr material with the backing adhered to said flat surfaces and with the face outermost whereby a ball contacting a target of burr adherent material is held against said target,

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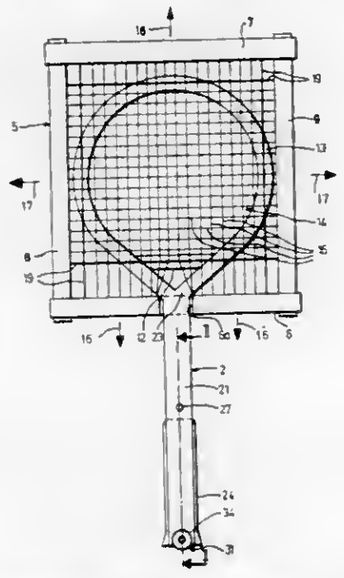
4,029,317
GAMES RACKET
Sven Erik Malmström, 11 Dammweg, 3904 Naters, Switzerland
Filed Sept. 5, 1975, Ser. No. 610,880
Claims priority, application Sweden, Sept. 9, 1974, 7411333; Aug. 11, 1975, 7508985
Int. Cl.² A63B *49/02, 51/16*
U.S. Cl. 273—73 C **6 Claims**

1. A method of manufacturing a games racket comprising the step of providing two, substantially mating, half-frame members having open rim portions; providing a plurality of individual substantially coplanar uncoated strings of a non-metallic material selected from the group consisting of natural and synthetic fibers; conjointly applying tension to all of the coplanar uncoated strings; while the strings are conjointly tensioned, pressing the strings between the two substantially mating open rim portions of the respective substantially mating half-frame members; and applying a bonding agent to inseparably bond the conjointly tensioned uncoated strings to both said open rim portions and the two open rim portions to each other.

3. A games racket comprising two individual substantially mating frame members each provided with a respective open rim portion and with a respective handle part connected to the

associated open rim portion; a plurality of initially uncoated individual strings, of a non-metallic material selected from the group consisting of natural and synthetic fibers crossed to



define a netting, fixed between said open rim portions while said strings are conjointly tensioned, and a bonding agent securing said two open rim portions to each other and to said netting.

4,029,318

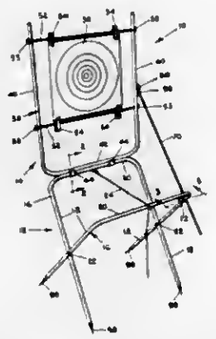
PORTABLE, ADJUSTABLE TARGET STAND

Richard K. Boss, 1677 - 32nd St. SW., Wyoming, Mich. 49509

Filed Sept. 19, 1975, Ser. No. 614,907

Int. Cl.² F41J *1/10*

U.S. Cl. 273—102 S **16 Claims**



1. A portable target stand for a firearm target comprising:

an extendible scissors frame base including a pair of elongated base members pivotably connected together at a pivot point between the ends thereof such that the height of the base is varied by relative pivotal movement of the base members, each base member having an upper portion extending above the pivot point thereof, the upper portions of the base members comprising an upper portion of the base;

target holder means for holding a target pivotably mounted on the upper portion of the base in such a manner that the target holder means can be positioned to hold the target in a generally vertical position on the base regardless of the height of the base or the relative angular positions of the base members; and

support means extending between the target holder means and the base for holding the target holder in at least one selected position with respect to the base, said support means providing a rigid, pivot-preventing interconnection between the base and the target holder means at points spaced away from the pivotal axis of the target holder means on the base at each said selected position.

4,029,319

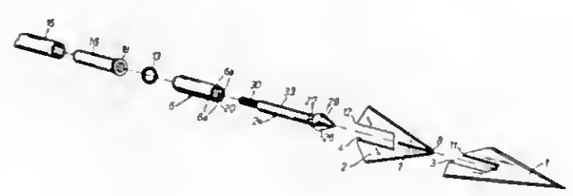
ARROWHEAD ASSEMBLY HAVING DETACHABLE LOCKING MEANS

Jack P. Christen, Onalaska, Wis., assignor to Outers Laboratories, Inc., Onalaska, Wis.

Filed Apr. 16, 1976, Ser. No. 677,559

Int. Cl.² F41B *5/02*

U.S. Cl. 273—106.5 B **3 Claims**



1. A removable arrowhead assembly comprising at least one blade having a recess extending inwardly from the rear edge thereof, a collet having at least one axial slot for the reception of said blade therein, said collet also having a cam surface and a threaded rearward end, a sleeve accommodated by said recess in said blade and having a cam surface adapted to abut against said cam surface of said collet for causing said collet to clamp tightly against said blade, said sleeve having at least one axial slot on the exterior thereof in axial alignment with said one axial slot in said collet, said slot in said sleeve receiving said blade for rigidly holding the latter in relationship to said sleeve, means located on the inner surface of said sleeve and interengaging with means on the exterior surface of said collet for preventing relative rotation between said collet and said sleeve, an insert having an internal thread for the reception of the threaded end of said collet, said insert being adapted to be secured to an arrow shaft, a metal impact ring mounted around said collet, said blade bearing against said metal impact ring when in assembled relationship, whereby said collet can be inserted in said sleeve and threadably engaged in said insert to tightly draw said collet cam surface against said sleeve cam surface for causing locking engagement of said collet against said blade.

4,029,320

EDUCATIONAL GAME APPARATUS AND TEACHING SYSTEM

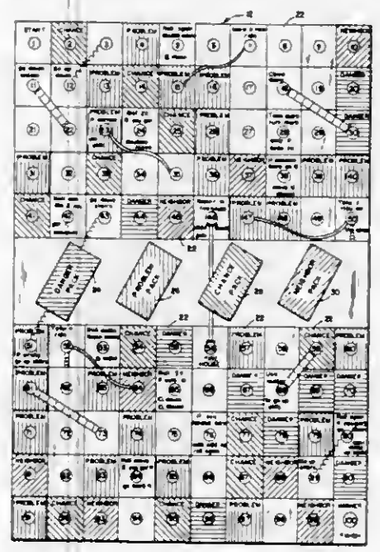
Jack Hausman, 18-05 215 St., Bayside, N.Y. 11360

Filed May 21, 1975, Ser. No. 579,317

Int. Cl.² A63F *3/00*

U.S. Cl. 273—134 AD **4 Claims**

1. An educational game apparatus in kit form adaptable for use in a classroom and designed to encourage and stimulate the learning processes by presenting selected teaching materials through a competitive game environment, said game apparatus comprising a game board having thereon a pattern of stations for defining paths of travel, a plurality of distinctive playing pieces for representing each of several game participants, the playing pieces being adapted for placement on the stations, chance controlled means for determining movement of the respective playing pieces from an initial station to a final station along alternate paths of travel, with selected stations on the game board being provided with written intelligence incorporated into the game procedure for determining the progressive movement of the playing piece landing thereon, accessory cards containing directions affecting movement of the playing pieces, said accessory cards being arranged in at least two different packs and being separately identifiable under specific headings and color coded to stations on the game board bearing similar headings and representative colors, at least one of said packs of accessory cards including tutorial cards containing specific pedagogic materials of selected subject matter and learning ability level, said tutorial cards being keyed to designated stations and integrated into the game procedure such that correct responses reinforce the learning processes by providing for the advancement of the respective playing pieces toward the final station, and further



including a pack of supplemental tutorial cards bearing other pedagogic material for selective introduction as by teacher monitoring in substitution of the first mentioned tutorial cards, said supplemental tutorial cards being programmed for interchangeable integration into the game procedure in accordance with the improved learning abilities and teaching objectives.

4,029,321

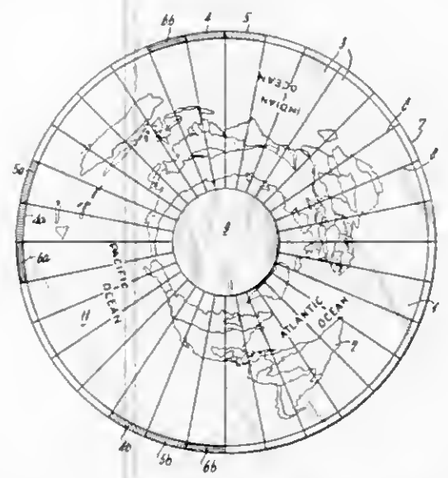
CARD AND BOARD MAP GAME

Charles G. Lang, Jr., Mato Maranhao 98, Capelas, Sao Miguel, Azores, Portugal

Filed Apr. 26, 1976, Ser. No. 679,901

Int. Cl.² A63F *3/04*

U.S. Cl. 273—135 AB **3 Claims**



1. A skill and chance influenced game comprising:

a game board containing indicia representing a map defining a large number of different political subdivisions and divided into a multiplicity of zones, there being associated with such zones indicia which correlate each zone only with a plurality of nonajacent other zones so as to provide to each player a plurality of recognizable assigned zones for his play;

a card deck containing cards divided into a plurality of sections, one section containing a type of indicia associated with a first political subdivision shown on the board and a second section containing a second type of indicia associated with a second political subdivision differing from the first shown on the board;

whereby in playing said game, a player attempts to correctly identify the position on the map of the political subdivision in his zone of play associated with any indicia on cards assigned to him and after which any second player can attempt to correctly identify the position on the map of the political subdivision in the second player's zone of play represented by the second indicia on the card.

4,029,322

PICKUP ARM ASSEMBLY

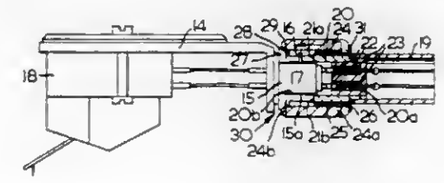
Keijiro Maeda, Yokohama, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Jan. 14, 1976, Ser. No. 648,864

Claims priority, application Japan, Jan. 18, 1975, 50-8847[U]

Int. Cl.² G11B *3/02*

U.S. Cl. 274—37 **8 Claims**



1. A phonograph pickup arm assembly comprising:

a pickup arm having an outer end portion;

a first hollow cylindrical member having a longitudinal axis and mounted on said outer end portion of said pickup arm, said member having at least one radially disposed slit;

a phonograph transducer having a connecting plug to be inserted into said first hollow cylindrical member for mounting said phonograph transducer to the outer end portion of said pickup arm;

a second cylindrical member disposed about said first cylindrical member and longitudinally moveable with respect to said first cylindrical member; and

locking means for reducing the diameter of said first cylindrical member in response to a longitudinal displacement of said second cylindrical member to clamp said transducer to said pickup arm, whereby said plug is locked in said first cylindrical member.

4,029,323

FLUID PRESSURE SEAL ARRANGEMENT

Gentei Inoue; Chuichi Sato, both of Fujisawa; Mamoru Tanaka, Yokohama, and Nobuhiro Matsuo, Kamakura, all of Japan, assignors to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 347,529, April 3, 1973, Pat. No. 3,949,996. This application Feb. 13, 1976, Ser. No. 658,008

Claims priority, application Japan, Apr. 11, 1972, 47-35717

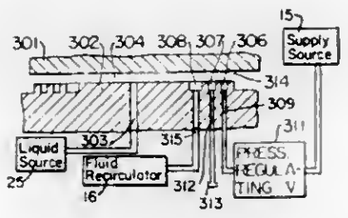
Int. Cl.² F16J *15/40*

U.S. Cl. 277—15 **1 Claim**

1. A static pressure seal arrangement for containing liquid between a planar base seat surface and a body overlying but spaced from said surface, said base seat including a liquid intake passage and a liquid outflow passage nearer the periphery of the base seat than said intake passage and connecting with a continuous liquid outlet groove recessed in said base seat surface and totally enclosing an interior area thereof, comprising,

at least a continuous inlet sealing gas groove recessed in said base seat surface and totally enclosing an interior area thereof, at least a continuous sealing gas outlet groove recessed in said base seat surface, said at least an outlet

groove being located interiorally of at least one inlet groove, said at least an outlet groove also totally enclosing an interior area of said surface, said gas inlet and outlet grooves being located exteriorally of said liquid



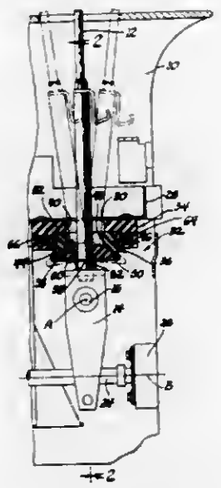
outlet groove, a supply passage in said base seat extending perpendicular and connecting with each gas inlet groove, and an output passage in said base seat extending perpendicular and connecting with each gas outlet groove.

4,029,324

SEAL ASSEMBLY FOR CONTROL LEVER

Benjamin L. Berkes, Sagamore Hills, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed June 4, 1976, Ser. No. 692,660
Int. Cl.² F16J 15/16
U.S. Cl. 277—30 3 Claims



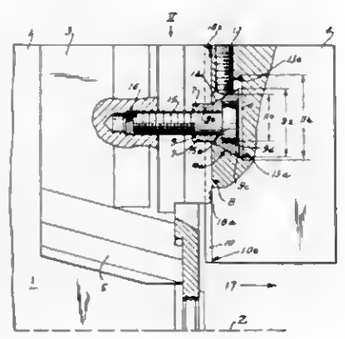
1. In combination, a wall having an enlarged opening therein, a seal assembly for sealing said enlarged opening in said wall, a control lever extending through the enlarged opening and being supported for pivotal movement about first and second mutually perpendicular non-intersecting axes with the first axis being located further from said wall than the second axis, said seal assembly comprising a stationary base member and first and second seal members adapted to be carried by the control lever and to move relative to the base member during movement of the control lever, said base member having an opening to allow movement of said control lever about said first and second axes, a first groove formed in said base member and having a first curved surface located on a sector of a circle generated by a point on said control lever as the latter is pivoted about said first axis, the first seal member being located in said first groove and having a complementary curved surface sealingly engaging said first curved surface of said first groove, a second groove formed in said first seal member and having a second curved surface located on a sector of a circle generated by a point located on the control lever as the latter is pivoted about the said second axis, said second seal member located in the second groove and having a complementary curved surface sealingly engaging said second curved surface of said second groove, the arrangement being such that when the control lever is pivoted about the first axis the first and second seal members move relative to the base member and when the control lever is pivoted about the second axis the second seal member moves relative to the first seal member and the base member.

4,029,325

CHUCK WITH RADIALLY ADJUSTABLE JAWS

Günter Horst Röhm, Heinrich-Rohm-Str. 50, Sontheim, Germany (7927)

Filed July 9, 1976, Ser. No. 704,046
Claims priority, application Germany, July 29, 1975, 2533770
Int. Cl.² B23B 31/06, 31/16
U.S. Cl. 279—123 12 Claims



1. A chuck comprising a body rotatable about an axis, a plurality of two-part jaws spaced about said axis and radially displaceable to engage a workpiece, each of said jaws including:

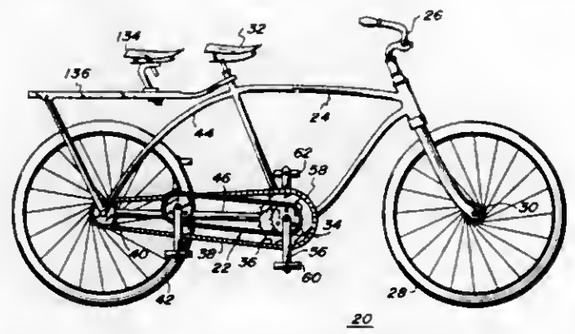
a carrier forming one jaw part and disposed on said chuck body, having a face turned in the axial direction, a radial groove formed in said face, a workpiece-engaging part with a radial guide edge mating with said radial groove of said carrier on said face, a groove of dovetail-shaped profile formed in said workpiece-engaging part transverse to said radial groove, a transverse bar of dovetail-shaped profile geometrically similar to said transverse groove projecting beyond said face of said carrier, said dovetail-shaped profile of said transverse groove being larger than said dovetail-shaped profile of said transverse bar to form an axial clearance between said transverse groove and said transverse bar at least equal to depth of engagement of said guide edge of said jaw with said radial groove of said carrier, and a radial clamping member provided on said workpiece-engaging part urging said bar against an opposite wall of said transverse groove.

4,029,326

BICYCLE CONSTRUCTION

James H. Blow, Jr., 23 Palisade Ave., Piscataway, N.J. 08854

Filed Jan. 21, 1976, Ser. No. 651,211
Int. Cl.² B62K 13/00
U.S. Cl. 280—7.16 9 Claims



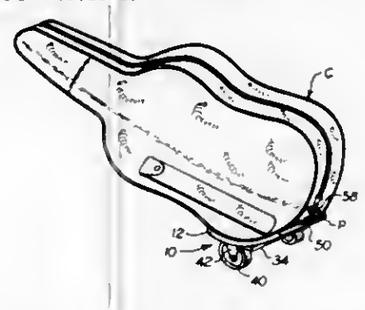
1. In a bicycle construction of the type having a frame, a front wheel, a rear wheel rotatable about a rear axle, a main seat mounted on an upper portion of said frame, main drive means connected between a lower portion of said frame and said rear wheel and including a main sprocket and a main chain drive, said main chain drive being connected between said main sprocket and said rear wheel, a forked rear wheel support extending between said lower portion of said frame and said rear axle, and a pair of main rotary pedals coupled to said main sprocket for rotating said main drive means, the improvement comprising: auxiliary drive means connected to said forked rear wheel support forwardly of said rear axle and operatively coupled to said main drive means for assisting in the rotation thereof; and a pair of independently supported auxiliary rotary pedals coupled to said auxiliary drive means for rotating said auxiliary drive means, said auxiliary drive means comprising two pairs of auxiliary sprockets including a pair of first auxiliary sprockets connected to respective ones of said auxiliary rotary pedals adjacent said forked rear wheel support forwardly of said rear axle, and a pair of second auxiliary sprockets concentrically connected to and rotable with said main sprocket said auxiliary drive means further comprising a first auxiliary chain drive connected between one of said first auxiliary sprockets and a corresponding one of said second auxiliary sprockets, and a second auxiliary chain drive connected between the other of said first auxiliary sprockets and the other of said second auxiliary sprockets, one of said auxiliary rotary pedals being coupled to one fork of said rear wheel support, the other of said auxiliary rotary pedals being coupled to the other fork of said rear wheel support, each of said auxiliary rotary pedals being independently rotatable with respect to one another.

4,029,327

STROLLER FOR ATTACHMENT TO A CARRYING CASE

Samuel Kolstein, 2801 Shore Drive, Merrkk, N.Y. 11566

Filed Apr. 27, 1976, Ser. No. 680,742
Int. Cl.² B62B 3/02
U.S. Cl. 280—47.13 R 17 Claims



1. A stroller for attachment to a case for transporting an article therein, said stroller comprising:

a. a mounting plate; and

b. a wheel support plate;

c. wheel means rotatably mounted on said support plate for 360° swivel movement;

d. shock absorbing means having portions respectively mounted on said mounting plate and said support plate for interconnecting said plates together in spaced apart relation, said means being operative between a normally extended condition and a compressed condition to effect relative movement of said plates in directions toward and away from each other;

e. said shock absorbing means being the sole structure for controlling the relative movement between said mounting plate and said wheel support plate, and for controlling the relative spacing between said plates in all directions;

f. one of said plates being disposed for movement between a rest position when said shock absorbing means is in its normally extended condition and a displaced position in the direction toward the other one of said plates when said shock absorbing means is in a compressed condition; and

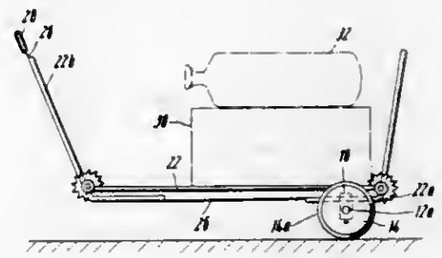
g. separable interengaging fastening means on said mounting plate, said means having a first portion connected to said mounting plate and a second portion adapted to be connected to said case for removably attaching said stroller to said case.

4,029,328

AUXILIARY TRANSPORTING DEVICE

Walter Herterich, Dachau, and Georg Probst, Munich, both of Germany, assignors to Ecofon Verkaufsgesellschaft Probst KG., Munich, Germany

Filed Sept. 4, 1975, Ser. No. 610,146
Claims priority, application Germany, Sept. 9, 1974, 2443042
Int. Cl.² B62B 1/06
U.S. Cl. 280—47.24 5 Claims



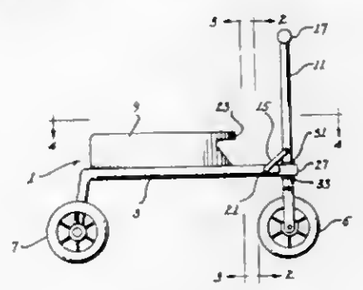
1. A device for the temporary moving of stationary articles, comprising at least one shaft having wheels mounted on both ends thereof, two blocks axially movably arranged on said shaft, each of said blocks having a receiving groove therein for receiving a projection on said article which is to be moved such that said article can be clamped between the receiving grooves in both blocks and can be moved on said wheels, a tension spring anchored between said two blocks, and between the shaft and a hole in each block receiving said shaft therein, there is provided a large clearance, so that the blocks can be positioned inclined for self-locking under the action of said tension spring on the shaft.

4,029,329

CHILD'S THREE-WHEEL SCOOTER

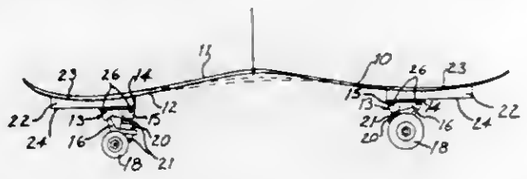
Carter Carl Chambers, P.O. Box 576, Parker, Ariz. 85344

Filed Jan. 19, 1976, Ser. No. 650,407
Int. Cl.² B62K 5/04
U.S. Cl. 280—87.02 R 3 Claims



1. A child's three-wheel scooter having a support bar, two rear wheels depending from said support bar, a knee trough mounted on said support bar, vertically disposed steering column attached to the front end of said support bar, said column having a front wheel on its lower end and two laterally and rearwardly extending projections disposed to engage the support bar when said front wheel has been turned about 45° from straight in either direction.

4,029,330
CAMBERED SKATEBOARD PROVIDED WITH LONGITUDINALLY ADJUSTABLE TRUCK ASSEMBLIES
Paul S. Runyan, Jr., 6658 Electric Ave., LaJolla, Calif. 92037
Filed May 5, 1976, Ser. No. 683,273
Int. Cl.² A63C *17/00*
U.S. Cl. 280—87.04 A **9 Claims**



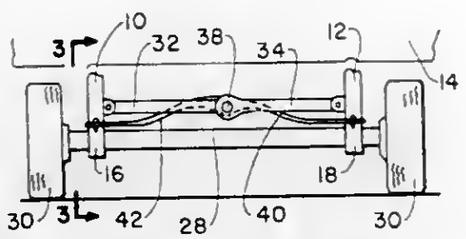
1. In a skateboard having a longitudinally cambered board made from resilient material capable of limited flexing under the weight of a rider, the skateboard having substantially parallel deck and lower surfaces, and front and back longitudinally spaced trucks mounted to its lower surface for carrying a rider along a path selected by application of pressure to the deck surface; the improvement comprising:

first mounting means for permitting longitudinal adjustment of one of the trucks with respect to the board, said first mounting means including:

a rigid track assembly having an upper longitudinal surface complementary to the unweighted configuration of a cambered portion of the lower surface of the board, said track assembly being fixed to said cambered portion in surface-to-surface engagement between the upper surface of the track and the lower surface of the board; and

releasable means operably engaged between said one truck and said track assembly for selectively fixing the longitudinal position of the truck relative to the track assembly.

4,029,331
VEHICLE SUSPENSION SYSTEM
Adolph Richard Obearle, 207 Aero Ave., Schertz, Tex. 78154
Filed Jan. 26, 1976, Ser. No. 652,209
Int. Cl.² B60G *11/00*
U.S. Cl. 280—112 R **5 Claims**



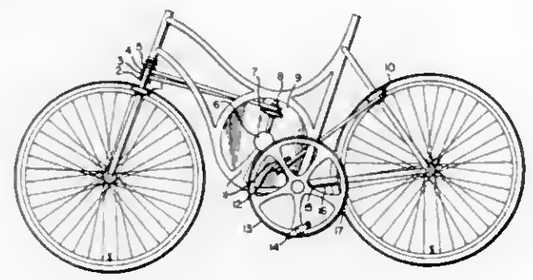
1. A vehicle suspension system comprising:

first and second frame members projecting substantially downwards from a vehicle frame;

first and second axle bearer means attached to said first and second frame members, respectively, for supporting a transverse and normally horizontal axle, the axle having two opposite ends, one wheel being attachable to at least one of said ends;

first and second substantially horizontal and transverse control bars having respective centers and pivotably connected to one another at said centers in a substantially mirror-symmetrical and scissor-type manner, each of said control bars being formed as a leaf spring on one side of said center having an extremity, and a downwardly opening concavo-convex curvature extending at least partly towards said extremity, said leaf springs of said first and second control bars being attached to said second and first axle bearer means near the extremities of said leaf springs, respectively, said first and second control bars having ends on the other side of said center, respectively, each of the latter ends being attached to said first and second frame members, respectively.

4,029,332
ROTACYCLE
Harry C. Davis, 2 Elmwood Ave., Winchester, Mass. 01890
Filed June 10, 1975, Ser. No. 585,751
Int. Cl.² B62M *11/12*
U.S. Cl. 280—234 **4 Claims**



1. A foot propelled two-wheel-in-line vehicular cycle having a structure and comprising:

A. a dual tubed mid-frame as means encompassing and supporting a rotor, said rotor being centrally disposed relative thereto,

B. dual pedal attached driving wheels having a coupling shaft, said shaft revolving in the bottom bracket hanger as means supporting said driving wheels,

C. said driving wheels as means transmitting motion to geared up wheels having a common shaft, said shaft revolving in stationary hubs, said hubs being respectively supported by vertically convergent stanchions, said stanchions being integrated with said mid-frame and said shaft medially mounting said rotor,

D. said rotor constituting a friction disk, said disk being in operative contact with a plurality of pulley wheels equally allocated to both faces of said disk, said pulley wheels' plane of rotation being normal to said disk's plane of rotation,

E. said pulley wheels capable of rotating and traversing on pressure rods, said rods non-coplanar and substantially parallel with said disk's diametral plane, said rods radially disposed relative to the axis of said disk, the inner termini of said rods conveniently mounted on the periphery of said shaft hubs and the outer termini of said rods conveniently mounted on a conventional top tube bridge and on the bottom bracket, and

F. relative to said disk, a lower set of said pulley wheels flexibly connected by endless means to mating wheels mounted on compressive seat stays adjustable conveniently, said mating wheels being thus in friction-tight contact with the sidewalls of the tire as means rotating the rear cycle wheel,

G. an upper set of said pulley wheels similarly connected as means oppositely driving mating wheels mounted on a fork stem extension.

4,029,333
DOUBLE ENDED WAREHOUSE TRAILER
Carl O. Christensen, Alamo, Calif., assignor to Roll-Rite Corporation, Oakland, Calif.
Division of Ser. No. 530,746, Dec. 9, 1974, Pat. No. 3,944,258.
This application Feb. 9, 1976, Ser. No. 656,719
Int. Cl.² B60D *1/00*
U.S. Cl. 280—415 A **5 Claims**

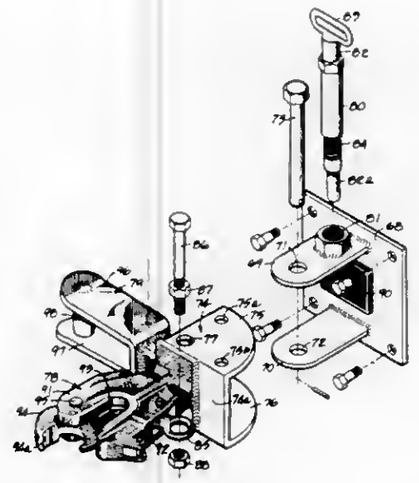
1. An indexing hitch assembly for detachably coupling a pair of vehicles together, comprising:

a base member to be secured to a vehicle, said base member including a pair of vertically spaced-apart brackets extending outward therefrom;

first pin means;

a body member pivotally secured between said brackets by said first pin means, said first pin means extending through said brackets and said body member, said body member including a pair of spaced apart panels defining a top and a bottom connected together by a least a pair of substantially rectangular shaped side panels;

at least first and second coupling members secured to and extending from said body member; said first and second coupling members being secured to said side panels;

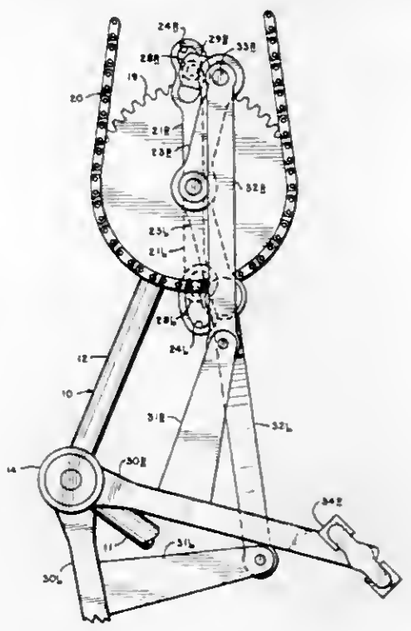


latch means for latching said body member in a plurality of latched positions with respect to said base member, said latch means comprising second pin means mounted on said base member and biased into one of a plurality of apertures in said body member, each aperture corresponding to one of said latch positions; and

said latch positions being oriented such that one of said coupling members is in a position to be coupled to a third coupling member secured to another vehicle in each of said latched positions.

f. the control means including:

1. a cam surface provided on one of the arms, and



2. a cam follower carried by the other of the arms and engaging the cam surface.

4,029,334
BICYCLE DRIVE ASSEMBLY
Earl M. Trammell, Jr., St. Louis, Mo., assignor to Cycle-Drive Corporation, St. Louis, Mo.
Continuation-in-part of Ser. Nos. 417,060, Nov. 19, 1973, Pat. No. 3,906,807, and Ser. No. 229,898, Feb. 28, 1972, Pat. No. 3,779,099. This application Sept. 17, 1975, Ser. No. 614,265
Int. Cl.² B62M *1/02*
U.S. Cl. 280—261 **13 Claims**

1. A drive assembly for a physically propelled vehicle comprising:

a. a drive member rotatively mounted on a drive axis,

b. a crank arm operatively connected to the drive member on the same drive axis for rotating the drive member,

c. a power arm rotatively mounted on the same drive axis for relative angular movement between the power arm and crank arm,

d. a pedal means operatively connected to the power arm for rotating the power arm, and

e. control means interconnecting the power arm and crank arm for rotating the crank arm and drive member, and for accelerating the power arm ahead of the crank arm during one portion of the crank arm cycle and decelerating the power arm behind the crank arm during another portion of the crank arm cycle, and

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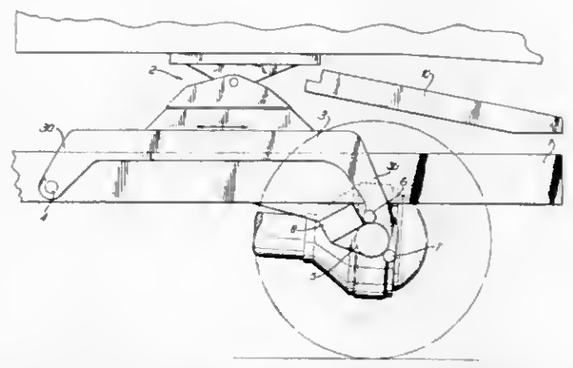
4,029,335
FIFTH WHEELS FOR TRUCK TRACTORS
John Billington Cady, Preston, and Michael John Kellaway, Chorley, both of England, assignors to British Leyland UK Limited, London, England
Filed Mar. 31, 1976, Ser. No. 672,243
Claims priority, application United Kingdom, Aug. 4, 1975, 14303/75
Int. Cl.² B62D *53/08*
U.S. Cl. 280—439 **4 Claims**



1. A truck tractor having the following combination of features:

a. a chassis;

b. a sub-frame;

c. a fifth wheel;

d. means mounting the fifth wheel on the sub-frame;

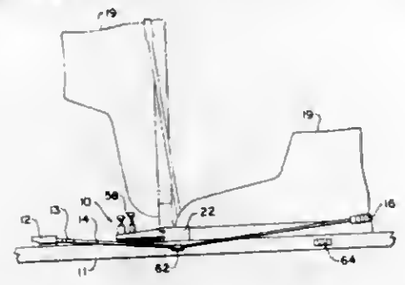
e. means pivotally connecting the sub-frame to the chassis;

f. an axle for road wheels;

g. means pivotally connecting the axle to the sub-frame so that a proportion of any load on the fifth wheel is carried directly be the axle; and

h. suspension elements interposed between the said axle and the chassis.

4,029,336
CONVERTIBLE SKI BINDING
Dennis J. Haimerl, Rte. 1, Box 148-A, Loma, Colo. 81524
Filed Oct. 20, 1975, Ser. No. 623,739
Int. Cl.² A63C 9/00
U.S. Cl. 280—614 12 Claims



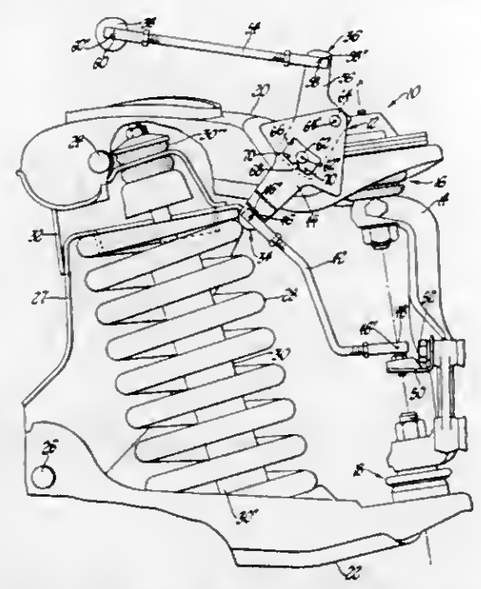
1. In an apparatus for binding a boot or the like to a flat surface of a ski, an improvement comprising:

boot-receiving means attached to the flat surface of a ski adapted for receiving the leading edge of a boot, including first pivot means pivotally attaching said boot-receiving means to the ski for pivotal movement parallel to the ski surface, and second pivot means pivotally attaching said boot-receiving means to the ski for pivotal movement of said receiving means in a direction perpendicular to the ski surface;

male locking means; and

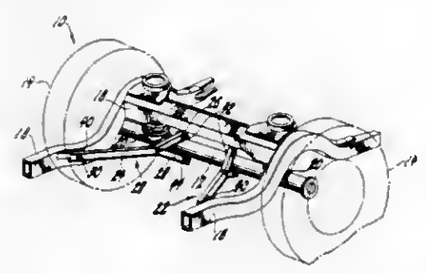
first and second female receiving means, said first female receiving means being adapted to releasably receive said male locking means for securing said boot-receiving means against pivotal movement parallel to the ski flat surface, and said second female receiving means being adapted to releasably receive said male locking means for alternatively securing said boot-receiving means against pivotal movement perpendicular to the ski flat surface.

4,029,337
CAMBER INDICATING LINKAGE
Joseph Gerald Bishop, West Bloomfield, Mich., assignor to American Motors Corporation, Detroit, Mich.
Filed Feb. 19, 1976, Ser. No. 659,298
Int. Cl.² B62D 17/00
U.S. Cl. 280—661 15 Claims



1. A wheel camber angle indicating linkage for a vehicle independent suspension system including a control arm pivoted to the sprung mass of the vehicle, and a wheel supporting member supported by the control arm, the linkage comprising: a first linkage portion adapted to extend between the wheel supporting member and the control arm so as to sense the angular relationship between the control arm and the wheel supporting member; a second linkage portion adapted to extend between the control arm and the sprung mass of the vehicle so as to sense the angular relationship between the control arm and the sprung mass of the vehicle; and means for comparing the angular relationships sensed by the first and second linkage portions so as to determine whether the wheel supporting member is angularly oriented so a wheel supported thereby has a camber angle that is proper.

4,029,338
TWIN TRAILING LINK REAR SUSPENSION SYSTEM
David B. Headley, Eaton Rapids, Mich., assignor to General Motors Corporation, Detroit, Mich.
Filed Aug. 13, 1975, Ser. No. 604,345
Int. Cl.² B60G 1/02
U.S. Cl. 280—725 3 Claims



1. In a motor vehicle including a frame having side rails and an interconnecting rear cross-rail, a solid, nonsteerable rear axle having wheels mounted on the opposite ends thereof, and a pair of coil springs mounted between the axle and the frame, the improvement characterized by a rear suspension system including twin trailing links mounted between the rear axle and respective side rails at a predetermined angle with respect to the vehicular longitudinal axis and extending in a direction either fore or aft the rear axle, each of the twin trailing links including a main arm having vertically diverging arms formed on one end thereof, an opening formed adjacent the free end of each of the main and diverging arms, a bushing assembly mounted in each of the openings, fastener means mounted through each of the bushing assemblies for pivotally securing the main arm to the inner surface of the adjacent side rail and for pivotally securing the vertically diverging arms to upper and lower substantially vertically aligned portions of the axle at a predetermined axial location therealong.

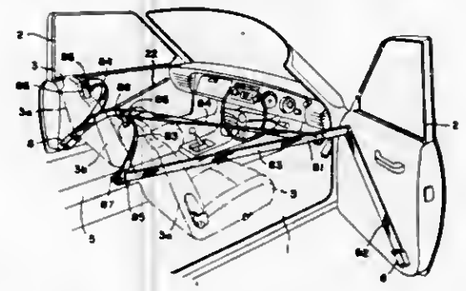
4,029,339
SAFETY BELT DEVICES FOR VEHICLES
Yuichiro Kaneko; Fuminori Teraoka, both of Aichi; Tatsushi Kubota, Kisogawa, and Takehiko Nishikawa, Aichi, all of Japan, assignors to Kabushiki Kaisha Tokai Rika Denki Seisakusho, Japan
Division of Ser. No. 301,796, Oct. 30, 1972, Pat. No. 3,933,369. This application Oct. 30, 1975, Ser. No. 627,379
Claims priority, application Japan, Nov. 4, 1971, 46-87868
Int. Cl.² B60R 21/02
U.S. Cl. 280—745 5 Claims

1. A safety belt device for vehicles, comprising:

a safety belt retractor secured on the inner surface of a door of a vehicle at a location opposite the outer side of a seat adjacent said door, said inner surface of the door having a slit defined therein extending slantingly from the location in which said safety belt retractor is secured to the upper portion of said door;

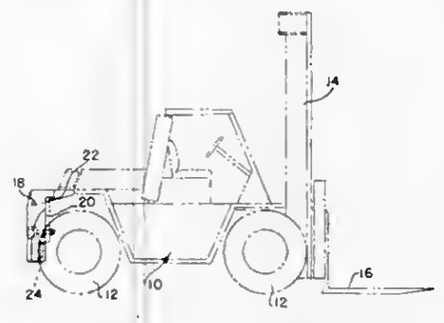
a three point safety belt having a waist belt and a shoulder belt which are branched from a common belt connected at one end to said retractor and extending slantingly from said retractor from the lower to the upper portion of said door, the other end of said waist belt being secured to the central portion of a vehicle body and the other end of said shoulder belt being fixed to the inner portion of the backside of said seat;

a belt driving mechanism provided in the door and comprising a door switch operated by the door opening and closing operation, a motor set in motion upon actuation of said door switch, belt drawing means for drawing said common belt by the drive of said motor, said belt drawing means being in the door substantially along said slit and comprising a gear train connected to said motor and a



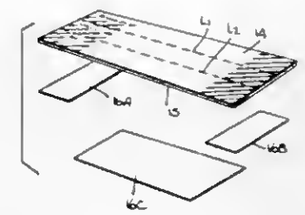
drawing belt having one end fixedly connected to the common belt and the other end connected to the gear train, whereby when the door is closed, said waist and shoulder belts are retracted through said common belt into said retractor and placed in their engaging positions to restrain the waist portion and the shoulder portion, respectively, of a passenger sitting on said seat, and when the door is opened said motor is set in motion so that said common belt is withdrawn from said retractor through said belt drawing means to hold said waist and shoulder belts in their disengaging position.

4,029,340
COMBINED TOWING AND MOUNTING MEMBER FOR VEHICLE COUNTERWEIGHTS
Charles Richard Chelin, Peoria, Ill., assignor to Towmotor Corporation, Mentor, Ohio
Filed Mar. 15, 1976, Ser. No. 666,726
Int. Cl.² B60R 27/00
U.S. Cl. 280—759 5 Claims



4. A counterweight and towing structure for attachment to a vehicle comprising an enlarged counterweight structure including, on one side thereof, a downwardly open hook formation adapted to abut and overlie a part of a vehicle frame and a bore extending through the counterweight structure; and an eye bolt having a threaded shank extending through said bore and adapted to be threadably received by a vehicle frame for securing the counterweight structure to the vehicle frame, the head of the eye bolt serving as a towing eye.

4,029,341
PRINTED FORM HAVING REMOVABLE LABEL
Jimmie D. Neill, Hatboro, Pa., and Lester V. Wise, Old Westbury, N.Y., assignors to Federal Business Products, Inc., New York, N.Y.
Filed Apr. 2, 1976, Ser. No. 672,969
Int. Cl.² B41L 1/24
U.S. Cl. 282—22 R 4 Claims



1. A printed form having an address block thereon for the entry of name and address data regarding the submitter of the form, said form having a label assembly component overlying the address block, making it possible to send material to the submitter in an envelope addressed by a label detached from the assembly, said assembly comprising:

A. a face sheet having an address block thereon corresponding to the block printed on the form, the underside of the face sheet being covered by a pressure-sensitive adhesive layer; and

B. a protective cover sheet laminated to said face sheet by said adhesive layer, said cover sheet being severed into two end section tabs which are adhered to and remain permanently attached to the corresponding end portions of the address block on the form and a relatively long intermediate section having a pressure-responsive duplicating back surface whereby when said data is inserted in the address block on the face sheet, it is reproduced on the printed form, said intermediate section laminated to said face sheet completely covering the adhesive on the underside of the face sheet to form an intermediate laminated portion having adhesive-free edges between said tabs and being readily removable from said form, said intermediate section being thereafter peelable from said face sheet which may then be applied to said envelope.

4,029,342
INTEGRATED RECORD CONTROL SYSTEM AND METHOD
Sidney R. Goodman, 24161 Greenlawn Ave., Beachwood, Ohio 44122
Filed Mar. 26, 1975, Ser. No. 562,095
Int. Cl.² B41L 1/02
U.S. Cl. 282—29 B 7 Claims

1. A closed-loop feed back system of double checking, updating and accurately recording of data between a central location and a remote location comprising the steps of:

at a central location taking a first, overlay member with at least one edge defining a horizontal edge and with one face thereof having an outer row and an inner row generally parallel to said horizontal edge,

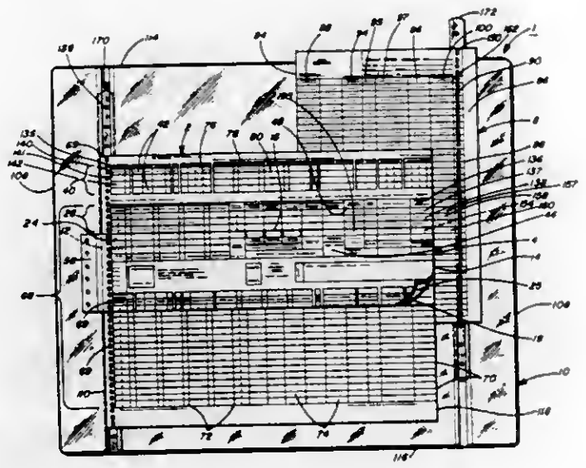
machine printing humanly readable information on at least one predetermined laterally horizontal position of said inner row and in vertical alignment with a blank portion of said outer row,

transmitting said overlay member to a remote location, at said remote location superimposing said overlay member at a laterally horizontally predetermined and vertically selected position on a primary data storage member whereby said blank portion of the overlay member is superimposed over a partially predetermined and partially blank portion of said primary data storage member

with transfer means disposed between the blank portion of said face of the overlay member and the top surface of the primary data storage member,

entering information related to said first mentioned information in said blank portion of the outer row of the overlay member whereby said second mentioned information is automatically transferred to the said blank portion of the primary data storage member,

transmitting the overlay member back to the central location,



at the central location taking a second overlay member and machine printing in humanly readable form the information from the outer row of the first overlay member on the inner row of said second overlay member at the laterally horizontal position corresponding to the laterally horizontal position of the information on the outer row of the first overlay member, and

transmitting said second overlay member to the remote location where it is processed corresponding to the processing at the remote location of the first overlay member.

4,029,343
EXPANSION JOINT FOR PREFABRICATED DOUBLE-WALLED METAL CHIMNEY
Richard L. Stone, Los Altos Hills, Calif., assignor to Wallace-Murray Corporation, Belmont, Calif.
Filed Sept. 23, 1976, Ser. No. 725,873
Int. Cl.² F16L *39/00*
U.S. Cl. 285—47 **7 Claims**

1. An expansion and length adjustment joint for a prefabricated double-walled metal chimney having outer and inner cylindrical chimney walls, comprising:

an upwardly extending end portion of the outer wall of a lower chimney section;

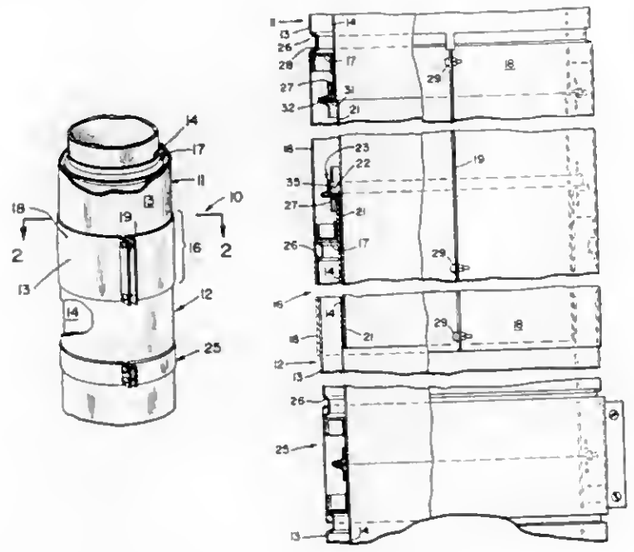
an outer support jacket connected to and extending downwardly from the outer wall of an upper chimney section, overlapping the upwardly extending outer wall end portion for a first selected distance and being closely circumjacent the lower outer wall in the overlapped area and is axially slidable with respect to the latter wall;

an inner slip section connected to and extending downwardly from the inner chimney wall of the upper chimney section;

an upwardly extending end portion of the inner wall of the lower chimney section, overlapping the inner slip section for a second selected distance and lying just outside the slip section in the overlapped area;

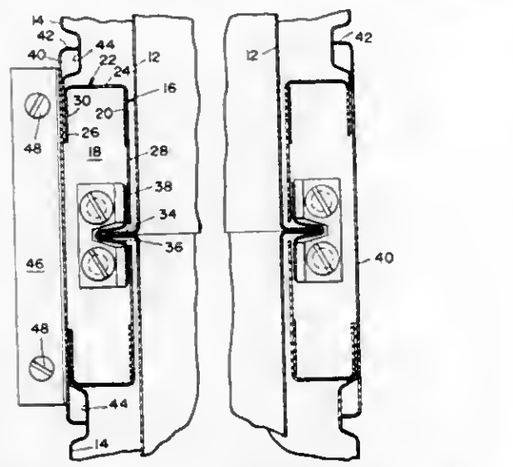
an annular gasket supported by and in sealed engagement with said lower inner wall end portion, and in slidable sealed engagement with the outer surface of the inner slip section; and

means retaining the inner and outer walls of each of the



upper and lower chimney sections a spaced distance apart near the joint.

4,029,344
CONNECTION JOINT FOR PREFABRICATED METAL CHIMNEY
Richard L. Stone, Los Altos Hills, Calif., assignor to Wallace-Murray Corporation, Belmont, Calif.
Filed Sept. 23, 1976, Ser. No. 725,951
Int. Cl.² F16L *39/00*
U.S. Cl. 285—47 **5 Claims**



1. A prefabricated double-walled chimney section adapted to be connected to a similar section to form a chimney column, said section comprising:

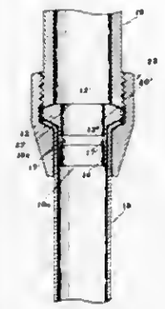
a cylindrical inner imperforate wall member having a radially extending flange at each end;

a cylindrical outer wall member having a greater diameter than and spaced outwardly from said inner wall member, said outer wall member being shorter than said inner wall member so that at least one end edge is spaced above the end flange of said inner wall member;

spacer connector means located between said inner and outer wall members near both ends, each said spacer connector means comprising a circular band portion, a plurality of web portions extending outwardly from circumferentially spaced apart locations on said band portion, outer tab means on each said web portion fixed to said outer wall member and inner tab means extending substantially parallel but unattached to said inner wall member and adjacent to its said radially extending flange;

an inner band means having a flange portion extending around said inner tab means of said spacer connector means and means on the opposite ends of said flange portion for drawing said inner band means tightly around said inner pipe member; and means near said end edge of said outer wall member for retaining a connectable outer band means adapted to extend circumferentially around said outer wall member.

4,029,345
PIPE FITTINGS
Antonio Romanelli, Via A. Omodeo 120, Naples, Italy
Filed May 15, 1975, Ser. No. 577,927
Claims priority, application Italy, May 20, 1974, 51117/74; Apr. 18, 1975, 49191/75
Int. Cl.² F16L *19/04*
U.S. Cl. 285—334.2 **6 Claims**



1. For use in establishing a fluid tight connection, a sealing assembly comprising:

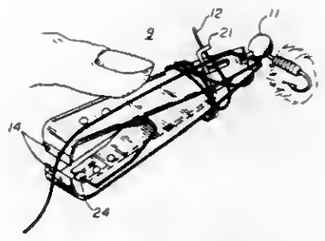
a cylindrical pipe;

a tube having an inwardly-beveled end, said tube being in axial alignment with said pipe;

a first sealing ring having a flanged head including a beveled upper surface, the bevel of which substantially matches the bevel at the end of said tube, a beveled undersurface and a shank tapering inwardly from the beveled undersurface to a short cylindrical portion adjacent the free end of the shank, the surface of said shank diverging slightly from the common axis of said pipe and said tube and the surface of said beveled undersurface diverging sharply from the common axis, the short cylindrical portion of said shank having a lesser outside diameter than the inside diameter of said pipe to facilitate initial, partial entry of the shank into said pipe, said shank including a pipe-flaring annular protruberance which extends outwardly from the shank surface prior to assembly but is deformed inwardly by said cylindrical pipe in the completed assembly, said flanged head and said shank having a hole therethrough; and

a locking nut comprising an annular body having a first hole extending inwardly from one end and a second smaller, axially aligned hole extending inwardly from the other end, the body of said nut having a beveled shoulder at the juncture of the first and second holes, the bevel of the shoulder substantially matching the bevel of the undersurface of the flanged head, said first hole being larger in diameter than the diameter of the flanged head and said second hole being smaller in diameter than the diameter of the flanged head, said nut including means for drawing the nut onto the tube to draw the beveled end of the tube into contact with the beveled upper surface of the flanged head and the end of the pipe initially into contact with the tapered shank and the pipe flaring protruberance, both of which act to flare the end of the pipe to produce a flared pipe surface for mating contact with the beveled undersurface of the flanged head.

4,029,346
LINE THREADER DEVICE
Charles W. Browning, 4645 E. 57th St., Tulsa, Okla. 74135
Filed Oct. 14, 1975, Ser. No. 622,036
Int. Cl.² D03J *3/00*
U.S. Cl. 289—17 **3 Claims**



1. A line threading device for attaching lines to fishing lures comprising

a. A first and a second plate

1. The said first and second plate, each having a cone-shaped indentation extending downwardly from the upper surface of each of the said plates at a first end of each of said plates, the said cone-shaped indentations in each plate nesting each with each other so as to firmly hold the eyelet of a fishing lure and

2. Each of the said cone-shaped indentations having a hole in the apex of the said indentations for easy threading of a fish line through the said eyelet of the said fishing lure;

b. The said first and second plate being connected together by a spring clip;

1. The said spring clip extending from the lower surface of a first said plate to the upper surface of the said second plate so as to provide proper alignment at the said first end of the said first and second plates when the said plates are in a closed position;

c. The said second plate having a Z-shaped spring line holder mounted on the lower surface of the said second plate and extending through an opening in the said first and second plates to the upper surface of the first said plate.

4,029,347
SUPPORT STAND ASSEMBLY
Gilbert Garcia, 4107 San Pedro, Tampa, Fla. 33609
Filed Oct. 8, 1976, Ser. No. 730,847
Int. Cl.² D03J *3/00*
U.S. Cl. 289—18 **9 Claims**

1. A support stand assembly of the type primarily designed to support an article while work is being performed thereon, said support stand assembly comprising: base means disposed in supporting relation to a remaining portion of said support stand assembly, a primary support means comprising a substantially elongated configuration and connected to said base means and extending substantially upwardly therefrom, article retention means including cable means movably attached to a substantially distal portion of said primary suport element and

disposed for attachment to the article, whereby the article may be positioned at various heights along the length of said

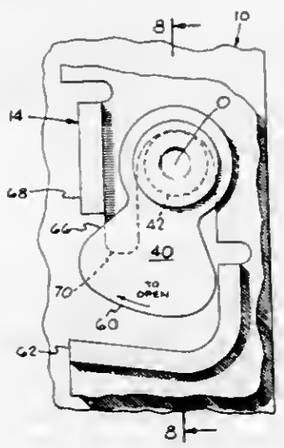
primary support means and at a predetermined position relative to one performing work on the article.

4,029,348

SELF-LOCKING DEVICES

Joseph E. Prather, Bernardsville, and Ramzi A. Khalifa, Rutherford, both of N.J., assignors to Edson Tool and Manufacturing Company, Inc., Belleville, N.J.

Filed Apr. 13, 1976, Ser. No. 676,509
Int. Cl.² E05C 3/04
U.S. Cl. 292—241 16 Claims



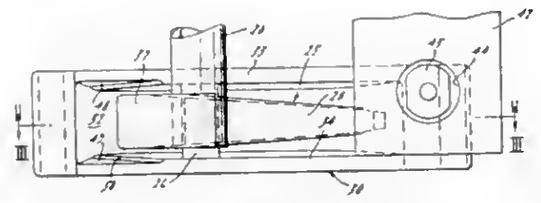
1. A self-locking device for locking a movable structural member to a stationary structural member, or to another movable structural member, or for unlocking the same, comprising: a first structural member; a second structural member which is movable in a first or opening direction; a rotatable self-locking cam; an actuating means capable of rotating said self-locking cam, said rotatable self-locking cam being rotatably mounted on said first structural member; a curved surface on said rotatable self-locking cam, capable of contacting and preventing movement of said second structural member in said first or opening direction; a cam surface on said rotatable self-locking cam, capable of contacting and moving said second structural member in said first or opening direction; an ear on said second structural member, said actuating means being capable of rotating said rotatable self-locking cam in an angular direction, whereby said cam surface on aid rotatable self-locking cam contacts said ear on said second structural membr to forcibly move said second structural member in said first or opening direction, while said curved surface on said rotatable self-locking cam is being simultaneously moved out of the way of said second structural member due to the angular rotation of said rotatable self-locking cam, to permit the movement of said second structural member in said first of opening direction to move and to unlock said second structural member from said first structural member; angular rotation limiting means having surfaces located from about 120° to about 270° and being on said first structural member to limit the angular rotation of said rotatable self-locking cam within a prescribed degree of angularity, said surfaces being located such that said rotatable self-locking cam is always in an operative position when in its open position for selfclosing and locking of said self-locking device, and then, said ear on said second structural member subsequently becoming an actuating means during the closing and locking of said second structural member to said first structural member and being capable of rotating said rotatable self-locking cam in an angular direction opposite to that of said first angular direction, whereby said second structural member returns to its original closed and locked position, wherein it is prevented from movement in said first or opening direction by said curved surface on said rotatble self-locking cam.

4,029,349

DOOR HARDWARE

Adam D. Sweda, Rochester, and Donald M. Wilde, Mount Clemens, both of Mich., assignors to Fruehauf Corporation, Detroit, Mich.

Continuation of Ser. No. 566,244, April 9, 1975, abandoned.
This application Mar. 22, 1976, Ser. No. 668,785
Int. Cl.² E05C 3/14
U.S. Cl. 292—241 7 Claims



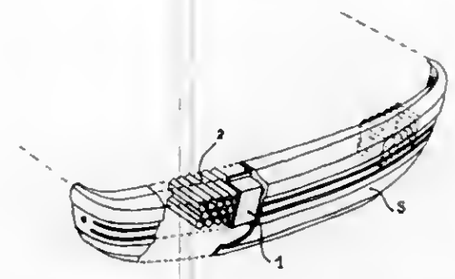
1. Combined fastening and aligning means for a closure which is hinged to a frame, comprising a cam portion and a keeper abutment portion, one of said portions being on the closure and the other portion on the frame, the cam portion being in the general shape of a hooked finger, said cam portion having a free end swingable to and from overengaged holding relation to the keeper abutment portion about an axis parallel to the keeper abutment portion and spaced from such free end, and having surfaces transverse to the pivot axis which converge toward said free end so that said cam portion tapers to reduced thickness toward such free end, a keeper pocket-defining portion having a pair of spaced walls defining reaction portions fixedly appurtenant to the keeper abutment portion and spaced from each other a distance which is not materially greater than the maximum thickness of the cam portion in a direction longitudinally of said axis, said reaction portions being located on one side of said keeper abutment portion and defining an entrance area therebetween, the free end of the cam portion being movable into and out of the entrance area between said walls, whereby one or the other of said surfaces of the cam portion is engageable with one of said reaction portions during the initial part of its inward movement in event of misalignment between the closure and frame, to cam the closure toward realignment with the frame, characterized in that the parts of said surfaces of the cam portion and of said reaction portions which initially engage each other, as the cam portion moves into interposed relation between said reaction portions, extend away from the positions of initial engagement in different non-parallel planes, whereby such initial engagement therebetween is substantially limited to point contact, said walls having continuation portions formed as extensions of said reaction portions and located on the opposite side of said keeper abutment portion from said entrance area, the continuation portions also being spaced apart a distance which is not materially greater than the maximum thickness of the cam portion and lying substantially parallel to the closest surfaces of the cam portion when the cam portion is fully overengaged with the keeper abutment portion.

4,029,350

ENERGY ABSORBING DEVICE

Marcel Goupy, and Pierre Roubinet, both of Boulogne-Billancourt, France, assignors to Regie Nationale des Usines Renault and Automobiles Peugeot, both of Paris, France

Filed Mar. 4, 1975, Ser. No. 555,106
Claims priority, application France, Mar. 5, 1974, 74.07434
Int. Cl.² B60R 19/04
U.S. Cl. 293—71 R 5 Claims



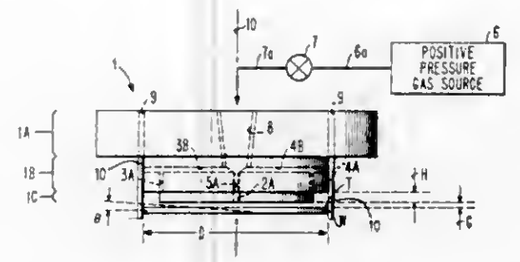
1. An energy absorbing device for use as a composite bumper on a vehicle comprising, in combination, a deformable unit including at least two energy absorbing members, each energy absorbing member formed by the juxtaposition of a plurality of elongated hollow members, said elongated hollow members having parallel longitudinal axes, and a partition extending transversely and perpendicular to the longitudinal axes of said elongated hollow members and located in a selected axial position with respect to said longitudinal axes for connecting said members together, wherein said partition is disposed in a selected axial position intermediate the ends of said deformable unit, an energy absorbing beam supported by said energy absorbing members wherein said elongated hollow members are substantially perpendicular to said energy absorbing beam, and a flexible shield disposed in wrapping relationship with at least a portion of said beam and deformable unit.

4,029,351

BERNOULLI PICKUP HEAD WITH SELF-RESTORING ANTI-TILT IMPROVEMENT

Donald Harlem Apgar, Binghamton, and Richard Fleming Kilburn, Vestal, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 2, 1976, Ser. No. 692,068
Int. Cl.² B66C 1/02
U.S. Cl. 294—64 B 10 Claims



1. Pickup apparatus of the Bernoulli type for lifting an article for support thereby, said article having a predetermined planar surface, said apparatus comprising:

a pickup head,

central main orifice means disposed on said pickup head and adapted to be coupled to a positive pressure gas supply, said main orifice means providing a gas flow discharge therefrom towards said predetermined planar surface for effecting the lifting and support of said article, and

at least three auxiliary orifice means disposed on said pickup head in a predetermined symmetrical manner about said main orifice means and adapted to be coupled to a positive pressure gas supply, said auxiliary orifice means providing gas flow discharges therefrom towards said predetermined surface for effecting a restoring torque to said article whenever said planar surface becomes tilted in any direction with respect to said pickup head.

4,029,352

FOLDABLE HAND RAIL

Lee T. Evans, Canon City, Colo., assignor to Lee T. Evans and Luella Evans, both of Canon City, Colo.

Filed Apr. 7, 1976, Ser. No. 674,617
Int. Cl.² B60B 3/36; E04H 17/14
U.S. Cl. 296—23 R 6 Claims

1. A foldable hand rail assembly to be placed alongside the side entrance of a camper trailer and comprising, in combination therewith:

a. a first bracket affixed to the side wall of the trailer alongside the trailer entrance and at a suitable height above the floor of the trailer for holding the top end of a hand rail;

b. a hand rail pivotally mounted upon said first bracket to hang therefrom alongside the trailer wall whenever it is retracted, but to swing outwardly therefrom whenever it is extended;

c. a second bracket affixed to the side wall of the trailer below the first mentioned bracket at a height near the floor of the trailer; and

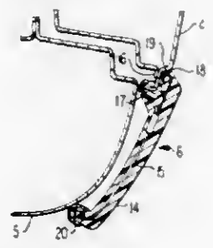
d. a strut below the hand rail pivotally connected to said second bracket to upstand alongside the trailer wall when it is retracted and to swing outwardly therefrom to engage and support the hand rail at its extended position.

4,029,353

MOTOR VEHICLE, ESPECIALLY PASSENGER MOTOR VEHICLE WITH AT LEAST ONE DOOR ON EACH SIDE

Béla Barényl, Maichingen; Heinrich Haselmann, Sindelfingen, and Egon Rieth, Boblingen, all of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed Mar. 26, 1975, Ser. No. 562,096
Claims priority, application Germany, Mar. 30, 1974, 2415534
Int. Cl.² B60J 5/04
U.S. Cl. 296—28 R 11 Claims



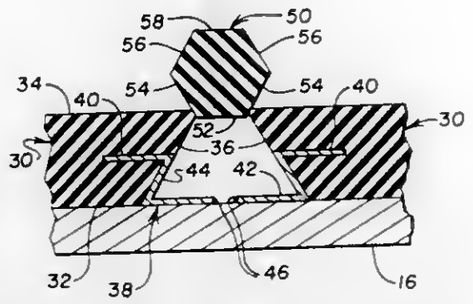
1. A motor vehicle with at least one door on each vehicle side, a door opening for receiving each door, a longitudinal bearer means delimiting a bottom of each door opening, characterized in that a shield means is provided at each door, said shield means with a closed door covers the longitudinal bearer means at least in its upper area and abuts with its edges at the longitudinal bearer means, the shield means is pivotally mounted at a lower edge of each door, and in that said shield means is stressed with a spring force in the direction toward the longitudinal bearer means.

4,029,354

PROTECTIVE STRIP OVERLAY FOR TRUCK BOXES

William J. Valeri, Hibbing, Minn., assignor to Irathane Systems Incorporated, Hibbing, Minn.

Filed Jan. 21, 1976, Ser. No. 651,063
Int. Cl.² B62D 33/00
U.S. Cl. 296—28 D 15 Claims



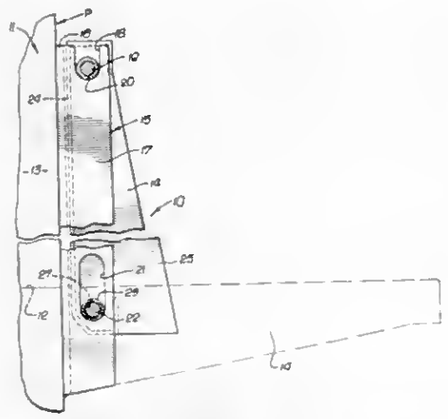
1. A protective overlay system for a metal truck box comprising a plurality of blocks of impact-resistant material having one face confronting the truck box surface to be protected, adjacent blocks being laterally spaced so as to provide an elongated slot therebetween, and anchor means for each block having a first portion thereof secured to its block and a second portion extending from its said block, said second portions of adjacent anchor means being laterally spaced and said second portions being welded to the surface to be protected, said slot in each instance providing access to said surface in order to permit the welding of said laterally spaced second portions.

4,029,355

TRUCK BODY TAIL GATE

Irven R. Wilhelmsen, 6359 Dominica St., Cypress, Calif. 90630

Filed Sept. 29, 1975, Ser. No. 617,424
Int. Cl.² B62D 25/00
U.S. Cl. 296—57 R 2 Claims



1. In a tail gate structure adapted to be applied as a unit exclusively to a transverse vertical plane provided by the rear end faces of the side walls of the bed of a truck service body, the combination of:

a pair of vertical right angle sheet metal brackets having primary aligned webs extending inwardly and secured by welding means to said side wall end faces and having parallel secondary webs extending rearwardly from outer edges of said primary webs, said secondary webs having a pair of aligned notches in their upper ends and a pair of aligned slots near their lower ends;

a rectangular tail gate formed of sheet metal to fit between said secondary webs and having upwardly tapered parallel sheet metal flanges welded to its opposite ends, the latter flanges being bolt-hole apertured opposite said notches and slots; and

two pair of bolts with spacing sleeves, said bolts penetrating said apertures with said sleeves extending through and occupying said notches and slots in said secondary webs,

said tail gate being supported vertically by said bolts, the upper bolts being liftable from said notches to permit the tail gate being swung downward into horizontal rearward extension of said truck bed, the tail gate being supported in its lower horizontal position by said lower pair of bolts and by the wide lower ends of said tapered end flanges abutting flush against lower end portions of said vertical primary bracket webs.

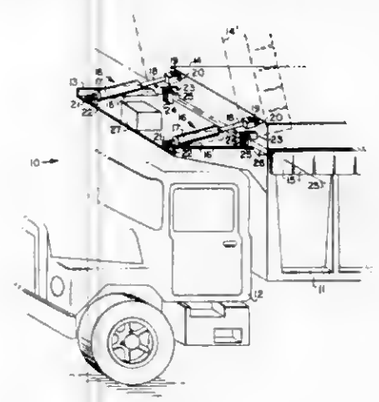
4,029,356

TRUCK BODY CLOSURE

Norris R. Hoch, Largo, Fla., assignor to Jeff-Ko Manufacturing Co., Inc., Milwaukee, Wis.

Division of Ser. No. 454,728, March 25, 1974, Pat. No. 3,913,969. This application Oct. 16, 1975, Ser. No. 622,885
Int. Cl.² B60P 7/02
U.S. Cl. 296—137 B 1 Claim

1. In a method of opening a closure which extends laterally when closed and upwardly when open and in which hydraulic fluid under pressure is supplied to hydraulic means to open the closure, the step of adjusting said pressure to a value such that the pressure is insufficient to open said closure if the weight of a human being is provided as a substantial downward force



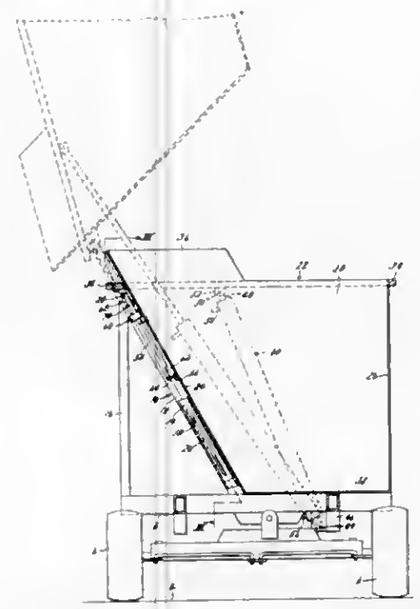
extraneous to the weight of the closure as a safety measure to prevent damage to said human being.

4,029,357

STRUT EXTENSION LOCK FOR DUMP TRUCKS

Jerald W. Bishop, Osborne, Kans., assignor to Gilmore-Tatge Manufacturing Co., Inc., Clay Center, Kans.

Filed Oct. 28, 1975, Ser. No. 626,249
Int. Cl.² B60P 1/34
U.S. Cl. 298—11 3 Claims



1. In combination with a dump truck including a wheeled bed, slidably extensible struts having a limited degree of extensibility fixed to said bed and extending upwardly therefrom, each of said struts including two slidably telescoped sections, a dump bucket normally resting on said bed and pivoted along one of its upper edges on a horizontal axis to the upper ends of said struts, and power means operable to exert an upward force on said bucket intermediate the vertical planes of its pivotal axis and its center of gravity, whereby said bucket is first elevated in an upright position to the limit of the extensibility of said struts, and then tilted about its pivotal axis to a dump position wherein its weight causes a reversal of the tensile load on said struts to a compressive load, a strut extension lock operable to prevent retraction of said struts under said compressive load, said lock comprising:

a. a locking bar pivoted to one of the sections of said strut on a transverse axis and extending longitudinally of said strut to coextend with a portion of the other section of said strut, a tubular keeper affixed to said other strut section, said locking bar extending slidably through said keeper, said locking bar having a notch formed in a longitudinal edge thereof, said notch being positioned to be brought within said keeper only when said strut is fully extended, and resilient means urging said locking bar pivotally in a direction to move a shoulder of said bar notch into abutting alignment with the end of said keeper facing said one strut section, whereby to lock said strut against longitudinal retraction, and

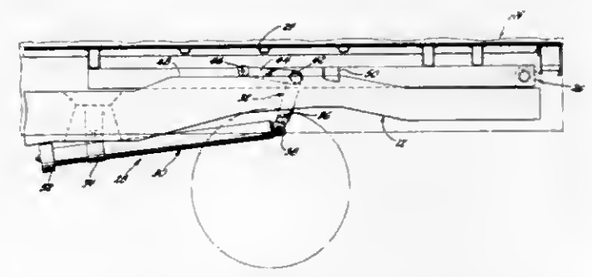
b. control means operable selectively to engage and disengage said extension lock, said control means being operable selectively to restrain said locking bar to a position coaxial with said keeper, against the pressure of said resilient means, or to release said locking bar for movement by said resilient means.

4,029,358

REAR DUMP OPERATING MECHANISM

Paul F. Bergdolt, Frankenmuth, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed July 29, 1976, Ser. No. 709,785
Int. Cl.² B60P 1/28
U.S. Cl. 298—19 B 3 Claims



1. In combination with a vehicle having a frame supporting a dump body for pivotal movement about a transverse horizontal axis, an operating mechanism for pivoting the dump body about said transverse axis between a lowered position and a fully raised position, said operating mechanism including a bell crank member having a pair of arms, means connecting said bell crank member to said dump body for pivotal movement about an axis parallel to said transverse horizontal axis, a track fixed to said frame and extending longitudinally thereof, one arm of said bell crank member adapted to move along said track, a linear drive transmitting means supported adjacent one end thereof by said frame and pivotally connected at the other end to the other of said arms, and a motor drivingly connected to said linear drive transmitting means, the arrangement being such that when the dump body is in the lowered position actuation of the motor causes the bell crank member to be rotated about its support means so that said one arm moves along the track and causes the dump body to be raised to a partially raised position after which said other of said arms contacts the underside of the dump body to complete the raising of the dump body to the fully raised position.

4,029,359

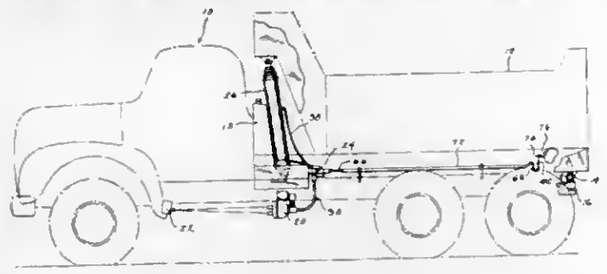
SAFETY APPARATUS FOR HYDRAULIC VALVES IN DUMP BODY MECHANISMS

Norman J. Glomski, Milwaukee, Wis., assignor to The Heil Co., Milwaukee, Wis.

Filed Apr. 30, 1975, Ser. No. 572,989
Int. Cl.² B60P 1/16
U.S. Cl. 298—22 C 9 Claims

1. In a dump body mechanism having a tiltable dump body and having means including a hydraulic cylinder for raising and lowering the body, there being a hydraulic circuit for said cylinder including an hydraulic pump and a return line, and there being a valve in said circuit for controlling the flow of hydraulic fluid into and out of said hydraulic cylinder, said valve including a housing and shiftable control member having a raise position in which hydraulic fluid is routed from said

pump to said hydraulic cylinder to operate the cylinder to raise the dump body, and having a neutral position in which hydraulic fluid is bypassed around said hydraulic cylinder to hold the body in a raised position, there being means in said circuit permitting said raising and the holding in raised position, and said shiftable control member having a lower position in which hyraulic fluid is routed from said hydraulic cylinder to said return line to operate said hydraulic cylinder to lower the dump body, there being means for selective shifting of said control member, and there being a flexible



force transmitting member connected between said tiltable dump body and said movable valve control member to automatically shift the valve control member from its raise position to its neutral position when said dump body approaches its uppermost position, the improvement comprising relatively movable means connected to said valve control member said valve housing, and to said force transmitting member for preventing an inadvertent pull on said force transmitting member from being transmitted to the valve control member when the latter is in neutral position to prevent accidental lowering of said dump body.

4,029,360

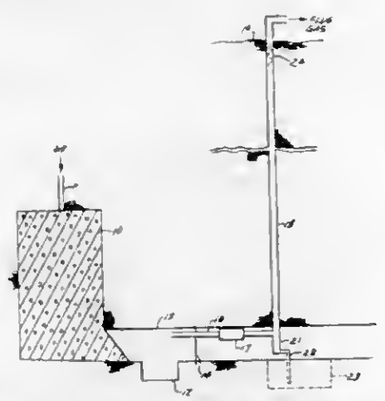
METHOD OF RECOVERING OIL AND WATER FROM IN SITU OIL SHALE RETORT FLUE GAS

Gordon B. French, Rifle, Colo., assignor to Occidental Oil Shale, Inc., Grand Junction, Colo.

Continuation of Ser. No. 492,598, July 26, 1974, abandoned. This application Apr. 2, 1976, Ser. No. 672,874

Int. Cl.² E21C 41/10; E21B 43/00

U.S. Cl. 299—2 5 Claims



1. A method of reducing the water content of flue gas from an underground in situ oil shale retort in a subterranean formation containing oil shale comprising the steps of:

collecting flue gas from an underground in situ retort, said flue gas having water vaporized therein;

passing the flue gas through an elongated conduit extending through at least one subterranean rock formation in heat transfer relationship with at least one such rock formation for a sufficient distance to lower the flue gas temperature to a temperature of less than the dew point of the collected flue gas for condensing water from the flue gas, at least a portion of such a rock formation having a temperature at the conduit of less than the dew point of said flue gas; and

recovering water condensed from the flue gas from the elongated conduit.

4,029,361

LONGWALL MINING ROOF SUPPORT FOR DOUBLE DECK MACHINES

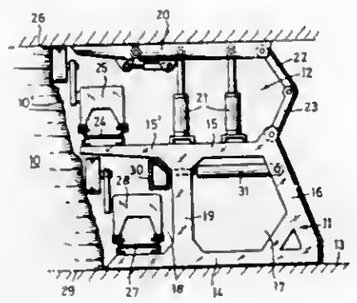
Klaus Beckmann, and Heinrich Behr, both of Lunen, Germany, assignors to Gewerkschaft Eisenhutte Westfalia, Wethmar near Lunen, Germany

Filed Mar. 4, 1976, Ser. No. 663,647

Claims priority, application Germany, Mar. 6, 1975, 2509810

Int. Cl.² E21D 15/44

U.S. Cl. 299—31 14 Claims



1. A mineral mining installation for use with a thick-seam mineral face; said installation comprising a plurality of support units each having a rigid underframe with a floor part resting on the floor of the working, a roof part and rear and intermediate structures interconnecting the roof and floor parts to define an access chamber between the roof and floor parts remote from the mineral face and a winning chamber adjacent the mineral face, the roof part extending at least over the entire area of the access chamber, and each support unit having an upper frame constituted by hydraulic props supported on the roof part of the underframe and carrying a roof girder engageable with the roof of the mine working, wherein means are provided for supporting and guiding a winning device in both the winning chamber and the face side region of the upper frame.

4,029,362

ARRANGEMENT FOR HYDRAULICALLY CONVEYING SOLIDS

Werner Kortenbusch, Lunen, Germany, assignor to Ruhrkohle AG, Essen, Germany

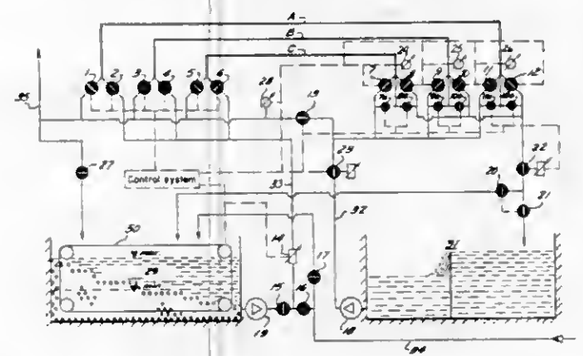
Filed Dec. 8, 1975, Ser. No. 638,563

Claims priority, application Germany, Dec. 7, 1974, 2457943

Int. Cl.² B65G 53/30

U.S. Cl. 302—14 11 Claims

1. In an arrangement for hydraulically conveying solids, especially coarse solids, which includes a plurality of chambers which are to be sequentially charged with solids-containing slurry at low pressure and from which slurry is to be sequentially discharged at high pressure into a discharge conduit by a pressurized hydraulic fluid, a plurality of supply conduits which conduct the slurry and the pressurized hydraulic fluid from respective sources thereof toward said chambers, a plurality of valves which are movable between respective open positions for establishing and closed positions for interrupting flow of the slurry and of the pressurized hydraulic fluid into and out of the respective chambers, and means for moving said valves between said closed and open positions thereof, the improvement comprising means for equalizing the pressures in said chambers with those in said supply conduits; and means for sequentially controlling the operation of said pressure-equalizing means and of said moving means of said valves to simultaneously charge at least one of said chambers with low-pressure slurry and discharge high-pressure slurry from at least one other chamber into said discharge conduit, including means for sensing the conditions prevailing at least in some of



said supply and discharge conduits and for generating signals representative of such sensed conditions, and means for sequentially actuating first said pressure equalizing means and then said moving means of said valves in dependence on said signals.

4,029,363

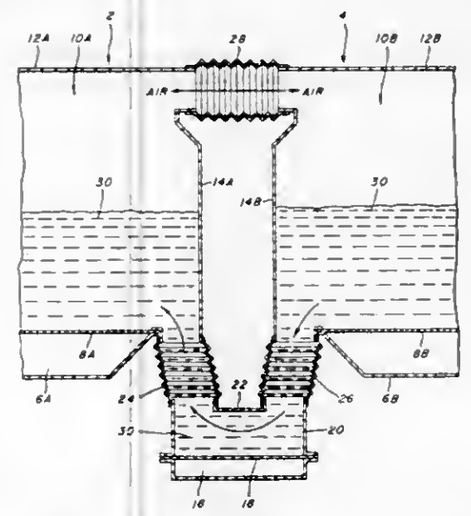
FLEXIBLE JUNCTION IN A SYSTEM FOR FLUIDIZING GRANULAR MATERIALS

Richard L. Lowe, Glenshaw, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Aug. 5, 1976, Ser. No. 711,955

Int. Cl.² B65G 53/52, 53/20

U.S. Cl. 302—29 6 Claims



1. In a system for fluidizing granular materials including primary enclosures having permeable floors therein and means for supplying a fluidizing medium upwardly through said floors, a flexible junction connecting said primary enclosures comprising:

a secondary enclosure spaced between and at a lower elevation than the primary enclosures, having a permeable floor and means for supplying a fluidizing medium upwardly through the permeable floor; and

juxtaposed flexible tubes connecting the secondary enclosure with each of the primary enclosures, the connection with the primary enclosures located contiguous to the end of the permeable floor in each primary enclosure.

4,029,364

DEVICE FOR LOADING AIR WITH A CONTROLLABLE AMOUNT OF A GRANULAR OR POWDERY MATERIAL

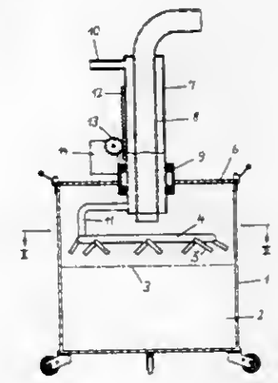
Roman Saizer, Inzersdorf, Austria, assignor to Interliz Anstalt, Vaduz, Liechtenstein

Filed Sept. 5, 1975, Ser. No. 610,907

Claims priority, application Austria, July 7, 1975, 95233/75

Int. Cl.² B65G 53/16

U.S. Cl. 302—34 3 Claims



1. A device for loading a stream of air with a controllable amount of granular or powdery material comprising a container having a cover, said material being disposed in said container with a free space being provided between the upper surface of said material and said cover, an annular conduit disposed in a general plane which is substantially horizontally disposed, said annular conduit being spaced from the wall of the container and having a plurality of nozzles disposed in said free space, said nozzles extending approximately tangentially relative to said annular conduit, a double tube means vertically and slidably mounted on said cover, sealing means slidably sealing said double tube means on said cover, driving means for raising and lowering said double tube means, said double tube means comprising a pair of tubes, one of said tubes carrying said annular conduit, a connection connecting said one tube to a source of compressed air for supplying compressed air to said annular conduit, the other tube having a lower end disposed within said free space in said container, said lower end of said other tube being disposed substantially aligned with the center of said annular conduit and at a level substantially at the general plane of said annular conduit to receive air laden with said material which has been blown and churned-up by the compressed air discharged into said container by said nozzles on said annular conduit.

4,029,365

METHOD FOR FEEDING POWDERED MATERIAL

Norbert Ahrens, Oelde; Heinrich Klockenbusch, Ahlen; Horst Ritzmann, Enniger; Hans Klein, Beckum; Gerhard Balzau, Neubeckum, and Clemens Schnuckel, Stromberg, all of Germany, assignors to Polysius AG, Neubeckum, Germany

Filed Dec. 22, 1975, Ser. No. 643,097

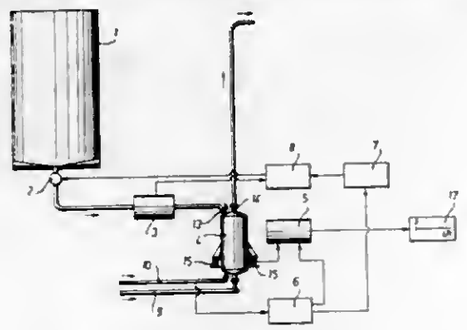
Claims priority, application Germany, Dec. 27, 1974, 2461579

Int. Cl.² B65G 53/66

U.S. Cl. 302—35 1 Claim

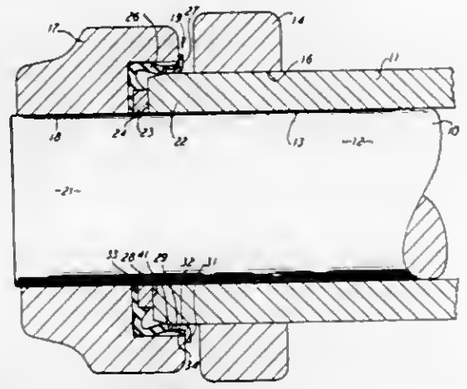
1. A method of controlling continuously the output of powder material from a vertical, pneumatic conveyor having a material inlet, a material outlet, and a porous base, said method comprising introducing material from a container therefor to said conveyor via said inlet at a predetermined initial rate; establishing a discharge gas stream between said base and said outlet for discharging material from said conveyor; introducing a fluidizing gas under pressure independently of paid discharge gas to said base for loosening material

thereon; continuously measuring the pressure of said fluidizing gas; and increasing and decreasing the rate of introduction



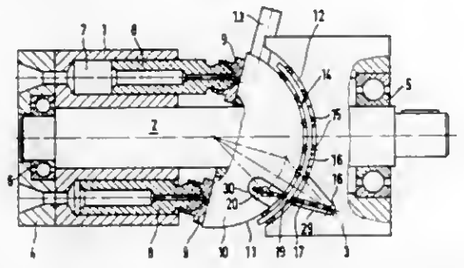
of material to said conveyor according to decreases and increases, respectively, in the pressure of said fluidizing gas.

4,029,366
SEALED TRACK CHAIN JOINT
John Merlin Baylor, Bettendorf, Iowa, assignor to J. I. Case Company, Racine, Wis.
Filed June 24, 1976, Ser. No. 699,259
Int. Cl.² B62D 55/20; F16J 15/34
U.S. Cl. 305—11 9 Claims



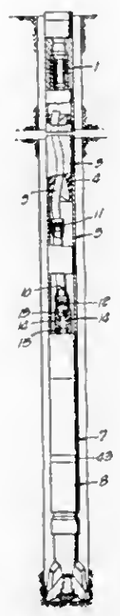
1. A sealed track chain joint comprising a track pin, a cylindrical bushing extending over the intermediate length of said pin and being rotatable thereon and with said pin having its axial end extending beyond the axial end surface of said bushing, a chain link member on said pin axial end spaced from said bushing end surface, a chain link member on the axial end of said bushing and spaced from said end surface whereby said chain link members are disposed to be spaced apart on opposite sides of the plane of said bushing end surface, a washer on said pin and disposed between said end surface and said link member on said pin and being in sealing relation with said pin, and a seal including an elastomeric member attached to said washer and extending therefrom and across the plane of said bushing end surface and to the outer diameter of said bushing and being in sealing relation with said washer and said bushing for presenting an elastomeric seal for said intermediate length of said pin and said bushing.

4,029,367
BEARING SUPPORTING A SWASHPLATE OF A HYDRAULIC AXIAL CYLINDER MACHINE
Franz-Josef Schwede, and Ingo Valentin, both of Ulm, (Danube), Germany, assignors to Hydromatic GmbH, Germany
Filed Apr. 21, 1976, Ser. No. 679,052
Claims priority, application Germany, May 13, 1975, 2521312
Int. Cl.² F16C 7/00
U.S. Cl. 308—2 R 6 Claims



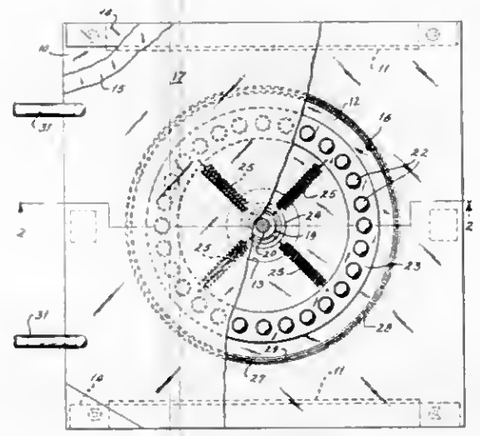
1. In a hydraulic axial cylinder machine of the kind having a concave cylindrical bearing face in the machine casing, a corresponding convex cylindrical bearing face on the swashplate, and an arcuate bearing cage with rolling contact bearing elements contained within the cage and disposed in the space between said concave and convex bearing faces, the improvement comprising, follow-up guide means for positively displacing the bearing cage to a theoretically correct position on each change of tilt of the swashplate, said guide means comprising a rod, a first pivotal connection between the rod and the swashplate, a second pivotal connection between the rod and the casing, and wherein the rod is linked to the bearing cage so that the bearing cage is always urged into a position on the line connecting the first and second pivotal connections.

4,029,368
RADIAL BEARINGS
John E. Tschirky, Long Beach, and Gary Monroe Crase, Cypress, both of Calif., assignors to Smith International, Inc., Newport Beach, Calif.
Continuation-in-part of Ser. No. 388,586, Aug. 15, 1973, Pat. No. 3,879,094. This application Jan. 27, 1975, Ser. No. 544,143
Int. Cl.² F16C 19/00
U.S. Cl. 308—8.2 20 Claims



1. In combination, a housing member, a shaft member, a radial bearing mounted between the housing member and the shaft member, said radial bearing including a sleeve member comprising matrix bonded hard particles, a complementary bearing member comprising matrix bonded hard particles mounted in said bearing in bearing relationship with said sleeve, passageways extending through one of said members.

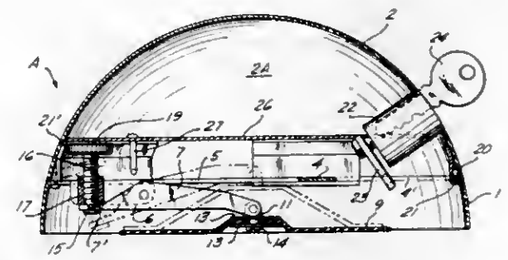
4,029,369
TURN PLATE DIRT SEAL
Lee Hunter, Ladue, and Joseph J. Jasso, St. Louis, both of Mo., assignors to Hunter Engineering Company, Bridgeton, Mo.
Filed Apr. 5, 1976, Ser. No. 673,416
Int. Cl.² B60B 35/00
U.S. Cl. 308—36.1 4 Claims



1. A turn plate supporting a vehicle wheel requiring turning in place, said turn plate comprising a flat base plate formed with a bearing race on its upwardly presented surface area surrounding a central opening, an anchor post movable relative to said base and projecting upwardly in said central opening in said bearing race, bearing means surrounding said post and supported on said bearing race for orbital movement about said post, means connecting said bearing means and post and restraining said bearing means to limited orbital movement on said bearing race, a top plate having an upper surface and a bearing race on its downwardly presented surface, said top plate being connected to said anchor post in position to be engaged by the vehicle wheel on its upper surface and with its downwardly presented race engaged on said bearing means, said bearing means holding said base and top plates in spaced relation, and dirt seal means engaged by and disposed between said bearing races and surrounding said bearing means to exclude dirt from an area of said bearing races witnin which said bearing means has its limited orbital movement.

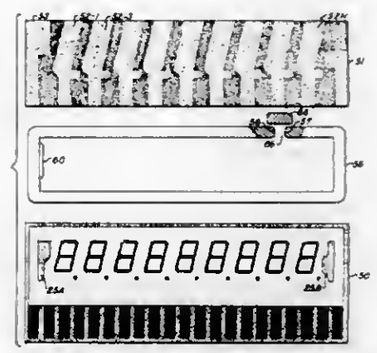
4,029,370
PORTABLE SAFE
Olivier Ziegel, and Liliane Ziegel, both of 66, Boulevard Malesherbes, 75008 Paris, France
Filed Sept. 26, 1975, Ser. No. 617,183
Claims priority, application France, Oct. 2, 1974, 74.33167; July 25, 1975, 75.23289
Int. Cl.² A47B 97/00; F16B 47/00; E05G 1/04
U.S. Cl. 312—284 14 Claims

1. A portable safe comprising, a base, a suction mounted in said base and having a suction surface directed outwardly from the base for engagement with a smooth support surface for securing the base to said smooth support surface, a cover for said base, said cover and base having cooperating means for removably securing the cover to the base, and cooperating to define a chamber within said safe, lock means for locking the cover to the base, and means mounted entirely within said chamber in the confines of said base and accessible only upon removal of said cover for selectively displacing the center of the suction cup inwardly of the base thereby to stretch the



suction cup and produce a strong gripping force on the support surface.

4,029,371
METHOD OF MANUFACTURING GAS DISCHARGE DISPLAY PANELS
George A. Kupsky, State College, Pa., assignor to Panel Technology, Inc., Lewistown, Pa.
Continuation of Ser. No. 513,803, Oct. 10, 1974, abandoned. This application July 23, 1976, Ser. No. 708,157
Int. Cl.² H01J 9/385, 9/395
U.S. Cl. 316—19 2 Claims



1. A batch process for making a plurality of gas discharge information display panels in each of which a pair of rigid flat plates define parallel flat boundaries each flat plate having electrodes thereon between which information to be displayed is generated by plural discrete gas discharges between selectively energized electrodes on said flat plates, said information display panels being sealed in groups by

A. applying a heat fusible glass frit in a pattern defining a lateral perimeter boundary of the gas chamber to one of said flat plates, a space being left in said glass frit pattern forming a vacuumization and gas fill port,

B. aligning said flat plates in an unfused assembly with the electrodes on the respective plates opposite each other in their desired information display positions, respectively,

C. heating said aligned electrode substrates to a temperature to fuse said heat fusible glass frit and join said flat plates in assembly with said gas fill port remaining open,

D. with said port in an up position relative to said gas chamber positioning a fusible plug between said pair of flat plate members and bridging said vacuumization and said gas fill port,

E. stacking together in a tray a plurality of assembled pairs of flat plates as formed by steps A-D with said gas fill port up and said fusible plug in place thereat,

F. simultaneously treating all the display panels in the stack by vacuumizing and gas filling the chambers via the respective ports thereof,

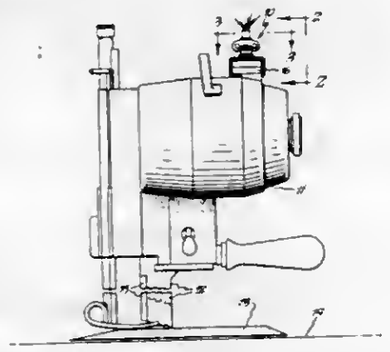
G. and then simultaneously fusing said fusible plug to said pair of flat plates and glass frit pattern bounding said port to seal the gas in each said gas chamber respectively of each flat gas discharge information display panel.

4,029,372

GROUNDING ATTACHMENT PLUG AND TERMINAL BLOCK ASSEMBLY FOR CLOTH CUTTING MACHINE

Frederick G. Clark, Naples, Fla., assignor to Eastman Machine Company, Buffalo, N.Y.

Filed Aug. 24, 1976, Ser. No. 717,282
Int. Cl.² H01R 3/06
U.S. Cl. 339—14 R 11 Claims



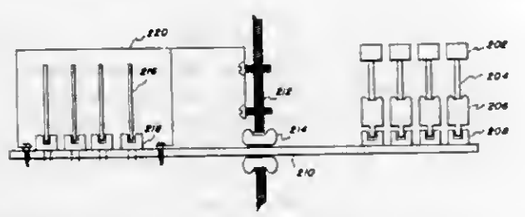
1. A combined prong shield and grounding construction for an electrical plug associated with a metal motor housing comprising a first plug section having longitudinal prong means extending therefrom, a metal prong shield including a tab, screw means extending through said tab and said first plug section and into said metal motor housing, said prong shield including a protective shell surrounding said longitudinal prong means and spaced therefrom, a second plug section, receptacle means in said second plug section for receiving said longitudinal prong means with a sliding fit, said second plug section having an outer configuration for being received in said protective shell, a grounding connection on said second plug section, a grounding post in electrical contact with said grounding connection, said grounding post extending in a direction substantially perpendicularly to said longitudinal prongs, clamp means mounted on said grounding post, slot means in said protective shell, said slot means being substantially parallel to said longitudinal prong means for receiving said post means when said receptacle means are slid over said prong means, spring means biasing said clamp means toward said second plug section and into engagement with said shell incidental to the entry of said post means into said slot means, whereby grounding is effected automatically upon connecting of said first and second plug sections.

4,029,373

MEANS FOR WIRING INTO A SEALED ENCLOSURE

Gleo D. Jones, Orange, and Michael J. Raffetto, Palos Verdes Peninsula, both of Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Aug. 3, 1973, Ser. No. 385,356
Int. Cl.² H05K 1/02
U.S. Cl. 339—17 R 6 Claims



1. Apparatus for wiring through the wall of a sealed enclosure comprising:

a printed circuit board extending through a slot in said wall, said printed circuit board having a plurality of etched conductors extending from an area of said board inside said enclosure to an area of said board outside said enclosure,

means mounted on said printed circuit board and electrically connected to the ends of said etched conductors for providing electrical connections to said etched conductors, and

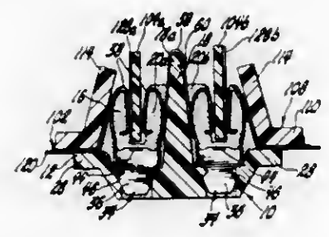
means for sealing the space between said wall and said printed circuit board.

4,029,374

ELECTRICAL CONNECTOR FOR PRINTED CIRCUITS

Charles R. Nestor, Niles, and John A. Yurtin, Southington, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed May 24, 1976, Ser. No. 689,083
Int. Cl.² H05K 1/07
U.S. Cl. 339—17 F 4 Claims



1. An electrical connector for electrically connecting flexible and hardboard printed circuits comprising:

a connector body having a base and a plurality of generally parallel partition walls perpendicularly disposed thereon to define at least one row of terminal receiving cavities,

each of said terminal receiving cavities having a top opening at an end thereof remote from said base and side opening communicating with the top opening,

each partition wall having a slot extending from an end surface thereof toward said base, said slots being aligned and generally perpendicular to said base and together with a central portion of each of said cavities including said top openings forming a slot means for receiving a hardboard printed circuit with different portions thereof disposed in each of said cavities, and

a transition terminal secured in each of a number of said cavities, each said transition terminal comprising a body having a pair of U-shaped arms having remote resilient legs connected to the body in a cantilevered fashion and confronting resilient legs protruding into said central portion of said one cavity for engaging opposite faces of a hardboard printed circuit received in said slot means, each said transition terminal further having one of said remote resilient legs in its free unbiased state extending outwardly of one of said cavities through the side opening thereof and beyond a side surface of said connector body defined by coplanar side end surfaces of said partition walls whereby said transition terminal is adapted for biased engagement with a deflectable flap portion of a flexible printed circuit when said connector body is plugged into a panel aperture.

4,029,375

MINIATURE ELECTRICAL CONNECTOR

Henry Gabrielian, Newport Beach, Calif., assignor to Electronic Engineering Company of California, Santa Ana, Calif.

Filed June 14, 1976, Ser. No. 696,109
Int. Cl.² H05K 1/12
U.S. Cl. 339—17 M 11 Claims

1. An electrical connector, comprising;

a. an insulative housing (1) having plural apertures,

each said aperture having an axial portion of large transverse extent (2)

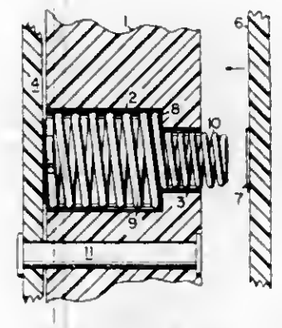
and a lesser axial portion of smaller transverse extent (3),

b. an electrically conductive helical wound resilient element (9,10;) within each said aperture,

each said resilient element having portions of different transverse area extent proportional to the area of portions (2,3) of said apertures in which they are located, resilient over the full axial extent thereof,

and of a slightly lesser transverse extent to allow free axial movement of each portion of said resilient element within a said aperture, the greater transverse area extent of each said resilient element exceeding the smaller transverse extent of the aperture containing said resilient element,

c. a first insulative member (4),



d. means to attach (11) said first insulative member to said housing adjacent to the aperture portions of large transverse extent,

e. said first insulative member having electrically conducting areas (5) contacting at least some of said resilient elements,

f. a second insulative member (6) removably attachable to said housing, and

g. electrically conductive areas (7) upon said second insulative member contacting at least some of said resilient elements,

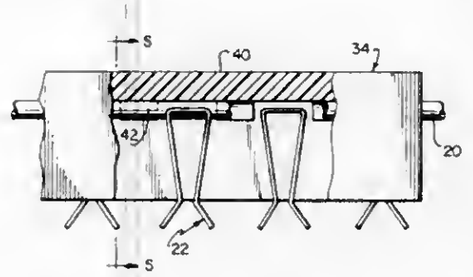
so that attachment of said second insulative member (6) causes each said resilient element to be axially constrained by said first and second insulative members.

4,029,376

BRIDGING CLIP ASSEMBLY AND COVER THEREFOR

Edward E. Headington, Port Monmouth; Albert J. Tutko, Belle Mead, both of N.J., and Robert H. Knickerbocker, Cheshire, Conn., assignors to The Siemon-Dynamic Manufacturing Co., Watertown, Conn.; Bell Telephone Laboratories, Incorporated, Berkeley Heights, N.J. and Western Electric Company, Inc., New York, N.Y.

Filed Oct. 10, 1975, Ser. No. 621,350
Int. Cl.² H01R 31/08
U.S. Cl. 339—19 2 Claims



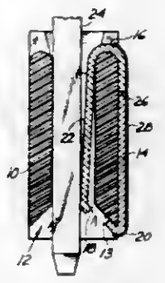
1. A cover for an electrical terminal bridging assembly comprising a base portion and two side portions, said side portions being perpendicular to said base portion thereby defining an elongated member closed on three sides and open on the fourth side opposite said base portion, said base portion containing a plurality of engaging means spaced along the length thereof, each of said engaging means being adapted to mate with and frictionally engage an electrical terminal bridging assembly, each of said engaging means being a triangularly shaped member, the base of the triangle being contiguous with the base of said cover and the apex of the triangle being in the space provided between the sides of the cover, the apex of the triangle having a recess therein which extends substantially to the base of the triangle, the sides of the recess being adapted to frictionally engage an electrical terminal bridging assembly and to provide a snap action which captivates the electrical terminal bridging assembly.

4,029,377

PUSH-ON BUS BAR

Anthony C. Guglielmi, Plainfield, Conn., assignor to Rogers Corporation, Rogers, Conn.

Filed Feb. 3, 1976, Ser. No. 654,846
Int. Cl.² H01R 31/08
U.S. Cl. 339—19 24 Claims



1. An electrical bus connector for interconnecting terminal pins of a linear array comprising:

an elongated housing, said housing being formed from a nonconductive material and being provided with a plurality of passages extending therethrough from oppositely disposed first and second sides thereof, said passages being arranged in a linear array for receiving terminal pins to be interconnected;

at least a first bus conductor, said first conductor having a first portion which is adjacent to a third side of said housing, said third housing side extending between said first and second sides, said first conductor being provided with a first plurality of fingers extending outwardly from a first edge thereof, said first conductor first edge facing the junction of said first and third housing sides and said fingers of said first plurality of fingers being spaced in a pattern defined by the terminal pins to be interconnected and having a width less than the width of said housing passages, said fingers of said first plurality of fingers passing about the junction of said housing first and third sides into preselected of said passages whereby said fingers define spring contacts for establishing electrical connections with the terminal pins extending through housing passages into which said fingers extend; and

mounting means mounting said first conductor on said housing.

4,029,378

ELECTRIFIED CHANNEL WITH CORRESPONDING SNAP ACTING CONNECTOR

Edoardo Bolis, Milan, Italy, assignor to ITT Industries, Inc., New York, N.Y.

Filed Mar. 11, 1976, Ser. No. 665,842
Int. Cl.² H01R 13/60
U.S. Cl. 339—22 B 2 Claims

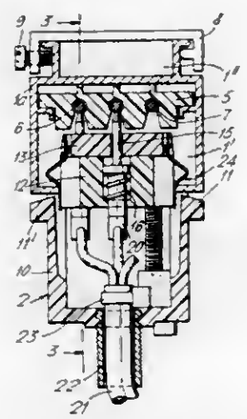
1. An electrified channel and snap acting connector therefor comprising:

a channel having a plurality of conductors mounted side by side in an insulating body within said channel;

said connector having mating contacts resiliently urged against said conductors when said connector is inserted into said channel;

said connector comprising a closing cap, a contact guiding

body having a cover, resilient means for urging said contacts in said guiding body outwardly, a ground screw,



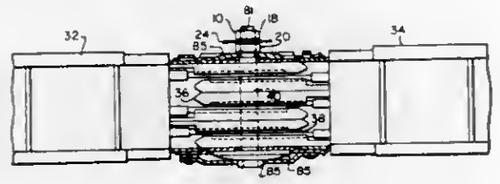
a ground contact spring connected to said ground screw, and a connector body supporting spring on the exterior of said connector body inside said closing cap.

4,029,379

ELECTRICAL BUS DUCT WITH TORQUE INDICATION NUT

James R. Kotala, Aliquippa, and William W. Hamilton, Beaver, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 14, 1973, Ser. No. 397,485
Int. Cl.² F16B *31/00*; **H01R** *13/60*
U.S. Cl. 339—22 B **2 Claims**



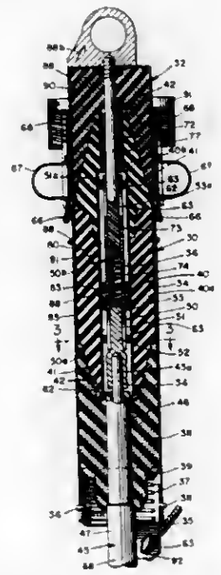
1. A torque indicating nut, comprising:
an engaging portion having an internally threaded opening therein, said engaging portion being engageable with a member having a complementary externally threaded portion thereon, said engaging portion being rotatably movable in threaded engagement with said member to cause force to be applied to an object by said engaging portion;
a driving portion, said drivin portion being rotatably movable, said driving portion having an opening through which said member may protrude, said opening having no internally threaded portion;
a bridging portion having an opening through which said member may protrude, said driving portion communicating with said engaging portion by way of said bridging portion to cause said engaging portion to move into contact with said object during rotation of said driving portion to apply said force to said object, the radial dimensions of said driving portion and said engaging portion being larger than the radial dimension of said bridging portion; and
a relatively flexible indicating member easily observable relative to said driving portion and having an opening therein which is sufficiently large to allow said indicating member to enclose said bridging portion but which is not sufficiently large to allow said indicating member to enclose said driving portion or said engaging portion, said indicating member being a separately manufactured article from said bridging portion, said engaging portion and said driving portion, said indicating member being initially flexed for disposal around said bridging portion and thereafter trapped between said driving portion and said engaging portion, said bridging portion maintaining a spaced relationship between said engaging portion and said driving portion until a predetermined value of said force is applied to said object, which force is related to a predetermined value of torque to which said driving portion is submitted during rotation, said driving portion being disengageable from said engaging portion at said bridging portion after said predetermined value of torque is attained, said indicating member then being freeable from said bridging portion to thereby indicate that said predetermined valve of said torque has been attained.

4,029,380

GROUNDED SURFACE DISTRIBUTION APPARATUS

Edward H. Yonkers, Wilmette, Ill., assignor to Joslyn Mfg. and Supply Co., Chicago, Ill.

Continuation of Ser. No. 660,748, Aug. 15, 1967, abandoned.
This application Jan. 20, 1970, Ser. No. 4,396
Int. Cl. H01r *13/52*
U.S. Cl. 339—60 R **7 Claims**



1. A cable terminal for a high potential grounded sheath cable for underground distribution systems comprising:
a cylindrical conductive grounding housing open at one end;
a hard dielectric filler secured in said housing and having a convex sealing surface projecting in the direction of said open end;
a readily removable conductive grounding cover for said open end conductively engaging said housing;
means for grounding said cover to the grounded sheath of a cable;
a soft dielectric filler in said cover having a concave sealing surface making void-free interfacial engagement with said convex surface; and
compression means positioned between said cover and said soft dielectric filler to maintain said soft dielectric filler under pressure.

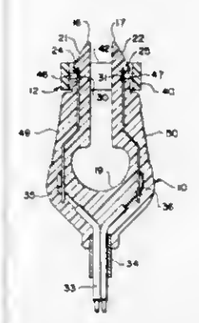
4,029,381

ELECTRICAL CONNECTOR

Mahone T. Tarrall, and Michael D. Patzer, both of Boulder, Colo., assignors to Valleylab, Inc., Boulder, Colo.

Filed Jan. 16, 1976, Ser. No. 649,623
Int. Cl.² H01R *13/62*
U.S. Cl. 339—61 R **5 Claims**

1. An electrical connector combination comprising: a male connector comprising a base portion, at least two substantially parallel resilient prongs extending from the base portion, a notch defined in the outer side portion of each prong, at least one electrical conductor positioned within each prong and exposed at the bottom portion of the notch defined in the prong, and outwardly facing inclined surfaces defined between the terminus of each prong and the notch defined therein, the inclined surfaces extending to the terminus of each prong and being in a diverging relationship from the termini of the prongs to the notches defined in the prongs; a female connector comprising a member having an opening with opposed sidewalls and of a depth greater than the width of the notches in the prongs defined therein and adapted to receive the prongs of the male connector, the width of the opening being greater than the greatest distance between the



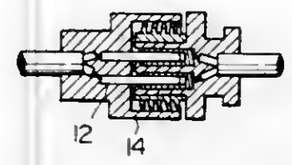
termini of the prongs, and at least one protruding electrical contact narrower than the width of the notches positioned on each internal sidewall of the opening and adapted to bear upon the exposed conductor of the male connector and fit between the sidewalls of a notch when the male connector is situated in the female connector; whereby, the male connector may be inserted into the female connector by elastically deforming the prongs together as the inclined surfaces bear upon the opening in the female connector upon insertion of the prongs into the opening defined in the female connector, and permitting the prongs to expand thereby positioning the male connector by means of the side edges of the notches bearing upon the electrical contacts in the female connector with the exposed conductors in the bottom of the notches also bearing upon the contacts.

4,029,382

WATERTIGHT MEANS FOR ELECTRIC PLUG-RECEPTACLE COUPLING

Yosiharu Kōda, Tokyo, Japan, assignor to Denkosha Co., Ltd., Tokyo, Japan

Filed Nov. 28, 1975, Ser. No. 635,878
Claims priority, application Japan, Dec. 9, 1974, 49-140448
Int. Cl.² H01R *19/60*
U.S. Cl. 339—94 M **4 Claims**



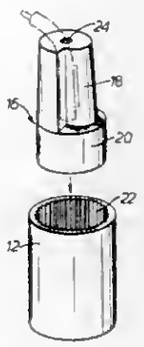
1. A watertight means for an electric plug-receptacle coupling, the electric plug and the receptacle having an axially extending support surface, and the support surfaces facing each other to define therebetween an annular space having a radius and each having an end, the support surface ends being axially spaced from each other, the watertight means consisting of a tubular packing between the support surface ends and secured to one of the support surfaces, the packing comprising a series of more than two flanges extending radially into contact with the other one of the support surfaces and having a radius larger than the radius of the annular space, and all the flanges in contact with the other support surface being arcuately flexed by the other support surface in a direction from the end of the one support surface towards the end of the other support surface.

4,029,383

ELECTRICAL CONNECTORS

John Patrick Harding, Bushey, and David Sydney Butler, Hassocks, both of England, assignors to The Post Office, London, England

Continuation of Ser. No. 524,985, Nov. 18, 1974, abandoned.
This application May 19, 1976, Ser. No. 687,759
Claims priority, application United Kingdom, Nov. 20, 1973, 53826/73; May 17, 1976, 22037/76
Int. Cl.² H01R *7/06*
U.S. Cl. 339—97 R **7 Claims**



1. An electrical connector comprising:
a body member having an inner wall defining an elongate cylindrical bore of circular cross-section, said bore extending into the body member from an outside surface thereof,
an elongate member located within said body member and surrounded by said inner wall,
a cylindrical boss of circular cross-section corresponding to the bore diameter at one end of said elongate member mating with the inner wall of said body member at a location remote said outside surface,
a tapered shank portion of snail cam cross-section on said elongate member extending from said boss to the other end of said elongate member adjacent said outside surface, the cross-sectional area of said snail cam decreasing progressively towards said other end of said elongate member, and
means to rotate the body member and elongate member relative to each other.

4,029,384

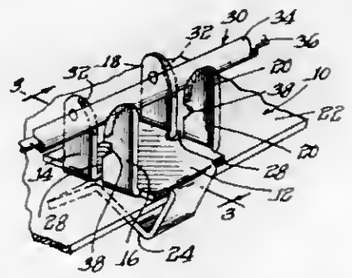
GROUNDING CLIP

Ernest William Reinwall, Jr., McHenry, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Continuation of Ser. No. 542,740, Jan. 20, 1975, abandoned.
This application May 14, 1976, Ser. No. 686,345
Int. Cl.² H01R *9/08*
U.S. Cl. 339—98 **1 Claim**

1. An electrical connector for receiving an insulated electrical conductor having a central conductor and an insulating cover, comprising an electrically conductive plate-like base, two pairs of adjacently positioned blades extending substantially normal to and formed integral with said base, adjacently spaced edges of each pair of said blades defining parallel vertical passageways spaced for receipt of said insulated conductor therebetween and for cutting through said insulation, at least one of each pair of blades being shaped for insertion into a standard spade-type terminal member, the upper edges of each pair of blades converging inwardly toward a respective passageway, said edges being coined to a reduced width to facilitate penetration into said insulating cover of said electri-

cal conductor when said conductor is forced between said flared edges, each said blade being substantially planar and the planes of each pair of blades relatively diverging outwardly from said base resiliently to accommodate oversize electrical conductors and spacing the coined edges to cut through the conductor insulation into engagement with the conductor at axially spaced close-coupled areas predetermined by the divergence of the blades, and a single notch in the edge of one



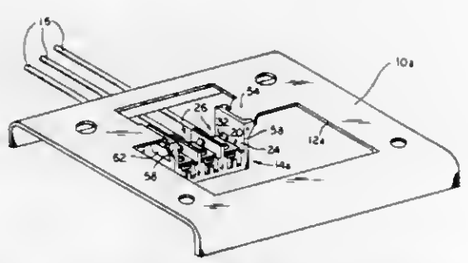
of said blades of each pair thereof, an outer margin of said notch extending inwardly from and perpendicular to the edge of said blade and an inner margin extending obliquely along a segment thereof and opening into said passageway opposite an unnotched central conductor contacting edge of the other blade, said unnotched blade edge and said notch margins providing a three-point wedging engagement for said central conductor.

4,029,385

ELECTRICAL CONNECTOR AND MEANS OF MOUNTING SAME

Eugene J. Mysiak, Cicero, and Allen J. Burry, Prospect Heights, both of Ill., assignors to Molex Incorporated, Lisle, Ill.

Division of Ser. No. 580,558, May 27, 1975, abandoned. This application Apr. 22, 1976, Ser. No. 679,472
Int. Cl.² H02B *1/04*
U.S. Cl. 339—128 **1 Claim**



1. In combination, a panel with an aperture formed therein, a connector housing adapted to be mounted on said panel, and mounting means cooperating between said panel and said housing to mount said housing on said panel, the improvement in said mounting means comprising:

a pair of mounting tabs formed on said panel extending into the aperature toward one another in a plane substantially parallel to the plane of said panel; and

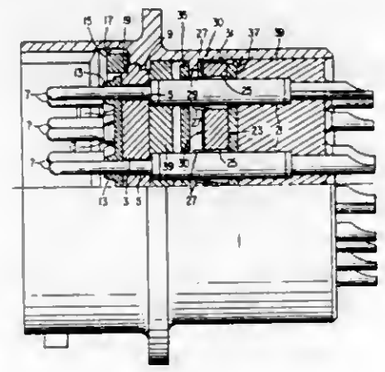
a pair of parallel, spaced apart tab receiving legs formed on said housing, each adapted to mount one of said tabs with said tabs extending perpendicular to said leg, each leg including slot means formed thereon to receive the respective tab, the outer portions of one of said slot means being spaced apart from the outer portions of the other slot means, a distance greater than the distance between the ends of said tabs each slot means having resilient locking means located therein for allowing insertion of the tabs in the respective slot means past said locking means and thereafter blocking withdrawal of said tabs.

4,029,386

CONNECTOR HAVING A PLATED PLASTIC GROUND FOR FILTER CONTACTS

Leonard Albert Krantz, Jr., and Jack Bernard Fort, both of Sidney, N.Y., assignors to The Bendix Corporation, Southfield, Mich.

Filed Feb. 23, 1976, Ser. No. 660,530
Int. Cl.² H01R *13/34*
U.S. Cl. 339—143 R **17 Claims**



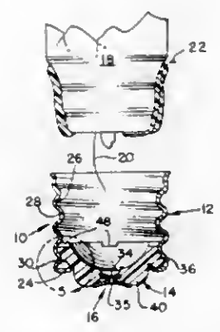
7. A ground element for grounding filters on contact terminals in a connector, comprising a member having apertures therein surrounded by integral spring tines for receiving and engaging the filters on the contact terminals, the member and tines being molded from plastic material and being plated with metal to make it electrically conducting.

4,029,387

ELECTRIC LAMP BASE AND METHOD OF ASSEMBLY

John W. Eager, 51 Dale Drive, Chatham, N.J. 07928

Filed Nov. 24, 1975, Ser. No. 634,354
Int. Cl.² H01J *5/60*
U.S. Cl. 339—146 **7 Claims**



1. A base assembly for electric lamp and the like comprising:

a thin-walled cylindrical shell having an inwardly directed flange at one end and screw threads extending from said one end toward the other end thereof, said flange having an inner edge portion inclined toward the other end of said shell, said threads being formed by inward deformation of the shell wall thereby to establish complementing inner and outer threads in said shell;

a preformed insulator having a threaded rim portion engagable with said inner shell thread, a protruding portion concentric with said rim portion, an annular abutment surface between said protruding and rim portions, the juncture of said protruding portion and said annular abutment surface being formed with an annular groove to receive said inner edge portion of said flange, thereby to capture said edge portion in a manner to bind said insulator against unthreading relative to said shell, and means

for transmitting driving torque to said rim portion on a face thereof opposite from said annular surface; and

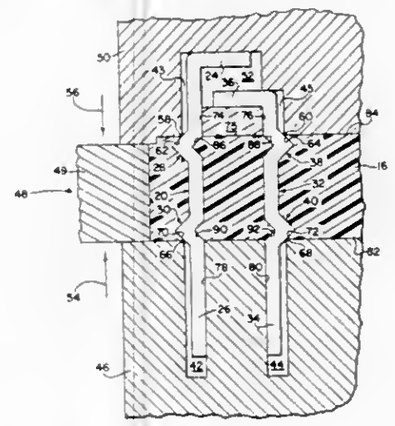
contact means secured to said protruding portion and spaced from shell.

4,029,388

ELECTRICAL TERMINAL CONSTRUCTED TO PREVENT INSERT MOLDING FLASH

Carl G. Knoll, Melrose Park, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Apr. 2, 1976, Ser. No. 673,225
Int. Cl.² H01R *13/40;* **B29D** *3/00*
U.S. Cl. 339—218 R **3 Claims**



1. A base assembly for an electrical switch comprising a support member of molded plastic material and at least one elongated, substantially flat electrical contact terminal which has first and second substantially straight elongated segments which have first and second opposed sides, each of said elongated segments extending from one of a pair of substantially parallel surfaces of said support member in substantially a normal direction to its associated surface, and first and second substantially straight angled segments, each of which makes an angle with respect to one of said elongated segments and which emerges from said associated surface of said support member, wherein said contact terminals are molded into said support member with a reduced amount of flash by an insert-molding process which is achieved with a mold that is constructed to have a corner for each angled segment that is located on said first side of said elongated segment so as to be tightly wedged against said angled segment at the point where said angled segment emerges from its associated surface of said support member during said molding process and an associated elongated substantially flat area which is located on said second side of said elongated segment so as to be firmly forced against said second side of the associated contact terminal during said molding process.

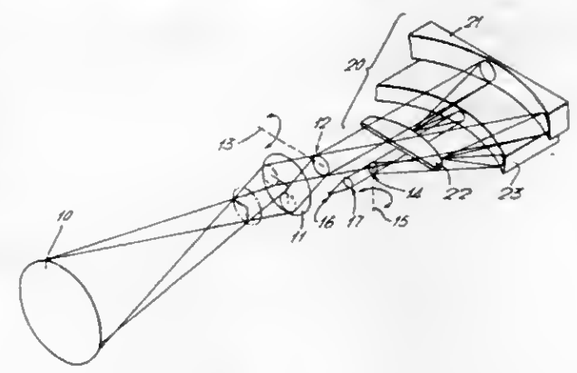
4,029,389

RADIATION SCANNING SYSTEM

Herbert Morrison Runciman, Glasgow, Scotland, assignor to Barr and Stroud Limited, Glasgow, Great Britain

Filed June 9, 1976, Ser. No. 694,484
Claims priority, application United Kingdom, July 26, 1975, 31392/75
Int. Cl.² G02B *27/17*
U.S. Cl. 350—7 **8 Claims**

1. A radiation scanning system comprising a radiation detector located at the focus of an objective lens element and a radiation scanning element arranged to scan radiation emanating from a field of view across said detector, wherein said radiation forms a primary pupil and one of said elements is located at a conjugate pupil formed by an optical assembly comprising first and second concave part-spherical reflectors respectively having their centres of curvature substantially optically co-incident with the locations of the primary pupil and the conjugate pupil, and a convex reflector substantially



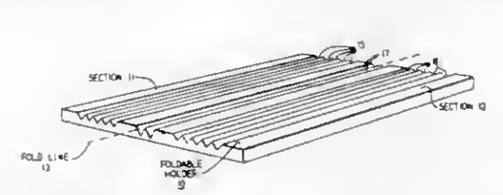
coincident with the locus of the focii formed by parallel beams of radiation emanating from said primary pupil and incident upon the first concave reflector.

4,029,390

OPTICAL FIBER GROUP SPLICING TECHNIQUE AND APPARATUS EMPLOYING UNIQUE FOLDABLE HOLDER

Edwin Leroy Chinnock, Rumson, and Detlef Christoph Gloge, Red Bank, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 23, 1974, Ser. No. 535,302
Int. Cl.² G02B *5/16*
U.S. Cl. 350—96 C **10 Claims**



1. A technique for splicing a first group of optical fiber waveguides to a second similar group of optical fiber waveguides, said technique comprising the steps of:

placing the fibers in said first and second groups in a foldable holder that comprises a relatively thin wafer of a bendable material having a major surface, said surface including first and second sections separated by a longitudinal line about which said wafer is foldable, each of said first and second sections including a plurality of longitudinal grooves laterally spaced in a parallel relation symmetrically about said fold line for receiving and aligning the fibers in said first and second groups, respectively, the fibers of said first group being disposed in the grooves of said first section oppositely to the fibers of said second group in the grooves of said second section;

fixing the fibers of said first and second groups to the grooves in said first and second sections of said holder, respectively;

dividing the fibers so fixed in said holder into two parts along the same line perpendicular to said fold line to expose perpendicular end faces of the fibers;

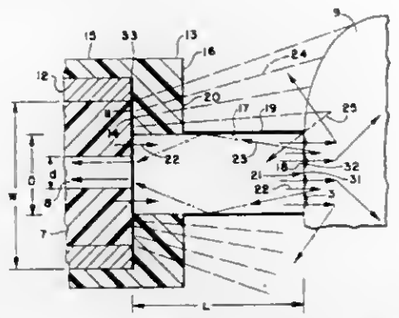
removing from said holder those parts of the fibers of said first group on one side of said dividing line and those parts of the fibers of said second group on the opposite side of said dividing line; and

folding said holder about said fold line to bring the fibers of said first group in alignment with the corresponding fibers of said second group.

4,029,391
LIGHT PROBE AND INTERFACE THEREFOR

Park French, Aurora, Ohio, assignor to Sterndent Corporation, Mount Vernon, N.Y.

Continuation-in-part of Ser. No. 499,491, Aug. 22, 1974, Pat. No. 3,947,088. This application Jan. 8, 1976, Ser. No. 647,365
Int. Cl.² G02B 5/14
U.S. Cl. 350—96 C 23 Claims



1. An end cap for a light probe for directly and indirectly optically coupling such light probe and a sample, comprising light conductive means having a first end positionable in substantial abutment with such light probe and a second end positionable in substantial abutment with such sample for conducting substantially all the light received at one end directly to the other end and thus substantially directly optically coupling such light probe and sample, and

support means generally annularly about said light conductive means for holding said first end aligned and in substantial abutment with such light probe, said support means including light transparent means positionable in alignment with such light probe for indirectly coupling light between such light probe and sample.

4,029,392
LIQUID CRYSTAL DISPLAY

Akio Moriyama, Katano; Masakazu Fukai, Nishinomiya, and Katsuji Hattori, Uji, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

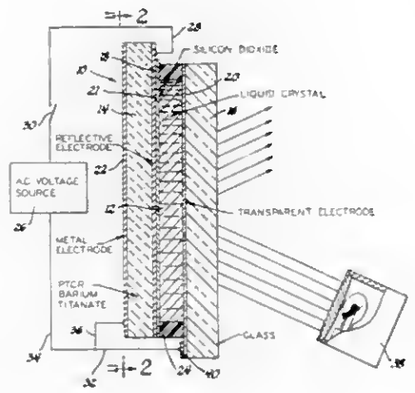
Filed July 11, 1974, Ser. No. 487,672
Claims priority, application Japan, July 20, 1973, 48-81723
Int. Cl.² G02F 1/13
U.S. Cl. 350—160 LC 5 Claims

1. A liquid crystal display device comprising two spaced plates one of which is a transparent front glass plate and the other of which is a white opaque ceramic rear plate, electrodes selectively disposed on the inner surfaces by said two plates, a nematic liquid crystal composition containing a pleochroic dye filled in the space between said two plates, and means for selectively applying an electric field across said nematic liquid crystal composition through said electrodes to thereby modulate light absorption in said liquid crystal composition when the electric field exceeds a threshold value.

4,029,393
INTEGRATED THERMALLY COMPENSATED LIQUID CRYSTAL DISPLAY DEVICE

Denois F. Dungan, and Adolph L. Micheli, both of Mount Clemens, Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Apr. 29, 1976, Ser. No. 681,472
Int. Cl.² G02F 1/13
U.S. Cl. 350—160 LC 3 Claims



1. A reflective mode liquid crystal cell having an integral heater that is self-actuating below a predetermined ambient temperature to permit liquid crystal displays at lower ambient temperatures without significantly increasing the complexity of the liquid crystal cell or a system including it, said reflective mode liquid crystal cell comprising:

a first member having a substantially flat surface portion thereon formed of barium titanate having a preselected positive temperature coefficient of electrical resistance;

a reflective electrically conductive coating on said barium titanate flat surface portion serving as one liquid crystal electrode;

a second member adjacent to said first member and having a transparent portion with a substantially flat surface facing said barium titanate surface portion, said transparent portion flat surface and said barium titanate flat surface portion being mutually spaced and substantially parallel;

a conductive transparent coating on said second member transparent portion flat surface serving as a complementary liquid crystal electrode;

a liquid crystal between said first and second members that exhibits an electro-optic effect in response to a voltage applied between said reflective and transparent coatings;

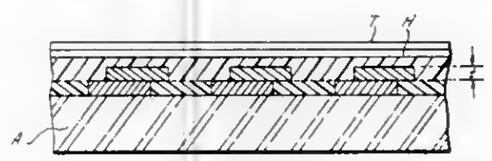
means retaining said liquid crystal between said members; and

at least one additional electrically conductive coating on said barium titanate spaced from said reflective electrode and serving as an additional electrode for maintaining a preselected electrical potential across said barium titanate plate that produces a significant electrical current flow therethrough and an attendant electrical heating therein only at ambient temperatures below a predetermined temperature, whereby said liquid crystal is maintained above said predetermined temperature without external control.

4,029,394
COLOR ENCODING FILTER AND METHOD FOR MAKING THE SAME

Yoshinobu Araki, Tondabayashi, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed May 15, 1975, Ser. No. 577,862
Claims priority, application Japan, May 16, 1974, 49-53873
Int. Cl.² G02B 5/28; H01J 29/02
U.S. Cl. 350—166 8 Claims



1. A dichroic filter to provide color signals for video transmission comprising:

a substrate;

a first grid pattern, formed of both a high and low index of refraction material, having a substantially upper flat planar surface of a substance capable of transmitting a first predetermined bandwidth of energy, covering a portion of the substrate;

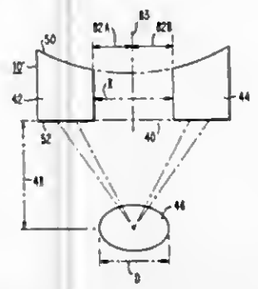
a second grid pattern, formed of both a high and low index refraction material, capable of transmitting a second predetermined bandwidth of energy superimposed directly on the upper planar surface of at least a portion of the first grid pattern, the second grid pattern having a constant thickness throughout the pattern and lying substantially in a single plane; and

a filler material having a medium index of refraction in the range of 1.59 to 1.95 and being substantially transparent to at least both the first and second predetermined bandwidths of energy and coacting with the first and second grid patterns to fill any spatial areas between both of the grid patterns and also the substrate whereby a flat surface is provided on the dichroic filter, the high index material having an index higher than the medium range and the low index material having an index lower than the medium range.

4,029,395
METHOD FOR ALTERING THE FOCAL ZONE OF A LENS SYSTEM

Michael J. Hurwitz, Wilkinsburg, and James W. Wonn, Hempfield Township, Westmoreland County, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 31, 1975, Ser. No. 627,734
Int. Cl.² G02B 3/06
U.S. Cl. 350—178 4 Claims



1. A method for altering the lateral dimension of a focal zone produced by an integral lens system having a first and a second lensing surface thereon, said method comprising the steps of:

removing a volume of lens material from said integral lens system so as to define first and second discrete remaining volumes, each of said remaining volumes having a point disposed therein, said points defining a straight line;

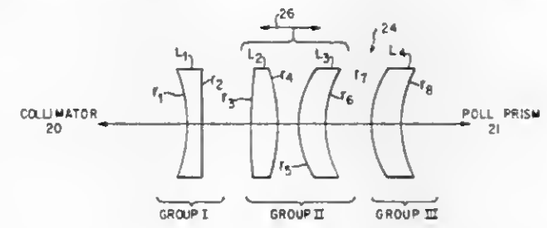
displacing one of said remaining volumes with respect to the other in such a manner that said points remain on said line, and that said remaining volumes are spaced apart; and

directing energy on one surface of each of said remaining volumes, whereby the energy is focused in a zone having an enlarged lateral dimension relative to the focal zone of the integral lens system.

4,029,396
LENS SYSTEM FOR MODIFYING SPHERICAL ABERRATION

Martin Shenker, Pomona, N.Y., assignor to Farrand Optical Co., Inc., Valhalla, N.Y.

Filed Aug. 6, 1976, Ser. No. 712,414
Int. Cl.² G02B 13/20, 9/34
U.S. Cl. 350—188 5 Claims



1. A lens system for modifying the spherical aberration of an optical apparatus, the lens system comprising first, second and third lens groups arrayed in order along the optical axis of said apparatus;

said first lens group having a negative optical power;

said second lens group having substantially zero optical power and having one or more lens elements bent to have a substantial amount of spherical aberration; and

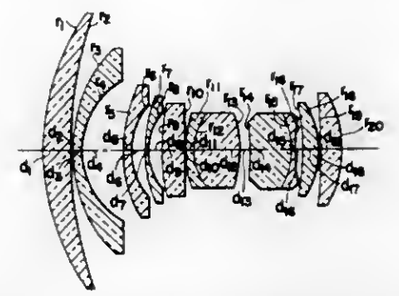
said third lens group having a positive optical power;

and wherein the relative spacing between said second lens group and said first and third lens groups is variable.

4,029,397
RETROFOCUS-TYPE WIDE-ANGLE PHOTOGRAPHIC LENS SYSTEM

Nobuo Yamashita, Tama, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Mar. 19, 1974, Ser. No. 452,670
Claims priority, application Japan, Mar. 20, 1973, 48-32213
Int. Cl.² G02B 13/04
U.S. Cl. 350—214 7 Claims



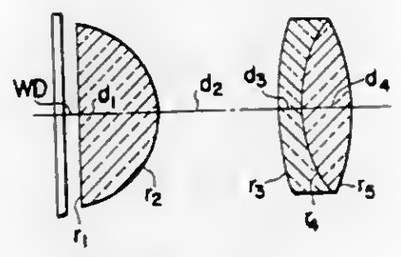
1. A retrofocus-type wide-angle photographic lens system comprising a front lens group and rear lens group arranged on both sides of an airspace, said front lens group being arranged on the object side of said airspace and said rear lens group being arranged on the image side of said airspace, said airspace being selected such that coefficients of correction for spherical aberration and sagittal astigmatism, when said rear lens group is moved toward said front lens group, are small and the coefficient of correction for meridional astigmatism at that time is large, said retrofocus-type wide-angle photo-

graphic lens system being arranged so that focusing in close-up photographing and correction of aberrations can be both attained by moving said rear lens group toward said front lens group.

4,029,398
OBJECTIVE FOR VIDEO DISKS

Toshimichi Kotzumi, Sagamihara, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed July 18, 1975, Ser. No. 597,224
Claims priority, application Japan, July 22, 1974, 49-83888
Int. Cl.² G02B 9/06
U.S. Cl. 350—231 **6 Claims**



1. An objective for video disks comprising a front lens component and a rear lens component, said front lens component being an approximately hemispherical lens with its plane surface positioned toward the object side, said rear lens component being a cemented doublet lens consisting of a concave lens and a convex lens, said objective for video disks satisfying the following conditions:

(1) $1.15 > f_1/f > 0.97$
(2) $1.5 > r_2/d_1 > 1.1$
(3) $n_2 - n_3 > 0.28$
(4) $1.01 > r_4/f > 0.85$
(5) $0.91 > d_2/f > 0.57$

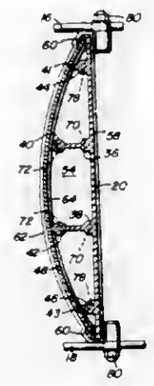
wherein reference symbol f represents the focal length of the lens system as a whole, reference symbol f_1 represents the focal length of the front lens component, reference symbol r_2 represents the radius of curvature of the surface on the image side of the front lens component, reference symbol r_4 represents the radius of curvature of the cemented surface of the rear lens component, reference symbol d_1 represents the thickness of the front lens component, reference symbol d_2 represents the airspace between the front lens component and rear lens component, and reference symbols n_2 and n_3 respectively represent refractive indices of respective lenses constituting the rear lens component.

4,029,399
FRAME FOR CONVEX MIRROR

Ernest Halle, 30 Cadwalader Terrace, Trenton, N.J. 08618

Filed Feb. 19, 1976, Ser. No. 659,549
The portion of the term of this patent subsequent to Mar. 22, 1994, has been disclaimed.
Int. Cl.² G02B 5/10
U.S. Cl. 350—293 **7 Claims**

1. A mirror construction comprising a mirror element including first and second opposite side edges, a mounting plate of a plan shape corresponding to the plan shape of said element over one side of which said element is placed in plan registry therewith, said plate including first and second opposite side edges corresponding with the first and second side edges, respectively, of said element, the first side edge of said plate being generally straight, the second side edge of said plate including opposite end portions which curve inwardly toward the remote ends of the first side edge of said plate, said second side edge end portions including retaining flange portions extending therealong, projecting outwardly of said one side of said plate and terminating outwardly in inwardly directed flange portions overlying said one side of said plate in spaced relation relative thereto, elongated reinforcing flanges supported from said one side of said mounting plate, projecting outwardly therefrom and extending between said first and second edges of said plate, said reinforcing flanges including arched outer longitudinal edges underlying, abutted by and closely conforming to the contours of the adjacent portions of the side of said mirror element opposing said one side of said

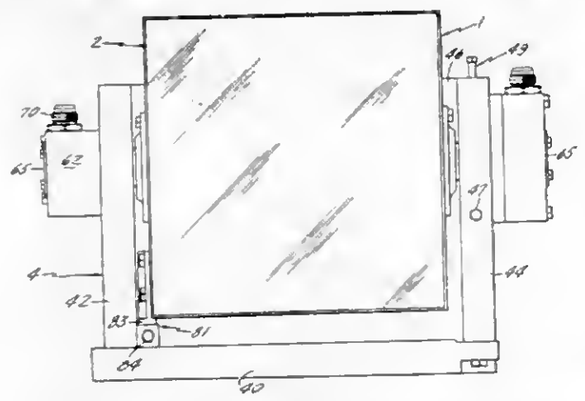


mounting plate with said second side edge of said element being held captive within said retaining flange portions and beneath said inwardly directed flange portions, and a cap panel removably secured over said first side edge of said plate and the corresponding edge of said element, said cap panel including a first inturned retaining flange overlying the outer side of the first side edge of said element and a second inturned flange overlying the first side edge marginal portion of said plate on the other side thereof.

4,029,400
PRESSURE BALANCED COOLED MIRROR WITH AXIALLY MOVABLE TRANSFER TUBE ASSEMBLIES

Fredrick G. Eltel, North Palm Beach, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Filed Nov. 25, 1975, Ser. No. 635,182
Int. Cl.² G02B 5/08
U.S. Cl. 350—310 **8 Claims**

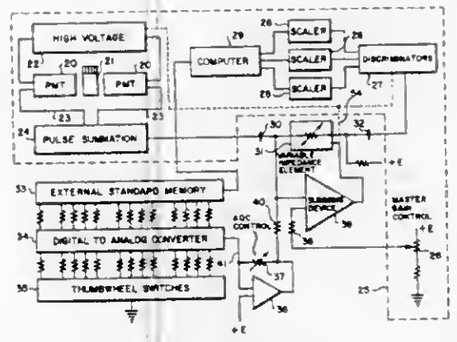


1. In combination, a laser mirror, means for mounting said laser mirror, said mirror containing coolant passages, first means for directing a coolant fluid from said mounting means to said coolant passages, second means for directing the coolant flow from said coolant passages to said mounting means, said mirror having a first opening therein and a second opening therein, said first opening being connected to one end of said coolant passages and said second opening being connected to the other end of said coolant passages, said first means for directing a coolant fluid from said mounting means to said coolant passages including a first axially movable transfer tube assembly, said second means for directing the coolant flow from said coolant passages to said mounting means including a second axially movable transfer tube assembly, said first transfer tube assembly having one end positioned in said first opening, said second transfer tube assembly having one end positioned in said second opening, said mounting means having a third opening therein and a fourth opening therein, said third opening facing said first opening on said mirror, said fourth opening facing said second opening on said mirror, said first transfer tube assembly having its other end positioned in said third opening, said second transfer tube assembly having its other end positioned in said fourth opening, means limiting the axial movement of each of said first and second transfer tube assemblies.

4,029,401
AUTOMATIC QUENCH COMPENSATION FOR LIQUID SCINTILLATION COUNTING SYSTEM

Roy E. Nather, Solana Beach, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Continuation of Ser. No. 650,842, July 3, 1967, abandoned. This application May 3, 1972, Ser. No. 250,089
Int. Cl.² G01T 1/20
U.S. Cl. 250—328 **8 Claims**



1. A method of automatically compensating for spectral shift due to quench in a liquid scintillation nuclear counter having an adjustable and voltage-controllable parameter to which the alignment of the spectral energy end-point of an isotope with a selected discriminator level is responsive, wherein the counter has at least one energy level counting window, a computer, and a digital-to-analog converter for producing an output voltage proportional to the difference between a reference input and a sample input thereto, said method comprising the steps of:

establishing a first reference measure of quench as reference input of the digital-to-analog converter,

taking a count on a reference sample of the isotope with an external standard source,

calculating in the computer a measure of quench of the reference sample and applying said measure of quench as the sample input of the digital-to-analog converter,

adjusting the level of said parameter of the liquid scintillation counter so that the spectral energy end-point of the reference sample is substantially aligned with a selected counting window discriminator level,

taking a count on a test sample of the isotope with the external standard source,

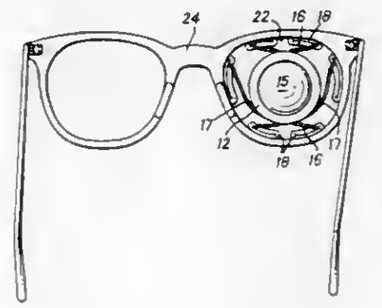
calculating in the computer a measure of quench of the test sample,

establishing the sample measure of quench as the sample input of the digital-to-analog converter thereby permitting automatic adjustment of the level of the voltage-controlled parameter in response to the output voltage of the digital-to-analog converter so that the spectral energy end point of the test sample is substantially restroed to the selected discriminator level, and thereafter noting the count on the sample while maintaining the voltage-controlled parameter at the adjusted level.

4,029,402
OPTICAL AID FOR USE IN THE SELECTION OF SPECTACLE FRAMES

Adrian Clive Noble, 16 Dovedale Avenue, Kenton, Harrow, Middlesex HA3 ODX, England

Filed Nov. 28, 1975, Ser. No. 636,050
Claims priority, application United Kingdom, Dec. 20, 1974, 55204/74
Int. Cl.² A61B 3/04
U.S. Cl. 351—22 **7 Claims**



1. An optical aid for use the selection of spectacle frames, comprising:

a holder for a lens;

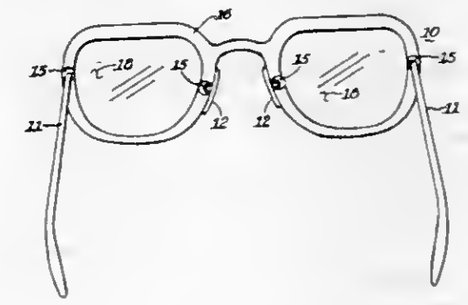
at least two pairs of resilient arms extending outwardly from said holder, the arms of each pair being opposed to each other, and the arms of at least one of the pairs being longer than the arms of at least one other pair; and

members at the extremities of the arms dimensioned and arranged to engage a lens-retaining groove of a spectacle frame, said members for at least each of the longer arms being arcuate in extent.

4,029,403
SELF-ADJUSTING EYEGLASSES

Gloria W. Harris, North Miami, Fla., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Oct. 28, 1975, Ser. No. 626,175
Int. Cl.² G02C 5/14
U.S. Cl. 351—121 **2 Claims**



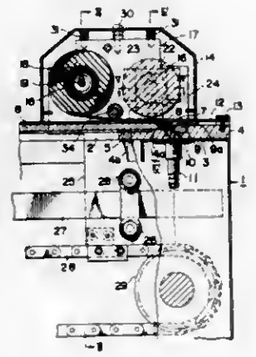
1. A pair of eyeglasses comprising a frame member enclosing a pair of eyeglass lenses, a pair of individual temple pieces and a pair of individual nose support pieces, with each temple piece and each nose support piece individually mounted by a ball and socket joint to the frame member, such that each of the two temple pieces and each of the two nose support pieces are pivotally mounted with respect to the frame and with respect to each of the other said pieces.

4,029,404

PLATEN COVER FOR A VACUUM CONTACT PRINTER

Hidekatsu Mizukami; Kosuke Fukui, and Tsutomu Kinoshita, all of Kyoto, Japan, assignors to Dainippon Screen Seizo Kabushiki-Kaisha, Kyoto, Japan

Filed Nov. 7, 1975, Ser. No. 629,841
Claims priority, application Japan, Sept. 2, 1975, 50-106400
Int. Cl.² G03B 27/62
U.S. Cl. 355—91 13 Claims



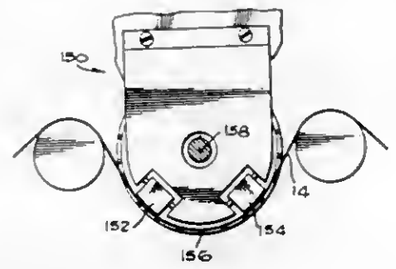
13. A vacuum contact printer comprising:
a body having upward light source therein,
a supporting frame mounted on the top surface of said body and provided with an air-tight resilient packing member at the periphery thereof,
a transparent hard plate supported on said supporting frame and surrounded by said resilient packing member,
a resilient vacuum sheet the rear end of which is secured to the rear portion of said supporting frame,
a pair of vertical bearing plates movable back and forth in a longitudinal direction along said supporting frame,
a winding roller both ends of which are journaled in said bearing plates and to which the fore end of said vacuum sheet is secured; said winding roller being biased in such a direction that the upper portion thereof is rotated toward the rear of said body,
a pressure roller rotatably supported on said bearing plates behind said winding roller so as to be vertically movable,
guiding means operatively connected to both ends of said pressure roller to cause said pressure roller to ascend so that said pressure roller is raised slightly above said vacuum sheet when said bearing plates are positioned at the rearmost of said supporting frame to reduce the pressure on said vacuum sheet,
a bottom-opened movable box covering said bearing plates, said winding roller and said pressure roller,
said movable box being supported by bolts embedded in the center of the top surface of said bearing plates so that said box can slightly swing back and forth in a longitudinal direction,
said swinging movements of said box being controlled by means of two pairs of compression springs disposed respectively between the ceiling panel of said box and the front and the rear surfaces of said bearing plates,
and a pair of electrically-controlled limit switches provided at the front and the rear portions of either of said bearing plates for stopping an operation of the apparatus or for giving a warning message whenever an inclination of said body exceeds a predetermined safety limit.

4,029,405

SPROCKETED FILM TRANSPORT

William H. Stutz, Los Angeles, Calif., assignor to Stutz-Bergman Design Group, Beverly Hills, Calif.

Division of Ser. No. 408,623, Oct. 23, 1973, Pat. No. 3,912,383. This application Oct. 14, 1975, Ser. No. 621,736
Int. Cl.² G03B 31/00
U.S. Cl. 352—6 13 Claims



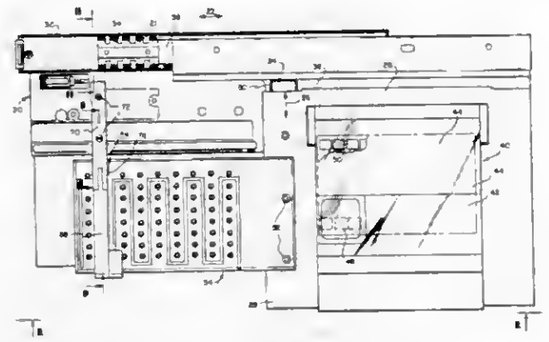
1. Apparatus for playing back sprocketed sound film comprising:
a machine frame;
a pair of hubs rotatably mounted on said frame;
a sprocket wheel rotatably mounted on said frame;
means for guiding film from around a first hub of said pair, partially about said sprocket wheel, and thence around the other hub of said pair;
a transducer head interiorly mounted with respect to said sprocket wheel and positioned to contact the film surface supported by said sprocket wheel;
said motor means including a stepping motor having a shaft directly connected to the sprocket wheel to rotate it at the same speed as the motor shaft, a flywheel, and a clutch frictionally coupling the flywheel to the motor shaft to permit slippage between them so that the stepping motor can suddenly start without suddenly rotating the flywheel while allowing the flywheel to minimize stepping motion of the shaft after the shaft is at full speed, said motor means being selectively operable to advance film incremently or advance film smoothly and continuously;
and means coupled to said transducer head for playing back the sound recorded on the film,
whereby the apparatus can be employed to transport sound film continuously or intermittently.

4,029,406

MICRO FICHE HANDLER

Ralph A. Sickles, 1418 Steamboat Bend, Tempe, Ariz. 85281

Filed July 6, 1976, Ser. No. 702,475
Int. Cl.² G03B 23/08; F16H 27/04
U.S. Cl. 353—27 R 15 Claims



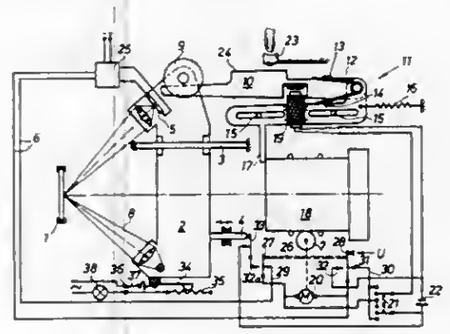
1. In a rectilinear micro fiche transport means; a frame; indexing means moveably mounted on said frame; a fiche carriage moveably mounted on said frame and connected to said indexing means; said indexing means and said carriage moveably in unison on said frame in two directions disposed at right angles to each other; said indexing means comprising a flat plate member; said plate member having opposite first and second sides; said first side having a plurality of equally spaced apart indexing portions arranged in intersecting rows; a first plurality of said rows being disposed in spaced apart parallel relation to each other and disposed in a first direction; a second plurality of said rows being disposed in spaced apart parallel relation to each other; said second plurality of said rows being disposed at substantially 90° with respect to and intersecting said first plurality of said rows; said indexing portions being common to both said first and second rows; said first side of said plate member also having a rectilinear track means comprising a series of adjacent opposed generally rectangular U-shaped portions disposed in continuity with each other; the U-shaped portion which are adjacent each other being opposed and in continuity with each other such that the continuity of U-shaped portions forms a unitary track which is alternately reversed in direction by means of each U-shaped portion; each U-shaped portion having an intermediate portion and a pair of spaced apart parallel portions disposed at substantially right angles to the respective intermediate portion; each one of said pair of spaced apart portions being in continuity with an opposed parallel portion of an adjacent U-shaped portion; said parallel portions of said U-shaped portions being disposed parallel to said rows of indexing portions; said second side of said plate member having rows of cam portions of generally herring bone shape; said rows of cam portions extending in zig-zag direction laterally with respect to said parallel portions of said U-shaped track portions; said rows of cam portions comprising first and second angularly disposed portions which are directed alternately at different angles to the direction of said parallel portions of said track portions; said first and second cam portions having adjacent ends disposed at transition proximities which substantially coincide with said indexing portions; an indexing detent means carried by said frame and disposed to be engaged by individual ones of said indexing portions; a guide member carried by said frame and engageable with said track means; a rotary cam means; means adapted for operating said rotary cam means and adapted to limit each rotary operation of said cam means; said cam means disposed to rotatably engage one of said herring bone cam portions during each operation of said rotary cam means; said rotary cam means having a rotary axis disposed at an angle to both said first and second cam portions.

4,029,407

FADING MECHANISM FOR SLIDE PROJECTORS WITH AUTOMATIC FOCUSING MEANS

Hermann Friedrich Albrecht, Hotzum, Germany, assignor to Rollei-Werke Franke & Heidecke, Braunschweig, Germany

Filed May 5, 1976, Ser. No. 683,514
Claims priority, application Germany, May 16, 1975, 2521760
Int. Cl.² G03B 3/10
U.S. Cl. 353—86 9 Claims



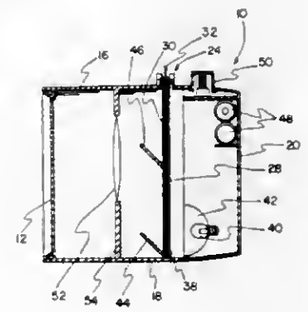
1. A slide projector comprising means for holding a picture slide in projection position, a projection lens member movable in the direction of its optical axis for projecting an image of said slide onto a viewing screen, a motor for moving said lens member axially, electro-optical scanning means for controlling said motor to move said projection lens member to a predetermined axial position of sharp focus with respect to a portion of said slide, a source of current for operating said motor, change-over switch means movable between a first position and a second position, circuit means effective when said switch means is in its first position for operatively disconnecting said motor from said scanning means and operatively connecting said motor to said source of current independently of said scanning means to drive said motor to move said projection lens member to an out-of-focus position substantially displaced axially from said predetermined sharp focus position, and circuit means effective when said switch means is in its second position for operatively connecting said motor to said scanning means to that said scanning means may control said motor to tend to move said projection lens member back from its substantially displaced out-of-focus position to its said predetermined axial position of sharp focus.

4,029,408

MAP READING APPARATUS

David R. Overby, 205 Brandon Court, Raleigh, N.C. 27606

Filed Sept. 29, 1975, Ser. No. 617,679
Int. Cl.² G03B 21/22, 23/10
U.S. Cl. 353—110 3 Claims



1. An apparatus for projecting map indicia on film onto a screen where the projected map image on said screen is substantially larger than the respective map indicia on said film, said map projecting apparatus comprising:
a. a housing structure;
b. film holding means disposed within said housing for receiving and holding film material, said film holding means including two spaced apart plates with aligned optical path opening means formed therein for allowing light to pass therethrough;
c. a screen formed within said housing generally forwardly of said film holding means;
d. circular disc film means normally held in said film holding means between said two plates and including a series of radially and circumferentially spaced different and distinct road or street map indicia thereon with each respective map indicia representing a certain geographical area, and wherein said optical path opening means formed within said film holding means is formed in an area radially spaced from a center point of said disposed disc when disposed between said plates such that in rotating said film disc between said plates the respective road or street map indicia radially formed thereon align with said optical opening means;
e. a light source disposed within said housing generally rearwardly of said film holding means relative to said screen and generally disposed behind said optical path opening means formed within said plates;
f. reflector means generally encompassing said light source within said housing structure for directing light from said

light source through said optical opening means within said plates; and

g. combination and cooperative mirror means and magnifying lens means disposed within said housing between said film holding means and said screen for receiving said road or street map image resulting from said light source projection through said optical opening means of said film means and for enlarging the received road or street map image and projecting the same onto said screen, whereby that particular road or street map image projected on said screen may be viewed even while operating a motor vehicle, said magnifying lens means being centrally disposed generally concentrically with said film means and disposed between said forwardmost plate and said screen; and wherein said mirror means is disposed between said magnifying lens means and the forwardmost plate of said film holding means for directing the map image projection passing through said optical path opening means towards the center of said film disc and through the adjacent magnifying lens where the map image is magnified and projected onto said screen, said mirror means comprising a pair of mirrors vertically spaced along the outer side of the forwardmost plate and including a first mirror disposed adjacent the optical opening means formed within said film holding means and disposed at approximately a 45° angle relative to the forwardmost plate of said film holding means, and a second mirror aligned with said first mirror and disposed about a portion of said forwardmost plate generally in the central area of the adjacent film disc and adapted to reflect the image received from said first mirror forwardly through said adjacent disposed magnifying lens where that particular map image is magnified and projected onto said screen.

4,029,409

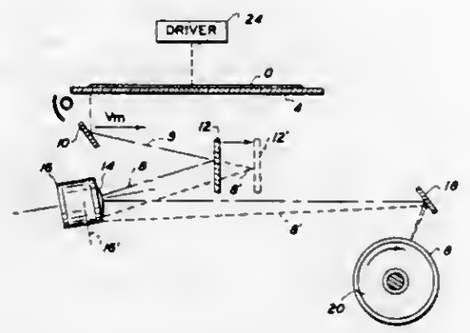
MULTI-MODE OPTICAL SCANNING SYSTEM

Richard A. Spinelli, and Robert F. Allis, both of Rochester, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed June 20, 1975, Ser. No. 588,974

Int. Cl.² G03B *27/48, 27/50, 27/70*

U.S. Cl. 355—51 **5 Claims**



1. An optical system for projecting an image of an object from an object plane to an image plane, including the following disposed along an optical path:

support means to support an object at said object plane,

a projection lens,

photosensitive means disposed at said image plane to receive an image of an object,

first and second reflectors between said object plane and said projection lens to fold said optical path, said first and second reflectors being disposed for movement in synchronism relative to said object plane for scanning of a stationary object and to maintain a constant object conjugate distance during said scanning, said first and second reflectors being further movable one relative to the other to change said object conjugate distance,

said support means being movable in said object plane so as to move an object for scanning of said object relative to stationary optics,

an add reflector selectively positionable into and out of said optical path to form with one of said reflectors a reflection cavity to change said object conjugate distance,

said lens being disposed for movement relative to said optical path to change conjugate distances, and laterally of said optical path to remain centered therein.

4,029,410

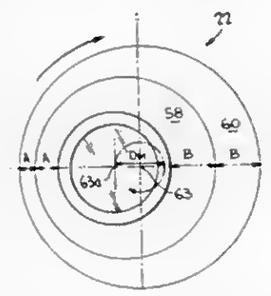
METHOD AND APPARATUS FOR MANIPULATING LINE WEIGHT IN AN IMAGE

Charles W. Richter, Herndon, Va., assignor to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Sept. 5, 1975, Ser. No. 610,810

Int. Cl.² G03B *1/00, 27/52, 27/68*

U.S. Cl. 355—52 **26 Claims**



12. A lens holding attachment for a camera for manipulating line weight associated with an image representation comprising a mount for supporting said lens to said camera; means for moving said lens in a circular orbit about an optical axis of said camera and in a plane parallel to said image representation; and means for controlling the diameter of said orbit, said controlling means including means for varying the diameter of said orbit between zero and a preselected maximum diameter, where said maximum diameter is determined by amount of line weight manipulation.

4,029,411

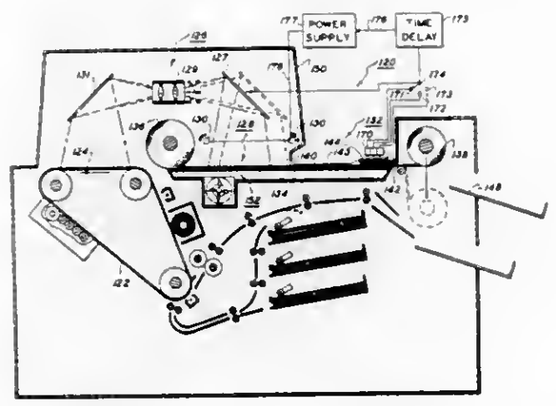
VARIABLE MAGNIFICATION COPIER

Denis J. Stemmle, Williamson, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 30, 1975, Ser. No. 627,434

Int. Cl.² G03B *27/48, 27/62*

U.S. Cl. 355—51 **4 Claims**



1. In a copier wherein documents are copied by optical imaging means providing selectively variable magnification copying of the documents onto a position on an imaging surface while said documents are moving along a path through a document imaging station transported by document transport means, where the documents have leading and trailing edges relative to said document transport means, and wherein said documents are illuminated for said optical imaging means by illumination means comprising a substantially instantaneous flash illumination system, and wherein the entire area of a document to be copied by said optical imaging means is simultaneously illuminated by said flash illumination system while the document is moving through said document imaging station, the improvement comprising:

document registration means outside of said document imaging station for registering one said edge of a document on said document transport means as a registration edge,

imaging position shifting means for automatically shifting the copying position within said document exposure station at which the moving registered document is copied in proportion to the selected magnification of said optical imaging means, including shifting the copying positions of both said leading and trailing edges of the document,

wherein said image position shifting means includes time delay means connecting between said document registration means and said flash illumination system and controlled by the selected magnification of said optical imaging means for varying the time of initiation of said flash illumination system relative to said moving registered document position in said document imaging station in response to the selected magnification of said optical imaging means and to said document registration means, and

wherein said image position shifting means includes means for maintaining stationary the position of the imaging surface onto which the document is copied when said copying position within said document exposure station is shifted.

4,029,412

MULTI-STANDARD REPROGRAPHIC CAMERA

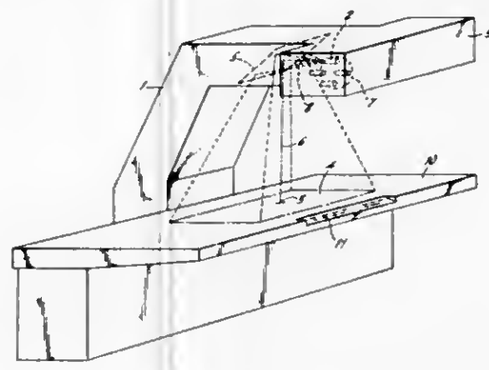
Harry Arthur Hele Spence-Bate, 115 Cheam Place, Morley, Australia (6062)

Filed Oct. 7, 1975, Ser. No. 620,279

Claims priority, application Australia, Oct. 8, 1974, 9175/74; Dec. 9, 1974, 9946/74; Apr. 14, 1975, 0918/75

Int. Cl.² G03B *27/32*

U.S. Cl. 355—64 **16 Claims**



1. A microcopying camera for recording records on microfiche or microfilm comprising a copying table and photographing lens mounted in a camera head with means for adjusting the front focal length of said lens relative to said copying table and the back focal length of said lens relative to said lens and a film transport device mounted in the camera head, the film transport device carrying when in use a microfiche or microfilm film, said means for adjusting the front focal length including means for increasing or decreasing the optical distance along an optical path between said table and said lens, a photographic shutter associated with said lens, and a mask assembly comprising a first and a second pair of masking blade side members, the edges of the members defining a masking frame, each of said pairs consisting of two parallel blades adapted for simultaneous movement towards or away from each other and linked by parallel linking members, each pair connected to a drive means providing said simultaneous movement, said drive means comprising a cam driven by a motor, said cam engaging with a cam surface associated with one of the side members of each pair, whereby adjustment of the front and back focal lengths associated with adjustment of the masking frame enables a plurality of different sized records to be recorded on one film.

4,029,413

COPIER WITH MEANS FOR HANDLING COMPONENTS OF FORM LETTERS, AND THE LIKE

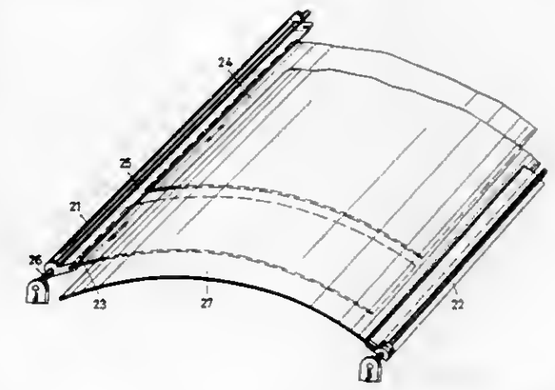
Gerhard Ritzerfeld, Schorlemer Allee 14, 1000 Berlin 33, Germany

Filed Oct. 23, 1975, Ser. No. 625,164

Claims priority, application Germany, Nov. 1, 1974, 2452430

Int. Cl.² G03B *27/62*

U.S. Cl. 355—75 **19 Claims**



5. In combination with a copier of the type comprised of a transparent support upon which originals to be copied are laid with their image-bearing sides face down, illuminating means for illuminating the image-bearing sides of such originals and means for forming reproductions of the illuminated images, an arrangement for use in the reproduction of printed forms, form letters, and the like, comprising first holding means adjacent the transparent support and operative for holding at least one lower original serving as a mask; second holding means adjacent the transparent support and operative for holding at least one upper original located above the original held by the first holding means so that a portion of the upper original is unblocked by the mask and accordingly exposed for illumination; mounting means mounting at least one holding means for movement relative to the other holding means; and means for moving the at least one holding means relative to the other holding means in the direction of the length of the transparent support, whereby different lines of an image on the upper original can be unblocked by the mask by effecting such relative lengthwise movement between the two holding means.

4,029,414

METHOD AND DEVICE FOR RECORDING COPIER USAGE DATA

Robert Aron Rubenstein, Mayfield Heights, Ohio, assignor to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed June 30, 1975, Ser. No. 591,338

Int. Cl.² G03B *27/14*

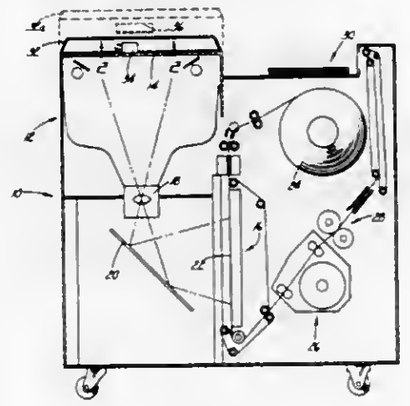
U.S. Cl. 355—112 **7 Claims**

1. In an apparatus for producing copies of documents or the like and including illumination station means for irradiating

documents to be copied, a device for recording data relating to the usage of the apparatus, said device comprising:

means operatively connected to said apparatus for producing visual data representative of the usage of the apparatus, and

means for presenting an image of said visual data to said apparatus whereby said apparatus may produce a copy of said image, said image presenting means presenting said image to said illumination station means whereby a copy thereof may be produced,



said illumination station means includes means for receiving a document for irradiation, said image presenting means being mounted in association with said receiving means, said receiving means including means for supporting a document in an object plane during irradiation and shielding means adjacent said support means for generally confining the radiation to the document, said image presenting means being carried by said shielding means for presenting said image to said object plane.

4,029,415

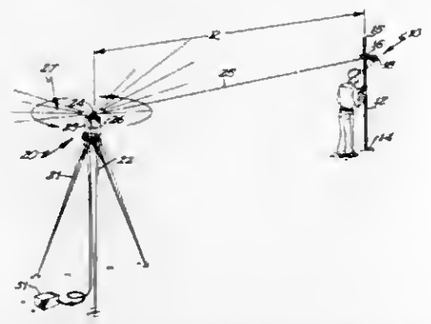
LASER LAND-SURVEYING APPARATUS WITH DIGITAL DISPLAY

Phillip R. Johnsoo, Mandan, N. Dak., assignor to Dakota Electron, Inc., Mandan, N. Dak.

Filed Feb. 3, 1975, Ser. No. 546,543

Int. Cl.² G01C *3/08, 3/00*

U.S. Cl. 356—4 **20 Claims**



1. A laser land-surveying apparatus operable from an electrical power source and usable with the beam from a laser beam source for measuring linear displcement comprising:

a rigid grade pole having a base and an apex;

a laser beam detection unit mounted to said grade pole between base and apex for relative motion between said pole and said detection unit, including a laser beam detector operatively electrically connectable to the power source and generating an electrical detection signal in response to detection of the laser beam;

indicating means electrically connected to said detector and producing an indication perceptible to an operator in response to any detection of the beam by said detector;

measuring means electrically connectable to the power source and mechanically coupled between said laser beam detection unit and said grade pole to permit relative motion between said detection unit and said pole, said measuring means determining the distance between said laser beam detector and said base of said pole and generating an electrical grade signal containing information representative of the distance between said base and said laser beam detector; and

a digital display unit electrically connectable to the power source and electrically connected to said measuring means to receive said electrical grade signal from said measuring means and in response thereto to digitally, visibly display to the operator the numerical grade distance between said laser beam detector and said base of said grade pole.

4,029,416

SAMPLE-BACKGROUND-SIGNAL AUTOCANCELLATION IN FLUID-SAMPLE ANALYZERS

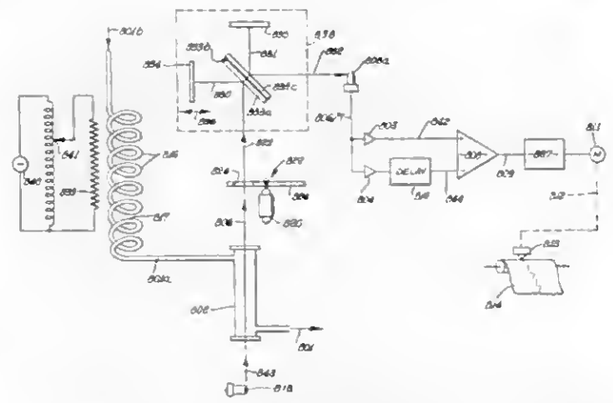
Roland C. Hawes, 771 Oakglade Drive, Monrovia, Calif. 91016

Continuation-in-part of Ser. No. 416,233, Nov. 15, 1973, Pat. No. 3,897,154. This application May 5, 1975, Ser. No. 574,618

The portion of the term of this patent subsequent to July 29, 1992, has been disclaimed.

Int. Cl.² G01N *21/34;* **G01J** *3/42*

U.S. Cl. 356—51 **15 Claims**



1. A system for monitoring a first constituent in a fluid stream, which stream may also include a second constituent whose concentration in the stream changes slowly relative to the changes in concentration of the first constituent, comprising:

a monitoring station, having sensing means for deriving a first component of a first measurement signal in quantitative response to presence of such first constituent in the station;

said sensing means also deriving an additional component of such first measurement signal in quantitative response to presence of such second constituent in the station, such additional signal component constituting a spurious signal component;

flow means, connected to the fluid stream and the monitoring station, for directing fluid from the fluid stream through the station;

primary signal-processing means, connected to receive the first measurement signal from the sensing means, for deriving in response to the first measurement signal a second measurement signal which is a time-distorted version of the first measurement signal and which has a first component and an additional component corresponding respectively to the first and additional components of the first measurement signal; and

secondary signal-processing means, connected to receive the first measurement signal along a signal path from the sensing means and the second measurement signal from the primary processing means, for deriving in response thereto a third signal which is a substantially continuous mathematical function of the first and second measurement signals, the function being such as to effect substantially complete mutual cancellation of the said additional measurement signal components, whereby the third signal comprises substantially only components corresponding to presence of the first constituent in the stream; and

utilization means responding to the third signal;

the said time-distorted version being related to the said first measurement signal by a substantially consistently applied function of time which is not directly controlled by any of the signals.

4,029,417

READING DEVICE FOR A MONOCHROMATOR

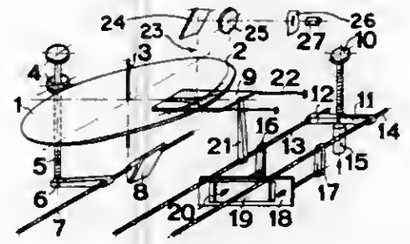
Jan Jasny, Warsaw, Poland, assignor to Polska Akademia Nauk, Instytut Chemii Fizycznej, Warsaw, Poland

Filed Oct. 7, 1975, Ser. No. 620,497

Claims priority, application Poland, Oct. 8, 1974, 174673

Int. Cl.² G01J *3/02*

U.S. Cl. 356—100 **4 Claims**



1. A reading device for a monochromator having an outlet slit of adjustable width and a light dispersing element adjustable with respect to the outlet slit to shift the spectrum in relation to the outlet slit, said reading device comprising a scale, means for displacing said scale in relation to adjustment of the light dispersing element with respect to the outlet slit, a transparent plate slidably mounted above the scale for movement in a direction perpendicular to said scale, a sliding mechanism for adjusting the width of the outlet slit, means connecting said plate to said sliding mechanism for corresponding movement therewith, a system of pairs of curved lines on said plate having curvatures such that the lines, at a determined position of the light dispersion element and a determined width of said slit intersect the scale at points characterizing a monochromator spectrum transmittance curve, a light-dividing element disposed above said plate to receive an image thereof, a lens adjacent the light-dividing plate to transmit said image, a mask with an aperture adjacent said lens and a photodetector adjacent said mask for receiving the image transmitted therethrough.

4,029,418

PLANT COMPARATOR

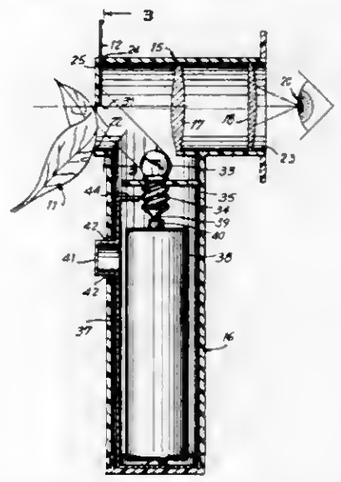
Hugh V. Cottingham, Upper Montclair, and Joseph Scrocco, West Orange, both of N.J., assignors to Black Hole Nebula Incorporated, Upper Montclair, N.J.

Filed Dec. 31, 1975, Ser. No. 645,757

Int. Cl.³ G01N *21/04*

U.S. Cl. 356—168 **6 Claims**

1. A hand held comparator for comparing a plant specimen to a color photographic reference of a plant specimen afflicted by a predetermined parasite, comprising in combination, lens means defining at least one object plane and a viewing region, said lens means producing a magnified image at the viewing region of a plant specimen disposed at the object plane, a support member defining an enclosure for supporting the lens means, said enclosure being cross-sectioned along a lengthwise extent to define a first opening of said enclosure, said first opening forming a viewing opening proximate to said viewing region defined by said lens means, the other end of said enclosure forming a second opening in substantial optical alignment with said first opening, the second opening in said support member defining an opening for positioning a plant specimen at the object plane, a light source for directing light on the object plane, said support member including positioning



means constructed and arranged to position a color photographic reference of a plant specimen afflicted by a predetermined parasite at said object plane to thereby provide a juxtaposed magnified image of said plant specimen and photographic reference at the viewing region.

4,029,419

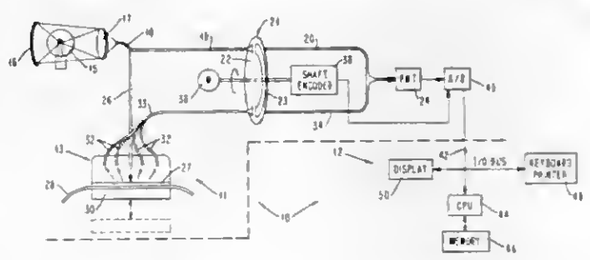
TEXTILE COLOR ANALYZER CALIBRATION

Paul A. Schumann, Jr., Wappingers Falls, and Alvin H. Tong, Poughkeepsie, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 10, 1975, Ser. No. 621,334

Int. Cl.² G01J *3/50;* **G01N** *21/48*

U.S. Cl. 356—173 **7 Claims**



1. The method of calibrating a spectrophotometer for measuring the reflectance of a test sample, said spectrophotometer comprising an instrument section including a light source, a detector, an opaque head having blackened inner walls defining a chamber and an opening adapted to be positioned next to a test object, first fiber optic means terminating in said chamber for directing light from said light source outwardly through said opening to illuminate a test object thereat, second fiber optic means terminating in said chamber for collecting light reflected from a test object through said opening and conducting such reflected light to said detector whereby said detector provides an output signal proportional to the intensity of light reflected from said test object, the steps comprising:

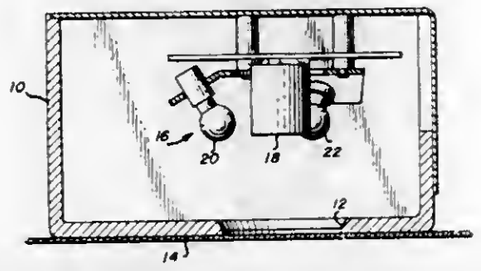
a. placing a mirror next to said opening as a test object and measuring the amount of light reflected from said inner wall;

b. placing a white standard next to said opening as a test object and measuring the amount of light reflected therefrom;

c. calculating the reflectance of said inner wall using the amounts of light measured in steps (a) and (b);

d. placing a test sample next to said opening as a test object and measuring the amount of light reflected therefrom;
e. and calculating the true reflectance of said test sample using the amounts of light measured in steps (b) and (d) and said reflectance of said inner wall.

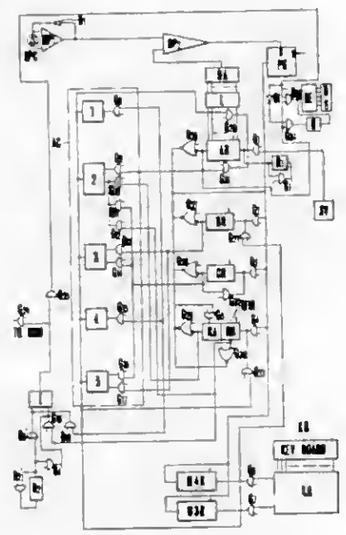
4,029,420
LIGHT REFLECTANCE INSTRUMENT
Romilly John Simms, 2192 Clayton Drive, Menlo Park, Calif. 94025
Filed Dec. 27, 1974, Ser. No. 536,715
Int. Cl.² G01N *21/48, 21/16, 21/32*
U.S. Cl. 356—209 **7 Claims**



1. An instrument for measuring the light reflectance from fabric and the like materials which have a heterogeneous surface configuration, comprising:
a housing having a nonreflective interior surface, said housing including a plate having an aperture defining a sensing area, said plate being disposed for engaging the surface of such a material and framing a portion of the material in the aperture, the aperture being sufficient to frame a relatively large number of all of the different types of individual components of the heterogeneous surface in the sensing area;
a light sensor mounted within said housing coaxially with respect to said aperture and a predetermined distance therefrom; and
only an odd number of light sources mounted within said housing at equidistant points around an outer periphery of said sensor and providing light beams along respective lines which pass through the center of said aperture, said lines being disposed at an angle with respect to said aperture axis which lies outside the range of from 35° to 55°.

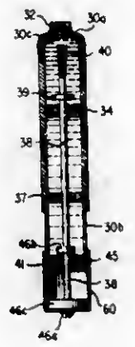
4,029,421
DIGITAL EXPOSURE METER
Nobuaki Sakurada, Yokohama; Nobuhiko Shinoda; Yukio Mashimo, both of Tokyo; Tadashi Ito, and Fumio Ito, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Oct. 16, 1975, Ser. No. 622,834
Claims priority, application Japan, Oct. 17, 1974, 49-119802
Int. Cl.² G01J *1/42;* **G03B** *7/08*
U.S. Cl. 356—223 **9 Claims**

1. A digital exposure meter comprising:
a. a first conversion means for converting the value of the intensity of light into a first digital signal;
b. a second conversion means for converting the value of an exposure factor into a second digital signal;
c. a plurality of register means, at least two of said register means being connected with each other and each having a first transfer gate through which the content of each said register means is transferred from one to another;
d. applying means for applying said first and said second digital signals from said first and second conversion means to said register means;
e. a computing circuit, said computing circuit including at least addition-computing means having addition function and division-computing means having division function, and each of said computing means being connected to at least two of said plurality of register means through input gates and having a second transfer gate through which the output of said computing means is transferred to said register means;
f. sequence control means connected to said first transfer and said second transfer gates and input gates for generating control signals in sequence which are selectively applied to said gates to control the gating operation of each of said gates;



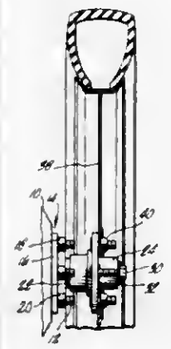
g. regulating means for regulating transmission of said control signals to said gates in predetermined sequential relation; and
h. display means connected to at least one of said register means for displaying the content of said register means.

4,029,422
DISPENSER FOR AIR DRYING LIQUID COATING
Edward J. Pillsbury, 377 S. Harrison St., East Orange, N.J. 07018
Continuation-in-part of Ser. No. 605,077, Aug. 15, 1975, abandoned. This application June 1, 1976, Ser. No. 691,528
Int. Cl.² A46B *17/08*
U.S. Cl. 401—117 **22 Claims**



1. A dispenser for air drying liquid coating material comprising in combination:
a tubular liquid container substantially closed at one end and terminating at the other end in a nozzle having an inner bore,
a longitudinal valve stem mounted for to-and-fro movement along the axis of said tubular liquid container,
said stem terminating at one end in a valve head disposed adjacent the inner bore of said nozzle and including an applicator brush protruding in axial relation from said valve head, the combination including said valve head and stem constructed to move between:
a first storage position in which the assembly including said valve stem, said valve head and said applicator brush is in retracted position with respect to said nozzle bore; and
a second operating position wherein the assembly including said valve stem and said valve head is extended to engage and close the inner bore of said nozzle forcing said applicator brush to protrude through said nozzle, and
guide means substantially spaced apart from the inner bore of said nozzle and disposed in fixed relation to the inner walls of said liquid container, said guide means including a disk-like member having a plurality of peripheral slots for the free flow of liquid therethrough and comprising an axially disposed opening large enough to accommodate said valve stem in freely movable relation, whereby said guide means functions to maintain said valve head and applicator brush centered with relation to the inner bore of said nozzle.

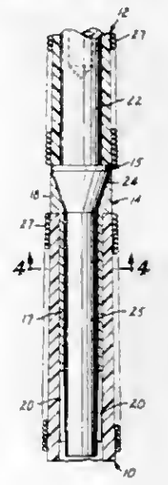
4,029,423
FREE-WHEELING SPINDLE ADAPTOR
Fred A. Sager, 42 Blackburn P., Ventura, Calif. 93003
Filed Nov. 24, 1975, Ser. No. 634,494
Int. Cl.² B60B *27/02, 27/06*
U.S. Cl. 403—3 **7 Claims**



1. A free-wheeling adaptor fitting to a drive hub, comprising an adaptor spindle including a spindle shaft and an adaptor plate, said adaptor plate having the capacity for being attached directly to the drive hub such that said spindle shaft is aligned with the drive hub;
a free-wheeling hub rotatably mounted on said adaptor spindle for free-wheeling motion, said free-wheeling hub having a wheel attachment pattern substantially the same as on the drive hub.

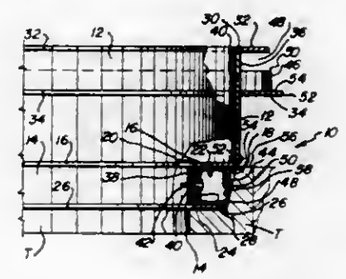
4,029,424
INTERNAL FISHING ROD FERRULE
William A. Dille, Maplewood, and Wayne E. Erickson, St. Paul, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Filed Nov. 1, 1976, Ser. No. 737,331
Int. Cl.² F16B *7/00*
U.S. Cl. 403—292 **1 Claim**

1. An internal fishing rod ferrule comprising:
a female element formed of a metal having a tensile strength of at least seven thousand kilograms per square centimeter at two percent yield, said female element having a hollow generally cylindrical body with an external diameter to fit within a rod blank and having a larger diameter cylindrical end to abut the free end of the rod blank, said larger diameter end being internally tapered from the internal diameter of said body outward to one free end, the other free end of said body being slit longitudinally to define a plurality of spring fingers, said spring fingers having their free ends offset radially inward,
a male element formed of a metal having a tensile strength of at least seven thousand kilograms per square centimeter at two percent yield, said male element having a cylindrical body to fit within a rod blank, a larger diameter central portion to abut the free end of the rod blank and a cylindrical engaging end having a diameter slightly less than the internal diameter of said female element body



for engagement only by said spring fingers of said female element body, said male central portion being externally tapered from said male body to the diameter of said engaging end at a taper complementary to said internal taper of said larger diameter end of said female element.

4,029,425
MANHOLE EXTENSION
Thurman A. Pelsue, 3706 S. Hibiscus Way, Denver, Colo. 80237
Filed July 10, 1975, Ser. No. 594,662
Int. Cl.² E02D *29/14*
U.S. Cl. 404—25 **4 Claims**



1. In a manhole extension for use in manhole casings of the type having an upwardly-facing annular seat recessed beneath a rim bordering the upper marginal edge of an upstanding wall therebetween wherein said extension includes a lower annular flange adopted to rest atop the casing seat, an upper annular flange spaced above the lower one, a ring connecting the inner edges of the upper and lower flanges cooperating therewith to define an outwardly-facing channel, and an inflatable gasket positioned within said channel for the purpose of sealing the joint between said extension and casing, the improvement which comprises a circular fence depending from the upper annular flange defining a gasket receiving seat which extends from the upper flange to a location spaced apart from the lower flange to span a gap between the top of the casing and the upper flange, said inflatable gasket being positioned outside of said gasket receiving seat to expand into said gasket receiving area and against the inside of said fence, said fence being positioned and adapted to cooperate with the channel and with the upstanding casing wall when the upper flange is placed thereagainst to define an enclosure substantially completely enveloping the gasket upon inflation thereof while leaving a portion of the inflated gasket exposed to engage said

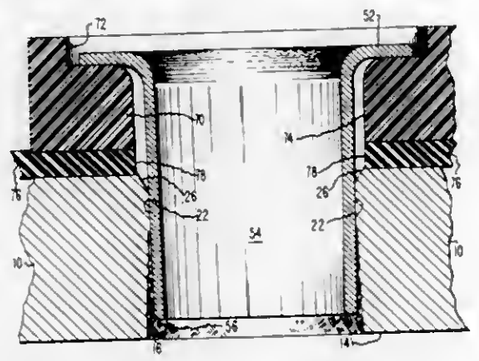
casing wall as well as the inside of said fence to form a continuous annular fluid-tight seal therewith while preventing extrusion of the inflated gasket out of the gap.

4,029,426

TUBULAR FASTENING SYSTEM

Dewey M. Sims, Jr., Westland, Mich., assignor to Burroughs Corporation, Detroit, Mich.

Filed May 7, 1975, Ser. No. 575,240
Int. Cl.² B25G 3/00; F16D 1/00; F16G 11/00
U.S. Cl. 403—408 1 Claim



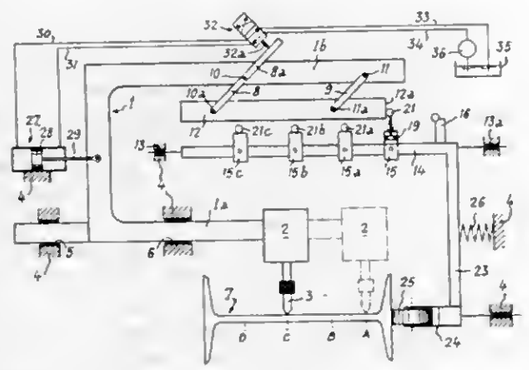
1. A fastening assembly for providing a readily predictable and substantially constant holding force comprising:
a thin-walled, hollow, cylindrical eyelet with a flanged head, the eyelet being formed of ductile, yet non-work hardening metal; and
a support member formed of a relatively rigid material and having formed therein an aperture with said eyelet received therein, the aperture being of such shape and dimension as to provide a plurality of discrete contact areas for the inserted eyelet in the aperture which interferingly contact the eyelet to create radial pressure sufficient to cause ductile yielding therein.

4,029,427

APPARATUS FOR POSITIONING TOOLS

Jean Cloup, 33360 Latresne, France

Filed Nov. 11, 1975, Ser. No. 631,159
Claims priority, application France, Dec. 24, 1974, 74.42695
Int. Cl.² B23B 29/08
U.S. Cl. 408—3 8 Claims



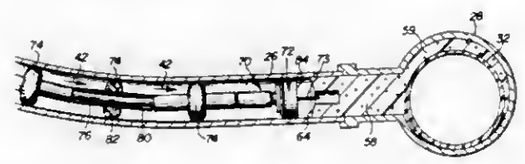
1. An apparatus for positioning a tool member in relationship to a workpiece which comprises:
guide means positioned in said apparatus;
a support member slidably mounted in said guide means and including said tool member disposed for movement in a parallel relationship to said workpiece; a controller member being supported for displacement from a normal position,
an actuator device mounted on said apparatus and operatively connected to said controller member for moving said support member relative to said workpiece upon said controller member being displaced from said normal position; and
a reference bar for determining the position of said workpiece, at least one pre-selector means mounted on said reference bar; and said preselector means being operative to displace said controller member from said normal position for effecting selective positioning of said tool with reference to said workpiece.

4,029,428

PIPE REPAIR APPARATUS

Joseph A. Levens, Richardson, Tex., assignor to Nipak, Inc., Dallas, Tex.

Division of Ser. No. 474,922, May 31, 1974, Pat. No. 3,950,461. This application Oct. 16, 1975, Ser. No. 622,952
Int. Cl.² B23B 47/02; B29D 27/04
U.S. Cl. 408—127 1 Claim



1. A cutting apparatus for use in interconnecting a relined main conduit to an intersecting service conduit wherein the main conduit has a liner positioned therein and wherein the area between the main conduit and the liner adjacent the intersection of the service conduit with the main conduit is filled with a foamable setting resinous material and the area adjacent the intersection of the service conduit and the main conduit is filled with a foamable setting resinous material, which comprises:
a cutter having a cylindrical cutting blade substantially conforming to the shape of said service conduit for forming a cylindrical opening, and shredding blade means positioned within said cylindrical cutting blade and axially away from said circular cutting edge for shredding material within said cylindrical cutting blade;
a drive shaft with the inner shaft attached to said cutter for transmitting power to the cutter at a remote location;
means adjacent the cutter for centrally positioning said cutter in the service conduit;
said positioning means comprising a plurality of lengths of tubing of a size to surround and axially slide along the exterior of said drive shaft, a portion extending from the exterior of each of said lengths of tubing for contacting and sliding along the walls of said service conduit, each of said extending portions defining an arcuate radially outward facing surface and having a maximum outside dimension in the radial direction slightly less than said service conduit; and
means for reciprocating said cutter within said service conduit whereby a port is formed between said service conduit and said liner.

4,029,429

BALL DRIVE NON-REVERSING TAPPING ATTACHMENT

Allan S. Johnson, 1400 Nottingham Road, Newport Beach, Calif. 92660

Continuation-in-part of Ser. Nos. 599,783, July 28, 1975, and Ser. No. 625,879, Oct. 28, 1975. This application May 24, 1976, Ser. No. 689,208
Int. Cl.² B23B 47/24; B23Q 1/46
U.S. Cl. 408—142 6 Claims

1. In coupling means for transmitting torque, in combination, a first rotating member, a second axially aligned member, said members being relatively movable axially, means for transmitting rotary drive from one member to the other, said means including at least one ball member positioned between the rotating members, both the rotating members having axial configurations engageable with the ball member whereby drive is transmitted through the ball member, the axial configurations on one of the rotating members being axial splines, said splines having an interruption therein, whereby after relative axial movement between the rotating members the ball member reaches the interruptions, the transmission of rotation is terminated, the rotating members being relatively movable axially into a position wherein the said ball member passes the interruptions and transmission of rotary drive is resumed.

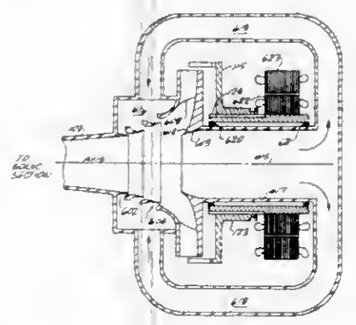
3. Coupling means as in claim 1, wherein the first rotating member is part of a tapping attachment adapted for rotation and to be moved axially, the second rotating member being the tapping spindle of the tapping attachment.

4,029,430

SHORT SUBSONIC DIFFUSER FOR LARGE PRESSURE RATIOS

Giusto Fonda-Bonardi, 2075 Linda Flora Drive, Los Angeles, Calif. 90024

Filed Sept. 2, 1975, Ser. No. 609,439
Int. Cl.² F01D 1/12
U.S. Cl. 415—53 R 10 Claims



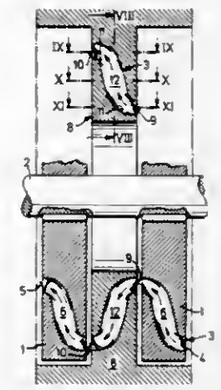
1. In a longitudinal divergent fluid diffuser, comprising means for converting a portion of the kinetic energy of a high velocity moving fluid in said diffuser into a higher pressure upon deceleration of the fluid stream wherein the diffuser includes means for preventing boundary layer detachment of the moving fluid along the divergent wall of the diffuser by increasing the momentum of the boundary layer in a direction parallel to the direction of longitudinal fluid flow by injecting a continuous thin layer of fluid along the diffuser wall through a slot immediately upstream of each point where the boundary layer detachment is likely to occur, means for collecting a central core portion of the high pressure decelerated fluid stream flowing in the diffuser in a central core region, away from the disturbed fluid flow near the diffuser wall, where the stagnation pressure has a value higher than the terminal pressure at the outlet of the diffuser and means for feeding back the collected high pressure central core portion fluid to said means for preventing boundary layer detachment, and means for introducing a high velocity fluid with said kinetic energy to be converted into the diffuser.

4,029,431

FLUID-FLOW MACHINE

Herbert Bachl, Stolzingstr. 4/IV, Munich 81, Germany

Filed Aug. 21, 1975, Ser. No. 606,706
Claims priority, application Germany, Aug. 23, 1974, 2440475
Int. Cl.² F04D 31/00
U.S. Cl. 415—69 4 Claims



4. A fluid-flow machine comprising:
a plurality of rotors;
at least one guide wheel located between said plurality of rotors;
said rotors each comprising a plurality of fluid-flow channels therethrough, each said fluid-flow channel comprising
rectangular shaped inlet and outlet openings on opposite sides of said rotor disposed at different distances from the axis of rotation of said rotor,
a tangential inlet channel portion including said inlet opening for receipt of a fluid-flow medium,
a tangential outlet channel portion including said outlet opening for discharge of the fluid-flow medium, and
a circular radial connecting section between said channel portions having curved opposite ends connecting said inlet portion to said outlet portion completely around the perimeter thereof;
each said channel portion having a direction, for directing the fluid-flow medium, which has a transverse and an axial component relative to the axis of rotation of the rotor, the axial components being in the same direction and the transverse components being in the opposite direction, said fluid-flow channels being formed so as to transform from the rectangular inlet and outlet channel portions into the curved cross-section in said radial connecting section;
said at least one guide wheel having fluid-flow channels in mirror image to the corresponding portions of said rotors and comprising inlets and outlets which are rectangular shaped in cross-section and a radial connecting section therebetween, said radial connecting section having a cross-section which is curved completely around the

perimeter thereof, the fluid-flow channels of said guide wheel forming a transition from the rectangular cross-section of the inlet and outlet openings thereof into the curved cross-section of the radial connecting section thereof.

4,029,432

THERMAL TURBOMACHINE

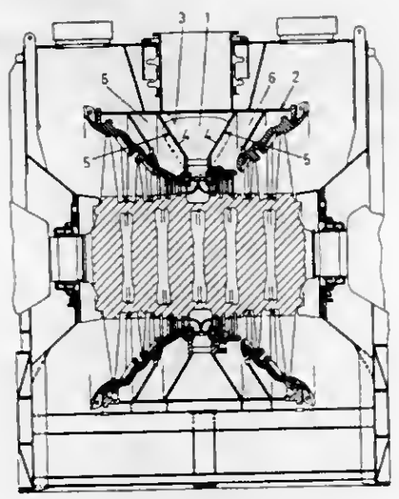
Pierre Meylan, Neuenhof, Switzerland, and Heinz Brunner, Waldshut, Germany, assignors to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Nov. 11, 1975, Ser. No. 630,789

Claims priority, application Switzerland, Nov. 18, 1974, 15308/74

Int. Cl.² F01D *3/02*

U.S. Cl. 415—101 **10 Claims**



1. In a thermal turbomachine, such as a steam turbine, and which is provided with an intake duct that is delimited by the internal surface of an essentially rigid part of an inner housing surrounding the rotor and by the opposed surfaces of two rotationally symmetrical shells, the improvement wherein there are provided means to ensure a gastight seal during operations between said rigid part of said inner housing and each said shell and which comprise means providing axially spaced first sealing surfaces fixed to said rigid part of said inner housing, and means providing second sealing surfaces respectively on the peripheral portions of said shells, said first and second sealing surfaces being pressed against each other by the operating pressure of the fluid operating medium admitted to said turbomachine thereby to effect said gastight seal, and said first and second sealing surfaces having cooperating means capable of relative movement with respect one another and allowing a substantially unobstructed heat expansion by each said shell thereby to avoid any interaction between said shells and said inner housing related to thermal stresses and thermal deformation.

4,029,433

STATOR VANE ASSEMBLY

Robert Noel Penny, Solihull, and Peter Boden Candy, Bearley, near Stratford-upon-Avon, both of England, assignors to Caterpillar Tractor Co., Peoria, Ill.

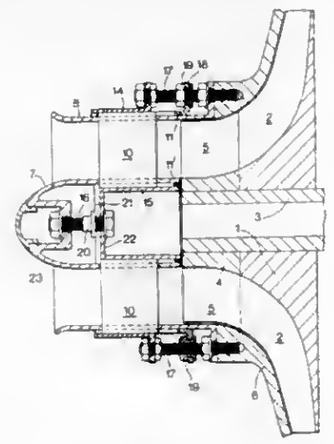
Filed Dec. 15, 1975, Ser. No. 640,688

Claims priority, application United Kingdom, Dec. 17, 1974, 54347/74

Int. Cl.² F01D *17/10*

U.S. Cl. 415—147 **8 Claims**

1. A stator vane assembly for a gas turbine engine, the stator vane assembly comprising a pair of radially spaced co-axial annular walls mounted co-axially of a rotor of the engine, a plurality of circumferentially-spaced flexibile stator vanes extending in a generally radial direction between said annular walls, an axially movable annular vane-deflecting member having a plurality of circumferentially-spaced surfaces formed thereon, each said surface embracing a respective one of said vanes over at least a substantial part of a working surface of said vane in the widthwise direction thereof, said surfaces on said vane-deflecting member and hence said working surfaces of said vanes being curved in the widthwise directions of said



vanes, and means to move said vane-deflecting member axially relatively to said vanes to embrace said working surface of each vane with a different part of a respective one of said surfaces of said vane-deflecting member to deflect said vanes in the widthwise directions thereof in the region of said vane-deflecting member.

4,029,434

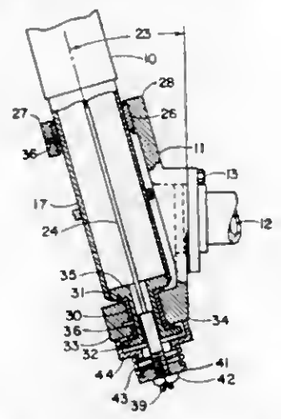
VARIABLE PITCH MOUNTING FOR AIRFOIL BLADES OF A WINDMILL OR PROPELLER

Clarence E. Kenney, 119 Stuart Road, Racine, Wis. 53406

Filed May 22, 1975, Ser. No. 579,822

Int. Cl.² F03D *7/04*

U.S. Cl. 416—41 **6 Claims**



1. An airfoil blade mounting comprising a hub rotatable about an axis, two co-axially disposed and spaced-apart sleeve bearings supported on said hub and having a common axis disposed offset from the axis of rotation of said hub and at an angle to the plane of rotation of said hub, an airfoil blade having two cylindrical portions at one end thereof and with said portions being respectively rotatably disposed in said sleeve bearings for rotation of said blade about its longitudinal axis for changing the pitch of said blade, said blade extending from said hub to the other end of said blade and with said blade being hollow along its length and terminating in a terminal end portion disposed away from said hub, said one end of said blade having two spaced-apart and mutually facing thrust surfaces disposed transverse to the longitudinal axis of said blade and in respective abutting relationship with said hub and in restrictive movement relative to said hub and along said longitudinal axis, a tension member extending through the hollow of said blade and having one end thereof connected with said terminal end portion of said blade and with the other

end of said tension member being anchored with said hub for supporting said blade against centrifugal force acting on said blade in the rotation of said blade and said hub about the axis of said hub and permitting the changes in pitch of said blade, and a spring operatively interconnected between said tension member and said hub and arranged to create a tensile force in said tension member to yieldingly restrain said blade against the influence of centrifugal force and thereby for yieldingly urging the radially inner one of said blade thrust surfaces away from abutting relationship with said hub, for rendering said blade free to rotate about its longitudinal axis in the changes in pitch of said blade.

4,029,435

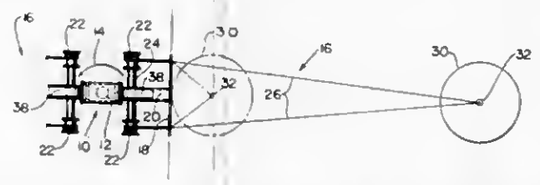
RETRACTABLE BLADE FOR A HELICOPTER ROTOR

Sidney L. Barker, 1211 N. Westshore Blvd., Tampa, Fla. 33607

Filed Jan. 29, 1976, Ser. No. 653,286

Int. Cl.² B64C *11/28*

U.S. Cl. 416—88 **6 Claims**



1. An aerodynamic rotor comprising, a rotor hub mounted for rotation about an axis, a blade mounted on said hub for rotation therewith, said blade including a blade member and a three dimensional, generally triangular truss; said truss including four flexible members and two rigid members each having opposite ends, a mid-portion of a first of said rigid members being attached to said hub and being generally transverse to said hub axis, a mid-portion of a second of said rigid members being attached to said blade member and being generally parallel to the hub axis, said flexible members forming pairs, said pairs each having spaced apart first ends, one for each of opposite ends of the first rigid member and secured thereto for free movement laterally thereof, said pairs each having a second end, one of the second ends being attached to one end of the second rigid member, and the other of the second ends being attached to the opposite end of said second rigid member, and means operable for rotating said hub about said axis at sufficient speed that operational loads create an excess of tension in all said flexible members and create a rigid three dimensional truss during operation of the rotor.

4,029,436

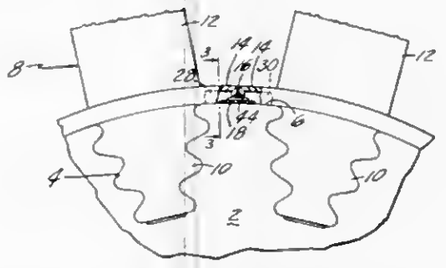
BLADE ROOT FEATHER SEAL

Edgar C. Shoup, Jr., Glastonbury, and Vincent Collettl, Jr., Rocky Hill, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed June 17, 1975, Ser. No. 587,787

Int. Cl.² F01D *5/30*

U.S. Cl. 416—193 A **9 Claims**



1. A rotor construction including:

a disk having a plurality of axially extending blade root receiving slots in its periphery with peripheral lands between the slots,

a plurality of blades having roots positioned in the slots with blade platforms on each blade extending circumferentially toward the platforms on adjacent blades and overlying the peripheral lands, adjacent platforms terminating in closely spaced relation to one another, and

a thin flexible, flat seal element positioned between each land and the overlying blade platforms and extending across the space between the adjacent platforms, said seal having means thereon to locate each seal element axially of the disk, the undersides of the platforms having recesses therein to form narrow flanges adjacent the outer edges of the platforms to engage the seal element, the narrow flanges being significantly narrower than the seal element to reduce the area of the seal element engaged thereby.

4,029,437

TURBINE SHAFT HAVING INSERTED DISKS

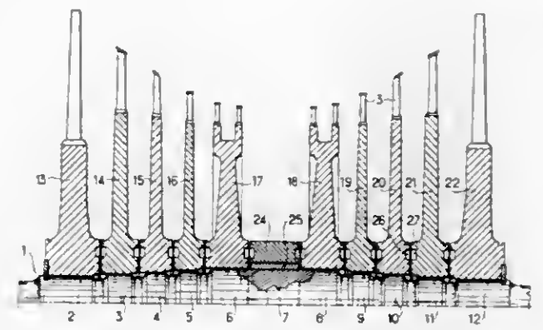
Pierre Aubry; Antoine Marques, and Rene Schwartz, all of Belfort, France, assignors to Groupe Europeen Pour La Technique Des Turbines a Vapeur G.E.T.T., Paris, France

Filed Dec. 10, 1975, Ser. No. 639,508

Claims priority, application France, Dec. 16, 1974, 74.41383

Int. Cl.² F01D *5/30*

U.S. Cl. 416—198 A **4 Claims**



1. In a turbine shaft having a succession of cylindrical bearings arranged in a stepped configuration, connected together by connecting surfaces of revolution and wherein a single disk is shrunk onto each cylindrical bearing and is unconnected to adjacent disks except through said shaft, the improvement wherein: each of said connecting surfaces of revolution comprises two conical surfaces, each of said conical surfaces starting from a respective one of the two successive cylindrical bearings being inclined at an angle of 30° to 60° to the axis of the shaft and tapering towards the axis of the shaft, a cylindrical surface being situated between said pair of conical surfaces and two toroidal surfaces connecting said cylindrical surface respectively to each one of the two conical surfaces, whereby, the zones of the shaft affected by shrinking stresses due to the shrinking of the individual disks to the individual cylindrical bearings is effectively separated from the zones affected by alternate bending stresses which lie intermediate of those zones affected by said shrinking stresses.

4,029,438

WELL POINT PUMPING SYSTEM AND PUMP ASSEMBLY THEREFOR

Albert H. Sloan, 4201 Kean Road, Fort Lauderdale, Fla. 33314

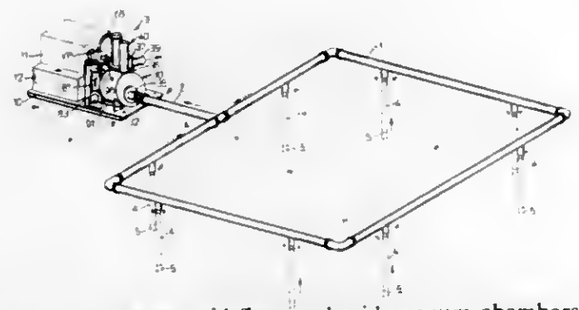
Filed Oct. 20, 1975, Ser. No. 623,655

Int. Cl.² F04D *9/00*; **F01C** *21/04*

U.S. Cl. 417—200 **13 Claims**

1. A well point pumping system comprising conduit means extending over an area of ground to be drained of water and

having well point means extending into the ground for extracting water therefrom, a pump assembly connected to said conduit means for pumping water from said conduit means, said assembly including a pump housing, an impeller type pump mounted in said housing and for causing water to flow through said conduit means and into said housing, said impeller pump including a rotatable pumping impeller member having curved vanes, and a stationary diffuser member surrounding said impeller and for receiving water discharged therefrom, said diffuser including curved vanes which curve in a direction opposite to said vanes of said impeller to thereby convert velocity of said water into static head; a float housing in fluid communication with and mounted on said pump housing and for receiving water therefrom, float means in said float housing and vertically shiftable in accordance with the water level in said housing, a vacuum chamber in communication with the float chamber of said float housing, a peller type valve



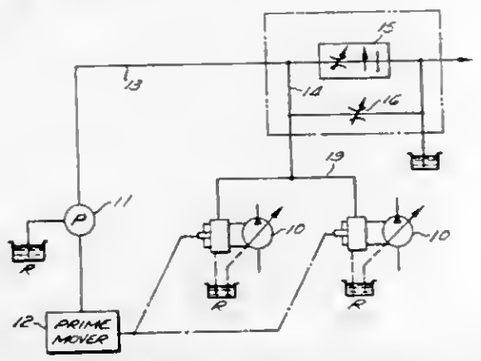
connected between said float and said vacuum chambers for permitting air to pass from said float chamber into said vacuum chamber, but for preventing water from entering said vacuum chamber from said float chamber, a discharge housing including a discharge valve in communication with said pump chamber and for permitting water to be pumped out of said pump chamber but preventing air from entering said pump chamber via said discharge chamber, power source means connected to said impeller pump for driving the latter in water pumping operation, a vacuum pump in air receiving communication with said vacuum chamber, oil and air separator means for receiving a mixture of oil and air from said vacuum pump, and oil circulating conduit means for flooding said vacuum pump with oil to thereby lubricate, seal, and cool said vacuum pump, a heat exchanger means in said pump housing and communicating with said vacuum pump for circulating oil thereto.

4,029,439

CONTROL SYSTEM FOR VARIABLE DISPLACEMENT PUMPS

Cecil E. Adams, Columbus, Ohio, assignor to Abex Corporation, New York, N.Y.

Filed Dec. 22, 1975, Ser. No. 642,868
Int. Cl.² F15D *31/02*; **F04B** *49/00, 1/26*
U.S. Cl. 417—216 **7 Claims**



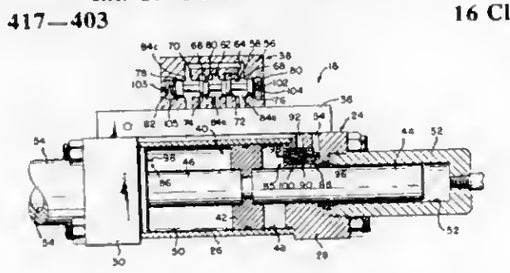
1. In a control for a hydraulic system which includes a prime mover, a plurality of variable displacement pumps driven thereby, each pump having a movable thrust plate, a fluid motor connected to the thrust plate which is operable to pivot the thrust plate between a position of maximum fluid displacement in one direction and a position of maximum fluid displacement in another direction and an independent control for selectively operating the fluid motor to move the thrust plate to thereby control the displacement of the pump, the improvement comprising a load sensing means, means connecting the load sensing means to the prime mover, the load sensing means having an output signal proportional to the load on the prime mover, each independent control including a rotary servo control valve which controls the fluid motor to selectively set the displacement of the pump, the rotary servo control valve having an input assembly which includes a rotary input shaft which sets the position of the fluid motor and the thrust plate to thereby set the displacement of the pump and the independent control further includes a variable ratio rotary input means connected to the rotary input shaft, second means connecting the variable ratio rotary input means to the output signal and the variable ratio rotary input means includes means for manually setting the position of the rotary input shaft to set the pump at a desired displacement and means responsive to said output signal for automatically changing the displacement of the pump in response to the output signal irrespective of the position of the manual setting means and each of said variable ratio rotary input means changes the displacement of its respective pump by the same percentage.

4,029,440

HIGH PRESSURE FLUID INTENSIFIER AND METHOD

John H. Olsen, Vashon, Wash., assignor to Flow Industries, Inc., Kent, Wash.

Continuation-in-part of Ser. No. 606,733, Aug. 21, 1975, abandoned, which is a continuation of Ser. No. 427,449, Dec. 26, 1973, abandoned, which is a continuation-in-part of Ser. No. 322,956, Jan. 12, 1973, Pat. No. 3,811,795. This application Mar. 16, 1976, Ser. No. 667,380
Int. Cl.² F04B *17/00, 35/00*
U.S. Cl. 417—403 **16 Claims**



1. A fluid pressure intensifying apparatus to provide a flow of a high pressure steam of an output fluid through a discharge nozzle, said apparatus comprising:
a. a working cylinder,
b. a working piston mounted in said working cylinder and separating said working cylinder into first and second working chambers, said working piston mounted in said cylinder for reciprocating motion in response to pressurized working fluid being directed alternately into said first and second working chambers,
c. high pressure output piston means operatively connected to said working piston so as to be moved along a reciprocating path thereby to deliver a high pressure flow of said output fluid,
d. a discharge nozzle to receive said high pressure flow from said output piston means, said discharge nozzle having an effective cross sectional flow area, with said discharge nozzle exerting a back pressure on said working fluid in said working chambers,
e. a control valve to direct pressurized working fluid from a working fluid source alternately to said first and second working chambers to cause the reciprocation of said working piston, said control valve comprising a valve element movable to:
1. a first position in which pressurized working fluid is directed to said first working chamber,
2. a second position in which pressurized working fluid is directed to said second working chamber,

3. an intermediate position through which said valve element passes in moving alternately between said first and second positions, said valve in said intermediate position having pressure reducing flow passage means to direct the pressurized working fluid from the working fluid source through said pressure reducing flow passage means, said pressure reducing flow passage means having an effective cross sectional area with a proportional relationship to the effective cross sectional flow area of the discharge nozzle and to the area of the working piston and the area of the high pressure piston, to produce a second back pressure of a value not substantially exceeding the back pressure resulting from transmission of power by said high pressure output piston means through said nozzle,

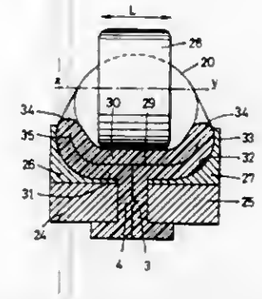
whereby potential pressure surges in said working fluid are alleviated in a manner that when flow of working fluid is increased or decreased to cause a corresponding increase or decrease of flow of said high pressure output fluid, the back pressure at both said pressure redicing flow passage and said nozzle increase or decrease correspondingly to alleviate potential pressure surges back in the working fluid.

4,029,441

TUBING MEANS FOR ROLLER PUMP

Lorenz Fischer, Kriens, Switzerland, assignor to Sermem S.A., Sion, Switzerland

Filed Apr. 22, 1975, Ser. No. 570,474
Claims priority, application Switzerland, Apr. 24, 1974, 5610/74; Apr. 24, 1974, 5611/74
Int. Cl.² F04B *43/08, 45/06*
U.S. Cl. 417—477 **14 Claims**



1. A volumetric pump comprising inlet and outlet couplings, each of said couplings having a circumferential groove therein, a flexible suction and delivery member, a support device for supporting said member, and a mobile arrangement cooperating with said support device for effecting a localized constriction of said member while moving cyclically along it, wherein said member is a flat, elastomeric section comprising two ends, two parallel side edges, and two securing appendages disposed along said edges, said appendages being fixed to said support device for keeping said section bent back upon itself in tubular form, the inner surface of said section having a rib parallel to and adjacent each of said two ends, and said two ends being respectively connected in a fluid-tight manner to said inlet and outlet couplings with said ribs respectively engaging in said grooves.

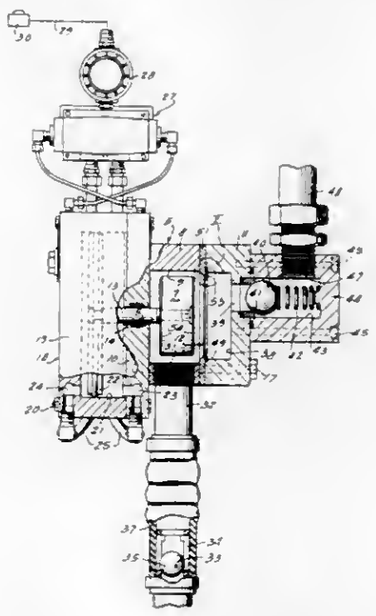
4,029,442

HIGH PRESSURE PISTON PUMP AND WIPER, SEALING, VALVING STRUCTURE

Paul W. Schlosser, Missouri City, Tex., assignor to Edward Bleiweiss, Houston, Tex.

Filed Aug. 19, 1975, Ser. No. 605,914
Int. Cl.² F04B *7/04*
U.S. Cl. 417—489 **4 Claims**

1. A pump for fluent materials and especially suitable for moving heavy fluent and abrasive materials, comprising:
a housing member providing a hollow cylinder chamber receptive of material to be pumped and having an axially extending chamber wall and opposite ends;
a piston within and shorter than the cylinder chamber and having its perimeter of smaller diameter than and in limited spaced gap relation to said wall so that material can flow through the gap;
a closure at one end of the cylinder chamber and means for guiding a piston rod of the piston for axial forward and return strokes of the piston relative to the opposite end of the cylinder chamber;
means for driving the piston rod and thereby the piston in said forward and return strokes;
a closure member and means securing the closure member to said housing member in closing relation to said opposite end of the cylinder chamber, and said closure member having a blind end chamber which forms a forward extension from the cylinder chamber and into which the piston extends a limited distance in the forward stroke of the piston, said blind end extension chamber being of a diameter which is larger than the diameter of the piston perimeter so that there is a limited spaced gap relation between the piston perimeter and said extension chamber when the piston extends into said extension chamber;
means for introducing into said cylinder chamber material to be pumped, and check valved means for receiving pumped material from said extension chamber;
a rigid annular ring plate clamped between said housing member and said closure member and having an inner annular rib portion which extends to a smaller diameter



than the diameters of the cylinder chamber wall and the extension chamber wall but to a larger diameter than the piston perimeter diameter, said rib portion defining a port through which the piston moves freely in a forward stroke from a position wherein the forward end of the piston is entirely within the cylinder chamber and clear of said rib portion; and
a combination valving, sealing and wiping elastic ring comprising a normally substantially flat elastic annular element fixedly clamped between said ring plate and said closure member and having an annular portion projecting radially inwardly beyond said rib portion to a substantially smaller diameter than the diameter of the piston perimeter, said elastic ring being engaged by the piston during the forward stroke through said rib portion and the piston elastically expanding the radially inwardly projecting portion of the elastic element into a tensioned sealing and wiping annular lip extending forwardly on the piston perimeter and maintaining pumping pressure in said blind end chamber against leakage past said rib flange during said forward stroke of the piston;
said rib portion serving as a backup for the elastic ring to prevent backward extrusion of the ring past the rib portion due to pumping pressure in said blind end chamber;
said piston producing a suction effect and developing a

negative pressure in said extension chamber during the return stroke of the piston whereby said lip expands and relieves its grip on the piston perimeter and diminishes the power load required to withdraw the piston from the lip during the return stroke;

said piston completely withdrawing from the elastic ring in said return stroke so that material can flow from said cylindr chamber past said piston and through said rib portion and said elastic ring into said blind end chamber in response to said negative pressure;

said lip providing the only surface in the pump with which the perimeter of the piston engages at any time and all other surfaces within the pump remaining at all times spaced from the piston perimeter.

4,029,443

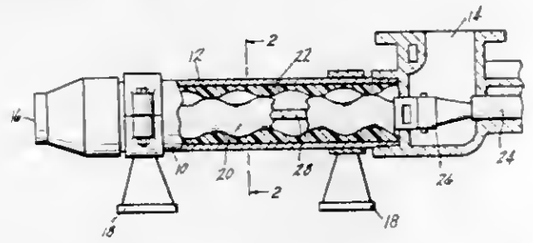
PROGRESSING CAVITY PUMP

Chester C. Burnside, Aiken, S.C., and John G. Wright, Coplay, Pa., assignors to Olin Corporation, New Haven, Conn.

Filed Nov. 27, 1974, Ser. No. 527,818

Int. Cl.² F01C *5/04*; **F04C** *1/06, 5/00*

U.S. Cl. 418—48 **2 Claims**



1. In a helical gear pump wherein an internally helically threaded resilient stator pumpingly coacts with an externally helically threaded rigid rotor, a rigid tubular casing embracing said stator, said casing having an inlet and an outlet, the improvement which comprises means to prevent said stator from rotating within said casing, said means being at least one rib attached along a portion of the inner wall of said casing, said rib being engagingly in contact within groove means in said stator, wherein said rib is curved, and in which said portion is from about 75 to about 100 percent of the length of said casing which is in contact with said stator.

4,029,444

SEALING BOLT SEAT FOR ROTARY PISTON MACHINE

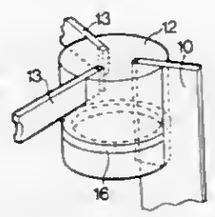
John Michael Clarke, Banbury, England, assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 10, 1975, Ser. No. 621,430

Claims priority, application United Kingdom, Oct. 10, 1974, 43855/74

Int. Cl.² F01C *19/08*

U.S. Cl. 418—120 **3 Claims**



1. A rotary piston machine having a rotor seal grid comprising a plurality of peripheral and apex seals and a cylindrical seal connector (herein called a "bolt") with which ends of said peripheral and apex seals engage, said bolt located with lateral clearance in a socket in the rotor, and having a circumferentially-extending slot in its circumferential surface, said seal grid also including an arcuate resilient seal located in said slot and extending circumferentially around said slot and engaging between the circumferential wall of said slot and the adjacent circumferential wall of the socket, whereby sealing is effected between the circumferential walls of the slot and the socket while permitting lateral movement and wobbling of said bolt in the socket.

4,029,445

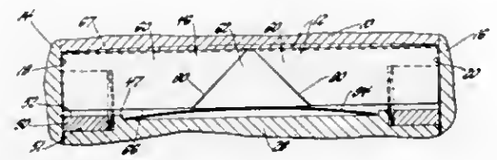
ROTARY COMBUSTION ENGINE APEX SEAL ARRANGEMENT

Jerry R. Mrlik, Birmingham, Mich., assignor to General Motors Corporation, Detroit, Mich.

Continuation of Ser. No. 591,752, June 30, 1975, abandoned. This application Aug. 11, 1976, Ser. No. 713,271

Int. Cl.² F01C *19/04*

U.S. Cl. 418—120 **4 Claims**



1. An apex seal arrangement for a rotary combustion engine having an inner peripheral wall and oppositely facing side walls and a rotor between the side walls with apexes that remain adjacent the peripheral wall as the rotor rotates, said apex seal arrangement comprising a pair of end segments arrangeable in a slot in each rotor apex with oppositely facing inner ends that leave a space therebetween and flat outer ends that face the respective side walls, a central segment arrangeable in the slot in each rotor apex in said space between the inner ends of said end segments, spring means between the bottom of the slot and said central segment only to provide a radially outward force on said central segment, all of said segments having a sealing surface on a radially outward side for contacting the peripheral wall and said end segments also having a sealing surface on their outer end for contacting one of the side walls, said inner ends of said end segments having ramps inclined at opposite and equal oblique angles to the peripheral wall and side walls, the sealing surface of each said end segment extending approximately half the width of said peripheral wall whereby a small gap is left between the oppositely facing inner ends of said end segments at said peripheral wall, said central segment having a shape generally corresponding to said space with a bottom facing the bottom of the slot and oppositely inclined flat sides positively engaging the respective end segment ramps and a top with the sealing surface thereon fitting within said small gap and always located above the top of the apex seal slot so that when a radially outward force is applied to said central segment the sealing surface thereon is urged toward engagement with the peripheral wall while said central segment sides operate on said end segment ramps to urge said end segments into sealing surface engagement with both the peripheral wall and respective side walls whereby the only possible leakage gap is in said small gap left between the oppositely facing inner ends of said end segments and remains substantially filled by said central segment top above the top of the apex seal slot, and said inclined sides of said central segment having a substantially steeper angle than said ramps of said end segments so that their engagement initially occurs adjacent opposite sides of said small gap at the low end of the engine's heat and pressure ranges and then as the peripheral wall changes in cross-wise contour with gas pressure and/or heat expansion and the end segments tilt to conform thereto the ramps and inclined sides then proceed toward full engagement along their interfaces.

4,029,446

SEALING ARRANGEMENT FOR GEAR-TYPE FLUID DISPLACING MACHINES

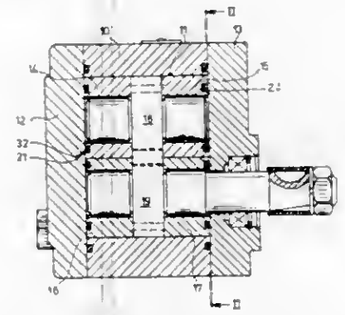
Siegfried Mayer, Vaihingen; Ivan Sauer, Schwieberdingen, and Jürgen Zorn, Korntal, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Dec. 31, 1975, Ser. No. 645,880

Claims priority, application Germany, Jan. 10, 1975, 7500496[U]

Int. Cl.² F01C *19/08*; **F03C** *3/00*; **F16J** *15/14*

U.S. Cl. 418—132 **18 Claims**



1. In a gear-type fluid displacing machine, a combination comprising a housing having a chamber and two side sections overlying opposite ends of the chamber; a pair of mating gears in said chamber for generating as they rotate a pressure area therein whose magnitude depends upon the loading and rotational speed of said gears, said gears having adjacent trunnions at said opposite ends of said chamber; annular bearing members surrounding said trunnions and each having an end facing one of said side sections and formed with a groove; and generally U-shaped resilient means in each of said grooves for sealing the latter as a function of the prevailing loading condition, said sealing means having legs which respectively engage one of said grooves and said side section which faces the latter in prestressed condition for normally sealing said grooves under no-load and slightly-loaded conditions due to the inherent resilience of said legs, and said legs in part bounding a space which is in communication with said pressure area so that under higher-loaded conditions said legs are pressed more firmly into sealing engagement therewith under the influence of pressure fluid entering from said pressure area into said space of said sealing means due to the increased magnitude of the force exerted by the pressure fluid entering from said pressure area under increased loading, whereby said grooves are sealed with different magnitudes of force which depend upon the prevailing loading condition.

4,029,447

RETREADING MOLD WITH NONPLOWING MATRICES CLOSING

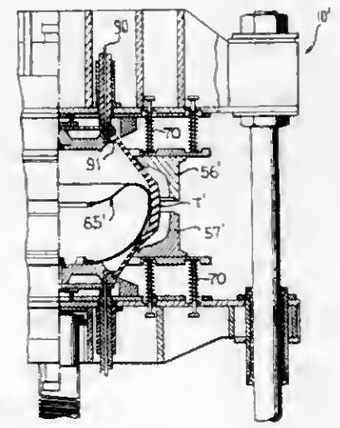
Kenneth T. MacMillan, 4992 Wesleyan Woods Drive, Macon, Ga. 31204

Division of Ser. No. 391,816, Aug. 27, 1973, Pat. No. 3,997,284. This application July 30, 1976, Ser. No. 710,131

Int. Cl.² B29H *5/04*

U.S. Cl. 425—21 **5 Claims**

1. A retreading mold comprising first and second relatively movable platens, means for imparting relative motion to said platens between first and second respective adjacent and remote relative positions, first and second matrices carried respectively by said first and second platens, first and second biasing means associated with said first and second platens and said first and second matrices for biasing said first and second matrices respectively away from said first and second platens, first and second bead aligner wheels carried respectively by said first and second platens, first and second means for respectively moving said first and second bead aligner wheels between first and second respective adjacent and remote positions, said matrices defining in the first position of said platens an annular chamber adapted to receive therein a tire to be retreaded, said matrices in the first position of said platens being in abutment with each other in a plane generally normal to the axis of said annular chamber, each bead aligner wheel having means for aligning a tire relative to said annular chamber by contacting beads of a tire, clamping means for internally bearing against each tire bead and clampingly urging each tire bead to an associated bead aligner wheel



whereby the diameter of the tire is reduced when said bead aligner wheels and matrices are in the second positions thereof, and control means for operating said motion imparting means to move said platens from their second position to their first position thereby forming said annular chamber prior to the movement of said bead aligner wheels from their second position to their first position whereby the tire returns to its normal diameter only after said matrices are closed.

4,029,448

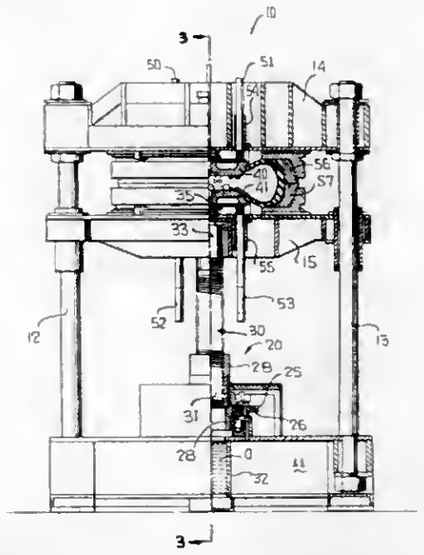
BEAD ALIGNER WHEELS WITH PROJECTION FOR RETREADING MACHINES

Kenneth T. MacMillan, 4992 Wesleyan Woods Drive, Macon, Ga. 31204

Division of Ser. No. 391,816, Aug. 27, 1973, Pat. No. 3,997,284. This application Aug. 2, 1976, Ser. No. 710,669

Int. Cl.² B29H *5/04*

U.S. Cl. 425—21 **8 Claims**



1. A retreading mold comprising first and second relatively movable platens, means for imparting relative motion to said platens to move the same between first open and second closed positions, first and second matrices carried respectively by said first and second platens and defining in the second position of said platens an annular chamber adapted to receive therein a tire to be retreaded, first and second bead aligner

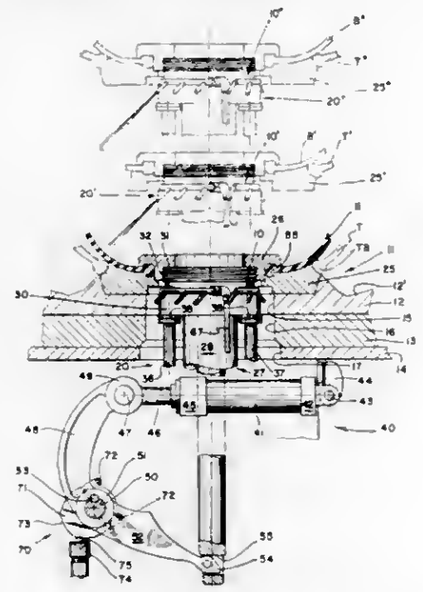
wheels carried respectively by said first and second platens adapted to engage the associated bead of a tire to be retreaded within said annular chamber, means for imparting relative motion between said bead aligner wheels to move the same between first adjacent and second more spaced apart positions, means carried by at least one of said bead aligner wheels for abuttingly contacting a second of said bead aligner wheels to preclude relative movement of said bead aligner wheels to a position less than that of said first adjacent position, an annular bladder having first and second innermost peripheral marginal portions, said first and second peripheral marginal portions contacting said first and second bead aligner wheels, respectively, and said abutting contacting means of said one bead aligner wheel is radially inboard of said first and second innermost peripheral marginal portions thereby aligning said bladder relative to said bead aligner wheels and preventing bladder pinching when said bead aligner wheels are in their first adjacent position.

4,029,449

MOLD BLOW OUT APPARATUS

Robert E. Longaberger, Marshallville Road, R.D. 1, Box 5, Marshallville, Ohio 44645

Filed July 14, 1976, Ser. No. 705,119
Int. Cl.² B29H *5/02*
U.S. Cl. 425—28 R **14 Claims**



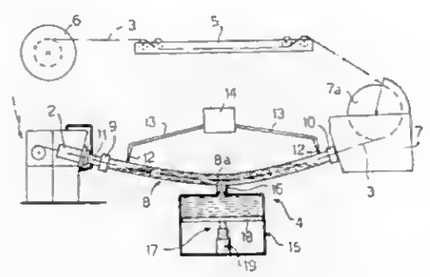
1. In a tire curing press having upper and lower mold sections and a center mechanism having a bladder and including a vertically movable hub carrying a ring for engaging the lower bead of a tire, mold blow out apparatus comprising, tubular means mounted exteriorly of the bladder on the movable hub of the center mechanism, conduit means communicating with and supplying pressurized fluid to said tubular means, and a plurality of nozzle means on said tubular means for directing the pressurized fluid into contact with the lower mold section to effect removal of residual foreign matter therein.

4,029,450

PLANT FOR VULCANIZING A CONTINUOUS LENGTH OF CURABLE MATERIAL ARTICLES OF ELASTOMERIC MATERIALS

Gustavo Caser, Gaglianico (Vercelli), Italy, assignor to Officine Termomeccaniche Successori Carello S.p.A., Gaglianico, Italy

Filed Apr. 18, 1975, Ser. No. 569,502
Claims priority, application Italy, Apr. 26, 1974, 68315/74
Int. Cl.² B29F *3/10*
U.S. Cl. 425—71 **27 Claims**



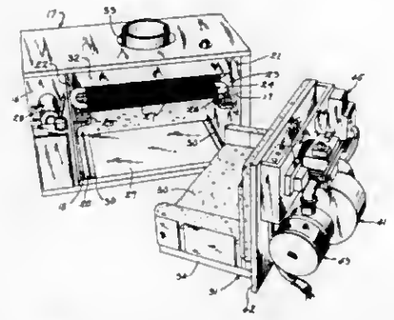
1. A plant for vulcanizing a continuous length of curable material, the plant comprising means defining a vulcanization chamber having a first region adapted to receive heat exchange liquid heated to a predetermined temperature, and at least one further region which communicates with said first region but is not invaded by said heat exchange liquid when said heat exchange liquid is received in said first region; fluid pressure means connected to said at least one further region to generate in said vulcanization chamber fluid pressure; and inlet means and outlet means provided at said at least one further region to allow passage of said material through said chamber in fluid tight manner.

4,029,451

GAS BURNING APPARATUS

Ken Farnia, East Lansing, Mich., assignor to A. O. Smith Corporation, Milwaukee, Wis.

Filed Feb. 3, 1975, Ser. No. 546,687
Int. Cl.² F24H *1/00*
U.S. Cl. 126—361 **14 Claims**



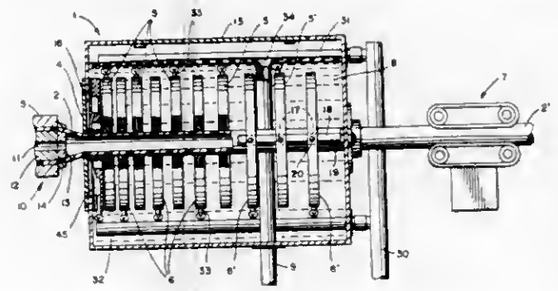
1. A gas burning apparatus, comprising housing means providing a combustion zone burning combustible gas, a burner unit operatively connected to said housing means and including a unit housing providing a substantially impervious channel having a first cross-sectional area located adjacent an inlet opening and a second cross-sectional area less than said first area located adjacent an outlet opening containing a perforated screen having a convex surface extending across said outlet opening and facing said combustion zone with at least one side edge of said screen movably retained by said housing, and means supplying combustible gas and air at a predetermined pressure to said first area of said channel provided by said burner unit with said unit channel increasing the velocity of mixed combustible gas and air to provide a gas velocity at said combustion zone greater than the flame propagation and maintaining the flame within said combustion zone in spaced relationship to said convex surface.

4,029,452

APPARATUS FOR CALIBRATING AN EXTRUDED THERMOPLASTIC TUBE

Heinz Schippers, Remcheid, and Gerhard Koslowski, Huckeswagen, both of Germany, assignors to Barmag Barmer Maschinenfabrik Aktiengesellschaft, Wuppertal, Germany

Filed Dec. 3, 1975, Ser. No. 637,369
Claims priority, application Germany, Dec. 3, 1974, 2456986
Int. Cl.² B29C *25/00*
U.S. Cl. 425—71 **17 Claims**



1. In an apparatus for the manufacture of an extruded thermoplastic tube including a vacuum tank partially filled with a liquid cooling medium to receive and cool the hot extruded tube and a plurality of draw plates with central openings as calibrating means aligned at spaced intervals within said tank along the axis of the extruded tube, the improvement which comprises:

a feed conduit for said liquid cooling medium opening tangentially into a ring channel contained within each draw plate around the central opening thereof; and

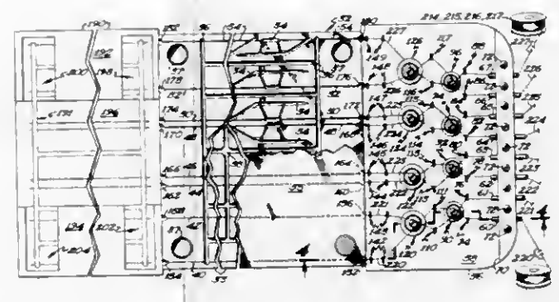
an annular liquid discharge slot extending inwardly from said ring channel toward the periphery of the tube.

4,029,453

MOLDING APPARATUS FOR MAKING A DENTAL FLOSS DEVICE WITH FLOSS TENSIONING MEANS

James M. Campion, Jr., Minnetonka, Minn., assignor to Philmon & Hart Laboratories, Inc., Bloomington, Minn.

Filed Nov. 4, 1974, Ser. No. 520,298
Int. Cl.² B29F *1/00*
U.S. Cl. 425—111 **13 Claims**



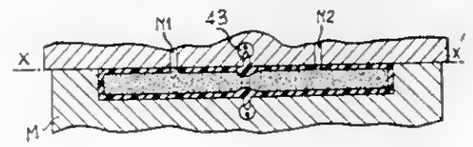
1. Apparatus for tensioning dental floss through a mold used in the production of a dental tooth cleaning instrument including a bow-shaped member having a first end and a second end and dental floss tensioned between the first and second ends, the mold being of the plastic-like material injection type including at least one line cavity for receiving the dental floss, comprising in combination: at least one source of dental floss; first means for holding the end of the dental floss; primary means for tensioning the dental floss in the mold during the injection of the plastic-like material into the mold; secondary means for supplementally tensioning the dental floss in the mold during the cool down period after the injection of the plastic-like material into the mold; second means for guiding the dental floss from the source of dental floss to the secondary tensioning means; and third means for guiding the dental floss into the line cavity of the mold for causing the dental floss to travel from the source, to the second means, through the secondary tensioning means, the primary tensioning means, the third means, and the mold, and to the first means.

4,029,454

INJECTION MOLDING MACHINE FOR COMPOSITE ARTICLES

Bernard Léon Monnet, "Mont Olivet", Bellignat, Ain, France

Filed Sept. 23, 1974, Ser. No. 508,568
Claims priority, application France, Sept. 25, 1973, 73.34327
Int. Cl.² B29F *1/10*
U.S. Cl. 425—130 **10 Claims**



1. An injection-molding machine for molding articles having at least locally, composite portions in which are found at least two materials of different compositions, one of which is coated by the other, said machine comprising:

a frame,

a mold supported on said frame including a fixed part and a movable part and having opposed surfaces at least one of which is movable toward and away from the other surface, said surfaces defining a joint plane for a mold cavity between said fixed and movable parts when the mold is closed, said mold including at least a pair of inlets to said mold cavity for delivering mold materials into said cavity with at least one of the fixed and movable parts of the mold having means providing for leakage of material outwards of said mold cavity in a plane substantially perpendicular to the joint plane,

at least two separate supply systems supported on said frame for injecting materials through said inlets into said mold cavity, and

a plurality of distributor means for the materials in communication with said mold cavity through said inlets, at least two of said distributor means each including a member movable for selectively and alternately connecting one or another of said separate supply systems with said mold cavity through a corresponding inlet to cause successive injection into the mold cavity of at least two materials of different compositions respectively, said inlets being spaced one from the other such that the successive injection of the two different materials through each inlet is provided at different locations within said cavity thereby initially forming a pair of discrete composite segments of said materials therein with one material forming a coating for a core formed of the other material in each segment, said leakage means being located between said inets and providing for flow of coating material outwardly of said mold cavity to enable the core material of each composite segment to unite one with the other upon formation of the final composite article.

4,029,455
APPARATUS FOR INTRODUCING STARTING MATERIALS INTO A SHEARING GAP OF A MACHINE FOR PRODUCTION OF FLAT STRUCTURES

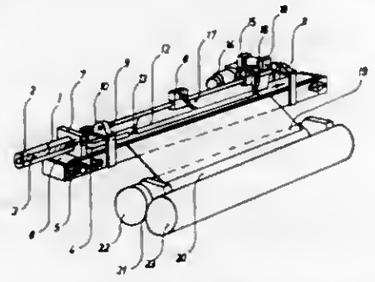
Herbert Schmidt, Offenback (Main); Joachim Herzel, Frankfurt am Main, and Dietrich Zickler, Muhlheim (Main), all of Germany, assignors to Zimmer Plastic GmbH, Frankfurt, Germany

Division of Ser. No. 264,398, June 15, 1972, abandoned. This application Feb. 26, 1975, Ser. No. 553,178

Claims priority, application Germany, Dec. 15, 1971, 2162229

Int. Cl.² B29C *15/00*

U.S. Cl. 425—142 **6 Claims**



1. An apparatus for introducing starting materials into a shearing gap of a machine for producing plastic films, ribbons, foils or plates, said shearing gap being bound on at least one long side by a heated turnable roller having a roller axis, comprising, in combination:

means for producing at least one endless plasticized string of said starting materials;

a conveyor belt positioned to withdraw said endless plasticized string from said producing means and to move said endless plasticized string to a predetermined position;

means for severing said endless plasticized string on said conveyor belt into substantially uniform string sections of a predetermined length, said conveyor belt moving said substantially uniform string sections into said predetermined position wherein said substantially uniform string sections are substantially parallel to said roller axis and above said shearing gap;

means for injecting said substantially uniform string sections into said shearing gap, said injecting means including a stripper adapted to engagingly remove said substantially uniform string sections from said conveyor belt and means for actuating said stripper in response to said substantially uniform string sections, said substantially uniform string sections being gravity fed into said shearing gap, said stripper being actuated whenever one of said substantially uniform string sections reaches said predetermined position.

4,029,456
RAPID LOAD-RELIEVE DEVICE FOR CONTINUOUS PRESS

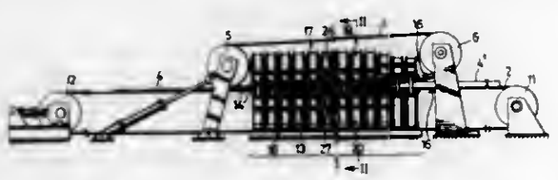
Karl-Heinz Ahrweiler, Krefeld, Germany, assignor to Eduard Kusters Maschinenfabrik, Krefeld, Germany

Filed Oct. 10, 1975, Ser. No. 621,382

Claims priority, application Germany, Oct. 31, 1974, 2451894

Int. Cl.² B29C *3/06*

U.S. Cl. 425—149 **10 Claims**



1. In a press having two press platens which are brought toward each other by at least one force exerting element utilizing a fluid medium under pressure, the elements designed to abut against a stop as long as a pre-determined operating pressure between the spans is not exceeded, the improvement comprising:

a. means for sensing the movement of the force exerting element away from the stop and providing an output indicative thereof; and

b. means responsive to the output of said sensing means for moving said press platens apart in a direction opposite to their normal operating direction.

4,029,457
MOLDING MACHINE

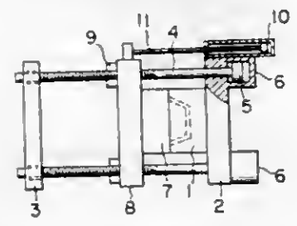
Rikichi Yamamoto, Numazu, Japan, assignor to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 479,629, June 17, 1974, abandoned. This application Jan. 26, 1976, Ser. No. 652,111

Int. Cl.² B29C *3/06*

U.S. Cl. 425—167 **7 Claims**

PRIOR ART



1. In a molding machine including a stationary mold mounted on a stationary die plate, a movable mold carried by a movable die plate movable along at least one tie bar, a boost cylinder coupled to said movable die plate for moving and forcing said movable die plate toward and away from said stationary die plate, at least one mold tightening cylinder coupled to said tie bar for urging said movable mold against said stationary mold with a force greater in magnitude than said boost cylinder, and a locking member for locking said movable die plate to said tie bars, an improvement comprising electric contacts arranged and configured to be closed by the movement of said movable die plate before said movable mold engages said stationary mold, and electric actuating means energized by an electric signal generated by the closure of said contacts for actuating said locking member while said movable mold is still moving toward said stationary mold.

4,029,458
EXTRUSION DIE

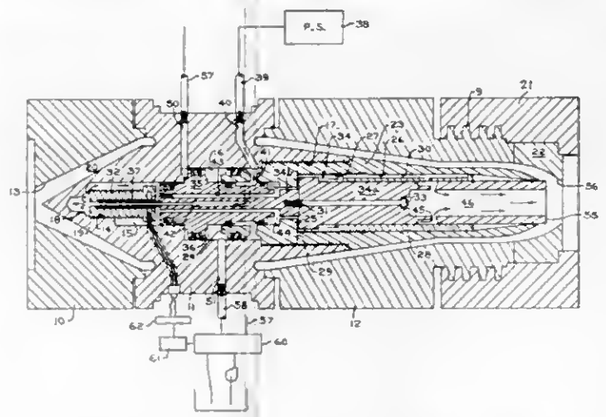
Heung Tai Kim, Avon Lake, and Gary F. Wilson, Grafton, both of Ohio, assignors to The B.F. Goodrich Company, Akron, Ohio

Filed June 24, 1975, Ser. No. 589,890

Int. Cl.² B29F *3/04*

U.S. Cl. 425—135 **4 Claims**

1. An extrusion die assembly comprising a housing having an inlet and an outlet opening, an elongated bore in said housing extending from said inlet to said outlet, a die head positioned at said outlet, a torpedo positioned within said bore with an end of the torpedo disposed adjacent said die head, said torpedo having a recess therein with an opening extending therefrom at the said one end of the torpedo, a mandrel slidably received by said recess of said torpedo with a portion of said mandrel extending through said opening to a location adjacent said die head, a piston on said mandrel within said recess and cooperative therewith to define a pair of spaced chambers, control means operatively connected to said chambers for selectively pressurizing one or the other of said chambers to control the position of said mandrel relative to said torpedo, said mandrel having an annular edge on the end thereof adjacent to said die head to control the wall thickness of the material being extruded, said control means includes sensing means comprising a transducer located in said recess



of said torpedo, and a magnetic core on said mandrel at the end thereof opposite said annular edge cooperative with said transducer to provide an output signal that is indicative of the relative position of said mandrel in said torpedo.

4,029,459
METHOD AND APPARATUS FOR MANUFACTURE OF GRANULATES FROM PULVERULENT, GRANULAR, DOUGHY OR SIMILAR MATERIAL

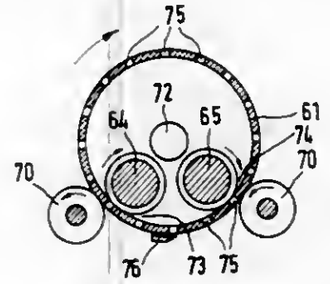
Jürgen Schmiedeke, Lage, Germany, assignor to Gunther Papenmeier KG, Maschinen-und Apparatebau, Detmold, Germany

Filed Jan. 20, 1975, Ser. No. 542,555

Claims priority, application Germany, Feb. 1, 1974, 2404813

Int. Cl.² B29B *1/04*

U.S. Cl. 425—202 **17 Claims**



1. Apparatus for producing granulates from pulverulent, granular, doughy or similar material, such as plastics, comprising: a plurality of members including means having closely adjacent but spaced apart rotating curved surfaces, providing an elongate nip zone where the rotating surfaces are approaching each other, means adjacent one of said curved surfaces for continuously feeding material into one portion of said nip zone; said rotating surfaces having surface formations structured to provide, at said zone, periodic and repeated kneading action on the material causing it to be formed as a skin and conveyed in the axial direction and along the length of the adjacent portions of the rotating surfaces; additional means, including one of said rotating surfaces, for receiving the material after a passage through said nip zone and structured so as to convey the material in the opposite direction as a skin on one of the rotating surfaces; means providing apertures in at least one of said members adjacent said nip zone and spaced axially from said portion of said nip zone where material is fed, said rotating structured surface formations providing a force on and, after alternate directions of movement of said material, causing kneaded material to pass through said apertures, and means located at the exit side of said apertures for granulating the material extruded from said apertures.

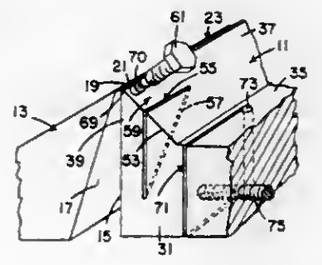
4,029,460
FLAT FILM EXTRUSION NOZZLE

Seddon C. Nelson, Fredericksburg, Va., assignor to FMC Corporation, Philadelphia, Pa.

Filed July 29, 1975, Ser. No. 600,175

Int. Cl.² B29F *3/04*

U.S. Cl. 425—466 **11 Claims**



1. An extrusion apparatus for shaping a flowable film-forming material into a stream of desired cross-section, said apparatus including a pair of elongated, oppositely disposed blades each having generally planar end walls, means supporting said oppositely disposed blades in fixed, spaced apart relationship whereby adjacent, exposed edges of said oppositely disposed blades together define an elongated extrusion orifice of generally uniform width, a corner of one of said blades, as defined by an end wall and an exposed surface extending between the end walls of said one blade, having a slot therein, said slot being open only along such one end wall and such exposed surface of said one blade and located in spaced relationship with said extrusion orifice as to permit that portion of said one blade which is between said slot and said extrusion orifice to be flexed, and means located adjacent to said corner for selectively deflecting said flexible portion of said one blade relative to the remainder thereof to thereby vary the width of the extrusion orifice at the end thereof.

4,029,461
FIBRE FELT FORMING AND CURING DIES

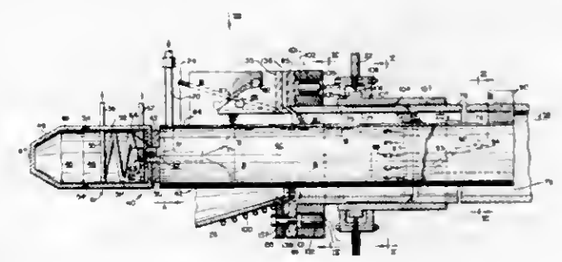
John W. Lacon, Sarnia, Canada, assignor to Fiberglas Canada Limited, Toronto, Canada

Filed Sept. 10, 1975, Ser. No. 612,166

Claims priority, application Canada, Aug. 29, 1975, 234475

Int. Cl.² B28B *21/42*

U.S. Cl. 425—384 **19 Claims**



1. A fibre felt forming die assembly, comprising:

means for longitudinally advancing a strip-shaped felt of fibrous material containing a heat-hardenable bonding material

a stationary elongate inner die having an external peripheral forming surface for sliding contact with a first surface of the advancing felt;

a stationary elongate outer die extending around said inner die;

said outer die having an internal peripheral forming surface for sliding contact with an opposite, second surface of the felt, said internal forming surface being spaced from said external forming surface on said inner die to define a gap for the advance of the felt between said internal and external forming surfaces;

said inner die comprising first and second inner die sections;

said first inner die section being disposed before said second inner die section in the direction of advance of the felt through the gap;

means for cooling said first inner die section to thereby cool the felt;

means for heating said second inner die section to thereby heat and at least partially cure the felt at and adjacent the first felt surface;

heat insulating means between said first and second inner die sections for counteracting the transference of heat from said second inner die section to said first inner die section, whereby the first felt surface undergoes a rapid temperature rise to partially cure the felt at and adjacent the first felt surface as the felt advances past said inner die; and

means for discharging hot gas through the entire thickness of the felt to further cure the felt.

4,029,462

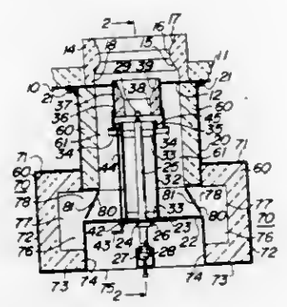
BURNER WITH NOISE SUPPRESSOR

Gordon M. Bitterlich, Tredyffrin Township, Chester County, Pa., assignor to National Airoil Burner Co., Inc., Philadelphia, Pa.

Filed Dec. 10, 1975, Ser. No. 639,572

Int. Cl.² F23C *7/04*

U.S. Cl. 431—114 **10 Claims**



1. Combustion apparatus for negative draft furnaces having an opening in a wall of the furnace with a pressurized oil burner and pressure gas burners in communication therethrough with the interior of the furnace,

a housing extending outwardly from said furnace for said burners and for air supply to said burners,

said housing having wall portions providing an air passageway communicating with said opening,

said wall portions having sound absorptive linings,

said burners being disposed within said housing and spaced from said wall portions,

said housing also having wall portions offset therefrom providing a tortuous air path communicating with said air passageway and with an air inlet opening to the atmosphere at the outer extremity thereof for air supply to the burners,

said offset wall portions having sound absorptive linings,

the tortuous path and the sound absorptive linings of said wall portions and said offset wall portions attenuating outwardly emitted high frequency fluid flow noise and low frequency combustion noise from the furnace opening by multiple reflection by the wall portions and offset wall portions and absorption by the sound absorptive linings.

4,029,463

METHOD FOR BAKING FOOD PRODUCTS

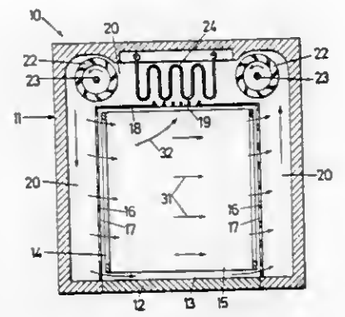
Leif A. T. Johansson, Huddinge, and Nils G. Pers, Upplands Vasby, both of Sweden, assignors to Tipe Revent AB, Stockholm, Sweden

Division of Ser. No. 434,681, Jan. 18, 1974, Pat. No. 3,905,760. This application Aug. 13, 1975, Ser. No. 604,094

Claims priority, application Sweden, Jan. 26, 1973, 7301135

Int. Cl.² F27D *7/00*

U.S. Cl. 432—25 **6 Claims**



1. A method of baking food products supported on superimposed horizontal racks in a chamber, the chamber being defined in part by opposed vertical apertured side walls and an intermediate vertical apertured side wall, comprising:

a. during a first main phase of a baking cycle, causing air to flow horizontally through one of the opposed side walls into the chamber, and to leave the chamber horizontally through both the other opposed side wall and the intermediate vertical side wall;

b. during a second main phase of the baking cycle, causing air to flow horizontally through said other opposed side wall into the chamber, and to leave the chamber horizontally through both said one opposed side wall and the intermediate vertical side wall; and

c. repeating said baking cycle until the food products are baked sufficiently.

4,029,464

ROTARY KILN FOR PRODUCING A BLOATED CLAY PRODUCT

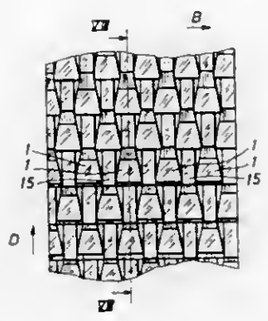
Harry Kamstrup-Larsen, Vanlose, Denmark, assignor to Leca Trading & Concession A/S, Copenhagen, Denmark

Filed Sept. 15, 1975, Ser. No. 613,555

Claims priority, application Denmark, Sept. 13, 1974, 4825/74

Int. Cl.² F27B *7/14*

U.S. Cl. 432—118 **16 Claims**



1. A rotary kiln for producing a bloated clay product on clay or clay slate, and comprising a tubular drying-kiln section slowly rotating about its axis and a tubular burning-kiln section which rotates relatively rapidly about its axis, said burning-kiln section being arranged adjacent the drying-kiln section with the rear part of the drying-kiln section being adjacent and in communication with the front part of the burning-kiln section, the rear part of the drying-kiln section and the front part of the burning-kiln section forming a transition zone, said transition zone having a lining which contains shovel-shaped bricks, each shovel-shaped brick comprising a portion projecting inwardly towards the center-line of the kiln, the projecting portion being defined by a top surface substantially perpendicular to a radius of the kiln, a plurality of inclined surfaces extending from said top surface, such inclined surfaces including a front surface inclined in relation to the tangential direction of the kiln, two side surfaces, and a rear surface.

4,029,465

ENERGY CONSERVING PROCESS FURNACE SYSTEM AND COMPONENTS THEREOF

Paul G. LaHaye; John W. Bjerklie, both of Cape Elizabeth, and Gerald G. Gallant, Jr., Gorham, all of Maine, assignors to Hague International Corporation, So. Portland, Maine

Filed Feb. 6, 1975, Ser. No. 547,381

Int. Cl.² F27D *17/00*

U.S. Cl. 432—179 **10 Claims**

1. An energy conserving process furnace comprising,

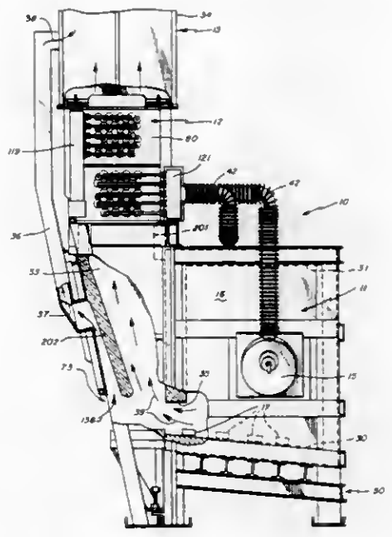
a combustion zone defined by heat insulated combustion chamber walls,

a fluid fuel burner comprising a fuel nozzle for heating said combustion zone to a temperature above 1300° F,

an exhaust passage from said combustion zone leading to an exhaust port through an exhaust stack,

a ceramic heat recuperator positioned in said stack and carrying means for heating combustion air for said burner by extracting heat energy from exhaust gas derived from said combustion zone,

said fluid fuel burner being a recirculating burner having means for recirculating hot gases from said combustion



zone through said burner and mixing said combustion air with said recirculating hot gases.

4,029,466

CONTAINER FOR EVAPORATION OF METAL

Masaji Ishii; Akio Mikogami, and Akira Miyai, all of Machida, Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 8, 1975, Ser. No. 603,140

Claims priority, application Japan, Aug. 8, 1974, 49-90972; Aug. 8, 1974, 49-90971

Int. Cl.² F27B *14/10, 14/06*

U.S. Cl. 432—264 **6 Claims**

1. A container for the evaporation of metal which comprises:

an electrically conductive ceramic base whose surface in contact with the molten metal is coated with a film comprising a main component selected from the group consisting of tungsten, tantalum and molybdenum metal.

4,029,467

SUBLIMATION TRANSFER AND DIISOCYANATE FIXATION OF AMINO- OR HYDROXY-CONTAINING AZO DYESTUFFS AND TRANSFER SHEETS THEREOF

Raymond Defago, Riehen; Hans-Joerg Angliker, Basel; Herbert Holzrichter, Muri; Werner Kneubuehler, Binningen, and Richard Peter, Basel, all of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

Continuation of Ser. No. 398,896, Sept. 19, 1973, abandoned, which is a division of Ser. No. 245,648, April 19, 1972, Pat. No. 3,782,896. This application Jan. 8, 1976, Ser. No. 647,478

Claims priority, application Switzerland, Apr. 26, 1971, 6069/71

Int. Cl.² D06P *5/06*

U.S. Cl. 8—2.5 A 30 Claims

1. A transfer printing process for the manufacture of prints on a textile or non-textile, hydrophobic sheet which prints are heat-fast to wet processing, comprising the steps of

a. applying to an auxiliary carrier web a sublimable azo dyestuff containing a hydroxyl group, an amino group or both,

b. transferring said dyestuff to said sheet by heat-induced sublimation of diffusion from said auxiliary carrier web,

c. subsequently providing to the printed area of said sheet an isocyanate compound, having at least two isocyanate groups per molecule, and which is capable of reacting with said dyestuff and fixing the dyestuff to the printed area of said sheet by reaction therewith.

25. An auxiliary carrier web for use in heat-transfer printing, consisting essentially of flexible sheet material carrying (1) sublimable disperse azo dyestuff containing a hydroxyl group, an amino group or both, and (2) a masked isocyanate compound which decomposes to liberate an effective fixing amount of an isocyanate having at least two isocyanate groups per molecule, at a temperature no greater than 240° C, wherein the sublimation temperature of the dyestuff is at least 10° C lower than the decomposition temperatures of the masked isocyanate.

4,029,468

TRANSFER DYES

Karl Maier; Fritz Graser, and Guenter Meyer, all of Ludwigshafen, Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

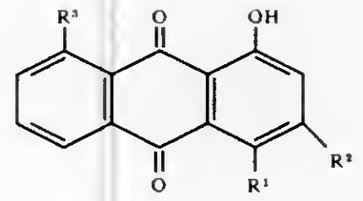
Filed June 2, 1975, Ser. No. 582,727

Claims priority, application Germany, July 4, 1974, 2432149

Int. Cl.² B41C *1/06;* D06P *1/22*

U.S. Cl. 8—2.5 A 5 Claims

1. A dye formulation for transfer printing containing in addition to conventional ingredients a dye of the formula



in which

R^1 is chloro,

R^2 is hydrogen, and

R^3 is hydrogen.

4,029,469

COLORING PROCESS FOR SYNTHETIC TEXTILE MATERIALS

Violet Boyd; Brian Ribbons Fishwick, and Brian Glover, all of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England

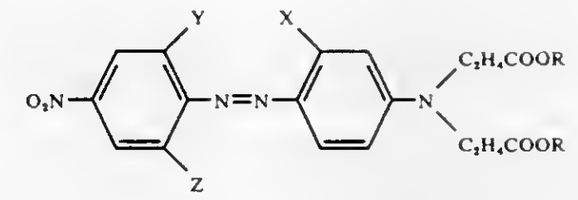
Filed Oct. 8, 1975, Ser. No. 620,692

Claims priority, application United Kingdom, Oct. 31, 1974, 47112/74

Int. Cl.² C09B *27/00;* D06P *1/02*

U.S. Cl. 8—41 C 2 Claims

1. Process for colouring aromatic polyester textile materials which comprises applying to the said textile material by an aqueous dyeing, padding or printing process an aqueous dispersion of a water-insoluble monoazo dyestuff of the formula:



wherein X is hydrogen or methyl, Y and Z are each independently chlorine or bromine, and R is lower alkyl, and subsequently subjecting the coloured textile material to a treatment in an aqueous solution containing from 0.05 to 0.5% of sodium hydrosulphite at a temperature of from 50° to 85° C.

4,029,470

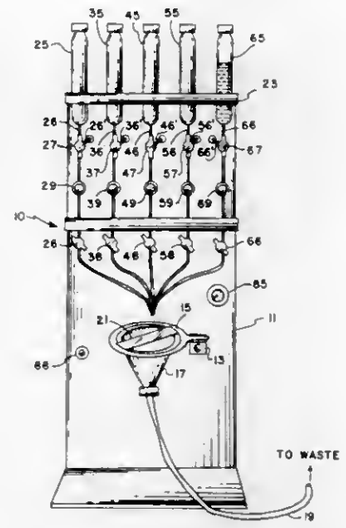
AUTOMATED SINGLE-SLIDE STAINING DEVICE

Judd R. Wilkins, and Stacey M. Mills, both of Hampton, Va., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Oct. 29, 1975, Ser. No. 626,942

Int. Cl.² D06P *3/00*

U.S. Cl. 8—94.11 18 Claims



1. Apparatus for making laboratory Gram stains of Gram-positive and Gram-negative bacteria on individual inoculated slides comprising:

an inoculated laboratory slide and support means for receiving and supporting the slide,

a plurality of liquid dispersing means each having a discharge outlet constructed and arranged to flood said inoculated slide with liquid,

waste collector and discharge means extending from said support means for receiving the liquid from said plurality of liquid dispersing means when said slide is flooded thereby,

individual valve means for each of said plurality of liquid dispersing means,

individual actuator means for selectively opening and closing each of said valve means,

timing means connected to and, when initiated, serving to sequentially actuate said individual actuator means to sequentially open and close each of said valve means in a predetermined sequence to flood said inoculated slide with increments of a primary stain, a mordant, a decolorizer, a counterstain and a wash solution, and

means for initiating said timing means.

14. A method of making laboratory Gram stains of Gram-positive and Gram-negative bacteria on individual inoculated slides comprising:

inoculating a laboratory slide with bacteria,

fixedly positioning the inoculated slide over a waste collector,

providing a plurality of liquid dispersing containers each individually housing a primary stain, a mordant, a decolorizer and a wash solution and each having a discharge outlet constructed and arranged to flood said inoculated slide,

automatically flooding the inoculated slide with sequentially timed increments of a primary stain, a mordant, a decolorizer, a counterstain and a wash solution, and

recovering a Gram stain slide.

4,029,471

PROCESS FOR SIMULTANEOUSLY FLAMEPROOFING AND SHRINKPROOFING WOOL

Nathan H. Koenig, Albany, and Mendel Friedman, Moraga, both of Calif., assignors to The United States of America, as represented by the Secretary of Agriculture, Washington, D.C.

Filed Apr. 14, 1976, Ser. No. 676,948
Int. Cl.² D06M *13/20, 13/42*
U.S. Cl. 8—128 R **3 Claims**

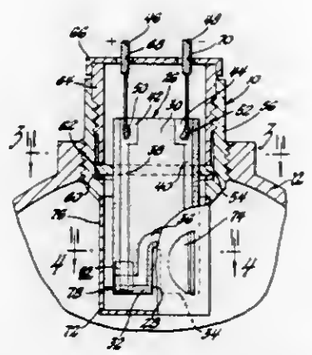
1. A process for preparing flameproof and shrinkproof wool by simultaneously reacting the wool with a halogenated acid anhydride and an isocyanate in the presence of cresol.

4,029,472

THERMOELECTRIC EXHAUST GAS SENSOR

Adolph L. Micheli, and Dennis F. Dungan, both of Mount Clemens, Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Apr. 5, 1976, Ser. No. 673,649
Int. Cl.² G01N *39/02*
U.S. Cl. 23—254 E **5 Claims**



1. In an internal combustion engine exhaust system having a conduit for directing a stream of exhaust gases, a durable and high output thermoelectric exhaust gas sensor in said conduit for detecting residual combustibles in said exhaust gas stream, said sensor comprising:

an electrically nonconductive ceramic element having a body portion and two integral mutually spaced legs, said legs serving as a support for at least two interconnected high output thermocouple junctions;

a continuous coating of doped titanium dioxide on said element extending from an extremity of one leg to an extremity of the other leg via said body portion, said titanium dioxide coating containing a dopant that is a pentavalent ion from Group V of the Periodic Table of the Elements and having a large negative Seebeck coefficient;

a first continuous coating of lithia-nickel on said element extending from said body portion to one leg extremity where it contacts said doped titanium dioxide coating, said lithia-nickel coating having a large positive Seebeck coefficient and forming a first high output thermocouple junction with said doped titanium dioxide coating at said one leg extremity that is resistant to corrosive and abrasive effects of an internal combustion engine exhaust gas stream;

a second continuous coating of lithia-nickel on said element extending from said body portion to the other leg extremity where it contacts said doped titanium dioxide coating, said second lithia-nickel coating having a large positive Seebeck coefficient similar to said first lithia-nickel coating and forming a second high output thermocouple junction with said doped titanium dioxide coating at said other leg extremity that is resistant to corrosive and abrasive effects of an internal combustion engine exhaust gas stream;

a coating of catalytic ceramic particles on only one of said leg extremities closely adjacent the one thermocouple junction thereon and providing a high surface area situs for exothermic reaction of residual combustibles in an internal combustion engine exhaust gas stream;

means attached to said body portion for mounting said element in an exhaust system conduit and uniformly exposing both leg extremities, including said first and second thermocouple junctions, to the exhaust gas stream whereby residual exhaust gas combustibles can react with said catalytic ceramic particles adjacent the one thermocouple junction and produce a temperature differential between it and the other thermocouple junction;

means on said body portion, spaced from said doped titanium dioxide coating, for making separate electrical connections to said first and second lithia-nickel coatings; and

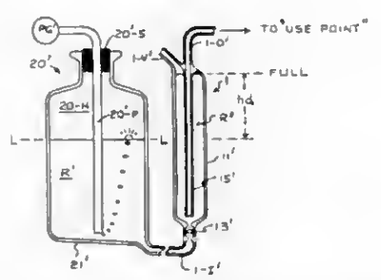
means for isolating said electrical connections from exhaust gas in said exhaust system conduit so that said electrical connections are not deleteriously affected while said thermocouple junctions are exposed to said exhaust gas stream.

4,029,473

VESTIBULE VALVE REAGENT DISPENSER

Thomas Davy Sharples, Atherton, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Filed Oct. 31, 1975, Ser. No. 627,803
Int. Cl.² B65D *83/00, 83/14*
U.S. Cl. 23—259 **11 Claims**



1. In an automatic liquid dispensing apparatus of the type having a closed storage vessel for containing a large quantity of liquid and having a bottom, means connected to said storage vessel for pressurizing said vessel, and fluid communication means having a first end and a second end, said first end connected to said storage vessel and said second end defining a discharge point, characterized in that said fluid communication means further comprises:

a. a closed intermediate vessel for containing a small quantity of said liquid and having a bottom,

b. pressurizing means connected to said intermediate vessel for periodically pressurizing liquid therein to expel said liquid therefrom, and

c. fluid control means for allowing passage of liquid from said storage vessel to said intermediate vessel when the pressure head in said storage vessel is greater than the pressure head in said intermediate vessel and restricting passage of liquid from said intermediate vessel to said storage vessel when the pressure head in said intermediate vessel is greater than the pressure head in said storage vessel.

4,029,475

BLANK FOR ROLLING AND FORGING AND METHOD OF PRODUCING SAME

Yoshihiko Hamai, Kawasaki; Tatsuro Hamai, Tokyo; Yuya Tanaka, Machida, and Akira Nakatani, Niiza, all of Japan, assignors to Kabushiki Kaisha Hamai Seisakusho, Tokyo, Japan

Filed Dec. 12, 1974, Ser. No. 532,247
Claims priority, application Japan, Dec. 31, 1973, 49-000822; June 8, 1974, 49-065410
Int. Cl.² B22F *3/00;* **C22C** *1/04*
U.S. Cl. 75—247 **9 Claims**

1. The method of making a sintered compact which comprises the steps of

adding to the initial metal powder consisting principally of copper and zinc at least one compound containing an additive metal selected from the group consisting of alkali metals and alkaline earth metals, and thereby producing a mixture consisting essentially of said at least one compound, copper and zinc,

annealing said mixture at a temperature higher than the decomposition temperature of said compound,

and then compacting and sintering said mixture,

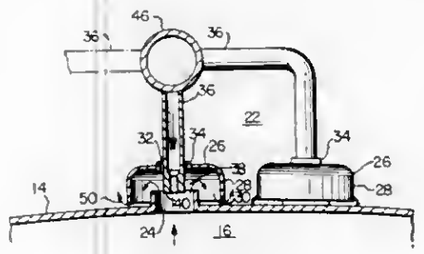
said at least one compound being of a type which decomposes into at least one gas which has no corrosive effect on said initial metal power, together with at least one substance selected from the group consisting of said additive metals and their oxides which substance forms a coating on said initial metal powder during said annealing step which inhibits subsequent volatalization of said zinc during said sintering step.

4,029,474

COAL LIQUEFACTION REACTOR DISTRIBUTION SYSTEM

Morgan C. Sze, Upper Montclair, and Harold B. Kohn, Cedar Grove, both of N.J., assignors to The Lummus Company, Bloomfield, N.J.

Filed June 3, 1976, Ser. No. 691,916
Int. Cl.² B01J *8/00;* **C10G** *1/06*
U.S. Cl. 23—285 **11 Claims**



1. A reactor for the liquefaction of coal comprised of:

a container divided by a partitioning head into a first and a second chamber;

a first plurality of tubes through said partitioning head communicating between said chambers and extending from said partitioning head into said second chamber;

a plurality of circular caps each of said caps individually positioned adjacent the extended end of one of said first tubes, concentric thereto, and spaced therefrom, said caps having a greater diameter than said first tubes;

a second plurality of tubes each of said second tubes concentrically aligned with one of said tubes, the end of each said second tube adjacent the extended end of said first tube;

inlet means for entry of pressurized material into said first chamber; and

inlet means for supplying pressurized material to said second plurality of tubes.

4,029,476

BRAZING ALLOY COMPOSITIONS

Walter V. Knopp, Wyckoff, N.J., assignor to A. Johnson & Co. Inc., New York, N.Y.

Filed Feb. 12, 1976, Ser. No. 657,691
Int. Cl.² B22F *3/00;* **C22E** *33/00*
U.S. Cl. 428—676 **13 Claims**

1. A brazing alloy composition consisting essentially by weight of about 30 to 50% copper, about 10 to 20% manganese, about 3 to 25% iron, about 0.5 to 4% silicon, about 0.5 to 2% boron and the balance essentially nickel ranging from about 30 to 50%, said alloy when employed to produce a brazed joint being characterized by improved ductility.

4. A brazed metal joint comprised of metal parts with a fused brazing alloy interposed therebetween joining said parts together into a strong joint, said fused brazing alloy consisting essentially by weight of about 30 to 50% copper, about 10 to 20% manganese, about 3 to 25% iron, about 0.5 to 2% boron, about 0.5 to 4% silicon and the balance essentially nickel ranging from about 30 to 50%, the fused braze alloy at the joint being characterized by improved ductility.

10. A powder brazing alloy composition mixture consisting essentially of an alloy powder of Cu-Mn-Ni-Si-B mixed with an iron powder such that the average composition of the alloy powder-iron powder mixture consists essentially of about 30 to 50% copper, about 10 to 20% manganese, about 3 to 25% iron, about 0.5 to 4% silicon, about 0.5 to 2% boron, and the balance essentially nickel ranging from about 30 % to 50%, said powder when compressed into a green blank being characterized by improved green strength as compared to the alloy powder without iron powder present.

4,029,477

COATED Ni-Cr BASE DISPERSION-MODIFIED ALLOY ARTICLE

John J. Grisik, Middletown, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Filed Oct. 29, 1975, Ser. No. 626,653
Int. Cl.² B32B 15/00
U.S. Cl. 428—680 4 Claims

1. A coated NiCr base dispersion-modified alloy article of improved resistance to oxidation and sulfidation comprising:
a dispersion-modified base alloy consisting essentially of, by weight, 15 – 30% Cr, 0.01 – 10% of oxides selected from the group consisting of oxides of the rare earth elements, up to about 1% of elements selected from the group consisting of Ti and Al, with the balance Ni and incidental impurities; and
a coating on the base alloy and consisting of, by weight, about 8 to less than about 14% Al, and 15 – 30% Cr, about 0.01 – 10% of elements selected from the group consisting of Y and Hf, with the balance Ni and incidental impurities;
the difference between the Cr content of the base and Cr content of the coating being no greater than about 10 weight percent.

4,029,478

Zn-Al HOT-DIP COATED FERROUS SHEET

Harvie Ho Lee, Glenwood, Ill., assignor to Inland Steel Company, Chicago, Ill.

Filed Jan. 5, 1976, Ser. No. 646,530
Int. Cl.² B32B 15/18, 15/20
U.S. Cl. 428—659 6 Claims

1. A ferrous metal sheet having on a surface thereof a zinc-aluminum alloy continuous hot-dip coating which is resistant to intergranular corrosion and which has a composition consisting essentially of between 0.2 wt. % and about 17 wt. % aluminum, between about 0.06 wt. % and about 0.15 wt. % lead, and about 0.1 wt. % magnesium with the balance being essentially zinc, and said alloy coating being characterized by a smooth ripple-free surface and the absence of blistering along grain boundaries and separation of the said coating from said sheet when said ferrous metal sheet is subjected to conventional formability tests after prolonged storage in a high humidity atmosphere.

4,029,479

PLATED FOIL FOR LIQUID INTERFACE BONDING OF TITANIUM

Elmo G. Parker, La Mesa, Calif., assignor to Rohr Industries, Inc., Chula Vista, Calif.

Division of Ser. No. 327,341, Jan. 29, 1973, Pat. No. 3,981,429, which is a continuation of Ser. No. 81,262, Oct. 16, 1970, abandoned. This application June 1, 1976, Ser. No. 691,663
Int. Cl.² B32B 15/20
U.S. Cl. 428—660 2 Claims

2. A liquid interface diffusion bonded structure comprising two titanium base members diffusion bonded and joined together with a titanium base layer having, on each side thereof successive plating layers of Cu-Ag-Ni plated thereon in the order named, therebetween, the region of the bonded joint between each said member and said layer comprising grain growth on the titanium across the joint and diffusion and dilution within and throughout said region of traces of liquid interface diffusion bridge materials comprising copper, silver and nickel, said bridge materials adding of the order of 6 grams per square foot per interface of the bonded structure.

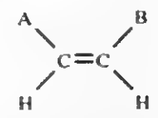
4,029,480

HYDROCARBON FUEL COMPOSITIONS CONTAINING POLYSULFONE ANTISTATIC ADDITIVES

Thomas E. Johnston, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 268,048, June 30, 1972, abandoned. This application Aug. 5, 1975, Ser. No. 602,092
Int. Cl.² C10L 1/24
U.S. Cl. 44—62 5 Claims

1. An electrically conductive hydrocarbon fuel composition comprising a normally liquid hydrocarbon fuel, and from 0.01 to 40 ppm of polysulfone copolymer, at an average molecular weight from about 10,000 to 900,000 effective to impart an antistatic property to said fuel consisting essentially of
a. about 50 mol percent of units derived from sulfur dioxide,
b. from about 40 to 50 mol percent of units derived from at least one 1-alkene having from 6 to 24 carbon atoms, and
c. from 0 to about 10 mol percent of units derived from an olefin having the formula



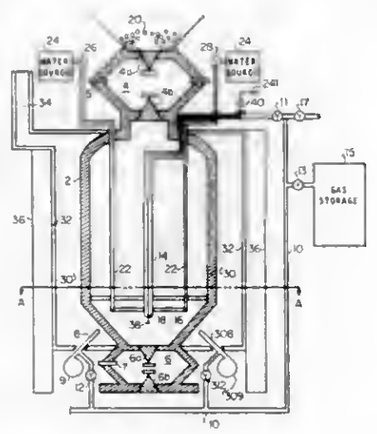
wherein A is a group having the formula, $-(C_xH_{2x})-COOH$, where x is from 0 to 17, and B is hydrogen or carboxyl, with the proviso that when B is carboxyl, x is 0, and A and B together can be a dicarboxylic anhydride group.

4,029,481

SELF POWERED BLUE WATER GAS GENERATOR

Stuart M. Oliver, Los Angeles, and Sanford J. Parsons, Richmond, both of Calif., assignors to Q² Corporation, Saratoga, Calif.

Filed Mar. 3, 1975, Ser. No. 554,761
Int. Cl.² C10J 3/20
U.S. Cl. 48—111 6 Claims



1. A blue water gas generator comprising:
a sealed retort forming a vertical column and having an upper cylindrical portion and a lower inverse conically shaped portion, the upper and lower portions being separated by a grate which is thermally coupled to the retort and disposed within the retort in a substantially horizontal plane;
means coupled to the sealed retort for applying steam within the lower portion of the sealed retort;
burner means thermally coupled to the sealed retort and disposed outside of the sealed retort and below the grate for heating under reflux materials placed within the sealed retort and establishing a substantially vertical thermal gradient therein, the gradient having a higher

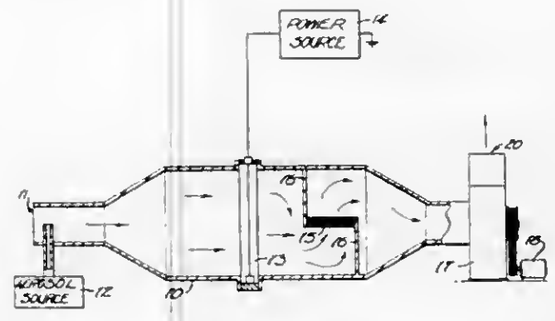
temperature potential at the lower portion of the retort than at the upper portion;
an input air lock coupled to the upper portion of the retort and operatively disposed above the grate to receive carbonaceous materials and pass them onto the grate;
an output air lock coupled to the lower portion of the sealed retort and operatively disposed below the grate to receive material which passes through the grate; and
gas extraction means coupled to the retort and communicating with the lower portion of the retort for receiving gas produced in the retort and being coupled to the burner means to burn a portion of the gas product.

4,029,482

ELECTROSTATIC REMOVAL OF AIRBORNE PARTICULATES EMPLOYING FIBER BEDS

Arlin Keith Postma, Benton City, and W. Kevin Winegardner, Richland, both of Wash., assignors to Battelle Memorial Institute, Richland, Wash.

Continuation of Ser. No. 453,714, March 27, 1974, abandoned. This application June 30, 1975, Ser. No. 591,278
Int. Cl.² B03C 3/00
U.S. Cl. 55—2 6 Claims



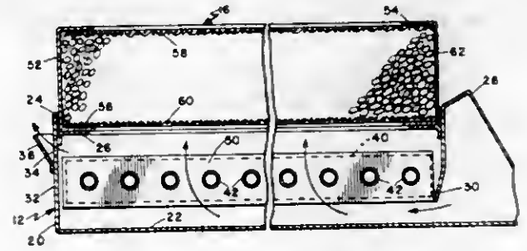
1. A method of removing an aerosol from a confined moving gaseous stream, the aerosol being composed of electrically resistive particles capable of accepting and retaining an electrical charge; said method comprising the following steps:
passing the confined gaseous stream through a corona discharge;
subsequently directing the confined gaseous stream through a dry porous bed having:
a. a physical location spaced downstream from the corona discharge;
b. substantial bed thickness in the direction of movement of the gaseous stream from an upstream location where the gaseous stream enters the bed to a downstream location where it leaves the bed;
c. relatively high porosity so as not to impede the flow of gas;
e. a structure composed of electrically resistive material;
the passage of the gaseous stream through the corona discharge and bed resulting in the production of a self-induced space charge field originating from the charged particles on the bed;
introducing the aerosol into the moving gaseous stream at a location upstream of the corona discharge whereby each particle in the aerosol is electrically charged by the emission of the corona discharge as the gaseous stream passes therethrough, the charge on each particle being a near-saturation charge of the same polarity as the space charge on the bed material;
and collecting the charged aerosol particles by deposition within the physical boundaries of the bed due to the electrical forces that result from the interaction of the charged particles and the space charge field during passage of the gaseous stream through the porous bed.

4,029,483

DIVING BELL HEATER AND ABSORBENT SYSTEM

Richard William Long, 760 Wakefield Court, San Diego, Calif. 92020

Filed May 5, 1975, Ser. No. 575,050
Int. Cl.² B01D 19/00
U.S. Cl. 55—68 9 Claims



9. The method of heating and removing carbon dioxide from breathing gas such as air that is introduced into a diving bell or that is circulated in a diving bell, comprising the steps of:
positioning a housing within the diving bell,
moving air by a blower from the bottom part of the housing out an opening in the top of the housing,
heating the moving air in the bottom part of the housing by a hot water heat exchanger,
removing carbon dioxide from the air by means of a carbon dioxide absorbent material positioned in the upper part of the housing,
feeding hot water to the heat exchanger from a source external to the diving bell,
venting of a portion of the heated air from the bottom part of the housing while passing the remaining portion of the heated air through the upper portion of the housing so that all the air passing through the bottom part of the housing does not have to pass through the carbon dioxide absorbent material if the material becomes clogged,
and selectively removing the upper part of the housing containing the carbon dioxide absorbent material to replace the absorbent material in the housing.

4,029,484

MIST SCRUBBING OF WASTE HALIDE EFFLUENT

Timothy Allen Fitzpatrick, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 21, 1976, Ser. No. 651,194
Int. Cl.² B01D 53/00
U.S. Cl. 55—71 10 Claims

1. In a process of treating a mixture of halide vapors to remove the vaporous halides of titanium, aluminum, vanadium, silicon, tin, magnesium, zinc, antimony, sulfur, phosphorus, and ammonium and separating said vaporous halides from acid halides in a waste gas stream followed by the waste gas stream the scrubbing of the improvement comprising the removal of said vaporous halides without the formation of particulates from said vaporous halides during separation by
A. generating an absorptive aqueous mist containing water in which is dissolved HCl, HNO_3, HBr, HF, HI, or one or more halide salts of calcium, sodium, ammonia, lithium, barium, and iron;
B. maintaining the temperature of the combined waste gas streams and aqueous mist at a temperature of from −5° C. to 70° C.;
C. maintaining the water vapor pressure of the absorptive aqueous mist at a vapor pressure of from 0.05–5.0 mm Hg prior to contact with the waste gas stream;
D. controlling the particle size of the aqueous absorptive mist so that the ratio of the surface area of the absorptive aqueous mist to the weight of the waste halide to be removed is at least 2 square meters surface area of the absorptive aqueous mist per gram of waste halide present in the gas stream;
E. contacting the gas stream containing the vaporous halide

with the absorptive aqueous mist to absorb said vaporous halide; and

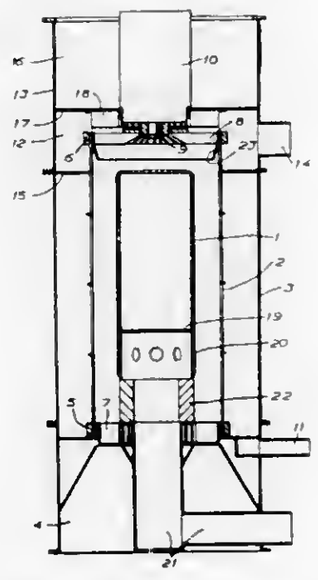
F. separating the gas stream from the aqueous absorptive mist.

4,029,485

GAS CLEANERS

Olle Lennart Siwersson, and Karl Gunnar Tell, both of Helsingborg, Sweden, assignors to AB S.T. Miljoteknik, Helsingborg, Sweden

Filed Aug. 8, 1975, Ser. No. 603,090
Int. Cl.² B03C 03/10
U.S. Cl. 55—113 5 Claims



1. In a gas cleaning apparatus of the electric precipitator type having

a gas inlet;

a gas outlet;

a plurality of discharge and collecting electrodes,

said discharge electrodes being mounted stationary in the shape of an inner cylinder surface configuration, being insulated from said collecting electrodes and being separated therefrom to form a gap therebetween, said collecting electrodes being mounted in the shape of an outer concentrical cylinder surface configuration, concentric with said discharge electrodes, for rotation around said discharge electrodes,

voltage source means to apply a voltage to said discharge and collecting electrodes, and

said gap between said cylinder surface configurations being annular and connecting at opposite ends with said gas inlet and said gas outlet;

means for forcing a gas stream to be cleaned from particles suspended therein from said gas inlet through said annular gap between said discharge and collecting electrodes to said gas outlet;

means for rapidly rotating said collecting electrodes; and a casing with extensions to the outer side of said collecting electrodes for defining an outwardly closed space,

whereby a radially directed electric field is established between said discharge and collecting electrodes when a voltage is applied by said voltage source,

said particles in said gas stream are attracted by said collecting electrodes for deposition thereon, and particles deposited on said collecting electrodes have kinetic energy imparted to them such that they are thrown out into said space between said collecting electrodes and said casing by centrifugal force;

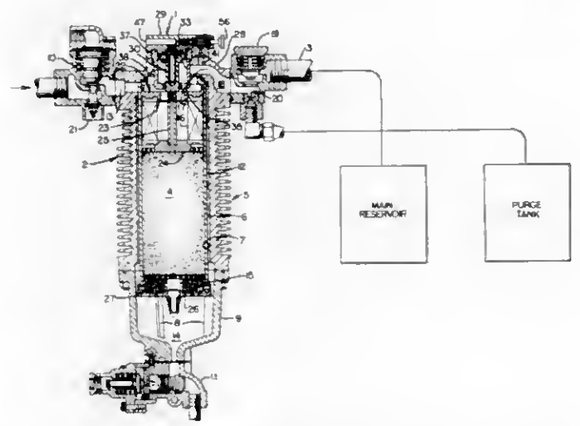
the improvement wherein means are provided between said gas outlet and said annular gap between said discharge and collecting electrodes for leading off radially outwards a peripheral portion of the gas stream leaving said annular gap between said discharge and collecting electrodes, and a separate gas outlet communicating with said annular gap and said means for leading off the peripheral portion of the gas stream for carrying away said led off portion of the gas stream.

4,029,486

PNEUMATIC COMPACTOR FOR PARTICULATE DESICCANT

Lanier Frantz, Salem, Va., assignor to Graham-White Sales Corporation, Salem, Va.

Filed Feb. 25, 1976, Ser. No. 661,307
Int. Cl.² B01D 53/26
U.S. Cl. 55—218 10 Claims



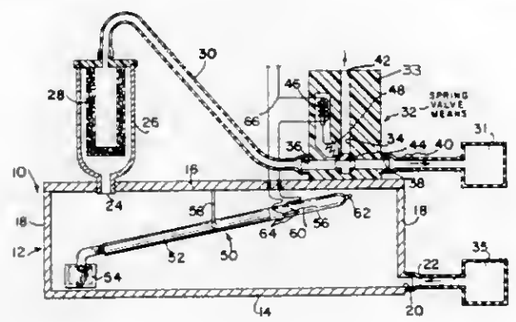
1. In a compressed gas filter assembly, the combination, with a filter unit having a housing containing a particulate desiccant for adsorbing a contaminant from compressed gas passing therethrough during a filtering cycle of the unit, of a pneumatic compactor comprising piston means actuated by compressed gas for applying a compacting force to the desiccant, and valve means normally preventing release of actuating gas from said piston means during a draining cycle of said unit.

4,029,487

APPARATUS FOR PROTECTING VACUUM SOURCES INCLUDING VALVE WHICH ALTERNATELY COMMUNICATES WITH VACUUM AND ATMOSPHERE

J. Wayne Brandt, Lutherville, Md., assignor to Spectroderm, Inc., Fairfax, Va.

Filed May 12, 1975, Ser. No. 576,477
Int. Cl. B01d 46/42
U.S. Cl. 55—309 5 Claims



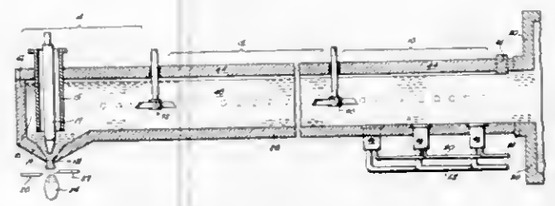
1. An apparatus for protecting vacuum sources from contamination occasioned by inadvertent aspiration of liquid-borne matter or aerosols from a device operated by a vacuum source comprising, an enclosed reservoir vessel with an inlet in the bottom thereof, a vacuum operated device in communication with said inlet, said vessel having an outlet in the top thereof, a filter housing secured to said outlet and forming an inlet to said housing, an outlet in said housing, filter means disposed between the housing inlet and outlet to filter air passed therethrough, a vacuum source, conduit means connecting said source with said filter housing outlet, a two-way valve disposed in said conduit means for communication with said vacuum source or the atmosphere, and a fulcrum disposed in said reservoir vessel and an elongated switch member connected to said fulcrum in said reservoir vessel and balanced thereby so its opposite ends are vertically movable in a see-saw manner and operatively connected to said two-way valve to communicate it to the atmosphere when the liquid level in said vessel reached a predetermined level, and biasing means normally urging said valve in a closed position and in communication with said vacuum source.

4,029,488

METHOD OF ADJUSTING GLASS TEMPERATURE IN A FOREHEARTH

Chester K. Rhett, Seattle, Wash., assignor to C. Rhett, Inc., Tukwila, Wash.

Filed Aug. 2, 1976, Ser. No. 711,068
Int. Cl.² C03B 5/02
U.S. Cl. 65—136 3 Claims



1. The method of delivering molten glass at a predetermined gob temperature from a melting furnace to an orificed forehearth bowl, comprising:

1. in the forehearth in close proximity to the entry of molten glass from said furnace, abruptly reducing the temperature of a lower central portion of the glass stream to a temperature approximately equal to but above the predetermined gob temperature;

2. immediately following the temperature reduction, mechanically blending and homogenizing the glass as it moves downstream;

3. continually applying a mild Joule-effect, below-surface conditioning heat to said stream for a period of time at least twice the length of time said stream was subjected to abrupt temperature reduction and permitting downward temperature adjustment to substantially the predetermined gob withdrawal temperature accompanied by temperature normalization throughout the stream; and

4. discharging the glass through the orifice of said bowl in the form of a series of uniform gobs.

4,029,489

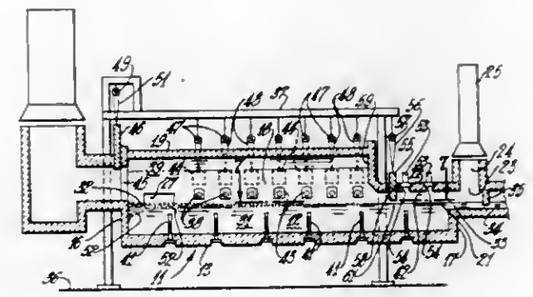
METHOD OF AND APPARATUS FOR MELTING OF GLASS

Magnus L. Froberg, Granville, and Charles M. Hohman, Newark, both of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Feb. 17, 1976, Ser. No. 658,643
Int. Cl.² C03B 5/02, 5/04
U.S. Cl. 65—136 40 Claims

1. Apparatus for the melting and fining of glass comprising a receptacle for containing glass constituents including molten glass up to a glass line and glass batch above portions of said glass line; a first region in said receptacle adapted to receive glass batch; a second region in said receptacle spaced horizontally from said first region and adapted to have molten glass withdrawn therefrom; a heat source beneath the glass line in said first and second regions adapted to heat the glass; means for distributing glass batch as a blanket over a preponderance of the upper surface of said first region; a heat source beneath the glass line adapted to heat the glass; and a cover for said receptacle to enclose the space above said second region, said cover having a flue for the passage of gas from beneath said cover and said cover being positioned sufficiently close to said glass line so as to reflect heat from within the glass in said second region back to the exposed upper surface of the glass in said second region to increase the fluidity of said surface to an extent to facilitate the escape of gas from said surface in said second region while thermal conditions at the exposed surface of said first region maintain a batch blanket over a preponderance of the upper surface of said first region.

23. The method of operating a continuous glass melting and refining furnace which comprises the steps of applying a preponderance of the heat applied to a body of molten glass beneath the upper surface of that glass; applying glass batch to the mass of glass constituents including the body of molten



glass in a charging region remote from a withdrawal region and from a level above the molten glass; distributing glass batch over a substantial portion of the upper surface of the body of molten glass; withdrawing molten glass from the body of molten glass in the withdrawal region adjacent one side of the body; maintaining a heat reflective surface in close proximity above the mass of glass constituents in the withdrawal region to reflect heat to the surface of the mass of glass constituents in thre withdrawal region beneath the heat reflective surface to an extent to maintain the upper surface of the mass of glass constituents beneath the heat reflective surface sufficiently fluid to promote the escape of gas therefrom, to maintain the upper surface essentially free of batch, and to define a leading edge of the batch blanket at its interface with an upper surface of the molten glass generally along the edge of the withdrawal region most proximate said charging region.

4,029,490

METHOD OF TOBACCO SUCKER INHIBITION

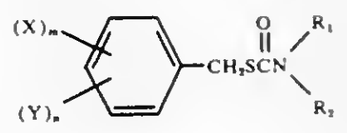
Kanichi Fujikawa; Ryohei Takahashi; Isao Yokomichi; Fumio Kimura; Takeo Kaji, and Nobuyuki Sakashita, all of Kusatsu, Japan, assignors to Ishihara Sangyo Kaisha Ltd., Osaka, Japan

Division of Ser. No. 508,732, Sept. 24, 1974, abandoned, which is a division of Ser. No. 340,534, March 12, 1973, Pat. No. 3,883,343. This application Aug. 4, 1975, Ser. No. 601,827

Claims priority, application Japan, Mar. 13, 1972, 47-26016

Int. Cl.² A01N 9/12
U.S. Cl. 71—78 4 Claims

1. A plant growth inhibiting composition which comprises the combination of a benzylthiolcarbamate having the formula



wherein

R_1 and R_2 are selected from the group consisting of acetyl, cyclohexyl, and C_{1-6} alkyl groups,

X and Y are selected from the group consisting of nitro, acetyl, amino, C_{1-3} alkyl, C_{1-3} alkoxyl and halogen; and

m and *n* are 0 or 1 with an alkyl-N-phenylcarbamate, wherein the phenyl ring is unsubstituted or substituted with a lower alkyl group or a halogen atom; and

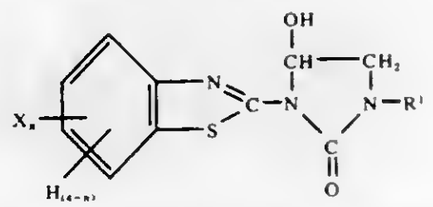
wherein said carbamate is mixed with said benzylthiolcarbamate in a ratio of from 0.1 to 6:1.

4,029,491
1-BENZOTHIAZOLYL-5-HYDROXYIMIDAZOLIDINONES

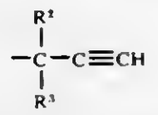
John Krenzer, Oak Park, and Chin Ching Wu, Libertyville, both of Ill., assignors to Velsicol Chemical Corporation, Chicago, Ill.

Filed Apr. 29, 1976, Ser. No. 681,372
Int. Cl.² A01N 9/12; C07D 277/82
U.S. Cl. 71—90 **10 Claims**

1. A compound of the formula



wherein X is selected from the group consisting of lower alkyl, chlorine, bromine, fluorine, lower chloroalkyl, lower bromoalkyl, trifluoromethyl, and lower alkoxy; *n* is an integer from 0 to 2; and R^1 is selected from the group consisting of lower alkyl, lower alkenyl, lower haloalkyl and



wherein R^2 and R^3 are each selected from the group consisting of hydrogen and alkyl of up to 3 carbon atoms.

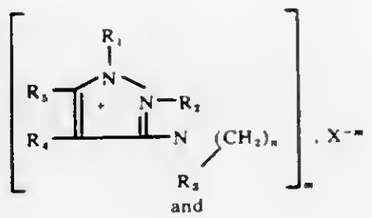
10. A method of controlling weeds which comprises contacting said weeds with a herbicidal composition comprising an inert carrier and, as an essential active ingredient, in a quantity toxic to weeds, a compound of claim 1.

4,029,492
NOVEL 1,2-DIALKYLPYRAZOLIUM COMPOUNDS HAVING 3-(OR 3,5-) NITROGEN-CONTAINING HETEROCYCLIC GROUP AS HERBICIDES

Barrington Cross, Rocky Hill, and Bryant Leonidas Walworth, Pennington, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed May 5, 1975, Ser. No. 574,795
Int. Cl.² A01N 9/22
U.S. Cl. 71—92 **10 Claims**

1. A method for the postemergence control of undesirable plant species comprising the step of: applying to the foliage of said undesirable plant species a herbicidally effective amount of a compound having a formula selected from the group consisting of:



(I)

and

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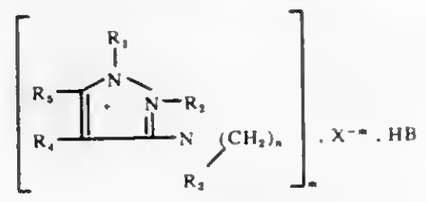
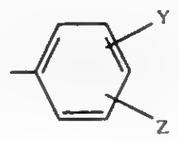
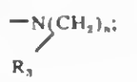
(II)



wherein R_1 and R_2 each represents alkyl C_1–C_4; R_3 represents a member selected from the group consisting of hydrogen, alkyl (C_1–C_3), alkoxy (C_1–C_3), phenyl, benzyl, cyano, carboxamido and carboxy; R_4 represents a member selected from the group consisting of hydrogen, alkoxy (C_1–C_4) and halogen; R_5 represents a member selected from the group consisting of



cyclohexyl and



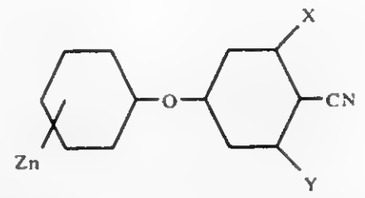
Y and Z each independently represents a member selected from the group consisting of hydrogen, halogen, methyl and alkoxy (C_1–C_4); X represents a non-phytotoxic anion with a charge of 1 to 3; *n* represents an integer from 4 to 6; and *m* represents an integer from 1 to 3; and HB is an inorganic acid.

4,029,493
SUBSTITUTED PHENOXYBENZONITRILES AS HERBICIDES

Robert James Theissen, Union County, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 335,408, Feb. 23, 1973, Pat. No. 3,923,858, which is a continuation-in-part of Ser. No. 69,959, Sept. 4, 1970, abandoned. This application May 21, 1975, Ser. No. 579,520
Int. Cl.² A01N 9/20
U.S. Cl. 71—105 **5 Claims**

1. The method for combatting herbs that comprises contacting them pre-emergently with an herbicidally effective amount of a compound having the formula:



wherein X is hydrogen, Y is halogen or lower alkyl, Z is halogen and *n* is an integer of from 1 to 3.

4,029,494
PROCESS FOR SMELTING AND RECOVERY OF A MATERIAL CONTAINING NOBLE METALS

Aarne Albin Kapanen; Raimo Uolevi Rantanen; Leo Elias Lindroos; John Henrik Relander, and Risto Johannes Honkala, all of Pori, Finland, assignors to Outokumpu Oy, Helsinki, Finland

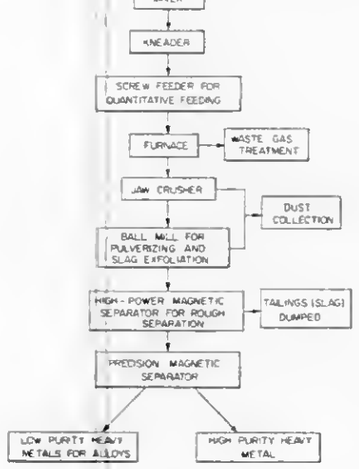
Filed Aug. 19, 1974, Ser. No. 498,321
Claims priority, application Finland, Aug. 24, 1973, 2655/73
Int. Cl.² C22D 7/00
U.S. Cl. 75—10 R **4 Claims**

1. A process for smelting of anode slime containing at least one of the noble metals gold and silver produced in the electrolytic copper process in order to recover the noble metals, comprising mixing slag-forming materials with the anode slime; smelting the mixture in a first inductively heated zone to produce a metal phase and a slag phase; at least partly withdrawing the slag phase from the first inductively heated zone and transferring the metal phase from the first inductively heated zone to a second inductively heated zone operating at a lower frequency than the first inductively heated zone and oxidizing the metal phase in said second treatment zone to form a refined product containing said noble metals.

4,029,495
PROCESS FOR RECOVERING A HEAVY METAL CATALYST COMPONENT FROM A SPENT CATALYST

Yoshiro Hirayama, 3-10, Chihaya-cho, Toshima, Tokyo, Japan

Filed Aug. 3, 1976, Ser. No. 711,223
Claims priority, application Japan, May 2, 1976, 51-12035; Mar. 2, 1976, 51-22464
Int. Cl.² C22D 7/00
U.S. Cl. 75—10 R **20 Claims**



1. A process for recovering a catalytic component which is a heavy metal or compound thereof from a spent supported catalyst composed of the catalyst metal and a non-combustible inorganic support, said process comprising the steps of:

a. introducing the waste supported catalyst into a furnace;

b. heating the waste catalyst within the furnace to at least 1,000° C to transform the waste catalyst into a sintered or semi-melted mass;

c. agitating said sintered or semi-melted catalyst mass to cause the metal component to aggregate as discrete granules within the sintered mass and to break the sintered mass into a granular material;

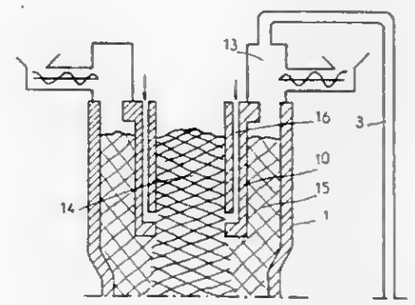
d. crushing said granular material; and

e. separating the metal granules from the crushed material.

4,029,496
PROCESS FOR THE REDUCTION OF IRON MINERAL

Ernest Dubois, Lausanne, Sweden, assignor to Etudes et Recherches Industrielles et Metallurgiques - ERIM, Lausanne, Switzerland

Continuation-in-part of Ser. No. 403,838, Oct. 5, 1973, abandoned. This application June 30, 1975, Ser. No. 592,089
Int. Cl.² C21B 13/02
U.S. Cl. 75—35 **8 Claims**



1. A substantially continuous process for the reduction of iron minerals in solid state in a vertical furnace comprising (1) charging the furnace substantially continuously with a mixture of particles of iron minerals and particles of solid carbonaceous combustible fuel containing large quantities of volatile hydrocarbons such that the mixture descends from top to bottom of the furnace by gravity, (2) injecting oxygen into the medial zone of the furnace as a plurality of fine jets distributed over the periphery of the furnace and over all of the height of the medial zone such that the oxygen ascends to the top of the furnace countercurrently to the mixture of solid particles, (3) withdrawing gases containing volatile components extracted from the mixture of particles produced at the top of the furnace, (4) washing and detarring the withdrawn gases and recycling the gases to the bottom of the furnace such that the gases ascend countercurrently to the mixture of solid particles, (5) withdrawing solids containing reduced iron and coke from the bottom of the furnace, wherein:

a. an upper zone is maintained in the furnace for heating the descending mixture of solid particles and cooling the ascending gases by countercurrent heat exchange,

b. a medial zone is maintained in the furnace for heating and reducing the iron minerals,

c. a lower zone is maintained in the furnace for heating the recycled gases and cooling the mixture of solids by countercurrent heat exchange,

d. the oxygen is injected into the medial zone at a low velocity compared to the velocity of the ascending gases,

e. the medial zone is heated by the combustion of at least a part of the ascending recycled gases and injected oxygen,

f. the amount of oxygen injected into the medial zone is regulated to maintain a temperature therein between 950° C. and 1200° C.,

g. the amount of gases recycled to the bottom of the furnace is regulated whereby the upper and lower zones are in heat exchange equilibrium and the calorific mass of the gases is substantially equal to the calorific mass of the solids in each zone,

h. the gases withdrawn at the top of the furnace are at a temperature of less than 100° C., and

i. the solids withdrawn from the bottom of the furnace are at a temperature of less than 100° C.

4,029,497

MANUFACTURE OF ALLOY STEELS AND FERROUS ALLOYS

Ivor Gray Nixon, Ier Stock Ost, "Matterhorgruss", Zermatt 3920, Valais, Switzerland

Filed Feb. 21, 1975, Ser. No. 551,738
Claims priority, application United Kingdom, Feb. 26, 1974, 8576/74
Int. Cl.² C21C 7/00
U.S. Cl. 75—60 40 Claims

1. A method for the production of a ferrous alloy in a converter comprising the steps of:

i. charging to said converter a metallic feedstock selected from the group consisting of steel, scrap, iron sponge and high grade cast iron, and mixtures thereof, containing minor amounts of non-ferrous elements, together with a ferro-alloy to provide a pool of molten metal in said converter;

ii. refining said molten metal by blowing with a decarburizing feed gas which is reducing to wustite at the temperature at which said converter is operated and which comprises a mixture of gases selected from the group consisting of mixtures comprising carbon monoxide, carbon dioxide, hydrogen and water vapor and gas mixtures which generate carbon monoxide, carbon dioxide, hydrogen and water vapor in situ in said converter; and

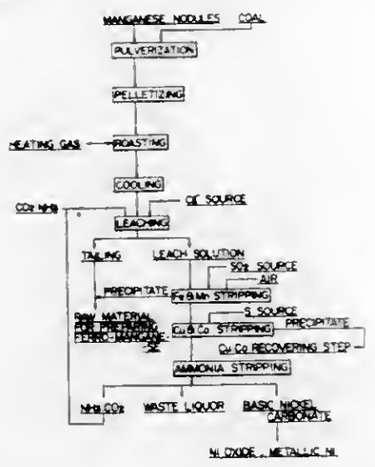
iii. tapping ferrous alloy and slag from said converter.

4,029,498

PROCESS FOR TREATING MANGANESE NODULES

Yasuhiro Okajima, Ichikawa, Japan, assignor to Sumitomo Metal Mining Co., Limited, Tokyo, Japan

Filed May 8, 1975, Ser. No. 575,700
Claims priority, application Japan, May 23, 1974, 49-57278
Int. Cl.² C22B 47/00
U.S. Cl. 75—103 14 Claims



1. In a process for recovering the metal impurities contained in manganese nodules which contain nickel, copper, cobalt, iron and manganese compounds which includes the steps of:

1. reducing the manganese nodules so as to convert the nickel, copper and cobalt to their metallic states while inhibiting the conversion of iron and manganese into their metallic state, thereby producing a reduced ore;
2. slurrying said reduced ore in a liquid selected from the group consisting of water or an aqueous ammoniacal solution;
3. adding said slurry to an aqueous ammoniacal solution and then blowing air into said solution;
4. adding a water-soluble chloride to said solution of (3) to form a leach solution, said compound being used in an amount of less than 3% by weight of the reduced ore; the improvement wherein after step (4) the following steps are conducted:
5. adding an SO_2-containing compound to said leach solution in order to help remove the manganese and iron impurities;
6. blowing air into said leach solution: and
7. removing the iron and manganese precipitates from said leach solution of step (6) in order to recover a solid useful for the preparation of ferromanganese.

4,029,499

RECOVERY OF GALLIUM

Walter Westwood; Jnhn James MacGregor, and John Blunden Payne, all of London, England, assignors to Johnson Matthey & Co., Limited, London, England

Filed July 3, 1975, Ser. No. 592,863
Claims priority, application United Kingdom, July 10, 1974, 30490/74
Int. Cl.² C22B 58/00
U.S. Cl. 75—109 7 Claims

1. A process for the recovery of gallium and alumina from bauxite ore comprising the steps of:

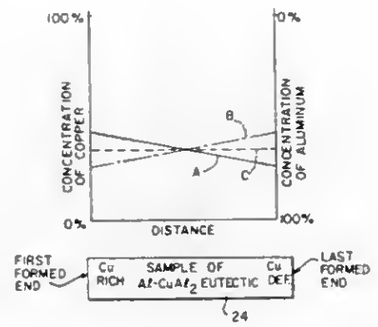
a. dissolving the ore in caustic soda solution under pressure;
b. precipitating alumina from the remaining caustic soda solution by reduction of temperature and pressure;
c. subjecting the resulting mother liquor from (b) to an elevated temperature of 60° to 450° C and a pressure of 2 to 100 atmos. in the presence of an oxygen-containing atmosphere; and
d. cementation of the gallium remaining in solution by contact with metallic aluminium.

4,029,500

METHOD OF GROWING COMPOSITES OF THE TYPE EXHIBITING THE SORET EFFECT

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of, and Biliyar N. Bhat, Grilfith, Ind.

Filed Mar. 11, 1975, Ser. No. 557,565
Int. Cl.² C22C 1/09
U.S. Cl. 75—135 9 Claims



1. A method for reducing lengthwise constituent concentration variations in a composite of the type exhibiting the Soret effect comprising:

a. introducing into a molten sample of the composite a predetermined lengthwise variation in the concentration of the constituents of the composite so that the concentration of that constituents which migrates toward the cooler part of a liquid solution of the composite held in a temperature gradient, varies from a higher value at one end of the sample to a lower value at the other end; and
b. directionally solidifying the molten sample starting at said other end for introducing into the composite a lengthwise constitutent concentration variation that is opposite to the variation present in the composite prior to solidification.

4,029,501

METHOD OF PREPARING IMPROVED MAGNETIC HEAD MATERIAL

Herbert Irwin Moss, Yardley, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Jan. 26, 1976, Ser. No. 652,225
Int. Cl.² B22F 3/14
U.S. Cl. 75—206 8 Claims

1. A method of oxidizing magnetic transducer head material having a first phase of a magnetic alloy or iron, silicon and aluminum and a hard, abrasion-resistant second phase at the grain boundaries of said first phase comprising

forming a thin oxide layer encapsulating finely-divided particles of an alloy of iron, silicon and aluminum in a hot aqueous base solution containing an oxidizing amount of alkali metal chlorate,

collecting the oxidized particles, and

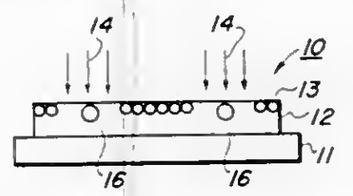
hot pressing the particles to form a substantially theoretically dense, compacted body from said oxidized particles, said body containing from about 2000 up to about 7500 parts per million of oxygen.

4,029,502

IMAGING SYSTEM CONTAINING AGGLOMERABLE MATERIAL

William L. Goffe, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Aug. 26, 1968, Ser. No. 755,306
Int. Cl.² G03G 13/22
U.S. Cl. 96—1 PS 33 Claims



1. An imaging method comprising the steps of:

a. providing an imaging member comprising a non-gaseous agglomerable layer contacting a softenable layer, said softenable layer or said agglomerable layer capable of being softened pursuant to the imagewise softening step below; and
b. imagewise softening said softenable layer or said agglomerable layer or both to cause agglomeration of nongaseous portions of said agglomerable layer in said imagewise softened areas of said member whereby said member in said imagewise softened areas is made more transparent compared to non-imagewise softened areas of said member.

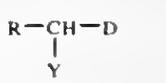
4,029,503

DIFFUSIBLE-DYE RELEASING TYPE DYES WHICH COUPLE TO FORM COLORLESS PRODUCTS

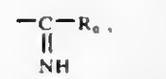
Mitsuto Fujiwhara, and Ryosuke Sato, both of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Division of Ser. No. 453,862, March 22, 1974, abandoned.
This application May 7, 1975, Ser. No. 575,374
Claims priority, application Japan, Mar. 28, 1973, 48-34469
Int. Cl.² G03C 7/00, 5/54, 7/04, 5/30
U.S. Cl. 96—29 D 24 Claims

1. In a diffusion transfer process which comprises imagewise exposing a photosensitive material comprising a support and a silver halide photosensitive layer thereon containing silver halide grains and further comprising a dye image forming substance therein; developing the exposed photosensitive material in an aqueous developing solution in the presence of a color developing agent thereby to form a diffusihle dye image corresponding to the imagewise exposure and derived from the dye image forming substance; and transferring the dye image from the photosensitive material to an image receiving layer superposed on the photosensitive material at least during the development whereby the dye image corresponding to the imagewise exposure is obtained in the image receiving layer, the improvement which comprises, as the dye image forming substance, a diffusible-dye releasing type dye having the formula:



in which D represents a dye residue carrying a water-soluble radical; Y represents hydrogen, halogen, an alkyl radical, an aryl radical, a heterocyclic radical, —O—R_1 or —$COOR_3$; R_1 is an alkyl radical, an aryl radical, a heterocyclic radical, an acyl radical or —SO_2—R_2; R_2 is an alkyl, aryl or heterocyclic radical; R_3 is an alkyl radical; R represents —CO—RA_4.



—SO_2—R_5, —SO—R_5, —CN or —$N(R_6)_2$; R_4 is hydrogen, hydroxyl, —R_0, —OR_0, —$N(R_0)_2$, —NH_2 or —NHR_0; R_5 is hydrogen, —R_0, —OR_0 or —$N(R_0)_2$; R_6 is hydrogen or —R_0; and R_0 is an aliphatic, aryl or heterocyclic radical, and when two or more R_0's are present in one radical, two of said R_0's can form together a nitrogen-containing heterocyclic ring, the diffusible-dye releasing type dye per se being non-diffusible and capable of coupling with the color developing agent in the aqueous developing solution in the presence of the exposed silver halide to split off D in the formula whereby the dye image is produced from D so split off, and the compound produced upon splitting off D being substantially colorless.

4,029,504

PHOTOGRAPHIC IMAGE TRANSFER ELEMENTS CONTAINING NEUTRALIZING LAYERS COMPRISING PARTICULATE MATERIALS

George Richard Secrist, Webster; Richard Warren Berls, and Brooke Pershing Schlegel, both of Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 14, 1976, Ser. No. 676,946
Int. Cl.² G03C 7/00, 5/54, 1/48, 1/40
U.S. Cl. 96—29 D 22 Claims

16. In a process of producing a photographic transfer image in color from an imagewise-exposed photographic element comprising a support having thereon at least one photosensitive silver halide emulsion layer having associated therewith a dye image-providing material, said process comprising treating said element with an alkaline processing composition in the presence of a silver halide developing agent to effect development of each of said exposed silver halide emulsion layers;

a. an imagewise distribution of dye image-providing material being formed as a function of development;
b. at least a portion of said imagewise distribution of dye image-providing material diffusing to a dye image-receiving layer;
c. a timing layer associated with a neutralizing layer being permeable by said alkaline processing composition after a predetermined time and wherein said layers are present in an image-receiving element or a cover sheet; and
d. said alkaline processing composition being neutralized by means of said neutralizing layer associated with said photographic element after said predetermined time;

the improvement comprising incorporating in said neutralizing layer a particulate material selected from the group consisting of diatomaceous earth, exploded volcanic rock and hydrous calcium silicate.

4,029,505

METHOD OF PRODUCING POSITIVE POLYMER IMAGES

William John Nebe, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 542,566, Jan. 20, 1975, abandoned, which is a continuation-in-part of Ser. No. 384,501, Aug. 1, 1973, abandoned. This application May 20, 1976, Ser. No. 688,479

Int. Cl.² G03C 5/00; G03C 5/04; G03C 1/68

U.S. Cl. 96—35.1 28 Claims

1. Method of making a positive polymeric image on a substrate which comprises

a. applying to the substrate a layer of photopolymerizable composition containing (1) non-gaseous ethylenically unsaturated compound capable of addition polymerization by free-radical initiated chain propagation, (2) 0.1–10% by weight, based on the photopolymerizable composition, of a compound containing a dinitroso group which is a noninhibitor of free-radical polymerization and is photochemically converted by ultraviolet radiation to an inhibitor of free-radical polymerization, and (3) 0.001–1.0 part by weight, per part of unsaturated compound, of an organic free-radical generating system activatable by actinic radiation that does not convert the dinitroso compound to an inhibitor of free-radical polymerization,

b. imagewise exposing a portion of the photopolymerizable layer through an image-bearing transparency consisting solely of substantially opaque and substantially transparent areas to ultraviolet radiation that converts the dinitroso compound to an inhibitor of free-radical polymerization, thereby inhibiting photopolymerization in the exposed areas,

c. exposing a greater portion of the photopolymerizable layer, including the areas exposed to the imagewise exposure radiation, to actinic radiation that activates the free-radical generating system but does not convert the dinitroso compound to an inhibitor of free-radical polymerization, whereby a positive polymeric image is formed in the areas not exposed to the imagewise exposure radiation.

4,029,506

UNIVERSAL PRODUCT CODE MARKING COMPOSITION CONTAINING A PHOTOSENSITIVE DYE FORMER, A PIGMENT AND A BINDER AND THE USE THEREOF

Rolf Dessauer, Greenville, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 516,483, Oct. 21, 1974, abandoned. This application Sept. 22, 1976, Ser. No. 725,585

Int. Cl.² G03C 5/24, 1/52

U.S. Cl. 96—48 R 7 Claims

1. A marking composition comprising:

a. a colorless, radiation-sensitive composition which, under exposure to radiation of the visible spectrum, is capable of forming a substantially permanent dye that can absorb at least a portion of the wavelength of light in the visible spectrum,

b. a pigment capable of diffusely reflecting the wavelengths of light absorbed by the dye, the amount of said pigment at least sufficient to opacify the marking composition but not so much as to hide color formed by exposure to radiation, and

c. a radiation-transmissive, colorless polymeric binder capable of providing coating adhesion to the surface of a substrate,

the quantity of pigment comprising about from 3 to 12 percent by volume of the combined components (a), (b) and (c) and the radiation-sensitive composition being present in an amount sufficient to produce, upon exposure to radiation of the visible spectrum, a detectable difference in diffuse reflectance density between exposed and unexposed areas.

4,029,507

PROCESS FOR THE PRODUCTION OF LIGHTFAST PHASE HOLOGRAMS UTILIZING AMMONIUM DICHROMATE AND GELATIN AS PHOTOSENSITIVE RECORDING MATERIAL

Hans Wehner, Bergisch-Gladbach, and Manfred Kliemann, Leichlingen, both of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Aug. 1, 1974, Ser. No. 493,515

Claims priority, application Germany, Aug. 4, 1973, 2339579

Int. Cl.² G03C 5/22

U.S. Cl. 96—49 7 Claims

1. A process for production of light fast phase holograms using a recording material comprised of a light-sensitive material containing hardenable gelatin

in which the recording material is

preliminarily hardened in a solution of 3–30% aqueous formaldehyde for up to 10 minutes to provide a temporary hardening and then

sensitized in a solution of from 1–10% ammonium dichromate

holographically exposed whereby cross-linked areas are created in accordance with the interference pattern of the holographic exposure and then the exposed material is developed to provide a phase hologram therein,

wherein the improvement comprises

the next treatment of the material after exposure is subjecting the hologram to a strongly basic formaldehyde sulfite bath comprising a solution of 3 to 20% hy weight of sodium sulphite ($Na_2S_2O_5$) and 5 to 30% by weight of 30% formalin in water for a period to desensitize the ammonium dichromate sensitization of the recording material

and then treating the desensitized material with a bath containing formaldehyde to harden the gelatin of the material and then

irrigating with running water for 30 minutes to 1 hour to complete desensitization by washing out dichromate without altering the cross-linked condition in the gelatin,

after which the exposed and developed material is dehydrated in a first stage with aqueous isopropanol solution and in a second stage with concentrated isopropanol solution to which formaldehyde has been added and dried,

said process producing optically clear phase holograms having signal to noise ratios of 30 to 70.

4,029,508

SILVER HALIDE MATERIAL CONTAINING A YELLOW COLOR-FORMING COUPLER

Mitsugu Tanaka; Atsuaki Arai; Kiyoshi Nakazyo, and Keisuke Shiba, all of Minami-ashigara, Japan assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

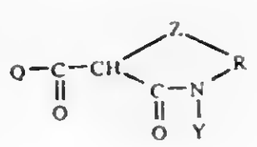
Filed Aug. 14, 1975, Ser. No. 604,861

Claims priority, application Japan, Aug. 14, 1974, 49-92894

Int. Cl.² G03C 7/00, 1/40

U.S. Cl. 96—56.3 13 Claims

13. A method of forming color photographic images which comprises developing an image-exposed photographic silver halide emulsion with a primary aromatic amine color developing agent in the presence of a yellow color forming photographic coupler as represented by the following general formula (1):



(1)

wherein Q represents a phenyl group, a naphthyl group, a pyridyl group or a furyl group, Y represents a hydrogen atom, an aliphatic group having 1 to 40 carbon atoms, an ali cyclic group, an aromatic group having 6 to 40 carbon atoms or a heterocyclic group having 3 to 40 carbon atoms, R represents a divalent aliphatic group having 1 to 40 carbon atoms, a divalent alicylic group, a divalent aromatic group having 6 to 40 carbon atoms or a divalent heterocyclic group having 3 to 40 carbon atoms; and Z represents an oxygen atom, a sulfur atom or a nitrogen atom substituted with an acyl group or a sulfonyl group.

4,029,509

POSITIVE PROCESS USING A LOW COATING WEIGHT SILVER HALIDE

Ralph Kingsley Blake, deceased, late of Union County, N.J., by June Arlene Blake, executrix, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 17, 1975, Ser. No. 632,729

Int. Cl.² G03C 5/32, 5/24, 1/76

U.S. Cl. 96—60 R 8 Claims

1. A process of forming an image in a photosensitive element that comprises a film support, a photosensitive silver halide layer, and an underlayer containing a chemically bleachable colorant selected from the group consisting of colloidal silver, colloidal mercury, colloidal palladium, colloidal copper, a copper film, a zinc film, a lead film, and a silver film; which process comprises:

1. imagewise exposing said photosensitive silver halide layer to actinic radiation,

2 developing the resulting latent image in said silver halide layer,

3. no sooner than step (2), treating said photosensitive element with a compound capable of generating sulfide ions under the conditions of treatment said compound selected from the group consisting of thiourea, substituted thioureas, mono-or di-N- substituted thioacetamides, dialkyl substituted dithiocarbamates, and

4. immersing said photosensitive element in a chemical bleach bath so as to chemically bleach the image in the silver halide layer and to bleach those areas of the colorant-containing layer which are under the image in the silver halide layer, leaving an image in those areas of the colorant-containing layer which are directly under the unexposed nonimage areas of the silver halide layer.

4,029,510

MULTI-SOLUTION PHOTOGRAPHIC PROCESSING METHOD USING MULTI-COMPONENT DEVELOPER COMPOSITIONS

Daniel Earle Speers, Miami, Fla., assignor to General Film Development Corporation, Southport, Conn.

Continuation-in-part of Ser. No. 273,048, July 19, 1972, abandoned. This application Dec. 23, 1974, Ser. No. 535,785

Int. Cl.² G03C 5/30, 5/38

U.S. Cl. 96—61 R 9 Claims

2. The method of rapidly developing silver halide film of the type such as is used as dental *X*-ray film at ordinary ambient room temperature processing conditions to produce a developed film which is clinically acceptable imagewise as resulting from the exposed *X*-ray film comprising immersing the exposed *X*-ray film for no longer than approximately 30 seconds, and with only an initial 5 second agitation of the immersed film, in an aqueous developer solution at ordinary ambient room temperature processing conditions, said developer solution having a pH in the range of 10 to 11 at 23° C (73° F), said aqueous developer solution including only the following three developing agents: p-methylaminophenol sulphate, 1,4-dihydroxy-benzene and 1-phenyl-3-pyrazolidone, and including anhydrous sodium sulphite for acting as a preservative, sodium hydroxide for acting as an accelerator, potassium bromide for acting as an anti-foggant and potassium carbonate for acting as a huffer for reducing oxidation, thereby producing developed dental X-ray film which is clinically acceptable imagewise within said short time period under such convenient ambient room temperature processing conditions.

4,029,511

COMPOSITION FOR USE IN MANUFACTURE OF MOLDED HOLLOW RUBBER ARTICLES

Malcolm E. Carson, Cleveland, and William M. Ellslager, South Euclid, both of Ohio, assignors to Kalcor Coatings Company, Inc., Willoughby, Ohio

Filed Feb. 26, 1976, Ser. No. 661,727

Int. Cl.² B28B 7/36

U.S. Cl. 106—38.22 2 Claims

1. A composition useful as a coating for the inside of pressurebag-molded hollow rubber articles during the final molding and curing operation, consisting essentially of an aqueous dispersion of 40 to 50% (based on entire composition weight) of mica of a particle size between 160 and 325 U.S. standard mesh, 4 to 10% of an alkyl acid phosphate in which the alkyl group contains 8 to 18 carbon atoms, 5 to 10% of a volatile nonaromatic hydrocarbon petroleum distillate, and sufficient surfactant to keep the composition homogeneous, the entire composition being at a pH of 4.5 to 5.0.

4,029,512

METHOD FOR THE PREPARATION OF FIBROUS INSOLUBLE CALCIUM SULFATE ANHYDRITE

Karlis L. Jaunarajs, Denver, Colo., and Julie C. Yang, Lexington, Mass., assignors to Johns-Manville Corporation, Denver, Colo.

Continuation-in-part of Ser. No. 281,269, Aug. 16, 1972, abandoned. This application Aug. 5, 1974, Ser. No. 494,429

The portion of the term of this patent subsequent to Oct. 28, 1992, has been disclaimed.

Int. Cl.² C04B 11/00

U.S. Cl. 106—109 11 Claims

1. A process for the formation of fibrous water insoluble calcium sulfate anhydrite, the fibers thereof having an overall average length in the range of from 30 to 70 microns, individual maximum lengths not exceeding 180 microns, and aspect ratios in the range of from 10:1 to 100:1; which comprises:

a. forming an aqueous suspension of gypsum, said suspension being not greater than 0.30 molar in gypsum, and said gypsum prior to dispersion being in the form of particles at least 90% of which are minus 4 mesh in size; and

b. converting the gypsum in said suspension to said fibrous calcium sulfate hemihydrate by reaction in a pressure vessel in the presence of saturated steam at a temperature in the range of from 120° C to 155° C for a period of 0.5 to 2.5 hours, thereby forming fibers of calcium sulfate hemihydrate having the aforesaid dimensions; and

c. thereafter calcining said fibers of calcium sulfate hemihydrate at a temperature in the range of 500° C to 750° C for a period of 0.5 to 3.0 hours to convert said fibers of calcium sulfate hemihydrate to fibers of water insoluble calcium anhydrite having substantially the same crystalline shape and dimensions.

10. A reinforced composite article comprising an inorganic matrix reinforced with the fibrous water insoluble calcium sulfate anhydrite produced in accordance with the process of claim 1.

11. A reinforced composite article comprising an organic polymeric resin matrix reinforced with the fibrous water insoluble calcium sulfate anhydrite produced in accordance with the process of claim 1.

4,029,513
SURFACE TREATED SILICA

Eric W. Vessey, Springfield, Pa.; James R. Miller, Rancho La Costa, Calif., and Klaus Robert Lange, Huntingdon Valley, Pa., assignors to Philadelphia Quartz Company, Valley Forge, Pa.

Continuation-in-part of Ser. No. 376,269, July 3, 1973, abandoned. This application June 11, 1975, Ser. No. 585,910
Int. Cl.² C09C *1/28*
U.S. Cl. 106—288 B **11 Claims**

1. A process for preparing microfine hydrated precipitated silica with a surface layer containing polyvalent inorganic ions by protocoacervate without residual gel formation, comprising:
a. forming a protocoacervate solution by saturating a dilute sodium silicate solution with a salt of a polyvalent inorganic ion;
b. neutralizing said protocoacervate solution to a pH of 8 to 9.5 by the slow addition of an acid of a polyvalent anion saturated with the salt of a polyvalent inorganic ion, thereby precipitating silica;
c. filtering, washing and reslurrying the precipitated silica;
d. adjusting the pH of the reslurried silica to about 9;
e. boiling the reslurried silica;
f. acidifying the slurry to a pH below about 3;
g. raising the pH of the slurry to between 6 and 7 with ammonia;
h. filtering, washing and reslurrying the precipitated silica; and
i. drying said slurry to obtain the product.

4,029,514
METHOD OF PRECIPITATING MICROFINE SILICA USING PHOSPHATE

Klaus Robert Lange, Huntingdon Valley, Pa., assignor to Philadelphia Quartz Company, Valley Forge, Pa.

Continuation-in-part of Ser. No. 376,269, July 3, 1973, abandoned. This application June 9, 1975, Ser. No. 584,804
Int. Cl.² C09C *1/28*
U.S. Cl. 106—288 B **6 Claims**

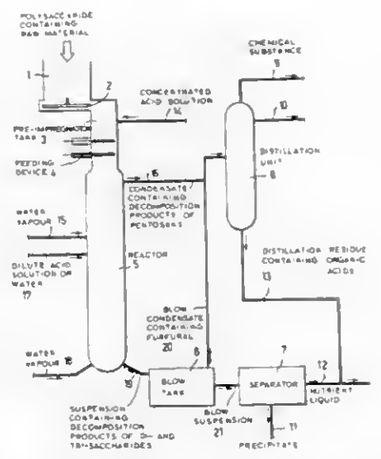
1. A method of precipitating finely divided silica having an ultimate particle size between 20 and 800 mμ, loss on ignition between 6.5 and 10.5%, loss at 105° C between 3.0 and 5.0%, pH value of 6.5 to 10, void volume of 1.3 to 5.0 cc/g., surface area of 25 to 600 m^2/g and pore volume of 0.01 to 0.4 cc/g. and having phosphate ions on the surface of said silica, said method comprising the steps of:
a. forming a dilute solution of sodium silicate having a weight ratio of 1.5 to 4.0 SiO_2/1.0 Na_2O and containing 0.01 to 0.05 g. of Na_2O/cc;
b. heating the dilute silicate solution to a temperature between 80° and 100 ° C;
c. adding 0.7 to 1.2 equivalents of phosphate salt per equivalent of Na_2O to said heated solution while maintaining the temperature between 80° and 100° C for a period of 1.0 to 3.5 hours, thereby producing a slurry of silica;
d. filtering, washing and reslurrying the silica with aqueous NH_3, and
e. filtering, rewashing and drying to obtain the product.

4,029,515
ACID HYDROLYSIS OF POLYSACCHARIDE-CONTAINING RAW MATERIAL

Keijo Kiminki; Raili Kulmala, and Seppo Sipilä, all of Pori, Finland, assignors to Oy. W. Rosenlew Ab, Pori, Finland

Filed Sept. 19, 1975, Ser. No. 615,037
Claims priority, application Finland, Oct. 4, 1974, 742911
Int. Cl.² C13K *1/02, 13/00*
U.S. Cl. 127—37 **7 Claims**

1. A continuous method for the decomposition of a raw material containing polysaccharides under pressure and elevated temperature by means of acid hydrolysis into raw materials of chemical and microbiological industry, as well as for recovery of same, said method comprising hydrolyzing the raw material containing polysaccharides continuously in one reactor as two steps, in the first step the hydrolysis being carried out in the upper part of the reactor in a vapor phase, and in the second step the hydrolysis being carried out in the bottom part of the reactor in a liquid phase, said steps being performed by:
a. impregnating the raw-material with a concentrated acid and supplying the impregnated raw-material into the reactor,
b. supplying water vapor into the bottom part of the vapor phase, and by the effect of the concentrated acid and water vapor decomposing pentosans into furfural, acetic acid, methanol, and acetone, and decomposing hexosans into disaccharides and trisaccharides,



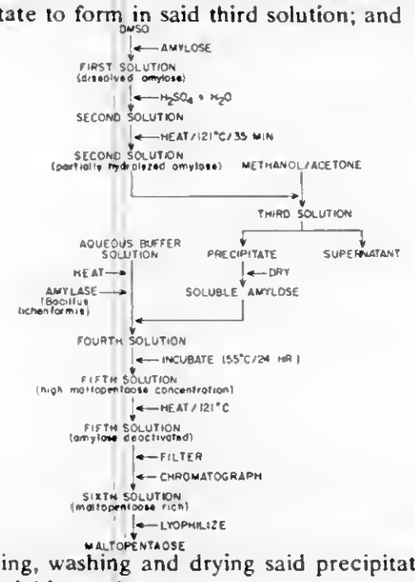
c. from the upper part of the vapor phase removing a condensate containing the mentioned decomposition products of pentosan,
d. feeding a dilute acid solution into the upper part of the liquid phase and feeding water vapor into the bottom part of the liquid phase, and by the effect of the dilute acid and water vapor decomposing the disaccharides and trisaccharides obtained in the first step into monosaccharides and into saccharic and fatty acids, and
e. removing from the liquid phase a liquid containing the mentioned decomposition products of disaccharides and trisaccharides.

4,029,516
PROCESS FOR PRODUCING SOLUBLE AMYLOSE

Thomas John Pankratz, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 9, 1976, Ser. No. 675,650
Int. Cl.² C08B *33/02*; **C13L** *1/08, 1/12*
U.S. Cl. 127—38 **6 Claims**

1. A process for producing water-soluble amylose comprising the steps of:
a. dissolving amylose in a first organic solvent capable of dissociating and dissolving said amylose to form a first solution;
b. mixing said first solution with an aqueous acid solution capable of partially hydrolyzing said dissociated amylose to form a second solution;
c. heating said second solution to partially hydrolyze said dissociated amylose into lower molecular weight segments;
d. mixing said second solution containing said partially hydrolyzed amylose with a second organic solvent capable of stripping the first organic solvent from the hydrolyzed amylose to form a third solution, and allowing a precipitate to form in said third solution; and

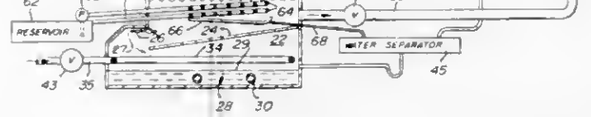


e. collecting, washing and drying said precipitate to form water-soluble amylose.

4,029,517
VAPOR DEGREASING SYSTEM HAVING A DIVIDER WALL BETWEEN UPPER AND LOWER VAPOR ZONE PORTIONS

Burton Rand, Norristown, Pa., assignor to Autosonics Inc., Norristown, Pa.

Filed Mar. 1, 1976, Ser. No. 662,750
Int. Cl.² B08B *5/00*
U.S. Cl. 134—11 **16 Claims**



6. Apparatus comprising a housing having a sump adapted to contain a vaporizable solvent, a first condensor means supported by the housing adjacent the upper end thereof and defining the upper end of a vapor zone in said housing, a second condensor means in said housing above the sump, a dividing wall at an elevation between the elevation of said first and second condensor means, a movable closure member cooperating with said wall and movable between opened and closed positions for providing selective communication between an upper portion of the vapor zone above the elevation of said wall and a lower portion of the vapor zone below said wall, and means connected to said housing above the elevation of said wall for removing residual vaporized solvent from the upper portion of said vapor zone and returning condensate thereof to said sump when said closure member is in its closed position and the upper portion of vapor zone is isolated from the lower portion of the vapor zone.

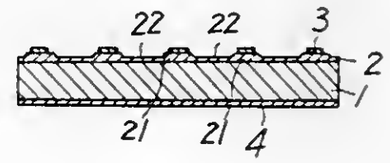
14. A method of cleaning comprising:
a. introducing work to be cleaned into a housing having a vapor zone divided into an upper portion and a lower portion, said upper and lower portions being in communication with each other, said work being introduced into said upper portion of said vapor zone;
b. introducing vaporized solvent into each portion of said vapor zone, cleaning said work by contact with said vapors;

c. using an upper condensor means to limit the upper extent of said vapor zone;
d. introducing a coolant into a lower condensor means located in said lower portion of said vapor zone when the work is cleaned, drawing hot vapors from the upper portion of said vapor zone into said lower portion of said vapor zone by said lower condensor means;
e. interrupting communication between said portions of said zone;
f. removing residual vapors from said upper portion of said zone and from said work; and
g. removing said work from said upper portion of said zone.

4,029,518
SOLAR CELL

Toshinobu Matsutani, Tenri, and Keiichi Nishida, Yamatokoriyama, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Nov. 20, 1975, Ser. No. 633,978
Claims priority, application Japan, Nov. 20, 1974, 49-141870[U]
Int. Cl.² H01L *31/06*
U.S. Cl. 136—89 SG **4 Claims**

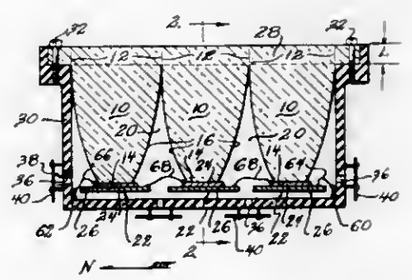


1. A solar cell comprising:
a semiconductor wafer of one conductivity type;
a diffusion layer of a conductivity type opposite to the conductivity type of the semiconductive wafer disposed on a first suface of said semiconductive wafer, said diffusion layer being formed on said first surface and having an etched surface providing thinner regions and thicker regions of a desired configuration;
a first electrode formed on a second surface of said semiconductor wafer opposite to said first surface; and
a second electrode formed on said thicker regions of said diffusion layer.

4,029,519
SOLAR COLLECTOR HAVING A SOLID TRANSMISSION MEDIUM

William W. Schertz, Batavia, and Solomon Zwerdling, Woodridge, both of Ill., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Mar. 19, 1976, Ser. No. 668,345
Int. Cl.² H01L *31/04, 35/00*
U.S. Cl. 136—89 PC **10 Claims**



1. A radiant energy direction device capable of operating in the concentrative mode where energy incident on a planar entrance area thereof is directed to an exit area thereof, comprising: a solid radiant energy transmission medium having surfaces coincident with said entrance and exit areas with the

surface coincident with said entrance area of larger area than the surface coincident with said exit area, a cover plate formed of a solid radiant energy transmission medium to which the surface of said medium coincident with said entrance area is coupled a radiant energy transducer coupled to the surface of said medium coincident with said exit area, and a housing upon which said cover plate is mounted such that said transducer and said medium are suspended to allow for differential heat expansion therebetween.

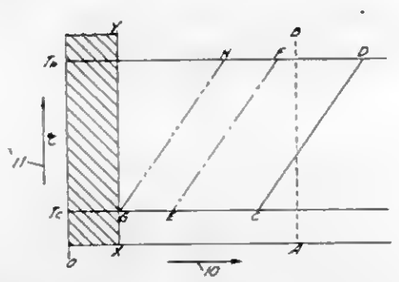
4,029,520
THERMOELECTRIC GENERATORS THAT INCORPORATE SELF-SEGMENTING THERMOELECTRIC LEGS

Edward F. Hampl, Jr., St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 293,862, Oct. 2, 1972, abandoned, which is a continuation of Ser. No. 36,131, May 11, 1970, abandoned, which is a continuation-in-part of Ser. No. 635,948, April 20, 1967, abandoned, which is a continuation-in-part of Ser. No. 463,148, June 11, 1965, abandoned. This application May 28, 1974, Ser. No. 473,553

Int. Cl.² H01V *1/14*

U.S. Cl. 136—205 — 5 Claims



1. In a thermoelectric generator,

A. at least one thermoelectric leg that exhibits a figure of merit of at least 0.5×10^{-3}; is operable at temperatures up to at least 800° C; consists essentially of metal elements and chalcogen elements united in a crystal lattice structure that is stoichiometric except for an excess or deficiency of metal sufficient to provide the current carriers needed for a thermoelectric composition; and has the property that atoms of said excess or deficient metal migrate from a first end of the leg toward the second end under the combined influence of thermal and electrical gradients applied to the leg by operation of said thermoelectric generator, said migration (a) forming an inherently stable gradation of current-carrier concentrations that is beneficial for thermoelectric conversion, and (b) causing the migrating metal element to be present at the second end of the leg at substantially the maximum solubility limit for the element in the lattice structure; each said thermoelectric leg in said generator having:

B. a contact member metallurgically bonded to the second end of the thermoelectric leg, with at least the exterior thickness of the contact member against the end of the thermoelectric leg consisting essentially of metal that includes said migrating metal element at substantially its free-state chemical potential; and

C. a contact member in electrical contact with the first end of the leg consisting essentially of metal that is free of said migrating metal element at its free-state chemical potential;

whereby as soon as said thermoelectric generator is operated to apply said combined thermal and electrical gradients to the leg, the migrating metal element in the second end of the leg will be in equilibrium with the migrating metal element in the contact member against the second end of the leg to permit the generator to exhibit steady-state operation.

4,029,521
THERMOELECTRIC DETECTOR

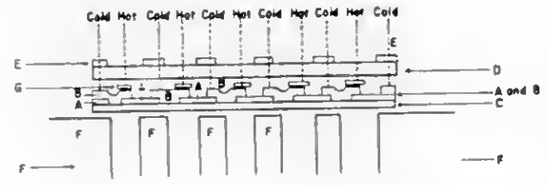
Uzi Korn, and Shmuel Shtrickman, both of Rehovot, Israel, assignors to Yeda Research & Development Co. Ltd., Rehovot, Israel

Filed Oct. 3, 1975, Ser. No. 619,687

Claims priority, application Israel, Oct. 4, 1974, 45788

Int. Cl.² H01L *35/02*

U.S. Cl. 136—225 — 4 Claims



1. A fast thermoelectric detector comprising, in combination: a plurality of thermocouple junctions connected in series in a meandering path consisting of a plurality of rows, each row including a plurality of substantially reactangular deposits of two different thermoelectrically active materials having overlap between deposits of said different materials which define said junctions; a thin support structure, said deposits being located on said thin inert support structure; and a tunnel structure on a thermally conducting base and defining a plurality of tunnels, said support structure being above said tunnel structure and said tunnels being substantially perpendicular to said rows of said meandering path of said junctions, said tunnels being located beneath those of said junctions which are hot junctions and material of said base being in good thermal contact beneath those of said junctions which are cold junctions.

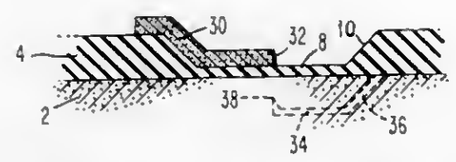
4,029,522
METHOD TO FABRICATE ION-IMPLANTED LAYERS WITH ABRUPT EDGES TO REDUCE THE PARASITIC RESISTANCE OF SCHOTTKY BARRIER FETS AND BIPOLAR TRANSISTORS

Francisco H. De La Moneda, Reston, Va., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed June 30, 1976, Ser. No. 701,375

Int. Cl.² H01L *21/265*

U.S. Cl. 148—1.5 — 23 Claims



1. A method for forming an asymmetrical buried, conductive layer in a semiconductor, comprising the steps of:

forming a first layer on the surface of a semiconductor substrate, having an opening with a tapered sidewall;

forming a layer of lift-off resist over said first layer overlapping said tapered sidewall, with a substantially vertical edge inside said opening in said first layer, leaving a portion of said opening in said first layer uncovered;

forming an ion-stopping layer over said lift-off resist layer and over said portion of said opening in said first layer, with a substantially vertical edge juxtaposed with and formed by said vertical edge of said lift-off resist layer;

lifting off said ion-stopping layer over said lift-off resist layer, uncovering said tapered sidewall, leaving a residual portion of said ion-stopping layer over said portion of said opening in said first layer;

ion-implanting a semiconductor dopant material into said semiconductor substrate outside of the region covered by said ion-stopping layer;

whereby a conductive layer is formed in the bulk of the substrate having a first end substantially following the contour of said tapered sidewall and a second end abruptly terminating within the bulk of said substrate.

4,029,523
SOLVENT PHOSPHATIZING COMPOSITIONS YIELDING NON WATER SOLUBLE COATINGS

Edward A. Rowe, Jr., and William H. Cawley, both of Mentor, Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Mar. 20, 1975, Ser. No. 560,377

Int. Cl.² C23F *7/10*

U.S. Cl. 148—6.17 — 30 Claims

1. An organic phosphatizing composition having a continuous and homogeneous liquid phase suitable for phosphatizing metal with a coating of at least substantial water insolubility, with said liquid phase containing water in minor amount, which composition comprises:

A. organic solvent providing liquid phase homogeneity, with an organic solubilizing liquid while being a non-solvent for a phosphatizing proportion of phosphoric acid in said composition, said solvent being unreactive with phosphoric acid in said composition;

B. solubilizing liquid capable of solubilizing phosphoric acid in said composition while retaining liquid phase composition homogeneity, said solubilizing liquid being unreactive with phosphoric acid in said composition;

C. a phosphatizing proportion of phosphoric acid;

D. aprotic polar organic compound soluble in said composition while retaining liquid phase homogeneity; and,

E. water in an amount above about 2% and exceeding said proportion of phosphoric acid while being sufficient for said composition to provide a phosphatized coating of substantial water insolubility on a ferrous metal substrate in phosphatizing contact with said composition, and while retaining liquid phase homogeneity.

4,029,524
HEAT TREATING PROCESS FOR A ROD WITHIN A FLUIDIZED BED

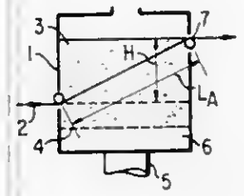
Eiji Takahashi, Nishinomiya; Masaru Shimizu, Kobe; Yasuhiro Oki, Kobe, and Osamu Ishigami, Kobe, all of Japan, assignors to Kobe Steel Ltd., Kobe, Japan

Filed Jan. 14, 1976, Ser. No. 649,151

Claims priority, application Japan, Jan. 14, 1975, 50-6886

Int. Cl.² C21D *1/74*

U.S. Cl. 148—13.1 — 3 Claims



1. A heat treating process for a rod by the use of a fluidized bed maintained at a constant temperature and having a constant length and which is composed of solid particles suspended by means of a pressurized gas, comprising the steps of:

introducing a heated rod at a predetermined temperature and at a constant rate of speed through an inlet opening into said fluidized bed so as to travel therethrough for heat treatment;

passing said rod through said fluidized bed in an upwardly inclined manner so as to exit from the surface of said fluidized bed; and

adjusting the resulting tensile strength of said rod by varying the soaking time of said rod within said fluidized bed as a result of varying the distance from said inlet to the point at which said rod emerges from the surface of said fluidized bed.

4,029,525
HIGH STRENGTH WROUGHT ZINC ALLOY

David L. Dollar, Greeneville, Tenn., assignor to Ball Corporation, Muncie, Ind.

Division of Ser. No. 573,292, April 30, 1975, Pat. No. 3,966,505, which is a continuation-in-part of Ser. No. 469,973, May 15, 1974, abandoned. This application Feb. 20, 1976, Ser. No. 659,613

Int. Cl.² C22F *1/16*

U.S. Cl. 148—32 — 2 Claims

1. A zinc alloy having superior age stability and tensile strength greater than 65,000 psi consisting of, by weight, 20–28 weight percent aluminum, 0.1 to 3.5 percent weight copper, 0.01 to about 0.5 weight percent magnesium, and the balance being zinc, said alloy having a homogenized structure.

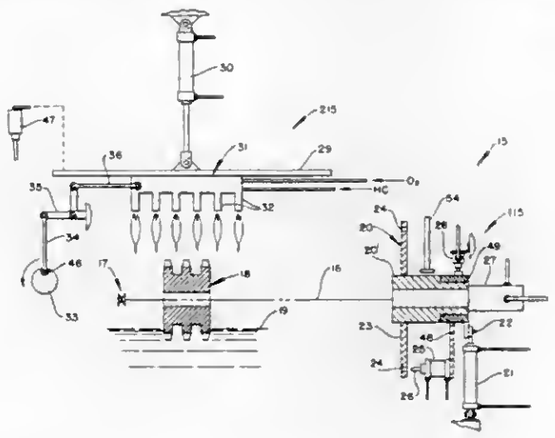
4,029,526
METHOD OF FLAME HARDENING GEARS

James David Carrigan, Odessa, Tex., assignor to Vance Industries, Inc., Odessa, Tex.

Division of Ser. No. 406,141, Oct. 15, 1973, Pat. No. 3,891,194. This application June 16, 1975, Ser. No. 586,911

Int. Cl.² C21D *9/32*

U.S. Cl. 148—147 — 9 Claims



1. Method of flame hardening the teeth of a gear having radially spaced rows of teeth thereon comprising the steps of:

1. rotatably supporting a gear such that the gear is held stationary for a first time interval and thereafter rapidly rotated about the central axis thereof and again held stationary for a second time interval;

2. positioning a burner means such that combustion products form a flame which is emitted therefrom to provide a flame which directly impinges upon a single row of teeth;

3. positioning a quench means in spaced relationship to said burner means to enable one row of gear teeth to be quenched;

4. positioning the gear respective to the burner means and the quench means such that spaced rows of teeth thereof are simultaneously treated, with one row of teeth being subjected to a heating action and another row of teeth to a quenching action, with there being other rows of teeth circumferentially disposed in each direction about the gear and between the rows of teeth being heated and quenched;

5. supplying sufficient heat at the burner means to cause the metal of a row of teeth located at the burner means to attain a temperature which forms an austenitic structure;

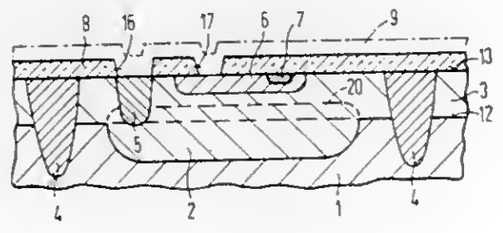
6. supplying sufficient cooling at the quench means to cause the metal of a row of teeth located at the quench means to be cooled at a rate which avoids the formation of decomposition products;
7. rotating the gear about its central axis an amount which causes the row of gear teeth located at the burner means to be directly transferred to the quench means;
8. cyclicly carrying out the previous step a sufficient number of times to cause the gear to rotate a plurality of revolutions while all of the individual rows of gear teeth are subjected to the heating action of the burner means and the cooling action of the quench means a single time before any one row of teeth can be subjected to the action of the burner means a second time.

4,029,527

METHOD OF PRODUCING A DOPED ZONE OF A GIVEN CONDUCTIVITY TYPE IN A SEMICONDUCTOR BODY

Andreas Glasl, Haar, and Helmuth Murrmann, Ottobrunn, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed June 18, 1975, Ser. No. 587,966
Claims priority, application Germany, June 21, 1974, 2429957
Int. Cl.² H01L 21/223
U.S. Cl. 148—187 1 Claim



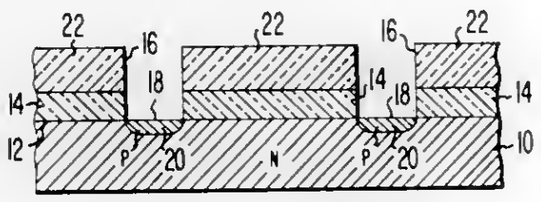
1. In a process of producing a n-conductivity type doped zone in a silicon semiconductor body wherein a silicon polycrystalline semiconductor layer is deposited on the surface of the zone to be doped, the improvement comprising:
depositing an undoped silicon polycrystalline semiconductor layer on the surface of the zone to be doped; and
diffusing PH_3 through said undoped polycrystalline layer and into said zone in the semiconductor body.

4,029,528

METHOD OF SELECTIVELY DOPING A SEMICONDUCTOR BODY

Wojciech Rosnowski, Summit, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Aug. 30, 1976, Ser. No. 718,806
Int. Cl.² H01L 21/223
U.S. Cl. 148—187 5 Claims



1. A method of selectively doping a silicon body with aluminum impurities comprising the steps of:
forming a layer of silicon dioxide on a surface of said body;
selectively exposing portions of said surface through said layer; and
subjecting said body to aluminum impurities at a temperature and for a time to form a pocket having a preselected surface impurity concentration and pre-drive in depth beneath said portions of said surface, said layer having a thickness such that said impurities are prevented from reaching said surface therebeneath.

4,029,529

CROSSLINKED CARBOXYL CONTAINING POLYMER AND NITROCELLULOSE AS SOLID PROPELLANT BINDER

Donald E. Elrick, Rawlings, and Harry Gilbert, Cumberland, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 12, 1967, Ser. No. 653,301
Int. Cl.² C06B 45/10
U.S. Cl. 149—19.6 16 Claims

1. An energetic binder composition, particularly adaptable for use in a composite-modified double or single base propellant, which comprises the admixture of up to about 98.5% nitrocellulose with at least 1% of a carboxy polymer having a carboxyl equivalent of from about 0.03 to 0.06 equivalents/hundred grams, said admixture being cross-linked with a multifunctional curing agent in an amount sufficient to improve the mechanical properties of the binder relative to the corresponding non-cross-linked binder.

4,029,530

METHOD OF FORMING LEAD STYPHNATE AMMUNITION PRIMING MIXTURE

Joseph F. Kenney, Bridgeport, Conn., assignor to Remington Arms Company, Inc., Bridgeport, Conn.

Continuation-in-part of Ser. No. 489,704, July 18, 1974, abandoned. This application Feb. 12, 1976, Ser. No. 657,487
Int. Cl.² C06B 41/06
U.S. Cl. 149—28 5 Claims

1. The method of making a normal lead styphnate priming composition which consists of reacting styphnic acid substantially free from sulphuric acid, the nitro derivatives of resorufin, the nitro derivatives of indophenol and the nitro derivatives of resazurin in the presence of water with an inorganic non-explosive compound of lead selected from the group of lead compounds consisting of lead oxide, basic lead carbonate, lead carbonate, and lead hydroxide to produce a workable, granular, wet mass of normal lead styphnate , and no by-products of the reaction except water or water and carbon dioxide said reaction taking place in the presence of gum arabic and a tetracene sensitizer incorporated in the reacting mass and, after the reaction has been completed, incorporated in the workable granular still wet mass an oxygen donor and a frictionator.

4,029,531

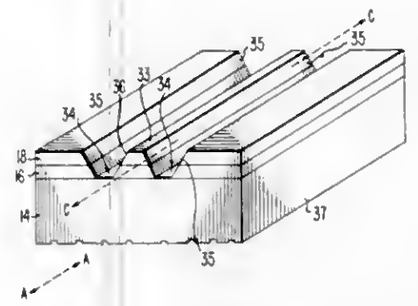
METHOD OF FORMING GROOVES IN THE [0$\bar{1}$1] CRYSTALLINE DIRECTION

Donald Paul Marinelli, Trenton, N.J., assignor to RCA Curporation, New York, N.Y.

Filed Mar. 29, 1976, Ser. No. 671,555
Int. Cl.² H01L 21/312
U.S. Cl. 156—647 7 Claims

1. A method of forming groove along the [0$\bar{1}$1] crystalline direction of a body of semiconductor material a portion of which is gallium arsenide or gallium aluminum arsenide along a (100) surface of said body, comprising the steps of:
applying to the (100) surface an etchant for at least 15 seconds at a temperature on the order of 80° C., said etchant being a solution by weight percent of 47.5% water, H_2O, 0.2% silver nitrate, $AgNO_3$, 23.8% of chromium trioxide, CrO_3, 28.5% of a 48% aqueous solution of hydrofluoric acid, HF, said etchant forming a pattern of elongated etch pits whose longitudinal axes are in the [0$\bar{1}$1] crystalline direction; and

forming grooves in said body at a surface opposite said surface on which said etchant is applied with said grooves



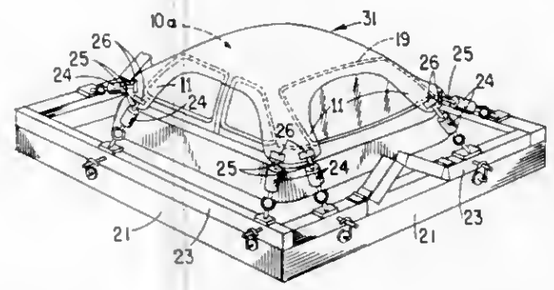
being aligned with the longitudinal axes of said etch pits so that said grooves are formed along the [0$\bar{1}$1] crystalline direction.

4,029,532

METHOD OF PRESHAPING AND INSTALLING CAR PLASTIC TOP

John G. Warhol, 14041 Vernon Ave., Oak Park, Mich. 48237, and Milton P. Ritter, 26400 Telegraph Road, Southfield, Mich. 48034

Filed July 19, 1976, Ser. No. 706,754
Int. Cl.² E04F 13/02
U.S. Cl. 156—71 3 Claims



1. In a process for applying a flexible plastic top sheet material to the outer surface of a metal real car body top, the steps which consist in preliminarily shaping sheet plastic roof material over a clean car body top mold, applying a matrix generating material to the outer surface of such preshaped plastic material to provide an assembly of a rigid support matrix and said preshaped plastic material, coating the cooperating available clean surfaces of the plastic portion of said assembly and the clean surface of a real car body top with adhesive material, applying said assembly to said real car body top so that the coated surfaces can contact each other for permanent union between the real car body top and the cemented surface of the plastic material and thereafter removing the matrix from said plastic material after said plastic material has been attached to said real car roof top.

4,029,533

METHOD OF FORMING GLASSY MATERIALS FROM PLUMBITES AND CELLULOSICS

Truman L. Ward; Ruth R. Benerito, both of New Orleans, and Jacques J. Hebert, Metairie, all of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Division of Ser. No. 499,689, Aug. 22, 1974, Pat. No. 3,926,709. This application Sept. 8, 1975, Ser. No. 611,370
Int. Cl.² C03B 29/00; C04B 33/34, 37/00
U.S. Cl. 156—89 2 Claims

2. A process for imparting aesthetic design and decoration, or a label to glass or ceramic surfaces, the process comprising . . .
a. placing a cellulosic textile premodified by reaction with sodium plumbite to a lead content of about 5 to 15%, on the surface of the glass or ceramic to which it is to be physically bound, and said textile shaped into the desired relief or other configuration,
b. inserting the assembly into a closed oven at or below 200° C.
c. elevating the oven temperatures to about 600° to 700° C., and
d. maintaining the elevated temperature for about 60 minutes, and
d. cooling the oven and material gradually to avoid fracturing the original glass or ceramic.

4,029,534

COMPOSITE MATERIALS AND PROCESSES FOR THEIR PRODUCTION

Paul J. Bocks, Viersen; Jurgen Grammel, Cologne, and Hermann Neumaier, Leichlingen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Division of Ser. No. 373,354, June 25, 1973, Pat. No. 3,989,870. This application July 14, 1976, Ser. No. 705,329
Int. Cl.² B32B 31/00
U.S. Cl. 156—246 10 Claims

2. A process for the production of a composite material consisting of a homogeneous or microporous plastic sheet and a polyurethane foam wherein said process comprises:
a. spreading on a transfer support a coating of an ionomer latex foam having a gross density of 0.04 to 0.40 g/cm³ produced by a churning process from an ionomeric polyurethane dispersion having
i. a solids content of 45 to 62% by weight of polyurethane,
ii. a viscosity of 10 to 70 seconds outflow time from a Ford measuring cup with a 4 mm nozzle,
iii. a particle diameter of 0.05 to 10 μ,
iv. an ionic group content of 2 to 40 milliequivalents per 100 g of polyurethane solids of ions selected from the group consisting of

$$\geq N^{+}- \;,\; -COO^{-} \;,\; -SO_3^{-} \;,\; \text{and } RO-\underset{\underset{O}{\|}}{P}-O^{-}$$

wherein R is hydrogen or a lower alkyl group, and
v. a tensile strength of at least 40 kg/cm² when dried to a homogeneous polyurethane foil, and which contains
i. 1–10% by weight of a foam stabilizing agent, based on the weight of solid polyurethane,
ii. 0–100% by weight of inorganic fillers based on the weight of solid polyurethane,
iii. 0–30% by weight of crosslinking agent based on the weight of solid polyurethane, and
iv. 0.1 to 10% by weight of thickener based on the weight of solid polyurethane;
b. while said foam is still liquid, applying thereto, using light pressure, a self-supporting homogeneous or microporous plastic sheet;
c. allowing the composite material to dry; and
d. removing said transfer support.

4,029,535

PROCESS FOR SEAMING FABRICS COMPRISING THERMOPLASTIC FIBERS USING LASER BEAMS

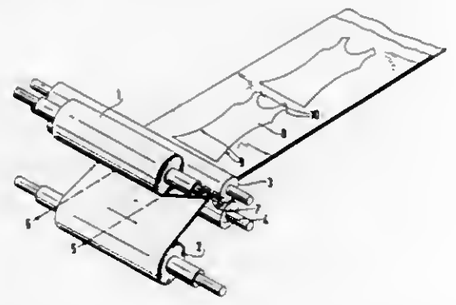
Cyril George Cannon, and Alan Selwood, both of Harrogate, England, assignors to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 564,506, April 2, 1975, abandoned. This application Sept. 1, 1976, Ser. No. 719,534

Claims priority, application United Kingdom, Apr. 16, 1974, 16446/74

Int. Cl.² B23K *31/00*; **B29C** *27/02*

U.S. Cl. 156—272 **3 Claims**



1. An improved process for seaming together two fabrics comprising fibers formed from thermoplastic polymers comprising heating the fabrics and combining the fabrics by passing them through a nip and exposing a line of contact between the fabrics to a heat source, wherein the improvement comprises directing at said line of contact a pulsed or chopped focused beam of energy from a laser traversable along said line of contact of said fabrics, said energy of said beam being sufficient to melt at least part of said contacting surfaces of said fabrics, but is insufficient to penetrate through said fabrics.

4,029,536

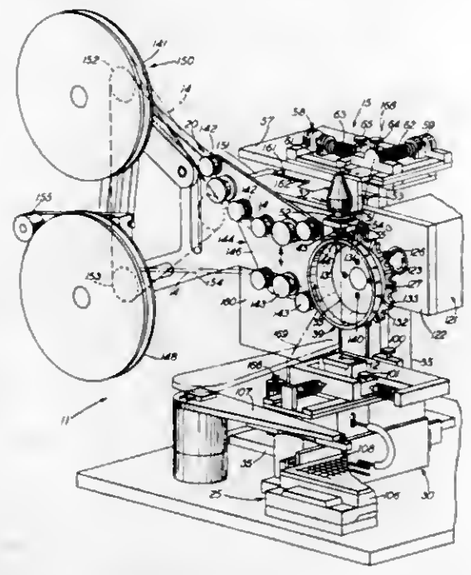
METHODS OF AND APPARATUS FOR MOUNTING ARTICLES TO A CARRIER MEMBER

Ernest Kovacs, Allentown; David P. Ludwig, and Friedich Zwickel, both of Whitehall, all of Pa., assignors to Western Electric Company, Inc., New York, N.Y.

Filed Apr. 7, 1976, Ser. No. 674,336

Int. Cl.² B29C *17/00*; **B32B** *31/00*; **B65C** *11/04*

U.S. Cl. 156—285 **16 Claims**



1. A method of loading an article onto a site on a carrier tape which comprises:

engaging a portion of the tape including the site with a locating means;

moving the site against an adhesive applicator to apply adhesive to predetermined areas of the site;

maintaining the engagement of the portion of the tape with the locating means while indexing the site into vertical alignment with an article; and then

moving the adhesive-applied site toward and against the article without releasing the engagement of the portion of the tape from the locating means until after the article has been loaded to the site by contact with the adhesive on the site.

4,029,537

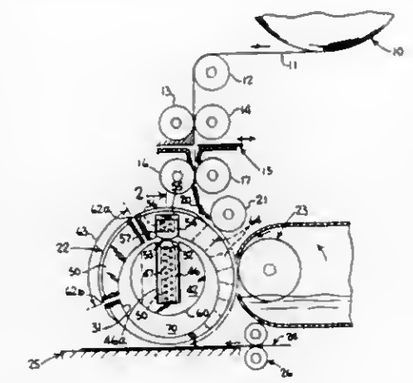
LABEL APPLICATOR

Richard E. Kish, Fairfield, Conn., assignor to Pitney-Bowes, Inc., Stamford, Conn.

Filed Dec. 8, 1975, Ser. No. 638,552

Int. Cl.² B65C *9/14*, *9/18*

U.S. Cl. 156—497 **3 Claims**



1. In a label applying apparatus having a rotatable applicator drum, means for feeding a series of labels to a first position adjacent the periphery of said drum, and means for feeding a label receiving document past a second position adjacent the periphery of said drum; the improvement comprising

a stationary shaft partially disposed within and rotatably supporting said drum;

vacuum generating means disposed within said drum operative in response to the rotation of said drum, including an internal cylindrical surface formed in said drum having an axis of rotation which is eccentric relative to the axis of said shaft to thereby define a chamber of variable radial distance between said drum and said shaft and radially movable blade means that slidably cooperate with the walls of said chamber; and

vacuum passage means formed and communicating between said chamber and a portion of the periphery of said drum whereby a partial vacuum is generated when said peripheral drum portion is located at said first position and whereby said partial vacuum is released as said drum peripheral portion passes said second position.

4,029,538

ULTRASONIC FILM SPLICER

Wallace I. Vance, Jr., Torrance, Calif., assignor to Metro/Kalvar Corporation, Darien, Conn.

Continuation of Ser. No. 363,091, May 23, 1973, abandoned. This application July 13, 1976, Ser. No. 704,806

Int. Cl.² B65H *21/00*; **G03D** *15/04*

U.S. Cl. 156—502 **8 Claims**

1. A film splicer comprising:

ultrasonic energy generating means mounted in a fixed position and including a transducer having a horn portion provided with a narrow elongated working edge, said transducer when energized generating vibratory motion in the ultrasonic range at said horn portion;

anvil means having a rotatably mounted circular member operably disposed opposite said working edge of the horn along its longitudinal axis for movement thereover in a spaced apart relationship to form a compression zone wherein film strips to be spliced across their widths may be fed into contact with the working edge of said horn portion and said circular anvil member;

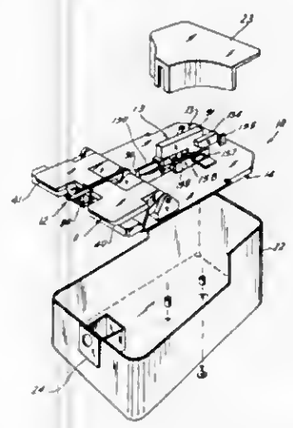
control means operably connected to said anvil means for controlling the rate of movement of said rotatably mounted circular member over said working edge;

film cutting means operably positioned in proximity to the horn portion of said transducer; and

two film block assemblies rotatably positioned in a substantially horizontal plane in spaced apart relationship on opposite sides of the arrangement of said film cutting means and said transducer, said assemblies including means for causing said assemblies to converge towards one another when the assemblies are rotated upwards and backwards from a position adjacent said cutting means to a position adjacent the working edge whereby film strips clamped in said film block assemblies and severed by said cutting means converge toward each other and cause the severed edges of the strips to overlap said working edge within the compression zone.

6. A film splicer comprising:

ultrasonic energy generating means including a transducer having a horn portion provided with a narrow elongated



working edge, said transducer when energized generating vibratory motion in the ultrasonic range at said horn portion;

anvil means operably disposed opposite said working edge of the horn along its longitudinal axis is spaced apart relationship with said horn to form a compression zone wherein film strips to be spliced across their widths may be fed into contact with the working edge of said horn portion and said anvil member;

means for selectively producing relative movement between the anvil and the working edge of said horn by an amount corresponding to differing widths of film strips to be spliced;

film cutting means operably positioned in proximity to the horn portion of said transducer; and

two film block assemblies rotatably positioned in a substantially horizontal plane in spaced apart relationship on opposite sides of the arrangement of said film cutting means and said transducer, said assemblies including means for causing said assemblies to converge towards one another when the assemblies are displaced from a position adjacent said cutting means to a position adjacent the working edge whereby film strips clamped in said film block assemblies and severed by said cutter means converge toward each other and cause the severed edges of the strips to overlap said working edge within the compression zone.

4,029,539

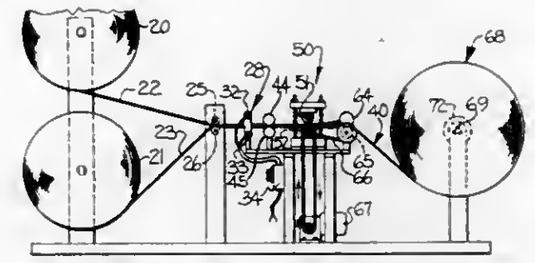
APPARATUS FOR FORMING A STRETCHABLE TUBULAR PACKAGING MATERIAL

Brendan L. Doll, Patterson, N.C., assignor to Cellu Products Company, Patterson, N.C.

Continuation-in-part of Ser. No. 223,246, Feb. 3, 1972, Pat. No. 3,834,969. This application Sept. 7, 1972, Ser. No. 286,701

Int. Cl.² B32B *31/00*; **B29D** *7/06*

U.S. Cl. 156—513 **3 Claims**



1. An apparatus for producing a stretchable tubular packaging material from elongate foam sheet material and which is adapted to receive and package articles therein, said apparatus comprising

means for guiding two advancing sheets of flexible foam sheet material into a contiguous overlying relationship to form overlying layers of the sheet material,

means positioned downstream of said guiding means for longitudinally severing the two advancing overlying layers of sheet material along a plurality of parallel lines and fusibly uniting the thusly formed adjacent side edges of the two layers along each of the parallel lines to form the same into a plurality of elongated flattened tubular members, said severing and uniting means comprising a plurality of laterally spaced, relatively thin electrically operable heating elements generally perpendicular to the direction of advance of the overlying layers and positioned to extend entirely through the advancing layers,

slitting means for slitting the two advancing overlying layers of the sheet material in a pattern of spaced apart rows of spaced incisions with the incisions of adjacent rows being staggered, said slitting means including a pair of rolls forming a nip therebetween through which said overlying layers pass, one of said rolls having a plurality of axially spaced substantially annular rows of spaced cutting blades projecting radially therefrom, the blades in adjacent annular rows being staggered to form said incisions through the two layers of foam material,

spreading means positioned downstream of said slitting means and engaging the interior of each tubular member for spreading opposing halves thereof to insure that they may be thereafter readily separated, and

means for advancing the two layers of flexible foam sheet material through said guiding means, and severing and uniting means, and said slitting means.

4,029,540

APPARATUS FOR FRAMING A PLURALITY OF X-RAY PHOTOGRAPHS OF A GIVEN SIZE

Herbert Weldanz, Kursiefener Strasse 16a, 5074 Odenthal-Globusch; Gerhard Sandt, Heimfriedweg 33, 5 Cologne-Hohenhaus, and Werner Samoray, Im Leuchterbruch 32, 5 Cologne 80, all of Germany

Filed Oct. 22, 1976, Ser. No. 735,077

Claims priority, application Germany, Oct. 25, 1975, 2547924

Int. Cl.² B32B *31/00*

U.S. Cl. 156—522 **30 Claims**

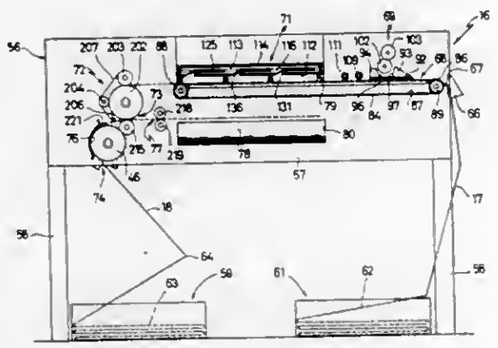
1. Apparatus for framing a plurality of X-ray photographs of a given size with the aid of a flexible frame which comprises two frame cards and in which the photographs are mounted

between recesses in the frame cards adapted to the size of the photographs, at least one of which cards is in the form of a mount with a self-adhesive coating of glue, with which the card adheres to parts of the photographs extending beyond the recess edges, both the adhesive-coated card and its covering frame card being provided along their lateral edges with perforations for cooperating with a transporting device using pin feed means, comprising

a first transporting device for said adhesive-coated card having a flat transporting section,

a photograph dispensing means arranged above said first transporting device by means of which the photographs are arranged in a predetermined order and applied to said adhesive-coated card in this order,

said photograph dispensing means comprising a frame which consists of relatively thick upper and lower plates provided with recesses of the same shape and size as those in said frame cards, which can be removably inserted into the apparatus, said frame having an opening which leads into said recesses, the photographs being arranged in the said frame at a distance from the transporting plane of said first transporting device which is substantially less than the length of the photographs measured in the transporting direction, in which frame the photographs can be slideably mounted in letter box-like compartments for guiding in the transport direction, the lower frame plate



being provided with an exit slit and guideface for each compartment in the direction of transport and inclined towards the transporting plane, through which slit the photograph can be applied to said adhesive card via said guide face,

a pusher means which drops into said opening in said frame leading into said recesses, which can engage on the rear edge of the photograph directed away from said slit to move this edge,

a deflecting mechanism following said first transporting device which diverts said adhesive card provided with photographs and moving in the transport direction,

a pressure glueing station to which said adhesive card is directed where said covering card is glued to the adhesive card,

a second transporting device which conveys said covering card to said pressure glueing station, which can be synchronized with said first transporting device in such a manner that said covering card and said adhesive card meet with a coincident arrangement of their recesses at the pressure glueing station,

a transfer mechanism following said pressure glueing station which grips the glued-together frame and transfers the frame to a delivery station,

a delivery station following said transfer mechanism for receiving said frame.

4,029,541

MAGNETIC RECORDING DISC OF IMPROVED DURABILITY HAVING TIN-NICKEL UNDERCOATING

Malcolm Barlow, Sunnyvale, and Jerry R. Lundquist, San Jose, both of Calif., assignors to Ampex Corporation, Redwood City, Calif.

Continuation-in-part of Ser. No. 485,812, July 5, 1974, abandoned. This application Feb. 19, 1976, Ser. No. 659,528

Int. Cl.² H01L *21/306*

U.S. Cl. 427—130 **3 Claims**

1. The process of making a magnetic recording medium comprising the following steps:

a. providing a metallic, non-magnetic substrate,

b. forming an electroless-nickel coating on said substrate,

c. polishing said electroless-nickel coating,

d. forming a tin-nickel layer over said electroless-nickel having a thickness of from 150 microinches to 1 mil.

e. forming a magnetic film selected from cobalt-nickel-phosphorus and cobalt-phosphorus over said tin-nickel film,

f. etching the surface of said film to produce a color change on said surface with an aqueous solution of a mild oxidizing agent selected from an aqueous nitric acid solution having a strength of 0.1 to 0.01 percent and an aqueous solution of ammonium persulfate having a strength of 0.01 to 1 percent, in the absence of a chelating agent, and

g. baking the composite structure at a temperature of from 225° to 325° C. for a time of from ½ to 6 hours.

4,029,542

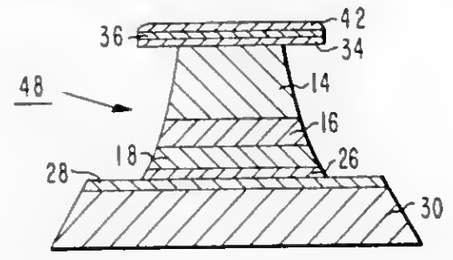
METHOD FOR SLOPING THE SIDEWALLS OF MULTILAYER P+ PN+ JUNCTION MESA STRUCTURES

George Allan Swartz, Plainsboro, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Sept. 19, 1975, Ser. No. 614,889

Int. Cl.² H01L *21/306*

U.S. Cl. 156—649 **2 Claims**



1. In a method for making a junction mesa structure from a semiconductor wafer wherein the wafer comprises a first layer having a masked area and an unmasked area comprising first layer molecules, a substrate, and a second layer comprising second layer molecules in between the first layer and the substrate and adjacent first layer and the substrate, the first layer and the second layer adapted to etch at substantially different etch rates in an etchant comprising 3% hydrofluoric acid and 97% nitric acid, the etchant further comprising etchant molecules which chemically remove first layer molecules from the first layer and second layer molecules from the second layer, the second layer molecules being removable substantially faster than said first layer molecules, the method comprising the steps of first contacting all of the unmasked area of the first layer with said etchant, removing the unmasked area of the first layer and removing a portion of said second layer unmasked by the masked area of the first layer, the improvement comprising the steps fo providing a known total quantity of the etchant molecules in the amount of 63 liters of etchant per cubic centimeter of the first layer in the unmasked area, providing a known total quantity of the first layer molecules in the unmasked area such that a ratio of said known total quantity of etchant molecules to said first layer

molecules in the unmasked area is approximately 631:1 and chemically consuming a known part of the etchant molecules by using said known part to consume the unmasked area of the first layer, and unconsumed quantity of the etchant molecules remaining after a reaction between the known total quantity of the etchant molecules and the known total quantity of the unmasked first layer molecules, the first layer being a P silicon semiconductor layer, the second layer being an N+ silicon semiconductor layer whereby the second layer is etched by the unconsumed quantity of etchant molecules at essentially the same rate as the first layer.

4,029,543

MECHANICALLY FREEING WOOD FIBERS IN THE PRESENCE OF SPENT PEROXIDE BLEACHING LIQUOR

Jonas Arne Ingvar Lindahl, Domsjoverken, Sweden, assignor to Mo och Domsjo, Ornskoldsvik, Sweden

Continuation of Ser. No. 478,198, June 11, 1974, abandoned, which is a continuation of Ser. No. 312,447, Dec. 6, 1972, abandoned. This application May 28, 1976, Ser. No. 691,171

Claims priority, application Sweden, Dec. 14, 1971, 15973/71

Int. Cl.² D21B *1/16;* **D21C** *9/16*

U.S. Cl. 162—24 **5 Claims**

1. In the process for the preparation of a cellulose pulp by mechanically freeing wood fibers in a grinder to form a fibrous pulp, and bleaching the fibrous pulp in a peroxide bleaching stage by adding a peroxide-containing bleaching agent, as the only bleaching agent, to said fibrous pulp the improvement which comprises mechanically freeing the wood fibers in a separate step preliminary to said bleaching, in the presence of only spent bleaching liquor from said peroxide bleaching stage, said liquor having a pH within the range from 7 to 9.

4,029,544

METHOD OF MAKING A NOVEL STARCH DERIVATIVE AND THE PRODUCT PRODUCED THEREBY

Wadym Jarowenko, Plainfield, and Henry R. Hernandez, Somerville, both of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Continuation-in-part of Ser. No. 517,450, Oct. 24, 1974, abandoned. This application July 12, 1976, Ser. No. 704,528

Int. Cl.² D21H *3/28*

U.S. Cl. 162—175 **9 Claims**

1. A paper containing pigment and alum and having dispersed therein as a pigment retention aid a starch derivative of an ungelatinized starch base having a water fluidity between 4 and 40, said starch derivative containing chemically introduced sulfo-succinate groups and cationogenic or cationic nitrogen containing substituent groups selected from the group consisting of primary amine, secondary amine, tertiary amine, and quaternary ammonium groups, wherein the degree of substitution in said starch derivative is about 0.008 to 0.20 with respect to said sulfo-succinate groups and about 0.005 to 0.50 with respect to said nitrogen containing substituent groups, said paper being prepared from a papermaking stock containing more than 4% alum by weight of dry pulp and from about 0.05 to 2.0% of said starch derivative by weight of dry pulp.

4,029,545

NUCLEAR FUEL ELEMENTS HAVING A COMPOSITE CLADDING

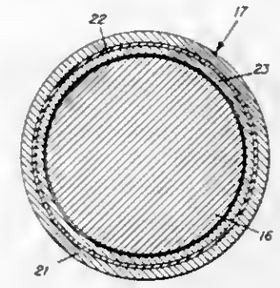
Gerald M. Gordon, Fremont, and Robert L. Cowan, II, Livermore, both of Canada, assignors to General Electric Company, San Jose, Calif.

Filed Nov. 11, 1974, Ser. No. 522,770

Int. Cl.² G21C *3/20*

U.S. Cl. 176—82 **12 Claims**

1. A nuclear fuel element comprising (a) a central core of a body of nuclear fuel material selected from the group consisting of compounds of uranium, plutonium, thorium and mixtures thereof and (b) an elongated composite cladding container comprising an outer layer of a material selected from the group consisting of zirconium or a zirconium alloy having two coatings bonded on the inside surface with the first coating being an undeformed diffusion barrier of constant thickness selected from the group consisting of chromium and chromium alloys and the second coating being an undeformed metal layer of constant thickness selected from the group



consisting of copper, nickel, iron and alloys thereof, said diffusion barrier being about 0.00005 to about 0.001 inch in thickness, said metal layer being about 0.0001 to about 0.002 inch in thicknes, each of said coatings having an impurity content of less than about 1 weight percent, and said cladding container enclosing said core so as to leave a gap between said core and said container during use in a nuclear reactor.

4,029,546

COLUMN APPARATUS AND PROCESS FOR IMMOBILIZED ENZYME REACTIONS

Robert Ernest Brouillard, Cedar Rapids, Iowa, assignor to Penick & Ford, Limited, Cedar Rapids, Iowa

Filed Mar. 29, 1976, Ser. No. 671,063

Int. Cl.² C12D *13/02;* **C12B** *1/00;* **C07G** *7/02*

U.S. Cl. 195—31 R **21 Claims**

12. The process for reacting a water-soluble enzyme-convertible substance with an enzyme other than cellulase, in which a water solution of the substance is passed through a porous bed of material containing immobilized therein at least one enzyme for the reaction, wherein the improvement comprises employing as said bed a regenerated cellulose sponge material which has been chemically modified to incorporate an effective amount of enzyme-immobilizing groups, said bed of sponge material having a flow direction length of at least 2 feet and a density under conditions of use of less than 1 gram of said sponge material (dry basis) per each 18 cubic centimeters of bed volume, and passing said water solution through said bed at a rate of over 0.5 gallon of solution per minute per square foot of bed cross-section.

4,029,547

BIOLOGICALLY ACTIVE SUBSTANCE, BESTATIN, AND PRODUCTION THEREOF

Hamao Umezawa, Tokyo; Takaaki Aoyagi, Fujisawa; Tomin Takeuchi, Tokyo; Masa Hamada, Hoya, and Yoshiro Okami, Tokyo, all of Japan, assignors to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai, Japan

Continuation-in-part of Ser. No. 591,924, June 30, 1975, abandoned. This application May 27, 1976, Ser. No. 690,456

Claims priority, application Japan, July 1, 1974, 49-75090

Int. Cl.² C12D *9/00*

U.S. Cl. 195—80 R **8 Claims**

1. The process for producing [(2S,3R)-3-amino-2-hydroxy-4-phenylbutanoyl]-L-leucine, denominated bestatin, which comprises culturing a bestatin-producing strain of *Streptomyces olivoreticuli* having the identifying characteristics of A.T.C.C. 31159 under submerged aerobic conditions in a nutrient medium containing a carbon source and a nitrogenous nutrient until a substantial amount of bestatin is produced by said organism in said solution.

4,029,548

PROCESS FOR PRODUCING ANTIBIOTICS U-50,147 AND U-51,738

Alexander D. Argoudelis, Portage, and LeRoy E. Johnson, Kalamazoo, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed May 7, 1976, Ser. No. 684,014
Int. Cl.² C12D *9/00*
U.S. Cl. 195—80 R **6 Claims**

1. A process for preparing antibiotic U-50,147 which comprises cultivating *Streptomyces lemensis*, having the identifying characteristics of NRRL 8170 in an aqueous nutrient medium under aerobic conditions until substantial antibiotic activity is imparted to said medium.

4,029,549

PROCESS OF PRODUCING 9α-HYDROXY-3-KETOBISNORCHOL-4-EN-22-OIC WITH MYCOBACTERIUM FORTUITUM

Frederick J. Antosz; Willard J. Haak, and Merle G. Wovcha, all of Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 670,657, March 26, 1976, abandoned. This application Apr. 30, 1976, Ser. No. 681,789
Int. Cl.² C12D *13/02*
U.S. Cl. 195—51 S **15 Claims**

1. A process for preparing 9α-hydroxy BN acid which comprises:

a. cultivating a 9α-hydroxy BN acid producing microorganism in an aqueous nutrient medium under aerobic conditions in the presence of a steroid containing from 8 to 10 carbon atoms, inclusive, in the 17-alkyl side chain to produce 9α-hydroxyandrostenedione and 9α-hydroxy BN acid in the fermentation beer, and,

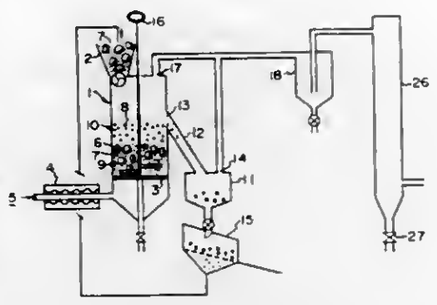
b. isolating said 9α-hydroxy BN acid free from 9α-hydroxyandrostenedione.

4,029,550

PROCESS FOR THE DRY DISTALLATION OF RUBBER

Shigeo Mitsui, Ebetsu; Tomiyasu Araki, Sapporo; Kazuhiko Niikawa, Sapporo; Hideo Hosoda, Sapporo; Yoshio Jyo; Ryuichiro Yoda, both of Yokohama; Giichi Suzuki, Kudamatsu; Takasi Iijima, Yokohama; Hiroshi Tanaka, Yokohama; Yasutaka Ochiai, Yokohama, and Takashi Ise, Yokohama, all of Japan, assignors to Agency of Industrial Science & Technology; Nippon Zeon Co., Ltd. and Japan Gasoline Co., Ltd., all of Tokyo, Japan

Filed Jan. 2, 1974, Ser. No. 429,980
Claims priority, application Japan, Jan. 5, 1973, 48-2942
Int. Cl.² C10B *57/04*
U.S. Cl. 201—2.5 **16 Claims**



1. An autothermic process for the dry distillation of rubber in a fluidized bed-forming oven means comprising:

1. heating, in an oxygen-containing fluidizing gas stream, rubber blocks under agitation by an agitation means, in the presence of carbon powder at temperatures which pulverize the said blocks into rubber particles, under these conditions, and

2. continuing the heating of the thus-obtained rubber particles in an oxygen-containing fluidizing gas stream to temperatures which pyrolyze the said rubber particles thus fluidized, said carbon powder being produced in situ by the pyrolysis.

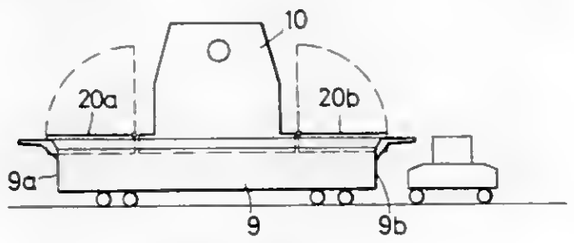
part of the rubber being burned throughout the process to produce in situ said heating in steps (1) and (2) required for the pulverization and pyrolysis respectively, thereby producing oily materials and solid materials, and then recovering the oily materials separately from the solid materials.

4,029,551

SUCTION ARRANGEMENT FOR WITHDRAWING CONTAMINATED GASES EMITTED FROM INCANDESCENT COKE PUSHED OUT FROM A COKING OVEN

Johann Georg Riecker, Ratingen, Germany, assignor to Hartung, Kuhn & Co. Maschinenfabrik GmbH, Dusseldorf, Germany

Filed Nov. 24, 1975, Ser. Nn. 634,405
Claims priority, application Germany, Nov. 25, 1974, 2455737
Int. Cl.² C10B *27/00*
U.S. Cl. 202—263 **8 Claims**



1. In a coking installation having a row of coke discharge openings, a combination comprising a coke guide car mounted for travel along the row; a coke-quenching car mounted for travel along the row and having a single recess adapted to receive coke pushed out from the coke discharge openings through the coke guide car; a suction arrangement for generating suction; a hood structure mounted for travel along the row of coke discharge openings and including opposite side walls having lower edges, the hood being connectable to the suction arrangement and movable into a position extending over the whole breadth but only a fraction of the length of the quenching car; wind shields provided on said opposite side walls of the hood in the region of the lower edges thereof, the wind shields extending horizontally outwardly from the hood in opposite respective travel directions of the hood and together with said hood having a combined length which is substantially equal to but slightly greater than the length of said quenching car, each of said wind shields having a breadth corresponding to the breadth of the hood; and wind guides provided on transverse end walls of the quenching car and having a breadth corresponding to the quenching car breadth, said wind guides being located slightly below said lower edges of said hood and of said wind shields and each extending horizontally outwardly from the quenching car in one of the opposite travel directions of said quenching car.

4,029,552

PROCESS FOR OBTAINING HIGH PURITY PERFLUORO-n-HEPTANE

George B. Fozzard, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 24, 1975, Ser. No. 625,742
Int. Cl.² B01D *3/34*
U.S. Cl. 203—69 **9 Claims**

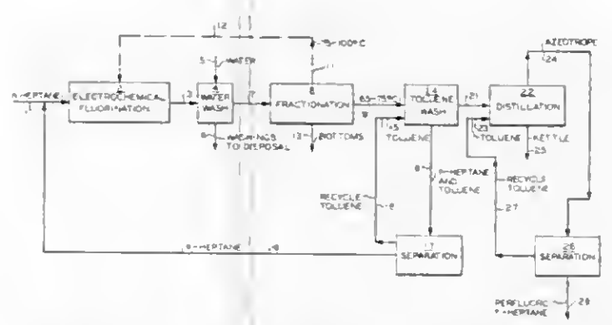
1. The process for obtaining a high purity perfluoro-n-heptane from an electrochemical fluorination product stream derived from the electrochemical fluorination of n-heptane,

wherein said product stream comprises perfluoro-n-heptane, n-heptane, partially fluorinated heptanes, and water soluble acidic components comprising hydrofluoric acid, which process comprises:

a. water-washing said electrochemical fluorination product stream, thereby removing substantially water soluble acidic components and producing a water-washed stream,

b. fractionating said water-washed stream, thereby producing a first overhead fraction rich in perfluoro-n-heptane and n-heptane, a second higher boiling fraction, and a bottoms fraction,

c. washing said first overhead perfluoro-n-heptane rich fraction with toluene, thereby substantially extracting



said n-heptane as an n-heptane-toluene admixture and leaving a raffinate admixture comprising perfluoro-n-heptane and toluene,

d. distilling said raffinate, thereby producing a toluene fraction and a toluene/perfluoro-n-heptane azeotrope,

e. effecting phase separation between said toluene and said perfluoro-n-heptane from said perfluoro-n-heptane/toluene azeotrope, thereby resulting in a substantially toluene rich phase and a substantially rich perfluoro-n-heptane rich phase,

f. drawing off said toluene rich phase from said perfluoro-n-heptane rich phase, and

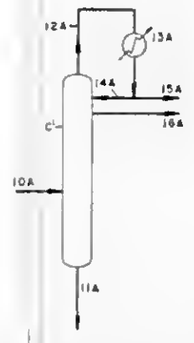
g. recovering said perfluoro-n-heptane as a substantially pure material.

4,029,553

PURIFICATION OF ACETIC ACID STREAMS BY DISTILLATION

Jerry L. Price, Texas City, Tex., assignor to Monsanto Company, St. Louis, Mo.

Filed July 28, 1975, Ser. No. 599,506
Int. Cl.² B01D *3/10*; **C07C** *53/08*
U.S. Cl. 203—94 **10 Claims**



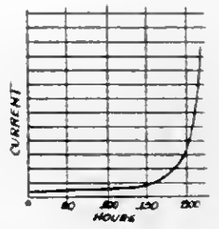
1. A process for the removal of very minor amounts of iodine from acetic acid which consists of introducing acetic acid containing very minor amounts of propionic acid and other high-boiling impurities and iodine into the intermediate section of a fractionation column, withdrawing propionic acid and high-boiling impurities from the bottom of said column, withdrawing and condensing the overhead vapors from said column, withdrawing a minor portion of said condensate and returning the remainder of said condensate as liquid reflux to the top of said column and withdrawing an acetic acid product containing 20 ppb or less of iodine as a liquid sidedraw below the point of reflux entry in the upper one-fourth of said column.

4,029,554

OIL TEST METHOD

Lynn E. Ellison, Crystal Lake, Ill., assignor to Naeco Associates, Inc., Arlington, Va.

Continuation of Ser. No. 471,748, May 20, 1974, abandoned, which is a division of Ser. No. 304,864, Nov. 8, 1972, abandoned, which is a continuation of Ser. No. 106,884, Jan. 15, 1971, abandoned, which is a continuation of Ser. No. 724,977, April 29, 1968, abandoned. This application Nov. 21, 1975, Ser. No. 634,008
Int. Cl.² G01N *27/52*
U.S. Cl. 204—1 T **5 Claims**



1. The method for testing an engine lubricating oil containing oxidation by-product inhibitors and adapted for high stress operating conditions as in aircraft, to determine deterioration of the lubricating properties thereof by the amount of oxidation by-product present therein as the inhibitors lose effectiveness after periods of use, and comprising the steps of: providing a pair of spaced-apart dissimilar electrodes selected from electromotive force series of materials to have different rates of oxidation, sampling the engine lubricating oil after such use and disposing the oil sample without modification thereof as the sole liquid medium between the electrodes in direct contact therewith, with resultant internally sourced current flow between the electrodes produced by oxidation thereof in response to the presence of said oxidation by-products in said oil sample, and electrically indicating deterioration of the lubricating properties of the oil sample to unsafe condition for further use of the engine lubricating oil by change in current flow resulting from the increased amounts of oxidation by-products therein.

4,029,555

HIGH-SPEED CONTINUOUS PLATING METHOD AND APPARATUS THEREFOR

Junichi Tezuka, Isehara, and Takatoshi Ando, Kamakura, both of Japan, assignors to Electroplating Engineers of Japan, Limited, Tokyo, Japan

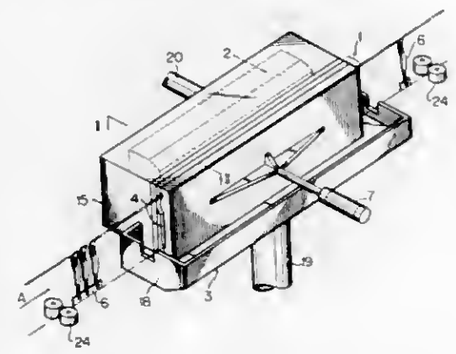
Filed May 7, 1976, Ser. No. 684,291
Claims priority, application Japan, May 23, 1975, 50-61089
Int. Cl.² C25D *5/02*, *5/04*, *5/08*, *17/00*
U.S. Cl. 204—15 **4 Claims**

1. A high-speed continuous plating method of the type employing an anode and solution spray nozzle to plate objects to be plated, wherein while a plurality of objects to be plated which are in complicated continuous form are being fed into and through an object feeding guide tunnel provided in a plating box and having a shape corresponding to the shape of said objects, a plating solution suitable for plating said objects with high current density is continuously sprayed against a solution spraying opening which communicates with said object feeding guide tunnel and has a predetermined dimension, said plating solution being sprayed from a solution spray

nozzle disposed in a position opposite to said solution spraying opening whereby to continuously plate the selected side of said objects at high speed.

2. A high-speed continuous plating apparatus comprising, in combination with an elongated plating box:

masking guide means including an elongated guide tunnel for feeding therethrough objects to be plated, said guide tunnel being adapted to closely confine said objects as



they move through said tunnel, means for feeding objects to be plated through said tunnel, said tunnel having an elongated solution spraying opening communicating with the interior of said plating box for exposing a limited area of said objects to be plated as they pass through said tunnel, an anode and solution spray nozzle disposed in said plating box opposite to said solution spraying opening, and solution recovering means for recovering a plating solution flowing out from said guide tunnel.

4,029,556

PLATING BATH AND METHOD OF PLATING THEREWITH

Emlee Monaco, and Pasquale F. Monaco, both of 5925 W. 130th St., Cleveland, Ohio 44130

Filed Oct. 22, 1975, Ser. No. 624,671
Int. Cl.² C25D *3/60, 5/10*
U.S. Cl. 204—40 **26 Claims**

1. An aqueous acidic plating bath for electrodeposition of a tarnish resistant alloy onto an electrically conductive substrate, said bath comprises ionic compounds of cobalt, tin and a third metal selected from the class consisting of Periodic Groups IV*b* metals and Periodic V*b* metals and combinations thereof, said ionic compounds being present in ranges of: about 50–350 grams per liter cobalt compounds, about5–45 grams per liter tin compounds, and about 0.2–60 grams per liter third metal compounds.

23. A method for bulk plating of the outer surface of small parts forming a randomly-oriented agglomeration, wherein each dimension of said agglomeration of parts is substantially greater than any dimension of the constituent parts of said agglomeration, said parts of said agglomeration being freely movable relative to each other when said agglomeration is tumbled, said method comprising the steps of:

a. placing said agglomeration of parts in a plating barrel;
b. placing said barrel into an aqueous acidic bath including dissociated ionic compounds of tin, cobalt, and a third metal from Periodic Groups IV*b* and V*b*, said ionic compounds being present in the bath in the ranges of about 50—350 grams per liter cobalt compounds, about 5–45 grams per liter tin compounds and about 0.2–60 grams per liter third metal compounds:
c. placing a first electrode into said agglomeration of parts;
d. placing a second electrode into said bath;
e. energizing said electrodes to plate an alloy onto said surfaces of said small parts; and,
f. rotating said barrel during said energizing step.

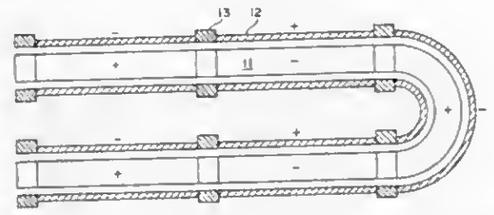
24. A method as defined in claim 23 including the initial step of plating bright metal substrate coating onto said surfaces of said parts.

4,029,557

TREATMENT OF WATER CONTAINING CYANIDE

Wendell N. Christensen, Brigham City, and Larry W. Poulter, Ogden, both of Utah, assignors to Thiokol Corporation, Newtown, Pa.

Filed Oct. 15, 1975, Ser. No. 622,599
Int. Cl.² C02C *5/12*; **C02B** *1/82*
U.S. Cl. 204—149 **3 Claims**



1. The process for destroying cyanide in water containing a metal-cyanide compound, comprising the steps of:

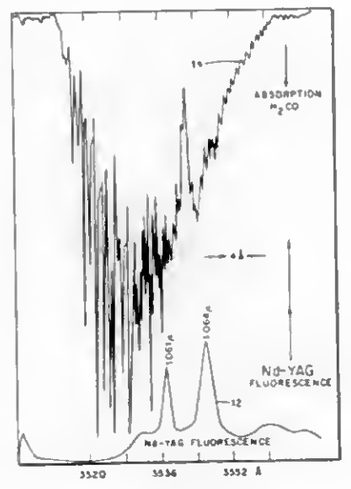
adding 1 to 6% by weight of sodium chloride to water;
passing the water through at least one energized electrolytic cell, wherein the sodium chloride and water are electrolyzed to produce chlorine and sodium hydroxide;
mixing this water with that containing the metal-cyanide compound;
allowing the chlorine and sodium hydroxide to react with the metalcyanide compound, wherein the cyanide is released in harmless gaseous products, the metal is precipitated, and the sodium chloride is reformed; and
recycling the resulting water containing the sodium chloride for repetition of the process.

4,029,558

ISOTOPE ENRICHMENT BY FREQUENCY-TRIPLED TEMPERATURE TUNED NEODYMIUM LASER PHOTOLYSIS OF FORMALDEHYDE

John B. Marling, Livermore, Calif., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Oct. 22, 1976, Ser. No. 734,840
Int. Cl.² B01J *1/10*
U.S. Cl. 204—158 R **11 Claims**



1. A method for separating isotopes of at least one of the elements carbon, hydrogen and oxygen by selective photo-predissociation of formaldehyde which comprises:

subjecting a gaseous formaldehyde isotope source material to laser radiation at a given wavelength in the range of from about 352 nanometers to about 355 nanometers which excites those molecules of formaldehyde containing a desired isotope without substantially exciting those molecules of formaldehyde containing an undesired isotope of the same element, the excited molecules thereby dissociating to form a product enriched in the desired isotope without substantial dissociation of unexcited molecules,
providing said laser radiation by means of a neodymium laser in a frequency-tripled configuration, said laser being tuned to said given wavelength by varying the temperature of the laser crystal, and
separating the dissociation product enriched in the desired isotope from the reaction system.

4,029,559

ION LASER ISOTOPE ENRICHMENT BY PHOTO-PREDISSOCIATION OF FORMALDEHYDE

John B. Marling, Livermore, Calif., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed June 17, 1976, Ser. No. 697,000
Int. Cl.² B01J *1/10*
U.S. Cl. 204—158 R **10 Claims**

1. A method for separating isotopes of at least one element selected from carbon, hydrogen and oxygen by selective photo-predissociation of formaldehyde which comprises:

subjecting a gaseous formaldehyde isotope source material to laser radiation at a predetermined wavelength selected from the range of about 3323.75 ± .025 A, the range of about 3323.71 ± .01 A, about 3250.3 A, and about 3454.26 A which excites those molecules of formaldehyde containing a desired isotope of said element without substantially exciting those molecules of formaldehyde containing an undesired isotope of the same element, the excited molecules thereby dissociating to form a product enriched in the desired isotope without substantial dissociation of unexcited molecules;
providing said laser radiation by means of a neon ion laser when said predetermined wavelength is in the range of about 3323.75 ± .025 A, by means of a neon-22 ion laser when said predetermined wavelength is in the range of about 3323.71 ± .01 A, by means of a cadmium ion laser when said predetermined wavelength is about 3250.3 A, and by means of a xenon ion laser when said predetermined wavelength is about 3454.26 A; and
separating the dissociation product enriched in the desired isotope from the reaction system.

4,029,560

PROCESS FOR PRODUCING α,α,α,α',α',α'-HEXACHLOROXYLENE

Shigeo Yoshinaka; Masaharu Doya; Seiiji Uchiyama, and Sadao Nozaki, all of Niigata, Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Filed Mar. 29, 1976, Ser. No. 671,698
Claims priority, application Japan, Apr. 1, 1975, 50-39587
Int. Cl.² B01J *1/10*
U.S. Cl. 204—163 R **5 Claims**

1. A process for batchwise or continuous production of α,α,α,α',α',α'-hexachloroxylene by reacting a xylene compound selected from the group consisting of (i) xylene selected from m-xylene and p-xylene and (ii) compounds resulting from the partial chlorination of the side-chain methyl groups of the xylene (i), with chlorine under the irradiation of ultraviolet rays; said process comprising

1. a first-step chlorination reaction which is carried out in the presence of α,α,α,α',α',α'-hexachloroxylene as a solvent added at the initial stage of the reaction, and continued until a compound convertible to α,α,α,α',α',α'-hexachloroxylene by chlorination becomes substantially absent in the reaction mixture, and
2. a second-step chlorination reaction which is continued from the first-step chlorination and carried out to convert difficulty-separable by-products present in the reaction mixture to easily-separable compounds.

4,029,561

PHOTOCURABLE CATHODIC ELECTROCOATING

Vincent Daniel McGinniss, Valley City, Ohio, assignor to SCM Corporation, New York, N.Y.

Filed Jan. 22, 1976, Ser. No. 651,541
Int. Cl.² C25D *13/06, 13/10*
U.S. Cl. 204—181 **2 Claims**

1. In a process for electrodeposition of an electrocoating composition onto a cathode substrate disposed within an aqueous electrocoating bath, said electrocoating composition containing a polymer having pendant amine groups which are protonated with a proton donating acid and a crosslinking agent in an aqueous dispersion in said bath, said polymer being crosslinkable upon subsequent ultraviolet irradiation of said electrocoating on said cathode substrate, the improvement which comprises:

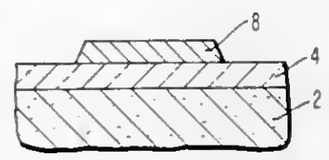
a. providing said electrocoating composition containing said polymer having at least about 5% pendant amine groups each amine group being attached to an alpha carbon relative to each said amine group of said polymer, said amine groups being protonated with said proton donating acid to render said polymer water dispersible in said bath, said electrocoating composition containing at least about 5% bis-maleimide crosslinking agent by weight of said polymer, and said electrocoating composition containing at least about 0.5% by weight of said polymer of an ultraviolet photosensitizer;
b. applying an electromotive potential through said bath to electrodeposit said polymer, said crosslinking agent, and said photosensitizer onto said cathode substrate to form an electrocoating, said pendant amine groups of said polymer becoming de-protonated thereby; and
c. irradiating said electrocoating on said cathode substrate with ultraviolet radiation to crosslink said polymer with said bis-maleimide by free radical addition polymerization with said alpha carbon to cure said electrocoating.

4,029,562

FORMING FEEDTHROUGH CONNECTIONS FOR MULTI-LEVEL INTERCONNECTIONS METALLURGY SYSTEMS

Bai-Cwo Feng, and John S. Lechaton, both of Wappingers Falls, N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed Apr. 29, 1976, Ser. No. 681,367
Int. Cl.² C23C *15/00*
U.S. Cl. 204—192 EC **6 Claims**



1. A method for forming connections between levels of conductive patterns comprising:

forming a first conductive pattern atop a substrate;
forming another pattern atop selected portions of said first conductive pattern, said other pattern including a first metal and an expendable material disposed on said first metal;
said expendable material being removable by an etchant which does not attack said metal or said substrate;
depositing an insulator atop said substrate and said patterns by RF sputtering at a bias which is sufficiently high to cause substantial reemission of said insulator, thereby covering the exposed substrate surfaces and said patterns, but leaving the side surfaces of said expendable material exposed;

etching said expendable material with said etchant, thereby removing said expendable material and the portion of the insulator disposed thereon.

2. A method as in claim 1 wherein said first metal is selected from the group consisting of aluminum, aluminum-copper alloys and aluminum-copper-silicon alloys.

3. A method as in claim 2 wherein said expendable material is selected from the group consisting of copper and chrome-copper-chrome composites; and

said etchant is nitric acid.

4,029,563

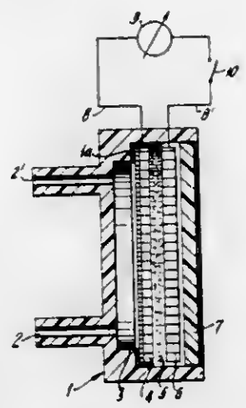
ELECTROCHEMICAL MEASURING CELL

Horst Binder, Karben-Petterweil; Reinhard Knödler, Hofheim; Alfons Köhling, Eschborn, and Gerd Sandstede, Frankfurt am Main, all of Germany, assignors to Dragerwerk Aktiengesellschaft, Germany

Filed Dec. 2, 1974, Ser. No. 529,007

Int. Cl.² G01N 27/46, 27/52

U.S. Cl. 204—195 R **3 Claims**



1. An electrochemical measuring cell for continuous measurement of the sulfur dioxide content of the air in emission and immission areas, comprising a cell having a test gas and cell chamber, a test gas connection for the passage of test gas into said test gas and cell chamber, a diffusion electrode serving as an anode and comprising a reversible, organic redox system located in said gas and test cell chamber, a cathode spaced from said anode and comprising an active mass having a redox potential higher than the redox potential of said anode, an immobilized electrolyte between said anode and said cathode, means connected between said anode and said cathode for measuring the short-circuit current therebetween; the redox system in the diffusion electrode having a quinoid structure and being present in a solid state.

4,029,564

HIGH SPEED PLATING DEVICE FOR RECTANGULAR SHEETS

Kazuhiro Higuchi, Hatano, and Junichi Tezuka, Isehara, both of Japan, assignors to Electroplating Engineers of Japan, Limited, Tokyo, Japan

Filed Mar. 26, 1976, Ser. No. 670,684

Int. Cl.² C25D 17/06

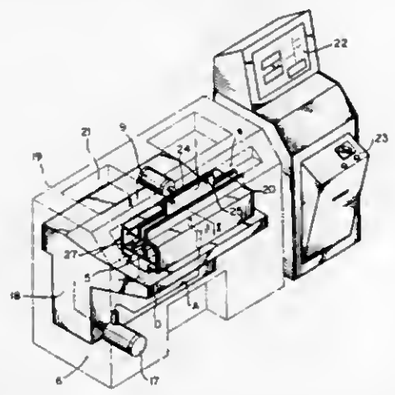
U.S. Cl. 204—224 R **8 Claims**

1. A plating device for plating a selected lengthwise portion of a sheet-like article, comprising:

masking means for masking portions on opposite sides of the article which are not to be plated, said masking means including a pair of opposed plates having masking sheets on the facing sides thereof, said plates having a length corresponding to the length of the article, and pressure cylinder means coacting with said plates for causing relative movement therebetween so that said article can be pressed between the plates whereby the masking sheets cover portions of the article which are not to be plated, said masking means leaving lengthwise portions located on opposite faces of the article exposed for plating;

jetting means for simultaneously and uniformly applying a plating solution to the exposed lengthwise portions of the article which are disposed on the opposite faces thereof, said jetting means including a pair of nozzle members which are spaced apart and are directed toward one another for permitting the article to be disposed therebetween, whereby each of the nozzle members jets the plating solution against the exposed lengthwise portion on one side of the article;

each nozzle member having a discharge opening means which is elongated in the lengthwise direction of the article and oriented to direct the discharged stream of



plating solution in a direction substantially perpendicular to the exposed lengthwise portion of the article so that the stream of plating solution, upon impacting against the exposed lengthwise portion of the article, divides substantially uniformly into substreams which flow outwardly in opposite directions over the exposed lengthwise portion of the article for effecting plating thereof;

anode means associated with each of said nozzle members, said anode means being positioned at the edge of said nozzle member so as to define said discharge opening means, said anode means being positioned along both edges of said discharge opening means and extending in the elongated direction thereof so as to extend in the lengthwise direction of the article; and

means for supplying plating solution to said jetting means.

4,029,565

ELECTROLYTIC APPARATUS

Werner Bender, Hofheim, Taunus; Dieter Bergner; Kurt Hannesen, both of Kelkheim, Taunus; Helmut Hund, Konigstein, Taunus, and Wilfried Schulte, Hofheim/Taunus, all of Germany, assignors to Hoeschst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Aug. 27, 1976, Ser. No. 718,341

Claims priority, application Germany, Aug. 29, 1975, 2538414; Mar. 11, 1976, 2610114

Int. Cl.² C25B 1/26, 9/00

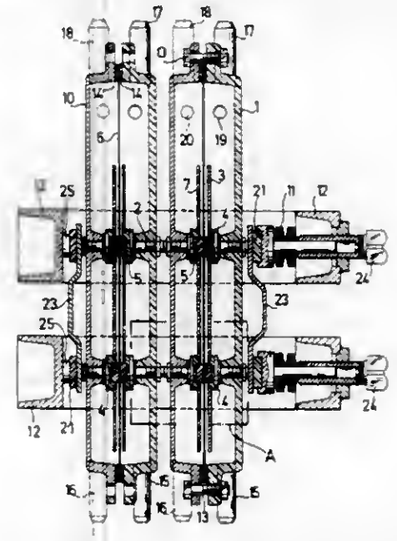
U.S. Cl. 204—256 **9 Claims**

1. Electrolytic apparatus for the production of chlorine from aqueous alkali metal chloride solution comprising at least one electrolytic cell consisting of a housing with equipment for the supply of the current for the electrolysis, for the supply of the starting products and for the discharge of the products of electrolysis, in which housing the anode and cathode are separated from each other by a separating wall, wherein

a. the housing is composed of two hemispherical shells,

b. the electrodes are connected with the hemispherical shells by conductive bolts projecting through the wall of the hemispherical shells and the end faces of the bolts are in contact with current supply means and means to clamp together the current supply means, the hemispherical shells, the electrodes and the separating wall, and

c. the separating wall is positioned between electrically



insulating spacers mounted in the extension of the bolts on the electrolytically active side of the electrodes and clamped between the edges of the hemispherical shells by packing elements.

4,029,566

ELECTRODE FOR ELECTROCHEMICAL PROCESSES AND METHOD OF PRODUCING THE SAME

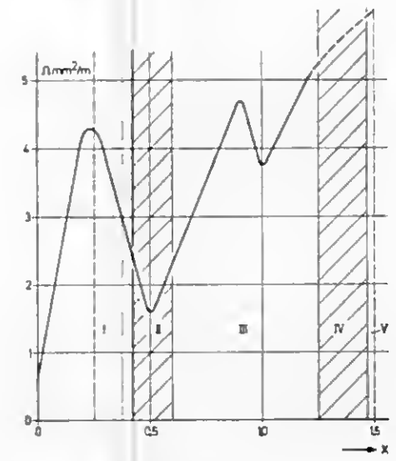
Franz Brandmair, Rain, Lech; Ottmar Rubisch, Meitingen near Augsburg, and Dietmar Hönig, Augshurg, all of Germany, assignors to Sigri Elektrographit GmbH, Meitingen near Augsburg, Germany

Filed Jan. 15, 1975, Ser. No. 541,348

Claims priority, application Germany, Feb. 2, 1974, 2405010

Int. Cl.² C25B 11/10

U.S. Cl. 204—290 F **9 Claims**



1. Chlorine resistant sintered electrode for aqueous electrolysis comprising a base formed of passivatable material, and a covering layer of activating substance at least partly covering said base, the material of said base consisting fo titanium oxide TiO_x, wherein x is 0.25 to 1.50, said material of said base having been sintered by heating in an inert gas atmosphere to a temperature of from 1200° C to 1400° C.

4,029,567

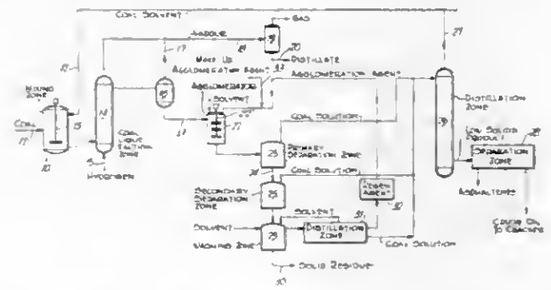
SOLIDS RECOVERY FROM COAL LIQUEFACTION SLURRY

Joseph Redmond Farnand, and Ira Edwin Puddington, both of Ottawa, Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Filed Apr. 20, 1976, Ser. No. 678,484

Int. Cl.² C10G 1/04

U.S. Cl. 208—8 **12 Claims**



1. In a coal liquefaction process which employs a coal liquefaction solvent wherein a product is recovered which contains a solution of coal liquefaction products in said liquefaction solvent as a first component and finely divided undissolved solids as a second component, the improvement for separating said second component from said first component by agglomeration while retaining substantially all asphaltenes contained in said product in said first component which comprises:

a. agitating said product, in an agglomeration zone, with

i. a hydrophilic agglomeration agent selected from the group comprising short chain organic compounds containing 2–8 carbon atoms and two or more functional groups selected from OH, COOH, C=O, NH_2, NH, N, ONH_4 and SO_3, and mixtures thereof, in the presence of

ii. an immiscibilizing agent selected from a polyvinyl alcohol and an aromatic solvent which renders said agglomeration agent immiscible in said solution, while maintaining the temperature and pressure sufficiently high to keep the mixture fluid, so as to effect agglomeration of said second component;

b. separating at least a major portion of said first component from agglomerated said second component; and

c. recovering said agglomeration agent and entrained said first component from said agglomerated second component.

4,029,568

METHOD OF RECOVERY OF OIL AND BITUMEN FROM OIL-SANDS AND OIL SHALE

Tobe A. Pittman, Centerville, and Jack L. Woods, Ogden, both of Utah, assignors to Minerals Research Corporation, Ogden, Utah

Continuation-in-part of Ser. No. 439,441, Feb. 4, 1974, abandoned. This application Sept. 26, 1975, Ser. No. 617,045

Int. Cl.² C10G 1/04

U.S. Cl. 208—11 LE **6 Claims**

1. A process for recovering bitumenous organic matter from tar sands, comprising the steps of supplying a layer of crushed ore containing tar sands on a perforate support, spraying such ore with a bitumen solvent from a class consisting of methylchloroform and chloroform, said spraying step being conducted at a pressure of from 1 to 100 psi to recover bitumen therefrom beneath said perforate support, whereby to form a solvent-bitumen solution which is essentially free of water, collecting said solution, vaporizing said solvent of said solution to leave a bitumen residue as a usable product, and condensing the so vaporized solvent for re-use in said spraying step.

4,029,569

PROCESS FOR RECLAIMING SPENT MOTOR OIL

Herbert D. Ivey, Jr., Pasadena, Calif., assignor to Lubrication Company of America, Los Angeles, Calif.

Filed Sept. 16, 1975, Ser. No. 613,932
Int. Cl.² C10M 11/00
U.S. Cl. 208—180 10 Claims

1. A process for reclaiming spent motor oil comprising:
a. heating said oil for a time sufficient to precipitate a substantial portion of the suspended solids;
b. separating said solids;
c. contacting said oil with concentrated sulfuric acid in an amount effective to substantially complete the precipitation of suspended solids without destroying viscosity index improvers in the oil;
d. separating said solids; and
e. treating said oil with an organic amine to neutralize the petroleum sulfonic acids resulting from the treatment with sulfuric acid, said amine being selected to form an oil soluble amino-sulfonate.

4,029,570

PROCESS FOR RECOVERING CRUDE OIL FROM AN UNDERGROUND RESERVOIR

Charles L. Coffman, Wichita, Kans.; Glen F. Kellerhals, Tulsa, Okla.; Jack Newcombe, Freehold, and Shirley H. Roth, Highland Park, both of N.J., assignors to Cities Service Company, Tulsa, Okla.

Filed Mar. 29, 1976, Ser. No. 671,187
Int. Cl.² C10G 33/00
U.S. Cl. 208—188 17 Claims

1. In a process for recovering crude oil from an underground reservoir wherein an oil-in-water emulsion of crude oil and water is recovered from the reservoir through a well therein, the method of breaking said emulsion for separation of the crude oil which consists essentially of mixing a naturally occurring brine with said emulsion in an amount sufficient to break the emulsion, agitating the mixture, and separating oil from the resulting broken emulsion.

4,029,571

METHOD OF REMOVING CONTAMINANT FROM HYDROCARBONACEOUS FLUID

Daniel J. Curtin, Plano, Tex., assignor to Atlantic Richfield Company, Dallas, Tex.

Filed Feb. 25, 1975, Ser. No. 552,946
Int. Cl.² C10G 23/00
U.S. Cl. 208—251 H 9 Claims

1. A method for removing a contaminant comprising at least one of arsenic and selenium from a synthetic hydrocarbonaceous fluid feed stream obtained from oil shale comprising the steps of
noncatalytically heat treating said feed stream at a temperature of at least about 600° F and at a pressure such that a substantial portion of said feed is maintained in a liquid phase for a period of time sufficient to form a precipitate; and
thereafter separating at least a portion of said precipitate from the thus treated synthetic hydrocarbonaceous fluid.

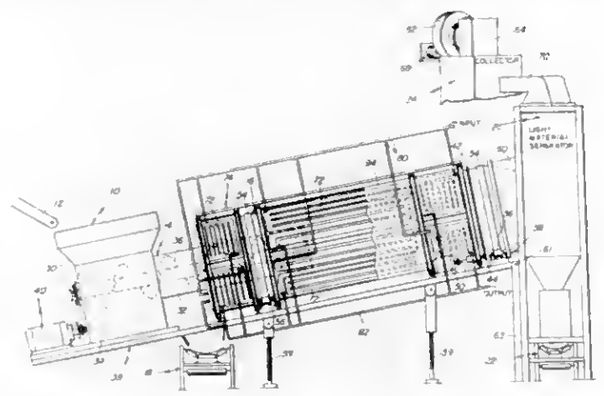
4,029,572

AIR DRUM WITH DRYING MEANS

Michael J. Theodore, Weston, Mass.; Malcolm M. Paterson, Atkinson, N.H., and William J. Paxson, Cedar Rapids, Iowa, assignors to Raytheon Company, Lexington, Mass.

Filed Oct. 3, 1975, Ser. No. 619,414
Int. Cl.² B07B 4/06
U.S. Cl. 209—11 2 Claims

1. An air classifier system comprising a drum, means for depositing mixed materials to be separated into the drum, means for directing a flow of air at relatively high velocity into one end and through the drum to entrain and carry light materials out the opposite end of the drum, means for removing moisture from the materials in the drum comprising plate coils disposed in at least partially encircling spaced relation to the outer surface of the drum for heating same, means for supplying heat-producing fluid to said plate coils for circulation therethrough, and means for removing fluid from the coil



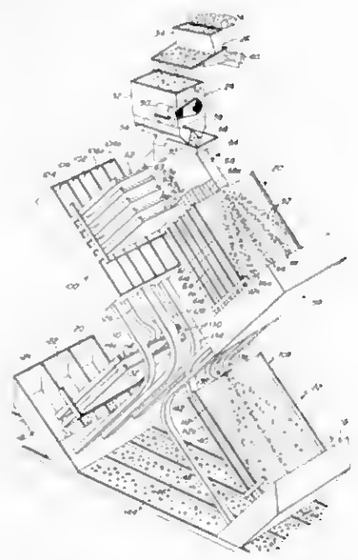
after circulation, and heat reflecting means covering the outer side of said plate coils for reflecting heat toward the drum, the outer surface of the drum being provided in areas opposite said plate coils with projections for creating turbulence in the air in the space between the drum and coils.

4,029,573

WASTE SEGREGATING APPARATUS

Michael J. Theodore, Weston, and John S. DiMercurio, Medford, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Mar. 17, 1975, Ser. No. 559,342
Int. Cl.² B03C 1/08
U.S. Cl. 209—212 14 Claims



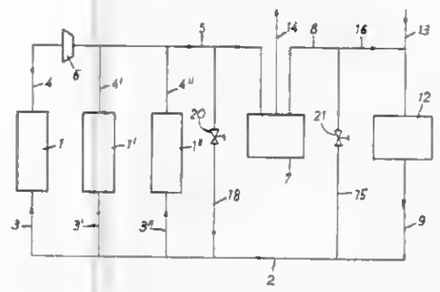
1. Apparatus for separating conductive nonferromagnetic metals from a supply of a commingled nonferromagnetic materials comprising a first sorting stage including means for separating said supply into a first portion comprising nonconductive materials, a second portion comprising conductive metals, such as aluminum, having relatively high conductivity, and a third portion comprising a streamlet of primarily conductive materials having lower conductivity than said second portion, said first stage comprising a plurality of inclined first ramps each of which has means at its upper end for receiving a respective stream of commingled nonferromagnetic materials, said first ramps each having steady-state magnetic means for separating its respective stream into said first, second, and third portions, and a second stage including at least one inclined second ramp positioned to receive said streamlets from said first ramps, said second ramp including permanent magnet means disposed to establish an alternating series of oppositely directed magnetic fields at an oblique angle to said streamlets for segregating therefrom conductive metals having relatively high conductivity which may be included therein.

4,029,574

PROCESS AND APPARATUS FOR THE PURIFICATION OF ORGANICALLY CONTAMINATED SEWAGE

Hans Reimann, Pullach, Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Germany

Filed Sept. 18, 1972, Ser. No. 289,850
Claims priority, application Germany, Sept. 16, 1971, 2146403
Int. Cl.² C02C 1/06
U.S. Cl. 210—3 15 Claims



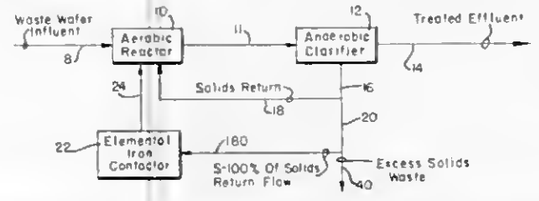
1. In an activated sludge process wherein sewage is oxygenated with oxygen or oxygen-enriched air containing at least 40% oxygen in an aeration tank containing a sewage-activated sludge mixture, the improvement which comprises:
a. collecting at least a portion of a gaseous mixture exiting from the aeration tank said gaseous mixture containing unconsumed oxygen and gaseous metabolic products, primarily CO_2;
b. separating at least a major portion of said CO_2 present in said gaseous metabolic products from said gaseous mixture by condensation, adsorption or scrubbing to form a purified gaseous mixture containing oxygen; and
c. recycling the purified gaseous mixture containing oxygen to an inlet of the aeration tank to further oxygenate the sewage-activated sludge mixture therein, and adding makeup oxygen in an amount corresponding to the oxygen consumption of the sewage-activated sludge mixture to maintain the at least 40% oxygen concentration in the aeration tank.

4,029,575

PHOSPHORUS REMOVAL FROM WASTE WATER

Michael J. Bykowski, West Bend, and Lloyd Ewing, Bay Side, both of Wis., assignors to Ewing Engineering Company, Milwaukee, Wis.

Filed June 9, 1972, Ser. No. 263,740
Int. Cl.² C02C 5/10
U.S. Cl. 210—16 16 Claims



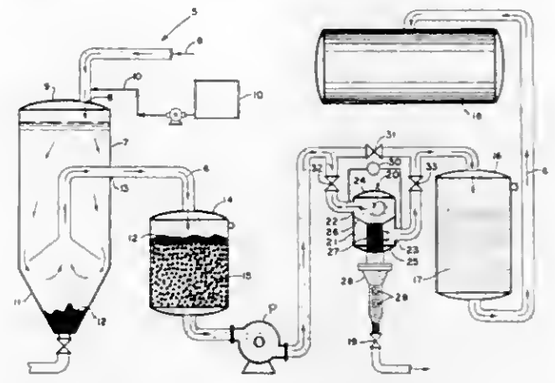
1. A process for the treatment of waste water comprising dissolved phosphorous compounds, including mixing the aqueous reaction products of elemental iron with waste water, exposing the resulting mixture alternately to aerobic and anaerobic conditions in either sequence, and clarifying the resulting liquid-solid suspension to produce a fraction from which has been removed suspended solids, including insolubilized phosphorous compounds.

4,029,576

SYSTEM FOR SOFTENING WATER

Ronald E. Shivers, Canton, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Feb. 23, 1976, Ser. No. 660,303
Int. Cl.² B01J 1/04
U.S. Cl. 210—27 13 Claims



6. A method of reducing the total hardness of water expressed in parts per million of calcium carbonate, comprising:
a. reacting water with lime and soda ash in a sedimentation tank to precipitate calcium carbonate from the water, as sludge, thereby reducing the hardness of the water;
b. then passing the water, with the reduced hardness, through a bed of coal for filtering out sludge carried by water from the sedimentation tank;
c. then passing the water, filtered through the bed of coal, through a separator for removing particles of coal carried by water from the bed of coal, the separator comprising:
1. a housing which is impervious to water and which has a top and bottom when disposed vertically;
2. an inlet port through which coal-laden water enters the housing adjacent the top thereof;
3. an outlet port through which coal-free water exits the housing adjacent the bottom thereof;
4. A stationary cage disposed within the housing in spaced relation from the inlet and outlet ports, the cage having an opening and formed of wire screen having a mesh sufficiently small to contain particles of coal within the cage; and
5. means disposed within the housing for directing coal-laden water from the inlet port into the cage through the opening and through the wire screen and into the space between the cage and outlet port for exit through the outlet port; and
d. then passing the water, from the separator, through a resinous bed of sodium zeolite to further reduce the total hardness of the water.

4,029,577

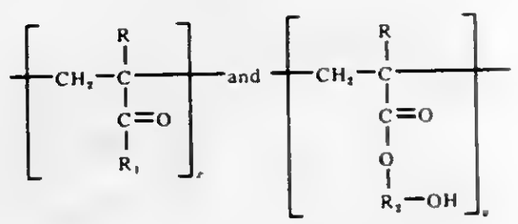
POLYMERS FOR USE IN WATER TREATMENT

Irene T. Godlewski, Moorestown, N.J.; Joseph J. Schuck, Holland, and Bruce L. Libutti, Bethayres, both of Pa., assignors to Betz Laboratories, Inc., Trevose, Pa.

Filed Nov. 17, 1975, Ser. No. 632,549
Int. Cl.² C02B 5/06
U.S. Cl. 210—58 27 Claims

1. A method of controlling the deposition of scale imparting precipitates on the structural parts of a system exposed to an aqueous medium containing scale imparting precipitates under deposit forming conditions; said scale imparting precip-

itates being selected from the group consisting of calcium phosphate, magnesium phosphate, calcium silicate, magnesium silicate, iron oxide and mixtures thereof, which method comprises adding to said aqueous medium an effective amount for the purpose of a water soluble polymer comprising moieties derived from an acrylic acid or water soluble salt thereof and moieties of an hydroxylated lower alkyl acrylate, wherein the moieties of the polymer have the following formulas:



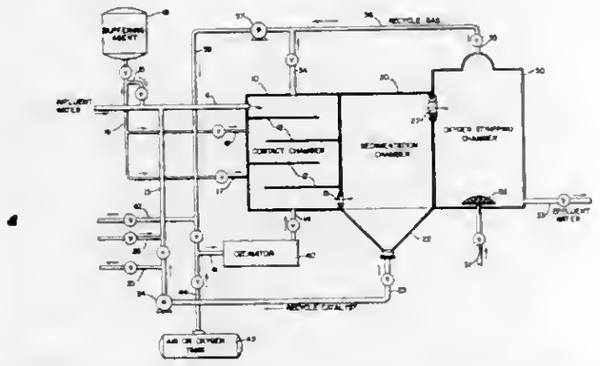
wherein R is hydrogen or a lower alkyl of from 1 to 3 carbon atoms; R_1 is OH, OM or NH_2 where M is a water soluble cation; R_2 is a lower alkyl of from about 2 to 6 carbon atoms and the mole ratio of x:y is 34:1 to 1:4.

4,029,578

CATALYTIC PROCESS FOR OZONATION OF WATER CONTAINING ORGANIC CONTAMINANTS

Amos Turk, Danbury, Conn., assignor to Environmental Research and Applications, Inc., Briarcliff Manor, N.Y.

Filed Sept. 4, 1975, Ser. No. 610,324
Int. Cl.² C02B *1/38*; **C02C** *5/04*
U.S. Cl. 210—63 Z **9 Claims**



1. In a process for the ozonation of water, wherein water containing organic material is contacted, at ambient temperature and pressure and without heating, with ozone in the presence of an insoluble ozonation catalyst suspended in said water; the improvement which comprises, employing as said ozonation catalyst a mixed heterogeneous catalyst consisting essentially of compounds selected from the group consisting of insoluble oxides and salts of at least two metals selected from the group consisting of copper, cadmium and the Group VIII metals.

4,029,579

METHOD AND DEVICE FOR DEWATERING OF SUSPENSIONS

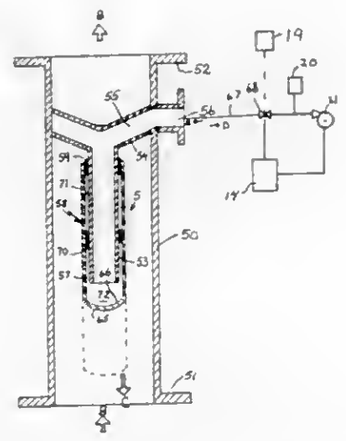
Finn Jacobsen, and Lennart Gustavsson, both of Karlstad, Sweden, assignors to Kamyr Aktiebolag, Karlstad, Sweden

Filed Apr. 13, 1976, Ser. No. 676,659
Claims priority, application Sweden, Apr. 15, 1975, 7504310
Int. Cl.² B01D *33/00*, *35/16*; **D21C** *9/18*
U.S. Cl. 210—77 **14 Claims**

10. A method of dewatering a suspension of comminuted fiber material and a liquid utilizing a generally circular container, a hydraulic piston mounted concentrically in the container and having screen means for separating liquid from the suspension and being movable in either a first or a second direction, said method comprising the steps of

passing a suspension to be dewatered through said container in a first direction,

separating out a portion of the liquid from said suspension with said screen means and removing said separated liquid from said container,



moving said piston in said first direction under the pressure of liquid of said suspension while separating out a portion of the liquid from said suspension, and

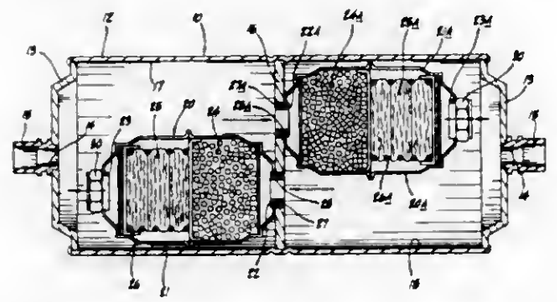
substantially terminating separating out of a portion of the liquid from said suspension while moving said piston in a second direction opposite to said first direction under the influence of liquid which has been separated from said suspension, to prevent clogging of said screen means.

4,029,580

BIDIRECTIONAL FLOW FILTER-DRIER

Harold T. Lange, St. Louis, Mo., assignor to Sporlan Valve Company, St. Louis, Mo.

Filed Oct. 5, 1976, Ser. No. 729,670
Int. Cl.² B01D *35/12*
U.S. Cl. 210—136 **10 Claims**



1. A filter-drier unit for heat pump systems, comprising:

a. a shell provided with flow ports,

b. a partition in the shell providing separate compartments, each of which operatively connects to a flow port,

c. a filter-drier means located in each compartment, each filter-drier means including an inlet and an outlet,

d. conduit means connecting the inlet of each filter-drier means with the compartment other than the one in which the filter-drier means is located, and

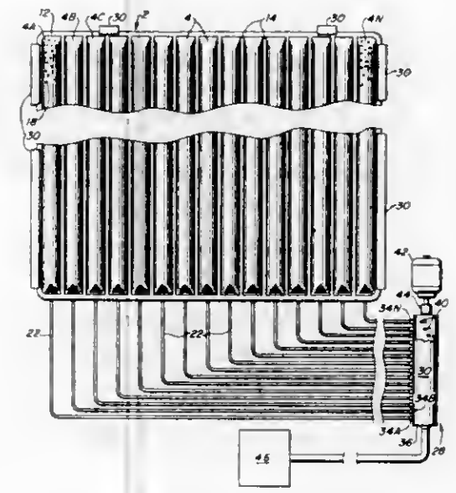
e. a check valve means connected to the outlet of each filter-drier means to enable flow into the compartment in which the filter-drier means is located and to preclude backflow.

4,029,581

AERATING SYSTEM

Roy L. Clough, Jr., Concord, N.H., and John F. Snow, Warwick, R.I., assignors to Xodar Corporation, Warwick, R.I.

Filed Dec. 26, 1974, Ser. No. 536,595
Int. Cl.² B01F *3/04*
U.S. Cl. 210—220 **7 Claims**



1. Apparatus for agitating and aerating a liquid waste suspension containing suspended organic matter, said apparatus comprising in combination:

a holder adopted to contain said liquid suspension, said holder having lateral boundaries and a bottom.

agitating and aerating means disposed along said bottom, said agitating and aerating means covering the bottom of said holder, said agitating and aerating means comprising a bag having upper and bottom sheets, each of said sheets being formed of water-impermeable material, said upper sheet being flexible, and somewhat larger in size than said bottom sheet, said sheets being sealed to each other along their entire outer edges and also at spaced apart regions so as to define a plurality of closed inflatable cells disposed in side by side relation, and a plurality of holes in said upper sheet for releasing gas from within said cells at restricted rates so as to form small bubbles that rise in said liquid suspension and make intimate contact with and oxidize said suspended organic matter;

means disposed along the periphery of said bag for anchoring said bag to said bottom so that said bottom sheet overlies and engages and is prevented from moving with said respect to said bottom; and

gas delivery means coupled to said cells for supplying gas to said cells so that sequentially and repetitively said cells are (a) inflated by inflow of gas from said gas delivery means and (b) deflated by outflow of gas via said holes, and a wave of agitation is produced in the suspension by the sequential and repetitive inflation and deflation of the cells.

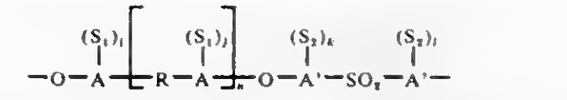
4,029,582

POLY(ARYLETHER-SULFONE) SEMIPERMEABLE MEMBRANE COMPRISING SUBSTITUTED HALOMETHYL AND/OR QUATERNARY NITROGEN GROUPS

Kiyoshi Ishii, and Kozi Sato, both of Saitama, Japan, assignors to Daicel, Ltd., Osaka, Japan

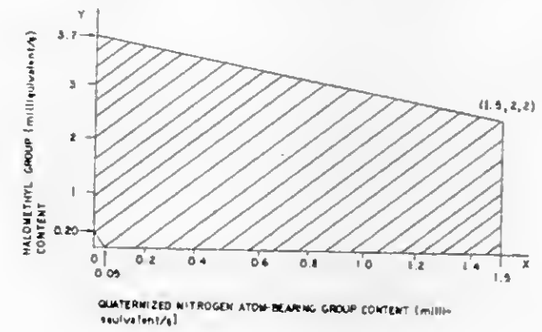
Filed July 7, 1975, Ser. No. 593,227
Claims priority, application Japan, July 11, 1974, 49-79417
Int. Cl.² B01D *39/00*, *39/14*
U.S. Cl. 210—500 M **15 Claims**

1. A semipermeable membrane made of a modified poly (arylether-sulfone) polymer consisting essentially of repeating units of the formula



(1)

wherein A and A', which are the same or different, are aromatic hydrocarbon groups having from 6 to 14 carbon atoms in which hydrogen atoms on said aromatic groups are substituted by halomethyl groups and/or quaternary nitrogen atom-bearing groups, the degree of substitution



of the halomethyl groups and the quaternary nitrogen atom-bearing groups in said polymer being within the hatched pentagonal area of FIG. 1 of the attached drawings, said halomethyl group having the formula $-CH_2X$ wherein X is halogen, said quaternary nitrogen atom-bearing group having the formula

wherein R_1 and R_2, which can be the same or different, are alkyls having one to 4 carbon atoms, R_3 is alkyl having one to 20 carbon atoms, T is alkyl having one to 4 carbon atoms, *m* is zero or an integer of one to 5 and X_1 is hydrogen or halogen,

and wherein S_1 and S_2, which are the same or different, are substituent groups which are inert to halomethylation and quaternization reactions, the suffixes *i*, *j*, *k*, *l*, which are the same or different, are zero or an integer of from one to 4, and at least one of those suffixes in less than 4, *n* is zero or one, and R is a valence bond, —O— or a bivalent organic hydrocarbon group.

2. A method for producing a semipermeable membrane as set forth in claim 1 which comprises

1. casting on a surface a film of a solution consisting essentially of

A. a polymer consisting essentially of repeating units of the formula (1) and

B. an organic solvent capable of dissolving said polymer or a mixture of said solvents, or a multicomponent organic solvent composition comprising one or more of said solvents and compounds which themselves are non-solvents for said polymer and are effective to dissolve said polymer only when mixed with said solvents;

or a solution comprising (A), (B), and

C. a compound having a molecular weight below 500 soluble in said solvents and said non-solvents for the polymer (A) which are compatible to said solvents;

2. evaporating a portion of said solvent from said solution; and

3. removing the remainder of said solvent, or said solvent and said compound, by immersing the resulting film of said solution in a non-solvent coagulating bath compris-

ing a non-solvent for the polymer (A) and in which said solvents, or said solvents and said compounds are miscible or soluble.

4,029,583

CHROMATOGRAPHIC SUPPORTS AND METHODS AND APPARATUS FOR PREPARING THE SAME

Shung Ho Chang, and Frederick E. Regnier, both of West Lafayette, Ind., assignors to Purdue Research Foundation, West Lafayette, Ind.

Filed Feb. 28, 1975, Ser. No. 554,071
Int. Cl.² B01D *39/00, 39/14*
U.S. Cl. 210—502 **3 Claims**

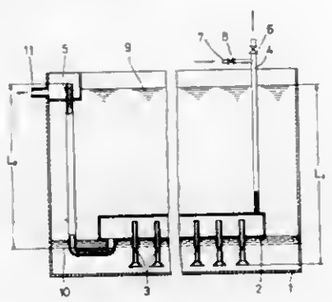
1. A chromatographic support, comprising:
an inorganic support matrix having a surface portion;
a stationary phase for partitioning solutes, said stationary phase being a glycidyl ether selected from the group consisting of methanol, ethanol, propanol, hexanol, tetradecanol, phenol, and p-nitrophenol, a nucleophilic functional group, and a leaving group; and
a silane coupling agent having one group for bonding to said surface portion of said support matrix and a second group for bonding to the stationary phase.

4,029,584

PNEUMATIC SLUDGE DISCHARGING SYSTEM

Tadao Takemoto, No. 2-2, 3-chome, Shimezu, Itami, Japan

Filed Oct. 26, 1976, Ser. No. 735,408
Claims priority, application Japan, Mar. 23, 1976, 51-33020
Int. Cl.² B01D *17/00*
U.S. Cl. 210—532 R **1 Claim**



1. A system for discharging sludge from a settling tank, said system comprising:
a sludge collecting pipe mounted in the tank in a horizontal position and having its opposite ends closed,
a plurality of branch pipes mounted on said sludge collecting pipe to extend downwardly therefrom for collecting sludge therethrough into said sludge collecting pipe,
said branch pipes having their top end projecting into said sludge collecting pipe near the top wall thereof,
an air supply pipe connected to said sludge collecting pipe to extend upwardly therefrom until it comes above the surface of a liquid to be treated in the tank,
said air supply pipe being open to the outside air at top end thereof through an exhaust valve and being connected to a source of compressed air at a position below said exhaust valve, and
a sludge discharge pipe connected to said sludge collecting pipe to extend downwardly and then upwardly until its top end comes slightly above the surface of the liquid to be treated,
said sludge discharge pipe having its lowermost portion disposed above the bottom end of said branch pipes, whereby the supply of compressed air causes the sludge to be discharged out of said sludge collecting pipe through said sludge discharge pipe.

4,029,585

AQUEOUS DISPERSIONS OF PERFLUOROALKYL ESTERS FOR TREATING TEXTILES

Robert Harold Dettre, Wilmington, and Edward James Greenwood, Newark, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 382,843, July 26, 1975, Pat. No. 3,923,715. This application Aug. 7, 1975, Ser. No. 602,902
Int. Cl.² D06M *13/16, 13/20*
U.S. Cl. 252—8.6 **2 Claims**

1. An aqueous dispersion of a composition consisting essentially of a perfluoroalkyl ester of a fluorinated alcohol having the formula $C_nF_{2n+1}(CH_2)_mOH$, wherein n is 6 to 14 and m is 2, and citric acid, the ester being volatile at about 200° C to 300° C, the composition forming up to about 60% of the total weight of the dispersion.

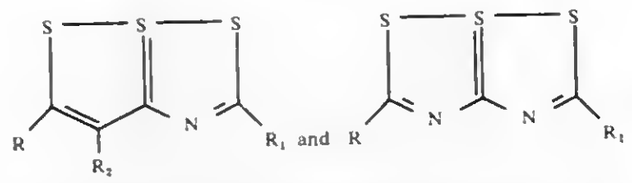
4,029,586

LUBRICATING COMPOSITIONS INHIBITED AGAINST OXIDATION BY ADDITION THERETO OF 3-AZO-6A-THIO-THIOPHTHENES OR 3,4-DIAZO-6A-THIO-THIOPHTHENES

Enzo Rossi; Silvano Fattori, both nI San Donato Milanese, and Luigi Imparato, Milan, all nI Italy, assignors to Snam Progetti, S.p.A., Milan, Italy

Filed Dec. 18, 1974, Ser. No. 533,955
Claims priority, application Italy, Dec. 20, 1973, 54483/73
Int. Cl.² C10M *1/38*
U.S. Cl. 252—47.5 **7 Claims**

1. A lubricating composition inhibited against oxidation, comprising a mineral or synthetic oil having dissolved therein an antioxidant amount of an additive selected from the group consisting of the 3-azo-6a-thio-thiophthenes and 3,4-diazo-6a-thio-thiophthenes, represented by the general formulae;



wherein R, R_1 and R_2, the same or different, represent a member of the group consisting of hydrogen, alkyl, cycloalkyl, aryl, alkylaryl, arylalkyl, and aminoaryl and p-methoxy-anilino.

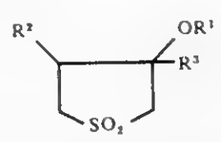
4,029,587

LUBRICANTS AND FUNCTIONAL FLUIDS CONTAINING SUBSTITUTED SULFOLANES AS SEAL SWELLING AGENTS

Frederick William Koch, Willoughby Hills, Ohio, assignor to The Lubrizol Corporation, Cleveland, Ohio

Filed June 23, 1975, Ser. No. 589,309
Int. Cl.² C10M *1/38*
U.S. Cl. 252—48.2 **14 Claims**

1. A composition comprising a major amount of an oleaginous liquid of lubricating viscosity and a minor amount, effective to cause swelling of seals in machinery, of a substituted sulfolane of the formula



wherein R^1 is a hydrocarbon radical having at least about 4 carbon atoms and each of R^2 and R^3 is hydrogen or a lower alkyl radical.

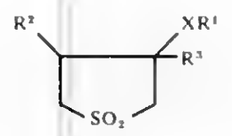
4,029,588

SUBSTITUTED SULFOLANES AS SEAL SWELLING AGENTS

Frederick William Koch, Willoughby Hills, Ohio, assignor to The Lubrizol Corporation, Cleveland, Ohio

Filed June 23, 1975, Ser. No. 589,310
Int. Cl.² C10M *1/38*
U.S. Cl. 252—48.2 **10 Claims**

1. A method of causing swelling of seals in machinery which comprises contacting said seals with a composition comprising a major amount of an oleaginous liquid of lubricating viscosity and, dissolved or stably dispersed therein, a minor amount, effective to swell said seals, of a substituted sulfolane of the formula



wherein R^1 is a hydrocarbon radical having at least about 4 carbon atoms, each of R^2 and R^3 is hydrogen or a lower alkyl radical, and X is oxygen or sulfur.

4,029,589

PROCESS OF INHIBITING CORROSION AND/OR SWEETENING HYDROCARBONS

J. Irvine Knepper, Manchester; Richard L. Godar, and James W. Propst, both of St. Louis, all of Mo., assignors to Petrolite Corporation, St. Louis, Mo.

Filed Aug. 6, 1974, Ser. No. 495,233
Int. Cl.² C10M *1/32;* **C10L** *1/22*
U.S. Cl. 252—51 **24 Claims**

1. A process of inhibiting the corrosion of a metal by a liquid hydrocarbon product coming in contact therewith, said liquid hydrocarbon product, prior to the herein recited treatment being incapable of passing the Copper Strip Tarnish Test ASTM D-130, which comprises treating said liquid hydrocarbon product by adding thereto an additive selected from the group consisting of iodine, bromine, complexes of iodine and complexes of bromine, said additive being employed in an amount sufficient to enable said liquid hydrocarbon product to pass said Copper Strip Tarnish Test.

4,029,590

DEXTRIN CARBOXYLATES AND THEIR USE AS DETERGENT BUILDERS

Joseph H. Finley, Metuchen, N.J., assignor to FMC Corporation, Philadelphia, Pa.

Division of Ser. No. 390,524, Aug. 22, 1973, Pat. No. 3,941,771. This application Oct. 6, 1975, Ser. No. 619,802
Int. Cl.² C11D *3/22*
U.S. Cl. 252—89 R **6 Claims**

1. A detergent composition consisting essentially of
a. at least one detergent surface active agent selected from the group consisting of anionic, nonionic, zwitterionic and ampholytic agents, and
b. an organic biodegradable detergent builder comprising a dextrinized starch of about 20 to about 100 anhydroglucose units wherein from about 2.2 to about 2.8 average OH groups per anhydroglucose unit are esterified through one of the carboxyls of a non-aromatic polycarboxylic acid of 2–4 carboxyls containing 2 to 10 carbon atoms, and the water-soluble salts thereof.

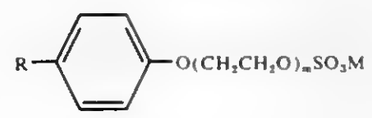
4,029,591

LIQUID DETERSIVE BLEACHING COMPOSITION

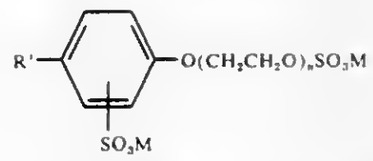
Kazuo Ohbu, Tokyo; Yuichi Takada, Kamagaya, and Shigemi Nakamura, Tokyo, all of Japan, assignors to Lion Fat & Oil Co., Ltd., Tokyo, Japan

Filed Sept. 22, 1975, Ser. No. 615,393
Claims priority, application Japan, Sept. 27, 1974, 49-110591
Int. Cl.² C11D *3/395, 7/54*
U.S. Cl. 252—95 **5 Claims**

1. A liquid detersive bleaching composition, consisting essentially of:
a. from 0.3 to 7 weight percent of a substance having the formula



wherein R is alkyl having 5 to 15 carbon atoms, *m* is an integer from 3 to 15, and M is Na or K;
b. from 0.1 to 5 weight percent of a substance having the formula



wherein R′ is alkyl having 5 to 15 carbon atoms, *n* is an integer from 3 to 15, and M is Na or K,
the sum of component a. plus component b. being from more than 0.5 weight percent to less than 10 weight percent, and the molar ratio of a./b. being in the range of from 20/80 to 85/15;
c. from 3 to 10 weight percent, calculated as available chlorine, of sodium hypochlorite;
d. from 0.5 to 3 weight percent of caustic alkali;
e. up to less than 10 weight percent of sodium benzenesulfonate; and
f. the balance is essentially water.

4,029,592

POLYBUTENE COMPOSITION AND USE THEREOF

Imre Puskas, Glen Ellyn, and John A. Cengel, Wheaton, both of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Division of Ser. No. 358,915, May 10, 1973, Pat. No. 3,960,900. This application Dec. 5, 1975, Ser. No. 638,183
Int. Cl.² C07D *307/36*
U.S. Cl. 252—182 **7 Claims**

1. A polybutene composition comprising a viscous polybutene having a $\overline{M}_n$ in the range of about 300 to about 3000 and based on the weight of said viscous polybutene from 5 to 200 ppm of a 40° to 225° C boiling bromo- or chlorobromo-substituted aliphatic hydrocarbon as additive.

4,029,593

MIXED POLYOLS

Dietmar Schäpel, Cologne, and Ulrich von Gizycki, Opladen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Aug. 12, 1974, Ser. No. 496,617
Claims priority, application Germany, Aug. 16, 1973, 2341294
Int. Cl.² C09K *3/00*
U.S. Cl. 252—182 **6 Claims**

1. A polyol mixture containing:

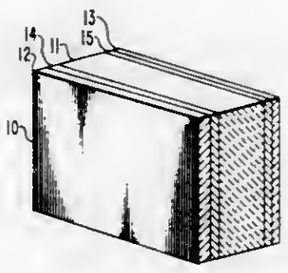
a. at least two polyols which are normally incompatible with each other, and
b. about 0.05 to about 5 percent by weight, based on component (a), of an inert surface-active inorganic material having a specific surface area of 10 to 800 m^2/g, which inorganic material is selected from the group consisting of activated charcoal, asbestos, a surface-active silicic acid and a zeolite.

4,029,594

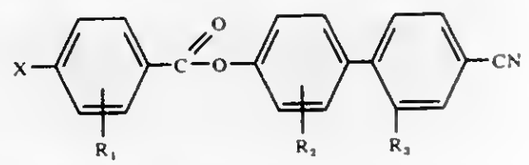
NOVEL LIQUID CRYSTAL COMPOUNDS AND ELECTRO-OPTIC DEVICES INCORPORATING THEM

Dragan Milan Gavrilovic, Cranbury, and Daniel Louis Ross, Princeton, both of N.J., assignors to RCA Corporation, New York, N.Y.

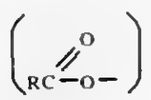
Filed June 17, 1976, Ser. No. 696,905
Int. Cl.² C09K *3/34*; **G02F** *1/13*; **C07C** *121/64, 69/96*
U.S. Cl. 252—299 **9 Claims**



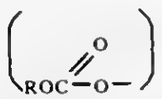
3. A liquid crystal compound having the formula



wherein X can be alkyl (R–), alkoxy (-OR), acyloxy



or alkylcarbonato



group wherein R is an alkyl group containing 1–10 carbon atoms and R_1–R_3 can be hydrogen, methyl or halogen with the proviso that at least one and no more than two of R_1–R_3 substituents other than hydrogen.

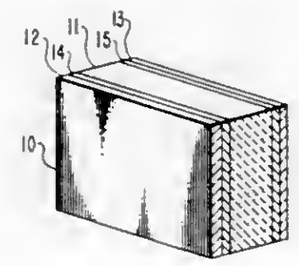
4,029,595

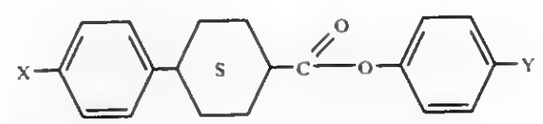
NOVEL LIQUID CRYSTAL COMPOUNDS AND ELECTRO-OPTIC DEVICES INCORPORATING THEM

Daniel Louis Ross, Princeton, and Dragan Milan Gavrilovic, Cranbury, both of N.J., assignors to RCA Corporation, New York, N.Y.

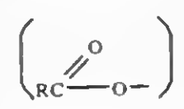
Filed Sept. 17, 1976, Ser. No. 724,221
Int. Cl.² C09K *3/34*; **G02F** *1/13*; **C07C** *121/46, 121/75, 79/44, 79/46*
U.S. Cl. 252—299 **8 Claims**

1. An electro-optic cell comprising a liquid crystal layer between two electrodes wherein said liquid crystal includes a compound of the formula

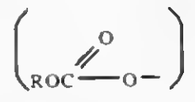




wherein X can be an alkoxy (RO—), acyloxy



or alkylcarbonato



group wherein R is an alkyl group having 1–10 carbon atoms and Y is a nitro or cyano group.

4,029,596

DE-EMULSIFIER FOR BREAKING PETROLEUM EMULSIONS

Hans-Ferdi Flnk, Essen-Ruttenscheid; Götz Koerner, Essen, and Gerd Rossmy, Essen-Werden, all of Germany, assignors to Th. Goldschmidt AG, Essen, Germany

Continuation-in-part of Ser. No. 471,585, May 20, 1974, abandoned. This application Dec. 23, 1974, Ser. No. 535,841
Claims priority, application Switzerland, Nov. 8, 1973, 015675/73
Int. Cl.² B01D *17/04*
U.S. Cl. 252—329 **12 Claims**

1. In a de-emulsifier for breaking a petroleum-water emulsion, wherein the de-emulsifier contains ethylene oxide and propylene oxide, the improvement which comprises that the de-emulsifier contains in excess of 0.001% by weight of silica having a BET surface in excess of $50m^2/g$.

4,029,597

NON-BLEEDING INDICATORS AND DYES THEREFOR USED IN pH DETERMINATION PROCESS

Karlheinz Neisius, and Wilhelm Bäumer, both of Darmstadt, Germany, assignors to E. Merck A. G., Darmstadt, Germany

Division of Ser. No. 807,411, March 14, 1969. This application Aug. 6, 1975, Ser. No. 602,470
Int. Cl.² G01N *31/00, 33/00*
U.S. Cl. 252—408 **53 Claims**

1. A process for determining the pH of a media, which comprises (a) contacting said media with a non-bleeding pH indicator comprising an insoluble polymer carrier having free hydroxyl or NH groups or mixtures thereof, and bound to said carrier an organic azo dyestuff capable of changing color in response to a change in pH, said dye being of the formula Ar — N = N — Ar wherein Ar is an aryl forming with the azo group said organic azo dyestuff, with the provision that at least one aryl group is substituted by at least one reactive group capable of forming a chemical bond with said polymeric carrier, and at least one aryl group is substituted by at least one other radical selected from the group consisting of $—SO_3H$ and —COOH, said reactive group being 2-(hydroxysulfonyloxy)-ethylsulfonyl, N-methyl-N-[2-(hydroxysulfonyloxy)-ethyl]-sulfonamide, monochlorotriazinyl, dichlorotriazinyl, mono-, di- and trichloropyrimidyl, dichloropyridazinyl, dichloroquinoxalinyl, dichlorophthalazinyl or 2-(hydroxysulfonyloxy)-ethylamino-sulfonyl; and (b) determining the pH from the resultant color of said indicator.

4,029,598

NON-BLEEDING INDICATOR AND DYES THEREFOR

Karlheinz Neisius, and Wilhelm Bäumer, both of Darmstadt, Germany, assignors to E. Merck A. G., Darmstadt, Germany

Filed Mar. 14, 1969, Ser. No. 807,411
Int. Cl.² G01N *31/00, 33/00*
U.S. Cl. 252—408 **54 Claims**

1. A non-bleeding pH indicator consisting essentially of an insoluble polymer carrier having free hydroxyl or NH groups or mixtures thereof, and bound to said carrier an organic azo dyestuff capable of changing color in response to a change in pH, said carrier having been reacted with a dyestuff of the formula Ar — N = N — Ar wherein Ar is aryl forming with the azo group said organic azo dyestuff, with the provision that at least one aryl group is substituted by at least one reactive group capable of forming a chemical bond with said carrier, and at least one aryl group is substituted by at least one other radical selected from the group consisting of $—SO_3H$ and —COOH, said reactive group being 2-(hydroxysulfonyloxy)-ethylsulfonyl, N-methyl-N-[2-(hydroxysulfonyloxy)-ethyl]-sulfonamido, monochlorotriazinyl, dichlorotriazinyl, mono-, di- and trichloropyrimidyl, dichloropyridazinyl, dichloroquinoxalinyl, dichlorophthalazinyl or 2-(hydroxy-sulfonyloxy)-ethylaminosulfonyl.

4,029,599

PROCESS FOR PASSIVATING A PROPHORIC CATALYST AND TAKING A HYDROGENATION REACTOR OUT OF OPERATION

Abraham A. Pegels, The Hague, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Apr. 18, 1975, Ser. No. 569,422
Claims priority, application Netherlands, Apr. 25, 1974, 7405565
Int. Cl.² B01J *23/92, 23/94*
U.S. Cl. 252—414 **11 Claims**

1. A process for taking passivating a pyrophoric catalyst and out of operation a reactor containing said catalyst which has been used for hydrogenation of a fluid feed, in which hydrogenation the feed is passed over a catalyst consisting essentially of cobalt sulphide and/or nickel sulphide combined with molybdenum sulphide and/or tungsten sulphide or a carrier at least the greater part of which consists of silica and/or alumina in the presence of added hydrogen, said process comprising:
a. When the temperature in the reactor is above 300° C reducing the temperature below 300° C;
b. maintaining the temperature in said reactor below 300° C for following steps (d)-(h) until the reactor is opened;
c. discontinuing the supply of feed and replacing the added hydrogen with an inert purge gas at a time which may be before, after or during said reduction in temperature;
d. purging the reactor with purge gas and a hydrocarbon gas oil wherein the amount of hydrocarbon gas oil is from about 5 to about 25% of the design feed rate of the reactor;
e. subsequent to step (d) introducing an oxygen-containing gas into the purge gas in a quantity such that the initial oxygen content of the purge gas is at most 1% by volume;
f. circulating simultaneously said gas oil and said oxygen containing purge gas through the reactor;
g. increasing gradually the oxygen content of the purge gas to the reactor until the oxygen partial pressure of the purge gas is brought to at least 0.2 kg/cm^2, and continuing the circulation of said gas oil and said oxygen containing purge gas until no further appreciable heat generation in the reactor is found to occur, and then discontinuing said circulation and;
h. opening the reactor.

7. A process as in claim 1, wherein oxygen is added to the purge gas to the reactor incrementally or continuously at a rate whereby the carbon dioxide content of purge gas from the reactor remains below about 0.04% by volume.

9. A process as in claim 1, wherein the reactor has been in operation for the catalytic reduction to hydrogen sulphide of sulphur compounds in a gaseous feed.

4,029,600

CARBON PARTICULATES WITH CONTROLLED DENSITY

Joseph Lawrence Schmitt, Jr., Bethel, Conn.; Philip Leroy Walker, Jr., State College, Pa., and George Augustus Castellion, Stamford, Conn., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 559,933, March 19, 1975, abandoned. This application May 20, 1976, Ser. No. 688,508
Int. Cl.² B01J *21/18*
U.S. Cl. 252—444 **17 Claims**

1. A porous carbon particulate comprising carbon black spheres bonded in molded relationship by a carbonized binder, said spheres having an average diameter in the range of about 80 to 5000 angstrom units and a surface area of at least 100 square meters per gram, and said particulate having a pore volume of at least 0.2 cubic centimeters per gram, a surface area of at least 100 square meters per gram, said particulate surface area being equal to or less than the surface area of said spheres, and a pore size distribution such that at least about 45% of its total surface area is in pores of radius equal to or greater than 20 angstrom units.

4,029,601

NOVEL OLIGOMERIZATION CATALYSTS AND THEIR PREPARATION

Herbert K. Wiese, Cranford, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed Apr. 29, 1975, Ser. No. 572,654
Int. Cl.² B01J *21/18*
U.S. Cl. 252—447 **2 Claims**

1. A method of preparing alkene oligomerization catalysts which comprises:
a. impregnating activated carbon with a solution of cobalt amine complexes having the generic formula

$$[CoA(NH_3)_4]B$$

where A is a carbonate or oxalate radical and B is a moiety selected from the group consisting of CO_3H, CO_3NH_4, C_2O_4H and C_2O_4NH;
b. decomposing said activated carbon impregnated with said cobalt amine complexes at temperatures of between about 250° to about 350° C. to produce cobalt oxide on carbon; and thereafter,
c. admixing said cobalt oxide on carbon with a refractory oxide as a catalyst support.

4,029,602

CATALYST SYSTEM FOR CATALYTIC HEATERS

Roger Paul Pierre Risse, Caluire, France, assignor to Societe Lyonnaise des Applications Catalytiques, Rillieux-La-Pape, France

Continuation of Ser. No. 471,752, May 20, 1974, abandoned. This application Jan. 14, 1976, Ser. No. 648,869
Claims priority, application France, May 22, 1973, 73.19582
Int. Cl.² B01J 21/04, 21/08, 23/64
U.S. Cl. 252—458 7 Claims

1. A catalytic mass for the oxidation of the hydrocarbons to produce carbon dioxide and water vapor which consists of, in effective amounts:
active components of chromium oxide;
at least one catalyst oxide of an element of Group VIIB or Group VIII of the Periodic Table of Elements;
an activation metal consisting of one of the platinum-group elements; and
a reaction promoter inhibiting recrystallization of the activation metal and constituted by a refractory oxide of an element having a high electron density; and a support for said active components, said support consisting of a first supporting mass of a pulverulent material having a high specific surface area and capable of dispersing the active components; and
a second supporting mass of fibrous material in which said pulverulent material is distributed.

4,029,603

CATALYTIC COATING COMPOSITION AND A METHOD FOR MAKING A COATED SURFACE FOR AN OVEN

Patrick John Denny, Norton, and Robert Robertson, Warrington, both of England, assignors to Imperial Chemical Industries Limited and T. I. Domestic Appliances Limited, both of London, England

Continuation of Ser. No. 450,217, March 11, 1974, abandoned. This application Jan. 30, 1976, Ser. No. 653,709
Claims priority, application United Kingdom, Mar. 26, 1973, 14342/73
Int. Cl.² B01J 23/18, 23/34, 23/72, 23/84
U.S. Cl. 252—471 12 Claims

1. A coating composition suitable for application to the internal surfaces of ovens which comprises a milled self-matting devitrifying enamel frit and an adhesion-promoting compound selected from the group consisting of antimony trioxide and precursors thereof which decompose to produce antimony trioxide on heating and an oxidation catalyst containing an oxide selected from the group consisting of oxides of copper, manganese and cobalt.

4,029,604

METHOD FOR PREPARING A PHOTOCONDUCTIVE POWDER

Yoshio Enoki, Katano, and Nobumasa Ohshima, Hirakata, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Aug. 27, 1975, Ser. No. 608,405
Claims priority, application Japan, Sept. 4, 1974, 49-102322; Sept. 5, 1974, 49-102719
Int. Cl.² H01L 31/00
U.S. Cl. 252—501 12 Claims

1. A method for preparing a photoconductive powder comprising: providing a starting mixture comprising (i) a host material consisting essentially of 65 to 95% by weight of CdSe powder, 3 to 15% by weight of ZnS powder and 2 to 20% by weight of ZnO powder, (ii) as an activator, 0.005 to 0.1 parts by weight, on the basis of 100 parts by weight of said host material, of a water soluble salt of one member selected from the group consisting of Cu and Ag and (iii) as a flux, 0.1 to 1 part by weight, on the basis of 100 parts by weight of said host material, of one member selected from the group consisting of $CdCl_2$, $CdBr_2$, $ZnCl_2$ and $ZnBr_2$; firing said starting mixture at a temperature higher than the melting point of said flux to fuse said flux and dissolve said host material in said flux; cooling the thus fired mixture to recrystallize said host material at least partially to a solid solution, the thus treated material having said activator diffused therein; and re-firing the thus treated material in a sulfur containing atmosphere to increase the threshold voltage of the material.

4,029,605

METALLIZING COMPOSITIONS

Raymond Stanley Kusiorek, Houston, Pa., assignor to Hercules Incorporated, Wilmington, Del.

Filed Dec. 8, 1975, Ser. No. 638,785
Int. Cl.² H01B 1/08
U.S. Cl. 252—514 3 Claims

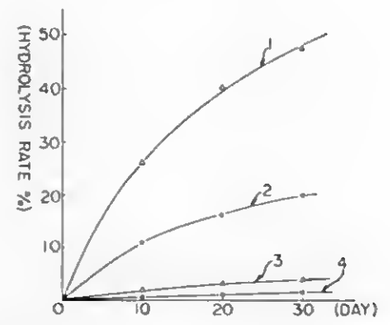
1. A conductive metal composition which when applied to and fired on a heat resistant substrate forms thereon an electrically conductive, adherent film wich does not adversely affect the overall strength of the substrate, said composition comprising by weight
a. from 50 to 88% of at least one finely-divided electrically conductive metal;
b. from 2 to 40% of a crystallizable glass frit binder consisting essentially of by weight 40 to 70% of SiO_2, 10 to 31% of Al_2O_3, 3 to 20% of Li_2O, 2 to 15% of B_2O_3, 0 to 4% of As_2O_3, 0 to 5% of Na_2O, 0 to 5% of K_2O, 0 to 6% of Bi_2O_3, and at least one oxide component selected from the group consisting of 4 to 19% of ZrO_2 and 1 to 10% of TiO_2;
c. from 5 to 48% of an inert liquid vehicle; and
d. from 0 to 20% of an inert filler or pigment.

4,029,606

NON-LIQUID DETERGENT COMPOSITION

Hiroshi Isa, Yachiyo; Noboru Suzuki, Kawasaki; Masatoshi Takahashi, Fujisawa, and Eriko Hirayama, Ichikawa, all of Japan, assignors to Lion Fat & Oil Co., Ltd., Tokyo, Japan

Filed May 9, 1975, Ser. No. 576,164
Claims priority, application Japan, Dec. 5, 1974, 49-139745
Int. Cl.² C11D 1/08
U.S. Cl. 252—529 13 Claims



1. A solid detergent composition in the form of a powder, granules or tablets, consisting essentially of a mixture obtained by blending
a. from 5 to 80 weight percent of organic surfactant substance having the formula

$$\left[RCO\left(\begin{matrix} R' \\ | \\ OCHCO \end{matrix} \right)_n O \right]_m M$$

wherein R is saturated or unsaturated straight-chain or branched-chain hydrocarbon having 5 to 19 carbon atoms, with the proviso that more than 70 weight percent of R has from 10 to 14 carbon atoms, R' is hydrogen, CH_3 or C_2H_5, n is a number in the range of 1.7 to 6.5 on the average, M is a monovalent or divalent cation, and m is one or 2 depending on the valency of M, and
b. from 5 to 95 weight percent of water-soluble organic or inorganic salt selected from the group consisting of sodium sulfate, sodium carbonate, sodium bicarbonate, sodium chloride, sodium phosphate, sodium tripolyphosphate, sodium borate, potassium carbonate, magnesium sulfate, sodium citrate, sodium tartrate, sodium malate, sodium succinate, sodium sulfosuccinate, sodium lactate, sodium glycolate, potassium citrate, potassium lactate, calcium citrate and calcium lactate, or mixtures thereof, with the proviso that one percent aqueous solutions of said salts have a pH of from 6 to 11, said composition additionally containing from 5 to 30 weight percent of anhydrous calcium chloride,
said composition containing less than 0.8 mole of free water per mole of ester linkages in said organic surfactant substance.

4,029,607

DRAIN CLEANING COMPOSITIONS

Justin J. Murtaugh, Guilford, Ind., assignor to The Drackett Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 456,431, March 29, 1974, abandoned. This application Feb. 19, 1976, Ser. No. 659,186
Int. Cl.² C11D 3/26, 7/32
U.S. Cl. 252—545 8 Claims

1. A drain cleaning composition consisting essentially of:
from about 0.25% to 5%, by weight, of a member selected from the group consisting of an ammonium, alkylamine, hydroxy-alkylamine salt of nitrilotriacetic acid, N-2-hydroxy-ethylimino diacetic acid, an alkylene polyamine polycarboxylic acid, and mixtures thereof;
from about 0.12% to 15%, by weight, of a surfactant selected from the group consisting of an ammonium, alkylamine, or hydroxyalkylamine salt of an anionic surfactant and mixtures thereof, wherein said anionic surfactant is selected from the group consisting of:
lauryl sulfate;
a sulfated linear primary alcohol ethoxylate;
a phosphate ester having the formula

$$[R{-}O\ (CH_2CH_2O)_x]_y\overset{O}{\overset{\|}{P}}(OH)_{3-y}$$

where x has a value of 1 to 15 and y has a value of 1 to 2, and R is an alkyl or phenalkyl radical having from 6–150 carbon atoms;
a derivative of sulfo succinic acid;
an alkyl aryl sulfonate;
an alkyl sulfate; and
an alkyl ethylene oxide ether sulfate; and
up to about 99%, by weight, of water, wherein said alkylamine and hydroxy-alkylamine have a chain length of from 1 to 5 carbon atoms and said composition is substantially free of alkali metal ions.

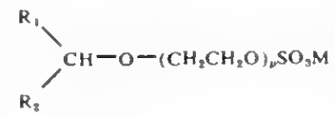
4,029,608

GRANULAR OR POWDERY DETERGENT COMPOSITION

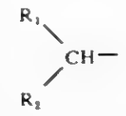
Moriyasu Murata, Chiba; Fumio Sai, Funabashi, and Takashi Fujino, Yokohama, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Sept. 21, 1976, Ser. No. 725,171
Claims priority, application Japan, Sept. 30, 1975, 50-117815
Int. Cl.² C11D 1/72, 1/83, 3/20
U.S. Cl. 252—551 4 Claims

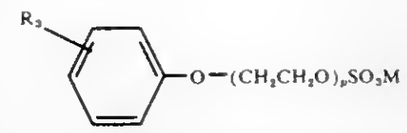
1. A granular or powdery detergent composition consisting essentially of
1. from 2 to 40 percent by weight of a first surfactant having a tendency to cake selected from the group consisting of
a. alkylethoxy sulfates having the formula



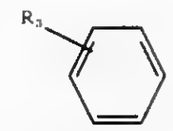
wherein R_1 and R_2, which can be the same or different, are hydrogens, alkyls having one to 17 carbon atoms, or alkenyls having one to 17 carbon atoms, provided that the average carbon atom number of



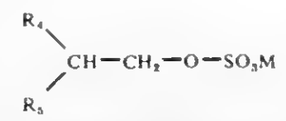
is from 10 to 18 carbon atoms, p is a number of from 0.5 to 5, and M is an alkali metal or an alkaline earth metal,
b. alkylphenylethoxy sulfates having the formula



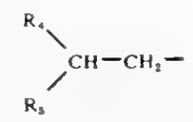
wherein R_3 is alkyl having 4 to 16 carbon atoms or alkenyl having 4 to 16 carbon atoms, provided that the average carbon atom number of



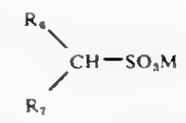
is from 10 to 18, and p and M are the same as defined above,
c. branched alkyl sulfates having the formula



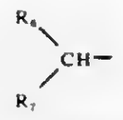
wherein R_4 and R_5, which can be the same or different, are alkyls having one to 15 carbon atoms or alkenyls having one to 15 carbon atoms, provided that



contains from 10 to 18 carbon atoms, and M is the same as defined above,
d. alkane sulfonates having the formula

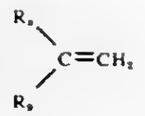


wherein R_6 and R_7, which can be the same or different, are hydrogens or alkyls having one to 17 carbon atoms, provided that



contains from 10 to 18 carbon atoms and M is the same as defined above,

e. sulfonate salts of vinylidene olefins having the formula



wherein R_8 and R_9, which can be the same or different, are alkyls having 1 to 15 carbon atoms, provided that the number of carbon atoms in the olefin molecule is from 10 to 18, and the salt-forming cation is an alkali metal or alkaline earth metal,

f. sulfonate salts of internal olefins having the formula

$R_{10}HC=CHR_{11}$

wherein R_{10} and R_{11}, which can be the same or different, are hydrogens or alkyls having one to 17 carbon atoms, provided that the number of carbon atoms in the olefin molecule is from 10 to 20 and further provided that in up to 80 wt.% of the olefin molecules, one of R_{10} and R_{11} can be hydrogen, and in the balance of the olefin molecules, neither of R_{10} and R_{11} is hydrogen, and the salt-forming cation is an alkali metal or alkaline earth metal,

g. ethylene oxide nonionic surface active agents having an HLB value of from 8 to 18 and selected from the group consisting of polyoxyethylene (6 to 12) alkyl (C_{12} to C_{18}) or alkenyl (C_{12} to C_{18}) ethers, polyoxyethylene (6 to 12) alkyl (C_6 to C_{10}) phenyl ethers, polyoxyethylene (8 to 20) saturated or unsaturated fatty acid (C_{12} to C_{18}) esters and polyoxyethylene (4 to 20) sorbitan saturated or unsaturated fatty acid (C_{12} to C_{18}) esters, and mixtures thereof,

II. from 0.2 to 20 percent by weight of an anti-caking agent having the formula

$RO(CH_2CH_2O)_nH$

wherein R is alkyl or alkenyl having 12 to 18 carbon atoms, and n is a number from 100 to 300, the weight ratio of II/I being at least 10/100 or higher,

III. from zero to 20 percent by weight of second surfactant selected from the group consisting of alkylbenzene sulfonates in which the alkyl has 10 to 16 carbon atoms, linear alkyl sulfates having an average of 11 to 18 carbon atoms, α-olefin sulfonates having 10 to 20 carbon atoms and mixtures thereof; and

IV. from 10 to 40 weight percent of water-soluble inorganic alkaline detergent builders, or water-soluble inorganic neutral detergent builders, or water-soluble organic detergent builders, or mixtures thereof.

4,029,609

NOVEL POLYETHERS HAVING PENDENT AMINOMETHYLENE GROUPS AND HAVING IMPROVED THERMAL AND CHEMICAL STABILITY

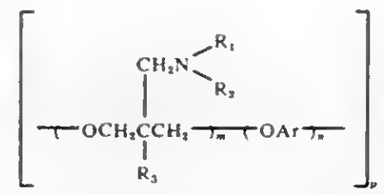
Masakazu Tanaka, and Kazuo Watanabe, both of Otsu, Japan, assignors to Toyo Boseki Kabushiki Kaisha, Japan

Filed June 11, 1975, Ser. No. 585,779

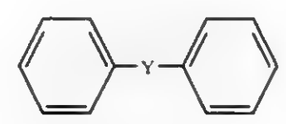
Int. Cl.² C08G *65/00*

U.S. Cl. 260—2 R **11 Claims**

1. Polyethers of the general formula:

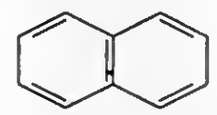


wherein, R_1 and R_2 are each a hydrogen atom or an alkyl group having 1 to 6 carbon atoms and, R_1 and R_2, when these are bonded to each other, are polymethylene groups that form a heteroring with the nitrogen atom, R_3 is a hydrogen atom or an alkyl group of 1 to 4 carbon atoms, m is an integer from 1 to 20, n is 0 or 1, p is an integer from 5 to 1000 and Ar is at least one member selected from the group consisting of divalent aromatic residues of the following formulas:



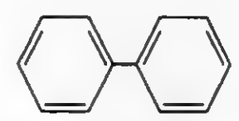
(1)

(2)



(3)

and



(4)

in which in the formula (1), Y is an alkylene group of 1 to 4 carbon atoms, an alkylidene group of 3 to 15 carbon atoms, —O—, —SO_2—, —S— or >C=O.

4,029,610

CARBODIIMIDE-ISOCYANURATE FOAMS CONTAINING URETHANE LINKAGES

Thirumurti L. Narayan, Riverview, and Moses Cenker, Trenton, both of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Division of Ser. No. 472,587, May 23, 1974, Pat. No. 3,922,238. This application Apr. 9, 1975, Ser. No. 566,249

The portion of the term of this patent subsequent to June 3, 1992, has been disclaimed.

Int. Cl.² C08G *18/18, 18/30, 18/48*

U.S. Cl. 260—2.5 BF **7 Claims**

1. A cellular foam composition characterized by carbodiimide, isocyanurate and urethane linkages prepared by condensing an organic polyisocyanate in the presence of a blowing agent, from 0.01 to 0. equivalent per equivalent of isocyanate of a primary hydroxy-terminated polyoxyalkylene or polyester polyol having an average functionality of from two to eight and an average equivalent weight of from about 150 to 1500 and a catalytically sufficient amount of a catalyst system consisting essentially of (a) from 0.1 part to 10 parts of methanol per 100 parts of organic polyisocyanate, (b) a tertiary amine trimerization catalyst, and (c) a urethane catalyst.

4,029,611

CARBODIIMIDE-ISOCYANURATE FOAMS MODIFIED WITH POLYFURFURYL ALCOHOL POLYMERS

Moses Cenker, Trenton; Thirumurti Narayan, Riverview, and John Thomas Patton, Jr., Wyandotte, all of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Dec. 18, 1975, Ser. No. 642,163

Int. Cl.² C08G *18/54*

U.S. Cl. 260—2.5 AW **10 Claims**

1. A cellular foam characterized by carbodimide and isocyanurate linkages prepared by catalytically condensing an organic polyisocyanate in the presence of (a) a carbodiimide-promoting catalyst; (b) a trimerization catalyst, and (c) from 5 to 100% by weight, based on the weight of the organic polyisocyanate of a polyfurfuryl alcohol polymer.

4,029,612

SILICA CONTAINING BLOWING AGENT COMPOSITIONS AS PLATE-OUT PREVENTIVES IN FOAMED PLASTICS PROCESSES

Kenneth Thomas Collington, Loughborough, England, assignor to Fisons Limited, England

Continuation-in-part of Ser. No. 328,079, Jan. 30, 1973, which is a continuation-in-part of Ser. No. 164,473, July 20, 1971. This application Mar. 25, 1975, Ser. No. 562,035

Claims priority, application United Kingdom, July 31, 1970, 37047/70; Aug. 5, 1970, 37779/70; Aug. 26, 1970, 41006/70; Dec. 7, 1972, 56562/72

Int. Cl.² B29D *27/09;* **C08J** *9/00*

U.S. Cl. 260—2.5 E **18 Claims**

1. A particulate blowing agent composition comprising azodicarbonamide, and a colloidal of fumed silica having a BET surface area of 200 to 400 m^2/g and an available water content of 2 to 20% by weight, the weight ratio of silica to azodicarbonamide being from 1:5 to 5:1 and such as to provide 1.5 to 20 parts by weight available water per 100 parts by weight azodicarbonamide.

4,029,613

ANTILUMPING EXPANDING STYRENE POLYMERS

John J. Quinlan, Atco, N.J.; James J. Garland, and Jose E. Granda, both of Aliquippa, Pa., assignors to ARCO Polymers, Inc., Philadelphia, Pa.

Filed Dec. 29, 1975, Ser. No. 644,355

Int. Cl.² C08J *9/22*

U.S. Cl. 260—2.5 B **2 Claims**

1. Expandable styrene polymer particles which will not lump during pre-expansion, comprising styrene polymer particles containing a blowing agent and having on their surface from 0.02 to 0.05 percent by weight based on polymer of hydrated calcium polysilicate consisting of 73–83 percent by weight of silicon dioxide, less than 1 percent by weight aluminum oxide, 3–7 percent by weight of calcium oxide, and 9–20 percent by weight water.

4,029,614

PARTICULATE EXPANDABLE STYRENE POLYMERS HAVING GOOD PROCESSABILITY

Eckhard Nintz; Rupert Schick, both of Ludwigshafen; Karl Seegmueller, Lambsheim, and Erhard Stahnecker, Heidelberg, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Claims priority, application Germany, May 9, 1975, 2520635

Filed Apr. 12, 1976, Ser. No. 676,248

Int. Cl.² C08J *9/18*

U.S. Cl. 260—2.5 B **8 Claims**

1. Expandable styrene polymers containing a foaming agent and from about 0.05 to 1% by weight of the styrene polymer of brominated oligomers of butadiene or styrene, brominated phosphoric acid esters, nuclear brominated phenyl alkyl ethers, pentabromo monochlorocyclohexane or 1,3,4-tribromo-4-phenylbutanone-(2) and additionally containing from 0.0001 to 1.0% by weight of the styrene polymer, of a styrene-soluble amine free from hydroxyl groups, said amine having the formula $NR^1R^2R^3$, wherein R^1 is an aliphatic or cycloaliphatic hydrocarbon radical of from 4 to 20 carbon atoms, R^2 is hydrogen or an aliphatic or cycloaliphatic hydrocarbon radical of from 1 to 15 carbon atoms, and R^3 is hydrogen or an aliphatic or aromatic hydrocarbon of from 1 to 15 carbon atoms, with the proviso, that when R^2 and R^3 are both hydrogen, then R^1 has from 6 to 20 carbon atoms.

4,029,615

POLYMERIC CELLULAR STRUCTURES

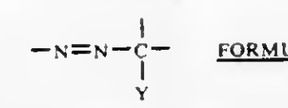
Ernest Rudolph Kamens, Tonawanda; Donald Milton Kressin, Getzville; Harold Carl Lange, Grand Island, and Ronald Edward MacLeay, Williamsville, all of N.Y., assignors to Pennwalt Corporation, Philadelphia, Pa.

Division of Ser. No. 548,946, Feb. 11, 1975, Pat. No. 3,993,609, which is a continuation-in-part of Ser. No. 453,446, March 21, 1974, abandoned. This application Aug. 26, 1976, Ser. No. 718,449

Int. Cl.² C08J *9/02*

U.S. Cl. 260—2.5 R **10 Claims**

1. Cellular polymeric structures prepared by the process which comprises mixing an acidulous or acidic polymerizable medium that is polymerizable and/or cross-linkable by a free radical mechanism with an effective amount of an acid sensitive mono- or poly-azo compound containing the group:



FORMULA I

wherein Y is an acid sensitive group which in the presence of an acidulous or acidic polymerizable medium causes sufficient decomposition of the azo compound that gas is released in said medium and during said decomposition said mono- or poly-azo compound promotes polymerization and/or cross-linking of said medium to provide a matrix that is sufficiently polymerized and/or cross-linked that the generated gases cause the matrix to expand, each of the remaining valences being satisfied by an organic radical; provided that any carbon atom that is directly linked to an azo nitrogen, except that of a carbonyl group, has at least two of its remaining three valences satisfied by a carbon to carbon bond or a carbon to hydrogen bond.

4,029,616

POLYMER COMPOSITION OF ETHYLENIC COMPOUNDS AND PULLULAN

Selzo Nakashio, Hyogo; Kozo Tsuji; Nobuhiro Toyota, both of Ibaragi, and Fumio Fujita, Osaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka and Hayashibara Biochemical Laboratories, Incorporated, both of Japan

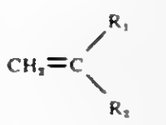
Filed Jan. 27, 1975, Ser. No. 544,573

Claims priority, application Japan, Feb. 1, 1974, 49-13831

Int. Cl.² C08F *36/00;* **C08L** *5/00*

U.S. Cl. 260—17.4 ST **17 Claims**

1. A polymer composition obtained by polymerizing an ethylenic compound selected from the group consisting of compounds represented by the formula,

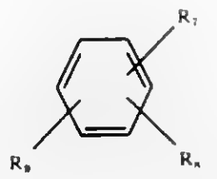


wherein

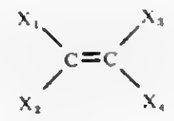
R_1 is H, a C_1–C_4 hydrocarbon group, a halogen or a hydroxyl group; and

R_2 is H, a C_1–C_4 hydrocarbon group, a halogen, —$OCOR_3$

where R_3 is a C_1–C_{18} hydrocarbon group, —$COOR_4$ where R_4 is H, an alkali metal, an alkaline earth metal, a C_1–C_{12} hydrocarbon group, or a halogen-, hydroxyl group-, alkoxy group- or epoxy group- substituted derivative thereof; —CN, —$CONR_5R_6$ where R_5 and R_6 are independently H, a C_1–C_{12} hydrocarbon group or a halogen-, hydroxyl group-, or alkoxy group-, or epoxy group-substituted derivative thereof; —$CH{=}CH_2$, or



where R_7, R_8, and R_9 are independently H, a C_1–C_4 hydrocarbon group, a halogen, a hydroxyl group or an alkoxy group; or compounds represented by the formula



wherein X_1, X_2, X_3, and X_4 are independently H, a halogen or —$COOR_1$ where R_1 is a C_1–C_4 hydrocarbon group, an alkali metal or an alkaline earth metal, with the proviso that X_2 and X_4 are substituents other than H; maleic anhydride and anhydrous maleimide in the presence of pullulan having a molecular weight of 10,000 to 5,000,000

and in the presence or absence of a solvent and a catalyst, said ethylenic compound being present in an amount of 5 to 90 weight % based on the solid content of the resulting composition and the remainder of the solid content being said pullulan.

4,029,617

PROCESS FOR THE PRODUCTION OF WATER-DILUTABLE BINDERS BASED ON AIR-DRYING SHORT-OIL ALKYD RESINS

Rolf Dhein; Jochen Schoeps, both of Krefeld; Johannes Beckers, Kempen, and Rolf Kuchenmeister, Krefeld, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Sept. 23, 1975, Ser. No. 616,070

Claims priority, application Germany, Sept. 28, 1974, 2446439

Int. Cl.² C09D *3/40, 3/56*

U.S. Cl. 260—20 **1 Claim**

1. A water-dilutable binder based on an air-drying short-oil alkyd resin which is essentially free of urethane groups and contains natural, unsaturated fatty acids in an amount of from 15 to 50% by weight, said binder having been prepared by

a. co-condensing in a single process stage

i. 2 to 10% by weight, of natural-resin-modified phenol resol resin and

ii. 90 to 98% by weight, of a mixture of a polyalcohol, a polycarboxylic acid or its anhydride and a monocarboxylic acid, the molar ratio of polyalcohol to polycarboxylic acid or anhydride to monocarboxylic acid being 1 to 0.5-1 to 0.3-1, until an alkyd resin with an acid number of from 30 to 70 and an OH number of from 40 to 120 is formed and

b. acidifying said alkyd resin by semiester formation with a dicarboxylic acid anhydride.

4,029,618

VINYL HALIDE STABILIZER COMPOSITIONS OF ANTIMONY ORGANIC SULFUR-CONTAINING COMPOUNDS AND ORTHO-DIHYDRIC PHENOLS

Dale J. Dieckmann, Euclid, Ohio, assignor to Dart Industries Inc., Los Angeles, Calif.

Filed June 30, 1975, Ser. No. 592,038

Int. Cl.² C08K *5/59*

U.S. Cl. 260—23 XA **20 Claims**

8. A vinyl halide resin composition which comprises a vinyl chloride resin and, as a heat stabilizer, an effective amount of a composition consisting essentially of,

an antimony organic sulfur-containing compound having the formula

R_nSbX_{3-n}

where R of the formula is selected from the group consisting of alkyl, alkenyl, alkynyl, aryl, cycloalkyl, cycloalkenyl, mixed aryl-alkyl, and substituted groups thereof, wherein X of the formula is selected from the group consisting of sulfur, SR and SRCOOR′, where R of the group SR is selected from alkyl, aryl, mixed aryl-alkyl, and substituted groups thereof, where R of the group SRCOOR′ is selected from alkylene, arylene, aralkylene, and substituted groups thereof, wherein R′ of the group SRCOOR′ is selected from alkyl, aryl, mixed aryl-alkyl, and substituted groups thereof, where n is an integer of 0 to 2, and

a phenol selected from the group consisting of o-dihydric phenols and o-dihydric alkyl phenols, and mixtures thereof, said antimony compound and phenol components in relative amounts which together provide a synergistic heat stabilizing effectiveness upon said resin.

4,029,619

METHOD OF PREPARING VINYL CHLORIDE RESINS

Shigenobu Tajima, Joetsu, and Kazuhiko Kurimoto, Ibaragi, both of Japan, assignors to Shinetsu Chemical Company, Tokyo, Japan

Filed Dec. 5, 1972, Ser. No. 312,306

Claims priority, application Japan, Dec. 7, 1971, 46-4698805

The portion of the term of this patent subsequent to Sept. 14, 1993, has been disclaimed.

Int. Cl.² C08L *91/60*

U.S. Cl. 260—23 XA **12 Claims**

1. A method comprising polymerizing in aqueous medium, under the influence of at least one oil soluble polymerization initiator, vinyl chloride or a mixture thereof with at least one copolymerizable monomer, containing at least 50% by weight of the vinyl chloride in the presence of (a) from 0.5 to 4% by weight, based on the weight of the monomer mixture, of at least one alkali metal salt of higher fatty acid, having from 8 to 18 carbon atoms in the molecule, (b) from 0.05 to 3% by weight, based on the weight of the monomer mixture and equivalent to from 4 to 75% by weight of said alkali metal salt, of at least one higher alcohol or higher fatty acid, having 8 to 18 carbon atoms, alone or in combination, and (c) from 0.001 to 0.1% by weight, based on the weight of the monomer mixture, of at least one hydroxide of alkali metal.

4,029,620

BLENDS OF PARTIALLY NEUTRALIZED CARBOXYL FUNCTIONAL COPOLYMERS AND EPOXY RESINS IN AQUEOUS EMULSION

Albert C. Chen, East Brunswick, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Aug. 13, 1975, Ser. No. 604,286

Int. Cl.² C08L *33/02*

U.S. Cl. 260—29.6 NR **13 Claims**

1. A thermally curable aqueous emulsion coating composition comprising an aqueous continuum having dispersed

therein emulsified liquid particles of resinous polyepoxide, said polyepoxide particles being stably suspended by means of a nonionic surfactant used in an amount of from 0.5–10%, based on the total weight of resin, said aqueous continuum further containing an organic solvent-soluble carboxyl functional copolymer containing from 4–20% copolymerized monoethylenic monomer carrying the carboxyl group stably dispersed in the aqueous continuum by salt formation between some of the carboxy groups in the copolymer, and volatile base selected from organic amines and ammonia, the extent of neutralization of the copolymer carboxyl by said base being less than about 30% neutralization when amine is used and being up to about 90% when ammonia is used, said polyepoxide being present in an amount to provide at least about a stoichiometric proportion of epoxy functionality with respect to the carboxyl functionality of the copolymer, up to about a 25% excess of epoxy functionality.

4,029,621

REACTION PRODUCTS OF A POLYEPOXIDE WITH A THIOL HAVING A GROUP HYDROYZABLE TO CARBOXYL, AND AQUEOUS SOLUBILIZED PRODUCTS

Marvis E. Hartman, Pittsburgh; Thomas R. Hockswender, Gibsonia; Rostyslaw Dowbenko, Gibsonia, and Roger M. Christenson, Gibsonia, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 602,858, Aug. 7, 1975, abandoned. This application Apr. 28, 1976, Ser. No. 680,935

Int. Cl.² C08G *59/16, 59/66*

U.S. Cl. 260—29.2 EP **32 Claims**

1. An aqueous composition comprising the solubilized reaction product of:

A. a polyepoxide containing a 1,2-epoxy equivalency greater then 1.0; and

B. a compound containing a mercaptan group and at least one group hydrolyzable to a carboxyl group, said compound having the structural formula:

$HS{-}R{-}(W)_m$

wherein m is an integer from 1 to 5, R is an organic radical having from 1 to 10 carbon atoms and W is a group hydrolyzable to a carboxyl group.

4,029,622

NON-AQUEOUS POLYMER DISPERSIONS OF WATER-SOLUBLE MONOMERS

Wilfried Keller, Opladen, and Friedhelm Müller, Odenthal, both of Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Apr. 21, 1975, Ser. No. 570,185

Claims priority, application Germany, Apr. 24, 1974, 2419764

Int. Cl.² C08L *33/26*

U.S. Cl. 260—29.6 WQ **1 Claim**

1. A stable, storable, non-aqueous dispersion which is rapidly dilutable with water to form a polymer solution and whose average particle size of the dispersed phase is from 0.01 to 1μ, said dispersion consisting essentially of

a. at least one water-soluble polymer having an average molecular weight of at least 5,000,000,

b. a liquid aliphatic or aromatic hydrocarbon selected from the group consisting of toluene, decalin, n-paraffins, iso-paraffins and mixtures thereof and

c. 5 to 20% by weight, based on the weight of the dispersion, of a water-soluble wetting agent selected from the group consisting of ethoxylated alkyl phenols and ethoxylated aralkyl phenols having from 8 to 20 carbon atoms in the alkyl and aralkyl moieties thereof,

said dispersion having been obtained by polymerizing at least one water-soluble α,β-monoolefinically unsaturated monomer in a water-in-oil emulsion by means of at least one photoinitiator and UV light and subsequently removing water from said product of polymerization, either before or after the addition of said water-soluble wetting agent, to a residual water content of less than 5% by weight, based on the weight of the polymer in said dispersion.

4,029,623

GLASS FIBER SIZING COMPOSITIONS FOR THE REINFORCEMENT OF RESIN MATRICES

John Maaghul, Monroeville, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 512,646, Oct. 7, 1974, Pat. No. 3,936,285. This application Aug. 20, 1975, Ser. No. 606,272

Int. Cl.² C08L *33/04*

U.S. Cl. 260—29.6 RW **9 Claims**

1. An aqueous sizing composition for sizing glass fibers used for reinforcing resinous matrices comprising:

a water solubilized, condensation, cross-linkable, first unsaturated polyester resin, said polyester resin substantially insoluble in aromatic solvents when crosslinked;

a second unsaturated water dispersible and insoluble polyester resin, said second polyester resin being insoluble in said first polyester resin in a water solution and said second polyester resin preventing the migration of said sizing composition;

a plasticizer;

a first silane coupling agent to promote adhesion between said glass fibers and said resin matrix;

a second silane coupling agent to control the wetting of said glass fibers by said first silane-coupling agent;

a thermoplastic polymer being of sufficiently low molecular weight to impart pressure sensitive adhesive characteristics to said sizing composition; and

a major amount of water.

4,029,624

EMULSION POLYMERIZATION OF ACRYLATE OR OTHER VINYL MONOMERS USING SELECTED MIXTURES OF SOLUBLE SALTS OF CERTAIN SULFOSUCCINIC ACID HALF ESTERS

Herbert Burkhard, Eastchester, N.Y.; Nelson Nae-Ching Hsu, Stamford, Conn., and Edward Joseph Fetter, East Brunswick, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 457,287, April 2, 1974, Pat. No. 3,947,400. This application Dec. 8, 1975, Ser. No. 638,478

The portion of the term of this patent subsequent to Mar. 30, 1993, has been disclaimed.

Int. Cl.² C08L *33/08, 33/10*; **B01F** *17/10*

U.S. Cl. 260—29.6 TA **24 Claims**

1. A surfactant mixture of 100 parts by weight consisting of:

from 57 to 87 parts by wt. of a soluble salt of the sulfosuccinate half ester of an alcohol selected from branched-chain alkanols having 8 to 12 carbon atoms,

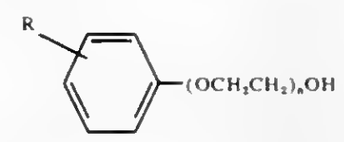
from 0 to 30 parts by wt. of a soluble salt of the sulfosuccinate half ester of an alkyl-polyoxyethylene alcohol having the formula,

$R(OCH_2CH_2)_nOH$ wherein

R is alkyl having 6 to 20 carbon atoms and

n is a value in the range from 2 to 50; and

from 0 to 33 parts by weight of a soluble salt of the sulfosuccinate half ester of a polyethoxyalkylphenol having the formula,



R is alkyl having 6 to 12 carbon atoms and

n is a value in the range from 2 to 50.

6. An aqueous latex of acrylate copolymer in which acrylate

monomer units selected from ethyl acrylate and methyl methacrylate predominate and having a minor proportion in said polymer of N-methylolacrylamide cross-linking units, said latex containing about 1 to 4 percent by wt. based on the polymer weight of a surfactant mixture defined by claim 1 as the emulsifier for said latex.

4,029,625

NON-PHASING CHLOROPRENE POLYMER ADHESIVE COMPOSITION AND PREPARATION THEREOF

Yasuaki Denda; Takashi Kadowaki, and Michio Dohi, all of Omi, Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 411,820, Nov. 1, 1973, Pat. No. 3,941,738. This application Aug. 27, 1975, Ser. No. 608,321

Int. Cl.² C08K *5/02;* **C08K** *5/10;* **C08L** *61/10*

U.S. Cl. 260—31.4 R **6 Claims**

1. In a non-phasing chloroprene polymer adhesive composition comprising:

a. 100 parts by weight of a chloroprene polymer,

b. 1–50 parts by weight of a metal oxide,

c. 5–100 parts by weight of an alkylphenol-formaldehyde resin,

a., b., and c. being admixed with an organic solvent so as to obtain a solids content of said adhesive composition of from 5–60%,

the improvement wherein said chloroprene polymer is prepared by the emulsion polymerization of chloroprene or a mixture of chloroprene and a comonomer in the presence of a non-ionic polyoxyethylene ether or ester surfactant.

4,029,626

POLYURETHANE COMPOSITION HAVING EASY-REENTRY PROPERTY

George W. Gillemot, Santa Monica; Robert Gamero, Whittier; Augusto E. Benavides, Granada Hills, and Robert James Elms, Sepulveda, all of Calif., assignors to Communications Technology Corporation and John T. Thompson, both of Los Angeles, Calif., part interest to each

Filed Nov. 24, 1975, Ser. No. 634,866

Int. Cl.² C08K *5/11*

U.S. Cl. 260—31.6 **13 Claims**

1. A two part package assembly adapted for producing a solid polyurethane composition when the contents of the two parts are intermingled, which assemhly consists essentially of:

I. a first package part containing an NCO group containing composition, which comprises liquid polyurethane prepolymer, made from;

a. organic diisocyanate;

b. aliphatic triol of a molecular weight of about 1500–6000, wherein the NCO/OH ratio of said diisocyanate and said triol is about 1.0–1.6; and

c. liquid, organic plasticizer material essentially inert to NCO reaction and essentially compatible with the diisocyanate triol reaction product; said organic plasticizer being present in an amount to provide a composition having an NCO content of about 1.2–2.5 weight % and wherein said triol provides the bulk of the weight sum of the said diisocyanate, triol and organic plasticizer; and

II. a second package part containing a curing solution composition consisting essentially of;

a. a curing agent, in a curing amount, for the polyurethane prepolymer composition of (I) selected from the class consisting of organic diamines and aminoalkanols;

b. liquid, organic plasticizer material essentially inert to NCO reaction and essentially compatible with the cured, solid polyurethane composition; and

c. organo-metallic compound effective for catalyzing the ambient temperature reaction of isocyanate groups and hydroxyl or amine groups; and soluble in said plasticizer, wherein said first and second packages are intermingled in proportions to yield upon curing, a solid polyurethane composition having a Shore hardness of about 5–20 in a curing time of not more than about 60 minutes at about 20° C.

9. A solid, polyurethane composition possessing structural strength against rebounding forces and also possessing the characteristic of crumbling under shearing force applied to the surface of the solid or from the interior of the solid, permitting the solid to be removed from another solid object which is encapsulated, embedded, or coated with said solid polyurethane which comprises the reaction product between an NCO group prepolymer and a curing solution, said NCO group prepolymer comprising:

I. an NCO group containing composition having liquid polyurethane prepolymer, made from:

a. organic diisocyanate;

b. aliphatic triol of a molecular weight of about 1500–6000 wherein the NCO/OH ratio of said diisocyanate and said triol is about 1.0–1.6; and

c. liquid, organic plasticizer material essentially inert to NCO reaction and essentially compatible with the diisocyanate-triol reaction product, said organic plasticizer being present in an amount to provide a composition having an NCO content of about 1.2–2.5%, and said triol providing the bulk of the weight sum of the said diisocyanate, triol and organic plasticizer; and

II. said curing solution consisting essentially of:

a. a curing agent, in a curing amount, for the polyurethane prepolymer composition of (I) selected from the class consisting of organic diamines and aminoalkanols;

b. liquid, organic plasticizer material essentially inert to NCO reaction and essentially compatible with the cured, solid polyurethane composition; and

c. organo-metallic compound effective for catalyzing the ambient temperature reaction of isocyanate groups and hydroxyl or amine groups; and soluble in said plasticizer; said prepolymer composition and said curing composition intermingled in proportions to yield upon curing, at ambient temperatures, a solid polyurethane composition possessing the aforesaid crumbling characteristic and having a Shore hardness of about 5–20 in a curing time of not more than about 60 minutes at about 20° C.

4,029,627

OLIGOMERIC POLYESTERS FROM LONG-CHAIN DICARBOXYLIC ACIDS AS PLASTICIZERS FOR VINYL POLYMERS

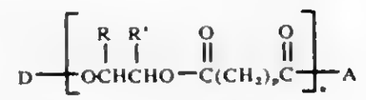
Shu-Pei Chang, Peoria, Ill., and Robert W. Ridgway, Winter Park, Fla., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Continuation-in-part of Ser. No. 611,374, Sept. 8, 1975, abandoned. This application Dec. 28, 1976, Ser. No. 754,940

Int. Cl.² C08K *5/10*

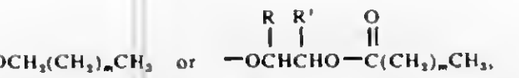
U.S. Cl. 260—31.6 **9 Claims**

1. Vinyl polymer plasticizer compositions comprising condensates having the structure:



wherein *n* is from 2 to 15, D is either

A is either

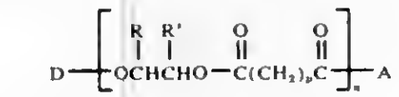


m is from 2 to 10, p in each of said condensates is 11 or 7 or admixtures thereof, with the proviso that condensates wherein p is exclusively 7 are admixed with those having p equal to 11, and R and R′ are either —H or —CH_3, with the proviso that R and R′ on adjacent carbon atoms are not the same.

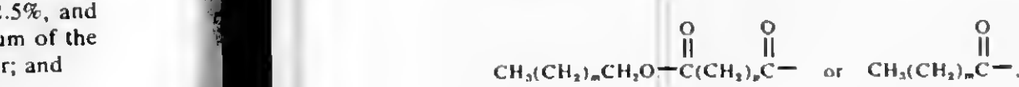
5. A plasticized vinyl polymer composition comprising

a. a vinyl polymer, and

b. incorporated with said polymer a plasticizer composition comprising condensates having the structure:



wherein *n* is from 2 to 15, D is either



A is either

m is from 2 to 10, *p* in each of said condensates is 11 or 7 or admixtures thereof, with the proviso that condensates wherein *p* is exclusively 7 are admixed with those having p equal to 11, and R and R′ are either —H or —CH_3, with the proviso that R and R′ on adjacent carbon atoms are not the same.

4,029,628

BONDING MATERIAL FOR PLANAR ELECTRONIC DEVICE

Marvin I. Fredberg, Stoughton, Mass., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 22, 1974, Ser. No. 472,404

Int. Cl.² C08K *5/07*

U.S. Cl. 260—32.8 R **2 Claims**

1. A composition for bonding integrated circuits to a heat sink and providing an improved thermal conduction path therebetween, said composition consisting essentially of from 2.85 to 3.15 parts by weight of an adhesive thermoplastic polymer for bonding said integrated circuit to said heat sink, said polymer having a softening point of 160° F, a flow point of 275° F,

a viscosity at said flow point of 6,000 cps, a clear amber color, and said polymer being soluble in acetone; from 2.85 to 3.15 parts by weight of a methyl ethyl ketone solvent for softening said polymer to a putty like substance; and

from 1.90 to 2.10 parts by weight of

an alumina filler for increasing the thermal conductivity of said composition for bonding integrated circuits.

4,029,629

SOLVENT RESISTANT ROOM TEMPERATURE VULCANIZABLE SILICONE RUBBER COMPOSITION

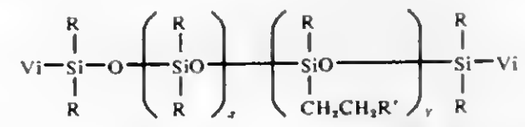
Edward M. Jeram, Burnt Hills, N.Y., assignor to General Electric Company, Waterford, N.Y.

Filed Oct. 6, 1975, Ser. No. 619,591

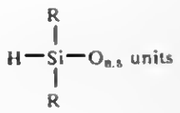
Int. Cl.² C08L *83/08;* **C08G** *77/24*

U.S. Cl. 260—37 SB **20 Claims**

1. A solvent resistant room temperature vulcanizable silicone rubber composition comprising (A) 100 parts of a vinyl-containing polymer of the formula,

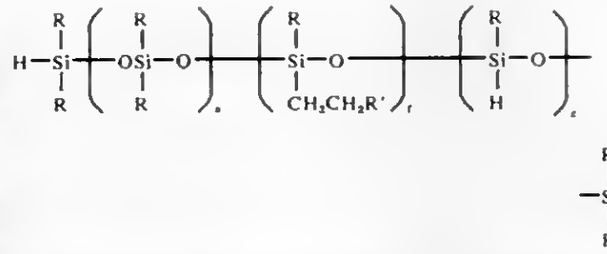


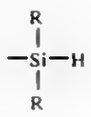
where Vi is vinyl, R is selected from the class consisting of alkyl radicals of 1 to 8 carbon atoms and phenyl, R′ is perfluoroalkyl of 1 to 8 carbon atoms, *x* and *y* are at least 1 and the viscosity of the compound varies from 1,000 to 200,000 centipoise at 25° C, and the concentration of siloxy units taken *y* times varies from 5 to 98 mole percent; (ii) from 0.1 to 50 parts per million of the total composition of a platinum catalyst, and (B) from 1 to 50 parts based on 100 parts of the mixture (A) of a cross-linking polymer selected from the class consisting of (iii) a resin having



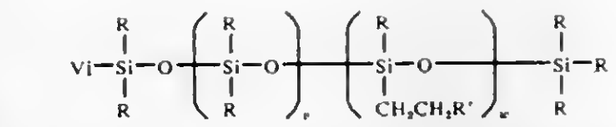
and SiO_2 units where the R to Si ratio varies from 1.0 to 2.7; (vi) a resin having

SiO_2 units and RR″ SiO units where the R to Si ratio varies from 1.2 to 2.7 and (v) a polymer of the formula





where R,R′ are as previously defined, *s* is at least 1, *t* and *z* may be zero or a positive integer and the viscosity of the polymer varies from 10 to 1000 centipoise at 25° C, where the concentration of siloxy units taken *t* times varies from 0 to 75 mole percent, and R″ is selected from the class consisting of alkyl radicals of 1 to 8 carbon atoms and —CH_2CH_2R' radicals and in (A) (vi) from 1 to 85 parts per 100 parts of polymer (i) of a vinyl-containing compound of the formula,



where, R, Vi, R′ are as previously defined; *v* and *w* are at least 1, and the concentration of the Vi $(R)_2SiO_{0.5}$ units with respect to the total terminal units in the polymer varies from 20 to 100 mole percent and the viscosity of the polymer ranges from 100 to 20,000 centipoise at 25° C.

4,029,630
PROCESS FOR THE MANUFACTURE OF STRUCTURAL ELEMENTS

Heinz Meinhold, Klettenbergstrasse 9, 6 Frankfurt am Main; Antonin Lev, Erzberger Strasse 15, 6056 Heusenstamm, and Vlastislav Kunopik, Bockenheimer Landstrasse 79, 6 Frankfurt am Main, all of Germany

Filed May 3, 1974, Ser. No. 466,818
Claims priority, application Germany, May 8, 1973, 2323170
Int. Cl.² C08K 3/08
U.S. Cl. 260—38 13 Claims

1. A process for manufacturing structural elements, consisting essentially of the steps of:

mixing minerals as well as low melting metallic substances selected from the group consisting of lead, aluminum, tin, Wood's metal, and an aluminum composition composed of 86% aluminum, 13% silicon, and 1% iron, to form a molding composition based on thermosetting phenolic resin; and

curing said molding composition to form such structural elements.

4,029,631
POLYESTER SHEET CONTAINING ANTIBLOCK AGENT ADDED IN DEGRADABLE POLYCARBONATE

Philip Stuart Bollen, Auburn, and Eugene Vincent Walacavage, Minersville, both of Pa., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Nov. 3, 1976, Ser. No. 738,784
Int. Cl.² C08G 63/62; C08K 3/36
U.S. Cl. 260—40 R 31 Claims

1. A method of adding an antiblock agent to polyethylene terephthalate, said polyethylene terephthalate having an intrinsic viscosity greater than 0.9, a melt viscosity at 525° F. of above about 10,000 poise, and used to form a sheet, consisting of

a. compounding from about 0.25 to 0.01 percent by weight, based on the final total weight of all components, of said antiblock agent, said antiblock agent having a pH of less than 6, with from about 2.5 to 0.1 percent by weight, based on the final total weight of all components, of a degradable polycarbonate, said polycarbonate having an intrinsic viscosity of from about 0.55 to 0.7, before it is compounded, then

b. uniformly blending said polyethylene terephthalate and said polycarbonate to make a composition of said polyethylene terephthalate and said polycarbonate containing said antiblock agent, then

c. extruding said blended polyethylene terephthalate and polycarbonate containing antiblock agent at about 490° to 530° F. to form a sheet; and finally

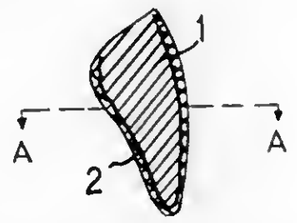
d. rapidly cooling the resulting extruded sheet with at least one cooling surface maintained at a surface temperature of from about 50° to about 160° F. for a period not exceeding about 15 seconds, said sheet being essentially amorphous and nonoriented,

so that said antiblock agent degrades said polycarbonate due to heat and acid hydrolysis during compounding of said antiblock agent with said polycarbonate, whereby said blend of polyethylene terephthalate and polycarbonate is uniform and said extruded sheet is clear.

4,029,632
PROSTHETIC DENTAL APPLIANCE

Albert Gross, Frankfurt am Main, and Roland Schaefer, Friedrichsdorf, Taunus, both of Germany, assignors to Kulzer & Co., GmbH, Bad Homburg vor der Hohe, Germany

Filed Feb. 3, 1975, Ser. No. 546,339
Claims priority, application Germany, Feb. 6, 1974, 2405578
Int. Cl.² C08K 9/06
U.S. Cl. 260—42.15 30 Claims



1. Prosthetic dental appliance comprising a shaped body portion having at least one outer surface portion having an outer surface which is adapted to be polished and which is highly resistant to abrasion, at least said outer surface portion adjacent to said outer surface comprising a hardened binder resin selected from the group consisting of methacrylate resins and acrylic acid ester resins containing between about 30% and 80% by weight of said outer surface portion of amorphous silicic acid filler particles of a maximum particle size of about 0.07 micrometer, said amorphous silicic acid being selected from the group consisting of precipitated silicic acid, and silicic acid produced by flame hydrolysis.

4,029,633
CARBON BLACK-RUBBER MASTERBATCH PRODUCTION

Erivan Hagopian, Lexington, and Allan Clark Morgan, Sudbury, both of Mass., assignors to Cabot Corporation, Boston, Mass.

Filed Apr. 14, 1976, Ser. No. 676,970
Int. Cl.² C08K 3/04
U.S. Cl. 260—42.55 7 Claims

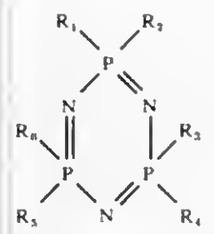
1. In a process for preparing a carbon black-rubber masterbatch wherein an aqueous carbon black slurry is mixed with a rubber latex to obtain a uniform mixture which is creamed and wherein the creamed carbon black-latex mixture is coagulated with an aqueous acidified solution to yield a rubber crumb-containing solution from which the rubber crumb is separated, washed, dried and recovered and the serum is recycled to the coagulating liquor, the improvement which comprises introducing the carbon black slurry and the latex in the form of separate continuous streams to form a uniform mixture prior to creaming the resulting carbon black-latex mixture and coagulating the resultant creamed mixture by introducing the creamed mixture in the form of at least one coherent stream into a flowing stream of acidified coagulating liquor from the periphery of the stream of coagulating liquor in a direction substantially transverse to the axis of the stream of the coagulating liquor so as to cause the stream of the creamed carbon black-latex mixture to be sheared and atomized prior to the occurrence of coagulation.

4,029,634
FLAME RETARDANT POLYMERIC COMPOSITIONS CONTAINING HALOGEN SUBSTITUTED HEXAKIS-(SUBSTITUTED PHENOXY)CYCLOTRIPHOSPHAZENE

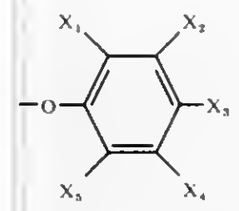
Philip Lacy Meredith, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 573,979, May 2, 1975, abandoned. This application Oct. 1, 1976, Ser. No. 728,752
Int. Cl.² C08D 3/20
U.S. Cl. 260—45.9 NP 17 Claims

1. A flame retardant polymeric composition comprising a polymer and a flame retardant effective amount of a compound of the formula:



where R_1 to R_6 has the formula



wherein X_1 to X_5 are hydrogen, bromine or chlorine, provided that at least one X is other than hydrogen and that said compound contains less than 50 ppm residual chloride ion.

4,029,635
SILICONE RESINS USEFUL FOR FORMING MICA LAMINATE

Duane F. Merrill, Ballston Spa, N.Y., assignor to General Electric Company, Waterford, N.Y.

Filed Jan. 15, 1975, Ser. No. 541,281
Int. Cl.² C08G 77/04
U.S. Cl. 260—46.5 R 4 Claims

1. A process for forming a silicone resin useful for making mica laminates consisting essentially of (a) adding a mixture of an organotrihalosilane and a dimethyldihalosilane dissolved in a water-immiscible organic solvent to a heterogeneous hydrolysis mixture consisting of water, a water-immiscible organic solvent and an alcohol of the formula R^4OH for a period of 15 minutes to 4 hours where there is present in the hydrolysis mixture per part by weight of said organotrihalosilane and dimethyldihalosilane 0.4 to 10.0 parts of the water-immiscible organic solvent, 0.2 to 1.0 parts of water and 0.5 to 1.5 parts of said alcohol; (b) continuously during and after said addition, agitating said mixture while maintaining the reaction temperature in the range of 25° C to 80° C (c) adding additional water to form two distinct separate layers, and (d) separating the solvent resin layer where said organo groups on said organotrihalosilane are methyl and phenyl where the concentration of said methyl radicals in said organotrihalosilanes varies from 30 to 70 mole percent and R^4 is selected from the class consisting of alkyl radicals haloalkyl radicals from 1 to 3 carbon atoms where the organo and methyl to Si ratio in said resin varies from 1.01 to 1 to 1.1 to 1, the alkoxy content is less than 6% and said resin has a silanol content of less than 6%.

4,029,636
METHOD FOR REDUCING MOLYBDENUM TRIOXIDE CONTENT OF GASES ISSUING FROM REACTORS CONTAINING MOLYBDENUM-BASED CATALYSTS

Richard P. Lowry; Joseph D. Chase, both of Corpus Christi, Tex., and Paul A. C. Cook, Mendham, N.J., assignors to Celanese Corporation, New York, N.Y.

Filed Nov. 12, 1974, Ser. No. 523,195
Int. Cl.² C07C 51/32
U.S. Cl. 260—530 N 8 Claims

1. In a process which comprises passing a gas comprising propylene or isobutylene admixed with water vapor, oxygen, and an inert diluent gas through a reaction zone which is maintained at an elevated temperature of about 300° C to 500° C and at a pressure of about 1 to 5 atmospheres absolute and which contains a solid catalyst comprising a molybdenum oxide or a metal molybdate salt which is a source of molybdenum trioxide under the conditions obtaining within said reaction zone, and (b) introducing the gaseous effluent from said reaction zone into a subsequent processing step or zone in which unsaturated aldehydes contained in said effluent are further oxidized with oxygen to the corresponding alkenoic acids at a temperature of approximately 240° to 300° C in the presence of a solid catalyst, the improvement which comprises:

cooling said reaction zone effluent gas by approximately 5° C to 200° C, prior to introducing it into said subsequent processing step or zone, by passing said effluent gas through a cooled bed or array of solid bodies which are chemically inert toward said gas, said bed or array having an effective void space greater than about 40%:

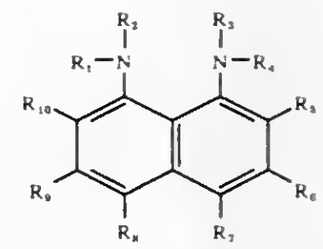
and condensing varpors of molybdenum trioxide contained in said effluent gas as a result of vaporization of molybdenum trioxide from said reaction zone catalyst upon the surfaces of said solid bodies to diminish the molybdenum trioxide content of said gaseous effluent priot to its entry into said second subsequent processing step or zone.

4,029,637
ACID DYEABLE POLYESTER CONTAINING 1,8-BIS-(DIALKYL-AMINO)NAPHTHALANE

Doetze J. Sikkema, Duiven, Netherlands, assignor to Akzona Incorporated, Asheville, N.C.

Filed Mar. 6, 1975, Ser. No. 556,064
Claims priority, application Netherlands, Mar. 22, 1974, 7403884
Int. Cl.² C08G 63/76, 63/02
U.S. Cl. 260—75 N 8 Claims

1. A filament-forming polyester comprising at least 80 mole % of repeating structural units of ethylene terephthalate in which is incorporated 0.001 – 10 mole % of a derivative of 1,8-diamino naphthalene of the following formula:



wherein R_1 and R_4 represent an alkyl group with 1 – 4 C atoms and R_3 and R_{10} an H atom, an alkyl group, or an aralkyl group.

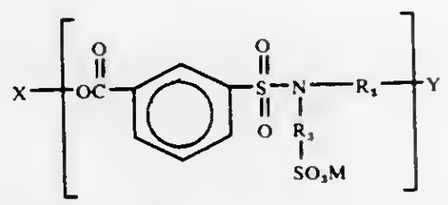
4,029,638

COPOLYESTER POLYMER OF ENHANCED DYEABILITY

Gerald W. McNeely, Arden, N.C., assignor to Akzona Incorporated, Asheville, N.C.

Filed Apr. 28, 1975, Ser. No. 572,025
Int. Cl.² C08G 63/76
U.S. Cl. 260—75 N 29 Claims

13. Copolyester polymer having from about 0.5 to about 10 mole percent comonomer dye sensitizing units containing sulfonamide groups as an intralinear part of the polymer chain, said copolymer having the formula:



wherein R_2 and R_3 are alkylene radicals of from 1 to about 6 carbons, M is selected from the group consisting of alkaline earth metals and alkali metals, X is a radical remaining after the removal of a hydroxyl group from a polyester unit and Y is a radical remaining after the removal of a hydrogen atom from a carboxyl group of a polyester unit.

4,029,639

TREATED FABRICS AND PROCESS

James T. Gragson, Bartlesville, Okla., and Joseph E. Ballard, Greenville, S.C., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed June 30, 1975, Ser. No. 591,921
Int. Cl.² C08G 75/16
U.S. Cl. 260—79 7 Claims

1. An article of manufacture comprising a water-repellent fabric of phenylene sulfide polymer fibers produced from polymers having a melt flow within the range of 75 to 800 grams per 10 minutes as measured by ASTM method D-1238-70 modified to operate at 650° F with a piston load of 5 kilograms which has been heat treated in a relaxed state at a temperature near, but below, the melting point of the polymer for a finite period of time sufficient to render the fabric water-repellent.

4,029,640

PROCESS FOR PRODUCING AMMONIUM AROMATIC SULFONATE

Tatsuo Hattori; Kanzi Katsuragawa; Keiichi Kihara; Isao Ono, and Hanzo Tamabayashi, all of Shin-nanyo, Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Japan

Filed May 27, 1975, Ser. No. 580,937
Claims priority, application Japan, May 27, 1974, 49-58858
Int. Cl.² C07C 143/24; C09K 13/06
U.S. Cl. 260—79.3 MU 8 Claims

1. A process for producing an ammonium p-styrenesulfonate or polymer thereof which comprises:

reacting an alkali metal p-styrenesulfonate or a polymer thereof with an inorganic ammonium salt, in a medium of a hydrophilic alcohol, or a mixture of a hydrophilic organic solvent and water, wherein when said medium is a mixture of a hydrophilic organic solvent and water, the weight ratio of the amount of said solvent to the amount of water is from 1.0 to 10.

4,029,641

PROCESS FOR THE SIMULTANEOUS OBTENTION OF INSULIN AND PANCREATIN FROM SWINE PANCREASES

Leonhard Hafner, Konigstein, Taunus; Wilhelm Schramm, Kelkheim, Taunus; Hans Kargl, Schwalbach, Taunus, and Friedrich Kieser, Eppstein, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Dec. 18, 1975, Ser. No. 641,927
Claims priority, application Germany, Dec. 20, 1974, 2460334
Int. Cl.² C07C 103/52
U.S. Cl. 260—112.7 5 Claims

1. A method for treating fresh or deep frozen swine pancreases simultaneously to obtain therefrom an insulin-containing material and a pancreatin-containing material, which method comprises extracting said pancreases with an aqueous extractant containing at least 40 percent by volume of acetone and having dissolved therein a first soluble salt the cation of which reacts with acidic substances accompanying the insulin to form undissociated compounds therewith while releasing hydrogen ions therefrom to establish a pH of about 5 to 7 in the pancreas-extractant combination, separating the extract and remaining solids after the extraction, and instantly adjusting the pH of the resulting solids to a pH above 5.6 by combining them with a buffer, whereby the extract so obtained is an insulin-containing material from which insulin can be isolated and the solids so obtained are a pancreatin-containing material.

4,029,642

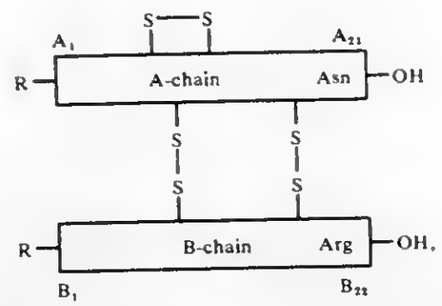
PROCESS FOR THE MANUFACTURE OF HUMAN INSULIN

Rainer Obermeier, Hattersheim, Main, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Dec. 19, 1975, Ser. No. 642,399
Claims priority, application Germany, Dec. 21, 1974, 2460753
Int. Cl.² C07C 103/52
U.S. Cl. 260—112.7 1 Claim

1. A method for making human insulin, which comprises condensing des-B_{23-30}-octapeptide porcine insulin of the formula

(I)



wherein R is an amino-protective group which is tert.-butyloxy-carbonyl, tert.-amyloxy-carbonyl, or methylsulfonyl-ethyloxy-carbonyl with a peptide of the formula

H—Gly—Phe—Phe—Tyr(X)—Thr(X)—Pro—Lys(-BOC)—Thr(Bu^t)OBu^t,

wherein X is hydrogen or tert.-butyl, in the presence of dicyclohexyl carbodiimide and hydroxybenzotriazole, and then splitting off said amino-protective group with alkali if said group is methylsulfonyl-ethyloxy-carbonyl or with trifluoroacetic acid if said protective group is tert.-butyloxy-carbonyl or tert.-amyloxy-carbonyl.

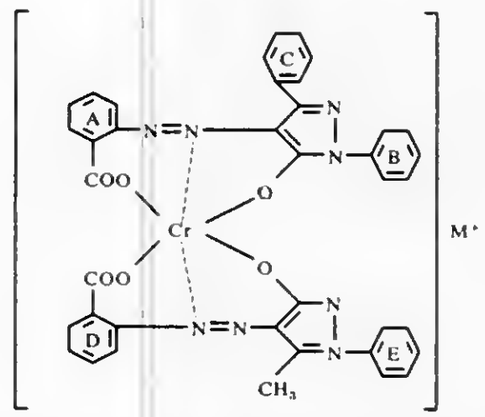
4,029,643

CHROMIUM CONTAINING AZO DYES

Yoichi Koiso, Yono; Koji Ito, Tokyo, and Hiroshi Seno, Omiya, all of Japan, assignors to Nippon Kayaku Kabushiki Kaisha, Tokyo, Japan

Filed May 19, 1972, Ser. No. 255,134
Claims priority, application Japan, May 29, 1971, 46-36713
Int. Cl.² C09B 45/48
U.S. Cl. 260—145 B 12 Claims

1. A chromium containing azo dye of the general formula:



wherein one of the phenyl nuceli A, B, D and E is substituted by sulfonic acid group, the nuclei A, B, C, D and E may be substituted by one or more substituents selected from the group consisting of chlorine atom, bromine atom, nitro group, lower alkoxy group and lower alkyl group and M is an alkali metal.

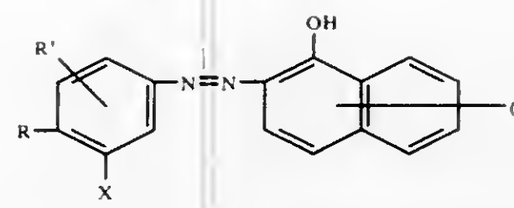
4,029,644

WATER-SOLUBLE, FIBER-REACTIVE MONOAZO DYESTUFFS

Fritz Meininger, Frankfurt am Main, and Ludwig Schläfer, Fischbach, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Continuation-in-part of Ser. No. 386,608, Aug. 8, 1973, abandoned, which is a continuation-in-part of Ser. No. 98,902, Dec. 16, 1970, abandoned. This application Nov. 6, 1975, Ser. No. 629,677
Claims priority, application Germany, Dec. 19, 1969, 1963673
Int. Cl.² C09B 29/16
U.S. Cl. 260—200 6 Claims

I. A water-soluble monoazo dyestuff of the formula



wherein R represents lower alkyl or lower alkoxy, R′ represents hydrogen, lower alkyl or lower alkoxy, X represents $-SO_2-CH_2-CH_2-OH$, $-SO_2-CH_2-CH_2-O-SO_3H$, $-SO_2-CH_2-CH_2-O-PO_3H_2$, $-SO_2-CH_2-CH_2-S-SO_3H$ or $-SO_2-CH_2-CH_2-N(\text{lower alkyl})_2$, and n stands for the integer 1, 2 or 3.

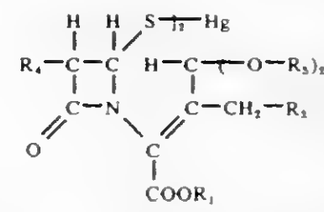
4,029,645

MERCURY INTERMEDIATES USEFUL IN THE PREPARATION OF 2-ALKOXY CEPHALOSPORINS

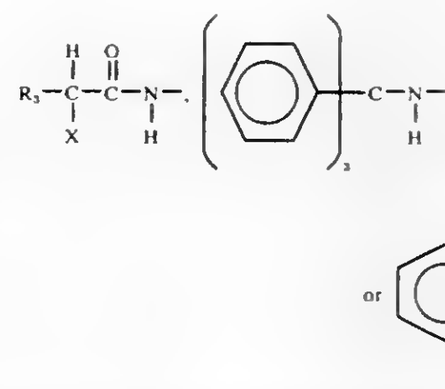
William A. Slusarchyk, Belle Mead, and Christopher M. Cimarusti, Hamilton, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Nov. 17, 1975, Ser. No. 632,617
Int. Cl.² C07D 205/08
U.S. Cl. 260—239 A 9 Claims

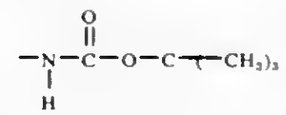
1. A compound of the formula:

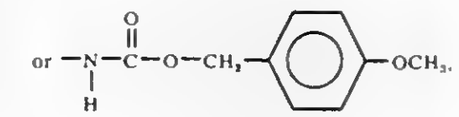


wherein R_1 is lower alkyl, diphenylmethyl, 2,2,2-trichloroethyl, p-methoxybenzyl, or p-nitrobenzyl; R_2 is hydrogen or acetoxy; R_3 is lower alkyl; and R_4 is

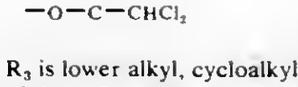


wherein X is hydrogen, protected amino of the formula





or protected hydroxy of the formula



and R_3 is lower alkyl, cycloalkyl of 3 to 7 carbons, cycloalkenyl of 3 to 7 carbons, cycloalkadienyl of 6 to 7 carbons, phenyl, phenoxy, phenyllower alkyl, substituted phenyl wherein said substituent is one or two members selected from the group consisting of lower alkyl, lower alkoxy, and halogen, or heterocyclic wherein said heterocyclic is attached by way of an available carbon atom and is unsubstituted or substituted at an available carbon atom by a lower alkyl or halogen group and is selected from the group consisting of thienyl, furyl, pyrryl, pyridyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, thiadiazolyl and tetrazolyl provided that X is protected amino or protected hydroxy only when R_3 is phenyl, substituted phenyl or cycloalkadienyl.

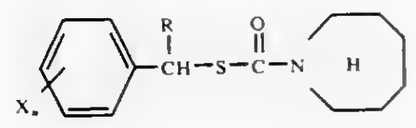
4,029,646

BENZYL N,N-HEXAMETHYLENETHIOLCARBAMATE COMPOUNDS AND HERBICIDAL COMPOSITIONS

Masahiro Aya; Masao Miyamoto; Nobuo Fukazawa, and Masaaki Yamagishi, all of Tokyo, Japan, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Feb. 9, 1971, Ser. No. 114,031
Claims priority, application Japan, Feb. 14, 1970, 50-12463
Int. Cl.² C07D *295/10*
U.S. Cl. 260—239 BF **23 Claims**

1. Thiolcarbamic acid ester compound of the formula



wherein
X is lower alkyl, lower alkoxy or halogen;
R is hydrogen or methyl; and
n is an integer from 0 to 3;
with the proviso that when R is hydrogen, *n* is an integer of from 1 to 3 and at last one X is alkyl or alkoxy.

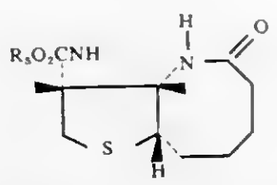
4,029,647

SYNTHESIS OF BIOTIN

Pasquale Nicholas Confalone, Bloomfield; Milan Radoje Uskokovic, Upper Montclair, and Giacomo Pizzolato, Belleville, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 421,460, Dec. 3, 1973, Pat. No. 3,978,084. This application May 12, 1976, Ser. No. 685,835
Int. Cl.² C07D *493/04*
U.S. Cl. 260—239.3 B **2 Claims**

1. A compound of the formula:



wherein R_5 is a straight or branched chain aliphatic hydrocarbyl group having from 1–20 carbon atoms; a cycloaliphatic group selected frum the group consisting of menthyl, bornyl and cholesteryl and aryl lower alkyl groups wherein the aryl moiety is selected from the group consisting of phenyl, tolyl, naphthyl, phenanthryl and azulyl wherein said aryl moieties may be unsubstituted or substituted with lower alkylenedioxy, halogen, lower alkyl, lower alkoxy or a nitro group and the lower alkyl moiety is a straight or branched chain alkyl group having 1 to 8 carbon atoms.

4,029,648

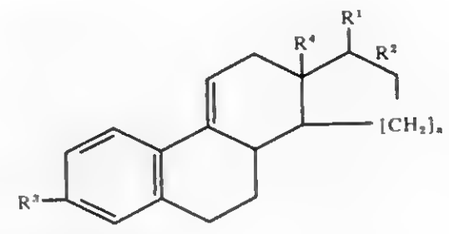
PROCESS OF MAKING GONA-1,3,5(10),9(11)-TETRAENES

Kurt Ponsold, and Helmut Kasch, both of Jena, Germany, assignors to VEB Jenapharm, Jena, Germany

Filed Jan. 15, 1976, Ser. No. 649,465
Int. Cl.² C07J *17/00*
U.S. Cl. 260—239.55 R **9 Claims**

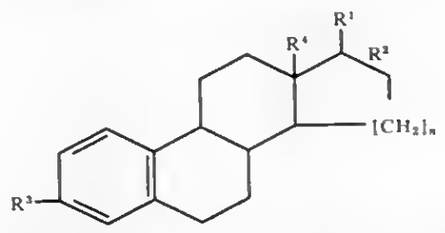
1. A process for the production of a gona-1,3,5(10),9(11)-tetraene having the formula

I



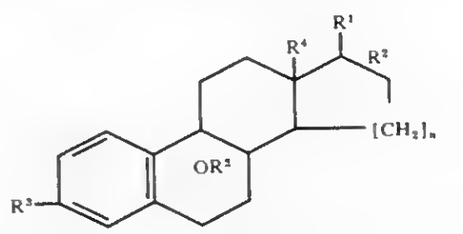
in which formula
n is 1 or 2,
R^1 is hydrogen, hydroxyl, alkoxy, alkanoyl or acetyl,
R^2 is hydrogen, alkoxy, acetoxy, alkenyl, alkinyl, or alkyl or is $—CH_2X$ in which X is halogen, cyano or alkoxy,
or R^1 and R^2 together are oxo, methyleneoxy, or ethylenedioxy,
R^3 is hydroxyl, alkoxy of up to 4 carbon atoms, alkanoyl or alkoxymethyleneoxy, and
R^4 is methyl or ethyl,
which process comprises the steps of electrolyzing a gona-1,3,5(10)-triene having the formula

II



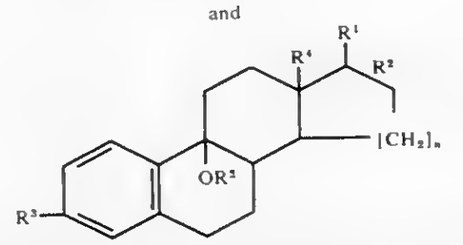
in which formula *n*, R^1, R^2, R^3, and R^4 have the same significance as hereinbefore, while dissolved or suspended in water or a primary or secondary alcohol or a mixture thereof, in the presence of an electroconductive salt which is non-reactive, under the conditions of the electrolysis with the gona-1,3,5(10)-triene, the cationic moieties of said electroconductive salts being ions of the alkali or alkaline-earth metals or cations of other metals and oxonium salts of elements of Groups V and VI of the Periodic Table, and the anionic moieties of the electroconductive salts being fluoborate, sulfate, perchlorate, arylsulfonate, alkylsulfonate, alkoxide, hexafluorophosphate, hydroxyl, nitrate, or carboxyl ions and the said electrolysis being conducted at a constant current or constant voltage until the conversion of the gona-1,3,5(10)-triene is complete so as to form a mixture of 9α and 9β-hydroxy or alkoxygona-1,3,5(10)-trienes having the respective formulae

IIIa



and

IIIb



in which *n*, R^1, R^2, R^3, and R^4 have the same significance as hereinbefore, and R^5 depending on the solvent or suspension medium is hydrogen in case of water and is the corresponding alkyl group in case of an alcohol, and subsequently converting the said 9α or 9β-hydroxy or alkoxygona-1,3,5(10)-triene by means of an acid reagent to a gona-1,3,5(10),9(11)-tetraene.

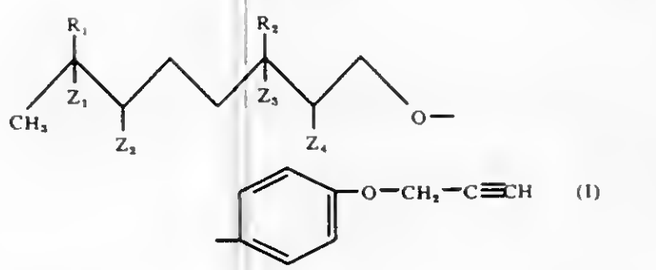
4,029,649

TERPENE ARYL ESTERS

Friedrich Karrer, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 190,307, Oct. 18, 1971, abandoned. This application May 16, 1973, Ser. No. 360,853
Claims priority, application Switzerland, Oct. 20, 1970, 15436/70; Aug. 23, 1971, 12321/71
The portion of the term of this patent subsequent to Apr. 13, 1993, has been disclaimed.
Int. Cl.² C07D *303/28*
U.S. Cl. 260—240 H **6 Claims**

1. a compound of the formula



(I)

wherein
Z_1 and Z_2 together are an oxygen bridge,
R_1 and R_2 are each methyl or ethyl, and
Z_3 and Z_4 together form a carbon-carbon-bond or are each hydrogen

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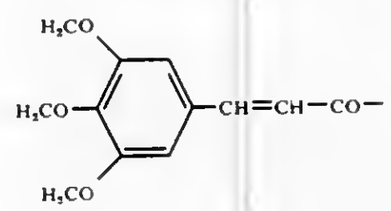
4,029,650

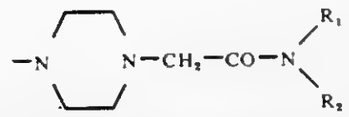
NOVEL DERIVATIVES OF N-(3,4,5-TRIMETHOXY CINNAMOYL)PIPERAZINE AND THE PROCESS FOR PREPARING THEM

Guy M. Raynaud, Paris; Bernard M. Pourrias, Meudon-la-Foret; Claude P. Fauran, and Michel J. Turin, both of Paris, all of France, assignors to Delalande S. A., Courbevoie, France

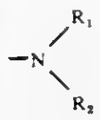
Filed Nov. 20, 1975, Ser. No. 633,932
Claims priority, application France, Nov. 20, 1974, 74.38203; Sept. 29, 1975, 75.29782
Int. Cl.² C07D *241/02, 403/06*
U.S. Cl. 260—240 J **8 Claims**

1. A compound having the formula





in which R_1 is alkyl having one to 4 carbon atoms and R_2 is dimethoxyphenylethyl, or



is piperidino, heptamethylenimino or 1,2,3,4-tetrahydro isoquinolino,
and the pharmacologically acceptable acid addition salts thereof.

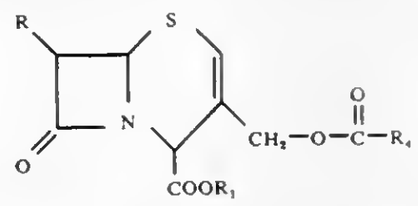
4,029,651

PROCESS FOR PREPARING 3-ACYLOXYMETHYL-2-CEPHEM COMPOUNDS

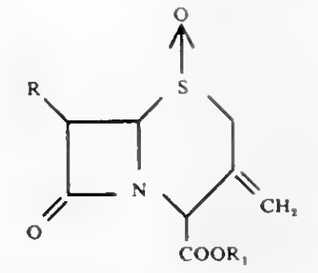
Gary A. Koppel, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Jan. 19, 1976, Ser. No. 650,583
Int. Cl.² C07D *501/04*
U.S. Cl. 260—243 C **13 Claims**

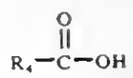
1. A process for preparing a compound of the formula



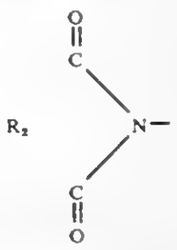
which comprises reacting a 3-exomethylenecepham sulfoxide of the formula



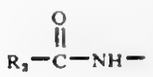
with a mixture of a carboxylic acid of the formula



and the corresponding anhydride of said carboxylic acid at a temperature of from about 70° C. to about 130° C., in which, in the above formulae, R_4 is C_1–C_4 alkyl, R_1 is a carboxylic acid protecting group, and R is
1. an imido group of the formula



in which R_2 is C_2-C_4 alkenylene or 1,2-phenylene;
2. an amido group of the formula

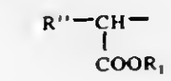


in which R_3 is
a. hydrogen, C_1–C_3 alkyl, halomethyl, benzyloxy, 4-nitrobenzyloxy, 2,2,2-trichloroethoxy, 4-methoxybenzyloxy, 3-(2-chlorophenyl)-5-methyl-isoxazol-4-yl;
b. the group R′ in which R′ is phenyl or phenyl substituted

with 1 or 2 halogens, nitro, cyano, trifluoromethyl, C_1–C_4 alkyl, or C_1–C_4 alkoxy;

c. a group of the formula $R'-(O)_m-CH_2-$ in which R' is as defined above and m is 0 or 1;

d. a group of the formula

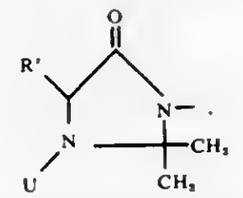


in which

R'' is R' as defined above, 2-thienyl, or 3-thienyl, and R_1 is as defined above; or

e. a group of the formula R'''—CH_2- in which R''' is 2-thienyl, 3-thienyl, 2-furyl, 3-furyl, 2-thiazolyl, 5-tetrazolyl, 1-tetrazolyl, or 4-isoxazolyl; or R is

3. an imidazolidinyl group of the formula



in which R' is as defined above and U is nitroso or acetyl.

4,029,652

TETRAHYDRO-3-(4-PYRIDYLMETHYL)-2H-1,3,5-THIADIAZINE-2-THIONE

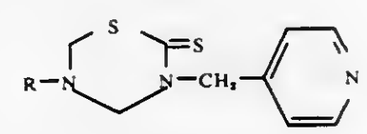
Thomas Andrew Lies, Princeton, and Herman Berenson, Trenton, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Mar. 10, 1976, Ser. No. 665,656

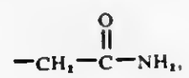
Int. Cl.² C07D *285/34*

U.S. Cl. 260—243 R **5 Claims**

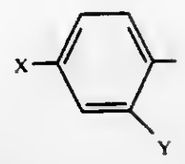
1. A compound of formula:



wherein R is selected from the group consisting of alkyl C_1–C_{12}, $-CH_2COOH$, $-CH_2COONa$,



and the radical:



wherein X is selected from the group consisting of hydroxy, hydroxy and chloro, Y is selected from group consisting of hydrogen and methyl.

4,029,653

7-METHOXY 7-ALPHA-UREIDOTHIENYLACETAMIDOCEPHALOSPORINS

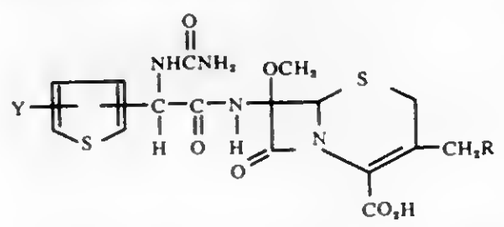
Joseph Edward Dolfini, Princeton, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 390,838, Aug. 23, 1973, Pat. No. 3,978,051. This application May 19, 1976, Ser. No. 687,585

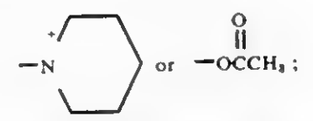
Int. Cl.² C07D *501/20*

U.S. Cl. 260—243 C **11 Claims**

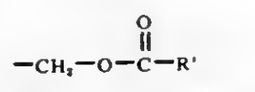
1. A compound of the formula:



wherein the 7-methoxy group occupies the α-configuration; R is H,



Y is H, Cl, Br, No_2 or methylsulfonyl; and a pharmaceutically acceptable salt thereof; straight or branched chain alkyl esters of 1 to 3 carbon atoms thereof; tertiary butyl ester thereof; benzhydryl ester thereof; trichloroethyl ester thereof, and acyloxymethyl esters thereof having the formula



wherein R' is lower alkyl of 1 to 5 carbon atoms, phenyl, benzyl or phenethyl.

4,029,654

7-METHOXY PHENYLUREIDOCEPHALOSPORINS

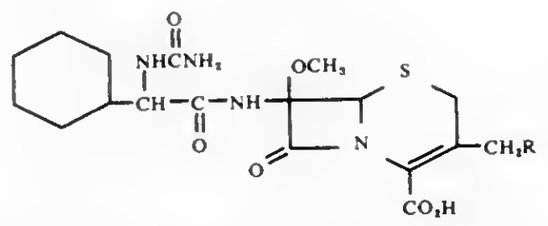
Joseph Edward Dolfini, Princeton, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 356,678, May 2, 1973, Pat. No. 3,989,697. This application June 25, 1976, Ser. No. 700,255

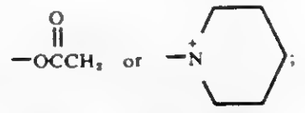
Int. Cl.² C07D *501/20*

U.S. Cl. 260—243 C **8 Claims**

1. A compound of the formula

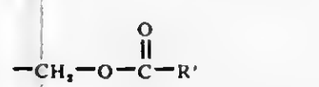


wherein the 7-methoxy group is in the α-configuration; R is H,



and a pharmaceutically acceptable salt thereof, a straight or

branched chain alkyl ester of 1 to 3 carbon atoms thereof, or an acyloxymethyl ester thereof having the formula



wherein R' is lower alkyl of 1 to 5 carbons, phenyl, benzyl or phenethyl.

4,029,655

METHOD OF PREPARING STABLE STERILE CRYSTALLINE CEPHALOSPORINS FOR PARENTERAL ADMINISTRATION

Michael D. Cise, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Apr. 11, 1975, Ser. No. 567,224

Int. Cl.² C07D *501/12*

U.S. Cl. 260—243 C **11 Claims**

1. A method of preparing a sterile, essentially crystalline cephalosporin selected from the group consisting of cephalothin sodium, cephaloridine betaine and cefazolin sodium for reconstitution for parenteral administration comprising the steps of:

a. dissolving said cephalosporin in water;

b. filtering the solution from (a) through a sterilizing filter;

c. cooling the sterile filtrate from (b) rapidly to a temperture below at least −15° C. within an interval not longer than 3 hours;

d. warming the preparation from (c) to between <0° C. and about −10° C.;

e. maintaining the temperature of the preparation from (d) between <0° C. and about −10° C. until the nucleation of the crystals of said cephalosporin is substantially complete;

f. reducing the pressure of the environment in which the preparation from (e) is maintained to a maximum of 1mm absolute;

g. raising the temperature of the environment in which the preparation from (f) is maintained to a maximum of about 50° C., avoiding the melting of such preparation; and

h. subliming the water from the preparation from (g) until the resulting crystals of said cephalosporin have a moisture content of no more than 6.0 percent.

4,029,656

7-(α-SULFOACYLAMIDO) CEPHALOSPORANIC ACIDS

Toshihiro Ishiguro, Suita; Takeshi Fugono, Kawanishi, and Hiroaki Nomura, Mino, all of Japan, assignors to Takeda Chemical Industries, Ltd., Japan

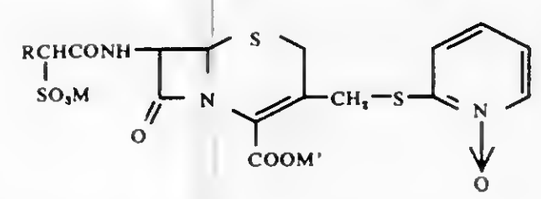
Division of Ser. No. 547,169, Feb. 5, 1975, Pat. No. 3,988,327, which is a continuation of Ser. No. 113,935, Feb. 9, 1971, abandoned. This application Aug. 4, 1976, Ser. No. 711,565

Claims priority, application Japan, Feb. 11, 1970, 45-11620

Int. Cl.³ C07D *501/50, 501/54*

U.S. Cl. 260—243 C **8 Claims**

1. A compound represented by the following formula:



wherein

R is a hydrogen atom, alkyl having 1–6 carbons atoms or phenyl;

M and M' may be the same as or different from each other, and are each a hydrogen atom, a non-toxic alkali metal, a non-toxic alkaline earth metal or a pharmaceutically acceptable non-toxic amine.

4,029,657

6,7-DICHLORO-3,4-DIHYDRO-2H-PYRAZINO(2,3-B)(1,4)OXAZINES

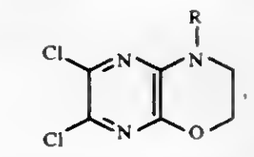
Thomas J. Dietsche, Berkeley, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Filed June 14, 1976, Ser. No. 695,711

Int. Cl.² C07D *265/00, 273/00, 295/00;* **A01N** *9/00*

U.S. Cl. 260—244 R **10 Claims**

1. A dichloropyrazino-oxazine of the formula:



wherein R is H, alkyl of 1–8 carbons, alkenyl of 2–8 carbons, cycloalkyl of 3–8 carbons or a cycloalkenyl radical of 4 to 8 carbons.

4,029,658

MONOMERIC MORPHOLINIUM EMULSION STABILIZERS

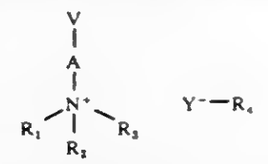
Carlos M. Samour, Wellesley Hills, Mass., assignor to The Kendall Company, Walpole, Mass.

Division of Ser. No. 452,073, March 18, 1974, Pat. No. 3,925,442, which is a continuation of Ser. No. 110,588, Jan. 28, 1971, abandoned, which is a continuation-in-part of Ser. No. 769,355, Oct. 21, 1968, abandoned. This application June 2, 1975, Ser. No. 582,685

Int. Cl.² C07D *295/00*

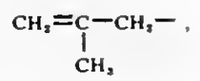
U.S. Cl. 260—247.1 E **2 Claims**

1. A monomeric emulsion stabilizer capable of stabilizing the polymerization of ethylenically-unsaturated monomers in a copolymerization reaction, corresponding to the formula:



wherein

V-A is selected from the group consisting of allyl, $CH_2{=}CH{-}CH_2-$ and methallyl,



R_1, R_2, and R_3 are selected from the class consisting of compounds wherein R_1 is an alkyl group of from 1 to 4 carbon atoms and R_2, R_3 are valence bonds of a morpholine ring,

and Y^- R_4 is an anionic group selected from the class consisting of alkyl sulfates wherein the alkyl group contains from 8 to 28 carbon atoms, and alkylphenoxypolyethyleneoxy ethanol sulfates of the formula

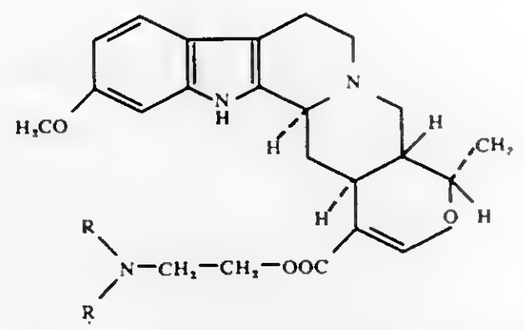
wherein
m is 0 to 40 and the alkyl group L contains from 8 to 28 carbon atoms.

4,029,659
N-DISUBSTITUTED AMINOETHYL ESTERS OF 11-METHOXY-RAUBASINIC ACID

Jean Alfred Alphonse Joseph Hannart, Brussels, Belgium, assignor to Omnium Chimique Societe Anonyme, Brussels, Belgium

Continuation of Ser. No. 238,818, March 28, 1972, abandoned. This application July 22, 1974, Ser. No. 490,436
Claims priority, application Belgium, Mar. 29, 1971, 764950; Mar. 17, 1972, 115227
Int. Cl.² C07D *491/22*
U.S. Cl. 260—247.2 B **9 Claims**

1. N-disubstituted aminoethyl ester of 11-methoxy-raubasinic acid of the formula :



in which R is an alkyl group containing up to 4 carbon atoms or the two R groups, together with the nitrogen atom to which they are attached, form a morpholinyl, piperidinyl, piperazinyl or pyrrolidinyl group, and their physiologically acceptable acid addition salts.

4,029,660
CRUDE CYANURIC ACID PURIFICATION

Sidney Berkowitz, Highland Park, N.J., assignor to FMC Corporation, Philadelphia, Pa.

Division of Ser. No. 511,447, Oct. 2, 1974, Pat. No. 3,969,352. This application Mar. 5, 1976, Ser. No. 664,244
Int. Cl.² C07D *251/32*
U.S. Cl. 260—248 A **4 Claims**

1. A novel free-flowing cyanuric acid composition having at least 90% cyanuric acid crystals with particle sizes between 700 and 800 microns and containing about 0.001% to about 0.1% sulfate values produced by a process for purifying crude cyanuric acid which comprises:

a. mixing in water sufficient amounts of crude cyanuric acid and a mono-substituted salt of a dibasic inorganic acid selected from the group consisting of ammonium bisulfate, sodium bisulfate and potassium bisulfate, to form a 10% to 25% crude cyanuric acid slurry containing about 10% to about 30% of said mono-substituted salt of a dibasic inorganic acid;
b. heating the slurry for about 15 seconds to about 10 minutes at a temperature of about 190° C to about 205° C under at least the autogenously developed pressure to digest the crude cyanuric acid impurities;
c. cooling the digested cyanuric acid slurry to precipitate the cyanuric acid crystals; and
d. recovering said cyanuric acid crystals from the digestion solution.

4,029,661
PROCESS FOR PRODUCING 5-FLUOROURACIL AND DERIVATIVES THEREOF IN ACID AND/OR ALCOHOL SOLVENTS

Paul D. Schuman, Hawthorne; Geraldine Westmoreland, and Roy Anderson, both of Gainesville, all of Fla., assignors to PCR, Inc., Gainesville, Fla.

Continuation-in-part of Ser. No. 186,443, Oct. 4, 1971. This application July 13, 1972, Ser. No. 271,489
Int. Cl.² C07D *239/54*
U.S. Cl. 260—256.4 C **24 Claims**

1. A process for the fluorination of pyrimidines, said process consisting essentially of reacting, in a solvent of the formula:

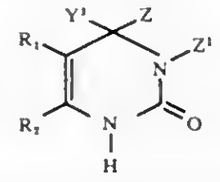
$CX''_2Y''—(CY''_2)_n—COOH$

or

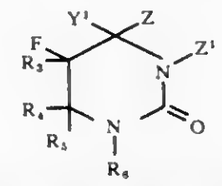
$CX_2Y—(CY_2)_n—CH_2OH$,

wherein X and Y are independently hydrogen, bromine, chlorine or fluorine, X'' and Y'' are independently bromine, chlorine, or fluorine, and *n* is an integer from 0 to 6,

at a temperature of about the solvent freezing point to about the solvent boiling point, a pyrimidine of the formula



with at least about a stoichiometric amount of gaseous fluorine to produce a compound of the formula:



wherein R_1 is hydrogen, fluorine, chlorine, bromine or lower alkyl, R_2 is hydrogen or lower alkyl, R_3 is R_1 or, taken with R_5, a 5,6-double bond, R_4 is hydrogen or lower alkyl, R_5 is

$CX_2Y—(CY_2)_n—CH_2O—$,

$CX''_2Y''—(CY''_2)_n—COO—$,

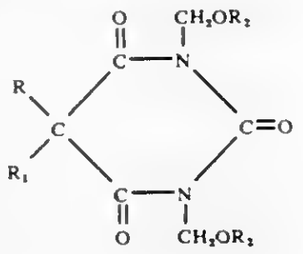
a 5,6-double bond when taken with R_3, or a 1,6-double bond when taken with R_6, R_6 is hydrogen or a 1,6-double bond when taken with R_5, Y^1 is $-NH_2$ and Z and Z^1 together are a 3,4-double bond or else Y^1 and Z taken with the 4-carbon atom, are carbonyl and Z^1 is hydrogen.

4,029,662
METHOD OF MAKING BARBITURIC ACID DERIVATIVES

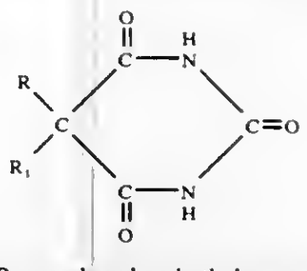
Julius A. Vida, Greenwich, Conn., assignor to Bristol-Myers Company, New York, N.Y.

Filed Apr. 30, 1976, Ser. No. 682,178
Int. Cl.² C07D *239/62*
U.S. Cl. 260—257 **7 Claims**

1. A process for the preparation of a barbituric acid derivative having the formula:



wherein R and R_1 are phenyl and ethyl respectively, or R and R_1 are individually or both alkyl or alkenyl, having 2 to 5 carbon atoms or cycloalkenyl having 5 to 7 carbon atoms, and each R_2 is the same and is an alkyl group having from 1 to 4 carbon atoms or benzyl, which process comprises reacting in one step a 5,5-disubstituted barbituric acid having the formula:



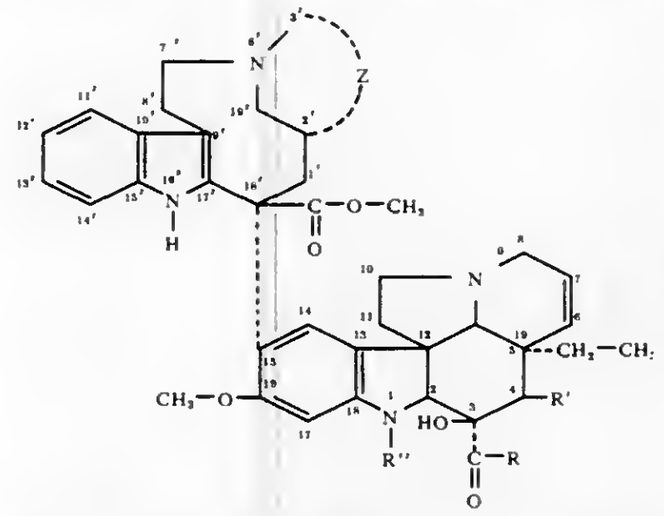
wherein R and R_1 are phenyl and ethyl respectively, or R and R_1 are individually or both alkyl or alkenyl, having 2 to 5 carbon atoms or cycloalkenyl having 5 to 7 carbon atoms, with at least 2 moles of a dialkoxymethane or a dibenzyloxymethane per mole of said barbituric acid and an at least equimolar amount of anhydrous stannic chloride based on the amount of said barbituric acid.

4,029,663
DIMERIC ANHYDRO-VINCA DERIVATIVES

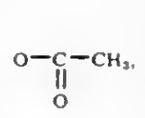
Gerald E. Gutowski, and Jean C. Miller, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed July 10, 1975, Ser. No. 594,915
Int. Cl.² C07D *519/04*
U.S. Cl. 260—287 B **8 Claims**

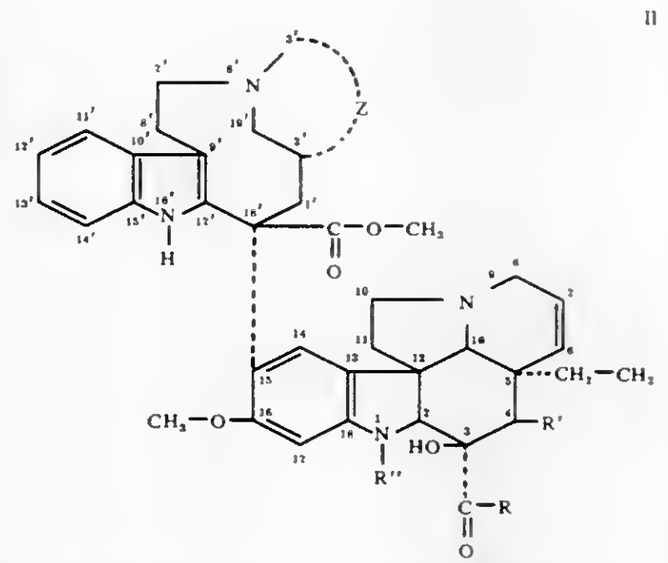
1. The compound represented by the formula



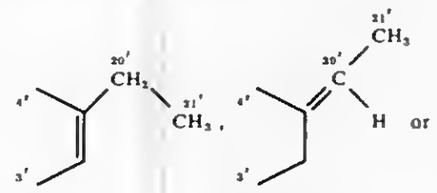
wherein R is OCH_3, NH_2, $NH—NH_2$, NHC_2H_5, $NH—C_2H_4OH$ or $NHCH_3$, NHC_2H_5, $NH—C_2H_4OH$ R' is OH or



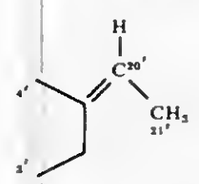
R'' is CH_3H or CHO, and one of R''' and R'''' is ethyl, the other being hydroxy, with cold concentrated sulfuric acid to form a compound of the formula



wherein R is OCH_3, NH_2, $NHCH_3$, NHC_2H_5, $NH—C_2H_4OH$ or $NH—NH_2$; R'' is CH_3, H, or formyl; R' is hydroxy or acetoxy and Z is



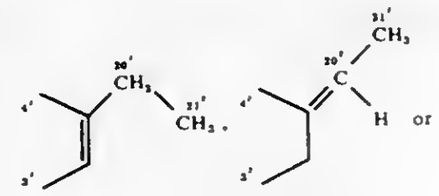
IIIa IIIb (isomer 1)



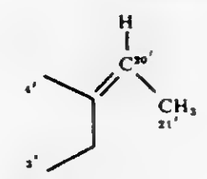
IIIc (isomer 2)

II

wherein R is OCH_3, NH_2, $NHCH_3$, or $NH—NH_2$; R'' is CH_3 or CHO; R' is hydroxy and Z is



IIIa IIIb (isomer 1)



IIIc (isomer 2)

4,029,664

PROCESS FOR INTERCONVERSION OF HETEROYOHIMBANE ALKALOIDS

Cesare Casagrande, Como, and Giorgio Ferrari, Milan, both of Italy, assignors to Siphar S.A., Lugano, Switzerland

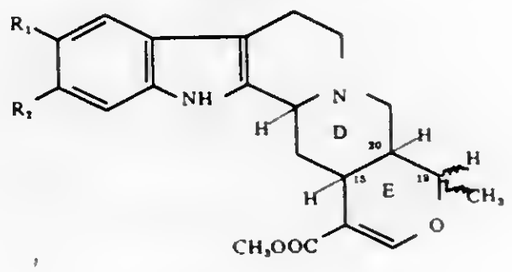
Filed July 6, 1976, Ser. No. 702,925

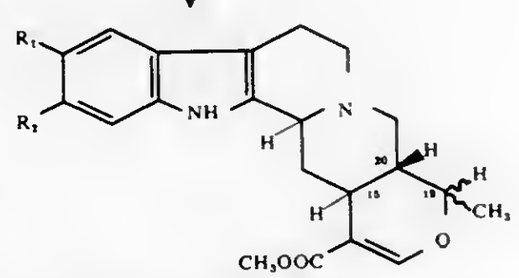
Claims priority, application Switzerland, July 7, 1975, 8846/75

Int. Cl.² C07D *491/14*

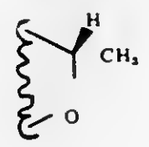
U.S. Cl. 260—293.53 **13 Claims**

1. A process for the interconversion of alkaloids of the group of the heteroyohimbanes having formula

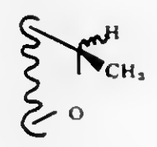




wherein R_1 and R_2 represent hydrogen or a methoxy group and the substituents at the C-19 atom indicate either the beta orientation of the hydrogen atom and the alpha orientation of the methyl group or viceversa, to obtain corresponding alkaloids having formula



3



4

having inverted asymmetry center at C-20, comprising the steps of:

a. opening of the ring E;

b. oxidation to a carbonyl group of the carbon atom at C-19;

c. epimerization with inversion of the center C-20; and

d. restoration of the ring E.

4,029,665

8-ARALKYL-1,4-ETHANO-5H-[1]BENZOPYRANO[3,4-B]PYRIDINES

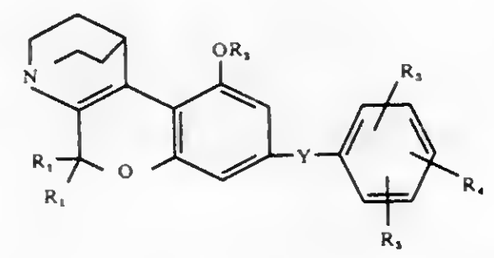
Martin Winn, Deerfield, Ill., assignor to Abbott Laboratories, North Chicago, Ill.

Continuation-in-part of Ser. No. 345,943, April 2, 1973, abandoned. This application Mar. 7, 1975, Ser. No. 556,238

Int. Cl.² C07D *405/14*

U.S. Cl. 260—293.53 **4 Claims**

1. A compound of the formula



wherein each R_1 is loweralkyl; R_2 is hydrogen or loweralkyl; Y is a straight or branched chain alkylene group having from one to ten carbon atoms and each R_3, R_4 and R_5 are the same or different members of the group consisting of hydrogen, halo, trifluoromethyl, loweralkyl, or N,N-diloweralkylamino; and the pharmaceutically acceptable salts thereof.

4,029,666

BENZENESULFONYL-UREAS AND PROCESS FOR PREPARING THEM

Helmut Weber, Frankfurt am Main; Walter Aumuller; Karl Muth, both of Kelkheim, Taunus; Rudi Weyer, Frankfurt am Main, and Felix Helmut Schmidt, Mannheim, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

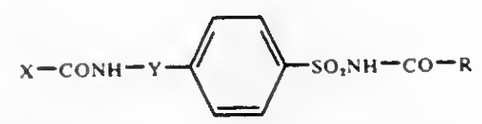
Continuation-in-part of Ser. No. 750,005, Aug. 5, 1968, abandoned. This application Dec. 8, 1971, Ser. No. 206,190

Claims priority, application Germany, Aug. 9, 1967, 53180

Int. Cl.² C07D *211/06*

U.S. Cl. 260—293.73 **4 Claims**

1. Benezenesulfonyl-urea of the formula



wherein X is 2-methoxy-5-chlorophenyl, Y is $-CH_2CH_2-$ and R is N,N-3,3-dimethyl-pentamethylene.

4,029,667

CERTAIN 1-CARBOTHIOAMIDES OF 1,8-NAPHTHYRIDINES, PYRROLO(2,3-b)PYRIDINES AND PYRIDO(2,3-b)AZEPINES

Adrian Charles Ward Curran, Newcastle upon-Tyne, England, assignor to John Wyeth & Brother Limited, Maidenhead, England

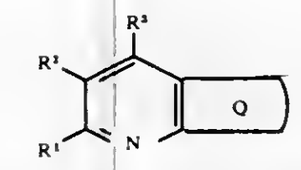
Division of Ser. No. 553,964, Feb. 28, 1975, Pat. No. 3,960,876. This application Mar. 29, 1976, Ser. No. 671,519

Claims priority, application United Kingdom, Mar. 5, 1974, 9764/74; July 12, 1974, 30935/74

Int. Cl.² C07D *471/04*

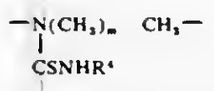
U.S. Cl. 260—294.8 C **4 Claims**

1. A compound of formula (I)



(I)

or a pharmaceutically acceptable acid addition salt thereof wherein R^1, R^2 and R^3 are the same or different and represent a hydrogen atom or a loweralkyl, phenylloweralkyl or, phenyl radical, any of which radicals may be substituted by loweralkyl, loweralkoxy, halogen, nitro or trifluoromethyl, Q is the group



wherein N of said group is directly attached to the alpha carbon of the pyridine ring, *m* is 1, 2, or 3 and the group Q may be substituted by loweralkyl, phenylloweralkyl, or phenyl radicals any of which radicals may be substituted by lower alkyl, lower alkoxy, halogen, nitro or trifluoromethyl and R^4 is alkyl of 1–3 carbon atoms substituted by loweralkanoyl, benzoyl or halobenzoyl.

4,029,668

CYCLOPENTENO[b]PYRIDINE DERIVATIVES

Adrian Charles Ward Curran, South Cave; Roger Crossley, Reading, and David George Hill, Cookham, all of England, assignors to John Wyeth & Brother Limited, Taplow, England

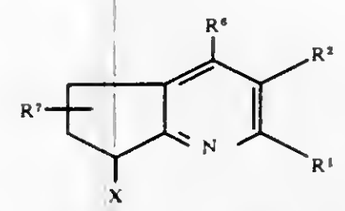
Continuation-in-part of Ser. No. 600,257, July 30, 1975, which is a continuation-in-part of Ser. No. 460,265, April 11, 1974, abandoned, which is a continuation-in-part of Ser. No. 403,289, Oct. 3, 1973, abandoned. This application Oct. 20, 1975, Ser. No. 624,039

Claims priority, application United Kingdom, Oct. 21, 1972, 48595/72; Feb. 4, 1974, 4950/74; Mar. 27, 1974, 13513/74; Mar. 27, 1974, 13515/74; Apr. 5, 1974, 15123/74; Apr. 3, 1975, 15123/74; Mar. 19, 1975, 13515/74

Int. Cl.² C07D *471/02*

U.S. Cl. 260—295 T **7 Claims**

1. A compound of formula I



and acid addition salts thereof with pharmaceutically acceptable acids, wherein R^1, R^2 and R^6 are the same or different and are selected from hydrogen, trifluoromethyl, alkyl containing from 1 to 6 carbon atoms, phenylalkyl wherein the alkyl group has 1–6 carbon atoms, or phenyl groups or R^1 and R^2 taken together represent a polymethylene chain of 3 to 5 carbon atoms, R^7 represents hydrogen or 1 or 2 groups selected from alkyl of 1 to 6 carbon atoms (which may be substituted by alkoxy of 1 to 6 carbon atoms or trifluoromethyl), phenylalkyl wherein the alkyl group has 1 to 6 carbon atoms and phenyl groups, X is $CONHR^2$ or CO_2R^2 wherein R^2 is hydrogen or alkyl of 1 to 6 carbon atoms and R^5 is hydrogen, alkyl of 1–6 carbon atoms or phenylalkyl wherein the alkyl portion has 1–6 carbon atoms and any of the phenyl or the phenyl portion of any phenylalkyl groups R^1, R^2, R^5, R^6 and R^7 may be substituted by alkyl of 1 to 6 carbon atoms, lower alkoxy of 1 to 6 carbon atoms, halogen, nitro or trifluoromethyl and metal salts of compounds wherein R^2 is hydrogen with the provisos that (1) when R^1 and R^2 or R^2 and R^6 are both alkyl they are selected from normal and secondary alkyl groups and (2) when two alkyl R^7 groups are present on the same carbon atom then they are both n-alkyl groups and when two R^7 alkyl groups are present on adjacent carbon atoms they are selected from normal and secondary alkyl groups.

4,029,669

6-BENZALIMINO-6-ARYLTHIO PENICILLANIC ACIDS AND DERIVATIVES THEREOF

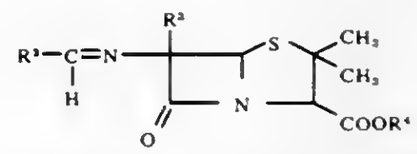
Joseph E. Dolfini; Ekkebard Bohme, both of Cincinnati, Ohio, and William A. Slusarchyk, Belle Mead, N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 500,435, Aug. 26, 1974, Pat. No. 3,965,093, which is a division of Ser. No. 183,642, Sept. 24, 1971, Pat. No. 3,855,233. This application Apr. 9, 1976, Ser. No. 675,393

Int. Cl.² C07D *499/02*

U.S. Cl. 260—306.7 C **2 Claims**

1. A compound of the formula



wherein R^3 is phenylthio or nitrophenylthio; R^4 is hydrogen, lower alkyl, benzyl, benzhydryl, methoxybenzyl, trimethylsilyl or trichloroethyl; and R^9 is phenyl or substituted phenyl wherein said substituent is selected from the group consisting of halogen, lower alkoxy, hydroxy, nitro, amino, and lower alkyl.

4,029,670

POLYCHROMOPHORIC HETEROCYCLIC ULTRAVIOLET STABILIZERS

David M. Pond; William C. Dickason, and Edward U. Elam, all of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sept. 19, 1975, Ser. No. 615,033

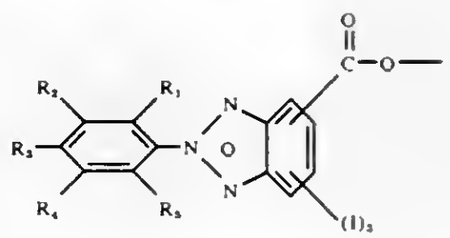
Int. Cl.² C07D *249/20*

U.S. Cl. 260—308 B **8 Claims**

1. A polychromophoric compound having the formula:

$(A)_x—C$

where A is a group having the structure



(I)$_3$

wherein

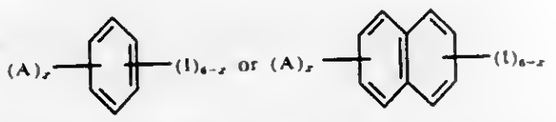
R_1, R_2, R_3, R_4 and R_5 are hydrogen, chloro, bromo, fluoro, lower alkyl, cycloalkyl, phenyl, lower alkylphenyl, phenyl-substituted-phenyl, alkoxy, phenoxy, dilower alkyl substituted amino, cyano, carboalkoxy and the substituents R_1 and R_2, R_2 and R_3, and R_3 and R_4, combined with the carbon atoms to which they are attached, are joined alkylene groups completing a carbocyclic ring, which ring can also be substituted with one or more of the substituents listed above for R_1, R_2, R_3 and R_4;

l is the same as R_1, R_2, R_3 and R_4 and is present on all positions of the benzenoid ring, except the carbon atom attached to the heterocyclic ring and the carbon atom attached to the carbonyl group connecting the heterocyclic aromatic A group with the aromatic C group, at least one l substituent on one of the carbon atoms adjacent to said carbon atom attached to said carbonyl group is hydrogen and said remaining l substituents can all be the same or different;

x is an integer of 1 to 4; and

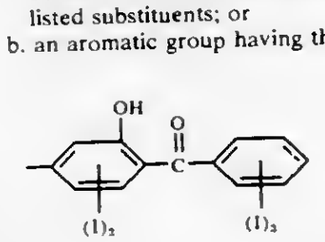
C is:

a. an aromatic group having the formula



where l is the same substituent as listed above and is present in all positions of the benzenoid ring except the carbon atom attached to the carbonyl group connecting the A and C moieties, and said l substituents can all be one of the substituents listed above or different listed substituents; or

b. an aromatic group having the formula



4,029,671

3-[(5-NITRO-2-IMIDAZOLYL)PYRAZOL-5-YL]OXAMIC ACID DERIVATIVES

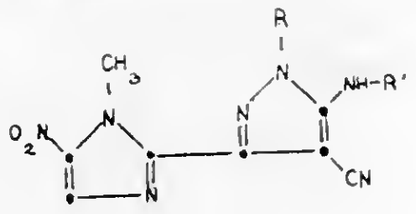
Henry Friedman, and Emily J. Canada, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Mar. 22, 1976, Ser. No. 668,874

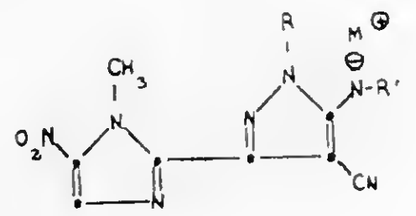
Int. Cl.² C07D *233/95*

U.S. Cl. 260—310 R **6 Claims**

1. A compound selected from the group consisting of



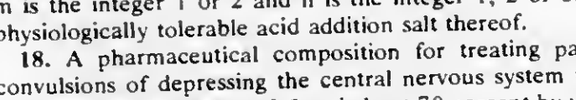
and



wherein

R is methyl;

R′ is selected from the group consisting of



and

M is an ion selected from the group consisting of Na^+ and K^+.

4,029,672

AMINOALKYLPYRROLOBENZOXAZALKANES

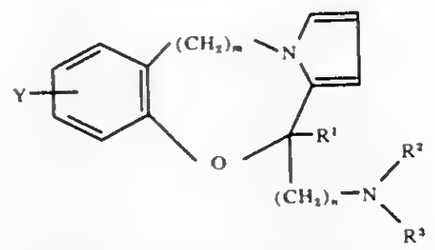
Richard C. Effland, Bridgewater; Larry Davis, Flemington, both of N.J., and Wolfgang Schaub, Kelkheim, Germany, assignors to American Hoechst Corporation, Bridgewater, N.J.

Filed Feb. 26, 1976, Ser. No. 661,505

Int. Cl.² C07D *273/00*; **A61K** *31/395*

U.S. Cl. 260—326.5 B **18 Claims**

1. A compound of the formula



wherein Y is hydrogen, halogen, alkoxy of 1 to 4 carbon atoms, alkyl of 1 to 4 carbon atoms, trifluoromethyl, nitro or amino; R^1 is hydrogen or alkyl of 1 to 4 carbon atoms; R^2 is hydrogen, alkyl of from 1 to 5 carbon atoms, phenyl, cycloalkyl of from 3 to 6 carbon atoms, phenalkyl of the formula $C_6H_5(CH_2)_n$—, or cycloakylalkyl of from 4 to 7 carbon atoms; R^3 is alkyl of from 1 to 5 carbon atoms, phenyl, cycloalkyl of from 3 to 6 carbon atoms, phenalkyl of the formula $C_6H_5(CH_2)_n$—or cycloalkylalkyl of from 4 to 7 carbon atoms; m is the integer 1 or 2 and n is the integer 1, 2 or 3, or a physiologically tolerable acid addition salt thereof.

18. A pharmaceutical composition for treating pain or convulsions of depressing the central nervous system which comprises between about 0.5 and about 70 percent by weight of a compound defined in claim 1 as an essential active ingredient, the balance being a pharmaceutically accceptable carrier therefor.

4,029,673

N-(1-BENZYL PYRROLIDINYL 2-ALKYL) SUBSTITUTED BENZAMIDES AND DERIVATIVES THEREOF

Gerard Bulteau, Paris; Jacques Acher, Itteville, and Jean-Claude Monier, Lardy, all of France, assignors to Societe d'Etudes Scientifiques et Industrielles de l'Ile-de-France, Paris, France

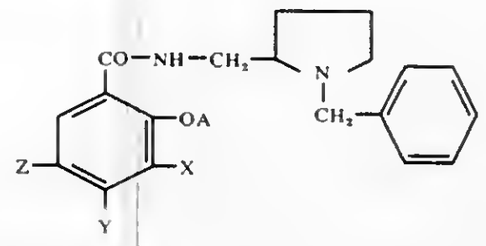
Filed Mar. 5, 1975, Ser. No. 555,376

Claims priority, application France, Mar. 5, 1974, 74.7535; Feb. 7, 1975, 75.3799

Int. Cl.² C07D *207/08*; **A61K** *31/405*

U.S. Cl. 260—326.47 **3 Claims**

1. A compound selected from the class consisting of substituted benzamides and their pharmaceutically acceptable salts, said substituted benzamides having the formula:



in which:

A is alkyl having 1 to 5 carbon atoms;

X is hydrogen or alkoxy having 1 to 5 carbon atoms;

Y is hydrogen or amino;

Z is hydrogen, halogen, sulfamoyl, alkylsulfamoyl or alkylsylfonyl having 1 to 5 carbon atoms, at least one of X, Y and Z being other than hydrogen, being N-(1′-benzylpyrrolidinyl 2′-methyl) 2-methoxy 4-amino 5-methylsulfamoylbenzamide or N-(1′-benzylpyrrolidinyl 2′-methyl) 2,3-dimethoxy 5-methylsulfamoylbenzamine.

4,029,674

2-OXO-2H CYCLOPENTA[b]FURANS

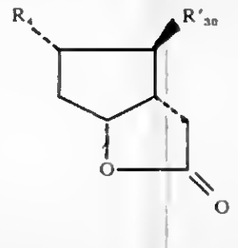
Frank Kienzle, Therwil, Switzerland, and Perry Rosen, North Caldwell, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 381,322, July 20, 1973, abandoned, which is a continuation-in-part of Ser. No. 300,633, Nov. 25, 1972, abandoned. This application Sept. 15, 1975, Ser. No. 613,682

Int. Cl.² C07D *307/77*

U.S. Cl. 260—343.3 R **5 Claims**

1. A compound of the formula



wherein R_4 is hydrogen, lower alkyl, carboxy or carboxy protected with a conventional group convertible thereto by hydrolysis; R'_{30} is selected from the group consisting of —CHO, —CH=NH, —C≡N, —CH=NOH, —CH_2NHX, —CH_2NH_2 and —CH_2NO_2; and X is chlorine or bromine;

or enantiomers, racemates or salts thereof.

4,029,675

PROCESS FOR PREPARATION OF LACTONE-ESTERS

Albert L. Williams, and El-Ahmadi I. Heiba, both of Princeton, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Aug. 13, 1975, Ser. No. 604,298

Int. Cl.² C07D *307/32*

U.S. Cl. 260—343.6 **4 Claims**

1. A process for the continuous preparation of lactose-esters which comprises: passing a liquid feed of a C_n–C_{300} branched-chain alkenylsuccinic anhydride containing a chain, wherein branching is derived from C_3 to C_{10} olefins, and an alcohol or thiol selected from the group consisting of methyl alcohol, hexyl alcohol, trimethylolpropane, octanethiol, ethyl alcohol, n-butyl alcohol, isopropyl alcohol and cyclohexanol in a hydrocarbon solvent through a packed bed of a sulfonated styrene-divinylbenzene copolymer exchange resin catalyst, in a reaction zone, said reaction zone being maintained at a pressure from about 1 to about 20 atmospheres and at a temperature from about 120° C to about 160° C.

4,029,676

ESTERS OF TETRAHYDRONAPHTHYLOXY-AMINOPROPANOLS

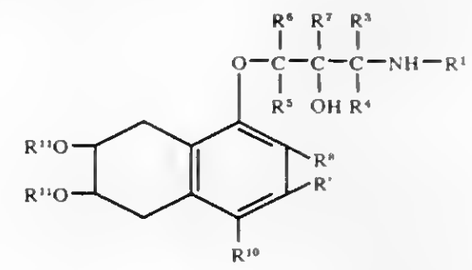
Frederic P. Hauck, Somerville; Christopher M. Cimarusti, Hamilton, and Venkatachala L. Narayanan, Hightstown, all of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 203,865, Dec. 1, 1971, Pat. No. 3,935,267, which is a continuation-in-part of Ser. No. 48,458, June 22, 1970, abandoned. This application Nov. 6, 1975, Ser. No. 629,734

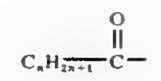
Int. Cl.² C07C *93/00*; **C07D** *307/62*

U.S. Cl. 260—343.7 **6 Claims**

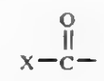
1. A compound having the formula



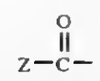
or a pharmaceutically acceptable salt thereof, wherein R^1 is lower alkyl; R^3, R^4, R^5, R^6 and R^7 are the same or different and are hydrogen or lower alkyl; R^8, R^9 and R^{10} are the same or different and are hydrogen, lower alkyl, lower alkoxy, or monocyclic cycloalkyl having 3 to 6 carbon atoms; and R^{11} is an acyl group of the type



wherein n is an integer of from 1 to 11,



wherein X is monocyclic aryl, or



wherein Z is monocyclic aryl-lower alkyl; wherein lower alkyl and lower alkoxy are groups having 1 to 8 carbon atoms and monocyclic aryl is phenyl, lower alkyl phenyl, di(lower alkyl)-phenyl, halophenyl, nitrophenyl, dinitrophenyl, or trinitrophenyl.

4,029,677

SPIRODIPYRANS USEFUL AS DYE PRECURSORS FOR COPYING PROCESSES

Hans Baumann, and Andreas Oberlinner, both of Ludwigshafen, Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

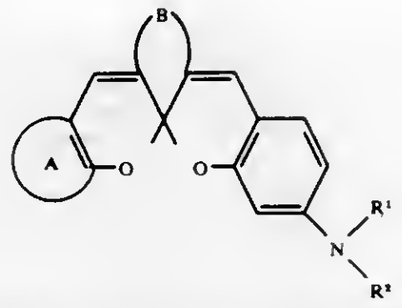
Filed June 5, 1975, Ser. No. 584,066

Claims priority, application Germany, June 26, 1974, 2430568

Int. Cl.² C07D *311/02*, *311/72*

U.S. Cl. 260—345.2 **10 Claims**

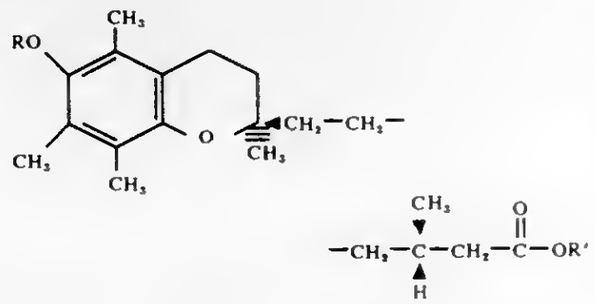
1. A spirodipyran of the formula



in which A is the benzene nucleus or a benzene nucleus substituted by 1 or 2 alkyl of 1 to 4 carbon atoms or one chlorine, bromine or alkoxy of 1 to 4 carbon atoms, B is diemthylene, trimethylene or tetramethylene substituted by from 1 to 3 alkyl of a total of 1 to 12 carbon atoms and R^1 and R^2 are identical or different alkyl, each of 1 to 6 carbon atoms.

4,029,678
ASYMMETRIC SYNTHESIS
Ka-Kong Chan, Stanhope, and Gabriel Saucy, Essex Fells, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.
Filed Dec. 8, 1975, Ser. No. 638,382
Int. Cl.² C07D *311/72*
U.S. Cl. 260—345.5 **3 Claims**

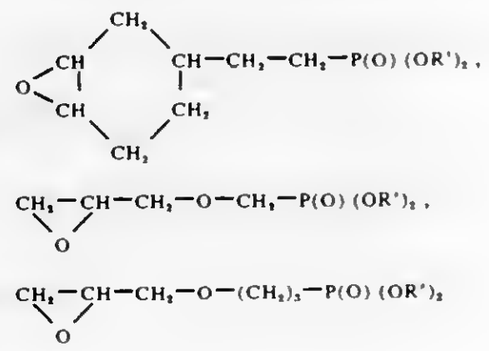
1. A compound of the formula



wherein R is lower alkanoyl, benzyl, benzyhydryl or trityl wherein R′ is hydrogen or lower alkyl.

4,029,679
ORGANOPHOSPHONIC ACIDS OR ESTERS CONTAINING AN EPOXY GROUP
Hans-Joachim Kötzsch; Claus-Dietrich Seiler, both of Rheinfelden, and Hans-Joachim Vahlensieck, Wehr, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany
Filed Aug. 30, 1974, Ser. No. 502,125
Claims priority, application Germany, Sept. 1, 1973, 2344197
Int. Cl.² C07F *9/40*
U.S. Cl. 260—348 R **4 Claims**

1. A compound selected from one of the following formulae:



wherein R′ is hydrogen, a branched or unbranched chained alkyl radical of 1 to 12 carbon atoms.

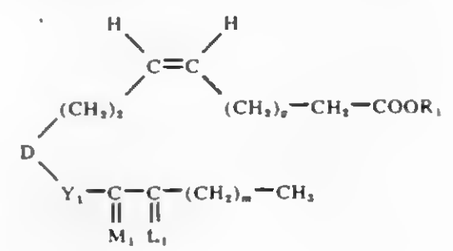
4,029,680
PROCESS FOR THE PREPARATION OF DIAMINO-DIHYDROXY ANTHRAQUINONE DISPERSE DYESTUFFS
Günter Gehrke, Cologne, and Reinold Schmitz, Blecher, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany
Filed July 25, 1975, Ser. No. 599,017
Claims priority, application Germany, Aug. 3, 1974, 2437523
Int. Cl.² C07C *97/26*
U.S. Cl. 260—380 **13 Claims**

1. Process for the preparation of anthraquinone disperse dyestuffs from aqueous solutions containing anthraquinone sulfonic acid mixtures comprising

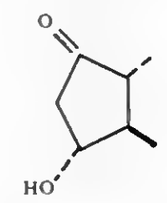
a. treating anthraquinone sulfonic acid waste waters arising from the sulfonation of anthraquinone by the Fischer treatment comprising halogenation with bromine or activated chlorine to form sparingly soluble halogenoanthraquinones;
b. isolating and dinitrating the halogenoanthraquinones to form dinitro halogenoanthraquinones;
c. warming the dinitro halogenanthraquinones with elementary sulfur in sulfuric acid having an SO_3 content of 0 to 20% at temperatures of from 70–170° C to obtain diaminodihydroxy anthraquinone derivatives.

4,029,681
13,14-DIDEHYDRO-PG ANALOGS
Herman W. Smith, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.
Filed Feb. 13, 1976, Ser. No. 657,739
Int. Cl.² C07C *177/00*
U.S. Cl. 260—408 **73 Claims**

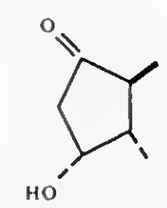
1. A prostaglandin analog of the formula:



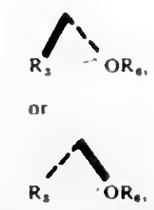
wherein O is



or

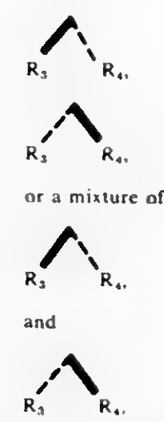


wherein Y_1 is $-C\equiv C-$;
wherein g is one, two, or 3;
wherein m is one to 5, inclusive;
wherein M_1 is



wherein R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hydrogen;

wherein L_1 is



wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro;

wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation.

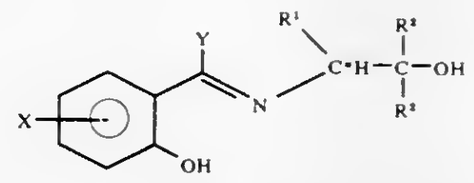
4,029,682
SOAPS AND ESTER-SOAPS OF α-OLEFIN DERIVED HIGH MOLECULAR WEIGHT ACIDS
Harold C. Foulks, Jr., Newport, Ky., assignor to Emery Industries, Inc., Cincinnati, Ohio
Filed Dec. 23, 1974, Ser. No. 535,603
Int. Cl.² C07C *51/09, 51/00;* **C08K** *5/09;* **C11C** *3/02*
U.S. Cl. 260—414 **10 Claims**

1. A soap of a mixed straight-chain aliphatic monocarboxylic acid obtained by the ozonization of a C_{22+} α-olefin wherein at least 90% by weight of the olefins contain 22 or more carbon atoms, said mixed acid containing less than 30% by weight acids having fewer than 21 carbon atoms, less than 20% by weight acids having greater than 35 carbon atoms and 55% by weight or more $C_{21\text{-}35}$ acids with the weight ratio of odd to even carbon content acids in the $C_{21\text{-}35}$ range being between 1.5:1 and 10:1 and a metal selected from the group consisting of alkali metals, alkaline earth metals, amphoteric metals and heavy metals.

5. An ester-soap derived from an aliphatic hydroxylic compound having 2 to 25 carbon atoms and 1 to 10 primary or secondary hydroxyl groups and a mixed straight-chain aliphatic monocarboxylic acid obtained by the ozonization of a C_{22+} α-olefin wherein at least 90% by weight of the olefins contain 22 or more carbon atoms, said mixed acids containing less than 30% by weight acids having fewer than 21 carbon atoms, less than 20% by weight acids having greater than 35 carbon atoms and 55% by weight or more $C_{21\text{-}35}$ acids with the weight ratio of odd to even carbon content acids in the $C_{21\text{-}35}$ range being between 1.5:1 and 10:1, and partially saponified with a metal selected from the group consisting of alkali metals, alkaline earth metals, amphoteric metals and heavy metals, said ester-soap containing from about 0.5 to 2.5 weight percent of said metal.

4,029,683
COPPER COMPLEX
Tadatoshi Aratani; Shuzo Nakamura; Tsuneyuki Nagase, and Yukio Yoneyoshi, all of Takatsuki, Japan, assignors to Sumitomo Chemical Company, Limited, Japan
Division of Ser. No. 549,034, Feb. 11, 1975, which is a continuation-in-part of Ser. No. 442,413, Feb. 14, 1974, abandoned. This application Dec. 29, 1975, Ser. No. 645,541
Claims priority, application Japan, Feb. 14, 1973, 48-18642; June 20, 1973, 48-69997; June 20, 1973, 48-69998
Int. Cl.² C07F *1/08*
U.S. Cl. 260—438.1 **7 Claims**

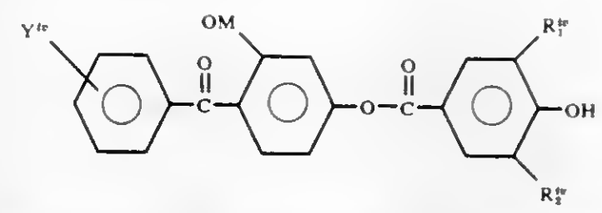
1. A compound which is a copper complex coordinated with a chiral Schiff base of the formula:



wherein C is an asymmetric carbon atom, R^1 is selected from the group consisting of (a) alkyl groups whose carbon atom number is 1–10, and (b) aralkyl groups with or without alkoxy substituent(s), whose total carbon atom number is 7–20, R^2 is selected from aryl groups with alkoxy substituent(s), whose total carbon atom number is 7–30, X is selected from the group consisting of (a) hydrogen, (b) alkyl groups having 1–10 carbon atoms, (c) phenyl group, (d) alkoxy groups having 1–10 carbon atoms, (e) halogen atoms, (f) nitro, or X is benzo which together with the ring to which it is attached forms a naphthalene ring, and Y is a hydrogen atom.

4,029,684
2-HYDROXYBENZOPHENONE DERIVATIVES
Lajos Avar, Binnigen, and Kurt Hofer, Muchenstein, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland
Continuation of Ser. No. 377,749, July 9, 1973, abandoned. This application May 16, 1975, Ser. No. 578,108
Int. Cl.² C07C *69/88;* **C07F** *7/24, 1/04, 15/04*
U.S. Cl. 260—439 R **9 Claims**

1. A compound of the formula:



wherein Y^{te} is hydrogen, fluorine, chlorine, bromine or alkyl of 1 to 9 carbon atoms,
R_1^{te} is tertiary butyl,
R_2^{te} is tertiary alkyl of 4 to 9 carbon atoms, and
M is hydrogen, an alkali metal or one equivalent of divalent nickel, zinc, manganese, copper, cobalt, lead, titanium or calcium.

4,029,685

PEROXY ESTERS OF PYROMELLITIC ACID

Duane B. Priddy, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Aug. 15, 1973, Ser. No. 388,526
Int. Cl.² C07C *179/18*
U.S. Cl. 260—453 RZ **2 Claims**

1. Tetra-tert-alkylperoxy pyromellitate wherein the alkyl groups are of 4–8 carbon atoms.

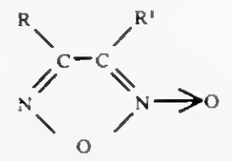
4,029,686

PRODUCTION OF ISOCYANATES

John Crosby; Robert Allan Campbell Rennie, both of Runcorn, England, and Robert Michael Paton, Edinburgh, Scotland, assignors to Imperial Chemical Industries Limited, London, England

Filed Dec. 8, 1975, Ser. No. 638,655
Claims priority, application United Kingdom, Dec. 11, 1974, 53551/74,
Int. Cl.² C07C *118/00, 119/45*
U.S. Cl. 260—453 P **7 Claims**

1. A process for the production of an organic isocyanate which comprises heating a furoxan in the presence of sulphur dioxide to give an isocyanate wherein the furoxan has the formula:



where R and R^1, which may be the same or different, are either separate aliphatic or aromatic hydrocarbon groups containing from 1 to 18 carbon atoms or, alternatively, R and R^1 form part of a second ring system fused to the furoxan ring, the furoxan being one which ring opens on heating to a temperature below 180° C.

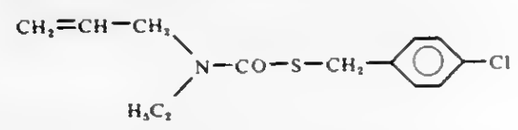
4,029,687

THIOLCARBAMATES FOR COMBATING UNDESIRED PLANT GROWTH

Werner Toepfl, Basel, Switzerland, assignor to Ciba-Geigy AG, Basel, Switzerland

Continuation of Ser. No. 84,465, Oct. 27, 1970, abandoned.
This application Dec. 8, 1975, Ser. No. 638,499
Claims priority, application Switzerland, Nov. 3, 1969, 16351/69
Int. Cl.² C07C *155/02*
U.S. Cl. 260—455 A **2 Claims**

1. The compound of the formula



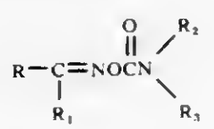
4,029,688

CARBAMIC PESTICIDAL COMPOSITIONS

Themistocles D. J. D'Silva, South Charleston, W. Va., assignor to Union Carbide Corporation, New York, N.Y.

Filed June 27, 1974, Ser. No. 483,882
Int. Cl.² C07C *121/00, 121/417*
U.S. Cl. 260—465.4 **17 Claims**

1. A compound of the formula:



wherein:
R is:
lower alkyl or
lower alkyl substituted with one or more lower alkoxy, lower alkylthio, lower alkylsulfinyl, lower alkylsulfonyl, phenylthio, phenylsulfinyl, phenylsulfonyl or $R_4CON(R_5)$—, all of which may be substituted with one or more cyano, nitro, azido, chloro, bromo or fluoro substituents
R_1 is:
hydrogen,
chlorine,
bromine,
fluorine,
cyano,
substituted or unsubstituted lower alkyl having from 1 to 4 carbon atoms,
substituted or unsubstituted lower alkylthio,
substituted or unsubstituted lower alkoxy,
substituted or unsubstituted lower carboalkoxyalkylthio, or
substituted or unsubstituted lower alkylthioalkyl;
wherein the permissible substituents may be one or more chloro, bromo, fluoro, cyano or nitro groups;
R_2 is:
lower alkyl or
lower alkyl substituted with one or more chloro, bromo, fluoro, nitro, cyano, lower alkoxy or lower alkyl groups;
R_3 is:
perhalomethanesulfenyl or
perhaloethanesulfenyl wherein the halogen substituents are chloro, bromo or fluoro; and
R_4 is:
hydrogen or
lower alkyl;
R_5 is:
hydrogen or
lower alkyl; and
with the provisos that:
a. when R is alkyl, R_1 is:
substituted lower alkyl,
substituted lower alkylthio,
substituted or unsubstituted lower alkoxy,
substituted or unsubstituted lower carboalkoxyalkylthio, or
substituted or unsubstituted lower alkylthioalkyl;
b. when R_1 is hydrogen, R is other than lower monoalkylthioalkyl; and
c. a cyano group is present in at least one of the groups R, R_1 and R_2.

4,029,689

7-(3(S)-HYDROXY-5-OXOCYCLOPENT-1-ENE)HEPT-5-CIS-ENOIC ACID, ESTERS THEREOF AND DERIVATIVES

Mildred S. Bruhn, Niles, and Raphael Pappo, Skokie, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Continuation-in-part of Ser. No. 346,358, March 30, 1973.
This application Mar. 21, 1975, Ser. No. 560,442
Claims priority, application United Kingdom, Mar. 25, 1974, 13058/74
Int. Cl.² C07C *61/38, 69/74*
U.S. Cl. 260—468 K **2 Claims**

1. A compound which is 7-(3(S)-hydroxy-5-oxocyclopent-1-ene)hept-5-cis-enoic acid.

2. A compound which is methyl 7-(3(S)-hydroxy-5-oxocyclopent-1-ene)hept-5-cis-enoate.

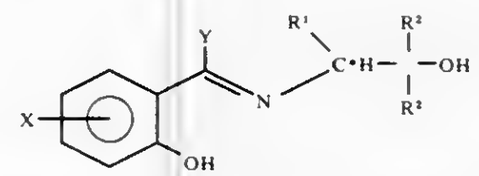
4,029,690

ASYMMETRIC SYNTHESIS OF ALKYL CHRYSANTHEMATES

Tadatoshi Aratani; Shuzo Nakamura; Tsuneyuki Nagase, and Yukio Yoneyoshi, all of Takatsuki, Japan, assignors to Sumitomo Chemical Company, Limited, Japan

Continuation-in-part of Ser. No. 442,413, Feb. 14, 1974, abandoned. This application Feb. 11, 1975, Ser. No. 549,034
Claims priority, application Japan, Feb. 14, 1973, 48-18642; June 20, 1973, 48-69997; June 20, 1973, 48-69998
Int. Cl.² C07C *67/30*
U.S. Cl. 260—468 H **17 Claims**

1. A process for the production of an optically active alkyl chrysanthemate which comprises reacting 2,5-dimethyl-2,4-hexadiene with an alkyl diazoacetate in the presence of a copper complex coordinated with a chiral Schiff base at a temperature in the range of −50° C to 150° C, said Schiff base having the formula:



wherein C* is an asymmetric carbon atom, R^1 is selected from the group consisting of (a) alkyl groups whose carbon atom number is 1 – 10, and (b) aralkyl groups with or without alkoxy substituent(s), whose total carbon atom number is 7 – 20, R^2 is selected from aryl groups with alkoxy substituent(s), whose total carbon atom number is 7 –30, X may be substituted at 1 or 2 positions on the ring and is selected from the group consisting of (a) alkyl having 1 – 10 carbon atoms, (b) phenyl, (c) benzo, (d) alkoxy having 1 – 10 carbon atoms, (e) halogen and (f) nitro, and Y is a hydrogen atom and wherein the molar ratio of the said copper complex to alkyl diazoacetate is in the range of 0.001 –0.1.

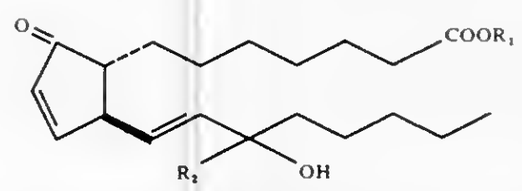
4,029,691

PROSTAGLANDIN A_1, ANALOGS

Gordon L. Bundy, Portage, and John E. Pike, Kalamazoo, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 465,881, May 1, 1974, abandoned, which is a division of Ser. No. 288,848, Sept. 13, 1972, abandoned, which is a continuation of Ser. No. 72,105, Sept. 14, 1970, abandoned. This application Dec. 24, 1975, Ser. No. 644,137
Int. Cl.² C07C *177/00*
U.S. Cl. 260—468 D **7 Claims**

1. An optically active compound of the formula:



or a racemic compound of that formula and the mirror image thereof, wherein R_1 is hydrogen, alkyl of one to 8 carbon atoms, or a pharmacologically acceptable cation, wherein R_2 is methyl or ethyl, and wherein the side-chain hydroxy is in S or R configuration.

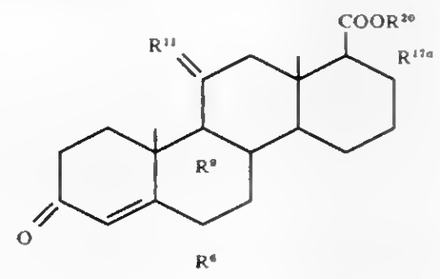
4,029,692

STEROID CARBOXYLIC ACIDS AND DERIVATIVES

Leo Alig, 76 Heidenlochstrasse, Liestal, Switzerland; Robert Nickolson, 102 Mohriner Allee; Rudolf Wiechert, 5 Petzower-Strasse, both of Berlin, Germany; Andor Fürst, 14 Magnolienpark, Basel, Switzerland; Klaus Kieslich, 4 Strasse zum Lowen, Berlin, Germany; Marcel Muller, 10 Quellenweg, Frenkendorf, Switzerland, and Ulrich Kerb, 8 Waitzstrasse, Berlin, Germany

Filed Mar. 29, 1976, Ser. No. 671,381
Claims priority, application Switzerland, Apr. 3, 1975, 4224/75; Jan. 30, 1976, 1172/76; Mar. 22, 1976, 3507/76
Int. Cl.² C07C *69/74, 61/36, 69/16, 69/28*
U.S. Cl. 260—468.5 **43 Claims**

1. A D-homosteroid of the formula



wherein R^6 is hydrogen, fluorine, chlorine or methyl; R^9 is hydrogen, fluorine, chlorine or bromine; R^{11} is oxo or (α-H, β-OH) when R^9 is hydrogen, oxo, (α-H, β-OH), (α-H, β-fluoro) or (α-H,β-chloro) when R^9 is fluorine, chlorine or bromine with the proviso that, in the case of 9,11-dihalo compounds, the atomic number of the halogen atom in the 9-position is not less than the atomic number of the halogen atom in 11-position; $R^{17\alpha}$ is hydroxy or acyloxy and R^{20} is hydrogen, lower alkyl, halo-(lower alkyl), hydroxy-(lower alkyl), acyloxy-(lower alkyl) or (lower alkoxycarbonyl)-(lower alkyl) and wherein the broken line in the 1,2-position denotes an optional carbon-carbon bond said acyloxy groups being derived from a saturated or unsaturated aliphatic or cycloaliphatic carboxylic acid containing up to 15 carbon atoms or phenyl acetic acid or benzoic acid.

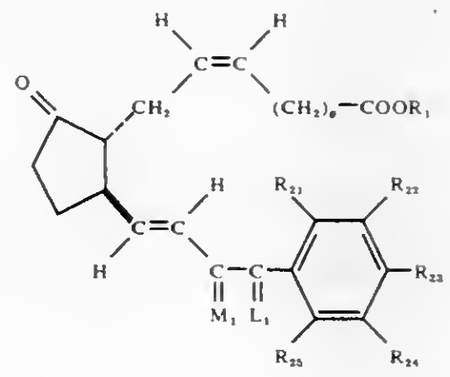
4,029,693

2a,2b-DIHOMO-11-DEOXY-17(SUBSTITUTED PHENYL)-18,19,20-TRINOR-PGE_2 COMPOUNDS AND THEIR CORRESPONDING ESTERS

Gordon L. Bundy, Kalamazoo, and Norman A. Nelson, Galesburg, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

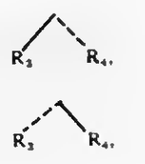
Filed Jan. 20, 1975, Ser. No. 542,372
Int. Cl.² C07C *63/33, 69/76;* **A61K** *31/19, 31/25;* **C07C** *177/00*
U.S. Cl. 260—473 R **22 Claims**

1. A compound of the formula

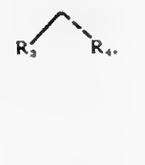


or a mixuture comprising that compound and the enantiomer thereof;

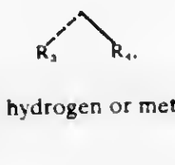
wherein g is 3 to 5, inclusive;
wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one or two alkyl of one to 3 carbon atoms, inclusive, or chloro, or a pharmacologically acceptable cation;
wherein L, is



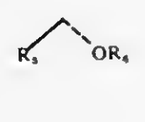
or a mixture of



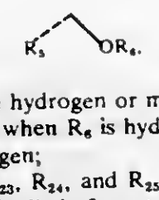
and



wherein R_3 and R_4 are hydrogen or methyl, being the same or different;
wherein M_1 is



or



wherein R_5 and R_6 are hydrogen or methyl, with the proviso that R_5 is methyl only when R_6 is hydrogen and R_6 is methyl only when R_5 is hydrogen;
wherein R_{21}, R_{22}, R_{23}, R_{24}, and R_{25}, are hydrogen, fluoro, chloro, trifluoromethyl, alkyl of one to 4 carbon atoms, inclusive, or $-OR_8$ wherein R_8 is alkyl of one to 3 carbon atoms, inclusive, with the proviso that at least two of R_{21}, R_{22}, R_{23}, R_{24}, and R_{25} are hydrogen, and not more than two of R_{21}, R_{22}, R_{23}, R_{24}, and R_{25} chloro, fluoro, trifluoromethyl or $-OR_8$, with the further proviso that R_{21}, R_{22}, R_{23}, R_{24}, and R_{25} are all hydrogen only when at least one of R_3, R_4, R_5, and R_6 is methyl.

4,029,694

ANTISTATIC AGENTS FOR MELT-FORMED POLYMERS

Eugene A. Weipert, Allen Park, and Charles F. Deck, Trenton, both of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Division of Ser. No. 177,136, Sept. 1, 1971. This application Mar. 22, 1974, Ser. No. 453,741
Int. Cl.² C07C *69/34, 69/80, 69/82*
U.S. Cl. 260—475 P **7 Claims**

1. An antistatic agent prepard by the reaction in a mole ratio of (a) to (b) of from about 0.5:1.0 to 1.0:1.0 at a temperature from about 60° to 160° C. for a period of from about 1 to about 4 hours of:
a. an alkyl ester of a dicarboxylic acid represented by the formula:

R''OOC—R—COOR'

wherein R is the organic portion of the dicarboxylic acid selected from the group consisting of oxalic, malonic, succinic, glutaric, adipic, pimelic, suberic, azelaic, sebasic, phthalic, isophthalic, terephthalic, and hydrogenated terephthalic, and R' and R'' are, each, individually, alkyl having from one to four carbon atoms, or hydroxyalkyl having from two to four carbon atoms with
b. an alkylene oxide adduct of a nitrogen-containing compound selected from the group consisting of alkanolamine, alkanolpolyamine, alkylene polyamine, polyalkylenepolyamine, aromatic polyamine and α-olefin oxide adducts thereof, said alkylene oxide selected from the group consisting of ethylene oxide or a mixture of ethylene oxide and a lower alkylene oxide having from three to four carbon atoms, said mixture comprising at least 25% by weight of ethylene oxide, said adduct having a molecular weight of from 1,000 to 40,000 and comprising from 60% to 99% by weight of alkylene oxide.

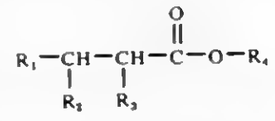
4,029,695

CATALYTIC PROCESS FOR THE MANUFACTURE OF UNSATURATED ACIDS AND ESTERS

Windell C. Watkins, Longview, Tex., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 498,885, Aug. 20, 1974, Pat. No. 3,975,301, which is a division of Ser. No. 409,823, Oct. 26, 1973, Pat. No. 3,855,279. This application June 5, 1975, Ser. No. 583,936
Int. Cl.² C07C *69/54*
U.S. Cl. 260—486 D **7 Claims**

1. A process for making unsaturated acids and esters by dehydrogenation of a compound defined by the formula



wherein each of R_1, R_2, R_3 and R_4 is selected from hydrogen and lower alkyl groups containing 1–4 carbon atoms, which process comprises contacting a feed-gas mixture comprising said compound and oxygen at a temperature in the range of from about 250° to about 600° C. with a solid catalyst described as the calcined residue of a mixture of (a) a base component consisting essentially of a mixture of iron phosphate and lead phosphate wherein the atomic ratio of the metals is defined by 1 Fe/x Pb where x has a value of from about 0.1 to about 10, and (b) a modifier component selected from the group consisting of manganese, uranium, praseodymium, calcium, strontium and chromium wherein said modifier component is presents in amounts of from about 0.1 to about 10% based on the weight of the base component.

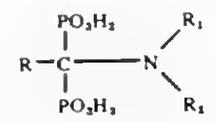
4,029,696

N-HYDROXY ALKANE AMINO ALKANE DIPHOSPHONIC ACIDS, PROCESS OF PRODUCING SAME, AND COMPOSITIONS FOR AND METHOD OF USING SAME

Klaus Sommer, Heidelberg, and Güenter Raab, Laudenbach, Bergstrasse, both of Germany, assignors to Benckiser-Knapsack GmbH, Ladenburg (Neckar), Germany

Filed Apr. 9, 1976, Ser. No. 675,479
Int. Cl.² C07F *9/38*
U.S. Cl. 260—502.5 **11 Claims**

1. An N-hydroxy alkane amino alkane diphosphonic acid of the formula



in which

R is hydrogen, lower alkyl, phenyl, hydroxy lower alkyl, or carboxy lower alkyl;
R_1 is hydrogen, lower alkyl, hydroxy lower alkyl, dihydroxy lower alkyl, or hydroxy carboxy lower alkyl, and
R_2 is hydroxy lower alkyl, or the alkali metal salts of said diphosphonic acid.

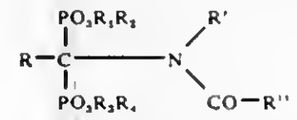
4,029,697

N-ACYL-1-AMINO ALKANE-1,1-DIPHOSPHONIC ACID COMPOUNDS, PROCESS OF MAKING SAME, AND COMPOSITIONS FOR AND METHOD OF USING SAME

Friedrich Krueger, Edingen, and Walter Michel, Ilvesheim, both of Germany, assignors to Joh. A. Benckiser GmbH, Ludwigshafen (Rhine), Germany

Filed Apr. 15, 1976, Ser. No. 677,286
Claims priority, application Germany, Apr. 30, 1975, 2519264; July 5, 1975, 2530139
Int. Cl.² C07F *9/38*
U.S. Cl. 260—502.5 **5 Claims**

1. An N-acyl-1-amino alkane-1,1-diphosphonic acid of the formula



in which
R, R', and R'' are hydrogen or lower alkyl and
R_1, R_2, R_3, and R_4 are hydrogen or an alkali metal.

4,029,698

CYCLOALKYLIDENOL ANALOGUES OF PROSTAGLANDINS E AND F

Warren Dexter Woessner; William Gerard Biddlecom; Henry Clifford Arndt, all of Madison; George Peter Peruzzotti, Middleton, and Charles John Sih, Madison, all of Wis., assignors to Miles Laboratories, Inc., Elkhart, Ind.

Continuation-in-part of Ser. No. 436,221, Jan. 24, 1974, abandoned, which is a division of Ser. No. 383,670, July 30, 1973, abandoned. This application Oct. 31, 1975, Ser. No. 627,627
Int. Cl.² C07C *177/00*
U.S. Cl. 260—514 D **1 Claim**

1. 2-(6'-Carboxyhexyl)-3-(2''-anti-hydroxycycloheptylidenemethyl)-cyclopentanone.

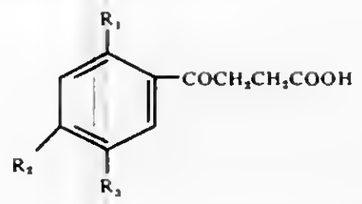
4,029,699

3,(2,4,5-TRISUBSTITUTED BENZOYL)-PROPIONIC ACID AND THE SALTS THEREOF

Tadakazu Murata, Osaka; Akira Nohara, Kyoto; Hirosada Sugihara, and Yasushi Sanno, both of Osaka, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Division of Ser. No. 288,348, Sept. 12, 1973, Pat. No. 3,943,169. This application Nov. 26, 1975, Ser. No. 635,447
Claims priority, application Japan, Sept. 13, 1971, 46-71087; Sept. 13, 1971, 46-71088; Dec. 29, 1971, 47-3167; Jan. 11, 1972, 47-5401
Int. Cl.² C07C *149/40*
U.S. Cl. 260—516 **2 Claims**

1. A compound of the formula



wherein R_1 is an alkoxy group of 1 to 4 carbons, R_2 is an alkyl group of 1 to 4 carbons and R_3 is an alkylthio group of 1 to 4 carbons or pharmaceutically acceptable salts thereof.

4,029,700

PROCESS FOR THE PRODUCTION OF EVEN SERIES ω-AMINO ACIDS

Rakhil Khatskelevna Freidlina, ulitsa vavilova, 44, korpus 4, kv. 167; Tamara Trofimovna Vasilieva, ulitsa Vinokurova, 17, korpus 3, kv. 9; Felix Kazimirovich Velichko, ulitsa akademika Vargi, 24, kv. 51, and Alexandr Borisovich Terentiev, ulitsa Vinokurova, 17, korpus 3, kv. 9, all of Moscow, U.S.S.R.

Filed Dec. 24, 1975, Ser. No. 644,176
Int. Cl.² C07C *99/00*
U.S. Cl. 260—534 R **5 Claims**

1. A process for the production of even series ω-amino acids of the general empirical formula $NH_2(CH_2CH_2)_nCH_2COOH$ (I), where n is the integer 1 or 2, wherein ethylene is telomerized with methyl esters of halogen acetic acids of the general empirical formula $X_mCH_{3-m}COOCH_3$ (II), where X and M are as follows:
X = Cl, m is the integer 2 or 3; said telomerization is effected at a temperature in the range from 100 to 145° C. and under ethylene pressure in the range from 25 to 40 gage atmospheres in the presence of initiators of free-radical reactions; said telomerization producing telomers of the general empirical formula $CH_3OOCCH_{3-m}X_{m-1}(CH_2CH_2)_nX$ (III), where X, n and m are the same as in the formulas hereabove; which are reduced to telomers of the same general formula, where X = Cl and m = 1, and the latter are subjected to ammonolysis with ammonia at a temperature from 135° to 140° C to yield ammonolysis products; the ammonolysis products are further hydrolyzed with hydrochloric acid at a temperature in the range from 80° to 90° C.; the desired product is recovered from the resultant hydrolyzate by use of a styrene-divinylbenzene sulfocationite resin in the H form.

5. A process for the production of even series ω-amino acids of the general empiricol formula $NH_2(CH_2CH_2)_nCH_2COOH$ (I), where n is the integer 1 or 2, wherein ethylene is telomerized with methyl esters of halogen acetic acids of the general empirical formula $X_mCH_{3-m}COOCH_3$ (II), where X and m are as follows:
X = Br, m = 1; said telomerization is effected at a temperature in the range from 100° to 145° C. and under ethylene pressure in the range from 25 to 40 gage atmospheres in the presence of initiators of free-radical reactions; said telomerization producing telomers of the general empirical formula $CH_3OOCCH_{3-m}X_{m-1}(CH_2CH_2)_nX$ (III), where X, n and m are the same as in the formulas hereabove; which are subjected to ammonolysis with ammonia at a temperature of about 100° C to yield ammonolysis products; the ammonolysis products are further hydrolyzed with hydrochloric acid at a temperature in the range from 80° to 90° C.; the desired product is recovered from the resultant hydrolyzate by use of a styrene-divinylbenzene sulfocationite resin in the H form.

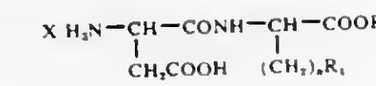
4,029,701

SWEETENING WITH HYDROHALIDE SALTS OF DIPEPTIDE SWEETENERS

Gerhard J. Haas, Woodcliff Lake, N.J., and Jeffrey H. Berg, Riverdale, N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Filed Mar. 30, 1972, Ser. No. 239,789
Int. Cl.² A23L *1/236*
U.S. Cl. 426—548 **15 Claims**

1. An artifically sweetened foodstuff comprising a foodstuff and a dry dipeptide sweetener from the formula



wherein:
the stereochemical configuration is DL-DL, DL-L, L-DL, or L-D;
X represents a halide;
n represents an integer of 0 to 5;
R represents lower alkyl, lower alkylaryl and cycloalkyl;
R_1 represents
a. lower alkyl,
b. a substituted or unstubstituted unsaturated, partially saturated or totally saturated six carbon hydrocarbon ring provided that when substituted, the substituent is at the four position and is hydroxy, lower alkoxy, lower alkyl or halogen; and
c. $S(O)_m$ (lower alkyl) provided that *n* is 1 or 2 and *m* is 0, or 2,
said dry dipeptide sweetener being present in an amount effective to sweeten the foodstuff, said dipeptide salt being faster to dissolve than the corresponding unsubstituted dipeptide sweetener.

4,029,702

OIL-SOLUBLE BICARBAMAMIDE COMPOUNDS

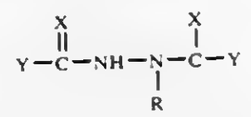
Richard J. Piccolini, Newtown, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 720,458, April 11, 1968, Pat. No. 3,634,493. This application Oct. 12, 1971, Ser. No. 188,588

Int. Cl.² C07C *133/02*

U.S. Cl. 260—554 **2 Claims**

1. A bicarbamamide compound in the formula



wherein R represents an alkenyl radical having at least 20 carbon atoms, X is oxygen and Y is $—NR_2R_3$ wherein R_2 and R_3 are independently selected from hydrogen, alkyl, cycloalkyl, aryl, alkaryl and aralkyl.

4,029,703

N,N'-DI-SUBSTITUTED HALOPHENYLACETAMIDINES

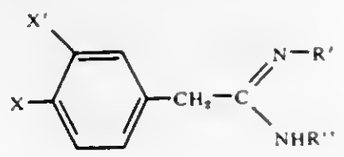
James R. McCarthy, Jr., Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 510,955, Oct. 2, 1974, abandoned, which is a continuation-in-part of Ser. No. 456,941, April 1, 1974, abandoned, which is a continuation of Ser. No. 279,651, Aug. 10, 1972, abandoned. This application Feb. 11, 1976, Ser. No. 657,335

Int. Cl.² C07C *123/00*

U.S. Cl. 260—564 R **8 Claims**

1. A substituted amidine compound selected from the group consisting of halophenylacetamidine compounds corresponding to the formula



wherein X and X′ independently represent halo or hydrogen, with the proviso that at least one of X and X′ represents halo and R′ and R″ each independently represent loweralkyl; and the pharmaceutically-acceptable salts thereof.

4,029,704

OXIMES

Brian Anderson, Blackley, England, assignor to Imperial Chemical Industries Limited, London, England

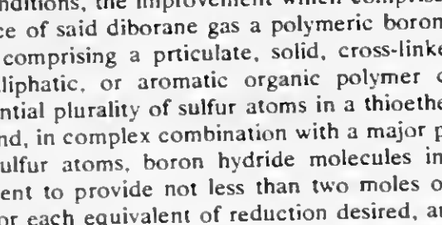
Continuation of Ser. No. 390,301, Aug. 21, 1973, abandoned. This application Aug. 12, 1975, Ser. No. 603,919

Claims priority, application United Kingdom, Aug. 25, 1972, 39703/72; Feb. 23, 1973, 8991/73; June 19, 1973, 29003/73

Int. Cl.² C07C *131/00, 131/14*

U.S. Cl. 260—566 A **2 Claims**

1. A ketoxime of the formula



wherein the oxime is in the anti configuration with respect to the phenolic hydroxyl group, X and R^2 are hydrogen and R^1 is a nonyl group.

4,029,705

PURIFICATION PROCESS FOR MDA

Adnan A. R. Sayigh, North Haven; Kwok K. Sun, Hamden, and Henri Ulrich, Northford, all of Conn., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed Aug. 18, 1975, Ser. No. 605,753

Int. Cl.² C07C *85/16*

U.S. Cl. 260—570 D **8 Claims**

1. A process for selectively removing 2,2′- and 2,4′-diaminodiphenylmethanes from mixtures thereof with 4,4′-diaminodiphenylmethane said mixtures having been previously isolated from the product of condensing aniline with formaldehyde which process comprises heating an aqueous mixture consisting essentially of said diaminodiphenylmethanes, hydrochloric acid, and formaldehyde at a temperature of 30° C to 100° C, the amount of hydrochloric acid present being from 0.55 to 0.95 equivalents per equivalent of diamine present in the reaction mixture.

4,029,706

REDUCTION WITH POLYMERIC REAGENT

Guy A. Crosby, Palo Alto, Calif., assignor to Dynapol, Palo Alto, Calif.

Division of Ser. No. 456,731, April 1, 1974, Pat. No. 3,928,293. This application Mar. 10, 1975, Ser. No. 556,857

Int. Cl.² C07C *87/28*

U.S. Cl. 260—570.9 **12 Claims**

1. In the process for reducing an organic compound wherein said compound is contacted with diborance gas under reducing conditions, the improvement which comprises employing in place of said diborane gas a polymeric boron hydride reagent comprising a prticulate, solid, cross-linked aliphatic, cycloaliphatic, or aromatic organic polymer containing a substantial plurality of sulfur atoms in a thioether configuration and, in complex combination with a major proportion of said sulfur atoms, boron hydride molecules in an amount sufficient to provide not less than two moles of complexed BH_3 for each equivalent of reduction desired, and thereafter isolating the reduced organic compound and recovering said reagent.

4,029,707

PREPARATION OF N-ALKYLATED AROMATIC AMINES

Charles W. Hargis, Johnson City, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sept. 2, 1975, Ser. No. 609,125

Int. Cl.² C07C *87/62*

U.S. Cl. 260—577 **4 Claims**

1. A process for the production of N-alkylated aromatic amines which comprises contacting a reaction mixture of an aliphatic alcohol having 1 to about 6 carbon atoms and an aromatic amine having at least 1 hydrogen atom attached to the amino nitrogen, in the vapor phase at a temperature of from about 250° C. to about 450° C. in the presence of a catalyst consisting of eta-alumina treated with hydrofluosilicic acid.

4,029,708

LINEAR SURFACTANT POLYMERS FORMED FROM SUBSTITUTED AMINES AND DIFUNCTIONAL REACTANTS

Paul L. Seitz, and Robert K. Gabel, both of Houston, Tex., assignors to Nalco Chemical Company, Oak Brook, Ill.

Filed Feb. 10, 1975, Ser. No. 548,463

Int. Cl.² C07C *93/02*; **B01D** *17/04*; **C07C** *87/20*

U.S. Cl. 260—584 B **7 Claims**

1. A linear surfactant polymer formed by the reaction of a substituted amine with a difunctional reactant wherein said substituted amine is the reaction product of hexamethylene triamine and propylene oxide, said hexamethylene triamine being reacted with propylene oxide in a molar ratio of 5:1 to 1:5 at a temperature of from 30°–220° C. for from 1-4 hours, and said difunctional reactant is a glycol adduct of epichlorohdyrin formed by the reaction of one mole of polyethylene glycol of molecular weight 250 with two moles of epichlorohydrin said reaction being conducted at temperatures in the range of 60°–110° C. for 1–3 hours under reflux, said difunctional reactant being reacted with the substituted amine in a molar ratio of 5:1 to 1:5 at a temperature of from 100°–250° C. for a period of time ranging from 1–6 hours.

4,029,709

PROCESS FOR THE HYDROGENATION OF CITRAL TO CITRONELLAL AND OF CITRONELLAL TO CITRONELLOL USING CHROMIUM-PROMOTED RANEY NICKEL CATALYST

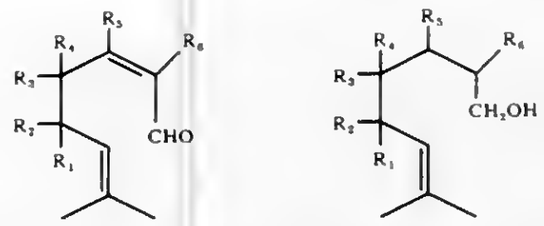
Robert S. De Simone, Middletown, N.Y., and Peter S. Gradeff, Andover, N.J., assignors to Rhodia, Inc., New York, N.Y.

Filed Feb. 17, 1976, Ser. No. 658,788

Int. Cl.² C07C *47/20*

U.S. Cl. 260—601 R **15 Claims**

1. In the process for the hydogenation of unsaturated aldehydes having the formulae:
to form an aldehyde and/or alcohol having the formulae:



wherein R_1, R_2, R_3, R_4, and R_6 are selected from the group consisting of hydrogen and lower alkyl groups having from one to about five carbon atoms and R_5 is a lower alkyl group having from one to about five carbon atoms, which comprises hydrogenating the aldehyde in the presence of catalyst and hydrogen gas, the improvement which comprises carrying out the hydrogenation in the presence of a chromium-promoted Raney nickel catalyst at a temperature within the range from about 5° C to about 200° C, and at a hydrogen pressure within the range from atmospheric pressure to about 500 psi.

4,029,710

4-ALKOXY-n-BUTYRALDEHYDE PREPARATION

Shigeto Suzuki, San Francisco, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Mar. 31, 1976, Ser. No. 672,363

Int. Cl.² C07C *47/02*

U.S. Cl. 260—602 **11 Claims**

1. A process for preparing 4-alkoxy-n-butyraldehyde which comprises contacting allyl alcohol, formaldehyde and a C_1 to C_{20} primary alcohol in the presence of hydrogen fluoride at a temperature of from about −100° to about 10° C and a pressure of from about 10 to about 1000 psia.

4,029,711

4-HYDROXY-n-BUTYRALDEHYDE FROM ALLYL ALCOHOL AND FORMALDEHYDE

Shigeto Suzuki, San Francisco, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Mar. 31, 1976, Ser. No. 672,362

Int. Cl.² C07C *47/02*

U.S. Cl. 260—602 **7 Claims**

1. A process for preparing 4-hydroxy-n-butyraldehyde which comprises contacting allyl alcohol and formaldehyde in the presence of hydrogen fluoride at a temperature from about −100° C to about 10° C and a pressure of from about 10 psia to about 1000 psia.

4,029,712

SULFOXIDE DERIVATIVE AND PROCESS FOR ITS PREPARATION

Genichi Tsuchihashi, Tama, and Katsuyuki Ogura, Kyoto, both of Japan, assignors to Sagami Chemical Research Center, Tokyo, Japan

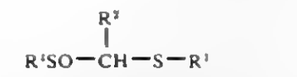
Division of Ser. No. 211,100, Dec. 22, 1971, Pat. No. 3,742,066. This application Mar. 30, 1973, Ser. No. 347,408

Claims priority, application Japan, Apr. 20, 1971, 46-24908; May 11, 1971, 46-30810

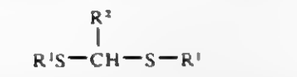
Int. Cl.² C07C *149/14*

U.S. Cl. 260—609 R **2 Claims**

1. A process for preparing a sulfoxide derivative of the formula



wherein R^1 is lower alkyl or phenyl and R^2 is hydrogen, lower alkyl, benzyl, p-methoxybenzyl or p-bromobenzyl, which comprises oxidizing a mercaptal of the formula



wherein R^1 and R^2 are as defined above, with 1.0–3.0 oxidative-equivalents of an oxidant selected from the group consisting of hydrogen peroxide, m-chloroperbenzoic acid and sodium metaperiodate at a temperature of from −20° to 50° C.

4,029,713

SUBSTITUTED HYDROXY-PHENYL PROPANOLS

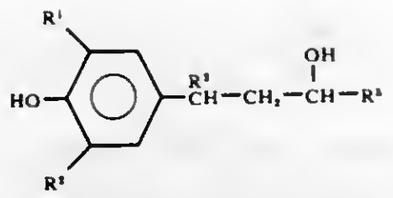
Dane K. Parker, Canton, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 435,569, Jan. 22, 1974, Pat. No. 3,989,741. This application Dec. 11, 1975, Ser. No. 639,662

Int. Cl.² C07C *39/06, 39/12*

U.S. Cl. 260—624 R **2 Claims**

1. A compound having the general formula



wherein R^1 and R^2 are the same or different radicals selected from the group consisting of tertiary alkyl radicals having from 4 to 12 carbon atoms, R^3 is selected from the group consisting of hydrogen and n-alkyl radicals having from 1 to 20 carbon atoms and R^4 is selected from the group consisting of alkyl radicals having from 1 to 10 carbon atoms, alkenyl radicals having from 2 to 10 carbon atoms, and aryl radicals having from 6 to 12 carbon atoms.

4,029,714

ETHYLENE/CHLORINE ELIMINATION PROCESS

Allyn J. Ziegenhagen, and Ramsey G. Campbell, both of Berkeley, Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Filed Nov. 5, 1975, Ser. No. 629,171
Int. Cl.² C07C *17/00*
U.S. Cl. 260—658 R 9 Claims

1. The process for eliminating chlorine and ethylene from a waste stream comprising chlorine at a concentration of up to about 5000 ppm (vol), and unchlorinated and partially chlorinated hydrocarbons, which comprises reacting said waste stream at a temperature between about 90° C and about 250° C and at a pressure between about 15 psig and about 75 psig, at a space velocity between about 50 hour^{-1} and about 2000 hour^{-1} and a residence time between about 2 sec and about 50 sec, over a fixed catalyst bed comprising a mixture of metallic iron and particles of activated alumina impregnated with ferric chloride either by prior treatment or by in situ deposition arising from the action of molecular chlorine on the metallic iron, in which the ratio of the superficial surface area of the iron to the total BET surface area of the alumina ranges from a value equal to 1.5 times the surface area of the inner reactor wall divided by the total BET surface area of the alumina contained therein, of about 1×10^{-7}, whichever is greater, to about 2×10^{-6}, to produce an effluent comprising more highly chlorinated hydrocarbons, and less than 200 ppm by volume of chlorine.

4,029,715

PREPARATION OF ETHYL BENZENE

Robert W. Rieve, Springfield, and Harold Shalit, Drexel Hill, both of Pa., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Aug. 24, 1976, Ser. No. 717,318
Int. Cl.² C07C *15/04*
U.S. Cl. 260—668 D 1 Claim

1. The method of preparing ethyl benzene which consists of:
directing a stream of C_8 cyclic olefin hydrocarbon vapors rich in 4-vinyl cyclohexene-1, together with a larger volume of an inert gas selected from nitrogen, steam, carbon dioxide, argon, and mixtures thereof as a reactant stream toward a fixed bed of catalyst particles, said reactant stream being substantially free from hydrogen;
directing said reactant stream through a fixed bed of particles consisting of alumina-supported oxides of cobalt, molydenum and potassium, the concentration of potassium oxide being within a range from about 0.9% to about 3%, said bed of particles being maintained at pressure within a range from about 0.4 to 8 atmospheres and at a temperature within a range from about b 400° C to about 450° C, the liquid space rate of C_8 hydrocarbons with respect to said bed of particles being within a range from about 0.5 to about 3.0 volumes of liquid per volume of catalyst bed per hour;
and recovering ethyl benzene from the effluent from said catalyst bed.

4,029,716

SELECTIVE PRODUCTION OF PARA-XYLENE

Warren W. Kaeding, Westfield, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 8, 1975, Ser. No. 638,864
Int. Cl.² C07C *3/62*, *15/08*
U.S. Cl. 260—672 T 10 Claims

1. A process for the selective production of paraxylene which comprises contacting toluene at a temperature between about 400° and about 700° C., a pressure between about 1 atmosphere and about 1000 psig and a weight hourly space velocity of between about 1 and about 20 with a catalyst consisting essentially of a crystalline aluminosilicate zeolite having a silica to alumina ratio of at least about 12 and a constraint index within the approximate range of 1 to 12, said zeolite having combined therewith boron in an amount of at least about 0.2 percent by weight as a result of reaction of said zeolite with a boron-containing compound; cooling the resulting product and separating para-xylene therefrom.

4,029,717

SIMULATED MOVING BED ADSORPTION-DESORPTION PROCESS FOR PARAXYLENE RECOVERY

Frank J. Healy, Morristown, and Paul R. Geissler, Edison, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 457,056, April 1, 1974, abandoned. This application Mar. 7, 1975, Ser. No. 556,431
Int. Cl.² C07C *7/13*; C10G *25/04*; B01D *15/08*
U.S. Cl. 260—674 SA 10 Claims

1. In a process for continuously separating, in a liquid phase, the components of a liquid C_8 aromatic feedstream wherein at least one of said components is selectively adsorbed by contact with a solid sorbent material utilizing a simulated countercurrent flow system wherein liquid streams are allowed to flow downward through a desorption zone, a rectification zone and a sorption zone, each zone being serially and circularly interconnected and divided into a plurality of serially interconnected sections, each section being packed with a mass of said solid sorbent material, the improvement whih comprises:
I. introducing a desorbent stream containing meta-diisopropylbenzene into the first section of said desorption zone:
II. withdrawing a desorption effluent comprising at least one selectively sorbed component from the last section of said desorption zone;
III. introducing said C_8 aromatic feedstream into the first section of said sorption zone; and
IV. withdrawing a raffinate effluent comprising a less sorbed component from the last section of said sorption zone.

4,029,718

PIVALOLACTONE RANDOM GRAFT COPOLYMERS

Sherman A. Sundet, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 268,056, June 30, 1972, Pat. No. 3,897,513, which is a continuation-in-part of Ser. No. 166,281, July 26, 1971, abandoned. This application May 20, 1975, Ser. No. 579,362
Int. Cl.² C08L *51/04*
U.S. Cl. 260—877 17 Claims

1. A thermoplastic random organic graft copolymer formed by contacting
an amorphous base polymer having at least one random carbanion site thereon
with up to 150% by weight of the polymer, of at least one α-substituted-β-propiolactone in an amount such that the ratio of the moles of β-lactone to the moles of anionic sites on the base polymer varies between 3 to 1000, and
polymerizing said β-lactone to form crystallizable polymer sidechains, said sidechains having a length of between 3 to 1000 monomer units and a weight of up to 60% of the graft composition,
said base polymer being characterized in that it is amorphous to X-rays at a temperature of 130° C or below, and has a molecular weight of above 2,000.

4,029,719

PROCESS FOR THE DIMERIZATION OR CO-DIMERIZATION OF LINEAR OLEFINS AND CATALYSTS THEREFORE

Lucio Forni, and Renzo Invernizzi, both of Milan, Italy, assignors to Societa Italiana Resine S.I.R. S.p.A., Milan, Italy

Division of Ser. No. 398,507, Sept. 18, 1973, abandoned. This application Dec. 8, 1975, Ser. No. 638,387
Claims priority, application Italy, Sept. 20, 1972, 29427/72
Int. Cl.² C07C *3/20*
U.S. Cl. 260—683.15 R 12 Claims

1. Process for the preparation of linear olefins having from 6 to 24 carbon atoms in the molecule, characterized by the introduction of one or more linear olefins having from 3 to 12 carbon atoms in the molecule to the catalysts obtained by activating, by means of an organic or inorganic base, a natural or synthetic crystalline zeolite on which has previously been deposited by ion exchange at least one metal chosen from among those belonging to group VIII of the periodic system of elements in an amount of from 0.1% to 50% by weight with respect to the zeolite, bringing the resulting product into contact with an organic or inorganic base in the liquid or gaseous form at a temperature in the range from −35 to 250° C for a time of at least 30 min, eliminating the excess of the base and heat-treating at temperatures in the range from 50 to 450° C for at least 30 min., and by operating at temperatures of from 130° to 260° C and at pressures of from 2 to 70 atmospheres.

4,029,720

BLOCK OR GRAFT COPOLYMERS OF POLYALKYLENE OXIDES AND VINYLAROMATIC OR DIENE POLYMERS

Erhard Seller, Ludwigshafen; Gerhard Fahrbach, Schwetzingen, and Dieter Stein, Limburgerhof, all of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengeselischaft, Ludwigshafen (Rhine), Germany

Continuation of Ser. No. 385,982, Aug. 6, 1973, abandoned. This application Mar. 3, 1975, Ser. No. 555,026
Claims priority, application Germany, Aug. 10, 1972, 2239401
Int. Cl.² C08L *9/00*, *9/06*
U.S. Cl. 260—887 11 Claims

1. A process for the manufacture of block copolymers of polyalkylene oxides which comprises:
1. forming a polymer block A by homopolymerizing an alkylene oxide selected from the group consisting of ethylene oxide and propylene oxide or block copolymerizing at least one of said alkylene oxides with at least one monomer selected from the group consisting of styrene, butadiene and isoprene to form alternating polymeric blocks within said block A using organosodium or organopotassium compounds as initiators in polar organic solvents;
2. forming a polymer block B by the steps of
a. polymerizing at least one monomer selected from the group consisting of butadiene, isoprene and styrene in a non-polar hydrocarbon solvent using an organolithium compound as initiator, wherein less than 60% of the diene units in said polymer block B have a 1,2-vinyl structure, and
b. adding methyl methacrylate to the living chain ends of the polymer block B in amounts of from 0.5 to 10% by weight of methyl methacrylate based on the weight of block B, whereby short polymethyl methacrylate claims are formed having ester end groups bearing a living CH_2 group; and
3. forming the final block copolymer by adding polymer block A to polymer block B with the reaction of at least one living alkali metal alcoholate end group of block A with at least one ester group of block B with the elimination of alkali metal methoxide.

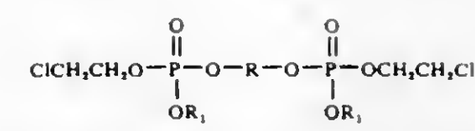
4,029,721

HALOGEN-CONTAINING PHOSPHORIC ACID POLYESTERS

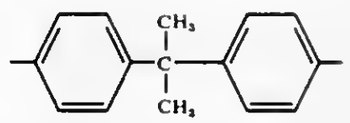
Hartfrid Vollmer; Franz-Josef Dany, both of Erfstadt; Joachim Wortmann, Turnich, and Peter Munch, Erfstadt, all of Germany, assignors to Hoechst Aktiengeselischaft, Frankfurt am Main, Germany

Filed Oct. 21, 1975, Ser. No. 624,546
Claims priority, application Germany, Oct. 26, 1974, 2451077
Int. Cl.² C07F *9/08*, *9/12*
U.S. Cl. 260—928 14 Claims

1. Halogen-containing phosphoric acid polyesters of the general formula



in which R stands for an alkylene radical or a halogen-substituted alkylene radical having from 2 to 6 carbon atoms, a —CH_2CH_2O—CH_2CH_2— radical, a phenylene radical or a radical of the formula



and R_1 stands for a branched or unbranched alkyl radical having from 6 to 18 carbon atoms.

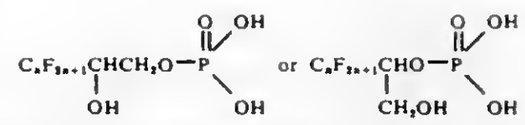
4,029,722

POLYFLUOROALKYL GLYCOL MONOESTERS OF ORTHOPHOSPHORIC ACID, AND THEIR SALTS AND METHOD OF PREPARATION

Michel Démarcq, and Joseph Slezions, both of Lyon, France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

Filed Apr. 19, 1974, Ser. No. 462,549
Claims priority, application France, Apr. 19, 1973, 73.14313
Int. Cl.² C07F *9/09*
U.S. Cl. 260—953 10 Claims

1. Compounds of the formula



wherein *n* is 2 to 18 and salts thereof.

4,029,723

EVAPORATIVE AIRCONDITIONER

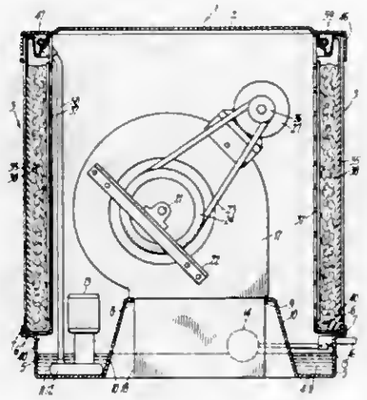
Terrence Keith Morrison, and Brian Eric McLaren, both of P.O. Box 156, Buronga, New South Wales 2648, Australia

Continuation of Ser. No. 618,242, Sept. 30, 1975, abandoned. This application Oct. 18, 1976, Ser. No. 733,404

Claims priority, application Australia, Sept. 30, 1974, 9073/74

Int. Cl.² F24F 3/14

U.S. Cl. 261—29 7 Claims



1. An evaporative airconditioner comprising:

a base panel,

a top panel,

side panels which include stiles having mitred side edges and wherein stiles of adjacent side panels abut and close sides of the airconditioner;

wherein the base panel includes a bottom, a first platform above the bottom, a second, perimetric, platform supporting the lower ends of the side panels and inner and outer walls respectively supporting the first and second platforms and with the bottom defining an annular water sump;

wherein the second platform has a perimetric flange restricting the lower ends of the side panels against outward movement;

air blower means supported on the first platform;

an outlet from the air blower means;

an aperture in one of the base, top and side panels in register with said outlet;

a water trough;

wherein the upper ends of the side panels and the water trough are complimentarily formed whereby the trough stabilizes the upper ends of the side panels and whereby the side panels support and locate the trough;

a water absorbent material carried by at least one of the side panels; and

pump means operative in use to pump water from the sump to the trough for distribution to said material for evaporation therefrom.

4,029,724

METHOD OF AND APPARATUS FOR MIXING GAS INTO LIQUIDS FOR CULTIVATING MICROORGANISMS

Hans Muller, Erlenbach, Zurich, and Bruno Guazzone, Rapperswil, both of Switzerland, assignors to Hans Muller, Mannedorf, Switzerland

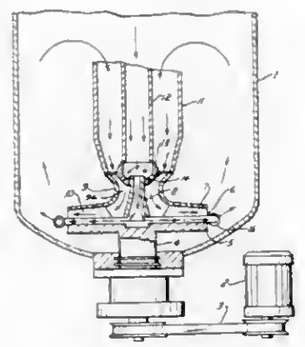
Continuation of Ser. No. 529,132, Dec. 3, 1974, abandoned. This application June 25, 1976, Ser. No. 699,709

Claims priority, application Switzerland, Dec. 4, 1973, 16819/73

Int. Cl.² B01F 3/04

U.S. Cl. 261—87 10 Claims

1. In an apparatus for mixing gas into liquids, particularly for aerating microorganisms in liquids, a combination comprising a vessel for a liquid; a hollow rotary impeller mounted for rotation in said vessel and having a venturi-shaped passage of hourglass configuration, comprised of an inlet in communication with the interior of said vessel and being located in the region of the axis of rotation of said impeller, an outlet located at the outer periphery of said impeller, and a throat located intermediate said inlet and said outlet and operative for drawing a stream of liquid through said passage in a first flow path; first gas outlet means including a plurality of first gas outlets located in said throat and communicating said throat with a source of gas so as to entrain the latter by the force of venturi suction prior to discharge of the resulting mixture through said outlet; means defining a separate second flow path for communicating a source of gas with said mixture at said outer periphery of said impeller; and second gas outlet means including a plurality of second gas outlets communicating with said separate means defining a second flow path, being located radially outwardly adjacent said outer periphery, and facing oppositely to the direction of rotation of said impeller for generating a suction force outwardly adjacent said outer periphery so as to draw the mixture in said first flow path outwardly from said hollow impeller into contact with the gas flowing in said second flow path, whereby a final mixture of finely-dispersed gas and liquid is obtained.



4,029,725

NONOXIDATIVE PROCESS FOR PURIFYING AQUEOUS INORGANIC SALT SOLUTIONS EMPLOYED IN THE WET SPINNING OF FILAMENTARY VINYL POLYMERS

Rupert B. Hurley, Wiliamsburg; Frederick B. Eastwood, Gloucester, and Joe A. Mann, Williamsburg, all of Va., assignors to Dow Badische Company, Williamburg, Va.

Filed Apr. 2, 1976, Ser. No. 672,892

Int. Cl.² D01F 13/00

U.S. Cl. 264—38 5 Claims

1. In the continuous process for producing a filamentary vinyl polymer including the procedural steps of

a. polymerizing a vinyl monomer in a concentrated aqueous inorganic salt solution to produce a vinyl polymer solution;

b. spinning the resulting vinyl polymer solution through a spinnerette into a coagulating bath containing an aqueous solution of the same inorganic salt as that employed in the polymerization step, the concentration of inorganic salt in the coagulating bath being maintained at a level which affords precipitation of the vinyl polymer to form a coherent filamentary gel;

c. washing the vinyl polymer filamentary gel so produced;

d. recovering the concentrated aqueous inorganic salt solution from the washing and coagulation steps by concentrating the combined effluents thereof; and

e. recycling the recovered concentrated aqueous inorganic salt solution into the polymerizing step;

in which process metallic ion and organic molecular impurities accumulate in the recovered concentrated aqueous inorganic salt solution; the improvement in such process which comprises purifying the recovered aqueous inorganic salt solution prior to the recycling and re-use thereof by complexing the metallic ion impurities and adsorbing the resulting metal complexes along with organic molecular impurities on activated carbon.

4,029,726

CELLULOSIC-LIQUID COMPOSITE MATERIALS AND PROCESS OF PREPARING SUCH MATERIALS

Larry D. Nichols, Arlington, Mass., assignor to Moleculon Research Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 363,267, May 23, 1973, Pat. No. 3,846,404. This application Oct. 29, 1974, Ser. No. 518,797

The portion of the term of this patent subsequent to Nov. 5, 1997, has been disclaimed.

Int. Cl.² B29D 27/04; B29H 7/20; C08L 1/12

U.S. Cl. 264—41 15 Claims

1. A process of preparing a polymer-liquid composite material, which process comprises:

a. providing a solvent solution of a cellulosic polymer having electronegative substituents, wherein the cellulosic polymer is selected from the group consisting of cellulose nitrate with a degree of substitution greater than about 2.25, cellulose acetate with a degree of substitution greater than about 2.90, a mixed cellulose nitrate and acetate cellulosic ester with a degree of substitution between about 2.25 and 2.90, and cellulose propionate with a degree of substitution greater than about 2.90, the solvent comprising a hydrogen-bonding solvent;

b. casting a wet film of the solvent solution;

c. forming an insoluble film by precipitating the cellulosic polymer in the wet film by contacting the film with a nonsolvent for the polymer, which nonsolvent is miscible with the solvent for the polymer so as to replace the solvent with the nonsolvent at a temperature below about 45° C to provide an essentially transparent, self-supporting, irreversibly shrinkable, ultramicroporous cellulosic polymer film having distinct interpenetrating cellulosic polymer and liquid nonsolvent phases.

4,029,727

CHITIN FILMS AND FIBERS

Paul Roland Austin, Wilmington, and Charles James Brine, Newark, both of Del., assignors to The University of Delaware, Newark, Del.

Filed Apr. 16, 1975, Ser. No. 568,434

Int. Cl.² C08B 37/08

U.S. Cl. 264—186 19 Claims

1. A cold drawn fiber, film or shaped object of renatured chitin containing crystalline chitin.

4. The fiber, film or shaped object of renatured chitin characterized by there being present in the renatured chitin characterized by there being present in the renatured chitin renatured fibrils, crystallites or spherulites, showing (1) a Maltese Cross or birefringence with a polarizing microscope, (2) an *x*-ray pattern with sharp concentric Debye rings, and (3) a specific gravity above 1.40, and in an amount sufficient for said fiber, film or shaped object to be cold drawn at least 25 percent of one of its original dimensions.

4,029,728

METHOD OF INJECTION MOULDING PALLETS

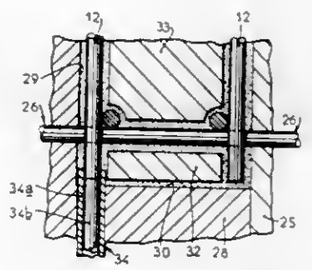
Herbert John Sharp, Greenford; Rudolf Drucker, London; Edward Droar, and Syed Mujahid Ali Zaidi, both of Harrow, all of England, assignors to GKN Sankey Limited, Bilston

Continuation-in-part of Ser. No. 472,017, May 12, 1974, abandoned. This application Jan. 6, 1976, Ser. No. 646,822

Int. Cl.² B29D 3/02

U.S. Cl. 264—278 5 Claims

1. A method of injection moulding a pallet having a reinforcing frame which includes at least two assemblies having vertical and horizontal rods connected at their crossing points and said assemblies being connected together in spaced generally parallel relationship by a plurality of cross members, the method of injection moulding comprising the steps of; placing said frame within the walls of an open mould cavity, extending a plurality of first projections into said open cavity to engage at least two of said rods to hold said frame within said cavity and in spaced relationship with said cavity walls, closing said mould cavity, extending a pluralirty of opposed second projections horizontally into said closed cavity into engagement with said frame to hold said frame in said location, injecting ther-



moplastic polymeric material under pressure into said closed cavity to fill the cavity and thus substantially to encapsulate said frame with said material, withdrawing said first and second projections so that said plastics material flows into the voids created by the withdrawal of said projections thus completing the encapsulation of said frame by said material, causing said material to solidify, opening said mould cavity and removing said pallet.

4,029,729

ROTATIONAL MOLDING AND COMPOSITIONS THEREFOR

Robert L. Rees, and Fay W. Bailey, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

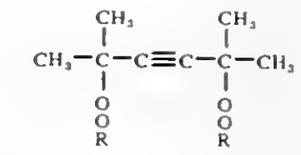
Division of Ser. No. 69,190, Sept. 2, 1970, abandoned, which is a continuation-in-part of Ser. No. 808,000, March 17, 1969, abandoned. This application May 8, 1972, Ser. No. 251,474

Int. Cl.² B29C 5/04

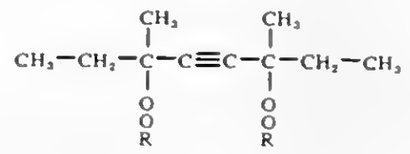
U.S. Cl. 264—310 14 Claims

1. A method for producing hollow articles which comprises:

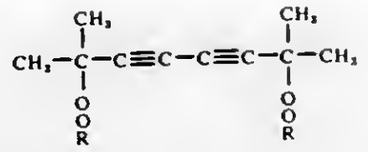
supplying to a mold a measured amount of a powdered thermoplastic moldable material comprising a solid polymer selected from the group consisting of ethylene homopolymers, copolymers of ethylene and at least one acrylic mono-1 olefin hydrocarbon having 3 to 8 carbon atoms per molecule formed from at least 75 weight percent ethylene, and mixtures thereof, having a melt index of at least about 10 having incorporated within the molding resin a crosslinking amount of an acetylenic diperoxy compound selected from the group consisting of hexynes having the formula



octynes having the formula



and octynes having the formula



wherein R is selected from the group consisting of tertiary alkyl, alkyl carbonate, and benzoate;

rotating the mold while heating it to fuse the thermoplastic powder; and

cooling the mold to cause the hollow article to solidify whereby said article has high impact strength and environmental stress cracking resistance (ESCR) and smooth inner surface.

4,029,730

CORDLESS VEHICLE TIRE

Herman E. Schroeder, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 476,132, May 31, 1974, abandoned, which is a division of Ser. No. 217,033, Jan. 11, 1972, Pat. No. 3,860,052. This application June 25, 1975, Ser. No. 590,375

Int. Cl.² B29H *5/18*

U.S. Cl. 264—315 **5 Claims**

1. A process for rapidly making a cordless vehicle tire which comprises adding to a mold containing an ethylene/-propylene/non-conjugated diene elastomer tread an isocyana-to-terminated prepolymer made from the reaction of an organic diisocyanate and a poly(alkylene oxide) glycol containing dispersed therein a methylene dianiline salt complex wherein said salt is selected from the group consisting of sodium chloride, sodium bromide, sodium iodide, sodium nitrite, lithium chloride, lithium bromide, lithium iodide, lithium nitrite or sodium cyanide, heating the prepolymer to a temperature of at least about 100° C in contact with the tread to simultaneously effect curing and adherence of the resulting polyurethane-carcass-sidewall to the tread.

4,029,731

AMINOPHENYLTETRALIN COMPOUNDS

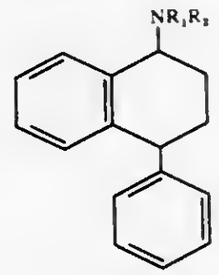
Reinhard Sarges, Mystic, Conn., assignor to Pfizer Inc., New York, N.Y.

Division of Ser. No. 521,451, Nov. 6, 1974, abandoned, which is a continuation of Ser. No. 292,526, Sept. 27, 1972, abandoned. This application June 4, 1976, Ser. No. 692,764

Int. Cl.² A01N *9/20, 9/24*; **C07C** *87/64*

U.S. Cl. 424—316 **5 Claims**

1. A method for combating depression in the treatment of a mentally-depressed subject, which comprises administering to said subject an effective amount of a compound selected from the group consisting of the trans-isomers of 1-amino-4-phenyltetraline bases of the formula;



and the pharmaceutically acceptable acid addition salts thereof, wherein R_1 is a member selected from the group consisting of hydrogen and alkyl having from one to three carbon atoms, and R_2 is a member selected from the group consisting of hydrogen alkyl having from one to three carbon atoms and cycloalkyl having from three to six carbon atoms, said R_2 only being cycloalkyl when R_1 is hydrogen.

4,029,732

PREPARATION OF BROMINE

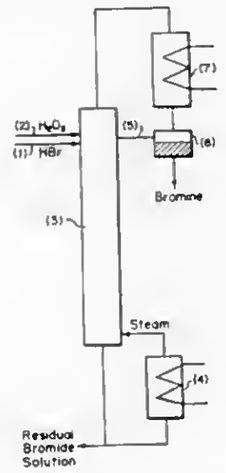
Georges Calloue, Port De Bouc, and Arsène Isard, Grenoble, both of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

Filed July 29, 1975, Ser. No. 599,960

Claims priority, application France, Aug. 2, 1974, 74.26851

Int. Cl.² C01B *7/10*

U.S. Cl. 423—500 **8 Claims**



1. A method of preparing bromine in an aqueous medium which comprises

a. contacting an aqueous solution of hydrogen peroxide with an aqueous solution containing bromide ions in an amount of about 0.1 to 1.0 mols of hydrogen peroxide per mol of bromide ion, to produce bromine;

b. vaporizing and removing the bromine produced from the aqueous medium substantially as rapidly as it is produced by an upward stream of inert gas or steam to substantially prevent the bromine from reacting with the hydrogen peroxide; and

c. condensing and collecting the bromine.

4,029,733

EXTRACTION OF METALS FROM SEA NODULES

Pierre Faugeras, Versailles; Pierre Miquel, Chatillon, and Michèle Robaglia, Orsay, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Feb. 11, 1975, Ser. No. 549,046

Claims priority, application France, Feb. 28, 1974, 74.06888

Int. Cl.² C01G *3/10, 53/10*

U.S. Cl. 423—21 **8 Claims**

1. A method for extraction of metals from manganiferous sea nodules, wherein said method comprises the steps of:

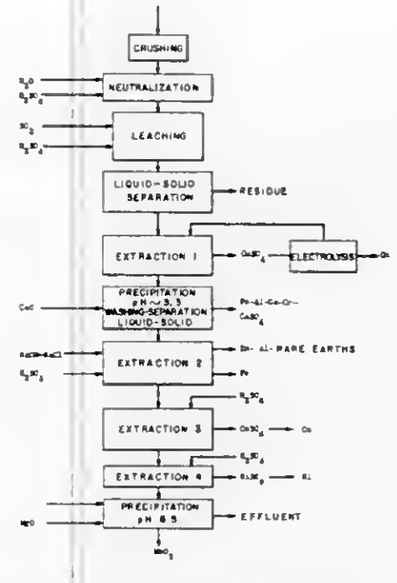
a. crushing of the ore;

b. mixing the crushed ore with a first sulphuric acid solution to form a pulp;

c. neutralizing the pulp by contact with a second sulphuric acid solution to adjust the pH of the pulp to 2 to 4, leaving substantially all the metals dissolved in the ore;

d. introducing a controlled quantity of sulphur dioxide gas corresponding to the stoichiometry of the reaction of sulphation of manganese dioxide by sulphur dioxide at a pH value within the range of 1.5 to 4 with agitation in order to break down the structure of the neutralized ore and promote subsequent dissolution of the metals including the desired quantity of manganese;

e. leaching the ore with sulphuric acid at a pH value within the range of 1 to 3;



f. separating the solid and liquid phases; and

g. separating the metals contained in the liquid phase.

4,029,734

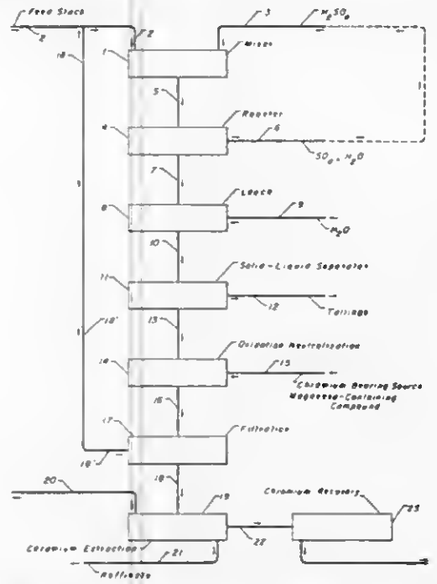
RECOVERY OF CHROMIUM VALUES

John C. Stauter, Itasca, and Richard T. Um, Mount Prospect, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed Feb. 19, 1976, Ser. No. 659,390

Int. Cl.² C01G *37/00*

U.S. Cl. 423—54 **8 Claims**



1. In the recovery of chromium values from a chromium bearing source, the improved method which comprises the steps of:

a. forming a mixture of said chromium bearing source, sulfuric acid and a compound containing manganese in at least a +4 valence state in a weight ratio of from about 1:1:1 to about 1:2:10 chromium bearing source, manganese compound and sulfuric acid, respectively;

b. roasting said mixture at a temperature of from about 200° to about 500° C for a sufficient time to remove the major portion of its water content and excess sulfuric acid;

c. leaching the resultant damp pulp with water at a temperature of from about 25° to about 95° C;

d. filtering the leach solution to separate undissolved solids from pregnant leach liquor containing dissolved manganese compound and chromium ions in a +3 valence state;

e. subjecting the pregnant leach liquor to a neutralization-oxidation treatment with an additional amount of said chromium bearing source and manganese compound to oxidize said chromium ions to a +6 valence state; and

f. thereafter selectively extracting chromium from the thus treated pregnant leach liquor.

4,029,735

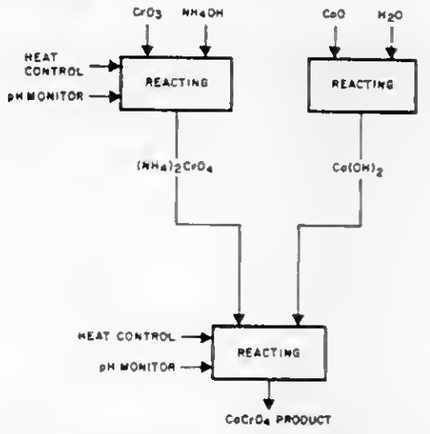
PROCESS FOR MAKING CALCIUM CHROMATE

Beverly M. Dillard, Clearwater, and William W. Welbon, Bellealr, both of Fla., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Oct. 9, 1975, Ser. No. 621,000

Int. Cl.² C01G *37/14*

U.S. Cl. 423—596 **1 Claim**



1. A process for forming calcium chromate comprising: reacting aqueous chromium trioxide with ammonium hydroxide to form aqueous ammonium chromate by adding the ammonium hydroxide to the aqueous chromium trioxide at a rate establishing and thereafter maintaining a temperature of about 65° to 75° C until a pH of about 7 is attained; and reacting calcium oxide with water to form an aqueous suspension of calcium hydroxide and reacting the aqueous ammonium chromate and the calcium hydroxide to form the calcium chromate by adding the aqueous calcium hydroxide suspension to the aqueous ammonium chromate at a rate establishing and thereafter maintaining a temperature of about 65° to 70° C until a pH of about 10 to 11 is attained.

4,029,736

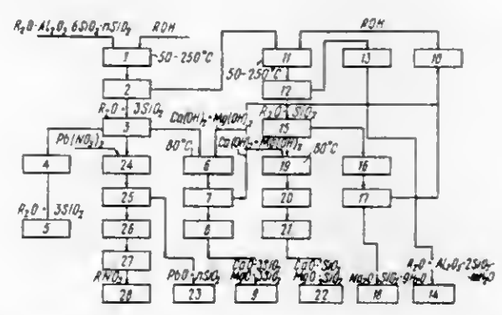
PROCESSING PEARLITE TO OBTAIN METAL SILICATES

Garegin Sarkisovich Melkonian, ulitsa Barekamutiana, 26, kv. 11, Erevan, U.S.S.R.

Filed June 7, 1973, Ser. No. 367,876

Int. Cl.² C01B *33/26*

U.S. Cl. 423—118 **8 Claims**



1. A method of processing pearlite comprising treating pearlite with an alkali metal hydroxide solution having a concentration of 40–140 g/l taken in an amount which brings the ratio of the liquid and solid phases to (0.7–1.5) : 1, to form a

pulp, hydrothermally treating the obtained pulp in an autoclave to form water glass and separating the water glass from the residue by filtration, treating the residue with an alkali metal hydroxide solution having a concentration of 150–200 g/l taken in an amount which brings the ratio of the liquid and solid phases to 0.5:1, at a temperature not below 50° C, followed by filtering to separate a residue of sodium metasilicate.

2. The method of claim 1, wherein the residue, separated upon filtering sodium metasilicate, containing alkali metal aluminosilicates is subjected to drying.

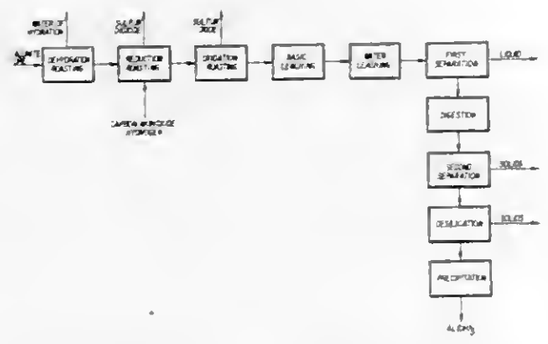
3. The method of claim 1, wherein the filtrate, obtained on separating the sodium metasilicate by filtration is reacted with hydroxides of alkaline earth metals taken in equivalent ratios to form a pulp, and the pulp is heated to the boiling temperature, whereupon the precipitated silicates of alkaline earth metals are separated by filtration.

4,029,737

REDOX TREATMENT OF ALUNITE ORE

Douglas Stevens, Golden, Colo.; Helge O. Forberg, Owensboro, Ky.; Larry D. Jennings, Arvada, Colo.; David L. Thompson, Arvada, Colo., and Julian V. Copenhaver, Arvada, Colo., assignors to Southwire Company, Carrollton, Ga.; National Steel Corporation, Pittsburgh, Pa. and Earth Sciences, Inc., Golden, Colo.

Filed Apr. 9, 1976, Ser. No. 675,383
Int. Cl.² C01F 7/06, 7/14
U.S. Cl. 423—127 24 Claims



1. A method for recovering aluminum hydroxide and other valuable constituents from ore containing alunite, comprising the steps of:

a. roasting the ore to remove water of hydration,

b. roasting the dehydrated ore resulting from step (a) in a reducing atmosphere to remove sulfate,

c. roasting the reduced ore resulting from step (b) in an oxidizing atmosphere to convert sulfides to sulfur oxides,

d. leaching the oxidized ore from step (c) with an aqueous containing inorganic base at a pH of from about 8 to about 10.5 to avoid the subsequent formation of trihydrates,

e. leaching the oxidized ore resulting from step (d) with an aqueous containing inorganic solvent to remove potassium and sulfate,

f. separating the liquid and solid portions of the slurry resulting from step (e),

g. digesting the solid portion resulting from step (f) with an aqueous mixture of alkali metal hydroxides at a concentration and at a temperature sufficient to extract the aluminum content from said solid portion,

h. separating the liquid and solid portions of the digestion mixture resulting from step (g),

i. precipitating silica from the liquid portion resulting from step (h),

j. separating the supernatant from the precipitant resulting from step (i),

k. precipitating aluminum hydroxide from the supernatant resulting from step (j), and

l. separating the supernatant from the precipitated aluminum hydroxide resulting from step (k).

4,029,738

DECOMPOSING NITROGEN OXIDES WITH NICKEL-IRON-CHROMIUM CATALYSTS

Philippe Courty, Nanterre; André Sugier, Rueil-Malmaison; Bernard Raynal, Le Pecq, and Georges Berrebi, Massy, all of France, assignors to Societe Francaise des Produits pour Catalyse, Rueil-Malmaison, France

Continuation of Ser. No. 245,771, April 20, 1972, abandoned.
This application Nov. 18, 1974, Ser. No. 524,880
Claims priority, application France, Dec. 2, 1971, 71.43394
Int. Cl.² B01D 53/00
U.S. Cl. 423—213.2 13 Claims

1. In a process for the reduction of nitrogen oxides present in a gaseous mixture containing said nitrogen oxides and a sufficient amount of reducing gas to reduce said nitrogen oxides, said process comprising contacting said gaseous mixture with a catalyst at about 200°–800° C, the improvement wherein said catalyst consists essentially of a carrier on which is deposited, in a proportion of from 3 to 20% of the catalyst weight, a dispersed, homogeneous active phase of mixed oxide of the formula $Ni_x(Fe_yCr_z)O_t$, x has a value from 0.85 to 1.30, the sum $(y + z)$ a value from 1.8 to 2.3, the ratio

$$\frac{y}{y+z}$$

a value in the range of from 0.02:1 to 0.6:1 and t is a positive value from 2 to 6, said active phase being deposited by impregnation of said mixed oxide in dissolved form, whereby said nitrogen oxides are substantially converted into molecular nitrogen.

8. A process as defined by claim 1 wherein said gaseous mixture is an exhaust gas of an internal combustion engine and the reducing gas is selected from the group consisting of carbon monoxide, hydrogen and mixtures thereof.

4,029,739

PROCESS FOR REMOVING NITROGEN OXIDES FROM WASTE GAS

Teizo Senjo, Machida, and Makio Kobayashi, Toyonaka, both of Japan, assignors to Fuji Kasui Engineering Co., Ltd., Tokyo, and Sumitomo Metal Industries, Ltd., Osaka, both of Japan

Filed Dec. 30, 1975, Ser. No. 645,350
Claims priority, application Japan, Jan. 6, 1975, 50-000009
Int. Cl.² C01B 21/00
U.S. Cl. 423—235 11 Claims

1. A process for removing nitrogen oxides including nitrogen monoxide and nitrogen dioxide from a waste gas substantially free of sulfur oxides comprising the steps of:

a. oxidizing the nitrogen monoxide to the nitrogen dioxide by adding a gaseous oxidizing agent to the waste gas, and

b. scrubbing the waste gas with an aqueous scrubbing solution to reduce a nitrogen oxides to nitrogen consisting essentially of:

i. at least 0.5% by weight of at least one sulfur-containing reducing compound selected from the group consisting of sulfites, thiosulfates, sulfides, polysulfides, hydrosulfites and hydrosulfides of alkali metals or ammonium, and

ii. at least 500 ppm by weight of at least one catalytic compound selected from the group consisting of (a) amino compounds having the general formula $R(NH_2)_n$, wherein R represents substituted or unsubstituted hydrocarbon radicals, said substituent being one or more oxygen-, sulfur-, or nitrogen-containing hetero radicls, and n represents a positive integer, (b) nitro compounds having the general formula $R(NO_2)_n$, wherein R represents substituted or unsubstituted hydrocarbon radicals, said substituent being one or more

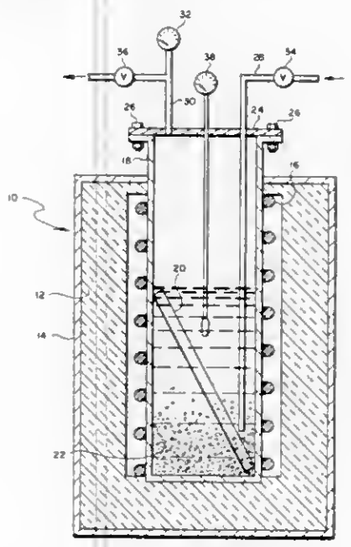
oxygen-, sulfur- or nitrogen-containing hetero radicals and n represents a positive integer and (c) nitroso compounds and hydroxylamino compounds produced by the reduction reaction of said nitro compounds or the oxidation reaction of said amino compounds.

4,029,740

METHOD OF PRODUCING METAL NITRIDES

Guy Ervin, Jr., Northridge, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Nov. 24, 1975, Ser. No. 634,687
Int. Cl.² C01F 15/00; C01G 43/00, 56/00
U.S. Cl. 423—251 9 Claims



1. A method of producing a selected nitride comprising the steps of:

a. providing a salt bath in a reaction zone;

b. introducing the selected metal into the salt bath in the presence of gaseous nitrogen;

c. providing a halide of the selected metal in an amount of at least 10 gm per liter of salt;

d. maintaining the salt bath at a temperature above its melting point and below its boiling point for a time sufficient for a desired amount of the selected metal to be reacted and form a precipitate of a nitride of the selected metal;

e. removing the salt from the reaction zone; and

f. recovering the selected metal nitride.

7. A method of producing a selected metal nitride comprising the steps of:

a. providing a molten salt bath in an inert atmosphere in a closed reaction zone;

b. introducing the selected metal into the molten salt bath in the presence of gaseous nitrogen, said selected metal being selected from the group consisting of plutonium uranium, thorium, and mixtures thereof;

c. providing a halide of the selected metal in an amount of at least 10 gms per liter of molten salt;

d. maintaining the molten salt bath at a temperature above its melting point and below its boiling point, said temperature being within the range of from 250° to 900° C, for a time sufficient for a desired amount of the selected metal to be reacted to form a precipitate of a nitride of the selected metal;

e. reducing the pressure in the reaction zone to less than about 10 mm/Hg and increasing the temperature above the boiling point of the salt, said temperature being within the range of from about 500° to 1500° C, for a time sufficient to volatilize the molten salt;

f. removing the volatilized salt from the reaction zone; and

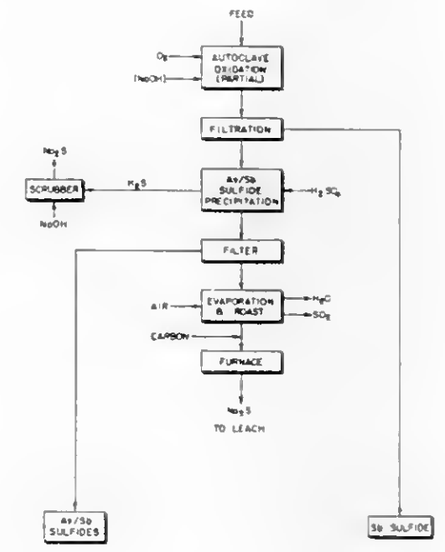
g. recovering the selected metal mononitride as a fine precipitate having a particle size of less than 5 microns.

4,029,741

RECOVERY OF ANTIMONY SULFIDES

Enzo L. Coltrinari, Arvada, Colo., assignor to Tajima Rooling Co., Ltd., Tokyo, Japan

Filed Mar. 1, 1976, Ser. No. 662,597
Int. Cl.² C01B 29/00
U.S. Cl. 423—179 9 Claims



1. A process for recovering antimony sulfides from an aqueous solution comprising thioantimony compounds and thioarsenic compounds, comprising:

subjecting the solution to partial oxidation by injecting sufficient oxygen so as to maintain a final solution e.m.f. of from about 300 millivolts to about 500 millivolts, measured with platinum/saturated Calomel electrodes, while maintaining the product solution at a pH of from about 7 to about 11 in order to oxidize and precipitate a substantial portion of the thioantimony compounds as antimony sulfides while leaving substantially all of the thioarsenic compounds in solution.

4,029,742

PROCESS OF PRODUCING MADDRELL SALT

Klaus Sommer, Heidelberg, and Hermann Weber, Hemsbach, both of Germany, assignors to Benckiser-Knapsack GmbH, Ladenburg (Neckar), Germany

Filed Apr. 6, 1976, Ser. No. 674,123
Claims priority, application Germany, Apr. 9, 1975, 2515370
Int. Cl.² C01B 15/16, 25/26
U.S. Cl. 423—314 12 Claims

1. In a process of producing Maddrell salt, including the steps of heating a starting material selected from the group consisting of mono-sodium orthophosphate, di-sodium pyrophosphate, and mixtures thereof, to a temperature between about 250° C. and about 450° C., whereby said starting material is converted to Maddrell salt, and recovering the Maddrell salt formed, the improvement which comprises carrying out said heating step with an admixture of said starting material

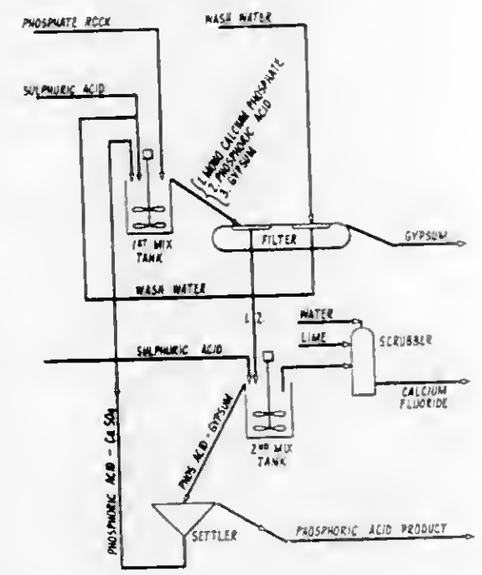
and a phosphoric acid salt of a nitogen-containing base in a catalytically effective amount of between about 0.25% and about 5.0%, by weight, of the starting material, whereby the Maddrell salt containing less than about 2% water-soluble impurities is formed.

4,029,743

PHOSPHORIC ACID MANUFACTURE

Douglas O. Hauge, 930 Acalanes Road, Lafayette, Calif. 94549

Filed Dec. 24, 1975, Ser. No. 644,106
Int. Cl.² C01B *25/22*
U.S. Cl. 423—320 **3 Claims**



1. A process for producing phosphoric acid from rock phosphate which comprises

a. continuously feeding finely divided rock phosphate, sulfuric acid, phosphoric acid and water to a first mixing zone and mixing them to form a slurry,

b. the quantity of sulfuric acid charged being about equal to the quantity stoichiometrically required to convert the calcium phosphate contained in the phosphate rock to monocalcium phosphate and other contained calcium compounds to $CaSO_4$, the quantity of phosphoric acid charged being on a molar basis from about 1.2 to 1.4 times the P_2O_5 content of the rock and the quantity of water charged being equal to 80 to 90 percent by weight of the rock phosphate charged whereby the slurry is characterized by a pH in the range 0.8 to 1.2 and by a calcium ion content in the liquid portion of the slurry about 3–4 percent by weight,

c. continuously withdrawing slurry from said first mixing zone and passing it into a filter zone to separate a filter cake comprising calcium sulfate and a filtrate comprising monocalcium phosphate,

d. passing the filtrate into a second mixing zone and there mixing it with a quantity of sulfuric acid stoichiometrically sufficient to convert the contained monocalcium phosphate to phosphoric acid and calcium sulfate,

e. continuously withdrawing phosphoric acid and calcium sulfate from the second mixing zone and passing them into a settling zone,

f. withdrawing product phosphoric acid from the upper portion of the settling zone,

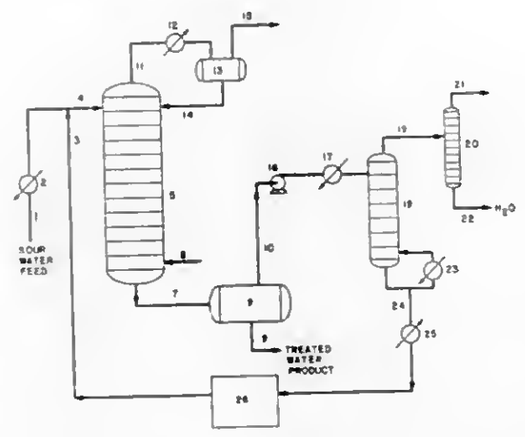
g. withdrawing a slurry of calcium sulfate in phosphoric acid from the lower portion of the settling zone and returning it to the first mixing zone.

4,029,744

PROCESS FOR REMOVING THE SALT OF A WEAK ACID AND A WEAK BASE FROM SOLUTION

Norman N. Li, Edison, and Robert P. Cahn, Millburn, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation of Ser. No. 382,466, July 25, 1973, abandoned. This application Apr. 14, 1975, Ser. No. 567,623
Int. Cl.² C01C *1/02*
U.S. Cl. 423—356 **22 Claims**



1. A process for removing the salt of a volatile weak acid and a weak base from aqueous solution which comprises contacting said solution with an emulsion under conditions of agitation, sufficient to maintain the emulsion dispersed in said aqueous solution, said emulsion comprising an exterior phase, said exterior phase being characterized as immiscible with solution and permeable to said weak base, and an interior phase, said interior phase comprising a reactant which is capable of converting said weak base to an impermeable form whereby said weak base permeates through said exterior phase into said interior phase wherein it is converted to a nonpermeable form, and simultaneously removing said volatile weak acid by passing an inert gas through said solution.

3. The process of claim 1 wherein said weak acid is selected from the group consisting of H_2S, SO_2, CO_2, HCN, and phenol.

12. A process for removing the salt of a weak acid and a volatile weak base from aqueous solution which comprises contacting said solution with an emulsion under conditions of agitation, sufficient to maintain the emulsion, said emulsion comprising an exterior phase, said exterior phase being characterized as immiscible with said solution and permeable to said weak acid, and an interior phase, said interior phase comprising a reactant which is capable of converting said weak acid to an impermeable form whereby said weak acid permeates through said exterior phase into said interior phase wherein it is converted to a nonpermeable form, and simultaneously removing said volatile weak base by passing an inert gas through said solution.

15. The process of claim 12 wherein said weak base is selected from the group consisting of ammonia and amines.

4,029,745

PROCESS FOR REDUCING MOLTEN AMMONIUM SULFATES CONTAINING METALLIC IMPURITIES TO AMMONIA AND SULFUR DIOXIDE

Claude Dezael, Maisons Laffitte; Philippe Renault, Noisy le Roi, and André Deschamps, Chatou, all of France, assignors to Institut Francais du Petrole des Carburants et Lubricants et Enterprise de Recherches et d'Activities Petroilers Elf, Rueil-Malmaison, France

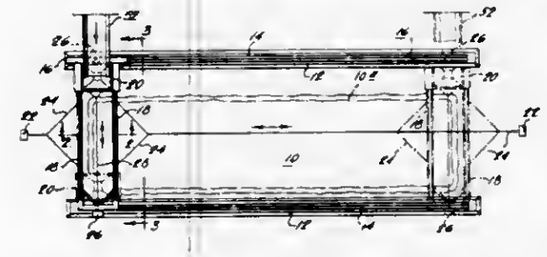
Filed July 21, 1975, Ser. No. 597,532
Claims priority, application France, Aug. 1, 1974, 74.27060
Int. Cl.² C01B *17/50;* **C01C** *1/02*
U.S. Cl. 423—356 **7 Claims**

1. In a process for reducing ammonium sulfate containing at least iron sulfate as an impurity, wherein said impure ammonium sulfate is progressively introduced into a reaction zone at 150°–450° C, is reacted in the molten state with molecular sulfur, hydrogen sulfide and/or ammonium thiosulfate to form a sulfur-dioxide containing gas, and the so-formed gas is discharged, the improvement comprising maintaining the iron sulfate content of the impure ammonium sulfate in the reaction zone in the range of 1 to 15% by weight by (a) withdrawing a fraction of said impure ammonium sulfate from said bath at a sufficient rate to maintain the 1–15% by weight concentration of iron sulfate in the reaction zone, (b) treating the withdrawn fraction with water and ammonia so as to precipitate iron compounds, (c) separating the iron compound precipitate from the remaining ammonium sulfate fraction, of low iron content, and (d) feeding back the ammonium sulfate fraction obtained from step (c) to the reaction zone.

4,029,746

MOVABLE PELLETIZING ROLLS

Steven I. Taub, Wilmington, Del., and Frederic J. Osterman, Ardmore, Pa., assignors to IU Conversion Systems, Inc., Philadelphia, Pa.

Filed Nov. 17, 1975, Ser. No. 632,673
Int. Cl.² B29C *15/00*
U.S. Cl. 425—363 **11 Claims**

1. Apparatus for forming and curing compression formed particles comprising continuous particle forming means, said forming means mounted on a mobile mount adapted to move said forming means over a particle curing area with limited vertical clearance between the outlet of said forming means and the surface of said particle curing area, said mounted forming means being adapted to deposit particles formed in said forming means, with minimum drop and handling, substantially throughout said curing area.

4,029,747

METHOD OF PREPARING INORGANIC MONOMERIC AND POLYMERIC COMPLEXES AND PRODUCTS SO PRODUCED

George G. Merkl, Haworth, N.J., assignor to Molecular Energy Research Co., Inc., Houston, Tex.

Continuation-in-part of Ser. No. 527,355, Nov. 26, 1974. This application Nov. 17, 1975, Ser. No. 631,949
Int. Cl.² C01B *21/00*
U.S. Cl. 423—413 **27 Claims**

1. A method of producing an inorganic polymeric complex which comprises:

reacting in an aqueous medium

a. at least one non-alkaline metal selected from Groups I–VIII of the Periodic Table;

b. an alkali metal hydroxide; and

c. a source of reactive NH_2 groups according to the following sequence:

i. introducing a predetermined quantity of said non-alkaline metal into a reaction vessel containing said aqueous medium;

ii. providing in said aqueous medium, a supply of said source of NH_2 groups;

iii. adding said alkali metal hydroxide to said reaction vessel, in the presence of said source of NH_2 groups, in such manner as to provide intimate contact between the alkali metal ions and the non-alkaline metal and a localized area in the immediate vicinity of said non-alkaline metal of pH approaching a value of 14, whereby the non-alkaline metal erodes, producing non-alkaline metal ions in said reaction medium, said non-alkaline metal ions entering into reaction with the alkali metal ions and reactive NH_2 groups to produce an inorganic monomeric complex;

said alkali metal hydroxide being added at a rate sufficient to bind substantial quantities of NH_2 in an overall endothermic reaction with said alkali metal hydroxide and said non-alkaline metal;

iv. thereafter establishing an exothermic reaction in said reaction vessel characterized by increased erosion of said non-alkaline metal and the formation of an inorganic polymeric complex; and

terminating the reaction by removing any unreacted non-alkaline metal from the reaction medium.

4,029,748

IRIDIUM CARBONYL COMPLEXES

Denis Forster, University City; Arnold Hershman, Creve Couer, and Donald E. Morris, Kirkwood, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed July 29, 1974, Ser. No. 492,958
Int. Cl.² C01G *1/04*
U.S. Cl. 423—418 **3 Claims**

1. A solution of dicarbonyldiiodohydridoaquoiridium (III), $[HIr(CO)_2I_2(H_2O)]$, in inert solvent.

2. A process for preparing $[HIr(CO)_2I_2(H_2O)]$ consisting of mixing a solution of [Ir(cyclooctadiene)I_3] with a mixture of hydrogen and carbon monoxide under pressure at elevated temperature, followed by treating the resulting solution with from 1 to 5 moles of water per mole of iridium compound.

3. A process for preparing $[HIr(CO)_2I_2(H_2O)]$ consisting of mixing a solution of [Ir(cyclooctadiene)I] with carbon monoxide and then excess iodine, followed by adding thereto carbon monoxide and hydrogen under pressure at elevated temperature and subsequently treating the resulting solution with from 1 to 5 moles of water per mole of iridium compound.

4,029,749

PROCESS FOR MANUFACTURING NEEDLE COKE

Hisashi Murakami, Tokyo, Japan, assignor to Mitsui Coke Co. Ltd., Tokyo, Japan

Filed Oct. 16, 1975, Ser. No. 622,897
Claims priority, application Japan, Nov. 29, 1974, 49-136165
Int. Cl.² C01B *31/02, 57/04*
U.S. Cl. 423—449 **7 Claims**

1. A process for manufacturing needle coke which comprises crushing coal into comminuted particles; dispersing said comminuted particles into a suitable solvent; subjecting the dispersed particles to hydrogenolysis liquefaction at 360° –480° C and 1–150 Kg/Cm² of hydrogen pressure to obtain a liquefied coal solution; distilling the substantially ashless liquefied coal solution thus obtained at 250°–600° C to remove

solid impurities and unreacted coal therefrom; and coking at least one selected distillate fraction of said distillation in a coking apparatus.

4,029,750

SOLID PARTICULATE LOBULAR $ALCL_3$

Ronald C. Schoener, Lower Burrell, Pa.; Larry K. King; Lester L. Knapp, both of Maryville, Tenn., and Nicholas Kloap, Benton, Ark., assignors to Aluminum Company of America, Pittsburgh, Pa.

Continuation of Ser. No. 180,277, Sept. 14, 1971, abandoned. This application Aug. 26, 1974, Ser. No. 500,757

Int. Cl.² C01F *7/56, 7/58;* **B01D** *7/00*

U.S. Cl. 423—495 **7 Claims**

1. Solid lobular $AlCl_3$ of essentially curvilinear contour compositely constituted of autogeneously bonded pluralities of smaller sized particles of essentially spheroidate character and characterized by the absence of planar exterior surfaces and sharp proturberant angles.

4,029,751

PROCESS FOR PRODUCING SULFURIC ACID

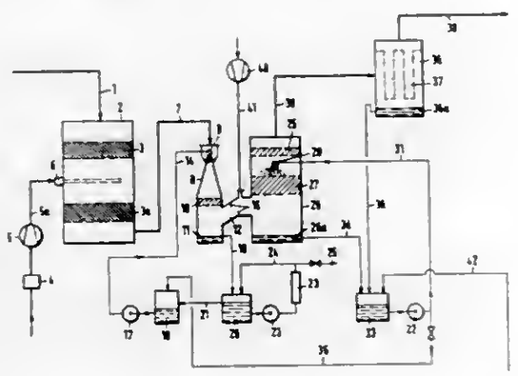
Karl-Heinz Dörr, Mainz; Hugo Grimm, Frankfurt am Main; Waldemar Weber; Michael Tacke, both of Offenbach, and Georg Schmidt, Frankfurt-Nied, all of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Filed Dec. 29, 1975, Ser. No. 645,125

Claims priority, application Germany, May 5, 1975, 2519928

Int. Cl.² C01B *17/76;* **B01D** *53/00*

U.S. Cl. 423—522 **8 Claims**



1. In the contact process for producing sulfuric acid from undried feed gases where a SO_3-containing humid gas is produced, said gas is directly cooled with aqueous sulfuric acid, sulfuric acid is condensed in the gases cooled below the dew point of the sulfuric acid, and the water not required to form sulfuric acid is discharged as water vapor with the end gases, the improvement which comprises

i. adding sulfuric acid of 70–95% by weight to cocurrently flowing, SO_3-containing humid gases so that the latter are directly cooled to 120°–230° C;

ii. collecting a major part of the sulfuric acid in a sump;

iii. indirectly cooling a partial stream of the collected sulfuric acid and then recycling to the SO_3-containing gases;

iv. discharging the other part of the sulfuric acid as product acid;

v. admixing cold air to the cooled gases, subsequently treating the gas-air mixture with dilute sulfuric acid of 5–70% by weight and collecting and diluting further the dilute sulfuric acid by an addition of water;

vi. recycling a partial stream of the further diluted sulfuric acid to the gas-air mixture while adding the other part of further diluted sulfuric acid to the recycled acid of 70–95% by weight;

vii. controlling the rates at which air and water are added so that the exhaust gas which has been treated with the dilute sulfuric acid has a temperature which is harmless for the succeeding mist collecting units, the treatment with the dilute sulfuric acid resulting in an evaporation of water substantially at the rate at which it is added; and

viii. collecting the acid mists from the exhaust gas in a mist collector.

4,029,752

METHOD OF PRODUCING SULFUR FROM SULFUR DIOXIDE

Robert P. Cahn, Millburn, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 364,888, May 29, 1973, abandoned. This application Apr. 22, 1974, Ser. No. 462,747

Int. Cl.² C01B *17/16*

U.S. Cl. 423—563 **22 Claims**

1. A method for thermally reducing sulfur dioxide comprising the step of reacting sulfur dioxide with gaseous ammonia at a molar ammonia/sulfur dioxide ratio of at least 4:3 at a temperature above about 1200° F. such that one or more compounds selected from the group consisting of elemental sulfur and hydrogen sulfide are produced.

4,029,753

SULFUR PLANT TEMPERATURE CONTROL

David K. Beavon, Pasadena, Calif., assignor to Ralph M. Parsons Company, Pasadena, Calif.

Filed Jan. 12, 1976, Ser. No. 648,198

Int. Cl.² C01B *17/04*

U.S. Cl. 423—574 R **8 Claims**

1. In a Claus process for the production of sulfur wherein a gaseous stream comprising hydrogen sulfide is combined with a source of oxygen in a flame zone in proportions to convert, by combustion, sufficient hydrogen sulfide to sulfur dioxide to form, with hydrogen sulfide added in a thermal conversion zone, a reaction gas stream wherein the mole ratio of hydrogen sulfide to sulfur dioxide is about 2:1, passing the reactive gas stream through the thermal converison zone where at a temperature above the dew point of sulfur, sulfur is thermally formed by reaction of a portion of the hydrogen sulfide with sulfur dioxide, from which the formed sulfur is condensed to form a residual gas stream, and wherein additional sulfur is formed by passing the residual gas stream through a plurality of catalytic conversion stages in series, and wherein the residual as stream is heated to a temperature sufficient to initiate catalytic reaction of hydrogen sulfide and sulfur dioxide prior to each stage, and formed sulfur is condensed following each catalytic conversion stage in a sulfur condensation stage, the improvement which comprises heating the residual gas stream to the catalytic initiation temperature by indirect heat exchange with high pressure steam generated by indirect flash heating of water in the flame zone to form steam at a pressure of at least about 600 psig, the quantity of steam formed being sufficient to at least heat the residual gas stream between each sulfur condensation and catalytic sulfur formation stage to a temperature required to initiate the catalytic reaction of sulfur dioxide with hydrogen sulfide to form elemental sulfur.

4,029,754

PROCESS FOR PRODUCING HYDROGEN AND OXYGEN

Shoichi Sata, Mito, and Yasumasa Ikezoe, Tokai, both of Japan, assignors to Japan Atomic Energy Research Institute, Tokyo, Japan

Filed July 11, 1975, Ser. No. 595,324

Claims priority, application Japan, July 18, 1974, 49-82547

Int. Cl.² C01B *13/02, 1/02*

U.S. Cl. 423—579 **4 Claims**

1. A process for producing hydrogen and oxygen from water, at temperatures not higher than 1000° C, comprising the steps of:

1. reacting manganese (II) chloride with carbon dioxide at a temperature higher than 550° C to obtain manganese (II) oxide, carbon monoxide and chlorine;

2. reacting the carbon monoxide obtained as a result of step (1) with water vapor to produce carbon dioxide and hydrogen;

3. reacting the manganese (II) oxide obtained as a result of step (1) with hydrogen chloride to produce manganese (II) chloride; and

4. reacting the chlorine obtained as a result of step (1) with water vapor to produce hydrogen chloride and oxygen.

4,029,755

TRANSPARENT ULTRAFINE GRAINED CERAMICS

George E. Gazza, Sudbury, and Sunil K. Dutta, Waltham, both of Mass., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Division of Ser. No. 224,244, Feb. 7, 1972, Pat. No. 3,767,745, which is a continuation-in-part of Ser. No. 81,612, Oct. 16, 1970, abandoned. This application Apr. 11, 1973, Ser. No. 350,287

Int. Cl.² C01F *7/04*

U.S. Cl. 423—600 **1 Claim**

1. Light-transparent ultrafine grained lithium aluminate made by a method of cold-pressing a lithium aluminate powder having a cubic crystal structure and having the formula $LiAl_5O_8$, to form a compact, followed by pressing the compact; said method comprising the steps of:

cold-compressing said lithium aluminate powder to about 40–50% of theoretical density to form a compact,

heating the compact under a vacuum to about 600° C to remove undesired gases,

raising the temperature of said compact to about 1,150° C, applying a pressure of about 6000–7000 p.s.i., maintaining said compact at said temperature and pressure for about 50–60 minutes, further raising the temperature of said compact to about 1,600° C in isothermal increments of about 50° C under said pressure while maintaining the temperature at each incremental increase for a period of about 50–60 minutes, and recovering a full-density light-transparent product having a grain of about 1 micron.

4,029,756

SEROLOGICAL PROCEDURE FOR DETERMINING PRESENCE OF NEISSERIA GONORRHOEAE ANTIBODIES

Hassan A. Gaafar, Slingerlands, N.Y., assignor to Research Corporation, New York, N.Y.

Filed Nov. 26, 1975, Ser. No. 635,325

Int. Cl.² A61K *43/00, 39/02;* **G01N** *31/00, 33/16*

U.S. Cl. 424—1 **13 Claims**

1. A serological method for determining the presence of *Neisseria gonorrhoeae* antibodies in human serum which comprises heating the serum at about 56° C. to 65° C. for from about 15 to 40 minutes, the serum being undiluted or diluted with physiological saline at a dilution up to about 1:1000; adding the serum to about an equal volume of *Neisseria meningitides* sorbent composition containing from 0.1 to 100 sorbent units of *Neisseria meningitides* antigen to remove cross reacting antibodies and thereafter mixing and incubating resulting mixture with a composition containing a heat labile *Neisseria gonorrhoeae* antigen produced from a culture of *Neisseria gonorrhoeae* antigen to form *Neisseria gonorrhoeae* antigen-antibody conjugate when said antibodies are present and detecting the presence of such conjugate.

4,029,757

MANUFACTURE OF PHARMACEUTICAL UNIT DOSAGE FORMS

Arthur Roman Mlodozeniec, Montclair, and Lawrence Samuel White, Ramsey, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Dec. 15, 1975, Ser. No. 640,652

Int. Cl.² A61K *9/70;* **B32B** *33/00*

U.S. Cl. 424—27 **4 Claims**

1. A method of preparing solid pharmaceutical unit dosage forms comprising loading one or more medicaments to a therapeutically inert, edible web, fabricating said web into a solid geometric form of predetermined dimensions having said medicament substantially internalized, said form being divisible into a plurality of unit dosage forms, unitizing said geometric form into said plurality of unit dosage forms and sealing said unit dosage forms to completely internalize said medicament wherein said procedures include at least one non-destructive testing operation to assure uniform quality of said unit dosage forms, wherein said fabrication procedure comprises fan folding a continuous web structure comprising at least one pair of layers of web having medicament loaded to the facing surfaces thereof and subjecting said stack to pressure to densify and shape same into a continuous rod-like geometric form.

4,029,758

PREPARATION OF PHARMACEUTICAL UNIT DOSAGE FORMS

Arthur Roman Mlodozeniec, and Arthur H. Goldberg, both of Montclair, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Dec. 15, 1975, Ser. No. 640,612

Int. Cl.² A61K *9/70;* **B32B** *31/18*

U.S. Cl. 424—27 **1 Claim**

1. A method of preparing solid pharmaceutical unit dosage forms comprising loading one or more medicaments to a therapeutically inert, edible web, fabricating said web into a solid geometric form of predetermined dimensions having said medicament substantially internalized, said form being divisible into a plurality of unit dosage forms, said fabrication comprising forming a stack of said webs arranged so that substantially no medicament is loaded to an outer surface thereof, cutting said stack to unitize same into unit dosage forms and simultaneously sealing only the edges of said unit dosage forms by applying heat and pressure during said cutting procedure thereby completely internalizing said medicament, said

procedure including at least one non-destructive testing operation to assure uniform quality of said unit dosage forms.

4,029,759

COMPOSITIONS CONTAINING COMPOUNDS PRODUCING A COOLING SENSATION

Francoise Ernestine Lucie Humbert, Paris, and Yves Tollard D'Audiffret, Neuilly-sur-Seine, both of France, assignors to Lever Brothers Company, New York, N.Y.

Filed Feb. 15, 1973, Ser. No. 332,955

Claims priority, application Luxembourg, Feb. 28, 1972, 64851

Int. Cl.² A61K *7/16*

U.S. Cl. 424—49 **1 Claim**

1. A method for imparting a cooling property to a composition for the care of the oral cavity comprising the step of adding to the composition from about 0.025 to about 2 percent by weight of the composition of a compound selected from the group consisting of 2-hydroxymethylmenthol, 2-(β-hydroxy ethyl)-menthol, 3-hydroxymethylcarvomenthol and 3-(β-hydroxy ethyl)-carvomenthol.

4,029,760

ANTI-GINGIVITIS ORAL COMPOSITION

Yannick De Roeck born Holtzhauer, and Herve De Roeck, both of Nantes, France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), France

Filed Mar. 11, 1975, Ser. No. 557,353

Claims priority, application France, Mar. 12, 1974, 74.09003

Int. Cl.² A61K *9/68*

U.S. Cl. 424—48 **19 Claims**

1. A pharmaceutically-acceptable dentifrice composition having an effective concentration of gingivitis-controlling active ingredient, an essential gingivitis-controlling component of which is at least one carragheenin.

14. In a chewing-gum composition having a physiologically-active ingredient therein, the improvement wherein an essential component of the physiologically-active ingredient is at least one carragheenin and the component constitutes a proportion of the composition effective to control gingivitis.

4,029,761

METHOD FOR TREATING GINGIVITIS

Patrick John Kingsley, Barrow-on-Soar Loughborough, England, assignor to Fisons Limited, London, England

Filed Oct. 6, 1975, Ser. No. 619,822

Claims priority, application United Kingdom, Oct. 19, 1974, 45339/74

Int. Cl.² A61K *31/35, 7/24*

U.S. Cl. 424—55 **11 Claims**

1. A method for the treatment of gingivitis, which comprises topically administering onto the teeth, gums or oral mucous membrane an effective quantity of 1,3-bis(2-carboxychromo-5-yloxy)-2-hydroxypropane, or a pharmaceutically acceptable salt thereof, as active ingredient, to a patient suffering from gingivitis.

4,029,762

LIPID A-PREPARATION

Chris Galanos; Otto Lüderitz, and Otto Westphal, all of Freiburg, Germany, assignors to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V., Gottingen, Germany

Continuation-in-part of Ser. No. 578,383, May 19, 1975, abandoned, which is a continuation of Ser. No. 306,022, Nov. 13, 1972, abandoned. This application Dec. 22, 1975, Ser. No. 643,121

Claims priority, application Germany, Nov. 17, 1971, 2157148

Int. Cl.² A61K *37/20, 39/02, 39/40*

U.S. Cl. 424—87 **16 Claims**

1. A preparation consisting essentially of a member selected from the group consisting of lipid A and alkali-treated lipid A adsorbed on a water-insoluble particulate organic carrier material having distinct hydrophilic and hydrophobic regions.

9. An immunizing agent consisting essentially of the preparation of claim 1 in an effective amount suitable for injection.

4,029,763

INFLUENZA VACCINE CONTAINING PURIFIED NEURAMINIDASE ANTIGEN AND METHOD OF USING THE SAME

Edwin D. Kilbourne, Ridgewood, N.J., assignor to Mount Sinai School of Medicine of the City University of New York, New York, N.Y.

Continuation-in-part of Ser. No. 494,716, Aug. 5, 1974, which is a continuation of Ser. No. 291,797, Sept. 25, 1972, abandoned. This application Jan. 16, 1975, Ser. No. 541,512

Int. Cl.² A61K *39/18*

U.S. Cl. 424—89 **4 Claims**

1. A method of influenza immunization comprising administering by injection to a human or an animal, subject to infection by natural means by naturally occurring influenza, an effective amount of a vaccine which comprises a purified neuraminidase antigen as essentially the sole functional component thereof, said antigen being substantially free from any hemagglutinin protein antigen and having substantial cross reactivity with a challenge natural contemporaneous or naturally infective wild type influenza virus, said antigen being derived from viruses which are not neurovirulent, the concentration of said antigen in said vaccine being sufficient to immunize the human or animal.

4,029,764

HEPATITIS A ANTIGEN

Philip J. Provost, Harleysville; Oswald L. Ittensohn, Telford, and Maurice R. Hilleman, Lafayette Hill, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Dec. 9, 1974, Ser. No. 530,623

Int. Cl.² A61K *39/12*

U.S. Cl. 424—89 **22 Claims**

1. A composition consisting essentially of a physiological saline solution buffered at from about pH 6.0 to about pH 7.8 containing hepatitis A antigen having a buoyant density in CsCl of from about 1.32 g/cm³ to about 1.36 g/cm² in concentration effective to give a measurable reaction with hepatitis A antibody in an immune adherence serological assay.

4. A method of preparing a vaccine to prevent hepatitis A disease comprising inactivating or attenuating the antigen contained in the composition of claim 1.

4,029,765

DERIVATIVES OF THE TETANUS TOXIN, PROCESS FOR THEIR PREPARATION AND AGENTS CONTAINING THEM

Torsten Bertil Helting, Marbach-Marburg an der Lahn, Germany, assignor to Behringwerke Aktiengesellschaft, Marburg an der Lahn, Germany

Filed Dec. 2, 1975, Ser. No. 637,028

Claims priority, application Germany, Dec. 3, 1974, 2457047

Int. Cl.² A61K *39/02*

U.S. Cl. 424—92 **18 Claims**

1. A method for mixing a derivative of the light chain of tetanus toxin, which comprises treating an aqueous solution of extracellular tetanus toxin with an aliphatic mono- or di-aldehyde having 1 to 6 carbon atoms at an aldehyde concentration from 0.01 to 0.05 molar at a temperature from 1° C. to 20° C. for 5 minutes to 50 hours, reacting the toxin, before or after the aldehyde treatment, with a denaturing agent in the presence of a compound reducing disulfide bridges, subsequently isolating said derivative in the presence of the denaturing agent by protein-chemical isolation processes, and then separating said derivative from the denaturing agent.

11. A derivative of the light chain of tetanus toxin obtained by the method of claim 1.

15. A tetanus vaccine containing a derivative of the light chain of tetanus toxin as defined in claim 11.

4,029,766

PROTECTIVE ANTIGEN FROM PERTUSSIS, PROCESS FOR ITS PREPARATION AND PRODUCTS CONTAINING THIS ANTIGEN

Torsten Bertil Helting, Marbach-Marburg an der Lahn, Germany, assignor to Behringwerke Aktiengesellschaft, Marburg an der Lahn, Germany

Filed Dec. 22, 1975, Ser. No. 643,123

Claims priority, application Germany, Dec. 24, 1977, 2461439

Int. Cl.² A61K *39/02*

U.S. Cl. 424—92 **15 Claims**

1. A method for making a protective antigen from *Bordetella pertussis*, which method comprises mixing pathogens of *Bordetella pertussis* with an aqueous solution of a denaturing agent and a netural salt, separating the liquid supernatant, which contains the protective antigen suspended therein, from the residue of the pathogens, and subsequently separating the denaturing agent from the aqueous suspension of the protective antigen.

4,029,767

PHARMACEUTICAL COMPOSITIONS OF STABLE UROKINASE-HEPARIN COMPLEXES AND METHODS FOR USE THEREOF

Edmond G. Vairel, Paris; Jean Goulay, Oissel, and Jean Choay, Paris, all of France, assignors to Choay S.A., Paris, France

Division of Ser. No. 292,139, Sept. 25, 1972, Pat. No. 3,926,727. This application Nov. 5, 1975, Ser. No. 629,076

Claims priority, application France, Sept. 24, 1971, 71.34435; June 30, 1972, 72.23867; June 30, 1972, 72.23868

Int. Cl.² A61K *37/48, 31/725*

U.S. Cl. 424—94 **20 Claims**

1. Solution for perfusion, containing an effective amount urokinase heparinate in association with an isotonic perfusion solution acceptable by the organism, compatible with urokinase, not precipitating with heparin and free of mineral salts.

4,029,768

COMPOSITION FOR APPLICATION TO THE ANIMAL BRAIN FOR SYNTHESIS OF BRAIN COMPONENTS INVOLVED IN THE LEARNING PROCESS, AND METHOD

Nathar W. Penn, 453 Glendale Road, Wyckoff, N.J. 07481

Filed Mar. 16, 1971, Ser. No. 124,959

Int. Cl.² A61K *35/12*

U.S. Cl. 424—95 **2 Claims**

1. A method of obtaining a composition adapted for use by injection into the animal organism for topical action upon the animal brain to produce synthesis of brain components involved in the learning process, comprising deoxyribonucleic acid which contains 5 Hydroxymethylcytosine, with substantial inhibiting of enzymes and chemical degradents, said method comprising the steps of homogenizing an animal brain in a solution of sodium bromide, potassium citrate, sodium arsenite, sodium deoxycholate and glutathione, precipitating DNA with alcohol, transferring the resultant precipitate to the aforesaid solution form but omitting the sodium bromide and subjecting said precipitate to further homogenizing, followed by the consecutive additional steps, namely:

a. Transferring the said precipitated solids thus treated to a solution which is the same as that first stated but omitting the sodium bromide and the sodium deoxycholate and reducing concentration of glutathione; and stirring the solution in the presence of an active precipitant and thereby forming a white precipitant

b. The white precipitant is dissolved in a solution of the same form as that stated in (a) together with lysozyme the latter having been purified by a water bath.

c. The white precipitate of deoxyribonucleic acid and lysozyme in its solvent is stirred, centrifuged, and the supernatent solution is discarded and the precipitated solids are washed with a solution composition as in (a) above and then dissolved in a solution the same as that stated above for hydrogenation but with lower sodium bromide concentration and precipitated with alcohol and by such action is formed a white precipitate of deoxyribonucleic acid, while the lysozyme is discarded; the precipitate then is transferred to a solution which is identical to that used after the last named homogenation step, dissolved and further purified by treatment with chloroform-isomethyl alcohol mixture; then the solution of deoxyribonucleic acid is precipitated with alcohol, dissolved in dilute citrate, physiological sodium chloride-chloride - 0.14M, and dilute glutathione. Finally the composition is precipitated with alcohol from said solution.

4,029,769

ANTIBIOTIC A-35512B AGLYCONE

Manuel Debono, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed May 24, 1976, Ser. No. 689,273

Int. Cl.² A61K *35/74*

U.S. Cl. 424—118 **2 Claims**

1. A-35512B aglycone, which in its hydrochloride form is a white amorphous compound having these characteristics:

a. an approximate elemental composition of 54.29 percent carbon, 4.34 percent hydrogen, 7.40 percent nitrogen, 28.95 percent oxygen, and 5.02 percent chlorine;

b. an infrared absorption spectrum in Nujol mull with significant absorption maxima at the following frequencies (cm^{-1}): 3440 (shoulder), 3340 (shoulder), 3215 (strong), 2950 (shoulder), 2910 (strong), 2840 (strong), 2640 (shoulder), 1735 (weak), 1655 (strong), 1590 (medium), 1500 (strong), 1460 (strong), 1378 (medium), 1365 (shoulder), 1298 (medium), 1215 (medium), 1155 (medium), 1120 (shoulder), 1105 (weak), 1060 (weak), 1040 (weak), 1008 (medium), 925 (weak), 875 (weak), 765 (shoulder), and 718 (weak);

c. ultraviolet absorption spectra, in acidic and neutral methanol, with an absorption maximum at 282 nm ($E_{1cm}^{1\%}$ 102.62) and, in basic methanol, an absorption maximum at 302 nm ($E_{1cm}^{1\%}$ 182.09);

d. a molecular weight of about 1282, as determined by titration;

e. three titratable groups in 66% aqueous dimethylformamide with pK_a values of approximately 7.5, 9.25, and 11.0;

f. the following specific rotations:
$[\alpha]_D^{25}$ −178° (c 5, CH_3OH)
$[\alpha]_{365}^{25}$ −716.8° (c 5, CH_3OH).

g. is soluble in water and methanol, but is insoluble in benzene, chloroform, acetone, diethyl ether, ethyl acetate, toluene, hexane, acetonitrile and dioxane;

h. an amino-acid analysis indicating the presence of at least four amino-acid residues:

i. an R_f value of approximately 0.80 on cellulose thin-layer chromatography (aluminum support) in a 1-butanol:pyridine-acetic acid:water (15:10:3:12) solvent system, using *Sarcina lutea* as the detection organism;

j. an R_f value of approximately 0.26 on silica gel thin-layer chromatography, in a methanol: chloroform-conc.NH_4OH (3:2:1) solvent system;

k. a ^{13}C nuclear-magnetic-resonance spectrum in (methyl sulfoxide)-d_6 with the following characteristics:

No.	PPM	Height (%)
1	187.8	37.2
2	172.0	40.9
3	170.7	45.2
4	170.1	46.9
5	169.6	47.7
6	168.4	57.6
7	166.7	52.5
8	157.4	49.9
9	156.6	45.5
10	155.7	55.8
11	155.6	71.5
12	155.4	56.7
13	154.5	50.5
14	149.3	43.0
15	138.8	38.8
16	136.9	54.3
17	136.3	40.2
18	135.2	31.7
19	134.7	28.4
20	133.8	40.9
21	128.2	102.9
22	126.2	77.2
23	123.0	57.5
24	121.3	38.1
25	117.7	44.4
26	117.0	31.5
27	108.6	31.0
28	106.7	47.9
29	105.7	81.2
30	103.2	26.5
31	93.6	33.4
32	74.9	39.8
33	71.8	33.9
34	68.9	40.2
35	63.2	43.1
36	60.4	33.6
37	57.1	57.8
38	55.2	33.1
39	53.2	30.1
40	51.8	36.0
44	23.8	55.7
45	17.1	47.8
46	0.0	43.7

l. contains a 3-amino-2,3,6-trideoxy-3-C-methyl-L-xylo-hexopyranose moiety;

m. has at least one hydroxyl group capable of esterification;

and which in its free-base form is a white amorphous compound having these characteristics:

a'. an approximate elemental composition of 52.65% carbon, 4.57% hydrogen, 6.91% nitrogen, 27.04% oxygen, and 2.94% chlorine;

b'. an infrared absorption spectrum in KBr pellet with significant absorption maxima at the following frequencies (cm^{-1}): 3360 (strong), 3260 (shoulder), 2940 (shoulder), 1735 (shoulder), 1660 (strong), 1598 (medium), 1510 (strong), 1440 (medium), 1295 (weak), 1215 (medium), 1165 (medium), 1122 (weak), 1070 (weak), 1018 (strong), 940 (weak), and 920 (weak);

c'. ultraviolet absorption spectra with an absorption maximum, in acidic and neutral methanol, at 282 nm ($E_{1cm}^{1\%}$ 43.65) and, in basic methanol, at 301 nm ($E_{1cm}^{1\%}$ 67.46);

d'. five titratable groups in 66% aqueous dimethylformamide with pK_a values of approximately 6.2, 8.2, 10.1, 11.4, and 12.4;

e'. the following specific rotation: $[\alpha]_D^{25}$ −64.5° (c 3, methyl sulfoxide);

or a pharmaceutically-acceptable acid-addition salt of A-35512B aglycone.

4,029,770

METHOD OF THERAPEUTICALLY TREATING DAMAGED AND/OR INFECTED TISSUE AND RELIEVING STRESS AND SHOCK IN WARM BLOODED ANIMALS

John W. Willard, Sr., Rapid City, S. Dak., assignor to CAW Industries, Inc., Rapid City, S. Dak.

Division of Ser. No. 455,022, March 26, 1974, Pat. No. 3,984,540, which is a continuation-in-part of Ser. No. 317,097, Dec. 20, 1972, Pat. No. 3,893,943, which is a continuation of Ser. No. 108,198, Jan. 20, 1971, abandoned. This application Aug. 6, 1976, Ser. No. 712,158

Int. Cl.² A61K *33/00, 33/06, 33/08*

U.S. Cl. 424—127 **18 Claims**

1. A method of treating infected and damaged tissue and relieving stress and shock in warm blooded animals comprising administering thereto a therapeutically effective amount of a catalyst,

the catalyst being prepared by a process comprising

admixing a water soluble alkali metal silicate with an aqueous medium containing a dissolved substance which is a source of calcium ion and dissolved substance which is a source of magnesium ion,

The aqueous medium containing said dissolved substances in amounts to provide between about 1×10^{-4} and 1×10^{-1} mole per liter each of calcium ion and magnesium ion,

the aqueous medium containing said dissolved substances in amounts to provide a molar ratio of calcium ion to magnesium ion between about 2.0:1.0 and 1.0:2.0,

the alkali metal silicate having an alkali metal oxide to silicon dioxide ratio between about 0.9:1.0 and less than 2.0:1.0 and being admixed with the aqueous medium in an amount of about 0.05–2 moles per liter,

reacting the alkali metal silicate with said dissolved substances providing calcium ion and magensium ion to produce an aqueous suspension of finely divided particles of the reaction product,

admixing a micelle-forming surfactant with the aqueous medium in an amount to form catalyst micelles comprising said finely divided particles of the reaction product upon agitating the aqueous medium, and

agitating the aqueous medium containing the finely divided particles of the reaction product and surfactant to form said catalyst micelles.

4,029,771

COMPOSITION FOR THE TREATMENT OF BACTERIAL-INTESTINAL INFECTIONS

Eraldo Antonini, Via Di Parione 37, Rome, Italy

Filed Apr. 21, 1976, Ser. No. 678,752

Claims priority, application Italy, Apr. 23, 1975, 22652/75

Int. Cl.² A61K *37/02*

U.S. Cl. 424—177 **4 Claims**

1. A method of treating acute bacterial gastroentheropathy in children, comprising orally administering to each infected child conalbumen in a dosage of about 300 mg per day.

4,029,772

PEPTIDE CARBAZATES

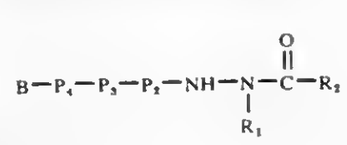
Conrad P. Dorn, Plainfield, and Shu S. Yang, Piscataway, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Dec. 23, 1975, Ser. No. 643,722

Int. Cl.² A61K *37/00*

U.S. Cl. 424—177 **8 Claims**

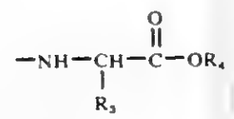
1. A compound of the formula:



I

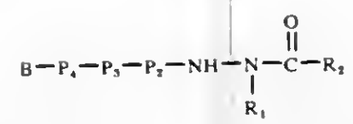
wherein

B is $C_{1\text{-}5}$alkanoyl, t-butoxycarbonyl or carbobenzyloxy,
P_4 is alanyl or prolyl,
P_3 is alanyl,
P_2 is prolyl or leucyl
R_1 is $C_{1\text{-}5}$alkyl,
R_2 is $C_{1\text{-}5}$alkoxy, benzyloxy or amino $C_{1\text{-}5}$alkoxy



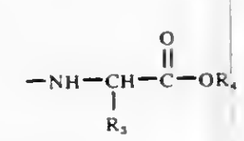
wherein
R_3 is $C_{1\text{-}5}$alkyl or benzyl, and
R_4 is $C_{1\text{-}5}$alkyl, or benzyl.

8. A method of treating pancreatitis, which comprises administering to a patient a therapeutically effective amount of a compound of the formula:



I

wherein
B is $C_{1\text{-}5}$alkanoyl, t-butoxycarbonyl or carbobenzyloxy,
P_4 is alanyl or prolyl,
P_3 is alanyl,
P_2 is prolyl or leucyl,
R_1 is $C_{1\text{-}5}$alkyl,
R_2 is $C_{1\text{-}5}$alkoxy, benzyloxy or amino $C_{1\text{-}5}$alkoxy



wherein
R_3 is $C_{1\text{-}5}$alkyl or benzyl, and
R_4 is $C_{1\text{-}5}$alkyl, or benzyl.

4,029,773

COMPOSITION AND METHOD OF TREATING ULCERS

Myron A. Beigler, Palo Alto, and Ronald J. Amen, Villa Park, both of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed May 25, 1973, Ser. No. 364,144

Int. Cl.² A61K *31/70*

U.S. Cl. 424—180 **22 Claims**

1. A composition, useful in the treatment and prevention of gastric intestinal ulcers, comprising from 10 to 40% wt. sucrose; 10 to 40% wt. glucose; 12 to 20% wt. amino acid mixture containing at least all of the essential amino acids, or pharmaceutically acceptable salts thereof, in the same relative ratio to each other as the essential amino acids are found in naturally occurring proteins; and 7.5 to 12% wt. lipid selected from the group consisting of soybean oil, corn oil, safflower oil, peanut oil, cotton seed oil, and a mixture thereof; said composition having an aqueous emulsion osmolality of about from 400 to 1500 milliosmols per kg., at a concentration of 0.1 to 0.5 g. of said composition per ml. wherein at least 50% of said composition is composed of said sucrose, glucose, amino acid mixture and lipid.

4,029,774

O,S-DIALKYL O -PHENYLTHIO-PHENYL PHOSPHOROTHIOLATES/PHOSPHORODITHIOATES AND THEIR DERIVATIVES AND PESTICIDAL USE

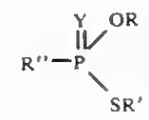
William S. Hurt, Collegeville, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 483,190, June 26, 1974, abandoned. This application May 12, 1975, Ser. No. 576,836

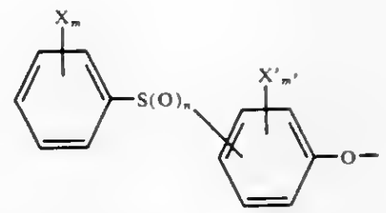
Int. Cl.² A01N *9/36;* **C07F** *9/18*

U.S. Cl. 424—216 **26 Claims**

1. A compound of the formula:



wherein
Y is oxygen or sulfur;
R is (C_1-C_4) alkyl;
R' is (C_3-C_6) alkyl; and
R'' is a group of the formula:



wherein
X is halogen, nitro, trifluoromethyl, (C_1-C_3) alkyl, or (C_1-C_3) alkoxy;
X' is halogen, trifluoromethyl, (C_1-C_3) alkyl or (C_1-C_3) alkoxy;
m and *m'* are the same or different and are integers from 0 to 3; and
n is an integer from 0 to 2.

19. A pesticidal composition comprising a pesticidally effective amount of compound according to claim 1 and an agronomically acceptable carrier.

21. A method of controlling pests which comprises applying directly to the pests or to the loci to be freed of or protected from attack by such pests, a pesticidally effective amount of the composition of claim 19.

4,029,775

ANTIMICROBIAL COMPOSITIONS

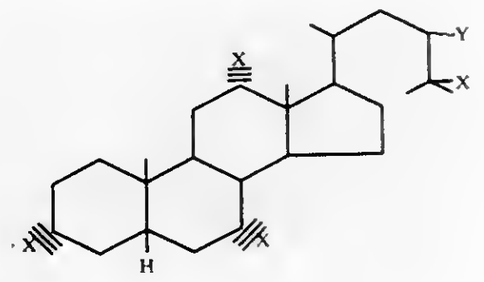
William H. Saltzman, New Rochelle, N.Y., assignor to Intellectual Property Development Corporation, New Rochelle, N.Y.

Continuation-in-part of Ser. No. 523,627, Nov. 14, 1974, Pat. No. 3,931,403, which is a continuation of Ser. No. 363,460, May 25, 1973, abandoned. This application Dec. 29, 1975, Ser. No. 644,688

Int. Cl.² C07J *9/00;* **A61K** *31/56*

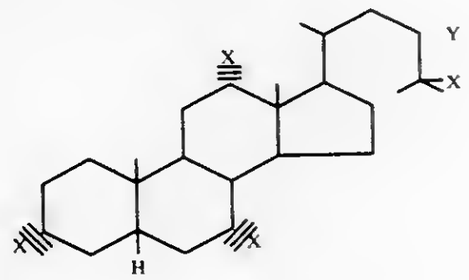
U.S. Cl. 424—238 **8 Claims**

1. A composition possessing antimicrobial, antibiotic or bacteriostatic properties comprising a combination of from 10 to 500 milligrams of a compound of the formula



wherein
Y is hydrogen, hydroxy or acyloxy;
wherein each
X is hydroxy or acyloxy; and a pharmaceutically acceptable non-toxic carrier.

5. A compound of the formula



wherein
Y is hydrogen, hydroxy or acyloxy;
and each
X is hydroxy or acyloxy.

4,029,776
THERAPEUTIC COMPOSITION AND METHOD OF USE THEREOF

Edward Joseph Cafruny, East Greenbush, and Gordon Oliver Potts, Chatham, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Filed Dec. 19, 1975, Ser. No. 642,677
Int. Cl.² A61K *31/56*
U.S. Cl. 424—240 **8 Claims**

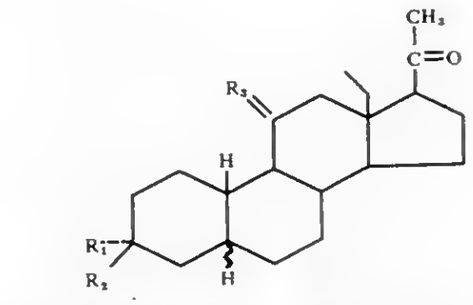
1. A process for reversing or preventing secondary aldosteronism and potassium depletion induced in a mammal undergoing diuretic therapy, which comprises administering orally to said mammal, sequentially or simultaneously, a substance having diuretic and kaluretic properties, and 4α,5-epoxy-17β-hydroxy-3-oxo-5α-androstane-2α-carbonitrile, the latter in amount effective to significantly reverse or prevent the secondary aldosteronism and potassium depletion caused by the diuretic alone.

4,029,777
18-METHYL-19-NOR-20-KETOPREGNANES AND PROCESS FOR THE PREPARATION THEREOF

Otto Engelfried; Ulrich Kerb; Rudolf Wiechert; Helmut Wachtel; Dieter Palenschat; Reinhard Horowski; Gert Paschelke, and Wolfgang Kehr, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Germany

Filed Aug. 5, 1975, Ser. No. 602,098
Claims priority, application Germany, Aug. 5, 1974, 2438020
Int. Cl.² C07J *5/00*; A61K *31/56*
U.S. Cl. 424—242 **18 Claims**

1. An 18-methyl-19-nor-20 ketopregnane of the formula



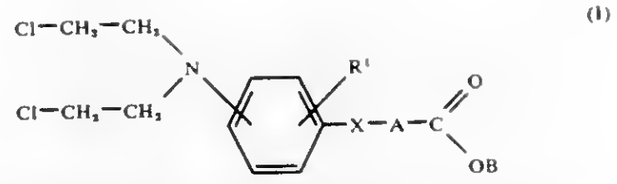
wherein R_1 is a hydrogen atom and R_2 is hydroxy, and R_3 is an oxygen atom or two hydrogen atoms.

4,029,778
CORTICAL STEROID NITROGEN MUSTARD COMPOSITIONS AND TREATMENT THEREWITH

Hans Jacob Fex; Knut Bertil Högberg, both of Helsingborg, and Imre Konyves, Hittarp, all of Sweden, assignors to Aktiebolaget Leo, Helsingborg, Sweden

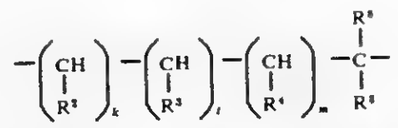
Division of Ser. No. 4,067, Jan. 19, 1970, Pat. No. 3,732,260. This application Mar. 13, 1973, Ser. No. 335,761
Claims priority, application United Kingdom, Jan. 23, 1969, 3952/69
Int. Cl.² A61K *31/56*
U.S. Cl. 424—243 **32 Claims**

1. A pharmaceutical composition, comprising from about 0.01 to about 75 weight percent of a corticoid steroid 21-ester of the general formula

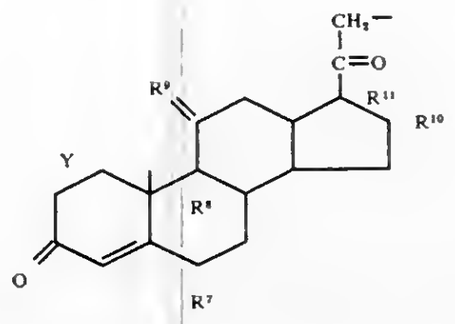


(I)

wherein R^1 is hydrogen, lower-alkyl, halogen or lower-alkoxy;
X is oxygen, sulphur or a monovalent carbon-carbon bond;
A represents the group



wherein R^2, R^3, R^4, R^5 and R^6 represent similar or dissimilar atoms or atom groups selected from the group consisting of hydrogen and lower-alkyl, and wherein R^6 can also be selected from the group consisting of amino and lower-alkanoylamino, in which case R^5 is hydrogen,
wherein *k*, *l* and *m* are integers having a value of zero or one, or A together with X (—X—A) represents a monovalent carbon-carbon bond; and B represents the radical of a corticoid steroid of the formula



wherein Y is a carbon-carbon single bond or a carbon-carbon double bond;
R^7 is hydrogen, methyl or F;
R^8 is hydrogen or F;
R^9 is oxygen or the group

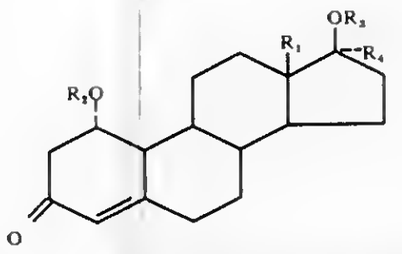
R^{10} is hydrogen, methyl or hydroxy;
R^{11} is hydrogen or hydroxy; and wherein R^{10} and R^{11} together can form an alkylidenedioxy group and a pharmaceutical carrier.

4,029,779
1α-HYDROXY STEROIDS

Karl Petzoldt, and Walter Elger, both of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

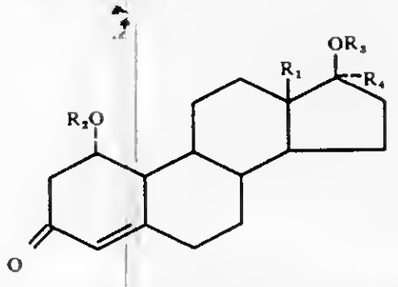
Filed Oct. 17, 1975, Ser. No. 623,542
Claims priority, application Germany, Oct. 18, 1974, 2450106; Sept. 1, 1975, 2539261
Int. Cl. A61k *31/56*; C07j *1/00*
U.S. Cl. 424—243 **8 Claims**

1. A 1α-oxy steroid of the formula



wherein R_1 is ethyl; R_2 and R_3 each are hydrogen atoms or alkanoyl of 1–8 carbon atoms; and R_4 is a hydrogen atom or hydrocarbon of 1–4 carbon atoms.

8. A method of treatment which comprises administering to a female having an irregular menstrual cycle or menopausal symptoms or to a fertile female for the prevention of pregnancy an amount effective to correct the irregular menstrual sycles, to alleviate the menopausal symptoms or to prevent pregnancy, respectively, of a 1α-oxy steroid of the formula



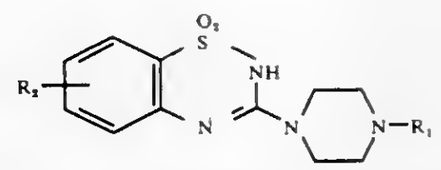
wherein R_1 is methyl or ethyl; R_2 and R_3 each are hydrogen atoms or alkanoyl of 1–8 carbon atoms or alkanoyl of 1–8 carbon atoms; and R_4 is a hydrogen atom or hydrocarbon of 1–4 carbon atoms.

4,029,780
3-PIPERAZINYL 1,2,4-BENZOTHIADIAZINE 1,1-DIOXIDE DERIVATIVES THEIR COMPOSITIONS AND METHOD OF USE

Haruki Nishimura, Ikeda; Masanao Shimizu, Toyonaka; Naonobu Hatano, Takaishi; Katsuyoshi Nakatsuzi, Sakai; Hiroaki Kinugasa, Tsuzuki, and Hiroko Kon, Kobe, all of Japan, assignors to Dainippon Pharmaceutical Co., Ltd., Osaka, Japan

Filed Oct. 28, 1975, Ser. No. 626,042
Claims priority, application Japan, Oct. 29, 1974, 49-125135; Feb. 4, 1975, 50-15050
Int. Cl.² C07D *285/24*; A61K *31/54*
U.S. Cl. 424—246 **11 Claims**

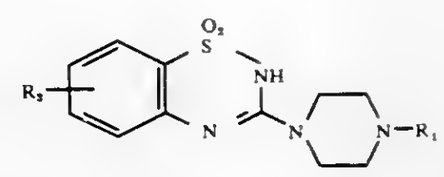
1. A compound of the formula



(I)

wherein R_1 represents a hydrogen atom or a lower alkyl group, and R_2 represents a hydrogen, chlorine or bromine atom or a trifluoromethyl group in 6- or 7-position,
or its pharmaceutically acceptable salt.

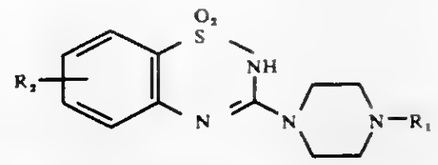
4. A pharmaceutical composition comprising, as an active ingredient, a compound of the formula



(I)

wherein R_1 represents a hydrogen atom or a lower alkyl group, and R_2 represents a hydrogen, chlorine or bromine atom or a trifluoromethyl group in the 6- or 7position,
or its pharmaceutically acceptable salt in admixture with a pharmaceutically acceptable carrier.

8. A method for treating hypertension which comprises administering to a patient suffering from hypertension a pharmaceutically effective amount of a compound of the formula



wherein R_1 represents a hydrogen atom or a lower alkyl group, and R_2 represents a hydrogen, bromine or chlorine atom or a trifluoromethyl group at the 6- or 7-position,
or its pharmaceutically acceptable salt.

4,029,781

1,4-DITHIIN (AND OXATHIIN)-YL CEPHALOSPORIN DERIVATIVES, AND COMPOSITIONS CONTAINING THEM

Christian Berger, Le Plessis Robinson; Daniel Farge, Thiais; Georges Gros, Bourg-La-Reine; Mayer Naoum Messer, Bievres, and Claude Moutonnier, Le Plessis-Robinson, all of France, assignors to Rhone-Poulenc Industries, Paris, France

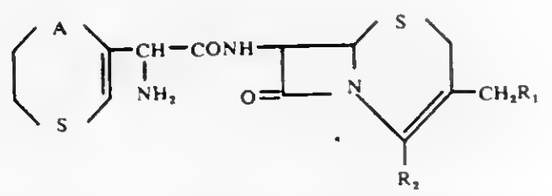
Filed Sept. 26, 1975, Ser. No. 617,066

Claims priority, application France, Sept. 27, 1974, 74.32701; July 21, 1975, 75.22682

Int. Cl.² C07D *501/22*, *501/34*; A61K *31/54*

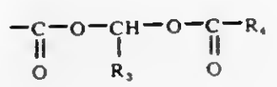
U.S. Cl. 424—246 13 Claims

1. A cephalosporin compound of the formula:



(I)

in which A is oxygen or sulphur, R_1 is hydrogen or acetoxy and R_2 is carboxy or a radical of the formula:



(II)

in which the radical

(III)

is a radical which can be easily removed enzymatically, and in which R_3 is hydrogen or straight or branched chain C_{1-4} alkyl and R_4 is straight or branched chain C_{1-4}, alkyl or cyclohexyl, its diastereoisomeric forms and mixtures thereof, and its pharmaceutically acceptable salts.

4,029,782

CEFAZOLIN SUSPENSION FOR PARENTERAL ADMINISTRATION

Michael Bornstein, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Apr. 28, 1975, Ser. No. 573,283

Int. Cl.² A61K *31/54*

U.S. Cl. 424—246 20 Claims

1. A pharmaceutical suspension for parenteral administration comprising from about 10 to about 65 percent (W/V) of cefazolin, from about 0.1 to about 1.0 percent of lecithin, from about 0.1 to about 1.0 percent (W/V) of a pharmaceutically acceptable surfactant, from about 0.1 to about 2.0 percent (W/V) of a viscosity adjusting agent selected from the group consisting of povidone and sodium carboxymethylcellulose or a combination thereof, and water for injection q.s. to 100 percent by volume.

4,029,783

N-SUBSTITUTED 1-AMINO-3-PHENOXY-PROPAN-2-OL COMPOUNDS AND THERAPEUTIC COMPOSITIONS CONTAINING THEM

Fritz Wiedemann; Max Thiel, both of Mannheim; Kurt Stach, Mannheim-Waldhof; Karl Dietmann, Mannheim-Vogelstang, and Gisbert Sponer, Hemsbach, all of Germany, assignors to Boehringer Mannheim G.m.b.H., Mannheim-Waldhof, Germany

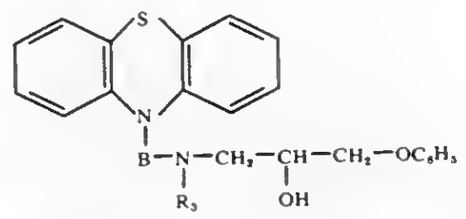
Division of Ser. No. 487,423, July 10, 1974, Pat. No. 3,998,810. This application Dec. 8, 1975, Ser. No. 638,874

Claims priority, application Germany, Aug. 3, 1973, 2339396

Int. Cl.² A61K *31/54*; C07D *279/24*

U.S. Cl. 424—247 12 Claims

1. N-substituted 1-amino-3-phenoxy-propan-2-ol compound of the formula:



(I),

wherein

R_1 and R_2 are, individually, hydrogen or

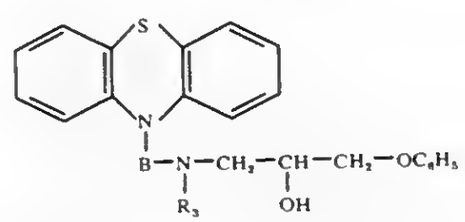
R_1 and R_2 taken together represent a sulfur linkage or a valency bond;

B is straight or branched chain alkylene or hydroxyalkylene of from 2 to 5 carbon atoms; and

R_3 is hydrogen or alkyl of up to 3 carbon atoms;

and the physiologically compatible salts thereof.

9. Method of treating a subject with cardiac or circulatory impairments which method comprises administering to such subject an effective amount of an N-substituted 1-amino-3-phenoxy-propan-2-ol compound of the formula:



(I),

wherein

R_1 and R_2 are, individually, hydrogen or

R_1 and R_2 taken together represent a sulfur linkage, an ethylene radical or a valency bond;

B is straight or branched chain alkylene or hydroxyalkylene of from 2 to 5 carbon atoms; and

R_3 is hydrogen or alkyl of up to 3 carbon atoms;

and the physiologically compatible salts thereof.

4,029,784

PYRIMIDINE SULFAMATE FUNGICIDES

Ann Mary Cole, Maidenhead; John Angus William Turner, Wokingham, and Brian Kenneth Snell, Twyford, all of England, assignors to Imperial Chemical Industries Limited, London, England

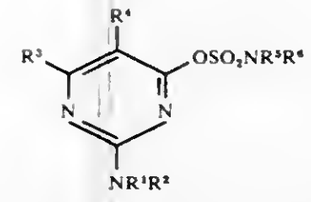
Division of Ser. No. 284,546, Aug. 29, 1972, Pat. No. 3,880,852. This application Feb. 13, 1975, Ser. No. 549,787

Claims priority, application United Kingdom, Sept. 23, 1971, 44401/71

Int. Cl.² A01A *9/22*

U.S. Cl. 424—248.5 26 Claims

1. A fungicidal composition comprising, as an active ingredient, a fungicidally effective mount of a pyrimidine sulphamate derivative having the formula:



or a salt thereof, wherein R^1 and R^2 are hydrogen or lower alkyl, lower alkynyl or lower alkenyl but are not both hydrogen, or together with the adjacent N-atom form a monocyclic 5-, 6- or 7-ring atom heterocyclic group, optionally interrupted by an additional hetero atom selected from the group consisting of O, N and S; R^3 and R^4 are lower alkyl, lower alkynyl or lower alkenyl; and R^5 and R^6 are lower alkyl, lower alkynyl or lower alkenyl or together with the adjacent N-atom form a monocyclic 5-, 6- or 7-ring atom heterocyclic group, optionally interrupted by an additional hetero atom selected from the group consisting of O, N and S, and a carrier for the active ingredient.

4,029,785

AMINO CONTAINING ISONICOTINIC ACID DERIVATIVES

Karl Gätzi, and Karl Hoegerle, both of Basel, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

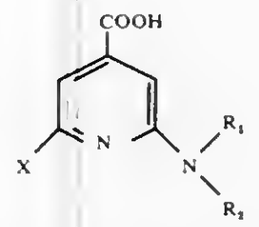
Filed Dec. 12, 1974, Ser. No. 532,145

Claims priority, application Switzerland, Dec. 17, 1973, 17663/73

Int. Cl.² C07D *213/79*; A01N *9/22*

U.S. Cl. 424—248.53 32 Claims

1. A compound of the formula



wherein

X represents chlorine, bromine or iodine,

R_1 represents C_1–C_{12} alkyl, C_1–C_{12} hydroxyalkyl, C_1–C_{12} alkyl substituted by C_1–C_4 alkoxy, C_1–C_{12} aminoalkyl, C_1–C_{12} alkyl substituted by mono- or di-(C_1 or C_2 alkyl-)amino, C_3 or C_4 alkenyl, C_3–C_8 cycloalkyl, benzyl, p-acetylbenzyl or phenethyl, and

R_2 represents hydrogen, C_1–C_4 alkyl, or C_3 or C_4 alkenyl, or

R_1 and R_2 taken together with the nitrogen atom to which they are attached represent morpholino, piperidino or pyrrolidino, or a salt thereof with a suitable organic or inorganic base.

18. A method for inhibiting the growth of phytopathogenic fungi and bacteria which comprises applying thereto an effective amount of a compound according to claim 1.

4,029,786

MORPHOLINE DERIVATIVES FOR TREATING DEPRESSION

Edwin Harry Paterson Young, Macclesfield, England, assignor to Imperial Chemical Industries Limited, London, England

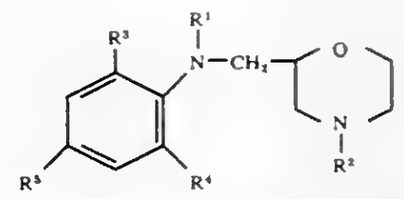
Division of Ser. No. 387,378, Aug. 10, 1973, Pat. No. 3,974,158. This application June 1, 1976, Ser. No. 691,298

Claims priority, application United Kingdom, Aug. 11, 1972, 37550/72

Int. Cl.² A61K *31/535*

U.S. Cl. 424—248.56 4 Claims

1. A pharmaceutical composition for treating or preventing depression which comprises as active ingredient an effective amount of morpholine selected from a compound of the formula:



wherein R^1 is hydrogen or hydrocarbon aryloxycarbonyl of up to 11 carbon atoms; R^2 is hydrogen or alkyl of 1 to 6 carbon atoms; and R^3, R^4 and R^5, which may be the same or different, are hydrogen, halogen, alkyl or alkylthio of 1 to 6 carbon atoms, halogenoalkyl of 1 to 3 carbon atoms, alkoxy of 1 to 10 carbon atoms, alkenyloxy or alkoxycarbonyl of up to 6 carbon atoms, hydrocarbon aroyl of up to 11 carbon atoms, hydrocarbon aryl, hydrocarbon aryloxy or hydrocarbon arylthio of up to 10 carbon atoms; and a non-toxic pharmaceutically-acceptable acid-addition salt thereof, in association with a major amount of a non-toxic, pharmaceutically-acceptable diluent or carrier.

4,029,787

BASICALLY SUBSTITUTED 3-SULFAMOYLBENZOIC ACID DERIVATIVES AND PROCESS FOR THEIR PREPARATION

Karl Sturm, Heidesheim, and Franz Starey, Frankfurt am Main, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

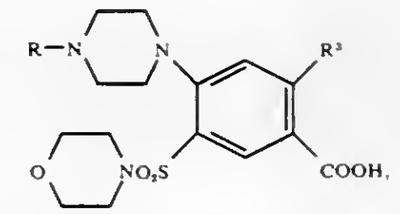
Filed Sept. 4, 1975, Ser. No. 610,388

Claims priority, application Germany, Sept. 6, 1974, 2442851

Int. Cl.² C07D *413/02*; A61K *31/535*

U.S. Cl. 424—248.53 4 Claims

1. A basically-substituted 3-morpholinosulfonyl benzoic acid of the formula



salts thereof with physiologically tolerable acids, and salts thereof with physiologically tolerable bases, wherein R is hydrogen, alkyl having 1 to 6 carbon atoms, or benzyl, and R^3 is hydrogen, halogen, or alkyl having 1 to 4 carbon atoms.

4. A method for treating high blood pressure in a patient suffering therefrom which comprises administering an effective amount of a compound as in claim 1.

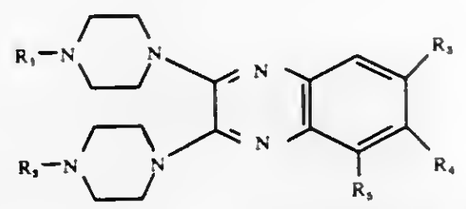
4,029,788

2,3-BIS(4-ALKYL-1-PIPERAZINYL)QUINOXALINES

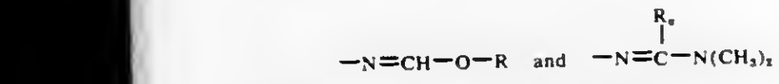
Paul Frank Fabio, Pearl River; Yang-I Lin, Nanuet; Stanley Albert Lang, Jr., Stony Point, all of N.Y., and Andrew Stephen Tomcufcik, Old Tappan, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed July 16, 1976, Ser. No. 706,027
Int. Cl.² A61K *31/495*; C07D *295/00*
U.S. Cl. 424—250 17 Claims

1. A compound selected from the group consisting of those of the formula:

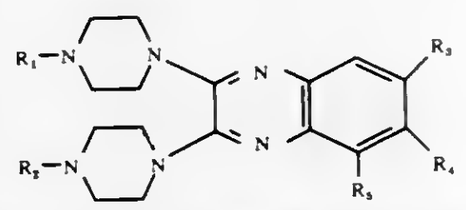


wherein R_1 and R_2 are the same and are lower alkyl; R_3 is hydrogen or halogen; and R_4 and R_5 are each individually selected from the group consisting of hydrogen, amino-p-toluenesulfonamido, 4-(3-dimethylaminopropyl)-piperidinomethyleneamino, and moieties of the formulae:

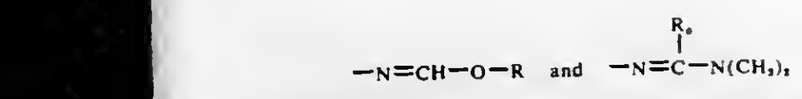


wherein R is lower alkyl and R_6 is hydrogen or lower alkyl, with the proviso that at least one but not both of R_4 and R_5 must be hydrogen; and the pharmacologically acceptable acid-addition and quanternary ammonium salts thereof.

10. A method of treating a mammal to eliminate cecal and hepatic amebae therefrom which comprises administering to said mammal an effective amount of a compound selected from the group consisting of those of the formula:



wherein R_1 and R_2 are the same and are lower alkyl; R_3 is hydrogen or halogen; and R_4 and R_5 are each individually selected from the group consisting of hydrogen, amino, p-toluenesulfonamido, 4-(3-dimethylaminopropyl)-piperidinomethyleneamino, and moieties of the formulae:



wherein R is lower alkyl and R_6 is hydrogen or lower alkyl, with the proviso that at least one but not both of R_4 and R_5 must be hydrogen; and the pharmacologically acceptable acid-addition and quaternary ammonium salts thereof.

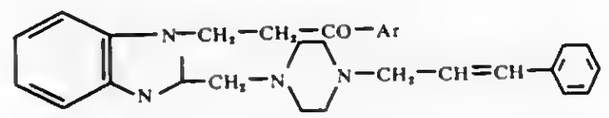
4,029,789

1-[2'-(α-FUROYL OR α-THIENOYL)ETH-1'-YL]-2-(4''-CINNAMYL PIPERAZIN-1''-YL METHYL)BENZIMIDAZOLES AND METHOD OF USING SAME

Claude P. Fauran; Nicole Dorme; Guy M. Raynaud, all of Paris, and Jeannine Eberle, Chatou, all of France, assignors to Delalande S.A., Courbevoie, France

Filed Nov. 20, 1975, Ser. No. 633,960
Claims priority, application France, Nov. 21, 1974, 74.38292
Int. Cl.² A61K *31/34*, *31/38*
U.S. Cl. 424—250 7 Claims

1. A compound having the formula



in which Ar is α-furyl or α-thienyl, and the pharmacologically acceptable acid addition salts thereof.

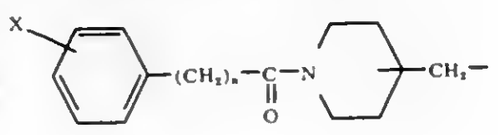
4,029,790

1-BENZOYL-2 OR 4 [2-(4-PHENYL-PIPERAZINO)-ETHYL]-PIPERIDINES

Roland Yves Mauvernay, Riom; Norbert Busch, Loubeyrat; Jacques Moleyre, Mozac; Jacques Simond, Chamalieres, and Andre Monteil, Gerzat, all of France, assignors to Centre European de Recherches Mauvernay, Riom, France

Filed Sept. 26, 1975, Ser. No. 617,141
Claims priority, application France, Sept. 30, 1974, 74.32805
Int. Cl.² A61K *31/495*; C07D *401/06*
U.S. Cl. 424—250 9 Claims

1. A compound of the formula:



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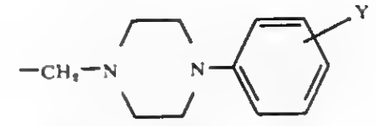
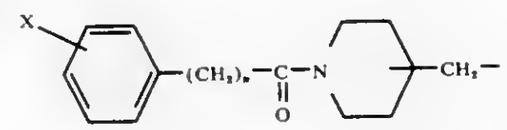
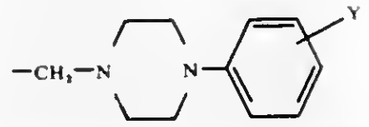


and salts thereof with pharmaceutically acceptable acids in which X represents a hydrogen or halogen atom or methoxy group, *n* is 0; Y represents a halogen atom; and the ethyl piperazine moiety is attached to the 2- or 4- position of the piperidine ring.

8. A pharmaceutical composition consisting essentially of a compound of





and salts thereof with pharmaceutically acceptable acids in which X represents a hydrogen or halogen atom or a lower alkoxy group, *n* is 0; Y represents a halogen atom; and the

ethyl piperazine moiety is attached to the 2- or 4- position of the piperidine ring in association with a pharmaceutically acceptable carrier or diluent.

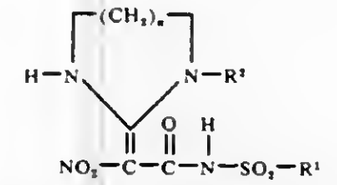
4,029,791

N-(ARYLSULFONYL)-2-NITRO-2-(1-METHYL-2-(1,3-DIAZACYCLOALKYLIDENE)ACETAMIDES

Willy D. Kollmeyer, Modesto; Steven A. Roman, Oakdale, and Samuel B. Soloway, Modesto, all of Calif., assignors to Shell Oil Company, Houston, Tex.

Filed June 17, 1976, Ser. No. 696,992
Int. Cl.² C07D *233/26*
U.S. Cl. 424—251 5 Claims

1. A compound of the formula:



wherein R^1 is phenyl or phenyl substituted by from one to two of one or more of halogen, nitro, cyano, alkyl or alkoxy of from 1 to 6 carbon atoms or phenoxy, R^2 is alkyl or cyanoalkyl of from 1 to 3 carbon atoms, allyl, 3-chloroallyl, 2-(methylthio)ethyl or propargyl, and *n* is zero or 1.

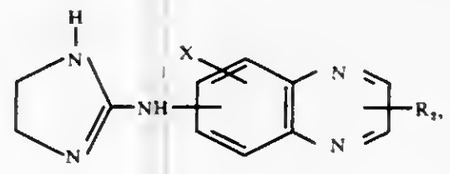
4,029,792

(2-IMIDAZOLIN-2-YLAMINO) SUBSTITUTED -QUINOXALINES AND -QUINAZOLINES AS ANTIHYPERTENSIVE AGENTS

John C. Danielewicz, Ash; Michael Snarey, Sandwich, and Geoffrey N. Thomas, Deal, all of England, assignors to Pfizer Inc., New York, N.Y.

Continuation-in-part of Ser. No. 551,318, Feb. 20, 1975, abandoned, which is a division of Ser. No. 332,485, Feb. 14, 1973, Pat. No. 3,890,319. This application Sept. 16, 1975, Ser. No. 613,808
Claims priority, application United Kingdom, Nov. 8, 1972, 51629/72; Feb. 29, 1972, 9196/72
Int. Cl.² A61K *31/505*, *31/495*
U.S. Cl. 424—251 9 Claims

1. A method for the treatment of hypertension which comprises orally or parenterally administering to a hypertensive host an antihypertensive amount of a compound selected from the group consisting of:



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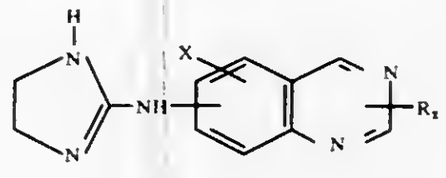


II

and the pharmaceutically acceptable acid addition salts thereof wherein X is selected from the group consisting of hydrogen, halogen, lower alkyl, lower alkoxy and trifluoromethyl and R_2 is selected from the group consisting of hydrogen, lower alkyl and lower alkoxy.

4,029,793

SYNERGISTIC LOCAL ANESTHETIC COMPOSITIONS

Herbert J. F. Adams, Westboro, and Bertil H. Takman, Worcester, both of Mass., assignors to Astra Pharmaceutical Products, Inc., Worcester, Mass.

Division of Ser. No. 369,302, June 12, 1973, Pat. No. 3,966,934, which is a continuation-in-part of Ser. No. 206,181, Dec. 8, 1971, abandoned, which is a continuation-in-part of Ser. No. 109,942, Jan. 26, 1971, abandoned. This application Dec. 9, 1975, Ser. No. 639,244
Int. Cl.² A61K *31/505*
U.S. Cl. 424—251 12 Claims

1. An injectable local anesthetic composition having long-lasting local anesthetic effect which is a solution consisting essentially of a pharmaceutically acceptable carrier having dissolved therein

a. a heterocyclic aminoacyl anilide local anesthetic compound in a concentration of from 0.05 to 5% by weight of the carrier and

b. a toxin selected from the group consisting of from 0.5 to 10 micrograms of tetrodotoxin per milliliter of the carrier and from 10 to 20 micrograms of desoxytetrodotoxin per milliliter of the carrier.

4,029,794

PHARMACEUTICAL LOCAL ANESTHETIC COMPOSITION

Herbert J. F. Adams, Westboro, and Bertil H. Takman, Worcester, both of Mass., assignors to Astra Pharmaceutical Products, Inc., Worcester, Mass.

Division of Ser. No. 369,147, June 12, 1973, Pat. No. 3,957,996, which is a continuation-in-part of Ser. No. 206,182, Dec. 8, 1971, abandoned, which is a continuation-in-part of Ser. No. 109,942, Jan. 26, 1971, abandoned. This applicatioo Dec. 8, 1975, Ser. No. 638,937
Int. Cl.² A61K *31/52*
U.S. Cl. 424—253 22 Claims

1. An injectable local anesthetic composition having long-lasting local anesthetic effect which is a solution consisting essentially of a pharmaceutically acceptable carrier having dissolved therein

a. an aminoalkyl benzoate local anesthetic compound in a concentration of from 0.05% to 5% by weight of the carrier and

b. from 0.5 to 10 micrograms of saxitoxin per milliliter of the carrier.

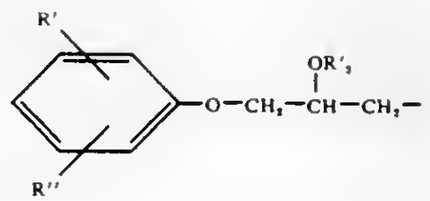
4,029,795

4(2' ISOQUINOLIN-1-ONE)PIPERIDINES

Kurt Eichenberger, Therwil; Christian Egli, Magden; Hans Kuhnis, Basel, and Oswald Schier, Oberwil, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed July 14, 1975, Ser. No. 595,456
Claims priority, application Switzerland, July 31, 1974, 10583/74
Int. Cl.² A61K *31/47*; C07D *217/00*
U.S. Cl. 424—258 9 Claims

1. A 1-(3-aryloxy-2-hydroxy- or 2-alkanoyloxy-propyl)-4-(1-oxoisoquinolino)-piperidine compound corresponding to formula



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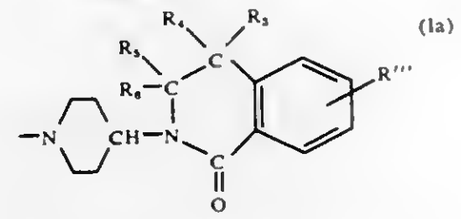


(Ia)

wherein R′ and R″ are hydrogen, lower o-alkyl, lower o-alkenyl, lower o-alkoxy, lower o-alkenyloxy or an o-halogen atom and R′ and R″ together with the phenyl radical form a β-naphthyl radical, R_2′ denotes hydrogen or lower alkanoyl, R_3 denotes hydrogen, R_4, R_5 and R_6 denote hydrogen, R‴ denotes hydrogen, lower alkyl, lower alkoxy, halogen, or trifluoromethyl, or a therapeutically useful acid addition salt thereof, wherein said open chain groups have up to 4 carbon atoms.

9. An antihypertensive pharmaceutical composition comprising a therapeutically effective amount of a compound claimed in claim 1, together with a pharmaceutical excipient.

4,029,796

NOVEL N-CYCLOALKYLMETHYL DECAHYDROISOQUINOLINES FOR PRODUCING OPIATE-LIKE ANALGESIA

Dennis M. Zimmerman, Indianapolis, and Winston S. Marshall, Bargersville, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 477,222, June 7, 1974, Pat. No. 4,001,248. This application Sept. 13, 1976, Ser. No. 722,940

Int. Cl.² A61K *31/47*

U.S. Cl. 424—258 **1 Claim**

1. The process of producing opiate-like analgesia in mammals which comprises administering to a mammal an analgesically-effective amount of a compound selected from the group consisting of trans-dl-1-cyclopropylmethyl-3a-(m-hydroxyphenyl)-1,2,3,3a,4,5,6,7,7a,8-decahydroisoquinoline, trans-l(−)-1-cyclopropylmethyl-3a-(m-hydroxyphenyl)-1,2,3,3a,4,5,6,7,7a,8-decahydroisoquinoline and a pharmaceutically-acceptable acid addition salt thereof.

4,029,797

PROCESS OF MAKING COUGH SYRUP WITH MASKED NOSCAPINE

Virgil D. Blanculli, Fort Lauderdale, Fla., assignor to Fisons Corporation, Bedford, Mass.

Filed June 20, 1973, Ser. No. 371,757

Int. Cl.² A61K *31/485*

U.S. Cl. 424—260 **6 Claims**

1. A method of preparing a palatable-tasting cough syrup formulation containing noscapine, which method comprises:

a. preparing an aqueous liquid syrup-type carrier solution for the noscapine, which carrier includes a buffer to maintain the pH of the liquid carrier above a pH of 7 at all times; and

b. mixing alkaloid noscapine in the absence of noscapine in salt form with the liquid carrier to form a fine suspension of the alkaloid noscapine therein, thereby providing a palatable-tasting liquid formulation of suspended noscapine essentially free of any bitter-tasting noscapine salts.

4,029,798

ANALGETIC COMPOSITION

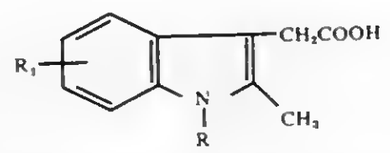
Hisao Yamamoto, Kobe; Toshiya Inukai, Sanda, and Yoshihiko Koga, Minoo, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed June 2, 1975, Ser. No. 582,757

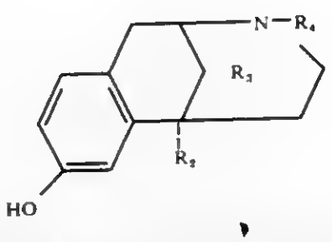
Int. Cl.² A61K *31/485, 31/40*

U.S. Cl. 424—260 **28 Claims**

1. An analgetic composition which comprises, as an active ingredient, a therapeutically effective amount of a synergistic mixture of an indole-3-acetic acid derivative of the formula,



wherein R is a halobenzoyl, piperonyloyl, or cinnamoyl group and R_1 is a 5-methoxy or 5,6-methylenedioxy group; and an analgetic compound of the formula,



wherein R_2 and R_3 are each a C_1-C_3 alkyl group and R_4 is a 4-(4-fluorophenyl)-4-oxobutyl, cyclopropylmethyl or 3-methyl-2-butenyl group and a pharmaceutically acceptable carrier or diluent, wherein the weight ratio of said indole-3-acetic acid derivative and said analgetic compound is from 3:97 to 90:10.

4,029,799

CERTAIN ANALGESICALLY ACTIVE SUBSTITUTED BENZYL PYRIDINE COMPOUNDS

Juan Bosch Cärtes; Jorge Canals Cabirö; Ricardo Granados Jarque, all of Barcelona; Cristobal Martinez Roldän, and Fernando Rabadan Peinado, both of Madrid, all of Spain, assignors to Laboratorios Made, S.A., Spain

Filed Apr. 29, 1975, Ser. No. 572,864

Claims priority, application Spain, Feb. 20, 1975, 434904

Int. Cl.² C07D *213/30;* **A61K** *31/44*

U.S. Cl. 424—263 **3 Claims**

1. A compound selected from the group consisting of 2-(3,4,5-trimethoxybenzyl)-3,4-dimethylpyridine, 3,4,5-trimethoxyphenyl-(3,4-dimethyl-2-pyridyl)-ethoxymethane and pharmaceutically acceptable acid addition salts thereof.

4,029,800

NEUROMUSCULAR BLOCKING AGENTS AND ANTAGONISTS

Theodore S. T. Wang, Lexington, Mass., and Julius A. Vida, DeWitt, N.Y., assignors to Bristol-Myers Company, New York, N.Y.

Filed May 28, 1976, Ser. No. 691,154

Int. Cl.² A61K *31/44, 31/445*

U.S. Cl. 424—263 **6 Claims**

1. A process for causing neuromuscular blockage or for antagonizing the effects of a neuromuscular blocking agent which comprises parenterally administering to a host animal a compound selected from the group consisting of 2-(4′-pyridyl)-1,3-dioxolane methiodide and 2-(1′-methyl-4-piperidyl)-1,3-dioxolane hydroiodide.

4,029,801

PHARMACEUTICAL COMPOSITIONS AND METHODS OF TREATING HYPERTENSION

John Frederick Cavalla, Isleworth, and John Leheup Archibald, Windsor, both of England, assignors to John Wyeth & Brother Limited, Maidenhead, England

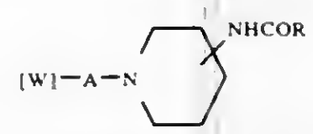
Continuation-in-part of Ser. No. 323,684, Jan. 15, 1973, abandoned, which is a continuation-in-part of Ser. No. 175,345, Aug. 26, 1971, abandoned. This application Apr. 2, 1975, Ser. No. 564,508

Claims priority, application United Kingdom, Sept. 3, 1970, 42090/70; July 22, 1971, 34376/71

Int. Cl.² A61K *31/445*

U.S. Cl. 424—267 **16 Claims**

1. A pharmaceutical composition for use in the treatment of hypertension comprising dosage form of a non-toxic pharmaceutically acceptable solid carrier and an effective amount of a heterocyclic compound of general formula (Ia),



wherein W is phenyl, mono-halophenyl, dihalophenyl, (lower-)alkoxyphenyl, di(lower)alkoxyphenyl, tri(lower)alkoxyphenyl, (lower)alkylphenyl, di-(lower)alkylphenyl, hydroxyphenyl, dihydroxyphenyl, methylenedioxyphenyl, ethylenedioxyphenyl, lower alkanoylaminophenyl, nitrophenyl, aminophenyl, di-(loweralkyl)-aminophenyl or acetylaminohydroxyphenyl; A is alkylene of 1–6 carbon atoms; and R is phenyl, or a pharmaceutically acceptable acid addition salt thereof, said unit dosage being in the form of a powder, capsule or tablet.

4,029,802

THE TREATMENT OF ASTHMA, HAY FEVER OR URTICARIA

Joachim Augstein, Linford; Hugh Cairns, Loughborough; Dennis Hunter, Loughborough, and John King, Loughborough, all of England, assignors to Fisons Limited, England

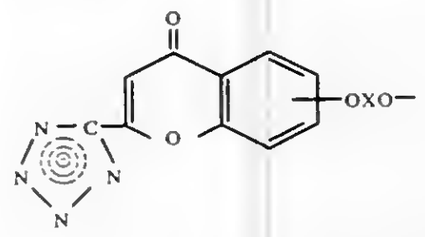
Divisinn of Ser. No. 175,391, Aug. 26, 1971, abandoned. This application Apr. 22, 1974, Ser. No. 463,180

Claims priority, application United Kingdom, Aug. 27, 1970, 41225/70; July 1, 1971, 30828/71

Int. Cl.² A61K *31/41*

U.S. Cl. 424—269 **7 Claims**

1. A method of treatment of asthma, hay fever or urticaria, which comprises administering a theraputically effective amount for the treatment of asthma, hay fever or urticaria, of a compound selected from a compound of formula I,



I

wherein X represent a hydrocarbon chain containing from 3 to 7 carbon atoms which chain may be substituted by one or more hydroxy groups or chlorine atoms,

and a pharmaceutically acceptable salt thereof.

to a patient afflicted with asthma, hay fever or urticaria.

4,029,803

METHOD OF TREATMENT WITH 2-IMINOTHIAZOLIDINES AND THIAZOLINES

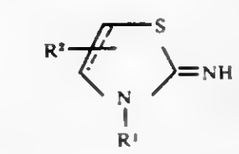
Norman R. Hunter, St. Norbert; Clarence S. Rooney, Beaconsfield; Joshua Rokach, Laval, all of Canada, and Edward J. Cragoe, Jr., Lansdale, Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed May 3, 1976, Ser. No. 682,802

Int. Cl.² A61K *31/425*

U.S. Cl. 424—270 **4 Claims**

1. A method of inhibiting indoleamine-N-methyl transferase comprising the administration to a host of a therapeutically effective amount of a compound of formula:



or pharmaceutically acceptable salt thereof, wherein

R^1 is C_{1-2} alkyl, C_3-alkenyl, or C_3-alkynyl; and

R^2 is hydrogen, C_{1-3} alkyl or trifluoromethyl.

4,029,804

INJECTABLE AMOXYCILLIN COMPOSITIONS

Dennis Edward Clark, Basking Ridge, and Robert Charles Blyth, North Plainfield, both of N.J., assignors to Beecham Group Limited, England

Filed Sept. 22, 1975, Ser. No. 615,239

Claims priority, application United Kingdom, Oct. 10, 1974, 43924/74

Int. Cl.² A61K *31/43*

U.S. Cl. 424—271 **1 Claim**

1. A solution adapted for injection which comprises 5–50% by weight of the sodium salt of amoxycillin dissolved in a sterile mixture of water and one or two water-miscible pharmaceutically acceptable alcoholic compounds selected from the group consisting of ethanol, n-propanol, iso-propanol, diethylene glycol, propylene glycol and glyceraldehyde, the mixed solvent system containing 35–85% v/v of water.

4,029,805

SEMISYNTHETIC PENICILLINS

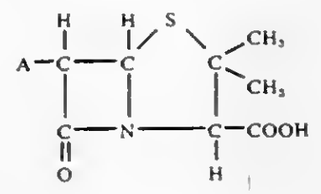
Alexander S. Emodi, West Orange; Harold Leon Newmark, Maplewood, and Leonard Joseph Scialpi, Andover, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Feb. 13, 1976, Ser. No. 657,810

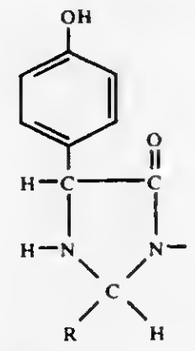
Int. Cl.² A61K *31/43;* **C07D** *499/80*

U.S. Cl. 424—271 **5 Claims**

1. A compound represented by the formula



wherein A is



R is hydrogen, substituted or unsubstituted lower alkenyl or alkyl or 1 to 8 carbon atoms in the alkyl chain, phenyl, and pharmaceutically acceptable salts with bases of said compounds.

4,029,806

NITRO-β-LACTAM ANTIBIOTICS AND PROCESSES FOR THEIR PREPARATION AND USE

Wolfgang Krohn, Leverkusen; Karl Georg Metzger; Michael Preiss, both of Wuppertal, and Michael Walkowiak, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

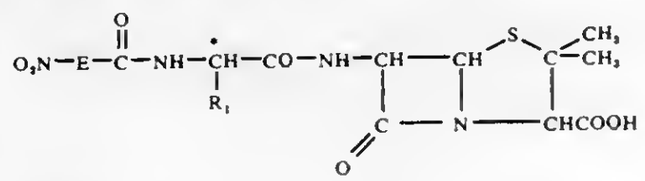
Division of Ser. No. 602,969, Aug. 8, 1975. This application July 22, 1976, Ser. No. 707,854

Claims priority, application Germany, Aug. 22, 1974, 2440268

Int. Cl.² C07D *499/66, 499/68;* **A61K** *31/43*

U.S. Cl. 424—271 **13 Claims**

1. A compound selected from the group consisting of a penicillin of the formula:



wherein

O_2N-E— is nitroalkyl of 1 to 6 carbon atoms;

the carbon atom designated by * constitutes a center of chirality and

R^1 is phenyl, hydroxyphenyl or cyclohexa-1,4-dien-1-yl;

and the pharmaceutically acceptable salts of said penicillin.

4,029,807

COMPOUNDS 5-HYDROXYTRYPTOPHAN GLUTAMATE AND ITS DERIVATIVES

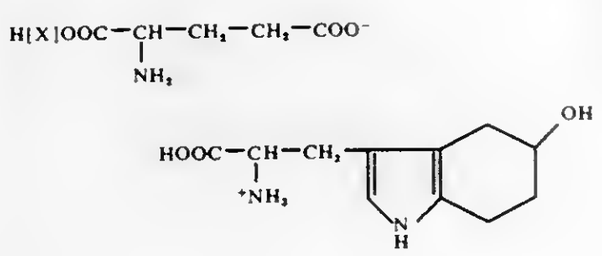
Cristóbal Martinez Roldán; Miguel Fernandez Braña, and José María Castellano Berlanga, all of Madrid, Spain, assignors to Laboratorios Made, S.A., Spain

Filed Apr. 8, 1975, Ser. No. 566,085

Int. Cl.² A01N *9/22*

U.S. Cl. 424—274 **3 Claims**

1. A compound consisting of 5-hydroxytryptophan glutamate having the general formula



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2. A pharmaceutical composition exhibiting anti-depressive properties which comprises an anti-depressive amount of a compound as claimed in claim 1 and a pharmaceutically acceptable carrier therefor.

4,029,808

THIENYL PHENYL O-(AMINOALKYL)-KETONE OXIME AND FURYL PHENYL O-(AMINOALKYL)-KETONE OXIME CORONARY VASODILATORS

Germaine Thulllier, Paris; Jacqueline Laforest, Vincennes, and Pierre Bessin, Chilly-Mazarin, all of France, assignors to C.E.R.P.H.A. a French Society organised under the laws of France, Arcueil, France

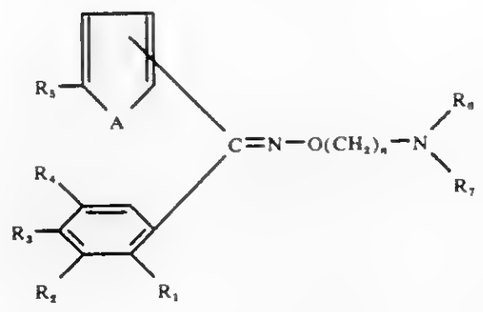
Filed Oct. 15, 1974, Ser. No. 515,063

Claims priority, application France, Oct. 19, 1973, 73.37444

Int. Cl.² A61K *31/34, 31/38*

U.S. Cl. 424—275 **11 Claims**

1. An aromatic compoumd having the formula:



in which,

A in the heterocyclic group is selected from the group consisting of O and S;

R_1, R_2, R_3, and R_4, which may be identical or different, are selected from the group consisting of hydrogen, halogen, lower alkyl, lower alkoxy and lower alkoxylidene;

R_5 is selected from the group consisting of hydrogen, lower alkyl, and nitro;

n is an integer from 1 to 3; and

R_6 and R_7 which are identical or different lower alkyl groups;

and pharmaceutically acceptable acid addition salts of the amino group; said compound being in the form of the cis isomer, the trans isomer or mixtures thereof.

4,029,809

METHOD OF PROTECTING PLANTS FROM PATHOGENS WITH CYANOMETHYL ARYL SULFONATES

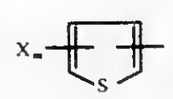
Herbert Q. Smith, deceased, late of Malvern, Pa.; by Jacqueline Smith, legal representative, Yardley, and Sameeh Said Toukan, Phoenixville, both of Pa., assignors to Pennwalt Corporation, Philadelphia, Pa.

Division of Ser. No. 385,495, Aug. 3, 1973, Pat. No. 3,903,298. This application July 25, 1975, Ser. No. 599,280

Int. Cl.² A01N *9/12*

U.S. Cl. 424—275 **2 Claims**

1. A method of inhibiting fungi or bacteria pathogenic to plants which comprises applying to said fungi, bacteria or the locus thereof a biocidally effective amount within the range of about 0.1 pound to about 20 pounds per acre of a cyanomethyl arylsulfonate represented by the formula RSO_3CH_2CN where R is



wherein X is selected from the group consisting of halogen, alkyl having from 1 to 18 carbon atoms, alkoxy having from 1 to 18 carbon atoms, NO_2, CN, CF_3, $CONH_2$, SO_2NH_2, H_2NCOO, COOH, YSO_2 and OOCY, wherein Y is lower alkyl, and *m* is 0 or an integer of 1 to 3.

4,029,810

LACTONE ESTERS OF PHENOXYISOBUTYRIC ACIDS

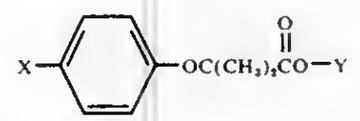
Sumanas Rakhit, Dollard des Ormeaux, Canada, assignor to American Home Products Corporation, New York, N.Y.

Filed Jan. 2, 1976, Ser. No. 646,211

Int. Cl.² C07D *307/32, 307/83*

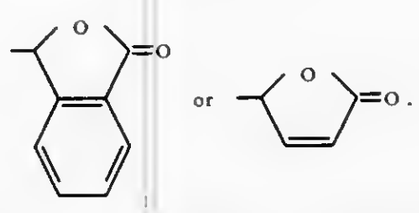
U.S. Cl. 424—279 **6 Claims**

1. A compound of formula I



I.

in which X is chloro, bromo or lower alkyl and Y is



3. A method for lowering concentrations of blood cholesterol and triglycerides in mammals in need thereof which comprises administering to said mammal a blood cholesterol and triglyceride lowering amount of a compound of formula I as claimed in claim 1.

4,029,811

CERTAIN ANTIINFLAMMATORY DIHYDROBENZOFURAN AND DIHYDRONAPHTHOFURAN ACETIC ACID COMPOUNDS

Gian Franco Tamagnone, and Franco De Marchi, both of Turin, Italy, assignors to SCHIAPPARELLI - Stabilimenti Chimici Farmaceutici Riuniti S.p.A., Turin, Italy

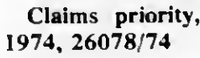
Filed June 9, 1975, Ser. No. 585,408

Claims priority, application United Kingdom, June 12, 1974, 26078/74

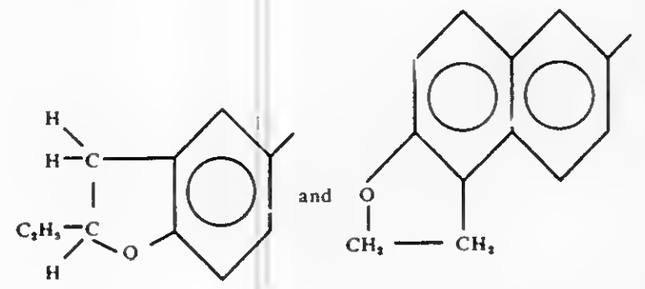
Int. Cl.² A61K *31/34*

U.S. Cl. 424—285 **7 Claims**

1. A compound of the following structural formula



wherein R represents a group selected from:



where:

X = OH, OCH_3, OC_2H_5; and their water soluble pharmaceutically acceptable salts.

4,029,812

NOVEL HYPOLIPIDEMIC 2-(3,5-DI-TERT-BUTYL-4-HYDROXYPHENYL)THIO CARBOXAMIDES

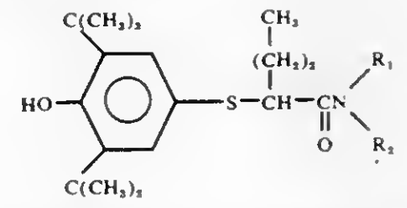
Eugene R. Wagner, Midland, and Larry G. Mueller, Ypsilanti, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Feb. 18, 1976, Ser. No. 658,971

Int. Cl.² A61K *31/21, 31/165;* **C07C** *119/20*

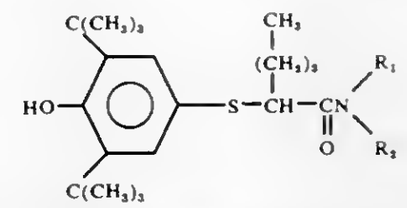
U.S. Cl. 424—298 **7 Claims**

1. A compound of the formula



wherein R_1 represents lower alkoxy and R_2 represents hydrogen, lower alkyl, lower alkoxy, hydroxy or lower hydroxyalkyl.

3. A method for lowering elevated serum lipids in a mammal which comprises administering internally to the mammal a hypolipidemically effective amount of a compound of the formula:



wherein R_1 represents lower alkoxy and R_2 represents hydrogen, lower alkyl, lower alkoxy, hydroxy or lower hydroxyalkyl.

4,029,813

FUNGICIDAL COMPOSITIONS CONTAINING BISTHIOUREIDO-BENZENES AND METHODS FOR USE THEREOF

Teruhisa Noguchi, Tokyo; Keisuke Kohmoto, Tottori, and Kimpei Kato, Ohiso, all of Japan, assignors to Nippon Soda Company Limited, Tokyo, Japan

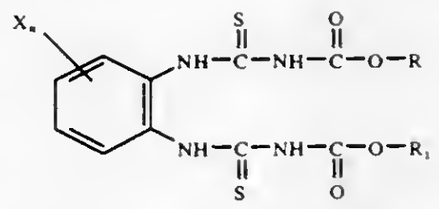
Continuation-in-part of Ser. No. 128,148, March 25, 1971, abandoned, which is a continuation-in-part of Ser. No. 771,269, Oct. 28, 1968, abandoned. This application Nov. 3, 1975, Ser. No. 628,574

Claims priority, application Japan, Oct. 30, 1967, 42-69358; Dec. 27, 1967, 42-83245; Apr. 13, 1968, 43-24528; Apr. 19, 1968, 43-25829; June 18, 1968, 43-41587; June 18, 1968, 43-41589

Int. Cl.² A01N *9/12*

U.S. Cl. 424—300 **16 Claims**

1. A fungicidal composition comprising an inert carrier and a fungicidally effective amount of at least one compound of the formula:



wherein each of R and R_1 represents a member of the group consisting of alkyl containing from 1 to 12 carbon atoms, alkyl containing from 1 to 2 carbon atoms substituted with halogen or methoxy, alkenyl containing 2 to 3 carbon atoms, alkynyl

containing 2 to 3 carbon atoms, benzyl, naphthyl, phenyl and phenyl substituted with halogen or methyl; each X represents halogen, nitro or methyl; *n* represents an integer from 0 to 3.

4,029,814

PHENYL-SUBSTITUTED PROSTAGLANDIN-E TYPE ANALOGS

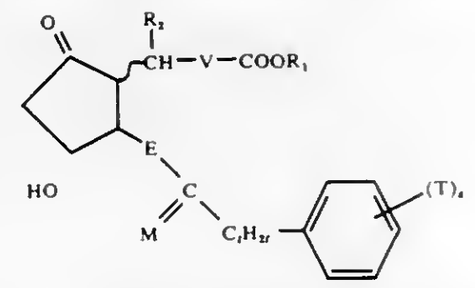
Gordon L. Bundy, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 645,279, Dec. 29, 1975, abandoned, which is a division of Ser. No. 431,011, Jan. 7, 1974, Pat. No. 3,987,087, which is a continuation-in-part of Ser. No. 167,446, July 29, 1971, abandoned, which is a continuation-in-part of Ser. No. 86,303, Nov. 2, 1970, abandoned. This application Sept. 22, 1976, Ser. No. 725,549

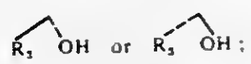
Int. Cl.² C07C *49/28*

U.S. Cl. 424—308 **148 Claims**

1. An optically active compound of the formula:



or a racemic compound of that formula and the mirror image thereof, wherein E is $-CH_2CHR_4-$ or trans $-CH{=}CR_4-$; wherein R_1 is hydrogen, alkyl of one to 8 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, 2 or 3 chloro or alkyl of one to 4 carbon atoms, inclusive, or ethyl substituted in the β-position with 3 chloro, wherein M is



wherein R_2, R_3, and R_4 are hydrogen or alkyl of one to 4 carbon atoms, inclusive; wherein C_tH_{2t} represents a valence bond or alkylene of one to 10 carbon atoms, inclusive, substituted with zero, one, or 2 fluoro, with one to 7 carbon atoms, inclusive, between

and the phenyl ring; wherein T is alkyl of one to 4 carbon atoms, inclusive, fluoro, chloro, trifluoromethyl, or $-OR_9$, wherein R_9 is hydrogen or alkyl of one to 4 carbon atoms, inclusive, and s is zero, one, 2, or 3, with the proviso that not more than two T's are other than alkyl; wherein V is (a) alkylene of 3 to 12 carbon atoms, inclusive, substituted with zero, one, 2, 3, or 4 fluoro, with 3 to 7 carbon atoms, inclusive, between $-CHR_2-$ and $COOR_1$, with the proviso that when 3 or 4 fluoro are present, they are all substituents of the carbon atoms alpha and beta to $-COOR_1$, (b) $-CH{=}CH-A-$, cis or trans, or (c) $-C\equiv C-A-$, wherein A is alkylene of one to 10 carbon atoms, inclusive, substituted with zero, one, 2, 3, or 4 fluoro, with one to 5 carbon atoms, inclusive, between $=CH-$ (or $\equiv C-$) and $-COOR_1$, with the proviso that when 3 or 4 fluoro are present, they are all substituents of the carbon atoms alpha and beta to $-COOR_1$, with the further proviso that when E is $-CH_2-CHR_4-$V is (a) above; and wherein ~ indicates attachment of the group to the cyclopentane ring in alpha or beta configuration; including the lower alkanoates thereof, and the pharmacologically acceptable salts thereof when R_1 is hydrogen.

4,029,815

ANTI-DIARRHEAL ANTHRANILIC ACIDS

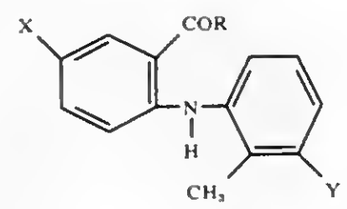
Margaret H. Sherlock, Bloomfield, and James F. Long, Whippany, both of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Filed Apr. 30, 1975, Ser. No. 572,981

Int. Cl.² A61K *31/24*; **C07C** *101/54, 103/28, 103/75*

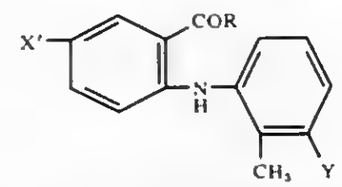
U.S. Cl. 424—309 **14 Claims**

1. The method for the treatment and control of diarrhea which comprises administering to a mammal suffering from diarrhea a therapeutically effective quantity of an N-arylanthranilic acid of the formula:



and the pharmaceutically acceptable salts thereof, wherein Y represents trifluoromethyl, difluoromethyl, or nitro, X represents hydrogen, bromo, chloro or nitro, and R represents OH, -O-lower alkyl, O-$CH_2CHOHCH_2OH$, O-alkyl-NR_1R_2, NHOH or NR_1NR_2, wherein R_1 and R_2 are each hydrogen or lower alkyl.

11. The compounds of the formula:



and the pharmaceutically acceptable salts thereof, wherein X' is H, chloro, bromo or nitro, Y is trifluoromethyl, difluoromethyl, or nitro, and R represents OH,-O-lower alkyl O-$CH_2CHOHCH_2OH$, NHOH, -O-alkyl NR_1R_2, or NR_1NR_2, wherein R_1 and R_2 are each hydrogen or lower alkyl, with the proviso that when X' is hydrogen, Y is difluoromethyl.

4,029,816

SUBSTITUTED 2-AMINOMETHYL-6-IODOPHENOLS

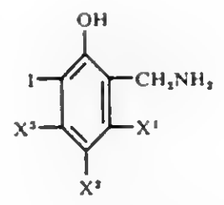
Edward J. Cragoe, Jr., Lansdale, and Everett M. Schultz, Ambler, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 635,198, Nov. 25, 1975, abandoned, which is a continuation of Ser. No. 466,316, May 2, 1974, abandoned, which is a continuation-in-part of Ser. No. 435,558, Jan. 22, 1974, abandoned, which is a continuation of Ser. No. 101,178, Dec. 23, 1970, abandoned. This application Sept. 20, 1976, Ser. No. 724,896

Int. Cl.² A01N *9/20, 9/24*; **C07C** *87/28*

U.S. Cl. 424—316 **14 Claims**

1. A compound of the formula:



wherein

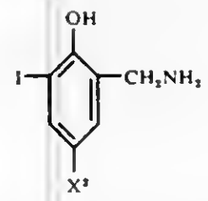
X^1 is hydrogen, methyl or methoxy;

X^2 is lower alkyl containing from 3 to 5 carbon atoms;

X^3 is hydrogen, methyl, ethyl, methoxy or ethoxy

or a non-toxic pharmaceutically acceptable salt thereof.

11. A pharmaceutical composition useful in the treatment of hypertension and edema which comprises from about 10 mg. to 500 mg. of a compound of the formula:



wherein

X^2 is a 4 or 5 carbon atom branched alkyl group wherein the branching occurs on the carbon atom attached to the ring or a non-toxic pharmaceutically acceptable acid addition salt thereof in an inert carrier.

4,029,817

SOFT CONTACT LENS PRESERVING SOLUTIONS

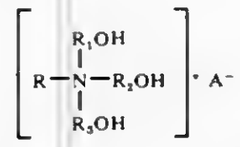
Milagros V. Blanco, Villa Park, and David L. Maurer, Orange, both of Calif., assignors to Allergan Pharmaceuticals, Irvine, Calif.

Continuation-in-part of Ser. No. 399,692, Sept. 24, 1973, abandoned. This application May 22, 1975, Ser. No. 580,034

Int. Cl.² A61K *31/14*

U.S. Cl. 424—329 **6 Claims**

1. A method of sterilizing soft contact lenses comprising contacting a soft contact lens with an effective amount of a sterile, aqueous, non-toxic composition comprising about 0.01 to about 0.1 percent (w/v) of a quaternary ammonium compound having the formula:



wherein A is a non-toxic anion, R is selected from the group consisting of saturated and unsaturated alkyl residues of fatty acids and mixtures thereof having from about 12–18 carbon atoms, R_1, R_2 and R_3 may be the same or different and are alkyl groups having 1–3 carbon atoms, and from about 0.01 to about 2 percent

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4,029,818

PROCESS FOR INHIBITING THE DETERIORATION OF WOOD DUE TO MARINE BORING ORGANISMS VIA THE USE OF DIBUTYLBENZYLPHENOL

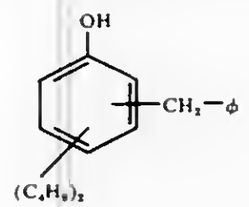
Leonard Jurd, Berkeley, Calif., and John Dale Bultman, Washington, D.C., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Apr. 9, 1976, Ser. No. 675,104

Int. Cl.² A61L *13/00*; **B27K** *3/38*

U.S. Cl. 424—346 **4 Claims**

1. A process for inhibiting deterioration of wood due to marine boring organisms, which comprises applying to the wood a compound of the structure



in an amount sufficient to inhibit deterioration due to marine boring organisms.

4,029,819

SUPEROXIDE DISMUTASE AND ITS APPLICATION AS AN OXIDATION INHIBITOR

Adolf Michael Michelson, Chatenay-Malabry, France, assignor to Etablissement Public det: Agence Nationale de Valorisation de la Recherche Anver, Paris, France

Division of Ser. No. 575,025, May 6, 1975, Pat. No. 3,997,402, which is a continuation-in-part of Ser. No. 461,379, April 16, 1974, abandoned. This application Aug. 22, 1976, Ser. No. 713,670

Claims priority, application France, Apr. 16, 1973, 73.13670

Int. Cl.² A23L *3/34*

U.S. Cl. 426—61 **6 Claims**

1. A composition protected from autooxidation comprising at least one member of the group consisting of lipids and antioxidants for foodstuffs and an effective amount of a superoxide dismutase of extracted from photobacterium marine bacterial cultures characterized by having a molecular weight of about 40,000 ± 2500, a pHi point of about 4 to 7, containing 1 to 2 atoms of non-hematinic iron per mole of superoxide dismutase and having a maximum enzymatic activity at a pH between 8.5 to 10.

3. A composition protected from autooxidation comprising at least one member of the group consisting of lipids and antioxidants for foodstuffs and an effective amount of a superoxide dismutase extracted from photobacterium marine bacterial cultures characterized by a molecular weight of 33,000 ± 2500, a pHi point of about 8.25, having a maximum enzymatic activity at a pH of 8.5 to 10 and containing about 1 atom of copper and about 2.0 atoms of zinc per mole of superoxide dismutase.

4,029,820

TRACERS

Sylvan Eisenberg, San Francisco, Calif., assignor to Micro Tracers, Inc., San Francisco, Calif.

Filed Jan. 20, 1975, Ser. No. 542,357

Int. Cl.² A23K *1/175*

U.S. Cl. 426—74 **6 Claims**

2. A dry pulverulent complete feed composition having as a uniformly distributed ingredient selenium, up to about 0.2 ppm, in the form of sodium selenite or sodium selenate adsorbed to the extent of from about 0.4% to about 4.0% by weight onto finely powdered magnetically attractable iron of from about 40 to about 150 microns in particle size.

4,029,821

ANIMAL FOOD

Douglas Newton Munro, Stathern, England, assignor to Pedigree Petfoods Limited, Melton Mowbray, England

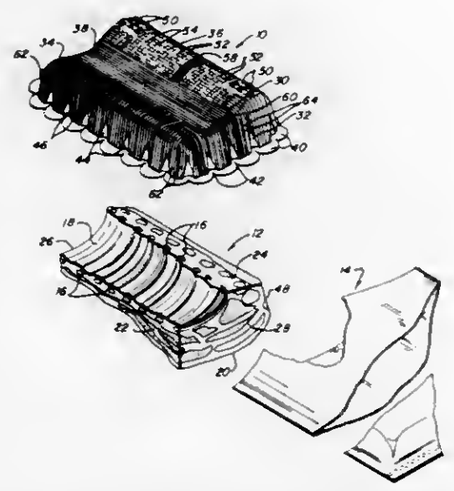
Continuation-in-part of Ser. No. 327,221, Jan. 26, 1973, abandoned. This application Jan. 7, 1976, Ser. No. 647,141

Int. Cl.² A23K *1/00, 1/16*

U.S. Cl. 426—92 **5 Claims**

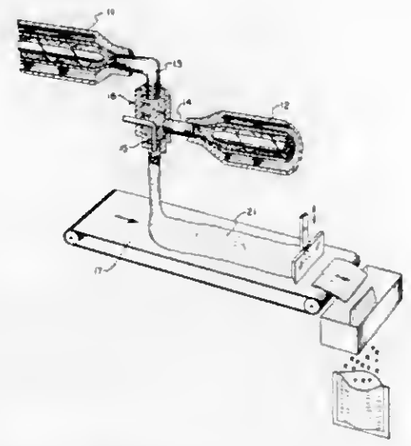
1. As a food composition for animals, discrete bitesized particles comprising a dry coherent food material selected from the group consisting of cereal, fish meal and mixtures thereof, and a coating of condensed fish solubles on said particles providing a concentration of the condensed fish solubles on or near the surface of said particles and constituting from 0.5 –15% of said total food composition.

4,029,822
BONE END SHIELD FOR MEAT CUTS
Robert E. Comer, 2425 25th Ave., Greeley, Colo. 80631
Filed Dec. 29, 1975, Ser. No. 644,628
Int. Cl.² B65B 25/06
U.S. Cl. 426—124 10 Claims



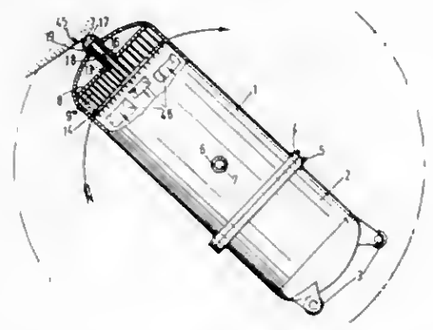
1. In combination: a cut of meat of the type having one or more rows of exposed bone ends and a concave surface adjacent thereto; an air-tight collapsible bag adapted to receive said meat cut and form a vacuum pack therefor upon being evacuated and sealed; and a sheet of pliable heat-formable puncture-resistant and fluid-impervious plastic preformed to provide at least one hump positioned and adapted to overlie a row of said exposed bone ends defining a protective cover therefor, a troughed section alongside said hump for covering said concave surface, and a skirt bordering said hump and troughed section cooperating therewith and with said meat cut to maintain said cut and cover in assembled relation while being placed in the bag and the latter evacuated and sealed.

4,029,823
METHOD OF MAKING A DRY PET FOOD HAVING A MARBLED MEAT-LIKE TEXTURE
David P. Bone, Palatine, and Edward L. Shannon, Barrington, both of Ill., assignors to The Quaker Oats Company, Chicago, Ill.
Filed June 12, 1974, Ser. No. 478,754
Int. Cl.² A23L 1/27
U.S. Cl. 426—249 12 Claims



1. A method for the production of a dry pet food having a moisture content of less than 15 percent by weight and a soft, elastic, marbled, meat-like texture and appearance comprising the steps of forming a first dough containing a first coloring agent and a second dough containing a second coloring agent, each dough comprising a fat, a proteinaceous adhesive, and a plasticizing agent; and sufficient amount of water to produce a product having less than 15 percent by weight moisture and an additional amount of process water; wherein said proteinaceous adhesive is present in an amount of from about 4 to about 60 percent by weight of the dough and said plasticizing agent is present in an amount of from about 2 to about 40 percent by weight of the dough; separately cooking said first and second doughs at a temperature between 160° and 300° F.; combining the first dough with said second dough such that the final product contains from about 70–90 percent by weight of said first dough and from about 10–30 percent by weight of said second dough; and drying the final product sufficiently to reduce the moisture content of the final product to less than 15 percent by weight of the final product.

4,029,824
METHOD OF AND APPARATUS FOR TREATING MEAT, MORE PARTICULARLY HAM MEAT
Christianus Petrus Langen, Cuyk, Netherlands, assignor to H. J. Langen & Sons Ltd., Rexdale, Canada
Filed Apr. 25, 1975, Ser. No. 571,592
Claims priority, application Netherlands, Apr. 26, 1974, 7405711
Int. Cl.² A23B 4/02
U.S. Cl. 426—281 2 Claims

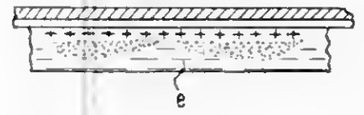


1. In a process of curing meat in a rotary tumbling device having a closed tumbling chamber partly filled with a bath of curing fluid comprising pickling fluid, the steps of repeatedly:
a. massaging the meat by tumbling the meat in and out of said bath within said chamber in response to rotation of said chamber, and thereafter;
b. simultaneously tenderizing and curing the meat by rotating the tumbling device to cause the meat to fall downwardly under the influence of gravity randomly oriented into the bath and onto a plurality of penetrating means located within said chamber and extending upwardly to be penetrated by the said means and thus tenderized, the meat absorbing the curing fluid from the bath and being thus cured, and thereafter;
c. removing said meat from said penetrating means as said tumbling device is rotated, and alternately repeating the cycle of massaging and simultaneous tenderizing and curing while catching and mixing the juices escaping from the meat with said bath.

4,029,825
PRODUCTION OF EGG WHITE SUBSTITUTE FROM WHEY
Pei K. Chang, Montrose, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.
Filed May 30, 1975, Ser. No. 582,550
Int. Cl.² A23C 21/00
U.S. Cl. 426—271 10 Claims

1. A process for forming an egg white substitute which comprises:
a. combining liquid whey with an effective amount of sodium lauryl sulfate to form a whey protein-sodium lauryl sulfate complex which precipitates from solution; and
b. reducing the sodium lauryl sulfate content of the complex to no higher than about 1.0% by weight.

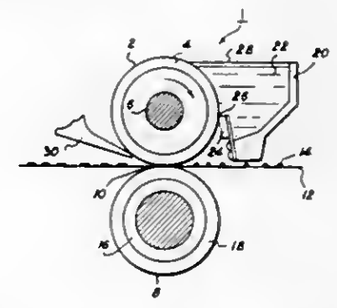
4,029,826
ELECTROSTATIC PRINTING METHOD
Keita Nakano; Kiyoshi Horie, and Noriaki Yamazaki, all of Ebina, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan
Filed Oct. 2, 1974, Ser. No. 511,278
Claims priority, application Japan, Oct. 9, 1973, 48-112875
Int. Cl.² G03G 13/10
U.S. Cl. 427—16 3 Claims



1. An electrostatic printing method comprising the steps of forming an electrostatic latent image on a recording member;
first developing said electrostatic latent image with a liquid ink comprising an insulating liquid vehicle and at least one solid coloring material, said liquid ink being applied from a developing surface having substantially uniform projections thereon, the spaces between said projections being so filled with said ink that the ink is normally maintained out of contact with the surface of said recording member whereby said liquid ink is electrostatically attracted and applied only to said electrostatic latent image and not to the non-charged background area of said image so that said ink adheres to at least part of said latent image; and
subsequent to said first developing step and prior to the evaporation of said ink, further developing said image by applying to both the developed electrostatic latent image and said non-charged background area an insulating liquid miscible with said insulating liquid vehicle and containing substantially no coloring matter to charge some of the solid coloring material in said ink which adhered to said part of said latent image to a given polarity in said insulating liquid to thereby cause electrophoresis of the charged solid coloring material in the insulating liquid, as a result of which said charged solid coloring material adheres to portions of said latent image left undeveloped by the first developing step to thereby complete the development of said last-mentioned portions.

4,029,827
MERCAPTO FUNCTIONAL POLYORGANOSILOXANE RELEASE AGENTS FOR FUSERS IN ELECTROSTATIC COPIERS
George R. Imperial, Webster, and Donald A. Seanor, Pittsford, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.
Filed July 24, 1974, Ser. No. 491,412
Int. Cl.² B05D 3/12; C23F 7/00; G03G 13/20
U.S. Cl. 427—22 14 Claims

6. The method of fusing modified electroscopic thermoplastic resin toner images to a substrate, said toner having functional groups which react with the metal of a fuser member, including the steps of:
(a) forming a film on a heated, metal fuser member in an electrostatic reproducing apparatus, said film being a barrier to said modified electroscopic thermoplastic resin toner having functional groups and comprising the product resulting from the interaction of the metal fuser member and a polyalkyl siloxane having reactive mercapto-functional groups thereon which interact with the metal fuser member, said mercapto-functional polyalkyl siloxane being fluid at the temperature between about 220° F and 400° F of the metal fuser member and acting as an improved release fluid film for the electroscopic thermoplastic resin toner having functional groups, said film having improved thermal stability;



b. contacting the toner images on said substrate with the coated, heated, metal fuser member for a period of time sufficient to soften the electroscopic thermoplastic resin toner having functional groups; and
(c) allowing the toner to cool.

4,029,828
X-RAY TARGET
Hubert Bildstein; Rudolf Machenschalk, and Helmut Petter, all of Tyrol, Austria, assignors to Schwarzkopf Development Corporation, New York, N.Y.
Filed June 16, 1976, Ser. No. 696,489
Claims priority, application Austria, June 23, 1975, 4809/75
Int. Cl.² B05D 3/06
U.S. Cl. 427—34 10 Claims

1. An X-ray target made of a refractory metal having a high thermal emission coating outside the focal area, the improvement comprising having the target surface outside the focal area equipped with a coating of a mixture consisting of more than 6 and less than 20 weight-% TiO_2 and more than 80 and less than 94 weight-% Al_2O_3.

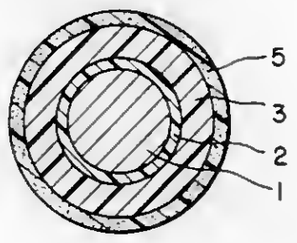
4,029,829
FRICTION MEMBER
John Victor Weaver, Water Orton, and Ronald Fisher, Hillmorton Rugby, both of England, assignors to Dunlop Limited, London, England
Filed Jan. 27, 1975, Ser. No. 544,575
Claims priority, application United Kingdom, Feb. 8, 1974, 05791/74
Int. Cl.² C01B 31/04; C23C 11/10; B32B 5/02
U.S. Cl. 427—44 6 Claims

1. A method of manufacturing an all-carbon friction member which comprises applying to at least one side of a graphite body a layer of carbon fibers with the interposition of a carbonizable resin, curing the resin to bond the layer to the body and subjecting the layer to a chemical vapor deposition process in which the layer is heated in the presence of a hydrocarbon gas whereby carbon is densified on the layer by cracking of the gas and the body is maintained at a higher temperature than the material of the layer during the chemical vapor deposition process whereby carbon is deposited in greatest concentration initially adjacent the hotter body surface and builds therefrom progressively through the fibrous layer to the exposed surface of the layer to form a friction surface on said side of said body.

4,029,830
METHOD OF MANUFACTURING INSULATED ELECTRIC POWER CABLES

Shuji Yamamoto; Setsuya Isshiki, and Mitsuru Igarashi, all of Tokyo, Japan, assignors to The Fujikura Cable Works, Ltd., Tokyo, Japan

Filed May 1, 1975, Ser. No. 573,425
Claims priority, application Japan, July 25, 1974, 49-85418; Aug. 22, 1974, 49-96549; Aug. 22, 1974, 49-96550; Oct. 14, 1974, 49-117942
Int. Cl.² B05D 5/12
U.S. Cl. 427—57 8 Claims



1. A method of manufacturing an insulated electric power cable comprising the steps of applying a curable polyethylene material on an electric conductor to form a polyethylene insulation layer, providing over said insulation layer, a layer of a plastic compound comprising 100 parts by weight of a thermoplastic resin and from 5 to 70 parts by weight of calcium oxide having an average diameter ≤ 50 μm and curing both the insulation layer and said layer of plastic compound at the same time with steam under a pressure of 1.5- 20 kg/cm², said thermoplastic resin being selected from the group consisting of saturated or unsaturated olefin polymers and ethylene-vinyl acetate copolymers with or without vinyl chloride grafting.

4,029,831
METHOD OF MAKING A MULTI-GLOSS PANEL

Lyn A. Daunheimer, Batavia, Ill., assignor to Masonite Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 588,322, June 19, 1975, abandoned, which is a continuation-in-part of Ser. No. 421,289, Dec. 3, 1973, abandoned. This application June 1, 1976, Ser. No. 691,703
Int. Cl.² B05D 5/02, 3/10
U.S. Cl. 427—264 10 Claims

1. A method of making a panel having a substantially flat planar surface with areas of differing light reflection characteristics, comprising the steps of:

applying to substantially the entire surface of a panel substrate a uniform thickness of a curable resinous top coat material comprising an alkyd resin and a second resin selected from the group consisting of urea-formaldehyde, melamine-formaldehyde and a mixture of urea-formaldehyde and melamine-formaldehyde wherein the ratio of alkyd resin to the second resin is in the weight ratio range of 1:19 to 19:1.

Curing said top coat material over substantially the entire surface thereof; and

inhibiting the curing of said top coat material in portions overlying selected areas of said surface to cause said portions to cure at a lower rate than the remainder of the coating thereby obtaining a cured substantially flat and planar top coat surface which reflects light more diffusely in a desired microscopically roughened pattern corresponding to the inhibited portions of said top coat material.

4,029,832
METHOD FOR PRODUCING AN ADHESIVE-COATED HIGH-STRENGTH STEEL REINFORCING MEMBER

Thomas E. Graham, Raleigh, N.C.; George H. Thaxton, Charleston, S.C.; Francis M. Mitchell, Chapel Hill, and Robert P. Bell, Cary, both of N.C., assignors to Monsanto Company, St. Louis, Mo.

Filed July 3, 1975, Ser. No. 598,591
Int. Cl.² C21D 1/00, 9/52
U.S. Cl. 427—318 17 Claims

1. A method for producing an adhesive-coated, high-strength steel reinforcing member, comprising the steps of:

a. providing a steel member;

b. austenitizing said member;

c. passing said member while in the austenitic state through an organic adhesive coating bath wherein a continuous adhesive coating for rubber is applied at a rate sufficient to form a quenched structure of martensite, bainite or mixtures thereof; and

d. reheating said member to dry and cure said adhesive coating and to temper said steel member.

16. In a method for heat treating a steel wire cord or ribbon and applying a continuous organic adhesive for rubber thereon, the improvement which comprises heating the said cord or ribbon to the austenitic range and passing the said cord or ribbon while in the austenitic range into a dip or bath of the said organic adhesive at a rate sufficient to transform the austenite to martensite, bainite or mixtures thereof.

4,029,833
WEB COATING APPARATUS

Geza Kosta, Plainfield, N.J., assignor to Midland-Ross Corporation, Cleveland, Ohio

Filed Apr. 11, 1975, Ser. No. 567,295
Int. Cl.² B05D 1/28
U.S. Cl. 427—428 6 Claims

1. A method of coating a web comprising the steps of: providing a pond of coating liquid having a viscosity up to 10,000 centipoises in upstream submerging relation with a first nip defining a gap of not less than about 0.0002 of an inch and not greater than about 0.015 of an inch formed between a first metallic roll and a second metallic roll, both rotatable to a surface accuracy within the first nip of less than 0.0001 of an inch;

passing said liquid downstream through said nip by rotating the first roll through said nip in an upstream direction and rotating said second roll through said nip in the downstream direction at a peripheral rate greater than that of said first roll;

passing the liquid carried on said second roll through a second nip formed by said second roll and a third roll having a resilient peripheral surface of a Shore A durometer hardness of approximately 90;

supporting said third roll in pressure nip relation with the second roll and rotating the third roll concurrently with the second roll through said second nip at a peripheral speed greater than that of said second roll by a factor substantially equal to the quotient of the thickness of material entering said second nip divided by the thickness of material leaving said nip;

passing the material carried away from said second nip through a third nip formed between said third roll and a fourth roll having resilient peripheral surface of a Shore A durometer hardness of approximately 90;

guiding a web through said third nip; and

supporting the fourth roll in pressure nip relation with the third roll and rotating the fourth roll concurrently with the third roll through said third nip at the same peripheral speed as said third roll to receive and forward the web at said peripheral speed.

3. Apparatus for coating webs comprising:

a first roll and a second roll oriented in nip relationship to receive and maintain a pond of coating material at the upstream side of the nip therebetween and at a height submerging said nip, both of said rolls being transaxially inflexible and finished to a hard surface of radial uniformity less than 0.0001 of an inch rendering said rolls capable of holding a constant nip gas while passing liquid having an absolute viscosity of up to 10,000 centipoises;

means for supporting said two rolls at a fixed nip gap;

means for driving the first roll through said nip in an upstream direction;

means for driving said second roll through said nip in the downstream direction at a peripheral rate greater than that of said first roll;

a third roll comprising a peripheral resilient material of a Shore A scale durometer hardness of approximately 90 supported in pressure nip relation with the second roll to form a second nip;

means for driving of a third roll concurrently with said second roll through said second nip at a peripheral speed substantially greater than that of the second roll;

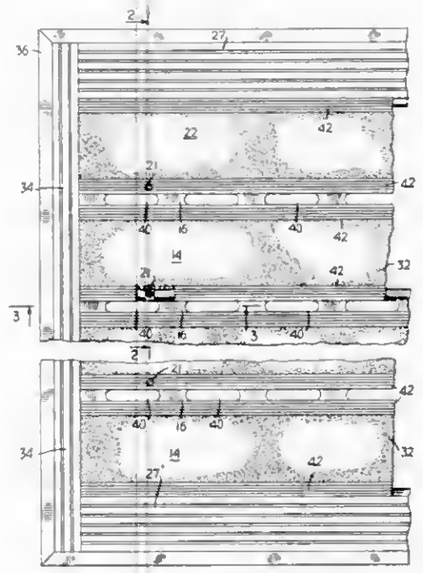
a fourth roll comprising a peripheral resilient material of a Shore A scale durometer hardness of approximately 90 supported in pressure nip relation with said third roll to form a third nip; and

means for driving said fourth roll concurrently with the third roll through said third nip at the same peripheral speed as said third roll, said third and fourth rolls being speedrated and adapted to receive the web and forward it at said peripheral speed through said third nip.

4,029,834
FLOOR MAT WITH HINGED RIGID ELONGATED RAILS

Gary F. Bartlett, Muncy, Pa., assignor to Construction Specialties, Inc., Cranford, N.J.

Filed Dec. 22, 1975, Ser. No. 643,303
Int. Cl.² B32B 3/06, 3/10; F04C 1/30; E04F 15/16
U.S. Cl. 428—62 9 Claims



1. A floor mat comprising a multiplicity of substantially rigid, elongated rails disposed generally parallel to each other in closely spaced relation, each rail having a base portion for support, a top portion, a ball structure extending continuously along one edge and having an enlarged ball end portion of uniform arcuate cross-section, and a socket structure extending continuously along the other edge and having an enlarged socket end portion defining an outwardly open concavity of arcuate cross-section matching the ball portion, the rails being interlocked with each other for fixedly spacing them from each other by reception of a ball portion of one rail within a socket portion of an adjacent rail, and the opening to the concavity being smaller than the ball end portion but larger than the part of the ball structure adjacent the ball end portion and at the opening to permit rotational movement of the rails transversely relative to each other, whereby the floor mat may be rolled up, and a tread surface on the top portion.

4,029,835
HEAT RESISTANT SHEET

Hiroshi Iwata, and Mikio Yoshida, both of Ohtake, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

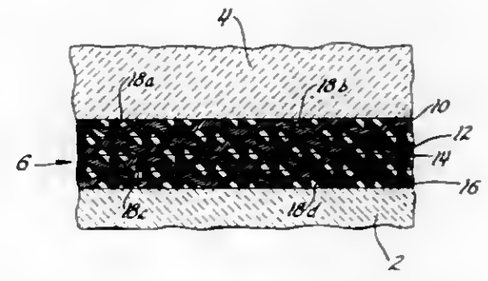
Filed Jan. 14, 1976, Ser. No. 649,147
Claims priority, application Japan, Jan. 16, 1975, 50-7327
Int. Cl.² B32B 7/00
U.S. Cl. 428—212 7 Claims

1. A heat resistant sheet produced by pressing and heating a mixed web of wholly aromatic polyamide fibers [A] having a maximum loss tangent tan δ(max) 0.25 and a sonic modulus Es < 130 g/d and wholly-aromatic polyamide fibers [B] having a maximum loss tangent tan δ(max) 0.2 and a sonic modulus Es < 130 g/d at a temperature of from 200° to 350° C and a pressure of not more than 200 kg/cm² wherein said fibers [A] are heat fused.

4,029,836
RESILIENT HEAT RESISTANT LAMINATED COMPOSITE

Leonard Wieczorek, Golden, Colo., assignor to Coors Porcelain Company, Golden, Colo.

Continuation of Ser. No. 547,302, Feb. 5, 1975, abandoned. This application Sept. 15, 1976, Ser. No. 723,428
Int. Cl.² B32B 7/00
U.S. Cl. 428—246 6 Claims

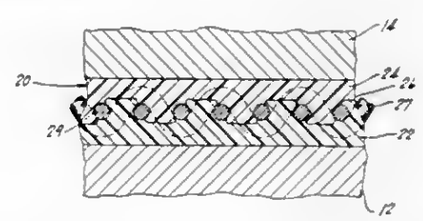


1. An assembly comprising two members, at least one of which is ceramic, bonded together by a layer of resilient heat-resistant laminated composite consisting essentially of a plurality of layers of woven graphite cloth bonded together by silicone rubber, said composite containing from about 60% to 90% by volume of said woven graphite cloth and the remainder of said silicone rubber and having resiliency above the temperature at which the silicone rubber loses its resiliency.

4,029,837
COMPOSITE PLASTIC-METALLIC BONDING MEANS AND METHOD

Alfred F. Leatherman, Columbus, Ohio, assignor to William C. Heller, Jr., Milwaukee, Wis.

Filed Aug. 14, 1975, Ser. No. 604,833
Int. Cl.² B32B 7/00, 15/00
U.S. Cl. 428—247 20 Claims



1. A composite bonding agent suitable for joining first and

second thermally bondable plastic bodies having at least some mutual bonding incompatibility comprising, in a generally stratified, integral configuration:

a first thermoplastic material layer having thermal fusion bonding compatibility with the first body;

a second thermoplastic material layer having thermal fusion bonding compatibility with the second body, said first and second layers having bonding incompatibility with each other; and

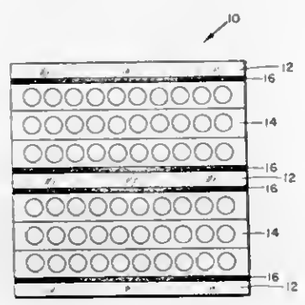
an inductively heatable metallic mesh interposed between said first and second layers, said mesh having a lattice of interwoven wires which mechanically interlock with said layers for providing internal cohesion to the composite bonding agent.

4,029,838

HYBRID COMPOSITE LAMINATE STRUCTURES

Christos C. Chamis, Fairview Park, and Raymond F. Lark, Westlake, both of Ohio, assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Sept. 24, 1975, Ser. No. 616,332
Int. Cl.² B32B *5/12, 15/14, 27/38*
U.S. Cl. 428—301 **7 Claims**



1. A hybrid structural laminate comprising alternating plies of a matrix material and planar metallic foil;

said matrix material being embedded with fiber elements having substantially unidirectional strength characteristics, said fiber elements being oriented within said matrix material with the longitudinal axes thereof extending in substantially the same direction; said foil plies alternating within the laminate structure with said matrix material plies, said matrix material being metal for outermost plies and non-metallic for innermost plies; and

said fiber embedded metal matrix material being aluminum with boron fibers therein.

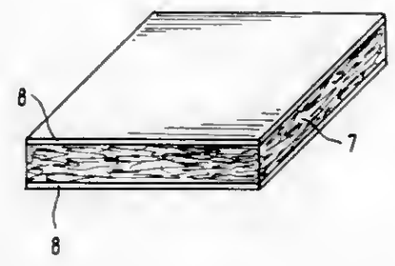
4,029,839

SOUND AND THERMAL INSULATING CONSTRUCTION ELEMENT

Klaus Lesti, Haunstetter Str. 243, Augsburg, Germany

Filed Dec. 3, 1975, Ser. No. 637,467
Claims priority, application Germany, Dec. 6, 1974, 2457848
Int. Cl.² B32B *5/00*
U.S. Cl. 428—306 **10 Claims**

5. A construction element comprising a pressed rigid mass of a hardened binder and comminuted carpet pieces which consists of a rubbery backing and fibers anchored thereto on one side, said pieces being embedded in said binder and held together thereby.



6. The element defined in claim 5 wherein said binder is a synthetic-resin foam.

4,029,840

SYNTHETIC LEATHER

Yasuo Shiklnami, Shiga; Kosuke Iida, Osaka; Kunihiro Hata, Osaka, and Tetsuya Fujii, Osaka, all of Japan, assignors to Takiron Co., Ltd., Osaka, Japan

Filed Oct. 1, 1976, Ser. No. 728,652
Claims priority, application Japan, Jan. 22, 1976, 51-6518
Int. Cl.² B32B *3/26*
U.S. Cl. 428—310 **5 Claims**

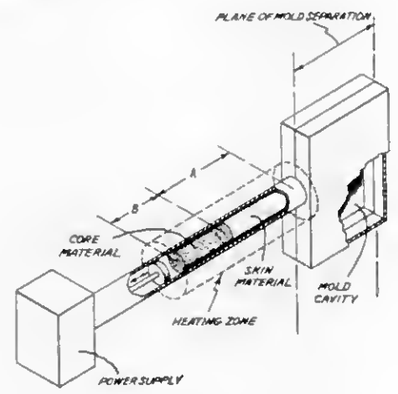
1. Synthetic leather comprising a substrate carrying a resin layer comprising cross-linked, foamed syndiotactic 1,2-polybutadiene.

4,029,841

INJECTION MOLDING PROCESS

Lawrence R. Schmidt, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Feb. 14, 1975, Ser. No. 550,003
Int. Cl.² B29F *1/12*
U.S. Cl. 428—325 **10 Claims**



1. A process for molding a solid thermoplastic article substantially free of warpage having a skin material essentially free of a nonreinforcing filler and a core material containing a reinforcing filler comprising:

a. positioning at least a first skin material free of a reinforcing amount of a reinforcing filler and at least a first core material containing a reinforcing amount of a reinforcing filler in an elongated heating zone at preselected locations of said materials relative one to the other;

b. heating said materials to a temperature sufficient to melt each of said materials while maintaining said materials at their preselected relative positions;

c. exerting a force free of complex shear fields against an end of the melted materials;

d. linearly moving the melted materials in response to said force through the heating zone and into a mold cavity; and

e. cooling said first skin and said first core materials in the mold cavity.

4,029,842

TRANSPARENT COATED RESIN COMPOSITE

Masaru Yoshida; Hiroshi Okubo, and Isao Kaetsu, all of Takasaki, Japan, assignors to Japan Atomic Energy Research Institute, Tokyo, Japan

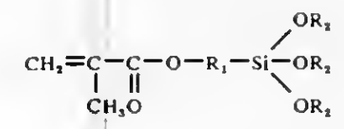
Filed Sept. 2, 1975, Ser. No. 609,857
Claims priority, application Japan, Sept. 5, 1974, 49-101417
Int. Cl.² B29D *11/00;* **G02C** *7/02;* **B32B** *27/08*
U.S. Cl. 428—334 **6 Claims**

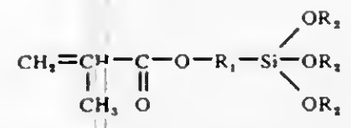
1. A transparent coated resin composite comprising:

a substrate of polymer consisting essentially of methyl methacrylate unit,

b. a precoating formed on said substrate of at least one silicon compound selected from the group consisting of:

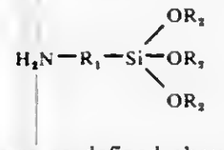
methacryloxyalkyl-trialkoxysilanes represented by the formula





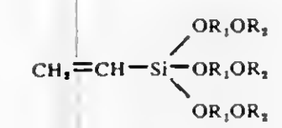
wherein R_1 is an alkylene group having 1 – 6 carbon atoms and R_2 is an alkyl group having 1 – 6 carbon atoms, and hydrolysates thereof;

aminoalkyl-trialkoxysilanes represented by the formula



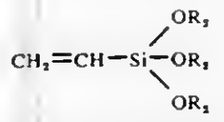
wherein R_1 and R_2 are as defined above, and hydrolysates thereof;

vinyltris(alkoxyalkoxy)silanes represented by the formula



wherein R_1 and R_2 are as defined above, and hydrolysates thereof; and

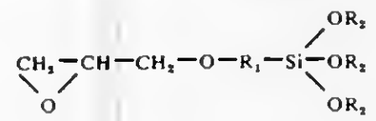
vinyltrialkoxysilanes represented by the formula



wherein R_2 is as defined above, and hydrolysates thereof; and

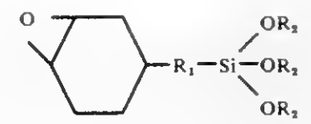
c. an over-coating formed on said precoating of at least one silicon compound selected from the group consisting of:

glycidoxyalkyl-trialkoxysilanes represented by the formula



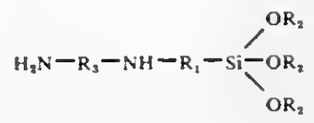
wherein R_1 and R_2 are as defined above, and hydrolysates thereof;

(3,4-epoxycyclohexyl)alkyl-trialkoxysilanes represented by the formula



wherein R_1 and R_2 are as defined above, and hydrolysates thereof;

N-(aminoalkyl)-aminoalkyl-trialkoxysilanes represented by the formula



wherein R_1 and R_2 are as defined above and R_3 is an alkylene group having 1 – 6 carbon atoms, and hydrolysates thereof,

whereby the total thickness of the coating is in the range of 0.0001 – 0.5 mm.

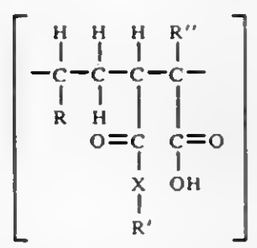
4,029,843

POLYMERIC RELEASE AGENTS

Jaykumar Jivraj Shah, Wheeling; Jules Downes Porsche, Oakbrook, and Charles Bartell, Highland Park, all of Ill., assignors to Borden, Inc., Columbus, Ohio

Filed Jan. 15, 1976, Ser. No. 649,227
Int. Cl.² C09J *7/02*
U.S. Cl. 428—352 **9 Claims**

1. In a tape having a pressure sensitive adhesive on one surface of the base strip of the tape, the improvement consisting of a layer of a polymeric release agent on the opposite surface of said base strip, said polymeric release agent having the following structural formula:



Wherein

R is a straight chain alkyl group with 4 to 22 carbon atoms,

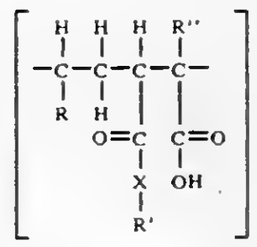
R′ is H or a straight chain alkyl group with 1 to 22 carbon atoms,

R″ is H or CH_3,

X is NH or O,

Either R or R′ must contain at least 12 carbon atoms.

9. A release liner comprising a backing sheet and on at least one surface of said sheet a layer of polymeric release agent, said polymeric release agent having the following structural formula:



Wherein

R is a straight chain alkyl group with 4 to 22 carbon atoms,
R′ is H or a straight chain alkyl group with 1 to 22 carbon atoms;
R″ is H or CH_3,
X is NH or O,
Either R or R′ must contain at least 12 carbon atoms.

4,029,844

ROCKET NOZZLE COMPRISING PYROLYTIC GRAPHITE-SILICON CARBIDE INSERTS

Eugene L. Olcott, Falls Church, Va., assignor to Atlantic Research Corporation, Alexandria, Va.

Division of Ser. Nos. 354,048, April 24, 1973, Pat. No. 3,900,675, and Ser. No. 65,899, Aug. 21, 1970, Pat. No. 3,738,906. This application Feb. 20, 1975, Ser. No. 551,470
The portion of the term of this patent subsequent to Dec. 2, 1992, has been disclaimed.
Int. Cl.² C23C 11/10; C01B 31/36; B05D 7/20; B32B 9/00
U.S. Cl. 428—367 12 Claims

1. A process for making a rocket nozzle insert of pyrolytic graphite microcomposite comprising pyrolytic graphite containing embedded therein codeposited silicon carbide comprising aciculae of silicon carbide, the longitudinal axis of said aciculae being aligned in the c-direction relative to the a–b plane of the associated pyrolytic graphite crystallite at the point of embedment, which comprises pyrolyzing a mixture of methyl trichlorosilane, an inert diluent gas, and a hydrocarbon gas onto a heated cylindrical substrate at a temperature of about 2800° – 3800° F and at a pressure at which said silicon carbide aciculae are formed, the volumetric ratio of inert gas to hydrocarbon gas being at least 86.7 to 13.3 and the weight ratio of methyl trichlorosilane to hydrocarbon being between about 5–95 and 75–25; and shaping the resulting microcomposite cylinder into a rocket nozzle insert.

4,029,845

PRINTED CIRCUIT BASE BOARD AND METHOD FOR MANUFACTURING SAME

Hirotoshi Nomura, Sulta, Japan, assignor to Sumitomo Bakelite Company, Limited, Tokyo and Nomura Electroplating Company, Ltd., Osaka, both of, Japan

Filed Aug. 12, 1975, Ser. No. 603,948
Claims priority, application Japan, Aug. 15, 1974, 49-93940; Aug. 29, 1974, 49-99765; Feb. 5, 1975, 50-15766; Feb. 5, 1975, 50-15767
Int. Cl.² B32B 27/38, 17/04, 27/42, 27/34
U.S. Cl. 428—415 23 Claims

1. A base board, for printed circuits for preparation by the additive process, obtained by heating under pressure (1) a layer of prepreg comprising a thermosetting resin as impregnant, (2) adjacent to said prepreg layer one or two layers of a semi-cured composition comprising 50-300 parts by weight of a thermosetting resin and 100 parts by weight of a nitrile rubber, and (3) adjacent to said composition layer one or two layers of phospholipid, said one or two layers of composition being placed on one or both sides of the layer of prepreg, said one or two layers of phospholiped being applied to the outer side of said layer of composition, to integrate the layers as a finished laminate.

3. A method for manufacturing a base board, for printed circuits for preparation by the additive process, characterized by heating under pressure a layer of prepreg comprising a thermosetting resin as impregnant, and one or two second layers of a transfer sheet material coated with a semi-cured composition of 50–300 parts by weight thermosetting resin and 100 parts by weight nitrile rubber, after undercoating a phospholipid on the transfer sheet material, said one or two layers of composition and phospholipid coated transfer sheet material being placed on one or both sides of the layer of prepreg so as to make contact between the coated side of the sheet material and the prepreg, to integrate the layer of prepreg and the coated sheet material as a finished laminate, and thereafter removing said sheet material, so that a coated composition of sheet material is transferred on the layer of prepreg.

4,029,846

FIBERBOARD SHIMS AND METHOD OF MAKING THEM

John W. Decker, Stockbridge, and Mieczyslaw Talik, Dearborn Hts., both of Mich., assignors to Eagle-Picher Industries, Inc., Cincinnati, Ohio

Filed May 20, 1975, Ser. No. 579,090
Int. Cl.² B32B 27/04, 27/42
U.S. Cl. 428—423 4 Claims

4. In an article of manufacture comprising an automotive assembly shim for use in the assembly of imperfectly fitting automotive components, wherein
said shims are formed of a phenolic resin impregnated cellulosic fiberboard, the improvement wherein
said shims are further impregnated with a solution consisting of up to about 20 percent by volume of methylene-bis-(4-phenyl isocyanate), and cured.

4,029,847

COATING COMPOSITION FOR POLYESTER RESIN CONTAINING CELLULOSIC MATERIAL AND POLYOL-DIISOCYANATE REACTION PRODUCT

Tadao Imagawa, and Noriyuki Endo, both of Fujimiya, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Division of Ser. No. 501,580, Aug. 29, 1974, Pat. No. 3,984,492. This application Mar. 15, 1976, Ser. No. 667,065
Claims priority, application Japan, Aug. 29, 1973, 48-97051
Int. Cl.² B32B 27/40; C08L 1/12, 1/14, 1/18
U.S. Cl. 428—425 7 Claims

1. A coating composition for a polyester resin which consists essentially of in an organic solvent (1) a cellulosic high molecular weight material and (2) an addition reaction product of at least one polyol having at least two hydroxyl groups and having 2 to 10 carbon atoms, and at least one diisocyanate having the general formula OCN —R —NCO, wherein R represents a divalent aliphatic or aromatic hydrocarbon group in an equivalent ratio of about 1:0.5 to 1:2 of the diisocyanate per hydroxyl group of the polyol, and wherein the ratio of component (2) to component (1) is about 10% to 500% by weight.

5. A polyester coated article comprising a polyester resin film having thereon a layer of the coating composition of claim 1.

4,029,848

UNSATURATED POLYESTER RESINS CONTAINING A DICYCLOPENTADIENE CONCENTRATE

Donald L. Nelson, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Jan. 21, 1976, Ser. No. 651,325
Int. Cl.² B32B 27/36, 17/04, 17/10; C08C 13/41
U.S. Cl. 428—430 6 Claims

1. The unsaturated polyester produced by reacting:
A. a glycol,
B. an olefinically unsaturated dicarboxylic acid or its corresponding anhydride,

C. a saturated dicarboxylic acid or its corresponding anhydride, and
D. an effective amount of a dicyclopentadiene concentrate comprising about 60 to about 90 percent by weight of dicyclopentadiene and about 5 to about 30 percent by weight of the mixed Diels Alder dimers of butadiene, piperylene, isoprene, cyclopentadiene and methyl cyclopentadiene.

3. The unsaturated polyester resin of claim 1 blended with a liquid ethylenically unsaturated monomer.

5. A glass fiber laminate with the blend of claim 3.

4,029,849

COVER SHEETS WITH TIMING LAYER COMPRISING CELLULOSE ACETATE AND COPOLYMER OF MALEIC ANHYDRIDE

Edward P. Abel, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 521,221, Nov. 5, 1974, Pat. No. 4,009,030. This application Sept. 7, 1976, Ser. No. 720,726
Int. Cl.² G03C 7/00, 5/54; B44D 1/09, 1/30
U.S. Cl. 428—500 6 Claims

1. In a cover sheet comprising a transparent support having thereon in order a neutralizing layer and a timing layer, the improvement comprising employing as said timing layer a compatible mixture of cellulose acetate and a maleic anhydride copolymer to provide a clear layer, said mixture comprising about 2 to about 20% by weight of said copolymer.

4,029,850

ADHESIVE COMPRISING POST-CHLORINATED POLYETHYLENE AND POLYVINYL CHLORIDE

Ko Ishii, Takatsuki, and Tadamasa Yoshida, Kobe, both of Japan, assignors to Sumitomo Bakelite Company, Limited, Tokyo, Japan

Division of Ser. No. 428,997, Dec. 27, 1973, abandoned. This application Dec. 22, 1975, Ser. No. 642,934
Claims priority, application Japan, Dec. 27, 1972, 47-129989; Dec. 27, 1972, 47-129990; Dec. 27, 1972, 47-129991; Dec. 27, 1972, 47-129992
Int. Cl.² B32B 27/08, 27/30, 27/32
U.S. Cl. 428—518 5 Claims

1. A composite material of a thermoplastic resin and an olefinic polymer, said thermoplastic resin comprising
a. 2 to 50 parts by weight of post-chlorinated polyethylene having a specific gravity of 1.00 to 1.35, a chlorine content of 5 to 50% and a mean molecular weight of from about 20,000 to 200,000, and
b. 100 parts by weight of polyvinyl chloride having a mean degree of polymerization from about 300 to 2,500, and said thermoplastic resin and said olefinic polymer having a contact interface therebetween.

4,029,851

LUMINESCENT MATERIAL AND X-RAY INTENSIFIER FOIL CONTAINING THE SAME

Heinz Degenhardt, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Dec. 17, 1975, Ser. No. 641,573
Claims priority, application Germany, Dec. 23, 1974, 2461260
Int. Cl.² C09K 11/46
U.S. Cl. 428—539 3 Claims

1. A luminescent material excitable by X-rays consisting essentially of terbium activated lanthanum-lead oxybromide crystals, wherein the lead content is in the range of 0.01 to 10 mole percent said mole percent based on the mole content of lanthanum and lead, said luminescent material having the general formula:

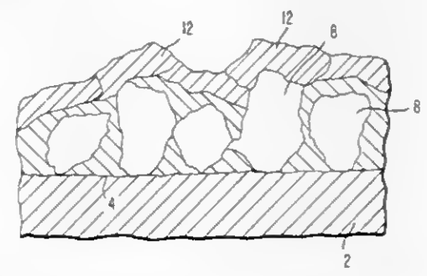
$(La,Pb)OBr:Tb.$

4,029,852

METAL NON-SKID COATING

Maximilian Palena, 1000 Wayne Road, Haddonfield, N.J. 08033

Continuation-in-part of Ser. No. 477,729, June 10, 1974, abandoned, which is a division of Ser. No. 783,901, Dec. 16, 1968, Pat. No. 3,855,444. This application Feb. 6, 1976, Ser. No. 655,939
Int. Cl.² B32B 15/16
U.S. Cl. 428—621 14 Claims



1. A non-skid product having a rough wearing surface comprising a sheet of backing material having a layer of grit particles in direct contact with the surface of the sheet, said particles being bonded to each other and to said sheet by solidified metal and covered by a layer of metal in direct contact with the solidified metal and serving to substantially encapsulate the grit particles, the grit particles having an average particle size exceeding 20 mesh and the thickness of the layers of grit and metal exceeding about 0.06 inch.

4,029,853

PBS-AL SELECTIVE SOLAR ABSORBER

Thomas J. McMahon, and Arold K. Green, both of Ridgecrest, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 20, 1975, Ser. No. 588,914
Int. Cl.² B32B 15/20
U.S. Cl. 428—621 2 Claims

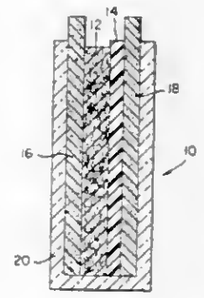
1. As an article of manufacture a solar energy collection panel for solar absorbing purposes comprising:
A. A thermally conductive plate of aluminum; and
B. A vacuum deposited coating of lead sulfide on one exterior surface of said thermally conductive plate, said lead sulfide coating being from 1000 to 1500 A thick.

4,029,854

HALOGEN ELECTRODE

Myles A. Walsh, West Falmouth; Fraser M. Walsh, Arlington, and Dennis N. Crouse, Melrose, all of Mass., assignors to Eco-Control, Inc., Cambridge, Mass.

Continuation-in-part of Ser. No. 644,636, Dec. 29, 1975, abandoned. This application Jan. 27, 1976, Ser. No. 652,780
Int. Cl.² H01M 4/00
U.S. Cl. 429—27 35 Claims



1. An electrode for interacting with electrochemically ac-

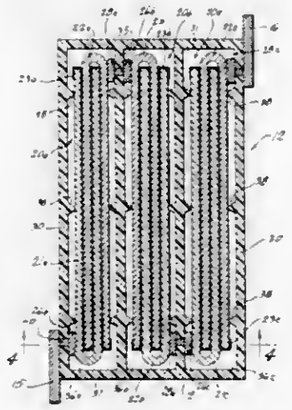
tive halogens in an electrochemical cell, said electrode comprising a conductive matrix and a polymer, said polymer having functional groups selected from the group consisting of quaternary ammonium salts, sulfonium salts, phosphonium salts, and mixtures thereof, said polymer being polymerized in the presence of said conductive matrix to become bonded thereto, said polymer remaining a separate phase from the electrolyte throughout charge and discharge, said polymer having displaceable room for the electrochemically active halogen, said polymer reversibly complexing with the electrochemically active halogen, said polymer not reacting irreversibly with the electro-chemically active halogen, and said polymer being formed from a monomer with a molecular weight in the range of 100–350 amu.

4,029,855

STORAGE BATTERY AND METHOD OF MAKING THE SAME

Thomas John Dougherty, Waukesha, and Victor William Bast, Oconto Falls, both of Wis., assignors to Globe-Union Inc., Milwaukee, Wis.

Filed Dec. 10, 1975, Ser. No. 639,350
Int. Cl.² H01M *2/18, 2/24*
U.S. Cl. 429—82 **7 Claims**



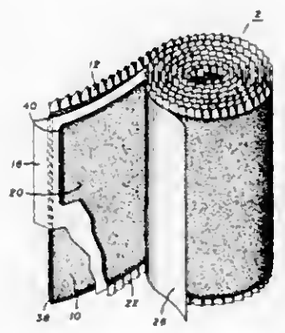
1. A storage battery comprising:
a battery case having a bottom and four side walls, at least one partition dividing the case into two or more cell compartments and a cover;
a battery element disposed within each cell compartment, each element comprising a single fold positive polarity battery plate and a single fold negative polarity battery plate, each of said plates having a vertical median bighted surface at the fold and two integral substantially parallel pasted spaced apart frame members extending from the bight to provide a bifurcated plate configuration with each frame member providing a pair of pasted surfaces, each plate having a conductive lug proximate the bighted surface, said plate frame members being interleaved whereby one of the positive plate frame members extends into the bight of the negative polarity plate toward the negative bighted surface spatially separated from the negative frame members pasted surfaces, and an N-shaped nonconductive separator sheet providing separator surfaces disposed between all adjoining surfaces of said plates;
the conductive lug of each plate being joined to the conductive lug of an opposite polarity plate in the adjoining cell by a connection through the intervening partition, and the unjoined conductive lugs of the end-most cells being coupled to the terminal posts extending outside the battery case; and
means for venting the interior of each cell to the outside of the battery case.

4,029,856

SINTERED POROUS PLAQUE BATTERY PLATES AND METHOD OF MAKING SAME

George Phillip Cromer; Harry Harold Hazen, both of Keystone Heights, and Saverio Pensabene, Gainesville, all of Fla., assignors to General Electric Company, Columbus, Ohio

Filed Apr. 30, 1976, Ser. No. 681,973
Int. Cl.² H01M *6/10*
U.S. Cl. 429—94 **19 Claims**



1. A method for making battery plates comprising the steps of:
a. providing an elongated metal substrate having a width dimensioned to form at least two longitudinal strips of plates from said substrate;
b. forming a first continuous longitudinal strip of a slurry, comprised of a metal powder, said slurry strip being formed with a transversely tapered porous plaque region extending longitudinally of said slurry strip, the longitudinal edges of said slurry strip being defined by said tapered plaque region and a slurry-free region extending longitudinally of said substrate, respectively;
c. sintering said slurry into a rigid porous plaque;
d. severing said substrate longitudinally along said tapered porous plaque region so that said tapered region terminates adjacent the edge of the substrate formed by said severence; and
e. severing said strip transversely into predetermined lengths thereby forming a plurality of plates from said strip.

13. In a battery coil comprising:
a. a pair of partially overlapping spirally wound elongated plates, one of said plates transversely offset from the other of said plates to define a first extended edge of said one plate at one coil end and a second extended edge of said other plate at the other coil end, at least one plate of said pair having a sintered porous plaque on the opposed major surfaces thereof and with active material impregnated therein;
b. a separator sandwiched between said pair of plates; and
c. a current collector fixed to said first extended edge;
d. the improvement comprising a transversely tapered porous plaque region on said major surfaces adjacent and extending longitudinally of the edge opposite said first extended edge of said one plate.

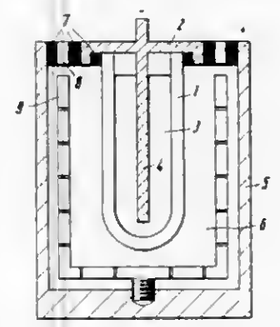
4,029,857

ELECTROCHEMICAL STORAGE CELL OR BATTERY

Wilfried Fischer, Neckargemund; Wilhelm Haar, Sandhausen; Herbert Kleinschmager, Eppelheim, and Gert Weddigen, Kloppenheim, all of Germany, assignors to Brown, Boveri & Cie. A.G., Mannheim, Germany

Filed Dec. 5, 1975, Ser. No. 638,174
Claims priority, application Germany, Dec. 5, 1974, 2457418
Int. Cl.² H01M *4/36*
U.S. Cl. 429—104 **5 Claims**

1. In an electrochemical storage cell or battery based on sodium and sulfur having a chamber containing sulfur material as a reactant and a chamber containing sodium as a reactant separated from each other by a dividing wall capable of conducting sodium ions and with each said electrode chamber having an electrode with an associated current connection, the improvement which comprises disposing an electrode in



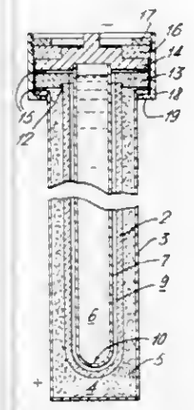
said chamber containing sulfur material, said electrode being spaced from said dividing wall and situated between the dividing wall and the cell wall which defines the outside of said chamber containing sulfur material to electrically screen said cell wall to minimize corrosion of said cell wall.

4,029,858

ELECTRIC CELLS

Leslie Samuel Evans, Reading; Trevor Leslie Markin, Goring-on-Thames; Ronald Michael Dell, Abingdon, and Albert George Montgomery, Reading, all of England, assignors to The Secretary of State for Industry in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, England

Filed Nov. 17, 1975, Ser. No. 632,783
Claims priority, application United Kingdom, Nov. 19, 1974, 50058/74
Int. Cl.² H01M *4/36*
U.S. Cl. 429—104 **8 Claims**



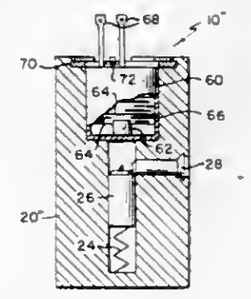
1. An electric cell having a solid electrolyte which partially bounds on one side thereof a compartment for a liquid cathode and on the opposite side thereof a compartment in the form of a wicking space for a liquid anode, said wicking space being shaped so that said space generally follows the contour of the surface of the solid electrolyte and is capable of containing only a very limited quantity of the liquid anode needed by the cell, and a reservoir for storing the bulk of the liquid anode needed for the cell, wherein the improvement comprises a corrosion resistant barrier between the solid electrolyte and the reservoir and separating one from the other, and a flow limiting means, through which liquid anode in the reservoir must flow to reach the liquid anode compartment and the solid electrolyte, for permitting flow therethrough of liquid anode for the normal charge and discharge operational requirements of the cell but limiting higher rates of flow such that in the event of damage to the solid electrolyte only a very limited quantity of liquid anode is readily available to react with the liquid cathode, and further supply of liquid anode is limited by the flow limiting means.

4,029,859

THERMAL SENSOR AND CURRENT GENERATOR

John H. Armstrong, Silver Spring, and Frank C. Kluge, Takoma Park, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Division of Ser. No. 495,478, Aug. 7, 1974, Pat. No. 3,930,629. This application Oct. 14, 1975, Ser. No. 622,355
Int. Cl.² H01M *16/00;* **G01K** *11/06*
U.S. Cl. 429—112 **14 Claims**



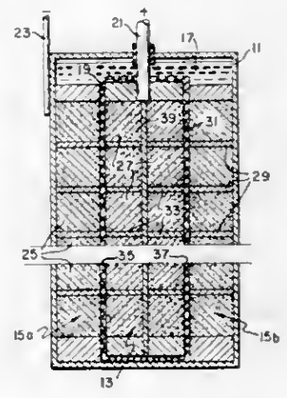
1. A thermal sensor for producing an output signal at a predetermined temperature comprising
a deformable, temperature-responsive means formed out of an alloy having memory characteristics;
a spring-biased firing pin releasably restrained in a cocked position by said temperature-responsive means and spaced from a detonation means; and
a current generator means responsive to the impact of said firing pin and said detonator means to produce an output current upon release of said firing pin by said temperature-responsive means at a preselected temperature.

4,029,860

COMPARTMENTED ELECTRODE STRUCTURE

Donald R. Vissers, Naperville; Hiroshi Shimotake, Hinsdale; Eddie C. Gay, Park Forest, and Fredric J. Martino, Riverdale, all of Ill., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Feb. 12, 1976, Ser. No. 657,525
Int. Cl.² H01M *10/38*
U.S. Cl. 429—122 **10 Claims**



1. In a secondary electrochemical cell having a positive and a negative electrode with liquid electrolyte between said electrodes, wherein said positive electrode includes solid particles of metal sulfide as reactant and is positioned intermediate two negative electrodes each having lithium as reactant, the improvement wherein said positive electrode is divided into

separate compartments by electrically conductive partitions that are generally impenetrable to said particulate reactant and wherein said positive electrode has major surfaces facing and parallel to opposing major surfaces of said negative electrodes and includes a central partition comprising an electrically conductive metal sheet impenetrable to liquid electrolyte and particulate reactant disposed generally parallel to said facing major surfaces so as to divide said positive electrode into two separate and parallel electrode portions.

4,029,861

POLYMERIC MATERIALS WITH ACID END GROUPS

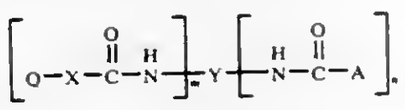
Frank N. Jones, Louisville, Ky., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 329,154, Feb. 2, 1973, abandoned, which is a continuation-in-part of Ser. No. 133,423, April 12, 1971, abandoned, which is a continuation-in-part of Ser. No. 39,523, May 21, 1970, abandoned. This application Oct. 14, 1975, Ser. No. 622,429

Int. Cl.² C08F *20/18*

U.S. Cl. 526—14 **6 Claims**

1. A polymeric material represented by the structure



where

Q is a resinous polymeric or copolymeric segment of

a. an ester of acrylic acid or methacrylic acid with an alkanol of 1–18 carbon atoms;

b. styrene or acrylonitrile;

c. a vinyl ester derived from an acid of 2 through 18 carbon atoms; or

d. a vinyl ether;

X is the residue of a chain transfer agent;

Y is the residue of a di-, tri-, or tetra- isocyanate radical after removal of isocyanate groups;

A is the residue of an acid radical having a pk_a value of −1 to 6; and

m and *n* are 1, 2 or 3, the total not exceeding 4, provided that when *n* is 2 or 3, only one of A need be as defined.

4,029,862

OLEFIN POLYMER CHLORINATION PRODUCTS HAVING IMPROVED HANDLING PROPERTIES AND PROCESS FOR THEIR PREPARATION

Gordon Y. T. Liu, Baton Rouge; Loyd D. Hutchinson, Denham Springs, and S. Douglas Stain, Jr., Baton Rouge, all of La., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 590,249, June 25, 1975, abandoned, which is a continuation of Ser. Nu. 373,531, June 25, 1973, abandoned. This application Mar. 15, 1976, Ser. No. 666,844

Int. Cl.² C08F *8/22*

U.S. Cl. 526—43 **2 Claims**

1. In the process of chlorinating solid, linear polyethylene with gaseous chlorine while holding said polyethylene in a fluidized bed state, the improvement consisting of: utilizing a polyethylene characterized by having a flowability measured as angle of repose of from about 24° to about 28°, a bulk density in the range of from about 25 to about 35 pounds/cubic foot and a surface area in the range of from about 2 to about 4 square meters/gram, said polyethylene being composed of individual particles having particle sizes predominantly in the range of from about 300 to about 600 microns and a porosity sufficient to provide an average free volume within individual particles in the range of from about 20 to about 45 volume percent based on total particle volume wherein said polyethylene is fluidized in the presence of an inert fluidizing gas to an extent sufficient to provide a value of no greater than 4 wherein said value is obtained by dividing the height of the powder bed in the reactor by the velocity in feet/second of said fluidizing gas and wherein said polyethylene is chlorinated to an extent of up to about 30 percent by weight chlorine by conducting the chlorination reaction at a temperature not exceeding about 80° C.

4,029,863

METHOD OF OBTAINING SMALL PARTICLE SIZE POLYMERS AND COPOLYMERS OF VINYL CHLORIDE BY BULK POLYMERIZATION

Anthony L. Lemper, Tonawanda, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Continuation-in-part of Ser. No. 169,838, Aug. 6, 1971, abandoned. This application July 21, 1975, Ser. No. 597,617

Int. Cl.² C08F *2/02, 14/06*

U.S. Cl. 526—88 **10 Claims**

1. In a process for the preparation of polymers and copolymers of vinyl chloride by bulk homopolymerization or copolymerization of a monomer or monomers wherein said vinyl chloride amounts to at least 80 percent by weight of the monomer employed and wherein polymerization is carried out in a stationary reaction zone in a first stage during which a reaction mixture is subjected to high speed agitation until about 3 percent to about 15 percent of said monomer or monomers have been converted to polymer and in which said polymerization is completed in a second stage during which said reaction mixture is subjected to low speed agitation until the reaction has been completed, the improvement which comprises carrying out said polymerization of said monomer or monomers in said first stage in contact with (1) a combination of a surface active agent which has both hydrophilic and hydrophobic moieties and an additive comprising an organic or inorganic, inert, fine particle size material, solid at least at reaction temperatures, and insoluble in said monomer or monomers (2) said additive alone; wherein said additive has an average particle size of about 0.001 to about 50 microns whereby there is obtained polymer product having an average particle size of 85 microns or under.

4,029,864

CATALYST AND PROCESS FOR THE MANUFACTURE OF POLYETHYLENE

Dieter Kurz, and Erich Männer, both of Burghausen, Germany, assignors to Wacker-Chemie GmbH, Munich, Germany

Filed May 5, 1976, Ser. No. 683,543

Claims priority, application Germany, May 12, 1975, 2521075; Feb. 26, 1976, 2607833; Feb. 26, 1976, 2607832

Int. Cl.² C08F *4/66, 10/02*

U.S. Cl. 526—125 **24 Claims**

1. In the method for the production of an ethylene polymer on a continuous or intermittent basis in either a single stage or multiple stages comprising reacting from 100 to 90 mol percent of ethylene and 0 to 10 mol percent of a alpha-olefin having from 3 to 6 carbon atoms in a hydrocarbon dispersing media having a boiling point between 30° C and 160° C, at a pressure of from 4 to 40 atmospheres gauge and a temperature of from about 60° C to about 100° C, in the presence of a partial pressure of hydrogen of from 0 to 75% of the total pressure, in the presence of a catalytic amount of a solid catalyst substance containing titanium, magnesium and chlorine, and an activating amount of an aluminum activator selected from the group consisting of (a) aluminum alkyls of the formula

$$AlR''_2R'$$

wherein R'' is alkyl having from 1 to 20 carbon atoms and R' is a member selected from the group consisting of hydrogen, R'' and chlorine, and (b) a reaction product of a dialkyl aluminum hydride having from 1 to 20 carbon atoms in each alkyl, with an alkadiene having from 4 to 20 carbon atoms,

and recovering said polyethylene, the improvement consisting essentially of utilizing a solid catalyst substance containing titanium, magnesium and chlorine produced by the steps consisting essentially of (1) reacting metallic magnesium having a large surface area per volume with from 2 to 10 mols of allyl chloride and from 1.75 to 4 mols of a di-lower alkyl ether, per gram-atom of magnesium at a temperature of from about 30° C to about 100° C, (2) maintaining the solid reaction product formed for at least 10 hours at a temperature of between about 30° C to about 140° C in order to age the same, (3) treating said solid reaction product formed, either together with or subsequent to said aging step (2), with from 0.2 to 4 mols of a di-lower alkyl sulfite, per gram-atom of magnesium, (4) reacting the aged and treated solid reaction product with from 0.5 to 10 mols of a titanium compound of the formula

$$Ti\,Cl_x\,(OR)_y$$

wherein *x* is a number from 2 to 4, y is a number from 0 to 2 and the sum of $x + y$ is 4, and R is a member selected from the group consisting of alkyl having 1 to 8 carbon atoms, cycloalkyl having 5 to 8 carbon atoms, chloroalkyl having 2 to 8 carbon atoms, chlorocycloalkyl having 5 to 8 carbon atoms and dichloroalkyl having 3 to 8 carbon atoms, per gram-atom of magnesium, for at least 1 hour at a temperature between about −20° C and about +140° C, and (5) separating said solid catalyst substance containing titanium, magnesium and chlorine.

4,029,865

PROCESS FOR THE POLYMERIZATION OF ETHYLENICALLY UNSATURATED ORGANIC COMPOUNDS

Silvio Vargiu, Casatenovo (Como); Volfango Gualandi, Macherio (Milan), and Beppino Passalenti, Milan, all of Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed Aug. 7, 1975, Ser. No. 602,834

Claims priority, application Italy, Sept. 10, 1974, 27121/74

Int. Cl.² C08F *2/06, 4/40*

U.S. Cl. 526—146 **26 Claims**

1. A method for the solution polymerization by addition of vinylidene chloride monomer or a mixture of the latter with one or more other ethylenically unsaturated monomers, which comprises contacting said monomer or mixture of monomers with a catalytic system consisting of an organic per-compound, an organic compound of zirconium and para-toluene acid sulfonic, in an organic solvent medium in which the monomers, the catalytic system and the polymer or copolymer being formed are soluble.

14. A method for the solution polymerization by addition of vinylidene chloride monomer or a mixture of the latter with one or more other ethylenically unsaturated monomers, which comprises contacting said monomer or mixture of monomers with a catalytic system consisting of an organic per-compound, an organic compound of cobalt and para-toluene sulfonic acid, in an organic solvent medium in which the monomers, the catalytic system and the polymer or copolymer being formed are soluble.

4,029,866

CATIONIC POLYMERIZATION CATALYST

Joseph P. Kennedy, Akron, Ohio, assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed Jan. 28, 1972, Ser. No. 221,774

Int. Cl.² C08F *4/52, 36/06, 36/08*

U.S. Cl. 526—185 **13 Claims**

1. A process for preparing polymers of cationically polymerizable olefins which comprises polymerizing said olefins by (1) introducing into the reaction zone about 10^{-1} to about 10^{-4} mole % based on the moles of olefins to be polymerized of an organoaluminum compound having the general formula AlR_2X wherein X is a halogen or hydrogen and R is the same or different monovalent radical selected from the group consisting of C_1–C_{12} alkyl, phenyl, C_7–C_{14} aralkyl and C_7–C_{14} alkaryl; and (2) subsequently introducing into the reaction zone a cocatalyst selected from the group consisting of halogens, mixed halogens and hypohalides, the molar ratio of said organoaluminum halide to said activator being greater than 1:1.

4,029,867

TERPOLYMERS OF FLUOROALKYL ETHERS AND MALEIC ANHYDRIDE

William L. Wasley, Berkeley, and Allen G. Pittman, El Cerrito, both of Calif., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Division of Ser. No. 322,588, Jan. 10, 1973, Pat. No. 3,844,827, which is a division of Ser. No. 271,894, July 14, 1972, Pat. No. 3,773,728, which is a division of Ser. No. 117,777, Feb. 22, 1971, Pat. No. 3,706,594. This application Mar. 22, 1974, Ser. No. 453,912

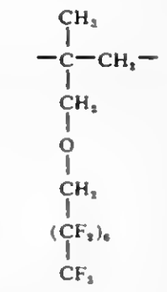
The portion of the term of this patent subsequent to Dec. 19, 1989, has been disclaimed.

Int. Cl.² C08F *214/18*

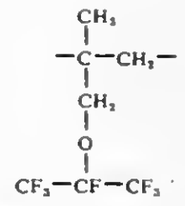
U.S. Cl. 526—247 **1 Claim**

1. A film-forming addition terpolymer which contains -

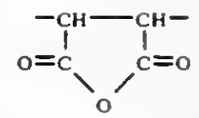
a. recurring units of the structure



b. recurring units of the structure



c. and recurring units of the structure



the aforesaid units being in a molar ratio of 1:1:2.

4,029,868

TETRAFLUOROETHYLENE TERPOLYMERS

Dana Peter Carlson, Parkersburg, W. Va., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 10, 1976, Ser. No. 665,548

Int. Cl.² C08F *214/26*

U.S. Cl. 526—247 **3 Claims**

1. A solid, substantially nonelastomeric terpolymer consisting of, in copolymerized form,

a. tetrafluoroethylene,

b. between about 4 and about 12 weight percent hexafluoropropylene, and

c. between about 0.5 and about 3 weight percent of either perfluoro(ethyl vinyl ether) or perfluoro(n-propyl vinyl ether),

said weight percent being based on weight of terpolymer, wherein the terpolymer has a melt viscosity of between about 10^3 and 10^7 poise at 372° C.

4,029,869

METHOD OF MAKING BROADER MOLECULAR WEIGHT DISTRIBUTION POLYSTYRENE

Alvin R. Ingram, and Harold A. Wright, both of Murrysville, Pa., assignors to ARCO Polymers, Inc., Philadelphia, Pa.

Filed Dec. 30, 1975, Ser. No. 645,160

Int. Cl.² C08F *212/08*

U.S. Cl. 526—233 **1 Claim**

1. In a process for polymerizing styrene in aqueous suspension at temperatures of from 80° to 140° C. in the presence of an oil-soluble, free-radical generating initiator, where the suspension is stabilized by the presence of from 0.10 to 5.0 per cent by weight based on styrene of a finely divided, difficultly water-soluble phosphate and an extender for said phosphate, the improvement comprising adding to the polymerizing styrene 0.05 to 0.35 part per 100 parts of styrene of a modifying comonomer selected from the group consisting of allyl acrylate, allyl methacrylate, and allylstyrenes, whereby a broadening of the molcular weight distribution is obtained without forming a polymer insoluble in organic solvents for polystyrene.

4,029,870

TETRAFLUOROETHYLENE POLYMERS

Michael Trevenen Brown, Welwyn Garden City, and William George Rodway, Welwyn, both of England, assignors to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 267,035, June 28, 1972, abandoned, which is a continuation-in-part of Ser. No. 111,700, Feb. 1, 1971, abandoned. This application Mar. 24, 1975, Ser. No. 561,661

Claims priority, application United Kingdom, Feb. 3, 1970, 5037/70; Sept. 17, 1971, 43436/71

Int. Cl.² C08F *2/46, 114/26*

U.S. Cl. 526—255 **3 Claims**

1. An unsintered coagulated dispersion grade of a tetrafluoroethylene polymer selected from (1) tetrafluoroethylene homopolymers and (2) copolymers of tetrafluoroethylene and an ethylenically unsaturated comonomer wherein the comonomer constitutes up to 10% by weight of the copolymer, said polymer having been irradiated with γ-rays and being in the form of a powder which is capable of being comminuted to a number average particle size less than 5 μm as measured optically.

4,029,871

HIGH MOLECULAR WEIGHT SOLUBLE POLYMERS STARTING FROM POLYCYCLIC POLYENES HAVING TWO CONJUGATED DOUBLE BONDS AND PROCESS FOR PREPARING SAME

Aldo Priola; Arnaldo Roggero, and Sebastiano Cesca, all of San Donato Milanese, Italy, assignors to Snam Progetti, S.p.A. and Brevetti e Licenze, both of Milanese, Italy

Continuation of Ser. No. 397,793, Sept. 17, 1973, abandoned, which is a continuation of Ser. No. 177,867, Sept. 3, 1971, abandoned. This application June 26, 1975, Ser. No. 590,574

Claims priority, application Italy, Sept. 3, 1971, 29299/71

Int. Cl.² C08F *12/32*

U.S. Cl. 526—282 **7 Claims**

1. Process for the preparation of a soluble polycyclic polyene polymer having residual unsaturation and high molecular weight wherein at least one monomer is 1-isopropylidendicyclopentadiene, said momomer being reacted in the presence of a catalyst system of the cationic type consisting of a halide of an element of the second to the eighth groups of the periodic table or a water alcohol, acid, ether or alkyl halide complex thereof that is selected from the group consisting of BF_3. OEt, $TiCl_4$, Et2AlCl and $EtAlCl_2$ to form said polycyclic polyene polymer.

4,029,872

VINYL BENZYL ETHERS AND NONIONIC WATER SOLUBLE THICKENING AGENTS PREPARED THEREFROM

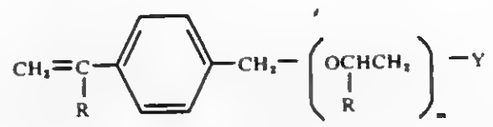
Syamalarao Evani, and Frederick P. Corson, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 489,876, July 18, 1974, Pat. No. 3,963,684, which is a division of Ser. No. 267,571, June 29, 1972. This application Oct. 28, 1975, Ser. No. 626,016

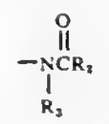
Int. Cl.² C08F *220/56*

U.S. Cl. 526—303 **2 Claims**

1. A nonionic water soluble binary copolymeric thickening agent composed of in polymerized form about 1 to 5 mole percent of a vinyl benzyl ether monomer and the balance to make 100 percent of acrylamide, said ether monomer having the formula



wherein R is hydrogen or methyl, *m* is about 10 to 100 and Y is



where R_1 is an alkyl, aralkyl or alkaryl hydrophobic group of 10 to about 22 carbon atoms.

4,029,873

VINYL BENZYL ETHERS AND NONIONIC WATER SOLUBLE THICKENING AGENTS PREPARED THEREFROM

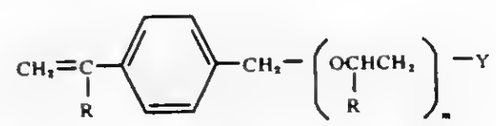
Syamalarao Evani, and Frederick P. Corson, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 489,876, July 18, 1974, Pat. No. 3,963,684, which is a division of Ser. No. 267,571, June 29, 1972. This application Oct. 28, 1975, Ser. No. 626,015

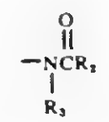
Int. Cl.² C08F *220/56*

U.S. Cl. 526—303 **2 Claims**

1. A nonionic water soluble binary copolymeric thickening agent composed of in polymerized form about 1 to 5 mole percent of a vinyl benzyl ether monomer and the balance to make 100 percent of acrylamide, said ether monomer having the formula



wherein R is hydrogen or methyl, m is about 10 to 100 and Y is



where R_2 is an alkyl group of 1 to about 22 carbon atoms and R_3 is hydrogen or an alkyl group of 1 to about 22 carbon atoms, provided R_2 and R_3 in combination have at least 10 carbon atoms.

4,029,874

VINYL BENZYL ETHERS AND NONIONIC WATER SOLUBLE THICKENING AGENTS PREPARED THEREFROM

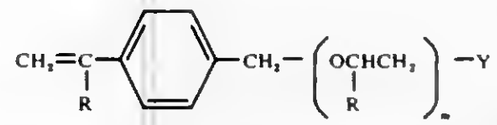
Syamalarao Evani, and Frederick P. Corson, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 489,876, July 18, 1974, Pat. No. 3,963,684, which is a division of Ser. No. 267,571, June 29, 1972. This application Oct. 28, 1975, Ser. No. 626,013

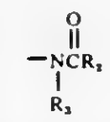
Int. Cl.² C08F *220/56*

U.S. Cl. 526—304 **2 Claims**

1. A nonionic water soluble binary copolymeric thickening agent composed of in polymerized form about 1 to 5 mole percent of a vinyl benzyl ether monomer and the balance to make 100 percent of acrylamide, said ether monomer having the formula



wherein R is hydrogen or methyl, *m* is about 10 to 100 and Y is



where R_2 is an alkyl group of 1 to about 22 carbon atoms and R_3 is hydrogen or an alkyl group of 1 to about 22 carbon atoms, provided R_2 and R_3 in combination have at least 10 carbon atoms.

4,029,875

RADICAL POLYMERIZATION OF ETHYLENE IN THE PRESENCE OF CYCLIC OLEFIN

Pierre Glorlod, Lillebonne, and Jean Pierre Machon, Bethune, both of France, assignors to Societe Chimique des Charbonnages-CdF Chimie, Paris, France

Filed Apr. 21, 1976, Ser. No. 678,748

Claims priority, application France, Apr. 22, 1975, 75.12511

Int. Cl.² C08F *2/38, 2/40*

U.S. Cl. 526—308 **5 Claims**

1. In a process for the radical polymerization of ethylene in a stirred autoclave reactor in a reaction medium at temperatures above 220° C and under pressures above 1000 bars in the presence of oxygen, peroxides or peresters as initiators, the improvement comprising injecting into the reaction medium, at the same time as the initiator up to 500 ppm based on the weight of the ethylene of an additive compound selected from the group consisting of cyclic olefins having from 5 to 12 carbon atoms and a ring of 5 to 9 members and styrene and its homologues bearing alkyl substituents on the benzene nucleus.

4,029,876

HEAT-TREATED, CORONA-TREATED POLYMER BODIES AND A PROCESS FOR PRODUCING THEM

Theodore R. Beatty, Bay Village, and Harry Vourlis, Lakewood, both of Ohio, assignors to Union Carbide Corporation, New York, N.Y.

Division of Ser. No. 456,877, April 1, 1974, Pat. No. 3,914,521. This application Apr. 30, 1975, Ser. No. 573,361

Int. Cl.² C08F *10/02, 10/06, 14/06*

U.S. Cl. 526—344 **11 Claims**

1. A process for producing a heat-treated, corona-treated polymer body having a surface with improved adhesion characterisitcs comprising the steps:

a. heating a polymer body to above about 40° C. and below the melting temperature of said polymer body; and

b. cooling the polymer body to ambient temperature and then subjecting said heat-treated and cooled body to a corona discharge at an energy density-to-film surface of at least 9 watt-minute per square foot to improve the affinity of a surface of said polymer body for adhesives.

9. A polymer body made in accordance with the process of claim 1.

4,029,877

PROCESS FOR PREPARING POLYOLEFIN

Hirohisa Yoshiura; Toshiharu Arai; Masao Miyake; Yoshikane Furuya; Seiji Onogi, and Tetsushi Kamizono, all of Kurashiki, Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

Filed June 10, 1975, Ser. No. 585,600

Claims priority, application Japan, June 13, 1974, 49-67365

Int. Cl.² C08F *6/00*

U.S. Cl. 528—483 **5 Claims**

1. In a process for preparing a polyolefin by polymerizing an olefin in the presence of a Ziegler catalyst having high catalytic activity, in an inert gas sealing system, the improvement which consists essentially of:

separating the polyolefin containing the catalyst residue from the polymerization mixture; and

contacting the polyolefin containing the catalyst residue with a weakly reactive gas of a mixture of an inert gas and a component selected from the group consisting of oxygen, water vapor and mixtures thereof, wherein the concentration of oxygen and water vapor in the inert gas ranges from 0.05 to 0.5 mole percent and 0.05 to 1 mole percent respectively, without separation of catalyst residues from said polyolefin.

4,029,878

PROCESS FOR PREPARING MANNITOL FROM GLUCOSE

Walter M. Kruse, Wilmington, Del., assignor to ICI United States Inc., Wilmington, Del.

Filed May 19, 1975, Ser. No. 578,548

Int. Cl.² C07H *1/00*

U.S. Cl. 536—1 **18 Claims**

1. In a process for producing a solution containing glucose and mannose by contacting an acidic solution of glucose,

oligomers of glucose, or a mixture of glucose and oligomers thereof, with a catalyst containing molybdenum in the hexavalent state at a temperature of at least about 70° C. under non-hydrogenating conditions, the improvement wherein said solution has a carbohydrate content of at least about 50 percent by weight.

4,029,879

PROCESS FOR THE REMOVAL OF CATALYSTS FROM POLYETHER POLYOLS EMPLOYING WATER AND ADSORBENT

John A. Muzzio, Grosse Ile, Mich., assignor to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Nov. 17, 1975, Ser. No. 632,276
Int. Cl.² C07H *15/08*; **C07C** *41/00, 43/00*
U.S. Cl. 536—4 **7 Claims**

1. In the process for purifying polyoxyalkylene ether polyols containing residual catalyst impurities, said polyols having a molecular weight range of 300 to about 26,000, the improvement which comprises:
   1. providing a mixture of water, said polyol and an adsorbent consisting of synthetic magnesium silicate, wherein the amount of water is from about 1.0 to about 5.0 weight percent based on the weight of the polyol,
   2. heating said mixture at a temperature range from about 80° Centigrade to about 130° Centigrade, and
   3. separating the polyol from the water and the adsorbent by filtration wherein the residual catalyst impurities are retained in the adsorbent.

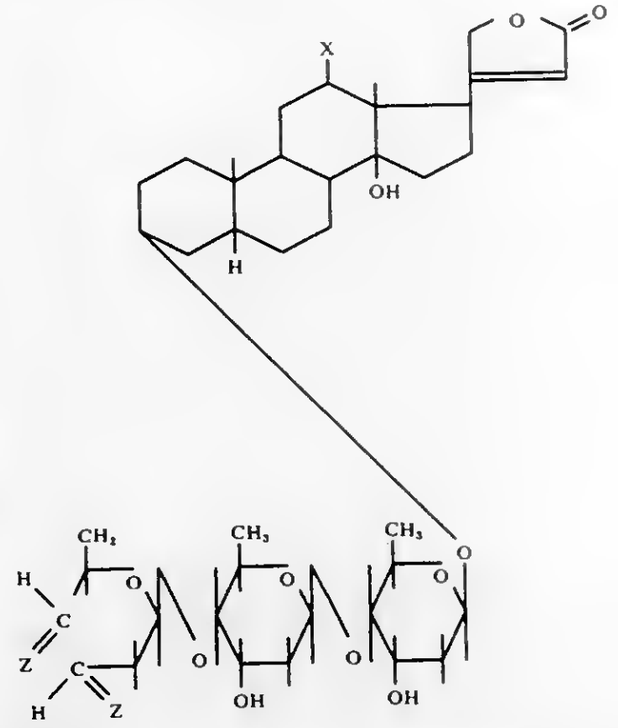
4,029,880

LABELLED DERIVATIVES OF STEROIDS

Keith Charles Tovey, Amersham, England, and John William Addison Findlay, Research Triangle Park, N.C., assignors to The Radiochemical Centre Limited, England

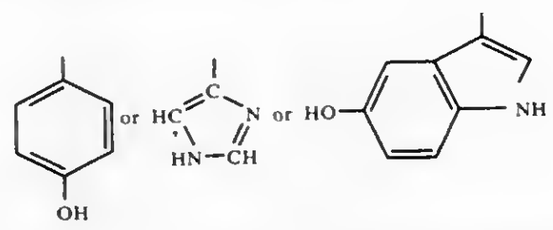
Filed June 19, 1975, Ser. No. 588,165
Claims priority, application United Kingdom, June 20, 1974, 27510/74
Int. Cl.² C07J *17/00*
U.S. Cl. 536—7 **11 Claims**

1. A compound having the structural formula



wherein one or two groups Z are $=NO(CHR)_nCO{\cdot}R_1$, any remaining group Z being = O;

X is —OH or —H;
R is H or C_1 to C_4 alkyl;
n is 1, 2 or 3;
R_1 is either —OH or $-NH{\cdot}CHY{\cdot}(CH_2)_mQ$;
Y is —H or $-COOR_2$;
m is 0, 1, 2, 3, 4 or 5;
R_2 is H, CH_3 or C_2H_5;
Q is unlabelled or labelled and has one of the following structural formulae:



7. A process for making a compound as claimed in claim 1, wherein R_1 is —OH, which process consists essentially of
   a. oxidising digoxin or digitoxin to the dialdehyde;
   b. reacting the dialdehyde with an o-carboxyalkoxyamine having the formula

$NH_2O(CHR)_nCOOH$

where r and n are as defined in claim 1, to form a mono- or di-o-carboxyalkyloxime derivative thereof.

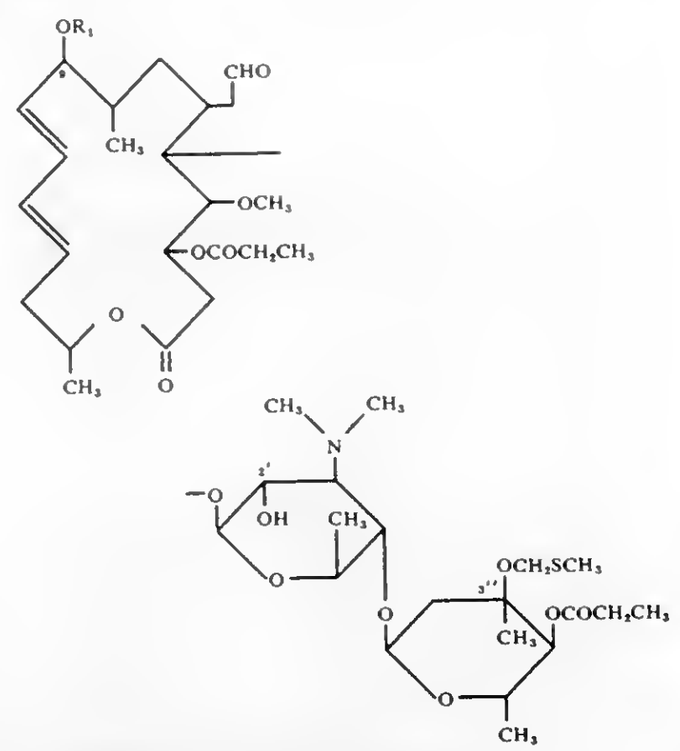
4,029,881

ANTIBIOTIC 9-ACYL-3''-THIOMETHOXYMETHYL-SF-837 COMPOSITION AND PROCESS FOR PREPARING THE SAME

Shigeharu Inouye, Yokohama; Shoji Omoto, Tokyo; Taro Niida, Yokohama, and Bunzo Nomiya, Tokyo, all of Japan, assignors to Meiji Seika Co., Ltd., Japan

Filed Mar. 28, 1973, Ser. No. 345,752
Claims priority, application Japan, Apr. 6, 1972, 47-33897
Int. Cl.² C07H *17/08*
U.S. Cl. 536—9 **9 Claims**

1. 9-acyl-3''-thiomethoxymethyl-SF-837 having the formula:



wherein R_1 represents acetyl or propionyl.

4,029,882

SELECTIVE ACYLATION OF THE C-1 AMINO GROUP OF AMINOGLYCOSIDE ANTIBIOTICS

John J. Wright, Orange, N.J., assignor to Schering Corporation, Kenilworth, N.J.

Filed Mar. 19, 1974, Ser. No. 452,586
Int. Cl.² C07H *15/22*
U.S. Cl. 536—17 **18 Claims**

7. A 1-N-Z-4,6-di-(aminoglycosyl)aminocyclitol antibacterial agent selected from the group consisting of 1-N-Z-gentamicin A, 1-N-Z-gentamicin B, 1-N-Z-gentamicin B_1, 1-N-Z-gentamicin C_1, 1-N-Z-gentamicin C_{1a}, 1-N-Z-gentamicin C_2, 1-N-Z-gentamicin C_{2a}, 1-N-Z-gentamicin X, 1-N-Z-3',4'-dideoxykanamycin B, 1-N-Z-sisomicin, 1-N-Z-verdamicin, 1-N-Z-tobramycin, 1-N-Z-antibiotic G-418, 1-N-Zantibiotic 66-40B, 1-N-Z-antibiotic JI-20A, 1-N-Z-antibiotic JI-20B, 1-N-Z-antibiotic G-52, 1-N-Z-mutamicin 1, 1-N-Z-mutamicin 2, 1-N-Z-mutamicin 4, 1-N-Z-mutamicin 5, 1-N-Z-mutamicin 6, and the non-toxic acid addition salts thereof wherein Z is an acyl group derived from a hydrocarbon carboxylic acid having 1 to 5 carbon atoms, said acyl group being unsubstituted or mono substituted by either hydroxy or amino, said acyl group being straight chain, branched chain or cyclic, said acyl group also being saturated or unsaturated with the proviso that when Z is formyl or is unsaturated it must also be unsubstituted.

4,029,883

DEHYDROXYLATION OF AMINOSUGARS

Kentaro Hiraga, Kyoto; Tetsuya Okutani, Osaka; Kouichi Yoshioka, and Tsunehiko Asako, both of Kyoto, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Dec. 20, 1973, Ser. No. 426,693
Claims priority, application Japan, Dec. 29, 1972, 48-2166; Dec. 29, 1972, 48-2167; May 24, 1973, 48-58282; May 24, 1973, 48-58283; July 9, 1973, 48-77261
Int. Cl.² C07H *17/00*
U.S. Cl. 536—17 **12 Claims**

1. A halogenated aminoglycoside antibiotic selected from the group consisting of 3'-chloro-3'-deoxyxylostasin, 3'-chloro-3'-deoxyneomycin B, 3'-chloro-3'-deoxyneomycin A, 3'-chloro-3'-deoxykanamycin B, 3'-chloro-3'-deoxyparomomycin and 3'-chloro-3'-deoxyribostamycin.

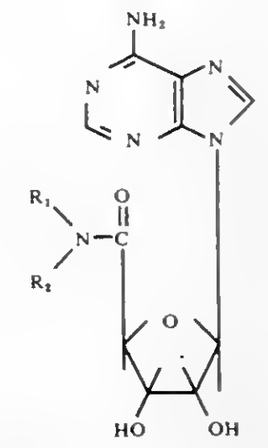
4,029,884

ADENOSINE-5'-CARBOXYLIC ACID AMIDES

Herman Hal Stein, Skokie, Ill., and Raj Nandan Prasad, Pierrefonds, Canada, assignors to Abbott Laboratories, North Chicago, Ill.

Continuation-in-part of Ser. No. 125,893, March 18, 1971. This application Mar. 22, 1972, Ser. No. 236,980
Int. Cl.² C07H *19/18*
U.S. Cl. 536—26 **17 Claims**

1. A compound of the formula



wherein R_1 is hydrogen and R_2 is phenyl, loweralkylphenyl, substituted phenyl, adamantyl, 2-methylfufuryl, benzylamino or R_1 and R_2 taken together form a 5 or 6 membered heterocyclic moiety.

4,029,885

CATIONIC STARCH SIZING

Peter D. Bulkema, Oak Park, Ill., assignor to Nalco Chemical Company, Oak Brook, Ill.

Filed Dec. 31, 1975, Ser. No. 645,778
Int. Cl.² C08B *31/08*
U.S. Cl. 536—50 **10 Claims**

1. A method of making gelatinized cationic starch useful in sizing and coating cellulosic materials which comprises the steps of:
   A. gelatinizing a granular anionic starch;
   B. adding to said starch during the course of gelatinization 1–10% by weight of a condensate of generally equimolar quantities of epichlorohydrin and dimethylamine wherein the percentage of said condensate is calculated from granular anionic starch;
   C. completing said gelatinization; and then,
   D. recovering the gelatinized cationic starch.

4,029,886

PROCESS FOR WATER-INSOLUBILIZATION OF MOLDED PULLULAN

Seizo Nakashio, Nishinomiya; Kozo Tsuji; Nobuhiro Toyota, both of Ibaragi, and Fumio Fujita, Osaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka and Hayashibara Biochemical Laboratories, Incorporated, both of, Japan

Filed Feb. 27, 1975, Ser. No. 553,678
Claims priority, application Japan, Mar. 1, 1974, 49-24389
Int. Cl.² C07H *15/04*
U.S. Cl. 536—120 **10 Claims**

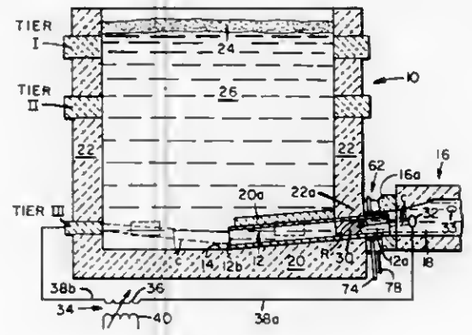
1. A process for the water-insolubilization of a molded pullulan, wherein molded pullan is treated with, at least one combination of a crosslinking agent with a catalyst, said combinations being selected from the group consisting of (1) formaldehyde with zinc chloride, (2) glyoxal with magnesium chloride, and (3) gaseous formaldehyde or glyoxal with hydrogen chloride gas or sulfurous acid ga

4,029,887

ELECTRICALLY HEATED OUTLET SYSTEM

Paul F. Spremulli, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Apr. 27, 1976, Ser. No. 680,728
Int. Cl.² C03B 5/02, 5/30
U.S. Cl. 13—6 13 Claims



1. An improved electric furnace for melting and refining glass, including a chamber for containing a bath of molten glass having a bottom wall and an upstanding peripheral wall; electrode means for supplying electrical energy to said bath; and passageway means extending through said sidewall for delivering molten glass from said bath to channel means for receiving glass, wherein the improvement comprises:

said passageway means includes a conduit made from an electrically conductive refractory metal;

said channel means includes electrode means; and

means for selectively supplying voltage across at least one electrode of said furnace electrode means and said electrode means in said channel means to establish a flow of electrical currents from said at least one furnace electrode to said conduit, through said electrically conductive conduit, and to said electrode means of the channel means,

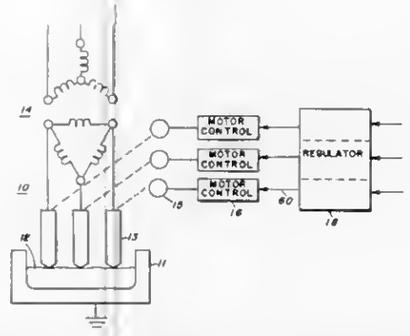
whereby said current flow in said channel means heats the glass therein, and heat transferred therefrom at least partially melts glass-forming materials initially within said conduit.

4,029,888

ARC FURNACE CONTROL SYSTEM

Roland W. Roberts, Pittsburgh, and Michael R. Sochacky, Jr., Murrysville, both of Pa., assignors to Robicon Corporation, Pittsburgh, Pa.

Filed May 27, 1976, Ser. No. 690,581
Int. Cl.² H05B 7/148, 7/152
U.S. Cl. 13—13 12 Claims



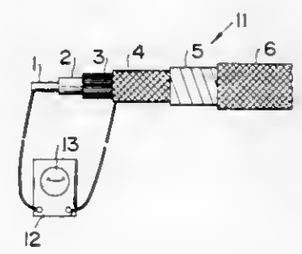
1. A system for controlling the position of an electrode in an electric arc furnace to maintain an arc of desired resistance between the electrode and a charge in the furnace, said system comprising means for deriving a signal representative of the arc current, means for deriving a signal representative of the product of the arc voltage and the power factor of the circuit, and means responsive to said signals for controlling the position of the electrode to maintain said signals substantially equal.

4,029,889

FLUID-LEAK DETECTOR CABLE

Shoken Mizuochi, Niigata, Japan, assignor to Asahi Engineering & Construction Co., Ltd., Tokyo, Japan

Filed Apr. 4, 1975, Ser. No. 565,221
Claims priority, application Japan, Oct. 8, 1974, 49-115944
Int. Cl.² H01B 7/32
U.S. Cl. 174—11 R 12 Claims



1. A fluid-leak detector cable which comprises an inner conductor, an outer conductor, and a serving layer for retaining a leaked fluid disposed therebetween, said layers being coaxially disposed with respect to each other, said outer conductor being provided with an exterior layer of a porous, permeable, plastic film which is permeable to hydrocarbons but not permeable to water, said film having an open-cell structure which is not soluble in the leaking fluid, thereby being adapted to retain the leaking fluid within the serving layer.

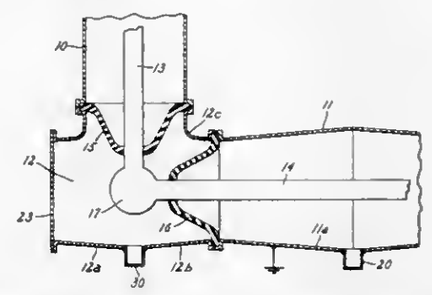
10. A method for detecting a hydrocarbon leak from an underground pipeline which comprises laying a fluid-leak detector cable in close proximity to and substantially parallel to the underground pipeline so that any leaking hydrocarbon fluid may permeate the fluid-leak detector cable, said fluid-leak detector cable comprising an inner conductor and an outer conductor, and a serving layer for retaining the leaked fluid disposed therebetween, said layers being coaxially disposed with respect to each other, said outer conductor being provided with an exterior layer of a porous, permeable, plastic film which is permeable to hydrocarbons, but not permeable to water, said film having an open-cell structure which is not soluble in the leaking fluid, thereby being adapted to retain the leaking fluid within the serving layer.

4,029,890

PARTICLE TRAPPING ELBOW JOINT FOR ENCLOSED HIGH VOLTAGE ELECTRIC BUS APPARATUS

Roy Nakata, Pittsfield, Mass., assignor to General Electric Company, Philadelphia, Pa.

Filed Apr. 19, 1976, Ser. No. 678,091
Int. Cl.² H01B 9/04
U.S. Cl. 174—14 R 3 Claims



1. In an enclosed angular joint between a pair of linear high voltage electric bus conductors disposed in coplanar angular relation and adapted to be disposed with the longitudinal axis of at least one said conductor horizontal, each said conductor being mounted in coaxial radially spaced relation

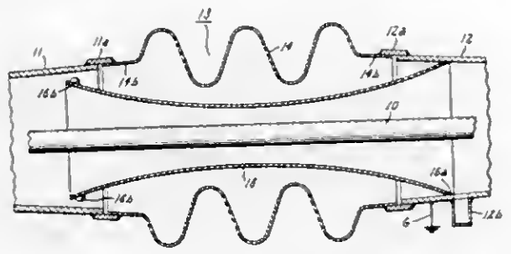
within a tubular sheath of conducting material adapted to be maintained at ground potential, an enlarged connector of generally spherical configuration forming a conductive joint between said linear conductors, a joint housing coupled to both said tubular sheaths and having walls radially spaced from said connector, the bottom wall of said housing including a particle trapping recess substantially centrally positioned in said bottom wall directly beneath said enlarged connector, substantially the entire area of said bottom wall being inclined downwardly toward said recess at an angle to the horizontal of the order of at least 2° to 5°.

4,029,891

PARTICLE TRAPPING SHEATH COUPLING FOR ENCLOSED ELECTRIC BUS APPARATUS

Roy Nakata, Pittsfield, Mass., assignor to General Electric Company, Philadelphia, Pa.

Filed Jan. 22, 1976, Ser. No. 651,666
Int. Cl.² H01B *9/00*
U.S. Cl. 174—14 R **6 Claims**



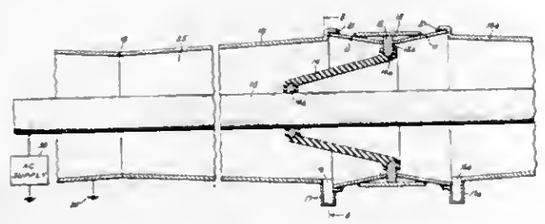
1. In high voltage electric bus apparatus adapted for disposition with its longitudinal axis substantially horizontal, a tubular metallic sheath having an axially corrugated portion including at one end a terminal convolution forming an internal annular recess in said sheath and an adjacent portion axially flared toward said annular recess, said flared adjacent portion having its maximum vertical cross sectional axis proximate said recess and its minimum vertical cross sectional axis remote, and a tapered tubular sleeve of electrically conductive material fixedly mounted within said sheath adjacent the other end of said corrugated portion and extending through said corrugated portion in coaxial radially spaced relation, at least a portion of said sleeve axially flared toward a free end positioned in radially spaced relation, within said adjacent sheath portion, whereby said sleeve electrostatically shields said corrugated portion and said annular recess forms an electrostatic trap for free conductive particles within said sheath, said oppositely flared sleeve and adjacent sheath portion providing stepped and oppositely inclined bottom surfaces adapted to direct electrically levitated particles into said trap.

4,029,892

METHOD AND MEANS FOR TRAPPING PARTICLES IN ENCLOSED HIGH VOLTAGE ELECTRIC BUS APPARATUS

Roy Nakata, Pittsfield, Mass., assignor to General Electric Company, Philadelphia, Pa.

Filed Nov. 28, 1975, Ser. No. 636,254
Int. Cl.² H01B *9/04*
U.S. Cl. 174—14 R **20 Claims**



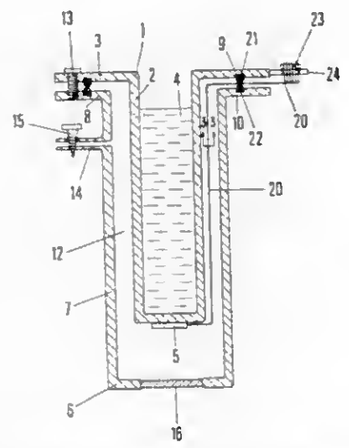
1. Compressed gas insulated high voltage electric bus apparatus adapted for disposition with its longitudinal axis horizontal which comprises, a sectional tubular sheath of electrically conductive material adapted to be maintained at essentially ground potential, said sheath comprising a plurality of tubular sections connected together in hermetically-sealed end-to-end relation and being filled with an insulating gas under pressure, an elongated conductor within said sheath adapted to be maintained at high voltage with respect to ground, a plurality of insulators radially interposed between said conductor and said sheath at axially spaced apart junctures of said sheath sections for maintaining said conductor in substantially coaxial radially-spaced relation within said sheath, insulator supporting means at each such juncture comprising a pair of electrically conductive axially flared collars fixed to said sheath and having insulator mounting means therebetween, each said pair of flared collars being disposed in axially opposed relation with their ends of minimum cross section contiguous and their flared ends remote thereby to provide bottom surfaces inclined downwardly in both axial directions away from said insulator mounting means, and particle trapping receptacles formed in the bottom surface of said sheath immediately adjacent the lowest point of each said downwardly inclined surface.

4,029,893

DOUBLE-WALL CRYOSTAT HAVING ELECTRICAL CONNECTIONS

Michel Robert Roger, Bures sur Yvette, France, assignor to Societe Anonyme de Telecommunications, France

Filed Dec. 4, 1974, Ser. No. 529,388
Claims priority, application France, Dec. 28, 1973, 73.46720
Int. Cl.² H01L *39/00*
U.S. Cl. 174—15 CA **2 Claims**



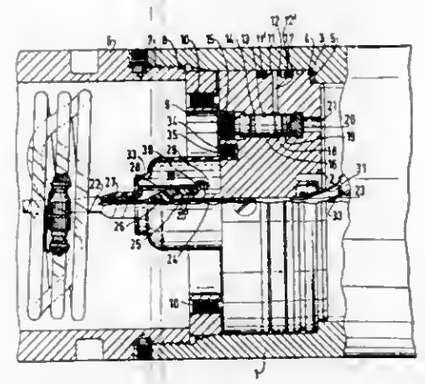
1. In a double-wall cryostat formed by the interconnection of an inner wall and an outer wall in their upper part, the walls defining therebetween a hermetic enclosure in which there is disposed a detector element connected by an electrical connector means to circuits outside said enclosure, the improvement which comprises providing each of the two walls in their upper part with a flexible metallic sealing element, the two metallic sealing elements cooperating by contact for ensuring the hermetic interconnection of the two walls and the electrical connector means comprises a plurality of electrical conductors deposited on a thin band of insulating material and covered with a second thin band of insulating material, said electrical conductor means extending locally out of the hermetic enclosure between said sealing elements, the thinness of the electrical connector means and the ductility of the metallic sealing elements cooperating to enable the cryostat to be hermetically sealed even in the region where said electrical connector means passes through said sealing elements.

4,029,894

SUBMERGED REPEATER HOUSING

Frank L. J. Jarvis, Gravesend; Duncan A. Gunn, Bishops Stortford, and Richard J. Buchanan, Shooters Hill, England, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Aug. 22, 1975, Ser. No. 606,760
Claims priority, application United Kingdom, Oct. 29, 1974, 46742/74
Int. Cl.² H02G *15/14*
U.S. Cl. 174—70 S **3 Claims**



1. A submersible housing for submarine cable repeaters and equalizers comprising

a tubular casing having an internal annular seat;

a bulkhead in said casing adjacent to said seat;

an annular non-resilient seal between said seat and said bulkhead;

a fixed annular clamping ring in said housing in front of said bulkhead; and

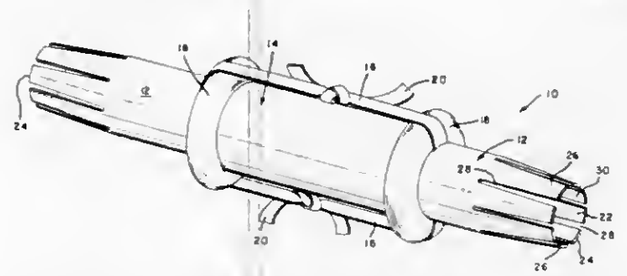
a plurality of circumferentially-spaced-apart screws in said ring pressing said bulkhead toward said seat to compress said seal, said ring being constructed and arranged to act as a strong spring in the axial direction of said tubular casing to compress said seal in a resilient manner.

4,029,895

RE-ENTERABLE SPLICE CASE

Grover Harry Scarborough, Exton, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Oct. 12, 1976, Ser. No. 731,181
Int. Cl.² H02G *15/18*
U.S. Cl. 174—138 F **3 Claims**



1. A splice case for removably covering a splice area between two cables, comprising:

a. an elongated generally rigid sleeve adapted to be positioned over a splice area between two cables;

b. an elongated resilient cover of elastomeric material supported on the sleeve and adapted to be rolled out over the sleeve and onto the cables extending out from either end of the sleeve; and

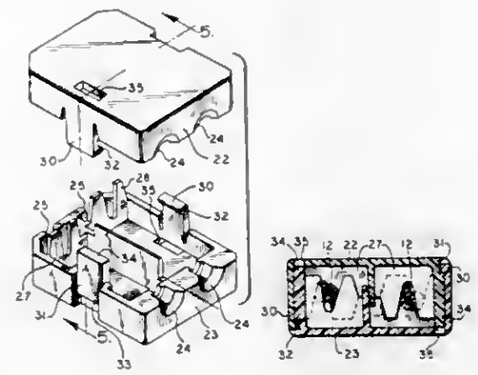
c. a pair of ribbons of tear resistant material positioned diametrically between the sleeve and cover, said ribbons being adapted to roll up the ends of the cover by grasping the ribbon ends and pulling back toward the other end of the sleeve.

4,029,896

TERMINAL HOUSING FOR AN ELECTRICAL RESISTANCE HEATER

Charles A. Skinner, Columbia, Md., assignor to Electro-Therm, Inc., Laurel, Md.

Filed Oct. 22, 1975, Ser. No. 624,697
Int. Cl.² H01R *13/48;* **H05B** *3/06;* **H01R** *13/58*
U.S. Cl. 174—138 F **3 Claims**



1. A housing for use in enclosing the connections between first and second electrical conductors and the terminals of an electric resistance heating element, said housing comprising, in combination:

first and second identical interlocking electrically non-conductive housing sections, each of said housing sections including a base portion, and a side wall portion projecting from said base portion and forming a compartment therewith, and side wall portion having a rim, and

means including a first pair of recesses on said rim for receiving in cooperation with a pair of like recesses on the other of said housing sections when said housing sections are locked together rim-to-rim respective ones of said electrical conductors, and means including a second pair of recesses on said rim opposite said first pair of recesses for receiving in cooperation with a pair of like recesses on the other of said housing sections when said housing are locked together rim-to-rim respective ends of said electrical resistance heating element, and

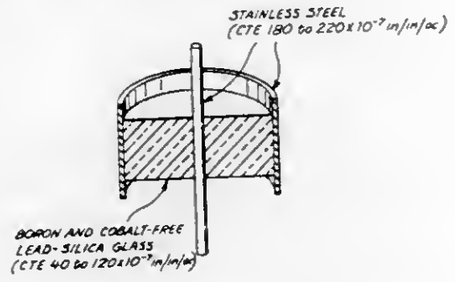
means including a divider wall portion projecting above said rim from said base portion and extending through said compartment from a first location on said side wall portion between said first pair of recesses to a second location on said side wall portion between said second pair of recesses for dividing said compartment into first and second electrically-isolated sections, said divider wall portion being disposed parallel to and adjacent one side of a plane bisecting said compartment whereby said wall portion comes into substantially contiguous surface to surface engagement with the wall portion of the other of said housing sections when said housing sections are locked together rim-to-rim; and

means including a locking tab portion projecting from said rim of said side wall portion, and a tab receiving portion disposed on said side wall portion opposite said tab portion for receiving a like tab portion on the other of said housing sections in locking engagement when the rims of said housing sections are brought into contact to lock said housing sections together about said connections.

4,029,897
GLASS SEAL

Peter Mayer, Burlington; M. Krishna Murthy, Toronto; Albert H. Brooks, Agincourt, and John A. Topping, Oakville, all of Canada, assignors to Quality Hermetics Limited, Toronto, Canada

Filed Aug. 7, 1975, Ser. No. 590,309
Int. Cl.² C03C *27/02, 3/10;* **H01B** *17/30*
U.S. Cl. 174—152 GM **9 Claims**



1. A seal construction comprising an inner electrically-conductive member, an outer electrically-conductive member and a glass sealingly joining said electrically-conductive members, said glass being formed from a boron- and cobalt-free lead-silica glass containing the following relative proportions of lead oxide and silica:

PbO	about 45 to about 65 wt. %
SiO_2	about 55 to about 35 wt. %

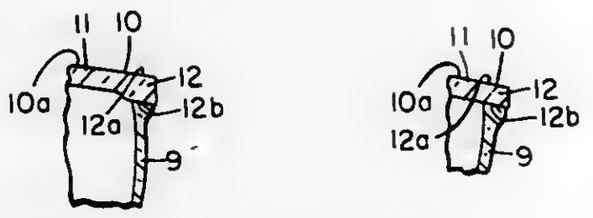
and the following other components in quantities based on the total weight of lead oxide and silica:

Al_2O_3	about 3 to about 4 wt. %
ZnO	about 7 to about 8 wt. %
CaO	0 to about 6 wt. %
BaO	0 to about 7 wt. %
Bi_2O_3	0 to about 7 wt. %.

4,029,898
TELEVISION PICTURE TUBE FACE PLATE

Yilmaz C. Belentepe, Corning, and Wendell S. Blanding, Painted Post, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Mar. 24, 1976, Ser. No. 670,046
Int. Cl.² H01J *5/02, 29/02*
U.S. Cl. 358—247 **8 Claims**



1. A face plate for a television picture tube envelope, such face plate having a uniformly convexly curved outside surface and comprising:

A. a viewing area of a generally uniform thickness throughout the areal expanse thereof;

B. adjacent to and surrounding the outer perimeter of said viewing area an annular area of a generally greater thickness than said viewing area and of a generally uniformly diminishing thickness, such annular area including,

I. a region of maximum thickness at the ends of the minor axis of the face plate,

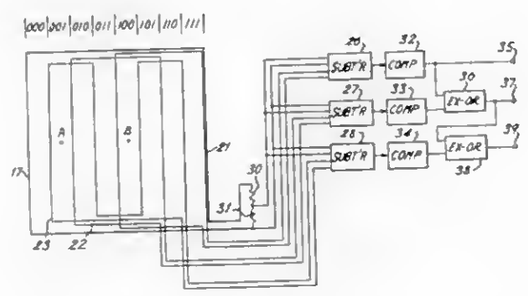
II. a region of minimum thickness at the ends of the diagonal axis of the face plate, and

III. a region of intermediate thickness at the ends of the major axis of the face plate.

4,029,899
POSITION INDICATOR

John Ashley Gordon, Hatfield, England, assignor to National Research Development Corporation, London, England

Filed Nov. 14, 1975, Ser. No. 632,176
Claims priority, application United Kingdom, Nov. 20, 1974, 50200/74; May 27, 1975, 23141/75
Int. Cl.² H04N *1/00;* **G08C** *21/00*
U.S. Cl. 178—19 **21 Claims**



1. Apparatus for generating a signal representative of a co-ordinate of a movable indicating member, the member being constructed to interact with magnetic flux, and the apparatus including:

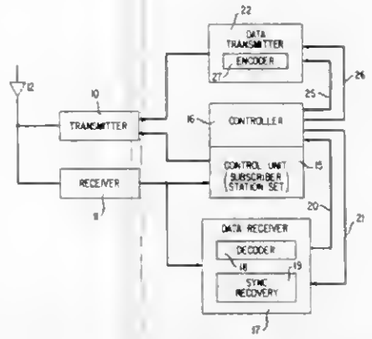
a plurality of sensing coils, positioned substantially in or adjacent to a real or imaginary surface in or adjacent to which the indicating member may be moved, the sensing coils overlapping in the direction of a required co-ordinate in the surface, and being positioned to divide an area of interest in the surface into regions, each coil encircling part of said area of interest having conductors in the said area substantially along region boundaries only, and each region being within an arrangement of the sensing coils particular to that region, a further coil, positioned substantially in or adjacent to the said surface and surrounding the entire area of interest, and

means responsive to change in magnetic flux passing through the said area of interest by way of the indicating member for providing signals representative of the co-ordinate of the indicating member, by separately combining signals from said further coil with signals from each of said sensing coils to provide a group of binary signals indicative of said coordinate

4,029,900
DIGITAL SYNCHRONIZING SIGNAL RECOVERY CIRCUITS FOR A DATA RECEIVER

Eric John Addeo, Long Valley, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jan. 26, 1976, Ser. No. 652,170
Int. Cl.² H04L *7/00*
U.S. Cl. 178—69.1 **25 Claims**



1. In a synchronizing signal recovery circuit for a receiver for data signals having a predetermined word rate, a predetermined bit rate, and a predetermined synchronizing character rate,

means for indicating the presence of a predetermined synchronizing character in the data signal,

a circuit for deriving an approximate bit rate timing signal from the data signals,

means, responsive to the timing signal, for producing a substantially stable clock signal at the bit rate of the data signal, and

means, responsive to the stable bit rate clock signal and the character indicating means output, for initiating the production of a train of word synchronizing pulses only after the occurrence of at least two of the indicating pulses in coincidence with the stable bit clock pulses, successive ones of the indicating pulses being spaced by only a word synchronizing time interval of the data signal.

19. A digital phase comparator comprising

input connections for receiving first and second input signals of variable phase difference to be compared in phase,

means for generating a pulse train at the frequency of one of said signals, and

means for inhibiting the first pulse of said train after each change in the sign of the phase difference between said first and second signals.

4,029,901
CONTROL CENTER FOR A COMMUNICATIONS SYSTEM WITH INTERCHANNEL PATCHING CAPABILITIES

Whitney Robertson Campbell, Elk Grove Village, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Nov. 13, 1975, Ser. No. 631,784
Int. Cl.² H04Q *7/04*
U.S. Cl. 179—2 E **7 Claims**

1. A control center for a radio communications system with interchannel patching capabilities comprising:

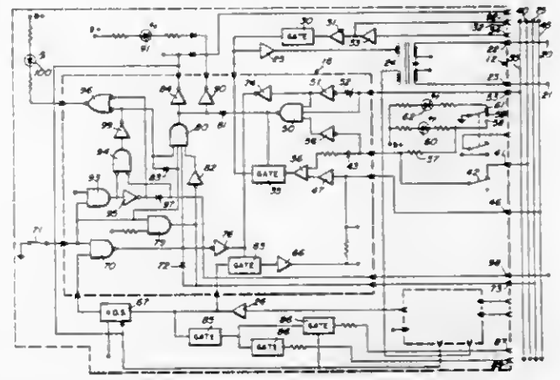
a. a housing adapted to have a plurality of control modules electrically and mechanically engaged therein;

b. a plurality of electrically conductive buses mounted in said housing;

c. a plurality of dedicated control modules having a front panel and mounted in said housing, each of said modules being adapted to be electrically connected to a transmitter/receiver base station for controlling all communications to and from its respective base station on an associated communications channel and for controlling the operation of said base station, each of said modules further having a plurality of terminals thereon one each of which is electrically connected to each of said buses;

d. a switch mounted on the front panel of each of said control modules; and

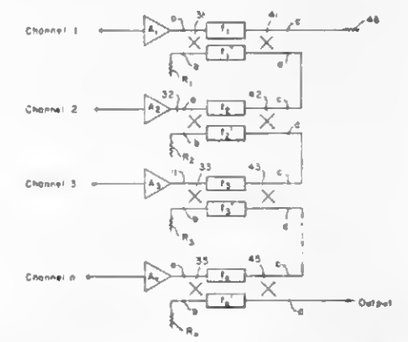
e. a plurality of patch boards one each mounted on each of said plurality of control modules each of said patch boards including associated circuitry electrically connected to the plurality of terminals, to various communications output terminals on the mounted control module and to said switch on the front panel, said switch being connected to provide electrical contact between predetermined ones of the various communications output terminals and predetermined ones of the plurality of terminals for providing selected patching between said normally dedicated communications chanels.



4,029,902
CONTIGUOUS CHANNEL MULTIPLEXER

H. Clark Bell, Jr., Sepulveda, and Harold A. Rosen, Santa Monica, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Oct. 22, 1975, Ser. No. 624,801
Int. Cl.² H04J *1/08*
U.S. Cl. 179—15 FD **11 Claims**

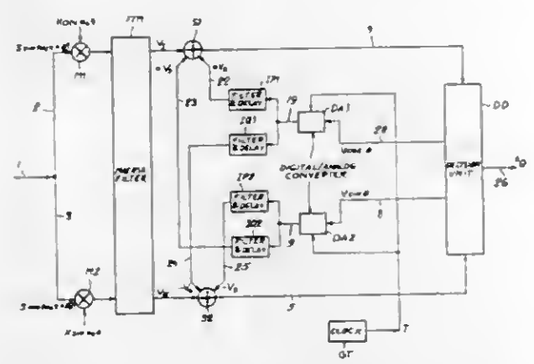


1. A multiplexer of the type comprising a plurality of directional filters each having at least one input port and an output port, said input ports being adapted to receive signals extending over predetermined bands of frequencies, said filter output ports being connected in a cascaded transmission path to a multiplexer output port, the transmission characteristics of said multiplexer from the respective input ports of a given filter to said multiplexer output port being a function of the transmission coefficient of that filter and the reflection coefficient of the succeeding filters along said transmission path, the improvement comprising the extension of at least one of the cutoff frequencies of preselected ones of said filters into the bandpass region of a channel next adjacent thereto in frequency.

4,029,903
RECEIVER FOR PSK DIGITAL SIGNALS

Giovanni Tamburelli, Torino, Italy, assignor to CSELT - Centro Studi E Laboratori Telecomunicazioni, Torino, Italy

Filed Oct. 6, 1975, Ser. No. 620,140
Claims priority, application Italy, Oct. 4, 1974, 69965/74; Apr. 2, 1975, 67850/75
Int. Cl.² H04B 1/00
U.S. Cl. 178—88 10 Claims



1. In a receiver for digital signals transmitted via two conjugate carrier waves of like frequency identifying n different signal levels, in combination:

first and second demodulating means for deriving from said carrier waves a first and a second input voltage defining respective coordinates of an orthogonal matrix divided into n sectors each representing one of said signal levels;

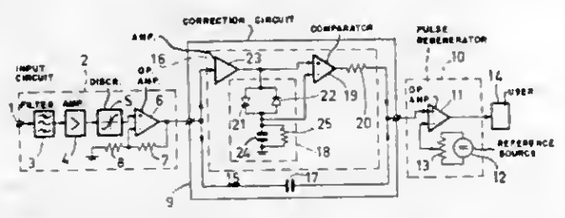
decision means connected to said demodulating means for generating an angle signal, depending on the magnitudes of said input voltages and identifying the corresponding sector, and two collateral signals representing conjugate trigonometric functions of said angle signal; and

feedback means connected to said decision means for converting said collateral signals into at least two corrective voltages and superimposing same upon succeeding first and second input voltages to compensate for distortions determined by the preceding input voltages.

4,029,904
RECEIVER CIRCUIT FOR AUTOMATIC CORRECTION OF DC LEVEL DISTURBANCES

Roberto Papeschi, Milan, Italy, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 24, 1975, Ser. No. 634,769
Claims priority, application Italy, Nov. 27, 1974, 29912/74
Int. Cl.² H04L 15/24
U.S. Cl. 178—88 7 Claims

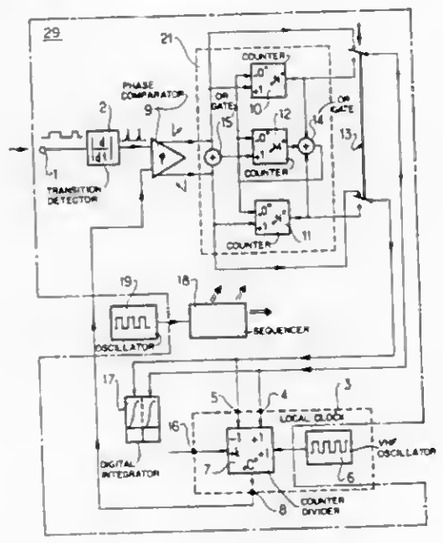


1. A receiver in a transmission system for binary pulse signals, including an input circuit having a low output impedance from which the base band binary pulse signals are derived, a circuit connected to the input circuit for automatic correction of disturbances in the DC level of the binary pulse signals caused during transmission, and a pulse regenerator having a high input impedance to which the correction circuit and a reference source are connected for regenerating the binary pulse signals, said correction circuit comprising two parallel branches whose inputs are connected to the input circuit and whose outputs are connected to the pulse regenerator, the first branch including a series capacitor and the second branch including a peak detector for deriving a threshold signal from the peak values of the binary pulse signals and a comparator for generating a binary decision signal in response to both the threshold signal and the binary pulse signals, said comparator being coupled via a resistor to the output of the second branch, the time constant constituted by the resistor in the second branch and by the series capacitor in the first branch being much larger than the duration of an element in the binary pulse signals to suppress in said binary decision signal a.c. components related to transitions in the binary pulse signals so that the second branch passes d.c. components of the binary pulse signals.

4,029,905
APPARATUS FOR DETECTING THE RHYTHM OF AN NRZ MESSAGE

Michel Abraham, St Michel sur Orge, France, assignor to Compagnie Industrielle des Telecommunications Cit-Alcatel, Paris, France

Filed Nov. 17, 1975, Ser. No. 633,017
Claims priority, application France, Nov. 25, 1974, 74.38586
Int. Cl.² H04I 7/00
U.S. Cl. 178—88 6 Claims

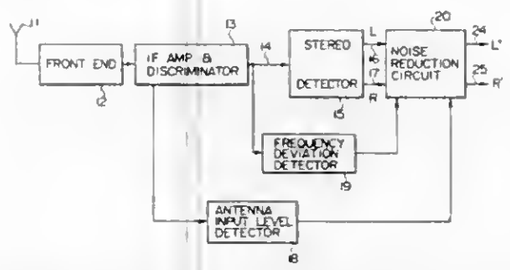


1. An apparatus for detecting the rhythm of an NRZ message, comprising: a binary-level transition detector (2) for receiving the message and delivering a pulse for each change in binary polarity; a phase-controllable local clock oscillator (3, 6) for delivering clock pulses at the rhythm of the message: a phase comparator (9) for comparing the phase of the clock pulses with the phase of the pulses delivered by said transition detector, and in turn delivering control pulses that selectively advance and delay the phase of said clock oscillator; an integrator assembly (17, 23–25) for integrating the control pulses and sending out a signal indicating the existence of a message when the number of advance control pulses reaches a first threshold, the number of delay control pulses remaining under a second threshold; and a command unit (18, 19) for defining cyclically groups of three operating periods, the first one for phase locking of said clock oscillator, the second being initiated by a sudden phase shift of said clock oscillator and the operation of said integrator assembly, and the third period being reserved for reading and evaluating the state of said integrator assembly, selectively in accordance with the presence and absence of a message.

4,029,906
AUTOMATIC NOISE REDUCTION SYSTEM OF FM STEREO RECEIVER

Shinobu Takahashi, Mitaka, Japan, assignor to Sansui Electric Co., Ltd., Tokyo, Japan

Filed Apr. 14, 1976, Ser. No. 676,860
Claims priority, application Japan, Apr. 18, 1975, 50-51984[U]
Int. Cl.² H04H 5/00
U.S. Cl. 179—15 BT 10 Claims



1. An FM stereo receiver comprising:

demodulation circuit means having first and second audio outputs for demodulating stereophonically related audio signals from an FM stereo transmission signal which is received by an antenna and providing the stereophonically related audio signals on said first and second audio outputs;

first detection means for detecting input level of the FM stereo transmission signal which is received by the antenna to produce a first control signal having a voltage level corresponding to the input level;

second detection means for detecting carrier frequency deviation of the FM stereo transmission signal to produce a second control signal having a voltage level corresponding to the carrier frequency deviation; and

control circuit means coupled to said first and second audio outputs of said demodulation circuit means and to said first and second detection means for, when at least one of the input level and the carrier frequency deviation of the FM stereo transmission signal decreases, reducing separation between said first and second audio outputs of said demodulation circuit means and attenuating high frequency components at each of said first and second audio outputs of said demodulation circuit means,

said control circuit means including a first blend circuit coupled between said first and second audio outputs of said demodulation circuit means for blending high frequency components at said first and second audio outputs, a second blend circuit coupled between said first and second outputs, for blending low, intermediate and high frequency components at said first and second audio outputs, and first and second attenuating circuits respectively coupled to said first and second audio outputs for attenuating high frequency components at said first and second outputs.

4,029,907
ASYNCHRONOUS DIGITAL REPEATER

Adam A. Jorgensen, Rochester; Norman L. Rose, Penfield, and Thomas F. Lewis, Macedon, all of N.Y., assignors to Stromberg-Carlson Corporation, Rochester, N.Y.

Continuation-in-part of Ser. No. 593,660, July 7, 1975, abandoned. This application July 13, 1976, Ser. No. 704,984
Int. Cl.² H04Q 1/36
U.S. Cl. 179—16 EA 3 Claims

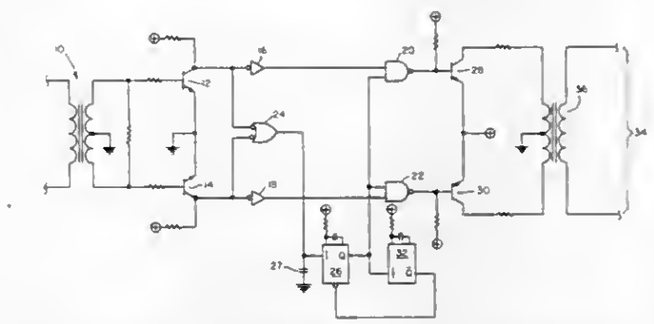
1. An asynchronous, regenerative, digital repeater circuit for use in a bipolar signalling system comprising:

a. a first monostable multivibrator having a characteristic period approximately equal to the design duration of the pulses to be repeated,

b. means for triggering said multivibrator in response to the leading edge of each of each received pulse,

c. a second monostable multivibrator having a period approximately equal to one-half the duration of the time slot assigned to each received pulse, said second multivibrator being connected to an output of said first multivibrator to be triggered on the trailing edge of each pulse produced by said first multivibrator, an output of said second multivibrator being connected to said first multivibrator to inhibit said first multivibrator during time-out of said second multivibrator, and

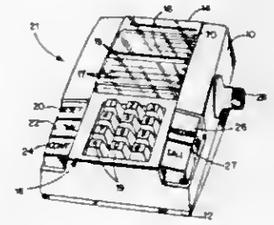
d. means for producing a bipolar train of output pulses in response to the output of said first multivibrator.



4,029,908
REPERTORY DIALER LOGIC

Robin C. Moseley, Andover, and Richard A. Brisk, Arlington, both of Mass., assignors to DASA Corporation, Andover, Mass.

Filed Nov. 24, 1975, Ser. No. 634,474
Int. Cl.² H04M 1/46
U.S. Cl. 179—90 BB 22 Claims



1. A telephone dialer comprising:

a magnetic tape transport including a magnetic tape for containing recorded data representative of telephone numbers and magnetic record-reproduction means operative to selectively record on or read from said tape;

keyboard means for manual entry of telephone number data;

an electronic temporary memory operative to store telephone number data derived from said magnetic tape or said keyboard means;

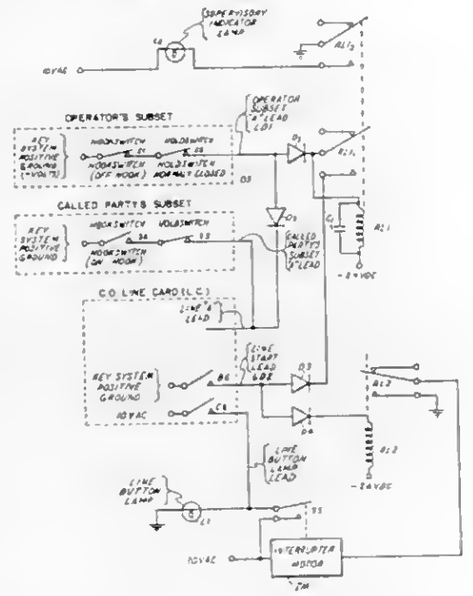
control means operative to selectively cause transfer of telephone number data from said magnetic tape to said temporary memory and from said keyboard means to said temporary memory; and

output circuit means operative in response to telephone number data stored in said temporary memory to provide telephone dialing signals for conveyance over a telephone line thereby to dial the telephone number represented by said stored telephone number data.

4,029,909
OPERATOR SUPERVISORY CIRCUIT FOR A KEY TELEPHONE SYSTEM

James Edwin Hinkle, Palmyra, Pa., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Mar. 23, 1976, Ser. No. 669,427
Int. Cl.² H04M 1/00
U.S. Cl. 179—99 9 Claims



1. An operator supervisory circuit for a key telephone system comprising:
- a source of key system positive ground;
- a single hold button operator's subset coupled to said source;
- a single hold button called party's subset;
- a supervisory indicator lamp;
- a line button lamp; and
- a switching arrangement including only relays and relay contacts coupled to said operator's subset, said source, said indicator lamp and said line button lamp to light said indicator lamp when said operator's subset is taken off-hook to answer an incoming call, to cause said line button lamp to wink at a given rate when said operator's subset is placed on hold to disperse said incoming call to said called party's subset, to extinguish said indicator lamp and said line button lamp wink when said called party's subset is taken off-hook, and to cause said line button lamp to again wink at said given rate when said called party's subset is placed on hold after said called party's subset has been taken off-hook.

4,029,910
WIDE DISPERSION LOUDSPEAKER WITH FLEXING DIAPHRAGM

Roy F. Allison, Wayland, Mass., assignor to Allison Acoustics, Inc., Natick, Mass.

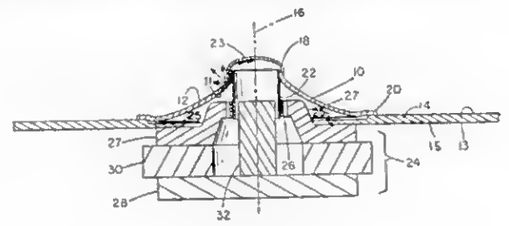
Continuation-in-part of Ser. Nos. 465,856, May 1, 1974, abandoned, and Ser. No. 617,067, Sept. 26, 1975, abandoned.
This application July 9, 1976, Ser. No. 704,068
Int. Cl.² H04R 7/12, 7/18, 9/06
U.S. Cl. 179—115.5 ME 10 Claims

1. In an audio speaker system comprising a mounting panel having a front surface facing towards a listening space and a loudspeaker secured to said panel for projecting sound directly into said listening space forward of said front surface, said loudspeaker comprising a diaphragm rotationally symmetrical about an axis generally perpendicular to said front surface, a voice coil former secured to said diaphragm, a voice coil secured to said voice coil former, and magnetic structure for driving said voice coil, that improvement wherein:

said diaphragm defines a sound propagating surface extending from a larger circular edge of said diaphragm to a smaller circular edge of said diaphragm spaced apart from said larger circular edge along said axis in the direction towards said listening space;

said voice coil former is secured to said diaphragm adjacent said smaller edge;

said sound propagating surface faces towards said listening space and is curved such that the included, initially acute, angle between a tangent to said sound propagating surface and said axis continuously increases as the point of



tangency moves from said smaller edge to said larger edge; and

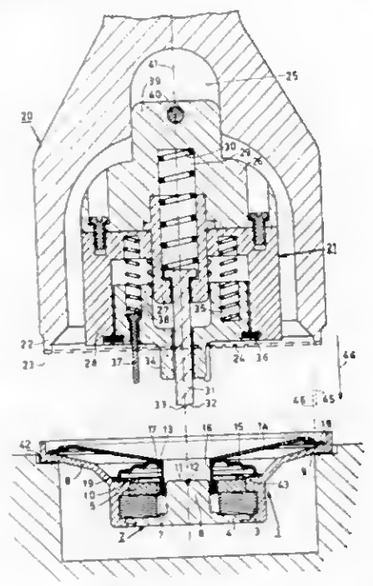
said loudspeaker includes means causing vibration of said voice coil parallel to said axis to produce vibration of said sound propagating surface having in phase components of velocity both parallel and perpendicular to said axis, said means including fixing said larger edge relative to said mounting panel,

whereby said loudspeaker projects sound into the full 2 π steradian solid angle on the side of said front surface towards said listening space.

4,029,911
ELECTRO-ACOUSTIC TRANSDUCER AND METHOD OF MANUFACTURING SUCH A TRANSDUCER

Walter Albinger, Vienna, Austria, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 28, 1976, Ser. No. 680,904
Claims priority, application Austria, Apr. 29, 1975, 3300/75
Int. Cl.² H04R 7/18, 9/04, 31/00
U.S. Cl. 179—115.5 ES 6 Claims

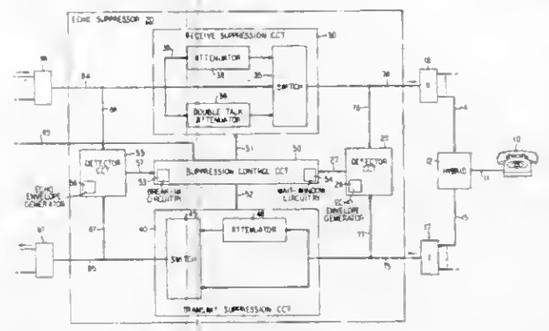


1. An electro-acoustic tranducer comprising a chassis having a contact surface, and a vibratory diaphragm having an edge, wherein said contact surface is formed of a plastic material, and said vibratory diaphragm is attached to the contact surface by an ultrasonic weld.

4,029,912
COMMON CONTROL DIGITAL ECHO SUPPRESSOR

Alfred Antonio Gelgel, Dunellen, and Robert Ernest LaMarche, Atlantic Highlands, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 10, 1975, Ser. No. 639,348
Int. Cl.² H04B 3/20
U.S. Cl. 179—170.2 19 Claims



8. An echo envelope generator comprising means for detecting peak magnitudes of input signals, first storing means for following increasing magnitude input signals and for storing the highest peak magnitude detected, first timing means responsive to the storing of a peak magnitude in said first storing means for initiating a predetermined timing interval, second timing means including a timer and means responsive to the detection of each input signal peak magnitude for restarting said timer, second storing means for storing the magnitude of the next-to-highest peak occurring after the peak magnitude stored in said first storing means, control circuit means responsive to the termination of said predetermined interval of time for transferring said next-to-highest peak magnitude from said second storing means and for storing it in said first storing means, said control circuit means being operative upon the storing of a peak magnitude from said second storing means in said first storing means for reducing said predetermined timing interval in accordance with the state of said timer, and output means connected to said first storing means for using said peak magnitude stored therein less a predetermined loss to generate an echo envelope corresponding to said input signals.

4,029,913
REMOTE ACCESSING SYSTEM FOR TELEPHONE LINES

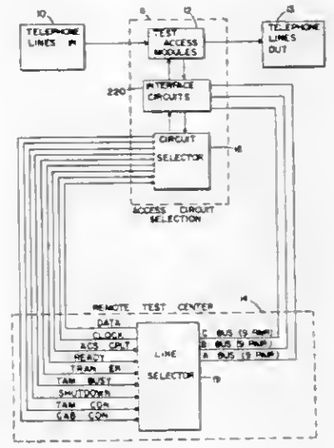
Richard A. Gunderson, Eden Prairie, Minn., assignor to Magnetic Controls Company, Minneapolis, Minn.

Filed Mar. 31, 1976, Ser. No. 672,406
Int. Cl.² H04B 3/46
U.S. Cl. 179—175.3 R 29 Claims

1. A system for accessing communication lines from a remote position comprising electronic access circuit selecting means at the communication lines and remote line selecting means at the remote position;

said access circuit selecting means having line selection data decoding means connected to operate access switching means, said switching means operable to connect a selected communication line to a selected transmission bus which transmission bus is routed to the remote line selecting means, and said access circuit selecting means further having automatic, sequentially programmed status determining means connected to said data decoding means and said access switching means and operable to direct status information to the remote line selecting means;

said remote line selecting means having status reviewing means connected to said status determining means and line selection data encoding means connected to said reviewing means and to said decoding means, said encoding means operable upon the reception of appropriate status information from the access circuit selecting means to transmit line selection data to the decoding means, and manual line selection data entry means at the remote

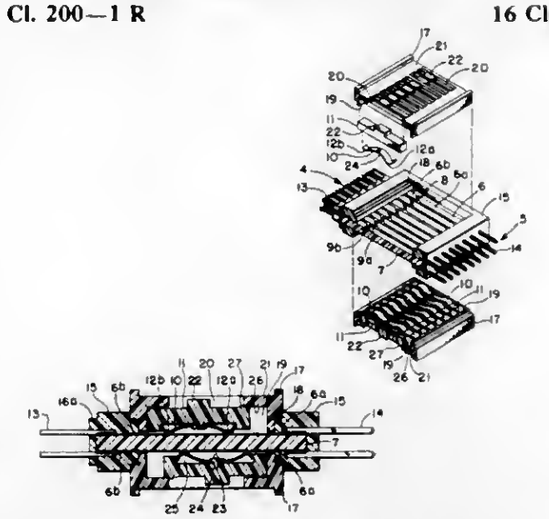


position to supply line selection data to the encoding means.

4,029,914
MULTIPLE SWITCH MECHANISM

Gary M. Schmidt, Cleveland; Robert J. Gabor, Mentor, and John T. Venaleck, Painesville, all of Ohio, assignors to A P Products Incorporated, Painesville, Ohio

Filed Apr. 14, 1976, Ser. No. 676,900
Int. Cl.² H01H 9/00, 15/00
U.S. Cl. 200—1 R 16 Claims



1. A multiple switch mechanism connectable on-line between one multi-conductor electrical cable termination assembly device, a receptacle device for the latter, or a like device and another similar device for selectively opening and closing respective electrical circuits therebetween, comprising:
- a plurality of first electrical contact means for connection with the respective contacts of such a device,
- a plurality of second electrical contact means for connection with the respective contacts of the other such device,
- a plurality of individually selectively operable slide switch means respectively electrically connected between said first and second electrical contact means for opening and closing respective circuit paths therebetween, said plurality of slide switch means including an electrically nonconductive support and a plurality of electrical conductors on said support, each of said plurality of electrical conductors including a pair of generally linearly extending conductor parts separated by an electrical discontinu-

ity therebetween, and each of said slide switch means including electrically conductive slide means in engagement with a respective electrical conductor and slidable thereon to a first position for completing a circuit path between said conductor parts across a respective electrical discontinuity and to a second position to open such circuit path, thereby to close and to open, respectively, respective electrical circuits between such devices, and,

dielectric housing means for holding in a common package at relative locations said first and second electrical contact means and said slide switch means, said dielectric housing means including a body of electrically non-conductive material integrally molded about at least respective portions of said electrical contact means, said support, and said electrical conductors to form an integral structure therewith.

4,029,915

MINIATURIZED CALCULATOR KEYBOARD SWITCH ASSEMBLY HAVING UNIVERSALLY PIVOTED KEY ACTUATORS

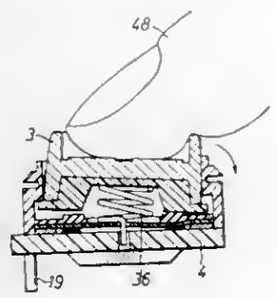
Shin Ojima, Yao, Japan, assignor to Hoshidenkoseizo Kabushiki Kaisha, Yao, Japan

Filed Dec. 3, 1975, Ser. No. 637,264

Claims priority, application Japan, Dec. 12, 1974, 49-143295

Int. Cl.² H01H *13/70, 25/00;* **G06F** *7/38*

U.S. Cl. 200—5 A **2 Claims**



1. A portable electronic calculator comprising:

a body;

a keyboard consisting of a plurality of keys housed in said body and exposed to the outside of said body through openings formed in the body, the keys of said keyboard being aligned with one another in a single row;

an indicator for displaying the result of a calculation; said indicator being housed in the body and exposed to the outside of said body through an elongated opening formed in said body, said elongated indicator opening being disposed in alignment with said single row of keys;

said keyboard including a plurality of resilient members each of which is retained at one end thereof by an engaging portion formed on the inside of one of said keys respectively, each of said resilient members being secured at its other end to a stationary portion of said body, each of said keys being normally held in a predetermined neutral position by its associated resilient member and being adapted to be tilted forwardly, backwardly, to the right, and to the left when the key is so depressed by the finger tip of a user on the front surface of the key;

said keyboard further including a set of four make-and-break contacts housed in the body in opposing relation to the inside of each of said keys, different ones of said contacts being selectively actuated in accordance with the direction of tilting of the key when the key is tilted;

an integrated calculator circuit housed in said body for receiving a signal based on the operation of each of the make-and-break contacts by the key operation to perform a calculation and to supply the result of the calculation to said indicator for viewing by the user through said elongated indicator opening; and

a power source housed in said body for supplying power to said integrated calculator circuit and to said indicator.

4,029,916

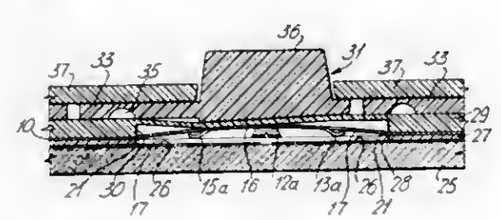
MULTI-CONTACT PUSH-BUTTON SWITCH AND PLURAL EMBODIMENT FOR KEYBOARD SWITCH ASSEMBLY

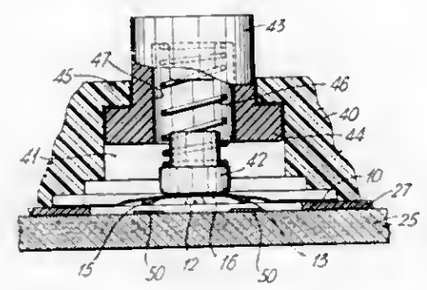
Pak-Jong Chu, Ottawa, Canada, assignor to Northern Electric Company Limited, Montreal, Canada

Filed Apr. 18, 1975, Ser. No. 569,381

Int. Cl.² H01H *13/70, 1/14*

U.S. Cl. 200—5 A **6 Claims**





1. A pushbutton switch including a flat spring plate having a switch position comprising:

a pre-stressed domed portion extending upwardly from said flat spring plate and having a central portion and a plurality of radial webs connecting said central portion and said flat spring plate, said flat spring plate surrounding said domed portion, said flat spring plate integral with the outer ends of said radial webs to constrain said webs radially and circumferentially;

an upwardly bent portion at the junction between each web and said flat spring plate, said bent portion constraining said webs to deflect radially inward of said bent portion;

a plurality of cantilevered spring contact members extending from said centre portion, a contact member between at least one adjacent pair of radial webs and extending a radial distance less than said radial webs, said contact member extending downward from said domed portion toward the plane of said flat spring plate;

a contact area at the radially outward end of each contact member;

a circuit member positioned below and spaced from said flat spring plate and including contact areas beneath said contact areas of said spring contact members;

a pushbutton mounted above said flat spring plate, over said domed portion to apply a downward force thereto, to deflect said domed portion;

said domed portion, on application of said downward force, arranged to snap downward toward said circuit member, said domed portion constrained by said upwardly bent portion to return said domed portion to an undeflected position.

4,029,917

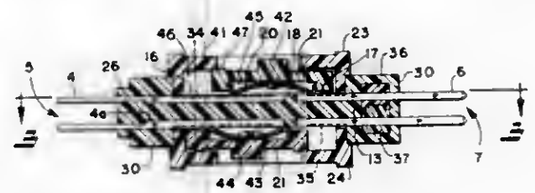
MOLDED MULTIPLE SWITCH MECHANISM

John L. Webster, Painesville, Ohio, assignor to A P Products Incorporated, Painesville, Ohio

Filed June 21, 1976, Ser. No. 698,117

Int. Cl.² H01H *9/00, 15/00*

U.S. Cl. 200—5 R **12 Claims**



1. A multiple switch mechanism connectable on-line with one multi-conductor electrical cable termination assembly device, a receptacle device therefor or like device and another similar device for selectively opening and closing electrical circuits therebetween, comprising:

a plurality of first electrical contacts,

a plurality of second electrical contacts,

electrically non-conductive housing means for holding said first electrical contacts in paired and electrically isolated alignment, respectively, with said second electrical contacts, said housing means including a body of electrically non-conductive material molded directly about portions of said electrical contacts forming an integral structure therewith,

each of said electrical contacts including one end portion means exposed relative to said body for connecting to respective external contacts or the like of such device,

each of said electrical contacts further including an opposite end portion means within said housing means and exposed therein for providing respective first and second fixed switch contacts in such paired alignment relation, and

a plurality of slide contact means in said housing means selectively slidable on respective electrical contact opposite end portion means for closing and opening respective circuit paths between respective aligned pairs of said first and second electrical contacts respectively to open and close such electrical circuits therebetween.

4,029,918

CONTINUOUS CYCLE TIMER HAVING ADJUSTABLE DAY AND TIME PERIODS OF OPERATION

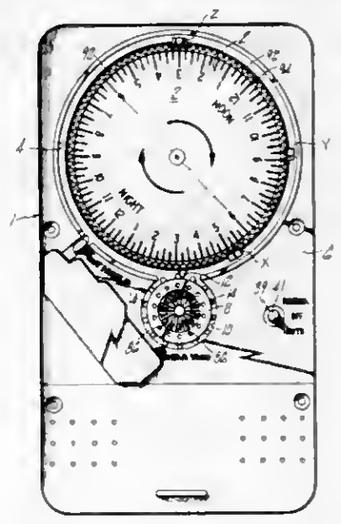
Carl L. C. Kah, Jr., 778 Lakeside Drive, North Palm Beach, Fla. 33408

Filed Mar. 27, 1975, Ser. No. 562,650

Int. Cl.² H01H *43/00*

U.S. Cl. 200—38 D **35 Claims**

1. A timing device having a mounting means, electrical input connectors connected to said mounting means, electrical output connectors connected to said mounting means, a first dial mounted for rotation on said mounting means, a second dial mounted for rotation on said mounting means, an actuation lever, means mounting said actuation lever between its ends on said mounting means for movement by said first and second dials, first contacting means on said first dial for engaging a first part of said actuation lever on one side of said means mounting said actuation lever, second contacting means on said second dial for engaging a second part of said actuation lever on the other side of said means mounting said actuation lever, switch means connected to said mounting means, said switch means including means for actuating said switch means, said switch means being electrically connected between said output and said input connectors for electrically connecting them, said means for actuating said switch means being located adjacent said actuation lever for selective movement thereby so that when only one contacting means engages its part of the actuation lever said actuation lever will not move to in turn move said means for actuating said switch means to actuate said switch means but when said other contacting means engages its respective part of said actuation lever at the same time said actuation lever will move to in turn move said means for actuating said switch means to actuate said switch means.



4,029,919

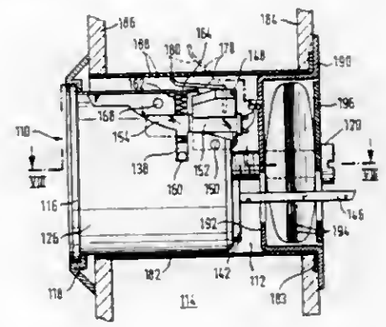
LOCKING ARRANGEMENT WITH BURGLAR ALARM

Edgar Lumme, Telgte, Westflaen, Germany, assignor to Aug. Winkhaus, Telgte, Germany

Filed Jan. 21, 1976, Ser. No. 650,934

Int. Cl.² H01H *35/00*

U.S. Cl. 200—52 R **11 Claims**



1. A locking arrangement comprising:

a. a casing element defining an axis of rotation;

b. a cylinder element mounted in said casing element for angular movement about said axis and formed with a key slot extending inward of one axially terminal face of said cylinder element;

c. tumbler means in said elements for normally preventing said angular movement and responsive to a key inserted in said key slot for permitting said movement;

d. a spring member having a portion radially projecting from said casing element, said portion being axially movable relative to said casing element, said spring member being stressed resiliently when said portion is moved in one axial direction;

e. first and second contact means mounted on said casing element in electrically insulated relationship; and

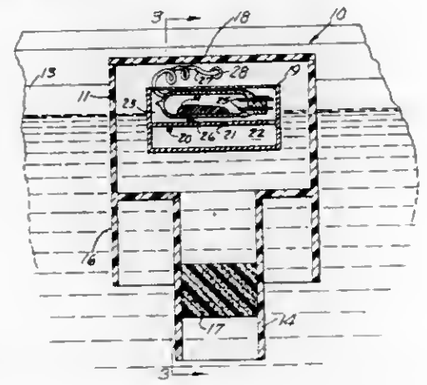
f. motion transmitting means interposed between said spring member and said first contact means for biasing said first contact means toward a circuit opening position remote from said second contact means in response to said stressing of said spring member, and for conductively engaging said first and second contact means in response to movement of said portion in the other axial direction.

4,029,920

FLOAT TYPE ELECTRIC CIRCUIT BREAKER FOR SWIMMING POOLS

Donald W. Odell, 8301 Hidden Valley Circle, Fair Oaks, Calif. 95628

Filed Jan. 29, 1976, Ser. No. 653,515
Int. Cl.² H01H 35/18
U.S. Cl. 200—84 B 5 Claims



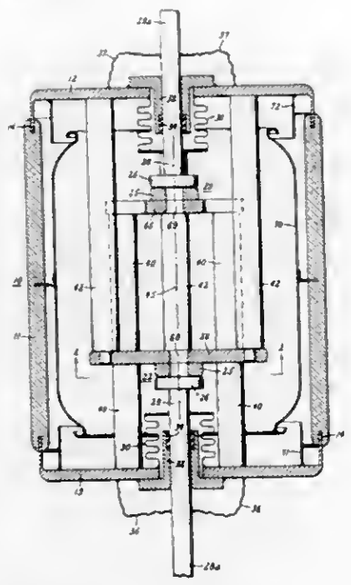
1. A float type electric circuit breaker for swimming pools comprising a housing, means securing said housing to the upper edge or skimmer recess of a swimming pool, a float mounted in said housing for pivotal movement about a horizontal pivot extending through said housing and said float, a mercury switch mounted on a roller in said float and electrically connected to a swimming pool control valve, a tube depending from said housing and communicating therewith for permitting a flow of water into and out of said housing, and means in said tube for preventing surge flow of water therethrough, whereby water inflow and outflow in the housing is buffered for the purpose of monitoring only static water level.

4,029,921

VACUUM-TYPE CIRCUIT INTERRUPTER WITH TWO SETS OF CONTACTS ELECTRICALLY IN PARALLEL

Joseph A. Rich, Schenectady, N.Y., and Joseph C. Sofianek, Broomall, Pa., assignors to General Electric Company, Philadelphia, Pa.

Filed July 1, 1975, Ser. No. 592,303
Int. Cl.² H01G 33/66
U.S. Cl. 200—144 B 10 Claims



1. In a vacuum-type circuit interrupter:
a. a highly evacuated envelope comprising an insulating housing and first and second metal end caps at opposite ends of said housing,
b. a first plurality of rod electrodes within said envelope mounted on said first end cap and electrically connected to said first end cap when the interrupter is open,
c. a second plurality of rod electrodes within said envelope mounted on said second end cap and electrically connected to said second end cap when the interrupter is open,
d. said first and second pluralities of electrodes being positioned so as to form a ring of electrodes within said envelope, the electrodes of said first plurality interleaving with and longitudinally overlapping the electrodes of said second plurality and being spaced circumferentially of said ring from the immediately adjacent electrodes of said second plurality, said electrodes alternating in polarity about said ring when the interrupter is open, whereby inter-electrode gaps are defined between the juxtaposed interleaving electrodes of said ring,
e. a first generally stationary contact, first conductive support structure extending transversely of said rod electrodes and attached to the distal ends of predetermined rod electrodes of said second plurality, and means for supporting said first generally stationary contact on said first support structure in a position intermediate the locations at which said first support structure is attached to said predetermined rod electrodes of said second plurality,
f. a second generally stationary contact, second conductive support structure extending transversely of said rod electrodes and attached to the distal ends of predetermined rod electrodes of said first plurality, and means for supporting said second generally stationary contact on said second support structure in a position intermediate the locations at which said second support structure is attached to said predetermined rod electrodes of said first plurality,
g. said first and second stationary contacts being disposed in positions spaced longitudinally of the longitudinally axis of said ring,
h. first and second movable contacts within said envelope for respectively engaging said first and second generally stationary contacts,
i. a first movable contact rod on which said first contact is mounted extending in sealed relationship through said first metal end cap,
j. a second movable contact rod on which said second contact is mounted extending in sealed relationship through said second metal end cap,
k. said two pairs of engageable contacts being electrically connected in parallel with each other while said interrupter is closed.

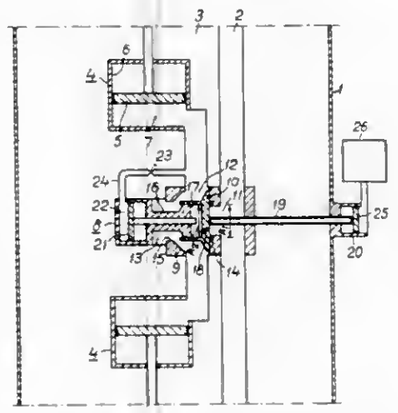
4,029,922

OPERATING DEVICE FOR ENCLOSED HIGH VOLTAGE CIRCUIT BREAKERS

Sten Berneryd, and Per-Olof Grune, both of Ludvika, Sweden, assignors to ASEA Aktiebolag, Vasteras, Sweden

Filed Sept. 4, 1975, Ser. No. 610,433
Claims priority, application Sweden, Oct. 1, 1974, 7412319
Int. Cl.² H01H 33/54
U.S. Cl. 200—148 D 5 Claims

1. An operating device for a high-voltage circuit breaker enclosed in an elongated casing (1) filled with compressed gas and comprising a high-pressure chamber (2) and a low-pressure chamber (3), a driving means (4) operated by compressed gas and including a pressure chamber (7), a compressed gas valve means (8) for alternatively connecting said driving means to the high-pressure chamber and the low-pressure chamber, said valve means having first and second openings (11,13) into the high-pressure chamber and the low-pressure chamber, respectively, communicating with the pressure chamber, a valve seat (14) around the first opening, a movable valve member (10) engageable with said valve seat to close the first opening, means (17) forming a space on the opposite side of the valve member from the first opening, means (18) permanently connecting said space with the high-pressure chamber, an impulse member (20) outside the high-



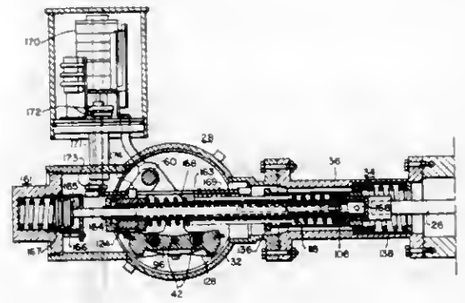
pressure chamber, an operating rod (19) extending substantially perpendicular to the longitudinal axis of the casing operatively connected to the impulse member and the valve member for moving the valve member away from the valve seat, and means responsive to movement of the valve member away from the valve seat to close the second opening.

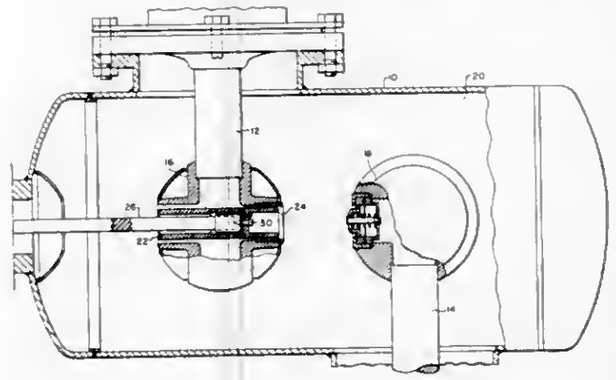
4,029,923

MAGNETIZING CURRENT SWITCH

Jeffry R. Meyer, Pittsburgh, and Sylvester J. Dropik, Jeannette, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 15, 1976, Ser. No. 649,181
Int. Cl.² H01H 1/44
U.S. Cl. 200—163 11 Claims





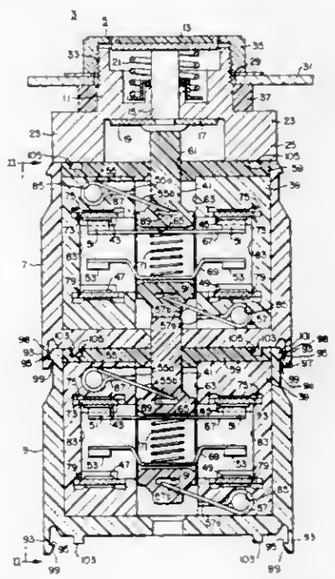
1. A magnetizing current switch comprising:
a sealed housing including two spaced-apart electrical conductors;
a movable contact disposed within said sealed housing and capable of being in two positions, one of said contact positions being in electrical contact with both of said conductors to permit the flow of electric current therebetween, the other of said contact positions being spaced apart from at least one of said conductors to prohibit the flow of electric current therebetween;
a rotatable drive shaft;
turning means for rotating said drive shaft;
drive means, coupled to said drive shaft, for positioning said movable contact, said drive means translating said shaft rotation to a generally straight-line motion; and
a movable insulating rod secured to said movable contact and coupled to said drive means, said straight-line motion of said drive means positioning said movable contact through said insulating rod.

4,029,924

CONTACT BLOCK INTERLOCK FOR ELECTRIC SWITCH

Stanley L. Frank, and Stephen S. Dobrosielski, both of Beaver, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 515,944, Oct. 10, 1974, abandoned. This application Sept. 16, 1975, Ser. No. 613,839
Int. Cl.² H01H 13/00
U.S. Cl. 200—307 1 Claim

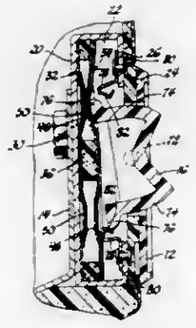


1. An electric switch asembly comprising at least two contact blocks stacked in end-to-end surface abutment and on a longitudinal axis, each contact block having stationary and movable contacts, each block also having movable contact operating means including a guided reciprocable plunger, the plunger in each block being in end-to-end abutment with the plunger of an adjacent block, manual means adjacent to one block and operatively connected to the plunger thereof, interlock means interconnecting adjacent blocks against longitudinal movement and comprising elongated hook-like members on one block detachably engaged with projections on another adjacent block, each reciprocable plunger being biased in a desired position by a pair of springs operatively connected thereto, and each spring having one outturned end portion bearing against the block and having another outturned end portion bearing against the plunger.

4,029,925
ELECTRIC SWITCH

James A. Biske, Sterling Heights, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 5, 1976, Ser. No. 673,637
Int. Cl.² H01H 3/00
U.S. Cl. 200—339 1 Claim



1. In switch apparatus of the type including first and second pairs of contacts in a housing, one contact of each pair being mounted on a sheet of flexible material separated from the other contacts of each pair by resilient means disposed therebetween, the resilient means being adapted to bias both pairs of contacts into disengagement but being locally deformable to allow separate engagement of either of said pairs of contacts; the improvement comprising, in combination:

a rocker member pivotably supported in the housing and adapted for pivotal reciprocation by an external operator between first and second positions, the rocker member having a pair of legs, one of the legs being effective to engage the first pair of contacts and cause engagement thereof in the first position and to withdraw therefrom and allow disengagement thereof by the resilient means in the second position, the other leg being effective to engage the second pair of contacts and cause engagement thereof in the second position and withdraw therefrom and allow disengagement thereof by the resilient means in the first position; and

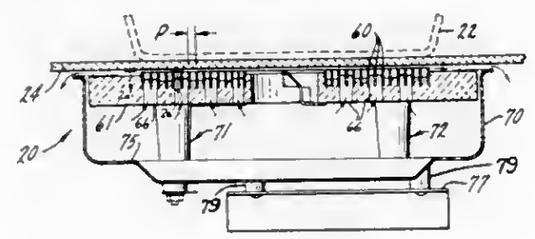
a pair of spring detents in the housing, each spring detent comprising a resilient metallic strip having one end fastened to the housing and another end spaced from the housing for engagement with one of the rocker legs, one of the spring detents being adjacent each of the legs and effective, upon rotation of the rocker member to the position in which the adjacent leg is withdrawn from its associated set of contacts and the other leg is biasing the other set of contacts into engagment, to engage the adjacent leg and thus hold the rocker member in position and the other pair of contacts in engagement against the bias of the resilient means exerted on the other leg.

4,029,926
WORK COIL FOR USE IN AN INDUCTION COOKING APPLIANCE

Buddy Julian Austin, Lafayette, Ind., assignor to Roper Corporation, Kankakee, Ill.

Filed Oct. 29, 1974, Ser. No. 518,773
Int. Cl.² H05B 9/02; H01F 27/28
U.S. Cl. 219—10.49 17 Claims

1. In a solid state induction cooking appliance for producing heat in a metallic utensil by means of an ultrasonic frequency magnetic field, said appliance including a solid state inverter having a resonant circuit comprising a capacitor and inductor, an improved work coil in said appliance for generating the ultrasonic frequency magnetic field and coupling said field to the utensil comprising a solid single strand conductor, said conductorbeing wound in a single layer spiral to form a substantially flat coil, the winding pitch being related to the radial thickness of the conductor by a thickness-to-pitch ratio in the range between 0.3 and 0.7, said work coil being connected as the inductor in said inverter for resonating with said capacitor at an ultrasonic frequency whereby resonant exchange of

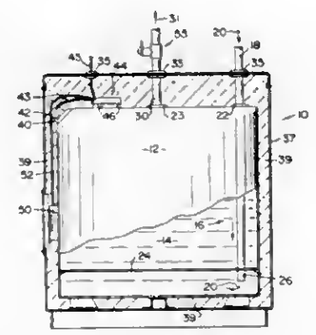


energy between said work coil and capacitor causes said work coil to generate said ultrasonic frequency magnetic field.

4,029,927
MICROWAVE WATER HEATER

Hugh G. McMillan, 2920 Walnut St., Tampa, Fla. 33607

Filed Nov. 28, 1975, Ser. No. 636,117
Int. Cl.² H05B 9/06
U.S. Cl. 219—10.55 R 7 Claims

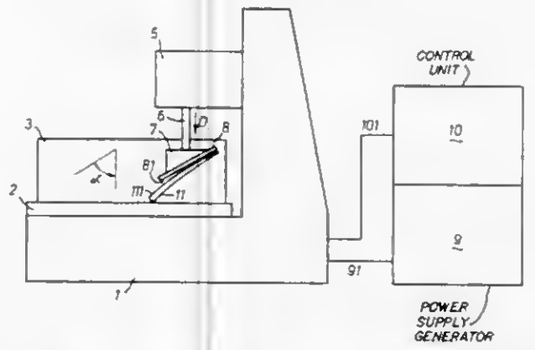


1. A water heater assembly of the type primarily designed for domestic use, said water heater assembly comprising: water storage means including a tank, inlet means interconnected between a water supply and the interior of said tank, outlet means interconnected between the interior of said tank and a desired point of water delivery; insulation means mounted on the exterior of said tank in at least partially surrounding relation thereto; microwave generator means connected to said storage means and disposed to direct wave energy to the water within said tank, regulating means interconnected in current regulating position between a current source and said microwave generator, temperature sensing means mounted on said storage means in temperature sensing disposition relative to the water within said tank and in current regulating relation to said microwave generator; safety means interconnected to said regulating means and disposed in direct heat conducting relation to said tank, so as to sense the temperature thereof; said assembly further comprising distribution means mounted on the interior of said tank, said distribution means comprising a plate element having apertures formed therein and disposed substantially uniformly in said plate so as to define fluid communication therethrough between opposite sides of said plate, said plate element disposed in transverse relation relative to water flow between said inlet means and said outlet means, said plate being configured and disposed to allow water, issuing from said water inlet to pass through said apertures in a dispersed fashion so as to be distributed evenly throughout said tank, whereby wave energy directed to the water from said microwave generator causes temperature increase therein.

4,029,928
ELECTRO-EROSION MACHINE TOOLS

Werner Ullmann, Locarno, and Ferdy E. Hermann, Luzern, both of Switzerland, assignors to A.G. fur industrielle Elektronik AGIE Losone b. Locarno, Losone, Switzerland

Filed Apr. 28, 1975, Ser. No. 572,087
Claims priority, application Switzerland, Sept. 16, 1974, 12550/74
Int. Cl.² B23P 1/08; C25C 7/02
U.S. Cl. 219—69 E 7 Claims



1. An electro-erosion machine tool for machining a multidimensionally curved surface (111) on a workpiece (11), the machine tool comprising

support means (2) for supporting said workpiece;

a tool electrode (3) having an electro-erosion machining face (31) presented to said workpiece (11);

and feed means (5, 6, 7) coupled to said tool electrode (8) to move the machining face (81) thereof relative to the workpiece to advance the tool electrode towards said workpiece;

wherein, in accordance with the invention,

the tool electrode (8) has its machining face (81) inclined at an angle of inclination (c) with respect to the direction of movement (D) of the feed means (5, 6, 7);

the machining face (81) of the tool (8), for a convex surface to be machined, has a larger radius of curvature than the curvature of the curved surface (11) to be machined on said workpiece;

and curve direction movement means (10, 78, 82, 83, 85, 86) are provided to cause, upon feed of the tool electrode at said angle of inclination to simultaneously effect electro-erosive machining, shifting of the tool electrode with respect to the workpiece, and a rolling movement of the machining face (81),

said curve direction movement means comprising a part (78) which is fixed in relation to the said tool electrode (8) and which defines a guide face, and template means (82, 83) which is fixed in relation to said workpiece and which is in engagement with said guide face so as to guide the tool electrode to move in relation to said workpiece along said path.

4,029,929
ELECTRICAL DISCHARGE MACHINING DEVICE FOR CUTTING WITH WIRE ELECTRODE

Frank P. Rietveld, Matthews, N.C., assignor to Colt Industries Operating Corporation, New York, N.Y.

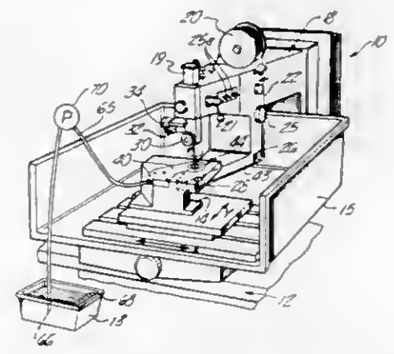
Filed Jan. 27, 1975, Ser. No. 543,989
Int. Cl.² B23P 1/08
U.S. Cl. 219—69 W 9 Claims

1. A wire cutting type electrical discharge machining tool operable to provide an incrementally controlled movement of a wire electrode relative to a workpiece in a cutting operation, and further operable to provide a tapered cut to said workpiece at the same time, wherein the improvement comprises:

a pair of guide rollers for supporting said wire electrode in a cutting path;

a plug having an eccentric opening formed therein for passing said wire electrode therethrough with a degree of eccentricity having a direct relationship to the degree of taper desired for the workpiece opening;

means for supporting said plug intermediate the pair of guide rollers, each roller located proximate a different outer surface of the workpiece; said rollers vertically displaced, one from the other, and the rotative drive of said plug is provided by a fluid driven impeller, said impeller and said plug both being mounted proximate the

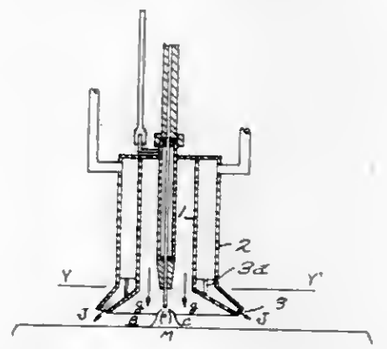


lower of said rollers and intermediate it and said upper roller, said impeller being rotatively driven through an impinging stream of fluid, said fluid and said impeller contained in a chamber, said chamber having a plurality of fluid exit holes proximate its lower surface for allowing a plurality of streams of fluid to exit and provide a continuous wetting for the wire electrode traversing therethrough, whereby the efficiency and uniformity of the cutting action of the wire electrode is greatly improved.

4,029,930
WELDING TORCH FOR UNDERWATER WELDING

Hideo Sagara; Yasuhiro Nishio; Hirokazu Wada, and Yoshinori Hiromoto, all of Hiroshima, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 2, 1973, Ser. No. 384,897
Claims priority, application Japan, Sept. 4, 1972, 47-87934
Int. Cl.² B23K 9/16
U.S. Cl. 219—74 4 Claims



1. A welding torch for underwater welding, comprising:

an inner tubular member having a flaring tip end portion;

an outer tubular member having a flaring tip end portion, radially outwardly spaced from the flaring tip end portion of the inner tubular member to provide an annulus between the inner and outer tubular members and defining an injection nozzel between said flaring tip end portions;

means for supplying welding rod means through the inner tubular member toward a region disposed centrally of the flaring tip end portion of the inner tubular member;

means for supplying a supply of weld-shielding gas to said region;

means for supplying water through said annulus, for flowing radially outwards as a flaring curtain form said injection

nozzle with sufficient force as to prevent water surrounding the torch from invading said region during under water welding,

the flaring of the tip end portion of the inner tubular member bears such relation of degree to the flaring of the tip end portion of the outer tubular member that the transverse cross sectional area of the annulus decreases toward the outer extents of said tip end portions to accelerate the velocity of the water issuing from said annulus;

whereby, when said torch is in use under water with said tip end portions adjacent a member to be welded,

a welding arc may be sustained at said region, with said gas driving water from said region, shielding the welding and escaping radially outwardly across said tip end portions into said curtain of water.

4,029,931

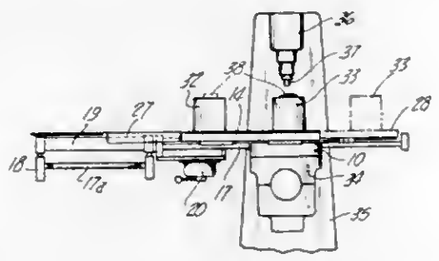
SLIDING TABLE FOR RESISTANCE WELDING

Walter P. Simmons, Birmingham, Mich., assignor to Tuffaloy Products, Inc., Sterling Heights, Mich.

Filed Oct. 31, 1975, Ser. No. 627,504

Int. Cl.² B23K *37/04*; **B21J** *13/08*

U.S. Cl. 219—78 **5 Claims**



1. A sliding, current conducting, work-piece holding, movable table for a resistance welding machine providing reliable conductivity in the welding position and a loading-unloading station spaced from the welding position to eliminate danger of injury to the operator, comprising,

a base mountable on a resistance welding machine below the welding head,

at least two horizontal slide rails lying on and over said base and extending laterally outwardly of said base on at least one side of said base beyond the welding head; each said rail having a bottom portion connected to said base and an upwardly extending top portion;

said top portion of each said rail comprising opposite flat sides lying on opposite angles converging upwardly toward one another,

a table over-lying said slide rails; said table having means forming bottom slide channels partially receiving said top portions of said slide rails,

each said slide channel having opposite flat sides lying on opposite angles converging upwardly into said table;

the angulation of said sides of said slide rails and the angulation of said sides of slide channels being substantially equal to provide a close interfit therebetween to provide a large area of mutual contact to facilitate transfer of welding current:

said table being slidable on said rails between a welding position below a welding head and a loading-unloading position outwardly of a welding head:

said slide rails and said slide channels under the force exerted by the welding head being jammed in substantially solid electrical contact due to their mutual angular interface allowing slight motion toward one another from a slidable to a jammed condition.

4,029,932

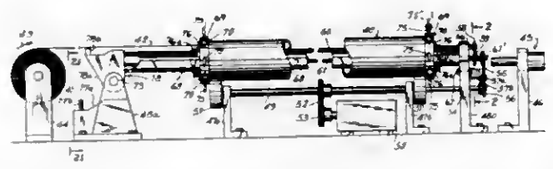
LINED PIPE, AND METHOD AND APPARATUS FOR MAKING SAME

Melvin S. Cook, Saddle River, N.J., assignor to Holobeam, Inc., Paramus, N.J.

Filed May 5, 1975, Ser. No. 574,537

Int. Cl.² B23K *26/00*; **F16L** *9/14*

U.S. Cl. 219—121 LM **88 Claims**



1. Apparatus for lining the inside wall of a pipe comprising means external to said pipe for feeding a continuous strip of lining material into one end of said pipe, means for moving inside said pipe from one end thereof to the other to lay down said strip against the pipe wall, means for controlling relative rotational movement between said pipe and said lay-down means so that said strip is wound against the pipe wall, the relative linear speeds and the relative rotational speeds of said pipe and said lay-down means being such that said strip is laid down against the pipe wall by said lay-down means in a helical shape with continuous overlapping edge regions, and means for welding together said continuous overlapping edge regions.

4,029,933

METHOD OF VERTICAL WELDING OF ALUMINUM AND ALUMINUM ALLOYS

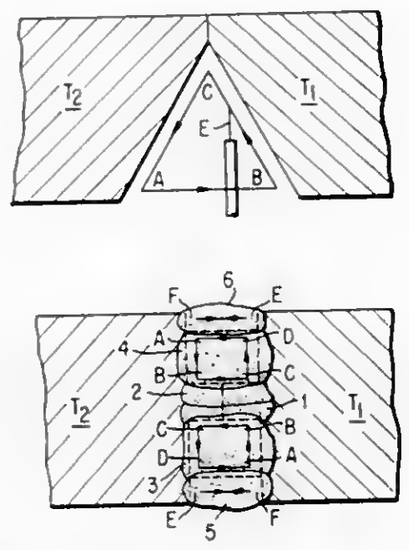
Minoru Oishi; Naoki Okuda, both of Fujisawa; Makoto Tomita, Yokohama; Nobumasa Ohkubo, Yamato; Kazuo Kogane, and Kazuo Yonezawa, both of Kamakura, all of Japan, assignors to Kobe Steel Ltd., Kobe, Japan

Filed Feb. 10, 1975, Ser. No. 548,624

Claims priority, application Japan, Nov. 14, 1974, 49-131728

Int. Cl.² B23K *9/12*

U.S. Cl. 219—126 **7 Claims**



1. A method of vertical welding of aluminum and aluminum alloys comprising:

welding aluminum or an aluminum alloy with at least a base welding current while oscillating in a welding groove an electrode in a closed pattern corresponding substantially to the groove shape,

wherein the welding is conducted by using an additional current higher by 10 to 150 A than said base welding current at least during the course of oscillation of the electrode along the groove face of one of the materials to be welded while the electrode is pursuing courses of oscillation along both the groove faces of the materials to be welded.

4,029,934

WELDING, AND A STEEL SUITABLE FOR USE THEREIN

Allan Clark, Newton Aycliffe, and Philip Robert Kirkwood, Middlesbrough, both of England, assignors to British Steel Corporation, London, England

Continuation of Ser. No. 497,089, Aug. 13, 1974, abandoned. This application Sept. 3, 1976, Ser. No. 720,358

Claims priority, application United Kingdom, Aug. 20, 1973, 39235/73

Int. Cl.² B23K *35/08, 35/22, 35/36*; **C22C** *38/14*

U.S. Cl. 219—145 **8 Claims**

1. A consumable welding wire for a source of filler metal for a weldment, said wire consisting essentially of:

Carbon 0.15% max
Manganese 0.5–1.5%
Silicon 0.03–0.10%
Molybdenum 0.2–0.6%
Aluminum 0.02% max
Titanium 0.03–0.05%
Boron 0.002–0.008%
Sulphur 0.04% max
Phosphorus 0.04% max
Iron and incidental impurities Balance.

4,029,935

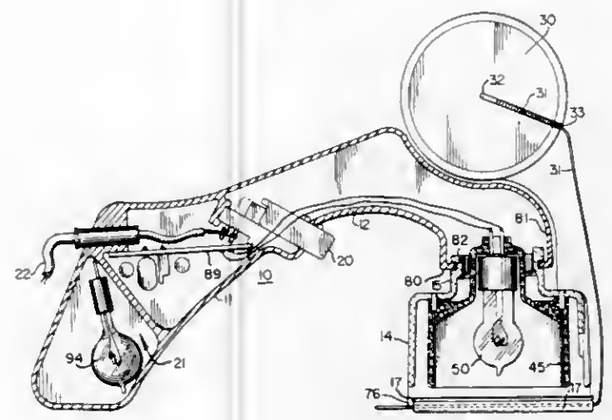
TOOLS FOR APPLYING HEAT IN EDGE BANDING OPERATIONS

Winfield S. Archer, Levittown, and Joseph Trus, Yardley, both of Pa., assignors to Blaine G. Greenwell, Honolulu, Hawaii

Filed May 20, 1975, Ser. No. 579,146

Int. Cl.² H05B *1/00*; **B30B** *15/34*; **D06F** *75/24*

U.S. Cl. 219—228 **10 Claims**



1. A hand held heating tool particularly adapted for accommodating an edge banding operation, wherein a tape having a hot melt adhesive backing is emplaced to cover an exposed edge of a surface of a panel with said tape, comprising:

a. a housing including a handle portion for grasping of the same by a user,

b. a barrel portion rotatably coupled to said housing and having a front section relatively transverse to said handle portion, said front section of said barrel portion having a bottom aperture communicating with an internal hollow within said front section,

c. placement means coupled to said front section of said barrel portion and positioned about the periphery of said aperture,

d. a heat conducting platen dimensioned to cover said aperture and having a top surface including means adapted to coact with said placement means to removably position said platen to cover said aperture, and a bottom surface including a predetermined shaped guide channel for enabling said tool to be moved along said edge to be banded,

e. tape dispensing means coupled to said housing and positioned such that a tape accommodated by said means is directed within said guide channel with said hot melt adhesive backing facing said edge, and

f. radiant heating means located in said hollow of said housing to transfer heat to said top surface of said platen and therefore to said bottom surface by radiation to heat said platen to a temperature sufficient to melt said adhesive, whereby due to said radiation, said platen can be removed and replaced when desired.

4,029,936

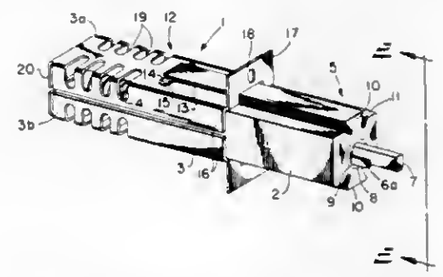
IGNITER ASSEMBLY

Ronald D. Schweitzer, Mansfield, Ohio, assignor to The Tappan Company, Mansfield, Ohio

Filed Jan. 13, 1975, Ser. No. 540,349

Int. Cl.² F23Q *7/00*

U.S. Cl. 219—267 **26 Claims**



1. An igniter assembly, comprising an electric resistance igniter element having relative high and low temperature portions, discrete spaced apart terminal parts connected to the latter portion for connection to a source of electric energy, electrically conductive means for connecting said terminal parts to a source of electric energy for energization of said electric resistance igniter element, an electrically non-conductive holder means for supporting said electric resistance igniter element, said holder means having opposite ends, means for directly mechanically connecting said low temperature portion of said electric resistance igniter element to said holder means proximate one end of the latter, said holder means having interior passageway means for directing said electrically conductive means through said holder means for connection to a source of electric energy, at least a portion of said electric resistance igniter element low temperature portion extending into said interior passageway means of said electrically non-conductive holder means, and shield means secured to said holder means and extending beyond said one end over at least a substantial portion of said electric resistance igniter element high temperature portion for shielding at least a portion of the latter.

4,029,937

CONTROL SYSTEM FOR ELECTRICALLY CONDUCTIVE LIQUID HEATING APPARATUS

Robert G. Russell, 21011 S. Figueroa St., Carson, Calif. 90745

Filed Oct. 4, 1974, Ser. No. 512,093

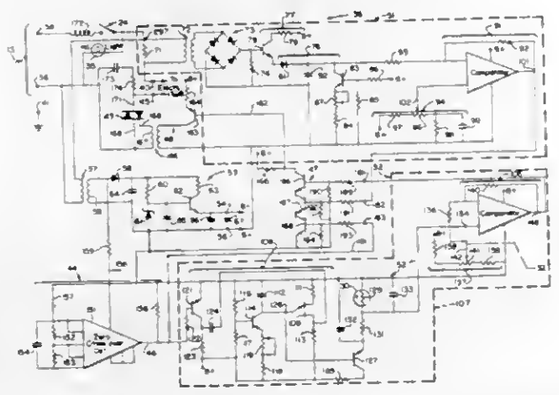
Int. Cl.² H05B *3/60, 1/02*; **F24H** *1/10*

U.S. Cl. 219—295 **7 Claims**

1. Apparatus for controlled heating of a flowing liquid capable of conducting electrical current, comprising:

at least one pair of spaced electrodes disposed to contact said flowing liquid for passing an electrical current therethrough;

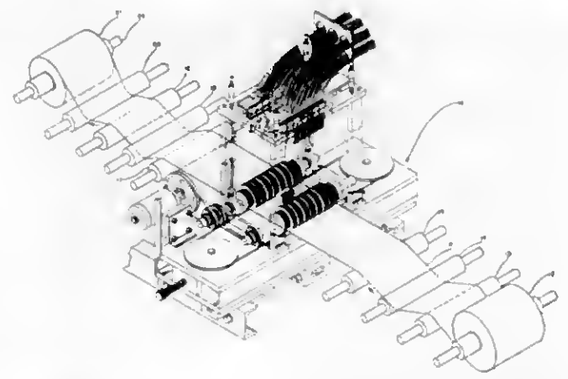
terminal means adapted for connection to a source of alternating current;
triggerable alternating current switching means connected to said terminal means and to said electrodes for selectively connecting said alternating current to said electrodes for passing said electrical current through said liquid;
current sensing means for sensing the magnitude of current flow between said electrodes through said liquid;
temperature sensing and comparing means for sensing the temperature of said liquid after being heated by said current flow and electrically comparing said temperature with a preselected reference temperature; and
logic circuit means having inputs connected to said current sensing means and to said temperature sensing and comparing means and having an output connected to and for controlling said switching means for conditioning said switching means to pass said alternating current to said electrodes only during intervals when said current sensing means senses a current flow below a preselected maximum current and concurrently therewith said temperature sensing and comparing means senses a temperature of said liquid below said preselected reference temperature, whereby an alternating current is passed through the flowing liquid causing a rapid increase in temperature thereof until said preselected reference temperature is attained whereafter said alternating current is applied



intermittently to maintain said preselected reference temperature unless excessive current flow is encountered by reason of increased conductivity of said liquid whereupon said current flow is limited to said maximum current level with a concomitant decrease in the temperature level of the liquid below said preselected reference temperature,
said triggerable alternating current switching means comprising:
a solid state triac device connected in series with said electrodes;
zero crossover detector means adapted for connection to said source of alternating current for issuing a train of electrical pulses representing in time the zero crossing of said alternating current; and
trigger circuit means connected to said triac and to said logic circuit means for receiving said train of electrical pulses for triggering said triac to pass said alternating current to said electrodes for at least one half cycle of said alternating current following each such electrical pulse, whereby said triac is conditioned to pass a minimum quanta of electrical energy consisting of at least one half cycle of said alternating current in response to each pulse signal passed by said logic circuit means in accordance with the inputs thereto from said current sensing means and said temperature sensing and comparing means.

4,029,938
APPARATUS FOR ELECTRICALLY PERFORATING MOVING WEBS

Richard Hugo Martin, Pisgah Forest, N.C., assignor to Olin Corporation, Pisgah Forest, N.C.
Filed Feb. 2, 1976, Ser. No. 654,201
Int. Cl.² H05B *7/18*
U.S. Cl. 219—384 **6 Claims**



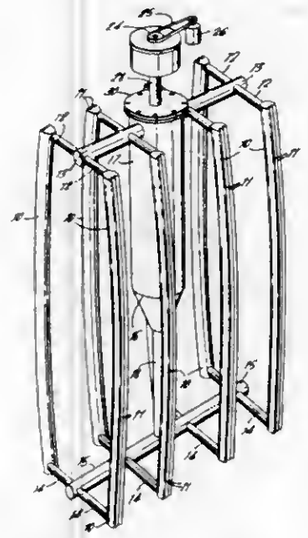
1. Apparatus for perforating a moving web of material by electric discharge comprising:
a. support means;
b. charged circular electrodes comprising a plurality of thin discs of equal diameter rotatably mounted on said support means and aligned axially in spaced relationship to each other, said discs electrically insulated from each other and from said support means;
c. means for rotating said discs on their axis;
d. a narrow ground electrode member mounted on said support means adapted to move at right angles to the direction of rotation of said discs and spaced parallel and in close proximity to the rims of said discs to provide a gap between the rims of said discs and said member;
e. means for moving said ground electrode member;
f. means for advancing a web through said gap; and
g. a pulsed high voltage power source connected to each of said discs providing intermittent charges to said discs and concomitant arcs across the gap between said discs and said ground electrode member, whereby a moving web of material is perforated as it passes through said gap.

4,029,939
APPARATUS FOR HEAT TREATMENT OF STRAND MATERIAL

Walter Parker, Wilmslow, England, assignor to Ernest Scragg & Sons Limited, Macclesfield, England
Filed May 21, 1975, Ser. No. 579,500
Claims priority, application United Kingdom, May 23, 1974, 23007/74
Int. Cl.² F27D *11/00*; **F28D** *15/00*
U.S. Cl. 219—388 **12 Claims**

1. Apparatus for heating strand material comprising two tubular liquid containing manifolds, a plurality of elongate tubular strand heater members each extending between and in

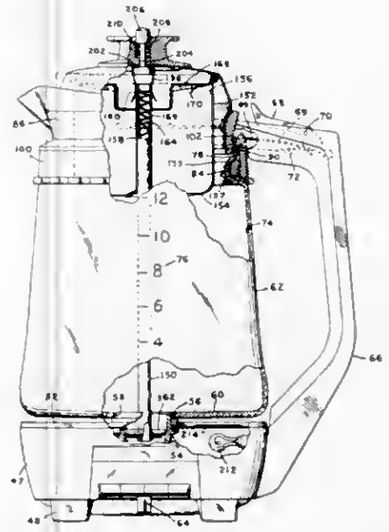
liquid flow connection with the two manifolds, a tubular housing also connected to the two manifolds, a liquid heating unit



and a liquid circulation pump, the heating unit and circulation pump being contained within the tubular housing.

4,029,940
PERCOLATOR

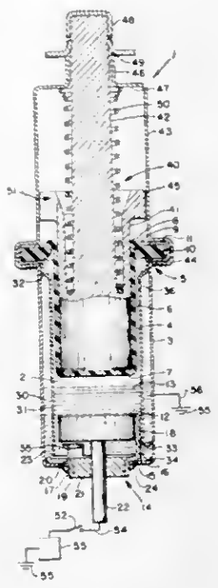
John Littell Eaton, Jr., Delanco, N.J.; Richard Henry Brill, and Walter E. Myers, both of Philadelphia, Pa., assignors to SCM Corporation, New York, N.Y.
Division of Ser. No. 451,336, March 18, 1974, Pat. No. 3,939,760. This application June 9, 1975, Ser. No. 584,795
Int. Cl.² H05B *1/02*
U.S. Cl. 219—506 **4 Claims**



1. An electrical circuit for lighting a lamp in response to the heating mode of an electric appliance comprising:
a pair of power terminals;
a primary heating means;
a secondary impedance means having first and second portions;
a lamp means;
a thermally sensitive switch means;
a first serially connected current loop including one of said power terminals, said thermally sensitive switch means, said primary heating means and said other of said power terminals;
a second serially connected current loop including one of said power terminals, said thermally sensitive switch means said first portion of said second impedance means, said lamp means and said other power terminal;
a third serially connected current loop including one of said power terminals, said thermally sensitive switch means, said second portion of said secondary impedance means, said lamp means and said other of said power terminals;
a fourth serially connected current loop including one of said power terminals, said thermally sensitive switch means, said first and second portions of said secondary impedance means, said primary heating means and the other of said power terminals;
said thermally sensitive switch means operative to conduct current in said first, second and third current loops to provide a high heat mode of operation and operative to conduct current in said third and fourth current loops in response to temperature sensed by said thermally sensitive switch means to provide a low heat mode of operation.

4,029,941
ELECTRIC HEATER ASSEMBLY

Richard G. Huebscher, Cleveland; Ronald S. Sobecks, Seven Hills, and Joseph A. Birli, Richmond Heights, all of Ohio, assignors to Gould Inc., Chicago, Ill.
Division of Ser. No. 623,669, Oct. 20, 1975, Pat. No. 3,991,572. This application Apr. 22, 1976, Ser. No. 679,460
Int. Cl.² H05B *1/02*
U.S. Cl. 219—511 **9 Claims**

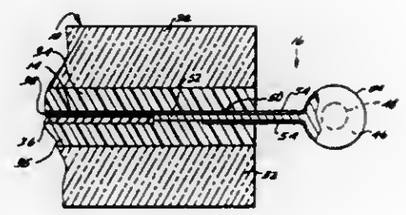


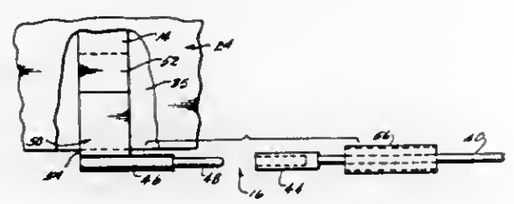
1. An electric heater assembly for a thermal actuator or the like having a substantially sealed chamber at least partially defined in a casing and thermally expansible material in said chamber, comprising an electrically conductive holder positionable in an opening through said casing and securable in sealed engagement with said casing, said holder having a generally central opening and an integral upstanding tab positioned to extend toward the interior of said chamber, an electrically conductive stud extending through said central opening, electrically non-conductive means for sealing said central opening with said stud securely positioned therein in electrically isolated relation with respect to said holder, and electric heater means for heating said material, said electric heater means being coupled to said tab and to said stud for mechanical support thereby and for electric energization thereof.

4,029,942
TRANSPARENT PRELAMINATE WITH ELECTRICAL CONNECTORS

Berton P. Levin, Santa Monica, Calif., assignor to The Sierracin Corporation, Sylmar, Calif.

Filed Aug. 27, 1975, Ser. No. 608,091
Int. Cl.² H05B *3/06*
U.S. Cl. 219—522 **15 Claims**





1. A prelaminate for a laminated electrically heatable window comprising:

a transparent sheet-like carrier film having a cut-out section adjacent an edge of the prelaminate,

an electrically resistive heating layer on a surface of the carrier film,

transparent, flexible, electrically insulated layers bonded to opposite surfaces of the carrier film, one of said insulated layers overlaying the electrically resistive heating layer,

a pair of conductive bus bars embedded between the electrically resistive heating layer and the insulated layer overlaying the electrically resistive heating layer,

a separate electrically conductive tab in electrical contact with each bus bar, each tab being disposed in a corresponding cut-out portion of the embedded carrier film, each tab also projecting outside the prelaminate away from an edge of the prelaminate, the electrically insulated layers overlaying and being bonded to the portions of the bus bars disposed in the cut-out sections of the carrier film,

separate electrical connectors on the remote ends of each tab outside the edge of the prelaminate, each electrical connector having an electrical contact for forming a cooperating electrically conductive pin-and-socket connection with a complementary electrical contact, and

means electrically insulating the portion of each tab extending outside the edge of the prelaminate and at least a portion of each tab bonded to the insulated layers.

4,029,943
METHOD AND APPARATUS FOR OPINION SURVEYS

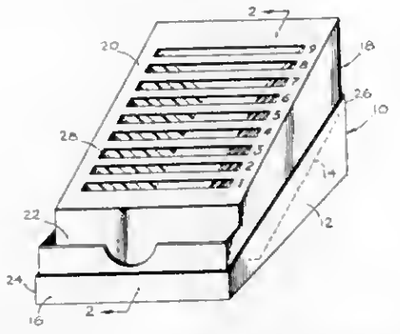
Henry Rodriguez, 8834 Saturn St., Los Angeles, Calif. 90035

Filed Dec. 12, 1975, Ser. No. 640,079
Int. Cl.² G07C *13/02*
U.S. Cl. 235—57 **5 Claims**

1. A polling box for use in poll-taking on issues having a scale of human responses thereto which lies over a range from agreement to disagreement, including:

a base portion having a front wall and a floor supported in said base portion and sloping downwardly toward said front wall, and,

a superstructure removable as a unit and sized to nest within said base portion and having a polling-scale surface sloped similarly to said floor in said base portion, said polling-scale surface having a plurality of slots therein adapted to receive cards bearing thereon recitations of

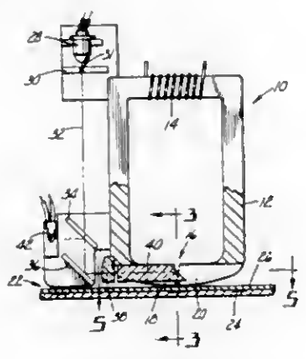


specific issues on which poll-taking is being conducted, each of said slots bearing a gradation identifier which lies in a progressive series of identifiers from the first of said slots to the last thereof, and each of said slots having separator means depending from opposite ends thereof for holding open removable envelopes placed beneath each of said slots to receive said cards.

4,029,944
DATA TRANSDUCER

Robert H. Trenkamp, Cleveland Heights, Ohio, assignor to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed Apr. 7, 1976, Ser. No. 674,562
Int. Cl.² G06K *7/08, 7/10, 9/00*; **G11R** *5/12*
U.S. Cl. 235—61.11 D **13 Claims**



1. A data transducer for use with a data bearing member comprising:

a magnetic transducer having a core with a pair of spaced, oppositely disposed magnetic pole pieces, a narrow gap between said pole pieces, said gap defining a pair of spaced magnetic reluctance apertures, and an optical reading aperture disposed between said spaced magnetic reluctance apertures,

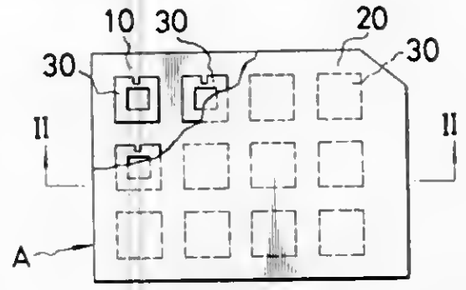
optical means including means for directing radiant energy along an optical path which extends through at least one of said pole pieces and through said optical reading aperture, and

radiant energy sensing means for providing signals in response to exposure to said radiant energy under predetermined conditions.

4,029,945
CARD AND CARD READER APPARATUS THEREFOR

Siyouhachi Yamada, Machida, and Reigi Nakatsubo, Tokyo, both of Japan, assignors to Stanley Electric Co., Ltd., Tokyo, Japan

Filed Aug. 27, 1975, Ser. No. 608,269
Int. Cl.² G06K *7/08, 19/06*
U.S. Cl. 235—61.12 N **13 Claims**



1. A card for storing encoded information, comprising:

a first opaque, non-magnetic sheet having a fixed form;

at least one closed-loop code storing medium of conductive material disposed at a given position on said first opaque sheet and having a constricted portion at a portion of the loop thereof, the surfaces of said at least one closed-loop storing medium being divided into at least two portions, each portion bordering the respective constricted portions thereof;

at least one open-loop code storing medium of conductive material and having substantially the same general shape as said at least one closed-loop code storing medium and cut at the constricted portion thereof, the surfaces of said at least one closed-loop code storing medium being divided into at least two portions, each portion bordering the respective constricted portion thereof; and

a second opaque, non-magnetic sheet covering said closed-loop and open-loop code storing mediums and being adhered at least to said first sheet with said code storing mediums interposed and sealed between said first and second opaque sheets;

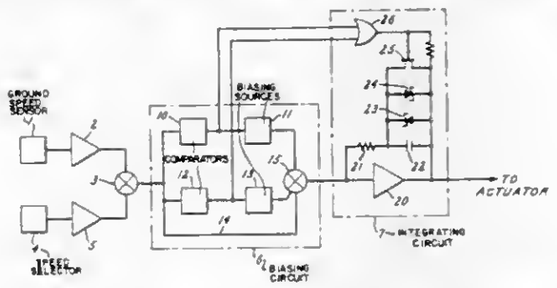
one of said portions on one side of at least one of said code storing mediums being adhered to said first opaque sheet, and the opposite surface of the other of said portions thereof being adhered to said second opaque sheet, whereby said at least one of said code storing mediums is broken at the respective constricted portions when said first and second opaque sheets are pulled apart.

4,029,946
SPEED CONTROL DEVICE FOR MOVING OBJECTS

Milton I. Gerstine, Wilmington, Del.; Setsuo Futatsugi, Kogamigahara; Kazuo Ueda, Kogamigahara; Ryozo Seo, Kogamigahara; Koji Iwasaki, Kogamigahara, and Makoto Uemura, Kogamigahara, all of Japan, assignors to The Boeing Company, Seattle, Wash. and Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan

Filed Nov. 24, 1975, Ser. No. 634,384
Claims priority, application Japan, Nov. 22, 1974, 49-134514
Int. Cl.² G06G *7/78*
U.S. Cl. 235—150.2 **5 Claims**

1. A speed control device for moving objects comprising speed detecting means for detecting the actual speed of a moving object and generating a speed signal, speed setting means for generating a set speed signal corresponding to a desired set speed, adding means receiving said actual speed signal and said set speed signal and generating a difference signal corresponding to the difference therebetween, biasing circuit means for adding a bias signal to said difference signal when said difference signal exceeds a predetermined value, resulting thereby in a control signal, and integrating circuit means including means for receiving said control signal and outputting said control signal unaltered, and additional means which together with said means for receiving serve to integrate said difference signal when said difference signal is below said

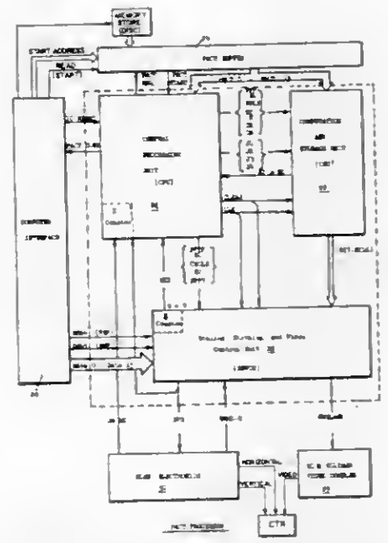


predetermined value, whereby speed control of the moving object is performed by the control signal and the difference signal.

4,029,947
CHARACTER GENERATING METHOD AND SYSTEM

Gregory W. Evans, Santa Ana, and Robert L. Caswell, Placentia, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed May 11, 1973, Ser. No. 359,591
Int. Cl.² G06F *3/14*
U.S. Cl. 235—151 **47 Claims**



1. A character generator for generating characters encoded in accordance with a normalized quad of X Y coordinates wherein each successive X coordinate value corresponds to a computation cycle, each character being encoded in a succession of data instructions related to outlines of the character segments and including a beginning line instruction identifying the initial Y coordinate of each of a related pair of outlines, outline change instructions specifying variously fixed and variable directions of outline, and termination of an outline pair, and an instruction designating the end of a character, each change instruction including an identification of the outline to which it relates, and a number designating the computation cycles to a subsequent instruction,

means responsive to a beginning line instruction to identify an initial pair of outlines and to store in relation thereto their respective Y coordinates,

means responsive to a change instruction for a related outline, as identified and stored, for computing, in each successive computation cycle, a new Y coordinate value for each identified outline in accordance with its associated change instruction, said means maintaining a stored Y coordinate value for an outline for which there is no change instruction,

means for updating the Y coordinate values in said storing means in accordance with the computed new value thereof, as computed in each computation cycle, and

means responsive to the encoded computation cycle number of each successive change instruction to request and receive the next successive instruction for the character upon completion of the encoded number of computation cycles of a present instruction.

4,029,948

RADIOGRAPHY

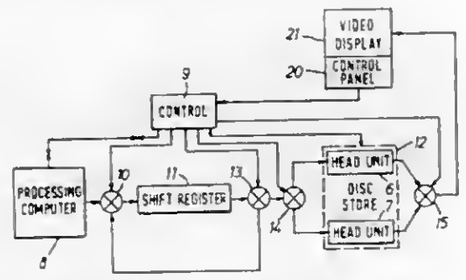
Godfrey Newbold Hounsfield, Newark, England, assignor to E M I Limited, Hayes, England

Filed July 10, 1975, Ser. No. 594,786

Claims priority, application United Kingdom, July 11, 1974, 30712/74

Int. Cl.² G01N *23/06*; **G01T** *1/166*

U.S. Cl. 235—151.3 **5 Claims**



1. Apparatus for displaying a representation of body sections for use, for example, in diagnostic X-ray apparatus including storage means for storing data signals representing the absorption coefficient of elements of two-dimensional spaced arrays of elements notionally delineated in respective spaced cross-sections of the body, means providing weighting functions, means for weighting data for corresponding elements of said first mentioned arrays with appropriate weighting functions to provide interpolated data signals according to predetermined interpolating functions said interpolated data signals representing coefficients for corresponding elements of another array of elements notionally delineated in another cross-section of said body intermediate the first mentioned body section and means for displaying a repesentation of any of said body sections.

4,029,949

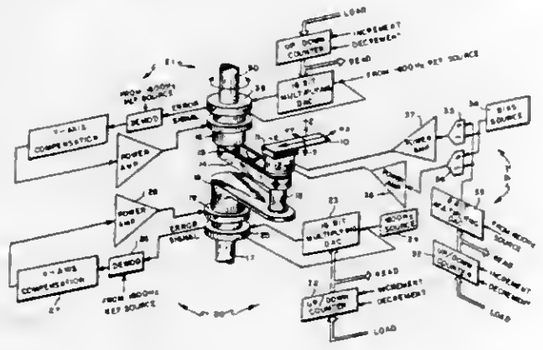
SERVO-CONTROLLED MICROSCOPE STAGE

Brock S. Dew, Newton, Mass., assignor to The Charles Stark Draper Laboratory, Inc., Cambridge, Mass.

Filed July 8, 1975, Ser. No. 593,999

Int. Cl.² G06J *1/00*; **G05B** *19/42, 19/34*

U.S. Cl. 235—151.11 **9 Claims**



1. An apparatus for controlling the position of a movable element comprising

means for holding said movable element, said holding means being capable of movement in at least two substantially orthogonal directions;

first and second positioning means for moving said holding means along first and second ones of said at least two orthogonal directions, respectively, each of said first and second means comprising

means for supplying a digital command signal representing a selected position along an arcuate path substantially corresponding to one of said at least two orthogonal directions;

means for providing a reference signal;

a high resolution digital-to-analog converter means responsive to said digital position command signal and to said reference signal for converting said digital position command signal to an analog position command signal, and

servo control means responsive to said analog position command signal and to said reference signal for directly moving said holding means along said arcuate path to said selected position.

4,029,950

NUMERICAL CONTROL SYSTEM FOR MACHINES UTILIZING A PROGRAMMABLE SEQUENCE CONTROLLER

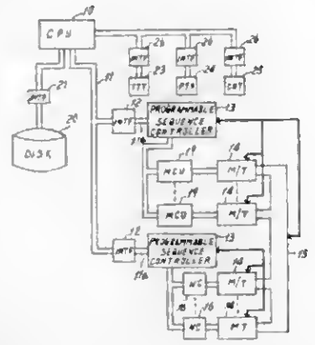
Kyosuke Haga, Anjo, Japan, assignor to Toyoda-Koki Kabushiki Kaisha, Japan

Filed Apr. 22, 1976, Ser. No. 679,450

Claims priority, application Japan, May 9, 1975, 50-55791

Int. Cl.² G05B *19/28*

U.S. Cl. 235—151.11 **20 Claims**



1. A machine control system comprising in combination;

a plurality of numerically controlled machines;

a plurality of machine controllers respectively connected with said machines for controlling the operations of said machines in accordance with numerical control data;

a digital computer provided with a memory device for storing said numerical control data and adapted to convert each of the least units of said numerical control data to a predetermined number of set and reset commands;

a programmable sequence controller comprising:

a. an input-output circuit provided with a plurality of addressable input and output terminals, a predetermined number of said output terminals being addressed respectively to data input terminals of said machine controllers,

b. a program memory device for containing a predetermined sequence control program,

c. register means connected with said digital computer for receiving from said digital computer said set and reset commands along with address codes designating said predetermining number of said terminals, and

d. a logic control circuit adapted to set or reset one of said output terminals as a result of examining the signal conditions of said input terminals in accordance with said sequence control program and to set or reset said output terminals addressed to said data input terminals when said set and reset commands and said address codes are supplied from said register means, whereby said programmable sequence controller is operable as a data transmitter for said numerical control data between said digital computer and said machine controllers.

4,029,951

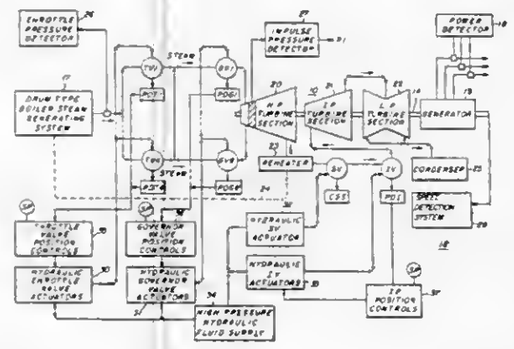
TURBINE POWER PLANT AUTOMATIC CONTROL SYSTEM

William R. Berry, Camden; Charles L. Groves, Jr., Willingboro, both of N.J., and Eddie Y. Hwang, Wallingford, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 21, 1975, Ser. No. 625,625

Int. Cl.² F01D *19/00*

U.S. Cl. 235—151.21 **16 Claims**



1. An electric power generating system, comprising:

a steam turbine having a high pressure section and a reheat turbine section;

an electric generator rotated by said turbine to produce electric power when connected to a load;

steam inlet valve means to govern the flow of steam to the turbine;

means to detect the temperature of the steam at predetermined locations within the steam turbine;

means to detect the temperature of stationary turbine metallic parts at predetermined locations within the steam turbine;

means governed by the detection means to generate data relating to thermal stress of the high pressure and reheat turbine rotors;

means governed by the detection means to generate data relating to temperature adjacent the axis of the reheat turbine rotor;

means to generate a signal governing the acceleration of the turbine in accordance with the generated data relating to thermal stress;

means governed by the generated data relating to the reheat rotor temperature to generate a signal governing the turbine to hold its speed at a predetermined speed at times when the generated data relating to the reheat temperature is below a predetermined value irrespective of the generated data relating to thermal stress; and

means governed by the generated hold signal and the acceleration rate signal to control the steam inlet valves to govern the flow of steam to the turbine.

4,029,952

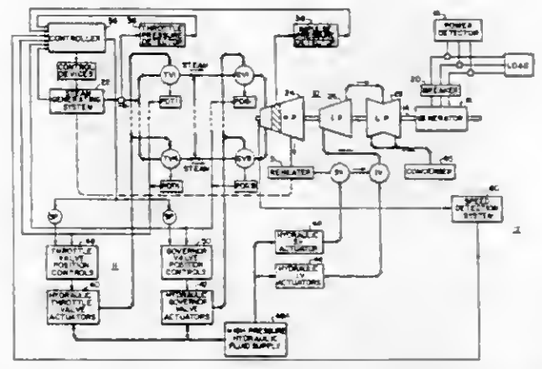
ELECTRIC POWER PLANT HAVING A MULTIPLE COMPUTER SYSTEM FOR REDUNDANT CONTROL OF TURBINE AND STEAM GENERATOR OPERATION

Theodore C. Giras, Pittsburgh; William E. Mendez, Jr., Murrysville, and Jack R. Smith, Pittsburgh, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 6, 1973, Ser. No. 413,275

Int. Cl.² F01D *17/02*; **G05B** *15/00*; **G06F** *15/06*

U.S. Cl. 235—151.21 **32 Claims**



1. A control system for an electric power plant having at least one steam turbine and a steam generator, said control system comprising multiple digital computers including at least a first digital computer and a second digital computer, means for generating input signals representing predetermined process variables associated with said steam generator, means for generating input signals representing predetermined process variables associated with said steam turbine, means for coupling the input signals to both of said computers, each of said computers including means for sequentially controlling its programmed operation and substantially identical means for generating control outputs for operating controllable elements of said steam generator and throttle and governor valves of said steam turbine as a function of the input signals, means for sensing predetermined control system malfunctions, means for coupling the outputs of one of said computers to operate the steam generator controllable elements and turbine valves, means for substantially conforming the structure of the other computer to the structure of said one computer in real time including means for generating control outputs in the other computer substantially equal to those from said one computer, means for generating in said other computer representations of predetermined variables stored in said one computer and normally undetectable from the control outputs of said one computer and subject to change as a result of internal operations of said one computer or as a result of responses to input signals entered only into said one computer even though such signals normally are entered into both computers, and means for executing a transfer in the control of the steam generator and the turbine from said one computer to said other computer substantially without disturbing the power generation when said sensing means detects a control system malfunction.

4,029,953

TWIST-LOCK LAMP SOCKET LOCKING MEANS

Richard A. Natoli, Girard, Ohio, assignor to General Motors Corporation, Detroit, Mich.

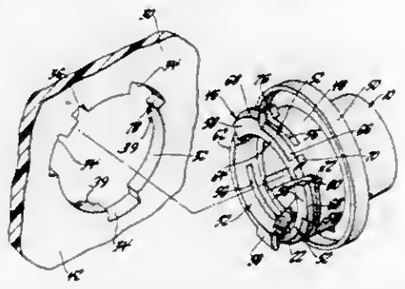
Filed Sept. 22, 1975, Ser. No. 615,236

Int. Cl.² B60Q *3/04*; **F21V** *21/08*; **H02B** *1/02*

U.S. Cl. 240—8.16 **3 Claims**

1. A lamp socket assembly comprising a socket support panel having a socket opening therein with a plurality of circumferentially spaced, radially outwardly directed retention slots, a socket having a plurality of circumferentially spaced integrally formed cantilevered beams formed on one end thereof, each of said beams having a root potion secured to said socket and a circumferentially directed arcuate seg-

ment extending from said root portion and being longitudinally flexible with respect to said socket, each of said beams including a radially outwardly directed surface congruent to said retention slots for guided axial alignment therewith, said beams being freely axially movable in guided relationship with respect to said slots for locating said socket on said panel, each of said beams having a free end portion thereon with a ramp formed thereon, first coacting means on said panel and said ramps for causing said free end portions to flex across and



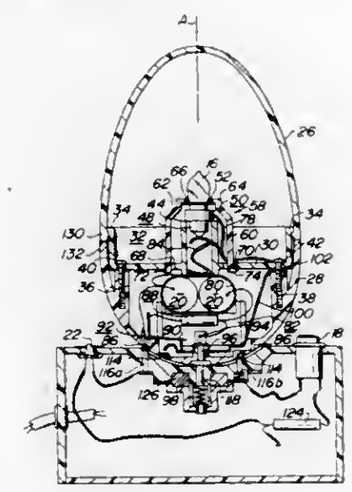
engage said panel to audibly indicate rotation of said socket from its axially inserted position within said panel to a retained position wherein said free end portions are arcuately shifted out of axial alignment with said slots, second coacting means on said socket and said panel to establish a rotatably indexed position of said socket with respect to said panel, said beams applying an axial retention bias between said socket and said panel when in the indexed position thereby to tightly hold said socket against vibrations with respect to said panel.

4,029,954

PORTABLE LAMP

John N. Moyer, Penns Park, Pa., assignor to HMS Associates, Inc., Willow Grove, Pa.

Filed Nov. 10, 1975, Ser. No. 630,233
Int. Cl.² F21L 7/00
U.S. Cl. 240—10.6 CH 15 Claims



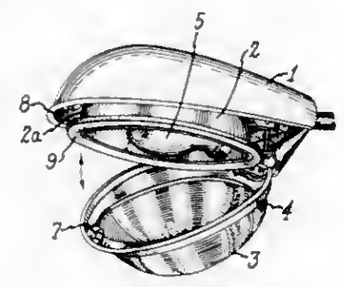
1. A portable lamp, comprising:
a lamp enclosure;
a base for supporting said lamp enclosure, said base including a plug connectable to a power source;
a lamp and one or more batteries connected thereto within said lamp enclosure;
means for recharging said batteries when said lamp enclosure is mounted on said base at an angular orientation about an axis transverse to said base; and
means for automatically energizing said lamp when said lamp enclosure is removed from said base independently of the connection of a power source to said plug.

4,029,955

LUMINAIRE FILTER MATERIAL

David K. Tart, Lenox, Mass., assignor to General Electric Company, New York, N.Y.

Division of Ser. No. 440,698, Feb. 8, 1974, abandoned. This application May 9, 1975, Ser. No. 575,991
Int. Cl.² F21S 13/10; B01D 39/00
U.S. Cl. 240—25 4 Claims



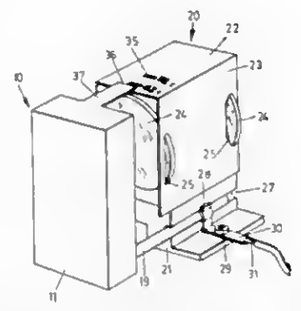
1. In a luminaire, an optical system comprising a reflector and a light transmitting closure defining a closed optical enclosure, means for mounting a lamp in said enclosure, and air-permeable, gas adsorbent filter means arranged on said optical enclosure communicating with the interior thereof for filtering air passing thereinto by removal of solid and gas impurities contained in the air, said filter means comprising a compressible composite felt comprising intermingled first and second fiber materials, said first fiber material composed of a high temperature resistant material, and said second fiber material comprising an organic material and being substantially carbonized, whereby said composite felt is adsorptive of gaseous and particulate contaminants in the air.

4,029,956

LIGHT FIXTURE FOR PROJECTION DEVICE

Max Leibundgut, Wadenswil, and Tony Reber, Zurich, both of Switzerland, assignors to Alos AG, Zurich, Switzerland

Filed Mar. 24, 1976, Ser. No. 670,021
Claims priority, application Switzerland, Mar. 24, 1975, 3714/75
Int. Cl.² F21V 7/09
U.S. Cl. 240—41.37 6 Claims



1. A light fixture for projection devices, including an electric light bulb serving as a light source, a bulb socket for holding and providing an electrical connection of the light bulb, a concave mirror serving as a reflector, and an optical condenser system including a condenser unit having an electric terminal, whereby the bulb socket and the concave mirror are combined into a first constructional unit, hereinafter referred to as a lamp unit, that is detachably connected with a second constructional unit containing the optical condenser system, and whereby the bulb is movable for the purpose of centering its filament coil in relation to the concave mirror, and the condenser unit is designed for stationary mounting in a projection device, while the lamp unit is only supported by the condenser unit, characterized in that connecting elements are provided to effect a mechanical connection of the lamp unit to the condenser unit as well as to effect an electrical

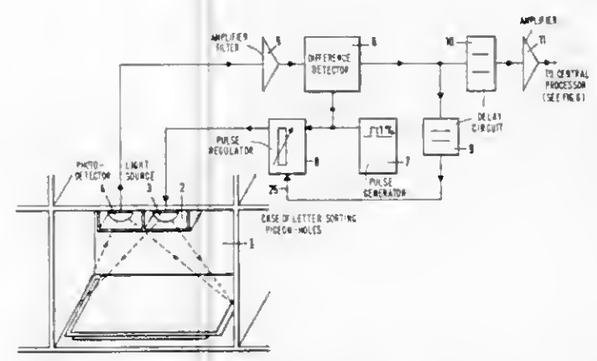
connection between the bulb socket of the lamp unit and the terminal in the condenser unit, the connecting elements being secured to one of the two constructional units and extending parallel to the optical axis of the light fixture, the other of the constructional units having guide grooves with which the connecting elements engage, and sliding contact elements on the other of the constructional units in contact with the connecting elements, whereby the connection elements are sufficiently long that the lamp unit can be adjusted as desired at various distances from the optical condenser system in the condenser unit, thereby making it possible to adjust the light fixture to various lens focal lengths of the projection device.

4,029,957

DETECTION DEVICE

Frans Betz; Jacobus Johannes de Haas, both of Leidschendam, and Petrus Cornelis van der Kraan, Zoetermeer, all of Netherlands, assignors to De Staat der Nederlanden, te Dezen Vertegenwoordigd Door de Directeur-Generaal der Posterijen, Telegrafie en Telefonie, The Hague, Netherlands

Filed Oct. 8, 1975, Ser. No. 620,638
Claims priority, application Netherlands, Oct. 9, 1974, 7413282
Int. Cl.² G01D 21/04
U.S. Cl. 250—221 16 Claims



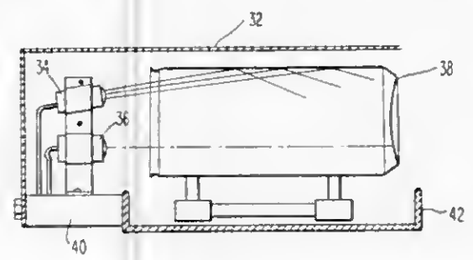
1. Detection device for detecting movements by means of a source of light and a photo-detector, characterized by a pulse generator for repeatedly supplying the source of light with energy to light it during a relatively short period of time compared to the time between repetitions of pulses from said generator, and by a comparator, synchronized with said pulse generator and connected to said photo-detector responsive to light from said light source for comparing each signal received from the photo-detector with the preceding signal received therefrom during the said time and for producing a third signal in case there is a difference between said received signal and said preceding signal.

4,029,958

APPARATUS FOR INSPECTING CONTAINERS

George W. Wright, Willingboro, N.J., assignor to Crown Cork & Seal Company, Inc., Philadelphia, Pa.

Filed July 25, 1975, Ser. No. 599,070
Int. Cl.² B07C 5/344; G01D 21/004
U.S. Cl. 250—223 B 12 Claims



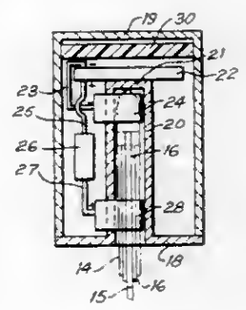
1. Inspection apparatus for detecting the substantial absence of a coating within a cylindrical metal container having one closed axial end, comprising:
means for transporting containers to be inspected along a path;
a source of substantially diffuse light disposed adjacent said path for directing diffused light toward a locus upon the cylindrical sidewall of a container to be inspected;
photosensor means disposed adjacent said path and adjacent said light source, said photosensor being directed axially within and toward the closed end of said container and outputting a signal indicative of a substantial absence of coating upon the total inner surface area of said container; and
discharge means coupled to said photosensor means and responsive to said signal for discharging said container from said path.

4,029,959

PLANT LIGHT SENSOR ADAPTOR

Hugh Cottingham, Upper Montclair, and Joseph Scrocco, West Orange, both of N.J., assignors to BHN, Inc., Upper Montclair, N.J.

Filed Feb. 13, 1976, Ser. No. 658,140
Int. Cl.² H01J 5/02, 39/12
U.S. Cl. 250—239 7 Claims



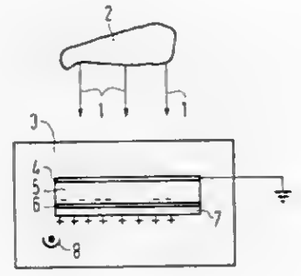
1. A plant light sensor adaptor for use with moisture monitoring means having a coaxially formed probe including first and second metal eletrode means, and indicating means for sensing and indicating current flow due to electro-galvanic response produced by the difference in the redox potential in the first and second metal electrode means, said current flow being controlled by the moisture content of the substrate material under test, comprising in combination, a reference member including receiving means for receiving said probe, said receiving means including first and second spaced apart electrically isolated contact means, said receiving means being configured to dispose said probe at a predetermined position to dispose said first and second contact means in electrical contact with said first and second metal electrode means when said probe is inserted into said receiving means, and photosensitive means coupled to said respective first and second spaced apart electrically isolated contact means, said photosensitive means being adapted to detect the luminous flux incident thereon, and in response thereto apply through said respective first contact and metal electrode means and through said respective second contact and metal electrode means a current signal representative of the luminous flux whereby said indicating means senses and indicates the luminous flux detected by the photosensitive means.

4,029,960

DEVICE FOR THE RECORDING AND REPRODUCTION OF X-RAY PICTURES

Dietlind Pekau, Taufkirchen, and Eckhard Storck, Munich, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sept. 4, 1975, Ser. No. 610,161
Claims priority, application Germany, Sept. 6, 1974, 2442808
Int. Cl.² G03G 13/00, 15/00
U.S. Cl. 250—315 R 9 Claims



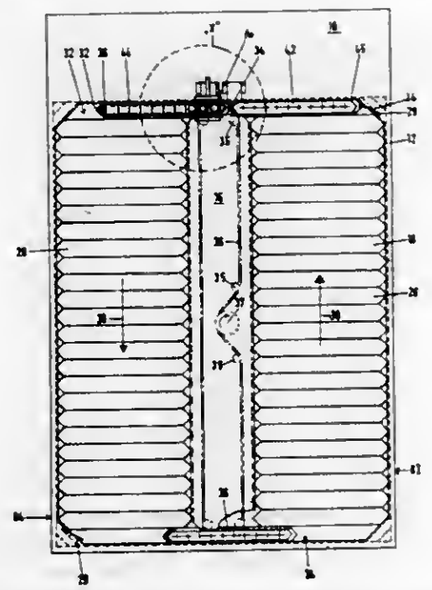
1. In a device for the recording and reproduction of X-ray pictures, the combination of a layer of amorphous selenium disposed in a housing, the selenium layer being carried by a thermoplastic disposed at one side of the selenium layer, an electrode disposed at the other side of the selenium layer on the free surface thereof, at which side the X-rays impact the device, an additional dielectric layer disposed between said selenium layer and said thermoplastic layer, forming a dielectric reflector, and a movable corona-charge electrode disposed adjacent the thermoplastic layer for charging the free surface of the latter.

4,029,961

APPARATUS FOR MEASURING THE NUCLEAR RADIATION OF A SEQUENCE OF RADIOACTIVE SAMPLES

Wilhelm Lohr, Reichertsklinge 11, D-7547 Wildbad; Fritz Berthold, Engelsbrander Strasse 12, D-754 Neuenburg, both of Germany, and Robert W. Allington, 1551 Ridgeway Road, Lincoln, Nebr. 68522

Filed Apr. 11, 1975, Ser. No. 567,436
Int. Cl.² G01T 1/00
U.S. Cl. 250—328 26 Claims



1. An apparatus for measuring the nuclear radiation of a sequence of radioactive samples in sample containers which are held in groups with each group held in a different magazine comprising:

a measuring station having a working place and a measuring place;

transporting means for moving the magazines in a horizontal direction and placing the sample containers in said magazines one-at-a-time at a working place;

said measuring station including means for measuring the nuclear radiation in said measuring place;

said measuring place vertically displaced below the working place;

transfer means for conveying the sample container in a magazine at the working place to the measuring place and returning it to the magazine at the working place after the nuclear radiation of the sample in the sample container has been measured;

each of said magazines including a receiving means for holding and releasing each individual sample container in the magazine; and

control means for operating the receiving means to release a sample container when the sample container is at the working place

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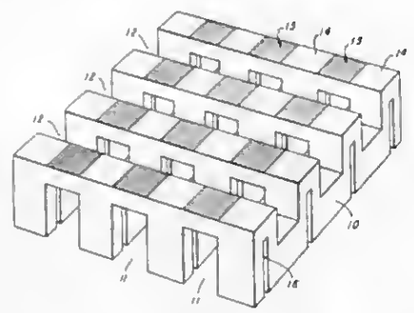
4,029,962

ARRAYS FOR INFRARED IMAGE DETECTION

Richard Alexander Chapman, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed June 23, 1975, Ser. No. 589,104
Int. Cl.² G01J 1/00
U.S. Cl. 250—338 21 Claims



1. A monolithic infrared detector array comprising:

a block of monocrystalline semiconductor material taken from the group consisting of silicon and germanium, said block of semiconductor material being doped with an infrared-sensitive conductivity-determining impurity and having first and second pluralities of parallel slots respectively formed in the opposite major surfaces thereof,

said first plurality of parallel slots formed in one major surface of said semiconductor block being orthogonally related to said second plurality of parallel slots formed in the other major surface of said semiconductor block,

a third plurality of parallel slots formed in said other major surface of said semiconductor block, said third plurality of parallel slots being parallel to said first plurality of parallel slots formed in said one major surface of said semiconductor block and being orthogonally related to and intersecting with said second plurality of parallel slots formed in said other major surface thereof,

said third plurality of parallel slots defining respective holes extending into the semiconductor material of said semiconductor block from said other major surface thereof toward said one major surface thereof,

a patterned metal layer opaque to infrared radiation overlying said one major surface of said semiconductor block and including a plurality of interrupted metal strips extending over the semiconductor material of said semiconductor block between successive slots formed therein;

a plurality of semiconductor regions of said one major surface of said semiconductor block including exposed areas arranged in a plurality of linear rows across said plurality of metal strips and forming the interruptions therein,

the exposed areas of said plurality of semiconductor regions communicating with respective portions of said semiconductor block disposed therebeneath and defining active infrared detector areas, said active infrared detector areas respectively including said holes as defined by said third plurality of parallel slots formed in said other major surface of said semiconductor block,

said plurality of semiconductor regions respectively including portions thereof contacting the metal strip segments on opposite sides of the exposed areas of said plurality of semiconductor regions,

insulation means interposed between the remaining portions of said patterned metal layer and said one major surface of said semiconductor block, and

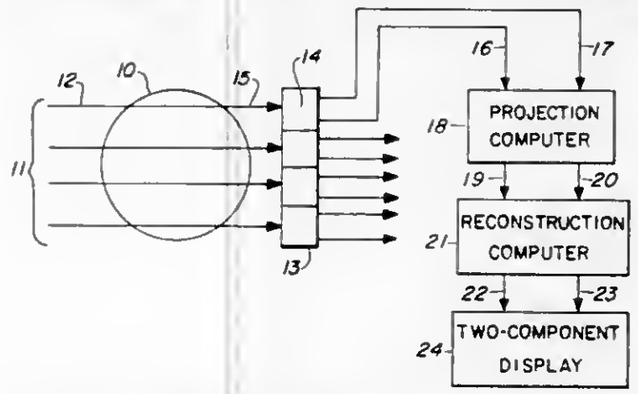
means associated with said holes providing electrically conductive areas in communication with said active infrared detector areas and said other major surface of said semiconductor block.

4,029,963

X-RAY SPECTRAL DECOMPOSITION IMAGING SYSTEM

Robert E. Alvarez, Stanford, and Albert Macovski, Palo Alto, both of Calif., assignors to The Board of Trustees of Leland Stanford Junior University, Stanford, Calif.

Filed July 30, 1976, Ser. No. 710,359
Int. Cl.² A61B 6/02; G01N 23/08; H05G 1/30
U.S. Cl. 250—360 22 Claims



1. Apparatus for providing energy-dependent x-ray images of an object comprising:

an x-ray source positioned on one side of the object producing an x-ray beam which transverses the object;

an x-ray detector positioned on the side of the object opposite that of the source;

means for measuring the x-ray transmission through the object, with the x-ray detector, at the lower and higher energy regions of the diagnostic x-ray spectrum and producing a low-energy projection signal and a high-energy projection signal;

computational means for processing the low-energy projection signal and the high-energy projection signal and producing an atomic-number-dependent signal which is substantially on the line integral of the atomic number of the object raised to a power, and a density-dependent signal which is substantially dependent on the line integral of the density of the object; and

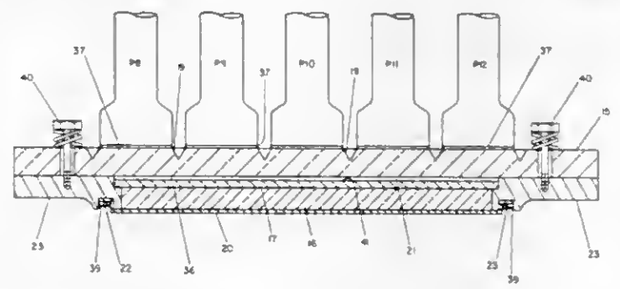
means for utilizing a plurality of the atomic-number-dependent signal and a plurality of the density-dependent signal to produce energy-dependent x-ray images of the object.

4,029,964

DETECTOR CONSTRUCTION FOR A SCINTILLATION CAMERA

John B. Ashe, Palatine, Ill., assignor to G. D. Searle & Co., Skokie, Ill.

Filed Aug. 11, 1975, Ser. No. 603,377
Int. Cl.² G01T 1/20
U.S. Cl. 250—368 13 Claims



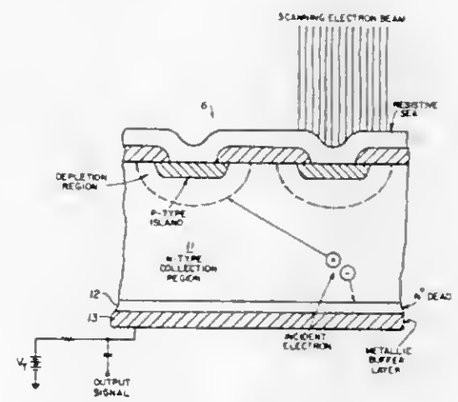
1. In a scintillation camera for radioisotope imaging employing a laminar scintillation crystal, an array of photodetectors in optical communication with said scintillation crystal for generating electrical signals providing position information with regard to scintillations occurring in said scintillation crystal in response to incident gamma radiation wherein each photodetector views an overlapping portion of said scintillation crystal, a transparent light conducting element interposed between said scintillation crystal and said array of photodetectors, electrical circuitry connected to said photodetectors for receiving the aforesaid electrical signals from said photodetectors and for producing composite image signals, and an image representation means for receiving said image signals and depicting signals for a single detected radioactive event as positional coordinates of interaction of said event with the aforesaid crystal, the improvement comprising a laminar moisture-impermeable barrier less than one quarter inch in thickness interposed between said scintillation crystal and said light conducting element.

4,029,965

VARIABLE GAIN X-RAY IMAGE INTENSIFIER TUBE

Allan Ivan Carlson, Ossining, and Barry M. Singer, New York, both of N.Y., assignors to North American Philips Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 550,362, Feb. 18, 1975, abandoned. This application Feb. 23, 1976, Ser. No. 660,728
Int. Cl.² G01T 1/22
U.S. Cl. 250—370 7 Claims



1. A electron sensitive silicon diode array target for use in an X-ray image intensifier tube having an electron scanning beam read-out and a predetermined range of photocathode voltages, an n-type single crystalline silicon substrate with a plurality of p-type islands on the side of the substrate that is

scanned with the electron read-out beam; a resistive film covering the plurality of p-type islands; a deep n^+ dead layer on the side of the substrate that receives the high energy incident electrons; a metallic buffer layer deposited on the n^+ dead layer, the combined thickness of said n^+ dead layer and said buffer layer being adjusted for providing target gain in said range of photocathode voltages, which is required for the X-ray image intensifier tube, and combined thickness of the n^+ dead layer and the metallic buffer layer being adjusted for providing a target gain which ranges from unity to about 300 at photocathode voltages from about −19 kv to −26 kv, respectively.

4,029,966

RADIATION-DETECTING DEVICES AND APPARATUS

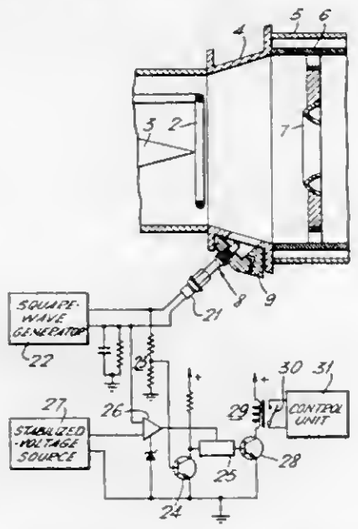
Peter D. Baker, and Denys V. Hollands, both of Basingstoke, England, assignors to Smiths Industries Limited, London, England

Filed May 21, 1975, Ser. No. 579,651

Claims priority, application United Kingdom, May 21, 1974, 22551/74

Int. Cl.² G01J *1/42*

U.S. Cl. 250—372 **14 Claims**



12. Flame-monitoring apparatus comprising means for sensing ultra-violent radiation, a filter mounted in front of said sensing means to limit substantially passage of infra-red radiation to said sensing means, means for interrogating said sensing means repeatedly to determine at each interrogation whether in accordance with the response of said sensing means a predetermined flame-condition exists, said flame-condition being related to the level of ultra-violent radiation received by said sensing means and said interrogating means including signal means to generate a predetermined signal whenever the said flame-condition is determined to exist at any said interrogation of said sensing means, resettable counting means, means coupled to said counting means to provide a predetermined response when the count of said counting means exceeds a predetermined value, means for advancing the count of said counting means stepwise towards said value upon each successive interrogation of said sensing means, and means coupled to said signal means to reset (for resetting) the said counting means in response to generation of said predetermined signal (whenever) during (the successive) interrogation of said sensing means (said predetermined flame-condition is determined to exist).

4,029,967

DEVICE FOR THE UNIFORM IRRADIATION OF GOODS BY MEANS OF ELECTRO-MAGNETIC RADIATION

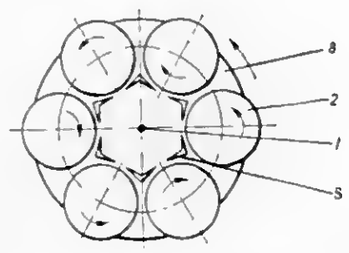
Karl-Heinz Tetzlaff, No. 3, Morikestrasse, Kelkheim, Germany

Filed Nov. 22, 1974, Ser. No. 526,187

Claims priority, application Germany, Nov. 24, 1973, 2358652

Int. Cl.² A61K *27/02*

U.S. Cl. 250—492 R **9 Claims**



1. An irradiation device for the uniform irradiation of goods by means of electro-magnetic radiation having a quantum energy larger than 5 KeV, comprising:

a. at least one radiation source,

b. means spaced from the radiation source for receiving goods to be irradiated, said goods having a center axis,

c. a radiation path extending from the radiation source to the center axis of the goods,

d. at least one shielding element laterally disposed with respect to the radiation path to provide a shielding effect that increases with increasing lateral space from the radiation path,

e. the shielding element and the receiving means for the goods being arranged with respect to each other to allow for the radiation to enter the goods through the entire superficies thereof in such a way that the region immediately around the center axis of the goods is irradiated with radiation unaffected by the shielding element.

4,029,968

STACKED RACKS FOR STORING SPENT NUCLEAR FUEL ELEMENTS

Herbert J. Rubinstein, Los Gatos, and James D. Gilcrest, San Jose, both of Calif., assignors to Nuclear Services Corporation, Campbell, Calif.

Filed Sept. 11, 1975, Ser. No. 612,533

Int. Cl.² G21F *5/00*

U.S. Cl. 250—507 **6 Claims**

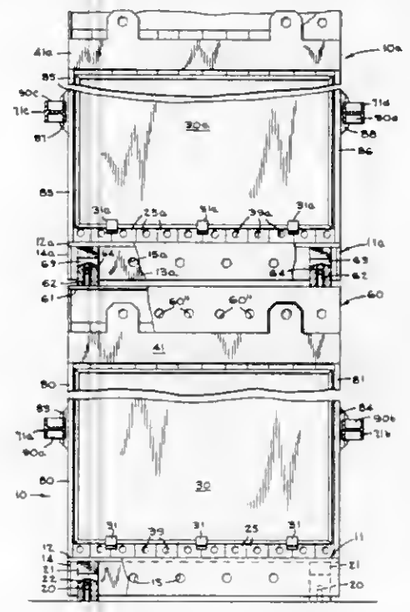
1. In combination:

a. a first rack for storing a plurality of nuclear fuel elements;

b. a second rack for storing a plurality of nuclear fuel elements, said second rack being disposed above said first rack; and

c. first means including a frame-like support engaging said first and second racks for removably retaining said first and second racks in a predetermined position,

d. said first and second racks including oppositely directed first members engaging said frame-like support for removably retaining said first and second racks in the predetermined position, said frame-like support including parallel second members engaged respectively by said first members for removably retaining said first and second racks in the predetermined position.



4,029,969

METHOD AND DEVICE FOR SUPPRESSING NOISE RADIO WAVES IN MOTOR VEHICLE HAVING IGNITION TYPE ENGINE

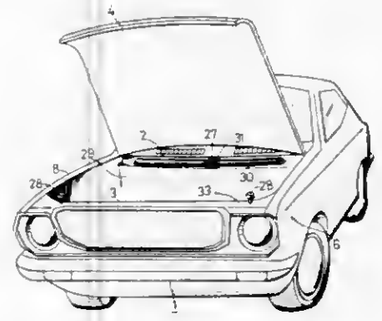
Hiroshi Kondo; Isamu Murata, and Teruo Yamanaka, all of Toyoda, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyoda, Japan

Filed June 17, 1975, Ser. No. 587,553

Claims priority, application Japan, Sept. 14, 1974, 49-106187

Int. Cl.² H02G *3/00*

U.S. Cl. 307—10 R **12 Claims**



1. A method of suppressing noise radio waves in a motor vehicle, comprising the steps of: determining the positions of interstices defined between

surface defining members of the body of said vehicle which exhibit a minimum quantity of the magnetic fluxes of said noise radio waves leaking through said interstices, said members being located in the neighborhood of a noise radio wave generating source, such an an engine mounted on said motor vehicle; and

bonding together said surface defining members which oppose each other through said interstices at said positions which exhibit said minimum quantity of magnetic fluxes.

4,029,970

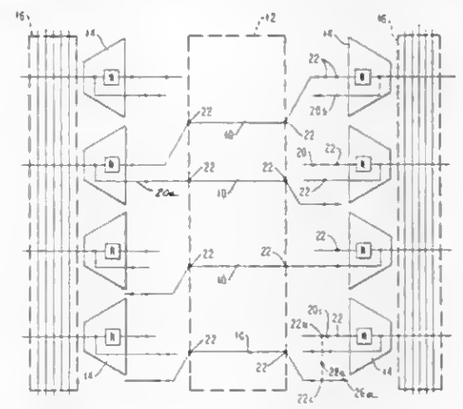
CHANGEABLE DECODER STRUCTURE FOR A FOLDED LOGIC ARRAY

Se J. Hong, and Daniel L. Ostapko, both of Poughkeepsie, N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed Nov. 6, 1975, Ser. No. 629,259

Int. Cl.² H03K *19/20*; **G06F** *9/00*; **H03K** *13/00*

U.S. Cl. 307—207 **3 Claims**



1. In a programmable logic array of the type comprising at least two arrays in which one of the arrays receives binary input variables on its input lines from decoders that generate those input variables from binary input signals and feeds the responses thereto on its output lines to a second array, an arrangement for driving a plurality of groups of four input lines of the first array at both ends to provide on the input lines all possible combinations of at least three input signals comprising:

two sets of one-bit decoders positioned on each side of the first array adjacent to each group of four input lines,

selective input means coupled to the inputs of the decoders for supplying at least one input signal to the inputs of sets of decoders serving one side of at least two groups of four unsegmented input lines and supplying two input variables to the inputs of sets of decoders serving the other side of said at least two groups of input lines,

selective output means coupling the outputs of one-bit decoders from the two sets to said groups of input lines of the first array for selectively placing three or more outputs from said one-bit decoders positioned on both sides of the first array on various ones of the input lines in said groups of at least two groups of input lines so that those three or more outputs of the decoders are dot ORd on the various ones of the input lines whereby three and four-bit decoding using two or more groups of input lines is accomplished.

4,029,971

TRI-STATE LOGIC CIRCUIT

Richard Lee Pryor, Voorhees, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Feb. 13, 1976, Ser. No. 657,838

Int. Cl.² H03K *1/00*, *19/08*

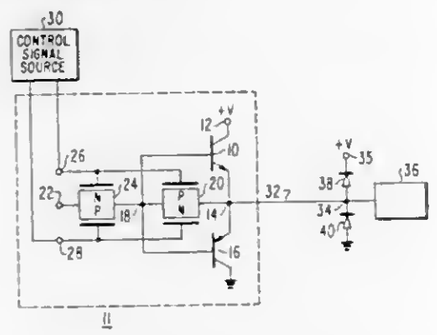
U.S. Cl. 307—209 **7 Claims**

1. An amplifying circuit comprising, in combination:

first and second amplifiers, each amplifier having an input and an output terminal and a relatively high input impedance, said first and second amplifier input terminals interconnected and coupled to a circuit input terminal to which an input signal may be applied and said first and second amplifier output terminals interconnected and connected to a circuit output terminal;

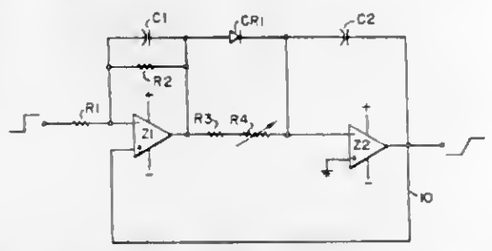
first switching means having an impedance when in its open state very much greater than said relatively high input impedance and when in its closed state very much less than said relatively high input impedance, said first

switching means connected between the interconnected amplifier input terminals and said circuit output terminal;
second switching means connected between said circuit input terminal and the interconnected amplifier input terminals;
means for concurrently closing said first switching means and opening said second switching means and vice-versa;
a transmission line connected at one end to said circuit output terminal;



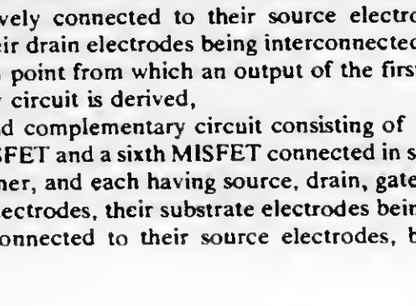
load means connected to the other end of said line, said load means causing a reflected wave to propagate through said line towards said circuit output terminal in response to said output signal when its input impedance does not equal the characteristic impedance of said line; and
means responsive to the instantaneous sum of said output signal and said reflected wave for coupling said line to a point at a first potential whenever said sum is greater than a first predetermined value and to a second potential whenever said sum is less than a second predetermined value.

4,029,972
RAMPING CIRCUIT
David A. Fox, Lima, and James L. Roof, Fort Shawnee, both of Ohio, assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Dec. 16, 1975, Ser. No. 641,314
Int. Cl.² H03K *4/08*
U.S. Cl. 307—228 **4 Claims**



I. A ramping circuit comprising:
an input terminal for receiving an input signal that may vary abruptly in magnitude;
a first operational amplifier having positive and negative input terminals and an output terminal, said input terminal being electrically coupled to said negative input terminal of said first operational amplifier;
a second operational amplifier having positive and negative input terminals and an output terminal, said negative input terminal of said second operational amplifier being electrically coupled to said output terminal of said first operational amplifier by a first circuit branch including a resistance and by a second circuit branch, in parallel with said first branch, including a diode rectifier poled to conduct from said first to said second operational amplifier to provide rapid reset of the ramping circuit, said positive input terminal of said second operational amplifier being maintained at a reference potential; and
a feedback circuit branch from said output terminal of said second operational amplifier to said positive input terminal of said first operational amplifier to provide at said output terminal of said second operational amplifier a linear signal gradually changing between levels corresponding to two levels of said input signal and in the same direction as the change in said input signal.

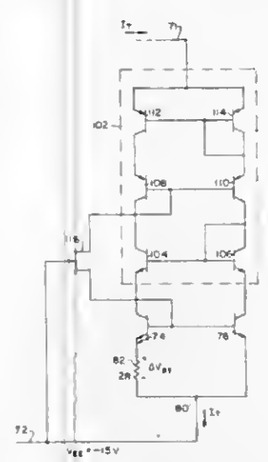
4,029,973
VOLTAGE BOOSTER CIRCUIT USING LEVEL SHIFTER COMPOSED OF TWO COMPLEMENTARY MIS CIRCUITS
Isamu Kobayashi, Tokyo; Osamu Yamashiro; Naoki Yashiki, both of Kodaira, and Tadashi Funakubo, Higashiyamato, all of Japan, assignors to Hitachi, Ltd., Japan
Filed Apr. 6, 1976, Ser. No. 674,084
Claims priority, application Japan, Apr. 21, 1975, 50-47546
Int. Cl.² H03K *1/14, 3/353, 17/60;* **G04C** *3/00*
U.S. Cl. 307—264 **5 Claims**



1. A voltage booster circuit comprising:
a. a terminal for receiving a fixed voltage;
b. a first switching MISFET having source, drain, gate and substrate electrodes, said drain electrode being connected to said terminal for receiving said fixed voltage;
c. a second switching MISFET connected in series with said first switching MISFET and having source, drain, gate and substrate electrode;
the substrate electrode of each of said first MISFET and said second MISFET being connected to the source electrode of the same respective MISFET, the source electrode of said first MISFET and the drain electrode of said second MISFET being connected to each other, said first MISFET and second MISFET being respective switching means of first and second stages;
d. a pulse input terminal;
e. a first inverter circuit and a second inverter circuit connected in cascade with said pulse input terminal;
f. a first capacitor connected between a common connection of said first and second MISFETs and a common connection of said first and second inverter circuits;
g. a second capacitor having one electrode connected with the source electrode of said second MISFET and the other electrode being grounded; and
h. a level converting circuit having a first and a second complementary circuit, said first complementary circuit consisting of
a third MISFET and a fourth MISFET connected in series with each other, and each having source, drain, gate and substrate electrodes, their substrate electrodes being respectively connected to their source electrodes, and both their drain electrodes being interconnected at a first junction point from which an output of the first complementary circuit is derived,
said second complementary circuit consisting of
a fifth MISFET and a sixth MISFET connected in series with each other, and each having source, drain, gate and substrate electrodes, their substrate electrodes being respectively connected to their source electrodes, both their

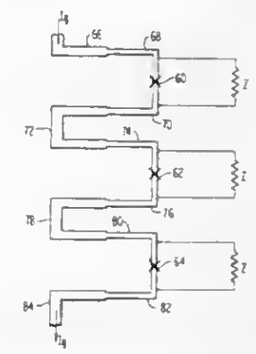
drain electrodes being interconnected at a second junction point from which an output of the second complementary circuit is derived,
said first junction point being connected to gate electrode of said first MISFET and connected to the gate electrode of said fifth MISFET,
said second junction point being connected to the gate electrode of said third MISFET and to the gate electrode of said second MISFET,
the source electrode of said third MISFET being connected to the common connection of said first and second MISFETs,
the source electrode of said fifth MISFET being connected to a common connection of the source electrode of said second MISFET and said one electrode of said second capacitor from which an output of said booster circuit is derived, and
the source electrode of each of said fourth MISFET and sixth MISFET being grounded.

4,029,974
APPARATUS FOR GENERATING A CURRENT VARYING WITH TEMPERATURE
Adrian Paul Brokaw, Burlington, Mass., assignor to Analog Devices, Inc., Norwood, Mass.
Division of Ser. No. 560,954, March 21, 1975, Pat. No. 3,940,760. This application Nov. 13, 1975, Ser. No. 631,844
Int. Cl.² H03K *1/00;* **H01V** *3/00;* **H01L** *35/00*
U.S. Cl. 307—296 R **12 Claims**



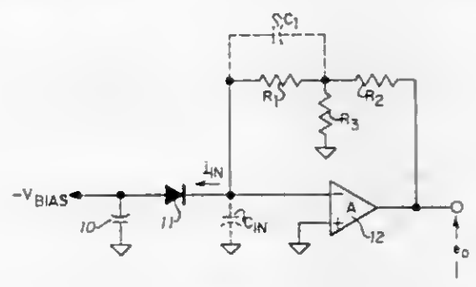
1. An apparatus for generating a current varying linearly with absolute temperature, comprising:
first and second transistors each comprising a base, an emitter and a collector, said transistors having conductive areas of different sizes;
means in the form of at least one regeneratively coupled transistor pair connected to the collectors of the first and second transistors for forcing equal currents through the first and second transistors to operate them at different current densities, thereby to produce different base-to-emitter voltages in the first and second transistors; and
means responsive to the difference in the base-to-emitter voltages of the first and second transistors for developing a current corresponding to the difference in base-to-emitter voltages.

4,029,975
LOW-CROSSTALK-AUTOMATIC RESETTING SCHEME FOR JOSEPHSON JUNCTION LOGIC CIRCUIT
Hans H. Zappe, Granite Springs, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.
Continuation of Ser. No. 422,959, Dec. 7, 1973, abandoned. This application Jan. 14, 1975, Ser. No. 540,762
Int. Cl.² H03K *3/38, 19/195;* **H01L** *39/22*
U.S. Cl. 307—306 **17 Claims**



1. A Josephson array comprising at least two Josephson junctions connected in series in a line adapted to carry current to said junctions, said junctions generating transients due to switching, said line including means disposed between said two junctions for substantially preventing said transients from passing between said two junctions.

4,029,976
AMPLIFIER FOR FIBER OPTICS APPLICATION
Franklin H. Fish, and Rodney S. Katz, both of Indianapolis, Ind., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.
Filed Apr. 23, 1976, Ser. No. 679,629
Int. Cl.² H03K *3/42;* **H03D** *1/00*
U.S. Cl. 307—311 **6 Claims**

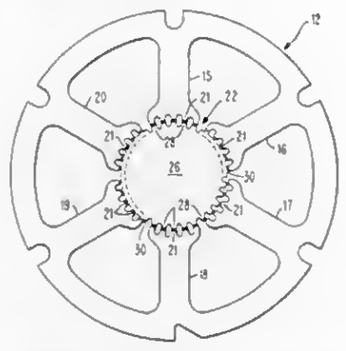


I. In an electro-optical transmission line, a receiver for converting light signals to electrical signals comprising,
a photodiode for receiving light inputs and having an electrical input terminal and an output signal port for providing electrical signals proportional to the input of light to said photodiode,
a source of voltage connected to said electrical input terminal for reverse biasing said photodiode,
an amplifier having an output terminal and an input terminal connected to said output signal port of said diode, and
a T-network feedback circuit connected between said amplifier output terminal and said input terminal for increasing transimpedance gain-bandwidth product of said amplifier.

4,029,977
ROTARY STEPPER MOTOR AND METHOD OF OPERATION

Hi Dong Chai, Binghamton, and Joseph Paul Pawletko, Endwell, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 26, 1975, Ser. No. 635,535
Int. Cl.² H02K *37/00*
U.S. Cl. 310—49 R **7 Claims**



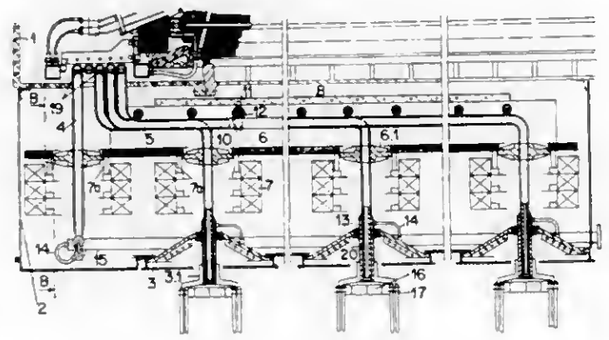
1. In a three-phase rotary stepper motor of the variable reluctance type comprising:
an annular stator having three pairs of uniformly spaced, diametrically opposed, inwardly extending poles with the pole faces thereof having equally spaced teeth;
a cylindrical rotor having a periphery with equally spaced teeth separated from said pole faces by a uniform air gap,
said rotor teeth and said stator teeth being disposed to limit occurrence of exact alignment to predetermined teeth while causing misalignment of all the other teeth;
the method of operating said motor comprising:
magnetizing said stator poles in a sequence of successive steps such that in each step
first and second adjacent pole pairs are concurrently magnetized with adjacent poles having opposite polarity and diametrically opposed poles having the same polarity,
said magnetized first and second pole pairs being separated by a magnetically neutral third pole pair, and
then magnetizing the neutral third pole pair concurrently with and to have a polarity opposite from the adjacent second pole pair while causing the first pole pair ot become magnetically neutral.

4,029,978
POWER TERMINAL STRUCTURE FOR STATOR COMPONENT OF HIGH-OUTPUT TURBO-GENERATOR

Kurt Jäger; Eugen Kunz, and Josko Vlah, all of Mannheim, Germany, assignors to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed June 20, 1975, Ser. No. 588,624
Claims priority, application Germany, July 3, 1974, 2431958
Int. Cl.² H02K *9/00*
U.S. Cl. 310—64 **9 Claims**

1. The combination with a high-output three-phase turbo-generator the housing of which is filled with a non-combustible and non-oxidizing gas at a pressure level slightly exceeding atmospheric and wherein the rotor conductors and the stator conductors are cooled by circulation of a liquid coolant, of a stator conductor terminal assembly for electrically leading out the phase windings from the coil heads, said conductor terminal assembly comprising a casing secured to the underside of and extending longitudinally of the generator housing, and communicating with the interior of said housing at hollow switching leads connected to the phase windings, a metallic plate located within said casing and extending longitudinally thereof, elastic means securing said metallic plate in place within said casing, a plate of insulating material likewise located within said casing and extending longitudinally thereof in parallel spaced relation with said metallic plate, three hollow terminal conductors insulated throughout their entire length against the full voltage of the stator windings, said conductors being connected respectively at one end thereof to corresponding switching leads and which extend from the latter in a first section directed vertically downward thence in a second section directed horizontally for different distances through the space between said metallic and insulating plates and thence in a third section directed vertically downward through elastic supports therefor secured to said insulating

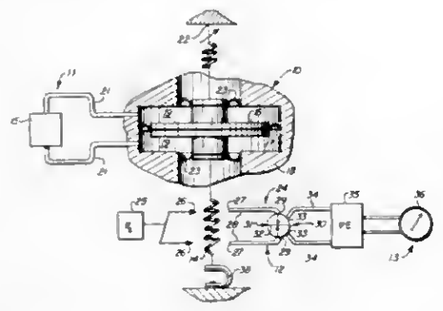


plate, means securing the horizontally extending second sections of said hollow conductors to said metallic plate, said third vertically downward extending sections of said hollow conductors ending in polygon-shaped connection terminals and being passed through openings provided in the bottom wall of said casing, and secured in place by means of gas-tight elastic support members attached to the wall of the casing, a fluid coolant duct located within said casing, and means connecting the interior of said hollow conductors with said fluid coolant duct.

4,029,979
FLUIDIC TO ELECTRIC TRANSDUCER AND METHOD

Donald W. Chapin, Scottsdale, Ariz., assignor to The Garrett Corporation, Los Angeles, Calif.

Continuation-in-part of Ser. No. 587,457, June 16, 1975. This application May 13, 1976, Ser. No. 685,853
Int. Cl.² H01L *41/04*
U.S. Cl. 310—8.2 **20 Claims**

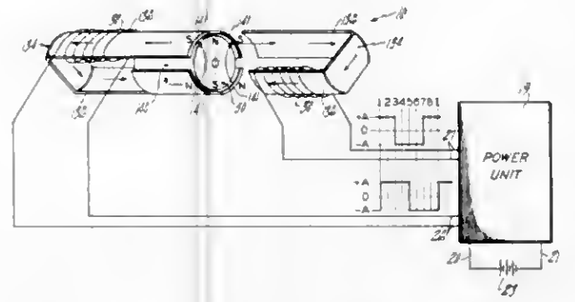


1. A fluidic to electric transducer comprising:
an element supported under tension for vibratory movement;
means responsive to a variable fluidic input to change the tension of said element;
a second means directing a jet of fluid under pressure against said element to cause vibration thereof at the frequency determined by the tension of said element, such vibration converting said fluid jet into a pulsating signal; and
means receiving said pulsating signal and converting the same into an electric signal proportional to the fluidic input employed to change the tension of said element.

4,029,980
ROTARY ELECTRIC MOTOR

John Griffith Gamble, Simsbury, Conn., assignor to Veeder Industries, Inc., Hartford, Conn.

Filed Feb. 4, 1975, Ser. No. 546,938
Int. Cl.² H02K *21/14*
U.S. Cl. 310—112 **4 Claims**

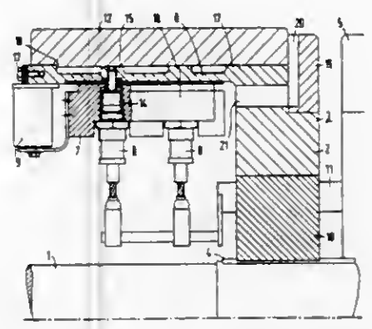


1. A rotary electric motor comprising a rotatable generally cylindrical elongated two pole permanent magnet armature with a generally diametral magnetic axis, two stators for the armature having separate generally U-shaped stator cores, each having exactly two substantially diametrically opposed axially extending elongated stator poles with elongated axially extending substantially diametrically opposed generally rectangular pole faces, the two stators providing an annular arrangement of exactly four said elongated axially extending stator pole faces encircling the elongated generally cylindrical permanent magnet with the pole faces substantially equiangularly spaced thereabout, a single separate coil encircling each separate generally U-shaped stator core for selectively magnetizing the core in opposite directions, and electrical power supply means for supplying full wave AC power to each separate coil and with the AC power supplied to the two separate coils being in generally 90° out-of-phase relationship.

4,029,981
ROTATING RECTIFIER ASSEMBLY FOR ELECTRIC MACHINES

Heinrich Küter, Wattenscheid, and Erich Weghaupt, Mulheim (Ruhr), both of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Germany

Filed July 10, 1975, Ser. No. 594,751
Claims priority, application Germany, July 11, 1974, 2433464
Int. Cl.² H02K *11/00*
U.S. Cl. 310—68 D **3 Claims**

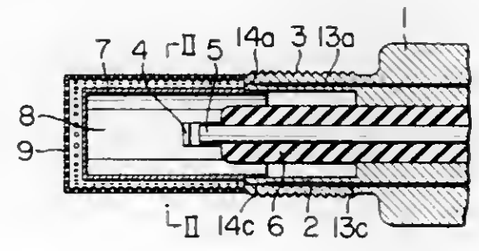


1. In a multiphase bridge circuit for electric machines, a rotating rectifier assembly having active components including cooling members, rectifier cells and safety fuses, and comprising a carrier wheel having a radially inner hub and a radially outer annular flange connected to said radially inner hub, the active components being radially outwardly braced at the inner side of said annular flange, said annular flange being formed of two parts, one of said parts being a radially inner flange ring of unitary construction with said hub, said radially inner flange ring formed with openings and solely containing all the openings for receiving therein and for securing the active components to said annular flange, and the other of said parts being radially outer cap ring without bores or recesses formed therein and of very strong material and being in press-fitting engagement with said flange ring, said cap ring and having uniform cross-sectional area over its axial length.

4,029,982
PLUG FOR INTERNAL COMBUSTION ENGINE FOR LIMITING PRODUCTION OF NITROGEN OXIDE

Hidetsugu Kubota, No. 122, 3-chome, Motomachi, Kameda, Naka Kanbara-gun, Niigata-ken, Japan

Filed Feb. 11, 1976, Ser. No. 657,299
Claims priority, application Japan, Feb. 17, 1975, 50-19534
Int. Cl.² F23Q *3/64*
U.S. Cl. 313—11.5 **4 Claims**

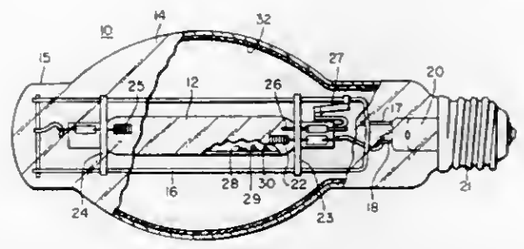


1. A plug for use in an engine cylinder comprising,
a. ignition electrodes,
b. an inner cover surrounding said electrodes, said inner cover having an opening to provide communication between said electrodes and said engine cylinder,
c. an outer cover surroundingly spaced from said inner cover and having an opening in juxtaposition with said inner cover opening,
d. said outer cover having perforations whereby water injected between said inner and outer covers is evaporated into steam upon engagement with said outer cover, said steam passing through said perforations into said cylinder in a direction away from said electrodes.

4,029,983
METAL-HALIDE DISCHARGE LAMP HAVING A LIGHT OUTPUT WITH INCANDESCENT CHARACTERISTICS

William A. Thornton, Cranford, N.J., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 25, 1976, Ser. No. 670,490
Int. Cl.² H01J *61/18, 61/34, 61/44*
U.S. Cl. 313—25 **17 Claims**



1. A high-pressure metal-halide discharge lamp comprising;
an arc tube of fused silica containing mercury, sodium, a halogen, scandium, and an ionizable fill gas,
a light-transmitting outer envelope surrounding said arc tube,
means supporting said arc tube in predetermined spaced-apart relationship with said outer envelope, and
means for modifying the color-rendering characteristics and

chromaticity of the light generated by the arc tube, when said lamp is energized, comprising a coating on the interior surface of the outer envelope that luminesces in response to impinging radiations emitted by said arc tube, said luminescent coating comprising a blend of green-emitting material and red-emitting material,

said green-emitting material being at least one phosphor of the group consisting of copper-activated zinc sulfide, zinc silicate and cerium-activated calcium sulfide, and

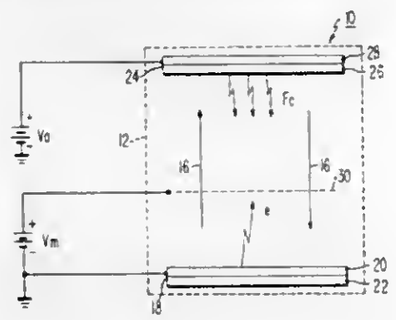
said red-emitting material being at least one phosphor of the group consisting of europium-activated yttrium vanadate, europium-activted strontium sulfide, europium-activated calcium sulfide and europium-activated yttrium vanadate phosphate.

4,029,984

FLUORESCENT DISCHARGE COLD CATHODE FOR AN IMAGE DISPLAY DEVICE

John Guiry Endriz, Plainsboro, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 28, 1975, Ser. No. 636,096
Int. Cl.² H01J *39/06, 31/48, 43/10*
U.S. Cl. 313—96 **10 Claims**



1. An image display device comprising an evacuated envelope within which is disposed a plurality of cathodoluminescent cells in a matrix array, each cell including:

a. a source of electrons comprising:

1. An anode electrode having means for producing electromagnetic radiation in response to bombardment by electrons;

2. a cathode electrode having means for emitting electrons in response to impinging electromagnetic radiation;

3. an open channel between said anode electrode and said cathode electrode whereby a fraction F_c of the electromagnetic radiation produced by said anode electrode is clear to feed back to and impinge upon said cathode electrode; and

4. means for sustaining a flow of electrons from said cathode electrode to said anode electrode;

b. electron beam formation means;

c. means for modulating a flow of electrons from said electron beam formation means;

d. means for accelerating the modulated flow of electrons; and

e. a cathodoluminescent screen excitable by the accelerated and modulated flow of electrons, said screen being separate from said anode electrode.

4,029,985

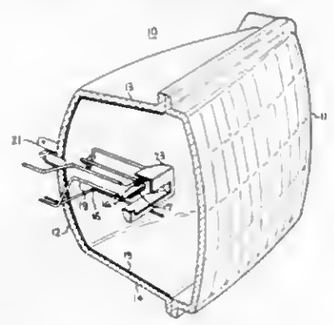
RECTANGULAR HEADLAMP FILAMENT SHIELD

Bernard W. Rachel, Lyndhurst, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Filed Mar. 24, 1976, Ser. No. 669,985
Int. Cl.² F21V *7/14;* **H01K** *1/26, 1/30*
U.S. Cl. 313—115 **9 Claims**

1. In a rectangular headlamp having a lens, a reflector in the shape of paraboloid intersected by four planes which form the sidewalls thereof, and at least one filament positioned in the region of the focus of said paraboloid, the improvement comprising:

filament shield means having a first portion positioned between said filament and said lens and a second portion



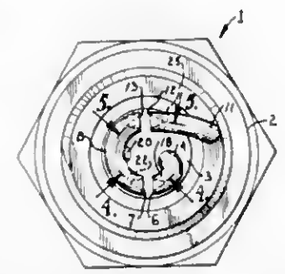
comprising a plurality of tabs positioned between said filament and respective sidewalls, wherein said first portion is geometrically similar to said lens and said tabs are geometrically similar to the respective sidewalls.

4,029,986

SPARK PLUG

Jose Hector Lara, and Edward B. Williams, Jr., both of P. O. Box 876, Greenville, Tex. 75401

Filed May 20, 1976, Ser. No. 688,137
Int. Cl.² H01T *13/46*
U.S. Cl. 313—123 **4 Claims**



1. In a spark plug having an insulator and a metal shell:

a. a first electrode for connection to a source of timed electrical pulses, said first electrode having a free end with a recess therein, said recess having a depth of less than a transverse dimension of said first electrode;

b. a second electrode insulated from said first electrode and having a first free end extending toward and aligned with said free end of said first electrode and spaced therefrom to define a first spark gap therebetween, said second electrode first free end having a recess therein with a depth of less than a transverse dimension of said second electrode first free end, said second electrode first free end having a bore extending transversely therethrough and intersecting and communicating with said recess in said second electrode first free end, said second electrode having a second free end extending therefrom and in opposed relation to said first free end of said second electrode, said second electrode second free end having a recess therein with a depth of less than a transverse dimension of said second electrode second free end; and

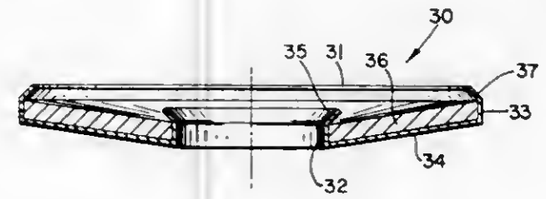
c. a third electrode having a ground connection with a metal shell of a spark plug, said third electrode having a free end extending toward and aligned with said second end of said second electrode and spaced therefrom to define a second spark gap therebetween, said third electrode free end having a recess therein with a depth of less than a transverse dimension of said third electrode free end, said third electrode free end having a bore extending transversely therethrough and intersecting and communicating with said recess in said third electrode free end.

4,029,987

WIDE CHANNEL GETTER DEVICE

Mario Zucchinelli, Milan, Italy, assignor to S.A.E.S. Getters S.p.A., Milan, Italy

Filed Apr. 16, 1975, Ser. No. 568,558
Claims priority, application Italy, Apr. 16, 1974, 21447/74
Int. Cl.² H01J *19/70, 29/94*
U.S. Cl. 313—174 **16 Claims**



1. A getter device comprising an annular ring having

1. an inner side wall, 2. an outer side wall, 3. a bottom wall joining the outer wall to the inner wall,

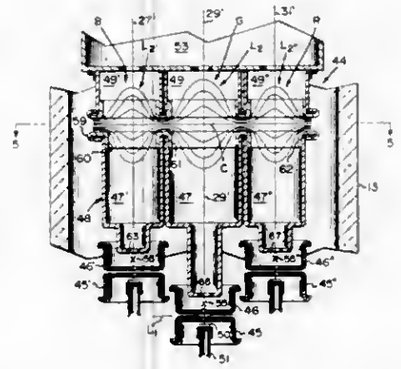
4. an evaporable getter material supported by said ring, characterized by the fact that the upper portion of the side walls disposed above said getter material are convergent relative to each other, the outer wall converging radially inwardly and upwardly, the inner wall converging radially outwardly and upwardly, such that the area of the convergent walls projected perpendicularly onto the upper exposed surface area of said getter material is no more than 20% of said upper exposed surface area.

4,029,988

CRT IN-LINE ELECTRON GUN ASSEMBLY

Donald L. Say, Waterloo, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed June 24, 1976, Ser. No. 699,424
Int. Cl.² H01J *29/50, 29/51*
U.S. Cl. 313—414 **5 Claims**



1. An improvement in a cathode ray tube three-beam in-line bi-potential electron gun assembly having a longitudinal axis therethrough and including electron generating means formed to separately emit each of the respective electron beams of substantially differing current levels, such beams being directed from a center and two side-related guns to selectively impinge a spatially related patterned electron responsive screen, each of said beams emanating from a gun structure formed of a plurality of related electrode members including a control electrode, an initial accelerator, a focusing electrode and a final accelerator positioned and supported by longitudinal insulative members in a sequential manner forward of a rear-oriented cathode member to effect the formation and control of each of said beams, said improvement comprising:

a unitized final accelerator having three in-line apertures defined therein, the center one of which is larger in diameter;

a unitized focusing electrode structure having a forward apertured portion in the form of a planar integrating member wherein three in-line oriented apertures are defined in a common plane spatially related to the apertures of said final accelerator, the forward aperture of the center gun being larger than those of the two side-related guns, said forward apertures being located in a substantially common plane, said focusing structure having a rear aperture arrangement whereat three spatially related apertures are arranged to accommodate each of said beams, the rear apertures of all of said guns being substantially equal in diameter, said rear apertures of said side-related guns being located in a substantially common plane while the aperture of said center gun is in a separate rearward oriented plane parallel thereto;

an arrangement of apertured initial accelerator members positioned in substantially equal spaced relationship with the respective rear apertured portions of said focusing electrode structure, the aperture portions of the side-related accelerators being in a substantially common plane while the center gun accelerator is in a separate rearward oriented plane parallel thereto; and

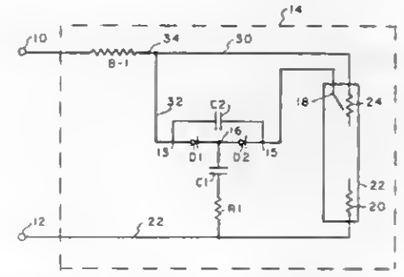
an arrangement of apertured control electrode members positioned in substantially equal spaced relationship with the respective initial accelerator members, the aperture portions of the side-related control electrodes being in a substantially common plane while the center gun control electrode is in a separate rearward oriented plane parallel thereto.

4,029,989

ELECTRIC DISCHARGE LAMP WITH VOLTAGE MULTIPLIER CIRCUIT HAVING A CAPACITANCE WHICH CHANGES WITH TEMPERATURE

Mark W. Fellows, Cranbury, N.J., assignor to North American Philips Corporation, New York, N.Y.

Filed Sept. 12, 1975, Ser. No. 612,717
Int. Cl.² H01J *7/44, 13/46, 17/34, 19/78*
U.S. Cl. 315—51 **5 Claims**



1. A discharge lamp for connection to an associated alternating current power supply which comprises:

a lamp envelope including a base which includes first and second connection means for connection to the associated alternating current power supply;

a discharge tube disposed within said envelope;

first and second main electrodes disposed at first and second ends respectively of said discharge tube;

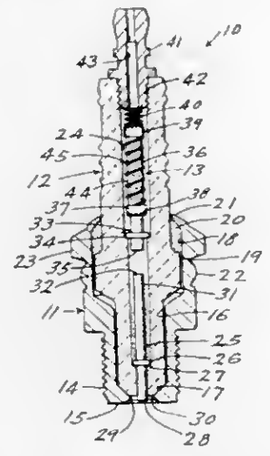
a starting electrode disposed at said first end of said discharge tube;

means for voltage multiplying connected to said first and second connection means, said starting electrode and one of said main electrodes, said means for voltage multiplying including a first capacitor having a capacitance which changes capacitance by a factor of at least 10 times with a temperature change of 175° C, said voltage multiplying means disposed within said envelope.

4,029,990
SPARK PLUG CONSTRUCTION

William L. Nagy, Northwood, and Robert J. Craver, Sylvania, both of Ohio, assignors to Champion Spark Plug Company, Toledo, Ohio

Filed Jan. 9, 1976, Ser. No. 647,819
Int. Cl.² H01T 13/46
U.S. Cl. 315—62 4 Claims

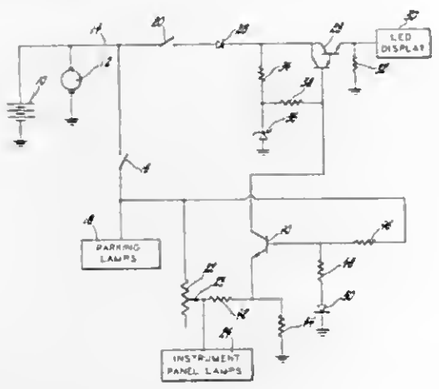


1. An improved spark plug for use in an internal combustion engine having a capacitive discharge ignition system, said spark plug comprising, in combination, a tubular metal shell having an exterior threaded section for threadably engaging the engine, ground electrode means in electrical circuit with said shell, an insulator mounted in said shell, said insulator having an axial bore extending therethrough, a center electrode, and means mounting said center electrode in said shell, said center electrode including tip means mounted to project from said insulator bore for defining a primary spark gap with said ground electrode means, a low resistance inductive suppressor having two ends, means forming an auxiliary spark gap within said insulator bore between said tip means and one end of said inductive suppressor, and terminal means for connecting the other end of said inductive suppressor to the capacitive discharge ignition system, said inductive suppressor having an inductance and said auxiliary spark gap having a gap size for suppressing oscillatory electrical ignition noise.

4,029,991
INSTRUMENT PANEL ILLUMINATION DIMMING CONTROL

Frederick K. Schultz, Bringhurst, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 14, 1976, Ser. No. 676,730
Int. Cl.² H05B 37/02, 43/00
U.S. Cl. 315—135 3 Claims



1. In an automotive instrument panel illumination circuit for a vehicle having a power supply subject to voltage fluctuations and a manually positioned dimmer control potentiometer connected to the power supply and providing a variable dimmer voltage for instrument panel illumination, a circuit for providing a variable supply voltage to light emitting diodes on the instrument panel comprising:

control means having an input terminal for controllably delivering a supply voltage from the power supply to the light emitting diodes according to a control voltage applied to the terminal input,

voltage regulator means for providing a maximum control voltage to the input terminal of the control means to establish a maximum supply voltage to the light emitting diodes which is sufficient to provide full light intensity,

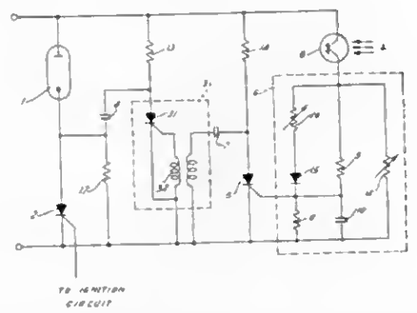
means connected to the power supply and the dimmer control potentiometer including a differential voltage detector sensitive to the voltage difference between the power supply voltage and the dimmer voltage for reducing the control voltage at the input terminal of the control means to effect dimming of the light emitting diodes according to the detected voltage difference,

whereby the light emitting diode intensity is dependent on the dimmer potentiometer position and substantially independent of power supply voltage fluctuations.

4,029,992
FLASH APPARATUS WITH FLASH TERMINATING SWITCH CONTROLLED BY PHOTOSENSOR

Heinz Engelstätter, Bad Soden, Germany, assignor to Braun Aktiengesellschaft, Frankfurt am Main, Germany

Filed May 2, 1975, Ser. No. 574,093
Claims priority, application Germany, Apr. 8, 1974, 2422237
Int. Cl.² H05B 41/02, 41/32
U.S. Cl. 315—156 6 Claims



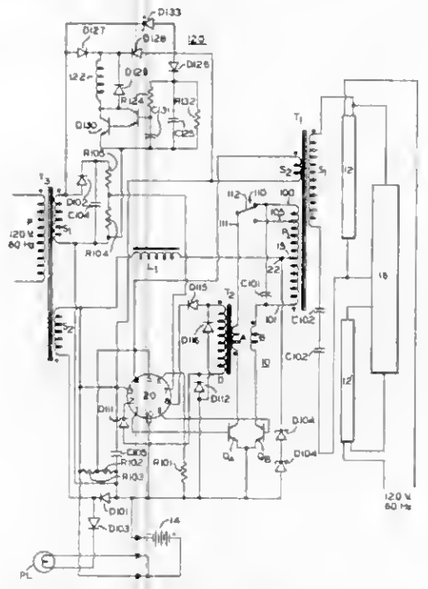
1. In the electronic flash unit of the type operative for producing flashes the duration of which is automatically controlled in dependence upon the scene brightness during the flash, in combination, a flash element; means for igniting the flash element; terminating means for terminating the flash produced by the flash element and including an electronic flash-terminating switch having a control electrode and operative when activated for causing the terminating means to terminate the flash; an integrating capacitor and means providing a current path for the capacitor; a charging resistor connected in the current path of the integrating capacitor and carrying a component of the integrating capacitor current, the charging resistor being operative for affecting the rate at which the integrating capacitor charges; means connecting the junction between the charging resistor and the integrating capacitor to the control electrode of the electronic flash-terminating switch for controlling the conductivity of the switch in dependence upon the voltage across the integrating capacitor; a light-sensing element connected in the current path of the integrating capacitor operative for making the capacitor current a function of sensed scene light; and a diode connected across the charging resistor with a polarity such as to carry a further component of the integrating capacitor current, the diode presenting to such further current component

a resistance which varies in inverse dependence upon variations in the voltage across the charging resistor.

4,029,993
TWO LEVEL INVERTER CIRCUIT

Robert Philbrick Alley, and Keith Karl Klett, both of Danville, Ill., assignors to General Electric Company, Carmel, Ind.

Filed Dec. 18, 1975, Ser. No. 642,014
Int. Cl.² H05B 41/29
U.S. Cl. 315—219 11 Claims



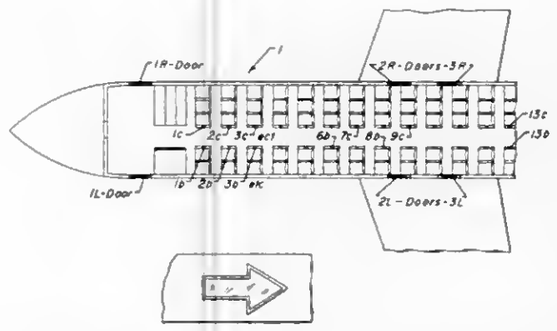
4. In an emergency lighting circuit for operating at least one gaseous discharge lamp including means for connection to an AC electrical energy source for energizing the lamp during normal conditions when the AC source voltage is above a predetermined value and an inverter having an output and an auxiliary electrical energy source for operating the lamp during emergency conditions when the AC source voltage is below a predetermined value, the improvement comprising:

switching means in the circuit for automatically operating the inverter on at least two power levels for better matching the inverter output capabilities to the lamp starting requirements and after starting, to lamp run requirements thereby to conserve energy in the auxiliary electrical energy source.

4,029,994
EMERGENCY FLASHING LIGHT SYSTEM FOR INDICATING EXITS OF PASSENGER CARRIERS

Robert C. Iwans, Hartford, Conn., assignor to UOP Inc., Des Plaines, Ill.

Filed Jan. 5, 1976, Ser. No. 647,276
Int. Cl.² H05B 37/02
U.S. Cl. 315—323 4 Claims



1. An emergency stroboscopic type of lighting system for directing passengers to an appropriate exit of a large passenger carrier having a plurality of doors, one or more of which may be unopenable in an emergency situation, which comprises in combination,

a. a strobe system including a plurality of electronic flash lamps which are maintained in spaced positions along the length of the passenger area of the carrier;

b. battery power supply means and high voltage-capacitive-trigger discharge means for each of the electronic flash lamps of the system;

c. an output driver means with switching means to connect to said flash discharge means for operating said flash lamps;

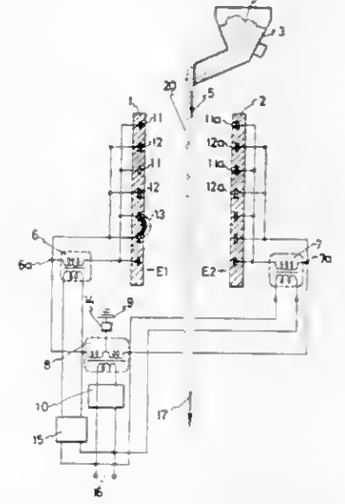
d. a time-base generator means connecting to a logic controller means and the latter in turn connecting to said output driver means to provide for the timing and switching thereof and the sequential firing of said plurality of electronic flash lamps in a manner whereby such sequential firing will create the effect of a moving light beam that will indicate a direction of egress from said carrier; and

e. a switch means at each door of the plurality thereof, each such switch being interconnected with said controller means, said controller means including programming means to provide a controlled sequence of firing from the driver means such that resulting lamp flashings will indicate directions to only such doors that are available for egress.

4,029,995
APPARATUS FOR PRODUCING CHARGED PARTICLES

Tsutomu Itoh, Tokyo, Japan, assignor to Onoda Cement Company, Ltd., Japan

Filed Jan. 6, 1976, Ser. No. 646,942
Int. Cl.² H05B 5/02
U.S. Cl. 361—226 11 Claims



1. An apparatus for producing charged particles, comprising a pair of surface-shaped ion generating electrodes, in each of which every other one of parallel linear electrodes spaced apart at a predetermined interval are connected in common to form separate electrode groups, said parallel linear electrodes, of at least one said electrode group being coated with an insulator, and an alternating voltage is applied between said respective electrode groups, and an alternating voltage is applied between said respective electrodes; a charging space formed between said pair of ion generating electrodes spaced in opposition to each other; means for shifting the phases of the alternating voltages applied to the respective ion generating electrodes relative to each other; and voltage supply means for applying between said respective ion generating electrodes another alternating voltage having a fundamental frequency twice as high as the frequency of the alternating voltage applied to the respective ion generating electrodes in

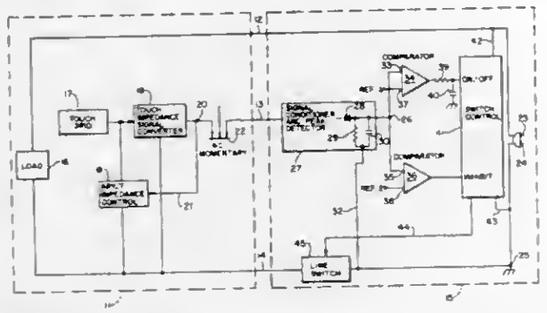
such phase relationship to said latter alternating voltage that inversion of the relative voltage between said respective electrode surfaces may not occur during the period when silent discharge is arising on one of the electrode surfaces.

4,029,996

APPARATUS HAVING A PROTECTIVE CIRCUIT

Donald Charles Mifflitt, Billerica, Mass., assignor to The Gillette Company, Boston, Mass.

Filed Mar. 8, 1976, Ser. No. 665,110
Int. Cl.² H02H *5/12*
U.S. Cl. 307—326 **17 Claims**



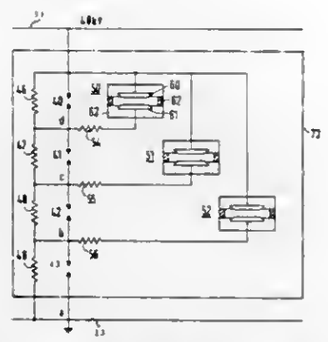
1. Apparatus electrically connectable to an AC source having a line conductor and a neutral conductor comprising:
a housing including a contact portion capable of being touched by an operator of the apparatus;
means for measuring an electrical parameter of the operator with respect to the line or neutral conductor of the AC source when the operator touches said contact portion; and
switching means electrically connectable in series with the line conductor for electrically disconnecting the apparatus from the AC source when the measured electrical parameter of the operator indicates a predetermined electrically dangerous condition for the operator.

4,029,997

SURGE VOLTAGE ARRESTER ARRANGEMENT

Hermann Wittel, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Dec. 9, 1974, Ser. No. 530,970
Claims priority, application Germany, Dec. 21, 1973, 2364034
Int. Cl.² H02H *3/22*
U.S. Cl. 361—129 **11 Claims**



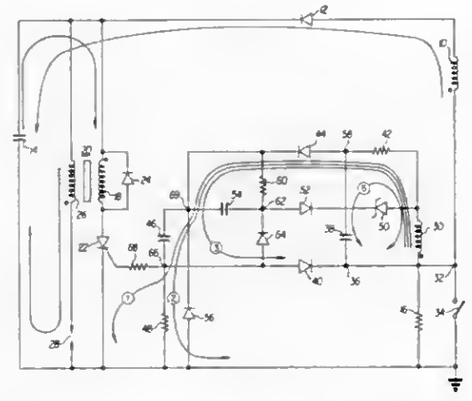
1. A surge voltage arrester module having a plurality of series arrays of spark gaps arranged in series between an upper and a lower voltage wherein the improvement comprises:
a. a plurality of controlled spark gaps, each control spark gap coupling a different junction point between two series arrays to one of the two voltages;
b. means enclosing each of said control spark gaps;
c. a gas which reduces the breakdown voltage of said control spark gaps contained within said enclosing means; and
d. means enclosing the total series array including said control spark gaps and their individual enclosures; and
e. a gas which increases the breakdown voltage of said series arrays contained within said overall enclosing means.

4,029,998

CAPACITOR DISCHARGE IGNITION CIRCUIT

Harold Elden Anderson, Los Angeles, Calif., assignor to McCulloch Corporation, Los Angeles, Calif.

Filed Mar. 3, 1975, Ser. No. 554,496
Int. Cl.² F02P *1/02*
U.S. Cl. 361—256 **4 Claims**



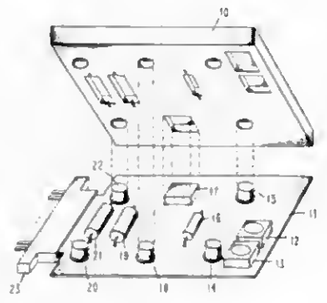
1. In a capacitor discharge ignition circuit including an ignition capacitor charged by the engine responsive rotation of a magnetic member through flux cutting proximity to a charging coil to thereby provide a charging coil waveform and discharged through an electronic switch and high voltage transformer by the engine responsive rotation of a magnetic member though flux cutting proximity to a trigger coil to thereby provide a trigger coil waveform substantially in-phase with the charging coil waveform, a method of advancing the time of discharge of the ignition capacitor relative to the engine cycle with an increase in the speed of the engine comprising the steps of providing a trigger coil waveform with a plurality of voltage peaks in a major wave component thereof and discharging the ignition capacitor responsively to the first of said voltage peaks with an amplitude exceeding a predetermined value.

4,029,999

THERMALLY CONDUCTING ELASTOMERIC DEVICE

Edward William Neumann, and Edward John Rabenda, Jr., both of Poughkeepsie, N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed Apr. 10, 1975, Ser. No. 566,853
Int. Cl.² H05K *7/20*
U.S. Cl. 361—386 **3 Claims**



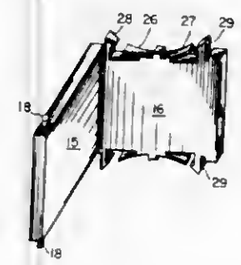
1. A device for heat transfer including heat producing electrical components of differing shapes mounted on a circuit card, a heat sink component through which said heat is to be dissipated,
a pad of a stretchable, elastomeric, thermally conducting, material,
said pad having first and second opposite surfaces, said second surface having multiple indentations each in the shape of the corresponding component on the card and replaceably fitting in glove-like relationship to the exterior of each component on said card to provide a snug interface for heat transfer from the components to the pad, and
said pad first surface contacting said heat sink component whereby said pad provides a thermal path from the heat-producing components to the heat sink component.

4,030,000

CORNER SUPPORT MEMBER FOR SUBSCRIBER CARRIER CHANNEL UNIT ASSEMBLY

James R. Stewart, Sao Jose, and Donald G. Tweed, Mountain View, both of Calif., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Mar. 1, 1976, Ser. No. 662,638
Int. Cl.² H05K *1/04, 7/12*
U.S. Cl. 361—400 **33 Claims**



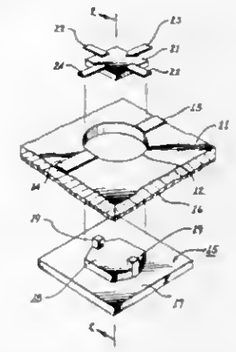
1. A member for holding a pair of printed circuit cards in a fixed, spaced-apart, adjacent and parallel relationship; groups of holes being formed in the same pattern at various locations in the faces of each card, at least one hole of each group extending all the way through the card; comprising:
first and second plates being located adjacent to each other and being joined together along one edges thereof for forming an angle therebetween which is different from 0° and 180°; at least a portion of opposing edges of said plates that are adjacent the one joined-together edges thereof being adapted for contacting faces of the cards;
a peg located on each of said opposing edges of said first plate;
a flexible post located on each of said opposing edges of said second plate; and
an arm extending from each of said posts proximate the end thereof that is spaced from said second plate in a direction substantially parallel to said portions of said opposing edges thereof;
said post and peg on the same side of said plates being located thereon such that they fit into corresponding holes in the same group of holes in a card, said arm being spaced from the portion of the associated opposing edge of said second plate a distance causing said arm to snap over the associated card to securely hold it in position, the pegs operating as load-bearing members when axial pressure is exerted on a plate in a plane parallel to the cards.

4,030,001

CO-PLANAR LEAD CONNECTIONS TO MICROSTRIP SWITCHING DEVICES

Max W. Medley, Jr., and James H. Ward, Jr., both of Largo, Fla., assignors to E-Systems, Inc., Dallas, Tex.

Filed Nov. 19, 1975, Ser. No. 633,344
Int. Cl.² H05K *1/04*
U.S. Cl. 361—401 **9 Claims**



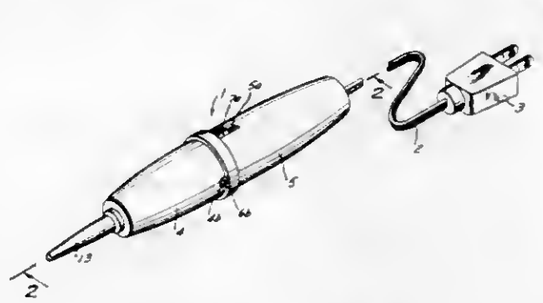
1. A method for assembling a switching device package having a plurality of terminal leads with a microstrip substrate having an input lead and an output lead on one surface of the substrate and a ground plane on the opposite surface of the substrate, said method comprising the steps of:
a. providing a hole extending through said substrate to separate the input and output leads thereof;
b. inserting a conductive member through the hole in said substrate;
c. connecting said conductive member to the ground plane of said substrate;
d. extending the ground plane of said substrate through said conductive member to become substantially co-planar with the one surface of said substrate;
e. positioning said switching device on said conductive member and generally below the extended ground plane; and
f. making co-planar connections from the terminal leads of said switching device package to the input and output leads and to said conductive member.

4,030,002

DEGAUSSER

George Alexandrovich, Sr., 7 Glenmere Court, Commack, N.Y. 11725, and Edward Perper, 1125 E. 57th St., Brooklyn, N.Y. 11234

Filed Nov. 6, 1975, Ser. No. 629,547
Int. Cl.² H01F *13/00*
U.S. Cl. 361—151 **13 Claims**



1. A degausser for degaussing magnetized components, comprising an elongated hollow housing having an internal surface and subdivided at a plane transverse to the elongation thereof into two discrete housing sections having respective detent recesses; a support having a plurality of elastically yieldable support portions which contact said internal surface of said housing to thereby position and support said housing sections on said support element, and of elastically yieldable

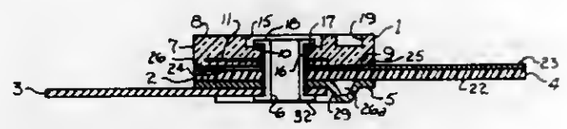
detent projections which engage with snap action in said detent recesses of said housing sections to thereby connect the latter to said support element, said support element including a flat portion, and a tubular portion of magnetically permeable material, which are rigid with one another and extend longitudinally of said housing, said flat portion and one part of said tubular portion being accommodated in said housing, and another part of said tubular portion extending to the exterior of and longitudinally beyond said housing for juxtaposition with a component to be degaussed; and means for generating a magnetic field in the circumambient region of said other part of said tubular portion to degauss the component upon juxtaposition of said other part therewith, including a core received in and surrounded by said tubular portion of said support element and extending within said parts thereof, a coil convoluted at least around a region of said one part of said tubular portion of said support element, and means for supplying electric current to said coil so as to generate an electromagnetic field which penetrates through said tubular portion of said support element and acts on the component juxtaposed with said other part of said tubular portion.

4,030,003

MINIATURE TRIMMER WITH FLEXIBLE PLASTIC BASE

Harold E. Wright, 162 Putnam Drive, Erie, Pa. 16511, and Lee A. Donatelli, 14 Summit St., Erie, Pa. 16508

Filed Aug. 22, 1975, Ser. No. 607,031
Int. Cl.² H01G 5/06
U.S. Cl. 361—293 **3 Claims**



1. A trimmer capacitor comprising a rigid dielectric disc having upper and lower surfaces and a center hole normal to said surfaces, the lower surface being flat, said disc having a rotor electrode above said lower surface and including a metal coating on said upper surface, a metal clad flexible sheet of dielectric material having on one side metal cladding presented to and engaging and making conforming contact with said lower surface, said sheet having a section registering with said disc and an integral terminal extending from said section, said metal cladding being removed to provide a stator electrode integral with said terminal on the one side of said hole and a balance pad on the opposite side of said hole, a compression washer engaging the unclad side opposite said one side and exerting a force on said sheet holding the stator electrode and balance pad against said lower surface, a rotor terminal engaging the under side of said washer, and a hollow rivet having a flange making contact on said upper surface around the hole and a flange making contact with and holding said rotor terminal against the under side of said washer.

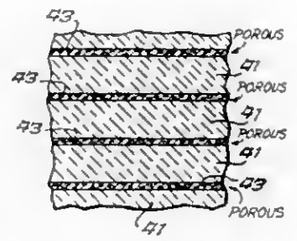
4,030,004

DIELECTRIC CERAMIC MATRICES WITH END BARRIERS

Truman C. Rutt, Niagara Falls, N.Y., assignor to NL Industries, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 274,668, July 24, 1972, abandoned, which is a continuation-in-part of Ser. No. 134,689, April 16, 1971, Pat. No. 3,679,950. This application Mar. 24, 1975, Ser. No. 561,297
Int. Cl.² H01G 4/08, 4/147
U.S. Cl. 361—313 **8 Claims**

1. A sintered, unitary ceramic body comprising: a plurality of strata of a dense dielectric or insulating ceramic composition, said strata alternating with open-structured areas substantially parallel with said strata and extending to edges of said body, each of said open-structured areas containing at least some solid material and alternate ones of said open-structured areas extending to different edge regions of said body; and a penetrable barrier over each of said edge regions,



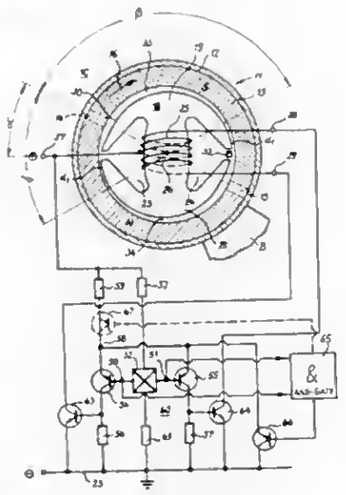
said barriers permitting molten metal to be forced by pressure into said areas.

4,030,005

BRUSHLESS D.C. MOTOR HAVING ROTOR POSITION-DEPENDENT CONTROL MEANS

Benno Doemen, St. Georgen, Germany, assignor to Papst-Motoren KG, St. Georgen, Germany

Filed Apr. 23, 1975, Ser. No. 570,837
Claims priority, application Germany, Apr. 23, 1974, 2419432
Int. Cl.² H02K 29/00
U.S. Cl. 318—138 **50 Claims**



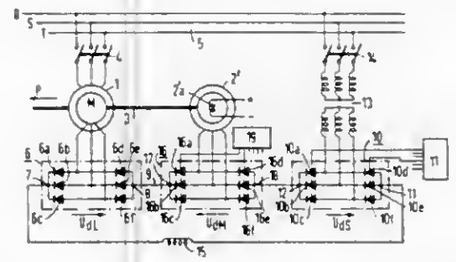
1. Brushless d.c. motor comprising:
a stator (18) having motor winding means (25, 26);
a permanent magnet rotor (11) rotatable relative to said stator;
a source of direct current (27, 53);
a rotor position-dependent semiconductor control means (32) having two pairs of terminals;
amplifying means responsive to said rotor position-dependent control means (32) and coupled to said direct current source and to said motor winding means for commutating the current in the motor winding means such that said motor winding means produces, in operation, an alternating magnetic field;
and a voltage divider (71, 72) having its end terminals coupled to one pair of the output terminals of the rotor position-dependent control means (32);
wherein said amplifying means includes a differential amplifier means (60) coupled to the other pair of output terminals of said semiconductor control means (32), the amplifying means having three output branches (54, 55, 66), two of said branches (54, 55) being coupled to control the currents in said motor winding means (25, 26);
and the voltage division ratio of the voltage divider (71, 72) being set such that the voltage of the tap point (70) of the voltage divider, when the rotor position-dependent control means (32) is subjected to a small or non-existent signal, will control said amplifying means so that current in said two branches tends to zero and current flow to said motor windings is blocked, said third branch substantially taking over and drawing the current of the differential amplifier means (60).

4,030,006

SPEED CONTROLLABLE DRIVE FOR AN ASYNCHRONOUS MOTOR

Harald Elger, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Apr. 10, 1975, Ser. No. 566,789
Claims priority, application Germany, Apr. 16, 1974, 2418332; Nov. 26, 1974, 2455876
Int. Cl.² H02P 7/36
U.S. Cl. 318—197 **8 Claims**



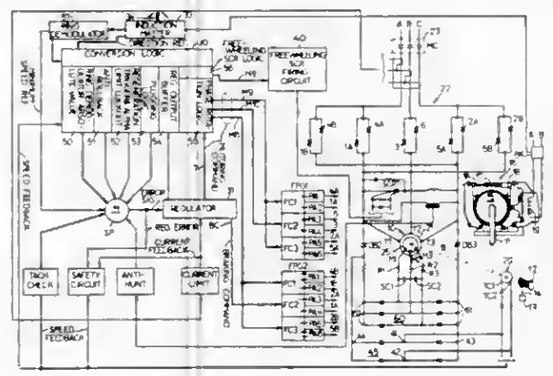
1. A speed controllable three phase drive comprising:
a. an asychronous motor having a slip ring rotor;
b. means for coupling the stator of said asynchronous motor to a three phase network;
c. a three phase synchronous motor having its shaft mechanically coupled to the shaft of said asynchronous motor;
d. an uncontrolled rectifier having its a.c. input coupled to the slip rings of said asynchronous motor;
e. a controlled inverter made up of a plurality of controlled rectifiers in a bridge arrangement feeding said three phase synchronous motor with its a.c. output; and
f. a controlled static converter having an a.c. input coupled to said three phase network, the d.c. terminals of said controlled static converter, said controlled inverter and said rectifier coupled in series with each other.

4,030,007

DIRECT CURRENT BRAKING MEANS FOR WOUND ROTOR MOTOR

Lester A. Price, Greenfield, and James N. Nash, New Berlin, both of Wis., assignors to Harnischfeger Corporation, West Milwaukee, Wis.

Filed Aug. 25, 1975, Ser. No. 607,601
Int. Cl.² H02P 3/20
U.S. Cl. 318—203 R **19 Claims**



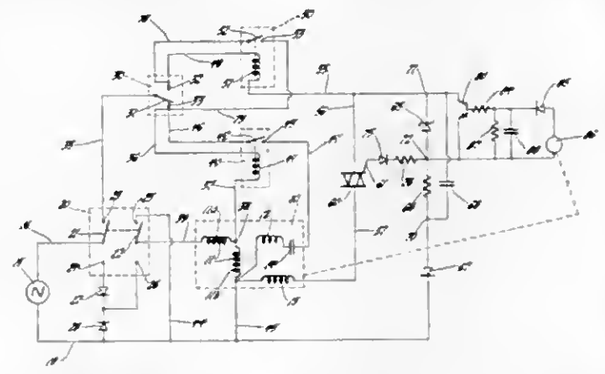
1. A system comprising:
a source of alternating current;
a hoist motor energizable from said source to hoist and lower a suspended load;
said motor comprising a stator winding energizable from said source and a rotor winding;
a brake operable when said motor is deenergized to prevent rotation of said motor and to maintain said load suspended;
control means operable when said motor exceeds a predetermined motor speed to change the applied power of the alternating current supplied to said motor from said source to produce a flow of direct current in said motor and effect direct current braking of said motor, said control means including a controlled rectifier means to smooth said flow of direct current;
first means responsive to rotation of said motor to provide an electric signal;
second means for directing said signal to said stator winding when said motor is deenergized and in the event said brake fails to maintain said load stationary to initiate a magnetic field for interaction with said rotor winding and thereby produce current flow in said rotor winding;
and third means for directing said current flow from said rotor winding to said stator winding to effect direct current braking of said motor and thereby control the speed of descent of said suspended load.

4,030,008

SINGLE PHASE ALTERNATING CURRENT MOTOR DUAL SPEED CONTROL CIRCUIT

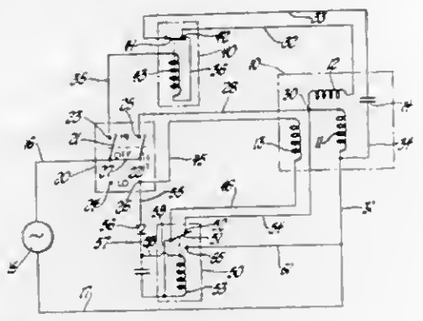
Kenneth A. Buckle, Utica, Mich.; Edwin H. Halsted, Dayton, and James O. Elliott, Xenia, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Jan. 26, 1976, Ser. No. 652,382
Int. Cl.² H02P 1/44
U.S. Cl. 318—220 B **4 Claims**



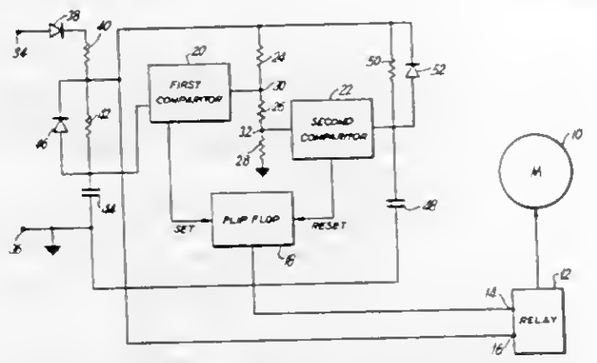
1. A single phase alternating current motor dual speed control circuit for use with a single phase alternating current motor having high speed main and starting windings and a low speed main winding comprising:
a selectively energizable energizing circuit for said high speed main winding including a first current responsive switching device sensitive to current flow through said high speed main winding for completing an energizing circuit for said high speed starting winding;
a selectively energizable energizing circuit for said low speed main winding including a bidirectional current translating device of the type capable of conducting electrical current in both directions in response to electrical control signals and a second current responsive switching device sensitive to current flow through said low speed main winding for completing an alternate energizing circuit for said high speed main winding;
means for producing electrical control signals for said bidirectional current translating device; and
means for inhibiting the producing of said control signals while the speed of said motor is greater than a predetermined value.

4,030,009
SINGLE PHASE ALTERNATING CURRENT MOTOR DUAL SPEED CONTROL CIRCUIT
Edwin Howe Halsted, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.
Filed Jan. 9, 1976, Ser. No. 648,044
Int. Cl.² H02P *1/44*
U.S. Cl. 318—221 R **4 Claims**



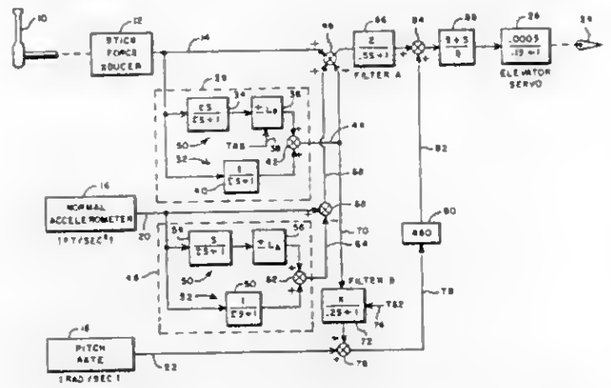
1. A single phase alternating current motor dual speed control circuit for use with a single phase alternating current motor having high speed main and starting windings and a low speed main winding comprising:
a selectively energizable energizing circuit for said high speed main and starting windings;
a selectively energizable first energizing circuit for said low speed main winding including said low speed main winding and the parallel combination of said high speed main and starting windings in series; and
a potential sensitive switching device responsive to a potential drop of a predetermined magnitude across said low speed main winding for interrupting said first energizing circuit for said low speed main winding and for establishing a second energizing circuit for only said low speed main winding.

4,030,010
TIME DELAY CONTROL CIRCUIT
Norman L. Schwartz, Stony Brook, N.Y., assignor to Multiplex Communications, Inc., Hauppauge, N.Y.
Filed Feb. 13, 1975, Ser. No. 549,764
Int. Cl.² H02P *1/10*
U.S. Cl. 318—487 **6 Claims**



1. A time delay control circuit comprising, a pair of input terminals, a capacitor, and a resistor arranged in series between the input terminals, a flip-flop, a first comparator connected across the resistor to set the flip-flop, a second comparator connected to one of the input terminals to reset the flip-flop, and resistance means connected across said input terminals and to each of said comparators to generate bias voltages for said comparators when voltage is applied across said input terminals, whereby the flip-flop is set in accordance with variations in the signal applied to the input terminals which are of a predetermined minimum duration established by the charging time of the capacitor.

4,030,011
MULTIMODE CONTROL SYSTEMS
Russell C. Hendrick, and John C. Larson, both of Minneapolis, Minn., assignors to Honeywell Inc., Minneapolis, Minn.
Filed Mar. 24, 1975, Ser. No. 561,381
Int. Cl.² G05B *13/00*
U.S. Cl. 318—561 **14 Claims**

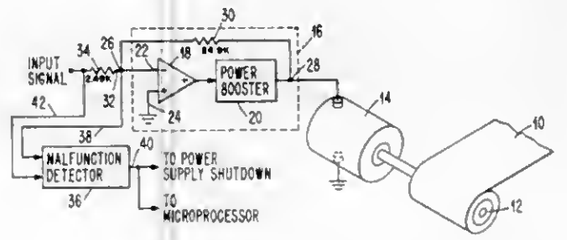


1. In a multimode control system including means for affecting physical condition in response to an input signal which is processed through nonlinear signal processing circuitry to provide more than one system response characteristic depending on input signal frequency and amplitude, the improvement which comprises:
a high pass filter;
a low pass filter;
means for supplying the input signal to said high pass and low pass filters;
an amplitude limiter;
means for supplying the output signal of one of said high pass and low pass filters to said amplitude limiter;
first summing means for additively combining the output signals of said amplitude limiter and the other said high pass and low pass filters;
second summing means for subtractively combining the input signal and the output signal of said first summing means;
first signal transfer means having a first signal response characteristic;
means for supplying the output signal of said first summing means to said first signal transfer means;
second signal transfer means having a second signal response characteristic distinct from the first signal response characteristic;
means for supplying the output signal of said second summing means to said second signal transfer means;
third summing means for combining the output signals of said first and second signal transfer means; and
means for supplying the output signal of said third summing means to the condition affecting means.

4,030,012
AMPLIFIER MALFUNCTION DETECTOR
Otto Richard Buhler, Boulder, Colo., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed June 23, 1975, Ser. No. 589,100
Int. Cl.² H02H *3/28*
U.S. Cl. 318—565 **11 Claims**

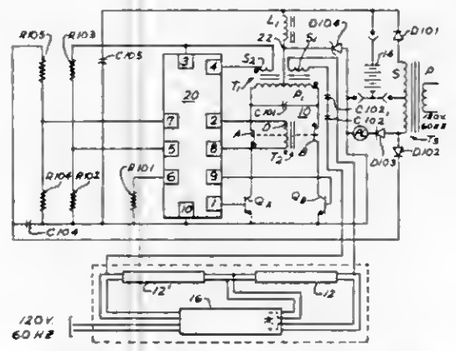
1. Apparatus for detecting malfunction in a power amplifier comprising:
amplifier means;
control means for producing a controlled signal to drive said amplifier;

malfunction means operably connected to said control means for summing a plurality of signals;
feedback means operably connected for feeding back a signal from the output of the amplifier to the malfunction means;



compare means to compare the signal from the malfunction means with reference signals; and
means for outputting an error signal indicative of the amplifier malfunction when the range of reference signals is exceeded.

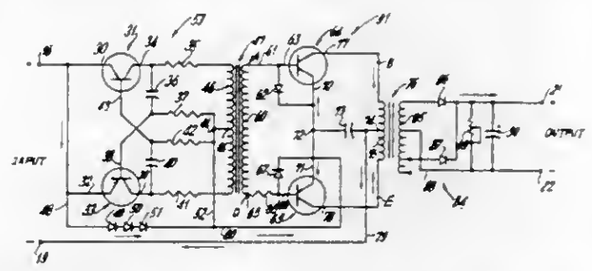
4,030,013
EMERGENCY LIGHTING SYSTEM AC LINE VOLTAGE SENSING
Donald L. Watrous, Liverpool, N.Y., assignor to General Electric Company, Carmel, Ind.
Division of Ser. No. 534,660, Dec. 19, 1974, Pat. No. 3,921,005. This application Aug. 25, 1975, Ser. No. 607,487
Int. Cl.² H05B *37/04*
U.S. Cl. 320—59 **4 Claims**



1. In an emergency lighting system having a high reactance transformer with a primary winding adapted for coupling to an AC energy source and a secondary winding, circuit means for monitoring the AC source voltage comprising:
means for coupling the secondary winding of the transformer with a non-linear load during one half cycle of the AC source voltage; and
means for coupling the transformer secondary winding with a linear load during an alternate half cycle of the AC source voltage to provide DC voltage proportional to the AC source voltage.

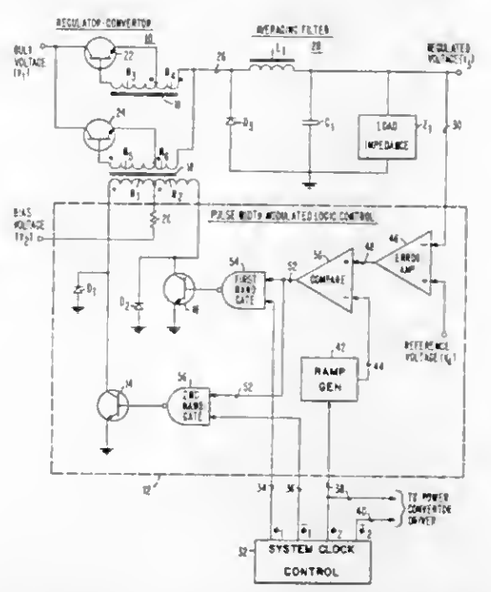
4,030,014
CURRENT-TO-CURRENT ELECTRICAL ISOLATOR
Maghar S. Chana, Rochester, and Eli Leonard Garelick, Henrietta, both of N.Y., assignors to Rochester Instrument Systems, Inc., Rochester, N.Y.
Filed Apr. 25, 1975, Ser. No. 571,586
Int. Cl.² H02M *3/335*
U.S. Cl. 321—2 **7 Claims**

1. A current-to-current isolator adapted to be utilized between a transmitter and a control room instrument and to be powered by the current signal from the transmitter and without another power source, said isolator comprising:
a pair of input terminals and a pair of output terminals;
a master oscillator means which is a push-pull chopper and connected to the first input terminal;
a first transformer whose primary winding has a center tap and two end taps;
a voltage reference means providing a voltage drop connected between said first input terminal and said center tap, the said center tap and the said taps being connected to said master oscillator;



a slave oscillator means connected to the secondary of said first transformer and whose frequency is controlled by said master oscillator;
a current transformer whose primary winding has a center tap and two end taps, said center tap being connected to the second input terminal and the end taps being connected to said slave oscillator means; and
full wave rectifying and filtering means being connected between the secondary of said current transformer and said output terminals.

4,030,015
PULSE WIDTH MODULATED VOLTAGE REGULATOR-CONVERTER/POWER CONVERTER HAVING PUSH-PUSH REGULATOR-CONVERTER MEANS
Joseph Michael Herko, and James Maurice Joyce, both of Boca Raton, Fla., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Oct. 20, 1975, Ser. No. 624,217
Int. Cl.² H02P *13/32*
U.S. Cl. 321—2 **3 Claims**



1. A regulator-converter for regulating a bulk voltage to a maximum regulated output voltage comprising, in combination:
clock means for generating first, second and third clock pulses at first, second and third outputs, respectively, of said clock means, said first clock pulse being at a frequency (F), said second clock pulse being at a frequency

(F) and 180° out phase with said first clock pulse and said third clock pulse being at a frequency (2F);

control means being driven by said first, second and third clock pulses and responsive to a ripple voltage on said regulated output voltage for generating, alternately, pulse width modulated control voltages at a frequency (F) at first and second outputs;

regulator means having a first input operably connected to said first output of said control means, a second input operably connected to said second output of said control means and a third input connected to said bulk voltage for providing a switched voltage at a frequency (2F) at its output substantially equal in amplitude to said bulk voltage and in response to said amplified pulse width modulated control voltages at a frequency (F);

said regulator means being comprised of a regulator interstage transformer having one end of a primary winding connected to said first output of said control means, the other end of said primary winding connected to said second output of said control means and a center tap connected by means of a current limiting resistor to a bias voltage, and said regulator interstage transformer having first and second secondary winding;

a first regulator power transistor having its collector connected to said bulk voltage, its base connected to one end of said first secondary winding and its emitter connected to a tapped winding; and

a second regulator power transistor having its collector connected to said bulk voltage, its base connected to one end of said second secondary winding and its emitter connected to a tapped winding, the other end of said first secondary winding being connected to the other end of said second secondary winding thereby forming said output of said regulator means; and

averaging filter means connected to said output of said regulator means for filtering said switched voltage providing at its output a regulated voltage approximating said bulk voltage.

4,030,016

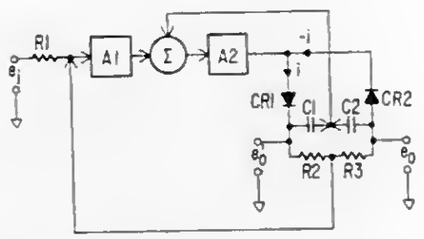
PRECISION ACTIVE RECTIFIER CIRCUIT

Joe E. Marriott, Loveland, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Mar. 26, 1976, Ser. No. 670,805

Int. Cl.² H02M *7/00*

U.S. Cl. 321—8 R **8 Claims**



1. A stable high speed switching circuit having feedback loops, the circuit comprising:

a first amplifier having an input and an output;

a second amplifier having an input connected to the output of first amplifier and having an output;

a first compensating feedback loop comprising a first non-linear switching component serially coupled to a first capacitor, the first non-linear switching component having a first terminal connected to the output of said second amplifier and a second terminal connected to a first terminal of the first capacitor, the first capacitor having a second terminal connected to the input of said second amplifier; and

an outer feedback loop comprising a first impedance having a first terminal connected to the second terminal of the first non-linear switching component, and having a second terminal connected to the input of the first amplifier.

4,030,017

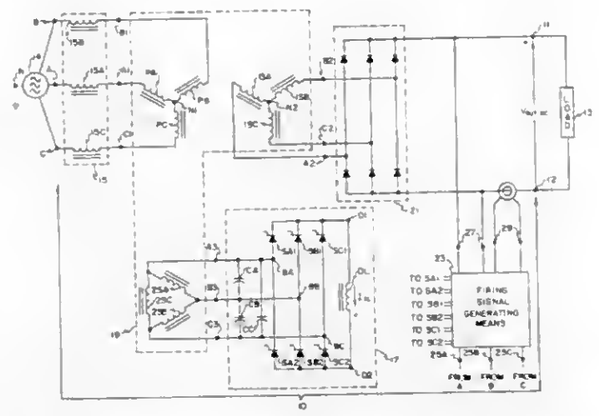
CONTROLLED REACTANCE REGULATOR CIRCUIT

Harold J. Brown, Lorain, Ohio, assignor to Lorain Products Corporation, Lorain, Ohio

Continuation-in-part of Ser. No. 546,554, Feb. 3, 1975, Pat. No. 3,983,469. This application Jan. 6, 1976, Ser. No. 646,973

Int. Cl.² H02M *7/155*; **G05F** *1/30*

U.S. Cl. 321—9 R **36 Claims**



18. A voltage regulator circuit comprising, in combination, a circuit input for connection to a polyphase a-c source, a circuit output for connection to a load, polyphase line inductance means for supporting the difference voltages between a polyphase a-c voltage at the circuit input and a desired voltage at the circuit output, a transformer having a set of polyphase primary windings, having a first set of polyphase secondary windings and having a second set of polyphase secondary windings, means for connecting the first set of secondary windings to the circuit output, at least three capacitors connected to one another in a closed circuit path, the sum of the voltages around said path being substantially equal to zero, means for connecting the capacitors to the second set of secondary windings, controllable discharging means for controllably conducting a recurring sequence of resonant discharge current pulses through the capacitors, each resonant discharge current pulse having a resonant discharge frequency of from three to ten times the frequency of the voltage at the circuit input, and control means for setting the phase relationship between the resonant discharge current pulses and the voltages at the circuit input, in accordance with the voltage at the circuit output, to maintain the desired voltage at the output, said capacitors and said controllable discharging means cooperating, under the control of the control means, to induce across the line inductance means voltages which add to the input voltages when the combined effective impedance thereof is capacitive and which subtract from the input voltages when the combined effective impedance thereof is inductive.

4,030,018

POWER CONVERTER SYSTEM

Takashi Tsubol, Katsuta, Japan, assignor to Hitachi, Ltd., Japan

Filed Jan. 13, 1976, Ser. No. 648,675

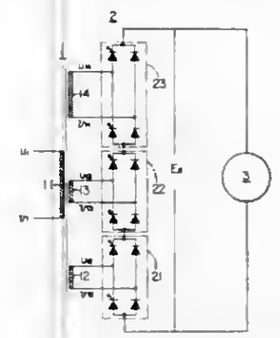
Claims priority, application Japan, Jan. 16, 1975, 50-6362

Int. Cl.² H02M *7/00*

U.S. Cl. 321—27 R **5 Claims**

1. A power converter system for converting an AC voltage into a DC voltage, comprising a transformer means provided with a primary winding connected to an AC power source and a secondary winding divided into a plurality of sets of coils; and rectifier means including a plurality of rectifier circuits, each of said rectifier circuits including controlled rectifier

elements and having AC and DC terminals, said AC terminals of each rectifier circuit being connected to the corresponding one of the sets of secondary coils, said DC terminals of said respective rectifier circuits being connected in series to produce a DC output voltage from said rectifier means, predetermined one of said rectifier circuits being adapted to control its DC output voltage sequentially and cyclically in a plurality of steps of generating the DC output voltage from said rectifier means, the remaining rectifier circuits being adapted to control their DC output voltages in an on-off fashion in said steps, said steps being switched over by on-off controlling said remaining rectifier circuits for on-off control when the DC output voltage of said predetermined one of said rectifier circuits reaches an ultimate value in each cycle; the improvement wherein the value of the DC output voltage from said rectifier means when the DC output voltage of said predetermined one of said rectifier circuits reaches said ultimate value is selected to be higher than the value of the DC output voltage from said rectifier means when the next step commences.



4,030,019

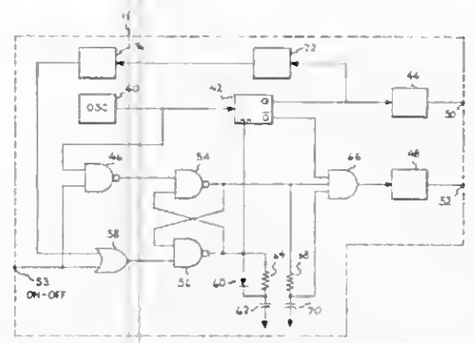
STATIC INVERTER CONTROL CIRCUIT

Ronald Barry Bailey, Erie, Pa., assignor to General Electric Company, Erie, Pa.

Filed Nov. 10, 1975, Ser. No. 630,733

Int. Cl.² H02M *7/515*

U.S. Cl. 321—45 R **4 Claims**



1. In a complementary impulse commutated inverter circuit of the type including first and second controllable switching means connected in alternate load current carrying paths between a DC power source and an inductive load, an improved control circuit including means for producing gating signals having a predetermined normal time duration, said control circuit having first and second output terminals and an input terminal, said first and second output terminals being connected to control terminals of said controllable switch means, said input terminal being connected to receive an inverter enable command signal said control circuit comprising:

a. means responsive to said enable command signal for initially supplying a first gating signal to a predetermined one of said controllable switching means and for thereafter supplying subsequent gating signals alternately to both of said controllable switching means;

b. means responsive to the removal of said enable command signal for causing a last gating signal to be applied to said predetermined one of said controllable switching means; and

c. means for prematurely terminating said last gating signal so that said last gating signal is of a subnormal duration.

4,030,020

THYRISTOR CONTROLLED DIRECT CURRENT REGULATOR

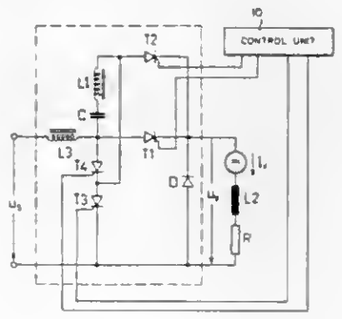
Fritz Korb, Lampertheim, Germany, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Nov. 20, 1975, Ser. No. 633,694

Claims priority, application Germany, Nov. 21, 1974, 2455132; Nov. 28, 1974, 2456216

Int. Cl.² H02M *1/06*

U.S. Cl. 321—45 C **7 Claims**



1. In a direct current regulator for a load circuit supplied with current from a voltage source from two main lines, one of said main lines including a main thyristor, a quenching thyristor and a quenching condenser connected in a series circuit which latter is connected in parallel with said main thyristor, a change-over reactor connected to one electrode of said quenching condenser, a change-over thyristor, a connection from one main electrode of said change-over thyristor to the connection line between said quenching thyristor and said quenching condenser, a connection between the other main electrode of said change-over thyristor and the like main electrode of said main thyristor and a control unit connected to the gating electrodes of said thyristors for setting their ignition periods, the improvement wherein the said connection from said one main electrode of said change-over thyristor extends directly to the connection line between said quenching thyristor and said quenching condenser, wherein said change-over reactor is connected in series with said quenching condenser and wherein one main electrode of a charging thyristor is connected directly to a line connecting said quenching thyristor with the series circuit formed by said quenching condenser and said change-over reactor, the other main electrode of said charging thyristor being connected to said other main line.

4,030,021

INVERTER

Masahiko Akamatsu, Amagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 513,472, Oct. 9, 1974, Pat. No. 3,942,094, which is a continuation-in-part of Ser. No. 387,700, Aug. 13, 1973, abandoned, which is a continuation-in-part of Ser. No. 199,190, Nov. 16, 1971, abandoned. This application Nov. 19, 1975, Ser. No. 633,548

Int. Cl.² H02M *7/515*

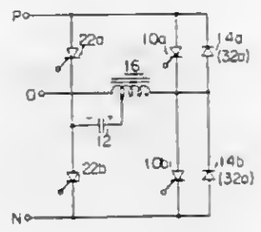
U.S. Cl. 321—45 C **12 Claims**

1. An inverter circuit comprising:

at least two semiconductor controlled rectifier means operatively connected between a source of direct current and

an AC load to provide an output current with alternating polarity;

a series combination of a commutation capacitor and a primary winding of a transformer connected across said semiconductor controlled rectifier means for applying reverse bias to said semiconductor rectifier means on commutation;



a respective first semiconductor unidirectional conductive element connected in anti-parallel with each of said semiconductor controlled rectifier means to pass reverse current on commutation; and

means for controlling the charging and discharging currents of said commutation capacitor flowing through said primary winding of said transformer with the output current having the alternating polarity and flowing through a secondary winding of said transformer.

4,030,022

PHASE-CONTROLLED CYCLOCONVERTERS

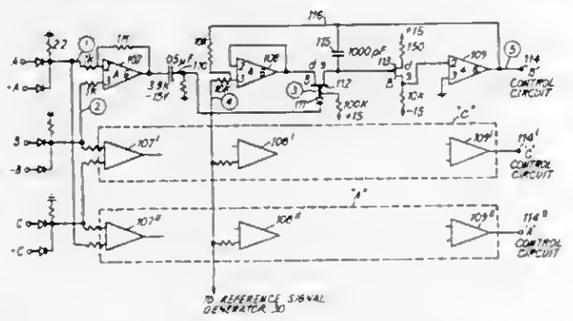
Brian Michael Bird, Bristol, England, assignor to National Research Development Corporation, England

Filed May 29, 1975, Ser. No. 581,755

Claims priority, application United Kingdom, June 3, 1974, 24430/74

Int. Cl.² H02M 5/27

U.S. Cl. 321—69 R **9 Claims**



1. A method of control of switching means for cycloconverter apparatus, for converting electrical power from an input, 3-phase alternating current supply of input frequency to an output, alternating current supply of output frequency different from said input frequency, said method comprising generating a sinusoidal reference wave of said output frequency for each phase of said output supply, sampling the amplitude of each said reference wave at the instants of amplitude equality of each pair of the input supply phases, storing the value of each sampled amplitude during the next following 180°, at supply frequency, to provide a modified reference wave of step-form amplitude, and providing a conduction initiating pulse for said switching means at each amplitude equality of each said modified reference wave and each input supply wave so as to control current conduction by said switching means and thus control the current flow from each of the input supply phases.

4,030,023

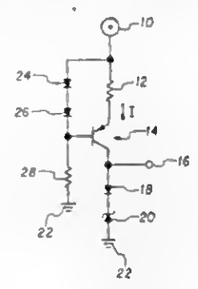
TEMPERATURE COMPENSATED CONSTANT VOLTAGE APPARATUS

John L. Keith, Garland, Tex., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed May 25, 1976, Ser. No. 689,877

Int. Cl.² G05F 1/58

U.S. Cl. 323—4 **2 Claims**



1. Temperature compensated constant voltage apparatus comprising, in combination:

power supply means including first and second terminal means;

transistor means including base, emitter and collector means;

first resistive means connected between said first terminal means and said base means;

apparatus output means connected to said collector means for outputting a constant voltage;

second resistive means connected between said emitter means and said second terminal means;

first diode means, comprising two diodes connected in series each having the same direction of easy current flow, connected between said base means and said second terminal means; and

second diode means, including at least a zener diode and a further diode having a direction of easy current flow opposite that of the zener diode, connected between said collector means and said first terminal means.

4,030,024

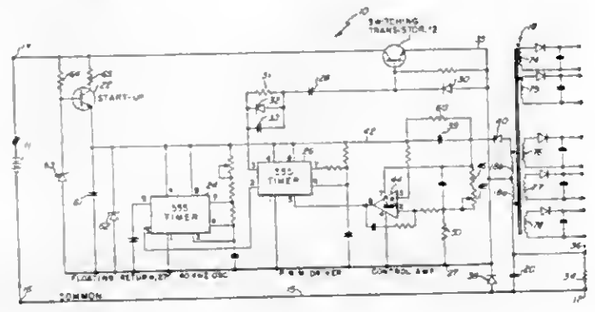
SWITCHING POWER SUPPLY WITH FLOATING INTERNAL SUPPLY CIRCUIT

Derek Chambers, Bedford, and Dee Wang, Londonderry, both of N.H., assignors to Raytheon Company, Lexington, Mass.

Filed July 2, 1976, Ser. No. 702,177

Int. Cl.³ H02M 7/217, 7/515

U.S. Cl. 323—17 **14 Claims**



1. A power supply, a pair of input terminals for connection to a source of direct current, a pair of output terminals for connection to a load, a choke coil comprising first and second windings, one end of which is connected to one of said output terminals, the other of said output terminals forming a common lead to one of said input terminals, a switching transistor coupled from a common point of said first and second windings to the other of said input terminals, a free-wheeling diode connected from said common point to said common lead and adapted to conduct during OFF periods of said switching

transistor and poled in a direction to provide a current path for said first winding, a first lead forming a common terminal for a plurality of floating power supply elements also connected to said common point, said floating power supply elements connected between said first lead and a second lead and connected by way of a rectifier diode to the other end of said first and second windings, said floating power supply elements including a voltage reference source, and means for comparing the voltage from said voltage reference source with the voltage from said rectifier diode as provided by said second lead, thereby to produce a differential voltage, and means for translating said differential voltage into pulses of varying widths for application to the floating control electrode of said switching transistor.

4,030,025

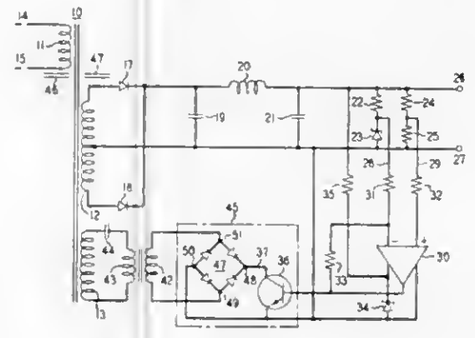
FERRORESONANT REGULATOR WITH SUPPLEMENTARY REGULATION THROUGH WAVEFORM CONTROL

Robert John Kakalec, Madison, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Feb. 20, 1976, Ser. No. 659,696

Int. Cl.² G05F 1/64

U.S. Cl. 323—61 **8 Claims**



4. A voltage regulator comprising:

a ferroresonant transformer including an input winding and an output winding,

a ferroresonant capacitor and a linear inductor connected in series and coupled to said output winding,

a peak voltage detector coupled to said output winding,

means for monitoring an output voltage of said peak voltage detector including means for generating an error signal respresentative of a deviation of the output voltage from a regulated value,

means for linearly varying the quality of said linear inductor in response to said means for monitoring including a linearly variable impedance coupled in shunt with said linear inductor, an impedance of said variable impedance being responsive to said error signal.

4,030,026

SAMPLING METAL DETECTOR

George Calvin Payne, Tempe, Ariz., assignor to White's Electronics, Inc., Sweet Home, Oreg.

Filed Nov. 25, 1974, Ser. No. 526,678

Int. Cl.² G01V 3/10; G01R 33/02

U.S. Cl. 324—3 **20 Claims**

1. A sampling metal detector comprising:

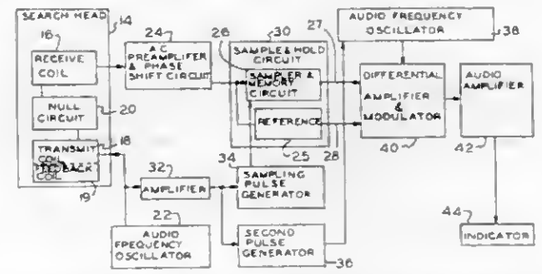
transmit coil means;

receive coil means;

search head means for enclosing and supporting said transmit coil means and said receive coil means in such a manner as to enable the detection of metal objects in an unabservable position external to the search head;

a first oscillator coupled to said transmit coil for transmitting a sinusoidal oscillator signal through said transmit coil to produce a changing electromagnetic field in the region of said search head means and cause a received signal to be induced in said receive coil during the transmission of said oscillator signal when a metal object is within the portion of said electromagnetic field which is external to said coil means and said search head means thereby enabling the detection of the metal object, said received signal including a mineral soil signal component when said metal object is located in mineralized soil;

sampling pulse generator means for producing sampling pulses at a time related to the output signal of said oscillator, said sampling pulses having a pulse width less than one cycle of said received signal and having a faster rise time than the oscillator signal;



sampling means coupled to the output of said sampling pulse generator means and having its input connected to the output of said receive coil means, for sampling said received signal at a position on its waveform where the mineral soil signal component of said received signal is of a minimum amplitude for a time period corresponding to the width of the sampling pulse to produce an output sample voltage corresponding to the sampled portion of one cycle of the received signal; and

output means for producing an output signal corresponding to a selected component of the received signal in response to the output sample voltage.

4,030,027

APPARATUS FOR NON-CONTACT MEASUREMENT OF DISTANCE FROM A METALLIC BODY USING A DETECTION COIL IN THE FEEDBACK CIRCUIT OF AN AMPLIFIER

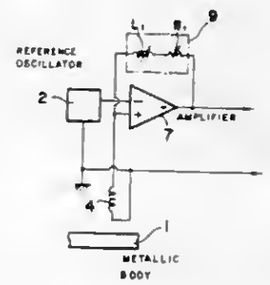
Takeo Yamada; Seigo Ando, both of Yokohama, and Katsujiro Watanabe, Tokyo, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 30, 1975, Ser. No. 627,463

Claims priority, application Japan, Nov. 6, 1974, 49-127048; Mar. 25, 1975, 50-34929

Int. Cl.³ G01R 33/12

U.S. Cl. 324—34 D **6 Claims**



1. Apparatus for measuring the distance between a detecting coil and a metallic body mounted in opposition thereto, said apparatus comprising a differential amplifier having positive and negative input terminals, a reference oscillator connected to the negative input terminal of the amplifier, a feedback circuit connected to the positive input of said differential amplifier, said feedback circuit incorporating said detecting coil such that amplified AC signals from said reference oscillator are applied to the detecting coil through said feedback

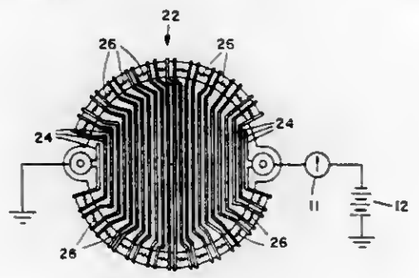
circuit, the amplified differential output signal between said AC signals applied to said differential amplifier and the signal also supplied to said differential amplifier and resulting from the impedance of the detecting coil corresponding to the distance between the detecting coil and the metallic body being thus a measure of said distance; at least one of the parameters of open-loop gain of the differential amplifier and the impedance of the feedback circuit being pre-determined so as to linearize at least for a pre-determined measuring range the output characteristics of said differential amplifier originating from the variation of the detecting coil impedance caused by the variation of said distance.

4,030,028

METHOD OF AND APPARATUS FOR DETECTING CONDUCTIVE PARTICLES IN AN OIL FLOW SYSTEM

David G. Allender, 23A - 12th Ave., San Mateo, Calif. 94402

Filed Aug. 13, 1975, Ser. No. 604,307
Int. Cl.² G01R *27/02*
U.S. Cl. 324—65 R **20 Claims**



1. The method of sensing the presence and quantity of conductive materials in a flow system for high electrical resistance fluid comprising the steps of:

a. positioning an electrically insulating substrate having a major surface with a plurality of elongated close spaced substantially parallel electrically conductive surfaces thereon below the normal level of fluid at a point in said system where the fluid flow is relatively static whereby conductive materials having a higher specific gravity than said fluid may contact said major surface of said substrate;

b. electrically connecting each of said elongated conductive surfaces at the junction between a different pair of a plurality of series connected electrical resistance elements providing a given total electrical resistance;

c. electrically isolating said plurality of series connected electrical resistance elements from said fluid of said flow system;

d. passing a given electrical current flow through said series connected electrical resistance elements; and

e. sensing effective decreases in said given total electrical resistance due to conductive materials which contact said substrate in a position to bridge the space between adjacent ones of said elongated close spaced substantially parallel conductive surfaces thereon.

4,030,029

HARNESS ASSEMBLY TEST SYSTEM

C. Eugene Cox, 2738 W. Strawberry Lane, Santa Ana, Calif. 92701

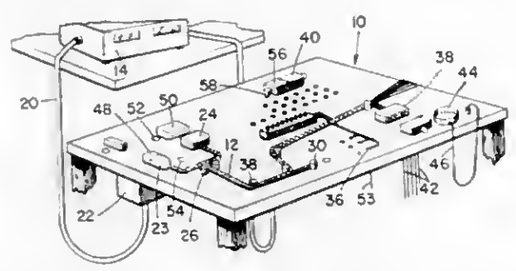
Filed Aug. 14, 1975, Ser. No. 604,821
Int. Cl.² G01R *31/02, 19/16*
U.S. Cl. 324—66 **21 Claims**

1. The method of making a wiring harness of the kind in which each conductor of a group of conductors, each having a first end and a second end, is to extend from a respectively associated first place at which a respectively associated electrically conductive element is located to a respectively associated second place at which a respectively associated electrically conductive element is located, which method comprises the steps of:

applying an initiating signal to the electrically conductive element at one of said first places;

sequentially examining the conductive elements at said first places for the presence of an initiating signal;

terminating said sequential examination upon finding a conductive element at a first place which is subjected to an initiating signal;



providing an indication to identify the second place associated with the first place which is subjected to said initiating signal; and

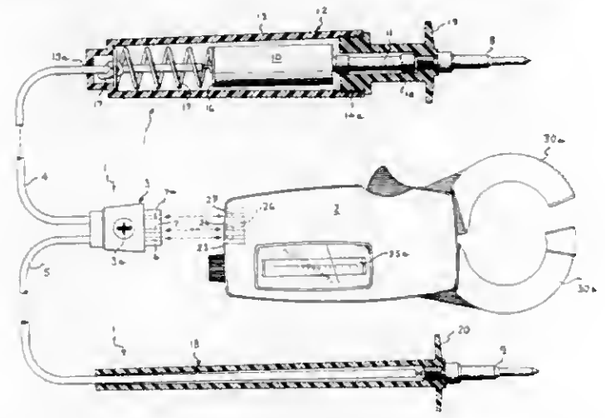
terminating said initiating signal and said indication by completing connection of said one conductor such that its first end is connected to the conductive element at the first place at which the initiating signal appeared and such that its second end is connected to the conductive element at the associated second place.

4,030,030

PROBE ASSEMBLY FOR AN ELECTRIC METER

Carl F. Van Bennekom; Donald R. Hyer, both of Lynnfield, and Warren N. Kernander, Boxford, all of Mass., assignors to General Electric Company, Schenectady, N.Y.

Filed Feb. 4, 1976, Ser. No. 655,315
Int. Cl.² G01R *31/02*
U.S. Cl. 324—72.5 **7 Claims**



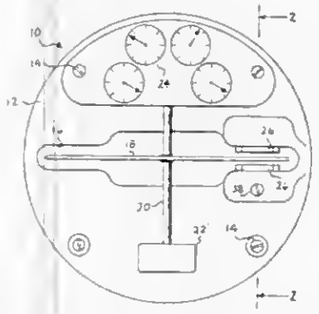
1. A probe assembly for use with a meter that is operable to measure electrical current or voltage and adaptable with said assembly to measure electrical resistance, comprising, an insulated multi-terminal plug housing, first and second flexible, insulated electrical conductors, first and second electrical probes, a plurality of terminals mounted in said plug housing, a resistor and a potentiometer, the ends of said first conductor being electrically connected, respectively, to said first probe and to one terminal in said plug housing, the ends of the second conductor being electrically connected, respectively, to said second probe and to another terminal in said plug housing, said potentiometer being electrically connected in series with one of said flexible conductors and the terminal to which it is connected and said resistor being electrically connected between the first and second flexible conductors, a fuse and a battery electrically connected in series with the other of said flexible conductors, said probes being manually movable into engagement with spaced points of an electrical conductor to measure the resistance thereof responsive to said battery establishing a potential difference between the probes whereby said potential difference is applied across the terminals connected, respectively, to the first and second probes, and said potentiometer being operable to adjust the meter to indicate full scale deflection when the first and second probes are placed in engagement with each other.

4,030,031

MAGNETIC DAMPING SYSTEM FOR INDUCTION WATTHOUR METERS

Harold Lloyd Stucker, Somersworth, N.H., assignor to General Electric Company, New York, N.Y.

Filed Sept. 10, 1975, Ser. No. 612,122
Int. Cl.² G01R *11/14, 11/10*
U.S. Cl. 324—152 **10 Claims**



1. In an induction watthour meter including a rotatably mounted electroconductive disk armature driven by alternating flux fields produced by an alternating current electromagnet, a magnetic damping system for said disk armature comprising a counterposed pair of predeterminedly spaced damping magnet units with each unit positioned adjacent opposite sides of the disk armature and opposite the other, said magnet units each comprising an assemblage including a non-permanent magnet bridge member for conducting magnetic flux, a cobalt-rare earth permanent magnet affixed to the bridge member, and a non-permanent magnet projection member for conducting magnetic flux on said bridge member extending in spaced symmetrical relationship with and in the same direction as said magnet and being of approximately the same dimensions as the magnet, the unlike poles of said permanent magnets and said non-permanent magnet projection members for conducting magnetic flux each being aligned with its respective counterpart on the opposite side of the interposing disk armature whereby a closed loop magnetic flux field is established through the counterposed pair of damping magnet units and passes twice and in opposite directions through the interposed disk armature.

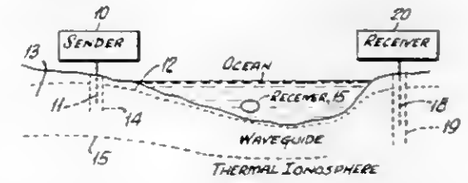
4,030,032

RADIO TRANSMISSION SYSTEM

Harold A. Wheeler, Great Neck, N.Y., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 5, 1960, Ser. No. 20,100
Int. Cl.² H04B *13/02*
U.S. Cl. 325—28 **8 Claims**

1. A method of radio transmission comprising radiating electromagnetic waves in the earth's crust through a "deep wave guide" formed of basement rock bounded on its upper side by a surface layer of sufficient conductivity to form the upper boundary of the wave guide and bounded on its lower side by a region having a temperature of several hundred degrees Centigrade, which temperature causes the lower region to have a conductivity which is high relative to that of the basement rock.

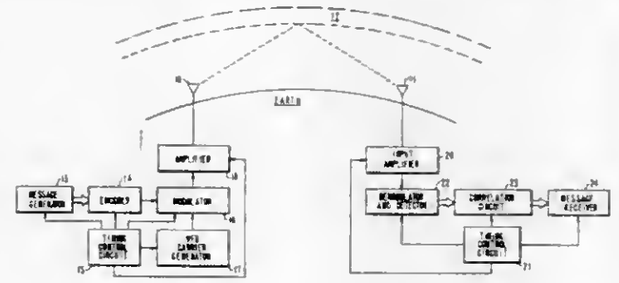


4,030,033

METHOD AND APPARATUS FOR TRANSMITTING MESSAGES TO AND FROM REMOTE LOCATIONS

Klaus Bibl, Belmont, and Bodo W. Reinisch, Bedford, both of Mass., assignors to Lowell Technological Institute Research Foundation, Lowell, Mass.

Filed June 13, 1975, Ser. No. 586,538
Int. Cl.² H04B *7/02*
U.S. Cl. 325—30 **14 Claims**



1. A communications system for transmitting a message including a plurality of characters through a highly noisy, variable delay propagation medium, said system comprising:

A. a modulated carrier wave transmitter including:

i. means responsive to each message character for establishing a corresponding multiple-bit phase code sequence,

ii. means for generating a carrier wave which shifts from one frequency to another, and

iii. means for phase-modulating the carrier wave in response to the phase code sequence thereby to transmit the modulated carrier wave with frequency diversity dependent upon the carrier wave frequency shifts to the propagation medium, and

B. a receiver for recovering from the propagation medium the transmitted message, said receiver including:

i. means for generating a carrier wave that shifts in frequency in synchronism with the carrier wave frequency shifts at said transmitter,

ii. input means for generating a demodulated signal in response to the signal from said incoming modulated carrier wave,

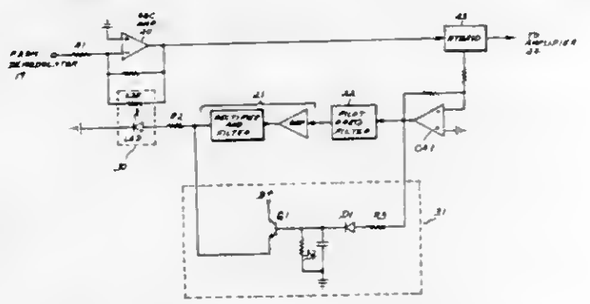
iii. detecting means for decoding the demodulated signal into a sequence of vector signals representing different predetermined range delays of the signal through the propagation medium, and

iv. correlation means for generating a message character based upon the correlation of the detected vector signals and the multiple bit phase code sequences.

4,030,034
OVERDRIVE PROTECTION CIRCUIT FOR POWER LINE CARRIER SYSTEMS AND THE LIKE

Eugen H. Ruegg, Lynchburg; Va., assignor to General Electric Company, Lynchburg, Va.

Filed Jan. 30, 1976, Ser. No. 653,716
Int. Cl.² H04B 1/16
U.S. Cl. 325—319 **5 Claims**

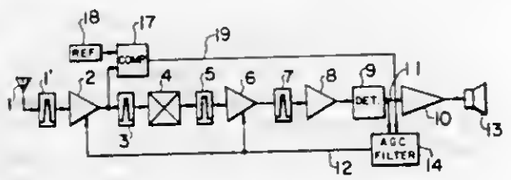


1. An improved gain control circuit for use with an arrangement having:
   a. a first amplifier having an input for a band of signals including a pilot frequency signal, having a gain control terminal for controlling the gain of said first amplifier, and having an output;
   b. a gain control loop comprising an input terminal connected to said first amplifier output, a second amplifier having its input connected to said gain control loop input terminal, a filter for said pilot frequency signal connected to the output of said second amplifier, and means connecting said pilot filter output to said gain control terminal of said first amplifier for varying the gain of said first amplifier as an inverse function of the magnitude of said pilot frequency signal; and
   c. said improved gain control circuit comprising biasing means connected to said connecting means of said gain control loop for producing a bias signal in response to said pilot frequency signal exceeding a selected magnitude, and means connected between the output of said second amplifier and said connecting means of said gain control loop for varying the gain of said first amplifier as an inverse function of the magnitude of said band of signals, said biasing means of said improved gain control circuit rendering said improved gain control circuit inoperative in response to said bias signal.

4,030,035
CIRCUIT FOR PREVENTING OUTPUT CLIPPING OF R.F. STAGE IN RADIO RECEIVER

Masanori Ienaka, Fuchu; Yasuo Kominami, Kokubunji; Yukio Suzuki, Hinode, and Masami Kawamura, Kodaira, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Sept. 29, 1975, Ser. No. 617,638
Claims priority, application Japan, Oct. 2, 1974, 49-112786
Int. Cl.² H04B 1/16
U.S. Cl. 325—404 **6 Claims**

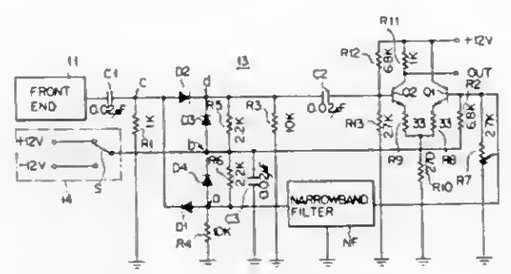


1. In a receiver including in cascade a radio frequency amplifier stage, a frequency converter stage, an intermediate frequency amplifier stage and a detector, and AGC filter means for automatically controlling the gains of said radio frequency amplifier stage and said intermediate frequency amplifier stage by an AGC voltage derived from the output of said detector, the improvement comprising voltage comparator means connected to the output of said radio frequency amplifier stage for effecting a comparison detection between the signal amplitude value of the output of said radio frequency amplifier stage and a reference value and for producing a control signal when the signal amplitude value of the output of said radio frequency amplifier stage becomes greater than the predetermined reference value, and means responsive to said control signal to reduce the gain of said radio frequency amplifier stage, thereby to prevent output clipping of said radio frequency amplifier stage.

4,030,036
BANDWIDTH CHANGING CIRCUIT

Kazutoshi Kusano, Mitaka, Japan, assignor to Sansui Electric Co., Ltd., Tokyo, Japan

Filed May 25, 1976, Ser. No. 689,948
Claims priority, application Japan, May 28, 1975, 50-71927[U]
Int. Cl.² H04B 1/16
U.S. Cl. 325—427 **5 Claims**

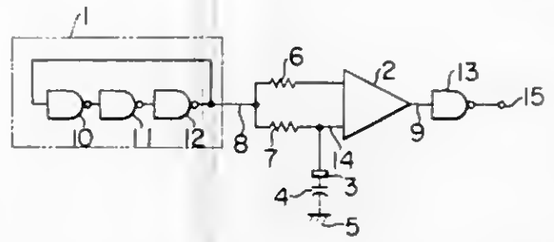


1. A bandwidth changing circuit comprising:
   a differential amplifier circuit means including first and second inputs and first and second transistors having input electrodes connected to said first and second inputs respectively and connected in differential configuration to each other, said second input being coupled to a power source to bias said second transistor conductive;
   a control voltage providing means for selectively providing first and second control voltages having different voltage levels to said first input of said differential amplifier circuit means, thereby causing, upon provision of the first control voltage, said first transistor to be biased conductive to constitute a differential amplifier circuit together with said second transistor and causing, upon provision of the second control voltage, said first transistor to be biased nonconductive;
   a wideband input signal source;
   a narrowband filter having an output coupled to said first input of said differential amplifier circuit means; and
   a switching circuit means for coupling, when said control voltage providing means provides the second control voltage to said first input of said differential amplifier circuit means, said wideband input signal source to said second input of said differential amplifier circuit means in response to said second control voltage, and coupling, when said control voltage providing means provides the first control voltage to said first input of said differential amplifier circuit means, said wideband input signal source to said first input of said differential amplifier circuit means through said narrowband filter in response to said first control voltage.

4,030,037
PROXIMITV DETECTING APPARATUS

Minoru Tanaka; Shoichi Mitani, both of Yokohama; Takeo Yuminaka, Katsuta; Rokuro Sasaki, Katsuta, and Hatuya Nakamura, Katsuta, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 21, 1974, Ser. No. 435,268
Claims priority, application Japan, Jan. 22, 1974, 49-9649
Int. Cl.² G01V 3/10
U.S. Cl. 328—5 **10 Claims**

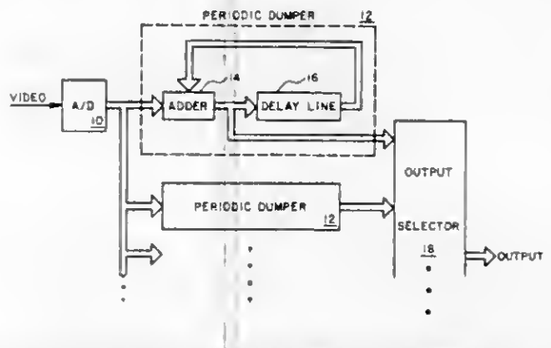


1. A proximity detecting apparatus comprising:
   an oscillator having an output terminal for generating high frequency voltage signals;
   an operational amplifier having at least two input terminals;
   at least one impedance element inserted between said output terminal of said oscillator and said input terminals for maintaining one of said input terminals at a slightly higher potential than the other input terminal; and
   a conductive metal plate connected to said one of said input terminals for forming in response to proximity of an object thereto an electrostatic capacitance between said metal plate and earth through said object.

4,030,038
MULTIPLE DUMPING INTEGRATOR

Donald D. Daniel, China Lake, and Roger V. Wilcox, Ridgecrest, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 27, 1976, Ser. No. 661,916
Int. Cl.² G06G 7/18
U.S. Cl. 328—127 **3 Claims**

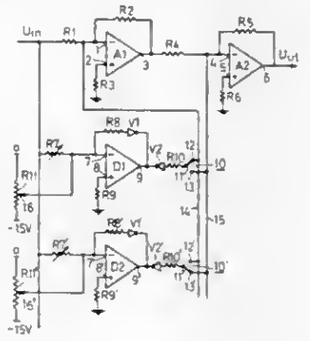


1. A multiple dumping integrator comprising:
   a source of digital signals; a plurality of periodic dumping integrators connected in parallel having a common input effectively connect to said source of digital signals and individual outputs to simultaneously integrate input data; and
   an output selector having an input connected to the outputs of said periodic dumping integrators to sequentially select each of said outputs in turn for display.

4,030,039
FUNCTION GENERATOR

Tord Fahlgren, Kolback, Sweden, assignor to ASEA Aktiebolag, Vasteras, Sweden

Filed Mar. 17, 1976, Ser. No. 667,703
Claims priority, application Sweden, Apr. 1, 1975, 7503674
Int. Cl.² G06G 7/12
U.S. Cl. 328—142 **3 Claims**

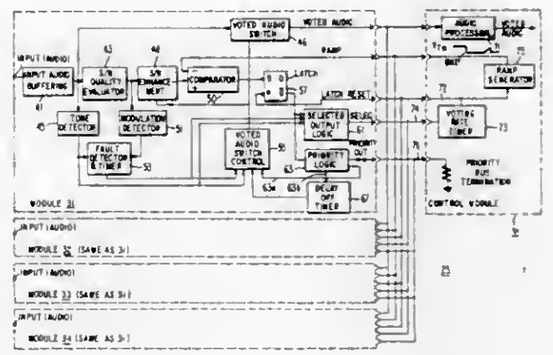


1. Function generator for generation of inverse time characteristics by approximation of the time function by means of individual, linear parts into a time function which is discontinuous at a number of break points, comprising first and second operational amplifiers, each having at least one input and at least one output the output of said first operational amplifier being connected to the input of said second operational amplifier, a plurality of amplifier circuits corresponding to the number of break points in the approximated time function, each of said amplifier circuits having at least one input and one output and operating as an ideal diode to provide a predetermined linear part of said time function, each of said amplifier circuits having said input connected to an input voltage source, and each of said amplifier circuits including selecting means for independently connecting the output thereof to the input of said first operational amplifier to decrease the derivative of the linear part of the time function generated by the respective amplifier circuit, said selecting means alternatively connecting the amplifier circuit output to the input of said second operational amplifier to increase the derivative of the linear part of the time function generated by the respective amplifier circuit.

4,030,040
RECEIVED SIGNAL SELECTING SYSTEM

Donald Duane Harbert, Prosperity, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Dec. 30, 1975, Ser. No. 645,339
Int. Cl.² H04B 1/10
U.S. Cl. 328—154 **10 Claims**



1. In combination,
   signal quality detector means providing a separate control signal having a level indicative of the quality of each of a plurality of signals,

ramp signal generating means,

comparator means responsive to said control signals and to said ramp signal for providing a further control signal when the magnitudes of one of said first mentioned control signals and said ramp signal are at a given relative level, and

means responsive to said further control signal and to said plurality of signals to pass that one of said plurality of signals resulting in said last-mentioned further control signal to a utilization circuit.

4,030,041

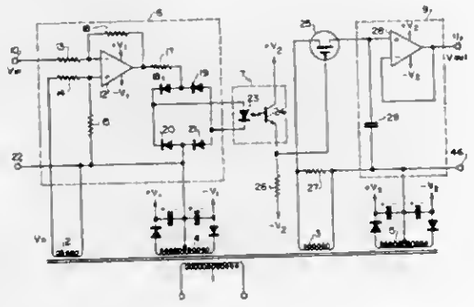
ANALOG ISOLATOR

Toshihiko Sasaki, Chigasaki, Japan, assignor to Honeywell Inc., Minneapolis, Minn.

Filed Aug. 28, 1975, Ser. No. 608,726

Int. Cl.² H03F *3/38*

U.S. Cl. 330—10 **4 Claims**



1. An analog isolator comprising:

a transformer having a primary winding arranged for connection to an A.C. power source;

a first and a second power supply secondary winding on said transformer;

a first and a second signal secondary winding on said transformer;

an input circuit arranged to be energized from said first power supply secondary winding;

input signal terminal means connected to said input circuit;

means coupling said first signal secondary winding to said input circuit;

said input circuit including means for comparing input signals applied to said input terminal means with A.C. signals induced in said first signal secondary winding and for producing a control signal derived from such comparison;

an output circuit arranged to be energized from said second power supply winding;

gating means coupling said second signal secondary winding to said output circuit; and

isolating coupling means for applying said control signal to control the operation of said gating means whereby to control the application of A.C. signals induced in said second signal secondary winding to said output circuit in accordance with said control signal;

said output circuit being responsive to said controlled application of A.C. signals from said second signal secondary winding to produce an output signal representative of the input signal applied to said input terminal.

4,030,042

FEEDBACK AMPLIFIERS

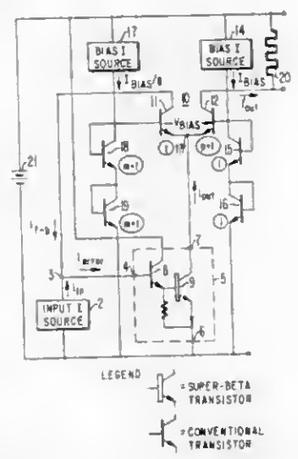
Allen LeRoy Limberg, Lambertville, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Jan. 29, 1976, Ser. No. 653,496

Claims priority, application United Kingdom, June 9, 1975, 24714/75

Int. Cl.² H03F *3/42*

U.S. Cl. 330—18 **27 Claims**



1. A feedback amplifier comprising, in combination:

a current amplifier having a signal input terminal, which is also the signal input terminal for said feedback amplifier, and an output terminal;

a current divider which includes a common terminal and first and second branch terminals, which second branch terminal is also the output terminal of said feedback amplifier, said current divider including first and second transistors, each having base and emitter and collector electrodes and being operated at substantially the same absolute temperature T, the emitter electrodes of said first and said second transistors being connected to said common terminal of said current divider and the collector electrodes of said first and said second transistors being connected respectively to said first branch terminal and to said second branch terminal, said current divider including means responsive to the temperature of said first and said second transistors for supplying a potential in fixed proportion to T, and means for applying said potential in fixed proportion to T between the base electrodes of said first and said second transistors in the poling that tends to reduce the flow of current through said first transistor as compared to the flow of current through said second transistor, the common terminal of said current divider being connected to the output terminal of said current amplifier; and

feedback circuit means connected between the first branch terminal of said current divider and the signal input terminal of said current amplifier for supplying a feedback current to said amplifier.

4,030,043

GENERALIZED OPERATIONAL AMPLIFIER

Thomas Allan Hamilton, 222 Newkirk Road, Richmond Hill, Ontario, Canada

Filed Feb. 19, 1975, Ser. No. 550,911

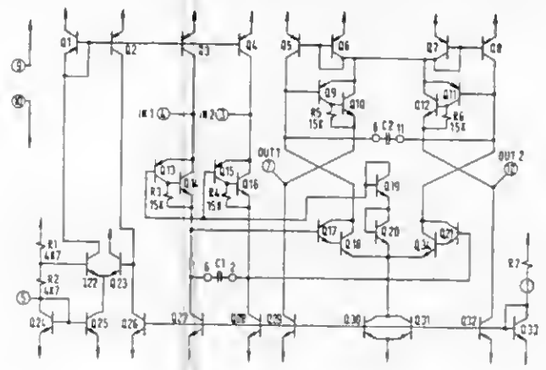
Claims priority, application United Kingdom, Feb. 20, 1974, 7761/74

Int. Cl.² H03F *3/45*

U.S. Cl. 330—30 D **10 Claims**

1. An operational amplifier comprising an input stage of first and second differential current inputs having a low input impedance connected between said inputs, a high current gain stage, an output stage of at least first and second differential current outputs, each output having at least one of each

polarity and a high output impedance connected between said first and said second differential current outputs, said high



current gain stage being interposed between said input stage and said output stage and connected to each.

4,030,044

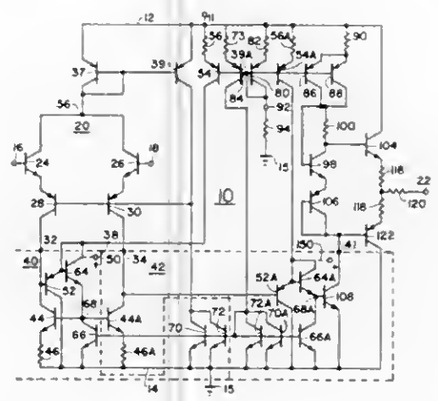
MONOLITHIC AMPLIFIER HAVING A BALANCED, DOUBLE-TO-SINGLE ENDED CONVERTER

Walter Richard Davis, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Nov. 13, 1975, Ser. No. 631,755

Int. Cl.² H03F *3/45*

U.S. Cl. 330—30 D **13 Claims**



11. A balanced double-to-single ended converter for transforming balanced signals occurring between the output terminals of a balanced signal supply into a single-ended output signal at an output terminal thereof, the single-to-double ended converter including in combination:

first power supply conducting means for providing a voltage of a first magnitude;

second power supply conducting means for providing a voltage of a second magnitude;

first current supply means for providing a current of a known predetermined magnitude at an output terminal thereof;

second current supply means for providing a current of said known predetermined magnitude at an output terminal thereof;

first and second circuit portions each including first, second and third signal paths, each of said first paths including a first transistor of a first conductivity type having main electrode coupled between said second power supply conductor and one of the output terminals of the balanced signal supply, each of said second paths including a transistor of a second conductivity type having main electrodes coupled between said output terminal of one of said current supply means and said second power supply conductor means and a control electrode connected to one of the output terminals of the balanced signal supply, and each of said third paths including a second transistor of said first conductivity type having main electrodes coupled between said first and second power supply conductors and a control electrode connected to one of the main electrodes of said transistor of said second conductivity type; and

first circuit means connecting the control electrodes of the first transistors of the first conductivity type of each portion together and to the second power supply conducting means.

4,030,045

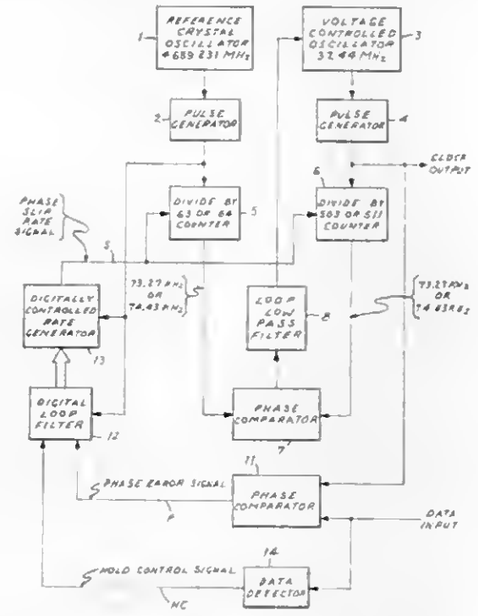
DIGITAL DOUBLE DIFFERENTIAL PHASE-LOCKED LOOP

James Monroe Clark, Cedar Grove, N.J., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed July 6, 1976, Ser. No. 702,803

Int. Cl.² H03B *3/04*

U.S. Cl. 331—1 A **30 Claims**



1. A digital double differential phase-locked loop for extraction of a bit clock from digital data comprising:

a source of digital data;

first means to provide a reference pulse train having a predetermined reference frequency;

second means including a voltage controlled oscillator to provide said bit clock having a repetition frequency locked to said repetition frequency of the bits of said digital data;

third means coupled to said first means to divide said reference frequency by a selected one of a first division factor and a second division factor different than said first division factor;

fourth means coupled to said second means to divide said repetition frequency by a selected one of a third division factor and a fourth division factor different than said first, second and third division factors;

fifth means coupled to said third and fourth means to compare the phase of the output signals of said third and fourth means and to produce a first control signal proportional to the phase difference between the output signals of said third and fourth means;

sixth means coupled to said fifth means and said second means to couple said first control signal to said voltage controlled oscillator to adjust the phase of said bit clock to lock said bit clock to the bits of said digital data; and

seventh means coupled to said source, said second means and said third and fourth means to produce a phase slip rate signal to select the appropriate one of said first and second division factors for said third mans and to select

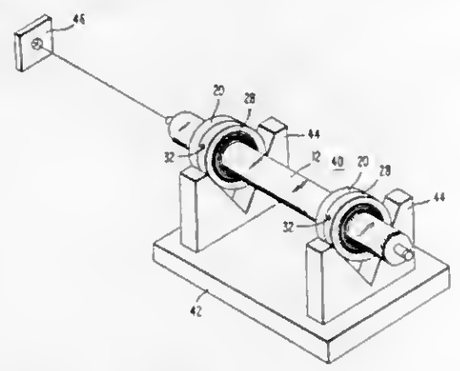
the appropriate one of said third and fourth division factors for said fourth means.

4,030,046

PREALIGNED LASER MOUNT AND METHOD OF MAKING SAME

Arthur Herbert Firester, Skillman, N.J., assignor to RCA Corporation, New York, N.Y.

Filed May 22, 1975, Ser. No. 579,968
Int. Cl.² H01S *3/03*
U.S. Cl. 331—94.5 D **4 Claims**



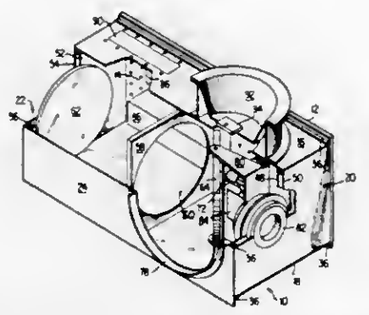
1. A gas laser discharge tube and mount comprising:
a gas laser discharge tube in the form of a closed gas confining envelope,
a first ring mount extending around the tube, the first ring mount positioned and fixedly attached to the tube near one end of the tube; and
a second ring mount extending around the tube, the second ring mount positioned and fixedly attached to the tube near the other end, the tube being in an aligned relationship with the perimeter of the first and second ring mounts.

4,030,047

OPTO-MECHANICAL SUBSYSTEM WITH TEMPERATURE COMPENSATION THROUGH ISOTHERMAL DESIGN

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Francis E. Goodwin, Malibu, Calif.

Filed Apr. 28, 1976, Ser. No. 680,957
Int. Cl.² H01S *3/02*
U.S. Cl. 331—94.5 D **10 Claims**



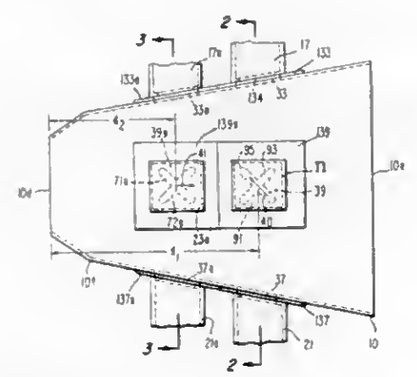
1. A thermally self compensating optical system and a mechanical support structure therefor, comprising:
housing means constructed of a selected material having a high thermal conductivity for supporting said optical system, said housing means constructed so as to minimize the existence of thermal gradients therein;
an optical system having critical focal parameters mounted within said housing, said optical system comprising optical system comprising optical elements formed of said same selected material as said housing means whereby said focal parameters are not effected by changes in temperature, said optical elements coupled both mechanically and thermally to said housing means to minimize the existence of thermal gradients therebetween.

4,030,048

MULTIMODE COUPLING SYSTEM INCLUDING A FUNNEL-SHAPED MULTIMODE COUPLER

Peter Foldes, Wayne, Pa., assignor to RCA Corporation, New York, N.Y.

Filed July 6, 1976, Ser. No. 702,402
Int. Cl.² H01P *1/16, 5/12*
U.S. Cl. 333—6 **8 Claims**



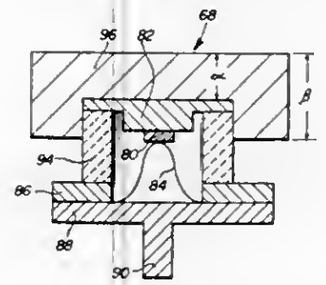
1. A multimode coupling system for coupling symmetrical waveguide mode signals at one frequency band and asymmetrical waveguide mode signals at another frequency band comprising:
a generally funnel-shaped hollow coupler with the small aperture end adapted to pass said symmetrical mode signals and reflect asymmetrical mode signals and the large aperture end adapted to be coupled to free space,
an asymmetrical mode signal terminal,
first and second sidewall coupling apertures in the tapering side wall of said coupler with said first and second side wall coupling apertures at diametrically opposite surfaces of said coupler and in a given plane orthogonal to the axis of the coupler a given distance from the small aperture end of said coupler,
third and fourth side wall coupling apertures in the tapering side wall of said coupler with said third and fourth side wall coupling apertures at diametrically opposite surfaces of said coupler equally spaced from said first and second side wall apertures and in said first given plane at said first given distance from the small aperture end of said coupler, and
coupling means including a filter-polarizer coupled between each of said first, second, third and fourth sidewall apertures and said asymmetrical mode signal terminal characterized by a response to signals at said terminal for coupling equal portions of the signal energy at the terminal to said first, second, third and fourth apertures with the phase of the coupled signals at the first and third apertures being advanced 90° relative to the phase of the signals at the second and fourth apertures,
said filter-polarizers characterized by a response to signals applied thereto at the terminal end thereof for exciting an elliptical polarized wave into the coupler, said given distance from said small aperture end of said coupler being selected together with the elliptical polarization characteristic of the filters to achieve a maximum coupling of asymmetric waveguide mode signal at a wanted polarization different from said elliptically polarized wave excited by the filter-polarizers.

4,030,049

BROADBAND LOW NOISE PARAMETRIC AMPLIFIER

David N. McQuiddy, Jr., and Truman G. Blocker, III, both of Richardson, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 427,898, Dec. 26, 1973, Pat. No. 3,860,879. This application Nov. 5, 1974, Ser. No. 521,008
Int. Cl.² H03F *7/04;* **H01P** *1/20, 5/02, 5/08*
U.S. Cl. 333—33 **8 Claims**



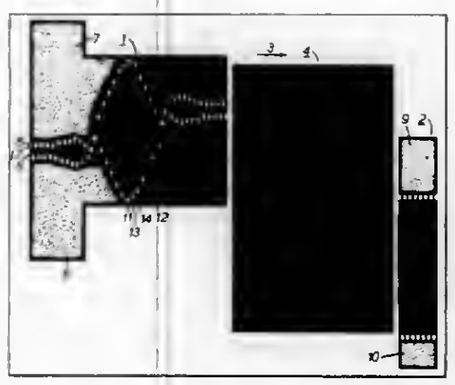
1. A varactor diode assembly for use in a parametric amplifier having a pump frequency comprising:
a varactor diode,
a conductive support for said diode,
a nonconductive spacer mounted on said support,
a conductive cap connected to said spacer remote from said support,
a conductive lead connected between said diode and said cap, and
a cup dimensioned to fit adjacent said support and having a capacitance such that the parallel resonance of said diode assembly is matched to said pump frequency.

4,030,050

ACOUSTIC SURFACE WAVE FILTERS

John Maxwell Deacon, Towcester, and James Heighway, Silverstone, both of England, assignors to Plessey Handel und Investments A.G., Zug, Switzerland

Filed Sept. 25, 1975, Ser. No. 616,689
Claims priority, application United Kingdom, Sept. 26, 1974, 41876/74
Int. Cl.² H03H *9/04, 9/06, 9/26, 9/32*
U.S. Cl. 333—72 **5 Claims**



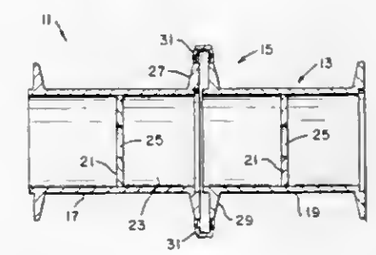
1. An acoustic surface wave filter comprising input and output transducers each having fingers of conductive material supported on a piezoelectric substrate, a pair of terminal pads to which the fingers of each transducer are electrically connected so that the fingers connected to one pad interleave with the fingers of the other pad, the transducers being mutually positionally offset in a direction orthogonal to the direction of acoustic surface wave propagation, a multistrip coupler by means of which the transducers are acoustically coupled, the spacing between adjacent fingers of at least one transducer being non-uniform, the overlap between adjacent fingers of at least one transducer being non-uniform, at least some of the fingers of at least one transducer being bifurcated so as to comprise two parts which are bridged so as to be electrically interconnected and at least some electrically connected fingers of at least one transducer being arranged to sandwich therebetween a dummy finger.

4,030,051

N-SECTION MICROWAVE RESONATOR HAVING ROTARY JOINT FOR VARIABLE COUPLING

James K. Shimizu, Palos Verdes Estates, and Richard V. Basil, Jr., Canoga Park, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed July 6, 1976, Ser. No. 702,796
Int. Cl.² H01P *5/04, 7/06*
U.S. Cl. 333—83 R **9 Claims**



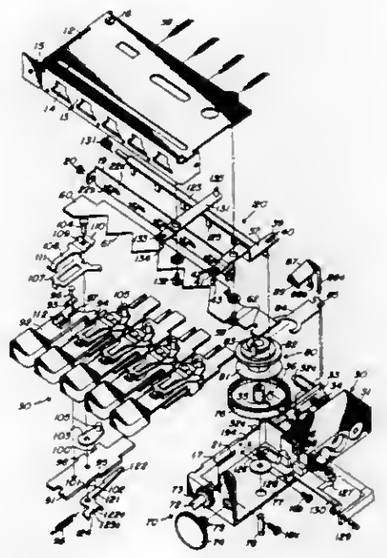
1. A microwave resonator for providing an infinitely variable coupling value over a relatively broad coupling range, comprising:
a cylindrical waveguide section having a rotating joint disposed therein;
a pair of spaced iris plates transversely disposed in said waveguide section and defining a resonant cavity section therebetween having a relatively low current density location approximately midway between said iris plates, said rotating joint being disposed in said relatively low current density location, said iris plates having centrally disposed elliptical apertures and, said iris plates being rotatable with respect to each other to provide a desired axis relationship between said elliptical apertures.

4,030,052

FLAT TUNER

Fernand Flavien Pelletier, Elmhurst, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Sept. 22, 1975, Ser. No. 615,617
Int. Cl.² H03J *5/12*
U.S. Cl. 334—7 **12 Claims**



1. A pushbutton tuner comprising

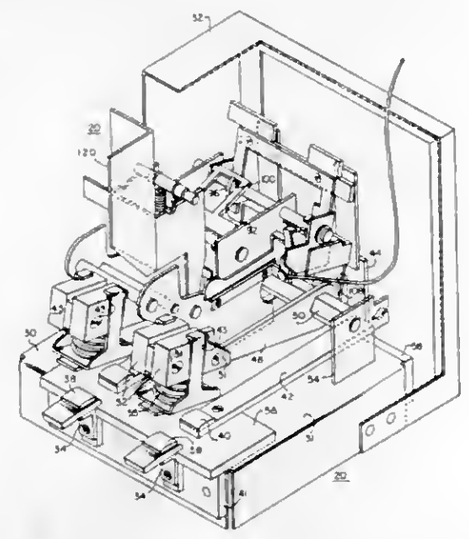
a tuner frame having a thickness dimension measured in a first plane and a width dimension measured in a second plane perpendicular to the first plane,
tuning means mounted to the frame movable to a plurality of positions representative of desired broadcast frequencies, and
a plurality of pushbutton assemblies mounted in the frame for in and out movement and each one of which carries a presettable memory cam means for recalling a memorized broadcast frequency when the one pushbutton assembly is pushed inwardly, upon actuation of a pushbutton assembly the tuning means being driven to the position corresponding to the memorized frequency of the cam carried by the actuated pushbutton
wherein the improvement comprises
slide bar means having a relatively thin dimension measured in a plane parallel to the first plane and mounted in the frame in a plane parallel to the second plane and slidable transverse the path of movement of the pushbutton assemblies for positioning the tuning means in response to driving actuation by any one of the memory cams,
a plurality of open shaped notches having cam surfaces in the slide bar aligned with the pushbutton assemblies,
the memory cam being received within its aligned open notch and engaging a cam surface thereof only when the selected pushbutton assembly carrying said memory cam is pushed in and otherwise being completely removed from its aligned open notch
inward movement of a memory cam within its aligned notch driving the slide bar transversely until the memory cam reaches the end of its travel on the engaged cam surface of its aligned notch, the slide bar and tuning means being thereby moved to the position corresponding to the memorized frequency of the actuated cam.

4,030,053

DISTRIBUTION TRANSFORMER SECONDARY CIRCUIT BREAKER HAVING CANTILEVERED CONTACTS

John F. Cotton, Athens, Ga.; Jack G. Hanks, Bethel Park, and Raymond E. Wien, Penn Township, Westmoreland County, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 11, 1975, Ser. No. 612,527
Int. Cl.² H01H *77/02*
U.S. Cl. 335—15 **11 Claims**



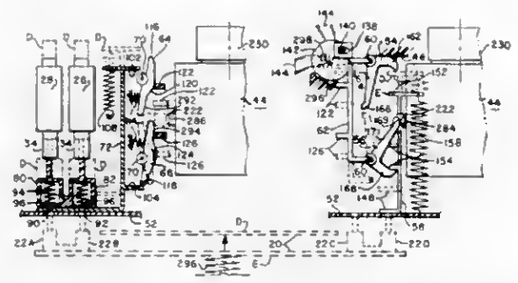
1. An oil-filled transformer having a housing with a circuit interrupter switchable between an open position wherein the electrical connections through the transformer are open and a closed position wherein the electrical connections through the transformer are closed disposed within the housing beneath the oil level comprising:
a circuit interrupter base;
a pair of stationary contacts one of which is disposed above said circuit interrupter base and the other disposed above and away from said circuit interrupter base;
bridging contact means movable between an open position spaced from said pair of stationary contacts and a closed position engaging said pair of stationary contacts completing a series circuit therethrough;
spring biasing means biasing said bridging contact means away from said pair of stationary contacts;
latching means movable between a latched position holding said bridging contact means in engagement with said pair of stationary contacts and an unlatched position allowing said bridging contact means to move away from said stationary contact means in response to said spring biasing means; and
bimetal actuating means supported from said circuit interrupter base so that transformer current flows therethrough and being cooperatively associated with said latch means to move said latch means to an unlatched position when current flow exceeds a trip level.

4,030,054

PNEUMATIC TIMING ATTACHMENT FOR AN ELECTROMAGNETIC DEVICE

Rudolf H. Kiessling, Glendale, Wis., assignor to Square D Company, Park Ridge, Ill.

Filed Dec. 23, 1975, Ser. No. 643,883
Int. Cl.² H01H *7/03, 43/00*
U.S. Cl. 335—61 **11 Claims**



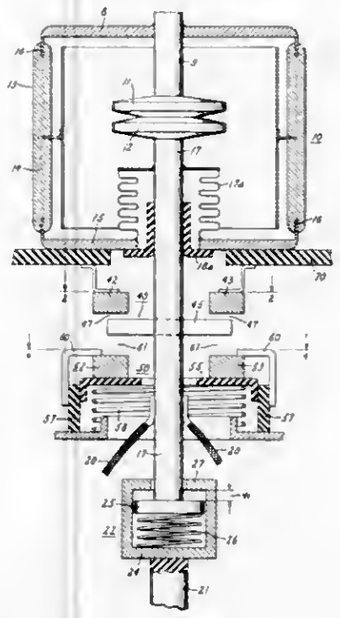
1. A timed delay device arranged for alternately providing either an ON delay or an OFF delay operation of a switch operator, comprising: a switch actuator movable between a first operated position and a second operated position for moving the switch operator from a first to a second position, a resettable timing unit having an operator movable from a reset position to a timed-out position during a regulated timed period, a first spring-biased latch having a portion releasably engaging the switch actuator for maintaining the switch actuator at its first position when the first latch is positioned in a latching position and a portion engageable with the timing unit operator for positioning the first latch in a released position when the timing unit operator is in its timed-out position, a second spring-biased latch having a portion releasably engaging the switch actuator for maintaining the switch actuator at its second position when the second latch is positioned in a latching position and a portion engageable with the timing unit operator for positioning the second latch in a released position when the timing unit is in its timed-out position, a first reset lever having a portion engageable with the timing unit operator for moving the timing unit operator to the reset position when the first reset lever is moved from a first position to a second position, a second reset lever having a portion engageable with the timing unit operator for moving the timing unit operator to the reset position when the second reset lever is moved from a first to a second position, a timing unit actuator moveable between a first position and a second position and having a portion engageable with a portion on the first reset lever for moving the first reset lever from its first position to its second position when the timing unit actuator is moved from its second position to its first position and a portion engageable with a portion on the second reset lever for moving the second reset lever from its first position to its second position when the timing unit actuator is moved from its first to its second position, and a mode selector movable to a first mode selected position and a second mode selected position and having a portion engageable with the first latch for maintaining the first latch in its released position and a portion positioning the first reset lever in its first position when the mode selector is at its first position and a portion engageable with the second latch for maintaining the second latch in its released position and a portion positioning the second reset lever in its first position when the mode selector is at its second position.

4,030,055

ELECTRIC CIRCUIT BREAKER WITH ELECTRO-MAGNETIC MEANS FOR OPPOSING MAGNETIC CONTACT-REPULSION FORCES

Peter Kotos, Havertown, Pa., assignor to General Electric Company, Philadelphia, Pa.

Filed Feb. 27, 1976, Ser. No. 662,069
Int. Cl.² H01H *77/10*
U.S. Cl. 335—195 **6 Claims**



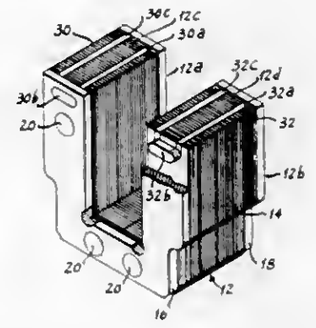
1. In an electric circuit breaker,
a. a first contact and a second contact movable into and out of engagement with said first contact,
b. a movable contact rod mechanically and electrically connected to said second contact for carrying current to and from said second contact,
c. closing-assist means for exerting on said contact rod when the contacts are engaged a magnetic hold-closed force varying in magnitude directly with current through said contact rod,
d. opening means effective during the initial portion of an opening operation for applying an impact force to said contact rod that acts to separate said contacts and to reduce the effectiveness of said closing-assist means,
e. opening-assist means effective after said contacts are separated during an opening operation for developing magnetic force acting on said contact rod in an opening direction comprising:
e_1. an armature comprising spaced segments of high permeability material fixed to opposite sides of said contact rod and projecting laterally therefrom in side-by-side relationship,
e_2. a pair of bridging members of high permeability material located at opposite sides of said contact rod and each disposed to extend between said side-by-side segments when said segments are located in proximity to said bridging members,
f. said bridging members and said segments being magnetically attracted toward each other with a force that varies in magnitude inversely with the spacing therebetween when current flows through said contact rod,
g. means mounting said bridging members for movement with said segments during the final portion of a circuit-breaker opening operation and during the initial portion of a circuit-breaker closing operation,
h. blocking means for blocking said bridging members from moving toward said segments when said contacts are engaged and for maintaining a relatively large spacing between said segments and said bridging members when said contacts are engaged,
i. said bridging members when blocked by said blocking means being positioned in the path of movement of said segments during a circuit-breaker opening operation and in such a location that the spacing between said segments and said bridging members decreases during the initial portion of a circuit-breaker opening operation.

4,030,056

CORE FOR AN ELECTROMAGNET HAVING SHADING COILS CAST IN SITU

Roman J. Patz, Wauwatosa, Wis., assignor to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed Nov. 19, 1975, Ser. No. 633,389
Int. Cl.² H01F *7/10, 7/12*
U.S. Cl. 335—245 **4 Claims**



1. A laminated core assembly for an A.C. electromagnet having at least one pole face for engaging an armature, said assembly comprising a plurality of contiguously stacked magnetizable laminations flush at their ends to form said pole face, said assembly having a continuous closed-loop path therein receiving molten metal injected thereinto forming, when solidified, a cast in situ closed-loop shading coil, said coil having substantially uniform resistance due to the continuity of said metal throughout said path, at least a portion of said path extending across said ends of said laminations whereby at least a portion of said coil extends across said pole face such that minute particles of said solidified metal migrate into cracks between said laminations on said pole face after repeated engagements by said armature to provide a smoother pole face and increasing quietness of operation.

4,030,057

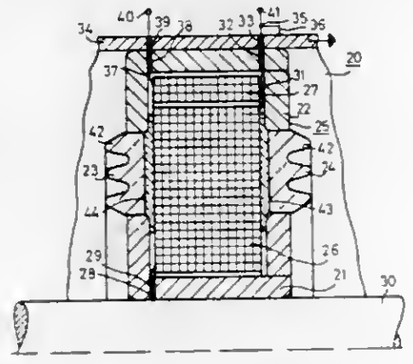
INDUCTIVE VOLTAGE TRANSFORMER

Werner Kohler, and Willi Müller, both of Berlin, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Continuation of Ser. No. 507,574, Sept. 19, 1974, abandoned. This application Apr. 28, 1976, Ser. No. 681,114
Claims priority, application Germany, Sept. 24, 1973, 2348397
Int. Cl.² H01F *15/02*
U.S. Cl. 336—83 **17 Claims**

1. In a metal-clad, high-voltage installation having a metal enclosure at low potential and a conductor for carrying a high

potential disposed within the metal enclosure, an inductive voltage transformer disposed between the potentials of the metal enclosure and the conductor, the inductive voltage transformer comprising: a first flux-conductive part made of electrically and magnetically-conductive material and electrically connected to the conductor of the installation; a high-voltage winding surrounding said first flux-conductive part and having a surface facing away from said flux-conductive part; a low-voltage winding arranged at said surface of said high-voltage winding; a second flux-conductive part electrically connected to the metal enclosure and made of electri-



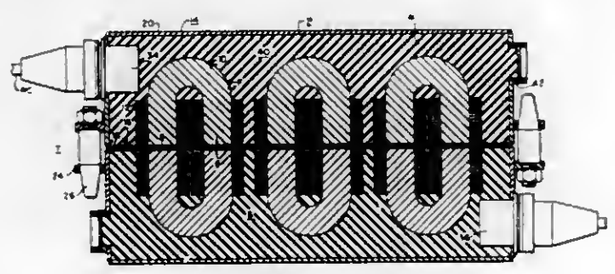
cally and magnetically-conductive material, said second flux conducting part being disposed in spaced relation to said first flux-conductive part so as to be adjacent thereto; and flux-conductive intermediate means extending between said potentials for connecting said parts together to conjointly define therewith a composite core enclosing said high-voltage and said low-voltage windings therein thereby reducing the stray inductance of said windings, said intermediate means being made of a material that is magnetically conductive while at the same time being electrically insulative thereby preventing a conductor to enclosure fault through said intermediate means during the operation of the high-voltage installation.

4,030,058

INDUCTIVE COUPLER

Delmar R. Riffe, Murrysville; Richard D. Olson, Monroeville; David M. Edison, Murrysville, and Robert J. Spreadbury, Franklin Township, Westmoreland County, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 30, 1976, Ser. No. 671,852
Int. Cl.² H01F 27/02
U.S. Cl. 336—92 **1 Claim**



1. An inductive coupler apparatus for connecting and disconnecting electrical power in an underwater environment, comprising:

first and second water-tight sealed stainless steel housings adapted for mechanical mating and each including a stainless steel mating wall having internal and external surfaces, each of said stainless steel mating walls being of a thickness between 0.002 and about 0.010 inches,

mechanical alignment means extending from said water-tight sealed stainless steel housing for mechanically aligning said first and second water-tight sealed stainless steel housing during mating in an underwater environment, said external surfaces of said stainless steel mating walls being aligned in intimate contact when said first and second water-tight sealed stainless steel housings are mechanically mated,

sacrificial anode means extending from at least one of said first and second water-tight sealed stainless steel housings to minimize corrosion of said housings in an underwater environment,

at least one primary transformer core section including a C-core element and corresponding pole faces and primary coil windings thereabout, said primary transformer core section being positioned within said first water-tight sealed stainless steel housing with said pole faces in ultimate contact with the internal surface of the stainless steel mating wall of said first water-tight sealed stainless steel housing,

at least one secondary transformer core section including a C-core element and corresponding pole faces and secondary coil windings thereabout, said secondary transformer core section being positioned within said second water-tight sealed housing with said pole faces in intimate contact with the internal surface of the stainless steel mating wall of said second water-tight sealed stainless steel housing, said primary and secondary transformer core sections being positioned such that the pole faces of the respective core sections are physically aligned when said first and second water-tight sealed stainless steel housings are mechanically mated to thereby complete a magnetic circuit between said primary transformer core section and said secondary transformer core section, and

fill composition filling the internal volumes of said first and second water-tight sealed stainless steel housings to provide mechanical support to enable the stainless steel mating walls to withstand the external pressure of an underwater environment.

4,030,059

FUSE

George Kwo Kiun Tong, 39, MacDonnell Road, Hong Kong

Filed June 9, 1975, Ser. No. 584,716
Int. Cl.² H01H 85/24
U.S. Cl. 337—262 **7 Claims**

1. A fuse comprising means defining a transparent casing having a side wall, a closed upper end, and a base, a first conductor having inner and outer ends extending through said base with its inner end within said casing and its outer end exteriorly of said base, a second conductor having inner and outer ends with its inner end embedded within said base and its outer end exteriorly of said base, and a filament having an inner end engaged to the inner end portion of said first conductor and an opposite end fixed to said second conductor inner end within said base.

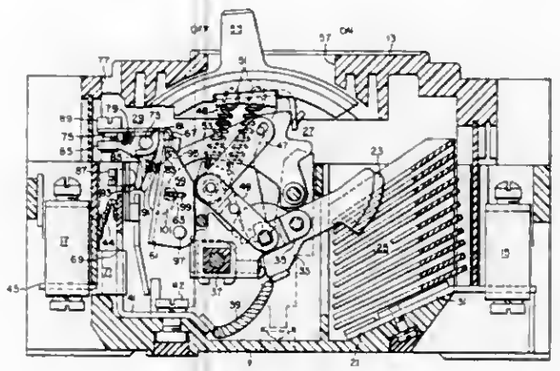
4,030,060

THERMALLY ADJUSTABLE CIRCUIT BREAKER

Stephen A. Mrenna, Beaver; Charles E. Haugh, New Brighton, and Glenn R. Thomas, Beaver, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 26, 1976, Ser. No. 661,592
Int. Cl.² H01H 71/14
U.S. Cl. 337—50 **5 Claims**

1. A multi-pole circuit breaker comprising a circuit breaker structure having a plurality of pole units, each pole unit comprising a pair of contacts, releasable means including a releasable arm to effect simultaneous opening of all of said pairs of contacts, trip means for each of said pole units, each trip means comprising a bimetal element being responsive to the occurrence of certain overload current conditions to effect release of the releasable means, the trip means also comprising a trip bar and a latch bracket, the trip bar being mounted to oscillate between latched and unlatched positions, the latch bracket being pivotally mounted with respect to the trip bar and being movable between latched and unlatched positions of the releasable arm and being urged to the unlatched position by the releasable arm, the trip bar being in the path of movement of each of the bimetal elements to effect movement



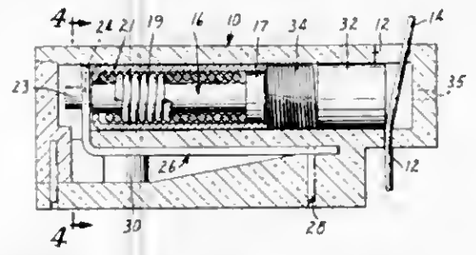
of said bracket when any one of said elements responds to an overload current, and adjustment means between the trip bar and the latch bracket for varying the distance between the bimetal elements and the trip bar.

4,030,061

ELECTRICAL WIRE CUTTING CIRCUIT BREAKER

Clifford R. Gaskell, Richfield, and Stephen E. Houghland, Maplewood, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 14, 1976, Ser. No. 676,695
Int. Cl.² H01H 37/76, 71/20
U.S. Cl. 337—409 **9 Claims**



1. An electrical wire cutting circuit breaker comprising:

a housing formed with an electrical wire receiving aperture therethrough,

a wire cutting piston within said housing with its axis at an angle to the axis of said wire receiving aperture, said piston being axially movable from a rest position to a wire cutting position.

a compression spring positioned within said housing to propel said piston from said rest position to said wire cutting position,

retainer means movable into the path of said piston to retain it in said rest position against said compression spring, said retainer means being resiliently biased out of the path of said piston,

a thermally activatable stop positioned within said housing to retain said retainer means in the path of said piston at normal temperatures and to move at a predetermined elevated temperature to permit said retainer means to move out of the path of said piston, and

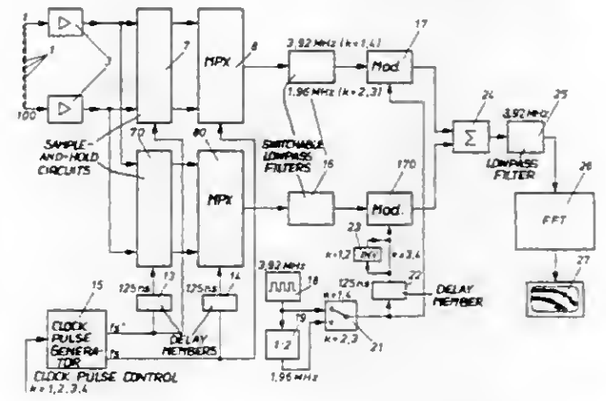
cutting means for severing a wire in said wire receiving aperture by the kinetic energy of said piston upon its release from said rest position by said retainer means and propulsion by said compression spring to said wire cutting position.

4,030,062

DIRECTION DETERMINATION IN SONAR SYSTEMS

Reiner Diehl, and Margitta Lütkemeyer-Hohmann, both of Bremen, Germany, assignors to Fried, Krupp Gesellschaft mit beschränkter Haftung, Essen, Germany

Filed Dec. 10, 1975, Ser. No. 639,603
Claims priority, application Germany, Dec. 14, 1974, 2459219
Int. Cl.² G01S 9/66, 3/80
U.S. Cl. 340—3 R **7 Claims**



1. In a method for determining the direction of echo signal pulses in a medium by means of a close range sonar system having at least one linear array of electroacoustic transducers and presenting a wide aperture angle and high azimuth and radial resolution,

the improvement comprising: dividing the total aperture angle into a plurality of partial regions each having a respective median direction and an aperture angle

$$\alpha \leq \frac{c}{D \cdot B},$$

where c is the speed of sound in the medium, D is the length of the transducer array, and B is the bandwidth of the emitted signal pulses; subjecting the received signals associated with each partial region to a delay time compensation corresponding to its associated median direction; scanning the signals received by successive units of the transducers of said array at a selected frequency f_s; intermediately storing the scanned signals; sampling successive ones of the intermediately stored signals at a sampling frequency f_s to form a serial signal; and phase compensating the resulting serial signal to produce a direction indication.

4,030,063

ULTRA LOW FREQUENCY ACOUSTIC GENERATOR

Albert E. Wallen, Winston-Salem, N.C., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 28, 1976, Ser. No. 709,151
Int. Cl.² H04B 13/00
U.S. Cl. 340—8 R **5 Claims**

1. An underwater acoustic signal generator comprising in combination:

a source of pneumatic fluid at a high pressure relative to ambient water pressure;

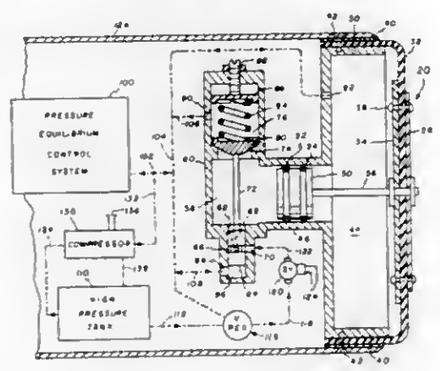
pressure equilibrium control means for providing pneumatic fluid at a reference pressure that is maintained substantially equal to ambient water pressure;

pressure reducing valve means, connected to said source and responsive to said reference pressure, for providing pneumatic fluid at a regulated pressure that is maintained at a predetermined differential over said reference pressure;

body means defining first and second chambers and a cylinder interconnecting said chambers;

pneumatic oscillator means, connected to said pressure reducing valve means to receive penumatic fluid at said regulated pressure and connected to said equilibrium control means so as to exhaust at said reference pressure, for effecting substantially square wave pneumatic pressure excursions in said second chamber at a predetermined frequency;

means for connecting the pressure equilibrium control means to said first chamber to provide pneumatic fluid at said reference pressure in said first chamber;



a first piston having one side exposed to said reference pressure in said first chamber and the other side exposed to ambient water pressures; and

a second piston disposed in said cylinder and connected directly to said first piston, said second piston being exposed on one side to pneumatic fluid at said reference pressure in said first chamber and on the other side to said pneumatic pressure excursions in said second chamber, whereby the effect of said pressure excursions on said second piston are transmitted through said first piston to said ambient water.

4,030,064

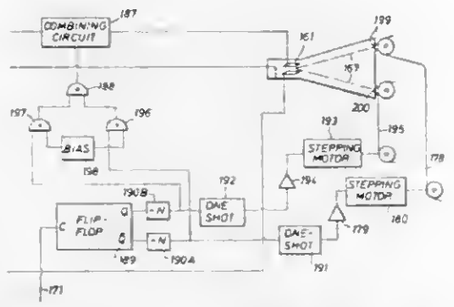
METHODS AND APPARATUS FOR RECORDING WELL LOGGING MEASUREMENTS

Jennings W. Elliott, Friendswood, Tex., assignor to Schlumberger Technolgy Corporation, New York, N.Y.

Division of Ser. No. 378,754, July 12, 1973, Pat. No. 3,916,372. This application Mar. 6, 1975, Ser. No. 556,058

Int. Cl.² G01V *1/40;* **H01J** *29/52*

U.S. Cl. 340—15.5 DS **4 Claims**



1. Apparatus for recording well logging data comprising:

means for producing synchronizing signals representative of a recurring event;

a cathode-ray tube having first and second deflection means and an intensity control means;

driving means responsive to said synchronizing signals and coupled to said first deflection means for providing a first signal of repetitively sweep the electron beam of said cathode-ray tube along an axis of the screen of said cathode-ray tube;

means for interrupting selected ones of said first signals to stop selected sweeps of said electron beam at a selected location along said axis;

means for providing first and second well logging data representative of subsurface characteristics at preselected depth intervals;

means coupled to said intensity control means and responsive to said first well logging data for modulating the intensity of said electron beam during sweeps of said electron beam to produce first indicia on said screen;

means coupled to said second deflection means and said intensity control means and responsive to said second well logging data for simultaneously modulating the intensity and location of said electron beam while said selected sweep of said electron beam resulting from said first signal is interrupted so as to produce second indicia on said screen;

a first recording medium located adjacent said screen of said cathode-ray tube and adapted for recording indicia produced thereon;

means for moving said first recording medium each that indicia produced by successive sweeps of said electron beam along a first axis of said screen are recorded at spaced intervals along said first recording medium and are representative of well logging data at preselected intervals;

a second recording medium located adjacent said screen of said cathode-ray tube adapted for recording indicia produced by successive sweeps of said electron beam along a second axis of said screen and which moves across said second axis of said screen such that traces along said second axis are recorded at spaced intervals along said second recording medium and are representative of well logging data at preselected intervals; and

means coupled to said second deflection means for shifting selected sweeps of said electron beam a preselected interval between said first axis and said second axis such that indicia produced along said first axis of said screen are recorded on said first recording medium and indicia produced along said second axis of said screen are recorded on said second recording medium.

4,030,065

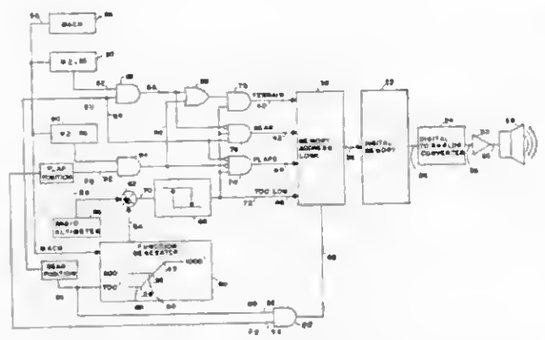
TERRAIN CLEARANCE WARNING SYSTEM FOR AIRCRAFT

Charles Donald Bateman, Bellevue, Wash., assignor to Sundstrand Corporation, Rockford, Ill.

Filed July 19, 1976, Ser. No. 706,519

Int. Cl.² G01C *5/00*

U.S. Cl. 340—27 AT **51 Claims**



1. A terrain clearance warning system for aircraft comprising:

a radar altimeter for generating signals representing the aircraft's altitude above the terrain;

a source of signals representing the aircraft's speed;

a source of signals representing the position of aircraft landing gear;

means, responsive to said speed signal, for generating a reference altitude signal as a function of aircraft speed;

means, responsive to said altitude signals and said reference altitude signals, for comparing aircraft altitude above terrain with said reference altitude signal;

means, responsive to said landing gear signal and speed signal and said comparing means for generating a first type of warning signal when the aircraft has descended below a first predetermined altitude below a predetermined speed with the landing gear up; and

means, responsive to said landing gear signal, said speed signal and said comparing means for generating a second type of warning signal when the aircraft has descended below a second predetermined altitude above said predetermined speed with the landing gear up.

4,030,066

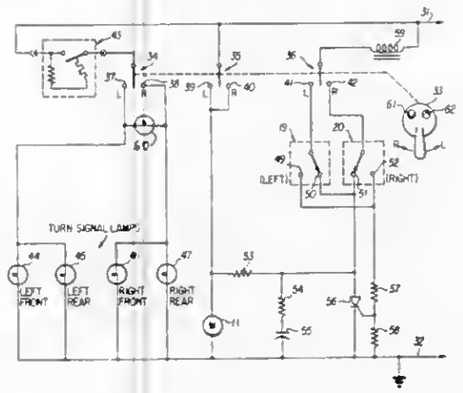
AUTOMATIC CANCELLATION MEANS FOR VEHICLE TURN INDICATOR SIGNALS

Rowland Kent White, 420 Kisconko Turn, Oxon Hill, Md. 20022

Filed Aug. 17, 1976, Ser. No. 715,134

Int. Cl.² B60Q *1/34;* **G01C** *19/02*

U.S. Cl. 340—73 **7 Claims**



1. In a turn indicator signal system for a vehicle having, turn signal means, selectively operable means for activating and deactivating said turn signal means, and means for automatically deactivating said turn signal means upon completion of a turn by the vehicle, the improvement wherein said automatically deactivating means comprises: a gyroscope mounted on said vehicle and having an axis of torque and an axis of precession, said axis of torque being located to respond to turning movements of the vehicle, means pivotally mounting said gyroscope on said axis of precession, and means responsive to pivotal movement of said gyroscope about said axis of precession for deactivating said turn signal means.

4,030,067

TABLE LOOKUP DIRECT DECODER FOR DOUBLE-ERROR CORRECTING (DEC) BCH CODES USING A PAIR OF SYNDROMES

Thomas H. Howell, Scottsdale; Gordon E. Gregg, Tempe, and Leonard Rabins, Scottsdale, all of Ariz., assignors to Honeywell Information Systems, Inc., Phoenix, Ariz.

Filed Dec. 29, 1975, Ser. No. 645,056

Int. Cl.² G06F *11/12*

U.S. Cl. 340—146.1 AL **10 Claims**

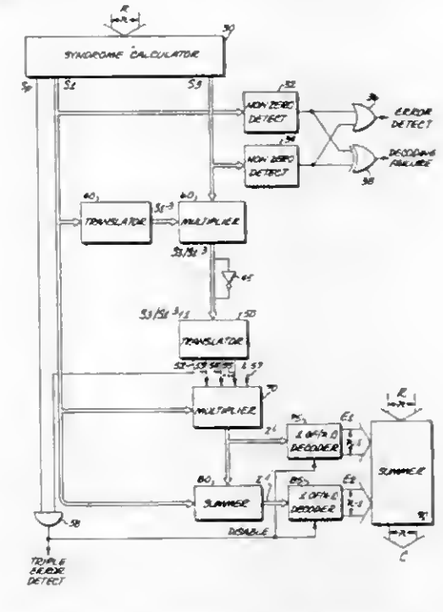
1. An apparatus for detecting and correcting double-bit errors in n-bit codewords, where said codewords include k information bits, $2m$ check bits and one parity bit ($n=k+2m+1$), said apparatus comprising:

means responsive to said codeword for calculating a first and a second syndrome, said syndromes identifying the existence and position of errors in said codeword according to an error-locator equation;

translation means responsive to said syndromes for generating root signals corresponding to one of the roots of said error-locator equation;

first multiplier means coupled to said translation means and to said calculation means for receiving said first syndrome and said root signals, said first multiplier means producing first signals for identifying a first error-location;

first summing means coupled to said first multiplying means and to said calculation means for receiving said first signals and said first syndrome, said summing means producing second signals corresponding to a second error-location;



first decoding means responsive to said first multiplying means for decoding said first signals and for producing an error word containing a 1 corresponding to said first error-location;

second decoding means responsive to said first summing means for decoding said second signals and for producing a second error word containing a 1 corresponding to said second error-locaton; and

second summing means adapted to receive said codeword and responsive to said first and said second decoding means, said second summing means adding said first and said second error words to said codeword for generating a corrected codeword.

4,030,068

OPTICAL CHARACTER RECOGNITION SYSTEM

D. Michael Banz, Wheaton, Md., assignor to Decision Data Computer Corporation, Horsham, Pa.

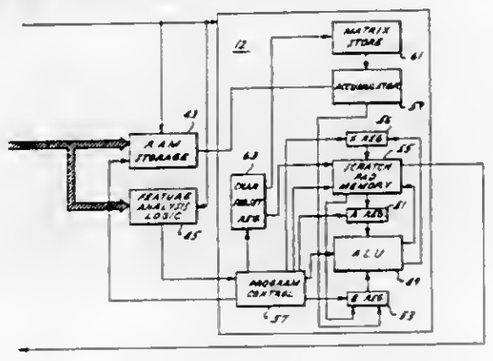
Filed Jan. 12, 1976, Ser. No. 648,298

Int. Cl.² G06K *9/12*

U.S. Cl. 340—146.3 AQ **4 Claims**

1. An optical character recognition system comprising means for scanning a character under test for generating digital information signals corresponding to the presence or absence of information bits at predetermined positions along the scan path, means operatively connected to said scanning means and responsive to the presence of the predetermined number of information bits located at adjacent positions within an area of the character under test, means responsive to the output of said last named means to thereby select a subgroup of characters having a distribution of information bits in said selective areas corresponding in general to the distribution enjoyed by said character under test, and means for performing a weight matrix analysis on each character com-

prising said selected subgroup of characters whereby each bit position of each of the characters comprising the selected



subgroup is compared with a corresponding one of said bit positions of said character under test.

4,030,069

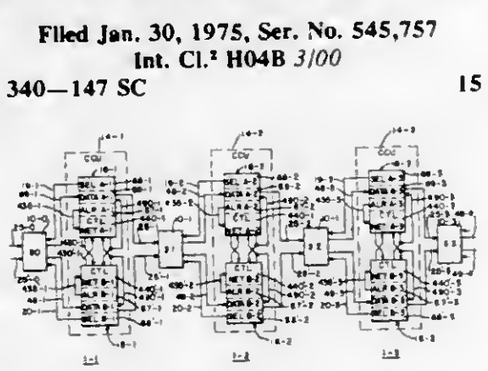
REDUNDANT MESSAGE METERING NETWORK

Gary C. Henrickson, Palo Alto, and John C. McDonald, Los Altos, both of Calif., assignors to TRW Inc., Los Angeles, Calif.

Filed Jan. 30, 1975, Ser. No. 545,757

Int. Cl.² H04B *3/00*

U.S. Cl. 340—147 SC **15 Claims**



1. A data transmission network for transmitting data comprising,

first transmission circuit means including redundant first and second data channels each operable, when enabled, to transmit data,

first channel control means including first alarm means for providing first alarms in response to alarm conditions associated with transmission of data over said first and second data channels and including first control network means responsive to said first alarms for enabling said first and second data channels,

second transmission circuit means including redundant third and fourth data channels each operable, when enabled, to transmit data received from said first or said second data channels,

second channel control means including second alarm means for providing second alarms in response to alarm conditions associated with transmission of data over said third and fourth data channels and including second control network means responsive to said second alarms for enabling said third and fourth data channels,

connection means including first connection means for connecting said first or said second data channel to said third data channel and including second connection means for connecting said first or said second data to said fourth data channel.

4,030,070

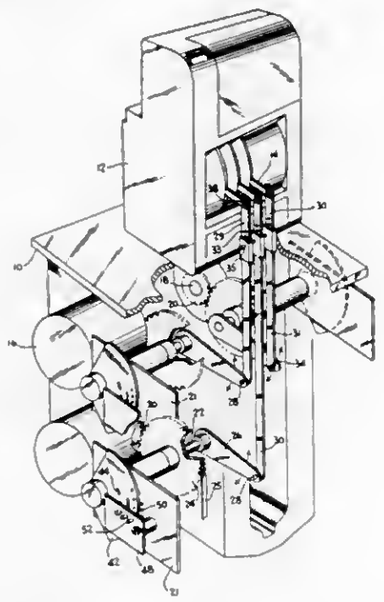
POSTAGE METER SETTING DEVICE

Louis T. Canevari, Norwalk; Vincent G. Coppola, North Branford; Daniel F. Dlugos, Huntington; Gerald C. Freeman, Darien, and Flavio M. Manduley, Seymour, all of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed May 17, 1976, Ser. No. 687,043

Int. Cl.² H04Q *1/00*

U.S. Cl. 340—147 R **12 Claims**



1. Apparatus for remotely resetting the postage selector levers of a postage meter, comprising:

A. a housing;

B. a plurality of stepper motors each having a drive shaft extending therefrom;

C. a drive gear secured to each of said motor shafts;

D. a plurality of crank shafts rotatably secured within said housing;

E. a driven gear secured to each of said crank shafts, each of said driven gears being meshed within a drive gear;

F. a plurality of crank arms each secured at one end of said crank shafts for rotation therewith;

G. means associated with each crank shaft for determining the rotational position of each crank arm;

H. a plurality of linkage members each having one end pivotably secured to one of said crank arms and its opposite end connected to a postage selector lever; and

I. means for selectively energizing said stepper motors to selectively reset the postage selector lever.

4,030,071

ELECTRICALLY OPERATED LOCKING MECHANISM

Herbert J. Barker, 6009 Rising Sun Ave., Philadelphia, Pa. 19111

Filed Apr. 22, 1976, Ser. No. 679,247

Int. Cl.² G08B *13/08*

U.S. Cl. 340—164 R **11 Claims**

1. An electrically operated lock system comprising in combination

solenoid means having a slideable core,

means coupled to said slideable core to be moved in response to said solenoid being energized to provide a locking means,

key receptacle means having a plurality of portions formed to effect electrical contacts,

first jumper means disposed to connect certain of said portions together,

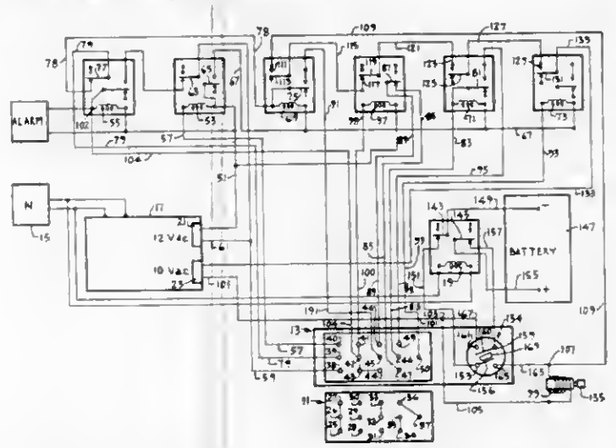
first and second groups of relays each having normally open and normally closed relay points and transfer straps associated therewith, said first and second groups of relays

having their relay points and transfer straps interconnected with each other and with certain of said portions so that when said first group of relays is energized and said second group of relays is unenergized, there are formed first and second electrical energy paths interrupted only by connection voids between certain of said receptacles,

said first electrical energy path providing a means through which electrical energy passes to energize certain relays of said first group,

said second electrical energy path providing a means to energize said solenoid,

first and second power means,



said first power means connected to certain of said portions and to certain of said relays,

said second power means connected to said solenoid through said second electrical energy path,

key means having a plurality of portions engaging portions of said key receptacle means,

second jumper means connecting certain of said portions of said key means whereby when said key means is inserted into said key receptacle means said connection voids have electrical connections thereacross and accordingly power is applied through said key receptacle means to energize said first group of relays to effect an energization of said solenoid through said second electrical energy path.

4,030,072

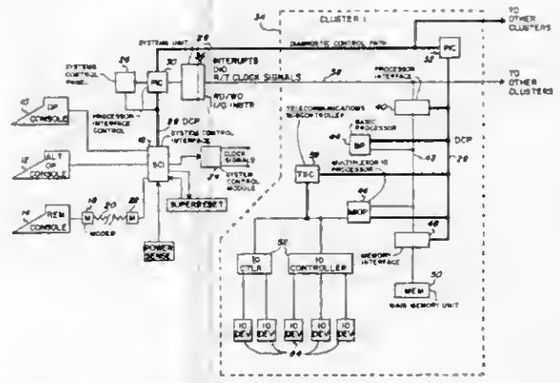
COMPUTER SYSTEM OPERATION AND CONTROL

Eyjolf Steuart Bjornsson, Manhattan Beach, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 18, 1974, Ser. No. 534,045

Int. Cl.² G06F *11/04*

U.S. Cl. 340—172.5 **8 Claims**



1. A data processing system having a plurality of devices including a basic processor, memory unit and I/O processor, said devices interconnected to one another by a first group of data and address lines comprising a first electrical bus, the data processing system further comprising:

a. at least one operator console,

b. a controller connected to said operator console, said controller including a microprogrammed processor comprising:

1. a control memory for storing a programmed sequence diagnostic control words,

2. means for addressing said control memory,

3. an arithmetic and logic unit for processing said control words, and

4. addressing means connected to said arithmetic and logic unit for generating an address,

c. a second group of data and address lines comprising a second electrical bus, said second bus independent of said first bus for carrying diagnostic control signals associated with said diagnostic control words, said second bus connected to said controller,

d. one of said plurality of devices comprising:

1. diagnosing means for conducting diagnostic tests thereon, and

2. means responsive to said address generated by said addressing means;

e. said diagnosing means comprising storage means for storing procedures of said diagnostic test therein,

f. said diagnosing means initiated by a signal of said controller on said second bus and conducting said diagnostic test independently of said controller,

g. said diagnosing means providing an indication of successful completion of said diagnostic test on said second bus to said controller.

4,030,073

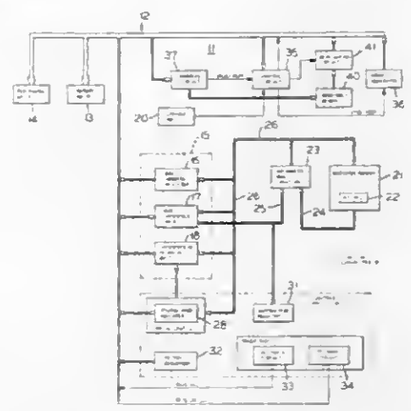
INITIALIZATION CIRCUIT FOR ESTABLISHING INITIAL OPERATION OF A DIGITAL COMPUTER

Robert A. Armstrong, Jr., Stow, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed Nov. 5, 1975, Ser. No. 629,028

Int. Cl.² G06F *3/00*

U.S. Cl. 340—172.5 **5 Claims**



1. An initialization circuit for loading initial information including data and instructions defining a predetermined operating condition into a digital computer system that includes a bus, a power supply, first means for transmitting address signals onto the bus when the power supply initially is energized, means for transmitting a power supply status signal onto the bus and means for transmitting and receiving transfer control signals onto and from the bus to transfer information over the bus, said initialization circuit comprising:

A. memory means including a storage location containing the initial information and instructions for loading the initial information onto the bus for transfer to the digital computer system,

B. address generator means for transmitting address signals onto the bus, and

C. control means connected to the bus, said address generator means and said memory means for controlling trans-

fers of information from said memory means, said control means including:

i. means responsive to the power supply status signal from the bus for enabling said address generator means to transmit address signals onto the bus simultaneously with the transmission of address signals from the first address signal transmitting means in the digital computer system thereby to produce combined address signals that designate a said storage location in said memory means, and

ii. transfer means responsive to certain of the control signals and the combined address signals on the bus for transferring the contents of said storage location in said memory means over the bus to the digital computer system thereby to establish the predetermined initial operating condition in the digital computer system.

4,030,074

SYSTEM FOR CHECKING TWO DATA PROCESSORS OPERATING IN PARALLEL

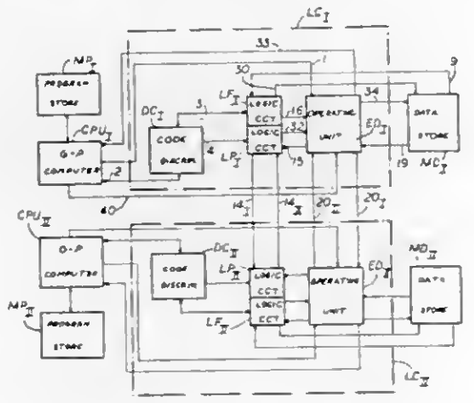
Silvano Giorcelli, Turin, Italy, assignor to Centro Studi e Laboratori Telecomunicazioni, Turin, Italy

Filed June 3, 1975, Ser. No. 583,250

Claims priority, application Italy, June 3, 1974, 68735/74

Int. Cl.² G06F *11/08, 15/00*

U.S. Cl. 364—200 **9 Claims**



1. In a data-processing system, in combination:

a pair of substantially identical data processors connected for parallel operation in the performance of a succession of operating cycles, ech data processor comprising a computer and a data store, said computer being provided with programming means establishing a succession of operating cycles, each cycle including a transfer operation and a checking operation;

a pair of substantially identical logic networks each inserted between the computer and the data store of a respective one of said data processors, each of said networks including memory means for the temporary registration of data called forth from and destined for the respective data store, each of said networks further including transfer means independent of said memory means connected to the respective computer and to the respective data store for transmitting data words therebetween during a transfer operation of any operating cycle;

comparison means for ascertaining the equality of information respectively registered in said memory means of said networks, said comparison means being provided with enabling circuitry rendered effective by the respective computer at the end of an operating cycle; and

feedback means extending from said comparison means to the computers of said data processors for reverting to an earlier operating cycle upon ascertainment of a mismatch between the contents of the respective memory means of said networks;

each of said logic networks comprising a first counter for the counting of successive operating cycles and a second counter for the counting of successive checking operations, said counters having output connections extending to said comparison means for initiating a checking operation upon the count of said first counter exceeding that of said second counter.

4,030,075

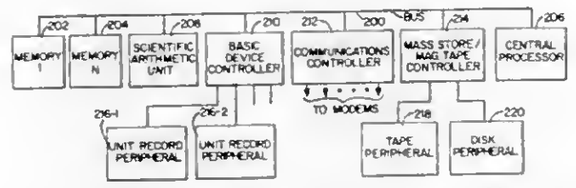
DATA PROCESSING SYSTEM HAVING DISTRIBUTED PRIORITY NETWORK

George J. Barlow, Tewksbury, Mass., assignor to Honeywell Information Systems, Inc., Waltham, Mass.

Filed June 30, 1975, Ser. No. 591,902

Int. Cl.² G06F *9/18*

U.S. Cl. 340—172.5 **21 Claims**



1. A data processing system having a priority determining system comprising:

A. a plurality of units each capable of either or both transferring or receiving information;

B. a common electrical bus, coupled to each of said units, for providing a path for the asynchronous transfer of informatin between any two of said units; and

C. a priority network, coupled with each of said units, for indicating the one of said units which is the highest priority unit requesting to transfer information over said bus, said priority network comprising:

1. a priority bus having a first end and a second end, the one of said units coupled to said first end of said priority bus having the highest priority, the one of said units coupled to said second end of said priority bus having the lowest priority, and the other ones of said units having a priority relative to their proximity to said first and second ends of said priority bus, and

2. priority logic, included in each of said units, said priority logic having

a. means for asynchronously attempting to transfer information over said common has independent of the operation of any other of said units, and

b. means, responsive to said means for asynchronously attempting to transfer information included in each of said units, for enabling said transfer of information if there is no other unit of higher priority currently transferring or attempting to transfer information over said common bus.

4,030,076

PROCESSOR NUCLEUS COMBINED WITH NUCLEUS TIME CONTROLLED EXTERNAL REGISTERS INTEGRATED WITH LOGIC AND ARITHMETIC CIRCUITS SHARED BETWEEN NUCLEUS AND I/O DEVICES

Arnold Blum, Pforzheim; Johann Hajdu, Boeblingen; Claus Erich Mohr, Munich; Leopold Reichl, and Guenther Sonntag, both of Boeblingen, all of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed July 16, 1975, Ser. No. 596,487

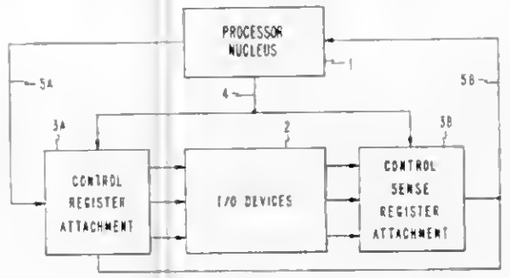
Claims priority, application Germany, Aug. 2, 1974, 2437252

Int. Cl.² G06F *3/00, 7/38, 9/12*

U.S. Cl. 340—172.5 **6 Claims**

1. In a stored program data processing system including a processor nucleus and input/output (I/O) devices, said processor nucleus including control storage containing microinstructions and data, said microinstructions having control bits and address bits, a microinstruction register connected to receive microinstructions from said control storage, microinstruction fetch means for accessing said control storage and transferring a selected microinstruction to said microinstruction register, a data local store, addressing means for addressing said data local store, internal address generation means selectively connectable by said control bits to receive said address bits from a microinstruction in said microinstruction register and connected to provide addresses to said addressing means, first and second operand registers having inputs from said data local store, from said microinstruction register and from sources external to said processor nucleus, an arithmetic and logic unit (ALU) connected to said operand registers, a data register connected to receive data from said ALU, clock timing control means connected to be controlled by said control bits and operable to provide timing control signals, the improvement comprising:

external address register means selectively connectable under control of said control bits to receive said address bits from said mircoinstruction,



external registers having logic means integral therewith to perform logical operations on data entered into said external registers for either said processor nucleus or said I/O devices

means connecting said logic means integral with said external registers to said I/O devices,

first gating means connected to control entry of data into said external registers, said first gating means connected to receive data from said data register under control of said external address register means and said clock timing control means, said data entered into said external registers including control data for said logic means integral with said external registers, and

second gating means connected to said logic means integral with said external registers to receive output data therefrom and pass said output data to said operand registers in said processor nucleus, said second gating means being connected under control of said external address register means and said clock timing control means.

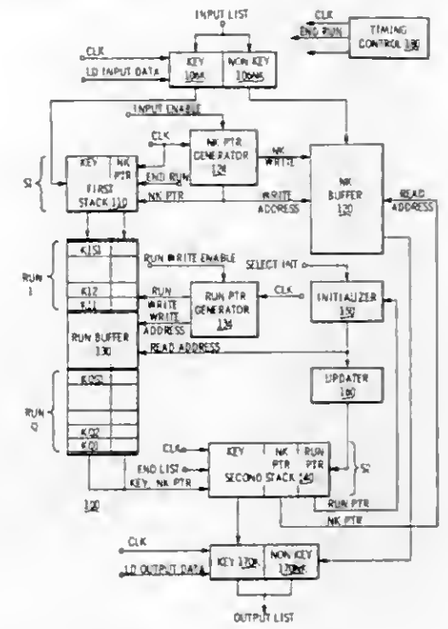
number into proper numerical order among the numbers previously received from the same group;

M-1 subsequent stages for progressively forming fewer groups of more numbers each, the last stage of which forms the numerically sorted output list, each stage including:

interstage storage means for storing the ordered groups from the preceding stage;

stack input means for sequentially receiving each of the numbers stored in the interstage storage means;

comparing means for comparing each currently received number to the previously received numbers currently in the sorting stack;



pushdown storage means of inserting each currently received number into proper numerical order among the previously inserted numbers, which pushdown storage means progressively fills up from a first position to a last position as each currently received number is inserted;

interstage output means for advancing the current number in the last position to the next stage; and

pointer means for identifying the next-to-be received number from the interstage storage means which is the next number from the same group as the current number in the last position; and

output means for receiving the ordered numbers from the last stage.

4,030,077

MULTISTAGE SORTER HAVING PUSHDOWN STACKS FOR ARRANGING AN INPUT LIST INTO NUMERICAL ORDER

Judit Katalin Florence, Menlo Park, and Michel Alexandre Rohner, San Jose, both of Calif., assignors to The Singer Company, Binghamton, N.Y.

Filed Oct. 16, 1975, Ser. No. 622,911

Int. Cl.² G06F *7/24*

U.S. Cl. 340—172.5 **21 Claims**

1. An M stage sorter for arranging input numbers into a numerically sorted output list, comprising:

means for grouping the input numbers into groups;

a first stage for ordering the input numbers within each of the groups, formed by a sorting stack which includes:

stack input means for sequentially receiving all of the numbers within each of the groups;

comparing means for comparing each currently received number to the previously received numbers from the same group; and

stack storage means for inserting each currently received

4,030,078

DYNAMIC MEMORY ARRANGEMENT FOR PROVIDING NONCYCLIC DATA PERMUTATIONS

Werner Klüge, Bensberg-Refrath, Germany, assignor to Gesellschaft fur Mathematik und Datenverarbeitung m.b.H., Bonn, Germany

Filed Dec. 16, 1975, Ser. No. 641,593

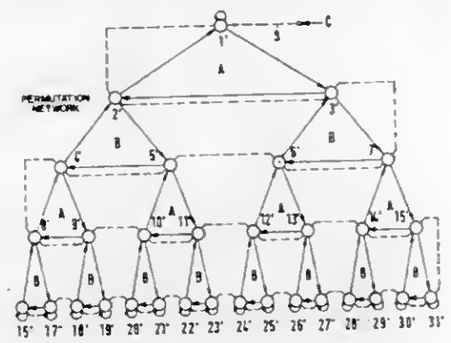
Claims priority, application Germany, Dec. 16, 1974, 2459476

Int. Cl.² G11C *9/02, 19/00, 21/00*

U.S. Cl. 340—172.5 **8 Claims**

1. In a circuit arrangement for noncyclic data permutations between the memory cells of a dynamic memory including a permutation network for transferring the contents of a predetermined memory cell into the read-write cell of the memory, and an access control means connected to said permutation network, for producing a permutation sequence to cause the transfer of the contents of the predetermined memory cell into said read-write cell of the memory; the improvement wherein: said permutation network is comprised of 2^k-1 memory cells which are arranged in a tree-like structure in k of 0 to $k-1$

numbered planes so that plane i is formed of 2^i memory cells, each memory cell of plane i is connected with two adjacent interconnected memory cells of plane $i+1$ so that these three associated memory cells form an interconnected triangle in which the contents of said memory cells can be cyclically interchanged in a clockwise direction, each memory cell of the planes $1 \leq i \leq k-2$ is included in two of such triangles, and the one memory cell of plane 0, which acts as the read-write cell for the memory and each of the memory cells of plane k–1 is included in but one triangle; and said access



control means is connected to said permutation network for producing either a permutation A constituted by the simultaneous transfer of the contents of the memory cells disposed in even numbered planes to the associated memory cells of the next higher odd numbered planes or a permutation B constituted by the simultaneous transfer of the contents of the memory cells disposed in odd numbered planes to the associated memory cells of the next higher even numbered plane, said permutation sequence constituting a sequence of permutation A and permutation B.

4,030,079

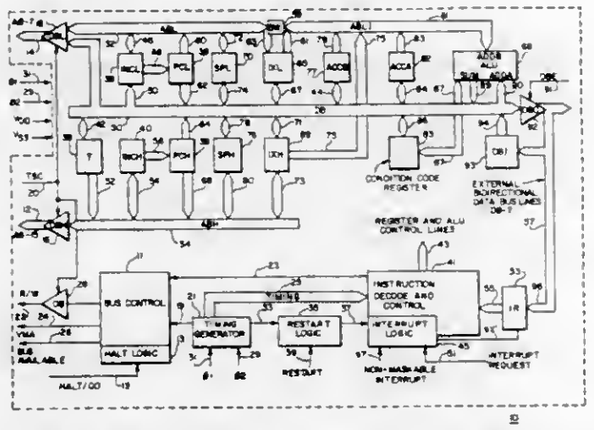
PROCESSOR INCLUDING INCREMENTOR AND PROGRAM REGISTER STRUCTURE

Thomas H. Bennett; Earl F. Carlow, both of Scottsdale; Anthony E. Kouvoussis, Phoenix, all of Ariz.; Rodney H. Orgill; Charles Peddle, both of Norristown, Pa., and Michael F. Wiles, Phoenix, Ariz., assignors to Motorola, Inc., Chicago, Ill.

Continuation of Ser. No. 519,150, Oct. 30, 1974, abandoned. This application Sept. 2, 1976, Ser. No. 719,889

Int. Cl.² G06F *7/50*

U.S. Cl. 340—172.5 **4 Claims**



1. A processor including a first bus, a second bus, and control means for producing control signals, said processor also including means comprising:

counter means having a plurality of inputs and a plurality of outputs and responsive to said control means and coupled between said first bus and said second bus for incrementing digital information at said inputs in response to said control means;

first means responsive to said control means for operatively coupling said inputs to said first bus to effect transferring digital information from said first bus to said inputs;

second means responsive to said control means for operatively coupling said inputs to said second bus to effect transferring digital information from said second bus to said inputs;

third means responsive to said control means for operatively coupling said outputs to said second bus to effect transferring digital information from said outputs to said second bus;

said second means and said third means controllably coupling said outputs, respectively, to said inputs via said second bus in response to said control means in order to cause said counter means to temporarily latch information present on said inputs upon the condition that said first means and said third means, respectively, simultaneously operatively couple said outputs to said second bus and said second bus to said inputs.

4,030,080

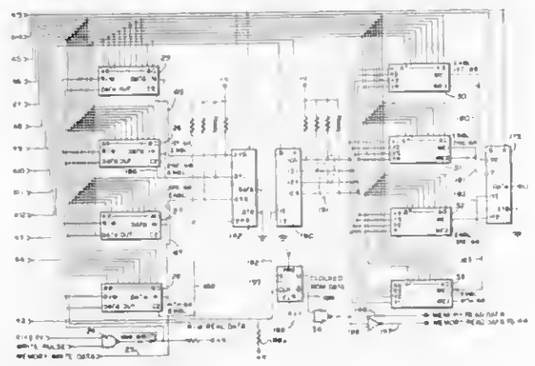
VARIABLE MODULE MEMORY

Bobby G. Burkett, Richardson, and Raymond W. Henry, Dallas, both of Tex., assignors to Texas Instruments Incorporated

Division of Ser. No. 431,538, Jan. 7, 1974, Pat. No. 3,953,034. This application Dec. 24, 1975, Ser. No. 643,970

Int. Cl.² G06F *13/00*; **G11C** *9/00*

U.S. Cl. 340—172.5 **6 Claims**



1. In a programmable controller for selectively connecting and disconnecting a power signal to each of a plurality of output devices in response to computed respective on/off states generated by execution of a stored control program on a plurality of binary parameters, wherein the value of each of said parameters corresponds to a state of a respective input device, a variable module memory for storing said control program comprising:

a. a set of up-to-N memory modules, each for storing a plurality of program instructions of n binary bits each;

b. N receptacle means for receiving said set of up-to-N memory modules, and for coupling each of the received memory modules to a common serial output bus;

c. memory address control means coupled via said receptacle means to said up-to-N memory modules for providing address signals for sequentially addressing each of ten memory modules and sequentially addressing the program instruction words of the addressed memory module to provide the contents stored therein in series to said common serial output bus; and

d. means for detecting the absence of memory modules in said receptables and for forcing said common serial data output bus to a predetermined binary state for all bits of

all program instruction words of vacant ones of said receptable means.

4,030,081

DYNAMIC TRANSISTOR-STORAGE ELEMENT

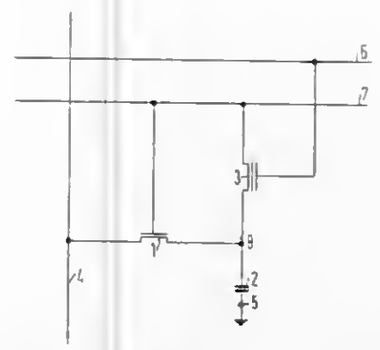
Karlheinrich Horninger, Eglharting, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sept. 2, 1975, Ser. No. 609,622

Claims priority, application Germany, Sept. 3, 9174, 2442134; Sept. 3, 1974, 2442133; Sept. 3, 1974, 2442132; Sept. 3, 1974, 2442131

Int. Cl.² G11C *11/24*; **H03K** *5/00, 3/353*

U.S. Cl. 340—173 CA **28 Claims**



1. A dynamic storage element, comprising: at least one transistor; at least one MI_1I_2S storage transistor connected to receive data to be stored in said data storage transistor; a word line; a bit line; a gate line; and a capacitor, said one transistor comprising a first electrode connected to said capacitor, a second electrode connected to said bit line and a gate electrode connected to said word line, and said MI_1I_2S storage transistor comprising a first electrode connected to said word line, a second electrode connected to the junction of said one transistor and said capacitor, and a gate electrode connected to said gate line.

4,030,082

APPARATUS FOR THE TREATMENT OF YARN THICKNESS VARIATION SIGNALS

Tsugio Goto, Nobeoka, Japan, assignor to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 343,980, March 22, 1973, Pat. No. 3,885,232. This application Nov. 5, 1974, Ser. No. 521,189

Claims priority, application Japan, Mar. 24, 1972, 47-29893

Int. Cl.² G11C *11/24*; **G06H** *3/05*

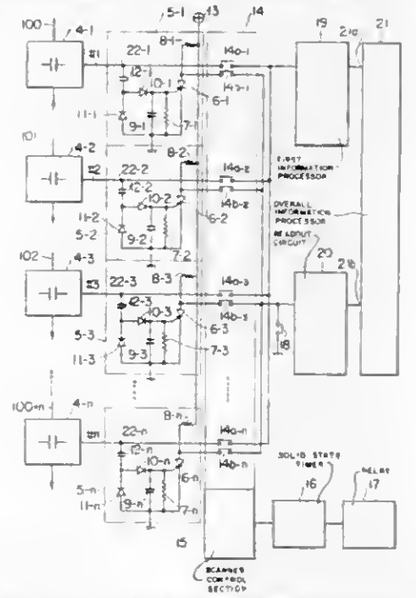
U.S. Cl. 340—173 R **1 Claim**

1. An apparatus for processing defect signals from a plurality of yarns wherein said signals may be applied to a computer, said apparatus comprising:

a. a plurality of sensor means, each sensor means associated with one of said yarns for detecting a defect in said yarns;

b. a plurality of memory means, each of said memory means coupled to a corresponding one of said sensor means for storing a defect signal produced by the corresponding said sensor means;

c. scanner means coupled to said plurality of memory means and to said computer for cyclically sequentially sampling the signals stored in said memory means and applying the signals stored therein to said computer; and



d. reset means for periodically resetting said memory means at the beginning of each sampling cycle.

4,030,083

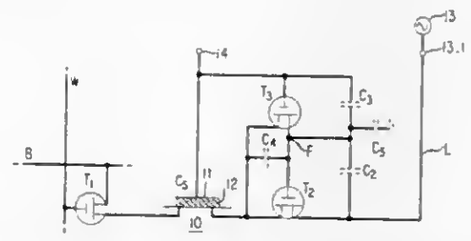
SELF-REFRESHED CAPACITOR MEMORY CELL

Harry Joseph Boll, Berkeley Heights, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Continuation-in-part of Ser. No. 565,227, April 4, 1975, abandoned. This application Dec. 18, 1975, Ser. No. 642,191

Int. Cl.² G11C *11/00*

U.S. Cl. 340—173 DR **43 Claims**



1. Apparatus which comprises:

a. a capacitor memory element capable of storing electrical charge to represent binary digital memory states of the element;

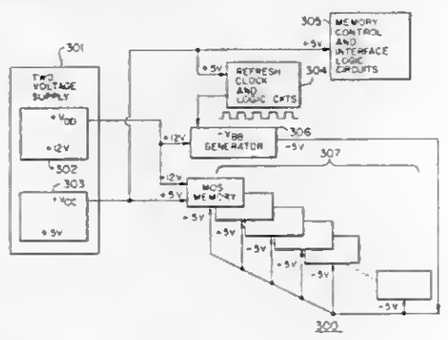
b. a first electrical network means for providing access reading and writing signals to the element; and

c. a second electrical network refresh means including first and second switching transistors, each having a pair of high current terminals and a low current terminal, one high current terminal of the first switching transistor being ohmically connected to a terminal of the memory element and the other high current terminal of the first switching transistor being ohmically connected to an electrically conductive refresh line, said refresh line having a refresh terminal means for the connection thereto of electrical means for acting as an electrical sink for spurious charges in the memory element during operation, one high current terminal of the second switching transistor being ohmically connected to the one high current terminal of the first switching transistor and the other high current terminal of the second switching transistor being ohmically connected to the low current terminal of the first switching transistor, the low current terminal of the second switching transistor being connected to a different terminal of the memory element.

4,030,084
SUBSTRATE BIAS VOLTAGE GENERATED FROM REFRESH OSCILLATOR

Edwin P. Fisher, N. Abington, and Robert B. Johnson, Billerica, both of Mass., assignors to Honeywell Information Systems, Inc., Waltham, Mass.

Filed Nov. 28, 1975, Ser. No. 636,276
Int. Cl.² G11C 11/40
U.S. Cl. 340—173 R 6 Claims



1. In a metal-oxide semiconductor (MOS) memory array associated with a data processing unit wherein information in groups of said (MOS) memory elements is to be refreshed by a refresh means, apparatus for providing negative bias to said (MOS) memory array comprising:

a. first means for providing a plus voltage to said MOS memory array relative to ground;

b. second means in said (MOS) memory array coupled to said first means for providing rectangular wave refresh clock signals;

c. third means responsive to the rectangular wave refresh clock signals for switching between the plus voltage and ground;

d. fourth means coupled to said third means for alternately accumulating the positive charge and releasing the positive charge to ground, whereby an a.c. voltage is generated;

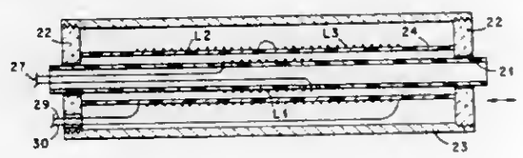
e. fifth means coupled to said fourth means for rectifying the a.c. voltage signal; and

f. sixth means coupled to said fifth means for filtering the rectified a.c. voltage signal.

4,030,085
NONFERROMAGNETIC LINEAR VARIABLE DIFFERENTIAL TRANSFORMER

James F. Ellis, Powell, and Peter L. Walstrom, Oak Ridge, both of Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed July 20, 1976, Ser. No. 707,000
Int. Cl.² G08C 19/08
U.S. Cl. 340—199 4 Claims

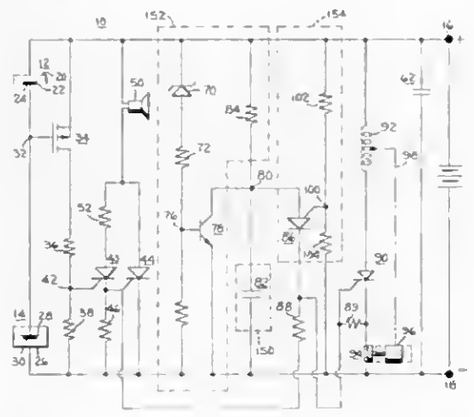


1. A nonferromagnetic linear variable differential transformer system for measuring mechanical displacements in the presence of a high magnetic field, comprising a cylindrical non-magnetic housing, a pair of respective non-magnetic end plates mounted in the respective ends of said housing, said end plates being provided with respective axial apertures therein, a slidable shaft of a non-magnetic insulator material, said shaft adapted to be moved between and through said apertured end plates, a coil form of a non-magnetic insulator material mounted within said housing and affixed to said end plates, said coil form axially encompassing said slidable shaft, a primary coil wound about said shaft, a pair of secondary coils wound series-opposed about said coil form, an oscillator for providing a fixed-frequency, constant-voltage signal, a first pair of leads coupled between said oscillator and said primary coil, a first capacitor means connected across said leads for tuning said primary coil to resonance, a phase sensitive demodulator, a second pair of leads coupled between said demodulator and said secondary series-opposed coils, and a second capacitor means connected across said second pair of leads for tuning said secondary coils to a resonant frequency slightly higher than the frequency of said oscillator, said primary coil being normally positioned in a null position with respect to said secondary coils, whereby when said slidable shaft is displaced axially within said housing said demodulator will provide an accurate indication of such displacement.

4,030,086
BATTERY VOLTAGE DETECTION AND WARNING MEANS

Robert J. Salem, Danbury, Conn., assignor to General Electric Company, Bridgeport, Conn.

Filed Nov. 10, 1975, Ser. No. 630,201
Int. Cl.² G08B 19/00, 17/10
U.S. Cl. 340—249 5 Claims



1. For use in a battery-operated device such as a smoke detector, means for detecting when the battery voltage drops below a predetermined level and for providing warning in response thereto, said detection and warning means comprising:

terminal means for connection to the terminals of a battery, a capacitor,

capacitor charging circuit means connected to said terminal means and said capacitor for gradually charging said capacitor when the voltage of a battery connected to said terminal means drops below a predetermined level, said capacitor charging circuit means including resistive means coupled to said capacitor, a normally conductive switching element in parallel with said capacitor, and voltage sensing means connected across said terminal means, said voltage sensing means coupled to said normally conductive switching element to maintain said normally conductive element conductive when the voltage of a battery connected to said terminal means is above the predetermined level and to render said normally conductive element non-conductive when the voltage of a battery connected to said terminal means drops below the predetermined level, whereby said capacitor charges only when the voltage of a battery connected to said terminal means drops below the predetermined level for a period of time,

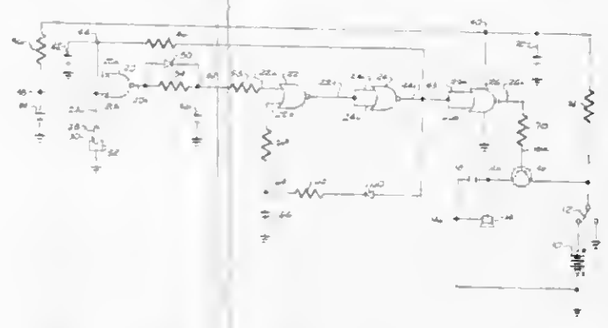
capacitor discharging circuit means connected to said capacitor and responsive to the voltage of said capacitor for rapidly discharging said capacitor when the charge on said capacitor exceeds a predetermined level,

and alarm means coupled to said capacitor discharging circuit means for producing a warning signal in response to at least the initial discharge of said capacitor.

4,030,087
ANTI-THEFT ALARM SYSTEM

Dale A. Ritchie; Walker G. Petroff, and Roy G. Smarr, Jr., all of Columbia, S.C., assignors to Augustus E. Quattlebaum, Pendleton, S.C.

Filed Mar. 12, 1976, Ser. No. 666,391
Int. Cl.² G08B 13/22
U.S. Cl. 340—261 8 Claims



1. In an alarm system for detecting a desired disturbance to an associated structure, said system having a buzzer for emitting an audible alarm signal in response to said detection, a d-c power source connected to said buzzer for supplying current thereto, first and second switch means connected in series with said buzzer and said power source for selectively connecting said buzzer to said power source, said first switch means being manually operated to activate said alarm system, a disturbance detecting circuit for controlling said second switch means comprising:

a detection means for detecting said disturbance and producing a detection signal;

a first digital logic gate means having a first input terminal coupled to said detection means for receiving said detection signal and producing a conditioned output signal of a predetermined level;

a second digital logic gate means having first and second input terminals and an output terminal, said first input terminal coupled to said first logic gate means for receiving said predetermined output signal and producing an output signal of a predetermined voltage level;

latch-up means coupled to said input terminal of said second logic gate for gating said second logic gate on and clamping the output terminal of said second logic gate at said predetermined voltage level when said disturbance is continued for a predetermined period of time;

a third digital logic gate means providing a high gain inverting amplifier having an input coupled to the output terminal of said second logic gate means and an output terminal coupled to said second switch means;

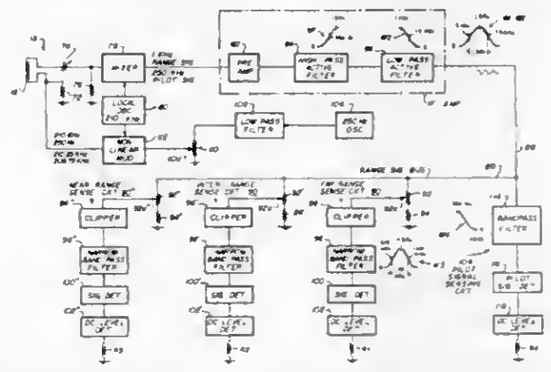
said third logic gate means inverting said predetermined output voltage of said second logic gate producing an output signal for switching said second switch means into conduction; and

said buzzer emitting a short audible alarm signal when said system is activated an an initial disturbance is detected and, thereafterward, said buzzer emitting a continuous audible alarm signal when said disturbance is continued for said predetermined period of time.

4,030,088
VEHICLE PROXIMITY SENSING AND CONTROL SYSTEM

David Jacob McCullough, Spruce Head Island, Maine, assignor to Dynascan Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 336,417, Feb. 28, 1973, abandoned. This application Oct. 21, 1974, Ser. No. 516,656
Int. Cl.² G08B 21/00
U.S. Cl. 340—267 C 21 Claims



1. A proximity sensing and control system for a vehicle having powered drive means, the system comprising, in combination: a radio transmitter and associated transmitting antenna associated with the system for radiating an alternating electromagnetic field at a low enough frequency such that signal reinforcement or attenuation at a receiving location due to signal reflections from nearby objects does not generally occur, and the induction field component predominates in strength over the electric field within the desired operating range of the system; a radio receiver and associated receiving antenna for sensing the level of the electromagnetic field thereat, one of said antennas being mounted on said vehicle and the other antenna being mounted remote therefrom, so the spacing therebetween varies as the vehicle is moved; first control means for carrying out a first control operation when the transmitting and receiving antennas are relatively widely spaced apart; second control means for carrying out a second control operation when the transmitters and receiving antennas are relatively closely spaced apart, the relative signal strengths at the receiving antenna being vastly different for these two relative spacings; said radio receiver including a given received signal output point; first and second range sensing circuits connected in parallel to said received signal output point and respectively including first and second signal level detecting means responsive to given signal levels indicative respectively of said relatively wide and close spacings of said transmitting and receiving antennas by initiation of operation respectively of said first and second control means, and first and second adjusting means associated with said first and second range sensing circuits for adjusting the level of the received signal at said received signal output point which effects operation of the associated control means.

4,030,089
ALARM SYSTEM

Wolfgang Wurfel, Konigsteinstrasse 12, 8000 Munich 40, BRD, Germany

Filed Apr. 2, 1976, Ser. No. 672,973
Int. Cl.² G08B 13/04, 13/08
U.S. Cl. 340—274 R 3 Claims

1. In an alarm system with a sensor arrangement including a break responsive means on a relatively movable part energized from a source of electric energy on a locally fixed part, the improvement comprising:

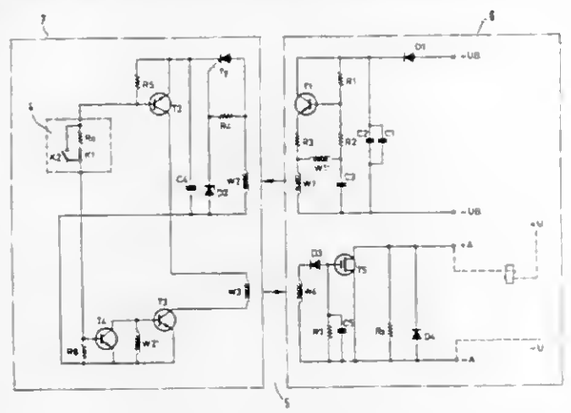
a first coil on an open core disposed on said fixed part for connection to a circuit including an alternating voltage source;

a second coil electrically coupled to the sensor arrangement on a second core disposed on the relatively movable part,

so that said first coil transmits energy to said second coil when said parts are in normal adjacent position;

a third coil on an open core mounted on said relatively movable part and connected to the sensor arrangement to normally maintain one state of operation; and

a fourth coil on an open core mounted on said fixed part;



said cores carrying said third and fourth coils being spaced apart with the coils thereon magnetically coupled with said parts are in normal adjacent position; and circuit means interconnecting said sensor arrangement and said second and third coils whereby actuation of the sensor arrangement will cause a change in the state of energization of said third and fourth coils.

4,030,090

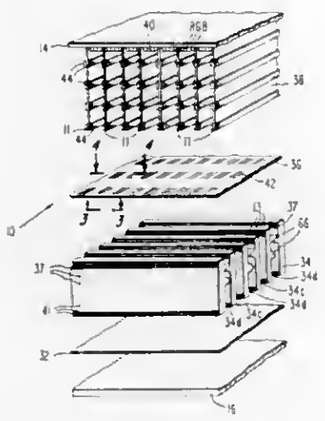
FLAT IMAGE DISPLAY DEVICE UTILIZING DIGITAL MODULATION

John Guiry Endriz, Plainsboro, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Dec. 17, 1975, Ser. No. 641,641

Int. Cl.² G09F *9/32*

U.S. Cl. 340—324 M **13 Claims**



1. An image display device comprising a matrix of cathodoluminescent cells, each cell including:

a. a source of electrons;

b. an electron multiplier, including at least one dynode member for multiplying electrons emitted from said electron source, said multiplier being open to feedback and of sufficiently high gain to produce regenerative feedback and sustained electron emission;

c. digital modulation means for modulating a flow of electrons from an output of said electron multiplier;

d. means for accelerating the modulated flow of electrons; and

e. a cathodoluminescent screen excitable by the accelerated and modulated flow of electrons.

4,030,091

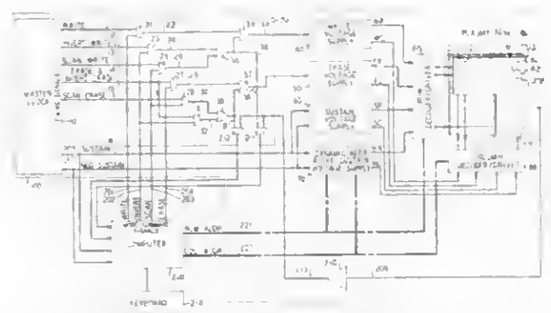
TECHNIQUE FOR INVERTING THE STATE OF A PLASMA OR SIMILAR DISPLAY CELL

Peter Dinh-Tuan Ngo, Colts Neck, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jan. 30, 1976, Ser. No. 653,662

Int. Cl.² H01J *17/48*

U.S. Cl. 340—324 M **26 Claims**



1. Circuitry for inverting a gas discharge display cell having light-emitting and non-light-emitting states from a current one of said states to the other, said cell comprising a volume of gas having an associated breakdown voltage and adapted to store voltages across said volume of gas, a characteristic voltage being stored at said cell when it is in said light-emitting state, said circuitry comprising

first means for applying a first signal to said cell, said first signal storing a first voltage at said cell at a predetermined time if said current state is said non-light-emitting state,

second means for repetitively applying first and second polarity sustain pulses of predetermined duration and predetermined voltage less than said breakdown voltage alternately to said cell, said sustain pulses causing said characteristic voltage to be stored at said cell in response to the storage of said first voltage thereat, thereby rendering said cell in a light-emitting state, and

third means for applying an inverting erase signal of predetermined voltage to said cell at said predetermined time, the sum of said inverting erase signal voltage and said characteristic voltage being greater than said breakdown voltage, and the sum of said inverting erase signal voltage and said first voltage being less than said breakdown voltage, whereby said inverting erase signal renders said cell in a non-light-emitting state only if said current state is said light-emitting state.

4,030,092

DIGITAL TO ANALOG CONVERTER USING RECIRCULATING SHIFT REGISTER

Paul Sieber, Heilbronn, and Joachim Kuhlmann, Heilbronn-Bockingen, both of Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed Aug. 13, 1974, Ser. No. 497,082

Claims priority, application Germany, Sept. 18, 1973, 2348831

Int. Cl.² H03K *13/02*

U.S. Cl. 340—347 DA **9 Claims**

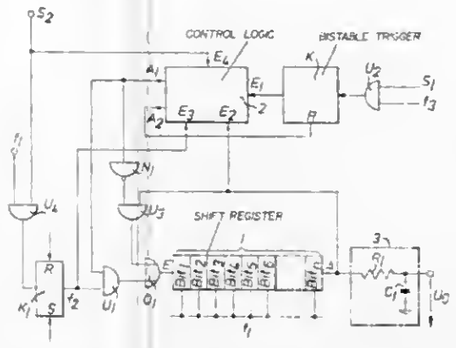
1. A digital/analog converter circuit for setting and varying electrical values comprising, in combination:

a shift register whose binary content corresponds to a defined value of an electrical parameter with the value of the electrical parameter being the ratio of the total number of logic "one" values in the register to the total number of logic "zero" values in the register;

a feedback line connected between the output and the input of said shift register;

means for continuously applying shift clock pulses of a first frequency to said shift register to cause the normally continuous circulation of the data in said register via said feedback line;

a logic circuit means for initially writing an alternating sequence of logic "zero" and logic "one" values, corresponding to the defined average of an electrical value, into said shift register and for thereafter selectively varying the ratio of the logic "one" and logic "zero" values circulating in said shift register to vary the digital content, said logic circuit means having a control logic means, and a means for changing the number of logic "zero" or one values contained in said shift register including: a first trigger stage for selectively providing a logic "one" or "zero" value at its output; a logic unit, which is controlled by said control logic means, connected between the output of said first trigger stage and the input of said shift register; and a second trigger stage triggered by means of



an input logic unit, which second trigger stage is connected to the input of said control logic means to control same when an input signal is present at said input logic unit; said control logic means being responsive to a single from said second trigger stage to trigger said logic unit to cause the conversion of the first circulating logic value in said shift register which is capable of conversion into the logic value appearing at the output of said first trigger stage;

and an analog integrating means connected to said output of said shift register for continuously integrating the signals appearing at said output of said shift register to continuously provide an output voltage whose magnitude corresponds to the digital content of said shift register.

4,030,093

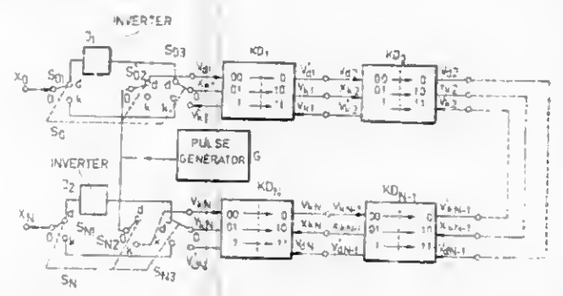
REVERSIBLE CODE COMPANDER

Jozsef Denes, and Mihaly Szokolay, Budapest, Hungary, assignors to Szamitastechnikai Koordinacios Intezet, Budapest, Hungary

Continuation-in-part of Ser. No. 281,016, Aug. 16, 1972, abandoned. This application May 9, 1974, Ser. No. 468,548

Int. Cl.² H03K *13/00*

U.S. Cl. 340—347 DD **1 Claim**



1. An arrangement for reproducing the original signal sequence from encoded binary contracted signal sequences comprising, in combination, a plurality of inverters; switching means connected to a common circuit point and to said inverters; a driving pulse generator connected to said common circuit point; a plurality of code transformers connected to said switching means having signal inputs and outputs, and having controlling inputs and outputs, the contracted encoded signal to be reproduced being applied to one of said inverters through said switching means for decoding by said inverters, said code transformers being connected in series, the signal output of any one code transformer being connected by pairs to the signal input of the subsequent code transformer, the output signal from the last code transformer being applied to another one of said inverters through said switching means for decoding by said other inverter after direct coding by said switching means, said pulse generator being connected to the controlling inputs of said code transformers through said switching means, said pulse generator being connected during decoding to the controlling input of the first code transformer through said switching means, said pulse generator being connected during encoding to the controlling input of the last code transformer through said switching means, the controlling inputs and outputs of said code transformers being interconnected by pairs, the encoding occurring in accordance with the rule 00 0, 1 11, 01 10, and the decoding occurring in accordance with the rule 11 1, 0 00, 10 01.

4,030,094

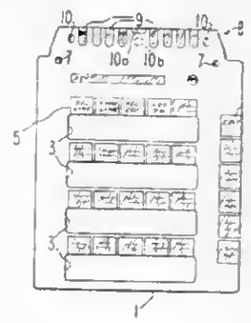
DEVICE FOR SELECTING COMPUTER OPERATIONAL MODE AND LABELING INPUT CONTROLS ACCORDINGLY

Richard C. Anderson, Los Altos, Calif., assignor to Varian Associates, Palo Alto, Calif.

Filed July 14, 1975, Ser. No. 595,946

Int. Cl.² G08C *1/00*

U.S. Cl. 340—365 R **2 Claims**



1. In an input/output station for a data processing system, said input/output station having a plurality of manually operable switches, THE IMPROVEMENT COMPRISING a translucent overlay receivable on said input/output station, said overlay including visible legend means for labeling said switches, and means on said overlay for optically encoding information, said input/output station having reader means to opto-electronically transduce said message into an electronic signal, said means for optically encoding including means for producing a signal indicative of receipt of said overlay on said input/output station and correct alignment therebetween.

4,030,095

PULSED ALARM SYSTEM

Edward Dalman, Arlington Heights, Ill., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 19, 1976, Ser. No. 650,490

Int. Cl.² G08B *19/00*

U.S. Cl. 340—413 **10 Claims**

1. A pulse indicating system comprising:

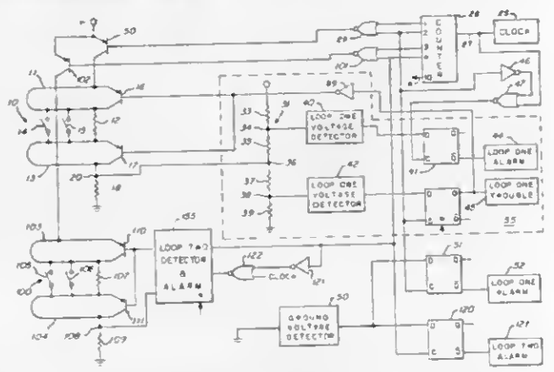
pulse source means for supplying energizing pulses and synchronizing pulses;

sensor means connected to be energized by said energizing pulses for providing a sensed output dependent upon a sensed condition;

voltage divider means comprising an impedance circuit having an input connected to receive said sensed output and first and second outputs, a high voltage detection

circuit having an input connected to said first output and having a first detection output, and a low voltage detection circuit havng an input connected to said second output of said impedance circuit and having a second detection output;

a first switch having a first input connected to said first detection output, a second input connected to receive said synchronizing pulses, and a switch output;



a second switch having a first input connected to said second detection output, a second input connected to receive said synchronizing pulses, and a second switch output; and,

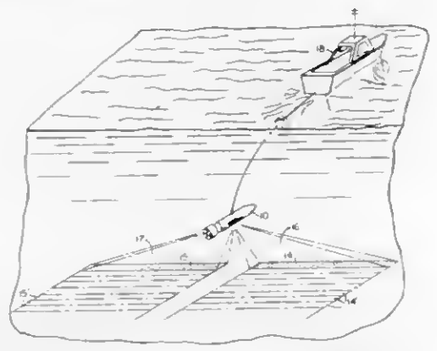
indicating means connected to said first and second switch outputs.

4,030,096

AUTOMATIC TARGET DETECTOR

Wesley E. Stevens, and Frederick Brimberg, both of Severna Park, Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 5, 1975, Ser. No. 637,999
Int. Cl.² G01S 9/02, 7/04, 9/66
U.S. Cl. 343—5 CM **12 Claims**



9. An automatic target detector for side-looking energy apparatus of the type which travels over a target area at an operating altitude and provides repetitive side-looking energy signals indicative of said target area, comprising:

A. means responsive to a side-looking energy signal for determining the presence of a target highlight and shadow, indicative of a possible target; and

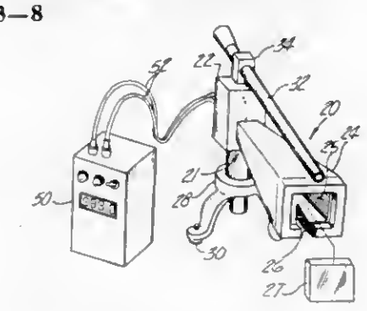
B. means for indicating the presence of said possible target only when the equivalent length S of said shadow is proportional to the range to said shadow by a predetermined factor.

4,030,097

MUZZLE VELOCITY CHRONOGRAPH

Anthony A. Gedeon, 508 Hull Ave., Lewisburg, Tenn. 37091

Filed Feb. 2, 1976, Ser. No. 654,246
Int. Cl.² G01S 9/44
U.S. Cl. 343—8 **13 Claims**



1. A chronograph for measuring the muzzle velocity of a projectile discharged from a firearm and in a portion of the trajectory, comprising:

electromagnetic wave energy source means at a predetermined frequency, f_1;

electromagnetic wave energy receiver means for receiving electromagnetic wave energy originating from the source means and reflected by the projectile at a frequency, f_2;

an electromagnetic wave antenna coupled to the source means and receiver means for illuminating the trajectory of the projectile with electromagnetic wave energy and receiving such energy as reflected by the projectile,

the electromagnetic wave antenna having a layer of sonic damping means disposed thereover to lower the resonant mechanical frequency thereof into a range near 0 to 10 Hz;

a mixer coupled to the source means and receiver means which has an output signal at a frequency f_d proportional to the difference between f_1 and f_2; and,

means for processing the mixer output signal to determine the muzzle velocity as a function of the frequency f_d.

4,030,098

METHOD AND MEANS FOR REDUCING REFLECTIONS OF ELECTROMAGNETIC WAVES

Maurice E. Nahmias, Ryswyk, Netherlands, assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 26, 1962, Ser. No. 183,694
Int. Cl.² H01Q 17/00
U.S. Cl. 343—18 A **8 Claims**

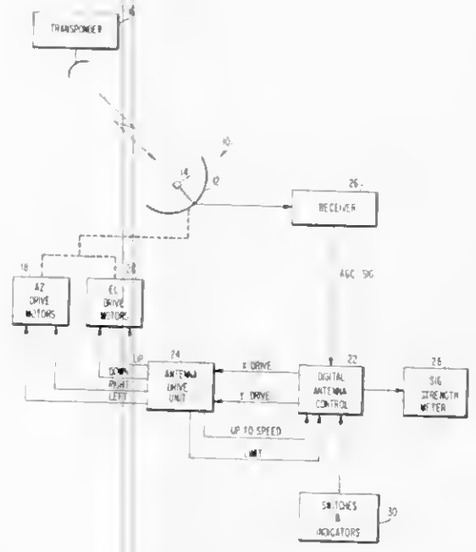
6. In combination with an aircraft having normally reflecting surfaces to radio frequency electromagnetic waves, a coating at singular places on its reflecting surfaces, said coating comprising a substance containing a radioactive material for creating a cloud of electrons in space to shroud said aircraft and provie attenuation to said rdio frequency electromagnetic waves incident thereon the distribution and concentration of said radioactive material producing a relatively uniform surface activity whose average value is in the order of 10 curies per square centimeter.

4,030,099

DIGITAL ANTENNA CONTROL APPARATUS FOR A COMMUNICATIONS TERMINAL

James V. Valenti, Laurel, Md., and Herbert Hanft, Alexandria, Va., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 12, 1974, Ser. No. 532,277
Int. Cl.² G01S 3/42, 3/44
U.S. Cl. 343—117 R **12 Claims**



1. A system for controlling a directive antenna for a communications receiver to periodically slew said antenna to a quasi-stationary remote communications signal source wherein the system includes a directive electromagnetic wave antenna having electrical drive means coupled thereto for being driven preferably along two separate axes together with manual antenna control means coupled to said drive means for providing course acquisition of said antenna to said remote signal source and communication signal receiver means coupled to said antenna providing an output signal indicative of the signal strength received by said antenna from said remote signal source, the improvement comprising:

digital antenna control means coupled to said drive means for automatically providing fine acquisition of said antenna to said signal source following course acquisition on at least one of two separate axes in response to the received signal, said digital antenna control means including,

first means for periodically sampling said output signal from said receiver means and converting the samples resulting from said sampling into respective digital signal samples;

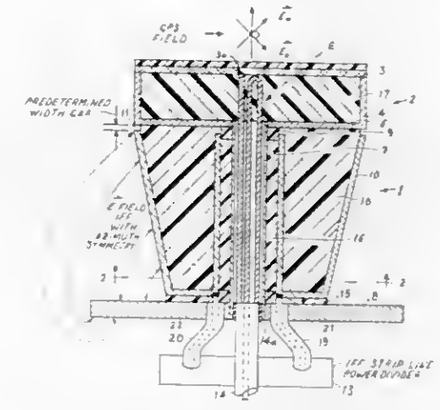
second means coupled to said conversion means for comparing one digital signal sample with the previous digital signal sample and generating a signal adapted to provide a continuous directional control signal coupled to said drive means in accordance with the comparison to cause said antenna to seek the maximum or peak signal strength of the received signal from said remote signal source and providing a stop command signal when a predetermined plurality of consecutive digital samples bear a predetermined value relationship to one another indicative that substantially maximum signal strength is being received by said antenna.

4,030,100

MULTIPURPOSE SUBMARINE ANTENNA

Emmanual Joseph Perrotti, Ramsey, N.J., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Feb. 6, 1976, Ser. No. 655,812
Int. Cl.² H01Q 1/34, 1/36
U.S. Cl. 343—709 **18 Claims**



1. A multipurpose submarine antenna comprising:

an identification friend or foe (IFF) antenna disposed symmetrically about a vertical axis;

first means coupled to said IFF antenna to symmetrically feed said IFF antenna;

a global positioning satellite (GPS) antenna disposed coaxially of said vertical axis and above said IFF antenna;

a gap having a predetermined width disposed between the top of said IFF antenna and the bottom of said GPS antenna;

second means disposed coaxially of said vertical axis and within said IFF antenna to feed said GPS antenna; and

a conductive shield disposed coaxially of said vertical axis surrounding said second means and interconnecting said IFF antenna and said GPS antenna for isolation therebetween;

said GPS antenna including

a spiral radiator disposed coaxial of and perpendicular to said vertical axis, and

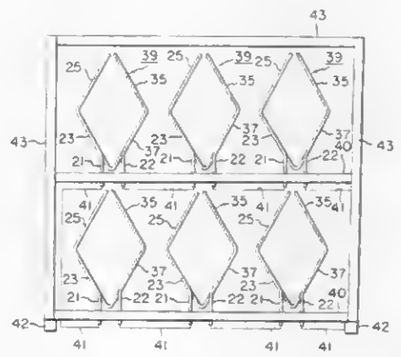
a cavity and ground plate disposed coaxial of said vertical axis and extending from and below said spiral radiator.

4,030,101

REGULAR EIGHT FACE POLYHEDRAL ANTENNA ELEMENT

Kazuhisa Satoh, 24-10-1 Megurohoncho, Meguro, Tokyo, Japan

Continuation-in-part of Ser. No. 503,699, Sept. 6, 1974, abandoned. This application Mar. 15, 1976, Ser. No. 667,154
Int. Cl.² H01Q 1/36, 1/42
U.S. Cl. 343—872 **7 Claims**



1. An antenna element comprising a single continuous length of electrically conductive metal bent into rectilinear

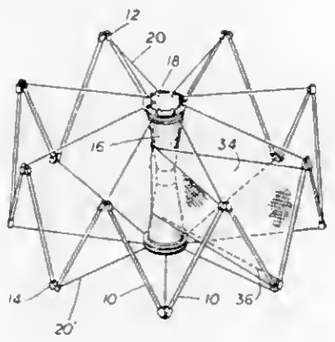
sections to form longitudinal edge lines defining the faces of a regular eight-face polyhedron-shaped antenna element, with the two ends of the continuous length of electrically conductive metal being bent outwardly at the bottom of said polyhedron to form electrical terminals of the antenna element; the length of each rectilinear section, with respect to a preselected frequency of transmission and reception, being equal to one half the wave length of the radiation at such preselected frequency.

4,030,102

DEPLOYABLE REFLECTOR STRUCTURE

Richard Kaplan, East Meadow, and Jack L. Schultz, Huntington, both of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Oct. 23, 1975, Ser. No. 625,210
Int. Cl.² H01Q *15/20*
U.S. Cl. 343—915 **10 Claims**



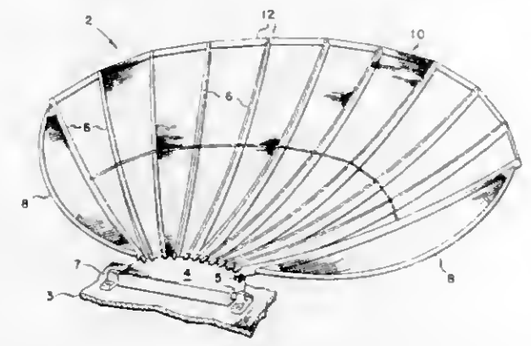
1. A process of deploying a structure to be a support for large surface devices, said process comprised of the steps:
unfolding a plurality of rim segments that are hinged to each other by means so as to permit mid span rotation and outward translation of each rim segment;
deploying spoke means between opposite ends of a central hub member to said rim segments to controllably limit said outward translation; and
removing panels from the central hub by the mid span rotation and outward translation to orient said panels to be the large surface device between the hub and the rim segments.

4,030,103

DEPLOYABLE OFFSET PARABOLOID ANTENNA

Gordon Kleth Colin Campbell, Los Altos, Calif., assignor to Lockheed Missiles & Space Company, Inc., Sunnyvale, Calif.

Filed Dec. 10, 1975, Ser. No. 639,236
Int. Cl.² H01Q *15/20*
U.S. Cl. 343—915 **2 Claims**



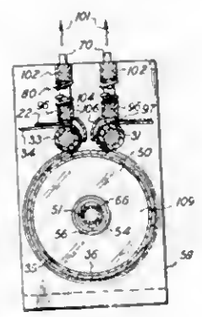
1. An antenna with a paraboloid shape which is fed from a feed in a position offset from the focal point of the paraboloid, said antenna deployable from a retractable stowed position to an extended deployed position, comprising:
a rigid generally semicircular support hub,
a number of radial ribs spaced about said support hub, each of said radial ribs including inner and outer ends,
a pair of rigid semicircular side supports attached to each of the outer radial ribs,
said radial ribs and said semicircular side supports defining an offset paraboloid when deployed,
inner hinge means pivotally joining the inner ends of said radial ribs to said support hub,
outer hinge means pivotally connected to the outer ends of each of said radial ribs,
foldable stiffeners connected to the outer hinge means of adjacent radial ribs for maintaining the adjacent ribs in a spaced apart relationship when the antenna is deployed, and
a preformed lightweight flexible metalized mesh stretched across and attached to said radial ribs and said semicircular side supports for forming a paraboloid shaped reflective surface when said antenna is deployed.

4,030,104

THERMO-MAGNETIC IMAGE TRANSFER APPARATUS

Stephen F. Pond, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 12, 1975, Ser. No. 631,006
Int. Cl.² G11B *11/14, 5/027;* **G03B** *15/05*
U.S. Cl. 346—74.1 **6 Claims**



1. A thermoremanent transfer apparatus for thermomagnetically transferring an image from a slave web onto the magnetizable surface of the master web comprising:
a transparent cylindrical carriage means,
web transport means cooperating with said carriage means for transporting said slave web and said master web into intimate contact around substantially the entire periphery of said carriage means;
a radiation source located within said carriage means for producing a thermomagnetic transfer of the image from the slave web onto the master web, and;
energy deflecting means for reflecting energy from said radiation source onto the surface of said carriage means to provide a substantially uniform irradiation over the entire surface.

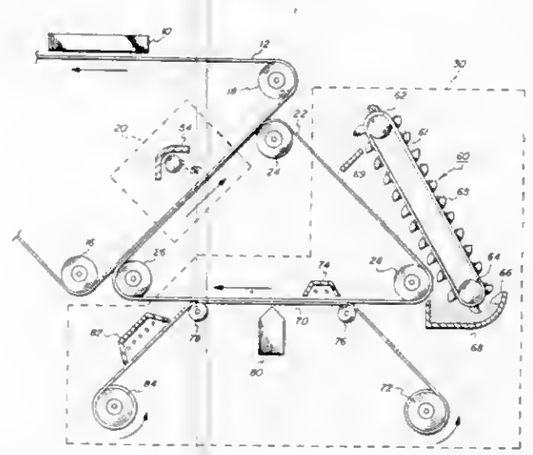
4,030,105

TECHNIQUE OF CHARACTER GENERATION ON MAGNETIC TAPES

Armand P. Neukermans, Palo Alto, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Sept. 26, 1975, Ser. No. 617,137
Int. Cl.² G03G *19/00*
U.S. Cl. 346—74.1 **11 Claims**

1. A direct recording magnetographic system comprising:
a magnetic head assembly having multiple integrated recording elements,
a buffer web with a magnetizable surface;
means, controlling said magnetic head assembly, for directly writing a magnetic latent image onto the surface of the buffer web with multiple passes of said magnetic head assembly;
a copy web with a magnetizable surface;
means for transferring said magnetic latent image from the magnetic surface of the buffer web to the magnetic surface of the copy web;
means for developing said magnetic latent image on the copy web into a visual image; and



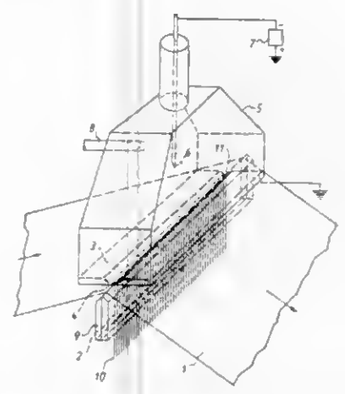
means for transferring said visual image to a hard copy output medium; wherein the ratio of the width of said magnetic head assembly to the width of said buffer web is substantially equal to the ratio of the magnetic writing speed of said head assembly to the development speed of said development means and transferring speed of said transferring means.

4,030,106

METHOD AND ARRANGEMENT FOR ELIMINATING UNDESIRED DENSITY VARIATIONS IN ELECTROSTATICALLY CREATED COPIES OF AN ORIGINAL

Friedrich Bestenreiner, Grunwald; Josef Helburger, and Wolfgang Ruf, both of Munich, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Sept. 22, 1975, Ser. No. 615,795
Claims priority, application Germany, Sept. 24, 1974, 2445543
Int. Cl.² G03G *15/044*
U.S. Cl. 346—153 **11 Claims**



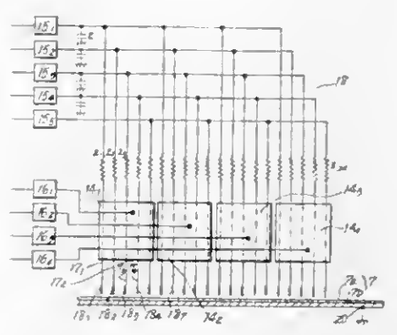
1. In a method of forming on a travelling recording medium an image of an original to be copied, wherein the original is scanned line-by-line and the scanning signals corresponding to one line are routed to respective ones of a plurality of recording channels, each recording channel being comprised of a writing electrode and a signal transmission channel leading to the writing electrode, the writing electrodes being disposed in a row extending transverse to the recording medium travel direction, the recording channels undesirably having non-identical characteristics tending to produce images containing perceivable stripes extending in the recording medium travel direction, a method of equalizing the operation of the recording channels so that such stripes will not appear, the equalizing method comprising the steps of applying identical test signals to the recording channels, using detector means to generate a plurality of error signals corresponding in a number to the recording channels and indicative of the lack of equality in the operation of the recording channels, in response to the application of the test signals, associating with the transmission channels a corresponding plurality of adjusting stages each operable for adjusting the transmission characteristic of the respective transmission channel, appplying the plurality of error signals to the plurality of adjusting stages to cause the latter to effect automatic errorsignal-dependent adjustments in the transmission characteristics of the transmission channels to equalize the operation of the plurality of recording channels and prevent the formation of such stripes.

4,030,107

ELECTROGRAPHIC RECORDING DEVICES EMPLOYING ELECTROSTATIC INDUCTION ELECTRODES

Takao Tagawa, Kashihara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Sept. 12, 1975, Ser. No. 613,033
Claims priority, application Japan, Sept. 12, 1974, 49-105614; Sept. 18, 1974, 49-108218; Sept. 20, 1974, 49-109198
Int. Cl.² G03G *15/044;* **G01D** *15/06*
U.S. Cl. 346—155 **7 Claims**



1. An electrostatic recording or printing device comprising:
a record medium on which a record image is to be disposed;
a record electrode spaced against the record medium to form a gap therebetween;
an electrostatic induction plate disposed over the record electrode or its associated lead wires and capacitively coupled thereto via insulation means;
an impedance element;
a pair of voltage sources switchable between first and second voltage levels, one being connected with the record electrode via the impedance element and the other being connected with the record electrode via the electrostatic induction plate, wherein the record electrode is activated by the sum of voltages from the first and second sources.

4,030,108
APERTURE SETTING DEVICE FOR CAMERA

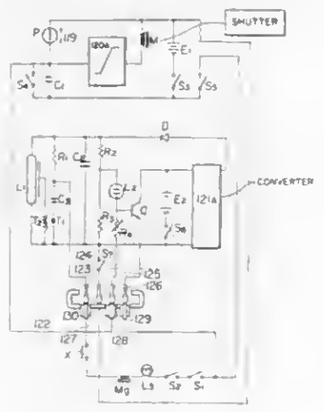
Mutsunobu Yazaki; Takashi Uchiyama; Mutsuhide Matsuda, all of Yokohama; Tetsuya Taguchi, Kawasaki, and Yukio Mashimo, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 399,480, Sept. 21, 1973, abandoned. This application May 12, 1975, Ser. No. 576,441

Claims priority, application Japan, Sept. 25, 1972, 47-95997; Sept. 26, 1972, 47-96474

Int. Cl.² G03B 7/16

U.S. Cl. 354—27 4 Claims



4. An exposure control apparatus for a camera having an objective lens comprising:

electric flash means for producing a controlled quantity of light energy;

energy means coupled to said flash means for storing electric energy to be translated into the light energy in said electric flash means;

a first diaphragm to control a first aperture size of the objective lens of the camera;

a second diaphragm coupled to the first diaphragm to control a second aperture size;

light sensitive means within the camera for converting an amount of light passing through said second diaphragm into an electric quantity;

shutter control means in the camera for generating a shutter operating signal;

timing means in the camera for controlling said shutter control means for a time period dependent upon the output signal of said light sensitivie means;

first information means for establishing an aperture suitable for daylight photography;

second information means for entering at least the distance to an object being photographed so as to establish an aperture suitable for flash photography;

transmitting means alternatively connected with said first information means or said second information means so as to transmit the output signal of the connected one of said two information means to said second diaphragm;

control means coupled to said energy means for connecting said transmitting means with said second information means when an electric energy value of said energy means reaches a predetermined value and for connecting said transmitting means with said first information means when said electric energy value reaches a second predetermined value.

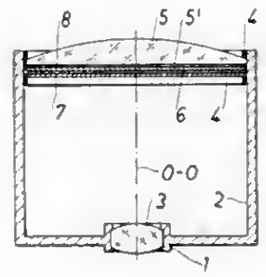
4,030,109
APPARATUS FOR CONTROLLING A PHOTOGRAMMETRICAL CAMERA

Gerhard Ernst Hecker; Heinrich Peter Klose, and Wilfried Friedrich Heinrich Muller, all of Jena, Germany, assignors to Jenoptik Jena G.m.b.H., Jena, Germany

Filed May 5, 1975, Ser. No. 574,995

Int. Cl. G03b 39/00

U.S. Cl. 354—68 3 Claims



1. An apparatus for control of a photogrammetrical camera, comprising

an imaging system,

a frosted glass arranged in the image plane of said imaging system,

said imaging system being adapted to image an object to be photographed onto said frosted glass,

a voltage sensitive material of variable optical transmissivity,

said material forming a plano-parallel sheet and being located adjacent to said frosted glass.

said sheet having a plurality of strip electrodes on one of its faces and a sheet electrode on the other of its faces,

an electronic counter,

each of said strip electrodes being connected to an output of said electronic counter,

and a tunable pulse generator connected to said counter,

said counter successively applying voltage pulses from said tunable pulse generator to said strip electrodes for producing potentials between said strip electrodes and said sheet electrode,

said pulse generator being adapted to control the frequency of said voltage pulses.

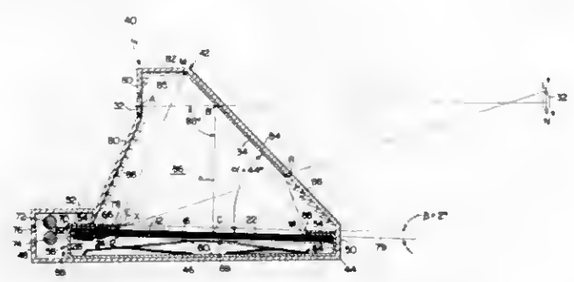
4,030,110
PHOTOGRAPHIC APPARATUS HAVING A REFLEX OPTICAL SYSTEM

Bruce K. Johnson, Andover, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Mar. 3, 1975, Ser. No. 554,928

Int. Cl.² G03B 19/12

U.S. Cl. 354—152 15 Claims



12. A camera and film apparatus comprising:

a film unit having an exposure image area of a given length and width and further having the characteristic of reflecting a small portion of light rays thereonto;

a housing;

an objective lens having an optic axis and being mounted on said housing;

a mirror mounted within said housing for receiving image-bearing light rays from a scene being photographed which enter said housing through said lens, and for redirecting said image-bearing light rays; and

means within said housing for positioning said film unit to extend with the length of its exposure area disposed at an angle to said mirror so that the entire exposure area of said film unit is illuminated by said redirected image-bearing light rays, said film unit positioning means being disposed within said housing to locate said film unit at a focal plane of said lens;

said film unit positioning means being arranged and said mirror being disposed at an angle with respect to said optic axis of said lens such that the one ray of said image-bearing light rays travelling along said optic axis is redirected by said mirror onto said film unit at a point substantially coincident with the center of its exposure area and in a directon substantially normal to said film unit, said mirror being spaced from said film unit a predetermined distance, as measured along the line which said one ray travels after being so redirected by said mirror, so that all of the image-bearing light rays redirected by said mirror onto the exposure area of said film unit and reflected back therefrom onto said mirror are then redirected a second time by said mirror to locations within said housing that are outside of the exposure area of said film unit with the ones of said image-bearing light rays reflected by said film unit back onto the portion of said mirror closestmost disposed with respect to said film unit being redirected said second time by said mirror to a location within said housing substantially contiguous with the exposure area of said film unit.

4,030,111
POWER-OPERATED ACTUATOR FOR A FILM ADVANCE MECHANISM OF A CAMERA

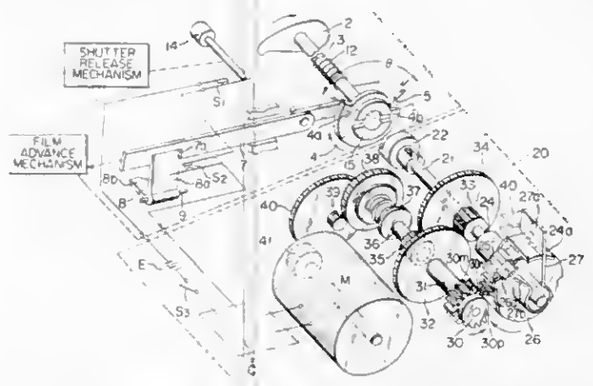
Shuji Kimura, Yokohama, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed Nov. 4, 1975, Ser. No. 628,652

Claims priority, application Japan, Nov. 13, 1974, 49-136562[U]

Int. Cl.² G03B 1/00

U.S. Cl. 354—173 12 Claims



1. In a camera having a film advance mechanism that includes a movable member for operating the mechanism, the combination of:

a. manually operable actuator means for manually moving the member;

b. motor driven actuator means for moving the member; and

c. means decoupling the motor of said motor driven actuator means from said member while said motor is de-energized and for automatically coupling said motor to said member in response to initial operation of said motor driven actuator means, whereby said manually operable actuator means is not loaded by said motor and whereby the motor starting load is substantially reduced.

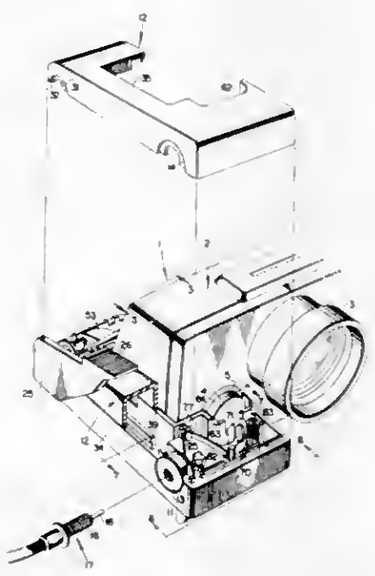
4,030,112
ACCESSORY ADAPTER FOR CAMERAS

John B. Morse, Boston; Donato F. Pizzuti, Saugus, and John M. Reynard, Framingham, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Jan. 13, 1976, Ser. No. 648,653

Int. Cl.² G03B 17/38

U.S. Cl. 354—269 3 Claims



1. An adapter for connecting a cable release to a camera of the kind having a housing including a front panel on which a shutter actuating button is mounted, a side panel adjoining the front panel, and a rear panel adjacent the side panel and behind the front panel, the rear panel having a detent formed thereon, said adapter comprising means forming an adapter housing adapted to embrace the three panels of the camera, means forming a cable release socket in said adapter housing, force transmitting linkage extending in said adapter housing from said cable release socket to an opening in said adapter housing confronting the shutter actuating button of the camera when the adapter is in operative position on the camera, said force transmitting linkage comprising a lever in said adapter housing and having one end thereof terminating in a plunger adapted to engage the shutter actuating button of the camera, and a spring connected to said lever and adapted to be engaged by a push rod of a device coupled to said cable release socket to drive said plunger into shutter button actuating position but also to yield and allow further movement of the push rod should said plunger meet an obstruction.

4,030,113
CAMERA FITTING

Christo Obreschkow, 1507-805 W. Broadway, Vancouver, British Columbia, Canada (V5Z 1K1)

Filed Sept. 19, 1975, Ser. No. 614,945

Int. Cl.² G02B 7/04; G03B 15/02, 17/00

U.S. Cl. 354—286 9 Claims

1. A lens containing converter adapted to be removably interposed between the standard master lens and the body of a single lens reflex camera to permit the formation of close-up images comprising;

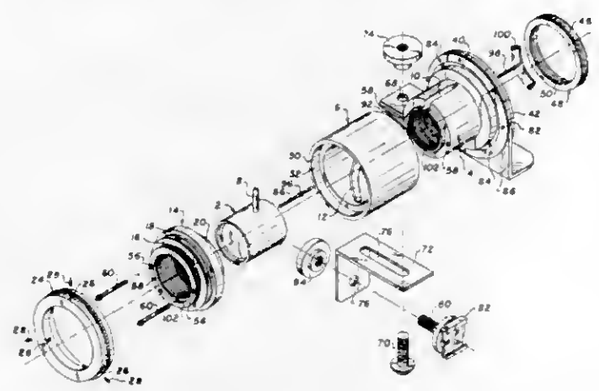
a lens system mounted in a lens carrier;

a sleeve in which the lens carrier can reciprocate;

means to determine the direction and extent of the reciprocation of the lens carrier within the sleeve and thus of the size of the image produced;

means at a first end of the lens containing convertor to

permit mounting of the lens containing convertor in place of the standard master lens of the camera; and



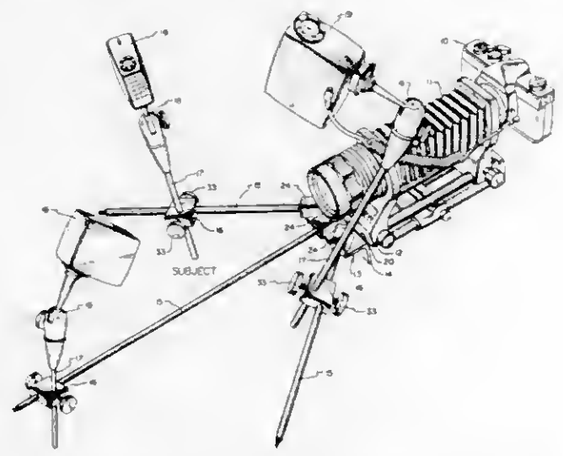
means at a second end of the lens containing convertor to permit mounting of said standard master lens on the lens containing convertor.

4,030,114

MODULAR PHOTOMACROGRAPHIC LIGHTING BRACKET

Jerry L. Telfer, 5th and Mission, San Francisco, Calif. 94119

Filed May 15, 1975, Ser. No. 577,656
Int. Cl.² G03B *17/56, 15/03*
U.S. Cl. 354—295 **12 Claims**



1. A modular lighting platform for hand held closeup photography comprising

a. a mounting platform adapted to be attached to a camera bellows or camera base,

b. a plurality of outwardly oriented extension arms attached to said mounting platform by attaching means which allow said extension arms pivotal movement to either side and which can lock said extension arms in any pivotal position,

c. dual fastening means slidably engaged on at least one extension arm rotatable about the longitudinal axis of said arm and containing means adapted only to secure said dual fastening means at any position along the length of the extension arm about which it is slidably

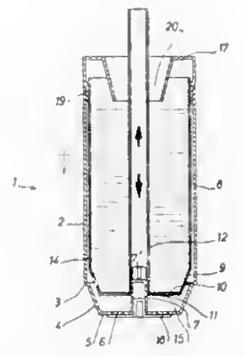
d. at least one auxiliary arm slidable engaged in each dual fastening means across a plane normal to the extension arm, said dual fastening means also containing additional means adapted only to secure the auxiliary arm at any position along the length of said auxiliary arm.

4,030,115

VERTICAL TANK FOR DEVELOPING PHOTOGRAPHIC MATERIAL

Claude M. Perriniaux, Auxerre, France, assignor to Anvar Agence Nationale de Valorisation de la Recherche, Neuilly sur Seine, France

Filed Nov. 12, 1975, Ser. No. 631,398
Claims priority, application France, Nov. 20, 1974, 74.38189
Int. Cl.² G03D *13/00*
U.S. Cl. 354—299 **11 Claims**



1. A vertical tank for the daylight development of sheet-type photographic materials comprising:

a. an outer tubular vessel having a closed bottom and open at its top;

b. an inner tubular vessel having a closed bottom, a space being formed between said vessels;

c. an annular chamber defined between said inner and outer vessels and adapted to receive the sheets to be treated;

d. a lower chamber defined between the closed bottoms of said inner and outer vessels and communicating with said annular chamber;

e. at least one closable conduit communicating with said lower chamber for the introduction of treatment solution into said lower chamber;

f. means for effecting the discharge of said solution from said lower chamber;

g. a lid for forming at least a light-tight recess defined by the space included between the two vessels and said lid; and

h. sliding means for axial motion of one of said vessels with respect to the other of said vessels for forcing the treatment solution introduced into said lower chamber into said annular chamber for development of the sheet-type photographic materials.

4,030,116

HIGH ASPECT RATIO P-N JUNCTIONS BY THE THERMAL GRADIENT ZONE MELTING TECHNIQUE

Samuel M. Blumenfeld, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 411,151, Oct. 30, 1973, Pat. No. 3,897,277. This application May 16, 1975, Ser. No. 577,999
Int. Cl.² H01L *29/06, 29/04*
U.S. Cl. 357—32 **10 Claims**

1. A semiconductor device comprising

a body of single crystal semiconductor material having opposed major surfaces, a first type conductivity, a vertical axis and a selected resistivity;

an array of columnar regions disposed in the body substantially parallel to each other and the vertical axis of the body and substantially perpendicular to the two opposed major surfaces, each region extending between and terminating in the two major opposed surfaces and the material of the region consists of recrystallized semiconductor material of the body;

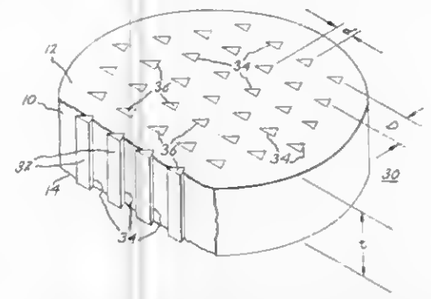
each region being formed in situ by the migration of a melt of a metal-rich semiconductor material through the body by thermal gradient zone melting at a predetermined elevated temperature along a thermal gradient substantially parallel with the vertical axis of the body and has a predetermined level of concentration of the metal of the melt therein as determined by the solid solubility limit of that metal in that semiconductor material at that predetermined elevated temperature of migration, the metal being distributed substantially uniformly throughout the

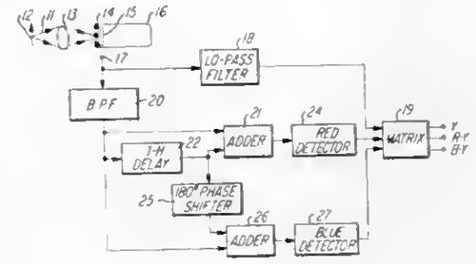
4,030,118

COLOR ENCODING CAMERA UTILIZING COMB FILTERING FOR COLOR SIGNAL SEPARATION

Robert Adams Dischert, Burlington, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Feb. 11, 1970, Ser. No. 10,323
Int. Cl.² H04N *1/22, 9/07*
U.S. Cl. 358—5 **33 Claims**





entire region and comprising a dopant impurity material to impart a second and opposite conductivity thereto, and the metal is derived from a metal lead thermocompression bonded to the major surface from which migration is initiated;

a P-N junction formed by the contiguous surfaces of each region and the body, and

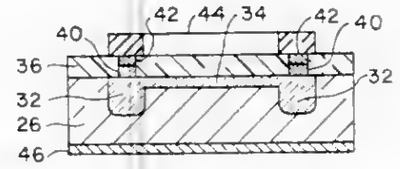
each region has a substantially equilateral triangular cross-section.

4,030,117

ZENER DIODE

Harry C. Kling, Boxford, Mass., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Mar. 10, 1975, Ser. No. 557,206
Int. Cl.² H01L *29/90, 23/02*
U.S. Cl. 357—13 **11 Claims**



1. A zener diode comprising

a body of semiconductive material having a first type of semiconductivity and opposed front and back surfaces;

a shallow junction region of a second type of semiconductivity formed in one surface of said body in pn-junction forming relation with said body;

a deep diffused region of a second type of semiconductivity formed in said one surface in contact with and about the entire periphery of the shallow junction region;

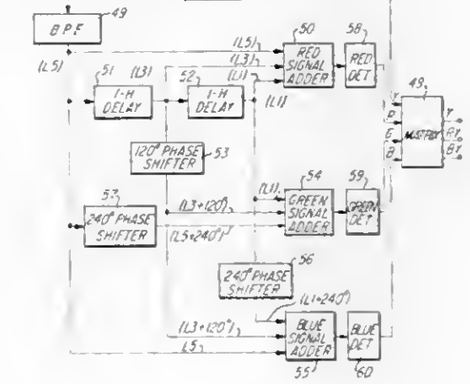
an insulating layer formed over said regions;

a metal contact means extending through the insulating layer and connected to and formed on the deep diffused region over the entire length of the region;

an electrical contact means formed on the other of said surfaces of the body of semiconductive material opposite from the one surface in which the shallow and deep diffused regions are formed;

first and second axially aligned electrodes disposed on opposite sides of said body of semiconductive material and in electrical contact with the previously mentioned contact means; and

a cylindrical sleeve of non-porous encapsulating material disposed about said electrodes and sealed thereto for encasing the body of semiconductive material.



11. A camera for encoding color information onto a black and white film for producing color representative signals when subsequently scanned, comprising:

a black and white film;

a striped spatial color encoding filter assembly disposed between said film and a scene;

means for imaging said scene and said color encoding filter assembly onto said film for encoding scene light and forming a record of said encoded light on said film;

said spatial color encoding filter assembly including first and second superimposed encoding gratings for encoding first and second colors, the direction of the stripes of said first grating being angularly disposed from the direction of the stripes of said second grating, the width of the stripes of said first and second gratings being selected such that subsequent scanning of said encoded film produces a signal including first and second carrier wave components resulting from scanning said first and second encoding gratings, respectively, the carrier frequency and sidebands of both groups of components having the same

frequency during a single line scanning interval, at least one of said carrier wave component groups having a phase change on successive scanned lines.

23. A system for producing signals representative of a scene, comprising:

an image scanning pickup device;

color encoding filter means disposed between said scene and a photosensitive electrode of said image pickup device for encoding light from said scene such that colored light information is derived as modulation of a composite signal derived from said image pickup device as said electrode is scanned,

said filter comprising three superimposed gratings for encoding three colors, the stripes of at least one of said gratings being angularly disposed with respect to the stripes of the other of said gratings, said stripes of each of said gratings having widths such that said composite signal includes a plurality of amplitude modulated color representative carrier wave components having the same frequency during a scanning interval,

at least two of said gratings having its stripes angularly disposed from the direction of scanning such that at least two component waves of said composite signal have a phase change on successively scanned lines; and

first, second and third signal processing means coupled to said image pickup device for combining signals derived from a plurality of scanning lines for producing signals representative of first, second, and third colors, respectively,

said first, second, and third signal processing means including means for delaying said signals for periods equal to the periods of one and two scanning lines for enabling said signals derived from a first and two next preceding scanning lines to be combined; and

said first, second, and third signal processing means including means for combining said signals derived from said three scanning lines in different phases for producing said first, second, and third color representative signals.

32. A system for producing signals representative of the color of a scene, comprising:

an image scanning pickup device;

striped spatial color encoding filter means comprising at least first and second gratings for encoding at least first and second colors, said gratings being disposed between said scene and a photosensitive electrode of said image pickup device for filtering the scene light reaching said electrode such that a composite signal representative of the color of said scene is derived from said image pickup device during scanning of said photosensitive electrode,

the encoding stripes of each said gratings being angularly disposed relative to the stripes of each other grating, said stripes of each of said gratings having a width such that said scanning produces said composite signal including a plurality of amplitude modulated color representative carrier wave components having the same frequency during a scanning interval; and

means coupled to said image pickup device for combining signals derived from a plurality of successively scanned lines for producing separate and simultaneous signals representative of a plurality colors.

4,030,119
VIDEO WINDOW CONTROL

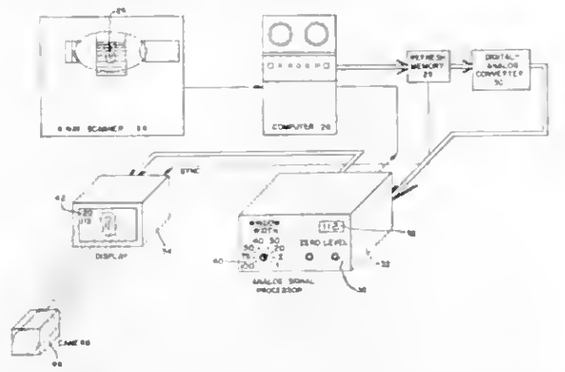
George W. Ellis, Burnt Hills, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Oct. 1, 1975, Ser. No. 618,682
Int. Cl.² H04N *7/18*; **H03K** *13/08*
U.S. Cl. 358—11 **14 Claims**

1. In an X-ray tomographic imaging system of the type comprising:

a source of radiation transmission data, a digital computer connected to receive said transmission data, and to calculate therefrom digital tomographic image data, a digital-to-analog converter connected to receive said digital image data and to produce therefrom a high resolution, analog image waveform, and an image display connected to receive and present a limited resolution analog image signal in an intensity modulated, visual format; the improvement comprising

an analog data processor connected to receive said high resolution image waveform and to convert said waveform into a limited resolution signal comprising an expanded function of those levels of said high resolution image waveform falling within the range of a selectable window function, said data processor including:



means for subtracting a reference level from said high resolution image waveform;

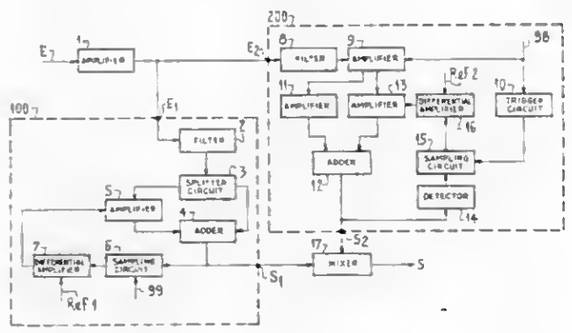
variable gain amplifier means connected to receive and increase the output of said means for subtracting; and

clipping means connected to act upon the output of said variable gain amplifier means whereby high level and low level data from said high resolution analog image waveforms are excluded from said limited resolution signal and the intensity resolution of said image display is selectively increased.

4,030,120
PROCESSING ARRANGEMENT AND CORRECTING DEVICE FOR COLOR TELEVISION SIGNALS

Luc Pham Van Cang, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Dec. 17, 1975, Ser. No. 641,668
Claims priority, application France, Dec. 24, 1974, 74.42636
Int. Cl.² H04N *9/535*
U.S. Cl. 358—27 **6 Claims**



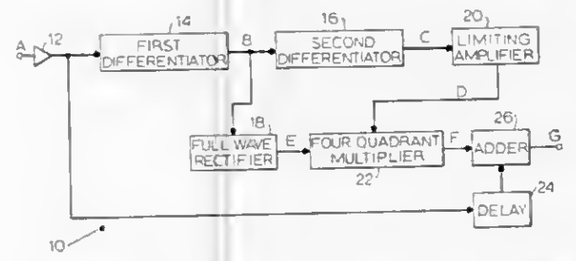
1. A processing arrangement for processing, prior to transmission or recording, a video frequency composite colour television signal including: horizontal sync. pulses, a chrominance information comprising a modulated chrominance sub-carrier outside the blanking intervals, and burst signals each of which is formed by a train of oscillations at the sub-carrier frequency and is transmitted in a horizontal blanking interval, and a picture signal, said arrangement comprising first and second processing circuits having respective inputs for receiving said composite signal, and respective outputs, said first circuit comprising first selecting means for selecting

said sync. pulses, and a first correcting circuit for receiving said sync. pulses and imparting thereto a predetermined amplitude, said second circuit comprising second selecting means, having an output, for selecting an upper portion, including said chrominance information, of the frequency spectrum of said composite signal, at least when said chrominance information is formed by said burst signals, and a second correcting circuit for receiving the output signal from said second selecting means and giving it a predetermined amplitude, said arrangement further comprising a mixer circuit having two inputs respectively coupled to said outputs of said first and second processing circuits, and an output for delivering a processed video frequency composite signal.

4,030,121
VIDEO CRISPENER

Yves C. Faroudja, 26595 Anacapa Drive, Los Altos Hills, Calif. 94022

Filed Dec. 2, 1975, Ser. No. 636,837
Int. Cl.² H04N *5/14*, *9/535*
U.S. Cl. 358—37 **28 Claims**



1. A method of shortening the transition time of transitions occurring in related high speed aperiodic signals including the steps of

differentiating a first related signal having transistions to be shortened to provide a first differential of said first signal,

twice differentiating a second signal which is related to said first signal to provide a second differential of said second signal,

producing a function of said first differential of said first signal,

producing a function of said second differential of said second signal,

multiplying said function of said first differential of said first signal by said function of said second differential of said second signal to produce a product,

delaying said first signal by a time factor equal to transit delay introduced in generating said product to provide a delayed first signal,

adding said product and said delayed first signal in phase to produce a sum which is the first signal having the transitions thereof shortened.

4,030,122
RECORDING APPARATUS UTILIZING SMALL OPTICAL COMPONENTS

Robert Guido Chemelli, Morristown; Dwight Dexter Cook, New Providence, and Richard Carrel Miller, Summit, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed July 28, 1975, Ser. No. 599,850
Int. Cl.² H04N *5/76*
U.S. Cl. 358—127 **10 Claims**

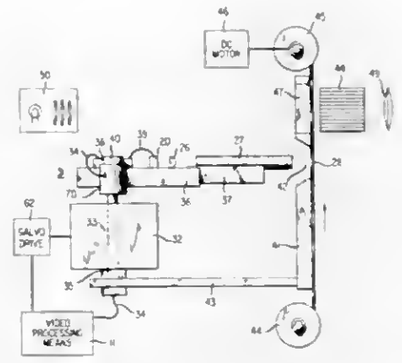
1. Appartus for forming an image in the form of discrete holes on a recording medium in response to an input signal representing video information comprising:

a laser medium adapted to emit pulses of coherent radiation in the form of an astigmatic elliptical beam in response to said input signal;

means for focusing said radiation onto said recording medium comprising an optical fiber with a parabolic radial index of refraction;

a hemicylindrical lens interposed between said laser and said optical fiber with the flat surface of said lens facing said laser, said hemicylindrical lens having a radius and being positioned at a distance from said laser so as to convert said radiation into an approximately nonastigmatic circular beam;

said laser, optical fiber and hemicylindrical lens being



mounted on a support which is capable of being deflected over a prescribed arc by rotation about an axis of said support;

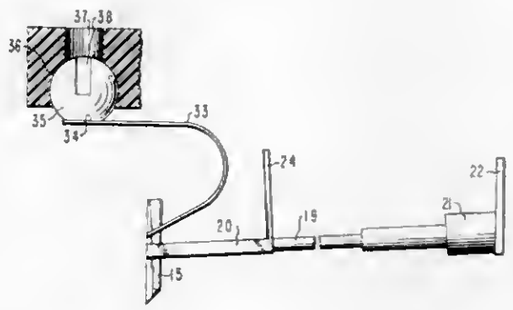
means for conforming the recording medium to an arc concentric with the arc defined by said support; and

means for periodically deflecting said support in one direction from an initial position across the prescribed arc so as to scan a line of said recording medium and in the opposite direction to return the support to its initial position.

4,030,123
STYLUS ADJUSTMENT APPARATUS FOR A VIDEO DISC PLAYER

Byron Kent Taylor, Indianapolis, and James Austin Allen, Monrovia, both of Ind., assignors to RCA Corporation, New York, N.Y.

Filed Mar. 16, 1976, Ser. No. 667,396
Claims priority, application United Kingdom, Sept. 18, 1975, 38458/75; Nov. 28, 1975, 49107/75
Int. Cl.² H04N *5/76*
U.S. Cl. 358—128 **9 Claims**



1. In a system for playing back prerecorded signals from a spirally-grooved and rotatable record, said system including a carriage mounted for lateral motion relative to a base plate of said system in correlation with lateral motion of a groove-riding stylus during playback; an apparatus comprising:

A. a stylus arm carrying said stylus at one end thereof;

B. means for flexibly supporting the end of said stylus arm remote from said one end within said carriage;

C. a spring for urging said stylus into said record groove during playback; said spring having a first end and a

second end; said first end of said spring being secured to said stylus; and

D. means mounted within said carriage and secured to said second end of said spring for adjusting the location of said second end of said spring.

4,030,124

VIDEO DISC PLAYBACK SYSTEM AND PICKUP CARTRIDGE THEREFOR

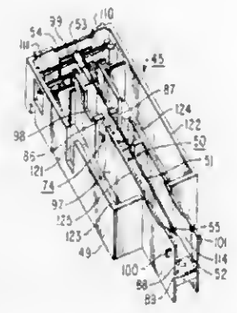
James Austin Allen, Monrovia, Ind., assignor to RCA Corporation, New York, N.Y.

Filed Mar. 16, 1976, Ser. No. 667,420

Claims priority, application United Kingdom, Sept. 18, 1975, 38458/75; Nov. 28, 1975, 49108/75

Int. Cl.² H04N *5/76*

U.S. Cl. 358—128 **11 Claims**



1. In a system for playing back prerecorded signals from a spirally grooved and rotatable record; said system including a carriage mounted for lateral motion relative to a base plate of said system in correlation with lateral motion of a groove-riding stylus during playback; said system further including a support member located within said carriage; an apparatus comprising:

A. a stylus arm unit including:

a. a stylus arm carrying said stylus at one end thereof.

b. a connector plate; and

c. a compliant member securing said connector plate to the other end of said stylus arm;

B. a cartridge having walls defining a protective enclosure for said stylus arm unit; said cartridge being subject to reception in a compartment provided in said carriage;

C. means for releasably clamping said stylus arm in a retracted position in said cartridge; said retracted position providing a location for said stylus withdrawn within the confines of said cartridge remote from an opening in the bottom of said cartridge through which said stylus may otherwise protrude;

D. means for flexibly suspending said connector plate within said cartridge; said suspending means establishing a location of said connector plate permitting alignment thereof with said support member when said cartridge is received in said compartment; said suspending means including a flexible diaphragm; said suspending means further including means for securing said diaphragm to said cartridge; a rear surface of said flexible diaphragm being oriented at a certain angle with respect to a front surface of said flexible diaphragm; said connector plate being secured to said rear surface; said cartridge having a bearing surface for engagement with said front surface to establish location of said front surface in said cartridge; and said certain angle being such that said compliant member is unstressed when said stylus arm is retained in said retracted position in said cartridge during said engagement of said front surface of said diaphragm with said bearing surface of said cartridge.

4,030,125

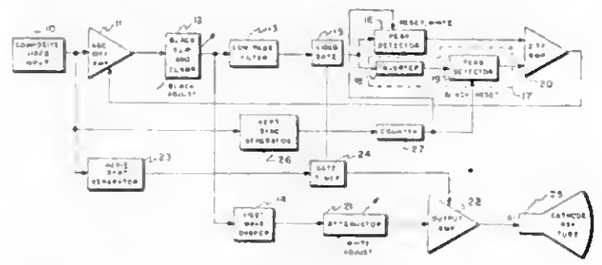
AUTOMATIC VIDEO PROCESSING FOR HIGH-PERFORMANCE CRT DISPLAYS

Robert J. Bedell, Arlington, Tex., and Richard E. Franseen, Springfield, Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 16, 1976, Ser. No. 751,296

Int. Cl.² H04N *5/14*

U.S. Cl. 358—169 **4 Claims**



1. A video processor including a gain-controlled amplifier having a composite video input, a control input, and an output; an adjustable clipper-clamper having an output and having an input connected to said output of said amplifier; a video gate having a control input, a video input, and a video output; a resettable peak video signal detector having an output and a reset input, and having a signal input connected to said video output of said gate; a resettable minimum video signal detector having an output and a reset input and having an input connected to said video output of said gate; a difference detector having an output and having individual inputs connected to said outputs of said peak and minimum video signal detectors, said difference detector output being connected to said control input of said gain-controlled amplifier; video waveshaping means having an input connected to said output of said clipper-clamper and having an output; a gated video output amplifier having a gain input, a video input, and an output; gate control means having a composite video input and having an output connected to said gate inputs of said video gate and said gated video output amplifier; detector reset means having a composite video input and having an output connected to said reset inputs of said detectors; and a cathode ray tube having a video input terminal connected to said output of said video output amplifier.

4,030,126

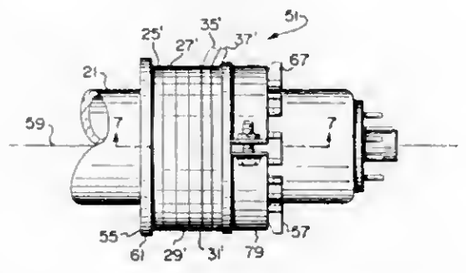
SUPPORT MEANS FOR A CRT BEAM ADJUSTMENT DEVICE

Peter George Puhak, Seneca Falls, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed Jan. 16, 1976, Ser. No. 649,684

Int. Cl.² H04N *5/645*; **H01F** *7/02*

U.S. Cl. 358—248 **8 Claims**



1. Support means for exteriorly positioning and retaining a beam adjustment device formed a plurality of sequentially oriented annulate magnetic members on the neck portion of a cathode ray tube, said support means comprising:

a cylindrical support sleeve formed of insulative material having substantially opposed alpha and beta end portions and a longitudinal axis therethrough, said sleeve having an internal diameter to facilitate sliding placement on said neck portion and an external diameter dimensioned to accommodate said annulate members positioned thereon, said alpha end portion having a terminus formed as an outstanding circumferential member to provide stop means for said annulate members, said beta end portion of said cylindrical sleeve having a plurality of spaced apart longitudinal slits therein oriented parallel with said axis to form a plurality of substantially similar tongue-like extensions of said sleeve, each of said extensions having at least one terminally oriented protuberance formed to extend radially outward therefrom to effect an outstanding circular array around the beta end of said sleeve, the surface of each protuberance oriented toward said annulate members being an angularly related surface sloping toward the body of said sleeve;

a spacer ring dimensioned for sliding placement upon said sleeve, said ring being positioned thereon between said protuberances and said annulate members; and

a ring-type band clamp having associated adjustable means and a circumferential dimensions less than that of said annular array of protuberances and greater than that of said sleeve, said band clamp being positioned between said protuberances and said spacer ring in a manner to abut said ring and ride on said sloping surfaces of said protuberances to simultaneously exert longitudinally directed pressure to positionally lock said annulate rings and circumferentially directed pressure to affix said support means upon said neck.

4,030,127

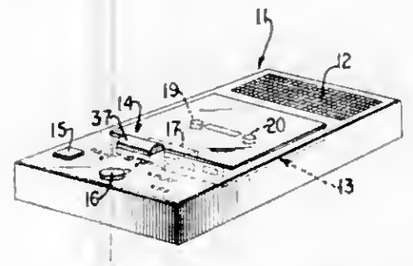
AUDIO TAPE PLAYER DRIVER INFORMATION DEVICE

Harry Newman, Main St., Box 141, South Fallsburg, N.Y. 12779

Filed May 14, 1975, Ser. No. 577,313

Int. Cl.² G11B *5/00, 15/06*

U.S. Cl. 360—12 **2 Claims**



1. In an audio tape device having a speaker and an audio tape energized transducer means connected to said speaker for providing a prerecorded informative message to a listener, the combination including means for receiving a reversable two track audio tape having reversed indicia and spaced information thereon for energizing said speaker when said tape is moved relative to said transducer, transport means for moving said tape relative to said transducer, manual reciprocable button means for energizing said transport means, said manual means having solenoid releasable locking means effective for one track only for holding said manual means in a tape device energized mode after said manual means is moved to energize said transport means, and portions of said tape indicia being insulative and portions being electrically conductive for releasing said locking means at the end of a message, and optical viewing means including a reflective mirror and adjacent prism means whereby the indicia is reflected by said mirror for enlarging by and viewing through said prism.

4,030,128

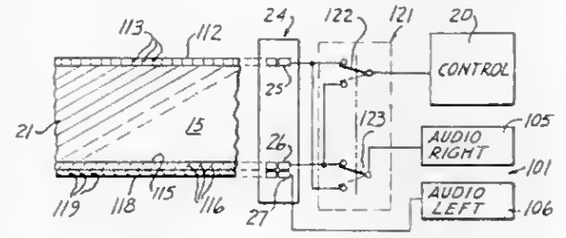
VIDEO RECORD SCRAMBLING AND UNSCRAMBLING

Ludwig A. Perret, La Canada, Calif., assignor to Bell & Howell Company, Chicago, Ill.

Filed Nov. 21, 1974, Ser. No. 526,019

Int. Cl.² H04N *5/76, 1/44*

U.S. Cl. 360—33 **24 Claims**



1. A method of scrambling a video information recording of a type having video information and a video information playback synchronization control signal recorded on a recording medium, with said playback control signal being normally in that type of recording recorded in a first track positioned on the recording medium for playback by a specifically positioned playback device in a standard video information playback apparatus for a control of the video information playback, and said video information being normally in that type of recording recorded in a slant-track pattern oriented in a predetermined manner on said recording medium, comprising in combination the steps of:

recording said video information on one side of said recording medium in said slant-track pattern being oriented in said predetermined manner; and

switching the recording of said video information playback control signal on said one side of said recording medium from said first track to a second track different from said first track and spaced from said specifically positioned playback device during playback in said standard video information playback apparatus sufficiently to miss the synchronization control signal playback device if said recorded video information and control signal were attempted to be played back from said medium in a standard video information playback apparatus.

4,030,129

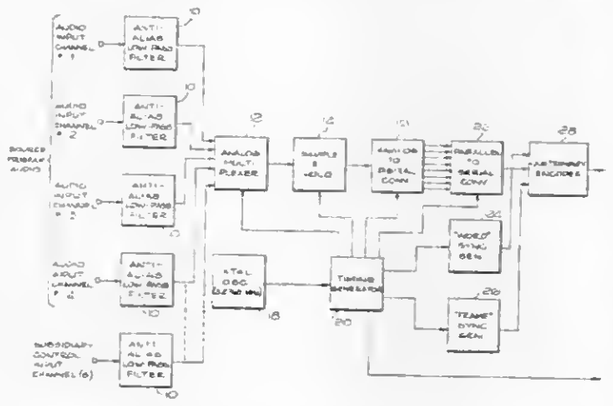
PULSE CODE MODULATED DIGITAL AUDIO SYSTEM

William E. Whitlock, Sherman Oaks, Calif., assignor to Lase Industries, Van Nuys, Calif.

Filed June 14, 1976, Ser. No. 696,156

Int. Cl.² G11B *5/00, 5/62*

U.S. Cl. 360—32 **26 Claims**



1. A system for minimizing discernable output discontinuities in reproducing digitally transmitted samples of continuous analog signals comprising:

means for receiving successive multibit digital words indica-

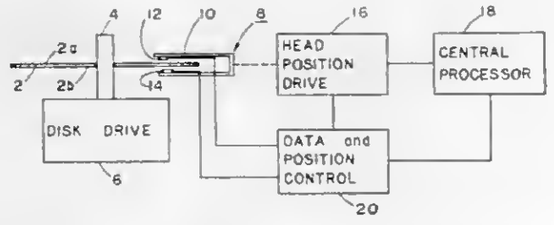
tive of the instantaneous amplitude value of successive samples of the analog signal;
memory means for entering each successive digital word received to be stored in one of a sequential plurality of word address positions;
dropout detector means for sensing a selected characteristic of the transmitted signal being received to generate an error signal indicative of transmission deficiencies;
memory address means responsive to said error signal for interrupting the normal sequence of entry for said digital words being received and for reading out from said address positions previously entered data words in the reverse sequence of their entry;
digital to analog converter means for receiving either the digital words being entered in forward sequence or digital values derived from the digital words being read out in reverse sequence from the memory means to generate analog values corresponding to successive samples of the continuous analog signal; and,
controlled low pass filter means providing a selectively variable cut-off frequency that decreases gradually from a maximum audio level in response to said error signal and that is gradually restored to or maintained at the maximum level during the absence of said error signal.

4,030,130

TRANSDUCER HEAD ASSEMBLY AND APPARATUS FOR USING SAME IN A PLURAL- TRACK RECORD DISK SYSTEM

Douglas A. Smith, Fife, Scotland, assignor to Burroughs Corporation, Detroit, Mich.

Filed Nov. 27, 1974, Ser. No. 527,896
Claims priority, application United Kingdom, Mar. 15, 1974, 11610/74
Int. Cl.² G11B *21/10*
U.S. Cl. 360—77 **11 Claims**



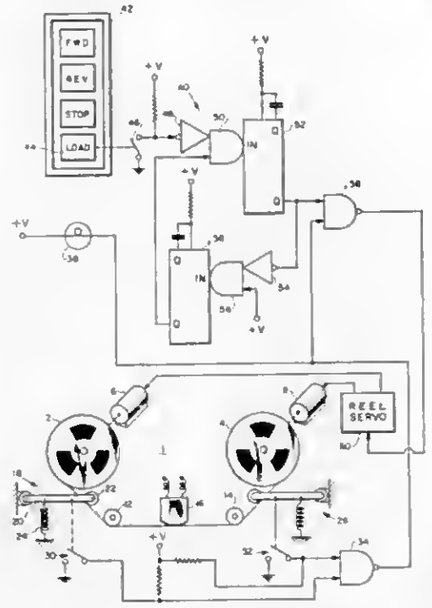
1. Apparatus for use in recording, reproducing or erasing data, comprising:
a record disk having a plurality of equally-spaced, radial, recording tracks on both faces thereof, tracks on one side being correspondingly, equal-radially spaced with respect to respective tracks on the other side, and variable informational data being recorded onto said tracks at different clock frequencies with respect to adjacent tracks;
support means;
an upper transducer head carried by said support means and cooperable with the upper face of said disk for reading or writing informational data from or onto said tracks;
a lower transducer head carried by said support means and cooperable with the lower face of said disk for reading or writing informational data from or onto said tracks, said lower transducer head fixed in a radially spaced relationship from said upper head with respect to said disk by one-half the distance between pairs of adjacent of said equally spaced tracks; and
means for centering either one of said heads with a said track by correspondingly centering other of said heads between two adjacent of said tracks on the opposite face of said disk, said means comprising:
1. means for separating reproduced data from said other head according to said different clock frequencies of said two adjacent tracks;
2. Means for comparing the amplitude of said separated reproduced data; and
3. Drive means responsive to said comparing means for driving said heads radially with respect to said disk for maintaining equal amplitude comparison by said amplitude comparison means.

4,030,131

SLACK TAPE LOADER

Glenn A. Belter, Louvlers, and Donald A. Evert, Littleton, both of Colo., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Aug. 20, 1975, Ser. No. 606,231
Int. Cl.² G11B *15/43*; **B65H** *59/38*
U.S. Cl. 360—71 **10 Claims**



1. A tape transport control system comprising
a pair of tape storage reels,
a pair of reel drive motors for driving respective ones of said storage reels,
a reel motor control system connected to said drive motors to supply energizing signals thereto,
means for detecting a slack condition in a tape driven by the tape transport between said storage reels to supply signals representative of said slack condition, and
selectively operable signal generator means responsive to said signals from said last-mentioned means and connected to said reel motor control system for providing a selectively operable signal generating capability to produce a succession of control signals for said reel motor control system with each control signal having a predetermined duration for energizing said reel motor control system for said predetermined duration to drive said reel motors to remove said slack condition in said tape.

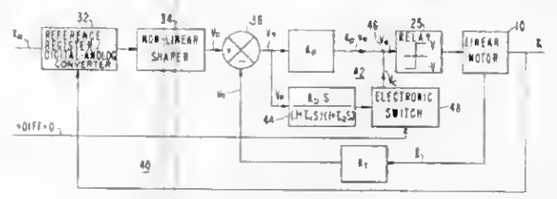
4,030,132

DUAL MODE VELOCITY SERVO CONTROL FOR A LINEAR ACTUATOR MOTOR

Syed H. Iftikar, San Jose, and Bing M. Leong, Sunnyvale, both of Calif., assignors to Memorex Corporation, Santa Clara, Calif.

Filed Mar. 27, 1975, Ser. No. 562,682
Int. Cl.² G11B *5/56*, *21/08*, *17/00*
U.S. Cl. 360—78 **13 Claims**

7. In a servo control system for controlling the movement of at least one magnetic transducer head relative to a rotating magnetic disc surface by means of a linear actuator motor having position and velocity modes of control, said servo control system having a velocity error signal and wherein the improvement comprises anticipatory mode means for deriving a compensatory signal proportional to the rate of change of



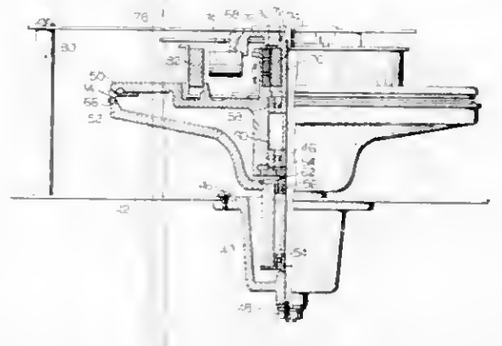
the velocity error signal in the operating frequency range of the system, and means responsive to both the servo error signal and compensatory signal for control of the linear actuator motor.

4,030,133

GUIDE DRUM APPARATUS FOR A VIDEO TAPE RECORDER AND/OR PLAYER

Klichiro Yamada, Nishinomiya; Isao Kozu, Katano; Takenori Akamine, Osaka, and Ryota Shimizu, Katano, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Osaka, Japan

Filed Sept. 9, 1975, Ser. No. 611,601
Claims priority, application Japan, Sept. 18, 1974, 49-108244
Int. Cl.² G11B *5/52*, *21/18*
U.S. Cl. 360—84 **4 Claims**



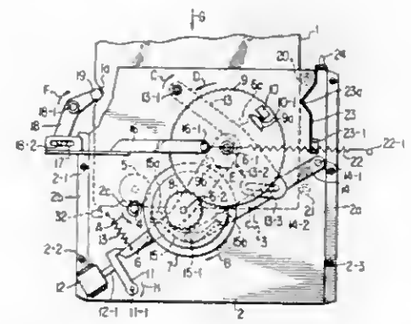
1. A guide drum apparatus for a video tape recorder and/or player in which a field or a frame of video signal is recorded in the longitudinal direction of a moving magnetic tape, and the recorded video signal is reproduced while the tape is moving, said apparatus comparising:
a main shaft fixedly secured on a chassis;
a first guide drum rotatably mounted on said main shaft and having a tape guiding surface on the periphery thereof and a plurality of magnetic video heads mounted thereon;
driving means coupled to said first guide drum for rotating said first guide drum at a rotational speed greater than the speed of movement of the tape;
a second guide drum mounted on said fixedly secured main shaft coaxially with said first guide drum and having a tape guiding portion at the periphery thereof which is opposed to the tape guiding portion of said first guide drum in the direction of the axis of said shaft so as to guide the magnetic tape together with said tape guiding surface on said first guide drum, said second guide drum being rotatable independently from said first guide drum at a lower rotational speed than that of said first guide drum according to the movement of the tape and due to the friction between the tape and the tape guiding portion of said second guide drum while said first guide drum is rotating at said greater rotational speed, whereby while moving around said guide drums the magnetic tape is scanned by said magnetic heads; and
adjusting means mounted on said fixedly secured main shaft and movable in a longitudinal direction of said fixedly secured main shaft for adjusting the height position of said magnetic video heads relative to the tape guiding portion of said second guide drum even while said first guide drum is rotating.

4,030,134

APPARATUS FOR TURNING ROTOR FOR EACH DESIRABLE ANGLE BY DRIVING FORCE OF CAPSTAN DRIVE SYSTEM

Itsuki Ban, Higashi-Oizumi; Takanori Kasuya, Kodaira; Kanji Yano, Higashi-Murayama, and Kenichi Maruyama, Toyoshima, all of Japan, assignors to Itsuki Ban, Tokyo, Japan

Filed Nov. 25, 1975, Ser. No. 635,146
Claims priority, application Japan, Nov. 27, 1974, 49-135524
Int. Cl.² G11B *21/08*, *15/08*
U.S. Cl. 360—92 **4 Claims**



1. An apparatus for turning a rotary element, of a tape cartridge insertion and removal system, for each desirable angle by a capstan drive system which comprises:
a lever turnable about a pivot bearing at one end thereof, the other end being free;
an eccentric free travelling ring carried by said turnable lever at a point revoved from said pivot end thereof so as to be contactable and discontactable from a rotary shaft of said capstan drive system;
a small gear connected to said free travelling ring;
a rotary element drivingly engaged with said small gear for reducing the rotation thereof and being pivotally mounted on said pivot bearing of said turnable lever;
lever means operatively associated with said rotary element at one end thereof and operatively engageable with said tape cartridge at the other end for permitting and forcefully ejecting said tape cartridge from a cartridge housing mounted on a tape deck, or for preventing the ejection of said cartridge from said housing, depending upon the rotary position of said rotary element;
means for biasing said free travelling ring toward said rotary shaft of said capstan drive system;
electromagnetic control means for interlocking the free end of said turnable lever so as to prevent contact of said free travelling ring with said rotary shaft of said capstan drive system; and
means for actuating said electromagnetic control means for releasing the interlock of said free end of said turnable lever so as to permit contact of said free travelling ring with said rotary shaft of said capstan drive system.

4,030,135

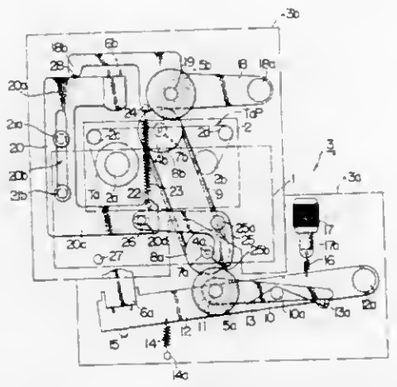
DUAL CASSETTE TAPE RECORDER

Sinichi Saitou, Ishikawa, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Nov. 17, 1975, Ser. No. 632,861
Claims priority, application Japan, Nov. 20, 1974, 49-133459; Nov. 20, 1974, 49-140410[U]
Int. Cl.² G11B *23/04*, *21/12*
U.S. Cl. 360—94 **20 Claims**

1. A dual cassette tape recorder including:
1. a primary recorder comprising:

A. first and second capstans;
B. a first pinch roller moveable between a first position wherein said first pinch roller is out of operative engagement with said first capstan and a second position wherein said first pinch roller is in operative engagement with said first capstan;
C. first receiving means for selectively receiving a compact cassette or an adaptor, said first receiving means adapted to position a tape contained in a compact cassette between said first capstan and said first pinch roller when a compact cassette is placed in said first receiving means;
2. said adaptor comprising:
A. a second pinch roller moveable between a third position wherein said second pinch roller is out of operational engagement with said second capstan when said adaptor is placed in said first receiver means and a fourth position wherein said second pinch roller is in operational engagement with said second capstan when said adaptor is placed in said first receiver means;
B. second receiver means for receiving a micro-cassette and for positioning a tape contained in said micro-cassette between said second pinch roller and said second capstan when a micro-cassette is placed in said second receiver means;
C. means coupling said first pinch roller to said second pinch roller when said adaptor is placed in said first receiver means, said coupling means for moving said second pinch roller into said fourth position in response to movement of said first pinch roller towards said second position.



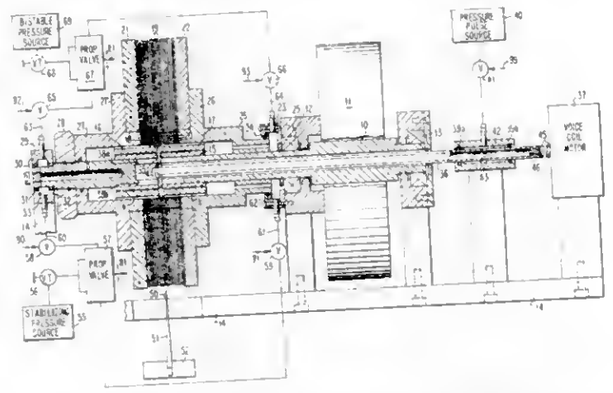
4,030,136

FLEXIBLE DISK PACK ACCESSING APPARATUS AND METHOD

James Taylor Smith, Boulder, Colo., and Frank Eberhard Talke, Morgan Hill, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 13, 1976, Ser. No. 658,134
Int. Cl.² G11B *5/012, 23/02*
U.S. Cl. 360—98 **13 Claims**

1. A record storage appartaus comprising, in combination,
a pack of closely spaced coaxially arranged interconnected rotary flexible disks,
means for normally supplying pressure fluid at a preselected flow rate to interstices between said disks to maintain the pack, during rotation, in a normal condition in which the disks are substantially parallel,
means for splitting said pack at a selected axial position to cause disks at each side of the split to be deflected apart and assume respective diverging positions, and
a movable means concentrically disposed within the pack and positioned at said selected position for sealingly isolating the interstices at one side of the split from those at the opposite side,
the first-mentioned means including means for providing pressure fluid at a flow rate higher than said preselected flow rate to one side of the movable means for restoring



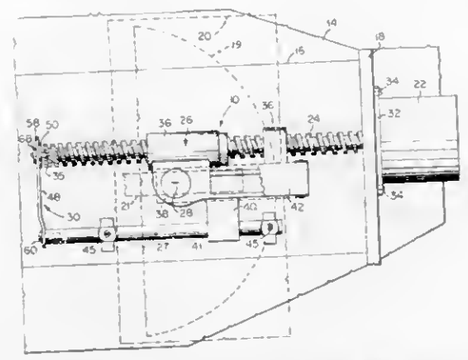
disks at said one side to substantially parallel positions while disks at the opposite side remain in their diverging positions.

4,030,137

LEAD SCREW SUPPORT DAMPING MECHANISM

Warren L. Dalziel, Monte Sereno, Calif., assignor to Shugart Associates, Inc., Sunnyvale, Calif.

Filed Sept. 23, 1975, Ser. No. 615,940
Int. Cl.² G11B *3/12, 5/58, 21/08*
U.S. Cl. 360—106 **10 Claims**



1. A magnetic read/write head-positioning apparatus comprising:
a frame;
a stepping motor mounted to said frame;
a cantilevered lead screw having one end mounted to the drive shaft of said motor and the other end unsupported, said lead screw being adapted to drive a magnetic read/write head, the unsupported end of said lead screw tending to vibrate in a transverse direction when rotated by said motor due to torsional reaction forces created in moving the head; and
damping assembly means disposed at said unsupported end of said lead screw and including first means carried by said unsupported end and forming a first surface, and resilient means affixed to said frame and forming a second surface, said resilient means being disposed to cause said second surface to engage said first surface with a force directed along the axis of said lead screw, whereby the frictional forces developed between said first and second surfaces due to transverse vibrating motion of said unsupported end tend to resist such motion.

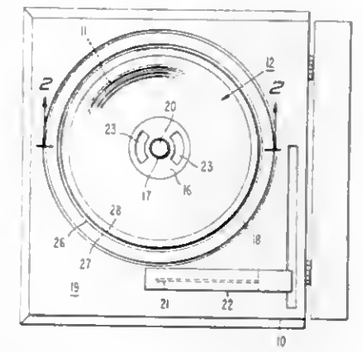
4,030,138

RECORD PROTECTION SYSTEM

James Hillier, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed July 18, 1975, Ser. No. 597,371
Int. Cl.² G11B *17/04*
U.S. Cl. 360—135 **12 Claims**

1. A record protection system comprising:
1. a record having an outer periphery, a central unrecorded region, and a recorded region disposed between said outer periphery and said central unrecorded region; said central unrecorded region including finger receiving holes for facilitating the manual handling of said record;
2. record receiving means including a wall portion defining the edge of a well for removably receiving said record; and
3. a cover mounted for motion between a closed position and an open position relative to said record receiving means;
the construction of said record protection system being such that said well is exposed to permit manual placement and removal of the record, when said cover is in said open position; and



wherein the spacing between said wall portion and said outer periphery of said record, when in said well, is such that grasping of said outer periphery of said record directly with human fingers is precluded.

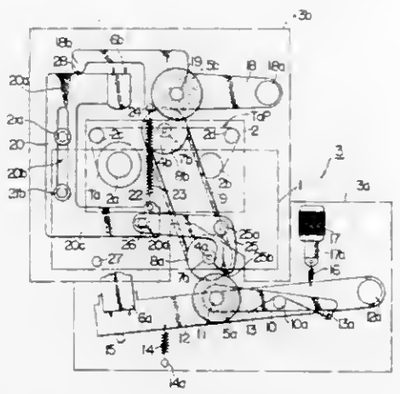
A. first and second capstans;

B. a first pinch roller moveable between a first position wherein said first pinch roller is out of operative engagement with said first capstan and a second position wherein said first pinch roller is in operative engagement with said first capstan;

C. first receiving means for selectively receiving a compact cassette or an adaptor, said first receiving means adapted to position a tape contained in a compact cassette between said first capstan and said first pinch roller when a compact cassette is placed in said first receiving means;

2. said adaptor comprising:

A. a second pinch roller moveable between a third position wherein said second pinch roller is out of operational engagement with said second capstan when said adaptor is placed in said first receiver means and a fourth position wherein said second pinch roller is in operational engagement with said second capstan when said adaptor is placed in said first receiver means;



B. second receiver means for receiving a micro-cassette and for positioning a tape contained in said micro-cassette between said second pinch roller and said second capstan when a micro-cassette is placed in said second receiver means;

C. means coupling said first pinch roller to said second pinch roller when said adaptor is placed in said first receiver means, said coupling means for moving said second pinch roller into said fourth position in response to movement of said first pinch roller towards said second position.

4,030,136

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U.S. Cl. 360—98 **13 Claims**

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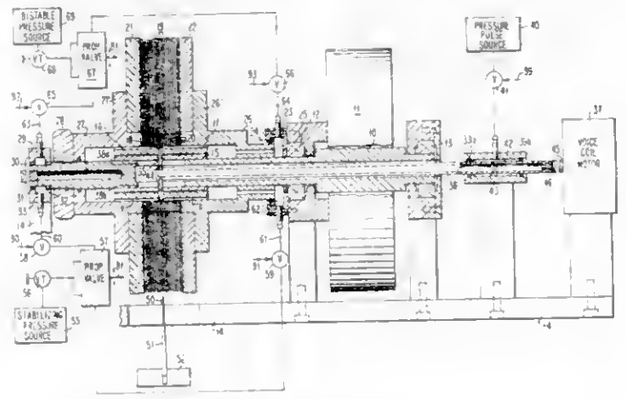
means for splitting said pack at a selected axial position to cause disks at each side of the split to be deflected apart and assume respective diverging positions, and

a movable means concentrically disposed within the pack and positioned at said selected position for sealingly isolating the interstices at one side of the split from those at the opposite side,

the first-mentioned means including means for providing pressure fluid at a flow rate higher than said preselected flow rate to one side of the movable means for restoring



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4,030,137

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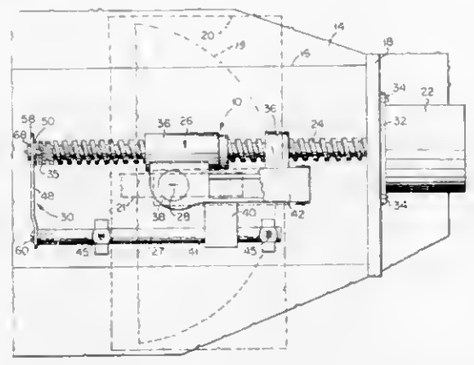
Warren L. Dalziel, Monte Sereno, Calif., assignor to Shugart Associates, Inc., Sunnyvale, Calif.

Filed Sept. 23, 1975, Ser. No. 615,940

Int. Cl.² G11B *3/12, 5/58, 21/08*

U.S. Cl. 360—106 **10 Claims**



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a stepping motor mounted to said frame;

a cantilevered lead screw having one end mounted to the drive shaft of said motor and the other end unsupported, said lead screw being adapted to drive a magnetic read/write head, the unsupported end of said lead screw tending to vibrate in a transverse direction when rotated by said motor due to torsional reaction forces created in moving the head; and

damping assembly means disposed at said unsupported end of said lead screw and including first means carried by said unsupported end and forming a first surface, and resilient means affixed to said frame and forming a second surface, said resilient means being disposed to cause said second surface to engage said first surface with a force directed along the axis of said lead screw, whereby the frictional forces developed between said first and second surfaces due to transverse vibrating motion of said unsupported end tend to resist such motion.

4,030,138

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James Hillier, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed July 18, 1975, Ser. No. 597,371

Int. Cl.² G11B *17/04*

U.S. Cl. 360—135 **12 Claims**

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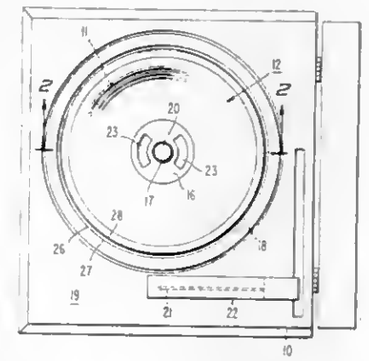
2. record receiving means including a wall portion defining the edge of a well for removably receiving said record; and

3. a cover mounted for motion between a closed position and an open position relative to said record receiving means;

the construction of said record protection system being such that said well is exposed to permit manual placement and removal of the record, when said cover is in said open position; and



wherein the spacing between said wall portion and said outer periphery of said record, when in said well, is such that grasping of said outer periphery of said record directly with human fingers is precluded.

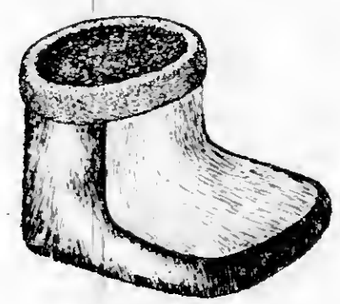
DESIGN PATENTS

GRANTED JUNE 14, 1977

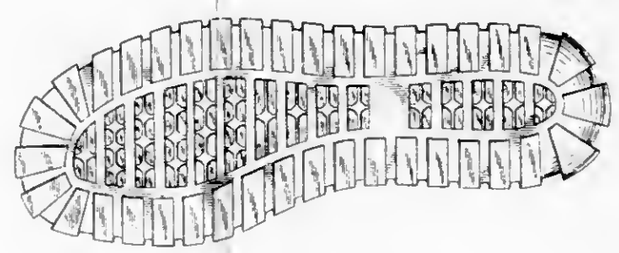
ERRATA

For CLASS	See PATENT NO.
014–030	244,696
014–068	244,697
014–037	244,698
014–006	244,699
014–012	244,700
030–099	244,701
024–038	244,711
030–040	244,712
014–070	244,718
024–002 B	244,719
028–073	244,720
028–035	244,721
028–038	244,722
028–038	244,724

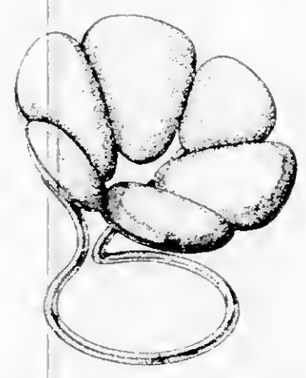
244,641
FOOT WARMER
Raymond U. Rajaniemi, and Brunhild B. Rajaniemi, both of 14 Mulberry St., Nashua, N.H. 03060
Filed Nov. 10, 1975, Ser. No. 630,343
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—264



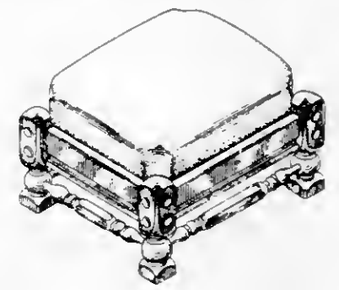
244,642
SHOE SOLE
Joseph P. Famolare, Jr., Florence, Italy, assignor to Famolare, Inc., New York, N.Y.
Filed June 30, 1975, Ser. No. 591,766
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—320



244,643
CHAIR
Charles U. Deaton, Genessee Mountain, and Lloyd H. Anderson, 670 McIntyre St., both of Golden, Colo. 80401
Filed Jan. 2, 1976, Ser. No. 646,077
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—26



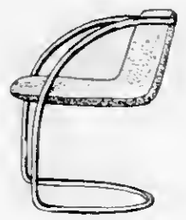
244,644
CONVERTIBLE BENCH
Philip L. Null, Maiden, N.C., assignor to Null Manufacturing Corporation
Filed Jan. 5, 1976, Ser. No. 646,839
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—36



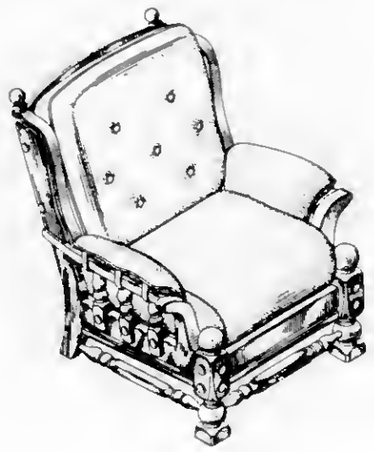
244,645
BLOW MOLDED PLASTIC SEAT
Floyd H. Talmon, Fairview Park, Ohio, and David K. Talmon, Williamsville, N.Y., assignors to Air-Lock Plastics, Inc., Tonawanda, N.Y.
Filed Nov. 28, 1975, Ser. No. 635,957
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—48

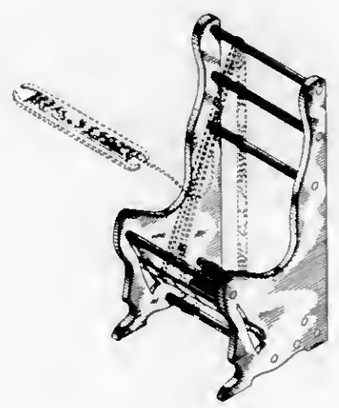
244,646
FOLDABLE ROCKING CHAIR
Suekichi Uchida, Oguchi, Japan, assignor to Uchida Sharyo Co., Ltd., Nagoya, Japan
Filed Nov. 6, 1975, Ser. No. 629,315
The portion of the term of this patent subsequent to Nov. 18, 1989, has been disclaimed.
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—49

244,647
ARMCHAIR
Giovanni Offredi, Milan, Italy, assignor to Fratelli Saporiti Industria Arredamenti Di Saporiti, Sergio E Giorgio S.N.C., Besnate (Varese), Italy
Filed June 8, 1972, Ser. No. 261,138
Claims priority, application Italy, Mar. 15, 1972, 21297/72
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—56

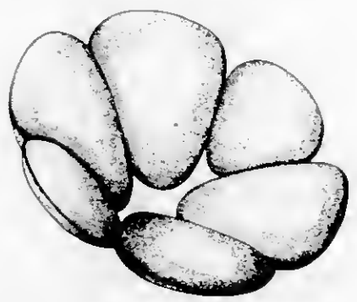


244,648
CONVERTIBLE CHAIR
Jeanne M. Swain, 801 S. 25th St., Allentown, Pa. 18103
Filed Oct. 14, 1975, Ser. No. 622,111
Term of patent 3½ years
Int. Cl. D6—*01*
U.S. Cl. D6—64



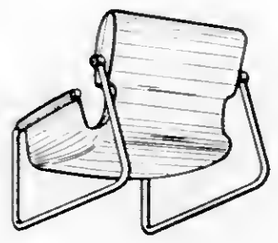


244,649
SEAT
Charles U. Deaton, Genessee Mountain, and Lloyd H. Anderson, 670 McIntyre St., both of Golden, Colo. 80401
Filed Jan. 2, 1976, Ser. No. 646,078
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—66

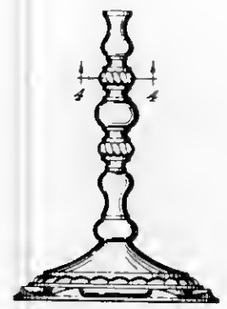


244,650
SEAT
Philip L. Null, Maiden, N.C., assignor to Null Manufacturing Corporation
Filed Jan. 5, 1976, Ser. No. 646,524
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—68

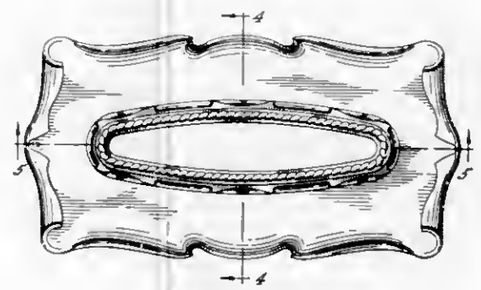
244,651
CHAIR
Maurice Prentice Burke, Apartment 402, 3300 De La Falaise, Montreal, Canada (H3R 2E5)
Filed Aug. 21, 1975, Ser. No. 606,544
Claims priority, application United Kingdom, Feb. 25, 1975, 970002/75
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—69



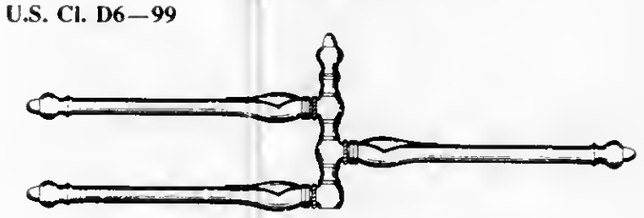
244,652
PEDESTAL FOR BATHROOM FIXTURES OR THE LIKE
Raymond U. H. Tegner, Lodi, Wis., assignor to Amerock Corporation, Rockford, Ill.
Filed Dec. 12, 1975, Ser. No. 640,032
Term of patent 14 years
Int. Cl. D23—*01*; D6—*06*
U.S. Cl. D6—86



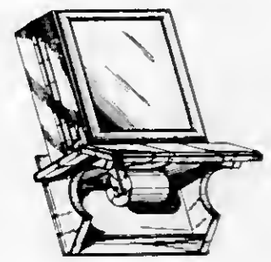
244,653
COVER FOR TISSUE BOXES OR THE LIKE
Raymond U. H. Tegner, Lodi, Wis., assignor to Amerock Corporation, Rockford, Ill.
Filed Dec. 12, 1975, Ser. No. 640,241
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D6—98



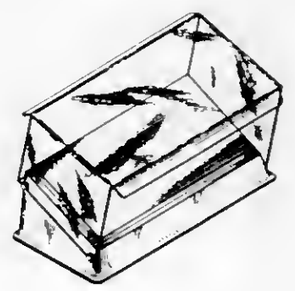
244,654
TOWEL RACK ELEMENT
Raymond U. H. Tegner, Lodi, Wis., assignor to Amerock Corporation, Rockford, Ill.
Filed Dec. 12, 1975, Ser. No. 640,030
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D6—99



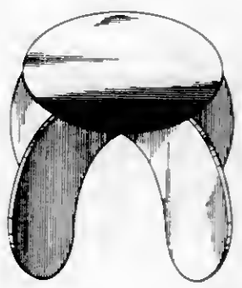
244,655
TELEPHONE BOOK CASE AND DESK COMBINATION
Victor H. Kemp, 1699 Cannes Way, Salt Lake City, Utah 84121
Filed Aug. 11, 1975, Ser. No. 603,461
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—128



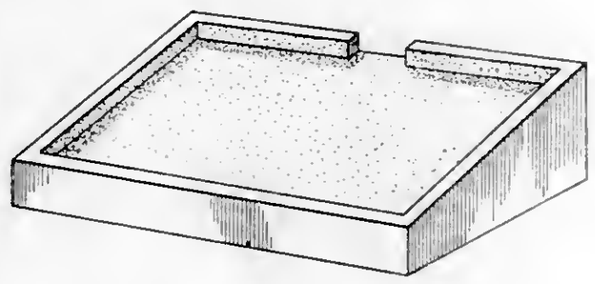
244,656
DISPLAY CASE
Loren J. Lawson, 7358 18th Ave. NW., Seattle, Wash. 98117
Filed May 24, 1976, Ser. No. 689,032
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—173



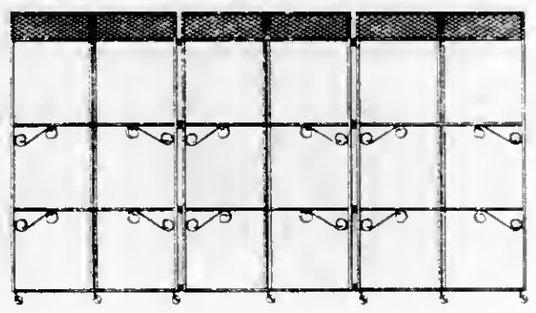
244,657
TABLE
Richard F. Laurenzi, 620 Vanderbilt Ave., Brooklyn, N.Y. 11238
Filed Oct. 15, 1975, Ser. No. 622,706
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—177



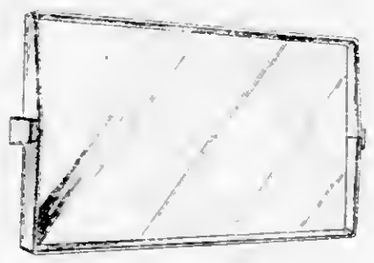
244,658
SUPPORT STAND FOR A PORTABLE CALCULATOR
Jack Allen Turner, R.R. No. 2, Box 111, Centerville, Ind. 47330
Filed Nov. 17, 1975, Ser. No. 632,449
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—181



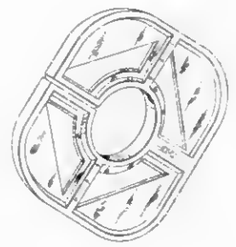
244,659
FOLDABLE SHELF UNIT OR SIMILAR ARTICLE
Allen E. Coles, Oklahoma City, Okla., assignor to W & W Steel Company, Oklahoma City, Okla.
Filed Aug. 20, 1975, Ser. No. 605,980
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—186



244,660
MIRROR
Guy Vrignaud, Grenoble, France, assignor to Allibert Exploitation, Societe Anonyme, Puteaux, France
Filed Aug. 18, 1975, Ser. No. 605,316
Claims priority, application France, Mar. 6, 1975, 75.73678
Term of patent 14 years
Int. Cl.[2] D6—*07*
U.S. Cl. D6—240

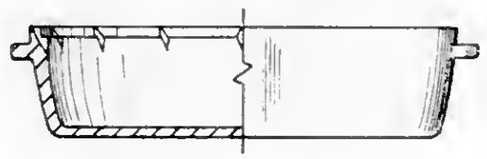


244,661
WARDROBE SYSTEMIZER DEVICE
Franklin H. Henry, 1431 Prentice Drive, Healdsburg, Calif. 95448
Filed Dec. 22, 1975, Ser. No. 642,773
Term of patent 14 years
Int. Cl. D6—*08*
U.S. Cl. D6—257

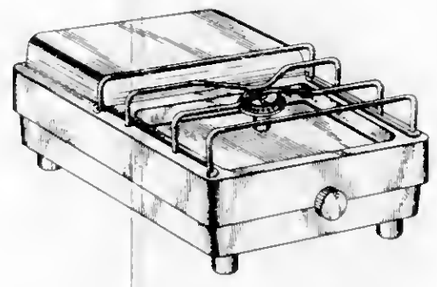


244,662
DINNER PLATE OR SIMILAR ARTICLE
James W. Luce, Syracuse, N.Y., assignor to Syracuse China Corporation, Syracuse, N.Y.
Filed July 21, 1975, Ser. No. 597,460
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—36

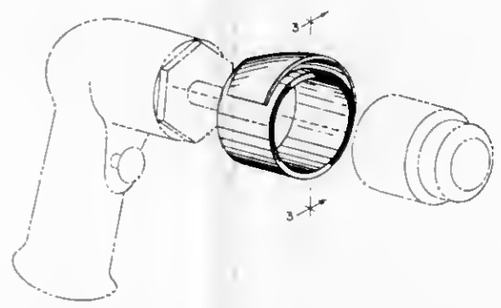
244,663
FRYING PAN
Jin Sul Cho, 1182 Cass St., Monterey, Calif. 93940
Filed Mar. 6, 1975, Ser. No. 556,001
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—97



244,664
GAS STOVE OR SIMILAR ARTICLE
Claude Alain Richard Monnet, Paris, France, assignor to Shell International Petroleum Company Limited, London, England
Filed June 18, 1975, Ser. No. 587,878
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—110



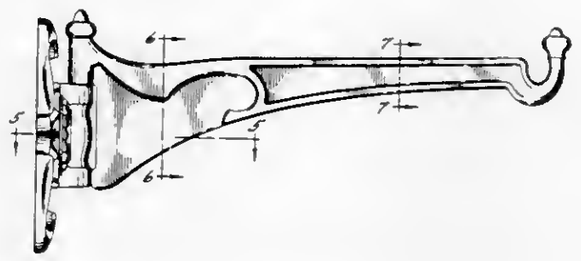
244,665
AIR TOOL HOUSING SHROUD
Richard H. Krom, 1700 Harrington Ave. NE., Renton, Wash. 98055
Filed Dec. 9, 1974, Ser. No. 530,792
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—70



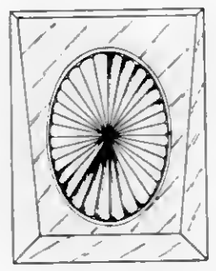
244,666
HACKSAW
Roy G. Kaywood, Stockbridge, Mich., assignor to Kaywood Products Corporation, Jackson, Mich.
Filed Apr. 19, 1976, Ser. No. 677,900
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—96

244,667
HANDCUFF LOCK KEY
Alan W. Craft, 15626 Larch Ave., Lawndale, Calif. 90260
Filed May 7, 1976, Ser. No. 684,197
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—347

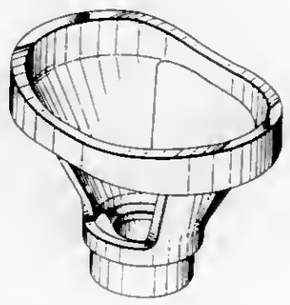
244,668
COMBINED BRACKET AND SUPPORTING ARM
Raymond U. H. Tegner, Lodi, Wis., assignor to Amerock Corporation, Rockford, Ill.
Filed Dec. 12, 1975, Ser. No. 639,810
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—363



244,669
JEWELRY BOX
Jerome Shiffman, 128 Carthage Road, Scarsdale, N.Y. 10583
Filed Aug. 31, 1973, Ser. No. 393,443
Term of patent 7 years
Int. Cl. D9—*03*
U.S. Cl. D9—235



244,670
DISPENSING CAP FOR AN EYE DROP BOTTLE OR THE LIKE
Stuart F. Winikoff, 9195 Collington Square, Allison Park, Pa. 15101
Filed Jan. 30, 1975, Ser. No. 545,475
Term of patent 14 years
Int. Cl.[2] D9—*07*
U.S. Cl. D9—261

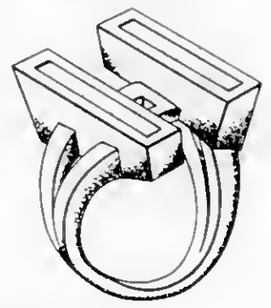


244,671
DIGITAL WRISTWATCH
Humbert C. Cozza, 16922 Club Hill Drive, Dallas, Tex. 75248
Filed Feb. 17, 1976, Ser. No. 658,636
Term of patent 14 years
Int. Cl.[2] D10—*02*
U.S. Cl. D10—38

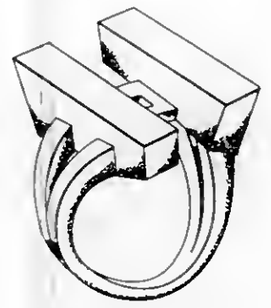
244,672
MOON DISC FOR A CLOCK FACE
Jane K. Molyneux, Carmel; Albert J. Day; Regina M. Day, both of San Mateo, all of Calif., and Theo E. Kaiser, Schwenningen, Germany, assignors to Molyneux Clocks, Burlingame, Calif.
Filed Mar. 15, 1976, Ser. No. 667,196
Term of patent 14 years
Int. Cl.[2] D10—*07*
U.S. Cl. D10—126

244,673
JEWELRY CLASP MEMBER
Paul V. Little, Central Islip, N.Y., assignor to Dover Findings, Inc., Deer Park, N.Y.
Filed Oct. 23, 1975, Ser. No. 624,739
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—87

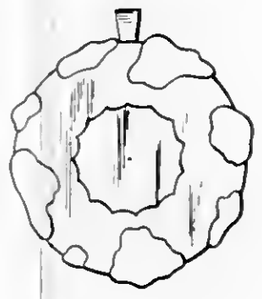
244,674
RING WITH CANTED TOP BARS
Sidney Frederick Mobell, 330 Bridge Road, Hillsborough, Calif. 94010
Filed Apr. 7, 1975, Ser. No. 565,976
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—34



244,675
RING WITH CANTED TOP BARS
Sidney Frederick Mobell, 330 Bridge Road, Hillsborough, Calif. 94010
Filed Apr. 7, 1975, Ser. No. 565,977
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—35

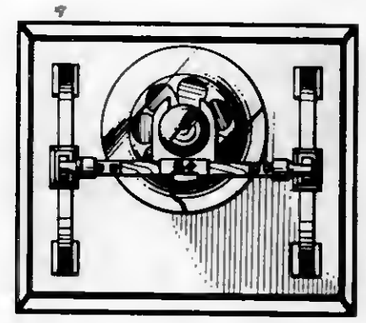


244,676
PENDANT
Gary K. Kobashikawa, 3460 Maluhia St., Honolulu, Hawaii 96816
Division of Ser. No. 598,213, July 23, 1975, Pat. No. Des. 243,360. This application Sept. 14, 1976, Ser. No. 733,211
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—44



244,677
PLACARD OR SIMILAR ARTICLE
Alphonse L. Micely, 33651 3rd St., Union City, Calif. 94587
Filed Oct. 8, 1975, Ser. No. 620,704
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—134

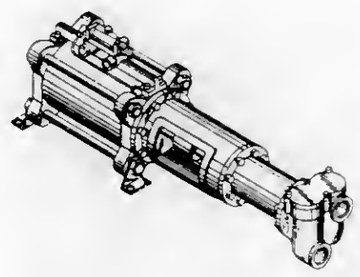
244,678
COMBINED BELL AND STAND THEREFOR
John W. Weimer, 709 Beechurst Ave., Morgantown, W. Va. 26505
Filed Apr. 10, 1975, Ser. No. 567,018
Term of patent 7 years
Int. Cl. D11—*02*
U.S. Cl. D11—157



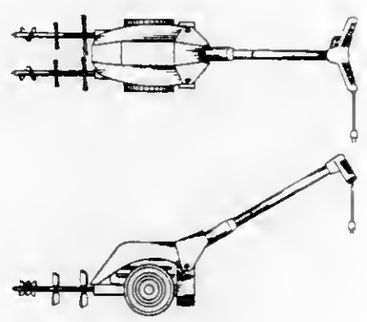
244,679
MASTHEAD FLAGSTAFF
Robert D. Outerbridge, 2059 Huntington Ave., Alexandria, Va. 22303
Filed Nov. 3, 1975, Ser. No. 628,064
Term of patent 14 years
Int. Cl. D11—*05*
U.S. Cl. D11—181

244,680
PADDLE
Darrell J. Leidigh, 224 Robin Road, Altamonte Springs, Fla. 32701, and R. Mark Leidigh, 8 Willow Place, Brooklyn, N.Y. 11201
Filed Jan. 19, 1976, Ser. No. 650,562
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—215

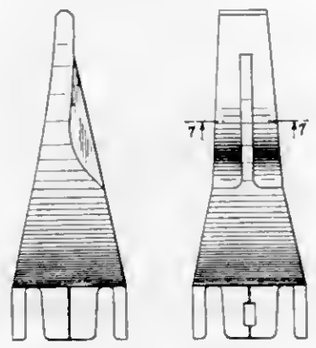
244,681
FLUID PUMP OR SIMILAR ARTICLE
Robert R. Bell, Houston, Tex., assignor to Vapor Corporation, Chicago, Ill.
Filed Aug. 14, 1975, Ser. No. 604,597
Term of patent 3½ years
Int. Cl. D15—*02*
U.S. Cl. D15—7



244,682
GARDEN TILLER
Earl L. Miner, Long Lane, Mo., assignor to Detroit Tool & Engineering Co., Lebanon, Mo.
Filed Mar. 5, 1976, Ser. No. 664,319
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—12

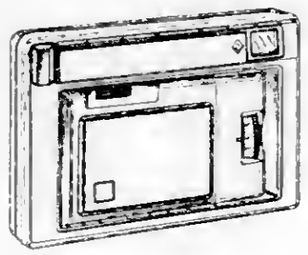


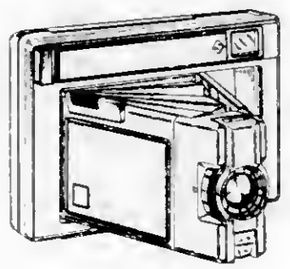
244,683
TOOTH FOR DREDGE CUTTER HEAD OR THE LIKE
Stephen M. Bowes, Jr., Jacksonville, Fla., assignor to Florida Machine & Foundry Co., Jacksonville, Fla.
Filed Jan. 26, 1976, Ser. No. 652,213
Term of patent 14 years
Int. Cl. D15—*04*
U.S. Cl. D15—29



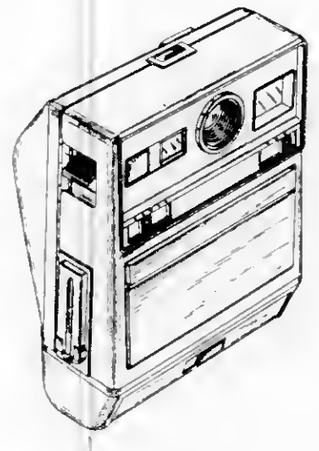
244,684
REFRIGERATOR
Robert D. Bartlett, Shawnee, Kans.; Myron G. Kordes, Parkville, Mo., and Paul H. Morphy, Prairie Village, Kans., assignors to Hobart Corporation, Troy, Ohio
Filed Aug. 4, 1976, Ser. No. 711,592
Term of patent 14 years
Int. Cl. D15—*07*
U.S. Cl. D15—81

244,685
PHOTOGRAPHIC CAMERA OR SIMILAR ARTICLE
David E. Hansen, Fairport, N.Y., and Wolfgang Ort, Stuttgart, Germany, assignors to Eastman Kodak Company, Rochester, N.Y.
Filed Mar. 22, 1976, Ser. No. 669,437
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—5

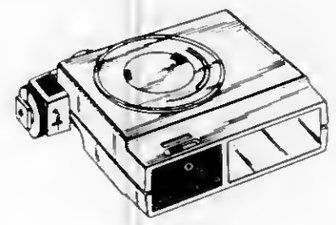




244,686
PHOTOGRAPHIC CAMERA OR SIMILAR ARTICLE
David E. Hansen, Fairport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Jan. 19, 1976, Ser. No. 650,477
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—06



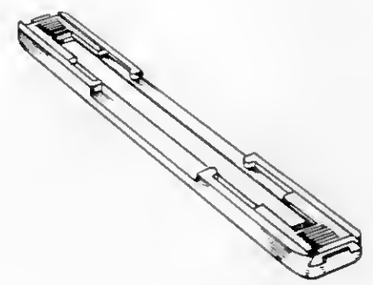
244,687
FLASH UNIT FOR A PHOTOGRAPHIC CAMERA
Naoya Tsugami, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed June 9, 1975, Ser. No. 584,947
Term of patent 14 years
Int. Cl. D16—*05*
U.S. Cl. D16—42



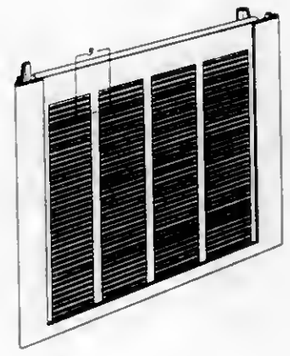
244,688
OPHTHALMIC SPECTACLES
Antoine Bourgeois, 39400 Morbier (Jura), France
Filed July 2, 1975, Ser. No. 592,637
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—65

244,689
OPHTHALMIC SPECTACLES
Antoine Bourgeois, 39400 Morbier (Jura), France
Filed July 2, 1975, Ser. No. 592,638
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—65

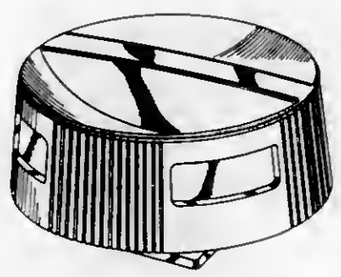
244,690
FILE FASTENER COMPRESSOR BAR
Menahem Hirsh, 15 Pontrialto, Fife Avenue, Berea, Johannesburg, Transvaal, South Africa
Filed Oct. 9, 1975, Ser. No. 621,040
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D19—65



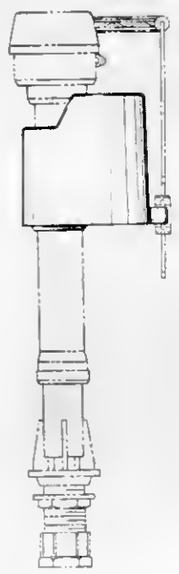
244,691
COMBINED FILTER AND PANEL FOR EVAPORATIVE AIR-CONDITIONER
Terrence Keith Morrison, and Brian Eric McLaren, both of P.O. Box 156, Buronga, New South Wales, 2648, Australia
Filed Mar. 27, 1975, Ser. No. 562,669
Claims priority, application Australia, Sept. 27, 1974, 65783/74
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—149



244,692
AIR FRESHENER OR SIMILAR ARTICLE
Georg Schimanski, Hagen, Germany, assignor to Globol-Werk GmbH, Neuburg, Germany
Filed May 17, 1976, Ser. No. 687,124
Claims priority, application Germany, Feb. 17, 1976, 297
Term of patent 14 years
Int. Cl.[2] D23—99
U.S. Cl. D23—150

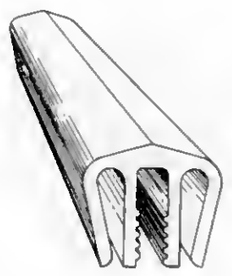


244,693
BALL COCK FLOAT
Adolf Schoepe, 1620 N. Raymond Ave., Fullerton, Calif. 92631
Filed July 19, 1976, Ser. No. 706,400
Term nf patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—33

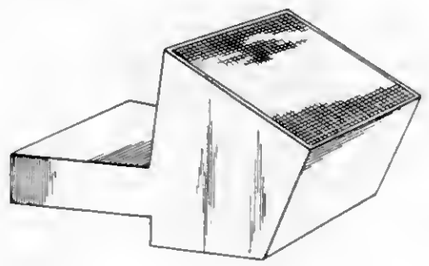


244,694
EQUIPMENT SHELTER AND THE LIKE
James B. McClure, 7810 NW. Scenic Drive, Kansas City, Mo. 64152
Filed Jan. 21, 1976, Ser. No. 646,358
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—33

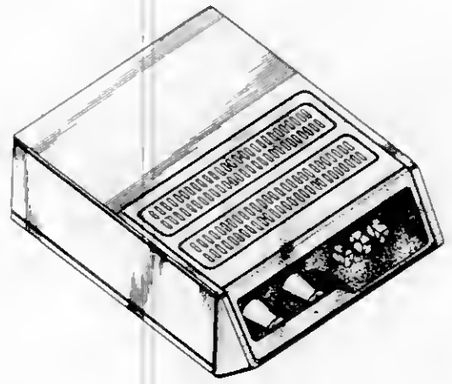
244,695
JOINT ELEMENT
Stig Martin Lindblad, 20 rue Saint-Pierre, CH 1701 Fribourg, Switzerland
Filed Sept. 12, 1975, Ser. No. 612,948
Claims priority, application Sweden, Mar. 19, 1975, 7500058
Term of patent 14 years
Int. Cl.[2] D25—*01*
U.S. Cl. D25—75



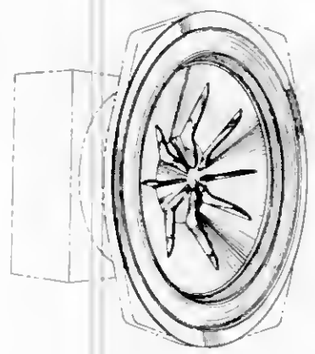
244,696
SPEAKER ENCLOSURE
Warren Ripple, 2839 Sterling Lane, Sarasota, Fla. 33581
Filed Feb. 14, 1975, Ser. No. 550,089
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—30



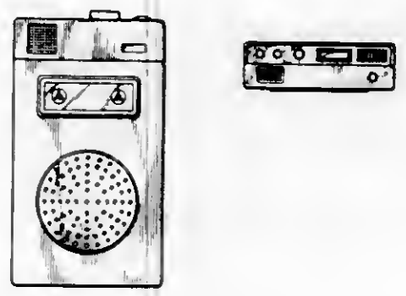
244,697
MOBILE TWO-WAY RADIO APPARATUS OR SIMILAR ARTICLE
Masaru Tokiyama, Bloomingdale, Ill., assignor to Motorola, Inc., Schaumburg, Ill.
Filed July 14, 1975, Ser. No. 595,961
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—68



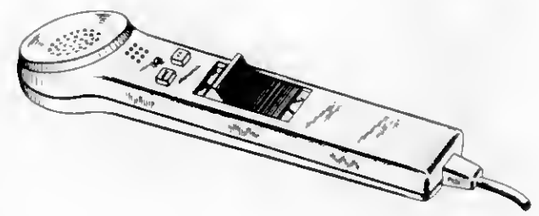
244,698
LOUDSPEAKER CONE
Burton A. Babb, Dallas, Tex., assignor to Babbco, Ltd., Dallas, Tex.
Filed Mar. 3, 1976, Ser. No. 663,341
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—37



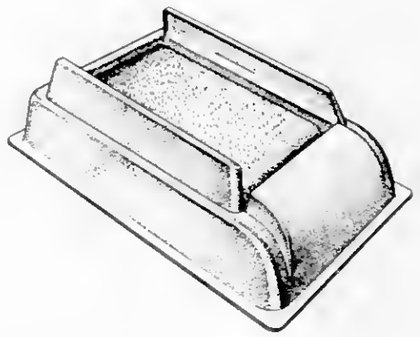
244,699
TAPE RECORDER
Shinobu Okamoto, Oyama, Japan, assignor to Kowa Company Ltd., Tokyo, Japan
Filed May 20, 1976, Ser. No. 688,369
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—6



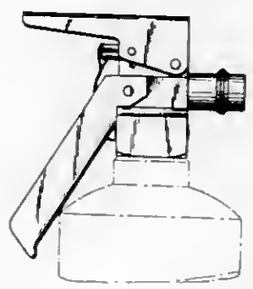
244,700
REMOTE CONTROL MICROPHONE OR SIMILAR ARTICLE
Arthur J. Pulos, Fayetteville; Michael Cridland, Manlius, and Joseph Moro, Ithaca, all of N.Y., assignors to Dictaphone Corporation, Rye, N.Y.
Filed June 28, 1976, Ser. No. 700,146
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—12



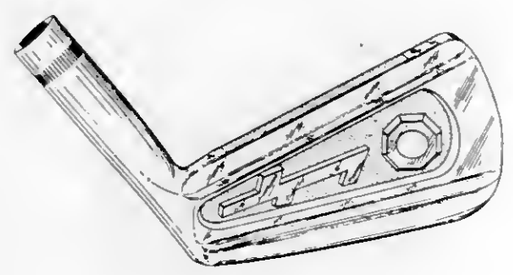
244,701
ANIMAL TOILET
Wayne L. Knochel, and Robert S. Traeger, both of Rochester, Ind., assignors to KLT Industries, Inc., Rochester, Ind.
Filed May 24, 1976, Ser. No. 688,980
Term of patent 14 years
Int. Cl. D30—*99*
U.S. Cl. D30—99



244,702
ACTUATOR ASSEMBLY FOR A PORTABLE HAND FIRE EXTINGUISHER
Roger Jay Montambo, Red Wing, Minn., assignor to The Ansul Company, Marinette, Wis.
Filed June 2, 1975, Ser. No. 582,919
Term of patent 14 years
Int. Cl. D29—*01*
U.S. Cl. D29—2



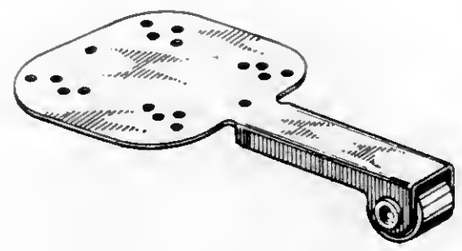
244,703
GOLF IRON HEAD
Timothy L. Guzzle, 3805 Trails Edge, Fort Worth, Tex. 76109, and Eugene L. Sheeley, 2428 Hillview Drive, Fort Worth, Tex. 76119
Filed Aug. 6, 1975, Ser. No. 602,268
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH



244,704
COMBINED SLIDE AND SWING SUPPORT OR THE LIKE
Emmanuel S. Smyrni, and Bobbie L. White, both of Shreveport, La., assignors to Gym-Dandy, Inc., Bossier City, La.
Filed Sept. 8, 1975, Ser. No. 611,039
Term of patent 14 years
Int. Cl. D21—*03*
U.S. Cl. D34—5 M

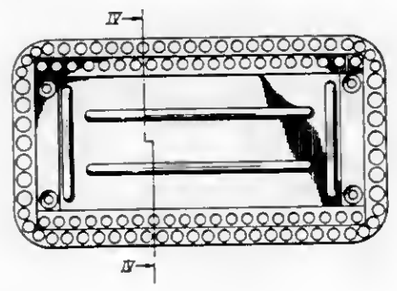
244,705
GOLF BAG
Donald G. Beste, 4725 Idlewood Court, Peoria, Ill. 61614
Filed Oct. 3, 1975, Ser. No. 619,519
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GB

244,706
AUXILIARY WHEEL FOR A SKATEBOARD
Hector H. Vela, 11903 Everle, Cerritos, Calif. 90701
Filed Feb. 5, 1976, Ser. No. 655,469
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ

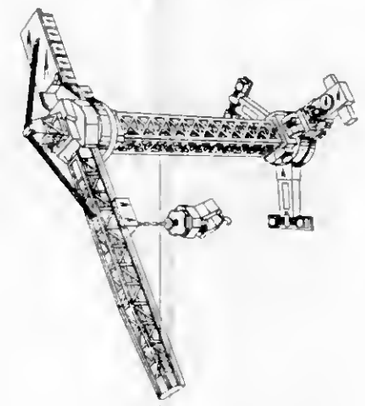


244,707
TOY DIGITAL WATCH
Darin M. Tiep, North Hollywood, Calif., assignor to Carrousel Party Favors, Inc., North Hollywood, Calif.
Filed Mar. 1, 1976, Ser. No. 662,423
Term of patent 7 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 R

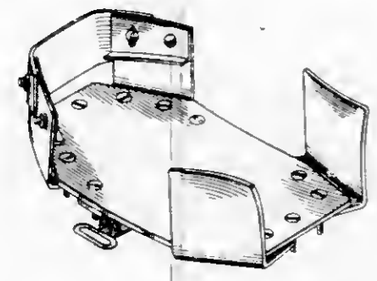
244,708
SWING SEAT
Victor Horace Yates, Shelley, near Huddersfield, England, assignor to The Sutcliffe Engineering Holdings Limited, Ossett, England
Filed Sept. 5, 1975, Ser. No. 610,767
Claims priority, application United Kingdom, Mar. 12, 1975, 970282/75
Term of patent 14 years
Int. Cl. D21—*03*
U.S. Cl. D34—5 M



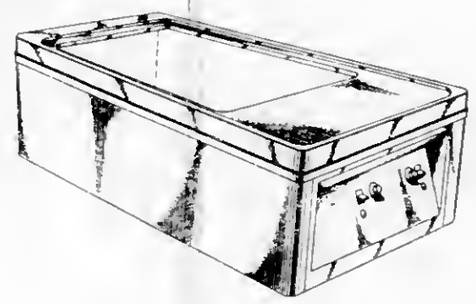
244,709
TOY CRANE
Hiroshi Sano, No. 7-9-10 Tateisbi, Katsushika, Tokyo, Japan
Filed July 16, 1975, Ser. No. 596,168
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 S



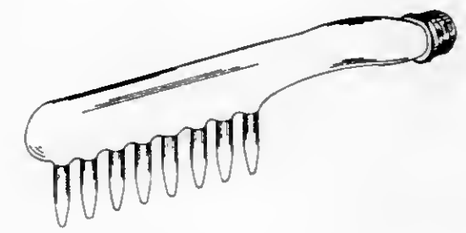
244,710
SNOWSHOE BINDING
Fritz Maul, 3768 S. 189th Place, Seattle, Wash. 98188
Filed Apr. 12, 1976, Ser. No. 657,778
Term of patent 14 years
Int. Cl. D02—*04*
U.S. Cl. D34—14 D



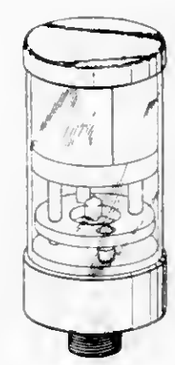
244,711
CABINET FOR A WATER BATH SHAKER
John T. Armbruster, Niagara Falls, N.Y., assignor to American Optical Corporation, Southbridge, Mass.
Filed Feb. 6, 1976, Ser. No. 655,649
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—38



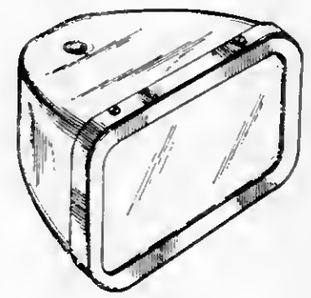
244,712
DOG GROOMING COMB
Rosa B. Houston, R.R. No. 2 (Box 126), Vance, Miss. 38964
Filed Dec. 29, 1975, Ser. No. 644,039
Term of patent 14 years
Int. Cl. D30—*99*
U.S. Cl. D30—40



244,713
MARINE LAMP
Desmond Egan-Andrew, High Street, Chobham, Woking, Surrey, England
Filed May 12, 1975, Ser. No. 576,793
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20 E

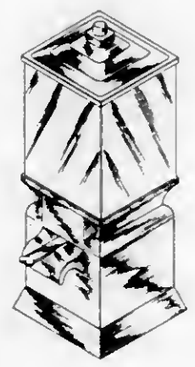


244,714
HEADLAMP HOUSING
Charles R. Ross, Laurel, Md., assignor to C.R. Engineering, Inc., College Park, Md.
Filed Feb. 2, 1976, Ser. No. 654,266
Term of patent 14 years
Int. Cl. D26—*06*
U.S. Cl. D48—32 R

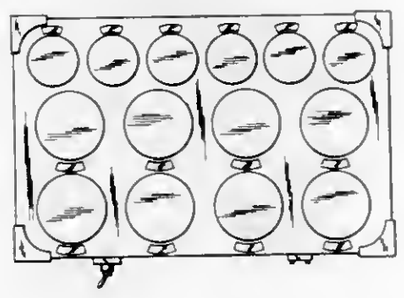


244,715
AUTOMOBILE ACCESSORY LAMP
John F. Fierro, 4115 Meadow Lane, Seaford, N.Y. 11783, and George A. Dunning, 280 N. Poplar St., N. Massapequa, N.Y. 11758
Filed Dec. 11, 1975, Ser. No. 639,720
Term of patent 14 years
Int. Cl. D26—*05, 06*
U.S. Cl. D48—20 E

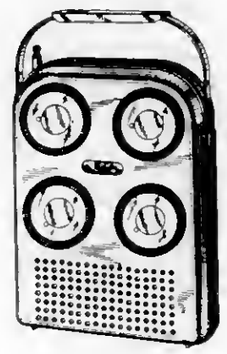
244,716
DISPENSER
Lane T. Weltzman, 4647 Park Mirasol, Calabasas, Calif. 91302
Filed Aug. 13, 1975, Ser. No. 604,108
Term of patent 14 years
Int. Cl. D20—*01*
U.S. Cl. D52—3 R



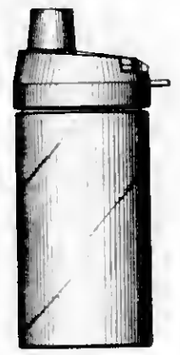
244,717
ELECTRONIC PERCUSSION MUSICAL INSTRUMENT
Florian Schneider, Leo Statzstr. 27, 4 Dusseldorf, and Ralf Hutter, Tiergardenstr. 45, 415 Krefeld, both of Germany
Filed July 10, 1975, Ser. No. 594,705
Term of patent 14 years
Int. Cl. D17—*04, 05*
U.S. Cl. D56—1 E



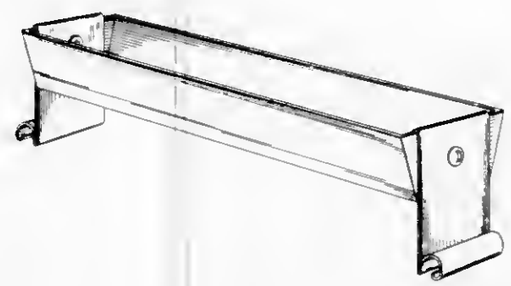
244,718
RADIO
Ronald Emmerling, New City, N.Y., assignor to Panorama Radio & Electronics Corporation, New York, N.Y.
Filed July 8, 1975, Ser. No. 594,401
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—70



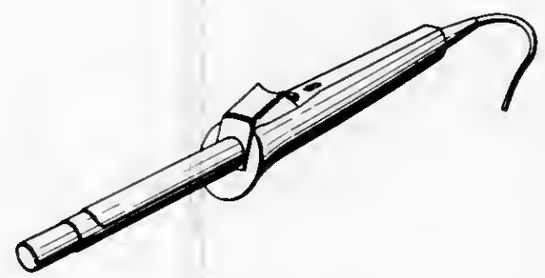
244,719
COMBINED VACUUM CURETTAGE VESSEL AND VALVE CLOSURE THEREFOR
Michael D. Thomas, Elmhurst, and Francis E. Ryder, Barrington, both of Ill., assignors to Ryder International Corporation, Schaumburg, Ill.
Filed Dec. 11, 1975, Ser. No. 639,648
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D24—28



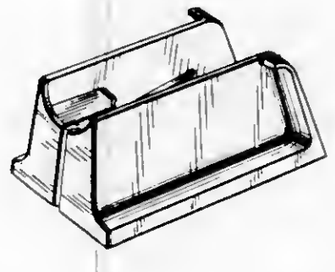
244,720
SNAP-ON HAIR STYLIST'S TRAY
Frederic V. Winkler, 14713 Waterway Drive, Rockville, Md. 20854
Filed Feb. 27, 1974, Ser. No. 446,482
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—73



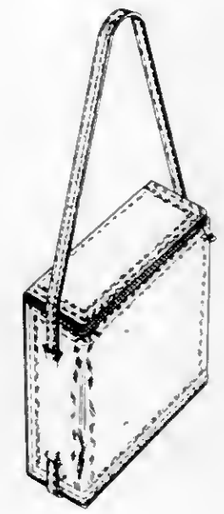
244,721
CURLING IRON
Ingeborg Kohl, Langenfeld, Germany, assignor to Reckjunior Cosmetic GmbH & Co. KG, Langenfeld, Germany
Filed Sept. 10, 1975, Ser. No. 612,040
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—35



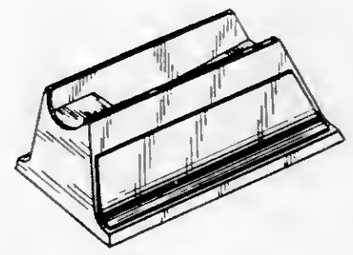
244,722
STAND FOR A CURLER/STYLER
Bernard B. Bluestein, Des Plaines, Ill., assignor to Sunbeam Corporation, Chicago, Ill.
Filed Dec. 12, 1975, Ser. No. 640,335
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—38



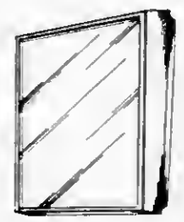
244,723
INSULATED TOTE BAG
Harold Rabinowitz, Lakewood, N.J., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed July 31, 1975, Ser. No. 600,700
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—1 R



244,724
STAND FOR CURLER/STYLER
Bernard B. Bluestein, Des Plaines, Ill., assignor to Sunbeam Corporation, Chicago, Ill.
Filed Dec. 12, 1975, Ser. No. 640,261
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—38



244,725
ILLUMINATED SIGN
Donald H. Niehaus, Crestview Hills, Ky.; Nick J. Schwab, Cincinnati, Ohio, and Patrick J. Seggerson, Fort Mitchell, Ky., assignors to American Sign and Advertising Services, Inc., Florence, Ky.
Filed Apr. 7, 1976, Ser. No. 674,610
Term of patent 14 years
Int. Cl. D20—*03*
U.S. Cl. D96—12 R



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 14TH DAY OF JUNE, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

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A. O. Smith Corporation: *See—*
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A P Products Incorporated: *See—*
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Webster, John L., 4,029,917.

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AB S.T. Miljoteknik: *See—*
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AB Wicanders Korkfabriker: *See—*
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Stein, Herman Hal; and Prasad, Raj Nandan, 4,029,884.
Winn, Martin, 4,029,665.

Abel, Edward P., to Eastman Kodak Company. Cover sheets with timing layer comprising cellulose acetate and copolymer of maleic anhydride. 4,029,849, Cl. 428-500.000.

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Adams, Cecil E., 4,029,439.

Abraham, Michel, to Compagnie Industrielle des Telecommunications Cit-Alcatel. Apparatus for detecting the rhythm of an NRZ message. 4,029,905, Cl. 178-88.000.

Acher, Jacques: *See—*
Bulteau, Gerard; Acher, Jacques; and Monier, Jean-Claude, 4,029,673.

Adachi, Masami: *See—*
Yano, Eizi; Ohkawa, Shunjiro; Komatsu, Tadaaki; and Adachi, Masami, 4,029,222.

Adams, Cecil E., to Abex Corporation. Control system for variable displacement pumps. 4,029,439, Cl. 417-216.000.

Adams, Clifton G.; Dallas, Carl B.; and Coltrin, George E., to Georgia-Pacific Corporation. Method and apparatus for moving a stack of corrugated sheets from a stacker to a desired locus. 4,029,216, Cl. 214-1.0BB.

Adams, Herbert J. F.; and Takman, Bertil H., to Astra Pharmaceutical Products, Inc. Synergistic local anesthetic compositions. 4,029,793, Cl. 424-251.000.

Adams, Herbert J. F.; and Takman, Bertil H., to Astra Pharmaceutical Products, Inc. Pharmaceutical local anesthetic composition. 4,029,794, Cl. 424-253.000.

Adams, John W. Pocket watch display kit. 4,028,842, Cl. 46-1.00R.

Adamski, Donald F.; and Anderson, David M., to MB Associates. Bus loader. 4,029,223, Cl. 214-77.00R.

Adamski, Henry Stanislaus: *See—*
Kindig, Guilford Edwin; and Adamski, Henry Stanislaus, 4,029,184.

Addeo, Eric John, to Bell Telephone Laboratories, Incorporated. Digital synchronizing signal recovery circuits for a data receiver. 4,029,900, Cl. 178-69.100.

Addressograph Multigraph Corporation: *See—*
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Rubenstein, Robert Aron, 4,029,414.
Trenkamp, Robert H., 4,029,944.

Adey, Anthony John: *See—*
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Aetna-Standard Engineering Company: *See—*
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Agence Nationale de Valorisation de la Recherche (ANVAR): *See—*
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Agency of Industrial Science & Technology: *See—*
Mitsui, Shigeo; Araki, Tomiyasu; Niikawa, Kazuhiko; Hosoda, Hideo; Jyo, Yoshio; Yoda, Ryuichiro; Suzuki, Giichi; Iijima, Takasi; Tanaka, Hiroshi; Ochiai, Yasutaka; and Ise, Takashi, 4,029,550.

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Wehner, Hans; and Kliemann, Manfred, 4,029,507.

Ahl, Bernard. Apparatus for the construction of ceiling in multi-story concrete buildings. 4,029,286, Cl. 249-19.000.

Ahrens, Norbert; Klockenbusch, Heinrich; Ritzmann, Horst; Klein, Hans; Balzau, Gerhard; and Schnuckel, Clemens, to Polysius AG. Method for feeding powdered material. 4,029,365, Cl. 302-35.000.

Ahrweiler, Karl-Heinz, to Eduard Kusters Maschinenfabrik. Rapid load-relieve device for continuous press. 4,029,456, Cl. 425-149.000.

Aircraft Systems Corporation: *See—*
Juhasz, Charles, 4,029,042.

Akamatsu, Masahiko, to Mitsubishi Denki Kabushiki Kaisha. Inverter. 4,030,021, Cl. 321-45.00C.

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Albinger, Walter, to U.S. Philips Corporation. Electro-acoustic transducer and method of manufacturing such a transducer. 4,029,911, Cl. 179-115.5ES.

Albrecht, Hermann Friedrich, to Rollei-Werke Franke & Heidecke. Fading mechanism for slide projectors with automatic focusing means. 4,029,407, Cl. 353-86.000.

Alexandrovich, George, Sr.; and Perper, Edward. Degausser. 4,030,002, Cl. 361-151.000.

Ali Zaidi, Syed Mujahid: *See—*
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Alig, Leo; Nickolson, Robert; Wiechert, Rudolf; Furst, Andor; Kieslich, Klaus; Muller, Marcel; and Kerb, Ulrich. Steroid carboxylic acids and derivatives. 4,029,692, Cl. 260-468.500.

Allan, John H.; Ball, Jerrold L.; Dull, Charles B.; Gabriel, Leo A.; Curtis, Richard E.; and Dervin, Victor J., to James Allan & Sons, Inc.; and NPI Corporation, part interest to each. Method of and apparatus for carcass cooling. 4,028,774, Cl. 17-24.000.

Allen, Clifford Edwin, to Isca Electronics Limited. Weighing apparatus. 4,029,163, Cl. 177-255.000.

Allen Group Inc., The: *See—*
Wiltrout, Dale E., 4,029,114.

Allen, James Austin, to RCA Corporation. Video disc playback system and pickup cartridge therefor. 4,030,124, Cl. 358-128.000.

Allen, James Austin: *See—*
Taylor, Byron Kent; and Allen, James Austin, 4,030,123.

Allender, David G. Method of and apparatus for detecting conductive particles in an oil flow system. 4,030,028, Cl. 324-65.00R.

Allergan Pharmaceuticals: *See—*
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Alley, Robert Philbrick; and Klett, Keith Karl, to General Electric Company. Two level inverter circuit. 4,029,993, Cl. 315-219.000.

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Allison, Roy F., to Allison Acoustics, Inc. Wide dispersion loudspeaker with flexing diaphragm. 4,029,910, Cl. 179-115.5ME.

Allison, William D., to Ford Motor Company. Preloaded tie rod end assembly. 4,028,784, Cl. 29-149.50B.

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Aluminum Company of America: *See—*
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American Cyanamid Company: *See—*
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Anderson, Harold Elden, to McCulloch Corporation. Capacitor discharge ignition circuit. 4,029,998, Cl. 361-256.000.

Anderson, Philip P., to Arkla Industries Inc. Preheater for weak absorbent. 4,028,904, Cl. 62-2.000.

Anderson, Richard C., to Varian Associates. Device for selecting computer operational mode and labeling input controls accordingly. 4,030,094, Cl. 340-365.00R.

Anderson, Richard N., to V. E. Anderson Mfg. Co. Window structure. 4,028,849, Cl. 49-181.000.

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Andres, Klaus; and Schmidt, Paul Herman, to Bell Telephone Laboratories, Incorporated. $PrNi_5$ as a cryogenic refrigerant. 4,028,905, Cl. 62-3.000.

Andrews, Peter. Pivoting rule. 4,028,814, Cl. 33-94.000.

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Araki, Yoshinobu, to Minolta Camera Kabushiki Kaisha. Color encoding filter and method for making the same. 4,029,394, Cl. 350-166.000.

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Aya, Masahiro; Miyamoto, Masao; Fukazawa, Nobuo; and Yamagishi, Masaaki, to Bayer Aktiengesellschaft. Benzyl N,N-hexamethylene-thiolcarbamate compounds and herbicidal compositions. 4,029,646, Cl. 260-239.0BF.

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Baker, Peter D.; and Hollands, Denys V., to Smiths Industries Limited. Radiation-detecting devices and apparatus. 4,029,966, Cl. 250-372.000.

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Balzau, Gerhard: *See—*
Ahrens, Norbert; Klockenbusch, Heinrich; Ritzmann, Horst; Klein, Hans; Balzau, Gerhard; and Schnuckel, Clemens, 4,029,365.

Ban, Itsuki; Kasuya, Takanori; Yano, Kanji; and Maruyama, Kenichi, to Ban, Itsuki. Apparatus for turning rotor for each desirable angle by driving force of capstan drive system. 4,030,134, Cl. 360-92.000.

Banz, D. Michael, to Decision Data Computer Corporation. Optical character recognition system. 4,030,068, Cl. 340-146.3AQ.

Barber, Stanley. Method and apparatus for assembling sheet piling. 4,028,901, Cl. 61-63.000.

Bardoni, Thomas J.; and Markarian, William. Underwater belt and hose clip. 4,028,778, Cl. 24-79.000.

Barcnyi, Bela; Haselmann, Heinrich; and Rieth, Egon, to Daimler-Benz Aktiengesellschaft. Motor vehicle, especially passenger motor vehicle with at least one door on each side. 4,029,353, Cl. 296-28.00R.

Bargellini, Marcello: *See—*
Fox, Anthony E., and Bargellini, Marcello, 4,029,167.

Barger, J. P., to Dynatech Corporation. Cryosurgical probe tip. 4,029,102, Cl. 128-303.100.

Barker, Herbert J. Electrically operated locking mechanism. 4,030,071, Cl. 340-164.00R.

Barker, Sidney L. Retractable blade for a helicopter rotor. 4,029,435, Cl. 416-88.000.

Barlow, George J., to Honeywell Information Systems, Inc. Data processing system having distributed priority network. 4,030,075, Cl. 340-172.500.

Barlow, Malcolm; and Lundquist, Jerry R., to Ampex Corporation. Magnetic recording disc of improved durability having tin-nickel undercoating. 4,029,541, Cl. 427-130.000.

Barmag Barmer Maschinenfabrik Aktiengesellschaft: *See—*
Schippers, Heinz; and Koslowski, Gerhard, 4,029,452.

Barnett, Robert D.: *See—*
McCaskill, John Walton; Barnett, Robert D.; and Herd, David P., 4,029,294.

Barr and Stroud Limited: *See—*
Runciman, Herbert Morrison, 4,029,389.

Barracudaverken Aktiebolag: *See—*
Gustafsson, Erik G., 4,028,750.

Barry Wright Corporation: *See—*
Schubert, Dale W.; and Salerno, Charles M., 4,029,305.

Bartell, Charles: *See—*
Shah, Jaykumar Jivraj; Porsche, Jules Downes; and Bartell, Charles, 4,029,843.

Bartlett, Gary F., to Construction Specialties, Inc. Floor mat with hinged rigid elongated rails. 4,029,834, Cl. 428-62.000.

Barton, Barbara J. Artificial eyeliner and eyelash structure. 4,029,111, Cl. 132-53.000.

BASF Aktiengesellschaft: *See—*
Baumann, Hans; and Oberlinner, Andreas, 4,029,677.
Maier, Karl; Graser, Fritz; and Meyer, Guenter, 4,029,468.
Nagel, Peter; Grau, Werner; Maier, Hermann; Wittkamp, Heinrich; Falk, Roland; and Willmann, Paul, 4,029,249.
Nintz, Eckhard; Schick, Rupert; Seegmueller, Karl; and Stahnecker, Erhard, 4,029,614.
Schoettle, Klaus; Wittkamp, Heinrich; Gliniorz, Lothar; and Dobler, Peter, 4,029,268.

BASF Wyandotte Corporation: *See—*
Cenker, Moses; Narayan, Thirumurti; and Patton, John Thomas, Jr., 4,029,611.
Muzzio, John A., 4,029,879.
Narayan, Thirumurti L.; and Cenker, Moses, 4,029,610
Weipert, Eugene A.; and Deck, Charles F., 4,029,694.

Basil, Richard V., Jr.: *See—*
Shimizu, James K.; and Basil, Richard V., Jr., 4,030,051.

Bast, Victor William: *See—*
Dougherty, Thomas John; and Bast, Victor William, 4,029,855.

Bata Shoe Company, Inc.: *See—*
Wilms, Gerard J. M.; and Joosten, Hendrik C. J., 4,028,764.

Bateman, Charles Donald, to Sundstrand Corporation. Terrain clearance warning system for aircraft. 4,030,065, Cl. 340-27.0AT.

Battelle Memorial Institute: *See—*
Postma, Arlin Keith; and Winegardner, W. Kevin, 4,029,482.

Baumann, Hans; and Oberlinner, Andreas, to BASF Aktiengesellschaft. Spirodipyrans useful as dye precursors for copying processes. 4,029,677, Cl. 260-345.200.

Baumer, Wilhelm: *See—*
Neisius, Karlheinz; and Baumer, Wilhelm, 4,029,597.
Neisius, Karlheinz; and Baumer, Wilhelm, 4,029,598.

Bayer Aktiengesellschaft: *See—*
Aya, Masahiro; Miyamoto, Masao; Fukazawa, Nobuo; and Yamagishi, Masaaki, 4,029,646.
Bocks, Paul J.; Grammel, Jurgen; and Neumaier, Hermann, 4,029,534.
Dhein, Rolf; Schoeps, Jochen; Beckers, Johannes; and Kuchenmeister, Rolf, 4,029,617.
Gehrke, Gunter; and Schmitz, Reinold, 4,029,680.
Keller, Wilfried; and Muller, Friedhelm, 4,029,622.
Krohn, Wolfgang; Metzger, Karl Georg; Preiss, Michael; and Walkowiak, Michael, 4,029,806.
Schapel, Dietmar; and von Gizycki, Ulrich, 4,029,593.

Baylor, Carl S. Probe for audiometric apparatus. 4,029,083, Cl. 128-2.00Z.

Baylor, John Merlin, to J. I. Case Company. Sealed track chain joint. 4,029,366, Cl. 305-11.000.

BBC Brown Boveri & Company Limited: *See—*
Erismann, Oskar, 4,029,275.
Jager, Kurt; Kunz, Eugen; and Vlah, Josko, 4,029,978.
Jancic, Gojko; Meylan, Pierre; and Portmann, Alexandre, 4,028,909.
Korb, Fritz, 4,030,020.
Meylan, Pierre; and Brunner, Heinz, 4,029,432.

Beatty, Theodore R.; and Vourlis, Harry, to Union Carbide Corporation. Heat-treated, corona-treated polymer bodies and a process for producing them. 4,029,876, Cl. 526-344.000.

Beavon, David K., to Ralph M. Parsons Company. Sulfur plant temperature control. 4,029,753, Cl. 423-574.00R.

Bechard, Conrad E.; Davenport, John M.; Herrmann, William H.; and Lovrekovic, Steven N., to General Electric Company. Method of making electrical connections. 4,028,798, Cl. 29-628.000.

Beckers, Johannes: *See—*
Dhein, Rolf; Schoeps, Jochen; Beckers, Johannes; and Kuchenmeister, Rolf, 4,029,617.

Beckman Instruments, Inc.: *See—*
Nather, Roy E., 4,029,401.
Sharples, Thomas Davy, 4,029,473.

Beckmann, Klaus; and Behr, Heinrich, to Gewerkschaft Eisenhutte Westfalia. Longwall mining roof support for double deck machines. 4,029,361, Cl. 299-31.000.

Bedell, Robert J.; and Franseen, Richard E., to United States of America, Army. Automatic video processing for high-performance CRT displays. 4,030,125, Cl. 358-169.000.

Beecham Group Limited: *See—*
Clark, Dennis Edward; and Blyth, Robert Charles, 4,029,804.

Beguin, Jean-Luc: *See—*
Droz, Willy; and Beguin, Jean-Luc, 4,028,878.

Behr, Heinrich: *See—*
Beckmann, Klaus; and Behr, Heinrich, 4,029,361.

Behringwerke Aktiengesellschaft: *See—*
Helting, Torsten Bertil, 4,029,765.
Helting, Torsten Bertil, 4,029,766.

Beigler, Myron A.; and Amen, Ronald J., to Syntex (U.S.A.) Inc. Composition and method of treating ulcers. 4,029,773, Cl. 424-180.000.

Beiter, Glenn A.; and Evert, Donald A., to Honeywell Inc. Slack tape loader. 4,030,131, Cl. 360-71.000.

Belart, Juan, to ITT Industries, Inc. Booster brake unit. 4,028,891, Cl. 60-550.000.

Belentepe, Yilmaz C.; and Blanding, Wendell S., to Corning Glass Works. Television picture tube face plate. 4,029,898, Cl. 358-247.000.

Bell, George E., to Xerox Corporation. Toner handling system. 4,029,047, Cl. 118-652.000.

Bell, H. Clark, Jr.; and Rosen, Harold A., to Hughes Aircraft Company. Contiguous channel multiplexer. 4,029,902, Cl. 179-15.0FD.

Bell & Howell Company: *See—*
Perret, Ludwig A., 4,030,128.

Bell, John T., to Container Corporation of America. Machine and method for packaging flat articles such as paperback books or the like. 4,028,864, Cl. 53-24.000.

Bell, Richard L.; and Lamb, Matthew J., to United States of America, Navy. Ventilated helmet with selected weight distribution. 4,028,739, Cl. 2-6.000.

Bell, Robert P.: *See—*
Graham, Thomas E.; Thaxton, George H.; Mitchell, Francis M., and Bell, Robert P., 4,029,832.

Bell Telephone Laboratories, Incorporated: *See—*
Addeo, Eric John, 4,029,900.
Andres, Klaus; and Schmidt, Paul Herman, 4,028,905
Boll, Harry Joseph, 4,030,083.
Chemelli, Robert Guido; Cook, Dwight Dexter; and Miller, Richard Carrel, 4,030,122.
Chinnock, Edwin Leroy; and Gloge, Detlef Christoph, 4,029,390.
Geigel, Alfred Antonio; and LaMarche, Robert Ernest, 4,029,912.

Headington, Edward E.; Tutko, Albert J.; and Knickerbocker, Robert H., 4,029,376.
Kakalec, Robert John, 4,030,025.
Ngo, Peter Dinh-Tuan, 4,030,091.

Bellagamba, Pietro. Heat-insulating panels. 4,028,859, Cl. 52-393.000.

Bemmerl, Hans-Ferdinand. *See*—
Blumenthal, Gunter; and Bemmerl, Hans-Ferdinand, 4,028,898.

Benavides, Augusto E.: *See*—
Gillemot, George W.; Gamero, Robert; Benavides, Augusto E.; and Elms, Robert James, 4,029,626.

Benckiser-Knapsack GmbH: *See*—
Sommer, Klaus; and Raab, Guenter, 4,029,696.
Sommer, Klaus; and Weber, Hermann, 4,029,742.

Bender, Werner; Bergner, Dieter; Hannesen, Kurt; Hund, Helmut; and Schulte, Wilfried, to Hoechst Aktiengesellschaft. Electrolytic apparatus. 4,029,565, Cl. 204-256.000.

Bendix Corporation, The: *See*—
Krantz, Leonard Albert, Jr.; and Fort, Jack Bernard, 4,029,386.

Bendler, Hellmut: *See*—
Hubsch, Gunter; Bendler, Hellmut; and Stahlmann, Rudolf, 4,029,017.

Benedict, Andrew G.; Marker, Thomas E.; and Schmidt, Herbert J., to MCP Facilities Corporation. Stock handling apparatus. 4,029,214, Cl. 214-1.00P.

Benerito, Ruth R.: *See*—
Ward, Truman L.; Benerito, Ruth R.; and Hebert, Jacques J., 4,029,533.

Bennett, Donald Alfred, to International Synthetic Rubber Company, Limited, The. Soil stabilization composition. 4,028,897, Cl. 61-36.00C.

Bennett, James C., to Rosen, Ralph S. Blade guard lift for power saw. 4,028,975, Cl. 83-397.000.

Bennett, Thomas H.; Carlow, Earl F.; Kouvoussis, Anthony E.; Orgill, Rodney H.; Peddle, Charles; and Wiles, Michael F., to Motorola, Inc. Processor including incrementor and program register structure. 4,030,079, Cl. 340-172.500.

Bentley Engineering Company, Ltd., The: *See*—
Wignall, Harry; Shelton, William Ewart Alan; and Klee, John Michael, 4,028,910.

Berenson, Herman: *See*—
Lies, Thomas Andrew; and Berenson, Herman, 4,029,652.

Berg, Jeffrey H.: *See*—
Haas, Gerhard J.; and Berg, Jeffrey H., 4,029,701.

Bergamini, Giorgio, to Nuovo Pignone, S.p.A. Protection system for the overpressures of a silicium wafer sensor used in a differential pressure transmitter. 4,028,945, Cl. 73-395.000.

Bergdolt, Paul F., to General Motors Corporation. Rear dump operating mechanism. 4,029,358, Cl. 298-19.00B.

Berger, Christian; Farge, Daniel; Gros, Georges; Messer, Mayer Naoum; and Moutonnier, Claude, to Rhone-Poulenc Industries. 1,4-Dithiin (and oxathiin)-yl cephalosporin derivatives, and compositions containing them. 4,029,781, Cl. 424-246.000.

Bergner, Dieter: *See*—
Bender, Werner; Bergner, Dieter; Hannesen, Kurt; Hund, Helmut; and Schulte, Wilfried, 4,029,565.

Bergstrom, Arthur Everett. Method of making a blast joint. 4,028,796, Cl. 29-416.000.

Berkes, Benjamin L., to General Motors Corporation. Seal assembly for control lever. 4,029,324, Cl. 277-30.000.

Berkowitz, Sidney, to FMC Corporation. Crude cyanuric acid purification. 4,029,660, Cl. 260-248.00A.

Berlin, David L. Automobile material carrier. 4,029,245, Cl. 224-42.430.

Berls, Richard Warren: *See*—
Secrist, George Richard; Berls, Richard Warren; and Schlegel, Brooke Pershing, 4,029,504.

Berman, Paul A.: *See*—
Martz, Lyle F.; Smith, Jack R.; Lebonette, Francis A.; Putnam, Robert A.; and Berman, Paul A., 4,028,884.

Bernardo, Matthew: *See*—
Cretella, Salvatore J.; Bernardo, Matthew; and De Musis, Ralph T., 4,028,787.

Berneryd, Sten, and Grune, Per-Olof, to ASEA Aktiebolag. Operating device for enclosed high voltage circuit breakers. 4,029,922, Cl. 200-148.00D.

Berrebi, Georges *See*—
Courty, Philippe; Sugier, Andre; Raynal, Bernard; and Berrebi, Georges, 4,029,738.

Berry, William R.; Groves, Charles L., Jr.; and Hwang, Eddie Y., to Westinghouse Electric Corporation. Turbine power plant automatic control system. 4,029,951, Cl. 235-151.210.

Berthold, Fritz: *See*—
Lohr, Wilhelm; Berthold, Fritz, and Allington, Robert W., 4,029,961.

Bessin, Pierre: *See*—
Thuillier, Germaine; Laforest, Jacqueline; and Bessin, Pierre, 4,029,808.

Bestenreiner, Friedrich; Helburger, Josef; and Ruf, Wolfgang, to AGFA-Gevaert, A.G. Method and arrangement for eliminating undesired density variations in electrostatically created copies of an original. 4,030,106, Cl. 346-153.000.

Beton, Richard John, to Olin Corporation. Connector member for tip of fastener. 4,028,986, Cl. 85-10.00E.

Betz, Frans; de Haas, Jacobus Johannes; and van der Kraan, Petrus Cornelis, to De Staat der Nederlanden, te Dezen Vertegenwoordigd Door de Directeur-Generaal der Posterijen, Telegrafie en Telefonie. Detection device. 4,029,957, Cl. 250-221.000.

Betz Laboratories, Inc.: *See*—
Godlewski, Irene T.; Schuck, Joseph J.; and Libutti, Bruce L., 4,029,577.

Beyer, Paul. Germinating tank for germinating and softening of malt. 4,029,116, Cl. 134-167.00R.

Bhat, Biliyar N.: *See*—
United States of America, National Aeronautics and Space Administration; and Bhat, Biliyar N., 4,029,500.

Bhat, Ghanshyam A.: *See*—
Buckley, Charles G.; Bhat, Ghanshyam A.; and Swartz, Harold L., 4,028,815.

BHN, Inc.: *See*—
Cottingham, Hugh, and Scrocco, Joseph, 4,029,959.

Bianculli, Virgil D., to Fisons Corporation. Process of making cough syrup with masked noscapine. 4,029,797, Cl. 424-260.000.

Bibl, Klaus; and Reinisch, Bodo W., to Lowell Technological Institute Research Foundation. Method and apparatus for transmitting messages to and from remote locations. 4,030,033, Cl. 325-30.000.

Bicc Limited: *See*—
Proud, Stanley Harold Russell, 4,029,182.

Biddlecom, William Gerard: *See*—
Woessner, Warren Dexter; Biddlecom, William Gerard; Arndt, Henry Clifford; Peruzzotti, George Peter; and Sih, Charles John, 4,029,698.

Bildstein, Hubert; Machenschalk, Rudolf; and Petter, Helmut, to Schwarzkopf Development Corporation. X-ray target. 4,029,828, Cl. 427-34.000.

Binder, Horst; Knodler, Reinhard; Kohling, Alfons; and Sandstede, Gerd, to Dragerwerk Aktiengesellschaft. Electrochemical measuring cell. 4,029,563, Cl. 204-195.00R.

Bird, Brian Michael, to National Research Development Corporation. Phase-controlled cycloconverters. 4,030,022, Cl. 321-69.00R

Bird Oil Equipment Ltd.: *See*—
Jones, Gomer W., 4,028,964.

Birdwell, J. C., to Mideon Pipeline Equipment Co. Pipe handling apparatus for pipe laying barges. 4,029,215, Cl. 214-1.00P.

Birli, Joseph A.: *See*—
Huebscher, Richard G.; Sobecks, Ronald S.; and Birli, Joseph A., 4,029,941.

Biscra, Jose; Carrington, James Howard; and Weil, Max Harry, to Cardio Pulminary Laboratory Research Foundation. Osmotic pressure sensing head. 4,028,931, Cl. 73-64.300.

Bishop, Jerald W., to Gilmore-Tatge Manufacturing Co., Inc. Strut extension lock for dump trucks. 4,029,357, Cl. 298-11.000.

Bishop, Joseph Gerald, to American Motors Corporation. Camber indicating linkage. 4,029,337, Cl. 280-661.000.

Biske, James A., to General Motors Corporation. Electric switch. 4,029,925, Cl. 200-339.000.

Bitterlich, Gordon M., to National Airoil Burner Co., Inc. Burner with noise suppressor. 4,029,462, Cl. 431-114.000.

Bivens, David J., to Bivens Winchester Corporation. Double overhead brush assembly. 4,028,766, Cl. 15-53.0AB.

Bivens Winchester Corporation: *See*—
Bivens, David J., 4,028,766.

Bjerklie, John W.: *See*—
LaHaye, Paul G.; Bjerklie, John W.; and Gallant, Gerald G., Jr., 4,029,465.

Bjornson, Bjorn Ove, to AB Bofors. Sabot for subcalibre projectile. 4,029,018, Cl. 102-93.000.

Bjornsson, Eyjolf Steuart, to Xerox Corporation. Computer system operation and control. 4,030,072, Cl. 340-172.500.

Black Hole Nebula Incorporated: *See*—
Cottingham, Hugh V.; and Scrocco, Joseph, 4,029,418.

Blair, Calvin B.; Brinker, Lee J.; and Ankenman, Thomas W., to Kent Manufacturing Co. Inc. Floating mount for agricultural finish tools. 4,029,155, Cl. 172-763.000.

Blair, Winford; and Schwartz, Melvin M., to Rohr Industries, Inc. Method of diffusion bonding and brazing of materials. 4,029,254, Cl. 228-181.000.

Blake, June Arlene, executrix: *See*—
Blake, Ralph Kingsley, deceased, 4,029,509.

Blake, Ralph Kingsley, deceased (by Blake, June Arlene, executrix), to Du Pont de Nemours, E. I., and Company. Positive process using a low coating weight silver halide. 4,029,509, Cl. 96-60.00R.

Blanco, Milagros V.; and Maurer, David L., to Allergan Pharmaceuticals. Soft contact lens preserving solutions. 4,029,817, Cl. 424-329.000.

Blanding, Wendell S.: *See*—
Belentepe, Yilmaz C.; and Blanding, Wendell S., 4,029,898.

Bleiweiss, Edward: *See*—
Schlosser, Paul W., 4,029,442.

Bljumshtein, Zigmund Genrikhovich: *See*—
Genshpring, Eduard Matveevich; Bljumshtein, Zigmund Genrikhovich; Maev, Veniamin Evnovich; Bondarenko, Fedor Alexeevich; Gutman, Anatoly Lvovich; and Presman, Vladimir Alexandrovich, 4,029,041.

Blocker, Truman G., III: *See*—
McQuiddy, David N., Jr.; and Blocker, Truman G., III, 4,030,049.

Blow, James H., Jr. Bicycle construction. 4,029,326, Cl. 280-7.160.

Blue, Donald E., to Caterpillar Tractor Co. Tooth forming rack with replaceable inserts. 4,028,921, Cl. 72-88.000.

Bluebird International, Inc.: *See*—
Zehrung, Claude D., Jr., 4,028,868.

Blum, Arnold; Hajdu, Johann; Mohr, Claus Erich; Reichl, Leopold; and Sonntag, Guenther, to International Business Machines Corporation. Processor nucleus combined with nucleus time controlled external registers integrated with logic and arithmetic circuits shared between nucleus and I/O devices. 4,030,076, Cl. 340-172.500.

Blumenfeld, Samuel M., to General Electric Company. High aspect ratio P-N junctions by the thermal gradient zone melting technique. 4,030,116, Cl. 357-32.000.

Blumenthal, Gunter; and Bemmerl, Hans-Ferdinand, to Bochumer Eisenhutte Heintzmann & Company. Pit prop assembly. 4,028,898, Cl. 61-45.00D.

Blyth, Robert Charles: *See*—
Clark, Dennis Edward; and Blyth, Robert Charles, 4,029,804.

Bochumer Eisenhutte Heintzmann & Company: *See*—
Blumenthal, Gunter; and Bemmerl, Hans-Ferdinand, 4,028,898.

Bocks, Paul J.; Grammel, Jurgen; and Neumaier, Hermann, to Bayer Aktiengesellschaft. Composite materials and processes for their production. 4,029,534, Cl. 156-246.000.

Boehringer Mannheim G.m.b.H.: *See*—
Wiedemann, Fritz; Thiel, Max; Stach, Kurt; Dietmann, Karl; and Sponer, Gisbert, 4,029,783.

Boeing Company, The: *See*—
Gerstine, Milton I.; Futatsugi, Setsuo; Ueda, Kazuo; Seo, Ryozo; Iwasaki, Koji; and Uemura, Makoto, 4,029,946.
Mercer, Paul W., 4,029,006.

Bogdanski, John J.; and Silverman, Harold, to Pitney-Bowes, Inc. Cutting device. 4,028,973, Cl. 83-169.000.

Bohm, Ludwig, to Hoechst Aktiengesellschaft. Modified ubbelohde viscosimeter. 4,028,929, Cl. 73-55.000.

Bohme, Ekkehard: *See*—
Dolfini, Joseph E.; Bohme, Ekkehard; and Slusarchyk, William A., 4,029,669.

Bolduc, Wayne J.; Cave, Vernon E.; and Chase, Edward J., to Container Corporation of America. Drum handling attachment. 4,029,230, Cl. 214-654.000.

Bolis, Edoardo, to ITT Industries, Inc. Electrified channel with corresponding snap acting connector. 4,029,378, Cl. 339-22.00B.

Boll, Harry Joseph, to Bell Telephone Laboratories, Incorporated. Self-refreshed capacitor memory cell. 4,030,083, Cl. 340-173.0DR.

Bollen, Philip Stuart; and Walacavage, Eugene Vincent, to Allied Chemical Corporation. Polyester sheet containing antiblock agent added in degradable polycarbonate. 4,029,631, Cl. 260-40.00R.

Bon, Michel-Julien-Marius-Auguste. Device for automatically evaluating the ball throwing efficiency of a football passer. 4,029,315, Cl. 273-55.00R.

Bondarenko, Fedor Alexeevich: *See*—
Genshpring, Eduard Matveevich; Bljumshtein, Zigmund Genrikhovich; Maev, Veniamin Evnovich; Bondarenko, Fedor Alexeevich; Gutman, Anatoly Lvovich; and Presman, Vladimir Alexandrovich, 4,029,041.

Bone, David P.; and Shannon, Edward L., to Quaker Oats Company, The. Method of making a dry pet food having a marbled meat-like texture. 4,029,823, Cl. 426-249.000.

Boose, Michael Anthony, to Lawrence Peska Associates, Inc., a part interest. Mustache kit. 4,029,112, Cl. 132-79.00R.

Borden, Inc.: *See*—
Shah, Jaykumar Jivraj; Porsche, Jules Downes; and Bartell, Charles, 4,029,843.

Borg-Warner Corporation: *See*—
Jenkins, Patrick A.; and Reinke, Ronald E., 4,029,257.

Born Free Plastics, Inc.: *See*—
Taylor, John, 4,028,761.

Bornstein, Michael, to Eli Lilly and Company. Cefazolin suspension for parenteral administration. 4,029,782, Cl. 424-246.000.

Boshinski, Edwin E.: *See*—
Krolick, James J., deceased; and Boshinski, Edwin E., 4,029,162.

Boss, Richard K. Portable, adjustable target stand. 4,029,318, Cl. 273-102.00S.

Boyd, Violet; Fishwick, Brian Ribbons; and Glover, Brian, to Imperial Chemical Industries Limited. Coloring process for synthetic textile materials. 4,029,469, Cl. 8-41.00C.

Brandifino, Angelo; and Brandifino, Frances. Perpetual memory bank calendar. 4,028,826, Cl. 40-110.000.

Brandifino, Frances: *See*—
Brandifino, Angelo; and Brandifino, Frances, 4,028,826.

Brandmair, Franz; Rubisch, Ottmar; and Honig, Dietmar, to Sigri Elektrographit GmbH. Electrode for electrochemical processes and method of producing the same. 4,029,566, Cl. 204-290.00F.

Brandt, J. Wayne, to Spectroderm, Inc. Apparatus for protecting vacuum sources including valve which alternately communicates with vacuum and atmosphere. 4,029,487, Cl. 55-309.000.

Braun Aktiengesellschaft: *See*—
Engelstatter, Heinz, 4,029,992.

Brevetti e Licenze: *See*—
Priola, Aldo; Roggero, Arnaldo; and Cesca, Sebastiano, 4,029,871.

Bridgestone Tire Company Limited: *See*—
Yano, Eizi; Ohkawa, Shunjiro; Komatsu, Tadaaki; and Adachi, Masami, 4,029,222.

Brill, Richard Henry: *See*—
Eaton, John Littell, Jr.; Brill, Richard Henry; and Myers, Walter E., 4,029,940.

Brimberg, Frederick: *See*—
Stevens, Wesley E.; and Brimberg, Frederick, 4,030,096.

Brine, Charles James: *See*—
Austin, Paul Roland; and Brine, Charles James, 4,029,727.

Brinker, Lee J.: *See*—
Blair, Calvin B.; Brinker, Lee J.; and Ankenman, Thomas W., 4,029,155.

Brisk, Richard A.: *See*—
Moseley, Robin C.; and Brisk, Richard A., 4,029,908.

Bristol-Myers Company: *See*—
Vida, Julius A., 4,029,662.
Wang, Theodore S. T.; and Vida, Julius A., 4,029,800.

British Cast Iron Research Association, The: *See*—
Simmons, William, 4,029,140.

British Leyland UK Limited: *See*—
Cady, John Billington; and Kellaway, Michael John, 4,029,335.

British Steel Corporation: *See*—
Clark, Allan; and Kirkwood, Philip Robert, 4,029,934.

Broadhurst, Jeffrey Charles, to Woodville Rubber Company Limited. Variable-geometry aircraft seal. 4,029,272, Cl. 244-46.000.

Broggi-Izar Fabbriche Italiane Riunite S.p.A.: *See*—
Mania, Carlo, 4,029,232.

Brokaw, Adrian Paul, to Analog Devices, Inc. Apparatus for generating a current varying with temperature. 4,029,974, Cl. 307-296.00R.

Brooks, Albert H.: *See*—
Mayer, Peter; Murthy, M. Krishna; Brooks, Albert H.; and Topping, John A., 4,029,897.

Brouillard, Robert Ernest, to Penick & Ford, Limited. Column apparatus and process for immobilized enzyme reactions. 4,029,546, Cl. 195-31.00R.

Brouwer Turf Equipment Limited: *See*—
Gerrits, Theodorus Petrus Hubertus, 4,029,152.

Brown, Boveri & Cie. A.G.: *See*—
Fischer, Wilfried; Haar, Wilhelm; Kleinschmager, Herbert; and Weddigen, Gert, 4,029,857.

Brown, Harold J., to Lorain Products Corporation. Controlled reactance regulator circuit. 4,030,017, Cl. 321-9.00R.

Brown, Michael Trevenen; and Rodway, William George, to Imperial Chemical Industries Limited. Tetrafluoroethylene polymers. 4,029,870, Cl. 526-255.000.

Browning, Charles W. Line threader device. 4,029,346, Cl. 289-17.000.

Bruhn, Mildred S.; and Pappo, Raphael, to G. D. Searle & Co. 7-(3(S)-Hydroxy-5-oxocyclopent-1-ene)hept-5-cis-enoic acid, esters thereof and derivatives. 4,029,689, Cl. 260-468.00K.

Brunner, Heinz: *See*—
Meylan, Pierre; and Brunner, Heinz, 4,029,432.

Buchanan, Richard J.: *See*—
Jarvis, Frank L. J.; Gunn, Duncan A.; and Buchanan, Richard J., 4,029,894.

Buck, Homer G., to King Label Company. Idler roll for printing press drying stage. 4,028,783, Cl. 29-117.000.

Buckeye International, Inc.: *See*—
McClurg, Carl D., 4,029,022.

Buckle, Kenneth A.; Halsted, Edwin H.; and Elliott, James O., to General Motors Corporation. Single phase alternating current motor dual speed control circuit. 4,030,008, Cl. 318-220.00B.

Buckley, Charles G.; Bhat, Ghanshyam A.; and Swartz, Harold L., to Sperry Rand Corporation. Temperature compensated toroidal accelerometer. 4,028,815, Cl. 33-366.000.

Budd Company, The: *See*—
Paul, John M., 4,029,021.

Budrose, Charles R., to Upaya, Inc. Pliers. 4,028,971, Cl. 81-383.500.

Budzich, Tadeusz. Load responsive fluid control system. 4,028,889, Cl. 60-420.000.

Buhler, Otto Richard, to International Business Machines Corporation. Amplifier malfunction detector. 4,030,012, Cl. 318-565.000.

Buikema, Peter D., to Nalco Chemical Company. Cationic starch sizing. 4,029,885, Cl. 536-50.000.

Bulanda, John J., to Panduit Corporation. Apparatus for holding and forming a plurality of objects into a bundle. 4,029,277, Cl. 248-74.00R.

Bullock, Rodes C.: *See*—
Chanslor, Hal; Bullock, Rodes C.; and Bullock, William H., 4,029,311.

Bullock, William H.: *See*—
Chanslor, Hal; Bullock, Rodes C.; and Bullock, William H., 4,029,311.

Bulteau, Gerard; Acher, Jacques; and Monier, Jean-Claude, to Societe d'Etudes Scientifiques et Industrielles de l'Ile-de-France. N-(1-benzyl pyrrolidinyl 2-alkyl) substituted benzamides and derivatives thereof. 4,029,673, Cl. 260-326.470.

Bultman, John Dale: *See*—
Jurd, Leonard; and Bultman, John Dale, 4,029,818.

Bundy, Gordon L.; and Pike, John E., to Upjohn Company, The. Prostaglandin A_1, analogs. 4,029,691, Cl. 260-468.00D.

Bundy, Gordon L.; and Nelson, Norman A., to Upjohn Company, The. 2a,2b-Dihomo-11-deoxy-17(substituted phenyl)-18,19,20-trinor-PGE, compounds and their corresponding esters. 4,029,693, Cl. 260-473.00R.

Bundy, Gordon L., to Upjohn Company, The. Phenyl-substituted prostaglandin-e type analogs. 4,029,814, Cl. 424-308.000.

Bunker Ramo Corporation: *See*—
Kwan, Okun, 4,029,193.

Burdett, Harold D. Apparatus for forming modular building structures. 4,029,287, Cl. 249-27.000.

Burkett, Bobby G.; and Henry, Raymond W., to Texas Instruments Incorporated. Variable module memory. 4,030,080, Cl. 340-172.500.

Burkhard, Herbert; Hsu, Nelson Nae-Ching; and Fetter, Edward Jo-

sepb, to American Cyanamid Company. Emulsion polymerization of acrylate or other vinyl monomers using selected mixtures of soluble salts of certain sulfosuccinic acid half esters. 4,029,624, Cl. 260-29.6TA.

Burnside, Chester C.; and Wright, John G., to Olin Corporation. Progressing cavity pump. 4,029,443, Cl. 418-48.000.

Burrougbs Corporation: *See—*
Manthiram, Chockalingam, 4,029,192.
Sims, Dewey M., Jr., 4,029,426.
Smith, Douglas A., 4,030,130.

Burry, Allen J.: *See—*
Mysiak, Eugene J.; and Burry, Allen J., 4,029,385.

Busch, Norbert: *See—*
Mauvernay, Roland Yves; Busch, Norbert; Moleyre, Jacques; Simond, Jacques; and Monteil, Andre, 4,029,790.

Butler, David Sydney: *See—*
Harding, John Patrick; and Butler, David Sydney, 4,029,383.

Butz, Hans, to Fichtel & Sachs A.G. Disk brake with axially floating casing. 4,029,179, Cl. 188-71.800.

Buzzi, Gunter, to Fa.Hans Grohe KG. Valve construction for controlling a liquid supply to one or more discharge points. 4,029,121, Cl. 137-545.000.

Bykowski, Michael J.; and Ewing, Lloyd, to Ewing Engineering Company. Phosphorus removal from waste water. 4,029,575, Cl. 210-16.000.

C.E.R.P.H.A. a French Society organised under the laws of France: *See—*
Thuillier, Germaine; Laforest, Jacqueline; and Bessin, Pierre, 4,029,808.

C. Rhett, Inc.: *See—*
Rhett, Chester K., 4,029,488.

Cabiro, Jorge Canals: *See—*
Cartes, Juan Bosch; Cabiro, Jorge Canals; Jarque, Ricardo Granados; Roldan, Cristobal Martinez; and Peinado, Fernando Rabadan, 4,029,799.

Cabot Corporation: *See—*
Hagopian, Erivan; and Morgan, Allan Clark, 4,029,633.

Cady, John Billington; and Kellaway, Michael John, to British Leyland UK Limited. Fifth wheels for truck tractors. 4,029,335, Cl. 280-439.000.

Cafruny, Edward Joseph; and Potts, Gordon Oliver, to Sterling Drug Inc. Therapeutic composition and method of use thereof. 4,029,776, Cl. 424-240.000.

Cahn, Robert P., to Exxon Research and Engineering Company. Method of producing sulfur from sulfur dioxide. 4,029,752, Cl. 423-563.000.

Cahn, Robert P.: *See—*
Li, Norman N.; and Cahn, Robert P., 4,029,744.

Cairns, Hugh: *See—*
Augstein, Joachim; Cairns, Hugh; Hunter, Dennis; and King, John, 4,029,802.

Calato, Joseph D. Adjustable drum brush. 4,028,983, Cl. 84-422.00S.

Calevich, George J.; McMillan, John E.; and Ticknor, Grant W., to General Electric Company. Apparatus for cross-rolling wire leads. 4,028,924, Cl. 72-252.000.

Calloue, Georges; and Isard, Arsene, to Produits Chimiques Ugine Kuhlmann. Preparation of bromine. 4,029,732, Cl. 423-500.000.

Campbell, Gordon Kicth Colin, to Lockheed Missiles & Space Company, Inc. Deployable offset paraboloid antenna. 4,030,103, Cl. 343-915.000.

Campbell, Ramsey G.: *See—*
Ziegenhagen, Allyn J.; and Campbell, Ramsey G., 4,029,714.

Campbell, Whitney Robertson, to Motorola, Inc. Control center for a communications system with interchannel patching capabilities. 4,029,901, Cl. 179-2.00E.

Campion, James M., Jr., to Philmon & Hart Laboratories, Inc. Molding apparatus for making a dental floss device with floss tensioning means. 4,029,453, Cl. 425-111.000.

Canada, Emily J.: *See—*
Friedman, Henry; and Canada, Emily J., 4,029,671.

Canadian Patents and Development Limited: *See—*
Farnand, Joseph Redmond; and Puddington, Ira Edwin, 4,029,567.

Canathane Roller Corporation Limited: *See—*
Dempster, William Boyd, 4,028,786.

Candler, Nigel Dane Quartano: *See—*
Wilkinson, Albert Edward Roy; and Candler, Nigel Dane Quartano, 4,029,263.

Candy, Peter Boden: *See—*
Penny, Robert Noel; and Candy, Peter Boden, 4,029,433.

Canevari, Louis T.; Coppola, Vincent G.; Dlugos, Daniel F.; Freeman, Gerald C.; and Manduley, Flavio M., to Pitney-Bowes, Inc. Postage meter setting device. 4,030,070, Cl. 340-147.00R.

Caniglia, Joseph E. Sanitary spray-dry closet seat. 4,028,745, Cl. 4-7.000.

Canjar, Mathew H., to M.H. Canjar Company. Trigger mechanism for rifles. 4,028,835, Cl. 42-69.00R.

Cannon, Cyril George; and Selwood, Alan, to Imperial Chemical Industries Limited. Process for seaming fabrics comprising thermoplastic fibers using laser beams. 4,029,535, Cl. 156-272.000.

Canon Kabushiki Kaisha: *See—*
Sakurada, Nobuaki; Shinoda, Nobuhiko; Mashimo, Yukio; Ito, Tadashi; and Ito, Fumio, 4,029,421.
Yazaki, Mutsunobu; Uchiyama, Takashi; Matsuda, Mutsuhide; Taguchi, Tetsuya; and Mashimo, Yukio, 4,030,108.

Cardio Pulminary Laboratory Research Foundation: *See—*
Bisera, Jose; Carrington, James Howard; and Weil, Max Harry, 4,028,931.

Carl Walther, Sportwaffenfabrik: *See—*
Keppeler, Dieter, 4,028,836.

Carlow, Earl F.: *See—*
Bennett, Thomas H.; Carlow, Earl F.; Kouvoussis, Anthony E.; Orgill, Rodney H.; Peddle, Charles; and Wiles, Michael F., 4,030,079.

Carlson, Allan Ivan; and Singer, Barry M., to North American Philips Corporation. Variable gain X-ray image intensifier tube. 4,029,965, Cl. 250-370.000.

Carlson, Dana Peter, to Du Pont de Nemours, E. I., and Company. Tetrafluoroethylene terpolymers. 4,029,868, Cl. 526-247.000.

Carlson, Everett W., to Lincoln Brass Works, Inc. Locking-type gas valve. 4,029,291, Cl. 251-96.000.

Carmichael, Daniel A., III. Anchoring system for a floating dock. 4,028,899, Cl. 61-48.000.

Carrigan, James David, to Vance Industries, Inc. Method of flame hardening gears. 4,029,526, Cl. 148-147.000.

Carrington, James Howard: *See—*
Bisera, Jose; Carrington, James Howard; and Weil, Max Harry, 4,028,931.

Carson, John C., Jr.; Hall, Robert T.; Kenkare, Divaker B.; and Robbins, Clarence R., to Colgate-Palmolive Company. Two product dispenser with cooperating telescoping cylinders. 4,029,236, Cl. 222-135.000.

Carson, Malcolm E.; and Ellslager, William M., to Kalcor Coatings Company, Inc. Composition for use in manufacture of molded hollow rubber articles. 4,029,511, Cl. 106-38.220.

Cartes, Juan Bosch; Cabiro, Jorge Canals; Jarque, Ricardo Granados; Roldan, Cristobal Martinez; and Peinado, Fernando Rabadan, to Laboratorios Made, S.A. Certain analgesically active substituted benzyl pyridine compounds. 4,029,799, Cl. 424-263.000.

Cartossi, Nando, to Walter Cartossi S.p.A. Method of heat and pressure bonding of plates of heat conductive metal onto stainless steel surfaces. 4,029,253, Cl. 228-175.000.

Casagrande, Cesare; and Ferrari, Giorgio, to Siphar S.A. Process for interconversion of heteroyohimbane alkaloids. 4,029,664, Cl. 260-293.530.

Cascardo, Adolph P.: *See—*
Lazich, Radovan P.; and Cascardo, Adolph P., 4,029,262.

Caser, Gustavo, to Officine Termomeccaniche Successori Carello S.p.A. Plant for vulcanizing a continuous length of curable material articles of elastomeric materials. 4,029,450, Cl. 425-71.000.

Castellano Berlanga, Jose Maria: *See—*
Martinez Roldan, Cristobal; Fernandez Brana, Miguel; and Castellano Berlanga, Jose Maria, 4,029,807.

Castellion, George Augustus: *See—*
Schmitt, Joseph Lawrence, Jr.; Walker, Philip Leroy, Jr.; and Castellion, George Augustus, 4,029,600.

Caswell, Robert L.: *See—*
Evans, Gregory W.; and Caswell, Robert L., 4,029,947.

Caterpillar Tractor Co.: *See—*
Blue, Donald E., 4,028,921.
Clarke, John Michael, 4,029,444.
Freese, Gary P., 4,029,157.
Haak, Willard J.; Marsden, Howard A.; and Van Zandt, Rollin P., 4,029,166.
Habiger, Cyril W.; and Hopkins, Donald L., 4,028,890.
Penny, Robert Noel; and Candy, Peter Boden, 4,029,433.
Wirt, Leon A., 4,029,225.
Zielie, Richard C., 4,029,276.

Cav Limited: *See—*
Jones, Christopher Robin; Williams, Malcolm; and Adey, Anthony John, 4,029,068.

Cavalla, John Frederick; and Archibald, John Leheup, to John Wyeth & Brother Limited. Pharmaceutical compositions and methods of treating hypertension. 4,029,801, Cl. 424-267.000.

Cave, Vernon E.: *See—*
Bolduc, Wayne J.; Cave, Vernon E.; and Chase, Edward J., 4,029,230.

CAW Industries, Inc.: *See—*
Willard, John W., Sr., 4,029,770.

Cawley, William H.: *See—*
Rowe, Edward A., Jr.; and Cawley, William H., 4,029,523.

Celanese Corporation: *See—*
Lowry, Richard P.; Chase, Joseph D.; and Cook, Paul A. C., 4,029,636.

Cellu Products Company: *See—*
Doll, Brendan L., 4,029,539.

Cengel, John A.: *See—*
Puskas, Imre; and Cengel, John A., 4,029,592.

Cenker, Moses; Narayan, Thirumurti; and Patton, John Thomas, Jr., to BASF Wyandotte Corporation. Carbodiimide-isocyanurate foams modified with polyfurfuryl alcohol polymers. 4,029,611, Cl. 260-2.5AW.

Cenker, Moses: *See—*
Narayan, Thirumurti L.; and Cenker, Moses, 4,029,610.

Central Illinois Tile co.: *See—*
Courson, Thomas G.; Schlueter, William L.; and Kelly, Thomas T., 4,028,902.

Centre European de Recherches Mauvernay: *See—*
Mauvernay, Roland Yves; Busch, Norbert; Moleyre, Jacques; Simond, Jacques; and Monteil, Andre, 4,029,790.

Centro Studi e Laboratori Telecomunicazioni: *See—*
Giorcelli, Silvano, 4,030,074.

Cesca, Sebastiano: *See—*
Priola, Aldo; Roggero, Arnaldo; and Cesca, Sebastiano, 4,029,871.

Chai, Hi Dong; and Pawletko, Joseph Paul, to International Business Machines Corporation. Rotary stepper motor and method of operation. 4,029,977, Cl. 310-49.00R.

Chambers, Carter Carl. Child's three-wheel scooter. 4,029,329, Cl. 280-87.02R.

Chambers, Derek; and Wang, Dee, to Raytheon Company. Switching power supply with floating internal supply circuit. 4,030,024, Cl. 323-17.000.

Chamis, Christos C.; and Lark, Raymond F., to United States of America, National Aeronautics and Space Administration. Hybrid composite laminate structures. 4,029,838, Cl. 428-301.000.

Champion Spark Plug Company: *See—*
Nagy, William L.; and Craver, Robert J., 4,029,990.

Chan, Ka-Kong; and Saucy, Gabriel, to Hoffmann-La Roche Inc. Asymmetric synthesis. 4,029,678, Cl. 260-345.500.

Chana, Maghar S.; and Garelick, Eli Leonard, to Rochester Instrument Systems, Inc. Current-to-current electrical isolator. 4,030,014, Cl. 321-2.000.

Chandler Evans Inc.: *See—*
Thompson, Raymond V., 4,029,127.

Chang, Pei K., to Stauffer Chemical Company. Production of egg white substitute from whey. 4,029,825, Cl. 426-271.000.

Chang, Shu-Pei; and Ridgway, Robert W., to United States of America, Agriculture. Oligomeric polyesters from long-chain dicarboxylic acids as plasticizers for vinyl polymers. 4,029,627, Cl. 260-31.600.

Chanslor, Hal; Bullock, Rodes C.; and Bullock, William H. Invalid walker with brakes. 4,029,311, Cl. 272-70.300.

Chao, Albert; and Chao, Ethel. Lighting display system. 4,028,828, Cl. 40-130.00D.

Chao, Ethel: *See—*
Chao, Albert; and Chao, Ethel, 4,028,828.

Chapin, Donald W., to Garrett Corporation, The. Fluidic to electric transducer and method. 4,029,979, Cl. 310-8.200.

Chapman, Richard Alexander, to Texas Instruments Incorporated. Arrays for infrared image detection. 4,029,962, Cl. 250-338.000.

Charles Machine Works, Inc., The: *See—*
Schuermann, Kenneth W.; and Slaton, Vernon C., III, 4,028,958.

Charles Stark Draper Laboratory, Inc., The: *See—*
Dew, Brock S., 4,029,949.

Chase, Edward J.: *See—*
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Chase, Joseph D.: *See—*
Lowry, Richard P.; Chase, Joseph D.; and Cook, Paul A. C., 4,029,636.

Chelin, Charles Richard, to Towmotor Corporation. Combined towing and mounting member for vehicle counterweights. 4,029,340, Cl. 280-759.000.

Chemelli, Robert Guido; Cook, Dwight Dexter; and Miller, Richard Carrel, to Bell Telephone Laboratories, Incorporated. Recording apparatus utilizing small optical components. 4,030,122, Cl. 358-127.000.

Chen, Albert C., to Mobil Oil Corporation. Blends of partially neutralized carboxyl functional copolymers and epoxy resins in aqueous emulsion. 4,029,620, Cl. 260-29.6NR.

Cheng, Dah Yu: *See—*
United States of America, National Aeronautics and Space Administration; and Cheng, Dah Yu, 4,028,939.

Chesky, Sheldon R.; and Patience, Donald, to Colgate-Palmolive Company. Absorbent article. 4,029,101, Cl. 128-290.00R.

Chevron Research Company: *See—*
Suzuki, Shigeto, 4,029,710.
Suzuki, Shigeto, 4,029,711.

Chinnock, Edwin Leroy; and Gloge, Detlef Christoph, to Bell Telephone Laboratories, Incorporated. Optical fiber group splicing technique and apparatus employing unique foldable holder. 4,029,390, Cl. 350-96.00C.

Choay, Jean: *See—*
Vairel, Edmond G.; Goulay, Jean; and Choay, Jean, 4,029,767.

Choay S.A.: *See—*
Vairel, Edmond G.; Goulay, Jean; and Choay, Jean, 4,029,767.

Christen, Jack P., to Outers Laboratories, Inc. Arrowhead assembly having detachable locking means. 4,029,319, Cl. 273-106.50B.

Christensen, Cai V. Protective head-wear. 4,028,743, Cl. 2-424.000.

Christensen, Carl O., to Roll-Rite Corporation. Double ended warehouse trailer. 4,029,333, Cl. 280-415.00A.

Christensen, Wendell N.; and Poulter, Larry W., to Thiokol Corporation. Treatment of water containing cyanide. 4,029,557, Cl. 204-149.000.

Christenson, Roger M.: *See—*
Hartman, Marvis E.; Hockswender, Thomas R., Dowbenko, Rostyslaw; and Christenson, Roger M., 4,029,621.

Christianson, Raymond A. Linkage for the demand regulator of a breathing apparatus. 4,029,120, Cl. 137-494.000.

Christoffel, Julius M., Jr. Kite. 4,029,273, Cl. 244-153.00R.

Chu, Pak-Jong, to Northern Electric Company Limited. Multi-contact push-button switch and plural embodiment for keybnard switch assembly. 4,029,916, Cl. 200-5.00A.

Ciba-Geigy AG: *See—*
Defago, Raymond; Angliker, Hans-Joerg; Holzrichter, Herbert; Kneubuehler, Werner; and Peter, Richard, 4,029,467.
Toepfl, Werner, 4,029,687.

Ciba-Geigy Corporation: *See—*
Eichenberger, Kurt; Egli, Christian; Kuhnis, Hans; and Schier, Oswald, 4,029,795.
Gatzi, Karl; and Hoegerle, Karl, 4,029,785.
Karrer, Friedrich, 4,029,649.

Cielaszyk, Dennis E.; and Meyer, Andrew J., to KMS Fusion, Inc. Apparatus for applying coatings. 4,029,045, Cl. 118-49.000.

Cimarusti, Christopher M.: *See—*
Hauck, Frederic P.; Cimarusti, Christopher M.; and Narayanan, Venkatachala L., 4,029,676.
Slusarchyk, William A.; and Cimarusti, Christopher M., 4,029,645.

Cise, Michael D., to Eli Lilly and Company. Method of preparing stable sterile crystalline cephalosporins for parenteral administration. 4,029,655, Cl. 260-243.00C.

Cities Service Company: *See—*
Coffman, Charles L.; Kellerhals, Glen F.; Newcombe, Jack; and Roth, Shirley H., 4,029,570.

Clark, Allan; and Kirkwood, Philip Robert, to British Steel Corporation. Welding, and a steel suitable for use therein. 4,029,934, Cl. 219-145.000.

Clark, Dennis Edward; and Blyth, Robert Charles, to Beecham Group Limited. Injectable amoxycillin compositions. 4,029,804, Cl. 424-271.000.

Clark, Frederick G., to Eastman Machine Company. Grounding attachment plug and terminal block assembly for cloth cutting machine. 4,029,372, Cl. 339-14.00R.

Clark, James Monroe, to International Telephone and Telegraph Corporation. Digital double differential phase-locked loop. 4,030,045, Cl. 331-1.00A.

Clark, Norman E. Release mechanism for fishing apparatus. 4,028,837, Cl. 43-43.120.

Clarke, John Michael, to Caterpillar Tractor Co. Sealing bolt seat for rotary piston machine. 4,029,444, Cl. 418-120.000.

Clarke, Peter Alec; Starkey, Stanley Victor; and Stone, William Alfred, to Molins Limited. Apparatus for handling cigarettes or other rod-like articles. 4,029,197, Cl. 198-425.000.

Clarke, William Arthur. Game ball. 4,029,316, Cl. 273-58.00K.

Clarridge, Glenn E., to Ford Industries, Inc. Tape drive with floating-plate-mounted drive spindles. 4,029,269, Cl. 242-201.000.

Cleghorn, John W.: *See—*
Davis, Marion H.; and Cleghorn, John W., 4,029,187.

Clough, Roy L., Jr.; and Snow, John F., to Xodar Corporation. Aerating system. 4,029,581, Cl. 210-220.000.

Cloup, Jean. Apparatus for positioning tools. 4,029,427, Cl. 408-3.000.

Clouth Gummiwerke AG: *See—*
Hartmann, Ewald; and De Blick, Hendrik, 4,029,296.

Coffman, Charles L.; Kellerhals, Glen F.; Newcombe, Jack; and Roth, Shirley H., to Cities Service Company. Process for recovering crude oil from an underground reservoir. 4,029,570, Cl. 208-188.000.

Cole, Ann Mary; Turner, John Angus William; and Snell, Brian Kenneth, to Imperial Chemical Industries Limited. Pyrimidine sulfamate fungicides. 4,029,784, Cl. 424-248.500.

Cole, David J.: *See—*
Zerobnick, Alan H.; and Cole, David J., 4,029,243.

Cole, Lewis C., to United States of America, Army. Plural mode fuze. 4,029,016, Cl. 102-69.000.

Colgate-Palmolive Company: *See—*
Carson, John C., Jr.; Hall, Robert T.; Kenkare, Divaker B.; and Robbins, Clarence R., 4,029,236.
Chesky, Sheldon R.; and Patience, Donald, 4,029,101.
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Karami, Hamzeh, 4,029,100.

Collet, Jean-Jacques. Apparatus for cutting bitumen cakes. 4,028,974, Cl. 83-171.000.

Colletti, Vincent, Jr.: *See—*
Shoup, Edgar C., Jr.; and Colletti, Vincent, Jr., 4,029,436.

Collington, Kenneth Thomas, to Fisons Limited. Silica containing blowing agent compositions as plate-out preventives in foamed plastics processes. 4,029,612, Cl. 260-2.50E.

Colt Industries Operating Corporation: *See—*
Rictveld, Frank P., 4,029,929.

Coltrin, George E.: *See—*
Adams, Clifton G.; Dallas, Carl B.; and Coltrin, George E., 4,029,216.

Coltrinari, Enzo L., to Tajima Roofing Co., Ltd. Recovery of antimony sulfides. 4,029,741, Cl. 423-179.000.

Comer, Robert E. Bone end shield for meat cuts. 4,029,822, Cl. 426-124.000.

Commissariat a l'Energie Atomique: *See—*
Faugeras, Pierre; Miquel, Pierre; and Robaglia, Michele, 4,029,733.

Communications Technology Corporation: *See—*
Gillemot, George W.; Gamero, Robert; Benavides, Augusto E.; and Elms, Robert James, 4,029,626.

Compagnie Industrielle des Telecommunications Cit-Alcatel: *See—*
Abraham, Michel, 4,029,905.

Composite Technology, Inc.: *See—*
Green, Andrew, 4,029,172.

Confalone, Pasquale Nicholas; Uskokovic, Milan Radoje; and Pizzolato, Giacomo, to Hoffmann-La Roche Inc. Synthesis of biotin. 4,029,647, Cl. 260-239.30B.

Consolidated Medical Equipment, Inc.: *See—*
Corasanti, Eugene R., 4,029,086.

Construction Specialties, Inc.: *See—*
Bartlett, Gary F., 4,029,834.

Container Corporation of America: *See—*
Bell, John T., 4,028,864.
Bolduc, Wayne J.; Cave, Vernon E.; and Chase, Edward J., 4,029,230.
Continental Group, Inc., The. *See—*
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Continental Oil Company: *See—*
Sweeney, William T.; Keller, Dennis F.; Harris, Gary R.; and Armstrong, Calvin N., 4,028,940.
Cook, Dwight Dexter: *See—*
Chemelli, Robert Guido; Cook, Dwight Dexter; and Miller, Richard Carrel, 4,030,122.
Cook, Melvin S., to Holobeam, Inc. Lined pipe, and method and apparatus for making same. 4,029,932, Cl. 219-121.0LM.
Cook, Paul A. C.: *See—*
Lowry, Richard P.; Chase, Joseph D.; and Cook, Paul A. C., 4,029,636.
Cook, Ralph M., deceased; Cook, Ruth Nelson, Personal Representative of the Estate; and Roach, Don T. Device for removing circumferentially bark from plants. 4,029,134, Cl. 144-208.00C.
Cook, Ruth Nelson, Personal Representative of the Estate: *See—*
Cook, Ralph M., deceased; Cook, Ruth Nelson, Personal Representative of the Estate; and Roach, Don T., 4,029,134.
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Copal Company Limited: *See—*
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Copenhaver, Julian V.: *See—*
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Coppola, Vincent G.: *See—*
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Cor, Inc.: *See—*
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Coston, Semer H. Oscillating piston rotary machine. 4,029,059, Cl. 123-18.00R.
Cottingham, Hugh; and Scrocco, Joseph, to BHN, Inc. Plant light sensor adaptor. 4,029,959, Cl. 250-239.000.
Cottingham, Hugh V.; and Scrocco, Joseph, to Black Hole Nebula Incorporated. Plant comparator. 4,029,418, Cl. 356-168.000.
Cotton, John F.; Hanks, Jack G.; and Wien, Raymond E., to Westinghouse Electric Corporation. Distribution transformer secondary circuit breaker having cantilevered contacts. 4,030,053, Cl. 335-15.000.
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Courson, Thomas G.; Schlueter, William L.; and Kelly, Thomas T., to Central Illinois Tile co. Apparatus for laying elongated flexible tubing. 4,028,902, Cl. 61-72.600.
Courty, Philippe; Sugier, Andre; Raynal, Bernard; and Berrebi, Georges, to Societe Francaise des Produits pour Catalyse. Decomposing nitrogen oxides with nickel-iron-chromium catalysts. 4,029,738, Cl. 423-213.200.
Couto, Luis R., to Thomas & Betts Corporation. Hand tool for working on electrical conductors. 4,028,756, Cl. 7-5.500.
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Coviello, Louis M.; and Coviello, Claire V. Apparatus for cleaning chimney flues. 4,028,769, Cl. 15-249.000.
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Cowen, Steven J., to United States of America, Navy. Film-recording noise dosimeter. 4,028,947, Cl. 73-557.000.
Cox, C. Eugene. Harness assembly test system. 4,030,029, Cl. 324-66.000.
Cragne, Edward J., Jr.; and Schultz, Everett M., to Merck & Co., Inc. Substituted 2-aminomethyl-6-iodnphenols 4,029,816, Cl. 424-316.000.
Cragoe, Edward J., Jr.: *See—*
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Crann, Richard N., to General Tire & Rubber Company, The. Nondestructive testing of tire wear. 4,028,937, Cl. 73-146.000.
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Crosby, John; Rennie, Robert Allan Campbell; and Paton, Robert Michael, to Imperial Chemical Industries Limited. Production of isocyanates. 4,029,686, Cl. 260-453.00P.
Cross, Barrington; and Walworth, Bryant Leonidas, to American Cyanamid Company. Novel 1,2-dialkylpyrazolium compounds having 3-(or 3,5-) nitrogen-containing heterocyclic group as herbicides. 4,029,492, Cl. 71-92.000.
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Cunningham, Donald J., to Thiokol Corporation. Safety igniter for flares. 4,029,014, Cl. 102-35.000.
Curran, Adrian Charles Ward, to John Wyeth & Brother Limited. Certain 1-carbothioamides of 1,8-naphthyridines, pyrrolo(2,3-b)pyridines and pyrido(2,3-b)azepines. 4,029,667, Cl. 260-294.80C.
Curran, Adrian Charles Ward; Crossley, Roger; and Hill, David George, to John Wyeth & Brother Limited. Cyclopenteno[b]pyridine derivatives. 4,029,668, Cl. 260-295.00T.
Currie, Philip V. Locking mechanism. 4,028,803, Cl. 30-321.000.
Curtin, Daniel J., to Atlantic Richfield Company. Method of removing contaminant from hydrocarbonaceous fluid. 4,029,571, Cl. 208-251.00H.
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Dalzell, John J.; and Stover, James E. Golf game apparatus and method. 4,029,314, Cl. 273-32.00R.
Dalziel, Warren L., to Shugart Associates, Inc. Lead screw support damping mechanism. 4,030,137, Cl. 360-106.000.
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Daniel, Donald D.; and Wilcox, Roger V., to United States of America, Navy. Multiple dumping integrator. 4,030,038, Cl. 328-127.000.
Danielewicz, John C., Snarey, Michael; and Thomas, Geoffrey N., to Pfizer Inc. (2-Imidazolin-2-ylamino) substituted -quinoxalines and -quinazolines as antihypertensive agents. 4,029,792, Cl. 424-251.000.
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Daunheimer, Lyn A., to Masonite Corporation. Method of making a multi-gloss panel. 4,029,831, Cl. 427-264.000.
Dauth, Michael F., to Metalworks Limited. Wall bracket and clip arrangement. 4,029,282, Cl. 248-221.100.
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Davis, Harry C. Rotacycle. 4,029,332, Cl. 280-234.000.
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De Staat der Nederlanden, te Dezen Vertegenwoordigd Door de Directeur-Generaal der Posterijen, Telegrafie en Telefonie: *See—*
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Deacon, John Maxwell; and Heighway, James, to Plessey Handel und Investments A.G. Acoustic surface wave filters. 4,030,050, Cl. 333-72.000.
DeAmicis, Ferdinando. Distributor adjustment tool. 4,028,968, Cl. 81-71.000.
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Defago, Raymond; Angliker, Hans-Joerg; Holzrichter, Herbert; Kneubuehler, Werner; and Peter, Richard, to Ciba-Geigy AG. Sublimation transfer and diisocyanate fixation of amino- or hydroxy-containing azo dyestuffs and transfer sheets thereof. 4,029,467, Cl. 8-2.50A.
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De Gennes, Gerard, to Societe Anonyme Francaise du Ferodo. Radially movable clutch release bearing. 4,029,186, Cl. 192-98.000
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Demole, Edouard, to Firmenich S.A. Aromatic compositions. 4,029,106, Cl. 131-17.00R.
Demole, Edouard P., to Firmenich S.A. Aromatic compositions. 4,029,107, Cl. 131-17.00R.
Demole, Edouard P., to Firmenkh SA. Aromatic compositions. 4,029,108, Cl. 131-17.00R.
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De Roeck born Holtzhauer, Yannick; and De Roeck, Herve, to Agence Nationale de Valorisation de la Recherche (ANVAR). Anti-gingivitis oral composition. 4,029,760, Cl. 424-48.000.
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Dessauer, Rolf, to Du Pont de Nemours, E. I., and Company. Universal product code marking composition containing a photosensitive dye former, a pigment and a binder and the use thereof. 4,029,506, Cl. 96-48.00R.
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Dew, Brock S., to Charles Stark Draper Laboratory, Inc., The. Servo-controlled microscope stage. 4,029,949, Cl. 235-151.110.
DeWitt, David P.; Hannemann, Robert E.; and Wiechel, John F., to Purdue Research Foundation. Method for determining bilirubin concentration from skin reflectance. 4,029,085, Cl. 128-2.00R.
Dey, James. Automatic motor kill system for preventing damage to a heavy equipment motor due to a dirty air filter. 4,029,073, Cl. 123-198.00D.
Dezael, Claude; Renault, Philippe; and Deschamps, Andre, to Institut Francais du Petrole des Carburants et Lubricants et Enterprise de Recherches et d'Activities Petroliers Elf. Process for reducing molten ammonium sulfates containing metallic impurities to ammonia and sulfur dioxide. 4,029,745, Cl. 423-356.000.
Dhein, Rolf; Schoeps, Jochen; Beckers, Johannes; and Kuchenmeister, Rolf, to Bayer Aktiengesellschaft. Process for the production of water-dilutable binders based on air-drying short-oil alkyd resins. 4,029,617, Cl. 260-20.000.
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Diggs, Richard E. Fireproof modular building. 4,028,854, Cl. 52-93.000.

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Dolfini, Joseph Edward, to E. R. Squibb & Sons, Inc. 7-Methoxy 7-alpha-ureidothienylacetamidocephalosporins. 4,029,653, Cl. 260-243.00C.

Dolfini, Joseph Edward, to E. R. Squibb & Sons, Inc. 7-Methoxy phenylureidocephalosporins. 4,029,654, Cl. 260-243.00C.

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Dupuis, Jean Marcel, to Northern Telecom Limited. Removal of connector pins. 4,028,790, Cl. 29-764.000.

Dutta, Sunil K.: *See—*
Gazza, George E.; and Dutta, Sunil K., 4,029,755.

Dye, John F.; and Memhardt, Charles R., to Kendall Company, The. Extremity compression device. 4,029,087, Cl. 128-24.00R.

Dynamit Nobel Aktiengesellschaft: *See—*
Hubsch, Gunter; Bendler, Hellmut; and Stahlmann, Rudolf, 4,029,017.
Kotzsch, Hans-Joachim; Seiler, Claus-Dietrich; and Vahlensieck, Hans-Joachim, 4,029,679.

Dynapol: *See—*
Crosby, Guy A., 4,029,706.

Dynascan Corporation: *See—*
McCullough, David Jacob, 4,030,088.

Dynatech Corporation: *See—*
Barger, J. P., 4,029,102.

E M I Limited: *See—*
Hounsfield, Godfrey Newbold, 4,029,948.

E. Merck A. G.: *See—*
Neisius, Karlheinz; and Baumer, Wilhelm, 4,029,597.
Neisius, Karlheinz; and Baumer, Wilhelm, 4,029,598.

E. R. Squibb & Sons, Inc.: *See—*
Dolfini, Joseph E.; Bohme, Ekkehard; and Slusarchyk, William A., 4,029,669.
Dolfini, Joseph Edward, 4,029,653.
Dolfini, Joseph Edward, 4,029,654.
Hauck, Frederic P.; Cimarusti, Christopher M.; and Narayanan, Venkatachala L., 4,029,676.
Slusarchyk, William A.; and Cimarusti, Christopher M., 4,029,645.

E-Systems, Inc.: *See—*
Medley, Max W., Jr.; and Ward, James H., Jr., 4,030,001.

Eager, John W. Electric lamp base and method of assembly. 4,029,387, Cl. 339-146.000.

Eagle-Picher Industries, Inc.: *See—*
Decker, John W.; and Talik, Mieczyslaw, 4,029,846.

Earl, Thomas E.: *See—*
Pfouts, Robert R.; Earl, Thomas E.; and Mort, Charles B., 4,029,145.

Earth Sciences, Inc.: *See—*
Stevens, Douglas, Forberg, Helge O.; Jennings, Larry D.; Thompson, David L.; and Copenhaver, Julian V., 4,029,737.

Eary, George Daniel, Sr. Adjustable head and shoulder rest. 4,028,754, Cl. 5-327.00B.

Eastman Kodak Company: *See—*
Abel, Edward P., 4,029,849.
Hargis, Charles W., 4,029,707.
Kindig, Guilford Edwin; and Adamski, Henry Stanislaus, 4,029,184.
Pond, David M.; Dickason, William C.; and Elam, Edward U., 4,029,670.
Secrist, George Richard; Berls, Richard Warren; and Schlegel, Brooke Pershing, 4,029,504.
Watkins, Windell C., 4,029,695.

Eastman Machine Company: *See—*
Clark, Frederick G., 4,029,372.

Eastwood, Frederick B.: *See—*
Hurley, Rupert B.; Eastwood, Frederick B.; and Mann, Joe A., 4,029,725.

Eaton Corporation: *See—*
Gee, Thomas A., 4,029,180.
Walsh, Michael M., 4,029,185.

Eaton, John Littell, Jr.; Brill, Richard Henry; and Myers, Walter E., to SCM Corporation. Percolator. 4,029,940, Cl. 219-506.000.

Ebauches S.A.: *See—*
Droz, Willy; and Beguin, Jean-Luc, 4,028,878.

Eberle, Jeannine: *See—*
Fauran, Claude P.; Dorme, Nicole; Raynaud, Guy M.; and Eberle, Jeannine, 4,029,789.

Eck, Calvert F., to Ocean Research Equipment, Inc. Acoustical flow meter. 4,028,938, Cl. 73-194.00A.

Eco-Control, Inc.: *See—*
Walsh, Myles A.; Walsh, Fraser M.; and Crouse, Dennis N., 4,029,854.

Ecofon Verkaufsgesellschaft Probst KG.: *See—*
Herterich, Walter; and Probst, Georg, 4,029,328.

Econocorp, Inc.: *See—*
Lee, Richard G., 4,028,999.

Edison, David M.: *See—*
Riffe, Delmar R.; Olson, Richard D.; Edison, David M.; and Spreadbury, Robert J., 4,030,058.

Edson Tool and Manufacturing Company, Inc.: *See—*
Prather, Joseph E.; and Khalifa, Ramzi A., 4,029,348.

Eduard Kusters Maschinenfabrik: *See—*
Ahrweiler, Karl-Heinz, 4,029,456.

Edwards, Floyd B.: *See—*
Edwards, Gerald D.; and Edwards, Floyd B., 4,028,823.

Edwards, Gerald D.; and Edwards, Floyd B. Digging tooth. 4,028,823, Cl. 37-142.00R.

Effland, Richard C.; Davis, Larry; and Schaub, Wolfgang, to American Hoechst Corporation. Aminoalkylpyrrolobenzoxazalkanes. 4,029,672, Cl. 260-326.50B.

Egli, Christian: *See—*
Eichenberger, Kurt; Egli, Christian; Kuhnis, Hans; and Schier, Oswald, 4,029,795.

Eichenberger, Kurt; Egli, Christian; Kuhnis, Hans; and Schier, Oswald, to Ciba-Geigy Corporation. 4(2' Isoquinolin-1-one)piperidines. 4,029,795, Cl. 424-258.000.

Eimen, Shawn H.: *See—*
Swenson, Richard F.; Eimen, Shawn H.; and Gryga, John J., Jr., 4,029,283.

Eisenbahn-Verkehrsmittel AG: *See—*
Kramer, Rolf; and Schneider, Felix, 4,029,292.

Eisenberg, Sylvan, to Micro Tracers, Inc. Tracers. 4,029,820, Cl. 426-74.000.

Eitel, Fredrick G., to United Technologies Corporation. Pressure balanced cooled mirror with axially movable transfer tube assemblies. 4,029,400, Cl. 350-310.000.

Ekholm, Rolf, to A.B. Hammars Mekaniska Verkstad. Device for rotating pieces of lumber. 4,029,196, Cl. 198-413.000.

Elam, Edward U.: *See—*
Pond, David M.; Dickason, William C.; and Elam, Edward U., 4,029,670.

Elder, Joseph F. Lantern stove device attachment. 4,029,079, Cl. 126-258.000.

Eldridge, Albert M. Sun compass. 4,028,813, Cl. 33-270.000.

Electro-Therm, Inc.: *See—*
Skinner, Charles A., 4,029,896.

Electronic Engineering Company of California: *See—*
Gabrielian, Henry, 4,029,375.
Huntress, Charles B., 4,029,169.

Electroplating Engineers of Japan, Limited: *See—*
Higuchi, Kazuhiro; and Tezuka, Junichi, 4,029,564.
Tezuka, Junichi; and Ando, Takatoshi, 4,029,555.

Elger, Harald, to Siemens Aktiengesellschaft. Speed controllable drive for an asynchronous motor. 4,030,006, Cl. 318-197.000.

Elger, Walter: *See—*
Petzoldt, Karl; and Elger, Walter, 4,029,779.

Eli Lilly and Company: *See—*
Bornstein, Michael, 4,029,782.
Cise, Michael D., 4,029,655.
Debono, Manuel, 4,029,769.
Friedman, Henry; and Canada, Emily J., 4,029,671.
Gutowski, Gerald E.; and Miller, Jean C., 4,029,663.
Koppel, Gary A., 4,029,651.
Zimmerman, Dennis M.; and Marshall, Winston S., 4,029,796.

Eller, Robert E. Andiron for controlled burning of logs. 4,029,078, Cl. 126-298.000.

Elliott, James O.: *See—*
Buckle, Kenneth A.; Halsted, Edwin H.; and Elliott, James O., 4,030,008.

Elliott, James Robert Charles. *See—*
Floyd, John Francis Leslie; and Elliott, James Robert Charles, 4,028,846.

Elliott, Jennings W., to Schlumberger Technolgy Corporation. Methods and apparatus for recording well logging measurements. 4,030,064, Cl. 340-15.5DS.

Ellis, George W., to General Electric Company. Viden window control. 4,030,119, Cl. 358-11.000.

Ellis, James F.; and Walstrom, Peter L., to United States of America, Energy Research and Development Administration. Nonferromagnetic linear variable differential transformer. 4,030,085, Cl. 340-199.000.

Ellison, Lynn E., to Naeco Associates, Inc. Oil test method. 4,029,554, Cl. 204-1.00T.

Ellslager, William M.: *See—*
Carson, Malcolm E.; and Ellslager, William M., 4,029,511.

Elms, Robert James: *See—*
Gillemot, George W.; Gamero, Robert; Benavides, Augusto E.; and Elms, Robert James, 4,029,626.

Elrick, Donald E.; and Gilbert, Harry, to United States of America, Navy. Crosslinked carboxyl containing polymer and nitrocellulose as solid propellant binder. 4,029,529, Cl. 149-19.600.

Elser, Dieter: *See—*
Keller, Manfred; and Elser, Dieter, 4,029,124.

Emery Industries, Inc.: *See—*
Foulks, Harold C., Jr., 4,029,682.

Emery, Leonard W., to Atlantic Richfield Company. Well fracturing method. 4,029,148, Cl. 166-254.000.

Emodi, Alexander S.; Newmark, Harold Leon; and Scialpi, Leonard Joseph, to Hoffmann-La Roche Inc. Semisynthetic penicillins. 4,029,805, Cl. 424-271.000.

Endo, Noriyuki: *See—*
Imagawa, Tadao; and Endo, Noriyuki, 4,029,847.

Endriz, John Guiry, to RCA Corporation. Fluorescent discharge cold cathode for an image display device. 4,029,984, Cl. 313-96.000.

Endriz, John Guiry, to RCA Corporation. Flat image display device utilizing digital modulation. 4,030,090, Cl. 340-324.00M.

Engelfried, Otto; Kerb, Ulrich; Wiechert, Rudolf; Wachtel, Helmut, Palenschat, Dieter; Horowski, Reinhard; Paschelke, Gert; and Kehr, Wolfgang, to Schering Aktiengesellschaft. 18-Methyl-19-nor-20-ketopregnanes and process for the preparation thereof. 4,029,777, Cl. 424-242.000.

Engelstatter, Heinz, to Braun Aktiengesellschaft. Flash apparatus with flash terminating switch controlled by photosensor. 4,029,992, Cl. 315-156.000.

Enoki, Yoshio; and Ohshima, Nobumasa, to Matsushita Electric Industrial Co., Ltd. Method for preparing a photoconductive powder. 4,029,604, Cl. 252-501.000.

Environmental Research and Applications, Inc.: *See—*
Turk, Amos, 4,029,578.

Erb, Robert Allan, to Franklin Institute, The. Device for recording temperature minimums. 4,028,944, Cl. 73-356.000.

Erickson, Wayne E.: *See—*
Dille, William A.; and Erickson, Wayne E., 4,029,424.

Erismann, Oskar, to BBC Brown Boveri & Company Limited. Anchoring assembly for a machine base. 4,029,275, Cl. 248-25.000.

Erlandson, Paul M.: *See—*
Kerwin, Joseph E.; and Erlandson, Paul M., 4,029,033.

Ernest Scragg & Sons Limited: *See—*
Parker, Walter, 4,029,939.

Ervin, Guy, Jr., to Rockwell International Corporation. Method of producing metal nitrides. 4,029,740, Cl. 423-251.000.

Etablissement Public dit: Agence Nationale de Valorisation de la Recherche Anver: *See—*
Michelson, Adolf Micbael, 4,029,819.

Etudes et Recherches Industrielles et Metallurgiques - ERIM: *See—*
Dubois, Ernest, 4,029,496.

Eurosil G.m.b.H.: *See—*
Mnegen, Gerhard; and Tang, Edward Y., 4,028,879.

Evani, Syamalarao; and Corson, Frederick P., to Dow Chemical Company, The. Vinyl benzyl ethers and nonionic water soluble thickening agents prepared therefrom. 4,029,872, Cl. 526-303.000.

Evani, Syamalarao; and Corson, Frederick P., to Dow Chemical Company, The. Vinyl benzyl ethers and nonionic water soluble thickening agents prepared therefrom. 4,029,873, Cl. 526-303.000.

Evani, Syamalarao; and Corson, Frederick P., to Dow Chemical Company, The. Vinyl benzyl ethers and nonionic water soluble thickening agents prepared therefrom. 4,029,874, Cl. 526-304.000.

Evans, Gregory W.; and Caswell, Robert L., to Rockwell International Corporation. Character generating method and system. 4,029,947, Cl. 235-151.000.

Evans, Lee T., to Evans, Lee T.; and Evans, Luella. Foldable hand rail. 4,029,352, Cl. 296-23.00R.

Evans, Leslie Samuel; Markin, Trevor Leslie; Dell, Ronald Michael; and Montgomery, Albert George, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Industry in Her Britannic Majesty's Government of the. Electric cells. 4,029,858, Cl. 429-104.000.

Evans, Luella: *See—*
Evans, Lee T., 4,029,352.

Evert, Donald A.: *See—*
Beiter, Glenn A.; and Evert, Donald A., 4,030,131.

Ewing Engineering Company: *See—*
Bykowski, Michael J.; and Ewing, Lloyd, 4,029,575.

Ewing, Lloyd: *See—*
Bykowski, Michael J.; and Ewing, Lloyd, 4,029,575.

Exxon Research and Engineering Company: *See—*
Cahn, Robert P., 4,029,752.
Healy, Frank J.; and Geissler, Paul R., 4,029,717.
Kennedy, Joseph P., 4,029,866.
Li, Norman N.; and Cahn, Robert P., 4,029,744.
Wiese, Herbert K., 4,029,601.

F.E.I., Inc.: *See—*
Dillon, Jan J., 4,029,200.

F. G. Waide, Inc.: *See—*
Figlia, Anthony G., 4,028,805.

F. J. Littell Machine Company: *See—*
Johnson, Kenneth C., 4,029,251

Fa.Hans Grohe KG.: *See—*
Buzzi, Gunter, 4,029,121.

Fabio, Paul Frank; Lin, Yang-I; Lang, Stanley Albert, Jr.; and Tomcufcik, Andrew Stephen, to American Cyanamid Company. 2,3-Bis(4-alkyl-1-piperazinyl)quinoxalines. 4,029,788, Cl. 424-250.000.

Fahlgren, Tord, to ASEA Aktiebolag. Function generator. 4,030,039, Cl. 328-142.000.

Fahrbach, Gerhard: *See—*
Seiler, Erhard; Fahrbach, Gerhard; and Stein, Dieter, 4,029,720.

Fairchild Industries Inc.: *See—*
Kuby, Milton, 4,028,991.

Falk, Roland: *See—*
Nagel, Peter; Grau, Werner; Maier, Hermann; Wittkamp, Heinrich; Falk, Roland; and Willmann, Paul, 4,029,249.

Falk, Sidney, to Fort Lock Corporation. CB radio locking device. 4,028,913, Cl. 70-58.000.

Far Out Products Ltd.: *See—*
Stahl, Michael A., 4,028,915.

Farge, Daniel: *See—*
Berger, Christian; Farge, Daniel; Gros, Georges; Messer, Mayer Naoum; and Moutonnier, Claude, 4,029,781.

Farnand, Joseph Redmond; and Puddington, Ira Edwin, to Canadian Patents and Development Limited. Solids recovery from coal liquefaction slurry. 4,029,567, Cl. 208-8.000.

Farnia, Ken, to A. O. Smith Corporation. Gas burning apparatus. 4,029,451, Cl. 126-361.000.

Faroudja, Yves C. Video crispener. 4,030,121, Cl. 358-37.000.

Farrand Optical Co., Inc.: *See—*
Shenker, Martin, 4,029,396.

Fattori, Silvano: *See—*
Rossi, Enzo; Fattori, Silvano; and Imparato, Luigi, 4,029,586.

Faugeras, Pierre; Miquel, Pierre; and Robaglia, Michele, to Commissariat a l'Energie Atomique. Extraction of metals from sea nodules. 4,029,733, Cl. 423-21.000.

Fauran, Claude P.; Derme, Nicole; Raynaud, Guy M.; and Eberle, Jeannine, to Delalande S.A. 1-[2'-(α-Furoyl or α-thicnoyl)cth-1'-yl]-2-(4''-cinnamyl piperazin-1''-yl methyl)benzimidazoles and method of using same. 4,029,789, Cl. 424-250.000.

Fauran, Claude P.: *See—*
Raynaud, Guy M.; Pourrias, Bernard M.; Fauran, Claude P.; and Turin, Michel J., 4,029,650.

Faust, Robert C., to Will Ross, Inc. Tracheostomy and endotracheal units. 4,029,105, Cl. 128-351.000.

Fecker, Josef; and Memminger, Gustav, to Gustav Memminger Verfahrenstechnik fuer die Maschenindustrie, Firma. Inclined pin wheel for yarn storage drum. 4,028,911, Cl. 66-132.00R.

Federal Business Products, Inc.: *See—*
Neill, Jimmie D.; and Wise, Lester V., 4,029,341.

Federal Paper Board Company, Inc.: *See—*
Manizza, Guelfo A., 4,029,204.

Fellows, Mark W., to North American Philips Corporation. Electric discharge lamp with voltage multiplier circuit having a capacitance which changes with temperature. 4,029,989, Cl. 315-51.000.

Feng, Bai-Cwo; and Lechaton, John S., to International Business Machines Corporation. Forming feedthrough connections for multilevel interconnections metallurgy systems. 4,029,562, Cl. 204-192.0EC.

Ferag AG: *See—*
Reist, Walter, 4,029,310.

Ferluga, Benjamin A. Micro-precision timed firing handgun. 4,028,994, Cl. 89-161.000.

Fernandez Brana, Miguel: *See—*
Martinez Roldan, Cristobal; Fernandez Brana, Miguel; and Castellano Berlanga, Jose Maria, 4,029,807.

Ferrari, Alain; and Suppa, Vito, to Thomson-CSF. Cooling device for components which dissipate large amounts of heat. 4,029,141, Cl. 165-80.000.

Ferrari, Giorgio: *See—*
Casagrande, Cesare; and Ferrari, Giorgio, 4,029,664.

Fetter, Edward Joseph: *See—*
Burkhard, Herbert; Hsu, Nelson Nae-Ching; and Fetter, Edward Joseph, 4,029,624.

Feurstein, Ludwig J.; Meives, Otis E.; and Scholk, Roger E., to Pemco, Inc. Automatic indexing and transferring apparatus. 4,029,194, Cl. 198-358.000.

Fex, Hans Jacob; Hogberg, Knut Bertil; and Konyves, Imre, to Aktiebolaget Leo. Cortical steroid nitrogen mustard compositions and treatment therewith. 4,029,778, Cl. 424-243.000.

Fiberglas Canada Limited: *See—*
Lacon, John W., 4,029,461.

Fichtel & Sachs A.G.: *See—*
Butz, Hans, 4,029,179.

Fickler, Hans; and Frankhauser, Walter, to Aktiengesellschaft Fur Rationelle Verpackung. Packaging receptacle for printed boards. 4,029,208, Cl. 206-454.000.

Ficberg, Russell F. Contact retention test tool. 4,028,812, Cl. 33-169.00B.

Fifield, Loretta Alice. Urine drainage apparatus. 4,029,099, Cl. 128-295.000.

Figlia, Anthony G., to F. G. Waide, Inc. Can opener. 4,028,805, Cl. 30-403.000.

Findlay, John William Addison: *See—*
Tovey, Keith Charles; and Findlay, John William Addison, 4,029,880.

Fink, Hans-Ferdi; Koerner, Gotz; and Rossmy, Gerd, to Th. Goldschmidt AG. De-emulsifier for breaking petroleum emulsions. 4,029,596, Cl. 252-329.000.

Finley, Joseph H., to FMC Corporation. Dextrin carboxylates and their use as detergent builders. 4,029,590, Cl. 252-89.00R.

Firester, Arthur Herbert, to RCA Corporation. Prealigned laser mount and method of making same. 4,030,046, Cl. 331-94.50D.

Firmenich S.A.: *See—*
Demole, Edouard, 4,029,106.
Demole, Edouard P., 4,029,107.

Firmenkh SA: *See—*
Demole, Edouard P., 4,029,108.

Fischer, Artur. Method and arrangement for mounting an object at a distance from a support structure. 4,028,857, Cl. 52-309.200.

Fischer, Lorenz, to Sermem S.A. Tubing means for roller pump. 4,029,441, Cl. 417-477.000.

Fischer, Wilfried; Haar, Wilhelm; Kleinschmager, Herbert; and Weddigen, Gert, to Brown, Boveri & Cie. A.G. Electrochemical storage cell or battery. 4,029,857, Cl. 429-104.000.

Fish, Franklin H.; and Katz, Rodney S., to United States of America, Navy. Amplifier for fiber optics application. 4,029,976, Cl. 307-311.000.

Fisher, David G.; and Gladden, Robert G., to Dayco Corporation. Endless power transmission belt drive system. 4,028,955, Cl. 74-234.000.

Fisher, Edwin P.; and Johnson, Robert B., to Honeywell Information Systems, Inc. Substrate bias voltage generated from refresh oscillator. 4,030,084, Cl. 340-173.00R.

Fisher, Ronald: *See—*
Weaver, John Victor; and Fisher, Ronald, 4,029,829.

Fishwick, Brian Ribbons: *See—*
Boyd, Violet; Fishwick, Brian Ribbons; and Glover, Brian, 4,029,469.

Fisons Corporation: *See—*
Bianculli, Virgil D., 4,029,797.

Fisons Limited: *See—*
Augstein, Joachim; Cairns, Hugh; Hunter, Dennis; and King, John, 4,029,802.
Collington, Kenneth Thomas, 4,029,612.
Kingsley, Patrick John, 4,029,761.

Fiss, Robert A., to International Telephone and Telegraph Corporation. Overspeed brake for a lift car. 4,029,177, Cl. 187-89.000.

Fitzpatrick, Timothy Allen, to Du Pont de Nemours, E. I., and Company. Mist scrubbing of waste halide effluent. 4,029,484, Cl. 55-71.000.

Flexsteel Industries, Inc.: *See—*
Quakenbush, Howard M., 4,029,303.

Florence, Judit Katalin; and Rohner, Michel Alexandre, to Singer Company, The. Multistage sorter having pushdown stacks for arranging an input list into numerical order. 4,030,077, Cl. 340-172.500.

Flow Industries, Inc.: *See—*
Olsen, John H., 4,029,440.

Flower, Alva E. Clamper fishhook. 4,028,838, Cl. 43-43.160.

Floyd, John Francis Leslie; and Elliott, James Robert Charles. Plant treatment. 4,028,846, Cl. 47-57.500.

FMC Corporation: *See—*
Berkowitz, Sidney, 4,029,660.
Finley, Joseph H., 4,029,590.
Nelson, Seddon C., 4,029,460.

Foldes, Peter, to RCA Corporation. Multimode coupling system including a funnel-shaped multimode coupler. 4,030,048, Cl. 333-6.000.

Folk, Craig L.: *See—*
Kotter, James I.; and Folk, Craig L., 4,028,872.

Fonda-Bonardi, Giusto. Short subsonic diffuser for large pressure ratios. 4,029,430, Cl. 415-53.00R.

Fonderie et Ateliers de Mersch S.A.: *See—*
Hartmann, Ewald; and De Bliek, Hendrik, 4,029,296.

Forberg, Helge O.: *See—*
Stevens, Douglas; Forberg, Helge O.; Jennings, Larry D.; Thompson, David L.; and Copenhaver, Julian V., 4,029,737.

Ford Industries, Inc.: *See—*
Clarridge, Glenn E., 4,029,269.

Ford Motor Company: *See—*
Allison, William D., 4,028,784
Stockton, Thomas R., 4,028,965.

Forni, Lucio; and Invernizzi, Renzo, to Societa' Italiana Resine S.I.R. S.p.A. Process for the dimerization or co-dimerization of linear olefins and catalysts therefore. 4,029,719, Cl. 260-683.15R.

Forster, Denis; Hershman, Arnold; and Morris, Donald E., to Monsanto Company. Iridium carbonyl complexes. 4,029,748, Cl. 423-418.000.

Fort, Jack Bernard: *See—*
Krantz, Leonard Albert, Jr.; and Fort, Jack Bernard, 4,029,386.

Fort Lock Corporation: *See—*
Falk, Sidney, 4,028,913.

Foster, Colin E.; and Karp, Edward C., to Sanitary Scale Company. Digital scale. 4,029,161, Cl. 177-25.000.

Foulks, Harold C., Jr., to Emery Industries, Inc. Soaps and ester-soaps of α-olefin derived high molecular weight acids. 4,029,682, Cl. 260-414.000.

Fox, Anthony E.; and Bargellini, Marcello, to Massey-Ferguson Inc. Exhaust system. 4,029,167, Cl. 180-64.00A.

Fox, David A.; and Roof, James L., to Westinghouse Electric Corporation. Ramping circuit. 4,029,972, Cl. 307-228.000.

Fozzard, George B., to Phillips Petroleum Company. Process for obtaining high purity perfluoro-n-heptane. 4,029,552, Cl. 203-69.000.

Frahm, Carl E.; and Frahm, Shirley E. Stackable carrying case. 4,029,209, Cl. 206-510.000.

Frahm, Shirley E.: *See—*
Frahm, Carl E.; and Frahm, Shirley E., 4,029,209.

Frank, Stanley L.; and Dobrosielski, Stephen S., to Westinghouse Electric Corporation. Contact block interlock for electric switch. 4,029,924, Cl. 200-307.000.

Frankhauser, Walter: *See—*
Fickler, Hans; and Frankhauser, Walter, 4,029,208.

Franklin Institute, The: *See—*
Erb, Robert Allan, 4,028,944.

Franks, Aud J.; and Hawkins, Harold E., to Henry, Patrick F., Sr. Method and apparatus for tufting high and low cut pile in the same row. 4,029,029, Cl. 112-79.00R.

Franseen, Richard E.: *See—*
Bedell, Robert J.; and Franseen, Richard E., 4,030,125.

Frantz, Lanier, to Graham-White Sales Corporation. Pneumatic compactor for particulate desiccant. 4,029,486, Cl. 55-218.000.

Franzmeier, Alvin W. Rain gutter attachment. 4,028,895, Cl. 61-14.000.

Frechette nee Bussieres, Jeannette. Boiler construction. 4,029,057, Cl. 122-149.000.

Fredberg, Marvin I., to United States of America, Navy. Bonding material for planar electronic device. 4,029,628, Cl. 260-32.80R.

Fredensberg, Fred F.: *See—*
Houghton, George L.; and Fredensberg, Fred F., 4,028,802.

Freeman, Gerald C.: *See—*
Canevari, Louis T.; Coppola, Vincent G.; Dlugos, Daniel F.; Freeman, Gerald C.; and Manduley, Flavio M., 4,030,070.

Freese, Gary P., to Caterpillar Tractor Co. Material pushing vehicle having pivotal blade portion. 4,029,157, Cl. 172-801.000.

Freiburger, Thomas William, to Deere & Company. Winch clutch pressure reducing valve and lubrication system. 4,029,189, Cl. 192-113.00B.

Freidlina, Rakhil Khatskelevna; Vasilieva, Tamara Trofimovna; Velichko, Felix Kazimirovich; and Terentiev, Alexandr Borisovich. Process for the production of even series ω-amino acids. 4,029,700, Cl. 260-534.00R.

French, Gordon B., to Occidental Oil Shale, Inc. Method of recovering oil and water from in situ oil shale retort flue gas. 4,029,360, Cl. 299-2.000.

French, Park, to Sterndent Corporation. Light probe and interface therefor. 4,029,391, Cl. 350-96.00C.

Fricke, Roy A. Sparkplug cleaner. 4,028,851, Cl. 51-412.000.

Fried, Henry B. Watch jeweling tool. 4,028,967, Cl. 81-7.000.

Fried, Krupp Gesellschaft mit beschrankter Haftung: *See—*
Diehl, Reiner; and Lutkemeyer-Hohmann, Margitta, 4,030,062.

Friedman, Henry; and Canada, Emily J., to Eli Lilly and Company. 3-[(5-nitro-2-imidazolyl)pyrazol-5-yl]oxamic acid derivatives. 4,029,671, Cl. 260-310.00R.

Friedman, Mendel: *See—*
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Froberg, Magnus L.; and Hohman, Charles M., to Owens-Corning Fiberglas Corporation. Method of and apparatus for melting of glass. 4,029,489, Cl. 65-136.000.

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Frost, Richard H.; and Criley, Ronald L., to Frost Engineering Development Corporation. Actuating mechanism for seat restraint divestment system. 4,028,948, Cl. 74-2.000.

Fruehauf Corporation: *See—*
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Fuji Xerox Co., Ltd.: *See—*
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Fujikawa, Kanichi; Takahashi, Ryohei; Yokomichi, Isao; Kimura, Fumio; Kaji, Takeo; and Sakashita, Nobuyuki, to Ishihara Sangyo Kaisha Ltd. Method of tobacco sucker inhibition. 4,029,490, Cl. 71-78.000.

Fujikura Cable Works, Ltd., The: *See—*
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Fujino, Takashi: *See—*
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Nakashio, Seizo; Tsuji, Kozo; Toyota, Nobuhiro; and Fujita, Fumio, 4,029,886.

Fujiwhara, Mitsuto; and Sato, Ryosuke, to Konishiroku Photo Industry Co., Ltd. Diffusible-dye releasing type dyes which couple to form colorless products. 4,029,503, Cl. 96-29.00D.

Fukai, Masakazu: *See—*
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Fukazawa, Nobuo: *See—*
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Gabriel, Leo A.: *See—*
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Gabrielian, Henry, to Electronic Engineering Company of California. Miniature electrical connector. 4,029,375, Cl. 339-17.00M.

Gabrio, Anthony L.: *See—*
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Gabrio, Iris G-S: *See—*
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Galanos, Chris; Luderitz, Otto; and Westphal, Otto, to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V. Lipid A-preparation. 4,029,762, Cl. 424-87.000.

Gallant, Gerald G., Jr.: *See—*
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Ganley, Thomas J.; and Cronin, Eamon P. Rotary engine. 4,028,885, Cl. 60-39.750.

Garcia, Gilbert. Support stand assembly. 4,029,347, Cl. 289-18.000.

Gardiner, Frank J. Hygrometer. 4,028,942, Cl. 73-335.000.

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Gatzi, Karl; and Hoegerle, Karl, to Ciba-Geigy Corporation. Amino containing isonicotinic acid derivatives. 4,029,785, Cl. 424-248.530.

Gavrilovic, Dragan Milan; and Ross, Daniel Louis, to RCA Corporation. Novel liquid crystal compounds and electro-optic devices incorporating them. 4,029,594, Cl. 252-299.000.

Gavrilovic, Dragan Milan: *See—*
Ross, Daniel Louis; and Gavrilovic, Dragan Milan, 4,029,595.

Gay, Eddie C.: *See—*
Vissers, Donald R.; Shimotake, Hiroshi; Gay, Eddie C.; and Martino, Fredric J., 4,029,860.

Gazza, George E.; and Dutta, Sunil K., to United States of America, Army. Transparent ultrafine grained ceramics. 4,029,755, Cl. 423-600.000.

Gedeon, Anthony A. Muzzle velocity chronograph. 4,030,097, Cl. 343-8.000.

Gee, Thomas A., to Eaton Corporation. Tubular wheel speed sensor for an anti-skid system. 4,029,180, Cl. 188-181.00R.

Gehrke, Gunter; and Schmitz, Reinold, to Bayer Aktiengesellschaft. Process for the preparation of diamino-dihydroxy anthraquinone disperse dyestuffs. 4,029,680, Cl. 260-380.000.

Geigel, Alfred Antonio; and LaMarche, Robert Ernest, to Bell Telephone Laboratories, Incorporated. Common control digital echo suppressor. 4,029,912, Cl. 179-170.200.

Geissler, Paul R.: *See—*
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Micheli, Adolph L.; and Dungan, Dennis F., 4,029,472.
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Miller, Harvey E., 4,028,797.
Genest, Earl Wilfred. Fish handling apparatus. 4,029,050, Cl. 119-5.000.
Genini, Graziano, to Albatex A.G. Weft yarn gripping element for looms. 4,029,130, Cl. 139-196.200.
Genshpring, Eduard Matveevich; Bljumshtein, Zigmund Genrikhovich; Maev, Veniamin Evnovich; Bondarenko, Fedor Alexeevich; Gutman, Anatoly Lvovich; and Presman, Vladimir Alexandrovich. Blockage indicator for internal combustion engine air cleaner element. 4,029,041, Cl. 116-114.0AE.
George, Harvey F.; Shah, Jitendra N.; and Oppenheimer, Robert H., to Gravure Research Institute, Inc. Wrap around gravure printing apparatus. 4,029,013, Cl. 101-382.0MV.
George, John A.; and Nixon, Donald R., to United States of America, Energy Research and Development Administration. Pump tank divider plate for sump suction sodium pumps. 4,029,123, Cl. 137-565.000.
George, Paul J.; and Raptes, M. Ted. Garment hanger. 4,029,240, Cl. 223-96.000.
Georgia-Pacific Corporation: *See—*
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German, William H. Ship's hull and method of bubbling hot gas therefrom. 4,029,035, Cl. 114-67.00A.
Gerrish, Arthur, to Laser Engineering Development Ltd. Pile driving apparatus. 4,029,158, Cl. 173-131.000.
Gerrits, Theodorus Petrus Hubertus, to Brouwer Turf Equipment Limited. Sod cutting machine with oppositely reciprocating undercutting and side cutting knives. 4,029,152, Cl. 172-19.000.
Gershbein, George. Indoor-outdoor toilet for small animals. 4,029,048, Cl. 119-1.000.
Gerstine, Milton I.; Futatsugi, Setsuo; Ueda, Kazuo; Seo, Ryozo; Iwasaki, Koji; and Uemura, Makoto, to Boeing Company, The; and Kawasaki Jukogyo Kabushiki Kaisha. Speed control device for moving objects. 4,029,946, Cl. 235-150.200.
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Giammattei, Guy. Fuel induction system for internal combustinn engine. 4,029,067, Cl. 123-136.000.
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Gillemot, George W.; Gamero, Robert; Benavides, Augusto E.; and Elms, Robert James, to Communications Technology Corporation; and Thompson, John T., part interest to each. Polyurethane composition having easy-reentry property. 4,029,626, Cl. 260-31.600.
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Gillette Company, The: *See—*
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Gingold, Albert; and Upchurch, Charles E., to Upchurch, Charles E. Fogging device for cooling a condenser coil. 4,028,906, Cl. 62-183.000.
Giorcelli, Silvano, to Centro Studi e Laboratori Telecomunicazioni. System for checking two data processors operating in parallel. 4,030,074, Cl. 364-200.000.
Giras, Theodore C.; Mendez, William E., Jr.; and Smith, Jack R., to Westinghouse Electric Corporation. Electric power plant having a multiple computer system for redundant control of turbine and steam generator operation. 4,029,952, Cl. 235-151.210.
GKN Birwelco Limited: *See—*
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Glasl, Andreas; and Murrmann, Helmuth, to Siemens Aktiengesellschaft. Method of producing a doped zone of a given conductivity type in a semiconductor body. 4,029,527, Cl. 148-187.000.
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Glomski, Norman J., to Heil Co., The. Safety apparatus for hydraulic valves in dump body mechanisms. 4,029,359, Cl. 298-22.00C.
Gloriod, Pierre; and Machon, Jean Pierre, to Societe Chimique des Charbonnages-CdF Chimie. Radical polymerization of ethylene in the presence of cyclic olefin. 4,029,875, Cl. 526-308.000.
Glover, Brian: *See—*
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Goebel, Paul, to Hoechst Aktiengesellschaft. Polymerization reactor with gilled-tube radiator and axial agitator. 4,029,143, Cl. 165-109.000.
Goffe, William L., to Xerox Corporation. Imaging system containing agglomerable material. 4,029,502, Cl. 96-1.0PS.
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Goodman, Sidney R. Integrated record control system and method. 4,029,342, Cl. 282-29.00B.
Goodsell, Earl M., Jr., to A-T-O Inc. Sprinkler. 4,029,150, Cl. 169-39.000.
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Gordon, Gerald M.; and Cowan, Robert L., II, to General Electric Company. Nuclear fuel elements having a composite cladding. 4,029,545, Cl. 176-82.000.
Gordon, John Ashley, to National Research Development Corporation. Position indicator. 4,029,899, Cl. 178-19.000.
Gordon, Robert L., to International Paper Company. Carrier carton. 4,029,207, Cl. 206-427.000.
Gorniak, Jerry. Solar energy collector. 4,029,077, Cl. 126-271.000.
Goto, Kenji; and Sawada, Daisaku, to Toyota Jidosha Kogyo Kabushiki Kaisha. Igniting apparatus for internal combustion engines. 4,029,072, Cl. 123-191.00S.
Goto, Tsugio, to Asahi Kasei Kogyo Kabushiki Kaisha. Apparatus for the treatment of yarn thickness variation signals. 4,030,082, Cl. 340-173.00R.
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Groth, Glenn F., to Sun Unlimited Research Corporation. Solar energy collector. 4,029,258, Cl. 237-1.00A.
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Gutowski, Gerald E.; and Miller, Jean C., to Eli Lilly and Company. Dimeric anhydro-vinca derivatives. 4,029,663, Cl. 260-287.00B.
Guy, Billy Lynn. Pressure gauge. 4,028,936, Cl. 73-146.800.
Guyton, William Cecil. Waxed dental textile material and method of preparing and using the same. 4,029,113, Cl. 132-91.000.
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Haar, Wilhelm: *See—*
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Haas, Gerhard J.; and Berg, Jeffrey H., to General Foods Corporation. Sweetening with hydrohalide salts of dipeptide sweeteners. 4,029,701, Cl. 426-548.000.
Habiger, Cyril W.; and Hopkins, Donald L., to Caterpillar Tractor Co. Piston pump assembly utilizing load pressure control. 4,028,890, Cl. 60-443.000.
Hackett, Robert D., to McDonnell Douglas Corporation. Passive chamber wall fragmenter. 4,028,886, Cl. 60-245.000.
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Hafele, Walter; and Kleeberger, Rudolf, to Robert Bosch G.m.b.H. Fuel supply pump. 4,029,069, Cl. 123-139.00R.
Hafner, Leonhard; Schramm, Wilhelm; Kargl, Hans; and Kieser, Friedrich, to Hoechst Aktiengesellschaft. Process for the simultaneous obtention of insulin and pancreatin from swine pancreases. 4,029,641, Cl. 260-112.700.
Haga, Kyosuke, to Toyoda-Koki Kabushiki Kaisha. Numerical control system for machines utilizing a programmable sequence controller. 4,029,950, Cl. 235-151.110.
Hagen, Magnus F. Method and means for operably interconnecting movable parts. 4,028,949, Cl. 74-25.000.
Hagopian, Erivan; and Morgan, Allan Clark, to Cabot Corporation. Carbon black-rubber masterbatch production. 4,029,633, Cl. 260-42.550.
Hague International Corporation: *See—*
LaHaye, Paul G.; Bjerklie, John W.; and Gallant, Gerald G., Jr., 4,029,465.
Hahne, Asger K. Service indicating device. 4,028,831, Cl. 40-130.00K.
Haile, Ernest. Frame for convex mirror. 4,029,399, Cl. 350-293.000.
Haimerl, Dennis J. Convertible ski binding. 4,029,336, Cl. 280-614.000.
Hajdu, Johann: *See—*
Blum, Arnold; Hajdu, Johann; Mohr, Claus Erich; Reichl, Leopold; and Sonntag, Guentber, 4,030,076.
Hall, Robert T.: *See—*
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Halsted, Edwin H.: *See—*
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Halsted, Edwin Howe, to General Motors Corporation. Single phase alternating current motor dual speed control circuit. 4,030,009, Cl. 318-221.00R.

Hamada, Masa: *See—*
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Hamai, Tatsuro: *See—*
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Hamilton, Thomas Allan. Generalized operational amplifier. 4,030,043, Cl. 330-30.00D.
Hamilton, William W.: *See—*
Kotala, James R.; and Hamilton, William W., 4,029,379.
Hammond, Walter J., to McCulloch Corporation. Chain saw with throttle control. 4,028,804, Cl. 30-382.000.
Hampl, Edward F., Jr., to Minnesota Mining and Manufacturing Company. Thermoelectric generators that incorporate self-segmenting thermoelectric legs. 4,029,520, Cl. 136-205.000.
Hanaki, Kimiyasu: *See—*
Morishima, Yukimasha; Yoshida, Minoru; and Hanaki, Kimiyasu, 4,029,300.
Hanemann, Horst J.: *See—*
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Hanft, Herbert: *See—*
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Hanks, Fletcher. Apparatus for dredging from the stern of marine vessels. 4,028,821, Cl. 37-55.000.
Hanks, Jack G.: *See—*
Cotton, John F.; Hanks, Jack G.; and Wien, Raymond E., 4,030,053.
Hannart, Jean Alfred Alphonse Joseph, to Omnium Chimique Societe Anonyme. N-disubstituted aminoethyl esters of 11-methoxy-raubasinic acid. 4,029,659, Cl. 260-247.20B.
Hannemann, Robert E.: *See—*
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Hannesen, Kurt: *See—*
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Hansen GmbH KG: *See—*
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Harbert, Donald Duane, to RCA Corporation. Received signal selecting system. 4,030,040, Cl. 328-154.000.
Harding, John Patrick; and Butler, David Sydney, to Post Office, The. Electrical connectors. 4,029,383, Cl. 339-97.00R.
Hargis, Charles W., to Eastman Kodak Company. Preparation of n-alkylated aromatic amines. 4,029,707, Cl. 260-577.000.
Harnischfeger Corporation: *See—*
Price, Lester A.; and Nash, James N., 4,030,007.
Harper, Laffie. Helical pipe lock seam. 4,029,129, Cl. 138-135.000.
Harrington, Cecil F.; Johnson, James M.; and Prince, Howard T., to Procter & Gamble Company, The. Abrasive seed defiberization. 4,028,852, Cl. 51-206.00R.
Harris, Gary R.: *See—*
Sweeney, William T.; Keller, Dennis F.; Harris, Gary R.; and Armstrong, Calvin N., 4,028,940.
Harris, Gloria W., to Raymond Lee Organization, Inc., The, a part interest. Self-adjusting eyeglasses. 4,029,403, Cl. 351-121.000.
Harris, John L.; and Nelson, Bror H., to Aluminum Company of America. Packaging clamp and method. 4,028,862, Cl. 53-3.000.
Harris, Peter John, to GKN Birwelco Limited. Heat exchanger assemblies. 4,029,144, Cl. 165-124.000.
Hart, Wallace F.; and Knenig, Ralph A., to John Zink Company. Corrugated sheet heat exchanger. 4,029,146, Cl. 165-166.000.
Hartman, Marvis E.; Hockswender, Thomas R.; Dowbenko, Rostyslaw; and Christenson, Roger M., to PPG Industries, Inc. Reaction products of a polyepoxide with a thiol having a group hydroyzable to carboxyl, and aqueous solubilized products. 4,029,621, Cl. 260-29.2EP.
Hartmann, Ewald; and De Bliek, Hendrik, to Fonderie et Ateliers de Mersch S.A.; and Clouth Gummiwerke AG. Diaphragm valve arrangement. 4,029,296, Cl. 251-331.000.
Hartness, Robert G.: *See—*
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Hartness, Thomas P.; and Hartness, Robert G. Guide apparatus for an article conveying machine. 4,029,195, Cl. 198-399.000.
Hartung, Kuhn & Co. Maschinenfabrik GmbH: *See—*
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Hattori, Tatsuo; Katsuragawa, Kanzi; Kihara, Keiichi; Ono, Isao; and Tamabayashi, Hanzo, to Toyo Soda Manufacturing Co., Ltd. Process for producing ammonium aromatic sulfonate. 4,029,640, Cl. 260-79.3MU.
Hauck, Frederic P.; Cimarusti, Christopher M.; and Narayanan, Venkatachala L., to E. R. Squibb & Sons, Inc. Esters of tetrahydronaphthyloxy-aminopropanols. 4,029,676, Cl. 260-343.700.
Hauge, Douglas O. Phosphoric acid manufacture. 4,029,743, Cl. 423-320.000.
Haugh, Charles E.: *See—*
Mrenna, Stephen A.; Haugh, Charles E.; and Thomas, Glenn R., 4,030,060.
Hauser, Hans; and Jones, Ronald N., to J. B. Foote Foundry Co., The. Transmission shift mechanism. 4,028,960, Cl. 74-477.000.
Hausman, Jack. Educational game apparatus and teaching system. 4,029,320, Cl. 273-134.0AD.
Hawes, Roland C. Sample-background-signal autocancellation in fluid-sample analyzers. 4,029,416, Cl. 356-51.000.
Hawkins, Harold E.: *See—*
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Hawkins, Kenneth G., to General Electric Company. Apparatus for making a copper-aluminum transition joint. 4,029,252, Cl. 228-3.100.
Hawthorne, Harold E.: *See—*
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Hayashibara Biochemical Laboratories, Incorporated: *See—*
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Nakashio, Seizo; Tsuji, Kozo; Toyota, Nobuhiro; and Fujita, Fumio, 4,029,886.
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Headington, Edward E.; Tutko, Albert J.; and Knickerbocker, Robert H., to Siemon-Dynamic Manufacturing Co., The; Bell Telephone Laboratories, Incorporated; and Western Electric Company, Inc. Bridging clip assembly and cover therefor. 4,029,376, Cl. 339-19.000.
Headley, David B., to General Motors Corporation. Twin trailing link rear suspension system. 4,029,338, Cl. 280-725.000.
Healy, Frank J.; and Geissler, Paul R., to Exxon Research and Engineering Company. Simulated moving bed adsorption-desorption process for paraxylene recovery. 4,029,717, Cl. 260-674.0SA.
Hebert, Jacques J.: *See—*
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Hechler, Valentine, IV. Multi-stage solution proportioner dispenser. 4,029,299, Cl. 259-4.00R.
Hecker, Gerhard Ernst; Klose, Heinrich Peter; and Muller, Wilfried Friedrich Heinrich, to Jenoptik Jena G.m.b.H. Apparatus for controlling a photogrammetrical camera. 4,030,109, Cl. 354-68.000.
Hedgcoth, Virgle L.: *See—*
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Hehr, Herbert. Stone gatherer with discharge conveyor. 4,029,151, Cl. 171-65.000.
Heiba, El-Ahmadi I.: *See—*
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Heil Co., The: *See—*
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Heinerichs, Donald W.: *See—*
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Heiser, Richard S.; and Scott, Anthony I., to Westinghouse Electric Corporation. System for operating a steam turbine with bumpless digital megawatt and impulse pressure control loop switching. 4,029,255, Cl. 235-151.210.
Helburger, Josef: *See—*
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Heller, William C., Jr.: *See—*
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Helting, Torsten Bertil, to Behringwerke Aktiengesellschaft. Derivatives of the tetanus toxin, process for their preparation and agents containing them. 4,029,765, Cl. 424-92.000.
Helting, Torsten Bertil, to Behringwerke Aktiengesellschaft. Protective antigen from pertussis, process for its preparation and products containing this antigen. 4,029,766, Cl. 424-92.000.
Henderson, Timothy M.; and Wuttke, Gilbert H., to KMS Fusion, Inc. Sensors for low temperature application. 4,028,941, Cl. 73-339.00R.
Hendrick, Russell C.; and Larson, John C., to Honeywell Inc. Multimode control systems. 4,030,011, Cl. 318-561.000.
Henrickson, Gary C.; and McDonald, John C., to TRW Inc. Redundant message metering network. 4,030,069, Cl. 340-147.0SC.
Henry, Patrick F., Sr.: *See—*
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Henry, William P. Plastic blousing block. 4,028,741, Cl. 2-232.000.
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Herko, Joseph Michael; and Joyce, James Maurice, to International Business Machines Corporation. Pulse width modulated voltage regulator-converter/power converter having push-push regulator-converter means. 4,030,015, Cl. 321-2.000.
Hermann, Ferdy E.: *See—*
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Herpich, William A.; Palmer, George W.; and Pittenger, Francis H., to Peabody International Corporation. Tailgate for a rear loading refuse vehicle. 4,029,224, Cl. 214-83.300.
Herrick, George A. Cleaning and sanitizing apparatus. 4,029,260, Cl. 239-282.000.
Herrington, Rodney E.; and Taylor, Carol O., to Texas Instruments Incorporated. Adjustable-Joule-Thomson cryogenic cooler with downstream thermal compensation. 4,028,907, Cl. 62-222.000.
Herrmann, William H.: *See—*
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Hertel, Terry J. Ski hot wax applicator. 4,029,046, Cl. 118-202.000.
Herterich, Walter; and Probst, Georg, to Ecofon Verkaufsgesellschaft Probst KG. Auxiliary transporting device. 4,029,328, Cl. 280-47.240.
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Hickey, Christopher Daniel Dowling. Sealing together of flexible sheets. 4,028,853, Cl. 52-2.000.
High Temperature Engineers Limited: *See—*
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Higuchi, Kazuhiro; and Tezuka, Junichi, to Electroplating Engineers of Japan, Limited. High speed plating device for rectangular sheets. 4,029,564, Cl. 204-224.00R.
Higuchi, Masaaki, to Nippon Kokan Kabushiki Kaisha. Cooling box for metallurgical furnace. 4,029,053, Cl. 122-6.500.
Hill, David George: *See—*
Curran, Adrian Charles Ward; Crossley, Roger; and Hill, David George, 4,029,668.
Hill, Robert S.; and Herwig, Lewis F., to Wurlitzer Company, The. Sostenuto piano action. 4,028,980, Cl. 84-218.000.
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Hillier, Albert John. Fish barrier. 4,029,049, Cl. 119-3.000.
Hillier, James, to RCA Corporation. Record protection system. 4,030,138, Cl. 360-135.000.
Hindman, Thomas Wayne, Sr.: *See—*
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Hinkle, Stanley J., to General Motors Corporation. Turbocharged two-cycle engine with positive blower and internally mounted aftercooler. 4,028,892, Cl. 60-599.000.
Hiraga, Kentaro; Okutani, Tetsuya; Yoshioka, Kouichi; and Asako, Tsunehiko, to Takeda Chemical Industries, Ltd. Dehydroxylation of aminosugars. 4,029,883, Cl. 536-17.000.
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Hirayama, Yoshiro. Process for recovering a heavy metal catalyst component from a spent catalyst. 4,029,495, Cl. 75-10.00R.
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Ho Chang, Shung; and Regnier, Frederick E., to Purdue Research Foundation Chromatographic supports and methods and apparatus for preparing the same. 4,029,583, Cl. 210-502.000.
Hobart Corporation: *See—*
Krolick, James J., deceased; and Boshinski, Edwin E., 4,029,162.
Hobson, Lloyd L. Lift blade apparatus. 4,029,229, Cl. 214-654.000.
Hoch, Norris R., to Jeff-Ko Manufacturing Co., Inc. Truck body closure. 4,029,356, Cl. 296-137.00B.
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Barlow, George J., 4,030,075.
Fisher, Edwin P.; and Johnson, Robert B., 4,030,084.
Howell, Thomas H.; Gregg, Gordon E.; and Rabins, Leonard, 4,030,067.
Hong, Se J.; and Ostapko, Daniel L., to International Business Machines Corporation. Changeable decoder structure for a folded logic array. 4,029,970, Cl. 307-207.000.
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Huck, Gerald N. Portable toilet. 4,028,746, Cl. 4-10.000.
Huddle, Carl Frederick, to Tension Structures Co.; and Vredevoogd, Jon D., part interest to each. Erection method for a vaulted membrane structure. 4,028,861, Cl. 52-745.000.
Huebscher, Richard G.; Sobecks, Ronald S.; and Birli, Joseph A., to Gould Inc. Electric heater assembly. 4,029,941, Cl. 219-511.000.
Hufton, Austen B., to Servicemaster Industries Inc. Sign. 4,028,827, Cl. 40-128.000.
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Hunter, Lee; and Jasso, Joseph J., 4,029,369.
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Hunter, Norman R.; Rooney, Clarence S.; Rokach, Joshua; and Cragoe, Edward J., Jr., to Merck & Co., Inc. Method of treatment with 2-iminothiazolidines and thiazolines. 4,029,803, Cl. 424-270.000.
Huntress, Charles B., to Electronic Engineering Company of California. Acoustic yoke. 4,029,169, Cl. 181-135.000.
Hurley, Rupert B.; Eastwood, Frederick B.; and Mann, Joe A., to Dow Badische Company. Nonoxidative process for purifying aqueous inorganic salt solutions employed in the wet spinning of filamentary vinyl polymers. 4,029,725, Cl. 264-38.000.
Hurt, William S., to Rohm and Haas Company. O,S-dialkyl O -phenylthio-phenyl phosphorothiolates/phosphorodithioates and their derivatives and pesticidal use. 4,029,774, Cl. 424-216.000.
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Liu, Gordon Y. T.; Hutchinson, Loyd D.; and Stain, S. Douglas, Jr., 4,029,862.
Hutter, Ernest; and Tuma, Leroy A., to United States of America, Energy Research and Development Administration. Tubular gage for a liquid-metal-cooled fast breeder reactor. 4,028,811, Cl. 33-174.00L.
Hutton, Michael Pier: *See—*
Saele, Arvid Harlan; and Hutton, Michael Pier, 4,028,914.
Hwang, Eddie Y.: *See—*
Berry, William R.; Groves, Charles L., Jr.; and Hwang, Eddie Y., 4,029,951.
Hyanova, Blanka; and Plasil, Vladimir. Pressure and temperature sensing device. 4,028,943, Cl. 73-345.000.
Hydromatic GmbH: *See—*
Schwede, Franz-Josef; and Valentin, Ingo, 4,029,367.
HydroTech International, Inc.: *See—*
Dietrich, Dave S., 4,028,903.
Hyer, Donald R.: *See—*
Van Bennekom, Carl F.; Hyer, Donald R.; and Kernander, Warren N., 4,030,030.
Hyland, Francis B., to Gillette Company, The. Hair styling implement. 4,029,110, Cl. 132-33.00R.
Ichinose, Kazutoshi: *See—*
Kikuyama, Akira; and Ichinose, Kazutoshi, 4,028,927.
ICI United States Inc.: *See—*
Kruse, Walter M., 4,029,878.
Identicator Corporation: *See—*
Smith, Jay, III; and Hedgcoth, Virgle L., 4,029,012.
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Iftikar, Syed H.; and Leong, Bing M., to Memorex Corporation. Dual mode velocity servo control for a linear actuator motor. 4,030,132, Cl. 360-78.000.
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Yamamoto, Shuji; Isshiki, Setsuya; and Igarashi, Mitsuru, 4,029,830.
Igel, Wolfgang: *See—*
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Iida, Kosuke: *See—*
Shikinami, Yasuo; Iida, Kosuke; Hata, Kunihiro; and Fujii, Tetsuya, 4,029,840.
Iijima, Takasi: *See—*
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Ikezoe, Yasumasa: *See—*
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Illinois Tool Works Inc.: *See—*
Knoll, Carl G., 4,029,388.
Reinwall, Ernest William, Jr., 4,029,384.
Wilson, Robert Neil, 4,028,987.
Imagawa, Tadao; and Endo, Noriyuki, to Fuji Photo Film Co., Ltd. Coating composition for polyester resin containing cellulosic material and polyol-diisocyanate reaction product. 4,029,847, Cl. 428-425.000.
Imparato, Luigi: *See—*
Rossi, Enzo; Fattori, Silvano; and Imparato, Luigi, 4,029,586.
Imperial Chemical Industries Limited: *See—*
Anderson, Brian, 4,029,704.
Boyd, Violet; Fishwick, Brian Ribbons; and Glover, Brian, 4,029,469.
Brown, Michael Trevenen; and Rodway, William George, 4,029,870.
Cannon, Cyril George; and Selwood, Alan, 4,029,535.
Cole, Ann Mary; Turner, John Angus William; and Snell, Brian Kenneth, 4,029,784.
Crosby, John; Rennie, Robert Allan Campbell; and Paton, Robert Michael, 4,029,686.
Denny, Patrick John; and Robertson, Robert, 4,029,603.
Young, Edwin Harry Paterson, 4,029,786.
Imperial, George R.; and Seanor, Donald A., to Xerox Corporation. Mercapto functional polyorganosiloxane release agents for fusers in electrostatic copiers. 4,029,827, Cl. 427-22.000.
Ingram, Alvin R.; and Wright, Harold A., to ARCO Polymers, Inc. Method of making broader molecular weight distribution polystyrene. 4,029,869, Cl. 526-233.000.
Inland Steel Company: *See—*
Lee, Harvie Ho, 4,029,478.
Inoue, Gentei; Sato, Chuichi; Tanaka, Mamoru; and Matsuo, Nobuhiro, to Nippon Seiko Kabushiki Kaisha. Fluid pressure seal arrangement. 4,029,323, Cl. 277-15.000.
Inouye, Shigeharu; Omoto, Shoji; Niida, Taro; and Nomiya, Bunzo, to Meiji Seika Co., Ltd. Antibiotic 9-acyl-3''-thiomethoxymethyl-SF-837 composition and process for preparing the same. 4,029,881, Cl. 536-9.000.
Institut Francais du Petrole des Carburants et Lubricants et Enterprise de Recherches et d'Activities Petroliers Elf: *See—*
Dezael, Claude; Renault, Philippe; and Deschamps, Andre, 4,029,745.
Institut fuer industriellen Fortschritt AG: *See—*
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Institute Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Elf: *See—*
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Blum, Arnold; Hajdu, Johann; Mohr, Claus Erich; Reichl, Leopold; and Sonntag, Guenther, 4,030,076.
Buhler, Otto Richard, 4,030,012.
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De La Moneda, Francisco H., 4,029,522.
Feng, Bai-Cwo; and Lechaton, John S., 4,029,562.
Herko, Joseph Michael; and Joyce, James Maurice, 4,030,015.
Hong, Se J.; and Ostapko, Daniel L., 4,029,970.
Neumann, Edward William; and Rabenda, Edward John, Jr., 4,029,999.
Schumann, Paul A., Jr.; and Tong, Alvin H., 4,029,419.
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Gordon, Robert L., 4,029,207.
International Standard Electric Corporation: *See—*
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International Synthetic Rubber Company, Limited, The: *See—*
Bennett, Donald Alfred, 4,028,897.
International Telephone and Telegraph Corporation: *See—*
Clark, James Monroe, 4,030,045.
Fiss, Robert A., 4,029,177.
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Kling, Harry C., 4,030,117.
Perrotti, Emmanual Joseph, 4,030,100.
Inukai, Toshiya: *See—*
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Invernizzi, Renzo: *See—*
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Irathane Systems Incorporated: *See—*
Valeri, William J., 4,029,354.
Irvin Industries, Inc.: *See—*
Rain, Lloyd Howard, 4,029,117.
Isa, Hiroshi; Suzuki, Noboru; Takahashi, Masatoshi; and Hirayama, Eriko, to Lion Fat & Oil Co., Ltd. Non-liquid detergent composition. 4,029,606, Cl. 252-529.000.
Isard, Arsenc: *See—*
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Isca Electronics Limited: *See—*
Allen, Clifford Edwin, 4,029,163.
Ise, Takashi: *See—*
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Isenberg, Edward. Meat curing rack. 4,029,004, Cl. 99-477.000.
Ishigami, Osamu: *See—*
Takahashi, Eiji; Shimizu, Masaru; Oki, Yasuhiro; and Ishigami, Osamu, 4,029,524.
Ishiguro, Toshihiro; Fugono, Takeshi; and Nomura, Hiroaki, to Takeda Chemical Industries, Ltd. 7-(α-sulfoacylamido) cephalosporanic acids. 4,029,656, Cl. 260-243.00C.
Ishihara Sangyo Kaisha Ltd.: *See—*
Fujikawa, Kanichi; Takahashi, Ryohei; Yokomichi, Isao; Kimura, Fumio; Kaji, Takeo; and Sakashita, Nobuyuki, 4,029,490.
Ishii, Kiyoshi; and Sato, Kozi, to Daicel, Ltd. Poly(arylether-sulfone) semipermeable membrane comprising substituted halomethyl and/or quaternary nitrogen groups. 4,029,582, Cl. 210-500.00M.
Ishii, Ko; and Yoshida, Tadamasa, to Sumitomo Bakelite Company, Limited. Adhesive comprising post-chlorinated polyethylene and polyvinyl chloride. 4,029,850, Cl. 428-518.000.
Ishii, Masaji; Mikogami, Akio; and Miyai, Akira, to Denki Kagaku Kogyo Kabushiki Kaisha. Container for evaporation of metal. 4,029,466, Cl. 432-264.000.
Ishii, Masaji: *See—*
Nakamura, Hitomi; Komiyama, Yosizo; Yamashita, Mitsuo; and Ishii, Masaji, 4,029,000.
Isshiki, Setsuya: *See—*
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Ito, Fumio: *See—*
Sakurada, Nobuaki; Shinoda, Nobuhiko; Mashimo, Yukio; Ito, Tadashi; and Ito, Fumio, 4,029,421.
Ito, Koji: *See—*
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Ito, Tadashi: *See—*
Sakurada, Nobuaki; Shinoda, Nobuhiko; Mashimo, Yukio; Ito, Tadashi; and Ito, Fumio, 4,029,421.
Itoh, Tsutomu, to Onoda Cement Company, Ltd. Apparatus for producing charged particles. 4,029,995, Cl. 361-226.000.
ITT Industries, Inc.: *See—*
Belart, Juan, 4,028,891.
Bolis, Edoardo, 4,029,378.
Ittensohn, Oswald L.: *See—*
Provost, Philip J.; Ittensohn, Oswald L.; and Hilleman, Maurice R., 4,029,764.
IU Conversion Systems, Inc.: *See—*
Taub, Steven I.; and Osterman, Frederic J., 4,029,746.
Ivey, Herbert D., Jr., to Lubrication Company of America. Process for reclaiming spent motor oil. 4,029,569, Cl. 208-180.000.
Iwans, Robert C., to UOP Inc. Emergency flashing light system for indicating exits of passenger carriers. 4,029,994, Cl. 315-323.000.
Iwasa, Seizo: *See—*
Nakamura, Hirokazu; Kinoshita, Mitsutaka; and Iwasa, Seizo, 4,028,963.
Iwasa, Yoshio, to Nissan Motor Co., Ltd. Carburetor. 4,029,066, Cl. 123-127.000.
Iwasaki, Koji: *See—*
Gerstine, Milton I.; Futatsugi, Setsuo; Ueda, Kazuo; Seo, Ryozo; Iwasaki, Koji; and Uemura, Makoto, 4,029,946.
Iwata, Hiroshi; and Yoshida, Mikio, to Mitsubishi Rayon Co., Ltd. Heat resistant sheet. 4,029,835, Cl. 428-212.000.
J. B. Foote Foundry Co., The: *See—*
Hauser, Hans; and Jones, Ronald N., 4,028,960.
J. I. Case Company: *See—*
Baylor, John Merlin, 4,029,366.
Seaberg, David H., 4,029,226.
Jablonsky, Erich, to Zahnradfabrik Friedrichshafen AG. Adjustable bypass valve to effect steering limits in booster power steering system. 4,028,996, Cl. 91-401.000.
Jablonsky, Erich, to Zahnradfabrik Friedrichshafen AG. Auxiliary power steering gear for motor vehicles having a common hydraulic system. 4,028,998, Cl. 92-107.000.
Jackovitz, John F.; and Pantier, Earl A., to Westinghouse Electric Corporation. Method of preparing high capacity nickel electrode powder. 4,029,132, Cl. 141-1.100.
Jackson, Kenneth Thomas; and Porter, Lance, to Yorkshire Imperial Metals Limited. Tubular products. 4,028,785, Cl. 29-157.30R.
Jacobsen, Finn; and Gustavsson, Lennart, to Kamyr Aktiebolag. Method and device for dewatering of suspensions. 4,029,579, Cl. 210-77.000.
Jacoby, Raymond C. Selective golf club dispenser. 4,029,136, Cl. 150-1.50R.
Jaegtnes, Karl O., to Westinghouse Electric Corporation. Apparatus and method for determining friction forces in position modulated valves. 4,029,122, Cl. 137-551.000.
Jager, Kurt; Kunz, Eugen; and Vlah, Josko, to BBC Brown Boveri & Company Limited. Power terminal structure for stator component of high-output turbo-generator. 4,029,978, Cl. 310-64.000.
Jalas, Leon C. Pneumatic planter. 4,029,238, Cl. 222-193.000.
James Allan & Sons, Inc.: *See—*
Allan, John H.; Ball, Jerrold L.; Dull, Charles B.; Gabriel, Leo A.; Curtis, Richard E.; and Dervin, Victor J., 4,028,774.
James, David Richard. Sanitary chairs. 4,028,749, Cl. 4-134.000.
Jancic, Gojko; Meylan, Pierre; and Portmann, Alexandre, to BBC Brown Boveri & Company Limited. Coupling, particularly for use in turbogenerators. 4,028,909, Cl. 64-28.00R.
Japan Air Lines Co., Ltd.: *See—*
Nakamura, Shinji; and Mihirogi, Kiyoshi, 4,029,020.
Japan Atomic Energy Research Institute: *See—*
Sata, Shoichi; and Ikezoe, Yasumasa, 4,029,754.
Yoshida, Masaru; Okubo, Hiroshi; and Kaetsu, Isao, 4,029,842.
Japan Gasoline Co., Ltd.: *See—*
Mitsui, Shigeo; Araki, Tomiyasu; Niikawa, Kazuhiko; Hosoda, Hideo; Jyo, Yoshio; Yoda, Ryuichiro; Suzuki, Giichi; Iijima, Takasi; Tanaka, Hiroshi; Ochiai, Yasutaka; and Ise, Takashi, 4,029,550.
Japan Steel Works Ltd., The: *See—*
Morishima, Yukimasha; Yoshida, Minoru; and Hanaki, Kimiyasu, 4,029,300.
Japan Tobacco & Salt Public Corporation, The: *See—*
Nakai, Saburo; and Koyama, Nobuyuki, 4,029,221.
Jarowenko, Wadym; and Hernandez, Henry R., to National Starch and Chemical Corporation. Method of making a novel starch derivative and the product produced thereby. 4,029,544, Cl. 162-175.000.
Jarque, Ricardo Granados: *See—*
Cartes, Juan Bosch; Cabiro, Jorge Canals; Jarque, Ricardo Granados; Roldan, Cristobal Martinez; and Peinado, Fernando Rabadan, 4,029,799.
Jarvis, Frank L. J.; Gunn, Duncan A.; and Buchanan, Richard J., to International Standard Electric Corporation. Submerged repeater housing. 4,029,894, Cl. 174-70.00S.
Jasny, Jan, to Polska Akademia Nauk, Instytut Chemii Fizycznej. Reading device for a monochromator. 4,029,417, Cl. 356-100.000.
Jasso, Joseph J.: *See—*
Hunter, Lee; and Jasso, Joseph J., 4,029,369.
Jaunarajs, Karlis L.; and Yang, Julie C., to Johns-Manville Corporation. Method for the preparation of fibrous insoluble calcium sulfate anhydrite. 4,029,512, Cl. 106-109.000.
Jeff-Ko Manufacturing Co., Inc.: *See—*
Hoch, Norris R., 4,029,356.
Jenkins, Patrick A.; and Reinke, Ronald E., to Borg-Warner Corporation. Thermally actuated valve. 4,029,257, Cl. 236-48.00R.
Jenner, Al. Tap holder. 4,028,763, Cl. 10-135.00R.
Jennings, Larry D.: *See—*
Stevens, Douglas; Forberg, Helge O.; Jennings, Larry D.; Thompson, David L.; and Copenhaver, Julian V., 4,029,737.
Jenoptik Jena G.m.b.H.: *See—*
Hecker, Gerhard Ernst; Klose, Heinrich Peter; and Muller, Wilfried Friedrich Heinrich, 4,030,109.
Jeram, Edward M., to General Electric Company. Solvent resistant room temperature vulcanizable silicone rubber composition. 4,029,629, Cl. 260-37.0SB.
Jett, Marion Barney, to Dresser Industries, Inc. Gripping member for well packer. 4,029,147, Cl. 166-217.000.
Joh. A. Benckiser GmbH: *See—*
Krueger, Friedrich; and Michel, Walter, 4,029,697.
Johansson, Leif A. T.; and Pers, Nils G., to Tipe Revent AB. Method for baking food products. 4,029,463, Cl. 432-25.000.
John Wyeth & Brother Limited: *See—*
Cavalla, John Frederick; and Archibald, John Leheup, 4,029,801.
Curran, Adrian Charles Ward. 4,029,667.
Curran, Adrian Charles Ward; Crossley, Roger; and Hill, David George, 4,029,668.
John Zink Company: *See—*
Hart, Wallace F.; and Koenig, Ralph A., 4,029,146.
Johns-Manville Corporation: *See—*
Jaunarajs, Karlis L.; and Yang, Julie C., 4,029,512.
Johnson, Allan S. Ball drive non-reversing tapping attachment. 4,029,429, Cl. 408-142.000.
Johnson, Bruce K., to Polaroid Corporation. Photographic apparatus having a reflex optical system. 4,030,110, Cl. 354-152.000.
Johnson, Edward M., Jr.; and Stone, John T., to Triangle Corporation, The. Plastic hinge construction. 4,029,234, Cl. 220-337.000.
Johnson, James M.: *See—*
Harrington, Cecil F.; Johnson, James M.; and Prince, Howard T., 4,028,852.
Johnson, Kenneth C., to F. J. Littell Machine Company. Roll feed with modular roll lifter mechanism. 4,029,251, Cl. 226-154.000.
Johnson, LeRoy E.: *See—*
Argoudelis, Alexander D.; and Johnson, LeRoy E., 4,029,548.
Johnson Matthey & Co., Limited: *See—*
Westwood, Walter; MacGregor, John James; and Payne, John Blunden, 4,029,499.

Johnson, Phillip R., to Dakota Electron, Inc. Laser land-surveying apparatus with digital display. 4,029,415, Cl. 356-4.000.

Johnson, Robert B.: *See—*
Fisher, Edwin P.; and Johnson, Robert B., 4,030,084.

Johnston, Thomas E., to Du Pont de Nemours, E. I., and Company. Hydrocarbon fuel compositions containing polysulfone antistatic additives. 4,029,480, Cl. 44-62.000.

Jones, Charles, to Curtiss-Wright Corporation. Stratified charge rotary engine with side housing fuel injection. 4,029,058, Cl. 123-8.090.

Jones, Christopher Robin; Williams, Malcolm; and Adey, Anthony John, to Cav Limited. Fuel systems for internal combustion engines. 4,029,068, Cl. 123-139.00E.

Jones, Frank N., to Du Pont de Nemours, E. I., and Company. Polymeric materials with acid end groups. 4,029,861, Cl. 526-14.000.

Jones, Glen D.; and Raffetto, Michael J., to Xerox Corporation. Means for wiring into a sealed enclosure. 4,029,373, Cl. 339-17.00R.

Jones, Gomer W., to Bird Oil Equipment Ltd. Speed reducer box for driving a pump jack. 4,028,964, Cl. 74-606.00R.

Jones, Ronald N.: *See—*
Hauser, Hans; and Jones, Ronald N., 4,028,960.

Jonsson, Knut Johan Vilhelm, to AB Wicanders Korkfabriker. Pilferproof closure for bottles, tubes and similar containers. 4,029,231, Cl. 215-256.000.

Joosten, Hendrik C. J.: *See—*
Wilms, Gerard J. M.; and Joosten, Hendrik C. J., 4,028,764.

Jorgensen, Adam A.; Rose, Norman L.; and Lewis, Thomas F., to Stromberg-Carlson Corporation. Asynchronous digital repeater. 4,029,907, Cl. 179-16.0EA.

Joslyn Mfg. and Supply Co.: *See—*
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Joyce, James Maurice: *See—*
Herko, Joseph Michael; and Joyce, James Maurice, 4,030,015.

Judkins, Ren. Foldable brushes. 4,028,767, Cl. 15-203.000.

Jueckstock, Dale Allen; and Hindman, Thomas Wayne, Sr., to McKellar, Robert L., a part interest. Method of threading short spool pieces. 4,028,762, Cl. 10-1.00B.

Juhasz, Charles, to Aircraft Systems Corporation. Differential pressure indicator device. 4,029,042, Cl. 116-114.0PV.

Jurd, Leonard; and Bultman, John Dale, to United States of America, Agriculture. Process for inhibiting the deterioratinn of wood duc to marine boring organisms via the use of dibutylbenzylphenol. 4,029,818, Cl. 424-346.000.

Jyo, Yoshio: *See—*
Mitsui, Shigen; Araki, Tomiyasu; Niikawa, Kazuhiko; Hosoda, Hideo; Jyo, Yoshio; Yoda, Ryuichiro; Suzuki, Giichi; Iijima, Takasi; Tanaka, Hiroshi; Ochiai, Yasutaka; and Ise, Takashi, 4,029,550.

Kabushiki Kaisha Daini Seikosha: *See—*
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Kabushiki Kaisha Hamai Seisakusho: *See—*
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Kabushiki Kaisha Komatsu Seisakusho: *See—*
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Kabushiki Kaisha Tokai Rika Denki Seisakusho: *See—*
Kancko, Yuichiro; Teraoka, Fuminori; Kubota, Tatsushi; and Nishikawa, Takehiko, 4,029,339.

Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See—*
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Kabushiki Kaisha Toyota Chuo Kenkyusho: *See—*
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Kabushiki Kaishi Komatsu Seisakusho: *See—*
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Kadowaki, Takashi: *See—*
Denda, Yasuaki; Kadowaki, Takashi; and Dohi, Michio, 4,029,625.

Kaeding, Warren W., to Mobil Oil Corporation. Selective production of para-xylene. 4,029,716, Cl. 260-672.00T.

Kaetsu, Isao: *See—*
Yoshida, Masaru; Okubo, Hiroshi; and Kaetsu, Isao, 4,029,842.

Kah, Carl L. C., Jr. Continuous cycle timer having adjustable day and time periods of operation. 4,029,918, Cl. 200-38.00D.

Kahler, Richard W. Fluid-cooled smoking device. 4,029,109, Cl. 131-173.000.

Kai, Chiharu. Metallic tag. 4,028,833, Cl. 40-316.000.

Kaji, Takeo: *See—*
Fujikawa, Kanichi; Takahashi, Ryohei; Yokomichi, Isao; Kimura, Fumio; Kaji, Takeo; and Sakashita, Nobuyuki, 4,029,490.

Kakalec, Robert John, to Bell Telephone Laboratories, Incorporated. Ferroresonant regulator with supplementary regulatinn through waveform control. 4,030,025, Cl. 323-61.000.

Kalcor Coatings Company, Inc.: *See—*
Carson, Malcolm E.; and Ellslager, William M., 4,029,511.

Kamens, Ernest Rudolph; Kressin, Donald Milton; Lange, Harold Carl; and MacLeay, Ronald Edward, to Pennwalt Corporation. Polymeric cellular structures. 4,029,615, Cl. 260-2.50R.

Kamizono, Tetsushi: *See—*
Yoshiura, Hirohisa; Arai, Toshiharu; Miyake, Masao; Furuya, Yoshikane; Onogi, Seiji; and Kamizono, Tetsushi, 4,029,877.

Kammel, Roland: *See—*
Winterhager, Helmut; Kammel, Roland; and Lucke, Michael, 4,029,302.

Kamstrup-Larsen, Harry, to Leca Trading & Concession A/S. Rotary kiln for producing a bloated clay product. 4,029,464, Cl. 432-118.000.

Kamyr Aktiebolag: *See—*
Jacobsen, Finn; and Gustavsson, Lennart, 4,029,579.

Kaneko, Yuichiro; Teraoka, Fuminori; Kubota, Tatsushi; and Nishikawa, Takehiko, to Kabushiki Kaisha Tokai Rika Denki Seisakusho. Safety belt devices for vehicles. 4,029,339, Cl. 280-745.000.

Kao Soap Co., Ltd.: *See—*
Murata, Moriyasu; Sai, Fumio; and Fujino, Takashi, 4,029,608.

Kapanen, Aarne Albin; Rantanen, Raimo Uolevi; Lindroos, Leo Elias; Relander, John Henrik; and Honkala, Risto Johannes, to Outokumpu Oy. Process for smelting and recovery of a material containing noble metals. 4,029,494, Cl. 75-10.00R.

Kaplan, Richard; and Schultz, Jack L., to Grumman Aerospace Corporation. Deployable reflector structure. 4,030,102, Cl. 343-915.000.

Karami, Hamzeh, to Colgate-Palmolive Cnmpany. Tape fastener for disposable diaper. 4,029,098, Cl. 128-284.000.

Karami, Hamzeh, to Colgate-Palmolive Company. Shape retaining diaper. 4,029,100, Cl. 128-284.000.

Kargl, Hans: *See—*
Hafner, Leonhard; Schramm, Wilhelm; Kargl, Hans; and Kieser, Friedrich, 4,029,641.

Karp, Edward C.: *See—*
Foster, Colin E.; and Karp, Edward C., 4,029,161.

Karpenko, Anatole N., to Anchor/Darling Valve Company. In service exercisable tilt disc check valve. 4,029,290, Cl. 251-82.000.

Karrer, Friedrich, to Ciba-Geigy Corporation. Terpene aryl esters. 4,029,649, Cl. 260-240.00H.

Kasch, Helmut: *See—*
Ponsold, Kurt; and Kasch, Helmut, 4,029,648.

Kasuya, Takanori: *See—*
Ban, Itsuki; Kasuya, Takanori; Yano, Kanji; and Maruyama, Kenichi, 4,030,134.

Kato, Kimpei: *See—*
Noguchi, Teruhisa; Kohmoto, Keisuke; and Kato, Kimpei, 4,029,813.

Kato, Michio: *See—*
Mori, Takashi; Kato, Michio; Mizu, Koichi; and Nishida, Yoshikazu, 4,029,266.

Katsuragawa, Kanzi: *See—*
Hattori, Tatsuo; Katsuragawa, Kanzi; Kihara, Keiichi; Ono, Isao; and Tamabayashi, Hanzo, 4,029,640.

Katz, Rodney S.: *See—*
Fish, Franklin H.; and Katz, Rodney S., 4,029,976.

Kauffeld, Norbert Mariner: *See—*
Spangler, Hayward Gosse; Kauffeld, Norbert Mariner; and Owens, Charles Dean, 4,028,755.

Kawamura, Masami: *See—*
Ienaka, Masanori; Kominami, Yasuo; Suzuki, Yukio; and Kawamura, Masami, 4,030,035.

Kawasaki Jukogyo Kabushiki Kaisha: *See—*
Gerstine, Milton I.; Futatsugi, Setsuo; Ueda, Kazuo; Seo, Ryozo; Iwasaki, Koji; and Uemura, Makoto, 4,029,946.

Kawasumi, Nobumitsu; Muramatsu, Shigeru; Suzuki, Mamoru; and Yasui, Yoshiharu, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Method and device for preventing creation of fuzzy fibers of yarn during twisting operation of the multiple twister. 4,028,870, Cl. 57-58.840.

Kehr, Wolfgang: *See—*
Engelfried, Otto; Kerb, Ulrich; Wiechert, Rudolf; Wachtel, Helmut; Palenschat, Dieter; Horowski, Reinhard, Paschelke, Gert; and Kehr, Wolfgang, 4,029,777.

Keith, John L., to Rockwell International Corporation. Temperature compensated constant voltage apparatus. 4,030,023, Cl. 323-4.000.

Kellaway, Michael John: *See—*
Cady, John Billington; and Kellaway, Michael John, 4,029,335.

Keller, Dennis F.: *See—*
Sweeney, William T.; Keller, Dennis F.; Harris, Gary R.; and Armstrong, Calvin N., 4,028,940.

Keller, Manfred; and Elser, Dieter, to Zahnradfabrik Friedrichshafen AG. Power steering control valve. 4,029,124, Cl. 137-596.120.

Keller, Wilfried; and Muller, Friedhelm, to Bayer Aktiengesellschaft. Non-aqueous polymer dispersions of water-soluble monomers. 4,029,622, Cl. 260-29.6WQ.

Kellerhals, Glen F.: *See—*
Coffman, Charles L.; Kellerhals, Glen F.; Newcombe, Jack; and Roth, Shirley H., 4,029,570

Kelly, Thomas T.: *See—*
Courson, Thomas G.; Schlueter, William L.; and Kelly, Thomas T., 4,028,902.

Kendall Company, The: *See—*
Dye, John F.; and Memhardt, Charles R., 4,029,087.
Samour, Carlos M., 4,029,658.

Kenkare, Divaker B.: *See—*
Carson, John C., Jr.; Hall, Robert T.; Kenkare, Divaker B.; and Robbins, Clarence R., 4,029,236.

Kennedy, Joseph P., to Exxon Research and Engineering Company. Cationic polymerization catalyst. 4,029,866, Cl. 526-185.000.

Kenney, Clarence E. Variable pitch mounting for airfoil blades of a windmill or propeller. 4,029,434, Cl. 416-41.000.

Kenney, Joseph F., to Remington Arms Company, Inc. Method of forming lead styphnate ammunition priming mixture. 4,029,530, Cl. 149-28.000.

Kent Manufacturing Co. Inc.: *See—*
Blair, Calvin B.; Brinker, Lee J.; and Ankenman, Thomas W., 4,029,155.

Keppeler, Dieter, to Carl Walther, Sportwaffenfabrik. Cocking mechanism for hand firearms. 4,028,836, Cl. 42-69.00B.

Kerb, Ulrich: *See—*
Alig, Leo; Nickolson, Robert; Wiechert, Rudolf; Furst, Andor; Kieslich, Klaus; Muller, Marcel; and Kerb, Ulrich, 4,029,692.
Engelfried, Otto; Kerb, Ulrich; Wiechert, Rudolf; Wachtel, Helmut; Palenschat, Dieter; Horowski, Reinhard; Paschelke, Gert; and Kehr, Wnlfgang, 4,029,777.

Kerber, Charles W. Calibrated leak balloon micro-catheter. 4,029,104, Cl. 128-348.000.

Kernander, Warren N.: *See—*
Van Bennekom, Carl F.; Hyer, Donald R.; and Kernander, Warren N., 4,030,030.

Kerwin, Joseph E.; and Erlandson, Paul M., to Continental Group, Inc., The. Convenience opening of containers for liquid products. 4,029,033, Cl. 113-121.00C.

Kessler, Peter: *See—*
Ursel, Eckhard; and Kessler, Peter, 4,029,259.

Khalifa, Ramzi A.: *See—*
Prather, Joseph E.; and Khalifa, Ramzi A., 4,029,348.

Kienzle, Frank; and Rosen, Perry, to Hoffmann-La Roche Inc. 2-Oxo-2H cyclopenta[b]furans. 4,029,674, Cl. 260-343.30R.

Kieser, Friedrich: *See—*
Hafner, Leonhard; Schramm, Wilhelm; Kargl, Hans; and Kieser, Friedrich, 4,029,641.

Kieslich, Klaus: *See—*
Alig, Leo; Nickolson, Robert; Wiechert, Rudolf; Furst, Andor; Kieslich, Klaus; Muller, Marcel; and Kerb, Ulrich, 4,029,692.

Kiessling, Rudolf H., to Square D Company. Pneumatic timing attachment for an electromagnetic device. 4,030,054, Cl. 335-61.000.

Kihara, Keiichi: *See—*
Hattori, Tatsuo; Katsuragawa, Kanzi; Kihara, Keiichi; Ono, Isao; and Tamabayashi, Hanzo, 4,029,640.

Kikuchi, Masaru: *See—*
Takahashi, Toshiro; Nagano, Toshihiro; Nakamura, Katsuhiko; and Kikuchi, Masaru, 4,028,795.

Kikuyama, Akira; and Ichinose, Kazutoshi, to Ricoh Watch Co., Ltd. High precision timepiece pace measuring device. 4,028,927, Cl. 73-6.000.

Kilbourne, Edwin D., to Mount Sinai School of Medicine of the City University of New York. Influenza vaccine containing purified neuraminidase antigen and method of using the same. 4,029,763, Cl. 424-89.000.

Kilburn, Richard Fleming: *See—*
Apgar, Donald Harlem; and Kilburn, Richard Fleming, 4,029,351.

Killop, James Thomas, to Anderson-Cook, Inc. Apparatus and method for splining power transmission members. 4,028,922, Cl. 72-88.000.

Kim, Heung Tai; and Wilson, Gary F., to B.F. Goodrich Company, The. Extrusion die. 4,029,458, Cl. 425-135.000.

Kiminki, Keijo; Kulmala, Raili; and Sipila, Seppo, to Oy. W. Rosenlew Ab. Acid hydrolysis of polysaccharide-containing raw material. 4,029,515, Cl. 127-37.000.

Kimura, Fumio: *See—*
Fujikawa, Kanichi; Takahashi, Ryohei; Yokomichi, Isao; Kimura, Fumio; Kaji, Takeo; and Sakashita, Nobuyuki, 4,029,490.

Kimura, Shuji, to Nippon Kogaku K.K. Power-operated actuator for a film advance mechanism of a camera. 4,030,111, Cl. 354-173.000.

Kindig, Guilford Edwin; and Adamski, Henry Stanislaus, to Eastman Kodak Company. Pawl and ratchet clutch. 4,029,184, Cl. 192-28.000.

King, John: *See—*
Augstein, Joachim; Cairns, Hugh; Hunter, Dennis; and King, John, 4,029,802.

King Label Company: *See—*
Buck, Homer G., 4,028,783.

King, Larry K.: *See—*
Schoener, Ronald C.; King, Larry K.; Knapp, Lester L.; and Kloap, Nicholas, 4,029,750.

Kingsley, Patrick John, to Fisons Limited. Method for treating gingivitis. 4,029,761, Cl. 424-55.000.

Kinkel, Karl F.: *See—*
Vice, Bobby C., 4,028,810.

Kinoshita, Mitsutaka: *See—*
Nakamura, Hirokazu; Kinoshita, Mitsutaka; and Iwasa, Seizo, 4,028,963.

Kinoshita, Tsutomu: *See—*
Mizukami, Hidekatsu; Fukui, Kosuke; and Kinoshita, Tsutomu, 4,029,404.

Kinugasa, Hiroaki: *See—*
Nishimura, Haruki; Shimizu, Masanao; Hatano, Naonobu; Nakatsuzi, Katsuyoshi; Kinugasa, Hiroaki; and Kon, Hiroko, 4,029,780.

Kirkwood, Philip Robert: *See—*
Clark, Allan; and Kirkwood, Philip Robert, 4,029,934.

Kish, Richard E., to Pitney-Bowes, Inc. Label applicator. 4,029,537, Cl. 156-497.000.

Klaren, Petrus Jozef. Anchor. 4,029,040, Cl. 114-304.000.

Klee, John Michael: *See—*
Wignall, Harry; Shelton, William Ewart Alan; and Klee, John Michael, 4,028,910.

Kleeberger, Rudolf: *See—*
Hafele, Walter; and Kleeberger, Rudolf, 4,029,069.

Klein, Hans: *See—*
Ahrens, Norbert; Klockenbusch, Heinrich; Ritzmann, Horst; Klein, Hans; Balzau, Gerhard; and Schnuckel, Clemens, 4,029,365.

Klein, Schanzlin & Becker Aktiengesellschaft: *See—*
Nothdurft, Jurgeo, 4,029,043.

Klein, Werner: *See—*
Rosewicz, Horst; and Klein, Werner, 4,029,023.

Kleinschmager, Herbert: *See—*
Fischer, Wilfried; Haar, Wilhelm; Kleinschmager, Herbert; and Weddigen, Gert, 4,029,857.

Klem, Angelina M.: *See—*
Klem, Edward J., 4,029,191.

Klem, Edward J., to Klem, Angelina M.; and Pahor, Robert B., part interest to each. Variable spacing printing apparatus. 4,029,191, Cl. 197-2.000.

Klett, Keith Karl: *See—*
Alley, Robert Philbrick; and Klett, Keith Karl, 4,029,993.

Kliemann, Manfred: *See—*
Wehner, Hans; and Kliemann, Manfred, 4,029,507.

Klieves, Hal. Valve and valve system. 4,029,119, Cl. 137-119.000.

Kling, Harry C., to International Telephone and Telegraph Corporation. Zener diode. 4,030,117, Cl. 357-13.000.

Klitzky, David. Work bench structure. 4,029,024, Cl. 108-60.000.

Kloap, Nicholas: *See—*
Schoener, Ronald C.; King, Larry K.; Knapp, Lester L.; and Kloap, Nicholas, 4,029,750.

Klockenbusch, Heinrich: *See—*
Ahrens, Norbert; Klockenbusch, Heinrich; Ritzmann, Horst; Klein, Hans; Balzau, Gerhard; and Schnuckel, Clemens, 4,029,365.

Kloeckner-Humboldt-Deutz AG: *See—*
Winterhager, Helmut; Kammel, Roland; and Lucke, Michael, 4,029,302.

Klose, Heinrich Peter: *See—*
Hecker, Gerhard Ernst; Klose, Heinrich Peter; and Muller, Wilfried Friedrich Heinrich, 4,030,109.

Kluge, Frank C.: *See—*
Armstrong, John H.; and Kluge, Frank C., 4,029,859.

Kluge, Werner, to Gesellschaft fur Mathematik und Datenverarbeitung m.b.H. Dynamic memory arrangement for providing noncyclic data permutations. 4,030,078, Cl. 340-172.500.

KMS Fusion, Inc.: *See—*
Cielaszyk, Dennis E.; and Meyer, Andrew J., 4,029,045.
Henderson, Timothy M.; and Wuttke, Gilbert H., 4,028,941.

Knapp, Lester L.: *See—*
Schoener, Ronald C.; King, Larry K.; Knapp, Lester L.; and Kloap, Nicholas, 4,029,750.

Knepper, J. Irvine; Godar, Richard L.; and Propst, James W., to Petrolite Corporation. Process of inhibiting corrosion and/or sweetening hydrocarbons. 4,029,589, Cl. 252-51.000.

Kneubuehler, Werner: *See—*
Defago, Raymond; Angliker, Hans-Joerg; Holzrichter, Herbert; Kneubuehler, Werner; and Peter, Richard, 4,029,467.

Knickerbocker, Robert H.: *See—*
Headington, Edward E.; Tutko, Albert J.; and Knickerbocker, Robert H., 4,029,376.

Knodler, Reinhard: *See—*
Binder, Horst; Knodler, Reinhard; Kohling, Alfons; and Sandstede, Gerd, 4,029,563.

Knoll, Carl G., to Illinois Tool Works Inc. Electrical terminal constructed to prevent insert molding flash. 4,029,388, Cl. 339-218.00R.

Knopp, Walter V., to A. Johnson & Co. Inc. Brazing alloy compositions. 4,029,476, Cl. 428-676.000.

Knudsen, Jens Nygaard: *See—*
Dideriksen, Erling Thue; and Knudsen, Jens Nygaard, 4,028,844.

Kobayashi, Akira, to Kabushiki Kaisha Toyota Chuo Kenkyusho. Fuel supply system for internal combustion engine. 4,029,070, Cl. 123-139.0AN.

Kobayashi, Isamu; Yamashiro, Osamu; Yashiki, Naoki; and Funakubo, Tadashi, to Hitachi, Ltd. Voltage booster circuit using level shifter composed of two complementary MIS circuits. 4,029,973, Cl. 307-264.000.

Kobayashi, Makio: *See—*
Senjo, Teizo; and Kobayashi, Makio, 4,029,739.

Kobe Steel Ltd.: *See—*
Oishi, Minoru; Okuda, Naoki; Tomita, Makoto; Ohkubo, Nobumasa; Kogane, Kazuo; and Yonezawa, Kazuo, 4,029,933.
Takahashi, Eiji; Shimizu, Masaru; Oki, Yasuhiro; and Ishigami, Osamu, 4,029,524.

Koch, Frederick William, to Lubrizol Corporation, The. Lubricants and functional fluids containing substituted sulfolanes as seal swelling agents. 4,029,587, Cl. 252-48.200.

Koch, Frederick William, to Lubrizol Corporation, The. Substituted sulfolanes as seal swelling agents. 4,029,588, Cl. 252-48.200.

Koda, Yosiharu, to Denkosha Co., Ltd. Watertight means for electric plug-receptacle coupling. 4,029,382, Cl. 339-94.00M.

Koenig, Nathan H.; and Friedman, Mendel, to United States of America, Agriculture. Process for simultaneously flameproofing and shrinkproofing wool. 4,029,471, Cl. 8-128.00R.

Koenig, Ralph A.: *See—*
Hart, Wallace F.; and Koenig, Ralph A., 4,029,146.

Koerner, Gotz: *See—*
Fink, Hans-Ferdi; Koerner, Gotz; and Rossmy, Gerd, 4,029,596.

Koga, Yoshihiko: *See—*
Yamamoto, Hisao; Inukai, Toshiya; and Koga, Yoshibiko, 4,029,798.

Kogane, Kazuo: *See—*
Oishi, Minoru; Okuda, Naoki; Tomita, Makoto; Ohkubo, Nobumasa; Kogane, Kazuo; and Yonezawa, Kazuo, 4,029,933.

Kohler, Werner; and Muller, Willi, to Siemens Aktiengesellschaft. Inductive voltage transformer. 4,030,057, Cl. 336-83.000.

Kohling, Alfons: *See—*
Binder, Horst; Knodler, Reinhard; Kohling, Alfons; and Sandstede, Gerd, 4,029,563.

Kohmoto, Keisuke: *See—*
Noguchi, Teruhisa; Kohmoto, Keisuke; and Kato, Kimpei, 4,029,813.

Kohn, Harold B.: *See—*
Sze, Morgan C.; and Kohn, Harold B., 4,029,474.

Kohnke, Ole Bjorn, to Hesse, Ruth Lea. Gas supply device. 4,029,093, Cl. 128-145.700.

Koiso, Yoichi; Ito, Koji; and Seno, Hiroshi, to Nippon Kayaku Kabushiki Kaisha. Chromium containing azo dyes. 4,029,643, Cl. 260-145.00B.

Koizumi, Toshimichi, to Olympus Optical Co., Ltd. Objective for video disks. 4,029,398, Cl. 350-231.000.

Kollmeyer, Willy D.; Roman, Steven A.; and Soloway, Samuel B., to Shell Oil Company. N-(Arylsulfonyl)-2-nitro-2-(1-methyl-2-(1,3-diazacycloalkylidene)acetamides. 4,029,791, Cl. 424-251.000.

Kolstein, Samuel. Stroller for attachment to a carrying case. 4,029,327, Cl. 280-47.13R.

Komatsu, Tadaaki: *See—*
Yano, Eizi; Ohkawa, Shunjiro; Komatsu, Tadaaki; and Adachi, Masami, 4,029,222.

Kominami, Yasuo: *See—*
Ienaka, Masanori; Kominami, Yasuo; Suzuki, Yukio; and Kawamura, Masami, 4,030,035.

Komiyama, Yosizo: *See—*
Nakamura, Hiromi; Komiyama, Yosizo; Yamashita, Mitsuo; and Ishii, Masaji, 4,029,000.

Kon, Hiroko: *See—*
Nishimura, Haruki; Shimizu, Masanao; Hatano, Naonobu; Nakatsuzi, Katsuyoshi; Kinugasa, Hiroaki; and Kon, Hiroko, 4,029,780.

Kondo, Hiroshi; Murata, Isamu; and Yamanaka, Teruo, to Toyota Jidosha Kogyo Kabushiki Kaisha. Method and device for suppressing noise radio waves in motor vehicle having ignition type engine. 4,029,969, Cl. 307-10.00R.

Konishiroku Photo Industry Co., Ltd.: *See—*
Fujiwhara, Mitsuto; and Sato, Ryosuke, 4,029,503.

Konrad, Joseph D. Surfacing tool. 4,028,781, Cl. 29-78.000.

Konyves, Imre: *See—*
Fex, Hans Jacob; Hogberg, Knut Bertil; and Konyves, Imre, 4,029,778.

Koppel, Gary A., to Eli Lilly and Company. Process for preparing 3-acyloxymethyl-2-cephem compounds. 4,029,651, Cl. 260-243.00C.

Korb, Fritz, to BBC Brown Boveri & Company Limited. Thyristor controlled direct current regulator. 4,030,020, Cl. 321-45.00C.

Korn, Uzi; and Shtrickman, Shmuel, to Yeda Research & Development Co. Ltd. Thermoelectric detector. 4,029,521, Cl. 136-225.000.

Kortenbusch, Werner, to Ruhrkohle AG. Arrangement for hydraulically conveying solids. 4,029,362, Cl. 302-14.000.

Kosiorek, Raymond Stanley, to Hercules Incorporated. Metallizing compositions. 4,029,605, Cl. 252-514.000.

Koslowski, Gerhard: *See—*
Schippers, Heinz; and Koslowski, Gerhard, 4,029,452.

Kosta, Geza, to Midland-Ross Corporation. Web coating apparatus. 4,029,833, Cl. 427-428.000.

Kotala, James R.; and Hamilton, William W., to Westingbouse Electric Corporation. Electrical bus duct with torque indication nut. 4,029,379, Cl. 339-22.00B.

Kotos, Peter, to General Electric Company. Electric circuit breaker with electro-magnetic means for opposing magnetic contact-repulsion forces. 4,030,055, Cl. 335-195.000.

Kotter, James I.; and Folk, Craig L., to United States of America, Agriculture. Method and apparatus for producing yarn from fibrous tufts. 4,028,872, Cl. 57-58.910.

Kotzsch, Hans-Joachim; Seiler, Claus-Dietrich; and Vablensieck, Hans-Joachim, to Dynamit Nobel Aktiengesellschaft. Organophosphonic acids or esters containing an epoxy group. 4,029,679, Cl. 260-348.00R.

Kouvoussis, Anthony E.: *See—*
Bennett, Thomas H.; Carlow, Earl F.; Kouvoussis, Anthony E.; Orgill, Rodney H.; Peddle, Charles; and Wiles, Michael F., 4,030,079.

Kovacs, Ernest; Ludwig, David P.; and Zwickel, Friedich, to Western Electric Company, Inc. Methods of and apparatus for mounting articles to a carrier member. 4,029,536, Cl. 156-285.000.

Koyama, Nobuyuki: *See—*
Nakai, Saburo; and Koyama, Nobuyuki, 4,029,221.

Kozu, Isao: *See—*
Yamada, Kiichiro; Kozu, Isao; Akamine, Takenori; and Shimizu, Ryota, 4,030,133.

Kraftwerk Union Aktiengesellschaft: *See—*
Kuter, Heinrich; and Weghaupt, Erich, 4,029,981.

Krake, Harry. Spool stand. 4,029,241, Cl. 223-106.000.

Kramer, Richard L., to General Motors Corporation. Steering column lock inhibitor. 4,029,168, Cl. 180-114.000.

Kramer, Rolf; and Schneider, Felix, to Eisenbahn-Verkehrsmittel AG. Globe valve construction. 4,029,292, Cl. 251-163.000.

Krantz, Leonard Albert, Jr.; and Fort, Jack Bernard, to Bendix Corporation, The. Connector having a plated plastic ground for filter contacts. 4,029,386, Cl. 339-143.00R.

Kraus, Werner: *See—*
von Bezold, Gotz-Dietrich; and Kraus, Werner, 4,029,091.

Krenzer, John; and Wu, Chin Ching, to Velsicol Chemical Corporation. 1-Benzothiazolyl-5-hydroxyimidazolidinones. 4,029,491, Cl. 71-90.000.

Kressin, Donald Milton: *See—*
Kamens, Ernest Rudolph; Kressin, Donald Milton; Lange, Harold Carl; and MacLeay, Ronald Edward, 4,029,615.

Kresta, Erich, to Semperit Aktiengesellschaft. Tire blank for a vehicle tire with tire bead ply means and improved vehicle tire formed therefrom. 4,029,138, Cl. 152-362.00R.

Krohn, Wolfgang; Metzger, Karl Georg; Preiss, Michael; and Walkowiak, Michael, to Bayer Aktiengesellschaft. Nitro-β-lactam antibiotics and processes for their preparation and use. 4,029,806, Cl. 424-271.000.

Krolick, Arline, executrix: *See—*
Krolick, James J., deceased; and Boshinski, Edwin E., 4,029,162.

Krolick, James J., deceased (by Krolick, Arline, executrix); and Boshinski, Edwin E., to Hobart Corporation. Zero return tare guard. 4,029,162, Cl. 177-165.000.

Krueger, Friedrich; and Michel, Walter, to Joh. A. Benckiser GmbH. N-acyl-1-amino alkane-1,1-diphosphonic acid compounds, process of making same, and compositions for and method of using same. 4,029,697, Cl. 260-502.500.

Kruger, Earl Cameron, Jr.: *See—*
Warner, H. Burt; and Kruger, Earl Cameron, Jr., 4,028,818.

Kruse, Walter M., to ICI United States Inc. Process for preparing mannitol from glucose. 4,029,878, Cl. 536-1.000.

Kubota, Hidetsugu. Plug for internal combustion engine for limiting production of nitrogen oxide. 4,029,982, Cl. 313-11.500.

Kubota, Tatsushi: *See—*
Kaneko, Yuichiro; Teraoka, Fuminori; Kubota, Tatsushi; and Nishikawa, Takehiko, 4,029,339.

Kuby, Milton, to Fairchild Industries Inc. Weapon system. 4,028,991, Cl. 89-41.0ME.

Kuchenmeister, Rolf: *See—*
Dhein, Rolf; Schoeps, Jochen; Beckers, Johannes; and Kuchenmeister, Rolf, 4,029,617.

Kuehnle, Manfred R. Method and means for making helical races. 4,028,992, Cl. 90-11.00C.

Kuhlmann, Joachim: *See—*
Sieber, Paul; and Kuhlmann, Joachim, 4,030,092.

Kuhn, Hans, to Hatebur Umformmaschinen AG. Assembly for applying lubricant to the working area of a punching device. 4,028,918, Cl. 72-45.000.

Kuhn, Wilfried; and Micklausch, Wilfried, to VEB Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungeo. Printing machine construction. 4,029,009, Cl. 101-231.000.

Kuhnis, Hans: *See—*
Eichenberger, Kurt; Egli, Christian; Kuhnis, Hans; and Schier, Oswald, 4,029,795.

Kulmala, Raili: *See—*
Kiminki, Keijo; Kulmala, Raili; and Sipila, Seppo, 4,029,515.

Kulzer & Co., GmbH: *See—*
Gross, Albert; and Schaefer, Roland, 4,029,632.

Kundikoff, Peter. Cutting tool guidance system. 4,028,976, Cl. 83-745.000.

Kunopik, Vlastislav: *See—*
Meinhold, Heinz; Lev, Antonin; and Kunopik, Vlastislav, 4,029,630.

Kunz, Eugen: *See—*
Jager, Kurt; Kunz, Eugen; and Vlah, Josko, 4,029,978.

Kupsky, George A., to Panel Technology, Inc. Method of manufacturing gas discharge display panels. 4,029,371, Cl. 316-19.000.

Kurimoto, Kazuhiko: *See—*
Tajima, Shigenobu; and Kurimoto, Kazuhiko, 4,029,619.

Kurner, Ebbert Franklin. Multi color wells process. 4,029,011, Cl. 101-330.000.

Kuroda, Akitada: *See—*
Utsumi, Masatoki; Toda, Munetaka; and Kuroda, Akitada, 4,028,961.

Kurz, Dieter; and Manner, Erich, to Wacker-Chemie GmbH. Catalyst and process for the manufacture of polyethylene. 4,029,864, Cl. 526-125.000.

Kusano, Kazutoshi, to Sansui Electric Co., Ltd. Bandwidth changing circuit. 4,030,036, Cl. 325-427.000.

Kuter, Heinrich; and Weghaupt, Erich, to Kraftwerk Union Aktiengesellschaft. Rotating rectifier assembly for electric machines. 4,029,981, Cl. 310-68.00D.

Kwan, Okun, to Bunker Ramo Corporation. Printer having a platen with resilient segments. 4,029,193, Cl. 197-149.000.

Laboratorios Made, S.A.: *See—*
Cartes, Juan Bosch; Cabiro, Jorge Canals; Jarque, Ricardo Granados; Roldan, Cristobal Martinez; and Peinado, Fernando Rabadan, 4,029,799.
Martinez Roldan, Cristobal; Fernandez Brana, Miguel; and Castellano Berlanga, Jose Maria, 4,029,807.

Lachaussee, Maurice; and Maigret, Andre, Priming chamber for cartridges. 4,029,015, Cl. 102-45.000.

Lacon, John W., to Fiberglas Canada Limited. Fibre felt forming and curing dies. 4,029,461, Cl. 425-384.000.

Laforest, Jacqueline: *See—*
Thuillier, Germaine; Laforest, Jacqueline; and Bessin, Pierre, 4,029,808.

LaHaye, Paul G.; Bjerklie, John W.; and Gallant, Gerald G., Jr., to Hague International Corporation. Energy conserving process furnace system and components thereof. 4,029,465, Cl. 432-179.000.

LaMarche, Robert Ernest: *See—*
Geigel, Alfred Antonio; and LaMarche, Robert Ernest, 4,029,912.

Lamb, Matthew J.: *See—*
Bell, Richard L.; and Lamb, Matthew J., 4,028,739.

Lang, Armin, to Zahnradfabrik Friedrichshafen AG. Motor vehicle steering. 4,028,997, Cl. 91-412.000.

Lang, Charles G., Jr. Card and board map game. 4,029,321, Cl. 273-135.0AB.

Lang, Stanley Albert, Jr.: *See—*
Fabio, Paul Frank; Lin, Yang-I; Lang, Stanley Albert, Jr.; and Tomcufcik, Andrew Stephen, 4,029,788.

Lange, Harold Carl: *See—*
Kamens, Ernest Rudolph; Kressin, Donald Milton; Lange, Harold Carl; and MacLeay, Ronald Edward, 4,029,615.

Lange, Harold T., to Sporlan Valve Company. Bidirectional flow filter-drier. 4,029,580, Cl. 210-136.000.

Lange, Klaus Robert, to Philadelphia Quartz Company. Method of precipitating microfine silica using phosphate. 4,029,514, Cl. 106-288.00B.

Lange, Klaus Robert: *See—*
Vessey, Eric W.; Miller, James R.; and Lange, Klaus Robert, 4,029,513.

Langen, Christianus Petrus, to H. J. Langen & Sons Ltd. Method of and apparatus for treating meat, more particularly ham meat. 4,029,824, Cl. 426-281.000.

Langen, Marinus J. M., to H. J. Langen & Sons Ltd. Wrap-around carton forming machine. 4,028,866, Cl. 53-195.000.

Lara, Jose Hector; and Williams, Edward B., Jr. Spark plug. 4,029,986, Cl. 313-123.000.

Lark, Raymond F.: *See—*
Chamis, Christos C.; and Lark, Raymond F., 4,029,838.

Larsen, Ole Fjord. Apparatus for preventing erosion of the seabed in front of hydraulic structures. 4,028,894, Cl. 61-3.000.

Larson, John C.: *See—*
Hendrick, Russell C.; and Larson, John C., 4,030,011.

Lase Industries: *See—*
Whitlock, William E., 4,030,129.

Laser Engineering Development Ltd.: *See—*
Gerrish, Arthur, 4,029,158.

Laserplane Corporation: *See—*
Teach, Ted L., 4,028,822.

Lasich, Lawrence E.; and Tetco, Charles, to Weatherchem Corporation. Container with plastic cap and display rack therefore. 4,029,202, Cl. 206-562.000.

Lassche, Jakob. Escape device. 4,029,298, Cl. 254-158.000.

Launder, James Mark. Conveying and weighing system. 4,029,052, Cl. 119-52.0AF.

Lavallee, Real, to Gilles Soucy. Variable diameter pulley. 4,028,953, Cl. 74-230.17E.

Lawrence Peska Associates, Inc.: *See—*
Boose, Michael Anthony, 4,029,112.
Delatorre, Jorge M., 4,028,876.
Lundwall, Carl, 4,028,841.

Lazich, Radovan P.; and Cascardo, Adolph P. Animal excrement disposal apparatus. 4,029,262, Cl. 241-43.000.

Leatherman, Alfred F., to Heller, William C., Jr. Composite plastic-metallic bonding means and method. 4,029,837, Cl. 428-247.000.

Lebonette, Francis A.: *See—*
Martz, Lyle F.; Smith, Jack R.; Lebonette, Francis A.; Putnam, Robert A.; and Berman, Paul A., 4,028,884.

Leca Trading & Concession A/S: *See—*
Kamstrup-Larsen, Harry, 4,029,464.

Lechaton, John S.: *See—*
Feng, Bai-Cwo; and Lechaton, John S., 4,029,562.

Lee, Chin-Chuan Frederic, to Gould Inc. Detachable battery carrying handle. 4,029,248, Cl. 224-45.00F.

Lee, Harvie Ho, to Inland Steel Company. Zn-Al hot-dip coated ferrous sheet. 4,029,478, Cl. 428-659.000.

Lee Marine, Inc.: *See—*
Toups, Earl Lee, 4,028,759.

Lee, Richard G., to Econocorp, Inc. Carton forming machine. 4,028,999, Cl. 93-51.00R.

Leesona Corporation: *See—*
Shah, Sunil C., 4,028,779.

Leibundgut, Max; and Reber, Tony, to Alos AG. Light fixture for projection device. 4,029,956, Cl. 240-41.370.

Leidvik, Gastav Martin, to Stabilator AB. Drilling machine. 4,029,160, Cl. 175-210.000.

Leifheit International Gunter Leifheit GmbH: *See—*
Liebscher, Johannes, 4,028,765.

Leiter, Larry L.: *See—*
Lynch, Thomas; and Leiter, Larry L., 4,029,309.

Leland Stanford Junior University, The Board of Trustees of: *See—*
Alvarez, Robert E.; and Macovski, Albert, 4,029,963.
Lemons, Ross A.; and Quate, Calvin F., 4,028,933.

Lemons, Ross A.; and Quate, Calvin F., to Leland Stanford Junior University, The Board of Trustees of. Acoustic microscope. 4,028,933, Cl. 73-67.600.

Lemper, Anthony L., to Hooker Chemicals & Plastics Corporation. Method of obtaining small particle size polymers and copolymers of vinyl chloride by bulk polymerization. 4,029,863, Cl. 526-88.000.

Leong, Bing M.: *See—*
Iftikar, Syed H.; and Leong, Bing M., 4,030,132.

LeRoy, Pierre L., to New Research and Development Laboratories, Inc. Surgical sponge collector and drainage system. 4,029,097, Cl. 128-276.000.

Lesti, Klaus. Sound and thermal insulating construction element 4,029,839, Cl. 428-306.000.

Lev, Antonin: *See—*
Meinhold, Heinz; Lev, Antonin; and Kunopik, Vlastislav, 4,029,630.

Levens, Joseph A., to Nipak, Inc. Pipe repair apparatus. 4,029,428, Cl. 408-127.000.

Leveque, Rene, to Automobiles Peugeot. Speed variator employing friction having an improved friction elements-tightening device. 4,028,952, Cl. 74-199.000.

Lever Brothers Company: *See—*
Humbert, Francoise Ernestine Lucie; and D'Audiffret, Yves Tollard, 4,029,759.

Levin, Berton P., to Sierracin Corporation, The. Transparent prelaminate with electrical connectors. 4,029,942, Cl. 219-522.000.

Levinson, Armand L.; Heinerichs, Donald W.; and Ruck, George, to Levinson, Armand L. Automatic date-stamping system for vehicles entering parking areas. 4,029,007, Cl. 101-42.000.

Lewis, Elmer: *See—*
Wheeler, Edison L., 4,029,115.

Lewis, Nathanial Henry. Capillary action brake shoe. 4,029,181, Cl. 188-250.00B.

Lewis, Thomas F.: *See—*
Jorgensen, Adam A.; Rose, Norman L.; and Lewis, Thomas F., 4,029,907.

Li, Norman N.; and Cahn, Robert P., to Exxon Research and Engineering Company. Process for removing the salt of a weak acid and a weak base from solution. 4,029,744, Cl. 423-356.000.

Libutti, Bruce L.: *See—*
Godlewski, Irene T.; Schuck, Joseph J.; and Libutti, Bruce L., 4,029,577.

Licentia Patent-Verwaltungs-G.m.b.H.: *See—*
Sieber, Paul; and Kuhlmann, Joachim, 4,030,092.

Licitis, Gunars, to Marvin Glass & Associates. Layered skin doll. 4,028,845, Cl. 46-164.000.

Liebler, Marvin E.; and Lum, Eugene J., to Westinghouse Electric Corporation. Method of assembling helical resistor. 4,028,793, Cl. 29-618.000.

Liebscher, Johannes, to Leifheit International Gunter Leifheit GmbH. Floor or carpet sweeper. 4,028,765, Cl. 15-42.000.

Lies, Thomas Andrew; and Berenson, Herman, to American Cyanamid Company. Tetrahydro-3-(4-pyridylmethyl)-2H-1,3,5-thiadiazine-2-thione. 4,029,652, Cl. 260-243.00R.

Limberg, Allen LeRoy, to RCA Corporation. Feedback amplifiers. 4,030,042, Cl. 330-18.000.

Lin, Jau-Guang. Thin flat eraser and holder. 4,028,771, Cl. 15-434.000.

Lin, Yang-I: *See—*
Fabio, Paul Frank; Lin, Yang-I; Lang, Stanley Albert, Jr.; and Tomcufcik, Andrew Stephen, 4,029,788.

Lincoln Brass Works, Inc.: *See—*
Carlson, Everett W., 4,029,291.

Lindahl, Jonas Arne Ingvar, to Mo och Domsjo. Mechanically freeing wood fibers in the presence of spent peroxide bleaching liquor. 4,029,543, Cl. 162-24.000.

Linde Aktiengesellschaft: *See—*
Reimann, Hans, 4,029,574.

Lindroos, Leo Elias: *See—*
Kapanen, Aarne Albin; Rantanen, Raimo Uolevi; Lindroos, Leo Elias; Relander, John Henrik; and Honkala, Risto Johannes, 4,029,494.

Lingl Corporation: *See—*
Lingl, Hans, Jr., 4,029,198.

Lingl, Hans, Jr., to Lingl Corporation. Method and apparatus for forming groups of bricks. 4,029,198, Cl. 198-425.000.

Lion Fat & Oil Co., Ltd.: *See—*
Isa, Hiroshi; Suzuki, Noboru; Takahashi, Masatoshi; and Hirayama, Eriko, 4,029,606.
Ohbu, Kazuo; Takada, Yuichi; and Nakamura, Shigemi, 4,029,591.

Liu, Gordon Y. T.; Hutchinson, Loyd D.; and Stain, S. Douglas, Jr., to Dow Chemical Company, The. Olefin polymer chlorination products having improved handling properties and process for their preparation. 4,029,862, Cl. 526-43.000.

Loch, Emil P., to Westinghouse Electric Corporation. Method of installing a sleeve in one end of a tube. 4,028,789, Cl. 29-157.400.

Lockheed Missiles & Space Company, Inc.: *See—*
Campbell, Gordon Kieth Colin, 4,030,103.

Lohr, Wilhelm; Berthold, Fritz; and Allington, Robert W. Apparatus for measuring the nuclear radiation of a sequence of radioactive samples. 4,029,961, Cl. 250-328.000.

Long, James F.: *See—*
Sberlock, Margaret H.; and Long, James F., 4,029,815.

Long, Leonard Clarence. Straight action gear changing mechanism. 4,028,959, Cl. 74-473.00R.

Long, Richard William. Diving bell heater and absorbent system. 4,029,483, Cl. 55-68.000.

Longaberger, Robert E. Mold blow out apparatus. 4,029,449, Cl. 425-28.00R.

Lorain Products Corporation: *See—*
Brown, Harold J., 4,030,017.

Loveland, Winton; Hanemann, Horst J.; and Warshaw, Saul, to Loveshaw Corporation, The. Control mechanism for carton sealing machine elevator head. 4,028,865, Cl. 53-76.000.

Loveshaw Corporation, The: *See—*
Loveland, Winton; Hanemann, Horst J.; and Warshaw, Saul, 4,028,865.

Lovrekovic, Steven N.: *See—*
Bechard, Conrad E.; Davenport, John M.; Herrmann, William H., and Lovrekovic, Steven N., 4,028,798.

Lowe, Richard L., to Aluminum Company of America. Flexible junction in a system for fluidizing granular materials. 4,029,363, Cl. 302-29.000.

Lowell Technological Institute Research Foundation: *See—*
Bibl, Klaus; and Reinisch, Bodo W., 4,030,033.

Lowry, Richard P.; Chase, Joseph D.; and Cook, Paul A. C., to Celanese Corporation. Method for reducing molybdenum trioxide content of gases issuing from reactors containing molybdenum-based catalysts. 4,029,636, Cl. 260-530.00N.

Lubrication Company of America: *See—*
Ivey, Herbert D., Jr., 4,029,569.

Lubrizol Corporation, The: *See—*
Koch, Frederick William, 4,029,587.
Koch, Frederick William, 4,029,588.

Luce, David A., to Norlin Music, Inc. Multiplexer for electronic musical instrument. 4,028,979, Cl. 84-1.240.

Lucke, Michael: *See—*
Winterhager, Helmut; Kammel, Roland; and Lucke, Michael, 4,029,302.

Luderitz, Otto: *See—*
Galanos, Chris; Luderitz, Otto; and Westphal, Otto, 4,029,762.

Ludwig, David P.: *See—*
Kovacs, Ernest; Ludwig, David P.; and Zwickel, Friedich, 4,029,536.

Luerken, Adolf. Convertible beach attire. 4,028,740, Cl. 2-67.000.

Lum, Eugene J.: *See—*
Liebler, Marvin E.; and Lum, Eugene J., 4,028,793.

Lumme, Edgar, to Aug. Winkhaus. Locking arrangement with burglar alarm. 4,029,919, Cl. 200-52.00R.

Lummus Company, The: *See—*
Sze, Morgan C.; and Kohn, Harold B., 4,029,474.

Lundquist, Jerry R.: *See—*
Barlow, Malcolm; and Lundquist, Jerry R., 4,029,541.

Lundqvist, Harald. Shelving structure. 4,029,025, Cl. 108-108.000.

Lundwall, Carl, to Lawrence Peska Associates, Inc., a part interest. Distribution system for vermin control composition. 4,028,841, Cl. 43-124.000.

Lutkemeyer-Hohmann, Margitta: *See—*
Diehl, Reiner; and Lutkemeyer-Hohmann, Margitta, 4,030,062.

Lynch, Thomas; and Leiter, Larry L., to Xerox Corporation. Set transport and stacker. 4,029,309, Cl. 270-53.000.

M.H. Canjar Company: *See—*
Canjar, Mathew H., 4,028,835.

Maag, Fritjof; Unger, Friedrich; and Mohr, Wilhelm, to Hoechst Aktiengesellschaft. Roving and process for its manufacture. 4,028,874, Cl. 57-144.000.

Maaghul, John, to PPG Industries, Inc. Glass fiber sizing compositions for the reinforcement of resin matrices. 4,029,623, Cl. 260-29.6RW.

Mabrouk, Saied Abd-Elrahman, to Addressograph Multigraph Corporation. Moisture control system. 4,029,008, Cl. 101-148.000.

MacGregor, John James: *See—*
Westwood, Walter; MacGregor, John James; and Payne, John Blunden, 4,029,499.

Machenschalk, Rudolf: *See—*
Bildstein, Hubert; Machenschalk, Rudolf; and Petter, Helmut, 4,029,828.

Machon, Jean Pierre: *See—*
Gloriod, Pierre; and Machon, Jean Pierre, 4,029,875.

MacLeay, Ronald Edward: *See—*
Kamens, Ernest Rudolph; Kressin, Donald Milton, Lange, Harold Carl, and MacLeay, Ronald Edward, 4,029,615.

MacMillan, Kenneth T. Retreading mold with nonplowing matrices closing. 4,029,447, Cl. 425-21.000.

MacMillan, Kenneth T. Bead aligner wheels with projection for retreading machines. 4,029,448, Cl. 425-21.000.

Macovski, Albert: *See—*
Alvarez, Robert E.; and Macovski, Albert, 4,029,963.

Macy, Frank D.; Hawthorne, Harold E.; and Norton, Harold L. Food dryer. 4,028,816, Cl. 34-195.000.

Macda, Keijiro, to Sony Corporation. Pickup arm assembly 4,029,322, Cl. 274-37.000.

Maev, Veniamin Evnovich: *See—*
Genshpring, Eduard Matveevich; Bljumshtein, Zigmund Genrikhovich; Maev, Veniamin Evnovich; Bondarenko, Fedor Alexeevich; Gutman, Anatoly Lvovich; and Presman, Vladimir Alexandrnvich, 4,029,041.

Maglificio Biellese Fratelli Fila S.p.A.: *See—*
Rolando, Pierluigi, 4,028,744.

Magnetic Controls Company: *See—*
Gunderson, Richard A., 4,029,913.

Magnuson, Allen H. Stabilization and motion alleviation of air cushion borne vehicles. 4,029,036, Cl. 114-67.00A

Maier, Hermann: *See—*
Nagel, Peter; Grau, Werner; Maier, Hermann; Wittkamp, Heinrich; Falk, Roland; and Willmann, Paul, 4,029,249.

Maier, Karl; Graser, Fritz; and Meyer, Guenter, to BASF Aktiengesellschaft. Transfer dyes. 4,029,468, Cl. 8-2.50A.

Maigret, Andre: *See—*
Lachaussee, Maurice; and Maigret, Andre, 4,029,015.

Mainiero, Michael R., to Man Barrier Corporation. Apparatus and method for forming barbed tape. 4,028,925, Cl. 72-294.000.

Mallyclad Corporation: *See—*
Dalbec, Peter M., 4,028,856.

Malmstrom, Sven Erik. Games racket. 4,029,317, Cl. 273-73.00C.

Man Barrier Corporation: *See—*
Mainiero, Michael R., 4,028,925.

Manaresi, Adriana. Device for the extemporary preparation of beverages. 4,029,003, Cl. 99-295.000.

Manduley, Flavio M.: *See—*
Canevari, Louis T.; Coppola, Vincent G.; Dlugos, Daniel F.; Freeman, Gerald C.; and Manduley, Flavio M., 4,030,070.

Manger, Josef Wilhelm. Membrane for electroacoustic converter systems. 4,029,171, Cl. 181-167.000.

Mania, Carlo, to Brnggi-Izar Fabbriche Italiane Riunite S.p.A. Single-piece aluminium container for aerosols. 4,029,232, Cl. 220-73.000.

Manizza, Guelfo A., to Federal Paper Board Company, Inc. Bottle package. 4,029,204, Cl. 206-140.000.

Mann, Joe A.: *See—*
Hurley, Rupert B.; Eastwood, Frederick B.; and Mann, Joe A., 4,029,725.

Manner, Erich: *See—*
Kurz, Dieter; and Manner, Erich, 4,029,864.

Manthiram, Chockalingam, to Burroughs Corporation. Digital circuit for controlling the return speed of a business machine carriage. 4,029,192, Cl. 197-19.000.

Marinelli, Donald Paul, to RCA Corporation. Method of forming grooves in the [011] crystalline direction. 4,029,531, Cl. 156-647.000.

Markarian, William: *See—*
Bardoni, Thomas J.; and Markarian, William, 4,028,778.

Marker, Thomas E.: *See—*
Benedict, Andrew G.; Marker, Thomas E.; and Schmidt, Herbert J., 4,029,214.

Markin, Trevor Leslie: *See—*
Evans, Leslie Samuel; Markin, Trevor Leslie; Dell, Ronald Michael; and Montgomery, Albert George, 4,029,858.

Marling, John B., to United States of America, Energy Research and Development Administration. Isotope enrichment by frequency-tripled temperature tuned neodymium laser photolysis of formaldehyde. 4,029,558, Cl. 204-158.00R.

Marling, John B., to United States of America, Energy Research and Development Administration. Ion laser isotope enrichment by photo-predissociation of formaldehyde. 4,029,559, Cl. 204-158.00R.

Marques, Antoine: *See—*
Aubry, Pierre; Marques, Antoine; and Schwartz, Rene, 4,029,437.

Marquis, Wilfred. Motorcycle safety belt. 4,028,742, Cl. 2-305.000.

Marriott, Joe E., to Hewlett-Packard Company. Precision active rectifier circuit. 4,030,016, Cl. 321-8.00R.

Marsden, Howard A.: *See—*
Haak, Willard J.; Marsden, Howard A.; and Van Zandt, Rollin P., 4,029,166.

Marshall, John A. Receptacle mounting bracket. 4,029,281, Cl. 248-220.300.

Marshall, Mary L. Folding clothes rack with stabilizing hinges and shne supports. 4,029,211, Cl. 211-104.000.

Marshall, Winston S.: *See—*
Zimmerman, Dennis M.; and Marshall, Winston S., 4,029,796.

Martin, Richard Hugo, to Olin Corporation. Apparatus for electrically perforating moving webs. 4,029,938, Cl. 219-384.000.

Martinez, Jacques, to Agence Nationale de Valorisation de la Recherche (ANVAR). Road trailer for transporting a boat. 4,029,227, Cl. 214-396.000.

Martinez Roldan, Cristobal; Fernandez Brana, Miguel; and Castellano Berlanga, Jose Maria, to Laboratorios Made, S.A. Compounds 5-hydroxytryptophan glutamate and its derivatives. 4,029,807, Cl. 424-274.000.

Martino, Fredric J.: *See—*
Vissers, Donald R.; Shimotake, Hiroshi; Gay, Eddie C.; and Martino, Fredric J., 4,029,860.

Martz, Lyle F.; Smith, Jack R.; Lebonette, Francis A.; Putnam, Robert A.; and Berman, Paul A., to Westinghouse Electric Corporation. Control apparatus for controlling the operation of a gas turbine inlet guide vane assembly and heat recovery steam generator for a steam turbine employed in a combined cycle electric power generating plant. 4,028,884, Cl. 60-39.18B.

Maruyama, Kenichi: *See—*
Ban, Itsuki; Kasuya, Takanori; Yano, Kanji; and Maruyama, Kenichi, 4,030,134.

Marvin Glass & Associates: *See—*
Licitis, Gunars, 4,028,845.

Marzocco, Alessandro, to Socimi Societa Costruzioni Industriali Milano S.p.A. Sliding-wing door for vehicles. 4,028,850, Cl. 49-212.000.

Mashimo, Yukio: *See—*
Sakurada, Nobuaki; Shinoda, Nobuhiko; Mashimo, Yukio; Ito, Tadashi; and Ito, Fumio, 4,029,421.
Yazaki, Mutsunnbu; Uchiyama, Takashi; Matsuda, Mutsuhide; Taguchi, Tetsuya; and Mashimo, Yukio, 4,030,108.

Mason, Burton Hoster. Method and apparatus for buoyancy control of submergible chambers 4,029,034, Cl. 114-16.00E.

Masonite Corporation: *See—*
Daunheimer, Lyn A., 4,029,831.

Massey-Ferguson Inc.: *See—*
Fox, Anthony E.; and Bargellini, Marcello, 4,029,167.

Mather & Platt Limited: *See—*
Wolstenholme, Harold, 4,028,867.

Mathers, E. H. Device particularly suited for use in handling hoods of motorized vehicles. 4,029,308, Cl. 269-17.000.

Matsuda, Mutsuhide: *See—*
Yazaki, Mutsunobu; Uchiyama, Takashi; Matsuda, Mutsuhide; Taguchi, Tetsuya; and Mashimo, Yukio, 4,030,108.

Matsuo, Nobuhiro: *See—*
Inoue, Gentei; Sato, Chuichi; Tanaka, Mamoru; and Matsuo, Nobuhiro, 4,029,323.

Matsushita Electric Industrial Co., Ltd.: *See—*
Enoki, Yoshio; and Ohshima, Nobumasa, 4,029,604.
Mori, Takashi; Kato, Michio; Mizu, Koichi; and Nishida, Yoshikazu, 4,029,266.
Moriyama, Akio; Fukai, Masakazu; and Hattori, Katsuji, 4,029,392.
Yamada, Kiichiro; Kozu, Isao; Akamine, Takenori; and Shimizu, Ryota, 4,030,133.

Matsutani, Toshinobu; and Nishida, Keiichi, to Sharp Kabushiki Kaisha. Solar cell. 4,029,518, Cl. 136-89.0SG.

Matsuura, Takashi. Two-storied parking apparatus for automobiles. 4,029,218, Cl. 214-16.10R.

Matsuzawa, Nobuyoshi, to Copal Company Limited. Motion transforming mechanism. 4,028,951, Cl. 74-128.000.

Matthews, James J., to Utility Tools Corporation. Cable shaving tool. 4,028,800, Cl. 30-90.100.

Maurer, David L.: *See—*
Blanco, Milagros V.; and Maurer, David L., 4,029,817.

Mauvernay, Roland Yves; Busch, Norbert; Moleyre, Jacques; Simond, Jacques; and Monteil, Andre, to Centre European de Recherches Mauvernay. 1-Benzoyl-2 or 4 [2-(4-phenyl-piperazino)-ethyl]-piperidines. 4,029,790, Cl. 424-250.000.

Max-Planck-Gesellschaft zur Forderung oer Wissenschaften e.V.: *See—*
Galanos, Chris; Luderitz, Otto; and Westphal, Otto, 4,029,762.

Mayer, Peter; Murthy, M. Krishna; Brooks, Albert H.; and Topping, John A., to Quality Hermetics Limited. Glass seal. 4,029,897, Cl. 174-152.0GM.

Mayer, Siegfried; Sauer, Ivan; and Zorn, Jurgen, to Robert Bnsch G.m.b.H. Sealing arrangement for gear-type fluid displacing machines. 4,029,446, Cl. 418-132.000.

MB Associates: *See—*
Adamski, Donald F.; and Anderson, David M., 4,029,223.

McCarthy, James R., Jr., to Dow Chemical Company, The. N,N'-disubstituted halophenylacetamidines. 4,029,703, Cl. 260-564.00R.

McCaskill, John Walton; Barnett, Robert D.; and Herd, David P., to McEvoy Oilfield Equipment Co. High pressure valve. 4,029,294, Cl. 251-282.000.

McClurg, Carl D., to Buckeye International, Inc. Center brace casting. 4,029,022, Cl. 105-420.000.

McConnell, Francis P. Anchoring plate for medical tubes. 4,029,103, Cl. 128-348.000.

McCulloch Corporation: *See—*
Anderson, Harold Elden, 4,029,998.
Hammond, Walter J., 4,028,804.

McCullough, David Jacob, to Dynascan Corporation. Vehicle proximity sensing and control system. 4,030,088, Cl. 340-267.00C.

McDonald, John C.: *See—*
Henrickson, Gary C.; and McDonald, John C., 4,030,069.

McDonnell Douglas Corporation: *See—*
Hackett, Robert D., 4,028,886.

McEvoy Oilfield Equipment Co.: *See—*
McCaskill, John Walton; Barnett, Robert D.; and Herd, David P., 4,029,294.

McGinniss, Vincent Daniel, to SCM Corporation. Photocurable cathodic electrocoating. 4,029,561, Cl. 204-181.000.

McGraw-Edison Company: *See—*
Vandas, Edward B., 4,029,002.

McKellar, Robert L.: *See—*
Jueckstock, Dale Allen; and Hindman, Thomas Wayne, Sr., 4,028,762.

McKinney, Roy L. Animal feeding and protective device. 4,029,051, Cl. 119-52.00R.

McLaren, Brian Eric: *See—*
Morrison, Terrence Keith; and McLaren, Brian Eric, 4,029,723.

McMahon, Thomas J.; and Green, Arold K., to United States of America, Navy. PbS-Al selective solar absorber. 4,029,853, Cl. 428-621.000.

McMillan, Hugh G. Microwave water heater. 4,029,927, Cl. 219-10.55R.

McMillan, John E.: *See—*
Calevich, George J.; McMillan, John E.; and Ticknor, Grant W., 4,028,924.

McNeely, Gerald W., to Akzona. Copolyester polymer of enhanced dyeability. 4,029,638, Cl. 260-75.00N.

MCP Facilities Corporation: *See—*
Benedict, Andrew G.; Marker, Thomas E.; and Schmidt, Herbert J., 4,029,214.

McQuiddy, David N., Jr.; and Blocker, Truman G., III, to Texas Instruments Incorporated. Broadband low noise parametric amplifier. 4,030,049, Cl. 333-33.000.

Mead Corporation, The: *See—*
Wood, Prentice J., 4,029,205.

Medley, Max W., Jr.; and Ward, James H., Jr., to E-Systems, Inc. Co-planar lead connections to microstrip switching devices. 4,030,001, Cl. 361-401.000.

Medynski, John B.: *See—*
Medynski, Joseph M.; and Medynski, John B., 4,029,032.

Medynski, Joseph M.; and Medynski, John B. Tie sewing machine 4,029,032, Cl. 112-121.220.

Mehnert, Walter, to Institut fuer industrielleo Fortschritt AG. Slip-free sheave or pulley. 4,028,954, Cl. 74-230.010.

Meiji Seika Co., Ltd.: *See—*
Inouye, Shigeharu; Omoto, Shoji; Niida, Taro; and Nomiya, Bunzo, 4,029,881.

Meinhold, Heinz; Lev, Antonin; and Kunopik, Vlastislav. Process for the manufacture of structural elements. 4,029,630, Cl. 260-38.000.

Meininger, Fritz; and Schlafer, Ludwig, to Hoechst Aktiengesellschaft. Water-soluble, fiber-reactive monoazo dyestuffs. 4,029,644, Cl. 260-200.000.

Meives, Otis E.: *See—*
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Melkonian, Garegin Sarkisovich. Processing pearlite to obtain metal silicates. 4,029,736, Cl. 423-118.000.

Memhardt, Charles R.: *See—*
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Mendez, William E., Jr.: *See—*
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Mercer, Paul W., to Boeing Company, The. Method and apparatus for printing indicia on a continuous, elongate, flexible three-dimensional member. 4,029,006, Cl. 101-35.000.

Merck & Co., Inc.: *See—*
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Dorn, Conrad P.; and Yang, Shu S., 4,029,772.
Hunter, Norman R.; Rooney, Clarence S.; Rokach, Joshua; and Cragoe, Edward J., Jr., 4,029,803.
Provost, Philip J.; Ittensohn, Oswald L.; and Hilleman, Maurice R., 4,029,764.

Meredith, Philip Lacy, to Du Pont de Nemours, E. I., and Company. Flame retardant polymeric compositions containing halogen substituted hexakis-(substituted phenoxy)cyclotriphosphazene. 4,029,634, Cl. 260-45.9NP.

Merideth, John H., to Phillips Petroleum Company. Tapping apparatus and method. 4,029,118, Cl. 137-15.000.

Merithew, David L.: *See—*
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Merkl, George G., to Molecular Energy Research Co., Inc. Method of preparing inorganic monomeric and polymeric complexes and products so produced. 4,029,747, Cl. 423-413.000.

Merrill, Duane F., to General Electric Company. Silicone resins useful for forming mica laminate. 4,029,635, Cl. 260-46.50R.

Merritt, Lauren V. Pitch determination and display system. 4,028,985, Cl. 84-454.000.

Messer, Mayer Naoum: *See—*
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Meyer, Guenter: *See—*
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Meyer, Jeffry R.; and Dropik, Sylvester J., to Westinghouse Electric Corporation. Magnetizing current switch. 4,029,923, Cl. 200-163.000.

Meyer-Kahrweg, Helmut, to Steag Aktiengesellschaft. Generating plant and method of starting up a generating plant. 4,028,883, Cl. 60-39.040.

Meylan, Pierre; and Brunner, Heinz, to BBC Brown Boveri & Company Limited. Thermal turbomachine. 4,029,432, Cl. 415-101.000.

Meylan, Pierre: *See—*
Janeic, Gojko; Meylan, Pierre; and Portmann, Alexandre, 4,028,909.

Meysenburg, Raymond Richard, to Deere & Company. Control valve. 4,029,293, Cl. 251-282.000.

Michael, John Graham. School ring charm with dangling school indicia. 4,028,908, Cl. 63-23.000.

Michel, Walter. *See—*
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Micheli, Adolph L.; and Dungan, Dennis F., to General Motors Corporation. Thermoclectric exhaust gas sensor. 4,029,472, Cl. 23-254.00E.

Micheli, Adolph L.: *See—*
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Michelson, Adolf Michael, to Etablissement Public det: Agence Nationale de Valorisation de la Recherche Anver. Superoxide dismu-

tase and its application as an oxidation inhibitor. 4,029,819, Cl. 426-61.000.
Micklausch, Wilfried: *See—*
Kuhn, Wilfried; and Micklausch, Wilfried, 4,029,009.
Miconi, Pietro. Sand spreader. 4,029,237, Cl. 222-614.000.
Micro Tracers, Inc.: *See—*
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Midcon Pipeline Equipment Co.: *See—*
Birdwell, J. C., 4,029,215.
Midland-Ross Corporation: *See—*
Kosta, Geza, 4,029,833.
Miffitt, Donald Charles, to Gillette Company, The. Apparatus having a protective circuit. 4,029,996, Cl. 307-326.000.
Miffre, Hubert, to Institute Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Elf. Control system for gate-valves. 4,029,289, Cl. 251-58.000.
Mighton, Perceptimus J., to H & M Pipe Beveling Machine Co. Connective means for providing variable attitude. 4,029,301, Cl. 266-77.000.
Mihirogi, Kiyoshi: *See—*
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Miller, David J.; and Miller, Charles P., to Miller Formless Co., Inc. Convertible construction machine. 4,029,165, Cl. 180-6.480.
Miller Formless Co., Inc.: *See—*
Miller, David J.; and Miller, Charles P., 4,029,165.
Miller, Harold R., to Data Documents, Inc. Mailing-price label. 4,028,824, Cl. 40-2.00R.
Miller, Harvey E., to General Tire & Rubber Company, The. Method for assembling resilient bushings. 4,028,797, Cl. 29-451.000.
Miller, James R.: *See—*
Vessey, Eric W.; Miller, James R.; and Lange, Klaus Robert, 4,029,513.
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Mills, Gerald W. Doorway safety device. 4,029,176, Cl. 187-52.00R.
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Milsco Manufacturing Company: *See—*
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Mitsubishi Jidosha Kogyo Kabushiki Kaisha: *See—*
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Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
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Miyai, Akira: *See—*
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Miyake, Masao: *See—*
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Mizukami, Hidekatsu; Fukui, Kosuke; and Kinoshita, Tsutomu, to Dainippon Screen Seizo Kabushiki-Kaisha. Platen cover for a vacuum contact printer. 4,029,404, Cl. 355-91.000.
Mizuochi, Shoken, to Asahi Engineering & Construction Co., Ltd. Fluid-leak detector cable. 4,029,889, Cl. 174-11.00R.
Mlodozeniec, Arthur Roman; and White, Lawrence Samuel, to Hoffmann-La Roche Inc. Manufacture of pharmaceutical unit dosage forms. 4,029,757, Cl. 424-27.000.
Mlodozeniec, Arthur Roman; and Goldberg, Arthur H., to Hoffmann-La Roche Inc. Preparation of pharmaceutical unit dosage forms. 4,029,758, Cl. 424-27.000.
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Williams, Albert L.; and Heiba, El-Ahmadi I., 4,029,675.
Moegen, Gerhard; and Tang, Edward Y., to Eurosil G.m.b.H. Switching arrangement for setting time-measuring apparatus. 4,028,879, Cl. 58-23.00R.
Mogg, Klaus: *See—*
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Mohr, Claus Erich: *See—*
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Monaco, Emlee; and Monaco, Pasquale F. Plating bath and method of plating therewith. 4,029,556, Cl. 204-40.000.
Monaco, Pasquale F.: *See—*
Monaco, Emlee; and Monaco, Pasquale F., 4,029,556.
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Monnet, Bernard Leon. Injection molding machine for composite articles. 4,029,454, Cl. 425-130.000.
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Moran, Barber, to Raymond Lee Organization, Inc., The, a part interest. Intensive care portable bathtub. 4,028,751, Cl. 4-173.00R.
Moreno, Enrique. Multiple holder for determining hematocrit. 4,028,930, Cl. 73-61.400.
Morgan, Allan Clark: *See—*
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Morgan, Bevly Boone, to U. S. Divers Co. Compartmentalized full face mask. 4,029,092, Cl. 128-141.00R.
Morgan, Lawrence M., to Cornelius Company, The. Swivel caster. 4,028,773, Cl. 16-35.00R.
Mori, Takashi; Kato, Michio; Mizu, Koichi; and Nishida, Yoshikazu, to Matsushita Electric Industrial Co., Ltd. Automatic thread winding apparatus. 4,029,266, Cl. 242-20.000.
Morishima, Yukimasha; Yoshida, Minoru; and Hanaki, Kimiyasu, to Japan Steel Works Ltd., The. Extruder of the degassing and modification type. 4,029,300, Cl. 259-192.000.
Moriyama, Akio; Fukai, Masakazu; and Hattori, Katsuji, to Matsushita Electric Industrial Co., Ltd. Liquid crystal display. 4,029,392, Cl. 350-160.0LC.
Morris, Donald E.: *See—*
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Morrison, Terrence Keith; and McLaren, Brian Eric. Evaporative airconditioner. 4,029,723, Cl. 261-29.000.
Morse, Charles Richard. Pipe-handling crampon. 4,029,217, Cl. 214-1.00P.
Morse, Glenn B. Simplified lathe. 4,028,972, Cl. 82-28.00R.
Morse, John B.; Pizzuti, Donato F.; and Reynard, John M., to Polaroid Corporation. Accessory adapter for cameras. 4,030,112, Cl. 354-269.000.
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Moseley, Robin C.; and Brisk, Richard A., to DASA Corporation. Repertory dialer logic. 4,029,908, Cl. 179-90.0BB.
Moss, Herbert Irwin, to RCA Corporation. Method of preparing improved magnetic head material. 4,029,501, Cl. 75-206.000.
Motorola, Inc.: *See—*
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Noguchi, Masaaki; Tanaka, Yukiyasu; Sekiya, Setsuro; and Motosugi, Katsuhiko, 4,029,075.
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Moyer, John N., to HMS Associates, Inc. Portable lamp. 4,029,954, Cl. 240-10.6CH.
Mrenna, Stephen A.; Haugh, Charles E.; and Thomas, Glenn R., to Westinghouse Electric Corporation. Thermally adjustable circuit breaker. 4,030,060, Cl. 337-50.000.
Mrlik, Jerry R., to General Motors Corporation. Rotary combustion engine apex seal arrangement. 4,029,445, Cl. 418-120.000.
Mueller, Larry G.: *See—*
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Mulholland, Lawrence K. Prone stander. 4,029,089, Cl. 128-80.00R.
Muller, Friedhelm: *See—*
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Muller, Gunther. Pile with a foot. 4,028,900, Cl. 61-53.000.
Muller, Hans; and Guazzone, Bruno, to Muller, Hans. Method of and apparatus for mixing gas into liquids for cultivating microorganisms. 4,029,724, Cl. 261-87.000.
Muller, Marcel: *See—*
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Muncheryan, Hrand M. Awakening system with means adapted to relax tense muscles. 4,028,882, Cl. 58-152.00B.
Munro, Douglas Newton, to Pedigree Petfoods Limited. Animal food. 4,029,821, Cl. 426-92.000.
Murakami, Hisashi, to Mitsui Coke Co. Ltd. Process for manufacturing needle coke. 4,029,749, Cl. 423-449.000.
Muramatsu, Shigeru: *See—*
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Murata, Moriyasu; Sai, Fumio; and Fujino, Takashi, to Kao Soap Co., Ltd. Granular or powdery detergent composition. 4,029,608, Cl. 252-551.000.
Murata, Tadakazu; Nohara, Akira; Sugihara, Hirosada; and Sanno, Yasushi, to Takeda Chemical Industries, Ltd. 3,(2,4,5-Trisubstituted benzoyl)-propionic acid and the salts thereof. 4,029,699, Cl. 260-516.000.
Murphy, Ivin S.; and Murphy, Melvin H. Concrete form bracket. 4,029,288, Cl. 249-216.000.
Murphy, Melvin H.: *See—*
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Murray, David E., to Murray, Michael D., a part interest. Lamp pedestal with terrarium bowl. 4,028,848, Cl. 47-69.000.
Murray, Michael D.: *See—*
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Murray, Michael F. Warning device for vehicles. 4,028,829, Cl. 40-129.00C.
Murrmann, Helmuth: *See—*
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Myers, Walter E.: *See—*
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Mykleby, Laurie G., to Coronet Container. Cable storage package. 4,029,206, Cl. 206-400.000.
Mysiak, Eugene J.; and Burry, Allen J., to Molex Incorporated. Electrical connector and means of mounting same. 4,029,385, Cl. 339-128.000.
Naeco Associates, Inc.: *See—*
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Aratani, Tadatoshi; Nakamura, Shuzo; Nagase, Tsuneyuki; and Yoneyoshi, Yukio, 4,029,690.
Nagel, Peter; Grau, Werner; Maier, Hermann; Wittkamp, Heinrich; Falk, Roland; and Willmann, Paul, to BASF Aktiengesellschaft. Roller system for continuous transport of webs of sheeting. 4,029,249, Cl. 226-95.000.
Nagy, William L.; and Craver, Robert J., to Champion Spark Plug Company. Spark plug construction. 4,029,990, Cl. 315-62.000.
Nahmias, Maurice E., to United States of America, Army. Method and means for reducing reflections of electromagnetic waves. 4,030,098, Cl. 343-18.00A.
Nakagawa, Yasuichi, to Kabushiki Kaisha Daini Seikosha. Mechanism for correcting calendar in a watch. 4,028,881, Cl. 58-58.000.
Nakai, Saburo; and Koyama, Nobuyuki, to Japan Tobacco & Salt Public Corporation, The. Method and apparatus for feeding a cigarette tray transporting vehicle. 4,029,221, Cl. 214-38.0BB.
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Nakamura, Hirokazu; Kinoshita, Mitsutaka; and Iwasa, Seizo, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Engine balancer. 4,028,963, Cl. 74-604.000.
Nakamura, Hiromi; Komiyama, Yosizo; Yamashita, Mitsuo; and Ishii, Masaji, to Toshiba Kikai Kabushiki Kaisha; and Denki Kagaku Kogyo Kabushiki Kaisha. Injection pump for injecting molten metal. 4,029,000, Cl. 92-170.000.
Nakamura, Katsuhiko: *See—*
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Nakamura, Shigemi: *See—*
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Nakamura, Shinji; and Mihirogi, Kiyoshi, to Japan Air Lines Co., Ltd. Magnetically levitated vehicle with module construction of suspension and propulsion means. 4,029,020, Cl. 104-148.0MS.
Nakamura, Shuzo: *See—*
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Nakano, Keita; Horie, Kiyoshi; and Yamazaki, Noriaki, to Fuji Xerox Co., Ltd. Electrostatic printing method. 4,029,826, Cl. 427-16.000.
Nakashio, Seizo; Tsuji, Kozo; Toyota, Nobuhiro; and Fujita, Fumio, to Sumitomo Chemical Company, Limited; and Hayashibara Biochemical Laboratories, Incorporated. Polymer composition of ethylenic compounds and pullulan. 4,029,616, Cl. 260-17.4ST.
Nakashio, Seizo; Tsuji, Kozo; Toyota, Nobuhiro; and Fujita, Fumio, to Sumitomo Chemical Company, Limited; and Hayashibara Biochemical Laboratories, Incorporated. Process for water-insolubilization of molded pullulan. 4,029,886, Cl. 536-120.000.
Nakata, Roy, to General Electric Company. Particle trapping elbow joint for enclosed high voltage electric bus apparatus. 4,029,890, Cl. 174-14.00R.
Nakata, Roy, to General Electric Company. Particle trapping sheath coupling for enclosed electric bus apparatus. 4,029,891, Cl. 174-14.00R.
Nakata, Roy, to General Electric Company. Method and means for trapping particles in enclosed high voltage electric bus apparatus. 4,029,892, Cl. 174-14.00R.

Nakatani, Akira: *See—*
Hamai, Yoshihiko; Hamai, Tatsuro; Tanaka, Yuya; and Nakatani, Akira, 4,029,475.
Nakatani, Koma. Device for holding each of the legs of a tripod. 4,029,279, Cl. 248-188.500.
Nakatsubo, Reigi: *See—*
Yamada, Siyouhachi; and Nakatsubo, Reigi, 4,029,945.
Nakatsuzi, Katsuyoshi: *See—*
Nishimura, Haruki; Shimizu, Masanao; Hatano, Naonobu; Nakatsuzi, Katsuyoshi; Kinugasa, Hiroaki; and Kon, Hiroko, 4,029,780.
Nakazyo, Kiyoshi: *See—*
Tanaka, Mitsugu; Arai, Atsuaki; Nakazyo, Kiyoshi; and Shiba, Keisuke, 4,029,508.
Nalco Chemical Company: *See—*
Buikema, Peter D., 4,029,885.
Seitz, Paul L.; and Gabel, Robert K., 4,029,708.
Napoleon, Frank. Folding stool with leveling leg. 4,029,278, Cl. 248-188.200.
Narayan, Thirumurti: *See—*
Cenker, Moses; Narayan, Thirumurti; and Patton, John Thomas, Jr., 4,029,611.
Narayan, Thirumurti L.; and Cenker, Moses, to BASF Wyandotte Corporation. Carbodiimide-isocyanurate foams containing urethane linkages. 4,029,610, Cl. 260-2.5BF.
Narayanan, Venkatachala L.: *See—*
Hauck, Frederic P.; Cimarusti, Christopher M.; and Narayanan, Venkatachala L., 4,029,676.
Nash, James N.: *See—*
Price, Lester A.; and Nash, James N., 4,030,007.
Nather, Roy E., to Beckman Instruments, Inc. Automatic quench compensation for liquid scintillation counting system. 4,029,401, Cl. 250-328.000.
National Airoil Burner Co., Inc.: *See—*
Bitterlich, Gordon M., 4,029,462.
National Research Development Corporation: *See—*
Bird, Brian Michael, 4,030,022.
Gordon, John Ashley, 4,029,899.
National Starch and Chemical Corporation: *See—*
Jarowenko, Wadym; and Hernandez, Henry R., 4,029,544.
National Steel Corporation: *See—*
Stevens, Douglas; Forberg, Helge O.; Jennings, Larry D.; Thompson, David L.; and Copenhaver, Julian V., 4,029,737.
Natoli, Richard A., to General Motors Corporation. Twist-lock lamp socket locking means. 4,029,953, Cl. 240-8.160.
Nebe, William John, to Du Pont de Nemours, E. I., and Company. Method of producing positive polymer images. 4,029,505, Cl. 96-35.100.
Neill, Jimmie D.; and Wise, Lester V., to Federal Business Products, Inc. Printed form having removable label. 4,029,341, Cl. 282-22.00R.
Neisius, Karlheinz; and Baumer, Wilhelm, to E. Merck A. G. Nonbleeding indicators and dyes therefor used in pH determination process. 4,029,597, Cl. 252-408.000.
Neisius, Karlheinz; and Baumer, Wilhelm, to E. Merck A. G. Nonbleeding indicator and dyes therefor. 4,029,598, Cl. 252-408.000.
Nelson, Bror H.: *See—*
Harris, John L.; and Nelson, Bror H., 4,028,862.
Nelson, Donald L., to Dow Chemical Company, The. Unsaturated polyester resins containing a dicyclopentadiene concentrate. 4,029,848, Cl. 428-430.000.
Nelson, Edwin B. Design and construction of flywheels from anisotropic materials. 4,028,962, Cl. 74-572.000.
Nelson, Norman A.: *See—*
Bundy, Gordon L.; and Nelson, Norman A., 4,029,693.
Nelson, Seddon C., to FMC Corporation. Flat film extrusion nozzle. 4,029,460, Cl. 425-466.000.
Neratoom B.V.: *See—*
van Dalen, Adrianus; and van der Bergh, Johannes W. H., 4,028,928.
Nestor, Charles R.; and Yurtin, John A., to General Motors Corporation. Electrical connector for printed circuits. 4,029,374, Cl. 339-17.00F.
Neukermans, Armand P., to Xerox Corporation. Technique of character generation on magnetic tapes. 4,030,105, Cl. 346-74.100.
Neumaier, Hermann: *See—*
Bocks, Paul J.; Grammel, Jurgen; and Neumaier, Hermann, 4,029,534.
Neumann, Edward William; and Rabenda, Edward John, Jr., to International Business Machines Corporation. Thermally conducting elastomeric device. 4,029,999, Cl. 361-386.000.
New Research and Development Laboratories, Inc.: *See—*
LeRoy, Pierre L., 4,029,097.
Newcombe, Jack: *See—*
Coffman, Charles L.; Kellerhals, Glen F.; Newcombe, Jack; and Roth, Shirley H., 4,029,570.
Newman, Harry. Audio tape player driver information device. 4,030,127, Cl. 360-12.000.
Newmark, Harold Leon: *See—*
Emodi, Alexander S.; Newmark, Harold Leon; and Scialpi, Leonard Joseph, 4,029,805.
Newton, Leroy, to Monogram Industries, Inc. Oil toilet. 4,028,747, Cl. 4-10.000.
Ngo, Peter Dinh-Tuan, to Bell Telephone Laboratories, Incorporated. Technique for inverting the state of a plasma or similar display cell. 4,030,091, Cl. 340-324.00M.
Nichols, Larry D., to Moleculon Research Corporation. Cellulosic-liquid composite materials and process of preparing such materials. 4,029,726, Cl. 264-41.000.
Nickolson, Robert: *See—*
Alig, Leo; Nickolson, Robert; Wiechert, Rudolf; Furst, Andor; Kieslich, Klaus; Muller, Marcel; and Kerb, Ulrich, 4,029,692.
Nielson, Carl J. Cushioning device. 4,029,307, Cl. 267-138.000.
Niemeier, Byron M., to General Dynamics Corporation. Mechanical roll rate stabilizer for a rolling missile. 4,029,270, Cl. 244-3.210.
Nigata Engineering Co., Ltd.: *See—*
Miyazaki, Nobuto; and Tokahashi, Tadaya, 4,029,126.
Niida, Taro: *See—*
Inouye, Shigeharu; Omoto, Shoji; Niida, Taro; and Nomiya, Bunzo, 4,029,881.
Niikawa, Kazuhiko: *See—*
Mitsui, Shigeo; Araki, Tomiyasu; Niikawa, Kazuhiko; Hosoda, Hideo; Jyo, Yoshio; Yoda, Ryuichiro; Suzuki, Giichi; Iijima, Takasi; Tanaka, Hiroshi; Ochiai, Yasutaka; and Ise, Takashi, 4,029,550.
Nintz, Eckhard; Schick, Rupert; Seegmueller, Karl; and Stahnecker, Erhard, to BASF Aktiengesellschaft. Particulate expandable styrene polymers having good processability. 4,029,614, Cl. 260-2.50B.
Nipak, Inc.: *See—*
Levens, Joseph A., 4,029,428.
Nippon Gakki Seizo Kabushiki Kaisha: *See—*
Okamoto, Eisaku, 4,028,978.
Nippon Kayaku Kabushiki Kaisha: *See—*
Koiso, Yoichi; Ito, Koji; and Seno, Hiroshi, 4,029,643.
Nippon Kogaku K.K.: *See—*
Kimura, Shuji, 4,030,111.
Nippon Kokan Kabushiki Kaisha: *See—*
Higuchi, Masaaki, 4,029,053.
Yamada, Takeo; Ando, Seigo; and Watanabe, Katsujiro, 4,030,027.
Nippon Seiko Kabushiki Kaisha: *See—*
Inoue, Gentei; Sato, Chuichi; Tanaka, Mamoru; and Matsuo, Nobuhiro, 4,029,323.
Nippon Soda Company Limited: *See—*
Noguchi, Teruhisa; Kohmoto, Keisuke; and Kato, Kimpei, 4,029,813.
Nippon Zeon Co., Ltd.: *See—*
Mitsui, Shigeo; Araki, Tomiyasu; Niikawa, Kazuhiko; Hosoda, Hideo; Jyo, Yoshio; Yoda, Ryuichiro; Suzuki, Giichi; Iijima, Takasi; Tanaka, Hiroshi; Ochiai, Yasutaka; and Ise, Takashi, 4,029,550.
Nishida, Keiichi: *See—*
Matsutani, Toshinobu; and Nishida, Keiichi, 4,029,518.
Nishida, Yoshikazu: *See—*
Mori, Takashi; Kato, Michio; Mizu, Koichi; and Nishida, Yoshikazu, 4,029,266.
Nishikawa, Takehiko: *See—*
Kaneko, Yuichiro; Teraoka, Fuminori; Kubota, Tatsushi; and Nishikawa, Takehiko, 4,029,339.
Nishimura, Haruki; Shimizu, Masanao; Hatano, Naonobu; Nakatsuzi, Katsuyoshi; Kinugasa, Hiroaki; and Kon, Hiroko, to Dainippon Pharmaceutical Co., Ltd. 3-Piperazinyl 1,2,4-benzothiadiazine 1,1-dioxide derivatives their compositions and method of use. 4,029,780, Cl. 424-246.000.
Nishio, Yasuhiro: *See—*
Sagara, Hideo; Nishio, Yasuhiro; Wada, Hirokazu; and Hiromoto, Yoshinori, 4,029,930.
Nissan Motor Co., Ltd.: *See—*
Asano, Masaharu, 4,029,061.
Iwasa, Yoshio, 4,029,066.
Tsutsumi, Saburo, 4,028,887.
Nixdorff, Frank S., to Anchor Hocking Corporation. Method of manufacturing container safety closure system. 4,028,863, Cl. 53-15.000.
Nixon, Donald R.: *See—*
George, John A.; and Nixon, Donald R., 4,029,123.
Nixon, Ivor Gray. Manufacture of alloy steels and ferrous alloys. 4,029,497, Cl. 75-60.000.
NL Industries, Inc.: *See—*
Rutt, Truman C., 4,030,004.
Noble, Adrian Clive. Optical aid for use in the selection of spectacle frames. 4,029,402, Cl. 351-22.000.
Nodet-Gougis: *See—*
Grataloup, Xavier Roger, 4,029,235.
Noguchi, Masaaki; Tanaka, Yukiyasu; Sekiya, Setsuro; and Motosugi, Katsuhiko, to Toyota Jidosha Kogyo Kabushiki Kaisha. Auxiliary combustion chamber for internal combustion engine. 4,029,062, Cl. 123-32.0ST.
Noguchi, Masaaki; Tanaka, Yukiyasu; Sekiya, Setsuro; and Motosugi, Katsuhiko, to Toyota Jidosha Kogyo Kabushiki Kaisha. Combustion apparatus for an internal combustion engine. 4,029,075, Cl. 123-75.00B.
Noguchi, Teruhisa; Kohmoto, Keisuke; and Kato, Kimpei, to Nippon Soda Company Limited. Fungicidal compositions containing bisthioureido-benzenes and methods for use thereof. 4,029,813, Cl. 424-300.000.
Nohara, Akira: *See—*
Murata, Tadakazu; Nohara, Akira; Sugihara, Hirosada; and Sanno, Yasushi, 4,029,699.
Nomiya, Bunzo: *See—*
Inouye, Shigeharu; Omoto, Shoji; Niida, Taro; and Nomiya, Bunzo, 4,029,881.
Nomura Electroplating Company, Ltd.: *See—*
Nomura, Hirotoshi, 4,029,845.

Nomura, Hiroaki: *See—*
Ishiguro, Toshihiro; Fugono, Takeshi; and Nomura, Hiroaki, 4,029,656.
Nomura, Hirotoshi, to Sumitomo Bakelite Company, Limited; and Nomura Electroplating Company, Ltd. Printed circuit base board and method for manufacturing same. 4,029,845, Cl. 428-415.000.
Norlin Music, Inc.: *See—*
Luce, David A., 4,028,979.
Normantas, Liudas. Incinerator. 4,029,026, Cl. 110-8.00A.
North American Philips Corporation: *See—*
Carlson, Allan Ivan; and Singer, Barry M., 4,029,965.
Fellows, Mark W., 4,029,989.
Northern Electric Company Limited: *See—*
Chu, Pak-Jong, 4,029,916.
Northern Telecom Limited: *See—*
Dupuis, Jean Marcel, 4,028,790.
Norton, Harold L.: *See—*
Macy, Frank D.; Hawthorne, Harold E.; and Norton, Harold L., 4,028,816.
Norwalk-Turbo Inc.: *See—*
Pilarczyk, Karol, 4,028,888.
Nothdurft, Jurgen, to Klein, Schanzlin & Becker Aktiengesellschaft. Position indicator for valves and the like. 4,029,043, Cl. 116-125.000.
Nozaki, Sadao: *See—*
Yoshinaka, Shigeo; Doya, Masaharu; Uchiyama, Seiiji; and Nozaki, Sadao, 4,029,560.
NPI Corporation: *See—*
Allan, John H.; Ball, Jerrold L.; Dull, Charles B.; Gabriel, Leo A.; Curtis, Richard E.; and Dervin, Victor J., 4,028,774.
Nuclear Services Corporation: *See—*
Rubinstein, Herbert J.; and Gilcrest, James D., 4,029,968.
Nuovo Pignone, S.p.A.: *See—*
Bergamini, Giorgio, 4,028,945.
N.V. Industrieele Handelscombinatie Holland: *See—*
van Heijst, Willem Jan, 4,029,039.
Nymann, Svend. Brake control for rotary electric tools. 4,029,159, Cl. 173-163.000.
Obearle, Adolph Richard. Vehicle suspension system. 4,029,331, Cl. 280-112.00R.
Oberlinner, Andreas: *See—*
Baumann, Hans; and Oberlinner, Andreas, 4,029,677.
Obermeier, Rainer, to Hoechst Aktiengesellschaft. Process for the manufacture of human insulin. 4,029,642, Cl. 260-112.700.
Obreschkow, Christo. Camera fitting. 4,030,113, Cl. 354-286.000.
Occidental Oil Shale, Inc.: *See—*
French, Gordon B., 4,029,360.
Ocean Research Equipment, Inc.: *See—*
Eck, Calvert F., 4,028,938.
Ochiai, Yasutaka: *See—*
Mitsui, Shigeo; Araki, Tomiyasu; Niikawa, Kazuhiko; Hosoda, Hideo; Jyo, Yoshio; Yoda, Ryuichiro; Suzuki, Giichi; Iijima, Takasi; Tanaka, Hiroshi; Ochiai, Yasutaka; and Ise, Takashi, 4,029,550.
O'Connor, John J. Combination utility knife and staple remover. 4,028,758, Cl. 7-14.10R.
Odell, Donald W. Float type electric circuit breaker for swimming pools. 4,029,920, Cl. 200-84.00B.
Oehley, Gernot: *See—*
Csaszar, Gabor; and Oehley, Gernot, 4,029,064.
Oerthel, Hermann. Load-carrying apparatus. 4,028,752, Cl. 5-81.00R.
Office National d'Etudes et de Recherches Aerospatiales (O.N.E.R.A.): *See—*
Philbert, Michel Eric; and Surget, Jean Marcel, 4,028,935.
Officine Termomeccaniche Successori Carello S.p.A.: *See—*
Caser, Gustavo, 4,029,450.
Ogura, Katsuyuki: *See—*
Tsuchihashi, Genichi; and Ogura, Katsuyuki, 4,029,712.
Ohbu, Kazuo; Takada, Yuichi; and Nakamura, Shigemi, to Lion Fat & Oil Co., Ltd. Liquid detersive bleaching composition. 4,029,591, Cl. 252-95.000.
Ohkawa, Shunjiro: *See—*
Yano, Eizi; Ohkawa, Shunjiro; Komatsu, Tadaaki; and Adachi, Masami, 4,029,222.
Ohkubo, Nobumasa: *See—*
Oishi, Minoru; Okuda, Naoki; Tomita, Makoto; Ohkubo, Nobumasa; Kogane, Kazuo; and Yonezawa, Kazuo, 4,029,933.
Ohshima, Nobumasa: *See—*
Enoki, Yoshio; and Ohshima, Nobumasa, 4,029,604.
Oishi, Minoru; Okuda, Naoki; Tomita, Makoto; Ohkubo, Nobumasa; Kogane, Kazuo; and Yonezawa, Kazuo, to Kobe Steel Ltd. Method of vertical welding of aluminum and aluminum alloys. 4,029,933, Cl. 219-126.000.
Ojima, Shin, to Hosbidenkoseizo Kabushiki Kaisha. Miniaturized calculator keyboard switch assembly having universally pivoted key actuators. 4,029,915, Cl. 200-5.00A.
Okajima, Yasuhiro, to Sumitomo Metal Mining Co., Limited. Process for treating manganese nodules. 4,029,498, Cl. 75-103.000.
Okami, Yoshiro: *See—*
Umezawa, Hamao; Aoyagi, Takaaki; Takeuchi, Tomio; Hamada, Masa; and Okami, Yoshiro, 4,029,547.
Okamoto, Eisaku, to Nippon Gakki Seizo Kabushiki Kaisha. Synthesizer type electronic musical instrument with volume envelope decay time control. 4,028,978, Cl. 84-1.260.
Okano, Toshikatsu, to Kabushiki Kaishi Komatsu Seisakusho. Control apparatus of steering clutch for tractor. 4,029,188, Cl. 192-109.00F.
Oki, Yasuhiro: *See—*
Takahashi, Eiji; Shimizu, Masaru; Oki, Yasuhiro; and Isbigami, Osamu, 4,029,524.
Okubo, Hiroshi: *See—*
Yoshida, Masaru; Okubo, Hiroshi; and Kaetsu, Isao, 4,029,842.
Okuda, Naoki: *See—*
Oishi, Minoru; Okuda, Naoki; Tomita, Makoto; Ohkubo, Nobumasa; Kogane, Kazuo; and Yonezawa, Kazuo, 4,029,933.
Okutani, Tetsuya: *See—*
Hiraga, Kentaro; Okutani, Tetsuya; Yoshioka, Kouichi; and Asako, Tsunehiko, 4,029,883.
Olcott, Eugene L., to Atlantic Research Corporation. Rocket nozzle comprising pyrolytic graphite-silicon carbide inserts. 4,029,844, Cl. 428-367.000.
Olegnowicz, Jaime. Piston displacement liquid spray pumps. 4,029,261, Cl. 239-333.000.
Olesovsky, Jaroslav, to Prvni Brnenska Strojirna, Narodni Podnik. Handling device for slipping tubes on the mandrel of bending machines. 4,028,926, Cl. 72-422.000.
Olin Corporation: *See—*
Beton, Richard John, 4,028,986.
Burnside, Chester C.; and Wright, John G., 4,029,443.
Martin, Richard Hugo, 4,029,938.
Oliver, Stuart M.; and Parsons, Sanford J., to Q² Corporation. Self powered blue water gas generator. 4,029,481, Cl. 48-111.000.
Olsen, John H., to Flow Industries, Inc. High pressure fluid intensifier and method. 4,029,440, Cl. 417-403.000.
Olson, Richard D.: *See—*
Riffe, Delmar R.; Olson, Richard D.; Edison, David M.; and Spreadbury, Robert J., 4,030,058.
Olympus Optical Co., Ltd.: *See—*
Koizumi, Toshimichi, 4,029,398.
Saitou, Sinichi, 4,030,135.
Yamashita, Nobuo, 4,029,397.
Omnium Chimique Societe Anonyme: *See—*
Hannart, Jean Alfred Alphonse Joseph, 4,029,659.
Omoto, Shoji: *See—*
Inouye, Shigeharu; Omoto, Shoji; Niida, Taro; and Nomiya, Bunzo, 4,029,881.
Ono, Isao: *See—*
Hattori, Tatsuo; Katsuragawa, Kanzi; Kihara, Keiichi; Ono, Isao; and Tamabayashi, Hanzo, 4,029,640.
Onoda Cement Company, Ltd.: *See—*
Itoh, Tsutomu, 4,029,995.
Onogi, Seiji: *See—*
Yoshiura, Hirohisa; Arai, Toshiharu; Miyake, Masao; Furuya, Yoshikane; Onogi, Seiji; and Kamizono, Tetsushi, 4,029,877.
Oppenheimer, Robert H.: *See—*
George, Harvey F.; Shah, Jitendra N.; and Oppenheimer, Robert H., 4,029,013.
Orgill, Rodney H.: *See—*
Bennett, Thomas H.; Carlow, Earl F.; Kouvoussis, Anthony E.; Orgill, Rodney H.; Peddle, Charles; and Wiles, Michael F., 4,030,079.
Ostapko, Daniel L.: *See—*
Hong, Se J.; and Ostapko, Daniel L., 4,029,970.
Osterday, John R., to General Motors Corporation. Depressed parking linkage for windshield wiper mechanisms. 4,028,950, Cl. 74-70.000.
Osterman, Frederic J.: *See—*
Taub, Steven I.; and Osterman, Frederic J., 4,029,746.
Ottinger, Dwight M. Snowing fisture. 4,028,830, Cl. 40-106.250.
Outers Laboratories, Inc.: *See—*
Christen, Jack P., 4,029,319.
Outokumpu Oy: *See—*
Kapanen, Aarne Albin; Rantanen, Raimo Uolevi; Lindroos, Leo Elias; Relander, John Henrik; and Honkala, Risto Johannes, 4,029,494.
Overby, David R. Map reading apparatus. 4,029,408, Cl. 353-110.000.
Owens, Charles Dean: *See—*
Spangler, Hayward Gosse; Kauffeld, Norbert Mariner; and Owens, Charles Dean, 4,028,755.
Owens-Corning Fiberglas Corporation: *See—*
Froberg, Magnus L.; and Hohman, Charles M., 4,029,489.
Oy Tampella AB: *See—*
Salmi, Pekka; and Raunio, Pentti, 4,028,995.
Oy. W. Rosenlew Ab: *See—*
Kiminki, Keijo; Kulmala, Raili; and Sipila, Seppo, 4,029,515.
P & D Manufacturing Co., Inc.: *See—*
Rutten, Donald E.; and Davis, Richard A., 4,029,219.
Pahor, Robert B.: *See—*
Klem, Edward J., 4,029,191.
Pako Corporation: *See—*
Sakariason, Douglas M., 4,029,247.
Palena, Maximilian. Metal noo-skid coating. 4,029,852, Cl. 428-621.000.
Palenschat, Dieter: *See—*
Engelfried, Otto; Kerb, Ulrich; Wiechert, Rudolf; Wachtel, Helmut; Palenschat, Dieter; Horowski, Reinhard; Pascbelke, Gert; and Kehr, Wolfgang, 4,029,777.
Pallisade Domain Limited: *See—*
Prewer, John R., 4,028,855.
Palmer, George W.: *See—*
Herpich, William A.; Palmer, George W.; and Pittenger, Francis H., 4,029,224.
Panduit Corporation: *See—*
Bulanda, John J., 4,029,277.

Panel Technology, Inc.: *See—*
Kupsky, George A., 4,029,371.
Pankratz, Thomas John, to Du Pont de Nemours, E. I., and Company. Process for producing soluble amylose. 4,029,516, Cl. 127-38.000.
Pantier, Earl A.: *See—*
Jackovitz, John F.; and Pantier, Earl A., 4,029,132.
Papeschi, Roberto, to U.S. Philips Corporation. Receiver circuit for automatic correction of DC level disturbances. 4,029,904, Cl. 178-88.000.
Pappo, Raphael: *See—*
Brubn, Mildred S.; and Pappo, Raphael, 4,029,689.
Papst-Motoren KG: *See—*
Doemen, Benno, 4,030,005.
Paramythioti, Michel, to Albaret S.A. Control lever assembly. 4,028,946, Cl. 74-522.000.
Parker, Dane K., to Goodyear Tire & Rubber Company, The. Substituted hydroxy-phenyl propanols. 4,029,713, Cl. 260-624.00R.
Parker, Elmo G., to Rohr Industries, Inc. Plated foil for liquid interface bonding of titanium. 4,029,479, Cl. 428-660.000.
Parker, Walter, to Ernest Scragg & Sons Limited. Apparatus for heat treatment of strand material. 4,029,939, Cl. 219-388.000.
Parsons, Sanford J.: *See—*
Oliver, Stuart M.; and Parsons, Sanford J., 4,029,481.
Pascal, Brian W. Retractable brush. 4,028,768, Cl. 15-203.000.
Paschelke, Gert: *See—*
Engelfried, Otto; Kerb, Ulrich; Wiechert, Rudolf; Wachtel, Helmut; Palenschat, Dieter; Horowski, Reinhard; Paschelke, Gert; and Kehr, Wolfgang, 4,029,777.
Passalenti, Beppino: *See—*
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Paterson, Malcolm M.: *See—*
Theodore, Michael J.; Paterson, Malcolm M.; and Paxson, William J., 4,029,572.
Patience, Donald: *See—*
Chesky, Sheldon R.; and Patience, Donald, 4,029,101.
Paton, Robert Michael: *See—*
Crosby, John; Rennie, Robert Allan Campbell; and Paton, Robert Michael, 4,029,686.
Patton, John Thomas, Jr.: *See—*
Cenker, Moses; Narayan, Thirumurti; and Patton, John Thomas, Jr., 4,029,611.
Patz, Roman J., to Cutler-Hammer, Inc. Core for an electromagnet having shading coils cast in situ. 4,030,056, Cl. 335-245.000.
Patzer, Michael D.: *See—*
Tarrall, Mahone T.; and Patzer, Michael D., 4,029,381.
Paul, John M., to Budd Company, The. Coil and pneumatic spring assembly. 4,029,021, Cl. 105-199.00R.
Pawletko, Joseph Paul: *See—*
Chai, Hi Dong; and Pawletko, Joseph Paul, 4,029,977.
Paxson, William J.: *See—*
Theodore, Michael J.; Paterson, Malcolm M.; and Paxson, William J., 4,029,572.
Pay-Bak, Inc.: *See—*
Davis, Marion H.; and Cleghorn, John W., 4,029,187.
Payne, George Calvin, to White's Electronics, Inc. Sampling metal detector. 4,030,026, Cl. 324-3.000.
Payne, John Blunden: *See—*
Westwood, Walter; MacGregor, John James; and Payne, John Blunden, 4,029,499.
PCR, Inc.: *See—*
Schuman, Paul D.; Westmoreland, Geraldine; and Anderson, Roy, 4,029,661.
Peabody International Corporation: *See—*
Herpich, William A.; Palmer, George W.; and Pittenger, Francis H., 4,029,224.
Peddle, Charles: *See—*
Bennett, Thomas H.; Carlow, Earl F.; Kouvoussis, Anthony E.; Orgill, Rodney H.; Peddle, Charles; and Wiles, Michael F., 4,030,079.
Pedigree Petfoods Limited: *See—*
Munro, Douglas Newton, 4,029,821.
Pegels, Abraham A., to Shell Oil Company. Process for passivating a prophoric catalyst and taking a hydrogenation reactor out of operation. 4,029,599, Cl. 252-414.000.
Peinado, Fernando Rabadan: *See—*
Cartes, Juan Bosch; Cabiro, Jorge Canals; Jarque, Ricardo Granados; Roldan, Cristobal Martinez; and Peinado, Fernando Rabadan, 4,029,799.
Pekau, Dietlind; and Storck, Eckhard, to Siemens Aktiengesellschaft. Device for the recording and reproduction of X-ray pictures. 4,029,960, Cl. 250-315.00R.
Pelczar, Stanley J. Adjustable wrench. 4,028,970, Cl. 81-165.000.
Pelletier, Fernand Flavien, to Motorola, Inc. Flat tuner. 4,030,052, Cl. 334-7.000.
Pelsue, Thurman A. Manhole extension. 4,029,425, Cl. 404-25.000.
Pemco, Inc.: *See—*
Feurstein, Ludwig J.; Meives, Otis E.; and Schelk, Roger E., 4,029,194.
Pena, Jose Baya. Device for circulating treating fluid through the nasal fossae. 4,029,095, Cl. 128-250.000.
Pender, David R. Lock for bicycles and the like. 4,028,916, Cl. 70-233.000.
Penick & Ford, Limited: *See—*
Brouillard, Robert Ernest, 4,029,546.
Penn, Nathar W. Composition for application to the animal brain for synthesis of brain components involved in the learning process, and method. 4,029,768, Cl. 424-95.000.
Pennwalt Corporation: *See—*
Kamens, Ernest Rudolph; Kressin, Donald Milton; Lange, Harold Carl; and MacLeay, Ronald Edward, 4,029,615.
Smith, Herbert O., deceased; Smith, Jacqueline, legal representative; and Toukan, Sameeh Said, 4,029,809.
Penny, Robert Noel; and Candy, Peter Boden, to Caterpillar Tractor Co. Stator vane assembly. 4,029,433, Cl. 415-147.000.
Pensabene, Saverio: *See—*
Cromer, George Phillip; Hazen, Harry Harold; and Pensabene, Saverio, 4,029,856.
Perkins, Larry F., to Halliburton Company. Propping subterranean formation fractures. 4,029,149, Cl. 166-280.000.
Perper, Edward: *See—*
Alexandrovich, George, Sr.; and Perper, Edward, 4,030,002.
Perret, Ludwig A., to Bell & Howell Company. Video record scrambling and unscrambling. 4,030,128, Cl. 360-33.000.
Perriniaux, Claude M., to Anvar Agence Nationale de Valorisation de la Recherche. Vertical tank for developing photographic material. 4,030,115, Cl. 354-299.000.
Perrotti, Emmanual Joseph, to International Telephone and Telegraph Corporation. Multipurpose submarine antenna. 4,030,100, Cl. 343-709.000.
Pers, Nils G.: *See—*
Johansson, Leif A. T.; and Pers, Nils G., 4,029,463.
Peruzzotti, George Peter: *See—*
Woessner, Warren Dexter; Biddlecom, William Gerard; Arndt, Henry Clifford; Peruzzotti, George Peter; and Sih, Charles John, 4,029,698.
Peter, Richard: *See—*
Defago, Raymond; Angliker, Hans-Joerg; Holzrichter, Herbert; Kneubuehler, Werner; and Peter, Richard, 4,029,467.
Petroff, Walker G.: *See—*
Ritchie, Dale A.; Petroff, Walker G.; and Smarr, Roy G., Jr., 4,030,087.
Petrolite Corporation: *See—*
Knepper, J. Irvine; Godar, Richard L.; and Propst, James W., 4,029,589.
Petter, Helmut: *See—*
Bildstein, Hubert; Machenschalk, Rudolf; and Petter, Helmut, 4,029,828.
Petzoldt, Karl; and Elger, Walter, to Schering Aktiengesellschaft. 1o-Hydroxy steroids. 4,029,779, Cl. 424-243.000.
Pfahl, Kurt J. Releasable rudder lock. 4,029,038, Cl. 114-162.000.
Pfizer Inc.: *See—*
Danielewicz, John C.; Snarey, Michael; and Thomas, Geoffrey N., 4,029,792.
Sarges, Reinhard, 4,029,731.
Pfouts, Robert R.; Earl, Thomas E.; and Mort, Charles B., to United Aircraft Products, Inc. Brazeless heat exchanger of the tube and shell type. 4,029,145, Cl. 165-161.000.
Pham Van Cang, Luc, to Thomson-CSF. Processing arrangement and correcting device for color television signals. 4,030,120, Cl. 358-27.000.
Philadelphia Quartz Company: *See—*
Lange, Klaus Robert, 4,029,514.
Philadephia Quartz Company: *See—*
Vessey, Eric W.; Miller, James R.; and Lange, Klaus Robert, 4,029,513.
Philbert, Michel Eric; and Surget, Jean Marcel, to Office National d'Etudes et de Recherches Aerospatiales (O.N.E.R.A.). Method, appliance and installation for the optical determination of small displacements of points on the surface of a solid body. 4,028,935, Cl. 73-71.300.
Phillips, Jesse O., to B & P Enterprises, Inc. Radial sound port speaker. 4,029,170, Cl. 181-155.000.
Phillips Petroleum Company: *See—*
Fozzard, George B., 4,029,552.
Gragson, James T.; and Ballard, Joseph E., 4,029,639.
Merideth, John H., 4,029,118.
Rees, Robert L.; and Bailey, Fay W., 4,029,729.
Philmon & Hart Laboratories, Inc.: *See—*
Campion, James M., Jr., 4,029,453.
Piccolini, Richard J., to Rohm and Haas Company. Oil-soluble bicarbamamide compounds. 4,029,702, Cl. 260-554.000.
Pike, John E.: *See—*
Bundy, Gordon L.; and Pike, John E., 4,029,691.
Pilarczyk, Karol, to Norwalk-Turbo Inc. Fuel distribution manifold to an annular combustion chamber. 4,028,888, Cl. 60-39.320.
Pillsbury, Edward J. Dispenser for air drying liquid coating. 4,029,422, Cl. 401-117.000.
Piper, Leslie Herbert, to High Temperature Engineers Limited. Winding flexible strip material on cores with frusto-conical ends. 4,029,265, Cl. 242-7.230.
Pitney-Bowes, Inc.: *See—*
Bogdanski, John J.; and Silverman, Harold, 4,028,973.
Canevari, Louis T.; Coppola, Vincent G.; Dlugos, Daniel F.; Freeman, Gerald C.; and Manduley, Flavio M., 4,030,070.
Deisting, Horst Gurgen, 4,029,010.
Kish, Richard E., 4,029,537.
Pittenger, Francis H.: *See—*
Herpich, William A.; Palmer, George W.; and Pittenger, Francis H., 4,029,224.
Pittman, Allen G.: *See—*
Wasley, William L.; and Pittman, Allen G., 4,029,867.

Pittman, Tobe A.; and Woods, Jack L., to Minerals Research Corporation. Method of recovery of oil and bitumen from oil-sands and oil shale. 4,029,568, Cl. 208-11.0LE.
Pizzolato, Giacomo: *See—*
Confalone, Pasquale Nicholas; Uskokovic, Milan Radoje; and Pizzolato, Giacomo, 4,029,647.
Pizzuti, Donato F.: *See—*
Morse, John B.; Pizzuti, Donato F.; and Reynard, John M., 4,030,112.
Planck, James L.; and Spector, George. Adjustable legs for ladder. 4,029,174, Cl. 182-204.000.
Planet Corporation: *See—*
Reens, Frank D., 4,029,199.
Plasil, Vladimir: *See—*
Hyanova, Blanka; and Plasil, Vladimir, 4,028,943.
Plessey Handel und Investments A.G.: *See—*
Deacon, John Maxwell; and Heighway, James, 4,030,050.
Poisson, Bernard: *See—*
Steydle, Guy; and Poisson, Bernard, 4,029,125.
Polaroid Corporation: *See—*
Johnson, Bruce K., 4,030,110.
Morse, John B.; Pizzuti, Donato F.; and Reynard, John M., 4,030,112.
Politte, Roscoe J. Adjustable wrench. 4,028,969, Cl. 81-146.000.
Polska Akademia Nauk, Instytut Chemii Fizycznej: *See—*
Jasny, Jan, 4,029,417.
Polysius AG: *See—*
Ahrens, Norbert; Klockenbusch, Heinrich; Ritzmann, Horst; Klein, Hans; Balzau, Gerhard; and Schnuckel, Clemens, 4,029,365.
Pond, David M.; Dickason, William C.; and Elam, Edward U., to Eastman Kodak Company. Polychromophoric heterocyclic ultraviolet stabilizers. 4,029,670, Cl. 260-308.00B.
Pond, Stephen F., to Xerox Corporation. Thermo-magnetic image transfer apparatus. 4,030,104, Cl. 346-74.100.
Ponsold, Kurt; and Kasch, Helmut, to VEB Jenapharm. Process of making gona-1,3,5(10),9(11)-tetraenes. 4,029,648, Cl. 260-239.55R.
Pont-A-Mousson S.A.: *See—*
Dauga, Bernard, 4,029,256.
Porsche, Jules Downes: *See—*
Shah, Jaykumar Jivraj; Porsche, Jules Downes; and Bartell, Charles, 4,029,843.
Porter, Lance: *See—*
Jackson, Kenneth Thomas; and Porter, Lance, 4,028,785.
Portmann, Alexandre: *See—*
Jancic, Gojko; Meylan, Pierre; and Portmann, Alexandre, 4,028,909.
Post Office, The: *See—*
Harding, John Patrick; and Butler, David Sydney, 4,029,383.
Postma, Arlin Keith; and Winegardner, W. Kevin, to Battelle Memorial Institute. Electrostatic removal of airborne particulates employing fiber beds. 4,029,482, Cl. 55-2.000.
Potts, Gordon Oliver: *See—*
Cafruny, Edward Joseph; and Potts, Gordon Oliver, 4,029,776.
Poulter, Larry W.: *See—*
Christensen, Wendell N.; and Poulter, Larry W., 4,029,557.
Pourrias, Bernard M.: *See—*
Raynaud, Guy M.; Pourrias, Bernard M.; Fauran, Claude P.; and Turin, Michel J., 4,029,650.
PPG Industries, Inc.: *See—*
Hartman, Marvis E.; Hockswender, Thomas R.; Dowbenko, Rostyslaw; and Christenson, Roger M., 4,029,621.
Maaghul, John, 4,029,623.
Prasad, Raj Nandan: *See—*
Stein, Herman Hal; and Prasad, Raj Nandan, 4,029,884.
Prather, Joseph E.; and Khalifa, Ramzi A., to Edson Tool and Manufacturing Company, Inc. Self-locking devices. 4,029,348, Cl. 292-241.000.
Preiss, Michael: *See—*
Krohn, Wolfgang; Metzger, Karl Georg; Preiss, Michael; and Walkowiak, Michael, 4,029,806.
Presman, Vladimir Alexandrovich: *See—*
Genshpring, Eduard Matveevich; Bljumshtein, Zigmund Genrikhovich; Maev, Veniamin Evnovich; Bondarenko, Fednr Alexeevich; Gutman, Anatoly Lvovich; and Presman, Vladimir Alexandrovich, 4,029,041.
Prewer, John R., to Pallisade Domain Limited. Partition wall joints. 4,028,855, Cl. 52-272.000.
Price, Jerry L., to Monsanto Company. Purification of acetic acid streams by distillation. 4,029,553, Cl. 203-94.000.
Price, Lester A.; and Nash, James N., to Harnischfeger Corporation. Direct current braking means for wound rotor motor. 4,030,007, Cl. 318-203.00R.
Priddy, Duane B., to Dow Chemical Company, The. Peroxy esters of pyromellitic acid. 4,029,685, Cl. 260-453.0RZ.
Prince, Howard T.: *See—*
Harrington, Cecil F.; Johnson, James M.; and Prince, Howard T., 4,028,852.
Priola, Aldo; Roggero, Arnaldo; and Cesca, Sebastiano, to Snam Progetti, S.p.A.; and Brevetti e Licenze. High molecular weight soluble polymers starting from polycyclic polyenes having two conjugated double bonds and process for preparing same. 4,029,871, Cl. 526-282.000.
Probst, Georg: *See—*
Herterich, Walter; and Probst, Georg, 4,029,328.
Procter & Gamble Company, The: *See—*
Harrington, Cecil F.; Johnson, James M.; and Prince, Howard T., 4,028,852.
Produits Chimiques Ugine Kuhlmann: *See—*
Calloue, Georges; and Isard, Arsene, 4,029,732.
Demarcq, Michel; and Slcziona, Joseph, 4,029,722.
Propst, James W.: *See—*
Knepper, J. Irvine; Godar, Richard L.; and Propst, James W., 4,029,589.
Proud, Stanley Harold Russell, to Bicc Limited. Overhead electric traction systems. 4,029,182, Cl. 191-39.000.
Provost, Philip J.; Ittensohn, Oswald L.; and Hilleman, Maurice R., to Merck & Co., Inc. Hepatitis A antigen. 4,029,764, Cl. 424-89.000.
Prvni Brnenska Strojirna, Narodni Podnik: *See—*
Olesovsky, Jaroslav, 4,028,926.
Pryor, Richard Lee, to RCA Corporation. Tri-state logic circuit. 4,029,971, Cl. 307-209.000.
Puddington, Ira Edwin: *See—*
Farnand, Joseph Redmond; and Puddington, Ira Edwin, 4,029,567.
Puhak, Peter George, to GTE Sylvania Incorporated. Support means for a CRT beam adjustment device. 4,030,126, Cl. 358-248.000.
Purdue Research Foundation: *See—*
DeWitt, David P.; Hannemann, Robert E.; and Wiechel, John F., 4,029,085.
Ho Chang, Shung; and Regnier, Frederick E., 4,029,583.
Puskas, Imre; and Cengel, John A., to Standard Oil Company (Indiana). Polybutene composition and use thereof. 4,029,592, Cl. 252-182.000.
Putnam, Robert A.: *See—*
Martz, Lyle F.; Smith, Jack R., Lebonette, Francis A.; Putnam, Robert A.; and Berman, Paul A., 4,028,884.
Pye Limited: *See—*
Thompson, Willie Ellis; and Davis, Timothy John Archer, 4,029,213.
Q³ Corporation: *See—*
Oliver, Stuart M.; and Parsons, Sanford J., 4,029,481.
Quakenbush, Howard M., to Flexsteel Industries, Inc. Spring-frame construction for seats and the like. 4,029,303, Cl. 267-110.000.
Quaker Oats Company, The: *See—*
Bone, David P.; and Shannon, Edward L., 4,029,823.
Quality Hermetics Limited: *See—*
Mayer, Peter; Murthy, M. Krishna; Brooks, Albert H.; and Topping, John A., 4,029,897.
Quate, Calvin F.: *See—*
Lemons, Ross A.; and Quate, Calvin F., 4,028,933.
Quattlebaum, Augustus E.: *See—*
Ritchie, Dale A.; Petroff, Walker G.; and Smarr, Roy G., Jr., 4,030,087.
Quinlan, John J.; Garland, James J.; and Granda, Jose E., to ARCO Polymers, Inc. Antilumping expanding styrene polymers. 4,029,613, Cl. 260-2.50B.
Raab, Guenter: *See—*
Sommer, Klaus; and Raab, Guenter, 4,029,696.
Rabenda, Edward John, Jr.: *See—*
Neumann, Edward William; and Rabenda, Edward John, Jr., 4,029,999.
Rabins, Leonard: *See—*
Howell, Thomas H.; Gregg, Gordon E.; and Rabins, Leonard, 4,030,067.
Rachel, Bernard W., to General Electric Company. Rectangular headlamp filament shield. 4,029,985, Cl. 313-115.000.
Radiochemical Centre Limited, The: *See—*
Tovey, Keith Charles; and Findlay, John William Addison, 4,029,880.
Raffetto, Michael J.: *See—*
Jones, Glen D.; and Raffetto, Michael J., 4,029,373.
Ragen, Robert A.; and Herendeen, Carl E., to Xerox Corporation. Font conversion apparatus. 4,029,190, Cl. 197-1.00R.
Rain, Lloyd Howard, to Irvin Industries, Inc. Shelter structure. 4,029,117, Cl. 135-4.00C.
Rakhit, Sumanas, to American Home Products Corporation. Lactone esters of phenoxyisobutyric acids. 4,029,810, Cl. 424-279.000.
Ralph M. Parsons Company: *See—*
Beavon, David K., 4,029,753.
Rand, Burton, to Autosonics Inc. Vapor degreasing system having a divider wall between upper and lower vapor zone portions. 4,029,517, Cl. 134-11.000.
Rantanen, Raimo Uolevi: *See—*
Kapanen, Aarne Albin; Rantanen, Raimo Uolevi; Lindroos, Leo Elias; Relander, John Henrik; and Honkala, Risto Johannes, 4,029,494.
Raptes, M. Ted: *See—*
George, Paul J.; and Raptes, M. Ted, 4,029,240.
Raunio, Pentti: *See—*
Salmi, Pekka; and Raunio, Pentti, 4,028,995.
Raymond Lee Organization, Inc., The: *See—*
Harris, Gloria W., 4,029,403.
Moran, Barber, 4,028,751.
Salerno, Michael T., 4,028,772.
Raynal, Bernard: *See—*
Courty, Philippe; Sugier, Andre; Raynal, Bernard; and Berrebi, Georges, 4,029,738.
Raynaud, Guy M.; Pourrias, Bernard M.; Fauran, Claude P.; and Turin, Michel J., to Delalande S. A. Novel derivatives of N-(3,4,5-trimethoxy cinnamoyl)piperazine and the process for preparing them. 4,029,650, Cl. 260-240.00J.

Raynaud, Guy M.: *See—*
Fauran, Claude P.; Dorme, Nicole; Raynaud, Guy M.; and Eberle, Jeannine, 4,029,789.

Raytheon Company: *See—*
Chambers, Derek; and Wang, Dee, 4,030,024.
Theodore, Michael J.; Paterson, Malcolm M.; and Paxson, William J., 4,029,572.
Theodore, Michael J.; and DiMercurio, John S., 4,029,573.

RCA Corporation: *See—*
Allen, James Austin, 4,030,124.
Dischert, Robert Adams, 4,030,118.
Endriz, John Guiry, 4,029,984.
Endriz, John Guiry, 4,030,090.
Firester, Arthur Herbert, 4,030,046.
Foldes, Peter, 4,030,048.
Gavrilovic, Dragan Milan; and Ross, Daniel Louis, 4,029,594.
Harbert, Donald Duane, 4,030,040.
Hillier, James, 4,030,138.
Limberg, Allen LeRoy, 4,030,042.
Marinelli, Donald Paul, 4,029,531.
Moss, Herbert Irwin, 4,029,501.
Pryor, Richard Lee, 4,029,971.
Rosnowski, Wojciech, 4,029,528.
Ross, Daniel Louis; and Gavrilovic, Dragan Milan, 4,029,595.
Swartz, George Allan, 4,029,542.
Taylor, Byron Kent; and Allen, James Austin, 4,030,123.

Reber, Tony: *See—*
Leibundgut, Max; and Reber, Tony, 4,029,956.

Redo, Dennis M.: *See—*
Thompson, Walter F.; and Redo, Dennis M., 4,029,210.

Reens, Frank D., to Planet Corporation. Overhead conveyor and guide loop. 4,029,199, Cl. 198-678.000.

Rees, Robert L.; and Bailey, Fay W., to Phillips Petroleum Company. Rotational molding and compositions therefor. 4,029,729, Cl. 264-310.000.

Reese, Ronald Griffith, to Union Carbide Corporation. Cling film roll having a nodulose leading edge portion and the method and apparatus for producing it. 4,029,264, Cl. 242-1.000.

Regie Nationale des Usines Renault: *See—*
Goupy, Marcel; and Roubinet, Pierre, 4,029,350.
Steydle, Guy; and Poisson, Bernard, 4,029,125.

Regnier, Frederick E.: *See—*
Ho Chang, Shung; and Regnier, Frederick E., 4,029,583.

Rehbein, Erwin G. Deck block. 4,028,858, Cl. 52-384.000.

Reichert, Donald G., to A-B-C Packaging Machine Corporation. Case erector. 4,029,001, Cl. 93-53.00M.

Reichl, Leopold: *See—*
Blum, Arnold; Hajdu, Johann; Mohr, Claus Erich; Reichl, Leopold; and Sonntag, Guenther, 4,030,076.

Reimann, Hans, to Linde Aktiengesellschaft. Process and apparatus for the purification of organically contaminated sewage 4,029,574, Cl. 210-3.000.

Reinisch, Bodo W.: *See—*
Bibl, Klaus; and Reinisch, Bodo W., 4,030,033.

Reinke, Ronald E.: *See—*
Jenkins, Patrick A.; and Reinke, Ronald E., 4,029,257.

Reinwall, Ernest William, Jr., to Illinois Tool Works Inc. Grounding clip. 4,029,384, Cl. 339-98.000.

Reist, Walter, to Ferag AG. Apparatus for folding printed products. 4,029,310, Cl. 270-63.000.

Relander, John Henrik: *See—*
Kapanen, Aarne Albin; Rantanen, Raimo Uolevi; Lindroos, Leo Elias; Relander, John Henrik; and Honkala, Risto Johannes, 4,029,494.

Remington Arms Company, Inc.: *See—*
Kenney, Joseph F., 4,029,530.

Renault, Philippe: *See—*
Dezael, Claude; Renault, Philippe; and Deschamps, Andre, 4,029,745.

Rennie, Robert Allan Campbell: *See—*
Croshy, John; Rennie, Robert Allan Campbell; and Paton, Robert Michael, 4,029,686.

Research Corporation: *See—*
Gaafar, Hassan A., 4,029,756.

Reynard, John M.: *See—*
Morse, John B; Pizzuti, Donato F.; and Reynard, John M., 4,030,112.

Reynolds, George L., to United States of America, Army. Cycle firing rate reducing assembly for automatic weapons. 4,028,993, Cl. 89-130.000.

Rhett, Chester K., to C. Rhett, Inc. Method of adjusting glass temperature in a forehearth. 4,029,488, Cl. 65-136.000.

Rhodia, Inc.: *See—*
De Simone, Robert S.; and Gradeff, Peter S., 4,029,709.

Rhone-Poulenc Industries: *See—*
Berger, Christian; Farge, Daniel; Gros, Georges; Messer, Mayer Naoum; and Moutonnier, Claude, 4,029,781.

Rich, Joseph A.; and Sofianek, Joseph C., to General Electric Company Vacuum-type circuit interrupter with two sets of contacts electrically in parallel. 4,029,921, Cl. 200-144.00B.

Richter, Charles W., to United States of America, Interior. Method and apparatus for manipulating line weight in an image. 4,029,410, Cl. 355-52.000.

Ricoh Watch Co., Ltd.: *See—*
Kikuyama, Akira; and Ichinose, Kazutoshi, 4,028,927.

Ridgway, Robert W.: *See—*
Chang, Shu-Pei; and Ridgway, Robert W., 4,029,627.

Riecker, Johann Georg, to Hartung, Kuhn & Co. Maschinenfabrik GmbH. Suction arrangement for withdrawing contaminated gases emitted from incandescent coke pushed out from a coking oven. 4,029,551, Cl. 202-263.000.

Rieth, Egon: *See—*
Barenyi, Bela; Haselmann, Heinrich; and Rieth, Egon, 4,029,353.

Rietveld, Frank P., to Colt Industries Operating Corporation. Electrical discharge machining device for cutting with wire electrode. 4,029,929, Cl. 219-69.00W.

Rieve, Robert W.; and Shalit, Harold, to Atlantic Richfield Company. Preparation of ethyl benzene. 4,029,715, Cl. 260-668.00D.

Riffe, Delmar R.; Olson, Richard D.; Edison, David M.; and Spreadbury, Robert J., to Westinghouse Electric Corporation. Inductive coupler. 4,030,058, Cl. 336-92.000.

Riken Keikinzoku Kogyo Kabushiki Kaishi: *See—*
Takahashi, Toshiro; Nagano, Toshihiro; Nakamura, Katsuhiko; and Kikuchi, Masaru, 4,028,795.

Rios, Augusto. Automatically rockable infant's crib. 4,028,753, Cl. 5-108.000.

Risse, Roger Paul Pierre, to Societe Lyonnaise des Applications Catalytiques. Catalyst system for catalytic heaters. 4,029,602, Cl. 252-458.000.

Ritchie, Dale A.; Petroff, Walker G.; and Smarr, Roy G., Jr., to Quattlebaum, Augustus E. Anti-theft alarm system. 4,030,087, Cl. 340-261.000.

Ritchie, Leon Thomas; and Harwood, Robert George, to AMP Incorporated. Laminated connector. 4,028,794, Cl. 29-629.000.

Ritter, Milton P.: *See—*
Warhol, John G.; and Ritter, Milton P., 4,029,532.

Ritzerfeld, Gerhard. Copier with means for handling components of form letters, and the like. 4,029,413, Cl. 355-75.000.

Ritzmann, Horst: *See—*
Ahrens, Norbert; Klockenbusch, Heinrich; Ritzmann, Horst; Klein, Hans; Balzau, Gerhard; and Schnuckel, Clemens, 4,029,365.

Roach, Don T.: *See—*
Cook, Ralph M., deceased; Cook, Ruth Nelson, Personal Representative of the Estate; and Roach, Don T., 4,029,134.

Robaglia, Michele: *See—*
Faugeras, Pierre; Miquel, Pierre; and Robaglia, Michele, 4,029,733.

Robbins, Clarence R.: *See—*
Carson, John C., Jr.; Hall, Robert T.; Kenkare, Divaker B.; and Robbins, Clarence R., 4,029,236.

Robert Bosch G.m.b.H.: *See—*
Hafele, Walter; and Kleeberger, Rudolf, 4,029,069.
Mayer, Siegfried; Sauer, Ivan; and Zorn, Jurgen, 4,029,446.
Ursel, Eckhard; and Kessler, Peter, 4,029,259.

Roberts, Izora M. Collapsible receptacle type stand for use in transporting loaded grocery bags. 4,029,244, Cl. 224-42.42R.

Roberts, Roland W.; and Sochacky, Michael R., Jr., to Robicon Corporation. Arc furnace control system. 4,029,888, Cl. 13-13.000.

Robertshaw Controls Company: *See—*
Sliger, Boyd Paul, 4,029,074.

Robertson, Robert: *See—*
Denny, Patrick John; and Robertson, Robert, 4,029,603.

Robicon Corporation: *See—*
Roberts, Roland W.; and Sochacky, Michael R., Jr., 4,029,888.

Rochester Instrument Systems, Inc.: *See—*
Chana, Maghar S.; and Garelick, Eli Leonard, 4,030,014.

Rockwell International Corporation: *See—*
Ervin, Guy, Jr., 4,029,740.
Evans, Gregory W.; and Caswell, Robert L., 4,029,947.
Keith, John L., 4,030,023.

Rodney Hunt Company: *See—*
Whipps, George E., 4,028,896.

Rodriguez, Henry. Method and apparatus for opinion surveys. 4,029,943, Cl. 235-57.000.

Rodway, William George: *See—*
Brown, Michael Trevenen; and Rodway, William George, 4,029,870.

Roger, Michel Robert, to Societe Anonyme de Telecommunications. Double-wall cryostat having electrical connections. 4,029,893, Cl. 174-15.0CA.

Rogers Corporation: *See—*
Guglielmi, Anthony C., 4,029,377.

Roggero, Arnaldo: *See—*
Priola, Aldo; Roggero, Arnaldo; and Cesca, Sebastiano, 4,029,871.

Rohm, Gunter Horst. Chuck with radially adjustable jaws. 4,029,325, Cl. 279-123.000.

Rohm and Haas Company: *See—*
Hurt, William S., 4,029,774.
Piccolini, Richard J., 4,029,702.

Rohner, Michel Alexandre: *See—*
Florence, Judit Katalin; and Rohner, Michel Alexandre, 4,030,077.

Rohr Industries, Inc.: *See—*
Blair, Winford; and Schwartz, Melvin M., 4,029,254.
Parker, Elmo G., 4,029,479.

Rokach, Joshua: *See—*
Hunter, Norman R.; Rooney, Clarence S.; Rokach, Joshua; and Cragoe, Edward J., Jr., 4,029,803.

Rolando, Pierluigi, to Maglificio Biellese Fratelli Fila S.p.A. Jacket of knitted jersey fabric. 4,028,744, Cl. 2-108.000.

Roldan, Cristobal Martinez: *See—*
Cartes, Juan Bosch; Cabiro, Jorge Canals; Jarque, Ricardo Granados; Roldan, Cristobal Martinez; and Peinado, Fernando Rabadan, 4,029,799.

Roll-Rite Corporation: *See—*
Christensen, Carl O., 4,029,333.

Rollei-Werke Franke & Heidecke: *See—*
Albrecht, Hermann Friedrich, 4,029,407.

Roman, Steven A.: *See—*
Kollmeyer, Willy D.; Roman, Steven A.; and Soloway, Samuel B., 4,029,791.

Romanelli, Antonio. Pipe fittings. 4,029,345, Cl. 285-334.200.

Roof, James L.: *See—*
Fox, David A.; and Roof, James L., 4,029,972.

Rookus, James E. Sharpeners for electric shavers. 4,028,799, Cl. 30-37.000.

Rooney, Clarence S.: *See—*
Hunter, Norman R.; Rooney, Clarence S.; Rokach, Joshua; and Cragoe, Edward J., Jr., 4,029,803.

Roper Corporation: *See—*
Austin, Buddy Julian, 4,029,926.

Rose, Norman L.: *See—*
Jorgensen, Adam A.; Rose, Norman L.; and Lewis, Thomas F., 4,029,907.

Rosen, Harold A.: *See—*
Bell, H. Clark, Jr.; and Rosen, Harold A., 4,029,902.

Rosen, Perry: *See—*
Kienzle, Frank; and Rosen, Perry, 4,029,674.

Rosen, Ralph S.: *See—*
Bennett, James C., 4,028,975.

Rosencwaig, Allan, to Hoffman-La Roche Inc. Photo acoustic cell. 4,028,932, Cl. 73-67.200.

Rosewicz, Horst; and Klein, Werner, to Furnier- und Sperrholzwerk Werzalit-Pressholzwerk J. F. Werz Jr. KG. Four-way pallet. 4,029,023, Cl. 108-51.100.

Rosnowski, Wojciech, to RCA Corporation. Method of selectively doping a semiconductor body. 4,029,528, Cl. 148-187.000.

Ross, Daniel Louis; and Gavrilovic, Dragan Milan, to RCA Corporation. Novel liquid crystal compounds and electro-optic devices incorporating them. 4,029,595, Cl. 252-299.000.

Ross, Daniel Louis: *See—*
Gavrilovic, Dragan Milan; and Ross, Daniel Louis, 4,029,594.

Rossi, Enzo; Fattori, Silvano; and Imparato, Luigi, to Snam Progetti, S.p.A. Lubricating compositions inhibited against oxidation by addition thereto of 3-azo-6a-thio-thiophthenes or 3,4-diazo-6a-thio-thiophthenes. 4,029,586, Cl. 252-47.500.

Rossmy, Gerd: *See—*
Fink, Hans-Ferdi; Koerner, Gotz; and Rossmy, Gerd, 4,029,596.

Roth, Shirley H.: *See—*
Coffman, Charles L.; Kellerhals, Glen F.; Newcombe, Jack; and Roth, Shirley H., 4,029,570.

Rottermann, Marcel: *See—*
Rottermann, Robert; and Rottermann, Marcel, 4,029,133.

Rottermann, Robert; and Rottermann, Marcel, to Gericke AG, Maschinenfabrik. Process for mechanically emptying powdery substances into a container, and device for carrying out the process. 4,029,133, Cl. 141-12.000.

Roubinet, Pierre: *See—*
Goupy, Marcel; and Roubinet, Pierre, 4,029,350.

Rowe, Edward A., Jr.; and Cawley, William H., to Diamond Shamrock Corporation. Solvent phosphatizing compositions yielding non water soluble coatings. 4,029,523, Cl. 148-6.170.

Rubenstein, Robert Aron, to Addressograph Multigraph Corporation. Method and device for recording copier usage data. 4,029,414, Cl. 355-112.000.

Rubinstein, Herbert J.; and Gilcrest, James D., to Nuclear Services Corporation. Stacked racks for storing spent nuclear fuel elements. 4,029,968, Cl. 250-507.000.

Rubisch, Ottmar: *See—*
Brandmair, Franz; Rubisch, Ottmar; and Honig, Dietmar, 4,029,566.

Ruck, George: *See—*
Levinson, Armand L.; Heinerichs, Donald W.; and Ruck, George, 4,029,007.

Ruegg, Eugen H., to General Electric Company. Overdrive protection circuit for power line carrier systems and the like. 4,030,034, Cl. 325-319.000.

Ruf, Wolfgang: *See—*
Bestenreiner, Friedrich; Helburger, Josef; and Ruf, Wolfgang, 4,030,106.

Rug Crafters: *See—*
Houghton, George L.; and Fredensberg, Fred F., 4,028,802.

Ruhrkohle AG: *See—*
Kortenbusch, Werner, 4,029,362.

Runciman, Herbert Morrison, to Barr and Stroud Limited. Radiation scanning system. 4,029,389, Cl. 350-7.000.

Runyan, Paul S., Jr. Cambered skateboard provided with longitudinally adjustable truck assemblies. 4,029,330, Cl. 280-87.04A.

Russell, Robert G. Control system for electrically conductive liquid heating apparatus. 4,029,937, Cl. 219-295.000.

Rustad, Stanley C.: *See—*
Davis, Noel; Dreier, William M.; and Rustad, Stanley C., 4,028,847.

Rutt, Truman C., to NL Industries, Inc. Dielectric ceramic matrices with end barriers. 4,030,004, Cl. 361-313.000.

Rutten, Donald E.; and Davis, Richard A., to P & D Manufacturing Co., Inc. Bottom grain unloader. 4,029,219, Cl. 214-17.0DA.

Ryeczek, John Joseph. Optoelectronic sound amplifier system for musical instruments. 4,028,977, Cl. 84-1.160.

S.A.E.S. Getters S.p.A.: *See—*
Zucchinelli, Mario, 4,029,987.

Saele, Arvid Harlan; and Hutton, Michael Pier, to Deere & Company. Lockable container spout closure. 4,028,914, Cl. 70-165.000.

Sagami Chemical Research Center: *See—*
Tsuchihashi, Genichi; and Ogura, Katsuyuki, 4,029,712.

Sagara, Hideo; Nishio, Yasuhiro; Wada, Hirokazu; and Hiromoto, Yoshinori, to Mitsubishi Jukogyo Kabushiki Kaisha. Welding torch for underwater welding. 4,029,930, Cl. 219-74.000.

Sager, Fred A. Free-wheeling spindle adaptor. 4,029,423, Cl. 403-3.000.

Sai, Fumio: *See—*
Murata, Moriyasu; Sai, Fumio; and Fujino, Takashi, 4,029,608.

Saito, Atsushi; and Shimada, Minoru, to Yanmar Diesel Engine Co., Ltd. Fuel injection pump for diesel engines. 4,029,071, Cl. 123-139.0AS.

Saitou, Sinichi, to Olympus Optical Co., Ltd. Dual cassette tape recorder. 4,030,135, Cl. 360-94.000.

Sakaguchi, Takumi; and Yamamoto, Toshifumi, to Showa Manufacturing Co., Ltd. Shock absorber for bumpers. 4,029,304, Cl. 267-64.00R.

Sakaguchi, Takumi; and Yamamoto, Toshifumi, to Showa Manufacturing Co., Ltd. Shock absorber for bumpers. 4,029,306, Cl. 267-116.000.

Sakariason, Douglas M., to Pako Corporation. Strip feeding mechanism. 4,029,247, Cl. 226-43.000.

Sakashita, Nobuyuki: *See—*
Fujikawa, Kanichi; Takahashi, Ryohei; Yokomichi, Isao; Kimura, Fumio; Kaji, Takeo; and Sakashita, Nobuyuki, 4,029,490.

Sakurada, Nobuaki; Shinoda, Nobuhiko; Mashimo, Yukio; Ito, Tadashi; and Ito, Fumio, to Canon Kabushiki Kaisha. Digital exposure meter. 4,029,421, Cl. 356-223.000.

Salem, Robert J., to General Electric Company. Battery voltage detection and warning means. 4,030,086, Cl. 340-249.000.

Salerno, Charles M.: *See—*
Schubert, Dale W.; and Salerno, Charles M., 4,029,305.

Salerno, Michael T., to Raymond Lee Organization, Inc., The, a part interest. Sliding door safety device. 4,028,772, Cl. 16-86.00A.

Salmi, Pekka; and Raunio, Pentti, to Oy Tampella AB. Hydraulic striking apparatus. 4,028,995, Cl. 91-276.000.

Saltzman, William H., to Intellectual Property Development Corporation. Antimicrobial compositions. 4,029,775, Cl. 424-238.000.

Salzer, Roman, to Interliz Anstalt. Device for loading air with a controllable amount of a granular or powdery material. 4,029,364, Cl. 302-34.000.

Samoray, Werner: *See—*
Weidanz, Herbert; Sandt, Gerhard; and Samoray, Werner, 4,029,540.

Samour, Carlos M., to Kendall Company, The. Monomeric morpholinium emulsion stabilizers. 4,029,658, Cl. 260-247.10E.

Sanchez, Edward J. Musical apparatus. 4,028,984, Cl. 84-422.00R.

Sandoz Ltd.: *See—*
Avar, Lajos; and Hofer, Kurt, 4,029,684.

Sandstede, Gerd: *See—*
Binder, Horst; Knodler, Reinhard; Kohling, Alfons; and Sandstede, Gerd, 4,029,563.

Sandt, Gerhard: *See—*
Weidanz, Herbert; Sandt, Gerhard; and Samoray, Werner, 4,029,540.

Sanitary Scale Company: *See—*
Foster, Colin E.; and Karp, Edward C., 4,029,161.

Sanko Co., Ltd.: *See—*
Urakami, Fukashi, 4,029,164.

Sanno, Yasushi: *See—*
Murata, Tadakazu; Nohara, Akira; Sugihara, Hirosada; and Sanno, Yasushi, 4,029,699.

Sansui Electric Co., Ltd.: *See—*
Kusano, Kazutoshi, 4,030,036.
Takahashi, Shinobu, 4,029,906.

Sarges, Reinhard, to Pfizer Inc. Aminophenyltetralin compounds. 4,029,731, Cl. 424-316.000.

Sasaki, Rokuro: *See—*
Tanaka, Minoru; Mitani, Shoichi; Yuminaka, Takeo; Sasaki, Rokuro; and Nakamura, Hatuya, 4,030,037.

Sasaki, Toshihiko, to Honeywell Inc. Analog isolator. 4,030,041, Cl. 330-10.000.

Sase, Hisashi, to Toho Plastics Co., Ltd.; and Mitsubishi Pencil Co., Ltd. Pipe organ. 4,028,982, Cl. 84-331.000.

Sata, Shoichi; and Ikezoe, Yasumasa, to Japan Atomic Energy Research Institute. Process for producing hydrogen and oxygen. 4,029,754, Cl. 423-579.000.

Sato, Chuichi: *See—*
Inoue, Gentei; Sato, Chuichi; Tanaka, Mamoru; and Matsuo, Nobuhiro, 4,029,323.

Sato, Kozi: *See—*
Ishii, Kiyoshi; and Sato, Kozi, 4,029,582.

Sato, Ryosuke: *See—*
Fujiwhara, Mitsuto; and Sato, Ryosuke, 4,029,503.

Satoh, Kazuhisa. Regular eight face polyhedral antenna element. 4,030,101, Cl. 343-872.000.

Saucy, Gabriel: *See—*
Chan, Ka-Kong; and Saucy, Gabriel, 4,029,678.

Sauer, Ivan: *See—*
Mayer, Siegfried; Sauer, Ivan; and Zorn, Jurgen, 4,029,446.
Sawada, Daisaku: *See—*
Goto, Kenji; and Sawada, Daisaku, 4,029,072.
Say, Donald L., to GTE Sylvania Incorporated. CRT in-line electron gun assembly. 4,029,988, Cl. 313-414.000.
Sayigh, Adnan A. R.; Sun, Kwok K.; and Ulrich, Henri, to Upjohn Company, The. Purification process for MDA. 4,029,705, Cl. 260-570.00D.
Scarborough, Grover Harry, to AMP Incorporated. Re-enterable splice case. 4,029,895, Cl. 174-138.00F.
Schaefer, Roland: *See—*
Gross, Albert; and Schaefer, Roland, 4,029,632.
Schafer, Augustin; and Mogg, Klaus, to Zinser Textilmaschinen GmbH. Spinning machine with automatic service carriage. 4,028,869, Cl. 57-34.00R.
Schafers, Heinrich B. Dowel. 4,028,988, Cl. 85-87.000.
Schapel, Dietmar; and von Gizycki, Ulrich, to Bayer Aktiengesellschaft. Mixed polyols. 4,029,593, Cl. 252-182.000.
Schaub, Wolfgang: *See—*
Effland, Richard C.; Davis, Larry; and Schaub, Wolfgang, 4,029,672.
Schcib, William R.; and Schuetz, James W., to Aetna-Standard Engineering Company. Plug and shoe changing in piercing and reeling mills. 4,028,923, Cl. 72-97.000.
Schelk, Roger E.: *See—*
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Schering Aktiengesellschaft: *See—*
Engelfried, Otto; Kerb, Ulrich; Wiechert, Rudolf; Wachtel, Helmut; Palenschat, Dieter; Horowski, Reinhard; Paschelke, Gert; and Kehr, Wolfgang, 4,029,777.
Petzoldt, Karl; and Elger, Walter, 4,029,779.
Schering Corporation: *See—*
Sherlock, Margaret H.; and Long, James F., 4,029,815.
Wright, John J., 4,029,882.
Schertz, William W.; and Zwerdling, Solomon, to United States of America, Energy Research and Development Administration. Solar collector having a solid transmission medium. 4,029,519, Cl. 136-89.0PC.
SCHIAPPARELLI - Stabilimenti Chimici Farmaceutici Riuniti S.p.A.: *See—*
Tamagnone, Gian Franco; and De Marchi, Franco, 4,029,811.
Schick, Rupert: *See—*
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Schier, Oswald: *See—*
Eichenberger, Kurt; Egli, Christian; Kuhnis, Hans; and Schier, Oswald, 4,029,795.
Schippers, Heinz; and Koslowski, Gerhard, to Barmag Barmer Maschinenfabrik Aktiengesellschaft. Apparatus for calibrating an extruded thermoplastic tube. 4,029,452, Cl. 425-71.000.
Schlafer, Ludwig: *See—*
Meininger, Fritz; and Schlafer, Ludwig, 4,029,644.
Schlage, Ernest L., to Schlage Lock Company. Key retaining cylinder for a lock. 4,028,917, Cl. 70-389.000.
Schlage Lock Company: *See—*
Schlage, Ernest L., 4,028,917.
Schlegel, Brooke Pershing: *See—*
Secrist, George Richard; Berls, Richard Warren; and Schlegel, Brooke Pershing, 4,029,504.
Schlosser, Paul W., to Bleiweiss, Edward. High pressure piston pump and wiper, sealing, valving structure. 4,029,442, Cl. 417-489.000.
Schlueter, William L.: *See—*
Courson, Thomas G.; Schlueter, William L.; and Kelly, Thomas T., 4,028,902.
Schlumberger Technolgy Corporation: *See—*
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Schmidt, Felix Helmut: *See—*
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Schmidt, Gary M.; Gabor, Robert J.; and Venaleck, John T., to A P Products Incorporated. Multiple switch mechanism. 4,029,914, Cl. 200-1.00R.
Schmidt, Georg: *See—*
Dorr, Karl-Heinz; Grimm, Hugo; Weber, Waldemar; Tacke, Michael; and Schmidt, Georg, 4,029,751.
Schmidt, Herbert; Herzel, Joachim; and Zickler, Dietrich, to Zimmer Plastic GmbH. Apparatus for introducing starting materials into a shearing gap of a machine for production of flat structures. 4,029,455, Cl. 425-142.000.
Schmidt, Herbert J.: *See—*
Benedict, Andrew G.; Marker, Thomas E.; and Schmidt, Herbert J., 4,029,214.
Schmidt, Lawrence R., to General Electric Company. Injection molding process. 4,029,841, Cl. 428-325.000.
Schmidt, Paul Herman: *See—*
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Schmiedeke, Jurgen, to Gunther Papenmeier KG, Maschinen-und Apparatebau. Method and apparatus for manufacture of granulates from pulverulent, granular, dougby or similar material. 4,029,459, Cl. 425-202.000.
Schmitt, Joseph Lawrence, Jr.; Walker, Philip Leroy, Jr.; and Castellion, George Augustus, to American Cyanamid Company. Carbon particulates with controlled density. 4,029,600, Cl. 252-444.000.
Schmitz, Reinold: *See—*
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Schmuck, Frederic E.: *See—*
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Schneck, Richard, to Sulzer Morat GmbH. Fabric take-up mechanism. 4,028,912, Cl. 66-149.00R.
Schneider, Felix: *See—*
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Schnuckel, Clemens: *See—*
Ahrens, Norbert; Klockenbusch, Heinrich; Ritzmann, Horst; Klein, Hans; Balzau, Gerhard; and Schnuckel, Clemens, 4,029,365.
Schobel, Alfred; and Schobel, Wilhelm. Clamping ring and closure means. 4,028,777, Cl. 24-16.0PB.
Schobel, Wilhelm: *See—*
Schobel, Alfred; and Schobel, Wilhelm, 4,028,777.
Schoener, Ronald C.; King, Larry K.; Knapp, Lester L.; and Kloap, Nicholas, to Aluminum Company of America. Solid particulate lobular $AlCl_3$. 4,029,750, Cl. 423-495.000.
Schoepe, Adolf; and Schmuck, Frederic E. Valve seat of a flush valve used in flush tanks and the like. 4,028,748, Cl. 4-52.000.
Schoeps, Jochen: *See—*
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Schoettle, Klaus; Wittkamp, Heinrich; Gliniorz, Lothar; and Dobler, Peter, to BASF Aktiengesellschaft. Tape recorder and magnetic tape cassette. 4,029,268, Cl. 242-198.000.
Scholz, I. Hartmut. Device for providing rugs and the like with tufts. 4,029,031, Cl. 112-80.000.
Schramm, Wilhelm: *See—*
Hafner, Leonhard; Schramm, Wilhelm; Kargl, Hans; and Kieser, Friedrich, 4,029,641.
Schroeder, Herman E., to Du Pont de Nemours, E. I., and Company. Cordless vehicle tire. 4,029,730, Cl. 264-315.000.
Schubert, Dale W.; and Salerno, Charles M., to Barry Wright Corporation. Pneumatic vibration isolator and suspension system. 4,029,305, Cl. 267-65.00R.
Schuck, Joseph J.: *See—*
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Schuermann, Kenneth W.; and Slaton, Vernon C., III, to Charles Machine Works, Inc., The. Single lever control for actuating control valves and the like. 4,028,958, Cl. 74-471.0XY.
Schuetz, James W.: *See—*
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Schultz, Everett M.: *See—*
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Schultz, Frederick K., to General Motors Corporation. Instrument panel illumination dimming control. 4,029,991, Cl. 315-135.000.
Schultz, Jack L.: *See—*
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Schulz, Gunter; and Igel, Wolfgang, to Zinser Textilmaschinen GmbH. Ring spinning or twisting machine. 4,028,873, Cl. 57-124.000.
Schuman, Paul D.; Westmoreland, Geraldine; and Anderson, Roy, to PCR, Inc. Process for producing 5-fluorouracil and derivatives thereof in acid and/or alcohol solvents. 4,029,661, Cl. 260-256.40C.
Schumann, Paul A., Jr.; and Tong, Alvin H., to International Business Machines Corporation. Textile color analyzer calibration. 4,029,419, Cl. 356-173.000.
Schuurman, Pieter J., to Shell Oil Company. Waste heat boiler. 4,029,054, Cl. 122-7.00R.
Schwartz, Melvin M.: *See—*
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Schwartz, Norman L., to Multiplex Communications, Inc. Time delay control circuit. 4,030,010, Cl. 318-487.000.
Schwartz, Rene: *See—*
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Schwartz, Robert. Crozat appliance and method of manufacturing same. 4,028,808, Cl. 32-14.00E.
Schwarzkopf Development Corporation: *See—*
Bildstein, Hubert; Machenschalk, Rudolf; and Petter, Helmut, 4,029,828.
Schwede, Franz-Josef; and Valentin, Ingo, to Hydromatic GmbH. Bearing supporting a swashplate of a hydraulic axial cylinder machine. 4,029,367, Cl. 308-2.00R.
Schweitzer, Ronald D., to Tappan Company, The. Igniter assembly. 4,029,936, Cl. 219-267.000.
Scialpi, Leonard Joseph: *See—*
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SCM Corporation: *See—*
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Seaberg, David H., to J. I. Case Company. Linkage support system for material handling unit. 4,029,226, Cl. 214-139.000.
Seanor, Donald A.: *See—*
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Searfoss, George H., Jr. Nail driving tool. 4,029,135, Cl. 145-46.000.

Secrist, George Richard; Berls, Richard Warren; and Schlegel, Brooke Pershing, to Eastman Kodak Company. Photographic image transfer elements containing neutralizing layers comprising particulate materials. 4,029,504, Cl. 96-29.00D.
Seegmueller, Karl: *See—*
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Seiler, Erhard; Fahrbach, Gerhard; and Stein, Dieter, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Block or graft copolymers of polyalkylene oxides and vinylaromatic or diene polymers. 4,029,720, Cl. 260-887.000.
Seitz, Paul L.; and Gabel, Robert K., to Nalco Chemical Company. Linear surfactant polymers formed from substituted amines and difunctional reactants. 4,029,708, Cl. 260-584.00B.
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Senjo, Teizo; and Kobayashi, Makio, to Fuji Kasui Engineering Co., Ltd.; and Sumitomo Metal Industries, Ltd. Process for removing nitrogen oxides from waste gas. 4,029,739, Cl. 423-235.000.
Seno, Hiroshi: *See—*
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Shah, Jaykumar Jivraj; Porsche, Jules Downes; and Bartell, Charles, to Borden, Inc. Polymeric release agents. 4,029,843, Cl. 428-352.000.
Shah, Jitendra N.: *See—*
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Sharp, Herbert John; Drucker, Rudolf; Droar, Edward; and Ali Zaidi, Syed Mujahid, to GKN Sankey Limited. Method of injection moulding pallets. 4,029,728, Cl. 264-278.000.
Sharp Kabushiki Kaisha: *See—*
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Sharples, Thomas Davy, to Beckman Instruments, Inc. Vestibule valve reagent dispenser. 4,029,473, Cl. 23-259.000.
Shaver, J. Lyle, to Allis-Chalmers Corporation. Self-raising bin loading auger for combines. 4,029,228, Cl. 214-522.000.
Shaw, John B. Open cycle solar energy system utilizing buoyancy as a conversion force. 4,028,893, Cl. 60-641.000.
Shawn, Nelson G.; Gabrio, Anthony L.; and Gabrio, Iris G-S. Match book. 4,029,203, Cl. 206-108.000.
Sheldon, Allen. Layering knife assembly. 4,028,806, Cl. 30-290.000.
Shell Oil Company: *See—*
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Pegels, Abraham A., 4,029,599.
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Shelton, William Ewart Alan: *See—*
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Sherlock, Margaret H.; and Long, James F., to Schering Corporation. Anti-diarrheal anthranilic acids. 4,029,815, Cl. 424-309.000.
Shiba, Keisuke: *See—*
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Shikinami, Yasuo; Iida, Kosuke; Hata, Kunihiro; and Fujii, Tetsuya, to Takiron Co., Ltd. Synthetic leather. 4,029,840, Cl. 428-310.000.
Shimada, Minoru: *See—*
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Shimizu, James K.; and Basil, Richard V., Jr., to Hughes Aircraft Company. N-section microwave resonator having rotary joint for variable coupling. 4,030,051, Cl. 333-83.00R.
Shimizu, Masanao: *See—*
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Shivers, Ronald E., to Goodyear Tire & Rubber Company, The. System for softening water. 4,029,576, Cl. 210-27.000.
Shoup, Edgar C., Jr.; and Colletti, Vincent, Jr., to United Technologies Corporation. Blade root feather seal. 4,029,436, Cl. 416-193.00A.
Showa Manufacturing Co., Ltd.: *See—*
Sakaguchi, Takumi; and Yamamoto, Toshifumi, 4,029,304.
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Shugart Associates, Inc.: *See—*
Dalziel, Warren L., 4,030,137.
Sibley, Henry C., to General Signal Corporation. Train control signalling system. 4,029,274, Cl. 246-187.00B.
Sickles, Ralph A. Micro fiche handler. 4,029,406, Cl. 353-27.00R.
Sieber, Paul; and Kuhlmann, Joachim, to Licentia Patent-Verwaltungs-G.m.b.H. Digital to analog converter using recirculating shift register. 4,030,092, Cl. 340-347.0DA.
Siemens Aktiengesellschaft: *See—*
Degenhardt, Heinz, 4,029,851.
Elger, Harald, 4,030,006.
Glasl, Andreas; and Murrmann, Helmuth, 4,029,527.
Horninger, Karlheinrich, 4,030,081.
Kohler, Werner; and Muller, Willi, 4,030,057.
Pekau, Dietlind; and Storck, Eckhard, 4,029,960.
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Sigri Elektrographit GmbH: *See—*
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Sih, Charles John: *See—*
Woessner, Warren Dexter; Biddlecom, William Gerard; Arndt, Henry Clifford; Peruzzotti, George Peter; and Sih, Charles John, 4,029,698.
Sikkema, Doetze J., to Akzona Incorporated. Acid dyeable polyester containing 1,8-bis-(dialkyl-amino)naphthalane. 4,029,637, Cl. 260-75.00N.
Silverman, Harold: *See—*
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Simington, Jack F. Fireplace opening enclosure. 4,029,076, Cl. 126-140.000.
Simmons, Walter P., to Tuffaloy Products, Inc. Sliding table for resistance welding. 4,029,931, Cl. 219-78.000.
Simmons, William, to British Cast Iron Research Association, The. Method of and means for obtaining white cast iron. 4,029,140, Cl. 164-72.000.
Simms, Romilly John. Light reflectance instrument. 4,029,420, Cl. 356-209.000.
Simond, Jacques: *See—*
Mauvernay, Roland Yves; Busch, Norbert; Moleyre, Jacques; Simond, Jacques; and Monteil, Andre, 4,029,790.
Simonds, George D., Jr., to Douglas Dynamics Corporation. Hydraulic system for vehicle mounted snowplow blade. 4,028,820, Cl. 37-41.000.
Sims, Dewey M., Jr., to Burroughs Corporation. Tubular fastening system. 4,029,426, Cl. 403-408.000.
Singer, Barry M.: *See—*
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Siwersson, Olle Lennart; and Tell, Karl Gunnar, to AB S.T. Miljoteknik. Gas cleaners. 4,029,485, Cl. 55-113.000.
Skinner, Charles A., to Electro-Therm, Inc. Terminal housing for an electrical resistance heater. 4,029,896, Cl. 174-138.00F.
Slaton, Vernon C., III: *See—*
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Sleziona, Joseph: *See—*
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Sliger, Boyd Paul, to Robertshaw Controls Company. Fuel valves. 4,029,074, Cl. 123-198.00D.
Slipper, John Richard, to Wingard Limited. Locking safety belt reels. 4,029,267, Cl. 242-107.40A.
Sloan, Albert H. Well point pumping system and pump assembly therefor. 4,029,438, Cl. 417-200.000.
Slusarchyk, William A.; and Cimarusti, Christopher M., to E. R. Squibb

& Sons, Inc. Mercury intermediates useful in the preparation of 2-alkoxy cephalosporins. 4,029,645, Cl. 260-239.00A.
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Smith, Douglas A., to Burroughs Corporation. Transducer head assembly and apparatus for using same in a plural- track record disk system. 4,030,130, Cl. 360-77.000.
Smith, Herbert O., deceased; by Smith, Jacqueline, legal representative; and Toukan, Samceh Said, to Pennwalt Corporation. Method of protecting plants from pathogens with cyanomethyl aryl sulfonates. 4,029,809, Cl. 424-275.000.
Smith, Herman W., to Upjohn Company, The. 13,14-Didehydro-PG analogs. 4,029,681, Cl. 260-408.000.
Smith International, Inc.: *See—*
Tschirky, John E.; and Crase, Gary Monroe, 4,029,368.
Smith, Jack R.: *See—*
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Smith, James Taylor; and Talke, Frank Eberhard, to International Business Machines Corporation. Flesible disk pack accessing apparatus and method. 4,030,136, Cl. 360-98.000.
Smith, Jay, III; and Hedgcoth, Virgle L., to Identicator Corporation. Two-part inkless applicator for fingerprints. 4,029,012, Cl. 101-368.000.
Smith, Randel P., to Singer Company, The. Patterned cut pile tufting machine. 4,029,030, Cl. 112-79.00A.
Smith, Robert H., to Atlantic Richfield Company. Method for generating heat. 4,029,027, Cl. 110-28.00J.
Smiths Industries Limited: *See—*
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Snam Progetti, S.p.A.: *See—*
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Societe Anonyme Francaise du Ferodo: *See—*
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Societe Chimique des Charbonnages-CdF Chimie: *See—*
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Societe d'Etudes Scientifiques et Industrielles de l'Ile-de-France: *See—*
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Societe Francaise des Produits pour Catalyse: *See—*
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Societe Lyonnaise des Applications Catalytiques: *See—*
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Soldner, Richard, to Siemens Aktiengesellschaft. Ultrasound applicator with guide slot for puncturing cannula. 4,029,084, Cl. 128-2.00V.
Sollish, Bruce D., to Yeda Research & Development Co. Ltd. Ultrasonic stereoscopic imaging device. 4,028,934, Cl. 73-67.80S.
Soloway, Samuel B.: *See—*
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Sommer, Klaus; and Raab, Guenter, to Benckiser-Knapsack GmbH. N-hydroxy alkane amino alkane diphnsphonic acids, process of producing same, and compositions for and method of using same. 4,029,696, Cl. 260-502.500.
Sommer, Klaus; and Weber, Hermann, to Benckiser-Knapsack GmbH. Process of producing Maddrell salt. 4,029,742, Cl. 423-314.000.
Sonntag, Guenther: *See—*
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Spangler, Hayward Gosse; Kauffeld, Norbert Mariner; and Owens, Charles Dean, to United States of America, Agriculture. Method of removing wax moth larvae from infested enclosures. 4,028,755, Cl. 6-1.000.
Sparton Corporation: *See—*
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Spector, George: *See—*
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Speers, Daniel Earle, to General Film Development Corporatinn. Multi-solution photographic processing method using multi-component developer compositions. 4,029,510, Cl. 96-61.00R.
Spence-Bate, Harry Arthur Hele. Multi-standard reprographic camera. 4,029,412, Cl. 355-64.000.
Sperry Rand Corporation: *See—*
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Spinelli, Richard A.; and Allis, Robert F., to Xerox Corporation. Multi-mode optical scanning system. 4,029,409, Cl. 355-51.000.
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Sporlan Valve Company: *See—*
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Square D Company: *See—*
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Stahl, Michael A., to Far Out Products Ltd. Lever arm lock for quick release hub assembly. 4,028,915, Cl. 70-233.000.
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Ziegenhagen, Allyn J.; and Campbell, Ramsey G., 4,029,714.
Stauter, John C.; and Um, Richard T., to UOP Inc. Recovery of chromium values. 4,029,734, Cl. 423-54.000.
Steag Aktiengesellschaft: *See—*
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Stein, Herman Hal; and Prasad, Raj Nandan, to Abbott Laboratories. Adenosine-5'-carboxylic acid amides. 4,029,884, Cl. 536-26.000.
Stemmle, Denis J., to Xerox Corporation. Variable magnification copier. 4,029,411, Cl. 355-51.000.
Sterling Drug Inc.: *See—*
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Stevens, Douglas; Forberg, Helge O.; Jennings, Larry D.; Thompson, David L.; and Copenhaver, Julian V., to Southwire Company; National Steel Corporation; and Earth Sciences, Inc. Redox treatment of alunite ore. 4,029,737, Cl. 423-127.000.
Stevens, Wesley E.; and Brimberg, Frederick, to Westinghouse Electric Corporation. Automatic target detector. 4,030,096, Cl. 343-5.0CM.
Stewart, James R.; and Tweed, Donald G., to GTE Automatic Electric Laboratories Incorporated. Corner support member for subscriber carrier channel unit assembly. 4,030,000, Cl. 361-400.000.
Steydle, Guy; and Poisson, Bernard, to Regie Nationale des Usines Renault; and Automobiles Peugeot. Snap-fitting pipe connecting device. 4,029,125, Cl. 137-614.060.
Stockton, Thomas R., to Ford Motor Company. Multiple ratio power transmission mechanism adapted for improved engine fuel economy and high/low ratio traction. 4,028,965, Cl. 74-765.000.
Stoesser, Martin J. Leg holster. 4,029,242, Cl. 224-2.00B.

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Stone, Richard L., to Wallace-Murray Corporation. Expansion joint for prefabricated double-walled metal chimney. 4,029,343, Cl. 285-47.000.
Stone, Richard L., to Wallace-Murray Corporation. Connection joint for prefabricated metal chimney. 4,029,344, Cl. 285-47.000.
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Strong, John D. Solar energy transport system. 4,029,081, Cl. 126-270.000.
Stubblefield, Robert A. Depth control device for use while fishing. 4,028,839, Cl. 43-43.130.
Stucker, Harold Lloyd, to General Electric Company. Magnetic damping system for induction watthour meters. 4,030,031, Cl. 324-152.000.
Sturm, Karl; and Starey, Franz, to Hoechst Aktiengesellschaft. Basically substituted 3-sulfamoylbenzoic acid derivatives and process for their preparation. 4,029,787, Cl. 424-248.530.
Stutz-Bergman Design Group: *See—*
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Suzuki, Shigeto, to Chevron Research Company. 4-Alkoxy-N-butyraldehyde preparation. 4,029,710, Cl. 260-602.000.
Suzuki, Shigeto, to Chevron Research Company. 4-Hydrosy-n-butyraldehyde from allyl alcohol and formaldehyde. 4,029,711, Cl. 260-602.000.
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Swartz, George Allan, to RCA Corporation. Method for sloping the sidewalls of multilayer P+ PN+ junction mesa structures. 4,029,542, Cl. 156-649.000.
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Sweda, Adam D.; and Wilde, Donald M., to Fruehauf Corporation. Door hardware. 4,029,349, Cl. 292-241.000.
Sweeney, William T.; Keller, Dennis F.; Harris, Gary R.; and Armstrong, Calvin N., to Continental Oil Company. Level sensor. 4,028,940, Cl. 73-299.000.
Swenson, Richard F.; Eimen, Shawn H.; and Gryga, John J., Jr., to Milsco Manufacturing Company. Seat supporting assembly. 4,029,283, Cl. 248-399.000.
Swenson, Richard F., to Milsco Manufacturing Company. Seat support assembly for a recreational vehicle. 4,029,284, Cl. 248-399.000.
Syntex (U.S.A.) Inc.: *See—*
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Sze, Morgan C.; and Kohn, Harold B., to Lummus Company, The. Coal liquefaction reactor distribution system. 4,029,474, Cl. 23-285.000.
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Takahashi, Shinobu, to Sansui Electric Co., Ltd. Automatic noise reduction system of FM stereo receiver. 4,029,906, Cl. 179-15.0BT.
Takahashi, Toshiro; Nagano, Tosbihiro; Nakamura, Katsuhiko; and Kikuchi, Masaru, to Riken Keikinzoku Kogyo Kabushiki Kaishi. Method of manufacturing extruded structural profiles from aluminum based metal scraps. 4,028,795, Cl. 29-403.000.
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Takemoto, Tadao. Pneumatic sludge discharging system. 4,029,584, Cl. 210-532.00R.
Takeuchi, Tomio: *See—*
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Tamabayashi, Hanzo: *See—*
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Tamagnone, Gian Franco; and De Marchi, Franco, to SCHIAPPARELLI - Stabilimenti Chimici Farmaceutici Riuniti S.p.A. Certain antiinflammatory dihydrobenzofuran and dihydronaphthofuran acetic acid compounds. 4,029,811, Cl. 424-285.000.
Tamburelli, Giovanni, to CSELT - Centro Studi E Laboratori Telecomunicazioni. Receiver for PSK digital signals. 4,029,903, Cl. 178-88.000.
Tanaka, Hiroshi: *See—*
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Tanaka, Mamoru: *See—*
Inoue, Gentei; Sato, Chuichi; Tanaka, Mamoru; and Matsuo, Nobuhiro, 4,029,323.

Tanaka, Masakazu; and Watanabe, Kazuo, to Toyo Boseki Kabushiki Kaisha. Novel polyethers having pendent aminomethylene groups and having improved thermal and chemical stability. 4,029,609, Cl. 260-2.00R.

Tanaka, Minoru; and Arai, Sakuji, to Honda Giken Kogyo Kabushiki Kaisha. Intake apparatus for internal combustion engine. 4,029,063, Cl. 123-52.00M.

Tanaka, Minoru; Mitani, Shoichi; Yuminaka, Takeo; Sasaki, Rokuro; and Nakamura, Hatuya, to Hitachi, Ltd. Proximity detecting apparatus. 4,030,037, Cl. 328-5.000.

Tanaka, Mitsugu; Arai, Atsuaki; Nakazyo, Kiyoshi; and Shiba, Keisuke, to Fuji Photo Film Co., Ltd. Silver halide material containing a yellow color-forming coupler. 4,029,508, Cl. 96-56.300.

Tanaka, Yukiyasu: *See—*
Noguchi, Masaaki; Tanaka, Yukiyasu; Sekiya, Setsuro; and Motosugi, Katsuhiko, 4,029,062.
Noguchi, Masaaki; Tanaka, Yukiyasu; Sekiya, Setsuro; and Motosugi, Katsuhiko, 4,029,075.

Tanaka, Yuya: *See—*
Hamai, Yoshihiko; Hamai, Tatsuro; Tanaka, Yuya; and Nakatani, Akira, 4,029,475.

Tang, Edward Y.: *See—*
Moegen, Gerhard; and Tang, Edward Y., 4,028,879.

Tappan Company, The: *See—*
Schweitzer, Ronald D., 4,029,936.

Tarlton, Russell W., Jr. Double slalom ski. 4,028,760, Cl. 9-310.00A.

Tarrall, Mahone T.; and Patzer, Michael D., to Valleylab, Inc. Electrical connector. 4,029,381, Cl. 339-61.00R.

Tart, David K., to General Electric Company. Luminaire filter material. 4,029,955, Cl. 240-25.000.

Taub, Steven I.; and Osterman, Frederic J., to IU Conversion Systems, Inc. Movable pelletizing rolls. 4,029,746, Cl. 425-363.000.

Tax, Hans; and Hosler, Klaus, to Tax, Hans. Method of erecting a tower crane from two groups of modular tower sections differing in cross section. 4,028,792, Cl. 29-431.000.

Taylor, Byron Kent; and Allen, James Austin, to RCA Corporation. Stylus adjustment apparatus for a video disc player. 4,030,123, Cl. 358-128.000.

Taylor, Carol O.: *See—*
Herrington, Rodney E.; and Taylor, Carol O., 4,028,907.

Taylor, John, to Born Free Plastics, Inc. Multipurpose slide. 4,028,761, Cl. 9-310.00B.

Taylor, Robert L., to Universal Vice & Tool Co. Rotary index table. 4,028,966, Cl. 74-822.000.

Teach, Ted L., to Laserplane Corporation. Manually operable depth control for trenchers. 4,028,822, Cl. 37-86.000.

Tecco, Charles: *See—*
Lasich, Lawrence E.; and Tecco, Charles, 4,029,202.

Teledyne Mid-America Corporation: *See—*
Stansak, Donald Edward, 4,028,782.

Telfer, Jerry L. Modular photomacrographic lighting bracket. 4,030,114, Cl. 354-295.000.

Tell, Karl Gunnar: *See—*
Siwersson, Olle Lennart; and Tell, Karl Gunnar, 4,029,485.

Tendler, Robert Kanof. Wall hanger. 4,029,285, Cl. 248-467.000.

Tension Structures Co.: *See—*
Huddle, Carl Frederick, 4,028,861.

Teraoka, Fuminori: *See—*
Kaneko, Yuichiro; Teraoka, Fuminori; Kubota, Tatsushi; and Nishikawa, Takehiko, 4,029,339.

Terentiev, Alexandr Borisovich: *See—*
Freidlina, Rakhil Khatskelevna; Vasilieva, Tamara Trofimovna; Velichko, Felix Kazimirovich; and Terentiev, Alexandr Borisovich, 4,029,700.

Tetzlaff, Karl-Heinz. Device for the uniform irradiation of goods by means of electro-magnetic radiation. 4,029,967, Cl. 250-492.00R.

Tetzner, Siegfried K. Fish hook remover. 4,028,825, Cl. 43-53.500.

Texas Instruments Incorporated: *See—*
Burkett, Bobby G.; and Henry, Raymond W., 4,030,080.
Chapman, Richard Alexander, 4,029,962.
Herrington, Rodney E.; and Taylor, Carol O., 4,028,907.
McQuiddy, David N., Jr.; and Blocker, Truman G., III, 4,030,049.

Tezuka, Junichi; and Ando, Takatoshi, to Electroplating Engineers of Japan, Limited. High-speed continuous plating method and apparatus therefor. 4,029,555, Cl. 204-15.000.

Tezuka, Junichi: *See—*
Higuchi, Kazuhiro; and Tezuka, Junichi, 4,029,564.

Th. Goldschmidt AG: *See—*
Fink, Hans-Ferdi; Koerner, Gntz; and Rossmy, Gerd, 4,029,596.

Thaxton, George H.: *See—*
Graham, Thomas E.; Thaxton, George H.; Mitchell, Francis M.; and Bell, Robert P., 4,029,832.

Theissen, Robert James, to Mobil Oil Corporation. Substituted phenoxybenzonitriles as herbicides. 4,029,493, Cl. 71-105.000.

Theodore, Michael J.; Paterson, Malcolm M.; and Paxson, William J., to Raytheon Company. Air drum with drying means. 4,029,572, Cl. 209-11.000.

Theodore, Michael J.; and DiMercurio, John S., to Raytheon Company. Waste segregating apparatus. 4,029,573, Cl. 209-212.000.

Thiel, Max: *See—*
Wiedemann, Fritz; Thiel, Max; Stach, Kurt; Dietmann, Karl; and Sponer, Gisbert, 4,029,783.

Thiokol Corporation: *See—*
Christensen, Wendell N.; and Poulter, Larry W., 4,029,557.
Cunningham, Donald J., 4,029,014.

Thomas & Betts Corporation: *See—*
Couto, Luis R., 4,028,756.

Thomas, Geoffrey N.: *See—*
Danielewicz, John C.; Snarey, Michael; and Thomas, Geoffrey N., 4,029,792.

Thomas, Glenn R.: *See—*
Mrenna, Stephen A.; Haugh, Charles E.; and Thomas, Glenn R., 4,030,060.

Thomason, Harry E.; and Thomason, Harry Jack Lee, Jr. Heat and cold storage apparatus. 4,029,082, Cl. 126-271.000.

Thomason, Harry Jack Lee, Jr.: *See—*
Thomason, Harry E.; and Thomason, Harry Jack Lee, Jr., 4,029,082.

Thompson, David L.: *See—*
Stevens, Douglas; Forberg, Helge O.; Jennings, Larry D.; Thompson, David L.; and Copenhaver, Julian V., 4,029,737.

Thompson, John T.: *See—*
Gillemot, George W.; Gamero, Robert; Benavides, Augusto E.; and Elms, Robert James, 4,029,626.

Thompson, Lawrence M., to Arbee Corporation, The. Transmission belt. 4,028,956, Cl. 74-236.000.

Thompson, Raymond V., to Chandler Evans Inc. Fluidic proportinnal amplifier. 4,029,127, Cl. 137-806.000.

Thompson, Walter F.; and Redo, Dennis M., to General Cable Corporation. Bobbin spacer for conveyor system. 4,029,210, Cl. 209-82.000.

Thompson, Willie Ellis; and Davis, Timothy John Archer, to Pye Limited. Crane load indicating arrangement. 4,029,213, Cl. 212-39.0MS.

Thomson-CSF: *See—*
Ferrari, Alain; and Suppa, Vito, 4,029,141.
Pham Van Cang, Luc, 4,030,120.

Thornton, William A., to Westinghouse Electric Corporation. Metal-halide discharge lamp having a light output with incandescent characteristics. 4,029,983, Cl. 313-25.000.

Thuillier, Germaine; Laforest, Jacqueline; and Bessin, Pierre, to C.E.R.P.H.A. a French Society organised under the laws of France. Thienyl phenyl O-(aminoalkyl)-ketone oxime and furyl phenyl O-(aminoalkyl)-ketone oxime coronary vasodilators. 4,029,808, Cl. 424-275.000.

Ticknor, Grant W.: *See—*
Calevich, George J.; McMillan, John E.; and Ticknor, Grant W., 4,028,924.

Tipe Revent AB: *See—*
Johansson, Leif A. T.; and Pers, Nils G., 4,029,463.

Toda, Munetaka: *See—*
Utsumi, Masatoki; Toda, Munetaka; and Kuroda, Akitada, 4,028,961.

Toepfl, Werner, to Ciba-Geigy AG. Thiolcarbamates for combating undesired plant growth. 4,029,687, Cl. 260-455.00A.

Toho Plastics Co., Ltd.: *See—*
Sase, Hisashi, 4,028,982.

Tokahashi, Tadaya: *See—*
Miyazaki, Nobuto; and Tokahashi, Tadaya, 4,029,126.

Tollemache Environmental Engineers Limited: *See—*
Wilkinson, Albert Edward Roy; and Candler, Nigel Danc Quartano, 4,029,263.

Tomcufcik, Andrew Stephen: *See—*
Fabio, Paul Frank; Lin, Yang-I; Lang, Stanley Albert, Jr.; and Tomcufcik, Andrew Stephen, 4,029,788.

Tomita, Makoto: *See—*
Oishi, Minoru; Okuda, Naoki; Tomita, Makoto; Ohkubo, Nobumasa; Kogane, Kazun; and Yonezawa, Kazuo, 4,029,933.

Tong, Alvin H.: *See—*
Schumann, Paul A., Jr.; and Tong, Alvin H., 4,029,419.

Tong, George Kwo Kiun. Fuse. 4,030,059, Cl. 337-262.000.

Topping, John A.: *See—*
Mayer, Peter; Murthy, M. Krishna; Brooks, Albert H.; and Topping, John A., 4,029,897.

Toshiba Kikai Kabushiki Kaisha: *See—*
Nakamura, Hiromi; Komiyama, Yosizo; Yamashita, Mitsuo; and Isbii, Masaji, 4,029,000.
Yamamoto, Rikichi, 4,029,457.

Toukan, Sameeh Said: *See—*
Smith, Herbert Q., deceased; Smith, Jacqueline, legal representative; and Toukan, Sameeh Said, 4,029,809.

Toups, Earl Lee, to Lee Marine, Inc. Marine anchor buoys. 4,028,759, Cl. 9-8.00R.

Tovey, Keith Charles; and Findlay, John William Addison, to Radiochemical Centre Limited, The. Labelled derivatives of steroids. 4,029,880, Cl. 536-7.000.

Towmotor Corporation: *See—*
Chelin, Charles Richard, 4,029,340.

Toyo Boseki Kabushiki Kaisha: *See—*
Tanaka, Masakazu; and Watanabe, Kazuo, 4,029,609.

Toyo Soda Manufacturing Co., Ltd.: *See—*
Hattori, Tatsuo; Katsuragawa, Kanzi; Kihara, Keiichi; Ono, Isao; and Tamabayashi, Hanzo, 4,029,640.

Toyoda-Koki Kabushiki Kaisha: *See—*
Haga, Kyosuke, 4,029,950.

Toyomura, Akihiro, to Kabushiki Kaisha Komatsu Seisakusho. Control valve for steering clutch and brake. 4,029,183, Cl. 192-13.00R.

Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Goto, Kenji; and Sawada, Daisaku, 4,029,072.
Kondo, Hiroshi; Murata, Isamu; and Yamanaka, Teruo, 4,029,969.
Noguchi, Masaaki; Tanaka, Yukiyasu; Sekiya, Setsuro; and Motosugi, Katsuhiko, 4,029,062.
Noguchi, Masaaki; Tanaka, Yukiyasu; Sekiya, Setsuro; and Motosugi, Katsuhiko, 4,029,075.
Utsumi, Masatoki; Toda, Munetaka; and Kuroda, Akitada, 4,028,961.

Toyota, Nobuhiro: *See—*
Nakashio, Seizo; Tsuji, Kozo; Toyota, Nobuhiro; and Fujita, Fumio, 4,029,616.
Nakashio, Seizo; Tsuji, Kozo; Toyota, Nobuhiro; and Fujita, Fumio, 4,029,886.

Trammell, Earl M., Jr., to Cycle-Drive Corporation. Bicycle drive assembly. 4,029,334, Cl. 280-261.000.

Trenkamp, Robert H., to Addressograph Multigraph Corporation. Data transducer. 4,029,944, Cl. 235-61.11D.

Triangle Corporation, The: *See—*
Johnson, Edward M., Jr.; and Stone, John T., 4,029,234.

Trus, Joseph: *See—*
Archer, Winfield S.; and Trus, Joseph, 4,029,935.

TRW Inc.: *See—*
Henrickson, Gary C.; and McDonald, John C., 4,030,069.

Tschift, Ludwig, to Siemens Aktiengesellschaft. High-impact force damping device. 4,029,178, Cl. 188-1.00C.

Tschirky, John E.; and Crase, Gary Monroe, to Smith International, Inc. Radial bearings. 4,029,368, Cl. 308-8.200.

Tsuboi, Takashi, to Hitachi, Ltd. Power converter system. 4,030,018, Cl. 321-27.00R.

Tsuchihashi, Genichi; and Ogura, Katsuyuki, to Sagami Chemical Research Center. Sulfoxide derivative and process for its preparation. 4,029,712, Cl. 260-609.00R.

Tsuji, Kozo: *See—*
Nakashio, Seizo; Tsuji, Kozo; Toyota, Nobuhiro; and Fujita, Fumio, 4,029,616.
Nakashio, Seizo; Tsuji, Kozo; Toyota, Nobuhiro; and Fujita, Fumio, 4,029,886.

Tsutsumi, Saburo, to Nissan Motor Co., Ltd. Internal combustion engine with improved exhaust port. 4,028,887, Cl. 60-282.000.

Tuffaloy Products, Inc.: *See—*
Simmons, Walter P., 4,029,931.

Tuma, Leroy A.: *See—*
Hutter, Ernest; and Tuma, Leroy A., 4,028,811.

Turin, Michel J.: *See—*
Raynaud, Guy M.; Pourrias, Bernard M.; Fauran, Claude P.; and Turin, Michel J., 4,029,650.

Turk, Amos, to Environmental Research and Applications, Inc. Catalytic process for ozonation of water containing organic contaminants. 4,029,578, Cl. 210-63.00Z.

Turner, John Angus William: *See—*
Cole, Ann Mary; Turner, John Angus William; and Snell, Brian Kenneth, 4,029,784.

Tutko, Albert J.: *See—*
Headington, Edward E.; Tutko, Albert J.; and Knickerbocker, Robert H., 4,029,376.

Tweed, Donald G.: *See—*
Stewart, James R.; and Tweed, Donald G., 4,030,000.

Tysver, Oliver Joseph, to Union Carbide Corporation. Apparatus for inserting a sizing disc into a tubular casing. 4,028,775, Cl. 17-49.000.

Uadiski, Ronald. Clothes hanger. 4,029,212, Cl. 211-113.000.

Uchiyama, Seiiji: *See—*
Yoshinaka, Shigeo; Doya, Masaharu; Uchiyama, Seiiji; and Nozaki, Sadao, 4,029,560.

Uchiyama, Takashi: *See—*
Yazaki, Mutsunobu; Uchiyama, Takashi; Matsuda, Mutsuhide; Taguchi, Tetsuya; and Mashimo, Yukio, 4,030,108.

Ueda, Kazuo: *See—*
Gerstine, Milton I.; Futatsugi, Setsuo; Ueda, Kazuo; Seo, Ryozo; Iwasaki, Koji; and Uemura, Makoto, 4,029,946.

Ueda, Takashi, to Kabushiki Kaisha Daini Seikosha. Life display device of a cell incorporated into an electronic timepiece. 4,028,880, Cl. 58-23.0BA.

Uemura, Makoto: *See—*
Gerstine, Milton I.; Futatsugi, Setsuo; Ueda, Kazuo; Seo, Ryozo; Iwasaki, Koji; and Uemura, Makoto, 4,029,946.

Ullmann, Werner; and Hermann, Ferdy E., to A.G. fur industrielle Elektronik AGIE Losone b. Locarno. Electro-erosion machine tools. 4,029,928, Cl. 219-69.00E.

Ulrich, Henri: *See—*
Sayigh, Adnan A. R.; Sun, Kwok K.; and Ulrich, Henri, 4,029,705.

Um, Richard T.: *See—*
Stauter, John C.; and Um, Richard T., 4,029,734.

Umezawa, Hamao; Aoyagi, Takaaki; Takeuchi, Tomio; Hamada, Masa; and Okami, Yoshiro, to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai. Biologically active substance, bestatin, and production thereof. 4,029,547, Cl. 195-80.00R.

Unger, Friedrich: *See—*
Maag, Fritjof; Unger, Friedrich; and Mohr, Wilhelm, 4,028,874.

Union Carbide Corporation: *See—*
Beatty, Theodore R.; and Vourlis, Harry, 4,029,876.
D'Silva, Themistocles D. J., 4,029,688.
Reese, Ronald Griffith, 4,029,264.
Tysver, Oliver Joseph, 4,028,775.

Union Chimique Continentale - U.C.C. Societe Anonyme: *See—*
Winicki, Bernard, 4,029,094.

United Aircraft Products, Inc.: *See—*
Pfouts, Robert R.; Earl, Thomas E.; and Mort, Charles B., 4,029,145.

United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Industry in Her Britannic Majesty's Government of the: *See—*
Evans, Leslie Samuel; Markin, Trevor Leslie; Dell, Ronald Michael; and Montgomery, Albert George, 4,029,858.

U. S. Divers Co.: *See—*
Morgan, Bevly Boone, 4,029,092.

United States of America
Agriculture: *See—*
Chang, Shu-Pei; and Ridgway, Robert W., 4,029,627.
Jurd, Leonard; and Bultman, John Dale, 4,029,818.
Koenig, Nathan H.; and Friedman, Mendel, 4,029,471.
Kotter, James I.; and Folk, Craig L., 4,028,872.
Spangler, Hayward Gosse; Kauffeld, Norbert Mariner; and Owens, Charles Dean, 4,028,755.
Ward, Truman L.; Benerito, Ruth R.; and Hebert, Jacques J., 4,029,533.
Wasley, William L.; and Pittman, Allen G., 4,029,867.

Army: *See—*
Bedell, Robert J.; and Franseen, Richard E., 4,030,125.
Cole, Lewis C., 4,029,016.
Gazza, George E.; and Dutta, Sunil K., 4,029,755.
Nahmias, Maurice E., 4,030,098.
Reynolds, George L., 4,028,993.

Energy Research and Development Administration: *See—*
Dillard, Beverly M.; and Welbon, William W., 4,029,735.
Ellis, James F.; and Walstrom, Peter L., 4,030,085.
George, John A.; and Nixon, Donald R., 4,029,123.
Hutter, Ernest; and Tuma, Leroy A., 4,028,811.
Marling, John B., 4,029,558.
Marling, John B., 4,029,559.
Schertz, William W.; and Zwerdling, Solomon, 4,029,519.
Vissers, Donald R.; Shimotake, Hiroshi; Gay, Eddie C.; and Martino, Fredric J., 4,029,860.

Interior: *See—*
Richter, Charles W., 4,029,410.

National Aeronautics and Space Administration; administrator; with respect to an invention of:
Bhat, Biliyar N. Method of growing composites of the type exhibiting the Soret effect. 4,029,500, Cl. 75-135.000.
Cheng, Dah Yu. System for measuring three fluctuating velocity components in a turbulently flowing fluid. 4,028,939, Cl. 73-189.000.
Goodwin, Francis E. Opto-mechanical subsystem with temperature compensation through isothermal design. 4,030,047, Cl. 331-94.50D.

National Aeronautics and Space Administration: *See—*
Chamis, Christos C.; and Lark, Raymond F., 4,029,838.
Wilkins, Judd R.; and Mills, Stacey M., 4,029,470.

Navy: *See—*
Armstrong, John H.; and Kluge, Frank C., 4,029,859.
Bell, Richard L.; and Lamb, Matthew J., 4,028,739
Cowen, Steven J., 4,028,947.
Daniel, Donald D.; and Wilcox, Roger V., 4,030,038.
Elrick, Donald E.; and Gilbert, Harry, 4,029,529.
Fish, Franklin H.; and Katz, Rodney S., 4,029,976.
Fredberg, Marvin I., 4,029,628.
McMahon, Thomas J.; and Green, Arold K., 4,029,853.
Wallen, Albert E., 4,030,063.

U.S. Philips Corporation: *See—*
Albinger, Walter, 4,029,911.
Papeschi, Roberto, 4,029,904.
Van Beukering, Henricus Cornelis Johannes, 4,029,142.
Zander, Georg, 4,028,920.

United Technologies Corporation: *See—*
Eitel, Fredrick G., 4,029,400.
Murphy, Richard D.; and Cotton, Lou S., 4,029,271.
Shoup, Edgar C., Jr.; and Colletti, Vincent, Jr., 4,029,436.

Universal Instruments Corporation: *See—*
Zemek, Albert W.; Holmes, Robert H.; and Merithew, David L., 4,029,131.

Universal Vice & Tool Co.: *See—*
Taylor, Robert L., 4,028,966.

University of Delaware, The: *See—*
Austin, Paul Roland; and Brine, Charles James, 4,029,727.

UOP Inc.: *See—*
Iwans, Robert C., 4,029,994.
Stauter, John C.; and Um, Richard T., 4,029,734.

Upaya, Inc.: *See—*
Budrose, Charles R., 4,028,971.

Upchurch, Charles E.: *See—*
Gingold, Albert; and Upchurch, Charles E., 4,028,906.

Upjohn Company, The: *See—*
Antosz, Frederick J.; Haak, Willard J.; and Wovcha, Merle G., 4,029,549.
Argoudelis, Alexander D.; and Johnson, LeRoy E., 4,029,548.
Bundy, Gordon L.; and Pike, John E., 4,029,691.
Bundy, Gordon L.; and Nelson, Norman A., 4,029,693.
Bundy, Gordon L., 4,029,814.
Sayigh, Adnan A. R.; Sun, Kwok K.; and Ulrich, Henri, 4,029,705.
Smith, Herman W., 4,029,681.

Urakami, Fukashi, to Sanko Co., Ltd. Movable apparatus adhering to the surface of a wall. 4,029,164, Cl. 180-1.0VS.

Ursel, Eckhard; and Kessler, Peter, to Robert Bosch G.m.b.H. Arrangement for washing transparent parts of vehicles. 4,029,259, Cl. 239-284.00A.

Uskokovic, Milan Radoje: *See—*
Confalone, Pasquale Nicholas; Uskokovic, Milan Radoje; and Pizzolato, Giacomo, 4,029,647.

Utility Tools Corporation: *See—*
Matthews, James J., 4,028,800.

Utsumi, Masatoki; Toda, Munetaka; and Kuroda, Akitada, to Toyota Jidosha Kogyo Kabushiki Kaisha. Shock absorbing steering assembly for automotive vehicles. 4,028,961, Cl. 74-492.000.

V. E. Anderson Mfg. Co.: *See—*
Anderson, Richard N., 4,028,849.

Vahlensieck, Hans-Joachim: *See—*
Kotzsch, Hans-Joachim; Seiler, Claus-Dietrich; and Vahlensieck, Hans-Joachim, 4,029,679.

Vairel, Edmond G.; Goulay, Jean; and Choay, Jean, to Choay S.A. Pharmaceutical compositions of stable urokinase-heparin complexes and methods for use thereof. 4,029,767, Cl. 424-94.000.

Valenti, James V.; and Hanft, Herbert, to Westinghouse Electric Corporation. Digital antenna control apparatus for a communications terminal. 4,030,099, Cl. 343-117.00R

Valentin, Ingo: *See—*
Schwede, Franz-Josef; and Valentin, Ingo, 4,029,367.

Valeri, William J., to Irathane Systems Incorporated. Protective strip overlay for truck boxes. 4,029,354, Cl. 296-28.00D.

Valleylab, Inc.: *See—*
Tarrall, Mahone T.; and Patzer, Michael D., 4,029,381.

Van Bennekom, Carl F.; Hyer, Donald R.; and Kernander, Warren N., to General Electric Company. Probe assembly for an electric meter. 4,030,030, Cl. 324-72.500.

Van Beukering, Henricus Cornelis Johannes, to U.S. Philips Corporation. Heat exchanger. 4,029,142, Cl. 165-105.000.

Vance Industries, Inc.: *See—*
Carrigan, James David, 4,029,526.

Vance, Wallace I., Jr., to Metro/Kalvar Corporation. Ultrasonic film splicer. 4,029,538, Cl. 156-502.000.

van Dalen, Adrianus; and van der Bergh, Johannes W. H., to Neratoom B.V. Method of detecting very small gas leakages through a liquid seal around a passage. 4,028,928, Cl. 73-40.700.

Vandas, Edward B., to McGraw-Edison Company. Kitchen ventilator damper construction. 4,029,002, Cl. 98-115.00K.

van der Bergh, Johannes W. H.: *See—*
van Dalen, Adrianus; and van der Bergh, Johannes W. H., 4,028,928.

van der Kraan, Petrus Cornelis: *See—*
Betz, Frans; de Haas, Jacobus Johannes; and van der Kraan, Petrus Cornelis, 4,029,957.

van der Lely, Cornelis. Rotary harrows. 4,029,153, Cl. 172-59.000.

van der Lely, Cornelis. Soil cultivating machines. 4,029,154, Cl. 172-91.000.

van der Lely, Cornelis. Soil working tines. 4,029,156, Cl. 172-765.000.

van Heijst, Willem Jan, to N.V. Industrieele Handelscombinatie Holland. Mooring means, particularly for carrying out production tests for gas and oil drilling on the high seas. 4,029,039, Cl. 114-230.000.

Van Zandt, Rollin P.: *See—*
Haak, Willard J.; Marsden, Howard A., and Van Zandt, Rollin P., 4,029,166.

Vargiu, Silvio; Gualandi, Volfango; and Passalenti, Beppino, to Societa' Italiana Resine S.I.R. S.p.A. Process for the polymerization of ethylenically unsaturated organic compounds. 4,029,865, Cl. 526-146.000.

Varian Associates: *See—*
Anderson, Richard C., 4,030,094.

Vasilieva, Tamara Trofimovna: *See—*
Freidlina, Rakhil Khatskelevna; Vasilieva, Tamara Trofimovna; Velichko, Felix Kazimirovich; and Terentiev, Alexandr Borisovich, 4,029,700.

Vassallo, Alphonse C. Bullet extractor. 4,028,989, Cl. 86-1.00A.

Vatterott, Oskar F., to Shinkle, Jackson J. Fluid operated clock. 4,028,877, Cl. 58-2.000.

VEB Jenapharm: *See—*
Ponsold, Kurt, and Kasch, Helmut, 4,029,648.

VEB Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen. *See—*
Kuhn, Wilfried; and Micklausch, Wilfried, 4,029,009.

Veeder Industries, Inc.: *See—*
Gamble, John Griffith, 4,029,980.

Velichko, Felix Kazimirovich: *See—*
Freidlina, Rakhil Khatskelevna; Vasilieva, Tamara Trofimovna; Velichko, Felix Kazimirovich; and Terentiev, Alexandr Borisovich, 4,029,700.

Velsicol Chemical Corporatinn: *See—*
Krenzer, John; and Wu, Chin Ching, 4,029,491.

Venaleck, John T.: *See—*
Schmidt, Gary M.; Gabor, Robert J.; and Venaleck, John T., 4,029,914.

Vernon, Kenneth O. Line releasing clamp. 4,028,780, Cl. 24-116.00R.

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Vissers, Donald R.; Shimotake, Hiroshi; Gay, Eddie C.; and Martino, Fredric J., to United States of America, Energy Research and Development Administration. Compartmented electrode structure. 4,029,860, Cl. 429-122.000.

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Vollmer, Hartfrid; Dany, Franz-Josef; Wortmann, Joachim; and Munch, Peter, to Hoechst Aktiengesellschaft. Halogen-containing phosphoric acid polyesters. 4,029,721, Cl. 260-928.000.

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Vredevoogd, Jon D.: *See—*
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Wachtel, Helmut: *See—*
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Wacker-Chemie GmbH: *See—*
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Wada, Hirokazu: *See—*
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Waide, Gene Terry, to Holex Incorporated. Explosively actuated release device for call buoys and the like. 4,028,990, Cl. 89-1.00B.

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Walker, Philip Leroy, Jr.: *See—*
Schmitt, Joseph Lawrence, Jr.; Walker, Philip Leroy, Jr.; and Castellion, George Augustus, 4,029,600.

Walkowiak, Michael: *See—*
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Stone, Richard L., 4,029,343.
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Wallen, Albert E., to United States of America, Navy. Ultra low frequency acoustic generator. 4,030,063, Cl. 340-8.00R.

Wallshein, Melvin. Buccal end tube. 4,028,809, Cl. 32-14.00A.

Walsh, Fraser M.: *See—*
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Walsh, Michael M., to Eaton Corporation. Torque transmitting and indicating device. 4,029,185, Cl. 192-30.00W.

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Ellis, James F.; and Walstrom, Peter L., 4,030,085.

Walt Disney Productions: *See—*
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Walter Cartossi S.p.A.: *See—*
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Walworth, Bryant Leonidas: *See—*
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Wang, Theodore S. T., and Vida, Julius A., to Bristol-Myers Company. Neuromuscular blocking agents and antagonists. 4,029,800, Cl. 424-263.000.

Wanson, Leon Jacques. Compact indirect heating vapor generator. 4,029,056, Cl. 122-34.000.

Ward, James H., Jr.: *See—*
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Ward, Truman L.; Benerito, Ruth R.; and Hebert, Jacques J., to United States of America, Agriculture. Method of forming glassy matcrials from plumbites and cellulosics. 4,029,533, Cl. 156-89.000.

Warhol, John G.; and Ritter, Milton P. Method of preshaping and installing car plastic top. 4,029,532, Cl. 156-71.000.

Warner, H. Burt; and Kruger, Earl Cameron, Jr. Tracked incline teaching apparatus. 4,028,818, Cl. 35-19.00R.

Warren, Rnger W., to Westinghouse Electric Corporation. Thermal collector of solar energy adapted for high temperature operation. 4,029,080, Cl. 126-270.000.

Warshaw, Saul: *See—*
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Wasley, William L.; and Pittman, Allen G., to United States of America, Agriculture. Terpolymers of fluoroalkyl ethers and maleic anhydride. 4,029,867, Cl. 526-247.000.

Wassmer, Werner, to Hansen GmbH KG. Fluid-flow valves. 4,029,295, Cl. 251-297.000.

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Watkins, William M., to Walt Disney Productions. Track for vehicles. 4,029,019, Cl. 104-124.000.

Watkins, Windell C., to Eastman Kodak Company. Catalytic process for the manufacture of unsaturated acids and esters. 4,029,695, Cl. 260-486.00D.

Watrous, Donald L., to General Electric Company. Emergency lighting system AC line voltage sensing. 4,030,013, Cl. 320-59.000.

Weatherchem Corporation: *See—*
Lasich, Lawrence E.; and Tecco, Charles, 4,029,202.

Weaver, John Victor; and Fisher, Ronald, to Dunlop Limited. Friction member. 4,029,829, Cl. 427-44.000.

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Weber, Hermann: *See—*
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Weber, Waldemar: *See—*
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Wehner, Hans; and Kliemann, Manfred, to AGFA-Gevaert, A.G. Process for the production of lightfast phase holograms utilizing ammonium dichromate and gelatin as photosensitive recording material. 4,029,507, Cl. 96-49.000.

Weidanz, Herbert; Sandt, Gerhard; and Samoray, Werner. Apparatus for framing a plurality of X-ray photographs of a given size. 4,029,540, Cl. 156-522.000.

Weil, Max Harry: *See—*
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Weipert, Eugene A.; and Deck, Charles F., to BASF Wyandotte Corporation. Antistatic agents for melt-formed polymers. 4,029,694, Cl. 260-475.00P.

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Western Electric Company, Inc.: *See—*
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Westinghouse Electric Corporation: *See—*
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Fox, David A.; and Roof, James L., 4,029,972.
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Liebler, Marvin E.; and Lum, Eugene J., 4,028,793.
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Martz, Lyle F.; Smith, Jack R.; Lebonette, Francis A.; Putnam, Robert A.; and Berman, Paul A., 4,028,884.
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Mrenna, Stephen A.; Haugh, Charles E.; and Thomas, Glenn R., 4,030,060.
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Wheeler, Harold A., to Westinghouse Electric Corporation. Radio transmission system. 4,030,032, Cl. 325-28.000.

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Wieczorek, Leonard, to Coors Porcelain Company. Resilient heat resistant laminated composite. 4,029,836, Cl. 428-246.000.

Wiedemann, Fritz; Thiel, Max; Stach, Kurt; Dietmann, Karl; and Sponer, Gisbert, to Boehringer Mannheim G.m.b.H. N-substituted 1-amino-3-phenoxy-propan-2-ol compounds and therapeutic compositions containing them. 4,029,783, Cl. 424-247.000.

Wien, Raymond E.: *See—*
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Wignall, Harry; Shelton, William Ewart Alan; and Klee, John Michael, to Bentley Engineering Company, Ltd., The. Tubular knitted fabric. 4,028,910, Cl. 66-26.000.

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Wilkins, Judd R.; and Mills, Stacey M., to United States of America, National Aeronautics and Space Administration. Automated single-slide staining device. 4,029,470, Cl. 8-94.110.

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Will Ross, Inc.: *See—*
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Willard, John W., Sr., to CAW Industries, Inc. Method of therapeutically treating damaged and/or infected tissue and relieving stress and shock in warm blooded animals. 4,029,770, Cl. 424-127.000.

Wille, Mark E. Trolling ski. 4,028,840, Cl. 43-43.130.

Williams, Albert L.; and Heiba, El-Ahmadi I., to Mobil Oil Corporation. Process for preparation of lactone-esters. 4,029,675, Cl. 260-343.600.

Williams, Edward B., Jr.: *See—*
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Wiltrout, Dale E., to Allen Group Inc., The. Back filter automatic vehicle wash water reclaim system. 4,029,114, Cl. 134-104.000.

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Winicki, Bernard, to Union Chimique Continentale - U.C.C. Societe Anonyme. Device for regulating perfusion flowrate. 4,029,094, Cl. 128-214.00F.

Winkler, Charles L., to Westinghouse Electric Corporation. Elevator system. 4,029,175, Cl. 187-29.00R.

Winn, Martin, to Abbott Laboratories. 8-Aralkyl-1,4-ethano-5H-[1]benzopyrano[3,4-b]pyridines. 4,029,665, Cl. 260-293.530.

Winstel, Frank H., to Auto-Heat, Inc. Apparatus for recovery of heat from exhaust gases of dryer. 4,028,817, Cl. 34-86.000.

Winterhager, Helmut; Kammel, Roland; and Lucke, Michael, to Kloeckner-Humboldt-Deutz AG. Device for separation of mistures of at

least partially molten metals and/or metallic compounds into at least two phases of different density. 4,029,302, Cl. 266-204.000.
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Wright, Forrest S. Exercising device. 4,029,312, Cl. 272-123.000.
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Wu, An-Chuan. Biological tissue strengthening device. 4,029,088, Cl. 128-38.000.
Wu, Celia. Corner hook frame. 4,028,832, Cl. 40-155.000.
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Yamada, Siyouhachi; and Nakatsubo, Reigi, to Stanley Electric Co., Ltd. Card and card reader apparatus therefor. 4,029,945, Cl. 235-61.12N.
Yamada, Takeo; Ando, Seigo; and Watanabe, Katsujiro, to Nippon Kokan Kabushiki Kaisha. Apparatus for non-contact measurement of distance from a metallic body using a detection coil in the feedback circuit of an amplifier. 4,030,027, Cl. 324-34.00D.
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Yamamoto, Rikichi, to Toshiba Kikai Kabushiki Kaisha. Molding machine. 4,029,457, Cl. 425-167.000.
Yamamoto, Shuji; Isshiki, Setsuya; and Igarashi, Mitsuru, to Fujikura Cable Works, Ltd., The. Method of manufacturing insulated electric power cables. 4,029,830, Cl. 427-57.000.
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Yoshida, Tadamasa: *See—*
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Yoshinaka, Shigeo; Doya, Masaharu; Uchiyama, Seiiji; and Nozaki, Sadao, to Mitsubishi Gas Chemical Company, Inc. Process for producing $\alpha,\alpha,\alpha,\alpha',o',\alpha'$-hexachloroxylene. 4,029,560, Cl. 204-163.00R.
Yoshioka, Kouichi: *See—*
Hiraga, Kentaro; Okutani, Tetsuya; Yoshioka, Kouichi; and Asako, Tsunehiko, 4,029,883.
Yoshiura, Hirohisa; Arai, Toshiharu; Miyake, Masao; Furuya, Yoshikane; Onogi, Seiji; and Kamizono, Tetsushi, to Mitsubishi Chemical Industries Ltd. Process for preparing polyolefin. 4,029,877, Cl. 528-483.000.
Young, Clifford Kenneth. Raker claw hammer. 4,028,757, Cl. 7-8.10R.
Young, Edwin Harry Paterson, to Imperial Chemical Industries Limited. Morpholine derivatives for treating depression. 4,029,786, Cl. 424-248.560.
Yu, Jing-Peir; and Gilmer, Donald G., to Monsanto Company. False-twist texturing process. 4,028,875, Cl. 57-157.0TS.
Yuminaka, Takeo: *See—*
Tanaka, Minoru; Mitani, Shoichi; Yuminaka, Takeo; Sasaki, Rokuro; and Nakamura, Hatuya, 4,030,037.
Yurtin, John A.: *See—*
Nestor, Charles R.; and Yurtin, John A., 4,029,374.
Zahnradfabrik Friedrichshafen AG: *See—*
Jablonsky, Erich, 4,028,996.

Jablonsky, Erich, 4,028,998.
Keller, Manfred; and Elser, Dieter, 4,029,124.
Lang, Armin, 4,028,997.
Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai: *See—*
Umezawa, Hamao; Aoyagi, Takaaki; Takeuchi, Tomio; Hamada, Masa; and Okami, Yoshiro, 4,029,547.
Zander, Georg, to U.S. Philips Corporation. Apparatus for high speed winding of coils. 4,028,920, Cl. 72-66.000.
Zappe, Hans H., to International Business Machines Corporation. Low-crosstalk-automatic resetting scheme for Josephson junction logic circuit. 4,029,975, Cl. 307-306.000.
Zehrung, Claude D., Jr., to Bluebird International, Inc. Towable lawn comber. 4,028,868, Cl. 56-17.200.
Zemek, Albert W.; Holmes, Robert H.; and Merithew, David L., to Universal Instruments Corporation. Non-axial lead electrical component prepper-taper apparatus. 4,029,131, Cl. 140-105.000.
Zerobnick, Alan H.; and Cole, David J., to Zerobnick, Samuel. Integrated belt-supported backpack. 4,029,243, Cl. 224-8.00R.
Zerobnick, Samuel: *See—*
Zerobnick, Alan H.; and Cole, David J., 4,029,243.
Zickler, Dietrich: *See—*
Schmidt, Herbert; Herzel, Joachim; and Zickler, Dietrich, 4,029,455.
Ziegel, Liliane: *See—*
Ziegel, Olivier; and Ziegel, Liliane, 4,029,370.
Ziegel, Olivier; and Ziegel, Liliane. Portable safe. 4,029,370, Cl. 312-284.000.
Ziegenhagen, Allyn J.; and Campbell, Ramsey G., to Stauffer Chemical Company. Ethylene/chlorine elimination process. 4,029,714, Cl. 260-658.00R.
Zielie, Richard C., to Caterpillar Tractor Co. Mounting bracket for tubular members. 4,029,276, Cl. 248-74.00R.
Zimmer Plastic GmbH: *See—*
Schmidt, Herbert; Herzel, Joachim; and Zickler, Dietrich, 4,029,455.
Zimmerman, Dennis M.; and Marshall, Winston S., to Eli Lilly and Company. Novel N-cycloalkylmethyl decahydroisoquinolincs for producing opiate-like analgesia. 4,029,796, Cl. 424-258.000.
Zinser Textilmaschinen GmbH: *See—*
Schafer, Augustin; and Mogg, Klaus, 4,028,869.
Schulz, Gunter; and Igel, Wolfgang, 4,028,873.
Zorn, Jurgen: *See—*
Mayer, Siegfried; Sauer, Ivan; and Zorn, Jurgen, 4,029,446.
Zucchinelli, Mario, to S.A.E.S. Getters S.p.A. Wide channel getter device. 4,029,987, Cl. 313-174.000.
Zwerdling, Solomon: *See—*
Schertz, William W.; and Zwerdling, Solomon, 4,029,519.
Zwickel, Friedich: *See—*
Kovacs, Ernest; Ludwig, David P.; and Zwickel, Friedich, 4,029,536.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 14TH DAY OF JUNE, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Ex-Cell-O Corporation: *See—*
Hendry, James W., Re. 29,265.

Hendry, James W., to Ex-Cell-O Corporation. Closed cell foam plastic molding machine. Re. 29,265, Cl. 425-147.000.

Hessemer, Lawrence E.; Manning, Richard P.; Sparks, Harry G., deceased (by Sparks, Helen W., administratrix); and Powers, Walter H., to S-C Liquidating Corporation. Motor controlled lamp. Re. 29,266, Cl. 240-61.900.

Hoerner Waldorf Corporation: *See—*
Roccaforte, Harry I., Re. 29,263.

Manning, Richard P.: *See—*
Hessemer, Lawrence E.; Manning, Richard P.; Sparks, Harry G., deceased; and Powers, Walter H., Re. 29,266.

Powers, Walter H.: *See—*
Hessemer, Lawrence E.; Manning, Richard P.; Sparks, Harry G., deceased; and Powers, Walter H., Re. 29,266.

Roccaforte, Harry I., to Hoerner Waldorf Corporation. Protective carton. Re. 29,263, Cl. 229-39.00B.

S-C Liquidating Corporation: *See—*
Hessemer, Lawrence E.; Manning, Richard P.; Sparks, Harry G., deceased; and Powers, Walter H., Re. 29,266.

Sparks, Harry G., deceased: *See—*
Hessemer, Lawrence E.; Manning, Richard P.; Sparks, Harry G., deceased; and Powers, Walter H., Re. 29,266.

Sparks, Helen W., administratrix: *See—*
Hessemer, Lawrence E.; Manning, Richard P.; Sparks, Harry G., deceased; and Powers, Walter H., Re. 29,266.

Svein Stromberg & Co. A/S: *See—*
Utz, Georg, Re. 29,262.

Thornber, Bernice B.: *See—*
Woodward, Frederick W., Re. 29,264.

Thornber, Donald: *See—*
Woodward, Frederick W., Re. 29,264.

Utz, Georg, to Svein Stromberg & Co. A/S. Arrangement pertaining to a case for bottles, boxes or other standardized articles. Re. 29,262, Cl. 220-21.000.

Woodward, Frederick W., to Thornber, Donald; and Thornber, Bernice B. Tent for rear-doored vehicle. Re. 29,264, Cl. 296-23.0MC.

LIST OF PLANT PATENTEES

Beakbane, A. Beryl, to National Seed Development Organisation Limited. Plum rootstock—Pixy variety. 4,061, 6-14-77, Cl. 38.000.

National Seed Development Organisation Limited: *See—*
Beakbane, A. Beryl, 4,061.
Tydeman, Henry M., deceased; Tydeman, Elizabeth Mary, executrix; and Tydeman, William Marcus, executor, 4,059.

Stark Brothers Nurseries and Orchards Co.: *See—*
Tuttle, Roy, 4,060.

Tuttle, Roy, to Stark Brothers Nurseries and Orchards Co. Apple tree—mutation of Scarlet Staymared. 4,060, 6-14-77, Cl. 34.000.

Tydeman, Elizabeth Mary, executrix: *See—*
Tydeman, Henry M., deceased; Tydeman, Elizabeth Mary, executrix; and Tydeman, William Marcus, executor, 4,059.

Tydeman, Henry M., deceased; by Tydeman, Elizabeth Mary, executrix; and by Tydeman, William Marcus, executor, to National Seed Development Organisation Limited. Cherry rootstock—Colt variety. 4,059, 6-14-77, Cl. 37.000.

Tydeman, William Marcus, executor: *See—*
Tydeman, Henry M., deceased; Tydeman, Elizabeth Mary, executrix; and Tydeman, William Marcus, executor, 4,059.

LIST OF DESIGN PATENTEES

Air-Lock Plastics, Inc.: *See—*
Talmon, Floyd H.; and Talmon, David K., 244,645.

Allibert Exploitation, Societe Anonyme: *See—*
Vrignaud, Guy, 244,660.

American Optical Corporation: *See—*
Armbruster, John T., 244,711.

American Sign and Advertising Services, Inc.: *See—*
Niehaus, Donald H.; Schwab, Nick J.; and Seggerson, Patrick J., 244,725.

Amerock Corporation: *See—*
Tegner, Raymond U. H., 244,652.
Tegner, Raymond U. H., 244,653.
Tegner, Raymond U. H., 244,654.
Tegner, Raymond U. H., 244,668.

Anderson, Lloyd H.: *See—*
Deaton, Charles U.; and Anderson, Lloyd H., 244,643.
Deaton, Charles U.; and Anderson, Lloyd H., 244,649.

Ansul Company, The: *See—*
Montambo, Roger Jay, 244,702.

Armbruster, John T., to American Optical Corporation. Cabinet for a water bath shaker. 244,711, 6-14-77, Cl. D24-38.000.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
Tsugami, Naoya, 244,687.

Babb, Burton A., to Babbco, Ltd. Loudspeaker cone. 244,698, 6-14-77, Cl. D14-37.000.

Babbco, Ltd.: *See—*
Babb, Burton A., 244,698.

Bartlett, Robert D.; Kordes, Myron G.; and Morphy, Paul H., to Hobart Corporation. Refrigerator. 244,684, 6-14-77, Cl. D15-81.000.

Bell, Robert R., to Vapor Corporation. Fluid pump or similar article. 244,681, 6-14-77, Cl. D15-7.000.

Beste, Donald G. Golf bag. 244,705, 6-14-77, Cl. D34-5.0GB.

Bluestein, Bernard B., to Sunbeam Corporation. Stand for a curler/styler. 244,722, 6-14-77, Cl. D28-38.000.

Bluestein, Bernard B., to Sunbeam Corporation. Stand for curler/styler. 244,724, 6-14-77, Cl. D28-38.000.

Bourgeois, Antoine. Ophthalmic spectacles. 244,688, 6-14-77, Cl. D16-65.000.

Bourgeois, Antoine. Ophthalmic spectacles. 244,689, 6-14-77, Cl. D16-65.000.

Bowes, Stephen M., Jr., to Florida Machine & Foundry Co. Tooth for dredge cutter head or the like. 244,683, 6-14-77, Cl. D15-29.000.

Burke, Maurice Prentice. Chair. 244,651, 6-14-77, Cl. D6-69.000.

C.R. Engineering, Inc.: *See—*
Ross, Charles R., 244,714.

Carrousel Party Favors, Inc.: *See—*
Tiep, Darin M., 244,707.

Cho, Jin Sul. Frying pan. 244,663, 6-14-77, Cl. D7-97.000.

Coles, Allen E., to W & W Steel Company. Foldable shelf unit or similar article. 244,659, 6-14-77, Cl. D6-186.000.

Cozza, Humbert C. Digital wristwatch. 244,671, 6-14-77, Cl. D10-38.000.

Craft, Alan W. Handcuff lock key. 244,667, 6-14-77, Cl. D8-347.000.

Cridland, Michael: *See—*
Pulos, Arthur J.; Cridland, Michael; and Moro, Joseph, 244,700.

Dart Industries Inc.: *See—*
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Day, Albert J.: *See—*
Molyneux, Jane K.; Day, Albert J.; Day, Regina M.; and Kaiser, Theo E., 244,672.

Day, Regina M.: *See—*
Molyneux, Jane K.; Day, Albert J.; Day, Regina M.; and Kaiser, Theo E., 244,672.

Deaton, Charles U.; and Anderson, Lloyd H. Chair. 244,643, 6-14-77, Cl. D6-26.000.

Deaton, Charles U.; and Anderson, Lloyd H. Seat. 244,649, 6-14-77, Cl. D6-66.000.

Detroit Tool & Engineering Co.: *See—*
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Dictaphone Corporation: *See—*
Pulos, Arthur J.; Cridland, Michael; and Moro, Joseph, 244,700.

Dover Findings, Inc.: *See—*
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Eastman Kodak Company: *See—*
Hansen, David E.; and Ort, Wolfgang, 244,685.
Hansen, David E., 244,686.

Egan-Andrew, Desmond. Marine lamp. 244,713, 6-14-77, Cl. D48-20.00E.

Emmerling, Ronald, to Panorama Radio & Electronics Corporation. Radio. 244,718, 6-14-77, Cl. D14-70.000.

Famolare, Inc.: *See—*
Famolare, Joseph P., Jr., 244,642.

Famolare, Joseph P., Jr., to Famolare, Inc. Shoe sole. 244,642, 6-14-77, Cl. D2-320.000.

Fierro, John F.; and Dunning, George A. Automobile accessory lamp. 244,715, 6-14-77, Cl. D48-20.00E.

Florida Machine & Foundry Co.: *See—*
Bowes, Stephen M., Jr., 244,683.

Fratelli Saporiti Industria Arredamenti Di Saporiti, Sergio E Giorgio S.N.C.: *See—*
Offredi, Giovanni, 244,647.

Globol-Werk GmbH: *See—*
Schimanski, Georg, 244,692.

Guzzle, Timothy L.; and Sheeley, Eugene L. Golf iron head. 244,703, 6-14-77, Cl. D34-5.0GH.

Gym-Dandy, Inc.: *See—*
Smyrni, Emmanuel S.; and White, Bobbie L., 244,704.

Hansen, David E.; and Ort, Wolfgang, to Eastman Kodak Company. Photographic camera or similar article. 244,685, 6-14-77, Cl. D16-5.000.

Hansen, David E., to Eastman Kodak Company. Photographic camera or similar article. 244,686, 6-14-77, Cl. D16-06.000.

Henry, Franklin H. Wardrobe systemizer device. 244,661, 6-14-77, Cl. D6-257.000.

Hirsh, Menahem. File fastener compressor bar. 244,690, 6-14-77, Cl. D19-65.000.

Hobart Corporation: *See—*
Bartlett, Robert D.; Kordes, Myron G.; and Morphy, Paul H., 244,684.

Houston, Rosa B. Dog grooming comb. 244,712, 6-14-77, Cl. D30-40.000.

Hutter, Ralf: *See—*
Schneider, Florian; and Hutter, Ralf, 244,717.

Kaiser, Theo E.: *See—*
Molyneux, Jane K.; Day, Albert J.; Day, Regina M.; and Kaiser, Theo E., 244,672.

Kaywood Products Corporation: *See—*
Kaywood, Roy G., 244,666.

Kaywood, Roy G., to Kaywood Products Corporation. Hacksaw. 244,666, 6-14-77, Cl. D8-96.000.

Kemp, Victor H. Telephone book case and desk combination. 244,655, 6-14-77, Cl. D6-128.000.

KLT Industries, Inc.: *See—*
Knochel, Wayne L.; and Traeger, Robert S., 244,701.

Knochel, Wayne L.; and Traeger, Robert S., to KLT Industries, Inc. Animal toilet. 244,701, 6-14-77, Cl. D30-99.000.

Kobashikawa, Gary K. Pendant. 244,676, 6-14-77, Cl. D11-44.000.

Kohl, Ingeborg, to Reckjunior Cosmetic GmbH & Co. KG. Curling iron. 244,721, 6-14-77, Cl. D28-35.000.

Kordes, Myron G.: *See—*
Bartlett, Robert D.; Kordes, Myron G.; and Morphy, Paul H., 244,684.

Kowa Company Ltd.: *See—*
Okamoto, Shinobu, 244,699.

Krom, Richard H. Air tool housing shroud. 244,665, 6-14-77, Cl. D8-70.000.

Laurenzi, Richard F. Table. 244,657, 6-14-77, Cl. D6-177.000.

Lawson, Loren J. Display case. 244,656, 6-14-77, Cl. D6-173.000.

Leidigh, Darrell J.; and Leidigh, R. Mark. Paddle. 244,680, 6-14-77, Cl. D12-215.000.

Leidigh, R. Mark: *See—*
Leidigh, Darrell J.; and Leidigh, R. Mark, 244,680.

Lindblad, Stig Martin. Joint element. 244,695, 6-14-77, Cl. D25-75.000.

Little, Paul V., to Dover Findings, Inc. Jewelry clasp member. 244,673, 6-14-77, Cl. D11-87.000.

Luce, James W., to Syracuse China Corporation. Dinner plate or similar article. 244,662, 6-14-77, Cl. D7-36.000.

Maul, Fritz. Snowshoe binding. 244,710, 6-14-77, Cl. D34-14.00D.

McClure, James B. Equipment shelter and the like. 244,694, 6-14-77, Cl. D25-33.000.

McLaren, Brian Eric: *See—*
Morrison, Terrence Keith; and McLaren, Brian Eric, 244,691.

Micely, Alphonse L. Placard or similar article. 244,677, 6-14-77, Cl. D11-134.000.

Miner, Earl L., to Detroit Tool & Engineering Co. Garden tiller. 244,682, 6-14-77, Cl. D15-12.000.

Mobell, Sidney Frederick. Ring with canted top bars. 244,674, 6-14-77, Cl. D11-34.000.

Mobell, Sidney Frederick. Ring with canted top bars. 244,675, 6-14-77, Cl. D11-35.000.

Molyneux Clocks: *See—*
Molyneux, Jane K.; Day, Albert J.; Day, Regina M.; and Kaiser, Theo E., 244,672.

Molyneux, Jane K.; Day, Albert J.; Day, Regina M.; and Kaiser, Theo E., to Molyneux Clocks. Moon disc for a clock face. 244,672, 6-14-77, Cl. D10-126.000.

Monnet, Claude Alain Richard, to Shell International Petroleum Company Limited. Gas stove or similar article. 244,664, 6-14-77, Cl. D7-110.000.

Montambo, Roger Jay, to Ansul Company, The. Actuator assembly for a portable hand fire extinguisher. 244,702, 6-14-77, Cl. D29-2.000.

Moro, Joseph: *See—*
Pulos, Arthur J.; Cridland, Michael; and Moro, Joseph, 244,700.

Morphy, Paul H.: *See—*
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Morrison, Terrence Keith; and McLaren, Brian Eric. Combined filter and panel for evaporative air-conditioner. 244,691, 6-14-77, Cl. D23-149.000.

Motorola, Inc.: *See—*
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Niehaus, Donald H.; Schwab, Nick J.; and Seggerson, Patrick J., to American Sign and Advertising Services, Inc. Illuminated sign. 244,725, 6-14-77, Cl. D96-12.00R.

Null Manufacturing Corporation: *See—*
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Null, Philip L., to Null Manufacturing Corporation. Convertible bench. 244,644, 6-14-77, Cl. D6-36.000.

Null, Philip L., to Null Manufacturing Corporation. Seat. 244,650, 6-14-77, Cl. D6-68.000.

Offredi, Giovanni, to Fratelli Saporiti Industria Arredamenti Di Saporiti, Sergio E Giorgio S.N.C. Armchair. 244,647, 6-14-77, Cl. D6-56.000.

Okamoto, Shinobu, to Kowa Company Ltd. Tape recorder. 244,699, 6-14-77, Cl. D14-6.000.

Ort, Wolfgang: *See—*
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Outerbridge, Robert D. Masthead flagstaff. 244,679, 6-14-77, Cl. D11-181.000.

Panorama Radio & Electronics Corporation: *See—*
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Pulos, Arthur J.; Cridland, Michael; and Moro, Joseph, to Dictaphone Corporation. Remote control microphone or similar article. 244,700, 6-14-77, Cl. D14-12.000.

Rabinowitz, Harold, to Dart Industries Inc. Insulated tote bag. 244,723, 6-14-77, Cl. D87-1.00R.

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Rajaniemi, Raymond U.; and Rajaniemi, Brunhild B. Foot warmer. 244,641, 6-14-77, Cl. D2-264.000.

Reckjunior Cosmetic GmbH & Co. KG: *See—*
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Ripple, Warren. Speaker enclosure. 244,696, 6-14-77, Cl. D14-30.000.

Ross, Charles R., to C.R. Engineering, Inc. Headlamp housing. 244,714, 6-14-77, Cl. D48-32.00R.

Ryder, Francis E.: *See—*
Thomas, Michael D.; and Ryder, Francis E., 244,719.

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Thomas, Michael D.; and Ryder, Francis E., 244,719.

Sano, Hiroshi. Toy crane. 244,709, 6-14-77, Cl. D34-15.00S.

Schimanski, Georg, to Globol-Werk GmbH. Air freshener or similar article. 244,692, 6-14-77, Cl. D23-150.000.

Schneider, Florian; and Hutter, Ralf. Electronic percussion musical instrument. 244,717, 6-14-77, Cl. D56-1.00E.

Schoepe, Adolf. Ball cock float. 244,693, 6-14-77, Cl. D23-33.000.

Schwab, Nick J.: *See—*
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Shell International Petroleum Company Limited: *See—*
Monnet, Claude Alain Richard, 244,664.

Shiffman, Jerome. Jewelry box. 244,669, 6-14-77, Cl. D9-235.000.

Smyrni, Emmanuel S.; and White, Bobbie L., to Gym-Dandy, Inc. Combined slide and swing support or the like. 244,704, 6-14-77, Cl. D34-5.00M.

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Bluestein, Bernard B., 244,722.
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Sutcliffe Engineering Holdings Limited, The: *See—*
Yates, Victor Horace, 244,708.

Swain, Jeanne M. Convertible chair. 244,648, 6-14-77, Cl. D6-64.000.

Syracuse China Corporation: *See—*
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Talmon, Floyd H.; and Talmon, David K., 244,645.

Talmon, Floyd H.; and Talmon, David K., to Air-Lock Plastics, Inc. Blow molded plastic seat. 244,645, 6-14-77, Cl. D6-48.000.

Tegner, Raymond U. H., to Amerock Corporation. Pedestal for bathroom fixtures or the like. 244,652, 6-14-77, Cl. D6-86.000.

Tegner, Raymond U. H., to Amerock Corporation. Cover for tissue boxes or the like. 244,653, 6-14-75, Cl. D6-98.000.

Tegner, Raymond U. H., to Amerock Corporation. Towel rack element. 244,654, 6-14-77, Cl. D6-99.000.

Tegner, Raymond U. H., to Amerock Corporation. Combined bracket and supporting arm. 244,668, 6-14-77, Cl. D8-363.000.

Thomas, Michael D.; and Ryder, Francis E., to Ryder International Corporation. Combined vacuum curettage vessel and valve closure therefor. 244,719, 6-14-77, Cl. D24-28.000.

Tiep, Darin M., to Carrousel Party Favors, Inc. Toy digital watch. 244,707, 6-14-77, Cl. D34-15.00R.

Tokiyama, Masaru, to Motorola, Inc. Mobile two-way radio apparatus or similar article. 244,697, 6-14-77, Cl. D14-68.000.

Traeger, Robert S.: *See*—
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Tsugami, Naoya, to Asahi Kogaku Kogyo Kabushiki Kaisha. Flash unit for a photographic camera. 244,687, 6-14-77, Cl. D16-42.000.

Turner, Jack Allen. Support stand for a portable calculator. 244,658, 6-14-77, Cl. D6-181.000.

Uchida Sharyo Co., Ltd.: *See*—
Uchida, Suekichi, 244,646.

Uchida, Suekichi, to Uchida Sharyo Co., Ltd. Foldable rocking chair. 244,646, 6-14-77, Cl. D6-49.000.

Vapor Corporation: *See*—
Bell, Robert R., 244,681.

Vela, Hector H. Auxiliary wheel for a skateboard. 244,706, 6-14-77, Cl. D34-15.0AJ.

Vrignaud, Guy, to Allibert Exploitation, Societe Anonyme. Mirror. 244,660, 6-14-77, Cl. D6-240.000.

W & W Steel Company: *See*—
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Weimer, John W. Combined bell and stand therefor. 244,678, 6-14-77, Cl. D11-157.000.

Weitzman, Lane T. Dispenser. 244,716, 6-14-77, Cl. D52-3.00R.

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Smyrni, Emmanuel S.; and White, Bobbie L., 244,704.

Winikoff, Stuart F. Dispensing cap for an eye drop bottle or the like. 244,670, 6-14-77, Cl. D9-261.000.

Winkler, Frederic V. Snap-on hair stylist's tray. 244,720, 6-14-77, Cl. D28-73.000.

Yates, Victor Horace, to Sutcliffe Engineering Holdings Limited, The. Swing seat. 244,708, 6-14-77, Cl. D34-5.00M.

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CLASS 16
35 R 4,028,773
86 A 4,028,772

CLASS 17
24 4,028,774
49 4,028,775

CLASS 19
265 4,028,776

CLASS 23
254 E 4,029,472
259 4,029,473
285 4,029,474

CLASS 24
16 PB 4,028,777
79 4,028,778
116 R 4,028,780

CLASS 29
78 4,028,781
95 R 4,028,782
117 4,028,783
132 4,028,786
149.5 B 4,028,784
156.8 B 4,028,787
4,028,788
157.3 R 4,028,785
157.4 4,028,789
403 4,028,795
416 4,028,796
427 4,028,791
431 4,028,792
451 4,028,797
618 4,028,793
628 4,028,798
629 4,028,794
764 4,028,790

CLASS 30
37 4,028,799
90.1 4,028,800
164.95 4,028,801
290 4,028,806
294 4,028,802
321 4,028,803
382 4,028,804
403 4,028,805
419 4,028,807

CLASS 32
14 A 4,028,809
14 E 4,028,808
57 4,028,810

CLASS 33
94 4,028,814
169 B 4,028,812
174 L 4,028,811
270 4,028,813
366 4,028,815

CLASS 34
86 4,028,817
195 4,028,816

CLASS 35
19 R 4,028,818
22 R 4,028,819

CLASS 37
41 4,028,820
55 4,028,821
86 4,028,822
142 R 4,028,823

CLASS 40
2 R 4,028,824
106.25 4,028,830
110 4,028,826
128 4,028,827
129 C 4,028,829
130 D 4,028,828
130 K 4,028,831
155 4,028,832
316 4,028,833

CLASS 42
1 T 4,028,834
69 B 4,028,836
69 R 4,028,835

CLASS 43
43.12 4,028,837
43.13 4,028,839
4,028,840
43.16 4,028,838
53.5 4,028,825
124 4,028,841

CLASS 44
62 4,029,480

CLASS 46
1 R 4,028,842
4,028,843
22 4,028,844
164 4,028,845

CLASS 47
57.5 4,028,846
65 4,028,847
69 4,028,848

CLASS 48
111 4,029,481

CLASS 49
181 4,028,849
212 4,028,850

CLASS 51
206 R 4,028,852
412 4,028,851

CLASS 52
2 4,028,853
93 4,028,854
272 4,028,855
281 4,028,856
309.2 4,028,857
384 4,028,858
393 4,028,859
565 4,028,860
745 4,028,861

CLASS 53
3 4,028,862
15 4,028,863
24 4,028,864
76 4,028,865
195 4,028,866

CLASS 55
2 4,029,482
68 4,029,483
71 4,029,484
113 4,029,485
218 4,029,486
309 4,029,487

CLASS 56
12.8 4,028,867
17.2 4,028,868

CLASS 57
34 R 4,028,869
58.84 4,028,870
58.89 4,028,871
58.91 4,028,872
124 4,028,873
144 4,028,874
157 TS 4,028,875

CLASS 58
1 R 4,028,876
2 4,028,877
23 BA 4,028,880
23 R 4,028,878
4,028,879
58 4,028,881
152 B 4,028,882

CLASS 60
39.04 4,028,883
39.18 B 4,028,884
39.32 4,028,888
39.75 4,028,885
245 4,028,886
282 4,028,887
420 4,028,889
443 4,028,890
550 4,028,891
599 4,028,892
641 4,028,893

CLASS 61
3 4,028,894
14 4,028,895
28 4,028,896
36 C 4,028,897
45 D 4,028,898
48 4,028,899
53 4,028,900
63 4,028,901
72.6 4,028,902
110 4,028,903

CLASS 62
2 4,028,904
3 4,028,905
183 4,028,906
222 4,028,907

CLASS 63
23 4,028,908

CLASS 64
28 R 4,028,909

CLASS 65
136 4,029,488
4,029,489

CLASS 66
26 4,028,910
132 R 4,028,911
149 R 4,028,912

CLASS 70
58 4,028,913
165 4,028,914
233 4,028,915
4,028,916
389 4,028,917

CLASS 71
78 4,029,490
90 4,029,491
92 4,029,492
105 4,029,493

CLASS 72
45 4,028,918
56 4,028,919
66 4,028,920
88 4,028,921
4,028,922
97 4,028,923
252 4,028,924
294 4,028,925
422 4,028,926

CLASS 73
6 4,028,927
40.7 4,028,928
55 4,028,929
61.4 4,028,930
64.3 4,028,931
67.2 4,028,932
67.6 4,028,933
67.8 S 4,028,934
71.3 4,028,935
146 4,028,937
146.8 4,028,936
189 4,028,939
194 A 4,028,938
299 4,028,940
335 4,028,942
339 R 4,028,941
345 4,028,943
356 4,028,944
395 4,028,945
557 4,028,947

CLASS 74
2 4,028,948
25 4,028,949
70 4,028,950
128 4,028,951
199 4,028,952
230.01 4,028,954
230.17 E 4,028,953
234 4,028,955
236 4,028,956
422 4,028,957
471 XY 4,028,958
473 R 4,028,959
477 4,028,960
492 4,028,961
522 4,028,946
572 4,028,962
604 4,028,963
606 R 4,028,964
765 4,028,965
822 4,028,966

CLASS 75
10 R 4,029,494
4,029,495
35 4,029,496
60 4,029,497
103 4,029,498
109 4,029,499
135 4,029,500
206 4,029,501
247 4,029,475

CLASS 81
7 4,028,967
71 4,028,968
146 4,028,969
165 4,028,970
383.5 4,028,971

CLASS 82
28 R 4,028,972

CLASS 83
169 4,028,973
171 4,028,974
397 4,028,975
745 4,028,976

CLASS 84
1.16 4,028,977
1.24 4,028,979
1.26 4,028,978
218 4,028,980
327 4,028,981
331 4,028,982
422 R 4,028,984
422 S 4,028,983
454 4,028,985

CLASS 85
10 E 4,028,986
46 4,028,987
87 4,028,988

CLASS 86
1 A 4,028,989

CLASS 89
1 B 4,028,990
41 ME 4,028,991
130 4,028,993
161 4,028,994

CLASS 90
11 C 4,028,992

CLASS 91
276 4,028,995
401 4,028,996
412 4,028,997

CLASS 92
107 4,028,998
170 4,029,000

CLASS 93
51 R 4,028,999
53 M 4,029,001

CLASS 96
1 PS 4,029,502
29 D 4,029,503
4,029,504
35.1 4,029,505
48 R 4,029,506
49 4,029,507
56.3 4,029,508
60 R 4,029,509
61 R 4,029,510

CLASS 98
115 K 4,029,002

CLASS 99
295 4,029,003
477 4,029,004
639 4,029,005

CLASS 101
35 4,029,006
42 4,029,007
148 4,029,008
231 4,029,009
316 4,029,010
330 4,029,011
368 4,029,012
382 MV 4,029,013

CLASS 102
35 4,029,014
45 4,029,015
69 4,029,016
70 R 4,029,017
93 4,029,018

CLASS 104
124 4,029,019
148 MS 4,029,020

CLASS 105
199 R 4,029,021
420 4,029,022

CLASS 106
38.22 4,029,511
109 4,029,512
288 B 4,029,513
4,029,514

CLASS 108
51.1 4,029,023
60 4,029,024
108 4,029,025

CLASS 110
8 A 4,029,026
28 J 4,029,027

CLASS 111
86 4,029,028

CLASS 112
79 A 4,029,030
79 R 4,029,029
80 4,029,031
121.22 4,029,032

CLASS 113
121 C 4,029,033

CLASS 114
16 E 4,029,034
67 A 4,029,035
4,029,036
127 4,029,037
162 4,029,038
230 4,029,039
304 4,029,040

CLASS 116
114 AE 4,029,041
114 PV 4,029,042
125 4,029,043

CLASS 118
9 4,029,044
49 4,029,045
202 4,029,046
652 4,029,047

CLASS 119
1 4,029,048
3 4,029,049
5 4,029,050
52 AF 4,029,052
52 R 4,029,051

CLASS 122
6.5 4,029,053
7 R 4,029,054
32 4,029,055
34 4,029,056
149 4,029,057

CLASS 123
8.09 4,029,058
18 R 4,029,059
4,029,060
32 EE 4,029,061
32 ST 4,029,062
52 M 4,029,063
75 B 4,029,075
119 E 4,029,064
122 AA 4,029,065
127 4,029,066
136 4,029,067
139 AN 4,029,070
139 AS 4,029,071
139 E 4,029,068
139 R 4,029,069
191 S 4,029,072
198 D 4,029,073
4,029,074

CLASS 126
140 4,029,076
258 4,029,079
270 4,029,080
4,029,081
271 4,029,077
4,029,082
298 4,029,078
361 4,029,451

CLASS 127
37 4,029,515
38 4,029,516

CLASS 128
2 R 4,029,085
2 V 4,029,084
2 Z 4,029,083
2.06 E 4,029,086
24 R 4,029,087
38 4,029,088
80 R 4,029,089
87 R 4,029,090

92 D 4,029,091
141 R 4,029,092
145.7 4,029,093
214 F 4,029,094
250 4,029,095
265 4,029,096
276 4,029,097
284 4,029,098
4,029,100
290 R 4,029,101
295 4,029,099
303.1 4,029,102
348 4,029,103
4,029,104
351 4,029,105

CLASS 131

17 R 4,029,106
4,029,107
4,029,108
173 4,029,109

CLASS 132

33 R 4,029,110
53 4,029,111
79 R 4,029,112
91 4,029,113

CLASS 134

11 4,029,517
104 4,029,114
111 4,029,115
167 R 4,029,116

CLASS 135

4 C 4,029,117

CLASS 136

89 PC 4,029,519
89 SG 4,029,518
205 4,029,520
225 4,029,521

CLASS 137

15 4,029,118
119 4,029,119
494 4,029,120
545 4,029,121
551 4,029,122
565 4,029,123
596.12 4,029,124
614.06 4,029,125
615 4,029,126
806 4,029,127

CLASS 138

89 4,029,128
135 4,029,129

CLASS 139

196.2 4,029,130

CLASS 140

105 4,029,131

CLASS 141

1.1 4,029,132
12 4,029,133

CLASS 144

208 C 4,029,134

CLASS 145

46 4,029,135

CLASS 148

1.5 4,029,522
6.17 4,029,523
13.1 4,029,524
32 4,029,525
147 4,029,526
187 4,029,527
4,029,528

CLASS 149

19.6 4,029,529
28 4,029,530

CLASS 150

1.5 R 4,029,136

CLASS 152

362 R 4,029,137
4,029,138
379.1 4,029,139

CLASS 156

71 4,029,532
89 4,029,533
246 4,029,534
272 4,029,535
285 4,029,536
497 4,029,537
502 4,029,538
513 4,029,539
522 4,029,540
647 4,029,531
649 4,029,542

CLASS 162

24 4,029,543
175 4,029,544

CLASS 164

72 4,029,140

CLASS 165

80 4,029,141
105 4,029,142
109 4,029,143
124 4,029,144
161 4,029,145
166 4,029,146

CLASS 166

217 4,029,147
254 4,029,148
280 4,029,149

CLASS 169

39 4,029,150

CLASS 171

65 4,029,151

CLASS 172

19 4,029,152
59 4,029,153
91 4,029,154
763 4,029,155
765 4,029,156
801 4,029,157

CLASS 173

131 4,029,158
163 4,029,159

CLASS 174

11 R 4,029,889
14 R 4,029,890
4,029,891
4,029,892
15 CA 4,029,893
70 S 4,029,894
138 F 4,029,895
4,029,896
152 GM 4,029,897

CLASS 175

210 4,029,160

CLASS 176

82 4,029,545

CLASS 177

25 4,029,161
165 4,029,162
255 4,029,163

CLASS 178

19 4,029,899
69.1 4,029,900
88 4,029,903
4,029,904
4,029,905

CLASS 179

2 E 4,029,901
15 BT 4,029,906
15 FD 4,029,902
16 EA 4,029,907
90 BB 4,029,908
99 4,029,909
115.5 ES 4,029,911
115.5 ME 4,029,910
170.2 4,029,912
175.3 R 4,029,913

CLASS 180

1 VS 4,029,164
6.48 4,029,165
9.62 4,029,166
64 A 4,029,167
114 4,029,168

CLASS 181

135 4,029,169
155 4,029,170
167 4,029,171

CLASS 182

46 4,029,172
150 4,029,173
204 4,029,174

CLASS 187

29 R 4,029,175
52 R 4,029,176
89 4,029,177

CLASS 188

1 C 4,029,178
71.8 4,029,179
181 R 4,029,180
250 B 4,029,181

CLASS 191

39 4,029,182

CLASS 192

13 R 4,029,183
28 4,029,184
30 W 4,029,185
98 4,029,186
105 BA 4,029,187
109 F 4,029,188
113 B 4,029,189

CLASS 195

31 R 4,029,546
51 S 4,029,549
80 R 4,029,547
4,029,548

CLASS 197

1 R 4,029,190
2 4,029,191
19 4,029,192
149 4,029,193

CLASS 198

358 4,029,194
399 4,029,195
413 4,029,196
425 4,029,197
4,029,198
678 4,029,199
830 4,029,200
858 4,029,201

CLASS 200

1 R 4,029,914
5 A 4,029,915
4,029,916
5 R 4,029,917
38 D 4,029,918
52 R 4,029,919
84 B 4,029,920
144 B 4,029,921
148 D 4,029,922
163 4,029,923
307 4,029,924
339 4,029,925

CLASS 201

2.5 4,029,550

CLASS 202

263 4,029,551

CLASS 203

69 4,029,552
94 4,029,553

CLASS 204

1 T 4,029,554
15 4,029,555
40 4,029,556
149 4,029,557
158 R 4,029,558
4,029,559
163 R 4,029,560
181 4,029,561
192 EC 4,029,562
195 R 4,029,563
224 R 4,029,564
256 4,029,565
290 F 4,029,566

CLASS 206

108 4,029,203
140 4,029,204
173 4,029,205
400 4,029,206
427 4,029,207
454 4,029,208
510 4,029,209
562 4,029,202

CLASS 208

8 4,029,567
11 LE 4,029,568
180 4,029,569
188 4,029,570
251 H 4,029,571

CLASS 209

11 4,029,572
82 4,029,210
212 4,029,573

CLASS 210

3 4,029,574
16 4,029,575
27 4,029,576
58 4,029,577
63 Z 4,029,578
77 4,029,579
136 4,029,580
220 4,029,581
500 M 4,029,582
502 4,029,583
532 R 4,029,584

CLASS 211

104 4,029,211
113 4,029,212

CLASS 212

39 MS 4,029,213

CLASS 214

1 BB 4,029,216
1 P 4,029,214
4,029,215
4,029,217
16.1 R 4,029,218
17 DA 4,029,219
35 R 4,029,220
38 BB 4,029,221
41 R 4,029,222
77 R 4,029,223
83.3 4,029,224
138 R 4,029,225
139 4,029,226
396 4,029,227
522 4,029,228
654 4,029,229
4,029,230

CLASS 215

256 4,029,231

CLASS 219

10.49 4,029,926
10.55 R 4,029,927
69 E 4,029,928
69 W 4,029,929
74 4,029,930
78 4,029,931
121 LM 4,029,932
4,029,933
145 4,029,934
228 4,029,935
267 4,029,936
295 4,029,937
384 4,029,938
388 4,029,939
506 4,029,940
511 4,029,941
522 4,029,942

CLASS 220

21 Re.29,262
73 4,029,232
89 A 4,029,233
337 4,029,234

CLASS 221

211 4,029,235

CLASS 222

135 4,029,236
193 4,029,238
614 4,029,237

CLASS 223

85 4,029,239
96 4,029,240
106 4,029,241

CLASS 224

2 B 4,029,242
8 R 4,029,243
42.42 R 4,029,244
42.43 4,029,245
42.45 B 4,029,246
45 F 4,029,248

CLASS 226

43 4,029,247
95 4,029,249
136 4,029,250
154 4,029,251

CLASS 228

3.1 4,029,252
175 4,029,253
181 4,029,254

CLASS 229

39 B Re.29,263

CLASS 235

57 4,029,943
61.11 D 4,029,944
61.12 N 4,029,945
150.2 4,029,946
151 4,029,947
151.11 4,029,949
4,029,950
151.21 4,029,255
4,029,951
4,029,952
151.3 4,029,948

CLASS 236

12 R 4,029,256
48 R 4,029,257

CLASS 237

1 A 4,029,258

CLASS 239

282 4,029,260
284 A 4,029,259
333 4,029,261

CLASS 240

8.16 4,029,953
10.6 CH 4,029,954
25 4,029,955
41.37 4,029,956
61.9 Re.29,266

CLASS 241

43 4,029,262
73 4,028,779
188 R 4,029,263

CLASS 242

1 4,029,264
7.23 4,029,265
20 4,029,266
107.4 A 4,029,267
198 4,029,268
201 4,029,269

CLASS 244

3.21 4,029,270
17.13 4,029,271
46 4,029,272
153 R 4,029,273

CLASS 246

187 B 4,029,274

CLASS 248

25 4,029,275
74 R 4,029,276
4,029,277
188.2 4,029,278
188.5 4,029,279
210 4,029,280
220.3 4,029,281
221.1 4,029,282
399 4,029,283
4,029,284
467 4,029,285

CLASS 249

19 4,029,286
27 4,029,287
216 4,029,288

CLASS 250

221 4,029,957
223 B 4,029,958
239 4,029,959
315 R 4,029,960
328 4,029,401
4,029,961
338 4,029,962
360 4,029,963
368 4,029,964
370 4,029,965
372 4,029,966
492 R 4,029,967
507 4,029,968

CLASS 251

58 4,029,289
82 4,029,290
96 4,029,291
163 4,029,292
282 4,029,293
4,029,294
297 4,029,295
331 4,029,296

CLASS 252

8.6 4,029,583
47.5 4,029,586
48.2 4,029,587
4,029,588
51 4,029,589
89 R 4,029,590
95 4,029,591
182 4,029,592
4,029,593
299 4,029,594
4,029,595
329 4,029,596
408 4,029,597
4,029,598
414 4,029,599
444 4,029,600
447 4,029,601
458 4,029,602
471 4,029,603
501 4,029,604
514 4,029,605
529 4,029,606
545 4,029,607
551 4,029,608

CLASS 254

139 4,029,297
158 4,029,298

CLASS 259

4 R 4,029,299
192 4,029,300

CLASS 260

2 R 4,029,609
2.5 AW 4,029,611
2.5 B 4,029,613
4,029,614
2.5 BF 4,029,610
2.5 E 4,029,612
2.5 R 4,029,615
17.4 ST 4,029,616
20 4,029,617
23 XA 4,029,618
4,029,619
29.2 EP 4,029,621
29.6 NR 4,029,620
29.6 RW 4,029,623
29.6 TA 4,029,624
29.6 WQ 4,029,622
31.4 R 4,029,625
31.6 4,029,626
4,029,627
32.8 R 4,029,628
37 SB 4,029,629
38 4,029,630
40 R 4,029,631
42.15 4,029,632
42.55 4,029,633
45.9 NP 4,029,634
46.5 R 4,029,635
75 N 4,029,637
4,029,638
79 4,029,639
79.3 MU 4,029,640
112.7 4,029,641
4,029,642
145 B 4,029,643
200 4,029,644
239 A 4,029,645
239 BF 4,029,646
239.3 B 4,029,647
239.55 R 4,029,648
240 H 4,029,649
240 J 4,029,650
243 C 4,029,651
4,029,653
4,029,654
4,029,655
4,029,656
243 R 4,029,652
244 R 4,029,657
247.1 E 4,029,658
247.2 B 4,029,659
248 A 4,029,660
256.4 C 4,029,661
257 4,029,662
287 D 4,029,663
293.53 4,029,664
4,029,665
293.73 4,029,666
294.8 C 4,029,667
295 T 4,029,668
306.7 C 4,029,669
308 B 4,029,670
310 R 4,029,671
326.47 4,029,673
326.5 B 4,029,672
343.3 R 4,029,674
343.6 4,029,675
343.7 4,029,676
345.2 4,029,677
345.5 4,029,678
348 R 4,029,679
380 4,029,680
408 4,029,681
414 4,029,682
438.1 4,029,683
439 R 4,029,684
453 P 4,029,686
453 RZ 4,029,685
455 A 4,029,687
465.4 4,029,688
468 D 4,029,691
468 H 4,029,690
468 K 4,029,689
468.5 4,029,692
473 R 4,029,693
475 P 4,029,694
486 D 4,029,695
502.5 4,029,696
4,029,697
514 D 4,029,698
516 4,029,699
530 N 4,029,636
534 R 4,029,700
554 4,029,702
564 R 4,029,703
566 A 4,029,704
570 D 4,029,705
570.9 4,029,706
577 4,029,707

584 B 4,029,708
601 R 4,029,709
602 4,029,710
4,029,711
609 R 4,029,712
624 R 4,029,713
658 R 4,029,714
668 D 4,029,715
672 T 4,029,716
674 SA 4,029,717
683.15 R 4,029,719
877 4,029,718
887 4,029,720
928 4,029,721
953 4,029,722

CLASS 261

29 4,029,723
87 4,029,724

CLASS 264

38 4,029,725
41 4,029,726
186 4,029,727
278 4,029,728
310 4,029,729
315 4,029,730

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77 4,029,301
204 4,029,302

CLASS 267

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65 R 4,029,305
110 4,029,303
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138 4,029,307

CLASS 269

17 4,029,308

CLASS 270

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63 4,029,310

CLASS 272

70.3 4,029,311
123 4,029,312

CLASS 273

2 4,029,313
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135 AB 4,029,321

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37 4,029,322

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30 4,029,324

CLASS 279

123 4,029,325

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CLASS 289

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18 4,029,347

CLASS 292

241 4,029,348
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CLASS 293

71 R 4,029,350

CLASS 294

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28 R 4,029,353
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2 4,029,360
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29 4,029,363
34 4,029,364
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CLASS 305

11 4,029,366

CLASS 307

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CLASS 310

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49 R 4,029,977
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68 D 4,029,981
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CLASS 312

284 4,029,370

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25 4,029,983
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414 4,029,988

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19 4,029,371

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CLASS 325

28 4,030,032
30 4,030,033
319 4,030,034
404 4,030,035
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CLASS 328

5 4,030,037
127 4,030,038
142 4,030,039
154 4,030,040

CLASS 330

10 4,030,041
18 4,030,042
30 D 4,030,043
4,030,044

CLASS 331

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94.5 D 4,030,046
4,030,047

CLASS 333

6 4,030,048
33 4,030,049
72 4,030,050
83 R 4,030,051

CLASS 334

7 4,030,052

CLASS 335

15 4,030,053
61 4,030,054
195 4,030,055
245 4,030,056

CLASS 336

83 4,030,057
92 4,030,058

CLASS 337

50 4,030,060
262 4,030,059
409 4,030,061

CLASS 339

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17 F 4,029,374
17 M 4,029,375
17 R 4,029,373
19 4,029,376
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22 B 4,029,378
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60 R 4,029,380
61 R 4,029,381
94 M 4,029,382
97 R 4,029,383
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218 R 4,029,388

CLASS 340

3 R 4,030,062
8 R 4,030,063
15.5 DS 4,030,064
27 AT 4,030,065
73 4,030,066
146.1 AL 4,030,067
146.3 AQ 4,030,068
147 R 4,030,070
147 SC 4,030,069
164 R 4,030,071
172.5 4,030,072
4,030,073
4,030,075
4,030,076
4,030,077
4,030,078
4,030,079
4,030,080
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173 CA 4,030,081
173 DR 4,030,083
173 R 4,030,082
4,030,084

CLASS 341

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261 4,030,087
267 C 4,030,088
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324 M 4,030,090
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347 DD 4,030,093
365 R 4,030,094
413 4,030,095

CLASS 343

5 CM 4,030,096
8 4,030,097
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117 R 4,030,099
709 4,030,100
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915 4,030,102
4,030,103

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74.1 4,030,104
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CLASS 350

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214 4,029,397
231 4,029,398
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310 4,029,400

CLASS 351

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121 4,029,403

CLASS 352

6 4,029,405

CLASS 353

27 R 4,029,406
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110 4,029,408

CLASS 354

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51 4,029,409
4,029,411
52 4,029,410
64 4,029,412
75 4,029,413
91 4,029,404
112 4,029,414

CLASS 356

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100 4,029,417
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209 4,029,420
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98 4,030,136
106 4,030,137
135 4,030,138

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256 4,029,998
293 4,030,003
313 4,030,004
386 4,029,999
400 4,030,000
401 4,030,001

CLASS 364

200 4,030,074

CLASS 401

117 4,029,422

CLASS 403

3 4,029,423
292 4,029,424
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CLASS 404

25 4,029,425

CLASS 408

3 4,029,427
127 4,029,428
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33 R 4,029,430
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216 4,029,439
403 4,029,440
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489 4,029,442

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120 4,029,444
4,029,445
132 4,029,446

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54 4,029,734
118 4,029,736
127 4,029,737
179 4,029,741
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251 4,029,740
314 4,029,742
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4,029,745
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92 4,029,765
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95 4,029,768
4,029,769
118 4,029,769
127 4,029,770
177 4,029,771
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180 4,029,773
216 4,029,774
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240 4,029,776
242 4,029,777
243 4,029,778
4,029,779
246 4,029,780
4,029,781
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247 4,029,783
248.5 4,029,784
248.53 4,029,785
4,029,787
248.56 4,029,786
250 4,029,788
4,029,789
4,029,790
251 4,029,791
4,029,792
4,029,793
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279 4,029,810
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298 4,029,812
300 4,029,813
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309 4,029,815
316 4,029,731
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61 4,029,819
74 4,029,820
92 4,029,821
124 4,029,822
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548 4,029,701

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22 4,029,827
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57 4,029,830
130 4,029,541
264 4,029,831
318 4,029,832
428 4,029,833

CLASS 428

62 4,029,834
212 4,029,835
246 4,029,836
247 4,029,837
301 4,029,838
306 4,029,839
310 4,029,840
325 4,029,841
334 4,029,842
352 4,029,843
367 4,029,844
415 4,029,845
423 4,029,846
425 4,029,847
430 4,029,848
500 4,029,849
518 4,029,850
539 4,029,851
621 4,029,852
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660 4,029,479
676 4,029,476
680 4,029,477

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27 4,029,854
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104 4,029,857
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CLASS 432

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118 4,029,464
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88 4,029,863
125 4,029,864
146 4,029,865
185 4,029,866
233 4,029,869
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255 4,029,870
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303 4,029,872
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CLASS 528

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CLASS 536

1 4,029,878
4 4,029,879
7 4,029,880
9 4,029,881
17 4,029,882
4,029,883
4,029,884
50 4,029,885
120 4,029,886

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D2—	264	244,641		173	244,656		261	244,670		37	244,698		149	244,691		5 GH	244,703
	320	244,642		177	244,657	D10—	38	244,671		68	244,697		150	244,692		5 M	244,704
D6—	26	244,643		181	244,658		126	244,672		70	244,718	D24—	28	244,719			244,708
	36	244,644		186	244,659	D11—	34	244,674	D15—	7	244,681		38	244,711		14 D	244,710
	48	244,645		240	244,660		35	244,675		12	244,682	D25—	33	244,694		15 AJ	244,706
	49	244,646		257	244,661		44	244,676		29	244,683		75	244,695		15 R	244,707
	56	244,647	D7—	36	244,662		87	244,673		81	244,684	D28—	35	244,721		15 S	244,709
	64	244,648		97	244,663		134	244,677	D16—	5	244,685		38	244,722	D48—	20 E	244,713
	66	244,649		110	244,664		157	244,678		06	244,686			244,724			244,715
	68	244,650	D8—	70	244,665		181	244,679		42	244,687		73	244,720		32 R	244,714
	69	244,651		96	244,666	D12—	215	244,680		65	244,688	D29—	2	244,702	D52—	3 R	244,716
	86	244,652		347	244,667	D14—	6	244,699			244,689	D30—	40	244,712	D56—	1 E	244,717
	98	244,653		363	244,668		12	244,700	D19—		244,690		99	244,701	D87—	1 R	244,723
	99	244,654	D9—	235	244,669		30	244,696	D23—	33	244,693	D34—	5 GB	244,705	D96—	12 R	244,725
	128	244,655															

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PATENTS

1 :	4,028,759		4,029,089		4,029,753	9 :	4,028,787		4,029,372		4,029,276
2 :	4,029,217		4,029,092		4,029,773		4,028,788		4,029,400		4,029,277
	4,030,032		4,029,111		4,029,791		4,028,800		4,029,403		4,029,281
4 :	4,028,755		4,029,120		4,029,817		4,028,925		4,029,435		4,029,299
	4,028,815		4,029,129		4,029,818		4,028,970		4,029,438		4,029,303
	4,028,893		4,029,169		4,029,820		4,028,973		4,029,510		4,029,340
	4,029,287		4,029,181		4,029,853		4,029,067		4,029,661		4,029,380
	4,029,406		4,029,190		4,029,867		4,029,127		4,029,735		4,029,384
	4,029,979		4,029,203		4,029,902		4,029,193		4,029,797		4,029,385
	4,030,044		4,029,209		4,029,920		4,029,271		4,029,856		4,029,388
	4,030,067		4,029,216		4,029,937		4,029,377		4,029,918		4,029,478
	4,030,079		4,029,223		4,029,942		4,029,436		4,029,927		4,029,491
5 :	4,028,901		4,029,254		4,029,943		4,029,530		4,030,001		4,029,519
	4,029,115		4,029,262		4,029,947		4,029,537		4,030,015		4,029,554
	4,029,308		4,029,270		4,029,963		4,029,578	13 :	4,028,810		4,029,592
6 :	4,028,740		4,029,290		4,029,968		4,029,600		4,029,029		4,029,627
	4,028,743		4,029,311		4,029,998		4,029,705		4,029,205		4,029,665
	4,028,747		4,029,313		4,030,000		4,029,731		4,029,447		4,029,689
	4,028,748		4,029,329		4,030,028		4,029,980		4,029,448		4,029,734
	4,028,757		4,029,330		4,030,029		4,029,994		4,030,053		4,029,823
	4,028,758		4,029,333		4,030,038		4,030,070	16 :	4,029,314		4,029,831
	4,028,761		4,029,343		4,030,047		4,030,086	17 :	Re.29,263		4,029,843
	4,028,774		4,029,344		4,030,051	10 :	4,029,097		4,028,763		4,029,860
	4,028,780		4,029,355		4,030,069		4,029,230		4,028,775		4,029,884
	4,028,802		4,029,368		4,030,072		4,029,440		4,028,811		4,029,885
	4,028,803		4,029,373		4,030,077		4,029,480		4,028,825		4,029,901
	4,028,804		4,029,375		4,030,094		4,029,484		4,028,827		4,029,964
	4,028,806		4,029,401		4,030,103		4,029,505		4,028,845		4,029,993
	4,028,812		4,029,405		4,030,105		4,029,506		4,028,851		4,030,052
	4,028,818		4,029,416		4,030,114		4,029,516		4,028,864		4,030,095
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	4,028,830		4,029,423		4,030,128		4,029,634		4,028,902		4,028,904
	4,028,834		4,029,429		4,030,129		4,029,718		4,028,913		4,029,085
	4,028,882		4,029,430		4,030,132		4,029,727		4,028,921		4,029,187
	4,028,917		4,029,471		4,030,137		4,029,730		4,028,993		4,029,229
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	4,028,933		4,029,479		4,028,868		4,029,878		4,029,033		4,029,583
	4,028,939		4,029,481		4,028,948		4,029,946		4,029,064		4,029,607
	4,028,947		4,029,483		4,029,243	11 :	4,029,082		4,029,098		4,029,651
	4,028,949		4,029,538		4,029,336	12 :	4,028,789		4,029,100		4,029,655
	4,028,957		4,029,541		4,029,352		4,028,875		4,029,101		4,029,663
	4,028,975		4,029,545		4,029,360		4,028,876		4,029,112		4,029,671
	4,028,976		4,029,558		4,029,381		4,028,906		4,029,157		4,029,769
	4,028,985		4,029,559		4,029,425		4,028,915		4,029,161		4,029,782
	4,028,989		4,029,569		4,029,512		4,029,001		4,029,165		4,029,796
	4,028,990		4,029,626		4,029,737		4,029,011		4,029,166		4,029,926
	4,029,005		4,029,657		4,029,741		4,029,051		4,029,206		4,029,976
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PATENT AND TRADEMARK OFFICE NOTICES

Notice of Abandonment for Failure to Prosecute Application

Effective immediately the Patent Examining Corps will mail a communication, concerning all applications becoming abandoned in the Corps for failure to prosecute, to the correspondence address of record.

The communication to be mailed will merely comprise a copy of the first page of the Office action, to which applicant failed to properly respond, the copy including stamped language thereon indicating that the application has become abandoned and the date that the copy was mailed. The language stamped on the copy will be as follows: APPLICATION HAS BECOME ABANDONED, THIS NOTICE MAILED: ————————. In no case will the mere failure to receive a notice of abandonment affect the status of an abandoned application.

This new procedure should enable applicants to take appropriate and diligent action to reinstate an application inadvertently abandoned for failure to timely respond to an official communication. In most cases, a petition to revive under 37 CFR 1.137 will be the appropriate remedy. It may be that a response to the Office action was mailed to the Office with a certificate of mailing declaration as a part thereof (notice of October 26, 1976; 951 O.G. 1342) but was not received in the Office. In this instance, adequate relief may be available by means of a petition to withdraw the holding of abandonment.

In any instance, if action is not taken promptly after receiving the notice of abandonment, appropriate relief may not be granted.

If a lack of diligent action is predicated on the contention that neither the Office action nor the notice of abandonment was received, one may presume that there is a problem with the correspondence address of record. Accordingly, your attention is directed to recent notices of May 28, 1975, and September 9, 1976, dealing with changes of address (935 O.G. 1352 and 951 O.G. 454). In essence, it is imperative that a paper notifying the Office of a change of address be filed promptly in *each* application in which the correspondence address is to be changed.

If an application is abandoned or a patent lapsed for an excessive time a terminal disclaimer may be required. A terminal disclaimer may also be required where the holding of abandonment or lapse is withdrawn but a determination is made that action attempting to correct the problem should have been taken in a more diligent manner.

WILLIAM FELDMAN,

May 9, 1977. *Deputy Assistant Commissioner for Patents.*

Registration to Practice

The following are names of persons applying for registration to practice before the United States Patent and Trademark Office. Information tending to affect the eligibility of said applicants on moral, ethical, or other grounds, should be furnished the Commissioner of Patents and Trademarks on or before July 15, 1977.

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United States Patent and Trademark Office Before the Commissioner of Patents and Trademarks

IN RE HERBERT DUBNO, RESPONDENT. PROCEEDINGS FOR SUSPENSION OR DISBARMENT

Final Order

Herbert Dubno of New York City, whose registration number is 19,752 is hereby suspended, beginning on June 15, 1977, from practicing before the United States Patent and Trademark Office, without prejudice to his reinstatement after five years and after compliance with the requirement of 37 CFR § 1.341.

This action is taken under the provisions of 35 U.S.C. § 32, 37 CFR § 1.348, and 37 CFR § 2.16.

C. MARSHALL DANN,

May 25, 1977. *Commissioner of Patents and Trademarks.*

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

2,908,831, G. Hirsch, SPIT DRIVE UNITS, **filed** June 2, 1976, D.C., N.D. Ill. (Chicago) Doc. 76c2042, *McGraw-Edison Company* v. *Beatrice Foods Co.* It is hereby stipulated, under F.R.C.P. Rule 41(a)(1)(ii), that the complaint and counterclaim in the above action be dismissed with prejudice, Mar. 1, 1977.

2,952,301, Schlaak and King, FOLDING STEP STOOL, **filed** Mar. 8, 1977, D.C., S.D. Ill. (Peoria) Doc. 77-1021, *Ever-Ready Appliance Manufacturing Company* v. *Hanson Scale Company, Inc.*

3,009,235, G. De Mestral, SEPARABLE FASTENING DEVICE, **filed** Feb. 28, 1977, D.C., W.D. Tenn. (Memphis) Doc. C-77-2133, *Actief, N.V. v. Comfort Care Products, Inc.*

3,056,836, H. D. Moed, ARALKYLAMINES AND METHODS OF PREPARATION THEREOF, **filed** Aug. 2, 1976, D.C., S.D.N.Y., Doc. 76-C-3324, *Mead Johnson & Company et ano. v. American Roland Corporation.* Consent judgment, defendant is permanently enjoined from further infringemet, and the above-captioned action is dismissed with prejudice, Jan. 14, 1977.

3,146,972, E. Engel, EMERGENCY CONTROL SYSTEM FOR AIRCRAFT, **filed** Aug. 30, 1976, D.C., S.D.N.Y., Doc. 76-C-3869, *Ervin Engel v. National Aeronautics and Space Administration et ano.* Memorandum, order of dismissal filed terminating above case, and complaint is dismissed in its entirety, Nov. 26, 1976.

3,545,151, Bobzin and Sawyer, SURFACE PANEL ASSEMBLY WITH RIGID STRIPS TO CONCEAL FASTENERS, **filed** Dec. 9, 1974, D.C., S.D. Mich. (Grand Rapids) Doc. 74-436, *The Celotex Corporation v. Bendix Homes Systems, Inc.* Notice of dismissal given by plaintiff, Mar. 2, 1977.

3,587,252, K. Kohl, COMBINED PRESSER AND GUIDE BAR MECHANISM FOR A WARP KNITTING MACHINE, **filed** Mar. 10, 1977, D.C., N.D. Ohio (Toledo) Doc. C77-119, *National-Standard Company v. Garbalizer Corporation of America.* **Same, filed** Mar. 10, 1977, D.C., N.D. Ohio (Toledo) Doc. C77-120, *J. Rush Snyder et al. v. Garbalizer Corporation of America.*

3,718,484, C. W. Gray, STRINGSHOT BACK-OFF TOOL, **filed** Mar. 9, 1977, D.C., E.D. La. (New Orleans) Doc. C.A. 77-751, *Claude W. Gray v. Edwards Rental & Fishing Tools, Inc.*

3,715,718, R. A. Astengo, GROUND PROXIMITY WARNING SYSTEM UTILIZING RADIO AND BAROMETRIC ALTIMETER COMBINATION, **filed** Mar. 9, 1977, D.C., W.D. Wash. (Seattle) Doc. C77-164S, *Sundstrand Data Control, Inc. v. Ralph A. Astengo.*

3,730,077, B. Selden, COLLAPSIBLE LAPBOARD STRUCTURE, **filed** Feb. 24, 1977, D.C., C.D. Calif. (Los Angeles) Doc. CV77-653-LTL, *Michele R. Selden v. Mark Distributors, Inc.*

3,740,980, Schimizzi and Schimizzi, AUTOMOBILE TRUNK LOCK MECHANISM (ANTI-THEFT DEVICE), **filed** Mar. 10, 1977, D.C., S.D.N.Y., Doc. 77-C-1169(MP), *Gregory Frank Schimizzi and Ernest Joseph Schimizzi v. Chrysler Corporation.*

3,789,210, Weber, Shroyer and Baker, RECESSED LIGHTED ASSIST BAR, **filed** Mar. 8, 1977, D.C., N.D. Ind. (South Bend) Doc. S77-0034, *Progressive Dynamics, Inc. v. ILC Products Company, Inc.*

3,821,830, J. J. Sundheim, CLEANER FOR CARPETS AND THE LIKE, **filed** Feb. 23, 1977, D.C. Colo. (Denver) Doc. 77-M-210, *Windsor Industries Inc. v. Burnside Equipment Ltd.*

3,822,707, Adducci and Schwalm, METAL-ENCLOSED PACER WITH SOLID-STATE POWER SOURCE, **filed** Mar. 11, 1977, D.C., W.D.N.Y. (Buffalo) Doc. 77-127, *Cardiac Pacemakers, Inc. v. Medtelectronics, Ltd.*

3,826,222, J. M. ROMICK, UNIT-DOSE MEDICATION HANDLING SYSTEM, **filed** Nov. 12, 1976, D.C., N.D. Ohio (Cleveland) Doc. C76-1202. *J. M. Romick v. Americare, Inc.* Stipulation and order dismissing action without prejudice, Mar. 10, 1977.

3,837,981, T. R. Flint, EPOXY TAPE, **filed** Oct. 6, 1976, D.C., N.D. Ga. (Atlanta) Doc. C76-1637A, *Theodore R. Flint and Polymeric Systems, Inc. v. Dynatron Bondo Corporation.* Consent judgment, defendant is enjoined from use of said epoxy tape, Mar. 7, 1977.

3,844,000, J. Hedu, CLASP; **D. 200,155,** same, CLASP FASTENER OR SIMILAR ARTICLE, **filed** May 23, 1975, D.C.N.J. (Newark) Doc. 75-889, *The Siemon Company v. E-Z Buckle, Inc.* Action dismissed, May 23, 1975.

3,900,250, E. J. Ivani, SEMI-RIGID, GAS PERMEABLE CONTACT LENSES, **filed** Mar. 1, 1977, D.C., C.D. Calif. (Los Angeles) Doc. CV77-784-RJK, *Continuous Curve Contact Lenses, Inc. v. Rybci Scientific Corporation.*

3,902,584, Lee and Asbo, PAPER FEED SYSTEM FOR HIGH-SPEED PRINTER; **3,954,168,** A. Gabor, HIGH SPEED PRINTER WITH INTERMITTENT PRINT WHEEL AND CARRIAGE, **filed** May 7, 1976, D.C., N.D. Calif. (San Francisco) Doc. C76-934-GBH, *Xerox Corporation v. Qume Corporation and Sen Lin Lee (also known as David Lee).* Parties stipulated to a dismissal without prejudice, Nov. 12, 1976.

3,954,168. (See 3,902,584.)

3,999,748, W. A. Clarke, CHILDREN'S GAME OF CATCH, **filed** Mar. 2, 1977, D.C., W.D. Pa. (Erie) Doc. 77-28 Erie, *William A. Clarke v. G. A. Kayser & Sons, Inc. et al.*

4,009,497, J. R. Moon, WATER SAVING PANEL DEVICE FOR WATER CLOSETS, **filed** Mar. 2, 1977, D.C., M.D.N.C. (Greensboro) Doc. C77-108-D, *Moon Watersaver, Inc. and Watersavers, Inc. v. Fitch Lumber Company, Inc.* **Same, filed** Mar. 4, 1977, D.C., M.D.N.C. (Greensboro) Doc. 77-116-D, *Moon Watersavers, Inc. and Watersavers, Inc. v. Kerr Discount Drugs.*

D. 200,155. (See 3,844,000.)

D. 231,758, A. Rosselli, COUCH; **D. 231,759,** same, ARMCHAIR, **filed** Feb. 28, 1977, D.C., S.D. Fla. (Fort Lauderdale) Doc. 77-456-C-NCR, *Industria Arredamenti Fratelli Saporiti v. Carriage House Showrooms, Inc.*

D. 231,759. (See D. 231,758.)

D. 238,268, C. Strada, MOTORCYCLE EXHAUST PIPE, **filed** Mar. 3, 1977, D.C., E.D. Wis. (Milwaukee) Doc. 77-C-135, *Harley-Davidson Motor Co., Inc. v. Charles Strada.*

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,085,386, Re. S.N. 790,771, Filed Apr. 25, 1977, Cl. 56/25.4, ROTARY LAWNMOWER, Arthur J. Slemmons, Owner of Record: *Food Machinery and Chemical Corporation, San Jose, Calif.,* Attorney or Agent: F. W. Anderson, et al., Ex. Gp.: 333

3,569,747, Re. S.N. 790,055, Filed Apr. 22, 1977, Cl. 310/8.1, PIEZOELECTRIC TRANSDUCER, Vernon H. Siegel, Owner of Record: *Sundstrand Data Control, Inc., Redmond, Wash.,* Attorney or Agent: Ernest A. Wegner, et al., Ex. Gp.: 212

3,602,733, Re. S.N. 790,569, Filed Apr. 25, 1977, Cl. 307/209, THREE OUTPUT LEVEL LOGIC CIRCUIT, Edward M. Aoki, Owner of Record: *Signetics Corporation, Sunnyvale, Calif.,* Attorney or Agent: C. Richard Pfeiffer, et al., Ex. Gp.: 254

3,735,161, Re. S.N. 790,513, Filed Apr. 25, 1977, Cl. 310/9.5, PIEZOELECTRIC TRANSDUCER, George D. Perkins, et al., Owner of Record: *Bell & Howell Company, Pasadena, Calif.,* Attorney or Agent: Robert Berliner, Ex. Gp.: 212

3,789,711, Re. S.N. 789,336, Filed Apr. 20, 1977, Cl. 83/61, PUNCH PRESS DISCHARGE FEEDER, Dennis E. Mead, Owner of Record: *Lipe Rollway Corporation, Liverpool, N.Y.,* Attorney or Agent: Eugene S. Stephens, et al., Ex. Gp.: 324

3,810,453, Re. S.N. 789,191, Filed Apr. 20, 1977, Cl. 123/139 R, FUEL INJECTION SYSTEM, George D. Wolff, Owner of Record: *Inventor,* Attorney or Agent: John F. Learman, et al., Ex. Gp.: 342

3,880,313, Re. S.N. 790,681, Filed Apr. 25, 1977, Cl. 215/211, SAFETY CAP AND CONTAINER, Edward G. Akers, Owner of Record: *Inventor,* Attorney or Agent: Peter J. Murphy, Ex. Gp.: 241

3,880,633, Re. S.N. 791,737, Filed Apr. 28, 1977, Cl. 65/60, METHOD OF COATING A GLASS RIBBON ON A LIQUID FLOAT BATH, John F. Jordan, et al., Owner of Record: *Photon Power, Inc., Wilmington, Del.,* Attorney or Agent: Ronald L. Engel, et al., Ex. Gp.: 173

3,885,170, Re. S.N. 794,061, Filed May 5, 1977, Cl. 307/252 UA, METHOD FOR MOTOR CONTROL, Roman Kuzyk, Owner of Record: *Inventor,* Attorney or Agent: Martha G. Pugh, Ex. Gp.: 254

3,897,451, Re. S.N. 793,188, Filed May 2, 1977, Cl. 260/325 R, SYNTHESIS OF OXINDOLES FROM ANILINES AND INTERMEDIATES THEREIN, Paul G. Gassman, Owner of Record: *The Ohio State University Research Foundation, Columbus, Ohio,* Attorney or Agent: Gordon W. Hueschen, Ex. Gp.: 121

3,926,169, Re. S.N. 780,404, Filed Mar. 23, 1977, Cl. 123/32 SJ, COMBINED FUEL VAPOR INJECTOR AND IGNITER SYSTEM FOR INTERNAL COMBUSTION ENGINES, Ervin Leshner, et al., Owner of Record: *Fuel Injection Development Corporation, Palmyra, N.J.,* Attorney or Agent: Frederick W. Powers, III, et al., Ex. Gp.: 342

3,937,907, Re. S.N. 791,624, Filed Apr. 27, 1977, Cl. 179/170.6, DIGITAL ECHO SUPPRESSOR, Samuel Joseph Campanella, et al., Owner of Record: *Communications Satellite Corporation, Washington, D.C.,* Attorney or Agent: Richard C. Sughrue, et al., Ex. Gp.: 232

3,938,308, Re. S.N. 785,187, Filed Apr. 6, 1977, Cl. 57/52, METHOD AND DEVICE FOR TRANSFERRING FRESH BOBBINS FROM A BOBBIN SUPPLY DEVICE TO A CONVEYER BELT OF A TEXTILE MACHINE, Ikuo Komura, et al., Owner of Record: *Kobushiki Kaisha Toyoda Jidoshokki Seisakusho, Aichi, Japan,* Attorney or Agent: Milton J. Wayne, Ex. Gp.: 244

3,970,331, Re. S.N. 792,028, Filed Apr. 28, 1977, Cl. 281/21 R, BINDER ELEMENT, Joe D. Giulie, Owner of Record: *Minnesota Mining and Manufacturing Company, St. Paul, Minn.,* Attorney or Agent: Cruzan Alexander, et al., Ex. Gp.: 334

3,974,707, Re. S.N. 793,366, Filed May 3, 1977, Cl. 74/217 B, DERAILLEUR FOR A BICYCLE, Masashi Nagano, Owner of Record: *Shimano Industrial Company, Limited, Japan,* Attorney or Agent: Davidson C. Miller, et al., Ex. Gp.: 345

3,998,494, Re. S.N. 792,031, Filed Apr. 28, 1977, Cl. 301/37 P, WHEEL AND GREASE CAP ASSEMBLY, Edward G. Spisak, Owner of Record: *Inventor,* Attorney or Agent: Hugh L. Fisher, et al., Ex. Gp.: 311

4,014,215, Re. S.N. 789,794, Filed Apr. 22, 1977, Cl. 73/371, CLINICAL GLASS THERMOMETER HAVING A STEM AND A BULB INTEGRALLY FORMED THEREWITH, Seymour N. Blackman, Owner of Record: *Inventor,* Attorney or Agent: David B. Kirschstein, et al., Ex. Gp.: 244

PATENT NOTICES

Certificates of Correction for the Week of June 21, 1977

P.P. 4,010	3,986,826	4,004,173	4,014,364
Re. 29,156	3,986,969	4,004,421	4,014,405
D. 243,686	3,987,350	4,004,455	4,014,779
3,861,889	3,987,762	4,004,635	4,014,871
3,880,837	3,988,599	4,005,493	4,014,881
3,886,226	3,989,857	4,005,913	4,014,885
3,887,500	3,990,774	4,006,060	4,014,896
3,888,980	3,992,335	4,006,174	4,014,999
3,894,871	3,992,808	4,006,515	4,015,025
3,902,393	3,993,803	4,007,123	4,015,053
3,906,765	3,995,013	4,007,124	4,015,207
3,910,347	3,995,119	4,007,291	4,015,498
3,918,013	3,995,200	4,007,593	4,015,612
3,947,763	3,997,216	4,008,363	4,015,694
3,953,970	3,997,585	4,008,813	4,015,734
3,954,749	3,997,770	4,009,073	4,015,969
3,956,309	3,999,027	4,009,514	4,016,161
3,956,628	4,000,119	4,009,696	4,016,160
3,957,864	4,000,548	4,010,164	4,016,655
3,962,741	4,001,105	4,010,450	4,016,708
3,967,305	4,001,357	4,011,567	4,017,009
3,968,870	4,001,379	4,011,944	4,017,219
3,972,375	4,001,990	4,012,026	4,018,239
3,975,709	4,002,176	4,012,155	4,018,333
3,976,125	4,002,435	4,012,323	4,018,341
3,976,248	4,002,442	4,012,540	4,018,427
3,976,436	4,002,587	4,013,307	4,018,558
3,982,550	4,002,662	4,013,486	4,018,650
3,984,519	4,003,747	4,014,288	

National Technical Information Service

GOVERNMENT-OWNED INVENTIONS

Availability for Licensing

The inventions listed below are owned by the U.S. Government and are available for U.S. and possibly foreign licensing, in accordance with the policies of the agency sponsors.

Copies of the patents cited are available from the Commissioner of Patents and Trademarks, Washington, D.C. 20231, for $.50 each. Requests for copies of patents must include the patent number.

Copies of the patent applications, either paper copy (PC) or microfiche (MF), can be purchased at the prices cited from the National Technical Information Service (NTIS), Springfield, Virginia 22161. Requests for copies of patent applications must include the patent application number. Claims are deleted from patent application copies sold to the public to avoid premature disclosure in the event of an interference before the Patent and Trademark Office. Claims and other technical data will usually be made available to serious prospective licensees by the agency which filed the case.

Requests for licensing information on a particular invention should be directed to the address cited for the agency-sponsor.

DOUGLAS J. CAMPION,
Patent Program Coordinator.

U.S. DEPARTMENT OF THE AIR FORCE
AF/JACP, Washington, D.C. 20314

Patent application 684,429. Fluidic Oscillating Jet for High Frequency Gust Tunnel. Filed May 7, 1976. PC $3.50/MF $3.00.

Patent 3,956,015. Lightweight Nickel Hydrogen Cell. Filed June 6, 1975. Patented May 11, 1976. Not available NTIS.

Patent 3,958,119. Method and Device for Evaluating Penetrants. Filed Aug. 5, 1974. Patented May 18, 1976. Not available NTIS.

Patent 3,959,740. Quartz Wedge Polarizer for an Electro Optic Switch. Filed Feb. 6, 1975. Patented May 25, 1976. Not available NTIS.

Patent 3,963,196. Aircraft/Spacecraft Ground Accelerator. Filed June 12, 1974. Patented June 15, 1976. Not available NTIS.

Patent 3,963,911. Hybrid Sample Data Filter. Filed Apr. 22, 1975. Patented June 15, 1976. Not available NTIS.

Patent 3,965,462. Serpentine Charge-Coupled-Device Memory Circuit. Filed May 9, 1975. Patented June 22, 1976. Not available NTIS.

Patent 3,966,160. Inflight Intravenous Bottle Holder. Filed May 12, 1975. Patented June 29, 1976. Not available NTIS.

Patent 3,966,729. Addition Curable Phenyl-Quinoxaline Compositions and Their Synthesis. Filed May 19, 1975. Patented June 29, 1976. Not available NTIS.

Patent 3,966,855. Method of Fabricating Silicon Carbide Articles. Filed Feb. 22, 1974. Patented June 29, 1976. Not available NTIS.

Patent 3,967,102. Self-Adjusting Digital Notch Filter. Filed Mar. 25, 1975. Patented June 29, 1976. Not available NTIS.

U.S. DEPARTMENT OF AGRICULTURE
Research Agreements and Patent Mgmt. Branch, General Services Division, Federal Bldg., Agriculture Research Service, Hyattsville, Md. 20782

Patent application 686,423. Continuous Mechanized Harvesting of Horticultural Crops. Filed May 14, 1976. PC $3.50/MF $3.00.

Patent application 686,424. Metering and Spray Apparatus for Horticultural Applications. Filed May 14, 1976. PC $3.50/MF $3.00.

U.S. DEPARTMENT OF TRANSPORTATION
Patent Counsel, 400 7th St., SW.
Washington, D.C. 20590

Patent 3,975,730. Radio Theodolite Angle Measuring Apparatus. Filed Feb. 11, 1975. Patented Aug. 17, 1976. Not available NTIS.

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
National Institutes of Health, Chief, Patent Branch
Westwood Bldg., Bethesda, Md. 20014

Patent application 698,688. Powered Wheel Chair. Filed June 22, 1976. PC $3.50/MF $3.00.

Patent application 698,689. Synthesis of Daunosamine Hydrochloride From a D-Mannose Starting Material. Filed June 22, 1976. PC $3.50/MF $3.00.

Patent application 699,996. Ultrasonic Transducer Calibration. Filed June 25, 1976. PC $3.50/MF $3.00.

U.S. DEPARTMENT OF THE NAVY
Assistant Chief for Patents, Office of Naval Research—Code 302, Arlington, Va. 22217

Patent application 461,834. Optical Temperature Probe. Filed Apr. 18, 1974. PC $3.50/MF $3.00.

Patent application 464,604. Apparatus for Collecting Deep-Sea Sediment Pore Water. Filed Apr. 26, 1974. PC $3.50/MF $3.00.

Patent application 576,923. Electrochemical Formation of Graphite Intercalation Compounds for Storage Batteries. Filed May 12, 1975. PC $3.50/MF $3.00.

Patent application 622,285. Broadband Millimeter Wave Amplifier. Filed Oct. 10, 1974. PC $3.50/MF $3.00.

Patent application 674,356. Memory Wire and Synchronous Plating Techniques Therefore. Filed Apr. 7, 1976. PC $3.50/MF $3.00.

Patent application 677,944. A Digital Flow Control System. Filed Apr. 26, 1976. PC $3.50/MF $3.00.

Patent application 680,013. Fluid Fill or Bleed Apparatus. Filed Apr. 23, 1976. PC $3.50/MF $3.00.

Patent application 683,996. Mechanical-Chemical Linkage Between Polymer Layers. Filed May 6, 1976. PC $3.50/MF $3.00.

Patent application 686,855. Multifrequency Array Using Common Phasors. Filed May 17, 1976. PC $3.50/MF $3.00.

Patent application 689,015. Microscope. Filed May 24, 1976. PC $3.50/MF $3.00.

Patent application 689,692. Toxic Gas Control for RF Absorber Fires. Filed May 24, 1976. PC $3.50/MF $3.00.

Patent application 689,891. Scuttling Valve. Filed May 25, 1976. PC $3.50/MF $3.00.

Patent application 690,699. Acoustic Surface Wave Device. Filed May 27, 1976. PC $3.50/MF $3.00.

Patent application 691,122. Reducing Electrostatic Hazard of CO_2 Fire Extinguishers. Filed May 28, 1976. PC $3.50/MF $3.00.

Patent application 691,753. A Connector for Coupling Multi-Filament Fiber Optic Cables. Filed June 1, 1976. PC $3.50/MF $3.00.

Patent application 693,592. Electric Discharge Gasdynamic Laser. Filed June 7, 1976. PC $3.50/MF $3.00.

Patent application 693,808. Ferroelectric Crystals Having Tailored Domain Patterns. Filed June 7, 1976. PC $4.00/MF $3.00.

Patent application 695,296. Ceramic Compositions. Filed June 11, 1976. PC $3.50/MF $3.00.

Patent application 695,298. Compact Three-Beam Interferometer. Filed June 11, 1976. PC $3.50/MF $3.00.

Patent application 695,614. Self Learning Monitor for VLF Wave Propagation. Filed June 14, 1976. PC $3.50/MF $3.00.

Patent application 696,238. Vinyl Polymerization Initiator and Reducing Agent. Filed June 15, 1976. PC $3.50/MF $3.00.

Patent application 700,279. Composite for Improved Stripline Board Material. Filed June 28, 1976. PC $3.50/MF $3.00.

Patent application 700,683. An Electro Optic Binary Adder. Filed June 28, 1976. PC $3.50/MF $3.00.

Patent application 701,467. Fiber Optic Cable Connector. Filed July 1, 1976. PC $3.50/MF $3.00.

Patent application 702,377. Double-Layer Oxide Gate Insulators for Field-Effect Transistors. Filed July 2, 1976. PC $3.50/MF $3.00.

Patent 3,896,328. Dual Mode CRT Screen. Filed May 28, 1974. Patented July 22, 1975. Not available NTIS.

Patent 3,898,984. Ambulatory Patient Monitoring System. Filed Feb. 4, 1974. Patented Aug. 12, 1975. Not available NTIS.

Patent 3,910,218. Propellant-Actuated Deep Water Anchor. Filed Feb. 4, 1974. Patented Oct. 7, 1975. Not available NTIS.

Patent 3,922,063. Winch Mounted Optical Data Transmission Cable With Fluid Coupling. Filed Aug. 29, 1974. Patented Nov. 25, 1975. Not available NTIS.

Patent 3,931,392. Enhancement of Ultimate Tensile Strength of Carbon Fibers. Filed Jan. 10, 1974. Patented Jan. 6, 1976. Not available NTIS.

Patent 3,933,390. Attachment Devices for Underwater Salvage. Filed May 22, 1974. Patented Jan. 20, 1976. Not available NTIS.

Patent 3,937,942. Multi-Channel Optical Correlation System. Filed July 1, 1974. Patented Feb. 10, 1976. Not available NTIS.

Patent 3,945,920. Coanda Effect Oil-Water Separator. Filed Oct. 3, 1974. Patented Mar. 23, 1976. Not available NTIS.

Patent 3,947,850. Notch Fed Electric Microstrip Dipole Antenna. Filed Apr. 24, 1975. Patented Mar. 30, 1976. Not available NTIS.

Patent 3,952,505. High Performance Ramjet Fuels. Filed July 26, 1974. Patented Apr. 27, 1976. Not available NTIS.

Patent 3,954,015. Method of Determining Piezoelectric Constants of Ceramic Rings. Filed July 17, 1975. Patented May 4, 1976. Not available NTIS.

Patent 3,954,323. Optical Waveguide Linear Modulator Array. Filed Mar. 23, 1973. Patented May 4, 1976. Not available NTIS.

Patent 3,956,706. Miniaturized Millimeter Wave Instantaneous Frequency Discriminator. Filed Feb. 3, 1975. Patented May 11, 1976. Not available NTIS.

Patent 3,957,296. Vacuum Multiplier. Filed May 5, 1975. Patented May 18, 1976. Not available NTIS.

Patent 3,957,672. Displacement of Organic Liquid Films From Solid Surfaces by Non Aqueous Systems. Filed Nov. 23, 1973. Patented May 18, 1976. Not available NTIS.

Patent 3,958,109. Universal Modularized Digital Controller. Filed Jan. 20, 1975. Patented May 18, 1976. Not available NTIS.

Patent 3,958,189. Stimulated Coherent Cyclotron Scattering, Millimeter, and Submillimeter Wave Generator. Filed June 4, 1975. Patented May 18, 1976. Not available NTIS.

Patent 3,958,214. Encoded Echo-Ranging Signal Generator. Filed July 19, 1963. Patented May 18, 1976. Not available NTIS.

Patent 3,958,243. Circuit for Generating a Digital or Analog Signal as a Function of Doppler Frequency. Filed Mar. 20, 1975. Patented May 18, 1976. Not available NTIS.

Patent 3,958,858. Modified Circuit Card Extender. Filed Sept. 10, 1975. Patented May 25, 1976. Not available NTIS.

Patent 3,959,127. Biodegradation of Oil on Water Surfaces. Filed Mar. 13, 1975. Patented May 25, 1976. Not available NTIS.

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Patent application 555,330. Monitoring Circuit for Reactor Safety System. Filed Mar. 4, 1975. PC $3.50/MF $3.00.

Patent application 556,353. Removal of Zn or Cd and Cyanide From Cyanide Electroplating Wastes. Filed Mar. 7, 1975. PC $3.50/MF $3.00.

Patent application 557,566. Separation of Isotopes by Cyclical Processes. Filed Mar. 11, 1975. PC $3.50/MF $3.00.

Patent application 560,430. Gas Production Apparatus and Method. Filed Mar. 20, 1975. PC $3.50/MF $3.00.

Patent application 562,289. Three-Dimensional Display of Mathematical Figures. Filed Mar. 26, 1975. PC $3.50/MF $3.00.

Patent application 564,182. Liquefaction and Desulfurization of Coal Using Synthesis Gas. Filed Apr. 1, 1975. PC $3.50/MF $3.00.

Patent application 568,809. A Kit for the Rapid Preparation of 99mTc Red Blood Cells. Filed Apr. 16, 1975. PC $3.50/MF $3.00.

Patent application 570,924. Laser Isotope Separation by Multiple Photon Absorption. Filed Apr. 22, 1975. PC $3.50/MF $3.00.

Patent application 571,655. An Improved Heat Pipe Methanator. Filed Apr. 25, 1975. PC $3.50/MF $3.00.

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Patent 3,911,684. Method for Utilizing Decay Heat From Radioactive Nuclear Wastes. Filed Aug. 29, 1974. Patented Oct. 14, 1975. Not available NTIS.

Patent 3,916,338. Metal Atom Oxidation Laser. Filed May 13, 1974. Patented Oct. 28, 1975. Not available NTIS.

Patent 3,917,369. Adjustable Extender for Instrument Module. Filed Aug. 26, 1974. Patented Nov. 4, 1975. Not available NTIS.

Patent 3,928,821. High Energy Chemical Laser System. Filed Jan. 23, 1975. Patented Dec. 23, 1975. Not available NTIS.

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
National Institutes of Health, Chief, Patent Branch
Westwood Bldg., Bethesda, Md. 20014

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U.S. DEPARTMENT OF THE NAVY
Assistant Chief for Patents, Office of Naval Research, Code 302, Arlington, Va. 22217

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Patent application 705,489. Transient Suppression Circuit for Push-Pull Switching Amplifiers. Filed July 15, 1976. PC $3.50/MF $3.00.

Patent 3,556,034. Prepackaged Buoyancy System. Filed Nov. 26, 1968. Patented Jan. 19, 1971. Not available NTIS.

Patent 3,621,447. Deep Submergence Electrical Assembly. Filed Dec. 22, 1969. Patented Nov. 16, 1971. Not available NTIS.

Patent 3,949,321. Conical Nozzle Aerodynamic Window. Filed Dec. 26, 1974. Patented Apr. 6, 1976. Not available NTIS.

Patent 3,965,474. Antenna for Receiving VLF/LF Transmission in Seawater. Filed Sept. 26, 1975. Patented June 22, 1976. Not available NTIS.

Patent 3,967,878. Optical Waveguide Coupler. Filed Mar. 3, 1975. Patented July 6, 1976. Not available NTIS.

Patent 3,969 091. Millimeter Waveguide to Microstrip Transition. Filed June 11, 1975. Patented July 13, 1976. Not available NTIS.

Patent 3,971,878. VLF Antenna Tower Base Insulator. Filed Oct. 3, 1975. Patented July 27, 1976. Not available NTIS.

Patent 3,971,931. LED Image Tube Light Valve. Filed Jan. 23, 1975. Patented July 27, 1976. Not available NTIS.

Patent 3,972,049. Asymmetrically Fed Electric Microstrip Dipole Antenna. Filed Apr. 24, 1975. Patented July 27, 1976. Not available NTIS.

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Patent 3,973,510. Submersible Object Having Drag Reduction and Method. Filed Sept. 9, 1974. Patented Aug. 10, 1976. Not available NTIS.

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U.S. DEPARTMENT OF THE ARMY
Office of Judge Advocate General, Patent Division, Room 2C-455, Pentagon, Washington, D.C. 20310

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U.S. DEPARTMENT OF THE AIR FORCE
AF/JACP, Washington, D.C. 20314

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Patent application 698,988. Recursive Processing of Multiple Intensity-Modulated Scans. Filed June 23, 1976. PC $3.50/MF $3.00.

Patent application 698,989. Tubular Plasma Display Seal Design. Filed June 23, 1976. PC $3.50/MF $3.00.

Patent 3,970,005. Mass Focus Explosive Layered Bomblet. Filed Jan. 25, 1969. Patented July 20, 1976. Not available NTIS.

U.S. ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
Assistant General Counsel for Patents
Washington, D.C. 20545

Patent application 566,497. Folded Membrane Dialyzer With Mechanically Sealed Edges. Filed Apr. 9, 1975. PC $4.00/MF $3.00.

Patent application 567,340. Improved Method for Solidifying Liquid Radioactive Wastes. Filed Apr. 11, 1975. PC $3.50/MF $3.00.

U.S. DEPARTMENT OF THE INTERIOR
Branch of Patents, 18th & C Sts., NW
Washington, D.C. 20240

Patent application 700,701. Method of and Apparatus for Manipulating Line Weight in an Image. Filed June 29, 1976. PC $4.00/MF $3.00.

Patent application 706,103. Extraction of Copper From Sulfide Ores. Filed July 16, 1976. PC $3.50/MF $3.00.

Patent 3,976,761. Preparation of TiO_2 and Artificial Rutile From Sodium Titanate. Filed Aug. 14, 1974. Patented Aug. 24, 1976. Not available NTIS.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Assistant General Counsel for Patent Matters NASA—Code GP-2, Washington, D.C. 20546

Patent application 678,520. Molded Composite Pyrogen Igniter for Rocket Motors. Filed Apr. 20, 1976. PC $4.00/MF $3.00.

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Patent application 708,658. Process for Preparing Liquid Metal Electrical Contact Device. Filed July 26, 1976. PC $3.50/MF $3.00.

Patent application 708,660. Direct Heating Surface Combustor. Filed July 26, 1976. PC $3.50/MF $3.00.

Patent application 710,035. Mechanical Capacitor. Filed July 30, 1976. PC $4.00/MF $3.00.

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Patent 3,971,230. Stirling Cycle Engine and Refrigeration Systems. Patented July 27, 1976. Not available NTIS.

Patent 3,971,535. Oblique-Wing Supersonic Aircrafts. Patented July 27, 1976. Not available NTIS.

Patent 3,971,915. Sun Angle Calculator. Patented July 27, 1976. Not available NTIS.

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PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner
WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF MAY 7, 1977

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	8-2-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oso and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	7-26-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Iok; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	5-4-76
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	8-27-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	7-12-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	11-26-75
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	3-15-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	6-1-76
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	11-22-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	5-3-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	10-28-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	5-24-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	9-10-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	6-1-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	6-11-76
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	10-12-76

Expiration of patents: The patents within the range of numbers indicated below expire during May 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 82nd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,934,766 to 2,939,144, inclusive
Plant Patents..... Numbers 1,938 to 1,948, inclusive

REISSUES

JUNE 21, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,267

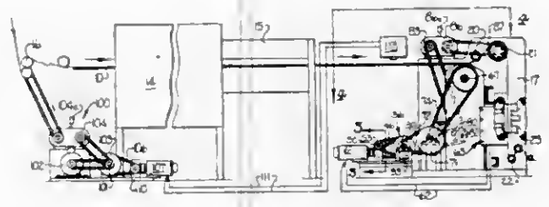
APPARATUS FOR STRAIGHTENING FABRIC

Frank Wilhite Leitner, and William Thomas Griffin, both of Charlotte, N.C., assignors to Coltron Industries, Inc., Matthews, N.C.

Original No. 3,839,767, dated Oct. 8, 1974, Ser. No. 243,385, Apr. 12, 1972. Application for reissue Feb. 20, 1976, Ser. No. 659,935

Int. Cl.[x] D06H *3/12*

U.S. Cl. 26—51.5 **12 Claims**



1. In a tenter having a pair of laterally spaced, elongate and longitudinally movable first and second fabric-engaging tenter chains for moving a fabric forwardly while applying lateral tension to the fabric therebetween; the combination therewith of

a. [tenter chains] *means* for driving said [fabric-engaging means] *tenter chains* to move at least the longitudinal center of the fabric therebetween at a predetermined substantially constant lineal speed and including a rotary input element adapted to be driven forwardly at a constant speed,

b. detecting means for detecting and producing a signal in response to a skew distortion in the forwardly moving fabric in which one side edge portion of the fabric is skewed forwardly of the opposite side edge portion thereof, and

c. responsive means interposed in said driving means and responsive to a skew correction signal of said detecting means for oppositely varying the lineal speed of said pair of fabric-engaging tenter chains in direct proportion to each other to correct the skew distortion without altering said constant lineal speed of the longitudinal center of the fabric, said responsive means comprising

1. first and second differential units including respective first and second rotary input portions driven by said input element, first and second rotary output portions on the respective first and second differential units drivingly connected to the respective first and second tenter chains, said first and second differential units also including first and second normally stationary rotary [housings] *members*, planetary gear means [in each housing] *carried by each rotary member*, and sun gears fixed on the input portion and the output portion, respectively, of each differential unit and meshing with the respective planetary gear means whereby each output portion is driven at a constant speed by said rotary input element while the respective [housings] *ratary members* are stationary, and

2. reversible means under control of said detecting means for rotating said first and second [housings] *rotary members* simultaneously in [opposite] directions [relative to each other whereby, when either housing rotates in a forward direction,] *required to increase and decrease by corresponding amounts* the [speed] *speeds* of the output [portion] *portions* of the respective differential [unit is reduced and the other housing is rotated in a reverse direction to increase the speed of the output portion of the other differential unit] *units*.

6. In a tenter having a pair of laterally spaced, elongate and longitudinallly movable first and second fabric-engaging means for moving a fabric forwardly while applying lateral tension to the fabric therebetween; the combination therewith of

a. means for driving said fabric-engaging means to move at least the longitudinal center of the fabric therebetween at a predetermined substantially constant lineal speed,

b. advancing means driven by said drive means for engaging the width of the fabric and advancing the same forwardly away from said fabric-engaging means,

c. detecting means for detecting and producing a signal in response to a skew distortion in the forwardly moving fabric in which one side edge portion of the fabric is skewed forwardly of the opposite side edge portion thereof and for detecting and producing a bow correction signal in response to a bowed distortion in the forwardly moving fabric,

d. first responsive means interposed in said driving means and responsive to a skew correction signal of said detecting means for oppositely varying the lineal speed of said pair of fabric-engaging means in direct proportion to each other to correct the skew distortion without altering said constant lineal speed of the longitudinal center of the fabric, and

e. second responsive means interposed in said driving means and responsive to a bow correction signal of said detecting means in which the central portion of the fabric is lagging or leading the opposite side edge portions thereof, for compensatively varying the speed of said advancing means to correct the bowed condition of the fabric.

Re. 29,268

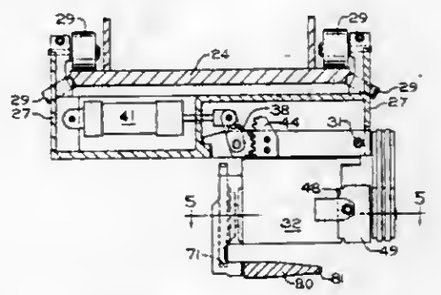
FABRIC CUTTING

Mathew Kots, Akron, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Original No. 3,924,503, dated Dec. 9, 1975, Ser. No. 576,325, May 12, 1975. Application for reissue Aug. 26, 1976, Ser. No. 717,932

Int. Cl.[2] B23D *19/02;* **B26D** *1/20*

U.S. Cl. 83—488 **9 Claims**



1. A bias cutting apparatus for cutting rubberized fabric comprising a support frame, a carriage mounted on said support frame for reciprocal movement, drive means connected to said carriage for reciprocating said carriage, a cutter support member pivotally secured to said carriage, a cutter means journaled on said cutter support member for rotation thereon, power means mounted on said carriage operatively connected to said cutter means for rotating said cutter means, said cutter means having a plurality of spaced linear cutting edges, a guide bar secured to the lower portion of said support frame over which fabric is moved and under which a conveyor belt travels, anvil means mounted on said cutter support member

for movement therewith, said anvil means having a linear cutting edge, said cutter means having its cutting edges parallel to said linear cutting edge of said anvil means, and power operated means interconnecting said carriage and said cutter support member for pivoting said cutter support member on said carriage to move said cutter support member and anvil away from said guide bar to facilitate the movement of fabric while said cutter support member and carriage are moved back for a subsequent cutting of the fabric.

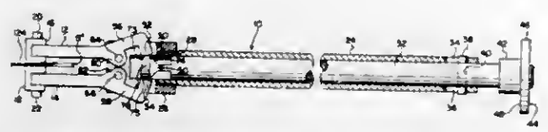
Re. 29,269
AUTOMATIC LEAD STRAIGHTENING OF AXIAL LEADED COMPONENTS

Denver Braden, San Diego, Calif., assignor to Illinois Tool Works Inc., Chicago, Ill.

Original No. 3,948,298, dated Apr. 6, 1976, Ser. No. 562,320, Mar. 26, 1975. Application for reissue Sept. 24, 1976, Ser. No. 726,316

Int. Cl.² B21F *1/02*

U.S. Cl. 140—147 **3 Claims**



1. A straightening mechanism for an elongated cylindrical element having an elongated axis comprising a pair of gripping means for engaging diametrically opposite sides of the periphery of said element and a cam follower coupled to [a second end of] each of said gripping means, an elongated hollow tube, a support member secured to a first end of said tube with each of said gripping means being pivotally mounted on said support member [intermediate said pad and said cam follower], an elongated rod slideably positioned inside of said tube so as to be capable of reciprocation back and forth along said elongated axis, coupling means constructed to limit the amount of said reciprocation of said rod and to couple together said rod and said tube so that they will rotate in unison, a cam secured to a first end of said rod which engages said cam [followers] *follower* and which is shaped so that when said rod is positioned in a first position said gripping means are pivoted to an open position at which said gripping means are not in engagement with said element and when said rod is positioned in a second position said gripping means are pivoted to a closed position at which said gripping means are in engagement with said element, an operating member having first and second control surfaces secured to the second end of said rod which is remote from said cam, control means constructed to interact with said operating member for controlling the position of said rod and drive means for rotating said tube, said rod, said support member and said gripping means as a unit about said element while simultaneously drawing said unit along said cylindrical element while said gripping means engage said cylindrical element, wherein said drive means comprises a carriage that carries said [rod] *tube* and a carriage reciprocation means for driving said carriage back and forth along said elongated axis in a reciprocating manner and said control means comprises a [stationary] frame member, an opening member secured to said frame member that engages said first control surface of said operating member to force said rod to said first position at a first time and a closing member secured to said frame member that engages said second control surface of said operating member to force said rod to said second position at a second time as said carriage and said rod reciprocate back and forth.

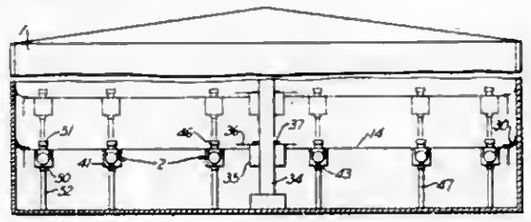
Re. 29,270
FLOATING COVER FOR A TANK

Ardell H. Nelson, 4055 Hollister Road, Houston, Tex. 77055

Original No. 3,861,555, dated Jan. 21, 1975, Ser. No. 317,371, Dec. 22, 1972. Application for reissue Sept. 9, 1975, Ser. No. 611,614

Int. Cl.² B65D *87/18*

U.S. Cl. 220—220 **18 Claims**



11. A floating cover for inside a tank comprising:

a plurality of laterally spaced horizontal tubular pontoons,

a plurality of spaced parallel support bars extending across the tops of the pontoons and supported thereby, said support bars having clamping means disposed along the length thereof,

metal sheets covering the spaces between the support bars, said sheets being spaced above the pontoons and extending across them, the edge portions of said sheets being engaged by said clamping means and deformed thereby to form metal-to-metal seals defining a gas tight deck above the pontoons, and

sealing means extending around said deck for sliding engagement with the side wall of a tank.

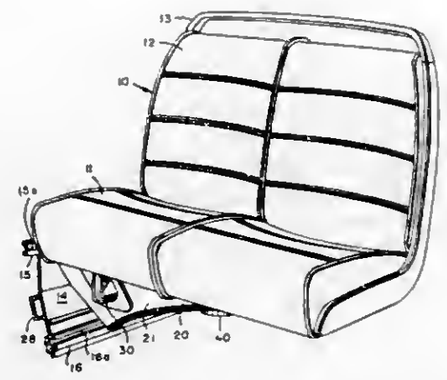
Re. 29,271
CANTILEVERED SEAT FOR MOTORCOACH VEHICLES OR THE LIKE

Chester J. Bareckl, Grand Rapids, Mich., assignor to American Seating Company, Grand Rapids, Mich.

Original No. 3,897,974, dated Aug. 5, 1975, Ser. No. 380,753, July 19, 1973. Continuation-in-part of Ser. No. 211,423, Dec. 23, 1971, Pat. No. 3,747,979. Application for reissue Jan. 30, 1976, Ser. No. 653,742

Int. Cl.² A47C *7/02*; **B60N** *1/02*

U.S. Cl. 297—451 **34 Claims**



1. In a multi-passenger seat for a vehicle, the combination comprising: a horizontal seat frame having two elongated horizontal stretcher members and cross frame means interconnecting said stretcher members at laterally spaced locations to form a rigid structure; an inclined arcuate truss frame located beneath said horizontal stretcher members and including [forward and rear] *an* inclined arcuate truss frame [members] *means* rigidly attached at [their] *its* upper [ends] *end* adjacent said stretcher members [respectively] and inclined downwardly from said [attachments] *attachment*; the curvature of said truss frame [members] *means* being upwardly toward said horizontal seat frame thereby providing by said arcuate shape less underseat obstruction from the inclined truss [member] *means* and a resultant greater leg and foot room; and means for mounting the wall ends of said stretcher members and the lower [ends] *end* of said inclined arcuate truss frame [members] *means* to the wall of said vehicle at a location above the floor, said seat being characterized in there being no connection between said seat and the floor of the vehicle.

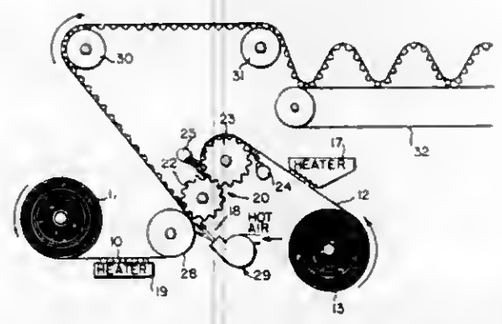
Re. 29,272
WATER RESISTANT CORRUGATED PAPERBOARD

Harold L. Hintz, and Joseph T. Webb, both of Charleston, S.C., assignors to Westvaco Corporation, New York, N.Y.

Original No. 3,849,224, dated Nov. 19, 1974, Ser. No. 273,835, July 21, 1972. Application for reissue June 7, 1976, Ser. No. 694,046

Int. Cl.² B31F *1/22*

U.S. Cl. 156—208 **10 Claims**



1. In the process of manufacturing water resistant corrugated paperboard, consisting of at least one linerboard component having both sides thereof coated with a film of thermoplastic material, and at least one corrugating medium component having both sides thereof coated with a film of thermoplastic material, the steps of:

a. pretreating the said corrugating medium component, *before both sides thereof are coated with the film of thermoplastic material*, with an internal size treatment selected from the group consisting of 0.75–1.0% rosin with about 1.5% alum, 0.2% stearic anhydride with 0.3–0.4% alum, or 0.2% succinic anhydride with 0.3–0.4% alum to inhibit the water wicking tendencies thereof;

b. applying a direct pre-heat treatment to one side of the said coated and sized corrugating medium prior to entering the corrugating nip of a corrugating machine;

c. applying an indirect pre-heat treatment to the opposite side of the said coated and sized corrugating medium by heating at least one of the corrugating rolls of the corrugating machine;

d. applying a lubricating treatment in the form of a water spray or a water spray containing detergent to the corrugating nip of the corrugating machine;

e. applying a direct pre-heat treatment to one side of the said coated linerboard component prior to entering the bonding nip of a corrugating machine;

f. applying an indirect pre-heat treatment to the opposite side of the said coated linerboard component by heating the pressure roll of the corrugating machine;

g. applying an additional direct heating treatment at the bonding nip of the corrugating machine to render the thermoplastic film surface on one of the components tacky and bondable;

h. pressing the tacky and bondable surface of one of the components into contact with the other of said components at the bonding nip; and,

i. cooling the laminate thus formed to allow the bond to set.

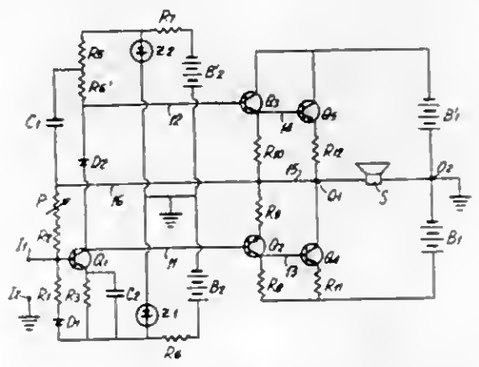
Re. 29,273
DIRECT-CURRENT-COUPLED TRANSISTOR POWER AMPLIFIERS

Martin G. Reiffin, 9 Charles Place, Mahopac, N.Y. 10541

Original No. 3,376,388, dated Apr. 2, 1968, Ser. No. 654,947, May 10, 1967. Continuation-in-part of Ser. No. 311,732, Sept. 26, 1963, Pat. No. 3,372,342, and Ser. No. 473,981, July 22, 1965, abandoned, and Ser. No. 501,515, Oct. 22, 1965, abandoned, and Ser. No. 563,586, July 7, 1966, and Ser. No. 388,399, Aug. 10, 1964, abandoned, which is a continuation-in-part of Ser. No. 270,011, April 2, 1963, Pat. No. 3,281,535. Application for reissue Mar. 27, 1975, Ser. No. 562,956

Int. Cl.² H03F *1/34*

U.S. Cl. 179—1 A **58 Claims**



7. [In combination, an amplifier as recited in claim 1,] *A transistor power amplifier comprising a single-ended push-pull output stage including at least two transistors connected in series at a midpoint of the stage, a split power supply connected to said output stage and having a center-tap, a pair of output terminals, means D.C.-coupling one of said output terminals to said center-tap, means D.C.-coupling the other output terminal to said output stage midpoint, a complementary-symmetry push-pull drive stage, means D.C.-coupling said drive stage to said output stage, amplification means, means D.C.-coupling said amplification means to said drive stage, and a D.C. feedback network for maintaining said output terminals at substantially the same D.C. potential,* preamplifier means connected in cascade with said amplifier, an inner negative feedback loop including said amplifier for raising the high-frequency cutoff of said amplifier to a predetermined frequency, said preamplifier means comprising a transistor stage preceding said inner feedback loop, said transistor stage having a high-frequency cutoff substantially lower than said predetermined frequency, and an outer negative feedback loop including said amplifier and said preamplifier transistor stage.

Re. 29,274
MECHANICAL COUNTER

Richard L. Collette, Hoffman Estates; Frank S. Vojir, Berwyn, and Roger E. Watts, Chicago, all of Ill., assignors to Guardian Electric Manufacturing Company, Chicago, Ill.

Original No. 3,863,052, dated Jan. 28, 1975, Ser. No. 452,183, Mar. 18, 1974. Application for reissue Dec. 11, 1975, Ser. No. 639,879

Int. Cl.² G06M *3/02*

U.S. Cl. 235—91 R **42 Claims**

1. A mechanical counter device comprising, in combination:

an indexing member positionable to a desired set detent position by movement in a first sense;

detent means movable in unison with said indexing member;

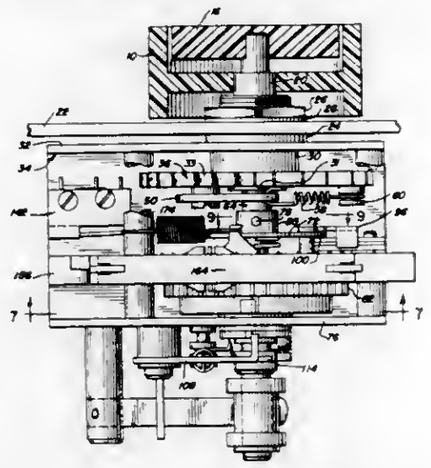
detent engaging means fixed relative to said detent means and cooperative therewith to enable positioning said indexing means to the desired set detent position;

a register member normally in a null position and positionable from said null position in a second sense to an active

position, said second sense being distinct from said first sense, said register member also positionable in said first sense by a counting mechanism;

register member locking means fixed in position relative to movement of said register member in the second sense and positionable in unison with said detent means;

receiving means for said locking means, said receiving means attached to move in unison in the second sense with said register member, said receiving means engageable with said locking means when said register is moved to the active position.



unlocking means attached to the register member and engageable with said locking means when said register member is in the null position to thereby release said locking means from said lock receiving means;

means for driving the register member including said counting mechanism in the first sense from a non-registered position to the registered position; and

means for biasing the register member toward the null position.

Re. 29,275

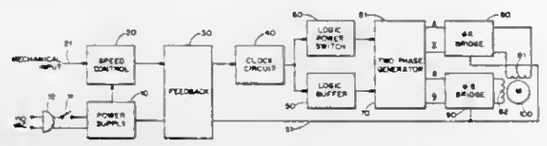
MOTOR CONTROL SYSTEM

Herbert Berman, 1018 Beacon St., and Stanley N. Tenen, c/o Dr. Herbert Berman, 1018 Beacon St., both of Brookline, Mass. 02146

Original No. 3,849,709, dated Nov. 19, 1974, Ser. No. 354,355, Apr. 25, 1973. Application for reissue June 9, 1975, Ser. No. 585,082

Int. Cl.[2] H02P *5/40*

U.S. Cl. 318—227 **10 Claims**



1. In a system for controlling a motor having at least one field winding and a variable frequency oscillator whose output controls motor speed, the improvement comprising speed control means coupled to said oscillator for controlling its output frequency, and including a light source a photo resistor and modulating means disposed intermediate said light source and resistor, said photo resistor characterized by a relatively long off or decay time constant as said photo resistor traverses from its low resistance to high resistance state.

Re. 29,276

LENS ATTACHMENT FOR FLASH-LIGHT PHOTOGRAPHING

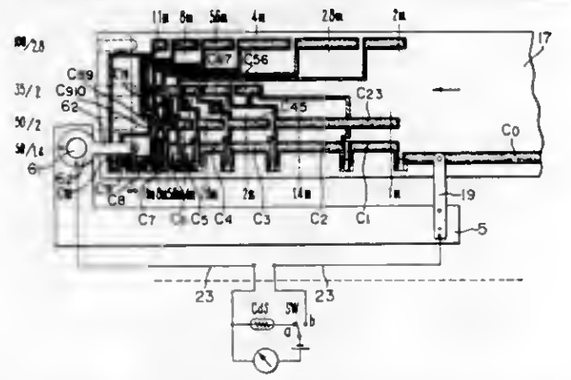
Taizo Mitani, and Takayuki Shirashaki, both of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Original No. 3,738,240, dated June 12, 1973, Ser. No. 184,351, Sept. 28, 1971. Application for reissue June 9, 1975, Ser. No. 584,840

Claims priority, application Japan, Oct. 2, 1970, 45-86939

Int. Cl.[2] G03B *7/16, 7/20;* **G03D** *13/00*

U.S. Cl. 354—32 **25 Claims**



1. For an automatic flash camera having an automatic diaphragm control and a photograhic lens with a rotatable focusing ring, a lens attachment, comprising mounting means for detachably mounting the attachment at the end of the lens, interconnecting means rotatably mounted on said mounting means and engageable with the focusing ring, variable resistance means mounted on said mounting means and said interconnecting means, said resistance means being variable by movement of said interconnecting means with the focusing ring and having an adjustable member which is movable between a plurality of positions, said variable resistance means exhibiting one range of resistances corresponding to one type of lens when the member is in one position and the interconnecting means is moved relative to the mounting means through a given path, said variable resistance means exhibiting another range of resistances corresponding to another type of lens when the member is in another position and the interconnecting means is moved relative to the mounting means through a path corresponding to the one path, electrical means connected with said variable resistance means and coupled to said diaphragm control means for adjusting the diaphragm on the basis of an electrical resistance value based upon the rotation of the focusing ring and the position of said member, said member being adjustable to a position causing said resistance means to exhibit a range of values corresponding to the type of lens.

PLANT PATENTS

GRANTED JUNE 21, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,062

KALANCHOE PLANT

Roy Nyal Pittman, 4211 Washington, Amarillo, Tex. 79110

Filed June 18, 1975, Ser. No. 588,004

Int. Cl.[2] A01H *5/02*

U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct variety of Kalanchoe plant substantially as herein disclosed characterized by the unique combination of flowers borne clearly above the foliage, said flowers being of large and uniform size, graceful, cusped petal shape and distinctive, attractive and uniform bright contrasting crimson flower coloring contrasting with a large green glossy regular leaf and upright sturdy branches.

4,063

ROSE PLANT

Samuel McGredy, IV, Auckland, New Zealand, assignor to Armstrong Nurseries, Inc., Ontario, Calif.

Filed Apr. 26, 1976, Ser. No. 680,507

Int. Cl.[2] A01H *5/00*

U.S. Cl. Plt.—15 **1 Claim**

1. The new and distinct variety of Grandiflora rose plant substantially as herein illustrated and described, which is characterized by a plurality of the following features, in combination, namely a notably vigorous, upright habit of growth, many-branched and tall, with abundant glossy medium-sized foliage, said plant being more hardy and more resistant to mildew than is usual with plants of the same species grown under comparable conditions; a nearly continuous blooming habit throughout the season; blooms with double petalage which have a predominantly yellow color effect, varying mainly in depth of shade, and having a mild, pollen-like fragrance; many of the flowering stems carrying only a single flower.

4,064

PEACH TREE

William Y. Minami, P.O. Box 788, Reedley, Calif. 93654

Filed July 26, 1976, Ser. No. 708,911

Int. Cl.[2] A01H *5/03*

U.S. Cl. Plt.—43 **1 Claim**

1. A new and distinct variety of peach tree substantially as illustrated and described and which is characterized by its regular and prolific bearing of early ripening small to medium, semi-freestone, yellow-fleshed fruit; and by its general resemblance to the Springcrest (unpatented) peach tree, but from which it is distinguished by its fruit ripening from 7 to 10 days earlier.

PATENTS

GRANTED JUNE 21, 1977

ERRATA

For CLASS	See PATENT NO.
280–408	4,030,171
308–006 C	4,030,191
057–009	4,030,248
403–405	4,030,266
428–586	4,030,525
273–110	4,030,555
277–092	4,030,730
293–071 R	4,030,735
273–095 E	4,030,760
273–106.5 A	4,030,761
273–134 AD	4,030,762
273–134 D	4,030,763
273–148 A	4,030,764
273–148 R	4,030,765
273–163 R	4,030,766
280–047.17	4,030,768
280–042	4,030,769
280–043.23	4,030,770
280–088	4,030,771
280–106 R	4,030,772
280–153 R	4,030,773
280–261	4,030,774
280–477	4,030,775
280–477	4,030,776
280–714	4,030,777
285–174	4,030,778
296–015	4,030,779
296–100	4,030,780
297–397	4,030,781
408–197	4,030,843
075–234	4,030,891
428–226	4,030,892
210–474	4,031,032
261–106	4,031,180
426–285	4,031,238
358–212	4,031,315
235–012	4,031,357
361–007	4,031,432
361–338	4,031,433
361–172	4,031,434
361–186	4,031,436
330–030 D	4,031,495
364–200	4,031,514
364–200	4,031,515
364–200	4,031,516
364–200	4,031,517
364–200	4,031,518

ERRATA—Continued

364–900	4,031,519
364–200	4,031,520
364–200	4,031,521
346–001	4,031,561
346–035	4,031,562
346–075	4,031,563

PATENTS

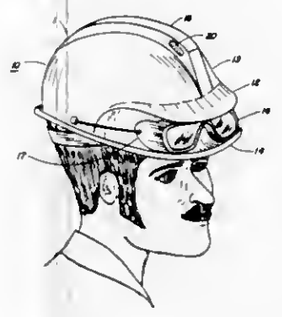
GRANTED JUNE 21, 1977

GENERAL AND MECHANICAL

4,030,139
PROTECTIVE APRON AND METHOD OF FABRICATION
Marvin A. Sonntag, Rte. 1, Green Lake, Wis. 54941
Filed Feb. 25, 1976, Ser. No. 661,215
Int. Cl.² A41B *13/10*
U.S. Cl. 2—51 **1 Claim**

1. A protective apron comprising a fabric base sheet having an over-all plastic coating, said sheet including a main panel covering portions of the wearer, a bib panel thereabove and a re-enforcing panel overlying the top portion of said main panel in the area of the wearer's belly, said re-enforcing panel comprising a belly band completely across the apron from one side to the other and comprising a top layer of substantially all plastic superimposed on the plastic coating of the base sheet fabric and laminated thereto throughout the contiguous areas thereof.

4,030,140
HARD SAFETY HAT
Terry L. Burt, 5169 Highland Drive, Marrero, La. 70072
Filed Aug. 9, 1976, Ser. No. 712,434
Int. Cl.² A42B *3/02*
U.S. Cl. 2—410 **2 Claims**

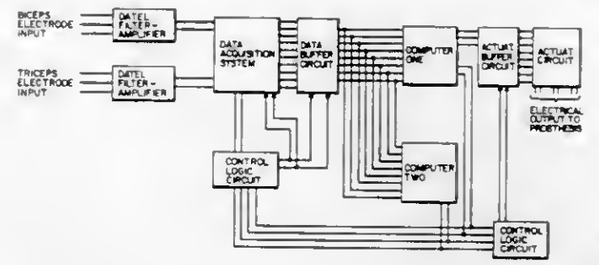


1. A hard safety hat, having a crown, for workers wearing safety goggles, comprising:

a. a brim defined by a lower portion of said crown;

b. a bill mounted forwardly on said crown and above said brim defining a spacing therebetween sufficient to accommodate the height of said goggles and constitute a support thereof when not in use.

4,030,141
MULTI-FUNCTION CONTROL SYSTEM FOR AN ARTIFICIAL UPPER-EXTREMITY PROSTHESIS FOR ABOVE-ELBOW AMPUTEES
Daniel Graupe, Fort Collins, Colo., assignor to The United States of America as represented by the Veterans Administration, Washington, D.C.
Filed Feb. 9, 1976, Ser. No. 656,412
Int. Cl.² A61F *1/00, 1/06*
U.S. Cl. 3—1.1 **31 Claims**

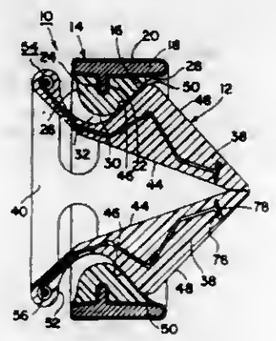


1. For use in combination with an electrically-operated prosthetic appliance for replacing a missing limb, a control circuit responsive to input signals supplied thereto for operating said appliance and a set of at least two electrodes adapted to receive electromyographic (EMG) signals from the stump of the missing limb when fastened thereto, the subcombination for processing said EMG signal preparatory to delivering same to said control circuit which comprises: data processing means for analyzing the EMG signal so as to reduce it to a near minimum number of linear time series model parameters which are effective to differentiate each of several functions of the missing limb from all other functions thereof, data acquisition means for collecting and storing historical data produced by the amputee at the electrodes relative to the maximum and minimum values of said linear time series model parameters for each limb function to be performed by the prosthesis, comparison measuring means for repeatedly sampling current data on said linear times series model parameters produced by the amputee at the electrodes and comparing said current data with a set of predetermined values therefor chosen on the basis of said historical data, and means responsive to the comparison measuring means operative during each sampling interval to deliver one or more output signals to the control circuit effective to initiate or continue actuation of only that function or those functions of the prosthesis wherein the sampled data falls within the set of unique values chosen for a particular function.

4,030,142
OCCLUDER FOR PROSTHETIC HEART VALVE ASSEMBLY
Gerald W. Wolfe, Paradise, Calif., assignor to InterMed, Inc., Wayne, Pa.
Filed Mar. 26, 1976, Ser. No. 670,690
Int. Cl.² A61F *1/22*
U.S. Cl. 3—1.5 **9 Claims**

7. An elongate occluder of a prosthetic heart valve assembly, said occluder being adapted to be positioned through a seating-ring passage for movement in its direction of elongation between closed and opened positions, said occluder including an upstream annular section and a downstream sealing section, both of which have a larger maximum diameter than the minimum diameter of the seating-ring passage, said downstream sealing section being provided by a plurality of cuspids which engage each other to define a closed sealing section when the occluder is in a closed position, each of said cuspids being joined to the upstream annular section through a flexi-

ble hinge section for permitting outward flexure of said cuspids when the occluder is in an opened position to define a central open passage through the occluder for the flow of blood; the improvement wherein the upper annular section and hinge section of the occluder are part of a unitary armature construction, said armature construction further including a plurality of circumferentially spaced arms extending in a downstream direction relative to the upper annular section, said cuspids being separate unitary plastic members, and each arm of the unitary armature construction extending into the interior of a respective cuspid for retaining said cuspids in their proper operative position and for reinforcing said cuspids.



4,030,143

ENDOPROSTHETIC BONE JOINT DEVICES

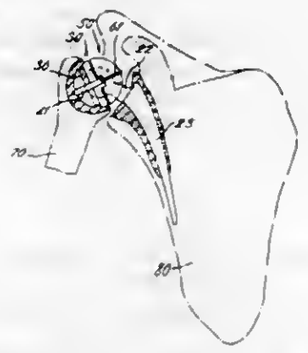
Martin Arthur Elloy, Liverpool, and Frank Howard Beddow, West Kirby, both of England, assignors to National Research Development Corporation, London, England

Filed Jan. 29, 1976, Ser. No. 653,524

Claims priority, application United Kingdom, Jan. 31, 1975, 04421/75

Int. Cl.² A61F *1/24*

U.S. Cl. 3—1.91 **8 Claims**



8. An endoprosthetic bone joint device comprising:
- a first component in the form of a ball connected through a neck to the wider end of a tapered stem;
- a first cup engaged with said ball by a mutual snap fit to form a ball and socket joint;
- and a second cup held in releasable engagement with said ball, said second cup being slotted from its rim to accommodate said neck and predetermine the relative positions of said second cup and said ball, and the rim of said first and second cups being complementary and abutted to predetermine the positions of said cups relative to each other.

4,030,144

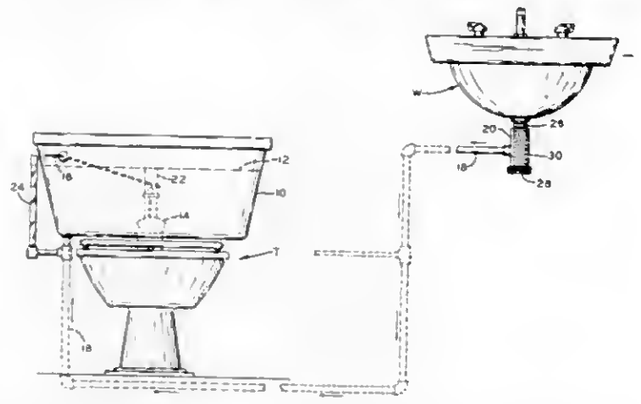
APPARATUS AND ARRANGEMENT FOR CONSERVING WATER FOR TOILET FLUSHING

Augusto Cuevas Aleman, Maria de la Luz Bringas No. 44, Colonia del Valle, Mexico 12, D.F., Mexico

Filed Sept. 2, 1975, Ser. No. 609,668

Int. Cl.² A47K *4/00*

U.S. Cl. 4—3 **2 Claims**



1. In a combination; a tank for a flush toilet adapted to be filled to a predetermined level; a wash basin adapted to receive water; a drain being positioned in said basin at the lowermost level of said basin for water flow from said basin; a continuous fluid conduit connecting said drain in uninterrupted fluid flow in relation to said tank; overflow means in said tank for preventing filling of said tank above said predetermined level;
- a fluid inlet at the lowermost portion of said tank; said conduit being coupled to said inlet;
- a transparent tube being in fluid communication with said conduit adjacent said fluid inlet; said tube having a portion extending vertically upwardly from said inlet exteriorly of said tank to a vertical level higher than said predetermined level, with the fluid level in said tube indicating the fluid level in said tank.

4,030,145

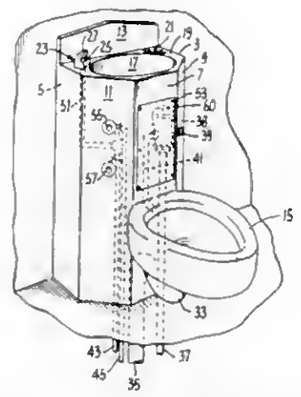
COMBINATION PLUMBING FIXTURE HAVING SINGLE FLOOR WASTE OUTLET

Frank E. Rowan, Burlingame, Calif., assignor to Aluminum Plumbing Fixture Corporation, Burlingame, Calif.

Filed Feb. 12, 1976, Ser. No. 657,474

Int. Cl.² E03D *1/00, 3/00, 5/00*

U.S. Cl. 4—10 **3 Claims**



1. A combination plumbing fixture comprising:
- a generally horizontal, completely enclosed column-like body having a base, a top, and an access opening defined therein between said base and said top, said body being mounted on a floor;

- a wash basin positioned on said body top;
- a toilet bowl mounted on said body to be located between said access opening and said base and extending outwardly therefrom;
- a combination drinking fountain and faucet mounted on said body top to introduce water into said wash basin;
- a cover plate covering said access opening;
- a flush valve for controlling flushing of said toilet bowl, said flush valve being positioned within said body;
- shutoff valves for controlling flow of hot and cold water into said combination drinking fountain and faucet, said shutoff valves being located within said body;
- a basin drain pipe located within said body and connecting said wash basin to said toilet bowl so that water from said basin drains into said toilet bowl; and
- main conduits for conducting water to said combination and to said toilet bowl via said shutoff and flush valves respectively, and a connecting conduit connecting said flush valve with said toilet bowl, said conduits all being located within said body, said main conduits extending in an essentially vertical direction through the floor into said body through said body base, said fixture being completely self-contained and mounted on the floor with all plumbing connections being made through the floor;
- said shutoff and flush valves being located adjacent said access opening so that said valves are accessible through said access opening.

4,030,146

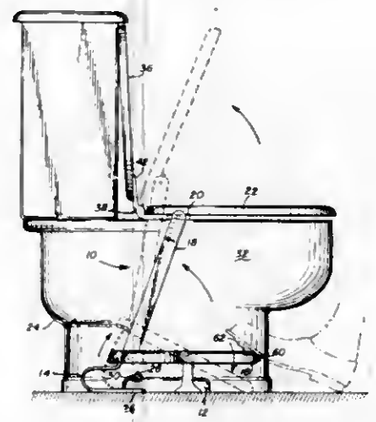
TOILET SEAT LIFTING APPARATUS INCLUDING A RESILIENT BOWED MEMBER FOR PREVENTING THE SEAT FROM SLAMMING

Ted S. Pilkington, 1050 Crestview Drive F-41, Mountain View, Calif. 94040, and Henry H. Castle, 11123 Beacon Ave., South, Seattle, Wash. 98178

Filed Dec. 29, 1975, Ser. No. 645,248

Int. Cl.² A47K *3/10*

U.S. Cl. 4—251 **3 Claims**



1. A toilet seat lifting apparatus for attachment to a toilet having a bowl with a lower flange and a seat, said apparatus comprising:
- a base having means adapted to be secured to a lower flange of a toilet bowl and including an upright portion and a flexible elongated portion, said upright portion having a top surface with an arcuate shape, and said flexible elongated portion extending rearwardly of said base and terminating in a distal end that is formed into a latch;
- a foot pedal having first and second ends and including a central portion, a foot-receiving portion proximate said first end which is adapted to be depressed by the foot of a user, and a connecting portion proximate said second end having means forming a recess for receiving and retaining said latch, said central portion having a groove therein which is bounded by an upper surface having an arcuate shape that generally conforms to said top surface, said groove serving to receive the means forming said top surface such that said central portion is pivotally mounted to said upright portion, said latch engaging said means forming a recess so as to form said flexible elongated portion into a bowed C-shape with said latch extending generally upwardly, said flexible elongated portion serving to urge said second end in an upward direction and to pivot said foot pedal about said upright portion;
- an arm having a third end attached to said connecting portion and having a fourth end; and
- means connected to said fourth end and adapted for securing said arm to a toilet seat, whereby when said foot-receiving portion is depressed, said toilet seat is caused to raise, and when said foot-receiving portion is released said flexible elongated portion damps the force associated with the lowering of said seat so as to prevent said seat from slamming against the toilet bowl.

4,030,147

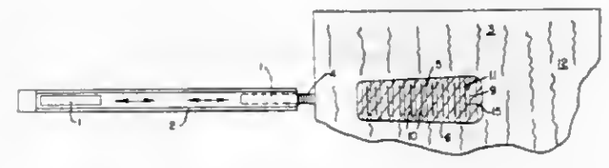
POOL DIVER SAFETY AND RESEARCH APPARATUS

Harold A. Jewett, 5451 42nd St., NW., Washington, D.C. 20015

Division of Ser. No. 620,143, Oct. 6, 1975, Pat. No. 3,997,924, which is a continuation-in-part of Ser. No. 596,173, July 15, 1975, Pat. No. 3,956,779. This application July 14, 1976, Ser. No. 705,298

Int. Cl.² E04H *3/16, 3/18;* F16L *22/02*

U.S. Cl. 4—172 **10 Claims**



1. In combination
- a swimming pool having a deck
- a railway having a runway flanked by side walls rising higher than said runway
- a car provided with rollers disposed for traveling along said runway between said walls
- said railway extending from a starting point distance from said pool toward a point adjacent an edge of said pool
- an abutment located at said last-mentioned point and disposed for blocking movement of said car when impacted by it during use
- said car having an upward-facing top portion disposed for supporting a diver reclining thereon in belly-down prone position
- whereby impacting of said abutment by said car abruptly terminates movement of the latter, thereby permitting momentum acquired by said diver during said travel to propel him outwardly of said edge and over water in the pool.

4,030,148

SWIMMING POOL SURFACE CLEANING DEVICE

Jeffrey Rosenberg, 1270 Stillwater Drive, Miami Beach, Fla. 33141

Filed May 17, 1976, Ser. No. 686,932

Int. Cl.² E04H *3/16, 3/18;* F16L *22/02*

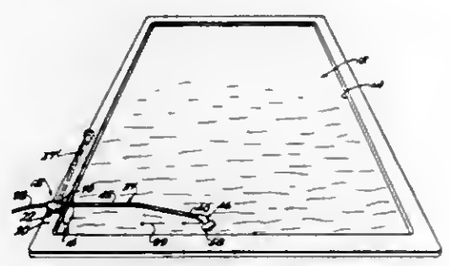
U.S. Cl. 4—172 **9 Claims**

1. For mounting to the edge of a pool above the normal water level of the pool, a device for urging floating debris on the water surface toward a skimmer having an opening at the normal waterline,

said device comprising,

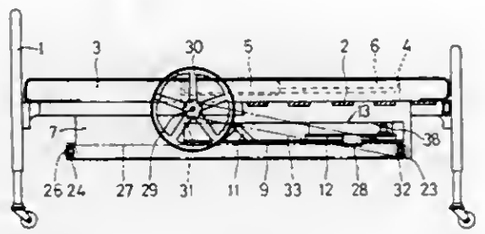
an elongate tubular arm having:
- a proximal end zone including means to connect to a waterflow supply through the arm to the distal end zone,

means to mount the proximal end zone to the pool edge,
said tubular arm including an intermediate zone extending outwardly and downwardly from said proximal end zone, and having a distal end zone below the proximal end zone and above the normal waterline of the pool, and said distal end zone having an opening facing toward said proximal end zone,



said means to mount including a base and fastener means to connect the base to the pool edge, and
vertical pivot means connecting the proximal end zone of the tubular arm to said base to permit a swinging movement of the arm about the axis of said pivot means.

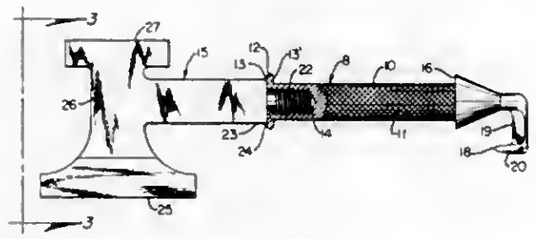
4,030,149
BED FOR THE INVALID
Mikio Kato, Tokyo, Japan, assignor to Nippon Felt Co., Ltd., Tokyo, Japan
Filed Mar. 4, 1976, Ser. No. 663,830
Claims priority, application Japan, Mar. 7, 1975, 50-28159; Mar. 29, 1975, 50-36584; Apr. 4, 1975, 50-41494; June 18, 1975, 50-83067[U]
Int. Cl.² A61G 7/02
U.S. Cl. 5—90 **8 Claims**



1. An invalid bed comprising a bed frame, a mat having formed centrally thereof a defecating hole, an auxiliary frame provided beneath said defecating hole, an excreta receptacle having a seat, a tank and a front covering mounted in said auxiliary frame, a truck on which said excreta receptacle is carried, a first and a second auxiliary mat arranged to normally close said defecating hole, a support plate for said first and second auxiliary mats, and means for supporting said first auxiliary mat support plate so as to be movable vertically, wherein said means for supporting said first auxiliary mat support plate is reciprocatable horizontally in said auxiliary frame and said excreta receptacle is also provided in said auxiliary frame and coupled integral to said means by connecting bars so that said truck is movable while tugging said means disposed adjacent thereto.

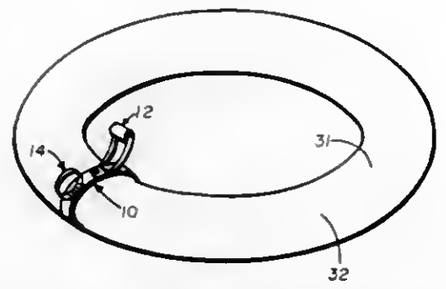
4,030,150
COMBINATION HAND TOOL
Lloyd R. Fisher, Longmont, Colo., assignor to Joe W. Page, Jr., Huntington Beach, Calif.
Filed Dec. 24, 1975, Ser. No. 644,096
Int. Cl.² B25B 1/00
U.S. Cl. 7—15 **4 Claims**

1. In a combination hand tool adapted for interchangeable, releasable attachment of implements thereto in which each implement is provided at one end with a male connecting portion and an enlarged shoulder having a correspondingly enlarged, squared end surface facing toward the male connecting portion, the combination therewith comprising:
a handle including hand gripping means and a first shoulder portion at the forward end of said handle enlarged with respect to said hand gripping means, said first enlarged shoulder portion having a correspondingly enlarged, squared end surface facing in a forward direction away from said hand gripping means and socket means in the forward extremity of said handle adapted for insertion and detachable connection of the male connecting portion on the implement, the enlarged, square end surface of the shoulder portion on each implement adapted to



frictionally engage said enlarged, squared end surface on said first shoulder portion when the male connecting portion is fully inserted into said socket means; and
a second shoulder portion on said handle at the rearward end of said handle enlarged with respect to said hand gripping means, said shoulder portion at the rearward end of said hand gripping means converging rearwardly away from said hand gripping means into a reverse curved, forwardly directed knife, the cutting edge of said knife being spaced from and in facing relation to said handle, and said knife terminating in an elongated, forwardly projecting end portion with a beveled, slightly pointed tip in parallel, laterally spaced relation to said hand gripping means.

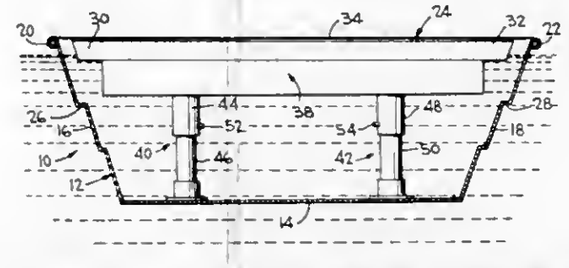
4,030,151
TOW STRAP FOR PNEUMATIC INNER TUBE
Edwin E. McKeen, Jr., E. 112 Regina, Spokane, Wash. 99218
Filed May 19, 1976, Ser. No. 688,062
Int. Cl.² B63C 9/08
U.S. Cl. 9—1.7 **3 Claims**



2. A towage strap for a pneumatically inflated inner tube, comprising, in combination:
an elongate, flexibly resilient strap-like body, having means at the end parts thereof to releasably fasten each end to the other and having a length when fastened slightly less than the periphery of an annular section of the inner tube to be serviced;
a loop-like tow line fastening structure carried by the body inwardly adjacent one end and on the side of the body opposite to that adjacent a serviced inner tube;
a rudder carried by the body on the same surface as the tow line fastening structure and approximately one-fourth of a body length away therefrom; and

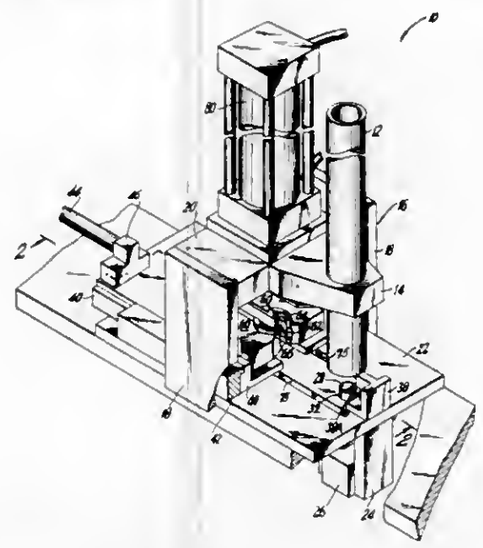
a handle carried by the body, near the tow line fastening structure, to extend away from the body.

4,030,152
AUTOMATICALLY ADJUSTING BOAT SEAT
Anthony J. Souza, Lancaster, Pa., assignor to Woodstream Corporation, Lititz, Pa.
Filed July 12, 1976, Ser. No. 704,749
Int. Cl.² A47C 3/34; B63B 29/04
U.S. Cl. 9—7 **11 Claims**



1. A boat construction comprising hull means and seat means therefor, guide means operatively engaged between said hull means and said seat means to guide said seat means for movement along a vertical path between a lowered position and a raised position, support means for supporting said seat means in said lowered position during normal use of the boat, flotation means carried by said seat means for automatically raising said seat means in the event of swamping of the boat, and stop means limiting the upward movement of said seat means to said raised position.

4,030,153
ATTACHMENT FOR THREAD CUTTING APPARATUS
Sami Shemtov, Brooklyn, N.Y., assignor to I-T-E Imperial Corporation EFCOR Division, East Farmingdale, N.Y.
Filed Oct. 14, 1975, Ser. No. 621,829
Int. Cl.² B23G 1/02
U.S. Cl. 10—89 WH **9 Claims**

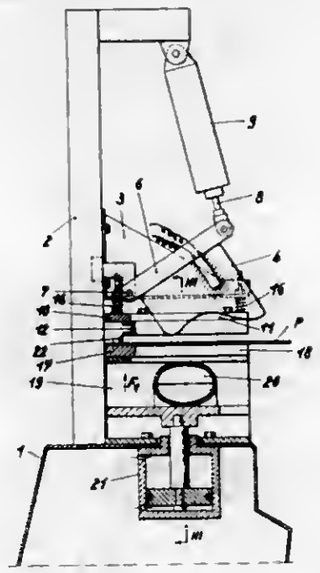


1. An attachment for an apparatus for forming threads on a tubular workpiece, said attachment comprising:
a stationary base plate;
delivery means for supplying a stream of workpieces to a receiving station on said base plate;
reciprocating means movable along said base plate for gripping and removing one workpiece at a time from said receiving station;
transfer means for moving the workpiece from said reciprocating means through a first opening in said base plate of thread cutting means and for subsequently removing the workpiece from the thread cutting means after the threads are cut;
discharge means for releasably receiving a threaded workpiece from said transfer means, said discharge means being movable in synchronism with said reciprocating means and in timed relationship with said transfer means to engage the threaded workpiece at approximately the same time that said reciprocating means grips an unthreaded workpiece, said discharge means being arranged to release the threaded workpiece at approximately the same time that said transfer means initiate the movement of the unthreaded workpiece towards the thread cutting means;
said delivery means including a vertically oriented tubular chute in which the workpieces are positioned one above the other, a retractable positioning pin positioned coaxially below said chute whereby the force of gravity drops the lowermost workpieces onto said pin, spring means for biasing said pin through a second opening in said base plate to receive the lowermost workpiece;
said reciprocating means including a movable plate disposed on said base plate; a first pair of opposed gripping jaws mounted on said movable plate and means for reciprocatingly moving said movable plate, said first pair of jaws grasping the lowermost workpiece associated with said pin and then removing the workpiece from said receiving station;
said pin including first cam surface means integral therewith, said movable plate including first cam means integral therewith for engaging said first cam surface means to depress said pin into said second opening against the biasing of said spring means when said movable plate moves said first pair of jaws past said pin, so that the lowermost workpiece is free from said pin and may be grasped by said first pair of jaws and removed from said receiving station;
said transfer means including an actuator having an axially movable piston rod that has a selected dimension so that a free end thereof may be received in one end of the tubular workpiece, said piston rod dimension permitting said piston rod to pass between said first pair of jaws and to pass through said first opening in said base plate so that the workpiece may be transported to said cutting means, said piston rod dimension further permitting said piston rod to pass through a third opening in said base plate so that the threaded workpiece may be removed from said cutting means to a surface of said base plate;
said discharge means including a second pair of opposed, spring biased jaws on said movable plate in association with said third opening, said second pair of jaws being arranged to grip the workpiece after the threads are cut thereon and after the workpiece is removed from said cutting means, the threaded workpiece being retained in said third opening and moved with said movable plate along said surface of said base plate to a discharge area.

4,030,154
MACHINE FOR PREFORMING SHOE UPPERS
Andre Paul Edouard Fromantin, 37, rue Caulaincourt, 75011 Paris, France
Filed Dec. 9, 1975, Ser. No. 639,188
Claims priority, application France, May 21, 1975, 75.15758
Int. Cl.² A43D 11/00
U.S. Cl. 12—54.1 **9 Claims**

1. In a machine for preforming shoe uppers, in combination, a mold, a frame, a lever articulated on said frame and supporting said mold, a notched platform being supported under said mold, a notched plate being supported under said platform and on which the upper to be formed is to be positioned, a movable box supporting said plate, an elastically deformable

member being positioned in the center of said box, means capable of pivoting said lever and causing said mold to pivot

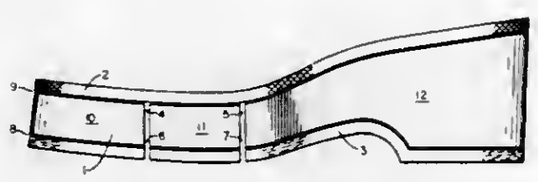


through the notches in said platform and said plate and means capable of displacing said box towards said plate.

4,030,155
CLOG SOLE

Jacques Azadian, 84 N. Adams St., Manchester, N.H. 03104, and Albert J. Arsenault, P.O. Box 571, Bethlehem, N.H. 03574

Filed Aug. 24, 1976, Ser. No. 717,256
Int. Cl.² A43D *00/00*; A43B *1/06*
U.S. Cl. 12—146 B **8 Claims**



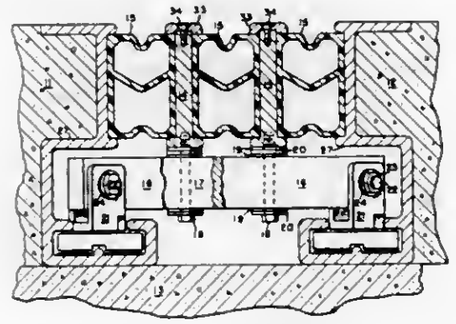
1. A method of manufacturing a segmented clog sole comprising:
   a. forming a unit sole having at least two slots on the upper side thereof running across the width of said unit sole perpendicular to the longitudinal axis thereof, one of said slots being approximately in the area of the ball and the others being forward thereof towards the toe;
   b. applying with an adhesive a mid sole to the upper side of said unit sole over said slots and an outer sole to the bottom side thereof; and
   c. cutting said unit sole and outer sole completely through from the side of said outer sole into said slots with the cuts being in register with and in number corresponding to said slots.

4,030,156
BRIDGE EXPANSION JOINT

Paul J. Raymond, Troy, N.Y., assignor to A. J. Harris & Sons, Inc., New Britain, Conn.

Filed Aug. 16, 1976, Ser. No. 714,853
Int. Cl.² E01D *19/06*
U.S. Cl. 14—16.5 **17 Claims**

13. An expansion joint for use in a gap between pavement sections comprising:
   at least one beam running longitudinally in the gap and having a wearing surface substantially coplanar with the wearing surfaces of the pavement sections;
   a resilient seal between each pair of beams and between each beam and the end of a pavement section;
   at least a pair of proportioning bars, said bars extending across the gap at an acute angle with the general line of direction of the gap;

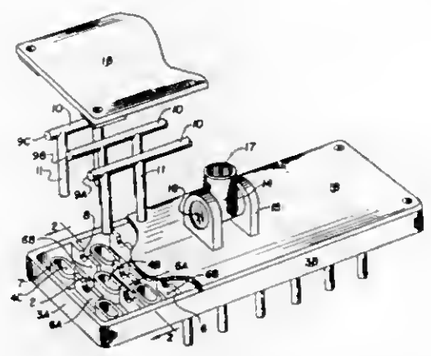


   a glide channel formed in the ends of each of the pavement sections being joined and defining the permissible motion of an end of each of the proportioning bars as substantially linear in the general line of direction of the gap;
   means for slidably mounting the ends of the proportioning bars in the glide channels.

4,030,157
RAKE DEVICE

Claude W. Seymour, 8401 Deildo Road, Louisville, Ky. 40219

Division of Ser. No. 410,289, Oct. 26, 1973, Pat. No. 3,913,169. This application Sept. 8, 1975, Ser. No. 597,698
Int. Cl.² A47L *13/00*
U.S. Cl. 15—142 **2 Claims**



1. A rake means including: base (means) member including a bottom member having selectively spaced apertures of selected width; a multiplicity of elongated spaced tooth members of mean width (diameter) less than the (diameter) width of said apertures and pivotably secured at a first end in said base member (means) and disposed to extend outwardly from said bottom member through said apertures so each said tooth member can pivotally move in a selected direction limited by the (periphery) ends of said aperture wherein said tooth members are arranged to provide a multiplicity of rows of tooth members extending outwardly from said base member (means) whereby said tooth members contact a surface to be raked and pivot from a first position to a second position as said base member (means) is moved first in one direction then in an opposite direction over said surface to be raked.

4,030,158
HAIR BRUSH

Michael A. Blair, and Robert M. Hoffman, both of Los Angeles, Calif., assignors to Advance Design Laboratories, Inc., Los Angeles, Calif.

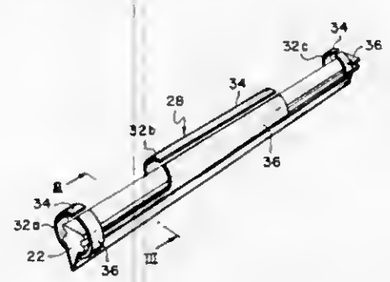
Filed June 3, 1976, Ser. No. 692,292
Int. Cl.² A46B *9/02*
U.S. Cl. 15—159 A **3 Claims**

1. A hair brush particularly for use in blow waving comprising:
   a substantially rigid elongated plastic brush block having a front surface and a back surface and having an integral longitudinally extended handle extending from one end thereof, said brush block having a solid continuous peripheral rim having first and second substantially parallel side portions and first and second end portions and a plurality of substantially identical, substantially equally spaced, substantially parallel rib portions laterally joining said side portions of said rim, each of said parallel rib portions being sharply arched towards the same one of said end portions with the apex of its arch being positioned at the midpoint of each rib portion, said rib portions defining arcuate apertures therebetween for permitting air to be freely blown through said hrush block.
   a first plurality of folded plastic single bristles formed of thermoplastic material and mounted in the front surface of said brush block at substantially uniform spacing from each other around said peripheral rim of said block;
   a second plurality of folded plastic single bristles formed of thermoplastic material, said second plurality of bristles being laterally unaligned with said first plurality of bristles and being mounted in the front surface of said block at substantially uniform spacings from each other along said sharply arched ribs and following the arch of said ribs to laterally subdivided the longitudinal spacing between said first plurality of brushes, whereby in a lateral projection of all of said bristles, the longitudinal spacing between bristles is substantially less than the spacing between said first plurality of bristles, and all the bristles present a much greater lateral surface area than the lateral surface area of said first plurality of bristles;
   and each of said bristles being folded at a point beyond its midpoint to provide one long flexible strand and one shorter substantially stiffer strand.

4,030,159
WINDSHIELD WIPER BLADE LINER

Nicholas J. Centoducati, 2142 Cayuga Drive, Merrick, N.Y. 11566

Filed Oct. 6, 1975, Ser. No. 620,162
Int. Cl.² B60S *1/38*
U.S. Cl. 15—250.42 **5 Claims**

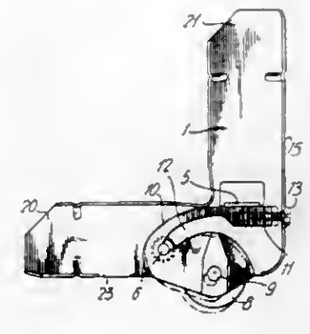


1. A windshield wiper blade and a liner therefor made of a synthetic polymeric material comprising:
   a windshield wiper blade having a wiping tip at one extremity thereof and connected adjacent the other extremity thereof to the yoke of an oscillatable wiper arm;
   and a liner for said balance comprising a pair of side walls having a spring-like resiliency and extending upwardly in spaced diverging relation from a converged end portion forming a wiping tip and terminating in a plurality of longitudinally spaced upper elements including pairs of first and second opposed lever arms which encircle said other extremity of said blade and connected yoke in spaced relation, said side walls being spaces so as to enclose said windshield wiper blade therebetween and be normally biased against said wiper blade to be releasably retained thereon, the outer free ends of said opposed lever arms being pivotable to thereby flex said side walls to effect the removal of accumulated ice and snow therefrom and to selectively mount the liner on and remove the liner from the wiper blade.

4,030,160
CORNER BRACKET AND ROLLER ASSEMBLY FOR SLIDING DOORS

Martin R. Lambertz, New Hamburg, and Maria Fiorelli, Kitchener, both of Canada, assignors to The Stanley Works, Hamilton, Canada

Filed July 19, 1976, Ser. No. 706,389
Claims priority, application Canada, Aug. 19, 1976, 233744
Int. Cl.² E05D *13/02*
U.S. Cl. 16—105 **12 Claims**



1. A corner bracket and roller assembly for a sliding door comprising:
   a. a corner bracket having integral first and second arms at right angles adapted for insertion into frame members of said door; said first arm having an aperture in the bottom edge thereof; said second are having an outside edge adjacent said aperture;
   b. first pivot means secured in a plane perpendicular to said first arm and spaced from said second arm; and
   c. a roller assembly comprising
      i. a housing,
      ii. a roller,
      iii. second pivot means mounting to said roller in said housing, and
      iv. an elongated resilient member connected to said housing and including an adjustment means; said housing being inserted into said corner bracket, for pivotal mounting on said first pivot means such that said roller is adjustably and resiliently extended through said aperture of said first arm adjacent said outside edge of said second arm, with said second pivot means intermediate said first pivot means and said outside edge of said second arm, and wherein said adjustment means is adjusted through an aperture in said second arm.

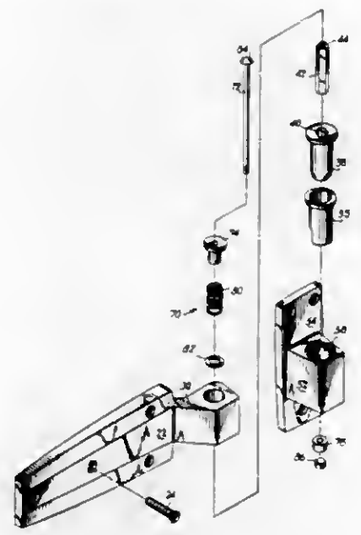
4,030,161
SELF-CLOSING SPRING HINGES

Frank F. Lolkitz, Middletown, N.J., assignor to Bulldex Incorporated, Huntington, N.Y.

Filed Oct. 29, 1976, Ser. No. 737,138
Int. Cl.² E05F *1/12*
U.S. Cl. 16—186 **11 Claims**

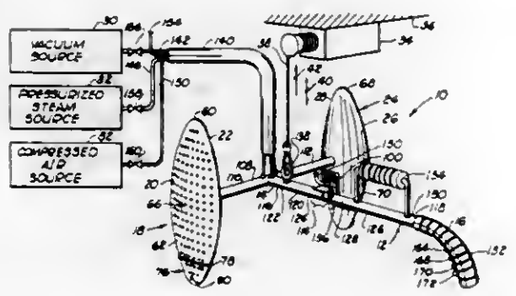
1. A hinge comprising support means, stationary cam means fixed to and carried by said support means, movable means, turnable cam means fixed to and carried by said movable

means, said stationary cam means cooperating with said turnable cam means to guide the latter for turning movement with respect to said stationary cam means about a predetermined hinge axis, said stationary and turnable cam means respectively having mating camming surfaces which are inclined with respect to said axis, mounting means fixed to said support means for mounting the latter on a stationary part with said camming surface of said stationary cam means situated beneath said camming surface of said turnable cam means and with said axis having a substantially upright attitude, said movable means carrying a connecting means for connecting to



said movable means a turnable part which is to turn with respect to said stationary part, and said camming surface of said turnable cam means riding upwardly and downwardly along said camming surface of said stationary cam means during opening and closing turning movement, respectively, of said movable means, and spring means engaging said movable means and urging the latter along said axis toward said stationary cam means so that opening movement of said movable means is carried out in opposition to said spring means while the weight of the turnable part and said spring means both act to urge said movable means to carry out a closing movement with respect to said support means and stationary cam means.

4,030,162
FOOD PROCESSING APPARATUS
James L. Hubbard, Rte. 1, Box 119,, Wewoka, Okla. 74884
Filed Apr. 7, 1976, Ser. No. 674,404
Int. Cl.² A22C *17/00*
U.S. Cl. 17—1 R **16 Claims**



1. An apparatus for removing leaf fat from the abdominal cavity of a hog carcass, comprising:
a first plate having a first face and a second face, the first face being engageable with a portion of the exposed surface of the leaf fat in a removal position of the first plate with respect to the leaf to be removed;
means connected to the first plate for positioning the first plate in the removal position with the first face engaging a portion of the leaf fat to be removed;
means connected to the first plate for severingly engaging a portion of the leaf fat in the removal position of the first plate, a portion of the leaf fat being severed from the hog carcass by said means in the removal position of the first plate for facilitating the removal of the leaf fat from the hog carcass; and
means connected to the first plate for maintaining an engagement between the first face of the first plate and a portion of the leaf fat in the removal position of the first plate while moving the first plate relative to the hog carcass for removing a portion of the leaf fat from the hog carcass.

4,030,163
CUTTER FOR REMOVING A TOUGH SURFACE LAYER FROM PIECES OF MATERIAL
Erik Laurits Reichstein, Frederikshavn, Denmark, assigoor to Arenco AB, Vastra Frolunda, Sweden
Filed May 29, 1975, Ser. No. 581,834
Claims priority, application Denmark, May 31, 1974, 2966/74
Int. Cl.² A22C *25/02*
U.S. Cl. 17—50 **12 Claims**

1. A machine for skinning fish, comprising:
an elongated roller having a generally cylindrical surface;
an elongated stationary cutter positioned in the path of trvel of the fish and having a wall portion inclined in the direction generally opposite to the direction of travel of said fish toward said roller and disposed at an acute angle relative to a perpendicular extension to the surface of said roller, a cutting edge defined by said wall portion and adjacent said surface of said roller for severing and removing the skin from said fish, an arcuate lower portion adjacent said cutting edge and disposed adjacent said roller, said arcuate lower portion located at an obtuse angle to said wall portion and having an arcuate configuration generally complementing and disposed generally parallel to said surface of said roller;
said roller constructed and arranged to feed said fish to said cutter past said cutting edge;
said wall portion intercepting said fish and urging the leading edge portion of said fish in the region of said skin toward and into engagement with said roller and said cutting edge for promoting severance of said skin and enabling said cutting edge to cut into the fish adjacent said skin; and
said cutting edge cooperating with said roller for guiding said severed skin between said cutter and said roller and for guidably lifting the remainder of said skinned fish above said cutter.

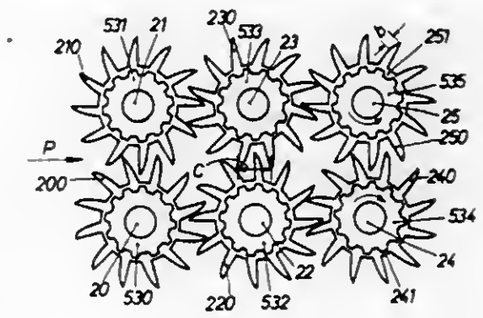
8. A method of skinning fish, comprising the steps of:
providing an elongated roller having a generally cylindrical surface;
providing an elongated cutter baving a wall portion inclined in the direction generally opposite to the traveling direction of said fish toward said roller, a cutting edge defined by said wall portion, and an arcuate lower portion adjacent said cutting edge with said arcuate lower portion located at an obtuse angle to said wall portion and having an arcuate configuration generally complementing said surface of said roller;
feeding fish via said roller to said cutter past said cutting edge by advancing the fish to intercept said wall portion substantially prior to severing the skin from said fish with said cutting edge;
positioning said cutter in the path of travel of the fish, including positioning said wall portion at an acute angle relative to a perpendicular extension to said surface of said roller, positioning said cutting edge adjacent said surface of said roller and positioning said arcuate lower portion adjacent and generally parallel to said surface;
forcing the leading edge of said fish in the region of said skin toward and into engagement with said cutting edge;
cutting the fish adjacent said skin with said cutting edge so as to remove said skin from said fish;
guiding said severed skin between said cutter and said roller; and
lifting the remainder of said skinned fish above said cutter; said wall portion enhancing continued cutting of said fish.

4,030,164
RETENTION DEVICE FOR FILLETING FISH
Henry A. Fick, 5138 Kempf, St. Louis County, Mo. 63128
Filed July 3, 1975, Ser. No. 593,039
Int. Cl.² A22C *25/00*
U.S. Cl. 17—70 **11 Claims**

1. A device for retaining a fish during filleting operation thereon comprising a rigid, flat, elongate body having a forward end portion and a rearward end portion, the length of said body being commensurate with that of the fish to be accommodated for supporting same thereon upon one of the sides of the fish; means provided on said body for engaging the fish to be filleted to maintain same against displacement during filleting, said means consisting essentially of an opening provided within the forward end portion of said body, said opening being of curvate configuration with forward and rearward edges having the central portions thereof in spaced-apart, confronting relationship, said front and rear edges merging rearwardly of the central portion of said rearward edge, said opening having the bight thereof extending forwardly of said body, the curvature of said opening substantially corresponding to the anterior edge of the external gill openings of the fish to be filleted, said body opening being dimensioned for extension therethrough of the adjacent external gill opening or operculum of the fish, and with said opening rearward edge presented for projection within the gill ports of the adjacent gill opening whereby a secure fish-retaining engagement is effected by said body.

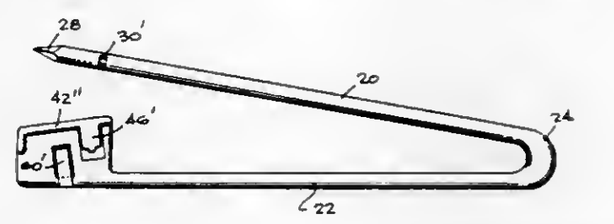
4,030,165
DEVICE FOR DRAFTING LONG STAPLE FIBRE SLIVER
Ludwig Schmitt, Mauching, and Joachim Kipping, Ingolstadt, both of Germany, assignors to Schubert & Salzer Maschinenfabrik Aktiengesellschaft, Ingolstadt, Germany
Continuation of Ser. No. 353,713, April 23, 1973, abandoned, which is a continuation of Ser. No. 139,629, May 3, 1971, abandoned. This application May 17, 1974, Ser. No. 471,016
Claims priority, application Germany, May 8, 1970, 2022482
Int. Cl.² D01G *31/00*; D01H *5/24*
U.S. Cl. 19—.2 **3 Claims**

1. In apparatus for drafting long staple fibre slivers including a first pair of drafting rollers, a second pair of drafting rollers spaced from said first pair of drafting rollers, a pair of guiding rollers located between said first and second pairs of drafting rollers for positively guiding fibre slivers along a substantially linear path between the drafting roller pairs, the improvement comprising:
each of said guiding rollers having pointed substantially radial projections arranged in generally longitudinal rows,
the outer ends of said projections of one row of projections carried on one of said guiding rollers projecting radially inwardly and between the outer ends of said projections of two adjacent rows of projections carried on said other guiding roller when the projections of said guiding rollers are in fiber sliver penetrating position,



said adjacent projections of each row of projections carried on said rollers being circumferentially spaced substantially less than the pitch between corresponding teeth of adjacent rows producing a helical configuration of teeth,
each of said projections on said one guiding roller being longitudinally spaced from a substantially corresponding located projection on said other guiding roller,
a drive sprocket carried by each roller, and endless loop drive means positively engageable with the roller drive sprockets for driving said rollers at constant angular velocity without backlash and thereby maintaining such offset relationship of the adjacent sliver-penetrating projections of said two rollers.

4,030,166
SAFETY PIN
Paul D. Betters, 60 Main St., Oakfield, N.Y. 14125
Filed Dec. 5, 1975, Ser. No. 638,108
Int. Cl.² A44B *9/14*
U.S. Cl. 24—156 R **3 Claims**



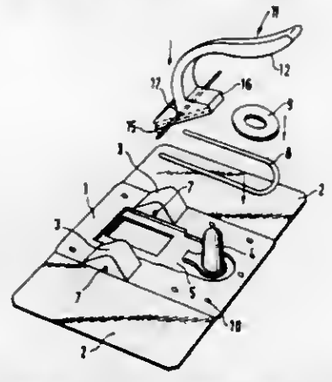
1. A reusable safety pin formable in a single plastic injection molding, said safety pin comprising a free shaft having a first end with an indentation on one side only of said shaft adjacent said first end, a fixed shaft connected at one end by a resiliently flexible portion to the second end of the free shaft, and a head assembly connected to the second end of the fixed shaft, said head assembly including a back wall with a mold opening therethrough and with a resilient projection integrally formed with the back wall and extending above the back wall, a rear wall integral along one edge with said back wall and extending upwardly from said back wall, a tab extending inwardly from said rear wall and over said mold opening in said back wall, said tab positioned above said back wall at a height approximately equal to the thickness of said first end of said free shaft to provide a receiving slot for said free shaft,

said tab including a downwardly projecting protrusion positioned over said mold opening and engageable with said indentation on said free shaft when said free shaft is inserted under said tab, said protrusion preventing axial movement of said free shaft, said resilient projection on said back wall positioned adjacent the free shaft when the free shaft is positioned in said receiving slot to increase the force required to remove the free shaft from the receiving slot thereby providing a reusable safety pin formable in a single injection molding without requiring the use of movable cores during the injection molding process.

4,030,167
GARMENT CLASP

Christoph Gubbels, Wellingsbutteler Weg near 32, D-2000 Hamburg 64, Germany

Filed Oct. 12, 1976, Ser. No. 731,534
Claims priority, application Germany, Oct. 9, 1975, 2545302
Int. Cl.² A44B *17/00*
U.S. Cl. 24—210 **6 Claims**



1. A garment clasp construction which includes: a base plate, bearing block means arranged on said base plate and located in spaced substantially parallel relationship to each other, a longitudinally extending substantially L-shaped clasp member having a foot portion with a bearing pin laterally protruding from both sides of said foot portion and extending in a direction transverse to the longitudinal extension of said clasp member, said laterally protruding portions of said bearing pin being pivotally journalled in said bearing block means to permit shifting said clasp member selectively from a first position representing the open position of said clasp member to a second position representing the closing position of said clasp member, and vice versa, stud means mounted on said base plate in substantial alignment with the vertical central plane through said clasp member and perpendicular to said base plate for resting said clasp member in its closed position, said foot portion of said clasp member being provided with at least two channel-shaped detent recess means arranged at an angle to each other corresponding to the shifting angle from said opening to said closing position of said clasp member, said base plate having that surface thereof which faces said clasp member provided with a recess, and U-shaped spring means fastened onto said stud means and arranged in said recess, the legs of said U-shaped spring means being preloaded for engaging said detent recess means.

4,030,168
METHOD AND APPARATUS FOR TRAVERSING A STRAND TO FORM A RESTRAINED WEB

Paul Morrison Cole, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

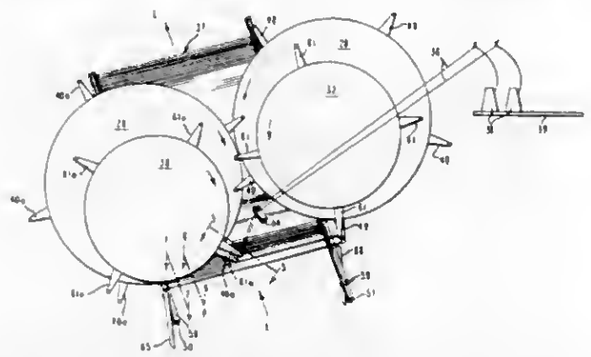
Continuation-in-part of Ser. No. 652,658, Jan. 27, 1976, abandoned. This application Aug. 27, 1976, Ser. No. 718,338
Int. Cl.² D04H *3/04, 3/05*
U.S. Cl. 28—101 **10 Claims**

1. An apparatus for traversing a strand between two spaced rows of strand-restraining elements moving together in the same direction at the same speed in the same plane to form a web, said apparatus comprising:

a strand supply source;

a guide located out of the plane of said rows and between them for receiving the strand from said supply source;

at least one pair of rotatable strand-engaging members associated with each row of strand-restraining elements for slideably engaging the strand between said guide and



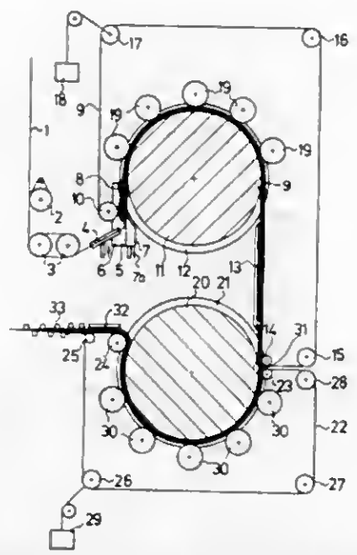
said plane and traversing said strand toward one and then the other row while forming a loop in said strand during each traverse and bringing said loop into a plane substantially parallel to the plane of the rows of strand-restraining elements and beyond said rows; and

means for disengaging said loop from said strand-engaging members beyond said rows of strand-restraining elements and depositing the strand in a loop around at least one of said elements.

4,030,169
METHOD AND APPARATUS FOR TREATING YARN

Helmrich Enneking, Karlsruhe; Günter Schubert, Malsch, and Karl-Heinz Baumann, Karlsruhe, all of Germany, assignors to Industriewerke Karlsruhe Augsburg Aktiengesellschaft, Germany

Filed Feb. 11, 1976, Ser. No. 657,218
Claims priority, application Germany, Feb. 22, 1975, 2507752
Int. Cl.² D02G *1/20, 1/16, 1/12*
U.S. Cl. 28—220 **14 Claims**



7. An apparatus for treating yarn comprising means defining a continuous heating chamber, means defining a continuous cooling chamber adjacent said heating chamber, means for stretching and feeding yarn to be treated toward said heating chamber, crimping means along the feed path of the yarn for crimping the yarn, means adjacent said crimping means for forming the crimped yarn into a wadding, mechanical means for positively advancing the wadding through said heating chamber and said cooling chamber, means associated with said heating chamber for compressing the wadding as it is moved therein so that it is transferred in a compressed state through a portion of said heating chamber and said cooling chamber, means in said heating chamber for heating said wadding and means in said cooling chamber for cooling said wadding.

4,030,170
FELTING NEEDLE

Hellmuth Eckhardt, Herzogenrath, Germany, assignor to Torrington GmbH, Wurselen, Germany

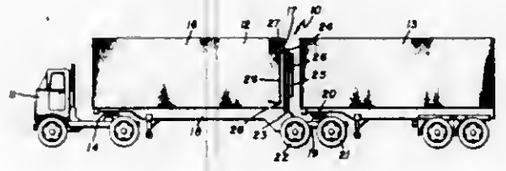
Filed Apr. 15, 1976, Ser. No. 677,502
Claims priority, application Germany, Apr. 23, 1975, 2518066
Int. Cl.² D04H *18/00*
U.S. Cl. 28—115 **8 Claims**

1. A felting needle comprising: a needle shaft with at least one barb formed on the shaft and a groove between the barb and the shaft, the groove being defined by a bottom surface, the inside surface of the barb, and a throat serving as a transition between the bottom surface and the inside surface of the barb, the bottom surface, inside surface of the barb, and the throat all being completely rounded in such a manner that no plane surfaces remain, and that said surfaces merge into each other and into the needle shaft without sharp edges.

4,030,171
TANDEM TRAILER SYSTEM

Gerard A. Arguin, 3 Valley St., Spencer, Mass. 01562

Division of Ser. No. 528,786, Dec. 2, 1974, Pat. No. 3,933,374, which is a continuation of Ser. No. 370,744, June 18, 1973, abandoned. This application Jan. 15, 1976, Ser. No. 649,369
The portion of the term of this patent subsequent to Jan. 20, 1993, has been disclaimed.
Int. Cl.² B62D *53/08*
U.S. Cl. 280—408 **1 Claim**



1. A trailer unit to be towed behind a highway tractor, and behind which may be towed another trailer, the trailer unit comprising

a. a cargo container,

b. a chassis on which the container is mounted, the chassis having a first and a second end, a portion of the chassis associated with the second end extending downwardly and rigidly beyond an end of the cargo container,

c. first attaching means associated with the first end of the chassis by which the chassis can be connected to a highway tractor,

d. a second attaching means associated with the portion of the chassis which extends beyond the end of the cargo container, by which another standard trailer can be attached to the chassis, the second attaching means being entirely below a horizontal plane which includes the lowest portion of the cargo container and at the level of the first attaching means,

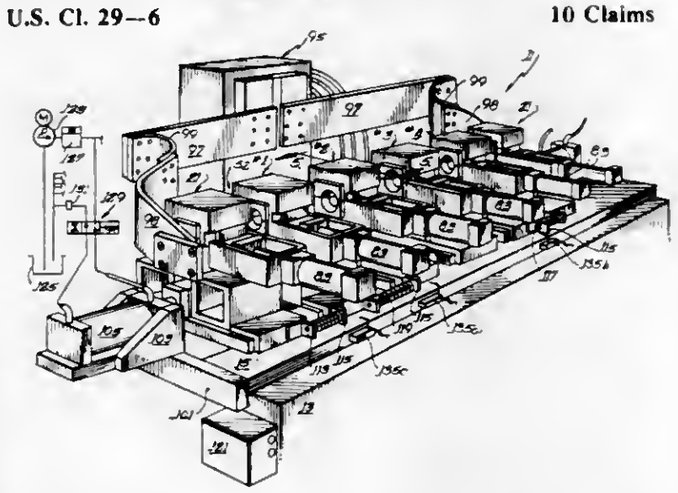
e. a first set of wheels attached to the said portion of the chassis, at a point where the set is at least as far away from the first end as the second attaching means, an entrance to the cargo container being provided facing toward and adjacent the second end of the chassis, and

f. a second set of wheels attached to the chassis between the first end and the first set of wheels.

4,030,172
CRANKSHAFT-FORMING APPARATUS AND METHOD

Elvin O. Gentry, 1419 Towanda St., Bloomington, Ill. 61701

Filed July 8, 1976, Ser. No. 703,621
Int. Cl.² B21K *1/08*
U.S. Cl. 29—6 **10 Claims**



1. Apparatus for forming crankshafts from metal rod, including a base, a pair of units for holding a metal rod to be formed at locations near the ends thereof, which holding units are movable in a direction axially of the rod, means for electrically heating the metal rod to a temperature sufficient to permit its deformation, a plurality of forming units which include forming heads designed to be clamped about the rod at precise locations therealong between said holding units, means for moving said forming heads in a direction transverse to the axis of the rod and control means for moving said forming heads of different units in different directions, wherein the improvement comprises said forming units being mounted on individual carriages which are axially movable along said base, each of which carriages supports a subcarriage for movement on said carriage along a first line transverse to said axis plus a first motor for so moving said subcarriage, each of said subcarriages supporting one of said forming heads plus a second motor for moving said head along a second line transverse to said axis with the direction of movement along said second line being generally perpendicular to the direction of movement along said first line.

4,030,173
PIN HANDLING AND INSERTION MECHANISM

Jodie W. Phillips, Elmira, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed July 26, 1976, Ser. No. 708,499
Int. Cl.² H01J *9/24*
U.S. Cl. 29—25.19 **10 Claims**

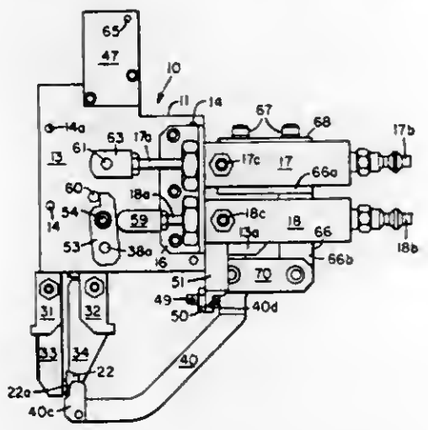
1. In the manufacturing of face plates for color television picture tubes each having inserted, in one surface thereof for

support of an aperture mask adjacent to such surface, an end of at least one of a plurality of relatively elongate pins each having a U-shaped channel cross-sectional configuration taken on a plane normal to the length thereof; and, in combination with a heating means intermittently disposed adjacent said one surface of each of said face plates, a mechanism for handling said plurality of pins and intermittently positioning each said pin adjacent said heating means for heating thereof and subsequent insertion of its end into said one surface of the respective face plate adjacent with such heating means is then disposed, said mechanism comprising;

A. a housing member disposed above said heating means, such housing member embodying;

I. a first pin guide channel having a height greater than the length of each of said pins and extending generally horizontally in said housing, a second pin guide channel for conveyance of each of said pins in a generally upright position thereof such channel having a lower end connecting with a first end of said first channel and an upper end extending through the upper wall of said housing for receipt of each of said pins, and a third pin guide channel for conveyance of each of said pins in a generally upright position thereof such channel having an upper end connecting with the second end of said first channel and a lower pin delivery end extending through the lower wall of said housing; and

II. slide means arranged for reciprocative movement



between first and second positions in said first channel for receipt and conveyance of each of said pins in said generally upright position thereof from said lower end of said second channel to said upper end of said third channel for delivery of the pin to such end of such third channel;

B. a pair of facing and generally vertically extending jaws having upper ends disposed adjacent said lower pin delivery end of said third channel, such jaws being actuable between first spaced-apart positions for receipt, between the upper ends of the faces thereof, of each of said pins delivered thereto from said third channel lower delivery end, and second positions for clamping part of each received pin therebetween, the face of one of said jaws having a width generally corresponding to and slightly smaller than that of the channel in each of said pins for sliding movement and guidance of such pins along such one jaw from said upper to said lower ends of said faces of the jaws for said clamping of said part of each of the pins therebetween;

C. stop means arranged for reciprocative movement between a first position substantially away from said jaws for clearance thereof and a second position adjacent and below the lower ends of said jaw faces for precisely limiting the distance each of said pins can extend downwardly from between said faces prior to said clamping of each of the respective pins;

D. resilient means for force biasing said jaws to their said second positions;

E. first motor means for imparting said reciprocative movements to said slide means and said stop means for simultaneous movement thereof from their said first positions to their said second positions and from their said second positions to their said first positions; and

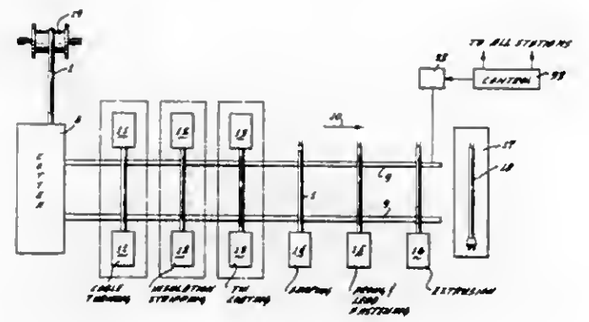
F. second motor means reciprocatively actuable between two positions and associated with said jaws for movement thereof and their said faces away from each other for receipt of each of said pins therebetween when such motor means are actuated from one to the other of their said two positions against the force of said resilient means, such resilient means again force biasing said jaws to their said second positions when the second motor means are actuated from said other to said one of their said two positions.

4,030,174

INSTALLATION FOR PREPARING CABLE LENGTHS FOR PLUG EXTRUSION

Karl Büttner; Jürgen Böll, and Kurt Wölfel, all of Nuremberg, Germany, assignors to Kabel-und Metallwerke Gutehoffnungshutte Aktiengesellschaft, Hannover, Germany

Division of Ser. No. 605,748, Aug. 18, 1975, Pat. No. 3,999,289. This application Oct. 13, 1976, Ser. No. 732,067
Claims priority, application Germany, Aug. 22, 1974, 2440264
Int. Cl.² B23P *23/04*
U.S. Cl. 29—33 M 11 Claims



1. In an apparatus for providing a plug element by means of extrusion to the end of a length of electrical cable having a plurality of leads and wherein each such length has to be prepared prior to extruding said element, and wherein a portion of each length, at least at one end, has its jacket removed to expose the insulated leads for a certain length, comprising:

means for positioning the lengths of cable in particular, spaced apart positions and moving the lengths in steps through a plurality of stations, said stations including:

means (a) for turning the exposed leads at least at one end of a length, so that the leads assume a predetermined orientation for and during the continuation of moving the length to the next and other stations;

means (b) for stripping the insulation of a portion of the leads as oriented to expose the wire;

means (c) for strengthening the tips of the exposed wires;

means (d) for shaping the lead ends with exposed and strengthened wire to assume an orientation and a disposition flush with the position of prongs in the completed product; and

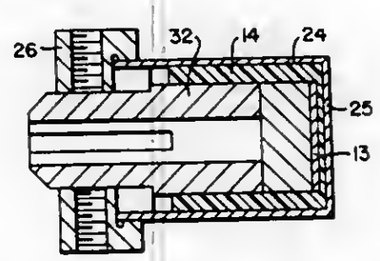
means (e) for connecting the prongs to said wires.

4,030,175

METHOD OF MAKING A METAL ENCLOSED TRANSDUCER ASSEMBLY

James L. McShane, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Division of Ser. No. 603,708, Aug. 11, 1975, Pat. No. 3,979,565. This application Apr. 6, 1976, Ser. No. 674,182
Int. Cl.² H01L *41/22*
U.S. Cl. 29—25.35 1 Claim



1. A process for manufacturing transducer apparatus including (a) an element assembly comprising an active piezoelectric member, a backup member and a base member united to said piezoelectric member and backup member, and electrical leads for said piezoelectric member passed through said base member, (b) a support for said base member, (c) a metallic capsule having a window wall interposed in the line of transmission of acoustic waves between said piezoelectric member and a transmitting medium, and (d) an epoxy resin for uniting said metallic capsule, said element assembly and said support comprising the steps of:

pouring epoxy resin in said capsule;

placing said element assembly in predetermined geometric relation to said capsule;

curing said epoxy resin in situ to unite said base member, said backup member, said piezoelectric member and said capsule;

placing said support in abutting relation to said capsule;

with fixture means being provided for placing said element assembly in predetermined geometric relation to said capsule, said fixture means being mounted on said element assembly before said step of pouring, and being removed therefrom after said step of curing; and

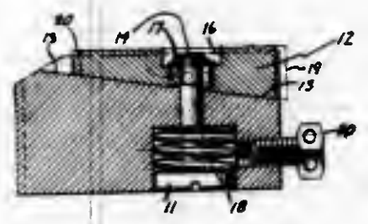
welding said capsule to said support in situ.

4,030,176

ADJUSTABLE CUTTING TOOL

Ronald E. Michonski, Rochester, Mich., assignor to General Electric Company, Schenectady, N.Y.

Filed Mar. 29, 1976, Ser. No. 671,458
Int. Cl.² B26D *1/00*
U.S. Cl. 29—96 7 Claims



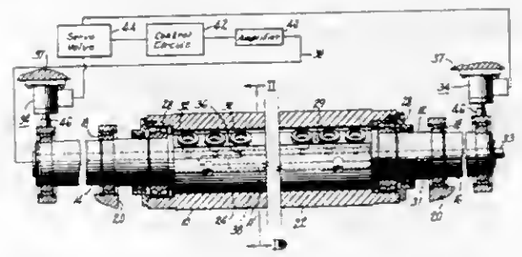
1. A cutting tool comprising a toolholder having a recess to receive an adjustable cartridge and an adjustable cartridge therein, said cartridge comprising a body member adapted to hold a cutting insert at one end, and an adjusting wedge member slidable mounted in a corresponding recess in said body member, rotatable eccentric means mounted in and extending through said body member and said wedge for holding said body member and said wedge member together and for effecting lateral movement of said adjusting wedge member relative to said body member means for holding said cartridge in said toolholder and means for longitudinally positioning said cartridge in said toolholder recess.

4,030,177

CONTROLLED DEFLECTION ROLL

Peter Hold, Milford, Conn., assignor to USM Corporation, Boston, Mass.

Continuation of Ser. No. 583,860, June 4, 1975, abandoned. This application Sept. 23, 1976, Ser. No. 725,870
Int. Cl.² B21B *13/02*
U.S. Cl. 29—116 AD 6 Claims



1. A controlled deflection roll comprising:

a shaft having a support arrangement near the ends thereof;

a shell roll journaled about said shaft, said shell roll and said shaft having a radial space therebetween;

a pressure sensor disposed within said shaft;

a biasing arrangement disposed near at least one end of said shaft to apply a bending moment across said shaft in response to a signal from said sensor;

at least two radially directed cylinders having a piston disposed therewith and spaced in said shaft;

a hydrostatic bearing pad on the outer end of each of said radially directed pistons facing the inside surface of said shell roll; and

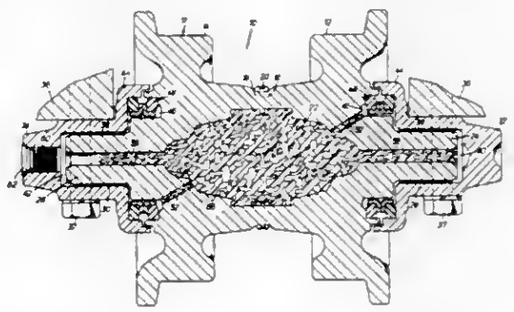
a manifold circuit arrangement extending through said shaft from at least one end thereof for conducting pressurized fluid to the vicinity of each of said radially disposed cylinders and pads, said conduit arrangement permitting pressurized fluid to be directed to said piston and bearing arrangement against the inner surface of said shell roll to help control deflection therein.

4,030,178

METHOD OF MANUFACTURING TRACK ROLLER WITH OPEN CELL PLASTIC FOAM IN LUBRICATION CAVITY

Leroy Luebkemann, Springfield, Ill., assignor to Fiat-Allis Construction Machinery, Inc., Deerfield, Ill.

Division of Ser. No. 491,768, Aug. 6, 1974, Pat. No. 3,955,646. This application Aug. 4, 1975, Ser. No. 601,669
Int. Cl.² B21D *53/10*
U.S. Cl. 29—149.5 NM 3 Claims



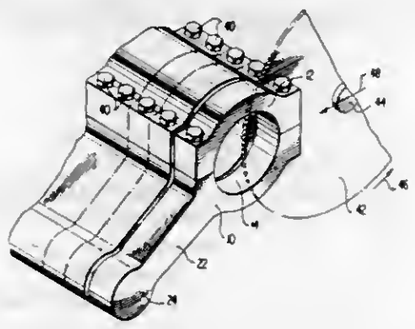
1. A method of manufacturing a track roller comprising the steps of: providing a track roller having a lubrication cavity

therein and at least one passage communicating with said lubrication cavity and accessible from the exterior of said track roller; providing a substance capable of foaming to form a solidified mass of open cell foamed material; supplying a sufficient quantity of said substance through said passage to said cavity wherein said substance foams in situ to form a solidified mass of said material which substantially fills said cavity and supplying a sufficient quantity of a lubricant under pressure through a passage to said cavity to saturate said solidified mass of material in said cavity.

4,030,179
METHOD OF MANUFACTURING LOW COST NON-POROUS METAL CONNECTING RODS

Leonard H. Schwarz, West Hartford, Conn., assignor to Dunham-Bush, Inc., West Hartford, Coon.

Filed Jan. 19, 1976, Ser. No. 650,401
Int. Cl.² B23P *15/00*
U.S. Cl. 29—156.5 A **3 Claims**

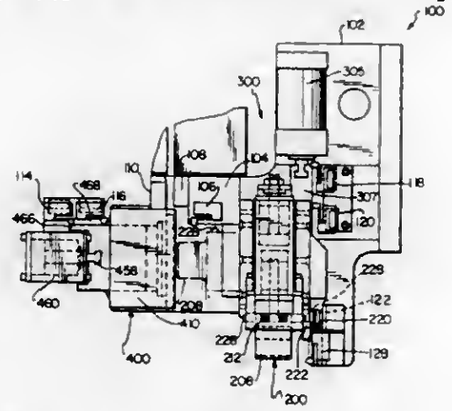


1. A method of manufacturing a series of dense, non-porous metal connecting rods comprising, in sequence, the steps of:
extruding semi-tubular metal bars having complementary edges and semi-circular recesses of equal diameter within the faces of said bars,
detachably joining said bars together at said complementary edges to form a rigid assembly defining a true circular opening therein running the complete length of said assembly, and
severing individual connecting rods from said assembly by sawing through said assembly at right angles to the axis of said joined semi-tubular metal bars such that each rod upon severance has a true circular opening formed by said joined portions of said bars.

4,030,180
LONGITUDINALLY FED COMPONENT INSERTION APPARATUS

Mark V. Pierson, 28 Ogden St., Binghamton, N.Y. 13901

Filed May 24, 1976, Ser. No. 689,249
Int. Cl.² H05K *3/30*
U.S. Cl. 29—741 **14 Claims**

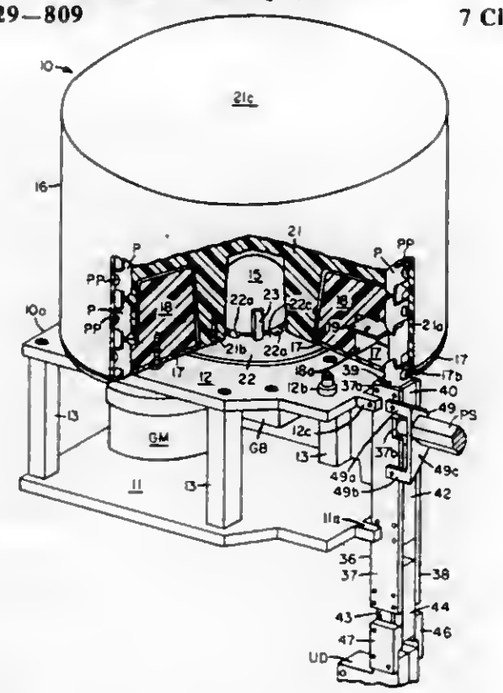


1. An apparatus for inserting electronic components whose leads are parallel and extend in the same direction substantially perpendicular to a planar surface of said component, said apparatus comprising:
component inserter means having a longitudinal axis;
drive means for rotating said inserter means between a feed position and a drive position and for reciprocating said inserter means from a first position to an insertion position along said longitudinal axis; and
feed means for feeding electronic components one at a time into said inserter means along said longitudinal axis when said inserter means is in said feed position.

4,030,181
PIN FEEDING MECHANISM

Lawrence W. Phillips, and Harris G. Rodgers, Sr., both of Corning, N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed July 6, 1976, Ser. No. 702,697
Int. Cl.² B23Q *7/10*
U.S. Cl. 29—809 **7 Claims**



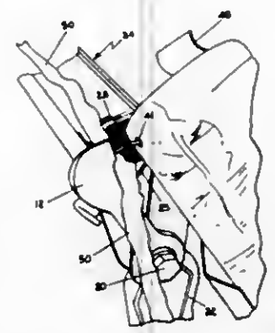
1. A mechanism for sequentially feeding to a utilization device each of a plurality of relatively elongate pins each having a U-shaped cross-sectional configuration taken on a plane normal to the length thereof and sides whose ends slope, at one end thereof, in directions parallel with each other, such mechanism comprising, in combination;
A. a cylindrical pin magazine including;
I. an outer main member embodying a plurality of elongate pin receiving channels aligned side-by-side with each other parallel with the length of said magazine and extending therethrough adjacent the outer periphery thereof, each of said channels having a cross-sectional configuration corresponding to that of one of said pins and of slightly larger size, such member having secured to the lower end thereof a first annular disk embodying a plurality of teeth spaced apart about the inner periphery thereof;
II. an inner annular member surrounded by said outer member adjacent the lower end thereof, such inner member having secured to the lower end thereof, above and slightly spaced from said first disk, a second annular disk extending under the lower ends of said channels in relatively close proximity thereto, such disk embodying in the outer periphery thereof a cut-out of a larger size than said cross-section of one of said channels in said magazine; and
III. a pin retention plate secured to said inner annular member adjacent the outer periphery thereof, such member extending outwardly partially over said cut-out in said second disk at a height slightly greater than the length of each of said pins;

B. a magazine support and drive assembly, such assembly including;
I. a support plate having means on the upper surface thereof for removably and precisely positioning said second annular disk thereon with said first annular disk slightly spaced from said upper surface of such support plate;
II. electric motor means including an output shaft extending upwardly through a suitable hole provided in said support plate; and
III. a generally cylindrical hub keyed to said output shaft for driven rotation therewith, such hub extending upwardly through the inner periphery of said first disk in a relatively snug but slidable relationship therewith and including a lug in a recess in the hub and normally spring biased out of such recess for engagement with one of said teeth in said inner periphery of the first disk for driven rotation thereof and, thereby, of said outer main member;
C. a pin feeding track assembly having an upper end attached to said support plate below said cutout in said second annular disk and a lower end attached to said utilization device, such assembly embodying pin guide channels extending vertically through the length thereof and providing a pin guide track for receiving at the upper end thereof pins released from said magazine and delivering at the lower end thereof such pins to said utilization device;
D. pin detection means disposed adjacent said pin guide track for detection of the passage of a pin moving through such track and actuating a pair of electrical circuit controlling contacts in response to such a detection; and
E. electrical circuit means, including said electrical circuit controlling contacts, for energizing said motor means to impart rotation to said main member of said magazine when a control signal is received from said utilization device and to interrupt such energization when said electrical circuit controlling contacts are actuated in response to said detection of a pin.

4,030,182
TAG APPLICATING DEVICE

Philip T. Wheeler, DeWitt, Mich., assignor to The Hardy Company, Lansing, Mich.

Filed Oct. 1, 1975, Ser. No. 618,453
Int. Cl.² B23Q *7/10*
U.S. Cl. 29—816 **11 Claims**

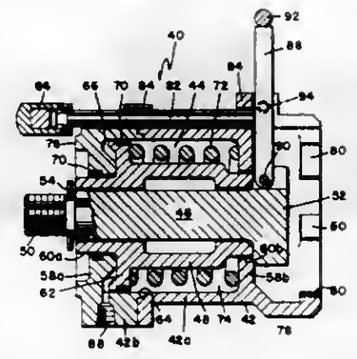


1. A tag applicating device comprising:
a pair of crimping pliers; and
a tag receiving magazine coupled to said crimping pliers for holding a tag advanced from said magazine in position with respect to said crimping pliers such that a fastener positioned to be clamped by said crimping pliers engages the tag for attachment of the tag to an object.

4,030,183
TOOL ASSEMBLY FOR MOUNTING AND REMOVING OVERHUNG ROLLS

Raymond L. Smola, Holden, Mass., assignor to Morgan Construction Company, Worcester, Mass.

Filed Feb. 2, 1976, Ser. No. 654,219
Int. Cl.² B23P *19/02*
U.S. Cl. 29—252 **14 Claims**



1. For use in combination with a work roll mounted on the end section of a shaft by means of a sleeve member inserted in an operative position therebetween, a fluid-actuated tool assembly for axially moving said sleeve member relative to said shaft into and out of said operative position, said tool assembly comprising: a cylinder movable axially relative to a piston, said tool assembly having oppositely disposed first and second ends, means at said first end for removably connecting said piston to said shaft with said cylinder positioned to abut said sleeve, means at said second end for removably connecting said cylinder to said sleeve with said piston positioned to abut said shaft, surface means on said piston and said cylinder for defining a fluid chamber, and means for admitting fluid under pressure into said chamber to produce axial movement of said cylinder relative to said piston, whereupon depending on which of the aforesaid ends of said tool assembly is operatively associated with said shaft and said sleeve member, axial movement of said cylinder relative to said piston will produce a desired axial displacement of said sleeve member relative to said shaft.

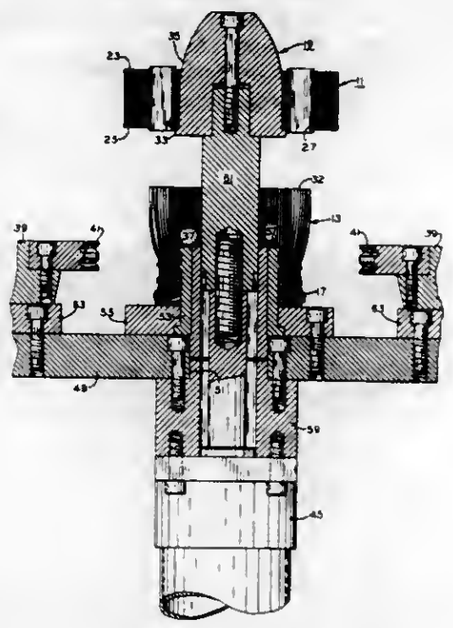
4,030,184
METHOD FOR STRIPPING WINDINGS FROM A STATOR

Frank R. Dombrowski, Kingston, and Raymond L. Larson, Sycamore, both of Ill., assignors to General Electric Company, Fort Wayne, Ind.

Division of Ser. No. 543,505, Jan. 23, 1975. This application Aug. 24, 1976, Ser. No. 717,293
Int. Cl.² B23Q *17/00;* **B26D** *1/04*
U.S. Cl. 29—403 **14 Claims**

1. A method of stripping from a dynamoelectric machine stator a pluality of windings thereof having one of a pair of opposite generally annular groupings of end turns of the windings severed therefrom comprising the steps of:
a. lowering the stator onto means for seating and supporting it so as to dispose the other of the end turns in a predetermined position;
b. gripping the other end turns for maintaining them generally against displacement friom the predetermined position; and
c. driving the seating means generally upwerdly relative to

the winding and moving the stator conjointly therewith toward a position displaced from the windings while



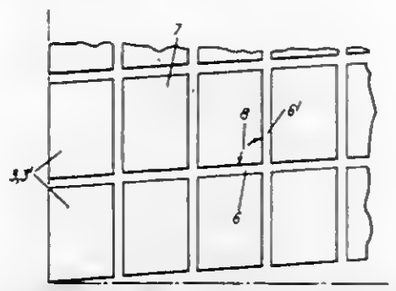
gripping the other end turns in the predetermined position thereby stripping the windings from the stator.

4,030,185

METHOD OF MANUFACTURING A BRAKE PAD ASSEMBLY FOR A SPOT-TYPE DISC BRAKE

Heinz Gunter Hahm, Frankfurt am Main, and Nedo Igor Pocci, Neuenhain, both of Germany, assignors to ITT Industries, Incorporated, New York, N.Y.

Continuation-in-part of Ser. No. 577,149, May 13, 1975, abandoned. This application Sept. 29, 1976, Ser. No. 727,830
Claims priority, application Germany, May 14, 1974, 2423377
Int. Cl.² B23P *17/02*
U.S. Cl. 29—413 **2 Claims**



1. A method of manufacturing a brake-pad assembly for a spot-type disc brake having a carrier plate and a pair of friction pads comprising the steps of:

forming separately a pair of spaced recesses in said carrier plate, said recesses having a parallelogram configuration other than a rectangle and a cross member therebetween providing an axis of symmetry, said recesses being symmetrically disposed with respect to said axis of symmetry to approximate a sector of a circle;

pressing and age-hardening separately a plate of friction material having a thickness corresponding to the desired thickness of said pads;

cutting at least said pair of pads separately from said plate having the dimensions and shape of said recesses; and

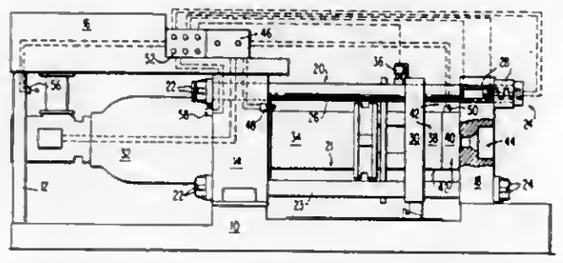
placing and securing each of said pair of pads produced in said cutting step in a different one of said recesses so that said pair of pads are disposed symmetrically with respect to said axis of symmetry to approximate a sector of a circle.

4,030,186

METHOD FOR FACILITATING ACCESS TO THE MOLD HALVES OF A MOLDING MACHINE

Gary L. Myers, and Donald W. Stalger, both of Mount Gilead, Ohio, assignors to HPM Corporation, Mount Gilead, Ohio

Division of Ser. No. 467,897, May 8, 1974, Pat. No. 3,951,579. This application Nov. 24, 1975, Ser. No. 634,593
Int. Cl.² B23P *19/02*
U.S. Cl. 29—427 **4 Claims**



1. A method of at least partially removing, from between the opposed stationary and movable platens of a molding machine, a tie rod which extends from a supportive structural frame freely through the movable platen to connection with the opposed stationary platen, said method comprising the steps of:

slidingly translating said movable platen toward said stationary platen freely along a plurality of independent tie rods connected to said stationary platen;

releasing at least one of said tie rods from connection with said stationary platen;

actuating a remote control mechanism connected to a power-actuated brake mechanism carried by said movable platen, to shift said brake mechanism into engagement with said one tie rod to connect said one tie rod to said movable platen for movement therewith;

slidingly translating said movable platen freely along those of said tie rods remaining connected to said stationary platen, to shift said one tie rod to a position away from said stationary platen;

actuating said remote control mechanism to shift said brake mechanism out of engagement with said one tie rod to disconnect said one tie rod from said movable platen;

slidingly translate said movable platen toward said stationary platen freely along said tie rods;

actuating said remote control mechanism to shift said brake mechanism into engagement with said one tie rod to connect said one tie rod to said movable platen for movement therewith; and

slidingly translating said movable platen freely along said remaining tie rods, to shift said one tie rod yet further away from said stationary platen.

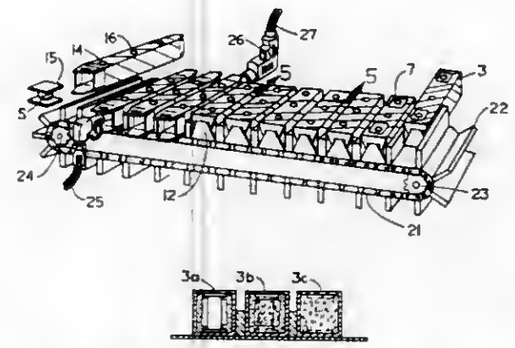
4,030,187

METHOD OF MAKING AN OBJECT SUPPORT MEMBER

Thomas G. Daley, 9716 Lanesboro Way, Louisville, Ky. 40222

Filed May 27, 1976, Ser. No. 690,437
Int. Cl.² B23P *3/00, 25/00*
U.S. Cl. 29—458 **7 Claims**

1. A method for making a support for objects comprising the steps of: inserting into a conduit member at preselected positions therein inserts with openings therethrough, the axes of the opening and said conduit member being at right angles to one another; feeding a resilient foam mix into preselected portions of said conduit member to form a resilient foam support within said selected portions of said conduit member and around said inserts; and, securing object mounting means at selected points of the foam filled said preselected portions



along the top outer surface of said conduit member for mounting an object thereto.

4,030,188

METHOD OF MAKING SHAKER PLATES

Dennis J. Reiland, St. Paul, Minn., assignor to General Pattern Co., Inc., St. Paul, Minn.

Filed June 11, 1976, Ser. No. 694,961
Int. Cl.² B22C *9/18*
U.S. Cl. 29—527.1 **7 Claims**

1. The method of making a metal shaker plate for removing flash sand from a sand core comprising the steps of:

placing a curing sand into a metal core box which is at a first temperature, heating the metal core box and the curing sand to a predetermined temperature to cure the sand and thereby produce a sand core, said metal core box undergoing a thermal expansion as a result of heating said metal core box to a predetermined temperature so that said sand core has extended dimensions which are equal to the internal dimensions of the metal core box when said metal core box is at the predetermined temperature;

forming a second core in said metal core box while said metal core box is maintained at the first temperature by use of a material that is characterized by an expansion of a predetermined amount upon setting which is greater than the thermal expansion of said metal core box;

using the second core as a pattern for casting a mold from a material which is characterized by a predetermined amount of shrinkage during the curing stage, said expansion of said second core and said contraction of said mold producing a dimensional compensation which is equal to the thermal expansion of said metal core box so that the mold has the same direction as the sand mold formed in said metal core box; and

using said mold as a pattern in making a shaker plate for said sand core.

4,030,189

METHOD OF MAKING MAGNETIC HEAD DEVICES

Jean-Pierre Lazzari, Villiers Saint Frederic, France, assignor to Compagnie Internationale pour l'Informatique, Louveciennes, France

Division of Ser. No. 444,495, Feb. 21, 1974, Pat. No. 3,975,771. This application Mar. 15, 1976, Ser. No. 666,566
Claims priority, application France, Feb. 21, 1973, 73.06006
Int. Cl.² G11B *5/42*
U.S. Cl. 29—603 **6 Claims**

1. A method of mounting a magnetic head in a carrier plate for operation as a flying shoe in magnetic disk equipment, said head being enclosed in an insulating non-magnetic material which is level with the airgap face of the magnetic structure of the head, said plate having front and rear faces, being formed of dielectric non-magnetic material and having a thru-hole from said front to said rear face for receiving said head, the steps comprising:

coating the side surfaces defining the thru-hole in said plate and said enclosed head with first and second films respectively of high permeability anisotropic material;

coating each of said magnetic films with a film of solder material having a melting point below said films of magnetic material and the insulating material enclosing said head;

positioning said head within the thru-hole in said plate with the airgap face of said head level with said front face of said plate; and

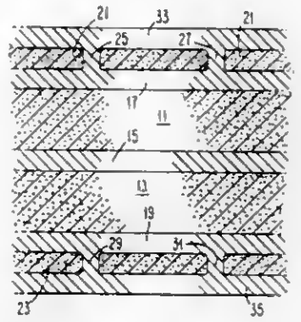
temporarily heating the thus assembled parts to a temperature higher than the melting point of the said solder material while simultaneously supplying additional solder material between the facing solder films.

4,030,190

METHOD FOR FORMING A MULTILAYER PRINTED CIRCUIT BOARD

Kenneth James Varker, Binghamton, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 30, 1976, Ser. No. 671,796
Int. Cl.² B41M *3/08;* **H05K** *3/08, 3/36*
U.S. Cl. 29—625 **13 Claims**



1. A method of manufacturing a multilayer printed circuit board including at least one base plane of inherently stable, conductive material and a plurality of signal planes, comprising the steps of:

adding first and second dielectric planes on the sides of said base plane;

creating first and second signal planes on said first and second dielectric planes, respectively;

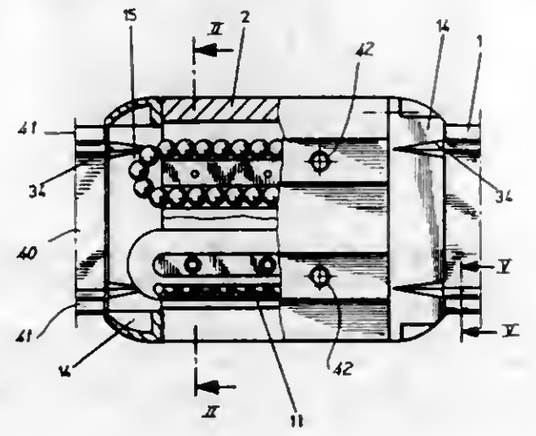
adding third and fourth dielectric planes over said first and second signal planes, respectively; and

creating respective third and fourth signal planes on said third and fourth dielectric planes.

4,030,191
DEVICE FOR LINEARLY GUIDING A MACHINE ELEMENT

Horst M. Ernst, Eltingshausen; Armin Olschewski, Schweinfurt, and Manfred Brandenstein, Aschfeld, all of Germany, assignors to SKF Industrial Trading and Development Company, B.V., Nieuwegein, Netherlands

Filed Mar. 4, 1976, Ser. No. 663,725
Claims priority, application Germany, Mar. 15, 1975, 7508272
Int. Cl.² F16C *29/12*
U.S. Cl. 308—6 C **15 Claims**



1. In a device for linearly guiding a machine element along a beam, wherein the beam and machine element define paths for two endless rows of circulating roll bodies on each side of the longitudinal median plane of the beam, the improvement wherein said beam has a center section joining a pair of end flanges, each end flange extending laterally of the beam on both sides of said longitudinal median plane, said machine element being positioned adjacent said flanges, a separate roll path for roll bodies under load being formed between said machine element and the inner edge of each said flange, said roll paths being positioned so that the force action lines on said roll bodies in the two roll paths on each side of the longitudinal median plane converge in the direction away from the respective side of said longitudinal median plane.

4,030,192
MAT CUTTER FOR CIRCLES

Franklyn G. Umholtz, Shutesbury, Mass., assignor to Russell Harrington Cutlery, Inc., Southbridge, Mass.

Filed May 25, 1976, Ser. No. 689,794
Int. Cl.² B26B *3/00*
U.S. Cl. 30—310 **5 Claims**

1. A mat cutter comprising a body, a blade, means mounting a shaft in the body, the shaft being threaded at one end with a nut thereon and free-ended at the opposite end, said opposite end having a generally side opening recess therein for the reception of the blade, said mat cutter including a wall against which the blade may be clamped by the shaft,

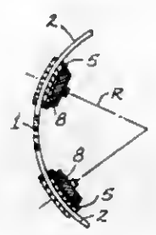
a radius rod, said radius rod having an opening therein for the reception of the free-ended portion of said shaft, said blade engaging the rod and holding it in position against said wall upon tightening of the nut on the shaft,

and a center point on the rod, said center point being adjustable therealong.

4,030,193
HAIRCUTTING MACHINE

Stepheo Emmanuel Mandilaras, 31 Brilissou St., Turkovounia Athens 703, Greece

Continuation of Ser. No. 330,740, Feb. 8, 1973, abandoned. This application July 18, 1975, Ser. No. 597,159
Claims priority, application Greece, Feb. 12, 1972, 47476
Int. Cl.² B26B *21/12, 21/22*
U.S. Cl. 30—30 **8 Claims**



1. A hair cutting device comprising:

a. an elongated support having a handle member extending along an axis from one end thereof;

b. a plurality of spaced, elongated comb teeth extending outwardly and downwardly from opposite sides of said support and having free ends, said teeth on one side of said support being symmetrical with and having substantially the same length as the teeth on the other side, the arrays of teeth on the opposite sides of said support defining the legs of an arch;

c. elongated blade carrier means adapted to be selectively and adjustably positioned along substantially the entire length of the teeth on either side of said support, said blade carrier means extending parallel with and being spaced from said elongated support and having a width substantially less than the length of said teeth, and including a stud passing through and slidable within the space between adjacent teeth, and a means attached to said stud for clamping said carrier on the teeth at a selected location along the length thereof; and

d. a cutter blade on said carrier means, said blade having a cutting edge facing away from said support and being selectively adjustable with said carrier to different positions along said teeth from the ends thereof at the bottom of the arch legs formed by the arrays of teeth on the opposite sides of said support, to the upper ends of said teeth adjacent said support,

whereby the device may be moved over a portion of the user's body with the ends of said teeth at the bottom of said arch legs slidably engaging the user's body to cut hair thereon to the length determined by the position of said blade along said teeth, said arch legs serving to hold said cutting edge a fixed distance from and in a selected position relative to said surface.

4,030,194
NESTED HUNTING KNIFE

Lorenzo R. Hendricks, 9919 E. Apache Trail, Mesa, Ariz. 85207

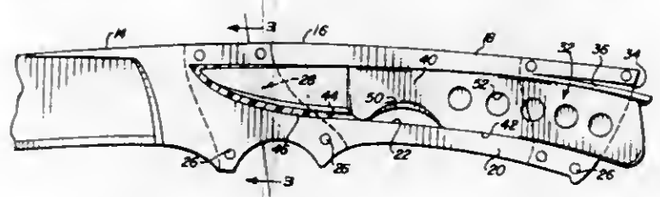
Filed Sept. 9, 1976, Ser. No. 721,666
Int. Cl.² B26B *1/08*
U.S. Cl. 30—143 **13 Claims**

1. Hunting knife apparatus, comprising:

a larger knife having blade and handle portions, said handle portion having a groove extending longitudinally therealong open at the end of said handle portion remote from said blade portion;

a smaller knife having blade and handle portions separate from those of said larger knife, said smaller knife configured and arranged relative to said handle portion of the larger knife to be inserted into said groove through said remote end of said handle portion of the larger knife and to be substantially completely received within said groove;

guide means on said handle portion of the larger knife



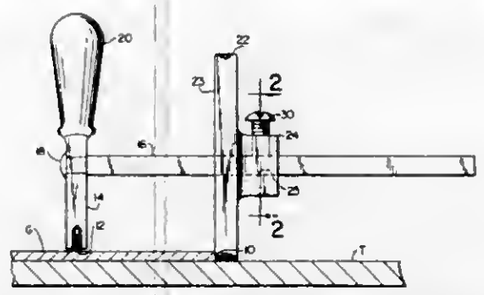
configured and arranged to guide said smaller knife longitudinally along said groove; and

detent means carried by one of said larger and smaller knives and engageable with the other of said larger and smaller knives to retain said smaller knife within said groove, said detent means being disengageable to allow complete withdrawal of said smaller knife from said groove, said groove being open along a sufficient length of said handle portion of the larger knife to allow easy grasping of said smaller knife while within said groove to facilitate insertion and removal of the smaller knife.

4,030,195
SCORING DEVICE WITH EDGE GUIDE

Thomas A. Insolio, Bristol, Conn., assignor to The Fletcher-Terry Company, Farmington, Conn.

Filed Sept. 29, 1976, Ser. No. 727,765
Int. Cl.² B26B *3/08*; **B26D** *3/08*
U.S. Cl. 30—164.9 **6 Claims**

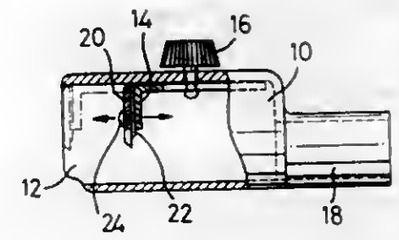


1. A device for manually scoring fracture sensitive sheet adjacent to one edge of the sheet and for guiding a scoring tool to keep it parallel the sheet edge, said device comprising a cam plate of irregular polygon shape having a plurality of guide edges selectively engageable with a flat work table upon which the sheet to be scored is supported, a rod slidably mounted in an axially extending opening, said cam plate, having a cross sectonal shape which is that of a regular polygon, said polygon shaped cam plate being similar to said rod cross section in that both have the same number of side edges, said rod adapted to be received in alternative orientations in said cam plate opening, and a scoring tool affixed to one end of said rod and projecting radially outwardly therefrom to engage the surface of the sheet to be scored.

4,030,196
HAIR CUTTER

Seki Koiwa, No. 2-4-13, Nakamura, Nerima, Tokyo, and Hajime Hasegawa, No. 3-21-13, Miyasaka, Setagaya, Tokyo, both of Japan

Filed Jan. 27, 1976, Ser. No. 652,791
Claims priority, application Japan, Jan. 29, 1975, 50-11373
Int. Cl.² B26B *19/20, 19/44*
U.S. Cl. 30—133 **3 Claims**

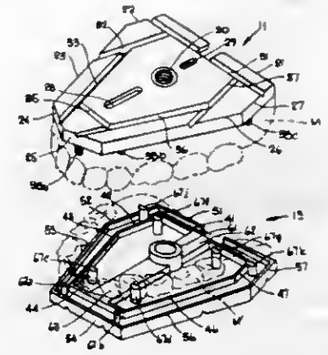


1. A hair cutting device which comprises a casing open at one side for suction of the hair ends and communicating at another location spaced from said open side with a delivery passage connectible to suction means, a guide comb extending transversely to the sides of said casing which border said open side, a fixed cutting blade secured to the side of said comb which is opposite said open side, an L-shaped member having one leg secured against the side of said blade opposite said comb and another leg is slidable engagement with one of said casing sides, and means for selectively clamping said another leg against said one casing side.

4,030,197
BASE PLATES FOR DENTAL ARTICULATORS

Donald W. Linck, II, Pleasant Hill, and George Kaprelian, Sunnyvale, both of Calif., assignors to Donald W. Linck, II, Pleasant Hill; George Kaprelian, Sunnyvale; Tom Basta, Cupertino; Maury Corbett, San Jose; William Danzig, Walnut Creek; Gary Hunt, San Mateo; Arthur Ingram, Fremont; Charles McNelll, Walnut Creek; Gerald Preiner, Burlingame and Ronald Roth, San Mateo, all of, Calif.

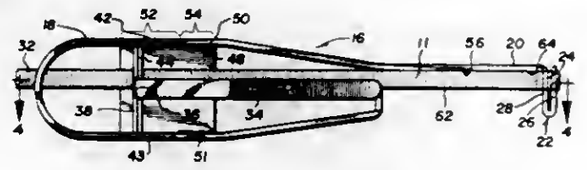
Filed May 14, 1976, Ser. No. 686,541
Int. Cl.² A61C *11/00*
U.S. Cl. 32—32 **10 Claims**



1. A breakway base plate for mounting dental models in articulators comprising,

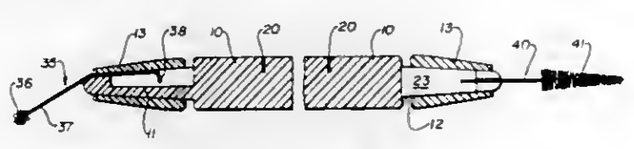
a base plate of a first size having an outer periphery, a central region having means for mounting said central region to an articulator, and a groove in said base plate between said central region and said outer periphery, said groove forming a closed curve defining a base plate of a second size, smaller than said first size, and having a groove profile for promoting material fracture along said groove, upon mechanical stressing, in preference to material fracture in base plate regions other than where said groove is disposed.

4,030,198
TOOTH ENAMEL-STRIPPING APPARATUS
Warren E. Gerber, LaJolla, Calif., assignor to Evalyn Gerber, LaJolla, Calif.
Filed Sept. 30, 1974, Ser. No. 510,320
Int. Cl.² A61C 3/06
U.S. Cl. 32—58 2 Claims



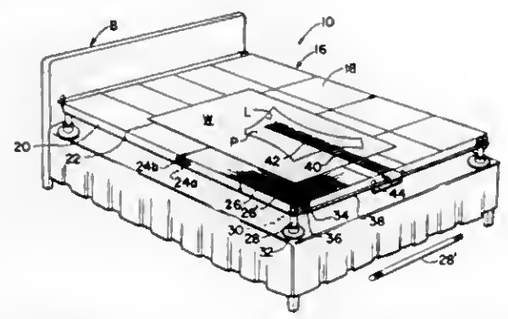
1. an orthodontic apparatus, for use with an abrasive band having a first end and a second end, to strip enamel from a tooth have a crown, said apparatus comprising:
a frame including a guiding portion;
means on said guiding portion for releasably securing said first end of said abrasive band;
lever means including a base portion;
biasing means on said frame spaced from said guiding portion for engagement with said lever means; and,
means mounting said lever means adjacent said biasing means for movement of said lever means between:
a. a first position wherein said base portion is not in contact with said biasing means to permit said second band end to be inserted between said base portion and said biasing means;
b. a second position wherein said base portion is in contact with said second band end and said biasing means for tensioning said abrasive band; and,
c. a third position wherein said base portion is in contact with said second band end and said biasing means for locking said abrasive band.

4,030,199
HANDLE FOR DISPOSABLE APPLIANCE
John R. Russell, San Diego, Calif., assigoor to E-Z Floss, Palm Springs, Calif.
Filed May 12, 1975, Ser. No. 576,621
Int. Cl.² A61C 17/00
U.S. Cl. 32—40 R 5 Claims



1. A device for holding a removable, stem-mounted appliance comprising:
a. an elongated handle shaped to be grasped by the fingers,
b. a holding means protruding from an end of said handle, said holding means including at least one groove adapted to embrace said stem and to hold it against axial movement, and a slot between said groove and said handle, said slot opening into said groove and being slightly larger in width than in the diameter of said stem and being adapted to receive the bent end of said stem, and
c. a removable sleeve having internal contours to form a friction fit with said holding element to surround said holding element, and, when in place on said holding element, cooperating with said holding element to form a channel including said groove, and an open end through said appliance may protrude.

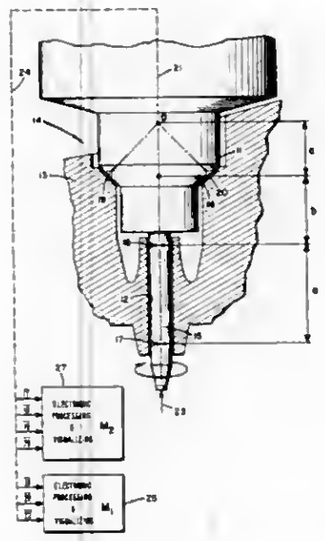
4,030,200
PORTABLE SEWING ALIGNING TABLE SYSTEM
Jane S. Francis, 3900 Allendale Court, Monkton, Md. 21111
Filed Nov. 21, 1975, Ser. No. 634,267
Int. Cl.² B43L 5/00
U.S. Cl. 33—76 R 1 Claim



1. A system for use in laying out, sewing and storing cloth and the like, comprising: a table having a top, said table top having first and second ends and downward frame strueture thereon, hinge means adjacent said frame structure for folding the table into storage-case configuration, the table top having a grid marking over the upper surface thereof with a plurality of holes through the table top in regular pattern at respective intersections of the grid marking, a straightedge, means including a rod for securing the straightedge detachably and slidably and pivotally at either end of the table in alignment with the grid markings such that the straight-edge can slide along said rod and the table top and can pivot about said rod to a position where the straight edge is not on said table top, means for holding the rod at each end of the table comprising a respective pair of flat-spring U-shaped clips fixed in spaced relation on said first and second ends with one leg of the U attached to said ends and the other leg of the U having a respective hole sized to fit said rod, the respective spring clips of each pair oppositely self-biasing flat at the table for storage and resiliently cramping the rod when the rod is inserted in said holes for holding, said means for securing including a shepherd's crook hook on the straight edge for quick engagement and disengagement with the rod, said straightedge having a plurality of transverse markings located for coincidence with the grid and holes through the table top when the rod is holding the straightedge.

4,030,201
METHOD AND RELEVANT APPARATUS FOR DETECTING THE GEOMETRICAL FEATURES OF MECHANICAL WORKPIECES, IN PARTICULAR FOR MEASURING THE ECCENTRICITY AND OUT-OF-ROUNDNESS
Mario Possati, and Franco Danielli, both of Bologna, Italy, assignors to Finike Italiana Marposs-Soc. In Accomandita Semplice di Mario Possati & C., Bentivoglio, Italy
Continuation of Ser. No. 462,426, April 19, 1974, abandoned.
This application Sept. 2, 1975, Ser. No. 609,739
Claims priority, application Italy, Apr. 19, 1973, 3383/73
Int. Cl.² G01B 5/25, 7/31
U.S. Cl. 33—174 Q 9 Claims

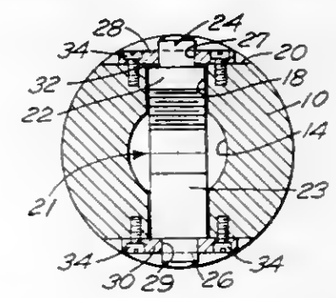
1. A method for determining the cross-section out-of-roundness of a revolution surface of a workpiece and the eccentricity of the revolution surface relatively to a right circular cylindrical surface of the workpieee by using a measuring means adapted to carry out measurements of linear dimensions and to provide eleetric signals depending on said dimensions, comprising:
defining a measurement reference axis, substantially parallel to the axis of the cylindrical surface; defining a measurement reference point on said reference axis;
carrying out first and second measurements of linear dimensions on a first point of a first cross-section and, respectively, a second point of a second cross-section of the right circular cylindrical surface, the first and second cross-sections being perpendicular to the reference axis and located at a known distance from each other, said step of carrying out first and second measurements including obtaining first and second electric signals depending on linear dimensions in directions perpendicular to said measurement reference axis, said directions coinciding substantially with diametral directions of said cross-sections, and third and fourth measurements of linear dimensions on opposed points of a cross-section of the revolution surface, this cross-section being perpendicular to said reference axis and located at known distances from said cross-sections of the right circular cylindrical surface, said third and fourth measurements including obtaining third and fourth electric signals responsive to the distance of said opposed points from said measurement reference point, said first and second points being coplanar with said opposed points;



repeating said first, second, third and fourth measurements along the whole perimeters of said cross-sections; processing said third and fourth signals to supply an indication of said out-of-roundness, said processing step including continuously electrically combining the third and fourth signals to obtain a combined signal responsive to the diameter of said cross-section of the revolution surface and evaluating the difference between the maximum and minimum values of said combined signals; and
processing said first, second, third and fourth signals to supply an indication of said eccentricity, this processing step including continuously obtaining a linear combination signal of said first, second, third and fourth signals and evaluating the difference between the maximum and minimum values of said combination signal to express the eccentricity as the distance between the center of one of said cross-sections of the revolution surface and cylindrical surface and a reference line defined by the other two cross-sections.

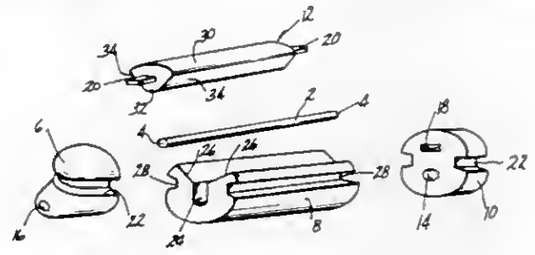
4,030,202
BORE GAGE
Mohamed F. A. Fadl, West Warwick, and Joseph S. Olasz, North Kingstown, both of R.I., assignors to Federal Products Corporation, Providence, R.I.
Continuation-in-part of Ser. No. 486,608, July 8, 1974, abandoned. This application Dec. 12, 1975, Ser. No. 640,271
Int. Cl.² G01B 7/12
U.S. Cl. 33—178 E 2 Claims

1. A bore gage comprising an elongated cylindrical housing, a substantially cylindrical electrical transducer within said housing having a pair of opposed measuring probes, each having a circular cross section, said transducer having a body of a diameter greater than the diameter of the measuring probes, said measuring probes extending in axial alignment outwardly of said housing on a diameter thereof, said housing including chordal surfaces, each chordal surface having an opening, bearing plate members on said chordal surfaces of



the housing, said probes extending through the bearing members, said bearing members locating the probes on a diameter of the housing and dimensioned to serve as an abutment for the end walls of the transducer body, the maximum length of the body being less than the distance between the plate members whereby the transducer is free to move restrained only by said bearing members, said body being sealed to prevent entry of foreign material.

4,030,203
REFLEX SIGHT RETICLE ILLUMINATOR
William R. Ackerman, Jr., El Paso, Tex., assignor to Olin Corporation, New Haven, Conn.
Filed Oct. 4, 1974, Ser. No. 512,832
Int. Cl.² F41G 1/32; F21K 2/00
U.S. Cl. 33—241 3 Claims



1. A reticle illuminator for use with a sighting device, said illuminator comprising:
a. a housing comprising forward and rearward end caps and a middle portion intermediate said end caps, said end caps including first cylindrical recesses with the cylindrical recess in said forward end cap opening into a through bore which forms a reticle for the sighting device, said middle portion having a substantially U-shaped cross section with an internal trough and upwardly extending side walls terminating in upwardly and outwardly extending surfaces, said end caps and said middle portion having aligned external grooves extending to form a continuous groove around an external side surface of said housing;
b. a fluorescent rod mounted in said housing, said rod having its opposite end portions contained in said cylindrical recesses in said end caps; and
c. a transparent cover member secured to said end caps and overlying said rod, said cover member having upwardly and outwardly extending side walls overlying said upwardly and outwardly extending surfaces on said side walls of said middle portion.

3. A sighting device.comprising a sight housing having an opening formed in a side wall thereof, a reticle illuminator housing mounted in said opening, said illuminator housing

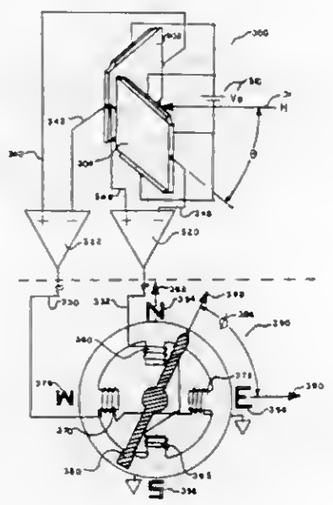
having an external groove formed in a side wall thereof, side walls of said sight housing opening being disposed in said groove to retain said illuminator housing in place on said sight housing, said illuminator housing includes end caps, a middle portion, and a top cover, said end caps being provided with recesses and said top cover being provided with projections disposed in said recesses and thereby secured to said end caps, said top cover, said end caps and said middle portion being provided with cooperating means operable to bias side walls of said middle portion of said illuminator housing outwardly to produce a tightly sealed joint between said illuminator housing groove and said side walls of said sight housing opening.

4,030,204

REMOTE INDICATING SOLID STATE MAGNETIC SENSOR

Robert A. Edwards, 12 Notch Park Road, Little Falls, N.J. 07424

Filed Mar. 18, 1974, Ser. No. 452,430
Int. Cl.² G01C *17/30*
U.S. Cl. 33—361 **1 Claim**



1. A low-inertia remote-indicating magnetic compass utilizing a solid-state magnetic sensor and providing a continuous 360° read-out meter movement for use in automobiles or the like and comprising:

a magnetic sensor consisting of a pair of Hall generators mounted to a vehicle in vertical planes, at right angles to one another, with one of two corresponding pairs of each generator's parallel edges connected across a source of d-c voltage, and with the remaining two parallel pairs of edges connected to the inputs of linear amplifiers to amplify Hall voltages, proportional to sine and cosine components of the earth's magnetic field, and with adjustable compensation magnets in the vicinity of said generators to cancel spurious magnetic fields of said automobile.

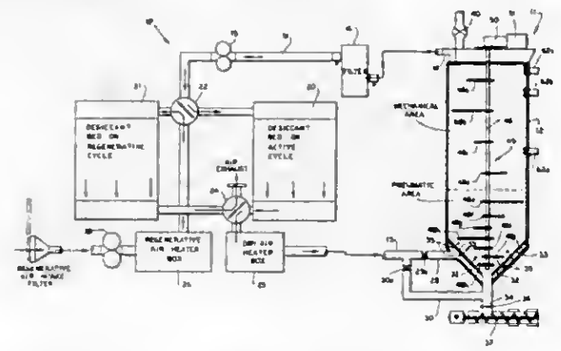
an indicator consisting of a stator with quadrature windings connected to outputs of said linear amplifiers, a magnetized rotor-pointer which pivots about the stator's principal axis in response to currents in stator windings, and a circular compass scale, centered with respect to the rotor's pivot axis. Rotor position ranging through 360° and determined by relative magnitudes of quadrature winding currents, pointer-position relative to map scale indicative of vehicle heading.

4,030,205

DRYING SYSTEM FOR PARTICLES

Joseph D. Robertson, 980 Swathmore Drive, NW., Atlanta, Ga. 30327, and Dean L. Ward, 414 James St., Lilburn, Ga. 30247

Filed Dec. 29, 1975, Ser. No. 644,902
Int. Cl.² F26B *7/00*
U.S. Cl. 34—12 **10 Claims**



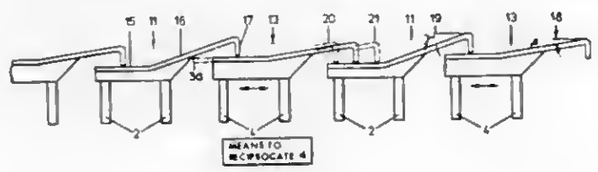
1. A process of treating plastic particles having a critical temperature range in which the particles tend to cling together, comprising feeding the particles at a temperature below the critical temperature to the upper portion of a container, moving the particles downwardly through the container and dispensing the particles from a lower portion of the container, heating a stream of air to a temperature above the critical temperature range of the particles, moving the stream of heated air into the lower portion of the container and upwardly through the particles in the container and out of the upper portion of the container for heating the particles in the lower portion of the container to a temperature level above the critical temperature range of the particles and for heating the particles in an intermediate portion of the container through the critical temperature range of the particles and for heating the particles in the upper portion of the container up to the critical temperature range of the particles, and continuously agitating the particles in the intermediate portion of the container as the particles are heated from a temperature below the critical temperature range of the particles until the particles have been heated to a temperature above the critical temperature range of the particles.

4,030,206

THRUST GRATE SUCH AS A HEAT EXCHANGE GRATE

Herbert Bode, Wohltorf, Germany, assignor to Claudius Peters AG, Hamburg, Germany

Filed June 2, 1975, Ser. No. 582,695
Claims priority, application Germany, June 7, 1974, 2427684
Int. Cl.² F26B *9/00*
U.S. Cl. 34—164 **10 Claims**



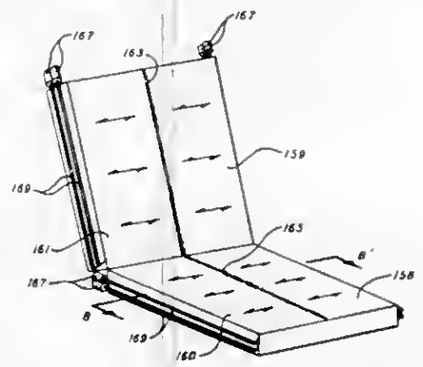
1. A thrust grate, particularly a cooling or a fire grate, comprising, a horizontally disposed sequence of overlapping grate plates which are alternatingly fixed and movable forward and backward, each said plates having a rear portion extending parallel to the direction of movement of the said movable grate plates, an at least partially upward slanting front portion on each of said grate plates terminating in a downwardly inclined front end thrust nose, means to move the said movable grate plates essentially in a horizontal direction. The angle of the front portion of the said fixed grate plate being greater than the angle of slope of the front portion of the said movable grate plate whereby the displacement of materials on the said thrust grate will be smaller on the backward movement of said movable grate plate than at the forward movement thereof.

4,030,207

G-SEAT WITH SKIN TENSION CUE GENERATOR

Gerald J. Kroo, Binghamton, N.Y., assignor to The Singer Company, Binghamton, N.Y.

Filed Dec. 2, 1975, Ser. No. 636,895
Int. Cl.² G09B *9/08*
U.S. Cl. 35—12 E **29 Claims**



1. A method of simulating the motion of a vehicle, comprising:

locating a subject on a body-supporting surface of a seat cushion, said seat cushion having a driveable component;

driving said seat cushion component to produce skin tension variations in a selected portion of the subject's skin proximate said surface, similar to the variations experienced in said skin portion during actual operation of the vehicle being simulated, said component being driven according to a predetermined schedule correlating component movement with compatible skin tension variations in said selected skin portion and developing said predetermined schedule from simulated motion profiles to directly generate the compatible skin tension variations.

29. Apparatus for simulating vehicular motion comprising:

a dynamic for providing simultaneously, independently variable haptic sensory system cues, said cues including the skeletal attitude, extent of seat contact, flesh pressure gradient and flesh surface tension of an occupant; and

means for controlling the operation of said seat so that it provides compatible haptic sensory system cues to said occupant.

4,030,208

SEAT VIBRATION SYSTEM FOR SIMULATING AIRCRAFT BUFFETING

Fred F. Carver, R.D. 1, Box A317, Chenango Forks, N.Y. 13746, and Carl E. Hoyt, 8081 Hillandale Drive, San Diego, Calif. 92120, assignors to The Singer Company, Binghamton, N.Y.

Filed Jan. 15, 1976, Ser. No. 649,447
Int. Cl.² G09B *9/08*
U.S. Cl. 35—12 F **8 Claims**

1. Apparatus for simulating, in the cockpit of a flight trainer, the buffeting experienced in an operational aircraft, comprising:

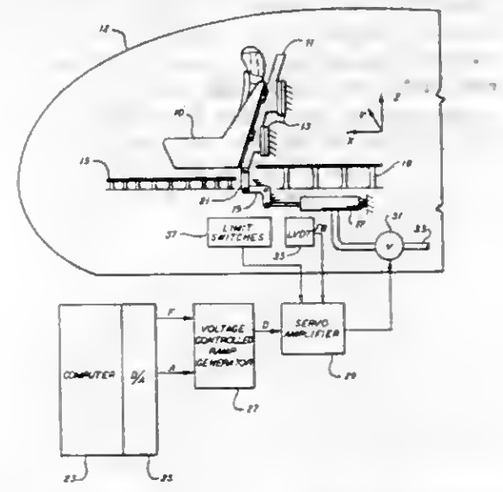
an ejection rail located within the cockpit of said flight trainer;

a seat mounted on said ejection rail;

means fixed relative to said cockpit for supporting said ejection rail from the rear;

at least one linear bearing oriented along the trainer's z-axis and connecting said ejection rail to said rear supporting means;

means for jointly vibrating said seat and ejection rail relative to said cockpit along said linear bearing, said vibrating means comprising an hydraulic actuator having a bi-directionally movable ram and means linking said ram to the bottom end of said ejection rail so that ram movement is translated into z-axis seat movement, said vibrating means being located within said cockpit, said hydraulic actuator being disposed perpendicular to said z-axis, and



said linking means comprising a rotatable bell crank and a link; and

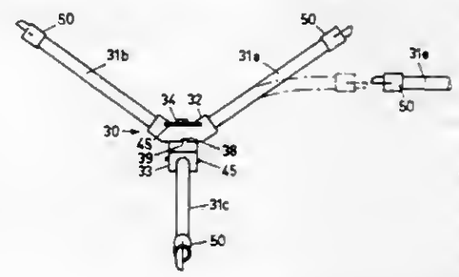
means for controlling the frequency and amplitude of said vibration in such a way as to provide an occupant of said seat with vibration sensations similar to those experienced in the operational aircraft during buffeting.

4,030,209

MOLECULAR MODELS

André Dreiding, Langackerstrasse 43, Herrliberg, Switzerland

Filed Mar. 3, 1975, Ser. No. 555,044
Claims priority, application Switzerland, Mar. 7, 1974, 3201/74
Int. Cl.² G09B *23/26*
U.S. Cl. 35—18 A **29 Claims**



1. A structural element for forming stereochemical models of molecular bonds between mutivalent atoms, said structural element comprising:

at least two connector arms representing the valences of at least one atom, at least two of said connector arms having each a free end portion provided with manually operable means for pairwise coaxial coupling and uncoupling of the arm to or from another connector arm of the same or of another said element;

articulation means for pivotally connecting together at least two of the connector arms in such a manner as to permit variation of the angular relationship of at least one of the connector arms with respect to at least one other of the arms; biasing means associated with the articulation means for producing a discontinuous manually surmountable resistance against pivotal movement and therewith for providing at least two discrete and stable rest positions with predetermined angular relationships between the connector arms, depending on the natural behavior of the

matter represented by structural element, thus avoiding unintended yet permitting intended movement from any selected rest position.

4,030,210

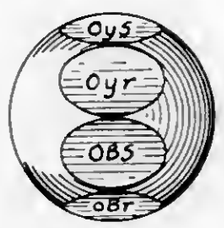
METHOD OF AND MEANS FOR DEMONSTRATING EVOLUTION INCLUDING CHANCE DETERMINATIONS

Robert C. Stebbins, 601 Plateau Drive, Kensington, Calif. 94708; Brockenbrough S. Allen, 1320 Juanita Drive, Walnut Creek, Calif. 94595, and Charles W. Brown, Santa Rosa Junior College, Santa Rosa, Calif. 95402

Division of Ser. No. 202,496, Nov. 26, 1971. This application Feb. 25, 1974, Ser. No. 445,593

Int. Cl.² G09B *23/36*

U.S. Cl. 35—20 5 Claims



1. A method of demonstrating the results of the organic evolutionary process known as natural selection comprising the following steps:

a. providing a background panel of predetermined color and design for simulating a life-sustaining environment;

b. providing a plurality of chips of different colors, each of said colors simulating a different species of life existing in said environment;

c. selecting a predetermined number of chips from said plurality thereof;

d. distributing said predetermined number of said chips onto the surface of said background panel so that, because of their color, some of said chips blend more readily into said background panel than other ones of said chips;

e. removing individual chips as they are readily detected by visual recognition due to their failure to readily blend into said background panel until a predetermined percentage of said predetermined number of chips has been removed; and

f. thereafter redistributing onto the surface of said background panel a predetermined additional number of said chips having a color corresponding to the color of said chips remaining on said panel; said additional number of said chips simulating the offspring of said species simulated by said chips remaining on said panel, and being selected as to appearance characteristics by chance determinations.

4,030,211

INSTRUCTIONAL SYSTEM FOR TEACHING AND TESTING WORD PRONUNCIATION AND SPELLING

Edward J. McGinley, 76 Old Hollow Road, Short Hills, N.J. 07078

Filed Feb. 10, 1976, Ser. No. 656,853

Int. Cl.² G09B *17/00*

U.S. Cl. 35—35 H 16 Claims

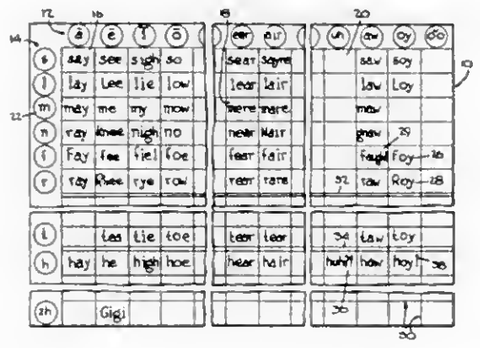
1. An instructional chart for teaching word pronunciation comprising:

a. a carrier;

b. first indicia disposed upon said carrier, said indicia including the character representation for a plurality of pronunciation symbols for vowels; a character representation heading an imaginary column or row emanating therefrom;

c. second indicia disposed upon said carrier, said indicia including the character representation of a plurality of pronunciation symbols for consonants; a character representation heading an imaginary row or column emanating therefrom; and

d. third indicia disposed upon said carrier at the juncture of at least one imaginary column and row; said third indicia comprising the letter representation of at least one entry



including a word which is sounded by the combination of the vowel sound represented by the respective character representation of said first indicia and the consonant sound represented by the respective character representation of said second indicia, whereby the user of said chart is guided in his understanding of the pronunciation of said entry.

4,030,212

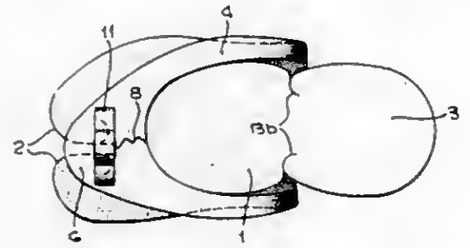
ONE-PIECE SANDAL MADE FROM A FLAT SHEET

Kakutaro Ito, Kobe, Japan, assignor to Kakutaro Ito and Yuzoh Katoh, both of Kobe, Japan

Filed Aug. 26, 1976, Ser. No. 717,571

Int. Cl.² A43B *3/12*; A43D *9/00*

U.S. Cl. 36—11.5 14 Claims



1. A one-piece sandal made from a flat sheet of relatively soft, resilient material, characterized in that:

said sheet forms a sole member of such size and shape as to extend underneath both the heel and toes of a wearer's foot, said sheet also having two further extending portions which are partially cut away from said sole member such that one end of each said portion remains integral with said sole member while the other end thereof is movable relative to said sole member;

said two further extending sheet portions being adapted to form strap means extending above said sole member just rearwardly of the toe portion thereof;

said movable ends of said two sheet portions also being of such configuration as to cooperatively form latch means for releasably securing the same together.

13. The method of manufacturing a sandal from a single flat sheet of relatively soft, resilient material, comprising the steps of:

cutting the sheet to about the configuration of the under side of the wearer's foot, but with some longitudinally forward and longitudinally rearward extension thereof;

cutting the forward extension partially away from the remainder of the sheet so that it has an enlarged forward extremity which can be bent upwardly relative to the sheet; and

cutting the sheet along the lateral sides and around the rearward edge of the heel portion thereof to provide a loop of material, and also cutting a notch in the lateral center of said loop;

so that said stem and said loop may then be bent towards each other and releasably latched together for forming a strap means for the sandal.

4,030,213

SPORTING SHOE

Alexander C. Daswick, 647 Orange Grove, South Pasadena, Calif. 91030

Filed Sept. 30, 1976, Ser. No. 728,211

Int. Cl.² A43B *13/12*, *5/00*

U.S. Cl. 36—30 R 3 Claims

1. A sporting shoe comprising:

an upper housing;

a relatively rigid sole disposed beneath and secured to said housing, the bottom surface of said sole being convexly arcuately curved in a longitudinal direction so that its longitudinal center portion provides a pedestal, whereby when a runner wearing the shoe lands upon a running surface with the heel portion of said sole the runner's foot and the shoe will then roll forward in a pivotal movement about said pedestal;

a first resilient auxiliary sole member secured to the heel portion of said rigid sole; and

a second resilient auxiliary sole member secured to the toe portion of said rigid sole.

4,030,214

ADJUSTABLE FLEXURE MEANS FOR SKI BOOT

Alden B. Hanson; Chris A. Hanson, and Donald W. Bertetto, all of Boulder, Colo., assignors to Hanson Industries Inc., Boulder, Colo.

Filed Mar. 21, 1975, Ser. No. 560,994

Int. Cl.² A43B *21/00*, *5/04*

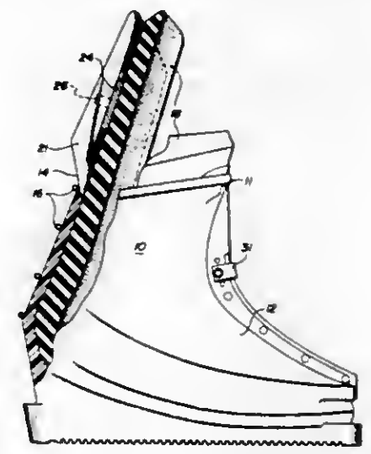
U.S. Cl. 36—105 6 Claims

1. A ski boot with means for adjusting the flex in the boot, said boot comprising a semi-rigid shell having a closure system for closing said shell about the foot of a wearer, said shell having a split portion commencing at the top of said boot and extending toward the bottom thereof, said split portion being defined in part by a pair of opposed generally parallel edges;

said shell being provided with a plurality of opposed apertures adjacent the edges of said split; and

clip means for interconnecting the edges of said split portion at a desired point along the length thereof corresponding to the location of an opposed pair of said apertures;

said clip means comprising a base member and spaced generally parallel leg members extending outwardly from said base member, each leg member being adapted to be received in one of said apertures, said clip being positioned with said base member within said shell and said leg members projecting outwardly through said apertures;



whereby upon exertion of pressure on said boot, the shell is adapted to separate along the length of said split portion from the top of the boot to the location where said clip means connects the edges of said split portion.

4,030,215

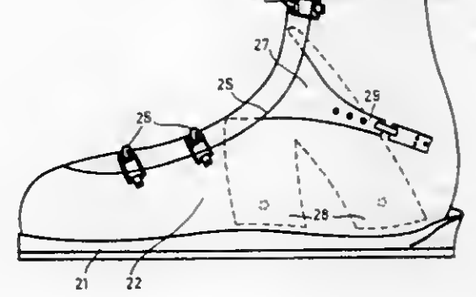
SPORTS SHOES MADE OF PLASTIC

Raimund W. Vogel, Lier St. 25, Munich 19 D8, Germany

Continuation of Ser. No. 189,846, Oct. 19, 1971, abandoned. This application Feb. 11, 1974, Ser. No. 457,632

Int. Cl.² A43B *5/04*

U.S. Cl. 36—119 5 Claims



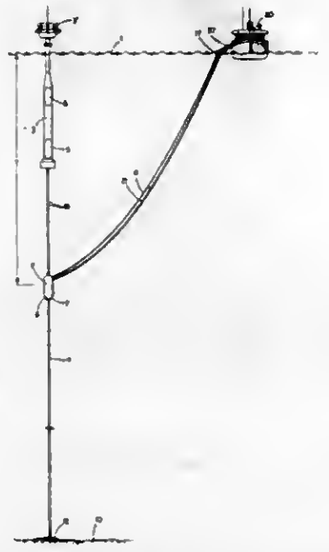
1. A plastic ski boot comprising a boot sole, a boot upper connected with said sole, said upper being stiff at least in the region of said sole and its sides and laterally above the ankle bone region of said upper, characterised in that the stiff lateral sides form recesses above the heel at the rearmost part of said upper and the instep region, and in that said upper includes a closing border of elastically deformable material having at least two appendages one of which extends from and closes said recess above the heel bone region of said upper and the second of which extends and closes said recess above the instep region of said upper, said closing border and its appendages being more elastically deformable than the remaining portion of said upper and decreasing in elasticity from the uppermost portion of said closing border in the direction of said sole of said boot, whereby said elastically deformable closing border is fixedly connected at the edge of said stiff upper, whereby every change of position between the foot and the lower leg of the skier required in skiing is possible without said elastically deformable closing border of said upper of said boot losing its snow-tight fit in respect to the leg of the skier positioned in said boot.

4,030,216

METHOD OF AND APPARATUS FOR UNDERWATER HYDRAULIC CONVEYING, AS FOR OCEAN MINING AND THE LIKE, AND CONTINUED TRANSPORT OF MATERIAL IN CONTROLLED FLOATING CONTAINERS

Jan-Olaf Williams, Sandvika, Norway, assignor to Nor-Am Resources Technology Inc., Boston, Mass.

Filed Oct. 28, 1975, Ser. No. 626,492
Int. Cl.² E02F *3/88*
U.S. Cl. 37—58 **17 Claims**



1. A method of hydraulically lifting and conveying materials carried by fluids from underwater depths, that comprises, suspending a partially gas-filled pumping chamber by cable means from a stable surface platform and submerging said chamber in said fluid spaced from the bottom thereof; maintaining the pumping chamber at a pressure equal to the atmospheric pressure at the surface region of said fluid; communicating the lower end of the submerged chamber through a fluid-receiving-and-conveying conduit of smaller cross-section than the chamber to greater depths, including depths many times the depth of submergence of the chamber, from which materials are to be hydraulically lifted with the fluid along the conduit and into the chamber; adjusting the fluid level of the submerged chamber to a depth such that the pressure difference between the inside of the chamber and the surrounding fluid is sufficient to lift the fluid and materials through the conduit; separating the materials from the fluid; exhausting the fluid outside the chamber; and conveying the separated materials to a surface region of said fluid remote from said platform.

4,030,217

TWO WHEEL EXCAVATING AND LOADING SYSTEM

Charles R. Satterwhite, Dallas, Tex., assignor to Unit Rig & Equipment Co., Tulsa, Okla.

Continuation of Ser. No. 596,677, July 17, 1975, Pat. No. 3,982,340, which is a continuation-in-part of Ser. No. 435,296, Jan. 21, 1974, Pat. No. 3,896,571. This application Sept. 2, 1976, Ser. No. 720,061
Int. Cl.² E02F *3/24*
U.S. Cl. 37—190 **6 Claims**

1. An excavating and loading system comprising: an excavating wheel assembly comprising axle means and at least two rigid excavating wheels rotatably mounted cantilever on and supported on the axle means, said excavating wheel assembly having a width at least equal to the widest portion of the remainder of the system;

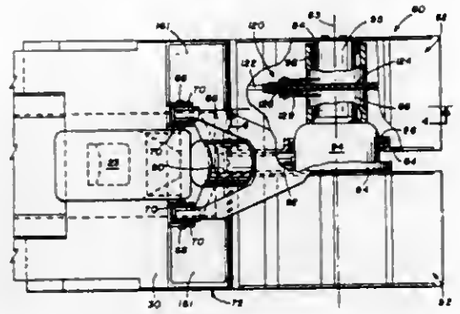
each of said excavating wheels including a plurality of digging buckets located immediately adjacent one another to define the entire circumference of the excavating wheel, each bucket having a cutting edge which extends to a stationary wall, and a wall mounted for pivotal movement from a material receiving position to a material dumping position;

supporting and housing means extending between the excavating wheels and connected to the axle means for supporting the excavating wheel assembly;

each of said digging buckets extending continuously between a side wall thereof located immediately adjacent to the supporting means and a side wall thereof defining one end of the excavating wheel assembly;

drive means including at least one motor means and speed reducer means drivingly connecting the motor means to the excavating wheel assembly for rotating the excavating wheels so that the digging buckets follow a circular path;

means located within the margins of the excavating wheel assembly and responsive to rotation of the excavating wheels for positively positioning the movable wall of each digging bucket of the excavating wheels in the material



dumping position when the bucket is in the upper and rearward portion of the path;

a vehicle for supporting and manipulating the excavating wheel supporting means and thereby positioning the excavating wheel assembly in engagement with material to be excavated;

an engine mounted on the vehicle;

means mounted on the vehicle and driven by the engine for supplying operating power to the motor means; and

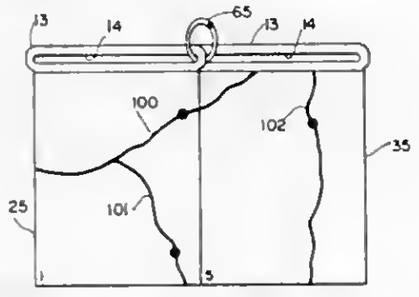
conveyor means mounted on the vehicle entirely behind the excavating wheel assembly for movement around a course including a relatively low portion positioned to receive material from the digging buckets of the excavating wheels upon the positioning of the movable walls of the buckets in the material dumping position and a relatively high material delivery portion located rearwardly on the vehicle for the low portion.

4,030,218

SEGMENTED MAP AND HOLDER

Guy N. Stockwell, Springfield, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sept. 7, 1976, Ser. No. 720,713
Int. Cl.² G09B *29/02*
U.S. Cl. 40—102 **9 Claims**



1. A segmented map comprising:

a plurality of map segments derived from a map divided into rows and columns, the map segments together constituting the thus divided map,

plural sheets each comprising on the face thereof one said map segment and on the back thereof a second said map segment which is adjacent to the first map segment in said map,

a flap extending along the edge of each said sheet said flap being longer than the said edge of the sheet, and having a slot therein said slot of each said flap being longer than the said edge of the sheet, and

holding means extending through said slots to hold said sheets in assembled relationship,

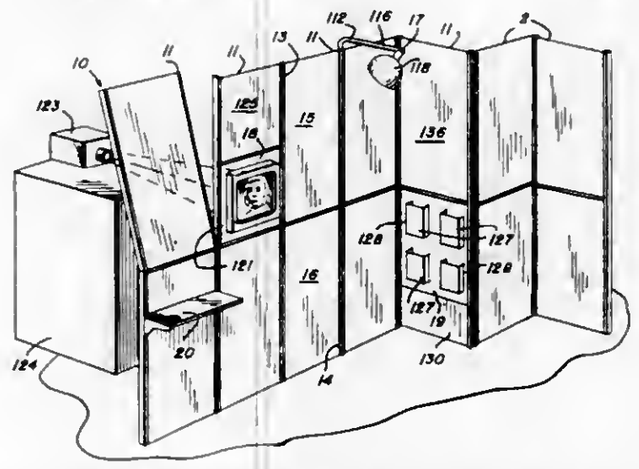
whereby a back and front of two sheets, and the backs and fronts of two sheets may be placed adjacent to each other for viewing two map segments simultaneously.

4,030,219

PORTABLE DISPLAY APPARATUS

John E. Donovan, Skokie, Ill., assignor to Package Exhibit Programs, Inc., Niles, Ill.

Filed June 1, 1976, Ser. No. 688,821
Int. Cl.² G09F *13/00*
U.S. Cl. 40—130 R **1 Claim**



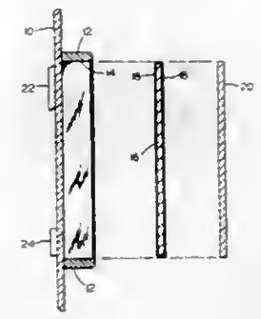
1. A display apparatus for use in exhibitions and shows, comprising; a plurality of releasably connected display frames, each display frame of said plurality having an upper rectangular portion and a lower rectangular portion hingedly connected to the upper rectangular portions, each of said upper rectangular portions and said lower rectangular portions including a pair of parallel uprights connected to each other, each of said uprights being an extruded anodized aluminum section having a support portion, a connector portion formed integral with said support portion, and a track portion formed integral with said support portion and said connector portion, each support portion being adapted to receive a fastener extending through the support portion substantially parallel to the track portion for connecting adjacent uprights in a substantially parallel attitude, each support portion and connector portion being adapted for receiving a fastener extending through the support portion and the connector portion substantially perpendicular to the track portion and being spaced away from the track portion for connecting adjacent uprights in a substantially perpendicular attitude, a display panel slideably mounted in each of the frames between parallel uprights in the respective track portions of said uprights, a panel stop positioned between the display panels mounted on each frame to prevent an upper display panel from sliding into contact with a lower display panel; a literature pouch slideably connected to said track portions of said uprights, said literature pouch including a plurality of pockets adapted to hold literature to be distributed, a shelf adapted to be connected to a pair of side connectors of one of said frames; and a projection screen connected to one of said display frames at a height slightly above the height of a carrying container for said portable display apparatus, said projection screen being a rear projection screen and being adapted to display projected films.

4,030,220

FRAME FOR TEXTILES, NEEDLEWORK AND THE LIKE

Deborah L. Kotchen, 108 Gilbert Ave., Rocky Hill, Conn. 06067

Filed Dec. 29, 1975, Ser. No. 644,434
Int. Cl.² G09F *1/12*
U.S. Cl. 40—156 **5 Claims**



1. A frame for material to be mounted such as needlepoint and the like comprising:

a. a substantially planar base member of rigid sheet material;

b. a continuous sidewall extending forwardly from and generally perpendicularly to one surface of said base member, said sidewall having inner surfaces circumscribing at least a portion of said base member surface and defining a frame enclosure, said sidewall and the portion of said base member circumscribed thereby defining a seating recess; said side wall is spaced inwardly from the peripheral edge of said base member;

c. a mounting member of relatively rigid generally planar sheet material having a peripheral edge and an inwardly facing surface, said member having substantially the same peripheral configuration as the inner surface of said sidewall and seated therewithin, said mounting member being adapted to provide a functional mounting for flexible material of greater dimension whereby the material to be mounted includes portions to be folded about the peripheral edge of said mounting member against the inwardly facing surface thereof, said mounting member having a dimension slightly smaller than the dimensions of said recess and sufficiently large so that the combined dimensions of said mounting member and the material portions folded about the peripheral edge of said mounting member is slightly greater than the dimensions of the recess so that a friction fit is provided upon seating of said mounting member within said recess; and

d. mounting means on the other surface of said base member for mounting said frame upon a wall or the like.

4,030,221

GUN LOCK USING MANUAL PRESSURE

William Doobenen, 6472 Camino Viviente, Goleta, Calif. 93017, and Robert Thomas Hennessy, 932 N. Patterson, Santa Barbara, Calif. 93111

Filed Oct. 6, 1976, Ser. No. 730,125
Int. Cl.² F41C *27/10*
U.S. Cl. 42—1 Y **7 Claims**

1. A gun lock for guns having a trigger guard in a plane and having a trigger disposed within the trigger guard, comprising:

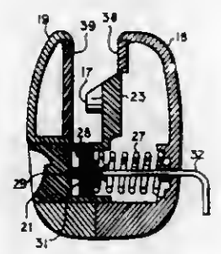
a. a housing of U-shaped cross section having a spacing between the legs of the U-shape to fit over the trigger guard and having sidewalls extending parallel to the plane of the guard to cover the trigger;

b. a latch disposed in the housing for movement in a direction transverse to the plane of the trigger guard and having a part projecting into the U- shape of the housing upon movement of the latch toward the opening of the U-shape;

c. a spring in said housing engaging the latch and urging said

latch in a direction to cause said part normally to engage the trigger guard;

d. and a manual pressure member at one sidewall of the housing to be manually squeezed to overcome the spring



to move the latch so that the guard engaging part is sufficiently retracted to allow removal of the entire trigger lock from the trigger guard,

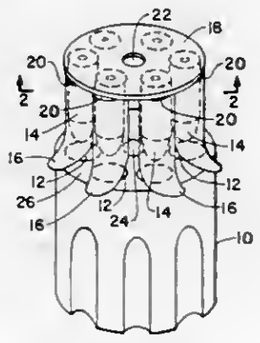
to thereby protect the trigger from persons of insufficient strength to retract the latch from the trigger guard.

4,030,222

CARTRIDGE LOADING DEVICE FOR REVOLVERS

Carl G. Sommer, 81-27 250th St., Bellerose, N.Y. 11426

Filed May 24, 1976, Ser. No. 689,362
Int. Cl.² F42B *39/04*
U.S. Cl. 42—89 **7 Claims**



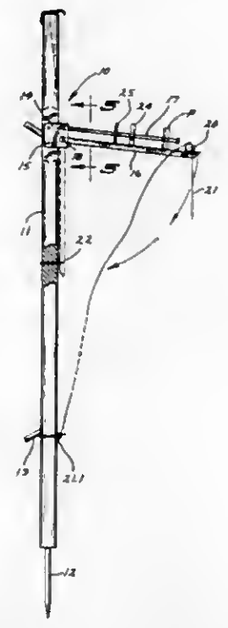
1. A cartridge loading device for revolvers comprising a plate, a plurality of cartridge grasping cams, hinging means for independently hingeably affixing each of said plurality of said cartridge grasping cams to said plate, a portion of said each of said plurality of said cartridge grasping cams broken away permitting a cartridge to be removed from said cartridge grasping cam grasping said cartridge and for insertion into a chamber in the cartridge loading surface of a cylinder of a revolver, said plurality of said cartridge grasping cams disposed circularly about said plate, said plurality of said cartridge grasping cams each having a cylinder contacting surface, said cylinder contacting surface for disposing said each of said plurality of said cartridge grasping cams radially outwardly from said cartridge loading surface upon said plate being manually urged towards said cartridge loading surface, said cylinder contacting surface for engagement with the marginal edges of said cartridge loading surface, said cylinder contacting surface forming an acute angle with the longitudinal axis of said cartridge when said cartridge is grasped within said cartridge grasping cam.

4,030,223

FISH LINE CONTROL APPARATUS WITH MAGNETIC RELEASE

Leo J. Loesch, and Claude E. Loesch, both of Kimball, Minn. 55353

Filed May 2, 1975, Ser. No. 573,956
Int. Cl.² A01K *97/12*
U.S. Cl. 43—15 **18 Claims**



1. A fish line control apparatus comprising:

a line suspending device,

attachment means retaining the line against downward travel relative to the device,

an independently supported mounting with means carrying said suspending device to allow movement of the device without significant restraint or impetus in the direction of line movement, and

the mounting and device incorporating a two part magnetic system, one part of the system being incorporated into the mounting, and the other part of the system being incorporated into the device, the two parts of the magnetic system having magnetic attraction for each other and being arranged to releasably restrain the device from moving with the line, the magnetic system having releasing characteristics for releasing the line suspending device in response to tension on the line resulting from action of a game fish, the transmission of line tension to the attachment means and the magnetic forces of the magnetic system providing the only influence upon the suspending device controlling restraint and release of the device in response to such tension on the line, the attachment means and the magnetic system operating alternately and to the exclusion of other influences on the suspending device to effect restraint and release of the device to move unidirectionally upon release.

4,030,224

LINE GUIDE FOR A FISHING ROD

Thor Dorph, San Francisco, Calif., assignor to Bjorn Lie and Gina Lie, both of Oslo, Norway

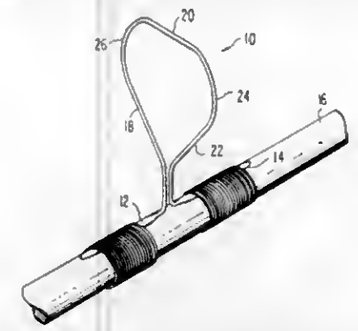
Filed May 27, 1976, Ser. No. 690,708
Int. Cl.² A01K *87/04*
U.S. Cl. 43—24 **2 Claims**

1. A line guide for a fishing rod comprising:

an annular ring;

means defining a groove in the periphery of said ring, said groove having a plurality of substantially equally spaced flat bottom portions interconnected by circular segments of equal radius and spaced circumferentially around said ring; and

resilient wire means for mounting on a fishing rod for supporting said ring in a plane perpendicular to the axis of the rod in any one of a plurality of rotatable indexable positions, said wire means extending around said ring and having at least three straight sections which engage with



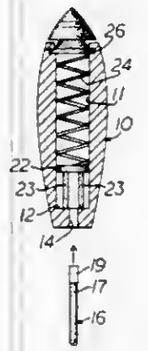
said flat bottom portions of the groove in said ring at substantially equally spaced locations around the circumference of said ring, said straight portions being interconnected by substantially circular segments lying outside the outer diameter of said ring when said ring is snapped into said wire means.

4,030,225

DETACHABLE CONNECTOR FOR SECURING A MEMBER TO A FISHING LURE

Kenneth W. Earley, Rte. 6, Box 839, Bessemer, Ala. 35020

Filed Aug. 13, 1976, Ser. No. 714,020
Int. Cl.² A01K *91/04*
U.S. Cl. 43—42.09 **7 Claims**



1. In a detachable connector for attaching one end of an elongated member to a fishing lure body comprising,

a. an inwardly extending bore in said body with the outer end of said bore terminating in a shoulder in spaced relation to an adjacent surface of said body,

b. an elongated slot in said adjacent surface of said body communicating with said bore,

c. at least one lateral projection carried by an end of said elongated member and being of a size and shape to pass through said slot into said bore while said projection is in a first position in alignment with said slot and to engage said shoulder upon rotation of said elongated member and said projection carried thereby to a second position after moving said projection into said bore,

d. a yoke-like member within said bore having a transverse member connected to spaced apart outwardly extending legs disposed to engage said shoulder at opposite sides of said slot and at opposite sides of said projection upon movement of said projection to said first position within said bore and disposed to enter said slot at opposite sides of said elongated member upon movement of said projection to said second position within said bore, and

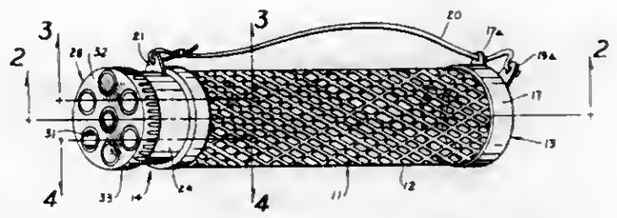
e. means to urge said yoke-like member outwardly so that said legs are moved into said slot at opposite sides of said elongated member upon movement of said projection to said second position.

4,030,226

INSECT CARRIER AND DISPENSER APPARATUS

Jack P. Shelton, Sr., 3790 William Paul Drive, Austell, Ga. 30001, and John M. Adam, 1209 Baker Lane, Marietta, Ga. 30062

Filed May 6, 1976, Ser. No. 683,822
Int. Cl.² A01K *97/04*
U.S. Cl. 43—55 **6 Claims**



1. Insect carrier and dispenser apparatus, comprising:

means defining a container for receiving and retaining a number of insects;

a plurality of individual insect receiving chambers mounted in proximity to said container, each said chamber having an entrance and a separate exit;

entrance means disposed between said carrier and the entrances of said plural chambers, said entrance means selectably permitting an insect within said container to enter a selected one of said chambers and blocking insect entry into at least one other such chamber;

exit means disposed adjacent the exits of said plural chambers to close all but one of said other chambers to the exit of an insect within each of said chambers; and

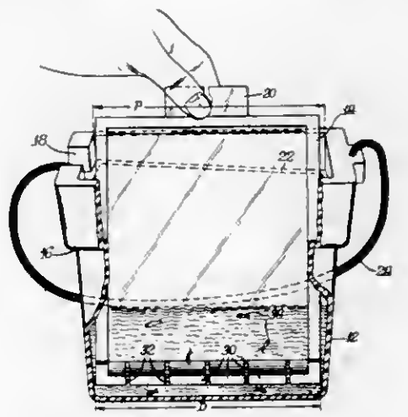
means operatively interconnecting said entrance means and said exit means to prevent entrance and concurrent exit of an insect from the same chamber.

4,030,227

BAIT BUCKET

Everett J. Oftedahl, 505 Highway 173, Antioch, Ill. 60002

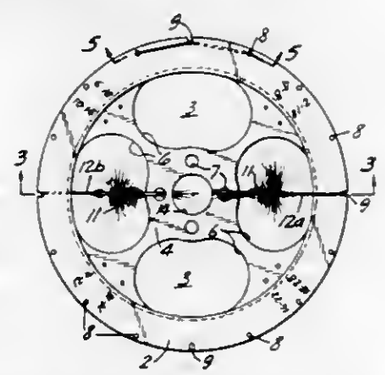
Filed May 28, 1976, Ser. No. 690,919
Int. Cl.² A01K *97/04*
U.S. Cl. 43—56 **4 Claims**



1. A bait bucket, comprising: a bait receptacle having an open top; and a removable, combination lid and scoop for covering the receptacle and for scooping live bait from within the receptacle, said receptacle including four sidewalls and a ledge on said sidewalls extending substantially around the inner perimeter of the receptacle for supporting the lid when the bait bucket is closed, said ledge being so positioned with respect to the top of the receptacle that, when the lid is resting on the ledge, the top of the lid is substantially flush with the top of the receptacle, said lid having at least one end portion which projects substantially downwardly into the receptacle when the lid is covering the receptacle and which serves as a bait scoop when the lid is removed from and inserted into the

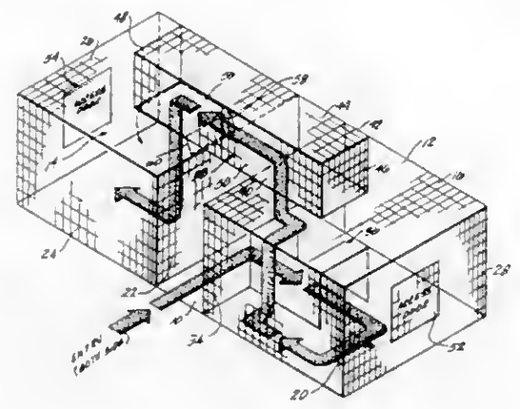
receptacle and said lid including an integral handle projecting from a second end portion of the lid and said receptacle including a slot in one of its walls for receiving said handle.

4,030,228
CARTRIDGE FOR FISHING FLIES AND LEADERS
Elvin J. Schaefers, 203 Windsor Court, New Brighton, Minn. 55112
Filed Jan. 22, 1976, Ser. No. 651,473
Int. Cl.² A01K 97/06
U.S. Cl. 43—57.5 R **1 Claim**



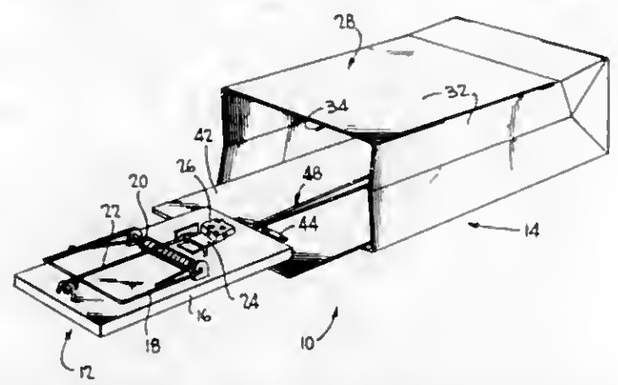
1. A cartridge for separate attachment, storage and drying of a plurality of fishing flies, having barbed ends and hackled shank portions, with leaders attached to said hackled shank portions, and for winding said leaders separately upon said cartridge; said cartridge comprising a front face, a back face, a divider member, and spool forming components; said front face and said back face being spaced approximately equidistantly from said divider member by means of said spool forming components, said front face and said back face being provided with a plurality of leader securing holes located adjacent the peripheries of said front face and said back face, said front face and said back face each having its central portion removed to render it ring-like, thus to provide centrally located open areas between each of said faces and said divider member; each of said open areas being of a depth substantially equal to the width of a spool forming component; the central portion of said divider member being provided with at least one hook receiving hole and at least one fly receiving aperture; said fishing flies being storable within said open areas by insertion of their barbed ends through a hook receiving hole with their hackled shank portions suspended within said fly receiving apertures, free from contact with any surface thereby minimizing crushing of said hackled shank portions, permitting free circulation of air around said hackled shank portions to facilitate quick drying thereof after said fishing flies have been used; said open areas providing ready access to said holes and apertures from either face or said cartridge for attachment and removal of said fishing flies, and further providing for the visual identification and selection of fishing flies stored in said cartridge; said spool forming components providing side by side tracks, said side by side tracks being separated by said divider member; means whereby the leaders attached to the hackled shank portions of each of said fishing flies stored within said cartridge may be brought into and maintained in position to be wound separately on said side by side tracks, each of said leaders being wound separately upon a separate one of said side by side tracks to prevent entanglement of said leaders; said leader securing holes providing means whereby the free ends of said leaders may be separately secured in position upon said cartridge after said leaders have been wound thereon; and means for encasing said cartridge.

4,030,229
BIRD TRAP
Morris D. Sale, 388 Sunset Way, Palm Springs, Calif. 92262
Filed June 4, 1976, Ser. No. 692,864
Int. Cl.² A01M 23/04
U.S. Cl. 43—69 **6 Claims**



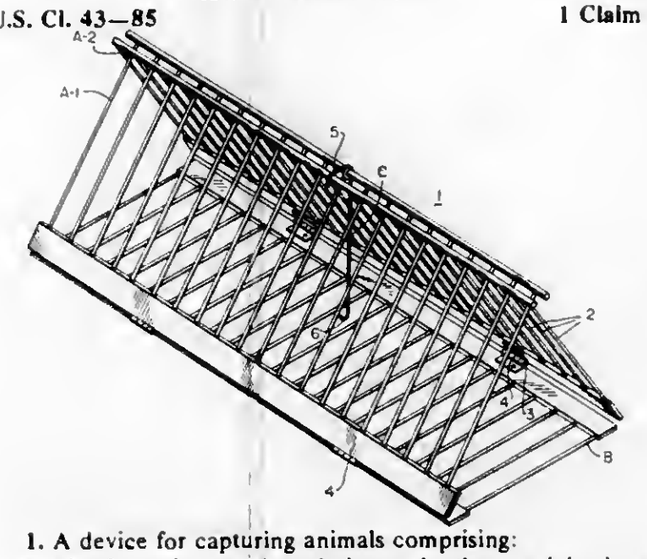
1. A bird trap comprising first and second cages made of open mesh wire screen forming two cages in closely spaced relationship, an open passage extending between the two cages, and an overhead tunnel extending across the tops of the two cages and bridging the space between them, the first cage having an opening in the side of the cage from the space between the cages into the interior of the cage and an opening through the top of the cage into the overhead tunnel, the second cage having an opening through the top of the cage into the overhead tunnel.

4,030,230
ANIMAL TRAP AND PACKAGE THEREFOR
Anthony J. Souza, Lancaster, Pa., assignor to Woodstream Corporation, Lititz, Pa.
Filed Apr. 6, 1976, Ser. No. 674,098
Int. Cl.² A01M 23/30
U.S. Cl. 43—81 **10 Claims**



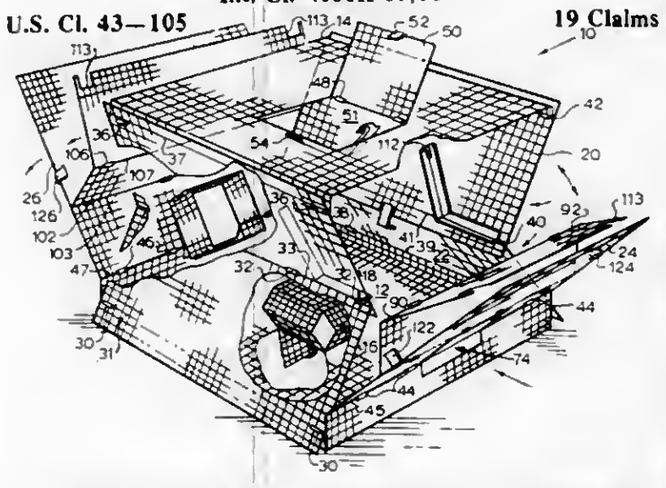
1. In combination, animal trap means and a package means therefor, said package means including a container portion, resilient means normally tending to withdraw said trap means into said container portion of said package means, and limited stop means forming part of said package means for temporarily maintaining said trap means outside said container portion of said package means, springing of said trap means in catching an animal overriding said limited stop means, whereby said trap means and the animal trapped thereby are automatically withdrawn into said container portion of said package means.

4,030,231
DEVICE FOR CAPTURING ANIMALS
Shuji Fukutome, 14-8, Kudo 2-chome, Ohji-cho, Kitakatsuragi, Nara, Japan
Filed July 8, 1976, Ser. No. 703,423
Claims priority, application Japan, July 11, 1975, 50-97667[U]
Int. Cl.² A01M 23/00
U.S. Cl. 43—85 **1 Claim**



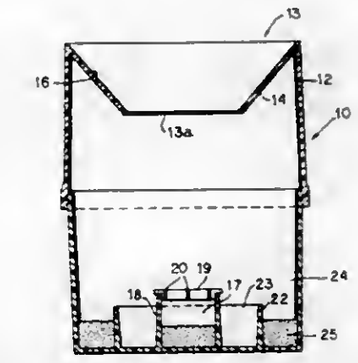
1. A device for capturing animals comprising:
a pair of pressing members facing each other, each having a rectangular frame and a plurality of parallel elongated pieces therein disposed along and at right angles to the opposite longer sides of said rectangular frame,
said parallel elongated pieces of one pressing member being disposed so as to be between the parallel elongated pieces of another pressing member, whereby said pressing members are not to be separated from each other at one longer side of each thereof;
a base member to which said pressing members are pivotally mounted at pivotally supporting portions thereof, so that said pressing members are adapted to form a gable roof at the up-position thereof and are adapted to normally fall down by means of springs provided at said pivotally supporting portions; and
suitable locking means for retaining said pressing members in the up-position thereof in the form of gable roof and adapted to release said pressing members from said up-position thereof when animals contact said locking means while either passing through the hollow triangular case path formed with said pressing members and said base member, or taking a bait preset therein.

4,030,232
COLLAPSIBLE CRUSTACEAN TRAP
Russell N. Niva, P.O. Box 521, Melbourne, Fla. 32901
Filed Oct. 14, 1975, Ser. No. 622,224
Int. Cl.² A01K 69/10
U.S. Cl. 43—105 **19 Claims**



1. A collapsible trap for catching crustaceans, comprising in combination:
a plurality of movably attached panels, said panels defining an enclosed cavity therein, with at least one of said panels including a first aperture for allowing the entry of said crustacean into said cavity;
means within said cavity for containing bait therein;
means within said cavity for restraining said crustaceans therein, said restraining means comprising a plurality of restraining partitions movably attached within said cavity for dividing said cavity into upper and lower chambers; and
means for allowing said panels, said bait containing means and said restraining means to collapsibly fold into said cavity, thereby collapsing said crustacean trap.

4,030,233
COCKROACH TRAP
Anton E. Wunsche, 656 W. 162nd St., New York, N.Y. 10032
Filed Dec. 12, 1975, Ser. No. 640,386
Int. Cl.² A01M 1/10
U.S. Cl. 43—121 **9 Claims**

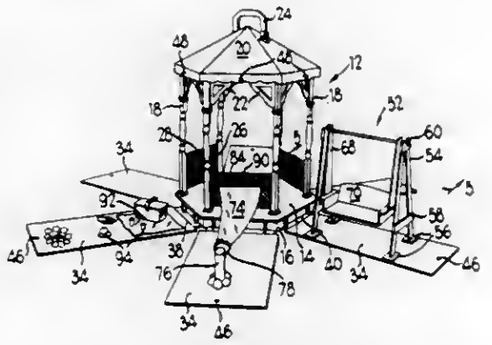


1. A trap for crawling insects, comprising an upright container adapted to hold a supply of bait and provided with a lid having an aperture and with a bottom part having a bottom wall formed with an annular upstanding partition which defines in said container an inner and an outer compartment, said lid being provided with a downward extension adjoining said aperture and forming a guidepath leading toward said supply of bait but terminating sufficiently short of said bottom wall to prevent an insect attracted by the bait from regaining said extension after landing on said bottom wall, and a slippery coating on the inner peripheral wall of said container for frustrating attempts of the insect to climb said inner peripheral wall; and a moisture-retaining ring of foam-plastic material in one of said compartments.

4,030,234
FIGURE TOY PLAY KIT
Robert K. Allen, Hinsdale; Palmer J. Schoenfield, Evanston, and Howard J. Morrison, Deerfield, all of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.
Filed Feb. 5, 1976, Ser. No. 655,419
Int. Cl.² A63H 3/52
U.S. Cl. 46—1 R **15 Claims**

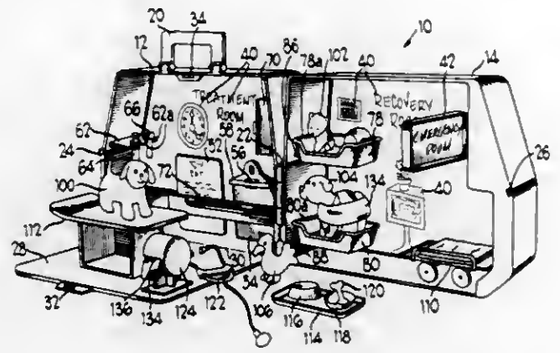
1. A child's amusement device for child activity with a doll or other toy figure, comprising: a carrying case having a base; a roof; means supporting said roof spaced above said base and securing the roof and base as a unit; a plurality of individual side panels for said case, each side panel separately hingedly connected to the base and pivotally movable relative to the base between (1) a horizontal, open or platform position extending outwardly from the base periphery providing a generally horizontal play area and exposing the interior of the case, and (2) a closed or upright position forming at least a portion of the side wall of the case; a plurality of latch means for releasably holding each panel individually in its upright position with the case thereby closed; and doll play accessory means secured to the interior surface of at least one of said

panels whereby the panel may be folded down from said upright position to said platform position to deliver the acces-



sory means from the interior of the case to the exterior thereof for access and play by the child.

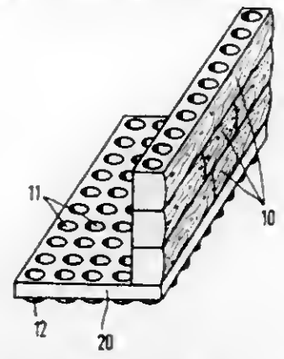
4,030,235
TOY PLAY KIT
Rouben T. Terzian, Chicago; Palmer J. Schoenfield, Evanston; Kathy A. Dunn, Chicago, and Wayne A. Kuna, Oak Park, all of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.
Filed Feb. 17, 1976, Ser. No. 658,701
Int. Cl.² A63H *3/00*
U.S. Cl. 46—11 **14 Claims**



1. A child's amusement device in the form of a toy hospital set, comprising:
- a portable carrying case simulating an ambulance or other emergency vehicle, said case including first and second mating closable casing halves hingedly connected along a line defining vertical mating edges of the casing halves for opening and closing the case;
- selectively operable latch means for releasably retaining the case in closed condition; and
- a partition, pivotally mounted to the bottom of said first casing half for folding downwardly generally along a longitudinal axis from a concealed vertical position dividing the case into two portions when the case is in a closed condition to a horizontal position on a suitable supporting surface when the case is open to provide an outwardly extending platform as well as access to the interiors of the two mating casing halves.

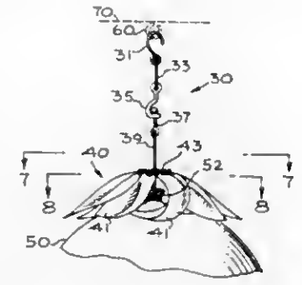
4,030,236
TOY BUILDING BLOCKS
Walter Schnabel, Im Wolfsgalgen 25, 7141 Schwieberdingen, Germany
Filed Feb. 4, 1976, Ser. No. 655,230
Claims priority, application Germany, Feb. 7, 1975, 2505109
Int. Cl.² A63H *33/08*
U.S. Cl. 46—25 **9 Claims**

1. A toy building block for interengagement with similarly constructed toy building blocks comprising a unitary plastic member having a first planar contact surface with at least one hole formed therein, a second planar contact surface parallel to said first contact surface with at least one plug extending therefrom, said holes and plugs being in alignment transverse to the plane of said contact surfaces, planar end surfaces extending perpendicular between said contact surfaces, at least one side face extending between said first and second



contact surfaces and said end surfaces, said contact surfaces, said end surfaces and said one side face being integral joined along their edges to form an elongated closed rectangular block, said one side face being convexedly formed so as to extend outwardly from a plane containing the edges of said side face connected to said first and second connecting surfaces, and having molded integral thereon a simulating wood graining extending over its entire area.

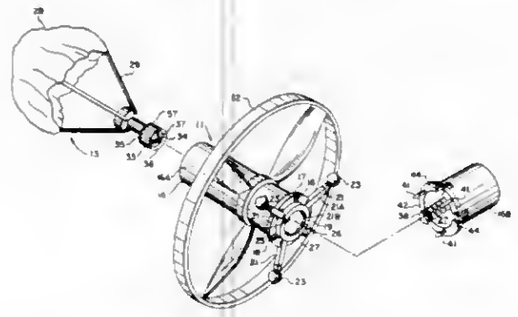
4,030,237
SPINNING BALLOON NOVELTY
Nathanial H. Lewis, Box No. 20424, Los Angeles, Calif. 90006
Filed July 15, 1975, Ser. No. 596,011
Int. Cl.² A63H *3/06*
U.S. Cl. 46—53 **3 Claims**



1. A combination of a pinwheel rotatably attached with a spherical balloon having a stem and a cord of a suspension assembly; a hub member secured with said pinwheel having an aperture centrally located in said hub member, the balloon being inflated and secured to said cord at its stem, said stem of said balloon attached to said cord and said cord being inserted in said aperture of said hub member, the said suspension assembly includes a swivel attached to said cord to provide rotatability, permitting said pinwheel and said balloon to rotate in a circular path along its longitudinal axis.

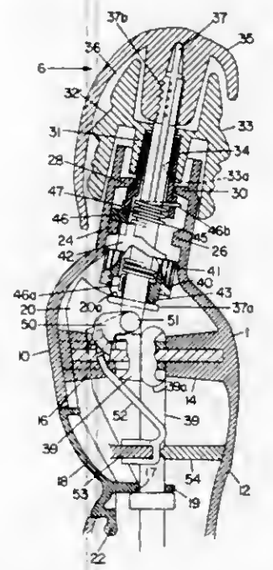
4,030,238
ROTATING TOYS, PARTICULARLY FLYING TOYS
Willis M. Lakin, P.O. Box 234, Rte. 2, Roselle, Ill. 60172
Filed May 4, 1976, Ser. No. 683,053
Int. Cl.² A63H *11/06, 13/02*
U.S. Cl. 46—86 R **15 Claims**

1. In a toy wherein at least some portion thereof is caused to rotate during operation of the toy, the improvement comprising an object adapted to be released from said toy, means for receiving said object, locking means for retaining said object in a first locked position within said object receiving means, and centrifugal force responsive means for releasing said object from said first locked position upon attainment of a first level of centrifugal force and maintaining said object in a second locked position until the level of centrifugal force



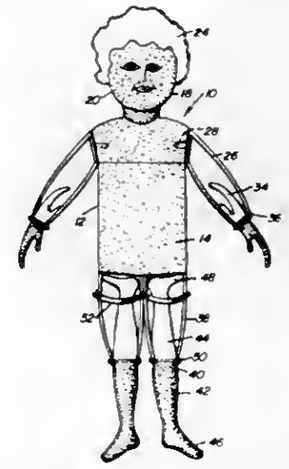
acting on said centrifugal force responsive means diminishes to a second level of centrifugal force.

4,030,239
MULTIPLE FACE DOLL
Peter Charles White, Rancho Palos Verdes; John Terry Benson, Canoga Park, and Richard Anthony Leoncavallo, Anaheim, all of Calif., assignors to Mattel, Inc., Hawthorne, Calif.
Filed Jan. 29, 1976, Ser. No. 653,551
Int. Cl.² A63H *13/00*
U.S. Cl. 46—135 R **17 Claims**



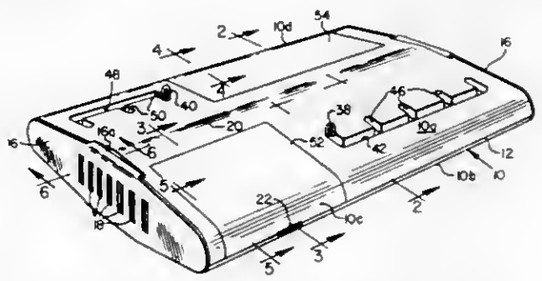
7. In a toy figurine of the type containing a torso, a rotatably mounted external appendage thereon, a rotatably mounted head thereon having two faces located on opposite sides of said head and a member fixedly coupled to the torso thereof for concealing one of said faces, the combination therewith comprising:
- spring driven means including a torsion spring located within said torso for rotating said head relative to said torso by 180° between first and second detent positions, holding means for releasably holding said spring-driven means in a selected one of said detent positions;
- cocking means coupled to said appendage of said figurine for increasing torsional force in said spring responsive to rotating said appendage a predetermined distance and for preparing said spring driven means for release from said one detent position; and
- means responsive to sequential operation of said cocking means and to a pushbutton at the rear of said figurine torso for causing said holding means to release said spring driven measn from said one detent position to permit said spring driven means to turn said head substantially instantaneously by 180°.

4,030,240
CONVERTIBLE DOLL WITH PIVOTED CHANGEABLE HANDS
Beverly A. Port, 5098 E. Hillcrest, Port Orchard, Wash. 98366
Filed Apr. 19, 1976, Ser. No. 678,173
Int. Cl.² A63H *3/12*
U.S. Cl. 46—153 **10 Claims**



1. A convertible doll comprising a body having a head at the upper end and defining a shoulder region, waist region and hip region, arm members attached to the shoulder regions and leg members attached to the hip region, each arm member including a double hand at the outer end thereof with the two hands on each arm having distinguishable appearance characteristics, and means mounting the double hands for pivotal movement about a transverse axis intermediate the extermities of the hands to enable one of said hands to be positioned as a longitudinal extension of the arm member.

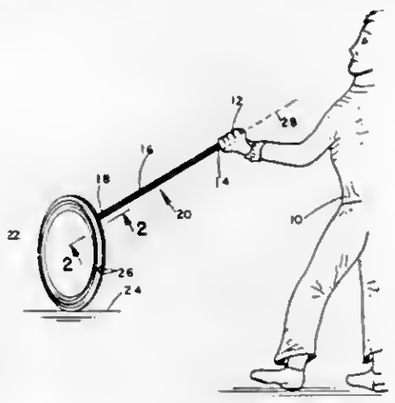
4,030,241
MULTIPLE PITCH ANIMAL CALL
H. Dan Gallagher, 902 SE. 119th, Vancouver, Wash. 98664
Filed Apr. 29, 1976, Ser. No. 681,413
Int. Cl.² A63H *5/00*
U.S. Cl. 46—180 **15 Claims**



1. A multiple pitch animal call comprising:
- a casing defining a mouthpiece means having exterior mouthpiece opening means leading into an interior air space within said casing,
- at least two stretchable elastic bands within said casing,
- band-positioning means within said casing positioning an edge portion of each said band inwardly of said mouthpiece opening means so that when a stream of air is blown into said interior space through said mouthpiece opening means it vibrates one or the other of said bands and thereby produces a sound,
- and band-stretching means for each band movably mounted within said casing and operable from the exterior of said casing for variably stretching each band independently of

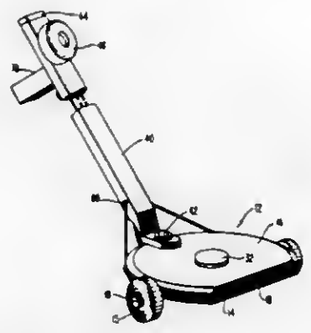
the other band so that each band can produce sounds of variable pitch.

4,030,242
HOOP AND PROPELLED MEANS
Cruz Sintron, 279 N. Broadway, Yonkers, N.Y. 10701
Filed May 21, 1976, Ser. No. 688,598
Int. Cl.[2] A63H *33/02*
U.S. Cl. 46—220 6 Claims



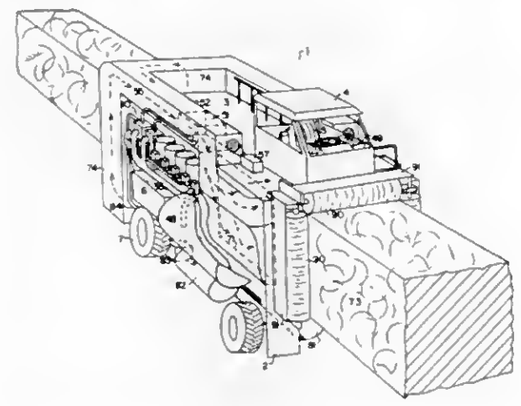
1. A hoop and propelling means comprising a propelling device, said propelling device having an elongated rod-like shape, a circular hoop, one end of said propelling device for manual grasping by the user, the other end of said propelling device for selective engagement with the exterior surfaces of said hoop, snap-like engagement means for capturing said other end of said propelling device along a first annular mouth passing through said exterior surfaces of said hoop, frictional engagement means for frictionally engaging said other end of said propelling device along a second annular mouth passing through said exterior surfaces of said hoop.

4,030,243
PUSH TOY
Howard Drucker, 35 Great Rock Road, Sherbon, Mass. 01770
Continuation-in-part of Ser. No. 623,560, Oct. 17, 1975. This application Apr. 12, 1976, Ser. No. 676,236
Int. Cl.[2] A63H *33/26*
U.S. Cl. 46—241 10 Claims



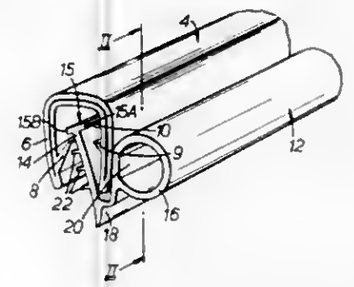
1. A push toy configured to interact magnetically with a toy vehicle having a magnetically cooperating member, said push toy comprising:
a. a base;
b. at least a pair of side wheels mounted to said base;
c. a movable magnetically cooperating member mounted to said base, said movable member constrained for movement between extended and retracted positions relative to a forward end of said base;
d. a control stick mounted to said base at a rearward portion thereof, said control stick extending outwardly from said base and defining a handle for maneuvering said push toy; and
e. control means operatively connected to said movable member for moving said movable member between said extended and retracted positions, said magnetically cooperating member of said toy vehicle magnetically attachable to said movable member in said extended position, said magnetically cooperating member of said toy vehicle detached from said movable member in said retracted position.

4,030,244
METERING AND SPRAY APPARATUS FOR HORTICULTURAL APPLICATIONS
Bernard R. Tennes, Charlotte, and Clyde L. Burton, East Lansing, both of Mich., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.
Filed May 14, 1976, Ser. No. 686,424
Int. Cl.[1] B05B *1/28*
U.S. Cl. 47—1.7 13 Claims



1. An apparatus for spraying materials onto horticultural plants comprising:
a power frame adapted to straddle the foliage of said horticultural plants,
means attached to said power frame for suspending spray materials into an air stream,
means for conducting said air stream with said suspended spray materials into a spray zone containing said horticultural plants and within the confines of said power frame,
means for recirculating said air stream from said spray zone to said suspending means, and
at least one metering means mounted on said power frame for metering at least one spray material to said suspending means, said metering means comprising:
a container for holding said spray material, said container having an opening,
an adapter for removably mounting said container and for permitting passage of said spray material through said container opening to a first conduit means, and for permitting return of said spray material through said container opening from a second conduit means,
an agitating pump for circulating said spray material through said first and second conduit means, and
a metering pump for metering said spray material to said suspending means, said metering pump connected to said second conduit means by a third conduit means, and further connected to said suspending means by a fourth conduit means, and wherein said metering pump is driven by a power shaft which rotates in direct proportion to the distance traveled by said power frame.

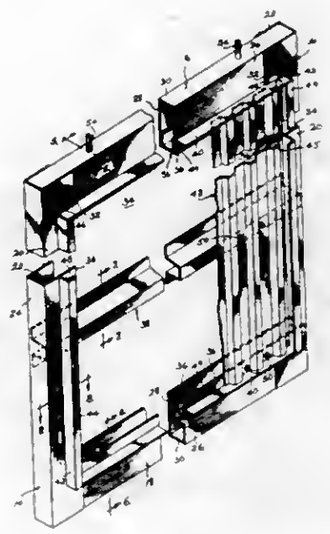
4,030,245
CHANNEL-SHAPED SEALING AND FINISHING STRIPS
Frederick G. Yeomans, Kenilworth, England, assignor to Draftex Development AG, Switzerland
Filed Jan. 12, 1976, Ser. No. 648,007
Claims priority, application United Kingdom, Sept. 13, 1975, 37729/75
Int. Cl.[2] E06B *7/23*
U.S. Cl. 49—490 15 Claims



1. A channel-shaped sealing strip for straddling a flange or the like, comprising
a longitudinal channel-shaped gripping portion having a longitudinally extending rib on at least one internal wall of the channel and spaced from the base of the channel by a predetermined distance,
a longitudinal sealing portion on and running along the outside of the gripping portion, the contacting surfaces of the sealing portion and the gripping portion being unconnected at their points of contact, and
a longitudinal support which extends at least partially over the outside of the said one wall of the channel of the gripping portion and into the said channel, is spaced from and movable relative to the said one wall of the cahnnel when the gripping portion is not straddling the said flange or the like, and has a longitudinally extending enlarged head which engages the distal edge of the said rib on the said one wall to hold the gripping portion and the sealing portion together,
the said predetermined distance being such that the head is held on the said rib by the said flange or the like when the latter is embraced, by, and has pushed home onto it, the gripping portion, thereby preventing separation of the gripping and sealing portions, the head being held spaced from the base of the channel.

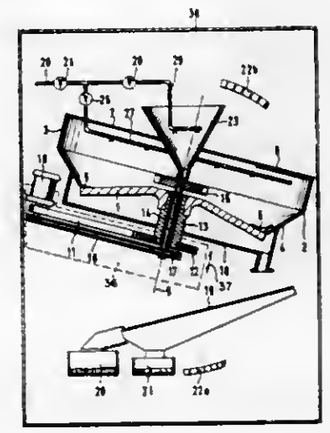
4,030,246
SLIDING BARN DOOR
Donald B. Naylor, Rte. 4, Box 357, Plymouth, Ind. 46563
Filed July 30, 1975, Ser. No. 600,713
Int. Cl.[2] E06B *3/12*
U.S. Cl. 49—501 5 Claims

1. A barn door comprising a pair of vertical side frame members, a horizontal top frame member and a horizontal bottom frame member, said frame members being joined at their respective end portions to define a four-sided opening between the frame members, a girt supported by and extending between said side frame members, siding applied over one side of said girt and covering said opening between the frame members, and means associated with said top frame member for securing said door to a barn support for opening and closing movement of the door, each frame member including a side located within the same general plane as said one girt side and defined by an outer edge which forms a part of the outside perimeter of the door and an inside edge which forms a part of the perimeter of said opening between the frame members, each frame member including a flange projecting outwardly from its said side and spacedly parelleling its said inside edge, said flanges forming a four-sided frame part about said opening, said siding fitted within said frame part and overlapping said frame members where said flanges are spaced from the inside edges of the frame members, each side frame member having a U-shaped cross sectional configuration including its said side and a spaced second side interconnected at the outer edge of the frame member by a web, the



end portions of said top and bottom frame members fitting into said side frame members between the spaced sides of the side frame members.

4,030,247
DEVICE FOR REMOVING BURRS FROM WORKPIECES
Peter Grund, Solingen; Jurgen Schmidt, Herborn, and Jurgen Hesse, Dusseldorf, all of Germany, assignors to Messer Griesheim GmbH, Frankfurt am Main, Germany
Filed Apr. 14, 1976, Ser. No. 676,906
Claims priority, application Germany, Apr. 16, 1975, 2516721
Int. Cl.[2] B24C *3/18*
U.S. Cl. 51—419 13 Claims



1. Device for removing burrs from workpieces made of rubber or similar materials which can be embrittled by cold comprising an axisymmetrical disposed container for receiving the workpieces, the bottom of said container being detached from the container side wall, means for rotating said bottom, said side wall being stationary, means for supplying a liquefied gas with a low boiling point and a blasting agent into said container, said supply means including a fan blower disposed within said container perpendicular to the axis of said container, the axis of rotation of said fan blower being coaxial and identical to the rotational axis of said bottom, said rotational axis being inclined by 5° to 25° with respect to the

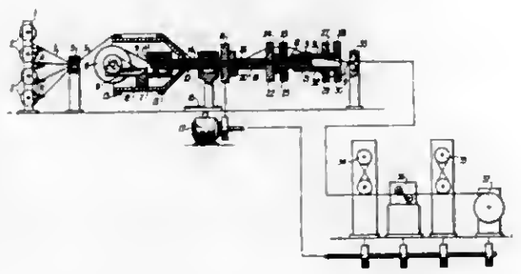
vertical, and said bottom having its outer surface in the form of a downwardly and outwardly extending circular cone with a conical angle of 130° to 170°.

4,030,248

METHOD AND APPARATUS FOR MAKING FILAMENT CABLES

Leendert Van Assendelft, Arnhem, Netherlands, assignor to Akzo N.V., Arnhem, Netherlands

Filed May 3, 1976, Ser. No. 682,262
Claims priority, application Netherlands, May 12, 1975, 7505523; May 12, 1975, 7505524
Int. Cl.² D07B *3/00*; D02G *3/48*
U.S. Cl. 57—9 **10 Claims**



4. An apparatus for cabling filaments comprising
a horizontal rotor having a bore therein;
means for rotating the rotor,
a plurality of eccentrically positioned filament guide openings mounted on the rotor, at least some of said guide openings being provided with deflection edges having a small radius of curvature for deforming filaments passing therethrough,
a plurality of filament delivery spools for supplying filaments to the rotor,
means for bundling the filaments run-off from said spools outside the rotor,
means for guiding the bundle into the bore of the rotor and out of the bore,
means for guiding the bundle after it emerges from the bore to the cable-forming device, said guide means comprising at least one guide opening having a deflecting edge,
a means for guiding at least one wrapping filament into the bore of the rotor separately from the bundle, and
means for guiding the said wrapping filament to the cable forming device, whereby the cable-forming device helically winds the wrapping filament about the bundle.

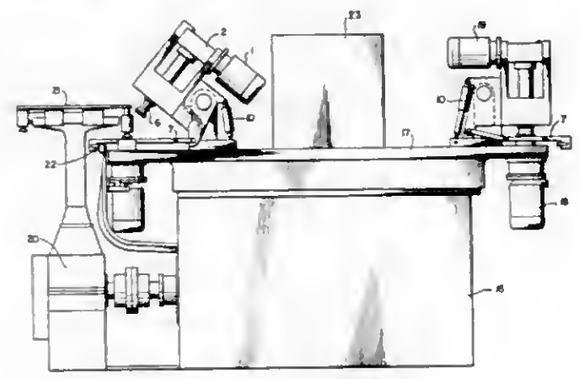
4,030,249

AUTOMATIC MACHINE FOR MAGNETIC ABRASIVE POLISHING OF INTERNAL ROTATIONAL SURFACES

Atanas Dimitrov Kochemidov; Boris Georgiev Makedonski; Ivan Minkov Dumanov; Stefan Georgiev Payakov; Peter Konstantinov Galabov, and Haralampi Aangelov Atanassov, all of Sofia, Bulgaria, assignors to Zniitmash, Sofia, Bulgaria

Filed Oct. 2, 1975, Ser. No. 618,939
Int. Cl.² B23C *3/05*
U.S. Cl. 51—105 R **3 Claims**

1. An automatic machine for magnetic abrasive polishing of internal rotation surfaces, especially internal race-ways of antifriction bearings, by means of an electromagnetic inductor and ferromagnetic powder, comprising a rotating table mounted on a casing with a plurality of working positions having means for receiving and chucking workpieces wherein on each working position there is an electromagnetic head means with a rotating magnetic tip adapted to be introduced into a workpiece received by a position without touching the



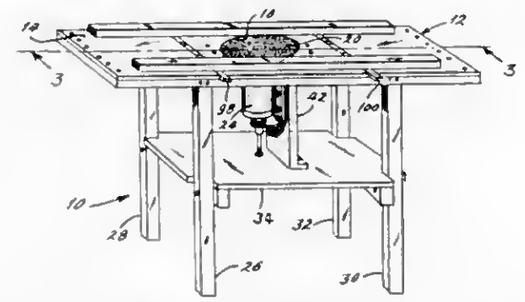
processed surface, and wherein the electromagnetic heads are vertically rotated around a horizontal axis.

4,030,250

DEVICE FOR ACCURATELY SANDING OBJECTS SUCH AS WOODEN OBJECTS AND THE LIKE

Leonard B. Walker, 903 S. Washington, Farmington, Mo. 63640

Filed May 20, 1976, Ser. No. 688,387
Int. Cl.² B24B *7/08*
U.S. Cl. 51—128 **13 Claims**



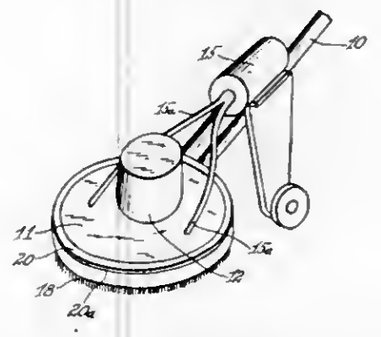
1. A device for sanding surfaces of wooden boards and like objects comprising a platform member having a substantially flat surface over which objects to be sanded are to be moved, said platform member having a round opening formed at an intermediate location therein, means for supporting said platform member in an operative position, motor means positioned on one side of said platform member, said motor means including a motor shaft which extends substantially in axial alignment with said opening, said shaft having an end portion located adjacent to the opening, means for supporting the motor means including means to reposition the end portion of said shaft relative to the opening in the platform member, said motor support means including a first support member attached to the platform member and oriented to extend in substantially perpendicular relationship thereto, said motor means being attached to said first support member, and second motor support means including a second support member spaced from the platform member, means connecting the first support member to the second support member at substantially a right angle, and means associated with said second motor support means to adjust the position of the motor means and of the motor shaft relative to the opening in the platform member, said last named means including an adjustable motor support member having spaced opposite end portions, one of the opposite end portions engaging the motor means opposite from the platform member, and means on said second support member for supporting said adjustable motor support member adjacent to the other opposite end portion thereof, means to adjust the orientation of the first motor support member relative to the platform member including means to adjust the angular relation between the first and second motor support members, a disc-like member attached to the end portion of the motor shaft, said disc-like member having means forming an abrasive surface thereon, said disc-like member being positioned to be rotated in the opening in the platform member with the abrasive surface in substantially coplanar relationship with said flat surface of the platform member, and guide means on the platform member including a pair of spaced parallel guide members positioned adjacent opposite sides of the opening for guiding objects to be sanded as they are moved over the opening in the platform member and across the abrasive surface on the disc-like member.

4,030,251

BRUSH ACCESSORY FOR FLOOR SANDERS

William A. Boettcher, 4507 N. Clark St., Chicago, Ill. 60640

Filed Jan. 30, 1976, Ser. No. 653,913
Int. Cl.² B24B *23/00*
U.S. Cl. 51—177 **7 Claims**



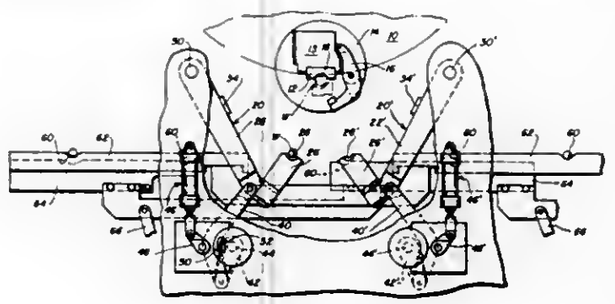
1. In combination with the horizontal base of a floor sanding machine having suction means in the base; a holder freely surrounding the base and a brush directed downwardly from the holder to floor contact, the brush also surrounding the base, the holder and brush being spaced radially from the rim of said base for vertical and radial movement relative to said base; and a cover extending radially along and beyond the top of the base and over the holder with a downbend at its periphery spaced from the holder to restrain and control movement of said holder relative to said base and to direct the entrance of outside air into the base by way of said brush.

4,030,252

WORKPIECE TRANSPORTING STRUCTURE FOR USE WITH A CYLINDRICAL GRINDER

Ralph E. Price, Waynesboro, Pa., assignor to Landis Tool Company, Waynesboro, Pa.

Filed June 3, 1976, Ser. No. 692,702
Int. Cl.² B24B *41/00*
U.S. Cl. 51—215 R **1 Claim**



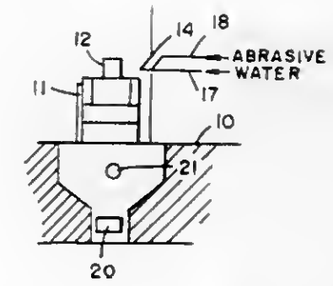
1. A workpiece transporting structure for use with a cylindrical grinding machine having a workpiece clamping assembly comprising
means for delivering workpieces to the clamping assembly including
a plurality of laterally spaced workpiece support means,
lift and carry means for sequentially advancing supported workpieces to the forwardmost workpiece support means,
loading arm means having workpiece holding means and means for displacing said workpiece holding means from a first position to a second position whereat a held workpiece can be clamped by the clamping assembly,
said holding means, located at said first position, comprising said forwardmost workpiece support means, and
means for removing workpieces from the clamping assembly including
a second plurality of laterally spaced workpiece support means,
lift and carry means for sequentially advancing workpieces from the rearwardmost workpiece support means of said removing means,
unloading arm means having workpiece holding means and means for displacing said holding means from a first position to a second position whereat a workpiece clamped in the clamping assembly can be held,
said unloading means holding means located at said first position, comprising said rearwardmost workpiece support means.

4,030,253

METHOD OF CASTING BENEFICIATION

William R. Barber, Jr., Portland, Oreg., assignor to Esco Corporation, Portland, Oreg.

Filed Apr. 14, 1976, Ser. No. 676,677
Int. Cl.² B24C *1/00*
U.S. Cl. 51—321 **7 Claims**



1. A method of removing adherent deteriorated surface material from metal castings comprising positioning said surface at a distance of from about 4 inches (10 cm.) to about 6 inches (15 cm.) from a jet nozzle, flowing a water-abrasive mixture through said nozzle into impinging relation with said surface at a pressure of from about 8,000 psi (550kg/cm²) to about 12,000 psi (850kg/cm²) at a flow rate of from about 10 gpm (38 liters/min.) to about 12 gpm (45 liters/min.) and including from about 5 lbs/min. (2.2kg/min) to about 7 lbs/min. (3.2kg/min) of an abrasive having a particle size in the range capable of passing an SAE size 14 screen but retainable on an SAE size 40 screen, said abrasive having a crystal structure characteristic of garnet sand.

4,030,254

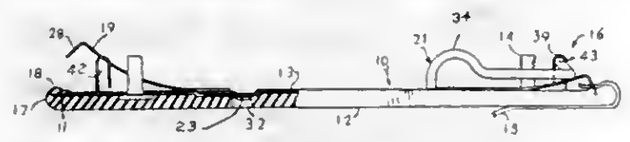
SANDING SHOE WITH REMOVABLE CLAMPING JAW

Livio F. Marcantonio, Utica, N.Y., assignor to Chicago Pneumatic Tool Company, New York, N.Y.

Filed Mar. 5, 1976, Ser. No. 664,250
Int. Cl.² B24D *17/00*
U.S. Cl. 51—386 **2 Claims**

1. A sanding shoe comprising an elongated spring metal support plate adapted for bolting to a reciprocable carrier plate in a portable sanding tool, an elongated rectangular elastomeric pad in which the support plate is moulded, the pad providing a cushion backing for a sheet of sandpaper extended over its bottom surface, separate clamping means detachably mounted upon opposite upper end areas of the shoe for

clamping in place opposite ends of the sandpaper extending over corresponding ends of the shoe, the support plate and the pad being flexible as a unit in moving over curved surfaces during operation of the tool, each of said clamping means including a spring metal flexible clamping jaw element having a rear end removably interlocked with the support plate and having a jaw end inherently biased angularly upward from the shoe in an open condition, a bearing element integral with the



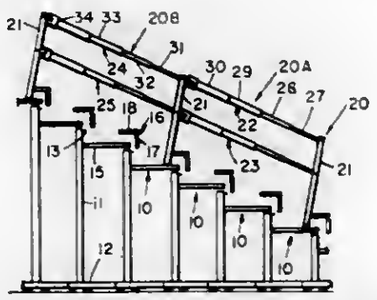
support plate and extending upwardly therefrom above the surface of the shoe, and a manipulative lever pivotable in the bearing and having a camming arm in overlying relation to the jaw end of the clamping jaw element, said support plate including a slot, the clamping jaw element including a tailpiece at its rear end insertable into the slot, said jaw end of the clamping jaw element being inherently biased upwardly against the camming arm of the lever.

4,030,255

FOLDING HANDRAIL SYSTEM FOR TELESCOPING SEATING SYSTEMS

Arlin Philip Hartman, Champaign, Ill., assignor to Universal Bleacher Company, Champaign, Ill.

Filed June 28, 1976, Ser. No. 700,158
Int. Cl.² F04H *3/12*
U.S. Cl. 52—9 **8 Claims**



1. In combination with a telescoping seating system having a plurality of rows movable between an extended use position in which said rows are in stepped relation and a retracted position in which said rows are in superposed relation, a telescoping handrail comprising at least a pair of posts, one mounted to an upper row and the other to a lower row, a handrail comprising a plurality of telescoping tubular elements forming a rail assembly; means for pivotally mounting the lower end of said rail assembly to one of said posts; a sleeve slidably received on the uppermost tubular element of said rail assembly; and link means pivotally connected at one end to said sleeve and pivotally connected at the other end to the other of said posts.

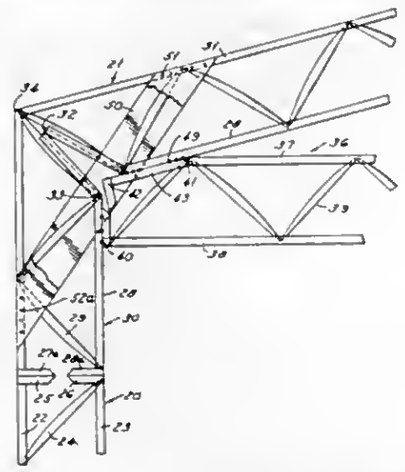
4,030,256

BUILDING CONSTRUCTION

Melvin L. Ollman, 16730 Huntington, Detroit, Mich. 48219

Filed Nov. 20, 1975, Ser. No. 633,644
Int. Cl.² E04B *7/00;* **E04C** *3/02*
U.S. Cl. 52—90 **11 Claims**

1. In a building construction, the combination comprising a foundation,
a plurality of vertically extending truss members,
each said truss member comprising spaced channels with alternately struts connected between said channels,
a roof frame associated with each opposed pair of said vertically extending truss members,
each roof frame comprising truss members including spaced outer and inner channels with alternately extending struts connected between said channels,
said roof frame having an upright portion at each end thereof defining a leg having the spaced outer and inner channels thereof extending vertically and alternately extending struts connected between said channels, said channels of said leg being aligned with a vertically extending truss member,
and means joining each said leg of said upright roof frame and its respective vertically extending truss member,
said roof frame having an inclined portion extending upwardly and inwardly from each said leg of said roof frame,



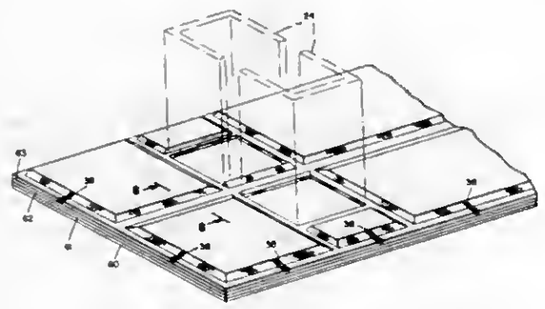
said leg of said roof frame having a strut extending the outer channel thereof at the juncture of the outer channel of said leg of said roof frame with said outer channel of said inclined portion,
and said inclined portion including a strut extending to said area of juncture of said outer channel of said inclined roof portion and the outer channel of said leg of said roof frame,
and a gusset plate fastened to a juncture of a pair of said strut members and said outer channel of said leg and fastened to the juncture of a pair of said strut members and said outer channel of said inclined portion.

4,030,257

FOLDED SLAB FLOOR CONSTRUCTION AND METHOD

Allan S. Lable, New York; Charles Thornton, Pleasantville; Irwin Paul Lew, Forest Hills, and Abraham Gutman, Old Bethpage, all of N.Y., assignors to International Environmental Dynamics, New York, N.Y.

Filed Mar. 4, 1975, Ser. No. 555,329
Int. Cl.² E04B *1/35, 1/34*
U.S. Cl. 52—126 **28 Claims**



1. In a building having at least one vertical structural member supported on a foundation at its lower end and extending upwardly at least a partial height of a building at its upper end, a plurality of stacked floors at the base of said vertical structural member; and, means for raising and fastening said floors

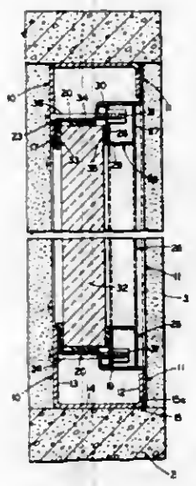
with said top floor of said stack being raised first to an upper supported elevation for support by said vertical structural member and said lower floor of said stack being raised second to a lower supported position by said vertical structural member, the improvement in said plurality of stacked floors comprising: a plurality of stacked floor slabs; each said floor slab including at least first and second poured and cured horizontal reinforced concrete slab sections of substantially the same vertical thickness for defining in side-by-side relation the major planar supporting surface of said floor; a fold of reinforced concrete of said same vertical thickness disposed along a path across each said floor between said first and second slab sections, said fold defining an upwardly exposed depression and rigidly joined at one upper extremity to said first slab portion and rigidly joined at its other upper extremity to said second slab portion to fasten said slab portions in side-by-side relation with the lowest point of said fold extending below the lower surface of said slabs and forming at least part of a first and lower beam flange disposed along said substantially linear path and said first and second slab portions as rigidly attached adjacent said fold forming at least part of a second and upper beam flange disposed along said linear path to support and stiffen each said floor, each said floor slab being nestable with an adjacent floor slab with its respective first and second slab sections and upwardly concave fold of reinforced concrete there betweeen immediately adjacent at a surface of said floor to corresponding and identical overlying undersurfaces of said stacked overlying floor slabs.

4,030,258

BANK WINDOW CONSTRUCTION

Walter G. Anders, Canton, Ohio, assignor to Diebold, Incorporated, Canton, Ohio

Filed Oct. 12, 1976, Ser. No. 731,123
Int. Cl.² E06B *5/00*
U.S. Cl. 52—208 **7 Claims**



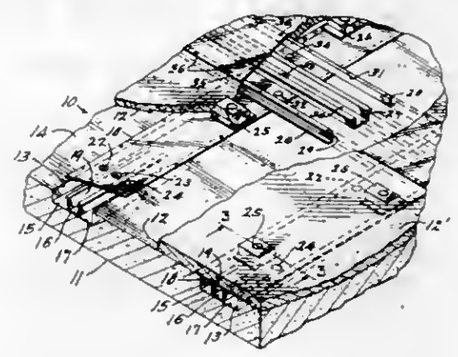
1. Bullet-proof glass bank window frame construction including a rectangular support frame having sill, head and end frame members; offset glass-panel-receiving and retainer-frame-receiving recesses formed in the support frame members opening toward the central portion of the support frame and located between the outside and inside portions of the support frame; a glass panel located in the panel-receiving recess adjacent the inside portion of the support frame; a rectangular retainer frame located in the retainer-frame-receiving recess adjacent the outside portion of the support frame; the retainer frame having pressure areas facing and adjacent the perimeter of the glass panel; sealing strip means in the panel-receiving recess between the support frame and the pressure areas and perimeter surfaces of the glass panel; clamping bolt means accessible at the inside portion of the support frame and extending through the support frame and engaging the retainer frame to retain the glass panel in the panel-receiving recess; and the clamping bolt means when tightened compressing the sealing means around the periphery of the glass panel to provide a weather-proof seal.

4,030,259

METHOD FOR FORMING WIRING CHANNELS IN A CONCRETE FLOOR

Gershon Meckler, 7425 Democracy Blvd. - Unit 212, Bethesda, Md. 20034

Filed Dec. 10, 1975, Ser. No. 639,295
Int. Cl.² E04B *5/48*
U.S. Cl. 52—221 **3 Claims**



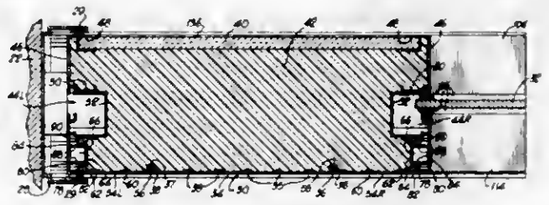
1. A method for forming a plurality of electrical wiring ducts in a building floor comprising the steps of: pouring a floor slab from a hardenable material; forming at least one trench in the upper surface of said poured floor slab before such material hardens; after such material hardens, placing a metal cover plate having a metal U-shaped channel attached thereto over said trench with said channel dividing said trench into at least two parallel ducts with one duct defined by said cover plate and said U-shaped channel; selectively attaching access boxes to the upper surface of said cover plate for providing access into said ducts, and pouring a surface layer of a hardenable material over said slab and said cover plate.

4,030,260

WALL CONSTRUCTION

Ronald D. Sukolics, Elkhart, Ind., and Lawrence F. Biebuyck, Dallas, Tex., assignors to Kawneer Company, Inc., Niles, Mich.

Continuation of Ser. No. 539,299, Jan. 8, 1975, abandoned.
This application Nov. 26, 1975, Ser. No. 635,761
Int. Cl.² E04B *1/62;* **E04H** *1/00*
U.S. Cl. 52—397 **28 Claims**



1. A wall construction including a panel member having spaced apart inside and outside faces and edge members along opposite longitudinal sides of said panel between said faces; said outside face comprising at least one sheet of weather resistant material having a plurality of spaced apart longitudinal grooves formed in the outer surface thereof and having tongue or groove means along at least one longitudinal edge interfitted with tongue or groove means in at least one of said edge members forming a groove on the outside of said panel parallel of said grooves in said outside face; said one edge member comprising an outside element of generally angular cross-section having an outside leg interfitted with said tongue or groove means of said outside face and a transverse leg extending inwardly of said outer face, an inside element hav-

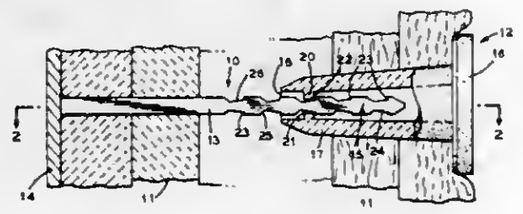
ing a leg extended transversely outwardly of said inside face and interconnected therewith, and a glazing pocket element of channel shaped cross-section having a pair of spaced apart legs on opposite sides of a web portion and transverse thereof, said pocket element legs being interconnected with said transverse leg of said outside element and said leg of said inside element; and structural foam insulation means secured between said inside and outside faces and engaging inner surfaces of said edge members.

4,030,261

CERAMIC CAP FOR INSULATION ANCHOR

Bob G. Coleman, Augusta, Ga., assignor to The Babcock & Wilcox Company, New York, N.Y.

Filed Apr. 8, 1975, Ser. No. 566,644
Int. Cl.² E04B 1/40
U.S. Cl. 52—511 7 Claims



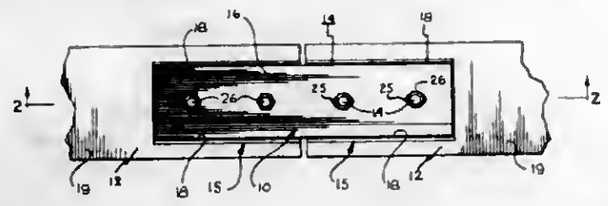
1. An anchor for fiber insulation of a furance comprising an elongate metallic stud of rectangular cross-section affixed at one end to a furnace wall, the stud having a plurality of notches cut in an opposite end portion thereof, insulating material lining the interior of the furnace and including at least some thickness of resilient ceramic fiber blanket, the length of the stud being less than the thickness of insulating materials lining the furnace, a tubular ceramic cap open and inwardly tapering at one end and having its opposite end enclosed and integrally formed with a refractory flange, the inner wall of the cap being formed with an inwardly extending ceramic collar provided with a slot-like opening of a configuration corresponding to and slightly larger than the cross section of the stud to engage the notches in the stud within the furnace lining and to retain the insulating materials on the wall, whereby the resiliency of the insulating materials forces the cap into the locking engagement with the notches.

4,030,262

BUILDING PANEL CONNECTOR ASSEMBLY AND THE LIKE

Almeta C. Dean, 1681 La Cresta Drive, Pasadena, Calif. 91103

Continuation of Ser. No. 377,220, July 9, 1973, abandoned, which is a continuation-in-part of Ser. No. 187,726, Oct. 8, 1971, abandoned. This application Jan. 15, 1975, Ser. No. 541,280
Int. Cl.² E04B 1/41; E04C 5/16
U.S. Cl. 52—583 3 Claims



1. A connector assembly for connecting together adjacent structural modules in a building of substantially modularized construction, the connector assembly comprising

a pair of anchor assemblies each including an elongated metal anchor channel and means for rigidly securing each channel in an upwardly open disposition to a horizontal upper edge of a module adjacent a vertical edge thereof to be aligned with and substantially contiguous to the other anchor channel of the pair in a building for intimate mating receiving engagement between the flanges thereof with a connector plate of the connector assembly, the securing means for each anchor channel including elongate means connected to the channel to extend substantially normal to the channel and adapted to be embedded in the material of a module,

an elongate connector plate configured to mate within the anchor channels of the anchor assemblies intimately between the flanges thereof,

a pair of threaded fasteners cooperating between each anchor channel at spaced locations therealong through corresponding apertures in the connector plate for coupling the connector plate and the anchor assemblies in said mated engagement, the fasteners in said cooperation being fixed from movement relative to the respective channel in a direction along the elongate extent of the channel,

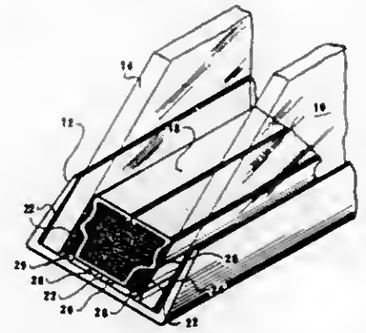
the connector plate fastener apertures associated with one anchor channel of the pair thereof being round and sized to mate intimately with the corresponding fasteners for securing the connector plate fixedly to the one channel, the connector plate fastener apertures associated with the other anchor channel being oversized for connecting the connector plate to the other anchor channel and, in cooperation with said mated engagement of the connector plate with said other channel, for constraining the other channel to move relative to the connector plate only in the direction of the elongate extent of the other channel.

4,030,263

PROTECTIVE CAPPING CHANNEL FOR GLASS SEALED UNIT

Gaetan Y. Lacombe, Duvernay, Canada, assignor to D.C. Glass Ltd., Ville D'Anjou, Canada

Filed Nov. 11, 1975, Ser. No. 630,771
Int. Cl.² E04B 2/28; E06B 3/24
U.S. Cl. 52—616 10 Claims



1. A protective capping channel for a glass sealed unit of the type having a rigid spacer sealed with a polysulphide sealant between the edges of two panes of glass, the said channel comprising a thermally non-conducting rigid plastic U-shaped member, the said member having a flat base and two integral lateral walls slightly tapering towards each other, the distance between the said walls adapted to cover the edges of panes of glass spaced by a spacer, the said base having short thin ribs integrally projecting on the inner surface of the base of said channel, the said ribs projecting angularly relative tothe said surface of the base and having a lip projecting sidewise from the free end of the said ribs,

whereby the said lip of the ribs are adapted to abut against the spacer and to maintain the said spacer at a distance from the base of the channel and to allow retention of the channel to the sealant.

6. In a glass sealed unit comprising a pair of panes of glass arranged in spaced relationship to form an air space therebetween, a rigid spacer disposed between the marginal edges of the panes of glass, a protective capping channel disposed over the marginal edges of the panes of glass to maintain the said panes in adjacent relationship with the spacer, and a polysulphide sealant spread between the panes and the spacer and between the panes and the capping channel, the improvement consisting in the said channel being a thermally non-conducting, rigid, plastic U-shaped member, the said member having a flat base and two intergral lateral walls slightly tapering towards each other, the said base having short, thin ribs integrally projecting on the inner surface of the base of said channel, the said ribs projecting angularly relative to the said surface of the base and having a lip projecting sidewise from the free end of the said ribs,

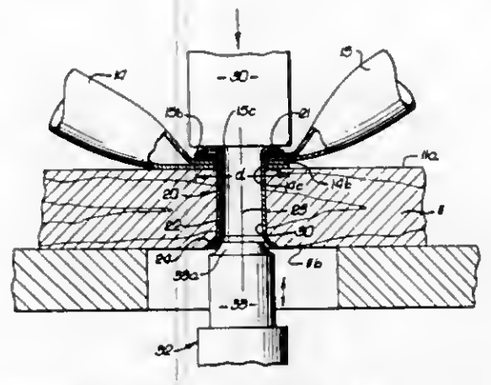
whereby the said lips abut against the spacer to maintain the latter at a distance from the base, the said distance allowing a layer of sealant between the spacer and the base of said channel, the said ribs and lips being immersed in the sealant to assure a positive retention of the channel to the sealant.

4,030,264

WOOD RIVET AND METHOD OF INSTALLATION IN A TRUSS

Edgar D. Jackson, Alta Loma, Calif., assignor to Steel Web Corporation, Alta Loma, Calif.

Filed Apr. 12, 1976, Ser. No. 675,977
Int. Cl.² E04C 3/12, 3/17
U.S. Cl. 52—693 3 Claims



1. In a truss, the combination comprising

a. upper and lower wooden chord members extending in generally the same longitudinal direction and in spaced apart relation,

b. metallic webs extending in zig-zag configuration in the space between the chord members, each web having opposite ends which are generally flat, the flat ends of successive webs extending in overlapping relation and containing aligned openings, and

c. metallic fasteners attaching the overlapping ends of the webs to the chord members, each fastener comprising a head overlying a pair of overlapping web ends and a generally tubular shank extending through said openings in said ends, and also through an opening formed in the adjacent chord member, the shank having a bell-shaped flaring end portion which is entirely within the confines of the chord member and radially outwardly deformed in the chord member compressing and deforming the wood adjacent the outer side of the flare, the end portion terminally in substantially flush relation with a surface of the chord member, said flared end portion being at the outerside of the chord member opposite said web flat ends.

4,030,265

ARCH BEAMS AND PLATES

Jay R. Allgood, 1888 Lyndhurst, Camarillo, Calif. 93010

Filed Oct. 24, 1975, Ser. No. 625,395
Int. Cl.² E04C 3/34, 3/10
U.S. Cl. 52—723 18 Claims

1. A low-rise light-weight synergistic arch-beam utilizing elastic support to vastly increase the transitional buckling load of a shallow arch and permitting large reductions in dead load, comprising:

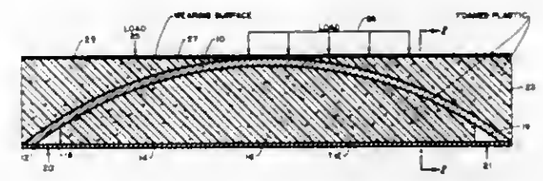
a. a compression element in the form of an elongated low-rise arch member of high compression strength material;

b. a tie element of high tensile strength material;

c. the opposite ends of said arch member being fastened to respective opposite ends of said tie element such that the opposite ends of said arch member react against each other through said tie element; said joined arch member and tie element being supported at said opposite ends thereof;

d. an elastic support means of low modulus material filling the space between said arch and said tie element and being internally confined therebetween to form a tied arch-beam structure;

e. said low modulus material operating to hold said arch and tie element apart except where fastened together at said opposite ends thereof and to maintain proper position with respect to each other for greatly increasing the transitional buckling load of the resultant arch-beam structure such that the arch-beam structure transfers load in essentially pure compression through said arch member to said supports at the opposite ends thereof; said elastic support means of low modulus material allowing a significant decrease in the material normally required for forming said low-rise arch member and still support a given load that would otherwise exceed the buckling load of said arch member and normally cause collapse of the low-rise arch member;



f. the tensile strength of said tie element normally determining the failure mode of the arch-beam structure;

g. said synergistic arch-beam providing greater ease in deflection control over conventional flexural elements, thereby permitting a much greater percentage of available resistance to be utilized in carrying live loads; the limitations of ordinary shallow arches and the inefficiency of conventional flexural elements being eliminated therein.

4,030,266

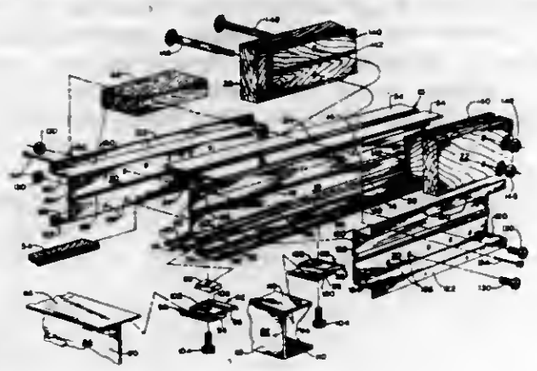
INVERTABLE, MULTI-PURPOSE STRUCTURAL CLAMP

David L. Cody, Hoffman Estates, Ill., assignor to Symons Corporation, Des Plaines, Ill.

Division of Ser. No. 658,515, Feb. 17, 1976. This application June 21, 1976, Ser. No. 697,930
Int. Cl.² F16B 5/06
U.S. Cl. 403—405 2 Claims

1. A reversible clamping member for selectively clamping a length of channel stock and a length of I-beam stock in fixed positions against the underneath side of a planar seating surface, said clamping member embodying a body portion having a bolt hole formed therein substantially centrally thereof, one side of said body portion being provided with a transverse trough therein adapted to underlie and receive a downturned rib which is formed on one horizontal side of the length of channel stock when the clamping member is in one position with said trough facing upwardly, the other side of said body portion being provided with a series of transverse gripping ribs adapted to underlie one of the flanges on the length of I-beam stock when the clamping member is inverted with said ribs facing upwardly, said series of ribs and said trough being

disposed on opposite sides of said bolt hole, said bolt hole being designed for selective reception of a clamping bolt



therethrough in opposite directions for drawing the body portion upwardly against said planar seating surface.

4,030,267
MOLDED PACKAGING SYSTEM

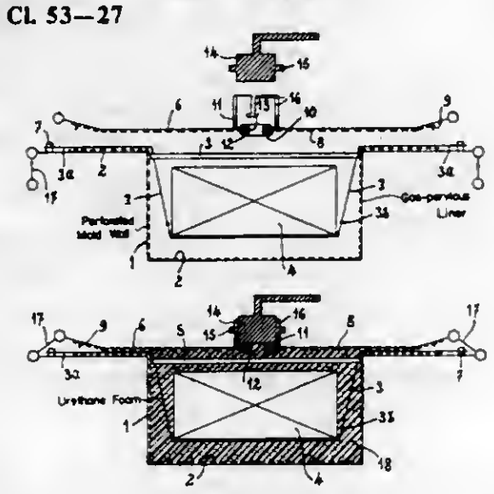
Guy Arnaud, Magnieu, Ain, France

Continuation-in-part of Ser. No. 315,899, Dec. 18, 1972, Pat. No. 3,952,082. This application Oct. 16, 1975, Ser. No. 623,102

Claims priority, application Switzerland, Dec. 16, 1971, 18363/71

Int. Cl.² B65B *23/00*

U.S. Cl. 53—27 **5 Claims**



1. A method of packaging an object comprising the steps of:
lining the perforated walls of a mold with a gas-pervious sheet;
supporting said object in said mold spaced from said sheet;
thereafter covering said mold with a perforated cover lined with another such gas-pervious sheet, said gas-pervious sheets being constituted by a plurality of flat panels each having an outer wall, an inner wall parallel to said outer wall, and a plurality of parallel webs interconnecting said inner and outer walls and defining a plurality of parallel passages therebetween, said inner and outer walls being formed with throughgoing holes opening into said passages;
thereafter pouring into said mold over said object foamable polyurethane material;
thereafter expanding said material in said mold with the generation of gas while venting said gas to the atmosphere over substantially all of the interior surfaces of said mold;
forcing said material only through the holes of said inner walls into said passages on expansion of said material whereby said passages and the holes of said outer walls remain substantially free from said material; and
thereafter polymerizing said material into a rigid foam weighing between 30 g and 50 g per dm^3 and having a multiplicity of cells at least 96% of which are closed.

4,030,268
PACKAGING MACHINE

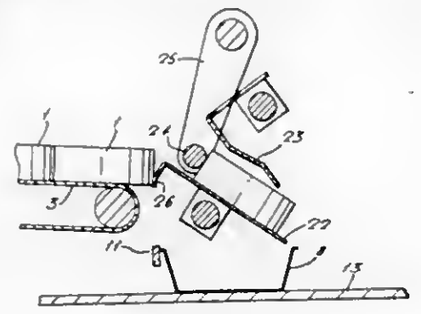
Richard Payne, Barton Turf, England, assignor to Thurne Engineering Company Limited, Norfolk, England

Filed July 13, 1976, Ser. No. 704,961

Claims priority, application United Kingdom, July 18, 1975, 30286/75

Int. Cl.² B65B *57/02, 57/10, 39/12*

U.S. Cl. 53—55 **9 Claims**



1. A packaging machine for loading trays with articles comprising, a first conveyor means for conveying a stream of articles to be loaded, a plate for receiving articles from said first conveyor, means pivotally mounting said plate at the end of said first conveyor means, a stop to locate on said plate articles from said first conveyor means, means mounting said stop above said plate, a pusher to push articles present on said plate, means mounting said pusher above said plate and on the same side of said stop as said first conveyor means, a second conveyor means beneath said plate for conveying trays to be loaded, and a mechanism coupled to said plate, said stop and said pusher whereby actuation of said mechanism causes said plate to be tipped, said stop to be moved away from said article and said pusher to be moved downwards and away from said first conveyor means to push said article present on said plate down said plate past said stop and off said plate into said tray on said second conveyor means, further actuation of said mechanism causing subsequent return of said plate, said stop and said pusher to their initial positions to enable said plate to receive a further article from said first conveyor means.

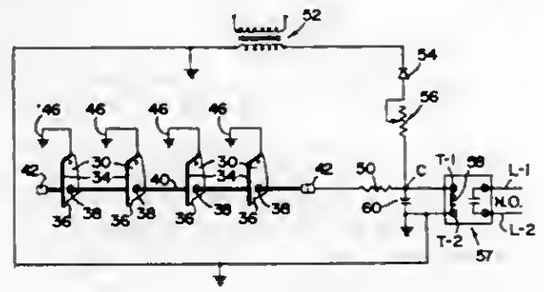
4,030,269
FILLING HEAD DETECTION DEVICE

James W. Mais, East Cleveland, and L. Paul Myers, Munroe Falls, both of Ohio, assignors to A-T-O Inc., Willoughby, Ohio

Filed July 12, 1976, Ser. No. 704,437

Int. Cl.² B65B *57/10*

U.S. Cl. 53—61 **6 Claims**



1. In a case packer including a filling head adapted to have a plurality of rows of abutted articles supplied thereto and

pushed downstream thereof, a filling head detection device comprising
a stop member at the downstream end of each row of articles as supplied to and moved along the filling head,
a conductive metallic flag pivotally carried by each of said stop members and normally projecting slightly in an upstream direction to be struck by an article before it is moved into engagement with a said stop member, each said flag having a hole therein, the stop members and the flags for all of said rows being aligned transversely of said filling head, and
an electrical contact device extending through the holes in said flags, articles moving to the downstream end of the filling head also moving said flags to retracted positions to change their physical and electrical relation with said contact device whereby the operative conditions in an electrical system connecting to said contact device can be varied when all of said flags are moved to retracted positions.

4,030,270
PACK-FORMING APPARATUS

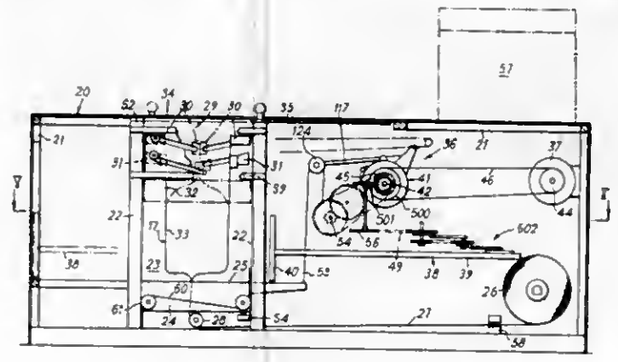
Robert Harry Arnold, London, England, assignor to The Metal Box Company Limited, England

Filed June 27, 1975, Ser. No. 591,005

Claims priority, application United Kingdom, June 29, 1974, 28972/74

Int. Cl.² B65B *5/02, 9/10*

U.S. Cl. 53—183 **19 Claims**



1. In packaging apparatus for forming successive packs of goods in flexible tubular wrapping material, said apparatus comprising: a power unit; pack-forming elements for handling said material in forming said packs; means defining a loading chamber of the apparatus; electrical control means for said pack-forming elements; pack support means in said loading chamber for supporting a succession of lengths of said material at a first end thereof, said packforming elements including holding means in said loading chamber for holding open a second end of each successive length of said wrapping material for goods to be loaded therethrough; the improvement comprising mechanical main drive means including cam means rotatable as a unit; a releasable first clutch coupling said cam means with said power unit; and feed-back means located engageably with respect to, and operable by, said cam means to engage and disengage said first clutch according to the rotational position of said cam means, said electrical control means including first switching means located engageably with respect to, and operable by, said cam means, and means connecting said first switching means electrically in series relationship with each of said electrical control means, whereby actuation of each pack-forming element takes place in a sequence each step of which is dependent at least on the rotational position of the cam means.

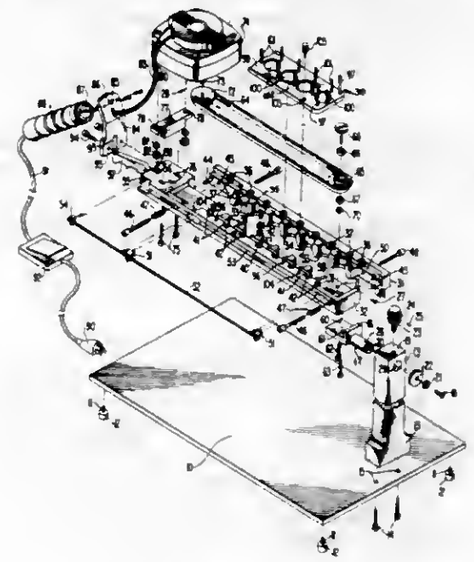
4,030,271
APPARATUS FOR CAPPING AND UNCAPPING CONTAINERS

Bernard C. Kefauver, Frederick, and Norman Little, Silver Spring, both of Md., assignors to The United States of America as represented by the Secretary of the Department of Health, Education and Welfare, Washington, D.C.

Filed June 11, 1976, Ser. No. 695,171

Int. Cl.² B65B *7/28;* **B67B** *3/20, 7/18*

U.S. Cl. 53—305 **16 Claims**



1. An apparatus for capping and uncapping containers, the apparatus comprising means for storing numbers of caps, means for guiding a plurality of containers into a given geometric relationship to each other in vicinity of said means for storing, an endless belt having oppositely directed spans between which a plurality of the caps are to be positioned, means for bringing said belt into contact with caps which are to be positioned between said spans, and reversible motor means for driving said belt to effect simultaneous rotation of caps between said spans with respect to the plurality of containers selectively to cap or to uncap these containers.

4,030,272
MEANS ON PACKING MACHINE

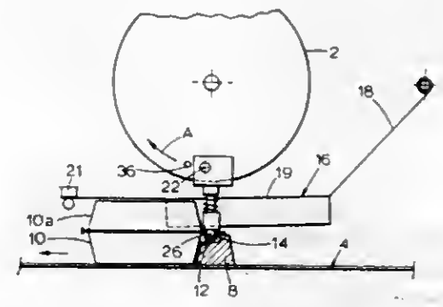
Marius Gundersen, Larvik, Norway, assignor to Vefi A/S, Norway

Filed May 19, 1976, Ser. No. 687,857

Claims priority, application Norway, May 28, 1975, 1890/75

Int. Cl.² B65B *7/26*

U.S. Cl. 53—376 **3 Claims**



1. An apparatus for closing containers with lids provided with complementary press-buttons snap-lock means which operates in connection with a packing machine including a conveyor belt for advancing the containers one after the other therethrough comprising a rotor wheel located above said conveyor belt, compression means located on said rotor wheel

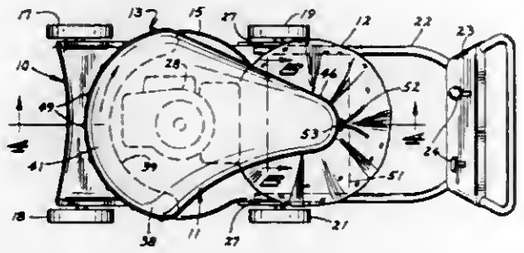
to successively press together and lock said press-button means during the successive passage of the containers on said belt, said compression means being pivotably suspended from said rotor wheel at the circumference thereof whereby said compression means will undergo angular pivotal movement to facilitate accommodation relative to the press-button means on the container due to the action of gravity, said compression means including a plunger rod means dimensioned to fit into the press-button means, said rod means being surrounded by a tube-like socket whereby the front surface of said socket comes into biasing engagement with the container surrounding the press-button means prior to the locking of the press-button means by the plunger rod means.

4,030,273

ROTARY CUTTING AND BAGGING MACHINE

Victor Leader, 21324 Lake George Drive NW., Cedar, Minn. 55011

Filed Jan. 28, 1976, Ser. No. 653,264
Int. Cl.² A01D *35/22, 53/06*
U.S. Cl. 56—13.4 8 Claims



1. A rotary mower and bagging chute for cutting grass and discharging the cut grass into a collection receptacle comprising a rotary mower having a housing, said housing including a top wall having front and rear portions and a continuous downwardly directed imperforate side wall extending entirely around the periphery of said top wall, motor means mounted generally centrally of said top wall and having a drive shaft extending therethrough, cutter blade means fixed to said drive shaft within said housing, said cutter blade means having lift portions for causing air and cut grass to move vertically upwardly, said front portion of said top wall having an arcuate opening substantially in alignment with said lift portions of said cutter blade means and symmetrical about the longitudinal axis of said housing, a hollow chute fixed to said top wall and extending substantially vertically upward therefrom, the lower portion of said chute having an arcuate cross-section generally complementary to the arcuate opening in said top wall, the arcuate lower portion of said chute partially surrounding said motor means, and the upper portion of said chute extending rearwardly over said motor means and communicating with a discharge opening located above said rear portion of said top wall for discharging cut grass into a collection receptacle on said rear portion, whereby the grass which has been cut by said cutter blade means is moved vertically upwardly into said lower portion of said chute without engaging said top wall and is discharged from the upper portion of said chute through said discharge opening.

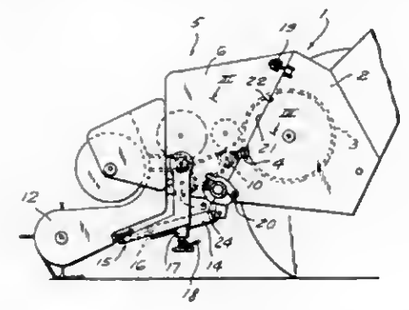
4,030,274

AGRICULTURAL MACHINE

Erwin Reber, and Fritz Schöllhorn, both of Saulgau, Germany, assignors to Josef Bautz GmbH, Saulgau, Wurttemberg, Germany

Filed Mar. 12, 1975, Ser. No. 557,668
Claims priority, application Germany, Mar. 15, 1974, 2412461
Int. Cl.² A01D *43/00*
U.S. Cl. 56—13.5 8 Claims

1. In an agricultural machine for picking up and chopping stalks and other materials, a combination comprising a first unit including a first housing having a leading end portion and a trailing end portion provided with a rearwardly facing open end, material pick-up means, and conveyor means in said first housing for receiving material from said pick-up means and conveying it to said open end; a second unit including a crop-receiving second housing having an open front end facing said open end of said first unit so as to receive the fed material therethrough, a rotary cutter head and a cooperating station-



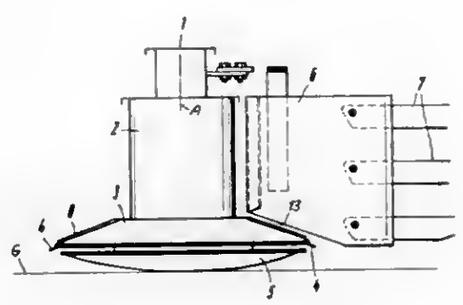
ary cutter bar in said second housing for chopping the material entering from said first housing; and quick-release coupling means for removably connecting said units to one another with said open ends in mutually facing relationship so that, upon disengagement of said units from one another, the components located in the interiors of said housing become accessible through the respective open ends thereof.

4,030,275

ROTARY MOWER

Hermann Ruprecht, Singen, Hohentwiel, Germany, assignor to Maschinenfabrik Fahr Aktiengesellschaft, Gottmadingen, Germany

Filed Jan. 12, 1976, Ser. No. 648,099
Claims priority, application Germany, Jan. 16, 1975, 2501642
Int. Cl.² A01D *57/30*
U.S. Cl. 56—192 9 Claims



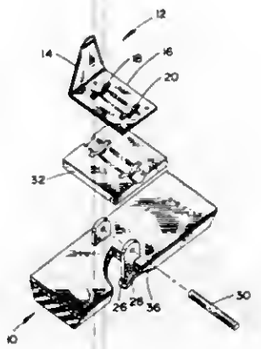
1. A rotary mower comprising:
a support displaceable along the ground;
a drum suspended from said support and rotatable relative thereto about an upright axis in a rotation sense;
a downwardly flared skirt on said drum;
a deflector plate secured to said support and having a lower edge spaced above and extending generally parallel to said skirt;
a ridge on said skirt displaceable on rotation of said drum underneath said lower edge, said ridge having a leading edge sweeping past said plate on rotation of said drum and juxtaposable with said lower edge, said edges including an acute angle between them upon juxtaposition of said edges; and
at least one blade secured to said skirt and extending generally radially therefrom.

4,030,276

INTEGRALLY MOLDED BELT WITH WORKING ELEMENT ATTACHED THERETO

Alfred L. Stecklein, Littleton, Colo., assignor to The Gates Rubber Company, Denver, Colo.

Filed June 8, 1973, Ser. No. 368,424
Int. Cl.² A01D *55/24*
U.S. Cl. 56—291 8 Claims



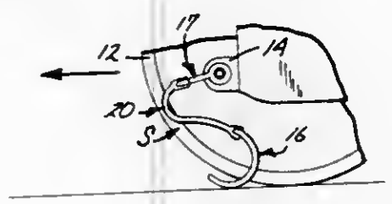
1. A power transmission belt adapted to perform work in addition to power transmission comprising:
at least two V-belts of substantially the same circumference and section arranged and spaced side-by-side in transverse alignment, the belts attached together with an integral tie-band at a radially outer surface of each V-belt to define an integral carrier belt;
at least one operative element disposed exteriorly of the carrier belt, the element having at least two spaced attaching portions oriented transversely of the carrier belt;
fastening means for attaching the operative element in at least two places to at least two V-belt transversely aligned portions of the carrier belt, the fastening means of each V-belt in substantially lineal alignment with each other at substantially ninety degrees in relation to the belt;
whereby the spaced attaching portions in cooperation with the fastening means enhances torsional rigidity of the carrier belt and stabilizes movements of the operative element transversely of the carrier belt.

4,030,277

MOWER REAR SHIELD STRUCTURE

Herman P. Christopherson, Burnsville, Minn., assignor to The Toro Company, Minneapolis, Minn.

Filed July 3, 1974, Ser. No. 485,379
Int. Cl.² A01D *75/20*
U.S. Cl. 56—320.1 10 Claims



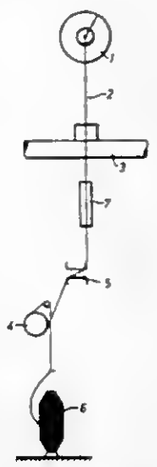
1. A rear shield for a power mower comprising, in combination:
a strip of flexible material;
means extending along one edge of the strip for supporting it behind a mower;
and means including a downwardly convex rigid strip of substantially hemi-cylindrical cross section extending along the other edge of said strip for rendering said edge substantially less flexible;
the total width of said strip and the first and second named means being such that when the shield is mounted on the mower the last named means is in contact with the surface being mowed.

4,030,278

HIGHLY ELASTIC CRIMP YARN

Karl-August Heinroth; Theo Dietrich; Hans Bach, and Hans-Dieter Jurischka, all of Dormagen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation of Ser. No. 187,702, Oct. 8, 1971, abandoned.
This application Jan. 13, 1975, Ser. No. 540,728
Claims priority, application Germany, Oct. 8, 1970, 2049357
Int. Cl.² D01H *7/92;* D02G *1/100*
U.S. Cl. 57—34 HS 2 Claims



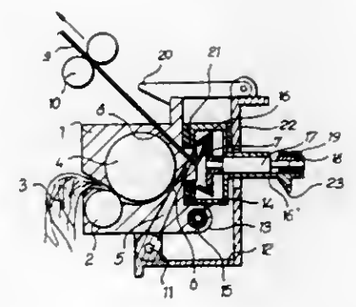
1. An apparatus for the production of a highly elastic crimped yarn by stretch texturising using the false-twist method and setting a synthetic endless filament comprising a supply unit of a stretch-texturising machine, a drafting roller, an internal friction twist-imparting unit and a contact heating rail, the spacing between the twisting unit and the heating rail being between 150 and 30 mm, the heating rail having a roughened contact surface and a length of at most 400 mm and means for separately controlling the speed of the drafting roller and the twist imparting unit being separately controllable.

4,030,279

HIGH-SPEED SPINDLE HOLDER SUSPENSION FOR OPEN-END SPINNING MACHINES

Miroslav Rambousek; Ladislav Kapl, and Milos Mladek, all of Usti nad Orlice, Czechoslovakia, assignors to Elitex, Zavody textilnibo strojirenstvi, generalni reditalstvi, Liberec, Czechoslovakia

Filed Dec. 1, 1975, Ser. No. 636,433
Claims priority, application Czechoslovakia, Nov. 29, 1974, 8171/74
Int. Cl² D01H *1/12, 7/00, 13/26*
U.S. Cl. 57—58.89 5 Claims



1. In a high-speed open-end spinning machine having a body

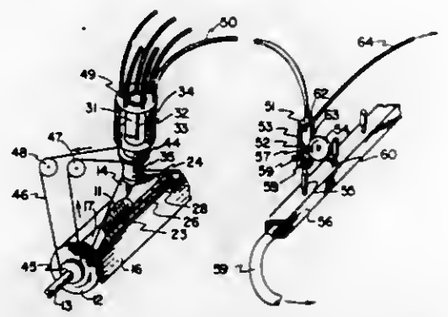
upon which there is pivotally mounted a holder for a high-speed spindle, the improved pivotal mounting means which comprises a sleeve and a pivot pin extending into the sleeve, the sleeve bieng connected to one of the body and the holder, and the pivot pin being conncted to the other of the body and the holder, and a resilient damping element disposed between the contact surfaces of the sleeve and pin and having a flange which separates the front contact surfaces of the sleeve and the holder.

4,030,280

FIBER BLENDING, SUBDIVIDING, AND DISTRIBUTING SYSTEM

Craig L. Folk, New Orleans, and James I. Kotter, Mandeville, both of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Jan. 7, 1976, Ser. No. 647,244
Int. Cl.² D01H *1/12*; **D01G** *23/08*
U.S. Cl. 57—58.95 **37 Claims**



1. An apparatus for removing textile fibers from a single source, transporting, collecting, blending, subdividing, and distributing said fibers in equal amounts to multiple remote locations, whereby said fibers are continuously assembled into uniform ribbons for subsequent textile processing or supplied directly to open-end spinning units comprising in combination:

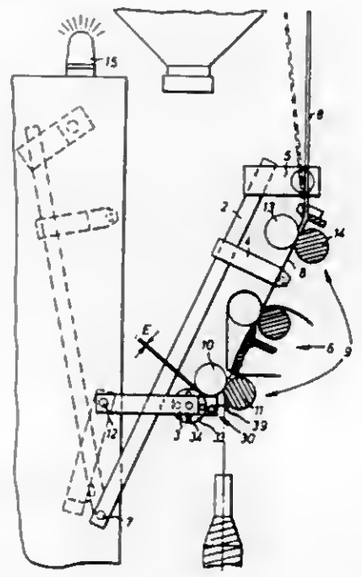
a. a fiber feeding means comprising:
   1. a cylinder supported and driven by a shaft,
   2. a pneumatic system drawing air from the atmosphere across the circumference or pheripbery of said cylinder by means of
      A. a vacuum suction, said fiber feeding means discharging into
b. a collecting means comprising a transitional duct encompassing a rectangular to round cross-section with multiple internal baffles, said baffles serving as a means of maintaining equal air velocity gradient across the transitional duct to equally disperse fibers through a round fiber outlet, said round outlet also serving as a journal and pneumatic seal for
c. a fiber distribution means comprising:
   1. a rotating fiber entrance tube, longitudinally slotted and disbursing fibers into
   2. a cylindrical chamber wherein the fibers are intimately blended and sub-divided into multiple outlets
   3. a negative air pressure means for transporting said fibers into said cylindrical chamber,
d. a means of transporting the fibers from the multiple outlets to a multiplicity/plurality of condensing units or open-end spinners comprising a plurality of tubes,
e. a condensing unit comprising a grid surface to separate fibers from the airstream and
f. a rotatable take-out cylinder adjacent to and in contact with each fiber condenser forming a pneumatic seal, and in close proximity to the grid surface within the condenser, rotating at a low speed, thereby withdrawing fibers from the confines of said condenser resulting in a continuous forming of a fiber ribbon, at a determined production rate,
g. a curved deflection plate in close proximity to the rotating take-out cylinder serving as a guide for feeding the newly formed fibrous ribbon to a subsequent process.

4,030,281

SURVEYING DEVICE

Alf Schopper, Meyrin, and Jean Linder, Genf, both of Switzerland, assignors to Heberlein Hispano S.A., Vernier-Genf, Switzerland

Filed Aug. 19, 1975, Ser. No. 605,937
Claims priority, application Switzerland, Sept. 3, 1974, 11986/74
Int. Cl.² D01H *13/18*, *13/26*
U.S. Cl. 57—87 **6 Claims**



1. Surveying apparatus on an automatic knotting device movable along a spindle row in a texile machine including drafting devices respectively allocated to spindles for drafting rovings passing to said spindles, each said drafting devices including a pair of output delivery rollers between which roving is delivered to the associated spindle, said surveying apparatus comprising a lever pivotally mounted on the casing of the automatic knotting device, a first detecting device for checking the passage of roving through said drafting device, a device for pinching and interrupting the roving feed to said drafting devices, said first detecting device and said pinching and interrupting device being mounted on said lever, said lever being pivotable into and away from positions in which said first detecting device and said pinching and interrupting device are operatively related to the roving fed to and passing through said drafting devices, a member movably mounted on the casing of the automatic knotting device, a second detecting device for detecting the wrapping or roving around either one of said output delivery rollers, said second detecting device being mounted on said member and said member being movable into and away from a position in which said second detecting device is operatively related to said output delivery rollers.

4,030,282

RESILIENT SUPPORT FOR SPINNING-RING OR TWISTING-RING BEARING

Alfons Spies, Munich, Germany, assignor to Dr. Johannes Heidenhain GmbH, Traunreut, Germany

Filed July 24, 1975, Ser. No. 598,790
Claims priority, application Germany, July 25, 1974, 2435771
Int. Cl.² D01H *7/56*, *7/64*
U.S. Cl. 57—124 **6 Claims**

1. In an air bearing for a spinning or twisting ring and including a spinning stand, a stator, and a rotor, the improvement comprising

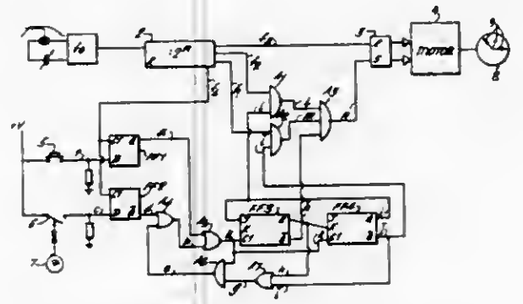
an absorber-damper support system for resiliently supporting the stator on said stand, an including two oppositely disposed and spaced apart ring segments composed of resilient material, each said ring segment being disposed between and secured with relation to said stator and said stand thereby to support said stator with respect to said stand, with a resiliency which varies circumferentially around said support system.

4,030,283

ELECTRICALLY DRIVEN TIME PIECE WITH MEANS FOR EFFECTING A PRECISE SETTING OF TIME

Pierre A. Sauthier, Bruegg, and Cyril Vuilleumier, Blenne, both of Switzerland, assignors to Societe Suisse Pour l'Industrie Horlogere Management Services S.A., Blenne, Switzerland

Filed Mar. 24, 1975, Ser. No. 561,344
Claims priority, application United Kingdom, Mar. 25, 1974, 13090/74
Int. Cl.² G04C *3/00*
U.S. Cl. 58—23 R **10 Claims**



1. An electrically driven timepiece comprising:

time display means including a seconds display means;

a source of timing pulses;

frequency divider means responsive to said timing pulses for producing display advancing pulses;

logic circuit means responsive to said display advancing pulses for controlling application of said display advancing pulses to said seconds display means;

a modulo-three counter having a first stable state for selectively controlling said logic circuit means to apply said display advancing pulses to said seconds display means at a first normal rate, a second stable state for controlling said logic circuit means to apply pulses to said seconds display means at a second faster than normal rate, and a third stable state controlling said logic circuit means to block said display advancing pulses altogether; and,

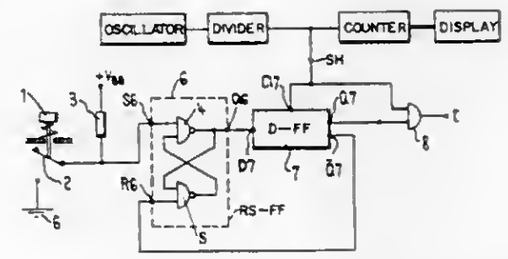
switch means actuable by the user of said timepiece, for advancing said counter in sequence from said first stable state to second to said third and back to said first stable state.

4,030,284

CONTROL DEVICE FOR AN ELECTRONIC WRIST WATCH

Hubert Portmann, Colombier, Switzerland, assignor to Ebauches S.A., Neuchatel, Switzerland

Filed Nov. 25, 1975, Ser. No. 635,088
Claims priority, application Switzerland, Dec. 11, 1974, 16371/74
Int. Cl.² G04C *3/00*
U.S. Cl. 58—23 R **4 Claims**



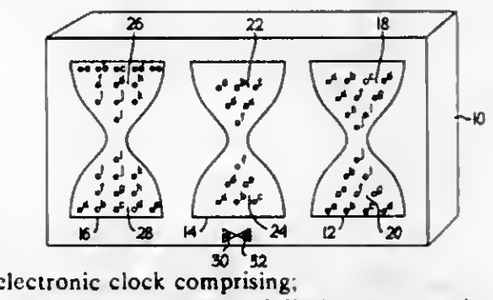
1. A control device of an electronic time-piece, comprising a push-button switch for providing a control signal, a memory element for memorizing said control signal, a delay means, a clock signal line, and a logic gate having inputs connected to an output of said delay means and to said clock signal line only, an input of said delay means being connected to said clock signal line, information from said memory element being transmitted in synchronism with a clock signal from said clock signal line through said delay means and said logic gate, the said information transmitted by the delay means erasing the contents of said memory element when the control signal has ceased.

4,030,285

ELECTRONIC HOUR GLASS CLOCK

Harshadrai D. Sheth, 32522 Jactynn Drive, Union City, Calif. 94587

Filed Jan. 2, 1976, Ser. No. 646,150
Int. Cl.² G04C *3/00*; **G04B** *19/06*
U.S. Cl. 58—50 R **22 Claims**



1. An electronic clock comprising;

a display having first and second display areas, each of said areas having a plurality of display elements, switchable between first and second display states in response to supplied control signals, each of said elements in said first display area being associated with a corresponding element in said second display area; and

electronic control means for providing a sequence of said control signals to said display, to cause successive ones of said element in said first display area to be changed from said first to said second display state at selected time

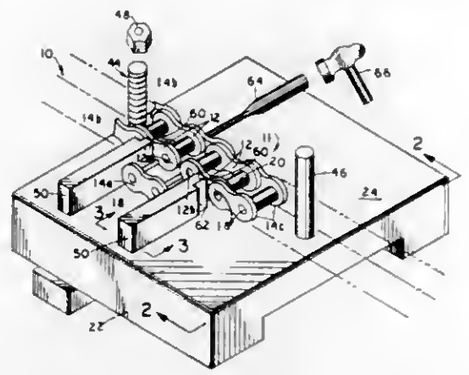
intervals, and to simultaneously cause the element corresponding thereto in said second display area to be changed from said second to said first display state and for additionally providing reset signals to cause selected elements in said first area to be in said first display state and selected elements in said second area to be in said second display state after a time period comprising a selected number of said time intervals.

4,030,286

LINK DRIVE CHAIN REPAIR TOOL

Frank Gibilaro, 55 Ferndale Court, Copiague, Long Island, N.Y. 11726

Filed July 19, 1976, Ser. No. 706,269
Int. Cl.² B21L *21/00*
U.S. Cl. 59—7 **6 Claims**



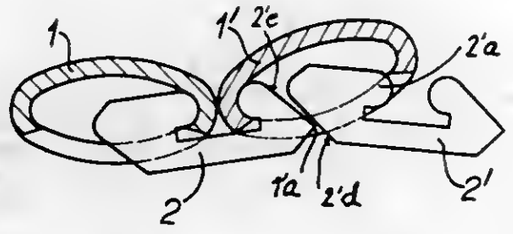
1. A link drive chain repair tool comprising in combination:
a base plate having upper and lower faces;
a pair of longitudinally aligned stud elements mounted on said base plate and projecting upwardly from the upper face thereof;
a pair of link support members mounted on said upper face of said base plate intermediate said stud elements to one side thereof and extending in spaced parallel relation to each other so as to provide lateral bearing support for an adjacent pair of inner chain links during removal and replacement of an outer link connecting said inner links;
and clamping means depending from said base plate adapted to clamp said tool to a portion of a machine driven by the link drive chain which underlies the drive chain.

4,030,287

ARTICULATED BRACELET

Roland Magnin, 32, rue des Noirettes, 1227 Carouge, Switzerland

Filed Jan. 23, 1976, Ser. No. 651,793
Claims priority, application Switzerland, Jan. 27, 1975, 936/75
Int. Cl.² F16G *15/04*
U.S. Cl. 59—85 **4 Claims**



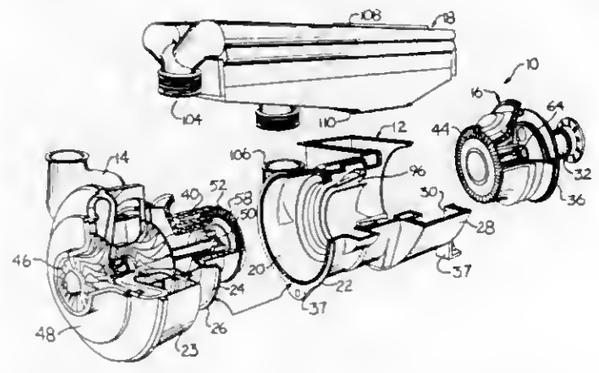
1. A bracelet, comprising:
a chain of outer, tubular links of oval cross-section, each outer link having an outer face, normally visible, exposed when the bracelet is worn, and an inner face, defining an opening; and
pairs of inner links, each having mutually facing, rounded, terminal hook portions for pivotal action against mutually adjacent rounded inner surfaces of said outer links, each inner link having its terminal hook portions extending into the openings of a pair of mutually adjacent ones of the outer links, to normally interconnect the outer links by the inner links.

4,030,288

MODULAR GAS TURBINE ENGINE ASSEMBLY

Warren Wiley Davis, Dunlap, and David Edward Keedy, Pekin, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Nov. 10, 1975, Ser. No. 630,476
Int. Cl.² F02C *3/10, 7/20*
U.S. Cl. 60—39.16 R **25 Claims**



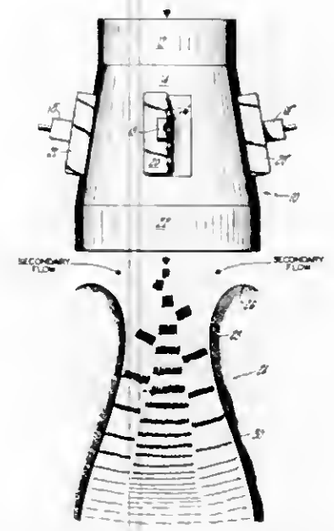
1. A modular gas turbine engine assembly, comprising:
1. a tubular case;
2. a gasifier module having a first tubular housing releasably secured with a first end thereof adjacent a first end of said case with the axis of said first housing aligned generally with the axis of said case, a compressor generally within a second end of said first housing, a combustor generally extending outwardly from said first end of said first housing, and a first shaft extending from said compressor to adjacent said combustor;
3. a gasifier turbine extending outwardly radially from said first shaft and having first blades positioned to be in the path of exhaust gases exiting said combustor to drive said first shaft and thereby drive said compressor;
4. a power output module having a second tubular housing releasably secured with a first end thereof adjacent a second end of said case with the axis of said case, a power turbine generally extending outwardly from said first end of said second housing having second blades positioned to be in the path of exhaust gases exiting said gasifier turbine, output gear means, and a second shaft driven by said power turbine and driving said output gear means;
5. annular channel means extending interiorly from said case intermediate said first and second extending means for directing said exhaust gases from said first blades to said second blades;
6. first flange means attached to the interior of said case and extending inwardly within said case generally towards said combustor;
7. second flange means attached to the interior of said case and extending inwardly within said case generally towards said power turbine;
8. first slidable sealing means for slidably adjustably sealing said gasifier module adjacent said combustor to said first extending means; and
9. second slidable sealing means for sealing said power output module adjacent said power turbine to said second extending means.

4,030,289

THRUST AUGMENTATION TECHNIQUE AND APPARATUS

Robert F. Kampe, West Hartford, Conn., assignor to Chandler Evans Inc., West Hartford, Conn.

Filed Oct. 29, 1973, Ser. No. 410,606
Int. Cl.² F23R *1/00*
U.S. Cl. 60—204 **7 Claims**



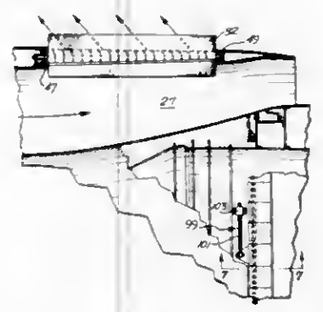
1. A method of thrust augmentation comprising the steps of:
generating a stream of primary gas, said stream having a normal flow axis;
varying the angular direction flow of the primary gas stream with respect to its normal axis at a sufficiently rapid rate to interrupt the stream to produce gas pulses traveling in different angular directions in a predetermined sequence; and
directing the gas pulses to an eductor, rarefraction of ambient air behind each pulse and compression of the ambient air past the eductor.

4,030,290

JET ENGINE THRUST REVERSER

Claude R. Stachowiak, Renton, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Nov. 6, 1974, Ser. No. 521,264
Int. Cl.² F02K *3/02*
U.S. Cl. 60—226 A **15 Claims**



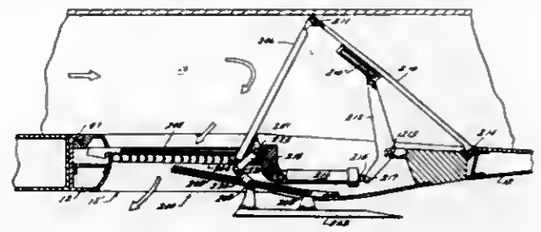
1. A thrust reverser for a jet engine comprising a nacelle and a turbine, said nacelle surrounding said turbine in a manner such that an air duct is located aft of the turbine, said thrust reverser comprising:
1. a cascade section including:
a. a plurality of elongated cascade elements mounted in the nacelle of said jet engine aft of said turbine so as to be rotatably movable about spaced, generally parallel longitudinal axes that lie generally parallel to the longitudinal axis of said jet engine between a closed position whereat said cascade elements form a portion of the outer wall of said nacelle and a portion of the outer wall of the aft air duct of said jet engine and an open position whereat said cascade elements form a passageway between said aft air duct and the exterior of said nacelle, each of said cascade elements including a plurality of spaced, curved vanes lying along their respective longitudinal axes and positioned so as to direct air from said aft air duct generally toward the air intake end of said jet engine when said cascade elements are in their open position, said plurality of cascade elements each further including inner and outer panels affixed to and mounted on opposed edges of said spaced, curved vanes such that said plurality of spaced, curved vanes and said inner and outer panels rotate together as said cascade elements rotate about said spaced, generally parallel longitudinal axes, said inner and outer panels positioned such that said inner panels form said portion of the outer wall of said air duct and said outer panels form said portion of the outer wall of said nacelle when said cascade elements are in their closed positions; and
b. cascade element movement means attached to said cascade elements for moving said cascade elements between their open and closed positions; and,
2. an aft air duct blocker section including:
a. A plurality of blocker elements mounted in said aft air duct aft of said cascade section so as to be movable between a closed position whereat said blocker elements form a door adapted to block said aft air duct and an open position whereat said blocker elements are retracted to a position which allows air to flow through said aft air duct in a normal manner; and,
b. duct blocker movement means connected to said plurality of blocker elements for moving said plurality of blocker elements between their closed and open positions.

4,030,291

THRUST REVERSER FOR A GAS TURBOFAN ENGINE

Donald Farley Sargisson, Cincinnati, Ohio, assignor to General Electric Company, Lynn, Mass.

Filed Jan. 2, 1976, Ser. No. 646,074
Int. Cl.² F02C *3/06;* **F02K** *3/06, 1/20*
U.S. Cl. 60—226 A **1 Claim**



1. A thrust reverser system for a gas turbine engine of the type which includes an outer nacelle spaced apart from a core engine to define an annular bypass duct therebetween and having a fan disposed in the inlet for providing compressed air to the bypass duct and core engine wherein the thrust reverser system is incorporated into the nacelle immediately downstream of the fan and includes a plurality of circumferentially spaced thrust reversers each comprising:
a passageway through the nacelle having a plurality of turning vanes disposed therein;
an outer door translatably mounted to the nacelle and movable between an open position wherein the passageway is uncovered and a closed position wherein the passageway is covered and including a plurality of rollers which slidingly engage a beam track diagonally spanning the turning vanes;

a blocker door disposed to be movable between an open position wherein the bypass duct flow is obtruded by the blocker door at a point downstream of the passageway and a closed position wherein the bypass duct flow is unobtruded by the blocker door, said blocker door including a roller at its upstream end which slidingly engages a second track spaced radially inward from and spanning the turning vanes and having its upstream end also joined to one of the outer door rollers by a pair of pivotally connected links;

a support door having its upstream end hinged to the downstream end of the blocker door, its downstream end hinged to the nacelle at a point downstream of the turning vanes, and

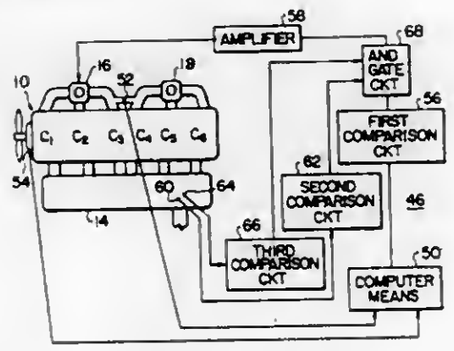
linear actuator means for simultaneously moving the outer door and blocker door between their respective open and closed positions, comprising a bell crank lever having its upstream end mounted in sliding engagement with a track disposed on the support door, hinged downstream of its midspan to the outer nacelle at a point upstream of the downstream end of the support door and having its downstream end pivotally mounted to the actuating arm of a linear actuator, whereby linear movement of the actuating arms in the upstream direction causes the blocker door to translate downstream along the second track while rotating radially inward and the outer door to simultaneously translate downstream along the beam track.

4,030,292

METHOD AND APPARATUS OF CONTROLLING AN AIR FUEL MIXTURE FOR A MULTI-CYLINDER INTERNAL COMBUSTION ENGINE

Kenji Masaki, No. 30-8, Nagahama, Kanazawa, Yokohama, and Hidehiro Minami, No. 18, Nojima-cho, Kanazawa, Yokohama, both of Japan

Filed June 11, 1975, Ser. No. 585,828
Claims priority, application Japan, June 13, 1974, 49-67464
Int. Cl.² F02B *75/10*
U.S. Cl. 60—274 11 Claims



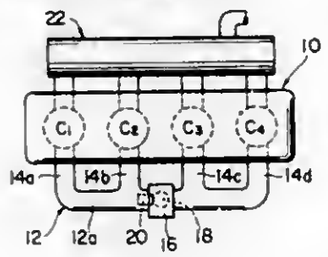
1. An apparatus for controlling an air-fuel mixture for a multi-cylinder internal combustion engine, comprising first mixture feeding means for feeding a relatively rich air-fuel mixture having an air-fuel ratio lower than a predetermined air-fuel ratio and a relatively lean air-fuel mixture having an air-fuel ratio higher than said predetermined air-fuel ratio to a first cylinder of a multi-cylinder internal combustion engine, second mixture feeding means for feeding a relatively lean air-fuel mixture having said air-fuel ratio higher than said predetermined air-fuel ratio to a second cylinder of said engine during operation of said engine, and control means for controlling said first mixture feeding means in accordance with an operating parameter of said engine to feed said relatively rich air-fuel mixture during a first operation of said engine when an exhaust gas treating device of said engine is inactive to oxidize burnable harmful components in the exhaust gas discharged from said engine and to feed said relatively lean air-fuel mixture during a second operation of said engine when said exhaust gas treating device is active to oxidize said burnable harmful components, in which said first and second mixture feeding means comprise first and second carburetors, respectively, said first carburetor comprising mixture enriching means operative to enrich a fuel mixture fed by said first carburetor from said relatively lean air-fuel mixture to said relatively rich air-fuel mixture, said control means rendering said mixture enriching means inoperative in response to an engine load in excess of low load.

4,030,293

MULTI-CYLINDER INTERNAL COMBUSTION ENGINE

Yoshitaka Hata, Fujisawa, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed May 16, 1975, Ser. No. 578,152
Claims priority, application Japan, May 20, 1974, 49-56850
Int. Cl.² F02B *75/10*
U.S. Cl. 60—285 8 Claims



1. A multi-cylinder internal combustion engine having a first group of cylinders consisting of at least half the total number of cylinders and a second group of cylinders consisting of the remaining cylinders, the engine comprising:

a carburetor for supplying an air-fuel mixture into all the cylinders;

an intake manifold including an elongate main runner, a first group of branch runners connected to said main runner and communicable with the first group of cylinders, a second group of branch runners connected to said main runner and communicable with the second group of cylinders, and a manifold riser connected to the central portion of said main runner and communicated with said carburetor;

means for obstructing the stream of a portion of liquid fuel flowing along the inner wall of said main runner toward the first group of cylinders, the liquid fuel being separated from the air-fuel mixture, said means including a fence plate disposed within a portion of said main runner between said manifold riser and one of the first group of branch runners, most adjacent said manifold riser, said fence plate being disposed at the upper portion of the inner wall of said main runner to which said manifold riser is connected, to form a space between the end of said fence plate and the opposite lower portion of the inner wall of said main runner in order to obstruct the stream of the liquid fuel flowing along the upper portion of the inner wall of said main runner.

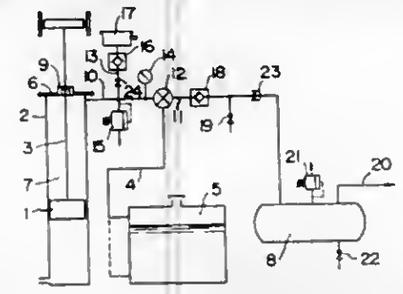
4,030,294

COMPRESSED AIR GENERATING DEVICE FOR FORKLIFT TRUCKS

Teisuke Ishida, Mito, Japan, assignor to Japan Patent Center Inc., Tokyo, Japan

Filed Mar. 24, 1976, Ser. No. 669,916
Int. Cl.² F15B *11/06*
U.S. Cl. 60—407 1 Claim

1. In a compressed air generating device for forklift trucks, the improvement in which a main pipeline connected to an end of a lift cylinder air chamber brances into a high-pressure air pipe and a return pipe, selectively communicating with the main pipeline through a switching valve means, and when the main pipeline switches to communication with the high-pressure air pipe, during a descending phase of a piston in the lift cylinder, air is sucked through an air suction pipe attached to



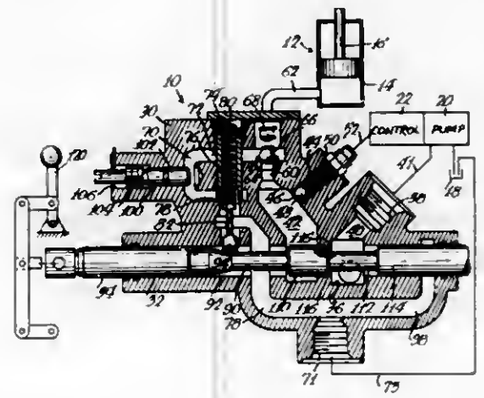
the main pipeline into the lift cylinder air chamber, and during a rising phase of the piston, the air in the air chamber is compressed and is sent into an air tank as compressed air.

4,030,295

CONTROL VALVE FOR TRACTOR-IMPLEMENT HYDRAULIC SYSTEM

Ramkishan Khatti, Racine, and Patrick M. Lourigan, Kenosha, both of Wis., assignors to J. I. Case Company, Racine, Wis.

Filed June 3, 1976, Ser. No. 692,293
Int. Cl.² F16H *39/46*
U.S. Cl. 60—445 4 Claims



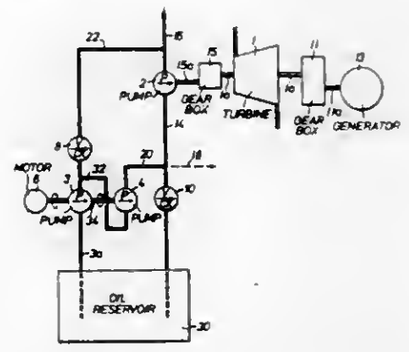
1. In a tractor-implement hydraulic system having a valve interposed between a one-way implement-actuating assembly including a cylinder and piston, a reservoir and a variable displacement pressure compensated pump having pressure compensating means, said valve including a valve housing having a valve bore with a valve spool slidable in said bore, an inlet chamber in communication with said pump and said bore, a pressure chamber in communication with said bore at a location spaced from said inlet chamber, a first passage in said housing connected to said pressure compensating means and to said pressure chamber with unidirectional valve means in said first passage limiting flow from said pressure chamber to said pressure compensating means, a second passage in said housing connected to one end of said cylinder and in communication with said pressure chamber with unidirectional valve means in said second passage limiting flow from said pressure chamber to said cylinder, and a third passage in said housing connected to said one end of said cylinder and said reservoir, said third passage having means therein normally blocking flow through said passage, so that movement of said valve spool in one direction from a neutral position will interconnect said chambers to pressurize said pressure chamber and open both unidirectional valve means and movement of said valve spool in an opposite direction from said neutral position will open said third passage to connect said cylinder to said reservoir.

4,030,296

HYDRAULIC DEVICE FOR ROTATING A TURBINE

Hans Deinlein-Kalb, Nurnberg, Germany, assignor to AEG-Kanis Turbinenfabrik GmbH, Germany

Filed Apr. 8, 1976, Ser. No. 674,909
Claims priority, application Germany, Apr. 18, 1975, 2517187; Mar. 11, 1976, 7512424[U]
Int. Cl.² F15B *13/09*
U.S. Cl. 60—486 3 Claims



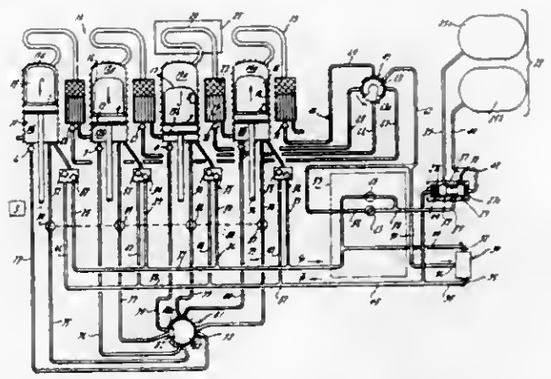
1. A device for rotating a turbine, particularly during starting, comprising a positive displacement-type main oil pump having a main oil pump suction, and having a shaft connected to the turbine and normally driven by the turbine, an auxiliary oil pump, a high-pressure oil pump having a discharge which is adapted to be connected for supplying bearing oil pressure and which is connected to said suction of said main oil pump, said auxiliary oil pump being mechanically coupled to said high-pressure oil pump and being hydraulically connected in series to said high-pressure oil pump, said high-pressure pump being connected to discharge to said main oil pressure pump suction to drive said main oil pressure pump as a motor when the speed of the turbine is low enough so that the main oil pressure pump does not deliver a quantity of oil sufficient to prevent a buildup of pressure in the suction of said main oil pressure pump.

4,030,297

HYDROGEN COMPRESSION SYSTEM FOR STIRLING ENGINE POWER CONTROL

Don B. Kantz, Ferndale, and Tim F. Lezotte, Dearborn, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed June 28, 1976, Ser. No. 700,678
Int. Cl.² F02G *1/06*
U.S. Cl. 60—521 7 Claims

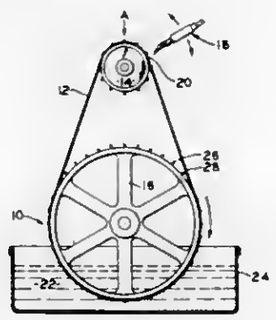


1. For use in a regenerative Stirling engine employing a plurality of double-acting pistons, each operating within a cylinder to define therein hot and cold chambers on opposed sides of each of said pistons, an apparatus for controlling the power of said engine, comprising:

a. reservoir means regulated to maintain a predetermined pressure therein and being connected to said closed pressurized gas system,

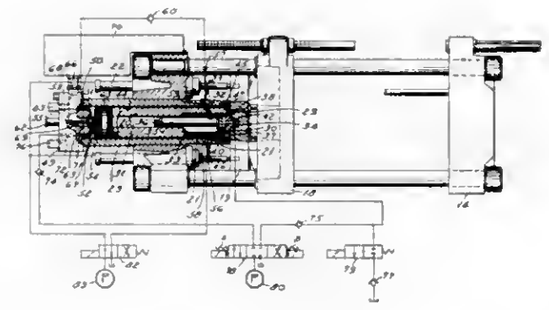
b. first means providing a reversible fluid communication for each one of said cold chambers and one of the next most adjacent hot chambers in series,
c. second means providing a one-way fluid communication between each of said cold chambers and said reservoir means, said communication permitting pressurized fluid flow from said cold chambers to said reservoir during steady state or reduced engine torque demand and when the pressure in any one of said cold chambers exceeds the pressure in said reservoir means,
d. third means providing a one-way fluid communication between said reservoir means and said cold chambers, said communication permitting pressurized fluid flow sequentially from said reservoir means to each one of said cold chambers during increased engine torque demand and when the pressure in said reservoir means exceeds the pressure in any one of said cold chambers, and
e. fourth means providing a one-way fluid communication between adjacent cold chambers, said communication being timed in phase relation to the operation of said piston so that the communication is permitted when the egressing cold chamber is undergoing or has completed compression and the ingressing cold chamber is preparing to undergo compression whereby fluid in said cold chambers is subjected to a staged pumping effect for increasing the mean pressure therein.

4,030,298
THERMAL MOTOR
Dante J. Sandoval, 6412 Pear Ave., Cleveland, Ohio 44102
Division of Ser. No. 527,254, Dec. 13, 1974. This application Feb. 19, 1976, Ser. No. 659,338
Int. Cl.² F03G *7/06*
U.S. Cl. 60—527 **9 Claims**



1. A device for the conversion of energy into mechanical motion comprising:
a housing;
a drive shaft mounted in said housing;
a plurality of reed like transdueers each having first and second ends, said transducers adapted to flex upon the application of stimulus, said transducers being rigidly attached in radial alignment to said drive shaft at said first ends and drivingly engaging said housing at said second ends, wherein stimulation of at least one of said transducers causes clockwise movement of said drive shaft, and stimulation of at least another of said transducers causes counterclockwise movement of said drive shaft; and,
means to apply stimulus first to at least one of said transducers, to cause reciprocating motion of said drive shaft.

4,030,299
INTENSIFIED CYLINDER ASSEMBLY
Donald L. Reuschel, Hamilton, and James W. Hendry, Holland, both of Mich., assignors to Ex-Cell-O Corporation, Troy, Mich.
Filed Dec. 20, 1974, Ser. No. 534,604
Int. Cl.² F15B *7/00*
U.S. Cl. 60—560 **9 Claims**

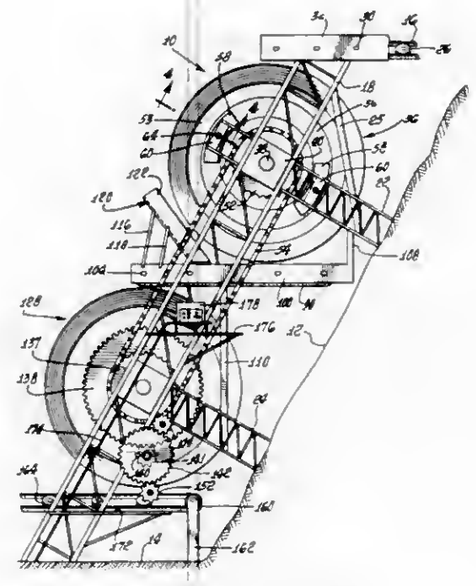


1. A ram and pressure intensifier device comprising,
a. a hydraulie cylinder means having a ram piston means disposed therein with said cylinder means connected to a fluid pressure switching means,
b. said ram piston means having a first and second bore means extending therethrough wherein said second bore means is vented to tank means from juncture of said first and second bore means by a passage means;
c. an intensifier piston means disposed in said (ram piston) first and second bore means wherein rod end of intensifier piston means is disposed in said first bore means and head end of said intensifier piston means is disposed in said second bore means;
d. head end of said second bore means and said pressure switching means in communication with a fluid pressure means; and
e. said intensifier piston means slideable in said ram piston means wherein said first bore means communicates with cylinder chamber means.

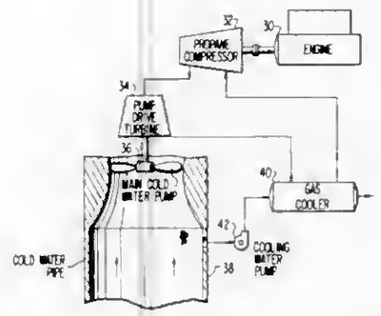
4,030,300
POWER GENERATING SYSTEM
William C. Thompson, P.O. Box 271, Desert Hot Springs, Calif. 92240
Continuation-in-part of Ser. No. 549,352, Feb. 12, 1975, abandoned. This application Aug. 10, 1976, Ser. No. 713,112
Int. Cl.² F03G *3/04*
U.S. Cl. 60—639 **21 Claims**

1. A gravity flow power generating system, comprising:
means for supplying solid material for gravity flow from a predetermined upper level;
a first wheel mounted for rotation on a substantially horizontal axis below said upper level for receiving said material flowing from said means;
peripheral pockets in said first wheel being open to the periphery thereof for carrying said material,
said material in said first wheel providing weight adjacent the periphery thereof to cause it to rotate,
said pockets when rotated to a predetermined lower level adapted to gravity discharge said material; and
material receiving means closely adjacent said first wheel to receive said material therefrom and to be driven by the rotation thereof,

said material receiving means being adapted to gravity discharge said material.

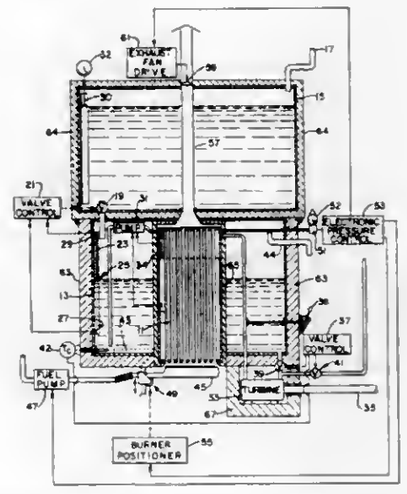


4,030,301
PUMP STARTING SYSTEM FOR SEA THERMAL POWER PLANT
James H. Anderson, York, Pa., assignor to Sea Solar Power, Inc., York, Pa.
Filed June 24, 1976, Ser. No. 699,245
Int. Cl.² F03G *7/04;* **F01K** *23/06*
U.S. Cl. 60—641 **2 Claims**



1. In a power generating plant of the gaseous fluid turbine powered type for operation on or near the surface of an ocean and which uses ocean surface water as a source of heat for the boiler and cold water pumped from substantial depths to absorb heat from the working fluid, an auxiliary drive for the water pumps for starting up and other times when the main system is not operating comprising:
a gas turbine connected to drive at least one of the pumps;
a prime mover;
a compressor connected to be driven by said prime mover;
a gas cooler;
means connecting said compressor, said turbine and said gas cooler in a closed fluid loop so that high pressure gas from said compressor supplies motive fluid to said gas turbine, the exhaust gas of said gas turbine being connected to said cooler and back to the suction side of said compressor:

4,030,302
STEAM POWER PLANT
Peter Mankouski, 90-16 54th Ave., Elmhurst, N.Y. 11373
Continuation-in-part of Ser. No. 596,601, July 17, 1975, abandoned. This application Apr. 6, 1976, Ser. No. 674,164
Int. Cl.² F01K *7/38;* **F22D** *1/32*
U.S. Cl. 60—667 **8 Claims**



1. A steam engine comprising a boiler for converting water to steam, a feedwater tank, means for pumping water from said feedwater tank to said boiler, a steam driven prime mover connected to receive and be driven by the steam generated in said boiler, valve means operable in a first condition to direct exhaust steam from said prime mover directly into the water in said feedwater tank at the bottom thereof and operable in a second condition to dump the exhaust steam from said prime mover externally of said feedwater tank, and means responsive to the temperature in said feedwater tank to control said valve means switching said valve means to said first condition whenever the temperature in said feedwater tank falls below a first predetermined temperature and switching said valve means to said second condition whenever the temperature in said feedwater tank rises above a second predetermined temperature greater than said first predetermined temperature.

4,030,303
WASTE HEAT REGENERATING SYSTEM
Robert A. Kraus, and Edmund J. Kraus, both of 14160 Redhill, Tustin, Calif. 92680
Filed Oct. 14, 1975, Ser. No. 622,266
Int. Cl.² F01K *25/04*
U.S. Cl. 60—688 **12 Claims**

1. A power-producing heat engine system, comprising a first closed, heat vapor power cycle;
incorporating a vertical-oriented, closed, partially heated and partially cooled, condensible fluid-vapor circulating system;
being connected in the proper sequence with the working fluid's circulation, and consisting of a boiler feed pump, a boiler heat-exchanger means having a separate heating fluid inlet and a heating fluid outlet, a hydrodynamic gas expander means and a condenser heat-exchanger means having a separate cooling fluid inlet and a cooling fluid outlet;
which arrangement comprises the continuous introduction of a liquid gas by pump to said boiler means at boiler pressure and its heating and evaporation therein, an adiabatic expansion of said heated vapor within said hydrodynamic expansion means to condenser pressure, the condensation of said vapor to initial state within said condenser means, and the reintroduction of said condensed gas by pump to boiler means, thus beginning a new cycle;
utilizing a condensible gas having a boiling point substantially lower than the condensation temperature of water at specific pressure;

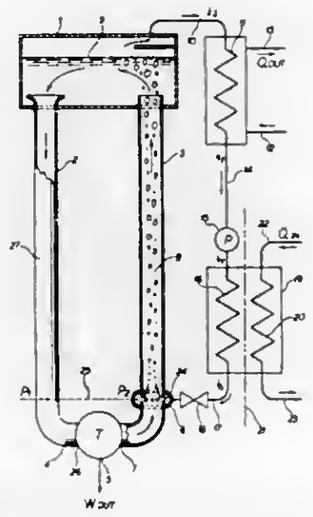
wherein said first heated vapor power cycle serves the purpose of continuously heating and cooling a quantity of said condensible gas;

which system further comprises a second closed hydrodynamic power extraction cycle, operating together with said first heated vapor cycle in an immiscible combined flow upward through their common tubular expansion means;

incorporating a vertically oriented, closed, non-condensible fluid circulation system, being connected in the proper sequence of said fluid's circulation, and consisting of a vertically oriented tubular gas expansion means having a gas inducer section at its lowermost portion, a hermetically sealed vapor separation means on the system's uppermost portion having a fluid inlet and a fluid outlet, as well as a vapor outlet, a vertically oriented tubular penstock, and a hydrodynamic power extraction turbine;

utilizing a non-compressible fluidic circulating medium;

wherein said first cycle's heated gas enters said second cycle's non-compressible fluid at said expansion means gas inducer section at a substantially higher pressure, to circulate immiscibly together through said common tubular expansion means, from its lowermost portion upwards, to be expanded therein into said separation means to condenser pressure and being separated from each other within said separation means;



whereafter, said expanded vapor, upon its separation from said non-compressible fluid, enters said condenser means to be condensed therein;

and said non-compressible fluid, upon its separation from said vapor, enters said vertically oriented fluid penstock in a downward flow, and through said turbine means at the system's lowermost portion, and on through said gas inducer means to begin a new cycle;

and in which power-producing system the introduction of said heated gas into said non-compressible fluid through said gas inducer section at the lowermost portion of said hydrodynamic expansion means, produces by virtue of said gas's expansion within said fluid and said vertical expansion means, the reduction of said common immiscibly upwards flowing mass' specific gravity as a whole;

as compared to the higher specific gravity of the separated downward flowing non-compressible fluid's mass, within the system's penstock;

giving rise to a difference in the hydrodynamic pressure heads between said turbine means' fluid inlet and its fluid outlet, thus giving rise to a circulation of said non-compressible fluid in the proper sequence through said second cycle's circulation system;

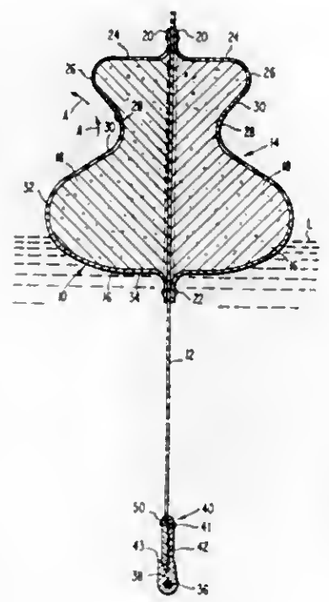
and in which system said turbine means is conveniently used for the conversion of said flowing fluid's kinetical energy, into rotary shaft work within said turbine means.

4,030,304

FLOATING BOOM

Robert E. West, Yardley, Pa., assignor to Cascade Industries, Incorporated, Edison, N.J.

Filed Mar. 17, 1976, Ser. No. 667,784
Int. Cl.² E02B *15/04, 3/00*
U.S. Cl. 61—1 F 1 Claim



1. A boom for restricting the movement of buoyant material beyond a predetermined area on the surface of water, comprising:

a. an elongated, flexible skirt;

b. float means attached to said skirt; adjacent one longitudinal edge portion thereof, and adapted for supporting the skirt buoyantly upon the surface of water in a position in which the skirt is disposed as a barrier for confining said pollutants;

c. means at opposite ends of each skirt for connecting the same to like boom structures, whereby to provide a continuous boom capable of being floated into place in position extending about said area within which the pollutants are to be confined;

d. an elongated, flexible tension element generally coextensive in length with the skirt and extending along the opposite longitudinal edge of said skirt; and

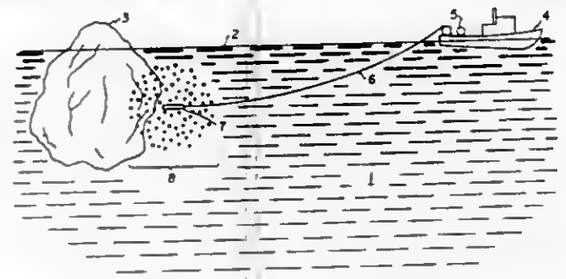
e. means for attaching said tension element to the skirt, the means for attaching the tension element being fixedly secured, at spaced locations along its length, both to the skirt and to the tension element, said tension element having exposed portions between the points of permanent securement thereof to said attaching means, whereby to relieve the skirt of stresses encountered during operation of the equipment, said means for attaching the tension element to the skirt comprising clamp assemblies spaced longitudinally of the skirt, each clamp assembly including a main clamp element having a longitudinal bore through which the tension element extends, and a second clamp element lockingly engageable with the main clamp element in position to deform and lock the skirt between the main and second clamp elements, said main and second clamp elements having confronting, serrated, mating locking faces in embracing relation to the skirt; said means for effecting permanent securement of the tension element to the skirt comprising swaging of the main clamp element to the tension element.

4,030,305

METHOD OF MOVING A FLOATING BODY INTO A PREDETERMINED FLOAT PATH

Leland Earl Wilson, Vanlose, Denmark, assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Sept. 23, 1976, Ser. No. 725,823
Int. Cl.² E02B *15/00;* B63B *51/00*
U.S. Cl. 61—1 R 5 Claims



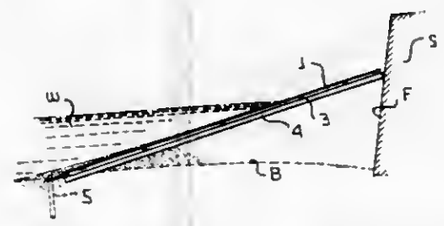
1. In a method for moving a body in a predetermined float path which is different from said body's natural drift path, said body floating in a liquid, the improvement comprising reducing the density of the liquid in which said body is floating, said reduction in density being generally in the direction of said predetermined float path, thereby providing a path of lesser resistance for travel for said body, said path of lesser resistance being in the general direction of said predetermined float path.

4,030,306

APPARATUS FOR PREVENTING EROSION OF THE SEABED IN FRONT OF HYDRAULIC STRUCTURES

Ole Fjord Larsen, 62 Fasanvaenget, P.O. Box 604, DK 6700, Esbjerg, Denmark

Filed Aug. 14, 1975, Ser. No. 604,548
Int. Cl.² E02B *3/04*
U.S. Cl. 61—3 5 Claims



1. The combination of a lengthy hydraulic structure having a steep generally upright uniplanar face, an upper end and a lower end, said lower end being disposed below an upper water level surface of a body of water, a sheet of flexible material, said sheet of flexible material being composed at least of first and second flexible layers, said sheet having upper and lower edge portions, said sheet being disposed at an acute angle to said upright face with said lower edge portion being contiguous a bed of said body of water and said upper edge portion being contiguous said upright face at a point spaced above said bed and below said upper end, said first and second layers including a plurality of perforations, said second layer overlying said first layer, said second layer being taut and said first layer being relatively loose, means for maintaining said sheet of material disposed at said acute angle, and said maintaining means including means for securing said upper and lower edge portions to said hydraulic structure and said bed, respectively.

4,030,307

IMPERMEABLE ECOLOGICAL BARRIER AND PROCESS OF MAKING SAME FROM RECONSTITUTED SHALE

Armen G. Avedisian, P.O. Box 669, Hinsdale, Ill. 60162

Filed June 14, 1976, Ser. No. 695,461
Int. Cl.² E02D *15/00*
U.S. Cl. 61—35 10 Claims

1. A process for reconstituting shale to make an ecologically impermeable geologic barrier along a wall comprising the steps of:

a. primarily crushing solid, as-mined shale selected from the group consisting of Maquoketa Group shale, a shale identified by the presence of Cornulite fossils in the upper part thereof, and shale which is high in illite mineral content, to produce a readily compactible aggregate having a progressive gradation of sizes;

b. mixing water with said shale to provide a wetted aggregate;

c. spreading said wetted aggregate along said wall; and

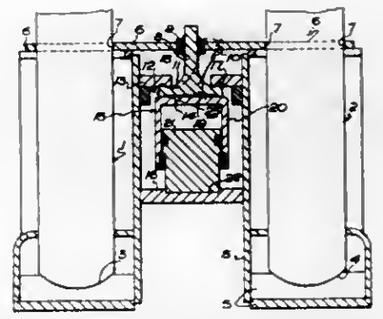
d. secondarily crushing and mixing said wetted aggregate in place against said wall to compact it to a substantially solid, impermeable state.

4,030,308

MINE ROOF SUPPORTS

Philip Dudley; Lewis Robert Bower, and Malcolm Wake, all of Wakefield, England, assignors to Fletcher Sutcliffe Wild Limited, England

Filed May 21, 1976, Ser. No. 688,939
Int. Cl.² E21D *15/44*
U.S. Cl. 61—45 D 26 Claims



1. A mine roof support comprising roof beam means, base member means, and a pair of hydraulically extensible chock legs connected at upper ends thereof in articulated manner to said roof beam means and connected at lower ends thereof in articulate manner to said base member means, and rigid yoke means spaced from the base member means between and connecting together said pair of chock legs, the yoke means containing projecting pin means secured in bearing means attached to the yoke means, said pin means having lateral base means, one side of said lateral base means contained between abutment means secured to the base member means, the other side of the lateral base means secured to one end of a permanent load applying means, the other end of the permanent load applying means being supported by the base member means, said permanent load applying means permanently loading said lateral base means against said abutment means.

4,030,309

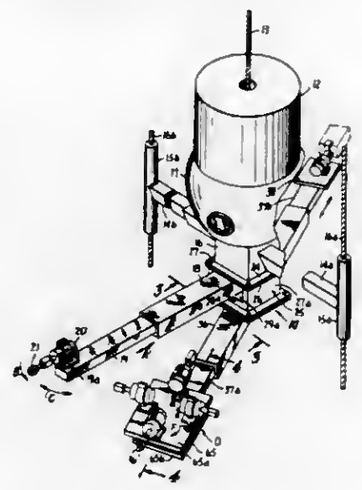
WORK ARM SYSTEM FOR SUBMERGIBLE CHAMBER

Burton Hoster Mason, Box 504, Covington, La. 70433

Filed May 18, 1976, Ser. No. 687,549
Int. Cl.² B63C *11/40*
U.S. Cl. 61—69 R 14 Claims

1. A work arm system for a submergible chamber comprising, a submergible chamber, means mounted to and outwardly disposed from the chamber to hold said chamber at a submerged depth adjacent a work area, first and second work

arms rotatably mounted to said chamber, said arms being in spaced relationship along the axis of the chamber, and where in said second extends outwardly from the chamber in two



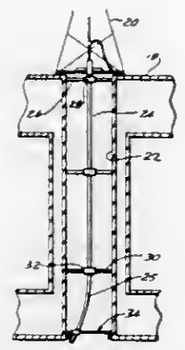
directions, and means at at least one end of each arm to mount a tool, so that the tool mount ends of at least two arms may be opposed to the work area.

4,030,310

MONOPOD DRILLING PLATFORM WITH DIRECTIONAL DRILLING

Joseph F. Schirtzinger, Pasadena, Calif., assignor to Sea-Log Corporation, Pasadena, Calif.

Filed Mar. 4, 1976, Ser. No. 664,011
Int. Cl.² E21B *7/12, 7/04, 15/02*
U.S. Cl. 61—86 **10 Claims**



1. Apparatus for providing directional drilling from a monopod ocean drilling platform having a submerged base, a column extending up from the base and supporting a platform above the water, the column having a vertical moon pool extending downwardly from the platform and opening in the base, comprising:

a conductor pipe for receiving a drill stem extending from the platform through the moon pool, at least a portion of the conductor pipe curving in an arc,

means rotatably supporting the conductor pipe in the moon pool adjacent the upper end,

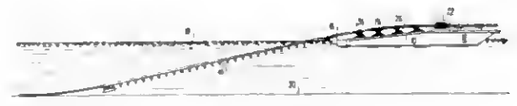
means supporting the conductor pipe in the moon pool adjacent the lower end at a position displaced from the center of the moon pool, and means for rotating said means supporting the conductor pipe about a vertical axis offset from the position of the conductor pipe.

4,030,311

METHOD AND APPARATUS FOR ADJUSTABLY SUPPORTING A PIPELINE RELATIVE TO A LAY VESSEL

Andrew J. Rafferty, Houston, Tex., assignor to Brown & Root, Inc., Houston, Tex.

Filed Jan. 19, 1976, Ser. No. 650,530
Int. Cl.² F16L *1/00*
U.S. Cl. 61—108 **10 Claims**



1. In a pipe laying apparatus including

a floating lay vessel,

a ramp extending generally longitudinally of the lay vessel and carried thereby,

a pipeline portion superposed on said ramp, and

a shoe carried by said ramp and adjustably supporting a portion of said pipeline on said ramp,

said shoe including cradling means for supporting the pipeline in longitudinally movable relation with the ramp, said cradling means simultaneously contacting opposite side portions of the underside of said pipeline;

the improvement in said shoe comprising:

elongated pivoting means, extending at least in part generally longitudinally of said ramp, for alternately raising and lowering said cradling means relative to the ramp, aaid elongated pivoting means being pivotally connected by first pivot means to the surface of the ramp and by second pivot means to said cradling means;

said first and second pivot means being mutually displaced longitudinally of said ramp, with said elongated pivoting means extending therebetween and defining a lifting lever arm extending between said ramp and said cradling means; and

rotating means for rotating said lifting lever arm about said first pivot means to support said pipeline relative to the ramp of the lay vessel;

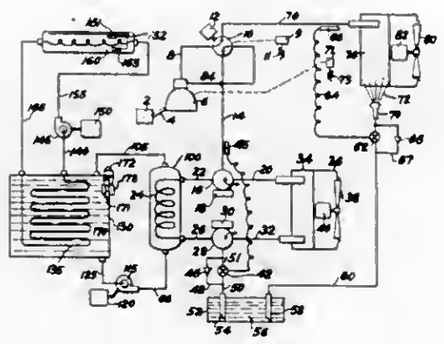
said cradling means, said lifting lever arm, and said rotating means being disposed entirely above, and not penetrating said ramp.

4,030,312

HEAT PUMPS WITH SOLAR HEAT SOURCE

Mark Wallin, Philadelphia, Pa., and Aaron Shantzer, deceased, late of Bucks County, Pa. (by Helen Shantzer, executrix), assignors to Shantzer-Wallin Corporation, Norristown, Pa.

Filed Apr. 7, 1976, Ser. No. 674,641
Int. Cl.² F25B *27/00, 27/02, 13/00*
U.S. Cl. 62—2 **13 Claims**



1. An improved reversible refrigeration system including conduit connected compressor and reversing means, said reversing means having a conditioning side and a service side; at least one conditioning heat transfer means subject to the conditioning side of the reversing means and positioned to

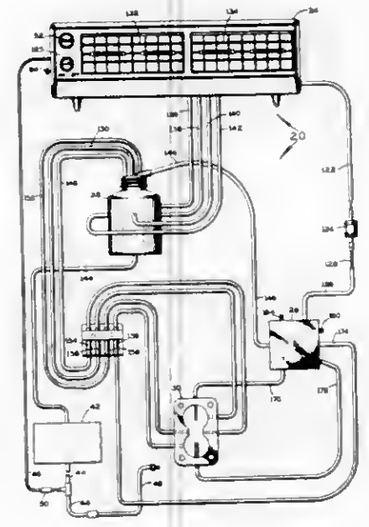
affect a conditioned space; wherein the improvement comprises; first service heat transfer means subject to the service side of the reversing means and adapted to transfer heat between refrigerant and a liquid; second service heat transfer means subject to the service side of the reversing means and adapted to transfer heat between refrigerant and air; and control means adapted to apportion the heat transferred on the service side between said first and said second service heat transfer means.

4,030,313

AIR CONDITIONER

Ernest H. Patrick, Rte. 1, Box 312-B, Conway, S.C. 29526

Filed Apr. 9, 1976, Ser. No. 675,616
Int. Cl.² F25B *19/00*
U.S. Cl. 62—7 **31 Claims**



19. An air conditioner for use in a vehicle having a gasoline engine with a fuel intake providing a source of reduced pressure comprising:

a gasoline vaporizer including a first outer tube, and a second inner tube within said first tube for discharging gasoline from the fuel system of the vehicle into said first tube to vaporize the same,

blower means for flowing air across said first tube to cool the air for circulation in the vehicle,

air inlet means to supply air to said first tube,

exhaust outlet means for said first tube,

vapor-liquid separator means connected between said exhaust outlet means and said fuel intake for separating excess gasoline from the mixture, and

proportioning means connected between said separator and said fuel intake for adjusting the fuel-to-air ratio at the fuel inlet.

4,030,314

METHOD AND APPARATUS FOR PRESERVING BIOLOGICAL MATERIALS

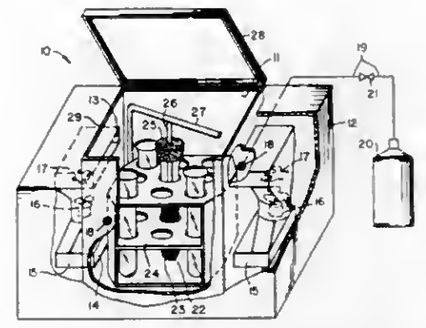
John Frederick Strehler, 1597 Prestwick, Grosse Pointe Woods, Mich. 48236; John Joseph Mikoliczeak, 32261 Arlington Drive, Birmingham, Mich. 48009, and Kirk Robert Strehler, 22462 Ardmore Park, St. Clair Shores, Mich. 48081

Filed Apr. 7, 1976, Ser. No. 674,504
Int. Cl.² F25D *13/04*
U.S. Cl. 62—65 **16 Claims**

1. A process for preserving biological materials by freezing comprising the steps of:

cooling the biological material to a temperature equal to or minimally warmer than the freezing temperature of the material;

chilling the environment surrounding the biological material rapidly to a preselected temperature substantially colder than the freezing temperature of the material to initiate phase change of the material;



warming the environment surrounding the biological material from said preselected temperature to a temperature equal to or minimally cooler than the freezing temperature of the material during removal of the heat of fusion of the material; and

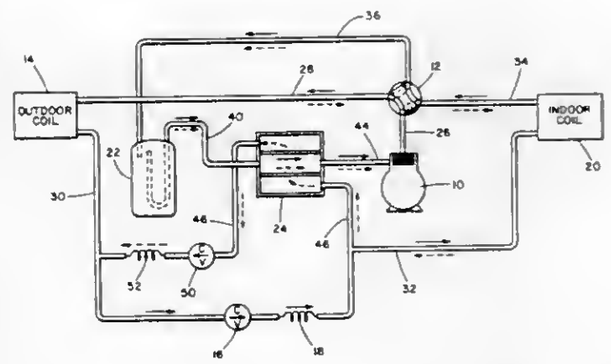
cooling the environment surrounding the biological material at a substantially linear preselected rate of temperature change to a preselected end temperature.

4,030,315

REVERSE CYCLE HEAT PUMP

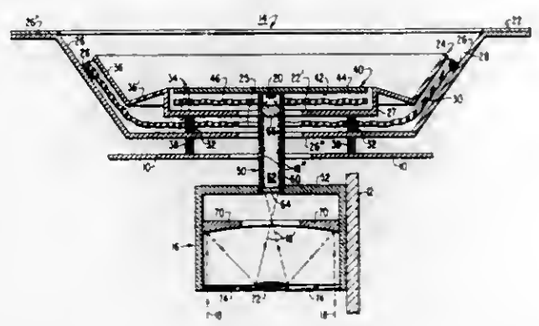
James R. Harnish, York, Pa., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Sept. 2, 1975, Ser. No. 609,322
Int. Cl.² F25B *13/00*
U.S. Cl. 62—324 **4 Claims**



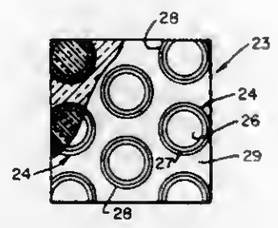
1. In a heat pump system of the type including a compressor; a fluid reversal means; an indoor coil; an outdoor coil; first and second expansion means; means for conducting refrigerant in a first closed circuit path from said compressor through said reversal means to said outdoor coil and then through said first refrigerant expansion means to said indoor coil and back to said compressor; said reversal means being adapted to be repositioned to allow refrigerant from said compressor to flow in a second closed circuit path to said indoor coil through said second refrigerant expansion means to said outdoor coil and then back to said compressor, the improvement comprising a heat exchanger for bringing fluid returning to said compressor into heat exchange contact with high pressure liquid from said indoor coil during flow in said second closed circuit path, and means for bypassing said heat exchanger during flow in said first closed circuit path.

4,030,316
PASSIVE COOLER
Albert Irving Aronson, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.
Filed Dec. 11, 1975, Ser. No. 639,760
Int. Cl.² F25B 25/00
U.S. Cl. 62—467 R 12 Claims



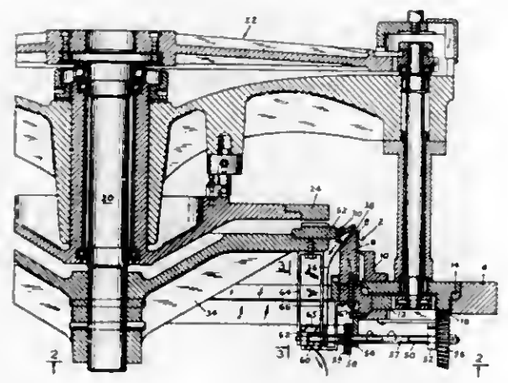
1. A passive device arranged to be mounted on a support body for maintaining an optical article at a given temperature in the presence of a thermal radiation sink comprising:
an article cooling and supporting member having a high emissive surface exposed to the ambient for cooling said article thermally coupled thereto,
a radiation shield member disposed in spaced relation with respect to said supporting member for inhibiting the impingement of thermal radiation on said supporting member, said shield member including means for mounting said shield member on said support body thermally isolated from said body and supporting member,
optical means arranged to be secured to said body for collecting selected radiation to be directed to said article, and
securing and optical coupling means connected to said supporting member and said optical means for directing said collected radiation to said article and for securing said supporting member to said optical means.

4,030,317
SIMULATED GEMSTONE
Paul S. Rogell, 95 Morgan St., Apt. 7B, Stamford, Conn. 06905
Filed July 16, 1973, Ser. No. 379,722
Int. Cl.² A44C 17/00
U.S. Cl. 63—32 12 Claims



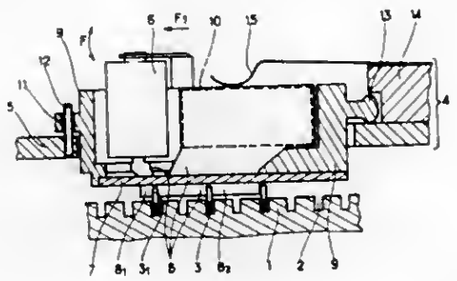
1. An ornamental artificial gem stone having a front face, comprising a body member of parallel light transmitting fibers, said fibers including respective cores of a first material having a first index of refraction, said cores extending across the gem stone to present their ends at the front face of the gem stone, said fibers further including respective coatings on the surfaces of said cores having a second index of refraction, said first index of refraction being greater than said second index of refraction, a light transmitting matrix surrounding said fibers throughout said body member, including a plurality of colored unclad light transmitting rods disposed throughout said matrix and distributed among said fibers, said colored unclad rods being of sufficient concentration in said matrix to impart their color to the gem stone.

4,030,318
DIAL AND CYLINDER CONNECTION
Morris Philip, c/o Philip Knitting Mills, 26 Bruckner Blvd., Bronx, N.Y. 10454
Filed Oct. 15, 1975, Ser. No. 622,480
Int. Cl.² D04B 9/06
U.S. Cl. 66—28 9 Claims



5. A stabilizer for use in stabilizing the cylinder and dial of a circular knitting machine having a needle operating cam arrangement in which the fabric circularly knitted by said machines includes a longitudinally extending strip of float yarns extending between the beginning and ends of rows of stitches knitted by said machine, said stabilizer including a first roller mounted for rotation on said cylinder against one side of said longitudinally extending strip of float yarns, a second roller in mating engagement with said first roller mounted for rotation on said dial against the other side of said longitudinally extending strip of float yarns and means driving one of said rollers at a constant speed relative to the knitting speed of said knitting machine for engaging and feeding said float yarns in said strip between said rollers and for feeding said circularly knit fabric past said engaged rollers.

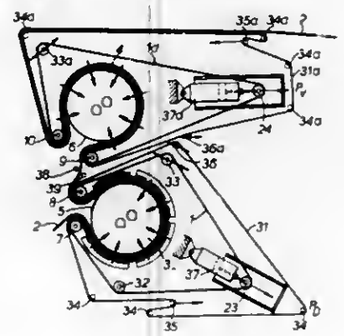
4,030,319
DOMESTIC KNITTING MACHINE
Alfred Gloeckler, Mulhouse, France, assignor to Superba S.A., Mulhouse, France
Filed Apr. 23, 1976, Ser. No. 679,876
Claims priority, application France, Apr. 24, 1975, 75.13490
Int. Cl.² D04B 7/00, 15/66
U.S. Cl. 66—75.2 8 Claims



1. A domestic knitting machine consisting of at least one needle board, a plurality of knitting needles supported in grooves in the needle board, a movable carriage oriented parallel above and to the needle board, the carriage being provided with a lock fitted with an electromagnetic needle selection component, said electromagnetic component being

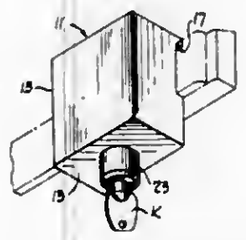
mounted on the lock by means of guiding means permitting free movement of said electromagnetic component in a direction substantially perpendicular to the plane of the needle board.

4,030,320
DECATIZING OF FABRICS
Dieter Riedel, Turmblick, Germany, assignor to Drabert Sohne, Minden, Germany
Filed Feb. 19, 1976, Ser. No. 659,536
Claims priority, application Germany, July 5, 1975, 2530138
Int. Cl.² D06B 5/08
U.S. Cl. 68—5 R 16 Claims



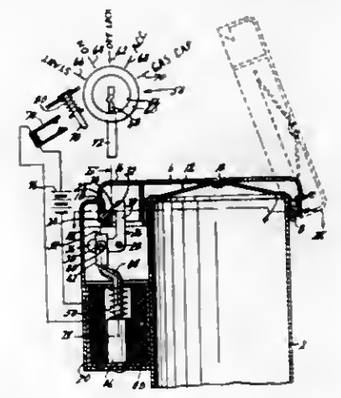
1. In apparatus for the continuous decatizing of a fabric,
at least one steaming cylinder,
at least one suction cylinder,
means for feeding the fabric around the cylinders,
a first length of primary backing cloth extending under tension around the steaming cylinder to press the fabric against the cylinder,
a second length of primary backing cloth extending under tension around the suction cylinder to press the fabric against the cylinder,
means for varying the tension in each of said lengths independently of the tension in the other said length,
a first seamless, endless, intermediate backing cloth located between the first said length of backing cloth and the fabric, and
a second seamless, endless, intermediate backing cloth arranged between the second said length of backing cloth and the fabric, said intermediate backing cloths moving with their associated lengths of backing cloths in the zone of the cylinders without slipping.

4,030,321
PADLOCK WITH PROTECTED SLIDE BOLT AND LOCKING MEANS
David L. Kenyon, 1727 W. Royalton Road, Broadview Heights, Ohio 44147
Filed June 16, 1976, Ser. No. 696,840
Int. Cl.² E05B 67/36
U.S. Cl. 70—34 8 Claims



1. A padlock for attachment over a staple, which comprises:
a case having an opening for insertion of the staple;
a slide bolt within said case capable of extending through said opening to engage said staple;
a lock sleeve mounted within a cylindrical bore in said case, said lock sleeve being movable between a locked position and an unlocked position, said slide bolt being fixedly attached to said lock sleeve and extending through said opening to engage said staple when said lock sleeve is in said locked position, said lock sleeve having a retractable locking member projecting from a hole in the wall of said sleeve, said locking member being capable of fitting within an indentation on the interior bore wall to hold said lock sleeve in said locked position and capable of retracting into said hole to free said sleeve when in said unlocked position; and
a lock cylinder fixedly mounted within said sleeve having an interior locking mechanism operatively connected to a camming means for forcing said locking member to project outwardly through said hole when said locking mechanism is locked and allowing said locking member to retract inwardly when said locking mechanism is unlocked.

4,030,322
LOCKING GAS CAP SYSTEM
Charles E. Pettit, 12000 Moonlight Road, Olathe, Kans. 66061
Filed Apr. 28, 1976, Ser. No. 681,168
Int. Cl.² B65D 55/41; B60R 25/00
U.S. Cl. 70—159 3 Claims



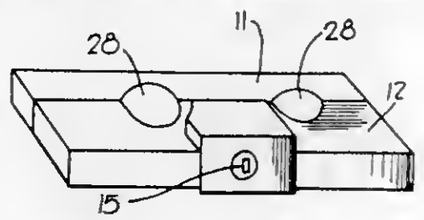
1. A locking system for the cap of the gasoline tank of an automative vehicle, said locking system comprising:
a. manually operable locking means for locking said cap closed whenever said cap is manually closed, said locking means including a lock member movable between a locking position directly engaging said cap and an unlocking position out of engagement with said cap,
b. unlocking means operable when actuated to move said lock member to said unlocking position, and
c. operating means including a manually movable member disposed interiorly of said vehicle and operable by movement of said member to actuate said unlocking means, said unlocking means including a striker member operable to strike said lock member with a hammer blow to drive said lock member toward its unlocking position whenever said unlocking means is actuated.

4,030,323
ANTI-THEFT TRANSMISSION LEVER LOCK PLATE
John P. Stanislawczyk, Elizabeth, N.J., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest
Filed Dec. 9, 1975, Ser. No. 639,053
Int. Cl.² F16H 57/00
U.S. Cl. 70—199 1 Claim

1. A detachable lock plate assembly for fitting about a transmission shift lever of a vehicle and a second fixed rod,

comprising a male plate member and a female plate member shaped to telescopically join each other in an engaged mode, with each plate member fitted with a pair of parallel grooves that form a pair of parallel through holes when the plate members are joined together, with locking means operated by a removable key that maintains the plates engaged in the locked mode.

said male plate member formed with a tubular shaft that projects perpendicularly from a surface of said member, said shaft being of an external shape to telescopically fit



into a through hole that extends from a surface of the female member, with each said surface of each member formed with said parallel grooves,

said shaft formed with an open axial hole, the internal surface of which hole is formed with a recess of a shape to engage a latch of said locking means,

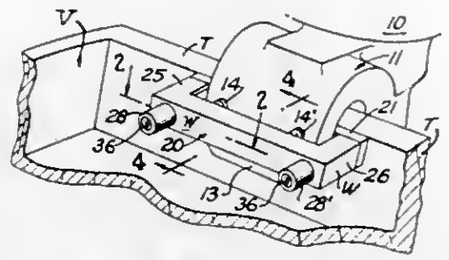
said locking means consisting of a detachable tumbler that fits into the hole of the female plate member and the hole of the shaft of the male plate member when the two plate members are assembled.

4,030,324

LOCK HARDWARE FOR OUTBOARD MOTOR

Leo A. Rizio, 260 1/2 Grand Ave., San Jose, Calif. 95126

Continuation of Ser. No. 594,858, July 10, 1975, abandoned.
This application Apr. 22, 1976, Ser. No. 679,164
Int. Cl.² E05B *73/00*; F16B *41/00*
U.S. Cl. 70—232 **8 Claims**



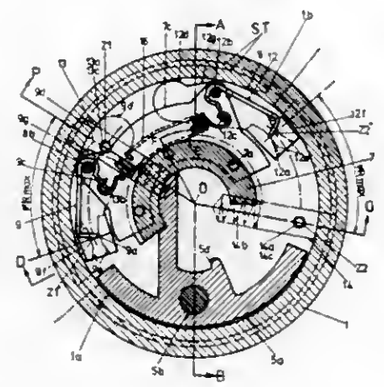
1. Locking hardware for the clamp screws on the inboard arm of an outboard motor C clamp which clamp screws have pad ends adapted to press against the transom board of a boat and the like by turning of transverse handles on the opposite ends of such clamp screws; said locking hardware comprising:
   1. a back plate adapted to be disposed between the pad ends of such clamp screws and the transom board and secured thereto thereby;
   2. a stud bolt mounted on said back plate and extending inboard therefrom parallel to and in the same horizontal plane as the clamp screws;
   3. a channel iron cover member having a main body for receiving and confining the handles of the clamp screws within the web and flanges thereof and having a bored hole formed through the web portion of said main body thereof for passage of the threaded end of said stud bolt therethrough;
   4. a pair of channel iron legs on the ends of said cover member disposed in the same horizontal plane and parallel to said stud bolt and clamp screws and with the free ends of said legs engaging said back plate;
   5. means between the main body of said cover member and said back plate providing a chamber for confining said stud bolt;
   6. a cylindrical shell formed on the inboard face of the web portion of the main body of said cover member in axial alignment with the bored hole formed therethrough for receiving and concealing the threaded end of said stud bolt projecting therefrom;
   7. a lug nut confinable within said cylindrical shell and threadedly connected to the threaded end of said stud bolt for securing the cover member thereto;
   8. a key operated locking means in the free end of said lug nut; and
   9. a key adapted to fit the key operated locking means in said lug nut for locking the lug nut within and against removal from said cylindrical shell.

4,030,325

LOCK

Kurt Ehrat, Zurich, Switzerland, assignor to KESO AG, Richterswil, Switzerland

Filed Apr. 22, 1975, Ser. No. 570,422
Claims priority, application Switzerland, Apr. 25, 1974, 5802/74
Int. Cl.² E05B *25/00*
U.S. Cl. 70—383 **12 Claims**



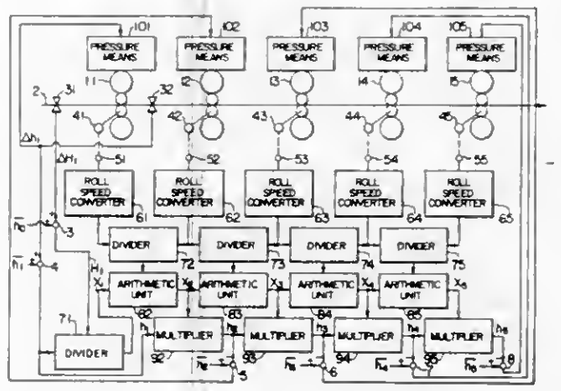
1. A lock comprising:
   a. a stator having an inner wall of circular cross section defining an axis;
   b. a main rotor mounted in said stator for rotation about said axis,
      1. said main rotor defining an axially open keyhole therein;
   c. a key carrying a plurality of key information elements, said key
      1. being dimensioned for axial insertion into said keyhole and
      2. including means for moving said main rotor about said axis between an angularly terminal, open lock position and an angularly terminal, closed lock position through an intermediate latched position when the inserted key is turned about said axis;
   d. an auxiliary rotor mounted in said stator for rotation about said axis;
   e. differential drive means coupling said main and auxiliary rotors for rotation of said auxiliary rotor relative to said main rotor during rotation of said main rotor into and out of said latched position, and coupling said auxiliary rotor to said main rotor for joint angular movement while said main rotor is in said latched position;
   f. a plurality of key information sensing elements respectively associated with said key information elements,
      1. said sensing elements being movably mounted on said auxiliary rotor for engagement by the respective associated key information elements during said rotation of said auxiliary rotor relative to said main rotor and for angular displacement from a starting position relative to the auxiliary rotor by the engaged key information elements, while said main rotor moves from one of said terminal positions toward said latched position;
   g. abutment means on said main rotor for disengaging said sensing elements from the associated key information elements in response to movement of said main rotor from said latched position toward the other terminal position and for returning the disengaged sensing elements to said starting position;
   h. a plurality of lock information elements associated with respective sensing elements,
      1. said lock information elements being mounted on said auxiliary rotor for angular movement about said axis;
   i. coupling means coupling said lock information elements to the associated sensing elements for joint angular movement responsive to movement of said main rotor from one of said terminal positions toward said latched position, whereby said lock information elements are positioned according to the key information elements engaged by said sensing elements,
      1. the relative angular positions of said sensing elements and the associated, coupled lock information elements constituting stored lock information;
   j. test means mounted on said auxiliary rotor and responsive to movement of said main rotor toward said latched position for engaging said positioned lock information elements and for thereby testing the engaged key information elements for conformity with said stored lock information; and
   k. bolt means mounted on said main rotor for movement between and effective position and an ineffective position, said bolt means when in said effective position preventing movement of said main rotor from said latched position into said open lock position,
      1. said test means including means for moving the bolt means into said ineffective position in response to conformity of the engaged key information elements with said stored lock information.

4,030,326

GAGE CONTROL APPARATUS AND METHOD FOR TANDEM ROLLING MILLS

Yasuo Morooka, and Shinya Tanifuji, both of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed Aug. 20, 1976, Ser. No. 716,281
Claims priority, application Japan, Aug. 25, 1975, 50-102163
Int. Cl.² B21B *37/00*
U.S. Cl. 72—8 **15 Claims**



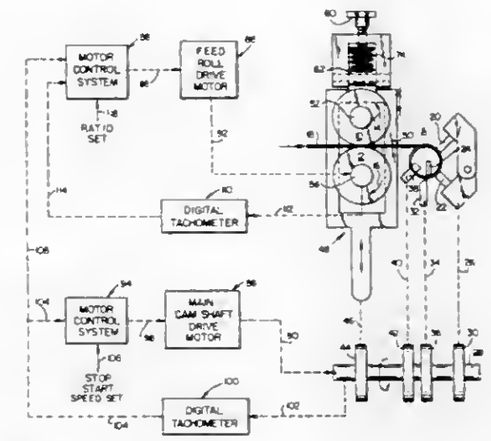
11. A gage control apparatus for a tandem rolling mill including a plurality of individual mill stands one of which is determined as a particular stand, comprising:
   means for detecting a deviation of a thickness of a plate to be rolled at least at the input or output side of said particular stand from desired thicknesses at said input and output sides,
   means for obtaining the thicknesses of the plate at the input and output sides of said particular stand on the basis of said detection,
   means for obtaining a thickness ratio between said thicknesses of the plate,
   means for detecting a circumferential speed of a roll of each of said stands,
   means for obtaining a circumferential speed ratio between the circumferential speeds of the rolls of adjacent said stands,
   means for calculating a thickness of the plate at the output or input side of said stands other than said particular stand on the basis of said thickness ratio and said circumferential speed ratios,
   means for obtaining a deviation of said calculated thickness from a desired thickness at the output or input side of each of said stands other than said particular stand, and
   means provided in association with respective said stands for adjusting a screw-down position of each of said stands in dependence on said deviation.

4,030,327

SPRING COILING MACHINE WITH IMPROVED DRIVE MEANS

Charles P. Collins, Torrington, and Bernard P. Lampietti, Goshen, both of Conn., assignors to Torin Corporation, Torrington, Conn.

Filed June 16, 1976, Ser. No. 696,777
Int. Cl.² B21F *3/02*, *35/00*
U.S. Cl. 72—23 **18 Claims**



1. In a spring coiling machine, the combination of at least one pair of feed rolls for intermittently longitudinally advancing an elongated length of wire from a source of supply whereby successively to feed integral leading end portions thereof to a coiling station, at least one coiling tool at said station arranged to engage said successively advanced leading end portions and to obstruct feed movement thereof whereby progressively to coil the same into springs, at least one cut-off tool at said coiling station operable successively to sever the springs at the termination of said coiling operations, a rotary camshaft and associated operating means for said coiling and cut-off tools, a drive means for said camshaft comprising a first electric motor connected with the camshaft and operable to effect continuous rotation thereof, a drive means for said feed rolls comprising a second electric motor connected with the rolls and operable to effect continuous rotation thereof, electrical control means including speed ratio selection and maintenance means connected with said two motors and adapted initially to accommodate manual motor speed ratio selection and thereafter to maintain automatically and precisely selected ratios of motor speed, and means separate from said second electric motor connected with said feed rolls and with said camshaft and operable in response to the latter successively to terminate wire advancement by said feed rolls

in timed relationship with the operation of said coiling and cut-off tools.

4,030,328

DEVICE FOR CONTINUOUS LUBRICATION OF AN EXTRUSION DIE

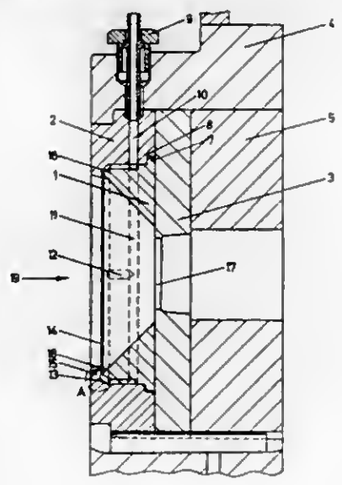
Alfred Wagner, Im Staudler 12, Steisslingen, Germany (D-7705), and Hermann Kidratschky, Hombollstrasse 1, Hilzingen, Germany (D-7701)

Filed Dec. 4, 1975, Ser. No. 637,594

Claims priority, application Switzerland, Dec. 5, 1974, 16146/74; Germany, Dec. 14, 1974, 2459172

Int. Cl.² B21C *23/32*

U.S. Cl. 72—45 **5 Claims**



1. A device for use in connection with the continuous lubrication of the working surface of an extrusion die during the extrusion process of a billet wherein at least a portion of said billet passing said working surface in the extrusion direction is in a plastic state,

comprising, in combination:

said extrusion die defining at least one cavity near said working surface for receiving a lubricant;

said cavity being operable for receiving said lubricant under low pressure with respect to the pressure for said extrusion process; and

said extrusion die defining a projection extending over said cavity with respect to said extrusion direction for reducing the flow rate of the billet material in the area of said projection independent of the extrusion pressure,

whereby, during said extrusion process, said billet portion flows, retarded by said projection over said projection past said cavity defining a dead space so that said lubricant can be expelled through said dead space to said working surface at said low pressure.

4,030,329

DEVICE FOR ELECTRICAL DISCHARGE FORMING

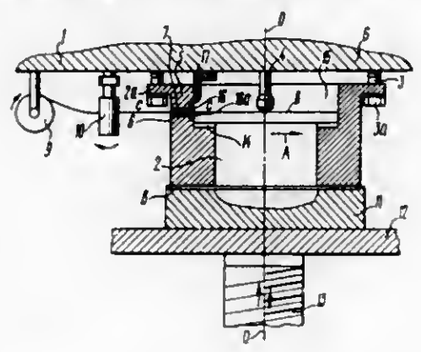
Viktor Nikolaevich Chachin, bulvar Lunacharskogo, 8, kv. 21; Alexandr Julyanovich Zhuravsky, prospekt Partizansky, 28, korpus 2, kv.135; Gennady Nikolaevich Zdor, ulitsa V.Khoruzhei, 19, kv. 14; Vladimir Leontievich Shaduya, ulitsa Pervomaiskaya, 8, kv. 7, and Elena Yakovlevna Golovkina, ulitsa Kakhovskaya, 37, kv. 42, all of Minsk, U.S.S.R.

Filed July 12, 1976, Ser. No. 704,177

Int. Cl.² B21D *26/02*

U.S. Cl. 72—56 **3 Claims**

1. A device for electrical discharge forming comprising: a fixed plate; an explosion chamber mounted on said fixed plate; a die pressed against said explosion chamber in the course of forming; an electrode accommodated in said explosion chamber; a wall of said explosion chamber serving as the other electrode and having a hole; a wire passing through said hole and intended to connect electrically said electrodes; a step made in said wall at the side opposite to that adjoining said die and located somewhat lower than said hole for the passage of said wire, two knives for cutting of said wire, one of said two knives being secured rigidly near said hole and the other one of said two knives being movably installed near said hole for



moving along the geometrical axis of said explosion chamber so that when said die moves together with said explosion chamber towards said fixed plate, said two knives approach each other and cut off said wire whose sheared end then comes to rest on said step.

4,030,330

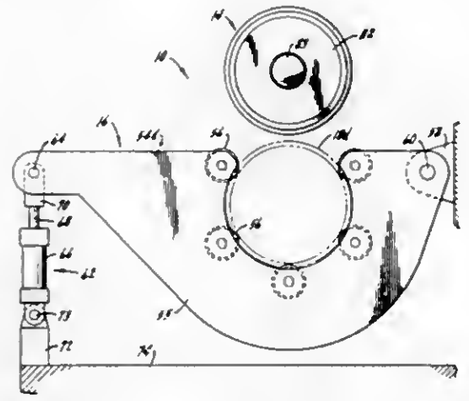
MULTIPLE ROLL RECORRUGATOR

Adrianus Marinus Nyssen, Chilliwack, and Gerhard Josef Rauch, Surrey, both of Canada, assignors to Ironside's Machine & Welding Ltd., Chilliwack, Canada

Continuation-in-part of Ser. No. 621,398, Oct. 10, 1975, abandoned. This application Aug. 20, 1976, Ser. No. 716,166

Int. Cl.² B21D *19/04*

U.S. Cl. 72—105 **17 Claims**



1. An apparatus for forming circumferential corrugations in the end portion of a pipe where the wall of the pipe is inserted between two corrugating rolls, comprising

a. a backup roll,

b. a thrust roll including a plurality of independent parallel roll elements,

c. means mounting said roll elements for independent motion transverse to one another,

d. means to engage said backup roll and said thrust roll with the wall of the end of the pipe therebetween,

e. drive means associated with said thrust roll to rotate said roll elements in unison, and

f. means to independently support each of said roll elements and retain said roll elements in contact with the end portion of the pipe so that the roll elements will form circumferential corrugations in the wall of the pipe as the pipe wall is driven between the thrust and backup rolls.

4,030,331

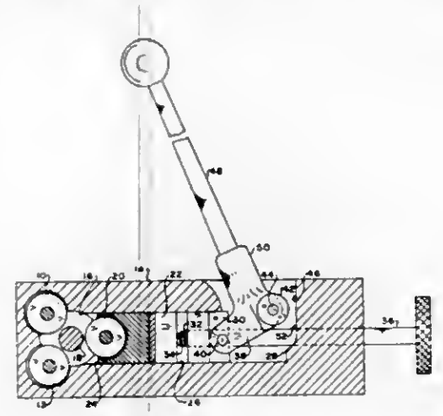
KNURLING TOOL

David E. Keasling, 1128 McGovock, Tullahoma, Tenn. 37388

Filed Dec. 27, 1976, Ser. No. 754,731

Int. Cl.² B21D *19/06*

U.S. Cl. 72—110 **4 Claims**



1. A knurling tool comprising:

a frame having an opening from one side to an opposite side through which a workpiece to be knurled may be extended, and having an elongated slot in said frame extending normal to and connecting with said opening;

a first moveable block positionable in and along said slot adjacent to said opening;

at least three knurling wheels journalled to rotate on parallel axes about said opening and about a workpiece, all said wheels being supported by said frame with at least one of said knurling wheels being mounted on said first block, in turn supported by said frame;

a second movable block positionable in and along said slot adjacent to said first block, and said second block having a threaded opening extending longitudinally through it in the direction of said slot;

an adjustment screw threaded through said threaded opening in said second block and adapted to adjustably separate said first and second blocks; and

locking means for selectively locking and unlocking said second block against travel in said slot in a direction away from said first block, whereby after once having longitudinally adjusted said screw with said locking means in a locked position to effect a desired relative position of said first and second blocks, and thereby between said knurling wheels, said locking means may be locked and unlocked to freely relatively move said knurling wheels with respect to a workpiece without affecting the adjustment.

4,030,332

MACHINE FOR STRAIGHTENING ELONGATED WORKPIECES

Rolf Eckart Koch, Witzhelden, and Ralf Fangmeier, Solingen, both of Germany, assignors to Kieserling & Albrecht, Solingen, Germany

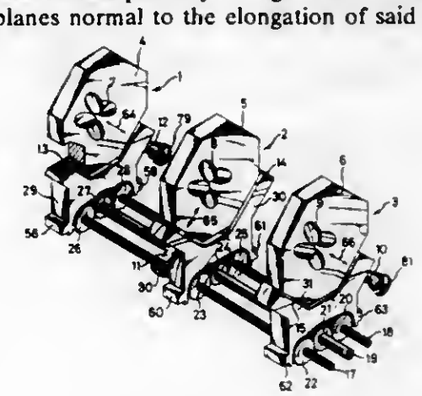
Filed June 24, 1976, Ser. No. 699,641

Claims priority, application Germany, June 25, 1975, 2528243

Int. Cl.² B21D *3/02*

U.S. Cl. 72—164 **10 Claims**

1. A straightening machine for elongated workpieces adapted to move at high speed through the straightening machine, comprising an elongated machine bed; and a plurality of straightening stands mounted on said machine bed displaceable with respect to each other in the direction of the elongation of the bed; each of said straightening stands comprises a cage, a roll set having four rolls mounted in the cage with two of the rolls turnable about horizontal axes and two of the rolls turnable about vertical axes, a cage holder supporting the cage and displaceable mounted on the machine bed, guide means on each of the cage holders for mounting the cage thereon adjustable in the direction of said guide means, the guide means on said plurality of cage holders being located in parallel planes normal to the elongation of said bed and the



guide means on the cage holders of successive stands extending, as viewed in the direction of movement of the workpieces, normal to each other.

4,030,333

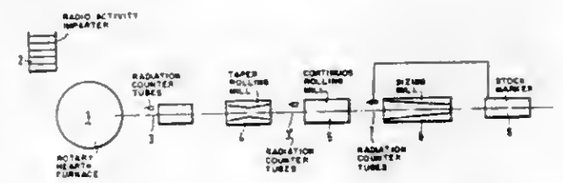
METHOD AND MEANS FOR SEPARATING SUCCESSIVE ROLLING LOTS

Manfred Bellmann, Breitscheid, and Hannes Goldberg, Mulheim, both of Germany, assignors to Mannesmann Aktiengesellschaft, Dusseldorf, Germany

Filed Sept. 16, 1976, Ser. No. 723,695

Int. Cl.² B21B *39/00*

U.S. Cl. 72—227 **5 Claims**



1. The method of gaplessly separating and identifying successive rolling lots or batches of ingots or blooms in a production process for making tubes or the like when the stock is introduced into a furnace for heating and subsequently rolled, comprising radioactively marking the first or the last ingot of a given rolling lot of ingots at its subsequently lost end prior to being introduced into the furnace; and interposing a radioactive radiation responsive signal device before rolling.

4,030,334

PROCESS FOR THE MANUFACTURE OF COMPOSITE SECTIONS AND A DEVICE FOR CARRYING THIS OUT

Alfred Wagner, Steisslingen, and Hermann Kidratschky, Hilzingen, both of Germany, assignors to Swiss Aluminium Ltd., Chippis, Switzerland

Filed Mar. 24, 1975, Ser. No. 561,239

Claims priority, application Germany, Mar. 23, 1974, 2414178

Int. Cl.² B21C *23/24, 25/04*

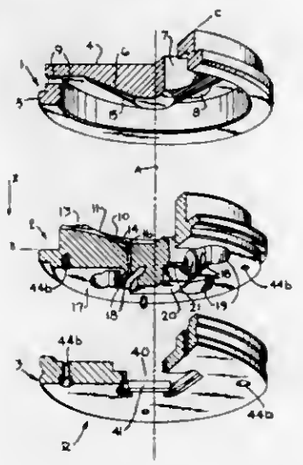
U.S. Cl. 72—258 **16 Claims**

1. An extrusion process for use in connection with an extrusion device including an entry plate, a mandrel plate, and a die plate defining a die bearing having an axis for manufacturing a composite section including at least a light metal and another metal, the steps comprising:

providing on opposite sides of said device channels defined by said entry plate and said mandrel plate, each of said channels having a first portion extending substantially radially and being defined substantially entirely by said entry plate, having a second portion extending along a curved path from said first portion and being defined

substantially by the combination of said entry and mandrel plates, and having a third portion extending substantially axially from said second portion and being defined substantially entirely by said mandrel plate, said third portion projecting into an opening defined in said die plate;

supplying said light metal to said extrusion device;



supplying said other metal in a solid preformed state to said extrusion device through said channels for extrusion along with said light metal;

extruding said light metal, whereby said light metal flows while said other metal is substantially unchanged in its physical form.

4,030,335

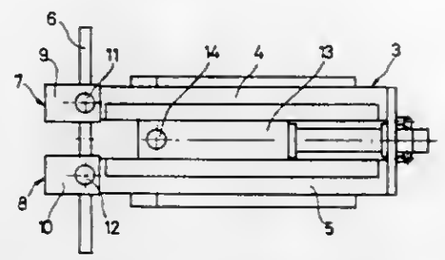
MULTI-FUNCTION METAL-WORKING MACHINE

Walter Allenspach, Bachtobelstrasse 66, Ottoberg (Thurgau), Switzerland

Filed Mar. 13, 1975, Ser. No. 558,118

Int. Cl.² B21D *7/06*

U.S. Cl. 72—389 **11 Claims**



1. A multi-function metal-working machine, comprising a support having spaced ends and a longitudinal passage extending intermediate said ends; a carriage mounted for displacement in and lengthwise of said passage; moving means for moving said carriage; at least one first tool holer on said carriage; mounting means located at least at one of said ends for mounting at least one second tool holder; a plurality of tool holders mountable on said mounting means; tool mounting devices on at least some of said tool holders for detachably mounting tools thereon, said device including projecting stub shafts; and comprising rotating means for rotating said stub shafts and thereby the tools thereon.

4,030,336

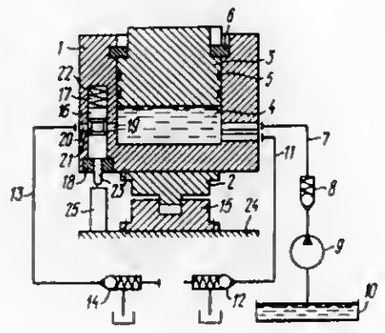
HYDRAULIC PROTECTION DEVICE FOR PRESSES

Anatoly Sergeevich Grigorenko, ulitsa Tovstukho, 1, kv. 21; Jury Antonovich Moroz, ulitsa Fugenflrova, 11, kv. 91, and Vladimir Vladislavovich Landyshev, ulitsa 50 let komsomola, 14-a, kv. 22, all of Omsk, U.S.S.R.

Filed July 9, 1976, Ser. No. 703,850

Int. Cl.² B21J *9/02*

U.S. Cl. 72—432 **2 Claims**



1. A hydraulic overload protection device for a press, adapted to protect this press from overloads upon the movable member of this press, carrying thereon a die, having been driven through the maximum length of the stroke thereof, comprising: a hollow housing; a piston accommodated within this hollow housing; a space defined within said hollow housing by said piston, communicating via a check valve with a source of working liquid and also communicating via a pressure relief valve with a drain, characterized in that said space is additionally communicated with the drain via a line including an adjustable pressure relief valve and a device for disconnecting the said space from the drain upon the movable member of the press, carrying thereon the die, having been driven through the maximum length of its stroke.

4,030,337

PICKUP FOR MEASURING THE RATE OF AN ELECTRONIC TIMEPIECE

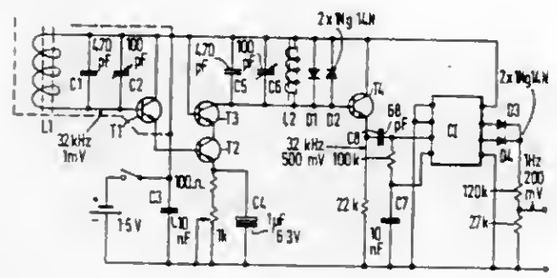
Daniel Bichsel, La Neuveville, Switzerland, assignor to Societe Suisse pour l'Industrie Horlogere Management Services S.A., Bienne, Switzerland

Filed Oct. 21, 1975, Ser. No. 624,418

Claims priority, application Switzerland, Oct. 30, 1974, 14510/74

Int. Cl.² G04D *7/12*

U.S. Cl. 73—6 **6 Claims**



1. A pickup adapted for detecting signals from the oscillator of a high-frequency electronic timepiece and for providing an output signal at a nominal frequency of 1Hz, said pickup being usable by a chrono-comparator designed for the determination of the instantaneous rates of mechanical or sonic frequency timepieces by comparing the timepieces' actual frequencies with an ideal frequency of 1 Hz obtained from a reference standard, said pickup comprising:

a detection means for detecting said signals of said high-frequency timepiece and providing an actual signal corresponding to the frequency of the timepiece oscillator signals, and

an integrated frequency divider circuit connected to said detection means for dividing the frequency of said actual signal and for providing said output signal at said nominal frequency of 1 Hz, said integrated frequency-divider circuit being the same as an integrated frequency-divider circuit in a timepiece operating at the same oscillator frequency as timepieces tested with said pickup means.

4,030,338

TIMEPIECE TESTING APPARATUS

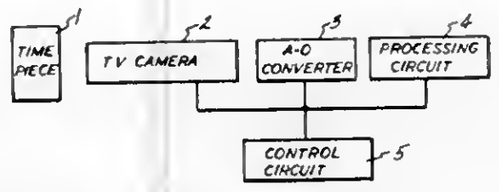
Heihachiro Ebihara, Tokorozawa, Japan, assignor to Citizen Watch Co., Ltd., Tokyo, Japan

Filed June 10, 1976, Ser. No. 694,574

Claims priority, application Japan, June 12, 1975, 50-71236; July 25, 1975, 50-90860

Int. Cl.² G04B *17/00*

U.S. Cl. 73—6 **13 Claims**



1. An apparatus for testing the accuracy of a timepiece comprising:

a television camera for converting the time displayed on said timepiece into an electrical signal;

a means for converting the electrical signal into a digital signal; and

a processing means for determining the time displayed on the timepiece from the digital signal and for comparing the displayed time to a time standard.

4,030,339

IMPACT IMPULSE MEASURING DEVICE

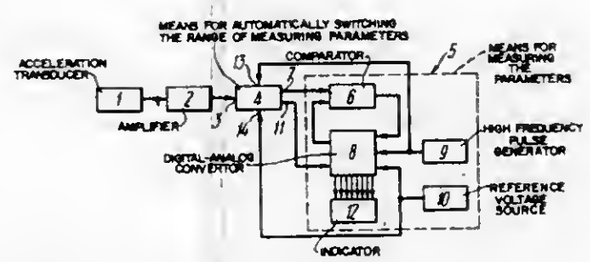
Alexandr Sergeevich Yakshin, ulitsa Malaya Filevskaya, 66, kv. 104; Oleg Nikolaevich Novikov, ulitsa Kuznetsky most, 18/7, kv. 6; Dmitry Alexeevich Grechinsky, ulitsa Tolbukhina, 8, korpus 2, kv. 48; Viktor Alexandrovich Klochko, ulitsa Oktyabrskaya, 38, kv. 374, and Viktor Georgievich Rygalin, 3-Dorozhny proezd, 5, korpus 2, kv. 103, all of Moscow, U.S.S.R.

Filed Feb. 17, 1976, Ser. No. 658,687

Claims priority, application U.S.S.R., Feb. 28, 1975, 2109015

Int. Cl.² G01N *3/30*

U.S. Cl. 73—12 **8 Claims**



1. An impact impulse measuring device comprising:

an acceleration transducer having an output and converting mechanical oscillation of an object being tested into electric signals;

an amplifier unit having an input and an output, said input being connected to said output of said acceleration transducer, said amplifier unit receiving said electric signals arriving from said acceleration transducer;

a means for automatically switching the range of measuring parameters of said impact impulse having first, second and third inputs and first and second outputs, said first input being connected to said output of said amplifier unit;

a means for measuring parameters of said impact impulse having first and second inputs and first and second outputs and including a comparator having first and second inputs and an output, said first input of said comparator, which is the first input of said means for measuring parameters of said impact impulse, being connected to the first output of said means for automatically switching the range of measuring parameters of said impact impulse, said means for measuring parameters of said impact impulse further including a digital-analog converter having a reset bus, which is the second input of said means for measuring parameters of said impact impulse and first, second and third inputs, an output, and a group of counting outputs, said reset bus being connected to the second output of said means for automatically switching the range of measuring parameters of said impact impulse, the first input and said output of said digital-analog converter being connected to said comparator, a high-frequency pulse generator having an output which is the first output of said means for measuring parameters of said impact impulse and is connected to the second input of the digital-analog converter and the second input of said means for automatically switching the range of measuring parameters of said impact impulse, a reference voltage source having an output which is the second output of said means for measuring parameters of said impact impulse and is connected to the third input of said digital-analog converter and the third input of said means for automatically switching the range of measuring parameters of said impact impulse, and an indicator having a group of inputs, said group of inputs being connected to said group of counting outputs of said digital-analog converter, said indicator indicating a measured value of said parameter of said impact impulse.

4,030,340

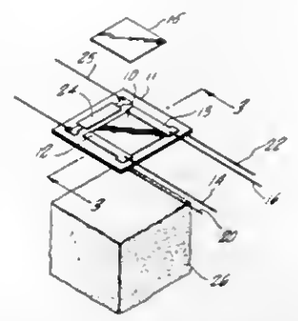
HYDROGEN GAS DETECTOR

Shih-Chia Chang, Santa Ana, Calif., assignor to General Monitors, Inc., Costa Mesa, Calif.

Filed July 22, 1976, Ser. No. 707,678

Int. Cl.² G01N *27/04*

U.S. Cl. 73—23 **12 Claims**



1. An article for detecting the concentration of hydrogen in the atmosphere, comprising:

a semiconductor detecting film comprising stannic oxide and deposited onto an inert substrate;

electrode means connected to said film; and a hydrogen activation film deposited onto said semiconductor detecting film.

4,030,341

FLUID APPLICATION DEVICE

Kevin J. Sullivan, Raleigh, N.C., assignor to Corning Glass Works, Corning, N.Y.

Filed July 24, 1975, Ser. No. 598,590
Int. Cl.² G01N 1/00
U.S. Cl. 73—61.1 C 4 Claims

1. A device for applying a fluid to a surface comprising

a housing having two broad opposing surfaces and a plurality of peripheral edge surfaces, one of said peripheral edge surfaces forming at least a part of the fluid applying face of said device, said applying face having a convex curvature,

means embodied within said housing defining a longitudinal aperture adapted to receive a discrete capillary tube, said aperture extending from one of said edge surfaces substantially parallel to said broad opposing surfaces,

means embodied within said housing defining a groove formed substantially entirely in said applying face of said device to a depth sufficient to permit said groove to communicate with said longitudinal aperture, said groove having a width of a dimension so as to retain any fluid disposed therein by surface tension until said fluid contacts said surface, said groove being tansverse to said longitudinal aperture and intersecting said longitudinal aperture at one end thereof, said groove forming a part of said applying face of said device, and

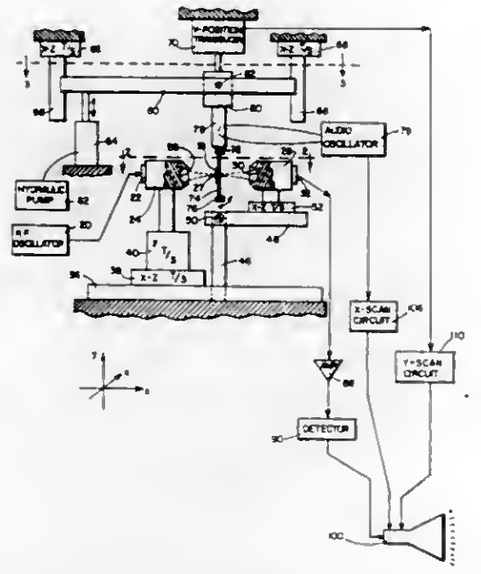
a discrete capillary tube disposed within said longitudinal aperture.

4,030,342

ACOUSTIC MICROSCOPE FOR SCANNING AN OBJECT STEREO-OPTICALLY AND WITH DARK FIELD IMAGING

Walter L. Bond, Los Altos, Calif.; Cassius C. Cutler, Holmdel, N.J., and Ross A. Lemons, Mountain View, Calif., assignors to The Board of Trustees of Leland Stanford Junior University, Stanford, Calif.

Filed Sept. 18, 1975, Ser. No. 614,359
Int. Cl.² G01N 29/00
U.S. Cl. 73—67.5 R 36 Claims



1. An acoustic microscope for imaging an object of interest at a plurality of aspects, comprising:

a. an acoustic transmitter for generating focused acoustic waves along an axis of propagation and having an acoustic lens at one end thereof for focusing the acoustic waves to a focal point;

b. an acoustic receiver for receiving along an axis of reception the acoustic waves propagated from the transmitter, said receiver having an acoustic lens at one end thereof for recollimating the received waves and a transducer opposite thereto for converting the recollimated waves into electrical signals;

c. means for positioning the acoustic lens of the acoustic transmitter and the acoustic lens of the acoustic receiver so that the focal points of each lens are coincident with each other;

d. means providing relative movement between the object and the microscope in a planar scanning pattern while maintaining the coincident focal points of each lens in the plane of the scanning pattern so that the object of interest modulates the acoustic waves and the electrical signals from the transducer converted therefrom; and

e. means for rotating the plane of the scanning pattern about an axis passing through the coincident focal points of the lenses while maintaining the coincident focal points of each lens in the plane of the scanning pattern so that the object of interest can be imaged in a plurality of aspects; and

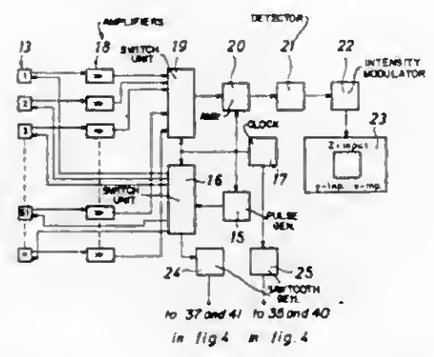
f. means connected to the transducer for recording the electrical signals corresponding to the acoustic waves modulated by the object of interest.

4,030,343

APPARATUS FOR PROVIDING AN ULTRASONIC SECTIONAL VIEW STATING THE PROPORTION OF MEAT AND LARD IN BIOLOGICAL MATERIAL

Svend Aage Lund, Birkerod; Allan Nortbeved, Bagsvaerd; Poul Solfjeld, Vanlose, and Knud Christian Claus Fabrin, Farum, all of Denmark, assignors to Akademiet for de tekniske Videnskaber, Svejsecentralen, Glostrup, Denmark

Filed Nov. 19, 1975, Ser. No. 633,311
Claims priority, application Denmark, Nov. 19, 1974, 6011/74
Int. Cl.² G01N 29/04
U.S. Cl. 73—67.8 S 4 Claims



1. An apparatus for carrying out an ultrasonic inspection of a body comprising:

an oscilloscope having a screen, an intensity modulation input, and first and second deflection signal inputs to which electrical signals can be applied to cause the oscilloscope's electron beam to scan the screen in mutually perpendicular directions;

a first linear array of electro-acoustic transducers arranged to emit and receive ultrasonic energy in directions parallel to a first axis;

a second linear array of electro-acoustic transducers arranged to emit and receive ultrasonic energy in directions parallel to a second axis;

an angle information unit for generating an electrical signal dependent on the angle of inclination of the first axis with respect to the second axis;

a pulse generator for generating a train of electrical pulses at a predetermined frequency;

switching means connected to the pulse generator for activating the transducers of the first and second arrays in turn whereby the transducers are successively enabled to emit pulses of ultrasonic energy and are successively rendered receptive to echoes of ultrasonic energy; and

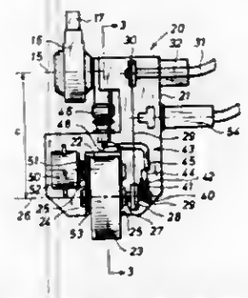
means for displaying ultrasonic echoes received successively by the transducers on the oscilloscope screen, which means comprise means connecting the transducers to the intensity modulation input of the oscilloscope to cause the electron beam of the oscilloscope to increase in intensity when an ultrasonic echo is received by a transducer which is activated by the switching means, a first sweep generator connected to the pulse generator for generating a first sweep signal at said predetermined frequency, a second sweep generator connected to the switching means for generating a second sweep signal at a frequency equal to said predetermined frequency divided by the total number of transducers in said first and second arrays, an analog calculating circuit connected between the first and second sweep generators and the first and second deflection signal inputs of the oscilloscope and a gate circuit connected between the angle information unit and the analog calculating circuit for transmitting the electrical signal generated by the angle information unit to the analog calculating circuit only when the transducers of the second array are activated, whereby the first sweep signal and the second sweep signal are applied to the first deflection signal input and the second deflection signal input respectively when the transducers of the first array are activated whereas when the transducers of the second array are activated the signals that are applied to the first and second deflection signal inputs depend not only on the first and second sweep signals but also on the electrical signal generated by the angle information unit.

4,030,344

APPARATUS FOR RECORDING AN ULTRASONIC SECTIONAL VIEW

Allao Northeved, Bagsvaerd; Knud Christian Claus Fabrin, Farum, and Poul Solfjeld, Horsholm, all of Denmark, assignors to Akademiet for de tekniske Videnskaber, Svejsecentralen, Denmark

Filed May 7, 1976, Ser. No. 684,437
Claims priority, application Denmark, May 12, 1975, 2084/75
Int. Cl.² G01N 9/24
U.S. Cl. 73—67.8 S 4 Claims



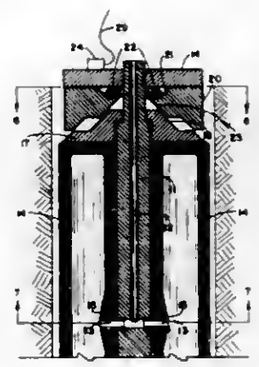
1. An apparatus for recording an ultrasonic sectional view comprising a transducer head (20) with a pulse circuit for transmission and reception of ultrasonic energy, means for visualizing received reflected ultrasonic signals on a cathode-ray tube, and a scanning arm (17) for moving the transducer head in a sectional plane along a plane curve corresponding to the outline (11) of the body (10) examined in the sectional plane, said apparatus comprising data potentiometers and analogous calculating circuits for producing electrical signals representing the positions of the reflection points (P) of the ultrasonic echoes in a rectangular XY-system of coordinates in the sectional plane, characterized by the transducer head (20) comprising four ultrasonic transducers (33) built into the periphery of a transducer wheel (23) at equidistant angular distance for bound rotation about an axis (26) perpendicular to the sectional plane, said transducer wheel (23) comprising means for separately and successively cutting the transducers (33) in and out of the pulse circuit in such manner that each transducer covers only a sector (angle D) from $-45°$ to $+45°$ about a symmetry axis (49) for the transducer head (20), the transducer head comprising a sine-cosine potentiometer (50) mechanically coupled to the transducer wheel (23) for the registration of the angle (D), and by the apparatus comprising means for resetting the angle (D) 90°, said angle being registrated by the sine-cosine potentiometer at each changing over from one transducer (33) to the subsequent one.

4,030,345

BOREHOLE PRESSURE CELL

Tibor O. Edmond, and H. Douglas Dahl, both of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Filed Aug. 13, 1976, Ser. No. 714,065
Int. Cl.² E21B 49/00
U.S. Cl. 73—88 E 7 Claims



7. A method of determining strength characteristics of a subterranean formation comprising the steps of:

a. forming a borehole into said formation;

b. applying uniform radial forces outwardly against the wall of said borehole in all directions except along a selected diameter of said borehole, thereby applying a higher parting force on said formation across the axial plane extending through said selected diameter;

c. determining the pressure required to generate microcracks in said formation at said plane, said determination being made by means of a sound pickup device; and

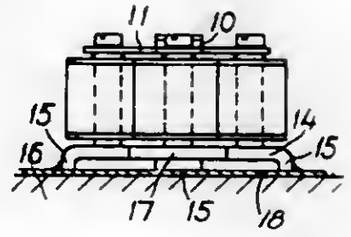
d. repeating steps (b) and (c) for at least one other selected diameter.

4,030,346

MAGNETOELASTIC TRANSDUCER ARRANGEMENT

Orvar Dahle; Folke von Knorring, and Sture Siby, all of Vasteras, Sweden, assignors to ASEA Aktiebolag, Vasteras, Sweden

Filed Oct. 6, 1975, Ser. No. 619,803
Claims priority, application Sweden, Oct. 25, 1974, 7413444
Int. Cl.² G01B 7/24
U.S. Cl. 73—88.5 R 4 Claims



1. In combination with a body having at least a part thereof of magnetic material, means for measuring mechanical stresses in the body, comprising four pins each having one end

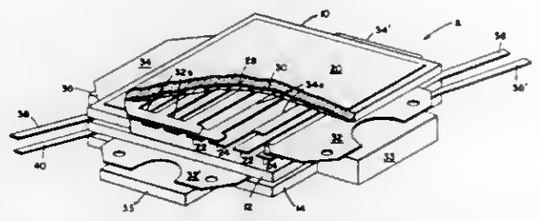
welded to the body and one end free, the pins being located at the corners of a substantially square surface area of the body, a first winding on at least one of the pins for generating a magnetic field in the body and a second winding on at least one pin adjacent to said first pin for sensing the changes in the field configuration which occur in the body when it is subjected to mechanical forces, yokes of magnetic material each connecting the free ends of each pair of diagonally placed pins to each other, said yokes being fastened to said free ends of the pins.

4,030,347

BIAXIAL CAPACITANCE STRAIN TRANSDUCER

Elwood B. Norris, and Lester M. Yeakley, both of San Antonio, Tex., assignors to Electrical Power Research Institute, Palo Alto, Calif.

Filed Oct. 31, 1975, Ser. No. 627,590
Int. Cl.² G01B 7/22
U.S. Cl. 73—88.5 R **26 Claims**



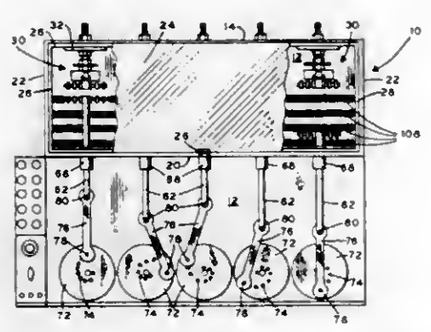
1. A multiaxial capacitance strain transducer comprising: a stack of at least three support wafers defining at least two slots therebetween, a first capacitance strain transducer formed in one of said slots including at least one capacitance varying element slidably carried in said one slot and extending outwardly therefrom, a second capacitance strain transducer formed in the other of said slots including at least one capacitance varying element slidably carried in said other slot and extending outwardly therefrom, said second capacitance strain transducer being angularly offset with respect to said first capacitance strain transducer by a predetermined angle and coupling means connecting the outwardly extending portions of said capacitance varying elements with the surface wherein strain is to be measured.

4,030,348

MACHINE FOR USE IN MONITORING FATIGUE LIFE FOR A PLURALITY OF ELASTOMERIC SPECIMENS

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an Invention of, and George E. Fitzer, Arcadia, Calif.

Filed Jan. 29, 1976, Ser. No. 653,682
Int. Cl.² G01N 3/34
U.S. Cl. 73—91 **8 Claims**



1. An improved machine for use in determining the term of fatigue life for a plurality of elastomeric specimens simultaneously subjected to cyclic strain over a range of frequencies comprising:

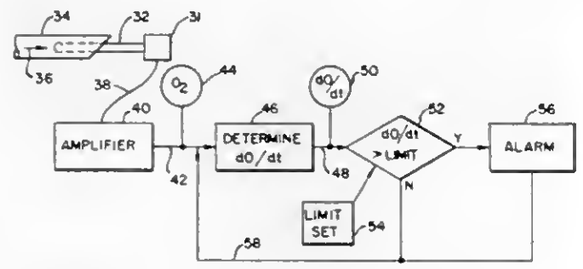
a. a plurality of test stations arranged in juxtaposition;
b. specimen support means located at each of said test stations for supporting in suspension a plurality of specimens of elastomeric materials; and
c. tensioning means arranged in coplanar relation with said specimen support means at each of said stations for periodically applying to the specimens supported at each of said stations tensile force of a magnitude suitable for cyclically subjecting the specimens to sinusoidal strain including means for selectively varying the amplitude of the strain to which the specimens are subjected at each of said stations, whereby monitoring of fatigue life over a range of strain amplitudes if facilitated.

4,030,349

ENGINE ANALYSIS APPARATUS

John David Blanke, Fullerton, and Norman Eliot Brunell, Sherman Oaks, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed Aug. 16, 1976, Ser. No. 714,144
Int. Cl.² G01M 15/00
U.S. Cl. 73—116 **10 Claims**



1. Improved engine exhaust gas analysis apparatus comprising:

a. means for sampling the exhaust gases including means for generating a first signal indicating the amount of a component present in the exhaust gases;
b. differentiating means connected to said sampling means and including means responsive to said first signal for generating a second signal indicating the rate of change of said first signal with respect to time;
c. means connected to said differentiating means for comparing said second signal to a limit; and,
d. means connected to said comparing means for indicating when said second signal exceeds said limit.

4,030,350

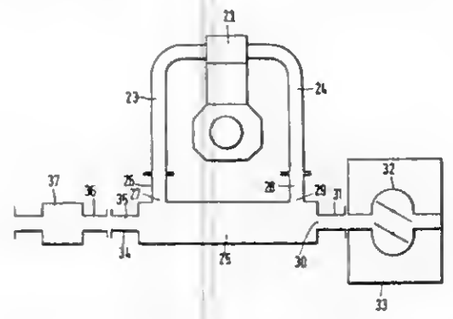
APPARATUS FOR SIMULATING VARIABLE AIR PRESSURES

Manfred Bier, Weissach, Germany, assignor to Porsche AG, Germany

Filed Aug. 13, 1976, Ser. No. 714,178
Claims priority, application Germany, Aug. 13, 1975, 2536047
Int. Cl.² G01M 15/00
U.S. Cl. 73—117.1 **10 Claims**

1. In an apparatus for simulating variable air pressure, particularly for the analysis of the influence of variable air pressures on the exhaust emission, power output and fuel consumption of an internal combustion engine, said apparatus including a cansiter which has first and second openings respectively coupled to the exhaust port of the internal combustion engine and a vacuum pump withdrawing gases from said canister, and a third opening coupled with a variable throttle device for adjusting the flow of air into said canister,
the improvement wherein

said canister is further provided with a fourth opening coupled to the air intake port of said engine, and wherein said variable throttle device is a self-regulating throttle device.

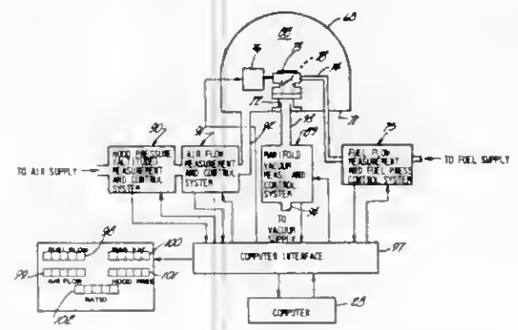


4,030,351

METHOD AND APPARATUS FOR LABORATORY TESTING OF CARBURETORS

Richard Lawrence Smith, Livonia, Mich., assignor to Scans Associates, Inc., Livonia, Mich.

Filed Nov. 17, 1975, Ser. No. 633,022
Int. Cl.² G01M 19/00
U.S. Cl. 73—118 **90 Claims**



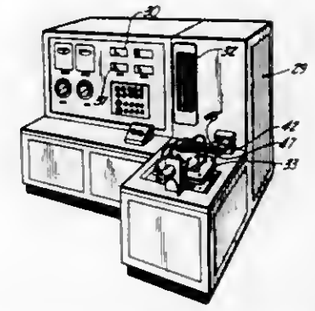
1. A method of testing carburetors at any desired number of points in the carburetor's operating range using subsonic flow to determine the air flow and fuel flow rate through the test carburetor, said method including the steps of providing a suitable test stand on which to mount a carburetor, providing a suitable test chamber above said stand adapted to sealingly enclose said carburetor, continuously controlling the pressure inside said test chamber with an optimized rate, reset and proportional control wherein the derivative time, reset time and proportional band values are continuously and automatically modified to be optimum so as to quickly produce the desired pressure at each point at which said carburetor test will take place in the shortest possible time, simultaneously controlling the pressure of the fuel entering the carburetor, simultaneously inducing air flow through said carburetor by providing a vacuum downstream of said carburetor, simultaneously determining the flow rate of air and fuel entering the carburetor, and simultaneously rotating the carburetor throttle plate until a desired predetermined test condition is achieved.

4,030,352

APPARATUS FOR REPRODUCING OPERATING CONDITIONS IN INDUCED FLOW DEVICES

Richard L. Smith, Livonia, and Peter J. Mosher, Northville, both of Mich., assignors to Scans Associates, Inc., Livonia, Mich.

Division of Ser. No. 483,320, June 25, 1974, Pat. No. 3,975,953. This application Jan. 12, 1976, Ser. No. 648,510
Int. Cl.² G01F 9/00
U.S. Cl. 73—118 **6 Claims**



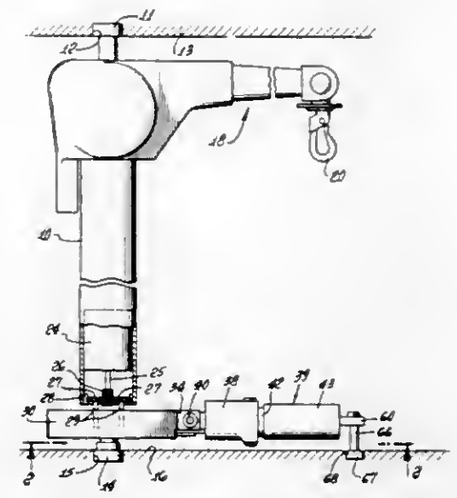
1. A carburetor throttle plate drive including a frame member, a stepping motor fixedly mounted to said frame member, a first non-linear driving means fixedly mounted to the shaft of said stepping motor, a second non-linear driven member rotatably mounted on said frame member in driving engagement with said driving means, and means mounted on said driven member adapted to drivingly but removably be connected to said carburetor to control the throttle plate thereof.

4,030,353

EFFORT LIMITING AND INTERRUPTING ACTUATOR

Donald P. Shutt, Long Beach, Calif., assignor to Western Gear Corporation, Lynwood, Calif.

Continuation-in-part of Ser. No. 554,509, March 3, 1975, Pat. No. 3,964,318. This application Apr. 12, 1976, Ser. No. 676,337
Int. Cl.² B66C 13/50
U.S. Cl. 73—139 **6 Claims**



1. In a mechanical direction discriminating sensor: an input arm pivoted on a first relatively fixed pivot axis and adapted to be torqued in either direction about said axis,
a reaction arm comprised of two telescopically related arm members, one pivoted about a second relatively fixed axis, spaced from and parallel to that of said input arm, the second being pivotally connected to said input arm for pivotal movement about an axis spaced from and parallel to said second relatively fixed pivot axis,
a V-cam on at least one of said input arm and said second arm member, facing longitudinally therealong.

a plunger engaging in said V-cam, telescopically related to the respective one of said second of said telescopically related arm members of said reaction arm, and said input arm,

a pre-compressed compression spring means acting longitudinally of said input arm between said plunger and said input arm, said compression spring means having sufficient pre-compression to withstand a compressive force of a predetermined limited magnitude without longitudinal contraction, and thereby stiffen said input and reaction arms against angular break at the pivot connection therebetween, but to contract in response to compressive force of a predetermined larger magnitude owing to torque in either direction on said input arm, whereby said angular break of said input and reaction arms occurs at said pivot connection therebetween, in opposite directions depending upon the direction of said torque, and

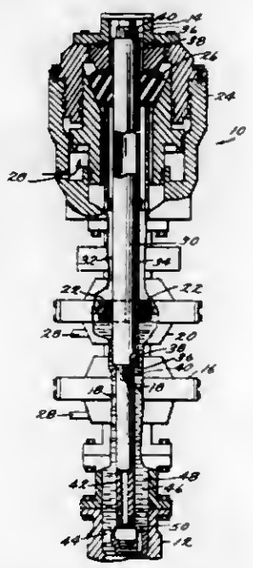
sensor operating means on a pivoting portion of said reaction arm discriminatory by its direction of movement between the directions of said angular break.

4,030,354

TESTING OF RAM AND ANNULAR BLOWOUT PREVENTERS

Kenneth F. Scott, 321 Woodmont, Gretna, La. 70053

Filed Feb. 27, 1976, Ser. No. 662,256
Int. Cl.² E21B *47/10*
U.S. Cl. 73—151 **5 Claims**



4. A method for testing the sealing and holding characteristics of an annular blowout preventer with a radially expansible-contractile bag and a casing rams-equipped blowout preventer, which are arranged one above the other in a blowout preventer stack, in turn mounted on a wellhead, comprising:

making up and running into the well until it seats a string of drill pipe having a test plug at the lower end thereof and incorporating a larger diameter section, of the diameter of the casing which the casing rams are designed to seal against, said section being of such length and placement in the string of drill pipe, that when the test plug seats in the wellhead the section is in position to be alternately circumferentially gripped by the casing rams and the bag of the annular preventer;

opening the annular preventer, closing the casing rams on said larger diameter section, introducing pressurized fluid into the annulus outside said string between the casing rams and the test plug, and monitoring for leakage from the annulus, of pressurized fluid;

opening the casing rams, closing the annular preventer on said larger diameter section, introducing pressurized fluid into the annulus outside said string between the annular preventer and the test plug, and monitoring for leakage of pressurized fluid from the annulus;

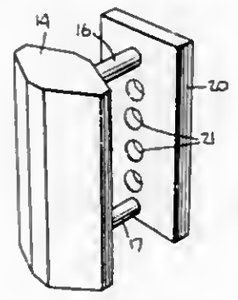
opening the annular preventer and pulling the string of drill pipe, test plug and incorporated larger diameter section from the well.

4,030,355

OBSTACLE ASSEMBLY FOR VORTEX TYPE FLOWMETER

Peter J. Herzl, Morrisville, Pa., assignor to Fischer & Porter Co., Warminster, Pa.

Filed June 18, 1976, Ser. No. 697,686
Int. Cl.² G01F *1/68*
U.S. Cl. 73—194 VS **7 Claims**



1. A vortex type flowmeter providing accurate flow rate readings regardless of turbulence or other disturbances in the fluid being metered, said flowmeter comprising:

A. a flow tube forming a conduit for the fluid to be metered;

B. an obstacle assembly disposed in said tube and constituted by a front section and a rear section, said front section being mounted across said tube at right angles to the longitudinal flow axis of said tube to intercept the incoming fluid whereby fluidic vortices are periodically shed therefrom, said rear section being disposed at right angles to said flow axis and being spaced from said front section to define a gap therebetween to trap and to stabilize said vortices, said rear section having an opening in the central zone thereof through which said flow axis extends to permit the passage of fluid therethrough in a direction parallel to said flow axis to smooth out turbulence behind the front section to an extent creating an orderly vortex trail down the center of the flow tube; and

C. means to sense the fluidic vortices to produce an output signal whose frequency corresponds to the periodicity of the vortices and is proportional to the flow rate of the fluid being metered.

4,030,356

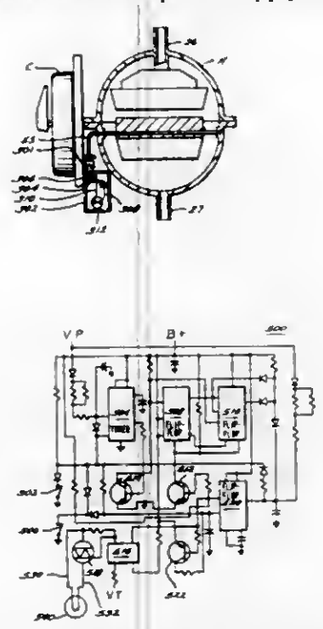
CONTINUOUS WEIGHING MECHANISM FOR FLUIDS

Burton Kent Jaquith, Fort Lauderdale, Fla., assignor to Technical Industries, Inc., Fort Lauderdale, Fla.

Filed Mar. 28, 1975, Ser. No. 563,093
Int. Cl.² G01F *3/26*; **A01J** *5/00*
U.S. Cl. 73—195 **6 Claims**

1. A fluid flow indicating device for use with a conduit system wherein a fluid material is moved and is weighed by a continuous weighing mechanism, which contains a fluid receiver mounted upon a rocker shaft, said receiver and a portion of said rocker shaft contained within a housing which is supported by a frame, and comprising (a) a magnet which is detachably connected to said rocker shaft on that portion thereof which is outside said housing; (b) an electromechanical switch which is adapted to be mounted on said frame, said switch being in electromagnetic relationship with said magnet so that movement of said magnet can activate said switch; (c) a control module containing input an output circuits, disposed remotely from said switch and interconnected therewith by suitable electrically conductive means, and which control module consists of a solid state timing device which comprises

(1) a flow monitoring circuit which comprises two flip-flop integrated circuits for counting an incoming electrical signal; (2) a reference timer integrated circuit which comprises a comparative timer which registers and compares the signals of said two flip-flop integrated circuits; (3) a control transistor which receives a signal from said flip-flop integrated circuits; (4) an optical coupler which receives a signal from said control transistor upon preset circuitry conditions and which is energized thereby; (5) a triac which is operative via a pilot voltage through the energized optical coupler and which triac in turn activates an electrical power supply through the output



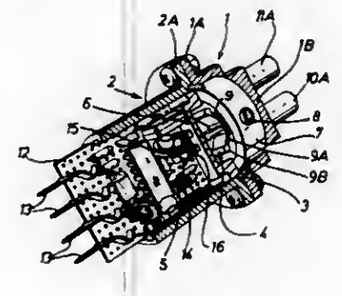
circuit and (6) an override section timer circuit which monitors the length of time between signals received in said flow monitoring circuit and upon preset circuitry conditions allows a greater lapse of time between said signals, and suitable electrically conductive means between items (1) and (6), said control module adapted to receive a signal from said switch through said input circuit and upon preset circuitry conditions, activate an outside electrical power supply through the said output circuit as described in item (5); and (d) a second housing which is adapted to detachably contain said control module.

4,030,357

METERING OF FLUID FLOWS

William Alexander Wemyss, Northwood, England, assignor to Litre Meter Limited, Northwood, England

Filed Aug. 3, 1976, Ser. No. 711,050
Claims priority, application United Kingdom, Aug. 5, 1975, 32668/75
Int. Cl.² G01F *1/075, 5/00*
U.S. Cl. 73—202 **4 Claims**



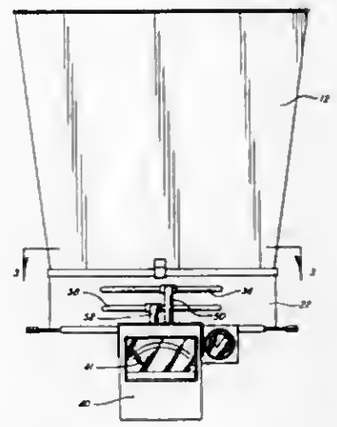
3. Fluid flow-metering apparatus comprising a fluid flowmeter device and a conduit, wherein said flowmeter device comprises a casing defining a cylindrical chamber, a first end wall closing one end of said chamber, and inlet and an outlet for the fluid in said first end wall, a separately made ring of metal fitted non-rotatably in said chamber, two bearings at diametrically opposite positions in said ring, said ring having a cylindrical outer face and a cylindrical inner face and two diametrically opposite bores, the bearings being received within said bores, the cylindrical outer faces of said ring fitting in said cylindrical chamber, a rotor mounted on said bearings so that rotor axis is perpendicular to an intersects the axis of said ring, said rotor including radially-directed, axially-extending blades which are each substantially rectangular as seen in a direction perpendicular to the respective blade, one or more inductively detectable elements mounted in the tip or tips of one or more respective blades of the rotor, and two or more members made separately from said ring and partly filling the interior of said ring, each of said two or more members having a part-cylindrical outer face interfitting with a respective part of the cylindrical inner face of said ring, and a planar inner face facing the rotor and perpendicular to the axis of the rotor, a second end wall closing the other end of the chamber, a coil arranged in the vicinity of the second end wall, means sealing off the coil fluid-tightly from the chamber, said coil being adapted and arranged for sensing rotation of the rotor by sensing passage past the vicinity of the coil of said elements, and wherein said inlet and said outlet communicates with said conduit, the flowmeter device being adapted to produce a pressure difference due to fluid flow along said conduit between said inlet and said outlet such that a minor proportion of the fluid flowing along said conduit flows into and out of said chamber though said inlet and outlet while a major proportion of the fluid flowing along sid conduit bypasses said chamber, the ratio between said minor and major proportions being substantially fixed over a range of rates of flow of a given fluid along said conduit.

4,030,358

PORTABLE AIR VELOCITY MEASURING UNIT

Robert W. Noll, Santa Rosa, Calif., assignor to Cambridge Filter Corporation, Syracuse, N.Y.

Filed Nov. 10, 1975, Ser. No. 630,419
Int. Cl.² G01F *1/00, 1/46*
U.S. Cl. 73—212 **10 Claims**



1. A portable unit for measuring the velocity of an air stream flowing into or out of an opening, said unit comprising:

a. a wall section defining a path for air flow between first and second open ends;

b. at least two hollow manifold tubes, closed at both ends, extending transversely across said second open end of said wall section;

c. at least two hollow sensing tubes respectively mounted coaxially within said manifold tubes, and extending through one end thereof, each of said sensing tubes having a plurality of openings through the walls thereof within said manifold tubes for air flow between the interiors of said manifold and sensing tubes;

d. a first plurality of probes having open ends facing said first open end at preselected locations in a first plane

adjacent and transverse to said second open end, and communicating with the interior of one of said manifold tubes;

e. a second plurality of probes having open ends facing away from said first open end at preselected locations in second plane adjacent and transverse to said second open end, and communicating with the interior of the other of said manifold tubes, said second plane being closely adjacent to and closer to said second open end than said first plane, the number of said first probe open ends being equal to the number of said second probe open ends;

f. an air flow velocity meter having an inlet and an outlet, and means movable in proportion to the velocity of air flowing from said inlet to said outlet; and

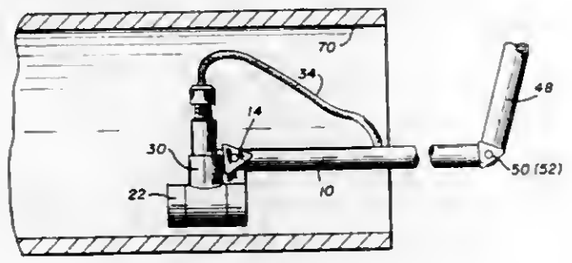
g. means for selectively connecting either of said inlet and outlet in communication with either of said sensing tubes.

4,030,359

OPEN STREAM VELOCITY PROBE AND METER

W. Mead Stapler, One Dey Lane, Riverdale, N.J. 07457

Filed Nov. 26, 1976, Ser. No. 745,472
Int. Cl.² G01F *1/115*
U.S. Cl. 73—231 R **7 Claims**



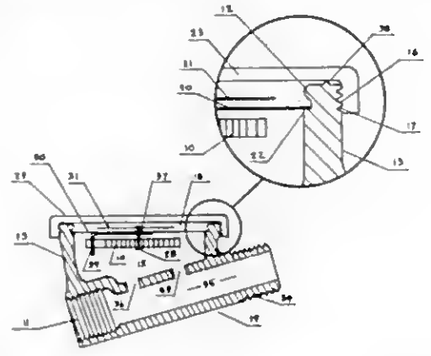
1. A flowmeter probe apparatus in which the probe is of a relatively small size and weight enabling hand holding and manipulation, said probe providing means for measuring the rate of fluid flow in open streams, discharge ends of pipes and the like, said probe apparatus including: (a) a turbine-type flowmeter in which a rotatable turbine has blades mounted thereon; (b) a housing in which the turbine is carried, this housing including a tubular shroud of not more than two inches in diameter and arranged so as to surround the tips of the rotatable turbine blades in a close proximity thereto and providing a clearance of not greater than one-eighth of an inch and to provide protection for said blades against accidental engagement of these blades with rocks, weeds, obstructions, walls of pipe and the like, said shroud having an inlet chamfer adapted to guide the influent in way of the wall of the shroud to the interior of the shroud; (c) a magnet carried by the turbine and producing in an induction transducer carried in the housing at least one pulse with every revolution of the turbine, this pulse carried by a cable to an amplifier and meter retained in a portable remote housing; (d) a pivot joint member formed on said housing; (e) a handle having a pivot mounting means on one end for the mounting thereon of the housing and a handle grip at the other end and a handle extension attachment means, the pivot mounting adapted for cooperative engagement with the pivot joint member on the housing; (f) means for locking and unlocking the pivot joint so that the housing may be moved and clamped at any position between alignment with the handle and at a position normal to the axis of the handle and when the housing is aligned with the handle placement of the probe into the ends of small discharge pipes may be achieved, and (g) a handle extension means pivotally attachable to the end of the handle enabling the housing and shroud to be inserted into a pipe while the operator stands above the pipe.

4,030,360

SHOWER WATER TEMPERATURE MEASURING INSTRUMENT

Jeffrey L. Fortune, 3901 40 St. South, St. Petersburg, Fla. 33711

Filed Dec. 18, 1975, Ser. No. 641,883
Int. Cl.² G01K *1/08, 13/02*
U.S. Cl. 73—349 **2 Claims**



1. Apparatus for measuring the temperature of flowing water attached at one end to a water pipe and disposed upstream to a shower nozzle relative to the flowing water comprising:

a molded casing means, a tubular cavity formed within said casing means and disposed for fluid connection of the water pipe with the shower nozzle, a first cavity formed within said casing means and disposed in spaced apart relation to said tubular cavity, at least one passage means interconnecting said tubular cavity with said first cavity, bimetal coil means with a bimetal coil disposed within said first cavity with the bimetal coil directly in fluid communication through said passage means with the flowing water, said bimetal coil means including a first and second end, connector means for mounting said first end of said bimetal coil within said first cavity shaft means attached to said second end, pointer means attached to said shaft means whereby rotation of said shaft means caused by coiling and uncoiling of said bimetal coil means rotates said pointer means, lens means disposed in water sealing attachment to said causing means, dial plate means disposed within said first cavity in spaced-apart relation to said lens means, said pointer means positioned between said dial plate means and said lens means, hollow bearing means disposed within said dial plate means and configured to receive said shaft means, said shaft means disposed in protruding relationship within said hollow bearing means, whereby said bimetal coil means coils and uncoils in response to variation in temperature of the flowing water, whereby said lens means is easily viewable to the user.

4,030,361

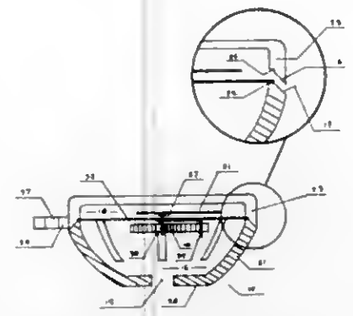
FLOATING BATH WATER TEMPERATURE MEASURING INSTRUMENT

Jeffrey L. Fortune, 3901 40th St. South, St. Petersburg, Fla. 33711

Filed Dec. 22, 1975, Ser. No. 643,535
Int. Cl.² G01K *1/08*
U.S. Cl. 73—353 **5 Claims**

1. A floating apparatus for measuring the temperature of water contained within an open vessel while floating on the surface of the water comprising: casing means with a hemispheric shape, said casing means having a first cavity formed therein, said casing means having at least one passage means through the wall thereof whereby said first cavity means is open to the flow of water, coil means including a first end and a second end disposed within said first cavity and attached at the first end to the wall of said first cavity, shaft means attached to the second end of said coil means, dial plate means

disposed in water sealing engagement with the lip of said casing means, lens means disposed in water sealing attachment to the lip of said casing means, a second cavity means formed between said dial means and said lens means whereby said second cavity means is sealed from the flow of water, hollow bearing means connecting said first cavity with said second cavity and configured to receive said shaft means, said shaft means disposed in protruding relation to said hollow



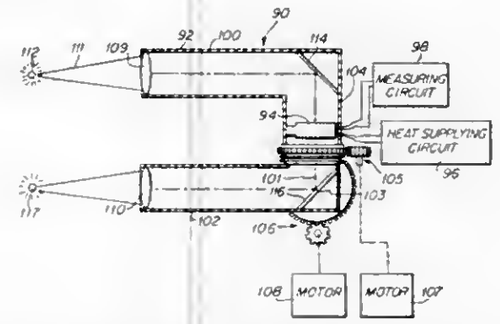
bearing means, pointer means disposed in substantially spaced apart parallel relation to said dial plate means and attached to said shaft means, the upper portions of said passage means positioned near the lip of said casing means whereby said passage means at least in part is disposed at the top of said first cavity when said floating apparatus is merged in water, whereby said shaft caused by coiling and uncoiling of said coil means rotates said pointer.

4,030,362

SELF-CALIBRATING RADIOMETER

John Dimeff, 5346 Greenside Drive, San Jose, Calif. 95127

Filed Dec. 22, 1975, Ser. No. 643,042
Int. Cl.² G01J *5/52*
U.S. Cl. 73—355 EM **2 Claims**



1. A self-calibrating radiometer comprising:

first means forming a block having a front surface for receiving incident radiation flux, an identically configured rear surface for receiving internally applied heat and a mid portion for thermally insulating said rear surface from said front surface, said front surface being capable of absorbing as heat substantially all radiation flux incident thereupon and capable of reradiating substantially all of the absorbed heat, and said rear surface being capable of radiating substantially all heat applied thereto;

second means for sensing the heat radiated by each of said front and rear surfaces and for indicating any difference therebetween;

third means for applying enough heat to said rear surface so that no difference in heat radiated by said front and rear surfaces is indicated by said second means;

fourth means for measuring the heat applied to said rear surface, such measurement being indicative of the radiant flux incident on said front surface;

fifth means for focusing first radiation flux from a first external source upon said front surface;

sixth means for focusing second radiation flux from a second external source upon said rear surface; and

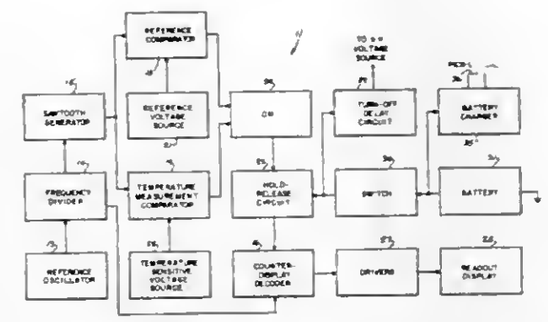
housing means enclosing said block and isolating said rear surface from said first external flux and isolating said front surface from said second external flux.

4,030,363

ELECTRONIC THERMOMETER

Michael E. Halleck, Boulder, Colo., assignor to Electromedics, Inc., Denver, Colo.

Filed Oct. 28, 1975, Ser. No. 626,364
Int. Cl.² G01K *7/24*; **H03K** *13/02*
U.S. Cl. 73—362 AR **2 Claims**



1. In an electronic thermometer having means for displaying a patient's temperature, an activation switch, means responsive to said patient's temperature for generating an analog temperature measurement signal, means for generating an analog reference signal, and means comparing said analog temperature measurement signal with said analog reference signal for controlling said display means, an improvement to said controlling means comprising:

oscillator means for generating a plurality of clock pulses;

frequency divider means responsive to said clock pulses for generating a first series of timing pulses and for generating a second series of timing pulses;

saw tooth generator means operative upon receipt of each timing pulse of said first series of timing pulses for producing a saw tooth pulse;

first comparator means, simultaneously receptive of each said saw tooth pulse and of said analog reference signal, for outputting a first control signal when the amplitude of said saw tooth pulse equals the amplitude of said analog reference signal;

second comparator means, simultaneously receptive of each said saw tooth pulse and of said analog temperature measurement signal, for outputting a second control signal when the amplitude of said saw tooth pulse equals the amplitude of said analog temperature measurement signal;

counting means responsive to said second series of timing pulses for counting timing pulses of said second series, the number of said counted pulses being related to the temperature displayed by said display means;

activating means, cooperative with said counting means and responsive to said first and second control signals and the number of said counted pulses, for activating said display means to display a temperature;

said activating means being responsive to said first control signal when the amplitude of said analog temperature measurement signal is less than the amplitude of said analog reference signal for activating said display means to display a calibration temperature, and

said activating means being responsive to said second control signal when the amplitude of said analog temperature measurement signal is greater than the amplitude of said analog reference signal for activating said display means to display a measured temperature of said patient;

adjustment means for adjusting the frequency of generation

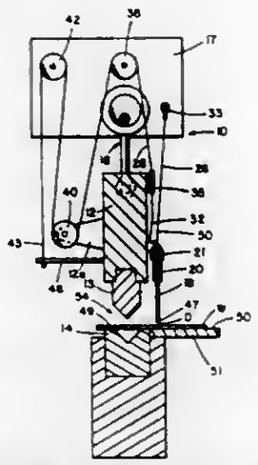
of clock pulses by said oscillator means to adjust the calibration temperature displayed to a preselected desired calibration temperature; and

presenting means responsive to the release of said activation switch for presenting only the last reading to said display means for a predetermined time interval, wherein said presenting means comprises a capacitor responsive to the activation of said activation switch for charging up to a supply voltage value and a discharge circuit responsive to said charged capacitor for supplying power to said controlling means after said activation switch is released.

4,030,364
SAFETY GUARD FOR PRESS BRAKES

Felix M. Atwood, Richardson, Tex., assignor to Square D Company, Park Ridge, Ill.

Filed May 20, 1976, Ser. No. 688,436
Int. Cl.² B21D *55/00*; F16P *3/00*
U.S. Cl. 72—389 **9 Claims**

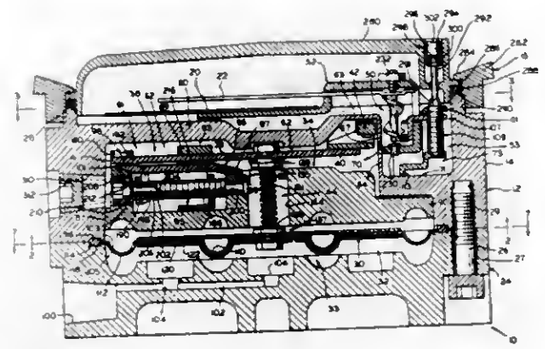


1. A safety guard for use with a press brake or the like having a supporting structure, a bed fixed with respect to and below at least a portion of the supporting structure, and a ram carried by the supporting structure, and reciprocable in a path between an uppermost position above the bed through a workpiece-engaging position to a lowermost position after performing a fabricating operation on a workpiece positioned on the bed, said safety guard comprising a protective sheet disposed, when the ram is in its uppermost position, in a guarding position with respect to the path of reciprocation of the ram and with a lower edge of the sheet positioned a predetermined distance above an upper surface of the bed thereby to define an opening of sufficient width to permit a workpiece to be passed through the opening onto the bed but of insufficient width for passage of an operator's hand, and means drivingly connecting the ram to the sheet for starting upward movement of the sheet to widen the opening only when the ram nears the bed during the downward portion of its stroke and continuing to move the sheet upwardly to a maximum displacement from the upper surface of the bed when the ram is at its lowermost position thereby to permit manipulation of the workpiece during its fabrication by the ram, said means effecting a return movement of the sheet to its initial position as the ram returns to its uppermost position.

4,030,365
DIFFERENTIAL PRESSURE GAUGE

James W. Phillips, and Terrance J. Troyer, both of Michigan City, Ind., assignors to Dwyer Instruments, Inc., Michigan City, Ind.

Continuation-in-part of Ser. No. 639,969, Dec. 11, 1975, Pat. No. 4,011,759. This application June 28, 1976, Ser. No. 700,131
Int. Cl.² G01L *7/08*
U.S. Cl. 73—393 **17 Claims**



1. In a gauge that includes linear to rotary motion transforming means including a housing, a helix in the housing journaled for rotation about its axis, with the helix having an indicator connected thereto, a magnet in the housing for producing rotational movement of said helix in response to linear movement of the magnet alongside the axis of the helix, said magnet being mounted on a leaf spring member secured within the housing cantilever fashion at one end of said spring member, with said spring member being disposed to extend generally transversely of the axis of said helix and with said helix aligned with said spring member, said magnet being mounted on said leaf spring member adjacent to and in magnetic attraction relation to said helix, sensing means connected to said spring member to shift said magnet substantially parallel to the axis of said helix and comprising a flexible diaphragm mounted across a pressure cavity formed by the housing and separating high and low pressure chambers in the gauge, and an adjustment device for adjusting the spring rate of said spring member,

the improvement wherein:

the housing between the diaphragm and the spring member defines a rim wall in circumambient relation about the cavity,

and including a mounting plate secured in said housing within said rim wall and contacting the housing only at said rim wall,

said leaf spring member being mounted on said mounting plate at said one end of said spring member and the magnet being adjacent the other end of said spring member,

a fulcrum for said spring member engaging said spring member intermediate said ends of said spring member and mounted on said mounting plate for adjustment longitudinally of said spring member,

and means for moving said fulcrum longitudinally of said spring member.

4,030,366
PRESSURE TRANSMITTER

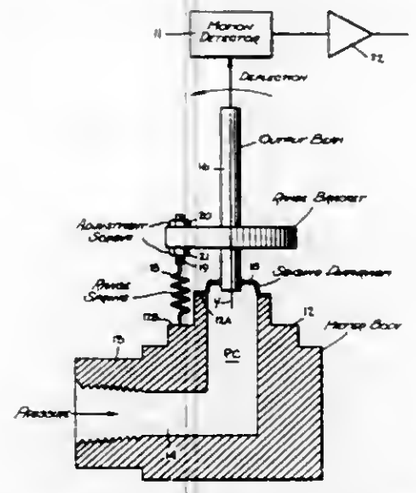
Masahiro Kazahaya, Southampton, and John J. Bonner, Philadelphia, both of Pa., assignors to Fischer & Porter Co., Warminster, Pa.

Filed Aug. 11, 1976, Ser. No. 713,623
Int. Cl.² G01L *7/08*
U.S. Cl. 73—406 **7 Claims**

1. In a pressure transmitter in which fluid pressure is indicated by a sensor to produce a corresponding deflection which is converted into a signal for transmission to a remote station, said sensor comprising:

A. a meter body having a chamber therein which is coupled to the fluid whose pressure is to be transmitted;

B. a diaphragm sealing said chamber whereby the diaphragm is caused to dilate axially as a function of applied fluid pressure;



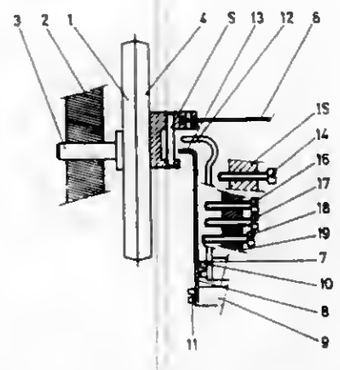
C. an upstanding force beam anchored on said diaphragm whereby said dilatable diaphragm seeks to push said beam upwardly; and

D. a range spring which is offset with respect to the axis of said beam and is connected between an intermediate point on the beam and said body whereby when said beam is pushed by said diaphragm, it is caused to deflect.

4,030,367
DEVICE FOR CORRECTING THE LAW OF DEFLECTION OF AN ANEROID CAPSULE

Roger Dussartre, Versailles, France, assignor to Jaeger, Levallois-Perret, France

Filed Mar. 19, 1976, Ser. No. 668,397
Claims priority, application France, Apr. 24, 1975, 75.12866
Int. Cl.² G01L *7/06*
U.S. Cl. 73—410 **1 Claim**

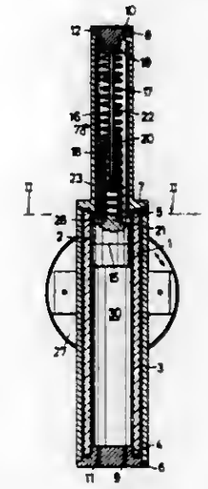


1. A device for correcting the law of deflection of an aneroid capsule sensitive to differential pressure, the device comprising an active diaphragm and at least two flexible strips of different rigidity, each having an end attached to a fixed frame of the device and a free end, the free ends of the strips being located at various points of a path covered by the central part of the active diaphragm of the aneroid capsule during its deflection, so that each free end constitutes an abutment for said central part when the central part reaches said free end, and wherein there is provided for at least one of said strips, abutments of adjustable length mounted on the fixed frame and located at various points in the region of displacement of said latter strips.

4,030,368
SPRING-LOADED DIFFERENTIAL PRESSURE GAGE

Hans-Jürgen Runge, Kisdorf, Germany, assignor to Warner Lewis Jr. Industrie- Filter GmbH, Frankfurt am Main, Germany

Filed Aug. 11, 1976, Ser. No. 713,449
Int. Cl.² G01L *13/02*
U.S. Cl. 73—419 **20 Claims**



1. A differential pressure gage, comprising a hollow cylinder; a piston reciprocably received in and dividing the interior of said cylinder into a low-pressure and a high-pressure chamber, said piston and said cylinder consisting of materials having at least substantially identical heat expansion coefficients; and means for biasing said piston in a direction to reduce the volume of one of said chambers, comprising a plurality of tension springs arranged in series and including a relatively weak first spring which is subjected to progressively increasing stresses only during a first stage of movement of said piston counter to said direction and a relatively strong second spring which is subjected to progressively increasing stresses substantially only during a next-following second stage of movement of said piston counter to said direction.

4,030,369
AUTOMATIC CONTROL SYSTEM FOR VACUUM LOOP SAMPLE INJECTION SYSTEM

Jay D. Etheridge, Sand Springs, Okla., assignor to Sun Oil Company of Pennsylvania, Philadelphia, Pa.

Continuation-in-part of Ser. No. 668,780, March 19, 1976. This application Sept. 30, 1976, Ser. No. 728,491
Int. Cl.² G01N *1/22*
U.S. Cl. 73—422 GC **13 Claims**

1. In a vacuum loop sample injection system for injecting a predetermined amount of sample material from at least one sample source into a system for analyzing the sample, said injection system comprising,

a. a vacuum source;

b. at least one enclosure means having a predetermined volume;

c. means for detecting the pressure within the enclosure means and for producing a signal related to the pressure detected;

d. a source of carrier gas;

e. first connecting means having a first inlet port connected to the vacuum source, a second inlet port connected to the sample source, and an outlet port, said first connecting means having a first position wherein its first inlet port is in fluid communication with its outlet port, and a second position wherein the second inlet port is in fluid communication with its outlet port; and

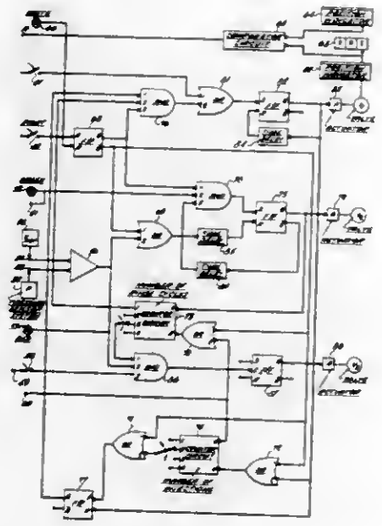
f. second connecting means having a first position wherein the enclosure means is connected to the outlet port of the first connecting means and a second position wherein the

enclosure means is placed in series with the carrier gas source and the sample analyzer system so that the carrier gas forces the sample isolated in the enclosure into the analyzing system;

an improvement for automatically controlling the two connecting means for sequential operation of the injection system, wherein the sequential control system comprises:

g. means for producing a command signal for initiating the sequential operation;

h. means, responsive to said command signal, for sequentially moving the first connecting means in a cyclic fashion from the first to the second position and back to the first position for a predetermined number of cycles, each cycle being complete upon the first connecting means reaching its second position, so that the enclosure means is rinsed out with sample material;



i. means, responsive to the completion of a predetermined number of cycles of the first connecting means, for moving the second connecting means from its first position into its second position, wherein the sample material in the enclosure means is injected into the sample analyzer system by the flow of carrier gas through the enclosure means.

4,030,370

TRANSDUCER POSITIONER FOR TESTING TUBES FROM INSIDE DIAMETER

Thomas R. Keith, Jr., Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Filed Feb. 25, 1976, Ser. No. 661,192

Int. Cl.² G01N *29/04*

U.S. Cl. 73—67.8 S **6 Claims**

1. A transducer positioner for testing conduits from the interior using a pulse-echo ultrasonic instrument comprising

a. a detection head comprising

1. flat, leaf-type springs connected in a cup-shaped arrangement,

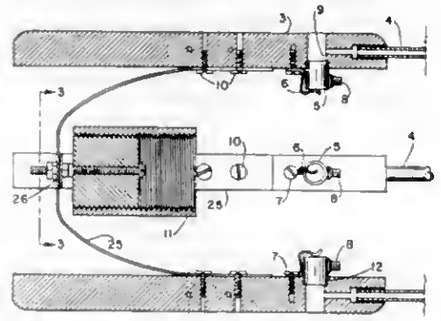
2. said springs supporting transducer shoes, having,

3. a transducer attached to said shoe, said transducer being exposed to water coupling means with the conduit to be tested,

b. connecting tubes between a water source and shoes to provide a water column for coupling each transducer to the conduit to be tested,

c. a switching box and a calibration transducer,

d. connecting cables from each transducer to an ultrasonic instrument, said cables passing through said switching box, said switching box allowing readings to be taken from any transducer.



4,030,371

GYROSCOPIC APPARATUS

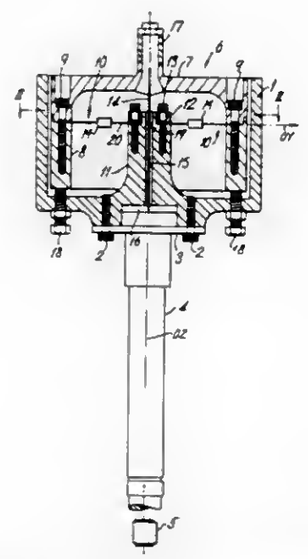
David Nicholas Bulman, Fairford, and Leonard Maunder, Newcastle-upon-Tyne, both of England, assignors to National Research Development Corporation, London, England

Filed Sept. 26, 1975, Ser. No. 617,162

Claims priority, application United Kingdom, Oct. 9, 1974, 43743/74

Int. Cl.² G01C *19/02*

U.S. Cl. 74—5 F **8 Claims**



1. Gyroscopic apparatus in which:

a driving element is rotatable about a driving axis;

a rotor has its center of gravity on said driving axis;

there is an elastic connection between said rotor and said driving element;

said elastic connection constrains said rotor to rotate normally in a plane lying at right angles to said driving axis, but permits it to deflect from said plane against elastic resistance;

said elastic connection includes a plurality of similar structures joining said rotor to said driving element and capable of exerting torque upon said rotor when deflected;

said structures each comprise a mass, a first member connecting said mass to said driving element and a second member connecting said mass to said rotor;

said first and second members are resilient in directions substantially parallel to said driving axis, whereby said masses have freedom to move in similar directions against elastic restraint; and

said restrained movement of said masses results in variation of said torque exerted by said structures upon said rotor when deflected, whereby at certain rotor speeds the resultant of said torques substantially compensates for any other external torques to which said rotor is subject.

4,030,372

DRIVING METHOD FOR TANGENTIAL BELT AND APPARATUS THEREFOR

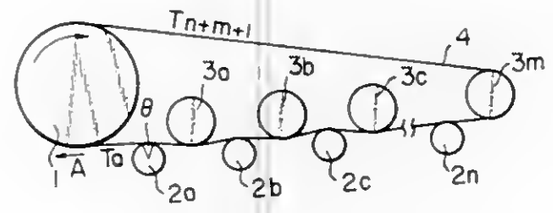
Noriaki Miyamoto, Kariya, Japan, assignor to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Japan

Filed Feb. 21, 1975, Ser. No. 551,765

Claims priority, application Japan, Feb. 27, 1974, 49-23107; Feb. 13, 1975, 50-17379; Feb. 13, 1975, 50-17380

Int. Cl.² F16H *7/00*

U.S. Cl. 74—221 **8 Claims**



1. An apparatus for driving a plurality of driven pulleys or pairs of driven pulleys, wherein said apparatus comprises an endless belt tangentially contacting said driven pulleys, a driving pulley for driving said endless belt, a plurality of driven pulley means each including from one to two driven pulleys mounted to be driven by said endless belt, and a plurality of guide pulleys positioned intermediate said pulley means to press against said endless belt so as to bring it into contact with said driven pulley means at given contact angles, comprising means for setting said contact angles between said endless belt and the driven pulley means, so that said contact angles on all of said pulley means are progressively decreased toward the down stream direction of movement of the belt.

4,030,373

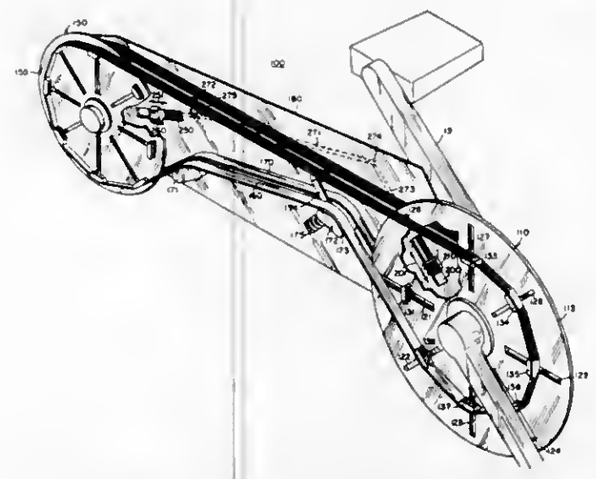
VARIABLE SPEED DRIVE FOR A BICYCLE

Hamlin Leonard, Darien, Conn., assignor to B-5 Associates of Stamford, Connecticut, Stamford, Conn.

Filed Nov. 20, 1975, Ser. No. 633,862

Int. Cl.² F16H *55/54, 9/00, 7/12, 55/30*

U.S. Cl. 74—230.19 **18 Claims**



1. A variable speed drive for a bicycle, comprising:

a variable diameter driving mechanism rotatably mountable on said bicycle, said mechanism including a mounting plate having a plurality of radial tracks therein;

a plurality of movable sheave elements each being mounted in one of said tracks, each sheave element having a releasable retaining means which normally retains it at a substantially fixed radial position in its track;

flexible driving means partially wrapped around said driving mechanism and engaging different adjacent ones of said sheave elements depending on the rotational orientation of said driving mechanism;

gate means positioned to sequentially coact with the non-engaged sheave elements and operative, under manual control, to release the retaining means of a sheave element to allow radial motion of said sheave element; and

means for applying a radial bias to the released sheave elements.

4,030,374

FRONT DERAILLEUR FOR BICYCLE

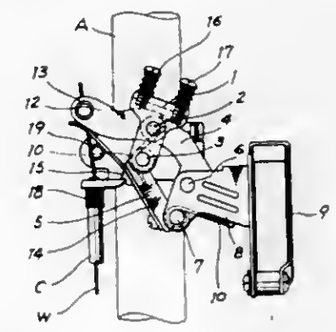
Mitsuhide Isobe, Sakai, Japan, assignor to Shimano Industrial Company, Limited, Osaka, Japan

Filed Dec. 15, 1975, Ser. No. 640,790

Claims priority, application Japan, Dec. 12, 1974, 49-143966; Dec. 12, 1974, 49-143967

Int. Cl.² F16H *7/22, 11/08*

U.S. Cl. 74—217 B **5 Claims**



1. A front derailleur for a bicycle for shifting a driving chain to one of two or more sprocket wheels of a front gear, said derailleur comprising:

a fixing member secured to a bicycle frame;

two linkage members pivotally connected to said fixing member;

a chain guide pivotally connected to one end of each of said linkage members, said chain guide being laterally movable with respect to said fixing member through said linkage members to thereby guide the driving chain to be shifted;

return springs for biasing said chain guide;

an arm pivotally connected at one end thereof to said fixing member and having one end of a Bowden wire fixed to the other end thereof, said arm extending from said one end thereof in a direction away from said linkage members to the other end thereof;

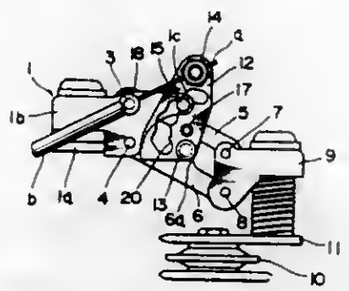
a leaf spring for transmitting the movement of said arm to said linkage members, one end of said leaf spring being secured to one of said arm and one of said linkage members and the other end of said leaf spring being in abutment with the other one of said arm and said one linkage member so that said leaf spring is movable with said arm, said leaf spring having an elastic force which is greater than that of said return springs whereby when resistance below a predetermined amount is applied to the guide frame the leaf spring transmits the movement of the arm to the linkage members to move the guide chain laterally and when resistance above the predetermined amount is applied to the guide frame the leaf spring is deformed and can not transmit the movement of the arm to the linkage members and stores the energy from its deformation to thereafter transmit the movement of the arm to the linkage members to move the guide frame laterally after the resistance goes below the predetermined amount.

4,030,375

DERAILLEUR FOR BICYCLE

Masashi Nagano, Sakai, Japan, assignor to Shimano Industrial Company, Limited, Osaka, Japan

Filed Mar. 31, 1976, Ser. No. 672,528
Claims priority, application Japan, Apr. 9, 1975, 50-43619
Int. Cl.[2] F16H 7/22, 7/00, 7/06
U.S. Cl. 74—217 B 15 Claims



1. A derailleur for a bicycle, which is adapted to change the bicycle speed by shifting a drive chain to one sprocket of a freewheel by means of a pull of a control wire, comprising:

a. a first fitting member, second and third linkage members pivoted at one end of the fitting member respectively, and a fourth movable member rotatably supported at its one end to the other end of each of the linkage members,

said linkage members being swingable with respect to said fitting member, said movable member being swingable with respect to said linkage members and movable with respect to said fitting member,

b. cages connected to the other end of said movable member, said cages carrying guide pulley means and moving together with said movable member to guide said drive chain therewith,

c. a cam plate pivotally supported at its one end to one of said four members in swingable relation therewith,

said cam plate having a cam face of a plurality of notches and a retainer attached to the other end opposite to said pivoted one end of the cam plate for retaining a terminal of the control wire, and

d. a pin fixed to a member, movable relative to said one member pivotally supporting said cam plate among said four members,

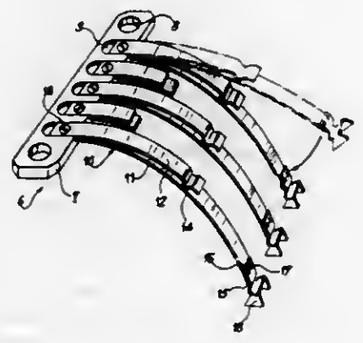
said pin being movable into contact with said cam face to be engaged with said notches respectively.

4,030,376

DEVICE FOR APPLYING TENSION TO BELTS OR CABLES FOR A REMOTE MANIPULATION

Jean-Claude Baudoin, Paris, and Robert Oger, Antony, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Feb. 20, 1976, Ser. No. 659,709
Claims priority, application France, Mar. 6, 1975, 75.07086
Int. Cl.[2] F16H 7/12, 7/10
U.S. Cl. 74—242.11 C 6 Claims



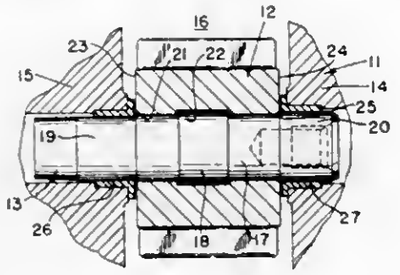
1. A device for applying tension to belts or cables for a remote manipulator and comprising a spring system mounted on a supporting bar which can be rigidly fixed to an element of the remote manipulator, a spring system continuously applied against the belts or cables with a substantially constant force in order to take up the slack of said belts or cables, said spring system being provided with a series of parallel elements equal in number to the belts or cables to be tensioned, each element being provided with an auxiliary spring-leaf applied against a main spring-leaf having a bridge-piece fitted at the end of said main spring-leaf and mounted astride the corresponding belt or cable.

4,030,377

ROTARY DRIVE ASSEMBLY

Frank E. Keske, Chillicothe, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed June 28, 1976, Ser. No. 700,273
Int. Cl.[2] F16H 1/02, 1/12, 55/04, 1/38
U.S. Cl. 74—412 R 14 Claims



1. A rotary drive assembly comprising:

a pinion having an axial bore having opposite ends and defining an annular recess intermediate said ends; and

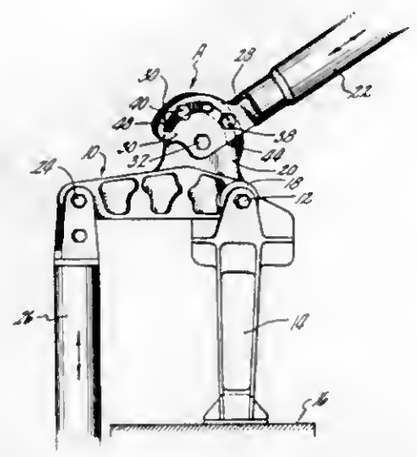
a shaft coaxially mounting said pinion and having an axially inner annular enlargement projecting into said bore and outer portion at axially opposite sides of said enlargement fitted in said bore axially outwardly from said recess.

4,030,378

REDUNDANT PUSHROD-TO-BELLCRANK CONNECTION

Edward James Kroesser, Milford, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Mar. 11, 1976, Ser. No. 666,112
Int. Cl.[2] G05G 1/04
U.S. Cl. 74—469 8 Claims



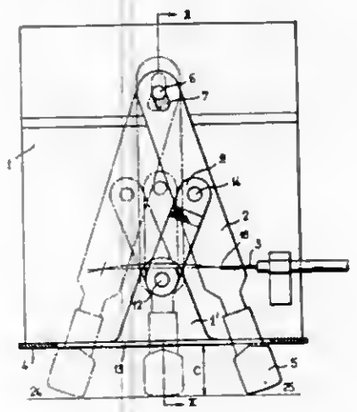
1. In an aircraft control system, a bellcrank member, a rod member, a primary pivot connecting one end of said rod member to said bellcrank member, secondary pivot means connecting said members comprising bearing means concentric with and spaced radially from said primary pivot, said bearing means including at least two spaced sets of aligned holes and arcuate slots in said members and pivot means extended through each set.

4,030,379

LEVER OPERATED CONTROL DEVICE

Andre Colinet, Boulogne-Billancourt, France, assignor to Regie Nationale des Usines Renault, Hauts de Seine and Automobiles Peugeot, Paris, both of, France

Filed Apr. 22, 1975, Ser. No. 571,000
Claims priority, application France, May 2, 1974, 74.15219
Int. Cl.[2] G05G 1/04
U.S. Cl. 74—522 7 Claims



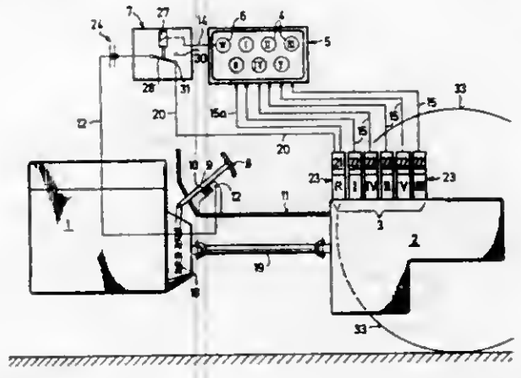
1. In a lever operated control mechanism wherein a control portion lies adjacent to and is adapted to move parallel to a control panel, a control device comprising: an elongated control lever having a first end and a second end; a control portion at the first end of said control lever; a restraining lever; first pivot means for pivotally mounting one end of said restraining lever on a movable axis located on said control lever between said first and second ends; second pivot means for pivotally mounting the other end of said restraining lever on a fixed axis; and limiting means at the second end of said control lever for limiting movement of said control lever to simultaneous pivotal movement about its second end and longitudinal movement.

4,030,380

SAFETY GEAR CHANGE APPARATUS FOR SNOW CLEARING VEHICLES

Werner Mutter, Todtmoos, Germany, assignor to Ing. Alfred Schmidt GmbH, Blasien, Black Forest, Germany

Filed Dec. 19, 1975, Ser. No. 642,500
Claims priority, application Germany, Dec. 24, 1974, 2461421
Int. Cl.[2] B60K 41/22
U.S. Cl. 74—866 12 Claims



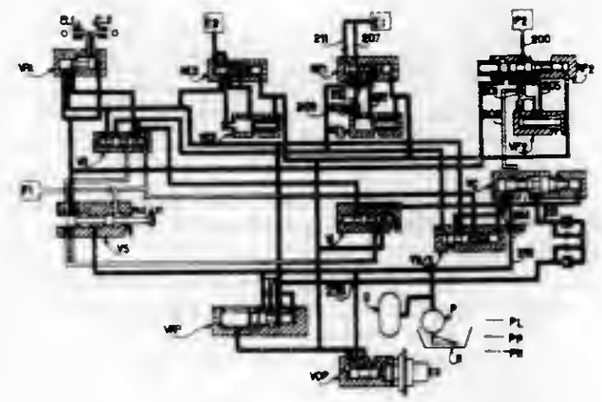
1. In transmission apparatus for use in snow clearing vehicles having a plurality of forward gears, a reverse gear and a control circuit for selectively engaging one of said plurality of forward gears or said one reverse gear, a safety gear change mechanism for avoiding damage thereto by an obstacle in the path of travel of the vehicle, comprising a preselection control circuit electrically connected to the control circuit of said vehicle for automatically placing said control circuit in a state that shifts the vehicle into said reverse gear, in response to a given stimulus for a time sufficient to assure clearance of the vehicle from the obstacle.

4,030,381

HYDRAULIC CONTROL DEVICE FOR AUTOMATIC CHANGE-SPEED TRANSMISSIONS

André Lalin, and Jean Piret, both of Boulogne-Billancourt, France, assignors to Regie Nationale des Usines Renault, Boulogne-Billancourt, France

Filed June 3, 1976, Ser. No. 692,354
Claims priority, application France, June 4, 1975, 75.17369
Int. Cl.[2] B60K 21/00
U.S. Cl. 74—867 12 Claims



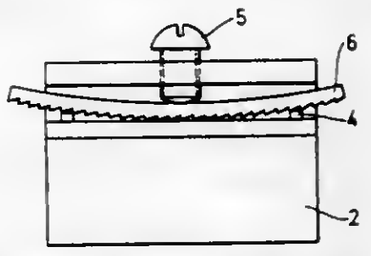
1. Hydraulic control device for automatic change-speed transmissions, especially for motor vehicles, which comprises a fluid reservoir, a pump supplied from said reservoir, a main pressure regulation valve determining the line pressure of the device and supplied from said pump, a hydraulic circuit connected to said main pressure regulation valve and feeding a series of hydraulic receivers through an assembly of auxiliary regulation valves associated with time-lag means, respectively, one of said valves being supplied through a cut-off valve, said device further comprising at least one delivery conduit supplying fluid to a group of hydraulic elements mainly consisting of a flap valve and a gauged orifice connected in parallel.

4,030,382

SHARPENING DEVICE FOR STEEL SKI EDGE STRIPS

Sven A. Nilsson, and Christian Melin, both of Eskilstuna, Sweden, assignors to C O Oberg & Co AB, Eskilstuna, Sweden

Filed Mar. 1, 1976, Ser. No. 662,548
Int. Cl.[2] B21K 17/00
U.S. Cl. 76—83 3 Claims



1. A sharpening device particularly for sharpening steel edge strips on skis and comprising a generally U-shaped holder for a generally straight blade with one longitudinal

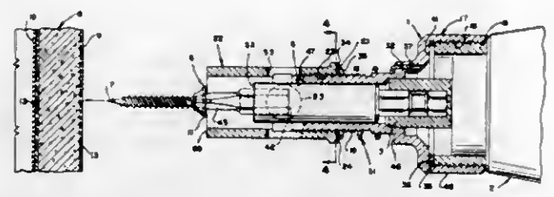
edge projecting from the holder and clamping means for securing the file blade to the inside of a first U-shank, the latter having a guide flange depending substantially at right angles therefrom, the improvement being the provision of two spaced supports for the file blade, at the inside of said first U-shank, said clamping means being a clamping screw received by a second U-shank and being located between said supports to cause upon actuation the bending of the file blade into a convex shape abutting said first U-shank between said supports.

4,030,383

NOSE PIECE FOR SCREWGUNS

John Bradley Wagner, 389 Montecillo Court, Walnut Creek, Calif. 94595

Filed June 30, 1976, Ser. No. 701,235
Int. Cl.² B25B *13/00*
U.S. Cl. 81—54 **7 Claims**



1. A nose piece for a screwgun having an externally threaded annular head surrounding the rotatable power driven shaft comprising:

a. a base member including a cylindrical internally threaded first wall adapted for threadably mating with said externally threaded annular screwgun head, a second cylindrical externally threaded wall and spring end receiving means;

b. a cylindrical nose piece member having a portion internally threaded for threadably mating with said second cylindrical threaded wall of said base member, a spring retaining planar annular surface presented toward said base member and a planar annular face adapted for engaging a work surface; and

c. a spring coaxially surrounding said second wall of said base member having a first end engaging said spring receiving means on said base member and having a second end slidably engaging said spring retaining planar annular surface and biasing said base member and nose piece members away from one another.

4,030,384

RATCHET WRENCH

David P. Newman, P.O. Box 295, yellow Springs, Ohio 45387

Filed Aug. 9, 1976, Ser. No. 712,510
Int. Cl.² B25B *13/00*
U.S. Cl. 81—58.3 **8 Claims**

1. A hand operated ratchet wrench comprising an

an elongated body providing a handle,

a driver ring fastened to said body and having opposite faces and a circular opening located on an axis transverse to the length of said body,

a circumferentially extending driver cam projecting from one face of said driver ring,

a socket member having an outer circular configuration matched to said opening and an inner configuration of irregular shape,

said socket member being rotatably fitted within said driver ring,

a series of driven teeth on said socket member having tooth faces formed with a slope opposite to said driver cam and located facing toward but spaced from said driver cam,

a pawl ring surrounding said socket member and having a circumferentially extending driven cam engaged with said driver cam on said driver ring,

said pawl ring also having a series of driving teeth engageable with said driven teeth,

said cams having a rise greater than the depth of said teeth,

and a retainer on said socket member extending in opposed relation to the other face of said driver ring,

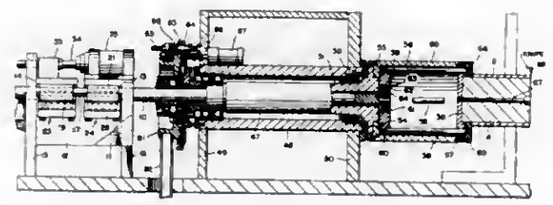
said retainer, said pawl ring, said teeth and said cams being spaced apart such that rotation of said driver ring in one direction will cause said cams to separate and impart engaging force to said teeth and rotation of said driver ring in the opposite direction will permit said cams to close and allow said teeth to disengage for free rotation of said socket member in said driver ring.

4,030,385

WASHER CUTTING MACHINE

Harold W. Scholin, Park Ridge, and Hieronim L. Lisiecke, Chicago, both of Ill., assignors to Scholin Industries, Inc., Chicago, Ill.

Filed Dec. 15, 1975, Ser. No. 640,636
Int. Cl.² B23B *7/00, 3/04*
U.S. Cl. 82—48 **14 Claims**



1. A machine for cutting a plurality of washers, or the like, successively from a sleeve of suitable elastomeric material, comprising,

a. a rotatable mandrel adapted to receive and to hold the sleeve thereon, said mandrel being unsupported at the outer end thereof,

b. indexing means for advancing the sleeve on said mandrel a distance substantially equal to the thickness of a washer to be cut therefrom, said indexing means including

1. a non-rotatable elongated stripper rod mounted for movement in an axial direction, and

2. a rotatable stripper ring at one end of said rod movable in an axial direction therewith,

3. said ring being in abutting engagement with the inner end of the sleeve, whereby advancement of said rod and ring will advance the sleeve,

c. cutting means operable to cut a ring of a predetermined width from the outer end of the sleeve beyond the end of said mandrel,

d. means for rotating said mandrel and sleeve, and

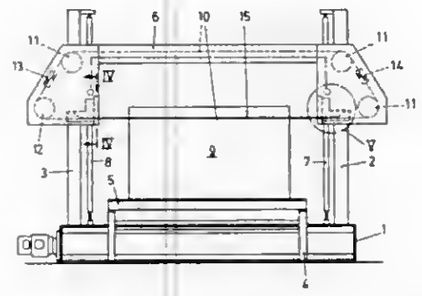
e. actuating means for operating said indexing means upon completion of a cutting operation.

4,030,386

TWIN-EDGED FOAM PLASTIC CLEAVING MACHINE

Rolf Poetzsch, and Hans Gunther Schuster, both of Freudenberg, Germany, assignors to Albrecht Baumer KG Spezialmaschinenfabrik, Germany

Filed July 11, 1975, Ser. No. 595,081
Claims priority, application Germany, July 16, 1975, 2434050
Int. Cl.² B26D *3/28*
U.S. Cl. 83—4 **11 Claims**



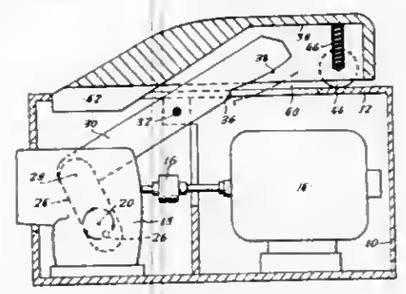
1. A twin-edged foam plastic cleaving machine having a machine frame and a drive for guiding and adjusting a band blade support, a workpiece table, movable in relation to the machine frame, for receiving the block of foam plastic to be cut; a twin-edged band blade arrangement, and a truss which is disposed on the side of the band blade remote from the block of foam plastic and which supports the band blade against yielding both due to a tensile force exerted on the band blade and also due to the reaction compressive force wherein the truss is pivotably mounted and can be pivoted out of the neutral position in the range of ±10° of arc in dependence on the thickness of the block to be cut wherein at each of the two ends of the truss a bearing and supporting member is provided which has an aperture for the band blade arrangement and the truss and is mounted via a rotary thrust bearing on the band blade support.

4,030,387

SHEET CUTTING MACHINE

Norman Alan Finnimore, "Cornerstones" East Hill, Ottery Saint Mary, Devon, England

Filed May 5, 1975, Ser. No. 574,688
Claims priority, application United Kingdom, May 6, 1974, 19900/74
Int. Cl.² B26D *1/26*
U.S. Cl. 83—49 **16 Claims**



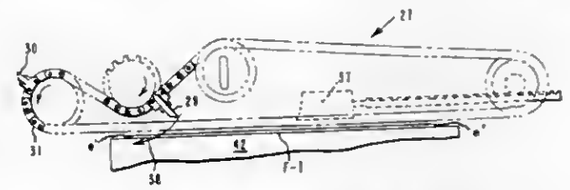
1. An asbestos sheet cutting machine, comprising a frame including a bed over which the sheet can be advanced to a cutting zone, a cutting blade mounted to the frame at the cutting zone, and drive motor for continually advancing the blade through the sheet, the bed having an elongate slot at the cutting zone through which the blade passes after cutting through the sheet whereby the sheet is supported by the bed on each side of the slot during the cutting action, a housing arranged to receive the blade on its return stroke and spaced from the bed so as to provide a gap for insertion of the sheet material to be cut while limiting the extent to which the cut sheet can lift from the bed, and a roller mounted to the housing through resilient means urging said roller towards the bed, said roller being rotatable to allow the sheet to be advanced towards the blade, the edge of the blade which contacts the sheet having a substantially flat transverse profile of about 3/16 inch width and the sides of the blade adjacent the cutting edge being hollow ground, so that the sheet is cut by the action of the blade in shearing from the sheet a strip of substantially the same width as the blade, the blade being pivotally mounted to the frame and linked to said drive motor so as to be moved thereby with an oscillating motion about its pivot at a rate of about 200 strokes/minute, the longitudinal profile of the cutting edge of the blade being curved so as to maintain an angle of about 17° with the sheet at the point of shearing as it moves through the sheet.

4,030,388

FILM SEVERING METHOD AND APPARATUS

Harold Eugene Ramsey, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 14, 1976, Ser. No. 686,507
Int. Cl.² B26D *1/26*
U.S. Cl. 83—49 **7 Claims**



1. A film severing method including the steps of:

engaging a portion of a film having first and second edges with a first holding means;

engaging another portion of the film by a second holding means; and

severing the film in a transverse path between the first and second holding means while the film is held on either side by such first and second holding means, such severing including

cutting the film at the first edge by moving a severing initiating means into the film at a position spaced from the first edge and thereafter in a first direction toward and through such first edge to form a partial cut, and completing the severing of the film by moving a severing completing means in a second direction into the partial cut and thereafter through the film toward and through the second edge thereof whereby to sever the film.

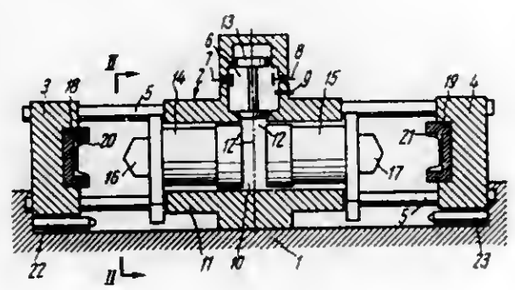
4,030,389
MACHINE FOR HIGH-SPEED PLASTIC WORKING OF MATERIALS

Nikolai Borisovich Ponomarenko, 531 mikroraion, 1a, kv. 49; Vadim Grigorievich Kononenko, ulitsa Chkalova, 15, kv. 12; Viktor Alexeevich Stelmakh, ulitsa Kirova, 18, kv. 2; Vladimir Ivanovich Kotelnikov, ulitsa Chuguevskaya, 29, kv. 39; Ivan Jurievich Valenya, ulitsa Materialisticheskaya, 27, kv. 11; Vladimir Nikolaevich Sarancha, ulitsa Kosmonavtov, 7a, kv. 71; Anatoly Avramovich Petrenko, ulitsa Borodivko, 39; Valery Pavlovich Bozhko, ulitsa Chkalova, 13, kv. 56; Sergei Vasilievich Yatsenko, Moskovsky prospekt, 204/1, kv. 36; Igor Pavlovich Komnatny, ulitsa Cheljuskintsev, 6; Levon Khachaturovich Akhnazariants, ulitsa Kospora, 23, kv. 23; Vitaly Evgenievich Strizhenko, ulitsa Osnovyanskaya, 56, kv. 2; Boris Alexeevich Kolokolov, ulitsa Kommunalnaya, 3a, kv. 9; Stanislav Anisimovich Maznichenko, ulitsa Geroev Truda, 28, kv. 188; Viktor Vasilievich Bozhko, ulitsa Chkalova, 15, kv. 206, all of, Kharkov; Oleg Alexandrovich Bondarenko, ulitsa Viktora Gjugo, 4, kv. 21, Gorlovka Donetskoi oblasti, and Robert Sharafutdinovich Zaklrov, ulitsa Zapadnaya 8, kv. 2, Kharkov, all of U.S.S.R.

Continuation of Ser. No. 573,258, April 30, 1975, abandoned. This application May 26, 1976, Ser. No. 690,197

Int. Cl.² B26D *5/12*

U.S. Cl. 83—513 **2 Claims**



1. A machine for high-speed plastic working of materials utilizing the energy of explosion comprising:

a. a bed;

b. a frame rigidly secured on said bed, said frame having an explosion chamber and a power cylinder space, said space being open at both ends and a hole having an axis located substantially in the middle of the length of said space providing communication between the space and the explosion chamber;

c. two similar plungers mounted in the power cylinder space opposite to the axis of said hole and moving in synchronism in opposite directions under the force of high-pressure gases liberated by an explosion of a working medium in said explosion chamber and entering said power cylinder space through said hole;

d. two similar punches secured on said plungers opposite to each other;

e. two similar anvil blocks, each block being rigidly secured on said bed opposite to one of said punches symmetrically with the other of said anvil blocks relative to the axis of said bole and rigidly connected therewith;

f. two similar dies, each die being rigidly secured on one of said anvil blocks opposite to and coaxially with the respective punch;

g. and means for returning said plungers with said punches to the initial position.

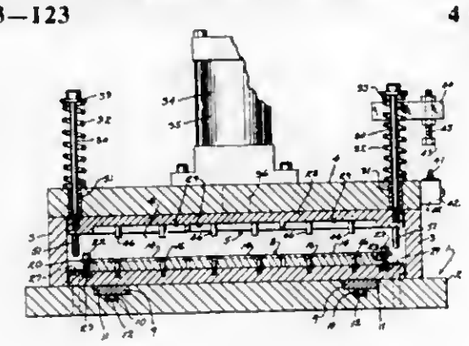
4,030,390
APPARATUS FOR CUTTING ITEMS FROM A SHEET

Richard H. Heiting, Little Chote, Wis., assignor to Fox Valley Tool & Die, Inc., Kaukauna, Wis.

Filed Sept. 10, 1975, Ser. No. 612,021

Int. Cl.² B26D *7/06, 5/20, 5/08*

U.S. Cl. 83—123 **4 Claims**



1. An apparatus for cutting a plurality of photographs from a sheet, comprising a housing defining an opening, a tray slidably mounted with respect to the housing from an extended position in which the tray is located outside of the housing to an inner position where the tray is located within the housing, a first die carried by the tray, a second die carried by the housing, one of said dies having a plurality of male die members corresponding in shape to the photographs to be cut from the sheet and the other of said dies having a plurality of female die members disposed to cooperate with said male die members to cut said photographs from the sheet located between said die members, a plate bordering said male die members, and means for biasing the plate outwardly away from the corresponding die to a position where the outer surface of said plate is generally flush with the outer surfaces of said male die members, operating means for moving one of said dies relative to the other of said dies to thereby cut said photographs from the sheet, and adjustable aligning means disposed on the tray for aligning the sheet with the die members associated with the tray, said aligning means comprising a plurality of rotatable cam means on said tray and disposed to be engaged by at least two edges of the sheet to align said sheet with respect to the corresponding die members, and locking means for locking the cam means in a given position

4,030,391
PUNCH PRESS WITH HYDRAULICALLY ACTUATED STRIPPER

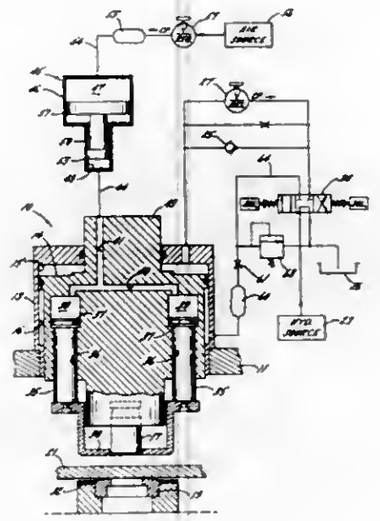
James P. Swanson, Winnebago, and Stephen E. Nyquist, Cherry Valley, both of Ill., assignors to W. A. Whitney Corporation, Rockford, Ill.

Filed Nov. 3, 1975, Ser. No. 627,843

Int. Cl.² B26D *7/02;* **B26F** *1/02*

U.S. Cl. 83—137 **5 Claims**

1. A punch press comprising a cylinder, a piston telescoped slidably into said cylinder to move back and forth therein and dividing the cylinder into first and second compartments, a punching element secured rigidly to said piston and movable back and forth in unison with said piston whenever the latter is moved within said cylinder, means for selectively admitting pressure fluid into said first compartment of said cylinder to advance said piston within said cylinder and cause said punching element to form a hole in a workpiece, a stripper associated with said punching element and adapted to engage and hold said workpiece as said punch first forms and then retracts from said hole, said stripper being supported to slide in first and second directions relative to said piston and having one end coacting with said piston to form a chamber, a supply of pressurized liquid within said chamber and biasing said stripper in said first direction relative to said piston, said stripper moving in said second direction relative to said piston and reducing the volume of said chamber during advance of said piston after engagement of said stripper with said workpiece, said pressurized liquid expanding the volume of said chamber and retracting said piston after release of said pressure fluid from said first compartment of said cylinder, and means (a)



for maintaining said liquid under substantially constant pressure at all times during movement of said stripper in said second direction relative to said piston and (b) for enabling selective adjustment of the magnitude of said constant pressure.

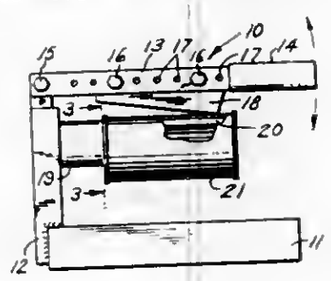
4,030,392
CAN SLITTING DEVICE

Lorenzo Torres, 15910 Hill St., LaPuente, Calif. 91744

Filed Jan. 29, 1976, Ser. No. 653,434

Int. Cl.² B23D *17/08*

U.S. Cl. 83—178 **4 Claims**



1. A can slitting apparatus comprising:

a vertical member supported on base means,

cylindrical support means extending from the vertical member and configurated to extend into and support a can,

a lever pivotally mounted on the vertical member, and

blade means on the lever to cut the can upon urging of the lever toward the cylindrical means,

said cylindrical support having at least one narrow axially extending peripheral slot adapted to receive said blade means as the can is cut thereby.

4,030,393
APPARATUS FOR CUTTING CONVEYED MATERIALS

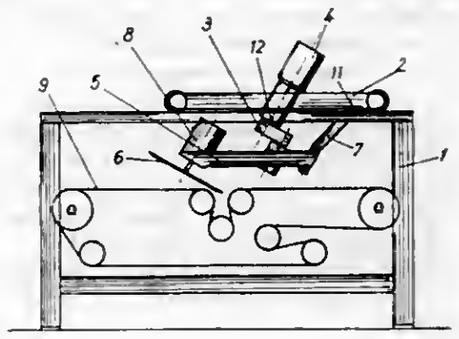
Anton Stelner, Baden, Austria, assignor to Semperit Aktiengesellschalt, Vienna, Austria

Continuation of Ser. No. 524,956, Nov. 18, 1974, abandoned. This application June 16, 1976, Ser. No. 696,732

Int. Cl.² B23D *45/20*

U.S. Cl. 83—318 **4 Claims**

1. An apparatus for cutting conveyed materials, preferably webs or strand-shaped articles formed of reinforced or non-reinforced rubber by means of a cutter, comprising a cutter carriage movable in the transport direction of the conveyed materials, a drive motor secured to said cutter carriage, a crank driven by said motor, a balance constructed as a lever means, said cutter being mounted at said balance, said crank



being operatively connected to said balance, and a guide pivotably connected to said carriage and pivotably connected to said balance, said cutter describing a closed kinematic path of travel when said crank is driven by said motor.

4,030,394
DEVICE FOR CUTTING THROUGH A PILE OF SHEETS WITH A REVOLVING BLADE

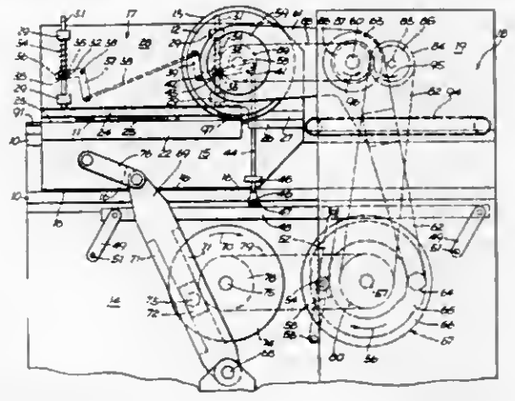
Hermann Kistner, Tamm, and Gunthart Lehmann, Heubach, Lautern, both of Germany, assignors to Maschinenbau Oppenweiler GmbH, Oppenweiler, Germany

Filed Aug. 16, 1976, Ser. No. 714,503

Claims priority, application Germany, Aug. 16, 1975, 2536558

Int. Cl.² B26D *7/06*

U.S. Cl. 83—409 **15 Claims**



1. Apparatus for cutting through a pile of sheets comprising a machine casing, a disk-knife rotatably mounted on said casing, the periphery of said disk-knife forming a circular cutting edge, conveying means for holding and supplying the pile of sheets to the disk-knife, said conveying means including a pair of confronting clamping members for clamping at least a portion of the pile of sheets therebetween, said clamping members being supported by a sliding carriage reciprocatingly movable relative to the machine casing and perpendicular to the rotational axis of the disk-knife in an advance stroke and a return stroke between a receiving end and a take-off end, a counter-knife supported by said one of said clamping members and forming a counter-cutting edge for the cutting edge of the disk-knife, said counter-cutting edge extending over the entire cutting range of the disk-knife and being arranged at a radial distance from the rotational axis of the disk-knife such that the cutting edges of the knives overlap only to an extent necessary to locate the cutting edges adjacent each other, the radius of the disk-knife being selected

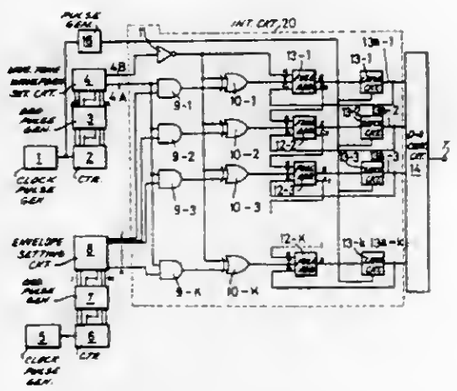
such that, for the thickest pile of sheets to be cut, a tangent line of the circular cutting edge of the disk-knife at the point of intersection of the disk-knife with the side of the pile sheets facing the disk-knife forms an angle with the plane of movement of the carriage of less than 30 degrees, the peripheral speed of the disk-knife being correlated to and slightly greater than the speed of the advance stroke of the carriage.

4,030,395

MUSICAL-TONE SIGNAL FORMING APPARATUS FOR AN ELECTRONIC MUSICAL INSTRUMENT

Toshio Kuglsawa, Hamamatsu, Japan, assignor to Kabushiki Kaisha Kawai Gakki Seisakusho, Hamamatsu, Japan

Filed June 5, 1975, Ser. No. 584,367
Claims priority, application Japan, June 6, 1974, 49-64382
Int. Cl.² G10H *5/02*
U.S. Cl. 84—1.03 **8 Claims**



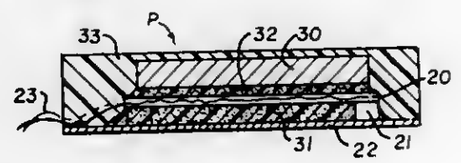
1. Musical-tone signal forming apparatus for an electronic musical instrument comprising a musical-tone waveform setting means for the sampling of the amplitude of a musical-tone waveform at *n* points and for generating relative to each point an increase, decrease or equal digital signal indicating the relationship to the previous point, an envelope setting means for sampling the envelope of the musical tone at *m* points and generating a digital signal representative of the analog value of the envelope at each point, an integrating circuit means in which the digital signals of the envelope setting means are accumulatively added or subtracted under control of the digital signals of the musical-tone waveform setting means to form a digital output signal, and digital-to-analog converter means to convert said output signal into a musical-tone signal.

4,030,396

ACOUSTIC PICKUPS

Ralph E. Mariner, 2060 S. Patton Court, Denver, Colo. 80219

Filed Oct. 17, 1975, Ser. No. 623,450
Int. Cl.² G10H *3/00*; **H01V** *7/00*
U.S. Cl. 84—1.16 **11 Claims**



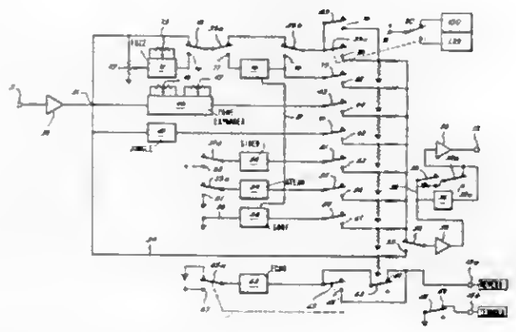
1. A pickup for a stringed instrument, or the like, comprising, in combination therewith:
a. a body structure which is mounted upon said instrument;
b. a transducer means within the body structure arranged to respond to vibrations generated by said instrument and produce electrical signals corresponding to such vibrations; and
c. a mass, whose weight is substantially greater than the weight of the transducer means, mounted on the body, with the transducer means being effectively positioned between the mass and the instrument, whereby to cause the transducer means to react against the mass whenever it is responding to vibrations generated by the instrument.

4,030,397

ELECTRICALLY AMPLIFIED MUSICAL INSTRUMENT CONTROL APPARATUS

Walter E. Nelson, 1833 Shaw Ave., Pittsburgh, Pa. 15217

Continuation of Ser. No. 262,058, June 12, 1972, abandoned. This application Nov. 21, 1975, Ser. No. 634,233
Int. Cl.² G10H *1/00, 5/00*
U.S. Cl. 84—1.22 **9 Claims**



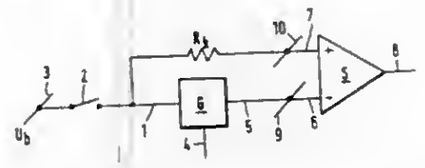
1. An electrically amplified musical instrument control apparatus for use with a musical instrument of a type having means for producing electrical signals representative of the sounds produced by the instrument, the apparatus comprising:
a pre-amplifier electrically connected to the instrument for boosting the incoming electrical signals from the instrument,
means for selectively complementing the output from the pre-amplifier, said means comprising:
a. a housing spaced apart from the instrument and having an electrical input terminal in electrical series with the pre-amplifier,
b. a plurality of transistorized electronic oscillating special effect circuits disposed within said housing for introducing background distortion and to govern the intensity of the overall frequency range,
c. a plurality of foot-operated switch means mounted on the outside of the housing, each one of the plurality of switch means being in electrical series with one of said special effect circuits to control the opertion thereof such that actuation of any one switch means actuates its associated effect circuit, each one of the plurality of switch means being in parallel circuit relationship with every other one of the plurality of switch means, whereby any one or more of said effect circuits is operable at any one time;
d. at least one summing amplifier disposed in said housing said amplifier being connectable in electrical series circuit relationship with each of said effect circuits,
e. means in said housing for providing a visible indication of the selection of said special effects circuits;
f. an output terminal; and
g. circuit means for interconnecting said electrical input terminal and said summing amplifier;
speaker means connected to the output terminal for converting the electrical output signals of the musical instrument and the means for selectively complementing into audible sound, and
wherein the output from the pre-amplifier is mixed with the output from the means for selectively complementing to produce said induced background distortion.

4,030,398

ELECTRONIC MUSICAL INSTRUMENT

Wilfried Dittmar, Halsenbach, Germany, assignor to WERSI-electronic GmbH & Co. Kommanditgesellschaft fur elektronische Gerate und elektronische Bauelemente, Halsenbach, Germany

Filed Mar. 4, 1976, Ser. No. 663,677
Claims priority, application Germany, Mar. 6, 1975, 2509684
Int. Cl.² G10H *1/02*
U.S. Cl. 84—1.26 **19 Claims**



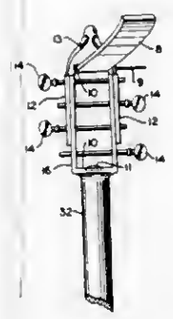
1. In an electronic key-operated musical instrument, such as an organ, a combination comprising a gate circuit including a gate having a first input for a constant voltage actuated by depression of a key, a second input for a sound signal and an output connected to further processing stages within the instrument, and a compensating circuit for suppression of bounce, said compensating circuit including at least one combining circuit having a first input connected with the output of said gate, a second input and an output connected to said further processing stages, and a source of compensating voltage connected with said second input of said combining circuit, said compensating voltage being dependent on the constant voltage actuated by depression of a key.

4,030,399

CLOSED PEG BOX ON STRINGED INSTRUMENT

Oresto P. Grottola, 930 S. Velare St., Anaheim, Calif. 92804

Filed Dec. 24, 1975, Ser. No. 630,522
Int. Cl.² G10D *3/14*
U.S. Cl. 84—304 **4 Claims**



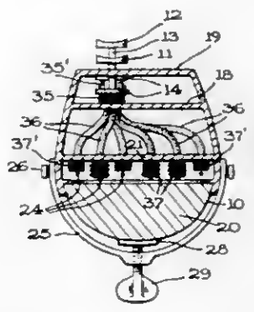
1. A peg box for a stringed musical instrument having a neck, said peg box comprising:
peg box walls defining a peg box well and at least one rotatable shaft extending into said peg box well through one of said peg box walls for the attachment of a musical instrument string to said rotatable shaft for adjusting the tension and pitch of the string;
said peg box having an imperforate permanently positioned top wall to cover said shaft in said peg box well;
said neck having a finger board, said finger board terminating in a nut, a string mouth positioned between said top wall and said nut and extending into said peg box well to permit entry of strings into said peg box well;
said peg box having an open back to permit access into said peg box well; and
a pivoted peg box door mounted on said peg box and positioned to selectively close the open back of said peg box well.

4,030,400

CHORD PLAYING ATTACHMENT FOR A STRINGED INSTRUMENT

Juan M. Del Castillo, Risco No. 119, Mexico City, Mexico (20 D.F.)

Filed Aug. 19, 1975, Ser. No. 605,874
Int. Cl.² G10D *3/00*
U.S. Cl. 84—317 **6 Claims**



1. Apparatus for use with a stringed instrument comprising a frame supported on the stringed instrument;
means to support said frame on the stringed instrument including means to adjust the compression of said frame against the stringed instrument;
said frame having upper, middle, and lower surfaces supported over a stringed portion of the stringed instrument;
a plurality of pushbutton means each adapted to receive the pressure applied to the stringed instrument by a single finger and designating a chord to be played, said pushbutton means positioned by said upper surface, and said middle surface in opposition to the force on said pushbutton means applied by the finger;
a plurality of hermetically sealed closed systems supported by said frame,
each of said hermetically sealed systems including
a first bellows connected to each of said pushbutton means having one end attached for movement with said pushbutton means,
a plurality of second bellows each smaller than said first bellows and formed to be in a contracted state when at rest position,
and conduit means for fluid pressure transmission connecting each of said second bellows to said first bellows;
said lower surface of said frame supporting said second bellows over the strings of the stringed instrument positioned so that each of said second bellows presses against a string when said second bellows is in an expanded state;
and spring means to hold said first bellows in an expanded state in its rest position and oppose a compressing force from said pushbutton means.

4,030,401

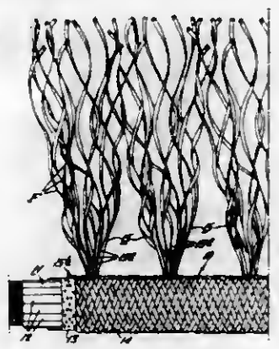
FAIRED ARTICLE

Henry Alexander Hood, Moorestown, N.J., assignor to Wall Industries, Inc., Beverly, N.J.

Division of Ser. No. 583,653, June 4, 1975, Pat. No. 3,975,980, which is a continuation-in-part of Ser. No. 499,278, Aug. 21, 1974, abandoned. This application June 7, 1976, Ser. No. 693,190
Int. Cl.² D04C *1/12*; **D07B** *1/14*
U.S. Cl. 87—6 **14 Claims**

1. A faired structure, comprising: an elongated core, a jacket around said core, and a series of fairings spaced apart along the length of the core, each of said fairings including a plurality of strands having base portions disposed along the core and gripped tightly by the jacket and having flexible

streamer portions splaying laterally outward from the core and terminating in free ends so that said streamer portions can flex



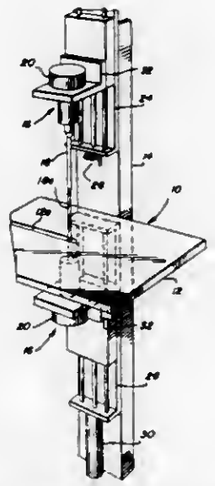
freely relative to the jacket in response to fluid flow across the structure.

4,030,402

TENSIONING DEVICE FOR A DOUBLE DRIVE PROFILE CUTTER

Charles R. Onsrud, 516 Berkshire Drive, Statesville, N.C. 28677

Filed Dec. 9, 1975, Ser. No. 639,165
Int. Cl.² B23C *5/26*
U.S. Cl. 90—19 **6 Claims**



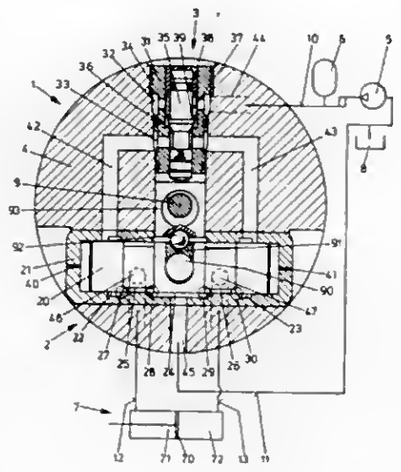
1. A machine for profile cutting a workpiece, comprising a slender axially elongated double-ended high speed cutting tool rotatable about its longitudinal axis and having a centrally located workpiece cutting portion and end portions, the length of said workpiece cutting portion being substantially greater than any lateral dimension thereof, said cutting portion having a substantially uniform lateral dimension throughout; axially aligned and rotatably mounted tool holding means in drive engagement with said tool end portions; drive means for each tool holding means, said drive means coacting with one another for overcoming dynamic loads imposed upon said tool cutting portion when the latter is rotating at high speed during oblique and cross cutting through the full thickness of the workpiece; a support for supporting the workpiece in a plane disposed intermediate the tool holding means and intersecting the tool rotary axis; a chassis supporting said tool holding means, said drive means and said workpiece support in a predetermined relationship; and guide means mounted on said chassis and engaging said drive means for controlling axial movement of one drive means and a corresponding tool holding means whereby the tool is subjected to a predetermined amount of axial tension overcoming rhythmic and cyclic torsional and bending loads imposed thereon during cutting of the workpiece.

4,030,403

POWER STEERING WITH ACCUMULATOR OPERATION

Dieter Elser, Bobingen, Germany, assigoor to Zahnradfabrik Friedrichshafen AG, Friedrichshafen, Germany

Filed Apr. 10, 1975, Ser. No. 566,829
Int. Cl.² F15B *11/08, 13/04*
U.S. Cl. 91—448 **6 Claims**



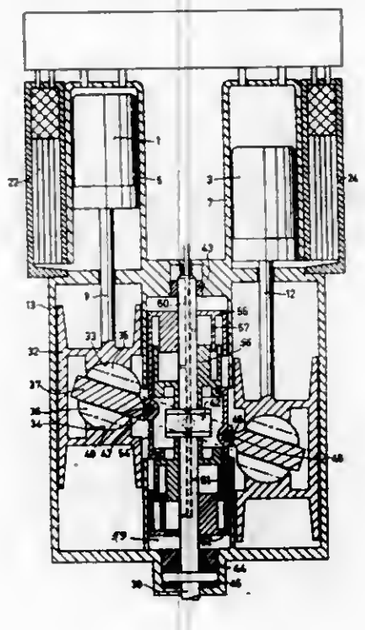
1. A power steering system comprising:
a double acting servomotor and an accumulator;
a steering control piston valve (**20**) having a pair of piston heads;
a housing inlet and outlet ports and passages for connection to said servomotor and accumulator and having a bore in which said piston valve is shiftable;
a manually operable steering actuating means (**90**) engaging said piston valve for bidirectional movement to pressurize said servomotor selectively for corresponding bidirectional steering responsive to operator control;
said housing having pressure feed (**22, 23**) and exhaust grooves (**24**) coacting with respective piston heads to control flow through said passages and ports wherein a neutral position of said piston valve cuts off pressure feed to said double acting servomotor while effecting continuous connection for exhasut flow therefrom;
said passages having pressure feed passage means (**42, 43**) for flow from said accumulator to said pressure feed grooves;
valve means (**3**) in said passage means including bias means (**37**) biasing said valve means to normally cut off flow through said passage means;
actuating means for said valve means (**91, 92, 93**) engaging said piston valve and disposed to be operated only by manual force upon shift of said piston valve by said manually operable actuating means (**90**) to open said valve means when said piston valve is actuated to effect pressure feed to said servomotor;
said valve means comprising a conical valve head and a seat therefor and means biasing said conical valve head to seated position responsive to accumulator pressure;
a sleeve in which said valve head is slidable;
a portion of said valve means having reciprocal and sealed guidance in a portion of said sleeve;
said sleeve portion being closed except for a damping bore therein;
said pressure feed passage means comprising annular grooves on said sleeve upstream and downstream of said valve seat.

4,030,404

SWASH-PLATE DRIVE MECHANISM

Roelf Jan Meijer, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 4, 1975, Ser. No. 601,463
Claims priority, application Netherlands, Aug. 6, 1974, 7410532
Int. Cl.² F01B *3/00, 13/04*
U.S. Cl. 92—12.2 **4 Claims**



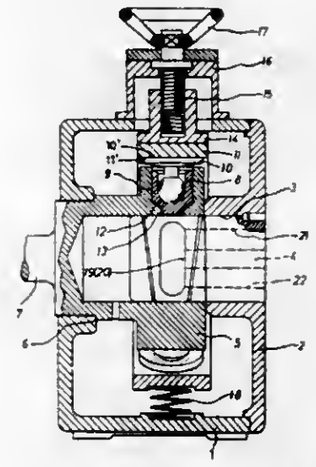
4. In a machine having a wobble-plate drive mechanism, the machine including at least three reciprocating drive pistons and a drive rod extending axially from each of said pistons, the drive mechanism including a central drive shaft rotatable about its axis, a wobble-plate mounted on said shaft, said plate defining a plane transverse of the shaft axis and tiltable relative to said axis, said plate being fixed to rotate only with said shaft, said drive rods each having an end slidably engaging said plate, whereby the angle of tilt of the plate corresponds to the stroke of said drive pistons, and control means for tilting said plate, the improvement in combination therewith, wherein said control means comprises two pairs of first and second axially-spaced control pistons, the two control pistons of each pair being coaxially mounted on said shaft and being axially movable relative to said shaft axis and to each other, said control pistons of each pair having adjacent and axially spaced control surfaces defining and bounding a variable volume closed control space, said control means further comprising a source of fluid under pressure, duct means for flowing said fluid into said control spaces for driving said control pistons of each pair axially apart, and two coupling means, each coupling means pivotally connecting the control pistons of one of said pairs with said plate, said two coupling means spaced generally 180° apart around said shaft axis, whereby movement of said control pistons axially apart moves said two coupling means axially apart, thereby tilting said plate; each of said pairs of control pistons having a center of gravity located along the axis of said central shaft and respectively on opposite sides of said plate.

4,030,405

RADIAL PISTON MACHINE

Ulrich Aldinger, and Günter Kersten, both of Stuttgart, Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Sept. 21, 1973, Ser. No. 399,724
Claims priority, application Germany, Nov. 9, 1972, 2254752
Int. Cl.² F01B *13/06*
U.S. Cl. 92—58 **12 Claims**



1. A radial piston machine, comprising a stationary member; a cylinder body mounted on said stationary member for rotation with respect thereto and having a plurality of cylinder bores bounded by internal surfaces, said stationary member and said cylinder body having neighboring contact regions of case-hardened steel and alloyed pearlitic iron, respectively, in sliding contact with one another; pistons mounted in said cylinder bores for reciprocation therein and having external surfaces in sliding contact with said internal surfaces, said pistons and said cylinder body having portions of case-hardened steel and alloyed pearlitic iron, respectively, defining said external and internal surfaces; a piston-control ring of steel adjacent said cylinder body; and glide shoes on said pistons and in sliding contact with said piston-control ring.

4,030,406

APPARATUS FOR STERILIZATION

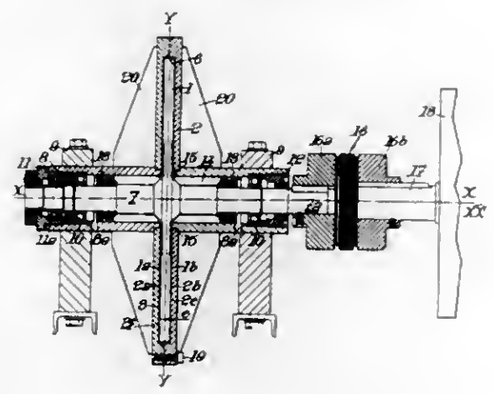
Raoul Wander, 11 bis rue Jean Goujon, 75 Paris 8eme, and Robert Angue, 9 La Bastide, Chemin du Puy St., 06600 Antibes, both of France

Continuation-in-part of Ser. No. 93,015, Nov. 27, 1970, abandoned, which is a continuation-in-part of Ser. No. 718,044, April 2, 1968, abandoned. This application Oct. 3, 1972, Ser. No. 294,578
Claims priority, application France, Apr. 18, 1967, 67.103192; Dec. 15, 1967, 67.132589
Int. Cl.² A23C *3/00;* **A23L** *3/00*
U.S. Cl. 99—461 **10 Claims**

1. An apparatus for sterilizing a product which may contain microorganisms, comprising:
a first member and a second member, said two members having respective cooperating opposed substantially planar surfaces, said first member comprising a rotatable disc having an annular ring in gripping engagement with the disc around its periphery, said second member comprising a fixed housing within which said first member is disposed, said first member having two principal surfaces each of which is spaced from a corresponding substantially planar opposed surface of said housing;
inlet means for the charging of said product into said space between said two opposed surfaces of said two members, said inlet means in said housing being in the area of the center of said first member;

outlet means for said product flowing in the space between the surfaces of said first and second means; and

driving means for driving at least one of said members about its axis to produce a linear peripheral speed of at least 50



meters per second and applying sufficient centrifugal force to said product to maintain it in liquid form under pressure and causing said product in said space to flow from the inlet to the outlet.

4,030,407

BINDING APPARATUS

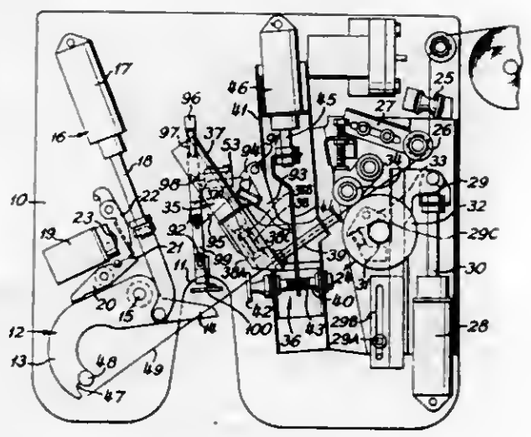
Thomas William Jesty, Dorchester; John Anderson, Surrey, both of England, and 53, 198 A, assignors to T.W. Jesty & Partners, Dorchester, England

Filed Sept. 18, 1975, Ser. No. 614,438

Claims priority, application United Kingdom, Sept. 20, 1975, 41108/74

Int. Cl.² B65B *13/28*

U.S. Cl. 100—4 **25 Claims**



1. Apparatus for forming a loop of strip material around a bunch of elongate articles which is to be tied so that the ends of a length of strip material so looped can be twisted together to complete a tie around the bunch; the apparatus comprising

a. means for locating a length of strip material adjacent a station at which a bunch of elongate articles to be tied is positioned during use of the apparatus, the strip material locating means being adapted to locate such a length of strip material so that it extends laterally with respect to a bunch of elongate articles positioned at said station, said means for locating including

means for drawing the length of strip material from a stock of such material and for feeding the length of strip material longitudinally adjacent to and past the station, and

guiding means for guiding the length of strip material along a linear path which extends from the point where the strip material exits from the drawing and feeding means adjacent to and past said station;

b. movable means movable to and fro along an orbital path around said station from one rest position and having a part which is adapted to engage part of a length of strip material located adjacent said station by said strip material locating means so as to move one end of that length of strip material around a perimeter of said station,

c. means which coact with another part of the length of strip material so as to restrain the other end of the length of strip material from following said one end as said one end is moved around the station by the movable means so that the length of strip material is looped around the station and thus around a bunch of elongate articles located at the station; and

d. control gear for controlling sequential operation of parts of the apparatus so that said part of the movable means is located to one side of the linear path when it is at said one rest position and the length of strip material is fed adjacent to and past said station by the feeding means without being deflected from the linear path by said movable means.

4,030,408

THERMAL PRINTER HEAD

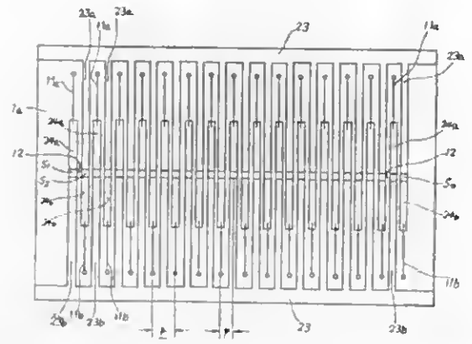
Takeshi Miwa, Kyota, Japan, assignor to Juichiro Ozawa, Kyoto, Japan

Filed Dec. 19, 1975, Ser. No. 642,354

Claims priority, application Japan, Jan. 21, 1975, 50-009449; Nov. 10, 1975, 50-153397

Int. Cl.² G02B *7/06*

U.S. Cl. 101—1 **3 Claims**



1. A thermal printer head for printing on heat sensitive paper under the condition in which there is relative motion between the printer head and the paper, said printer head comprising a cylindrical insulator base having a plurality of shallow linear recesses in the cylindrical surface thereof along a single line parallel to the cylinder axis, heat generator film resistors within said recesses and filling said recesses to a level just below the surface of the base surrounding the recesses, the areas of the surface of the base between said recesses contacting the heat sensitive paper during a printing operation and frictional contact occurring only between the base and the paper, and the heat generator film resistors being protected from abrasion due to friction between the resistors and the paper, said heat generator film resistors having first film conductor terminals extending therefrom around said cylindrical insulator base, the first film conductor terminals from alternate heater elements extending in opposite directions around the cylindrical insulator base, and said heat generator film resistors having second lead wire terminals extending therefrom around the cylindrical insulator base in the opposite directions from the first film conductor terminals in the spaces on the surface of the cylindrical insulator base between the first film conductor terminals and for a distance less than the length of said first terminals, whereby the arrangement of the heat generator film resistors is compact due to the fact that the pitch therebetween is half the itch between adjacent first film conductor terminals and adjacent second lead wire terminals

and the printer head is suitable for a line-dot type printer head.

4,030,409

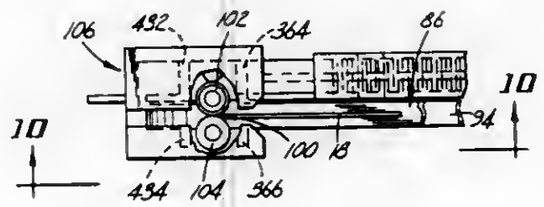
PRINTING APPARATUS CONTROLS

Manoj C. Adhikari, Wickliffe, and Joseph G. Gardner, Painesville, both of Ohio, assignors to Addressograph Multigraph Corporation, Cleveland, Ohio

Continuation of Ser. No. 326,920, Jan. 26, 1973, abandoned. This application Apr. 28, 1975, Ser. No. 572,126

Int. Cl.² B41L *47/56*

U.S. Cl. 101—47 **9 Claims**



1. In apparatus for printing on a sequence of sheets of material in turn at a printing station, each with a different one of a sequence of printing plates, which apparatus is cyclically operable and includes means for feeding sheets one by one into and away from the printing station, means for feeding plates one by one into and away from the printing station, both during a first portion of the cycle, and means for transferring an impression from a plate to a corresponding sheet during a second portion of the cycle, the improvement which comprises:

means for sensing for the presence of the sheets and plates at certain locations and for generating signals representative of the presence or absence of sheets and plates thereat, and circuit means controlling operation of the machine in accordance with said signals, said circuit means including:

means for signalling the transition from the first cycle portion to the second cycle portion;

means for analyzing the signals generated by the sensing means to determine whether, at the time of said transition, there exists a condition such that the printed sheet has been moved away from the printing station and a succeeding sheet is present in the printing station;

means for analyzing the signals generated by the sensing means to determine whether at the time of said transition there exists a condition such that the printing plate used to mark the printed sheet has been moved away from the printing position and a succeeding print plate is present therein;

means for generating a signal for continuation of operation of the apparatus providing the analyzing means signal that both of said conditions are affirmative;

manually operable control means for initiating feeding of a sheet to the printing station;

manually operable control means for initiating feeding of a plate to the printing station;

first control means for rendering said manually operable sheet control means effective only if the condition preventing continuation of operation is lack of a sheet at the printing station; and

second control means for rendering said manually operable plate control means effective only if the condition preventing operation is lack of a plate at the printing station.

4,030,410

DYESTUFF APPLICATOR FOR SCREEN PRINTER

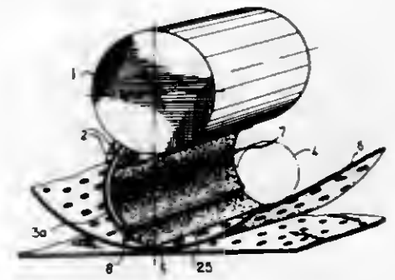
Peter Zimmer, Untere Sparchen 54, A 6330 Kufstein, Austria

Continuation of Ser. No. 440,043, Feb. 6, 1974, abandoned. This application Sept. 30, 1975, Ser. No. 618,204

Claims priority, application Austria, Feb. 14, 1973, 1330/73

Int. Cl.² B41F *15/44*

U.S. Cl. 101—120 **3 Claims**



1. In a printing machine, in combination:

a movable printing screen provided with apertures for the passage of dyestuff to an underlying substrate;

a dyestuff-supplying tube spacedly overlying a limited area of contact between said screen and said substrate;

applicator means mounted on said tube for facilitating the penetration of said dyestuff through said screen in said area of contact, said applicator means comprising a metallic doctor blade extending substantially radially downward from said tube and curving in the direction of screen movement, said blade approaching said area of contact substantially tangentially to said screen and terminating in a free edge bearing resiliently upon said screen;

elastic strip means hugging said blade on the concave side thereof for reinforcing same, said strip means having a thickness greater than that of said blade and extending over the major part of the blade surface with a curvature conforming to that of said blade and terminating short of said free edge thereof and of the inner screen surface, said tube being provided with a pair of radially extending lips clamping sections of said blade and of said strip means between them, said lips being angularly offset from the vertical in a direction opposite the direction of screen movement.

4,030,411

ROTARY-SCREEN PRINTING MACHINE

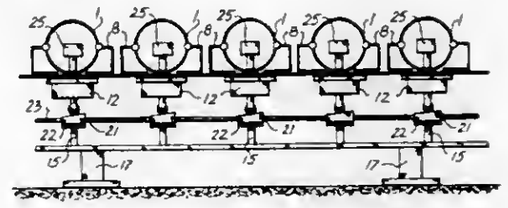
Peter Zimmer, Untere Sparchen 54, A6330 Kufstein, Austria

Filed June 20, 1975, Ser. No. 588,592

Claims priority, application Austria, July 3, 1974, 5500/74

Int. Cl.² B41F *15/24*

U.S. Cl. 101—126 **4 Claims**



1. A rotary-screen printing machine comprising:

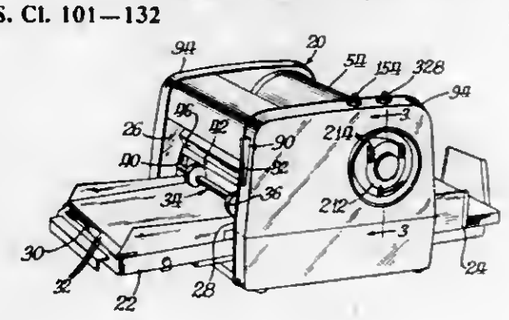
a plurality of cylindrical printing screens rotatable about parallel axes lying on a common level;

a machine frame provided with journal bearings for said printing screens;

drive means for rotating said printing screens, said drive means including pinions on said machine frame and gears in mesh with said pinions, said gears being rigid with said printing screens and being coaxially secured to the ends thereof;

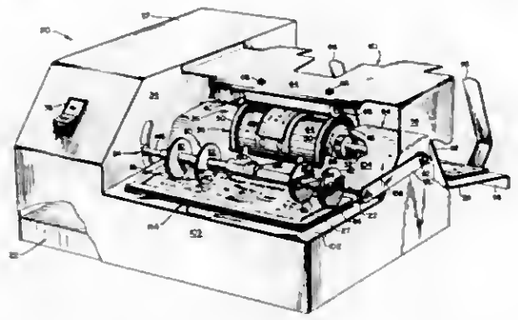
a dyestuff applicator within each printing screen;
a plurality of beds each underlying one of said printing screens and forming a flat horizontal surface for supporting a substrate to be imprinted with dyestuff from said applicator; and
elevation-adjusting means inserted between said frame and said beds for simultaneously varying the distance of all said beds from said level to compensate for changes in the thickness of the substrate, said elevation-adjusting means including rollers on the undersides of said beds, bases with flat horizontal upper surfaces spacedly confronting said rollers, wedges bearing from below upon said rollers while slidably resting on said upper surfaces, and a horizontally movable link interconnecting said wedges for horizontal displacement on said upper surfaces.

4,030,412
DUPLICATING MACHINE
Edward M. Springer, Chicago, Ill., assignor to Heyer Inc., Chicago, Ill.
Filed Apr. 7, 1976, Ser. No. 674,367
Int. Cl.² B41L 11/08
U.S. Cl. 101—132 **16 Claims**



1. In a duplicating machine having a frame, a rotatable printing drum with means for supporting a master sheet thereon, an impression roll positioned to press copy sheets against the master sheet on the drum, a support for a stack of copy sheets adjacent an inlet end of said housing, feeding means for advancing copy sheets successively from the stack into the housing between the drum and impression roll for printing from the master sheet onto the copy sheet, drive means for rotating the drum, means for automatically stopping the drum with the end of the master sheet at a predetermined position beyond the impression roll comprising in combination:
clutch means including driving and driven clutch members connected respectively to said drive means and to said drum, means for engaging said clutch members to enable said drive means to rotate said drum, a release collar connected to said driven member for rotation therewith and being rotatable with both said clutch members when so engaged, and means to disengage said clutch members and enable said drum to stop at a position corresponding to the stopped position of the release collar in response to stopping the rotation of said release collar;
stop means for said release collar including detent means on said release collar and a stop arm which is movable to and from a stop position engaging said detent means to thereby stop said release collar;
a manually movable starter arm movable to and from a start position;
means including a mechanical connection between said starter arm and said stop arm being responsive to manual movement of said starter arm to its said stop position to move said stop arm away from its said stop position and to simultaneously actuate said drive means to rotate said drum through said clutch means;
means including copy sheet sensing means having a follower sensitive to said stack of copy sheets to maintain said starter arm in its said start position while a copy sheet in said stack remains on said support; and
said means including said copy sheet sensing means being further responsive to the last copy sheet leaving the support to automatically move said stop arm into engagement with said detent means to stop said release collar and to disengage said clutch members while simultaneously deactuating said drive means to stop said drum at a predetermined position corresponding to the stopped position of said release collar.

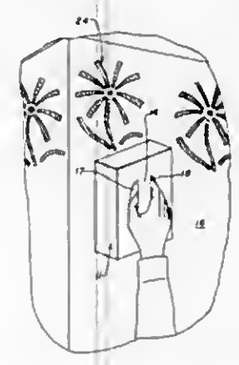
4,030,413
MECHANISMS FOR FEEDING DOCUMENTS FROM A STACK THEREOF
Robert D. Young, Rte. 1, Box 81, Accord, N.Y. 12404
Filed Apr. 30, 1975, Ser. No. 573,175
Int. Cl.² B65H 1/04; B41F 5/02
U.S. Cl. 101—232 **5 Claims**



1. A document feed mechanism which includes a document support means; a feed mechanism for displacing a document along a rectilinear path from said support means; and means which engages the displaced document and propels it along a continuation of said rectilinear path, said feed mechanism including a shaft extending at right angles to the path of movement of the document; means for rotating said shaft at a preselected speed; a document engageable, rotatable feed member journalled on said shaft; means for drive connecting said feed member to said shaft so that said shaft can rotate said feed member to initiate the displacement of the document, so that the feed member can thereafter rotate relative to the shaft as engagement of a document by the means which propels it along the continuation of the rectilinear path results in a change in the speed at which the document is then moving, and so that the shaft can rotate relative to the feed member at the end of the feed cycle, the means for drive connecting the feed member to the shaft on which it is journalled comprising a single means interconnecting said shaft and said feed member and providing limited rotation of said feed member with respect to said shaft and a pivotal interconnection between said feed member and said shaft whereby said feed member can pivot about said single means within a plane drawn through the axis of said shaft to thus promote uniform contact between said feed member and the document being displaced; a driven gear rotatable with said feed member; a driving gear meshed with said driven gear; means for rotating said driving gear in a direction opposite to the direction of document displacement; and means supporting said feed member and said driven gear for movement in an arcuate path about the axis of rotation of the driving gear whereby document engendered resistance to rotation of the feed member will create a reaction torque tending to move said feed member upwardly in said arcuate path, thereby lessening the pressure on any documents remaining on said support means as the document engaged by the feed member is displaced and reducing the tendency of a second document to be displaced with the document engaged by the feed member.

5. A document feed mechanism which includes: a document support means and rotatable feed means for engaging and displacing a document from said support means, said feed means comprising an elongated shaft, disc-shaped supports at intervals along said shaft, and replaceable, document engageable drive members each being made of a material having a high coefficient of friction and having a configuration in the shape of a segment of a circle extending about one-half way around said support, each drive member and its support further including means for detachably fixing the drive member on its support whereby each drive member may be easily removed when worn and replaced by a new drive member, and said means for detachably fixing each drive member on its support comprising a pair of headed projections extending laterally from said support and a pair of mounting legs on said drive member, each leg including means defining a mounting hole therein whereby said legs may be easily slipped onto said support over said projections and removed therefrom.

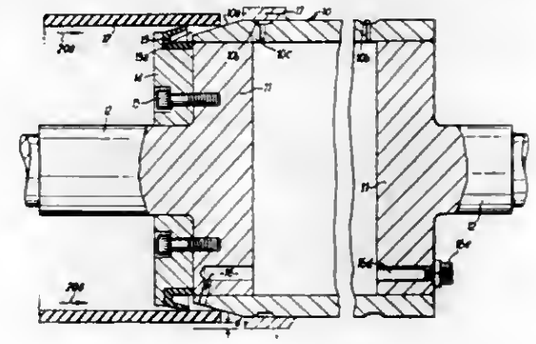
4,030,414
WALL DECORATING PAINT APPLYING DEVICE
James T. McGuire, 3822 S. Rio Blanco, Las Vegas, Nev. 89101
Filed May 16, 1975, Ser. No. 578,086
Int. Cl.² B41K 1/02
U.S. Cl. 101—379 **2 Claims**



1. A wall-decorating paint-applying device comprising:
a one-piece block-shaped unitary, soft compressible, resiliently self-restoring, sponge body having a deformable cellular paint retaining and applying face formed with relieved portions defining a decorative design to be applied to a wall or the like and a rear side; and
means to enable flexing of said body and face to enable selected substantially undistorted parts of said design to be applied to said wall surface, said means including elongated finger-receiving recesses formed in said rear side, each recess capable of receiving a plurality of fingers, said rear side being opposite and substantially parallel to said face, said recesses leaving therebetween an elongated, integral, finger-grippable soft compressible sponge handle portion substantially flush with said rear side for manual squeezing and handling of said device and pressing of said face onto a wall surface to be decorated, the flexibility and compressibility of said handle portion providing flexing of said body and face.

4,030,415
FLEXOGRAPHIC PRINTING ROLL HAVING FLUID PRESSURE GROOVING FOR DISMOUNTING
Stanley Fellows, Warrington, England, assignor to M.A. Buckley (Engraving) Limited, Warrington, England
Filed Sept. 22, 1975, Ser. No. 615,509
Claims priority, application United Kingdom, Sept. 26, 1974, 41814/74
Int. Cl.² B41F 27/00
U.S. Cl. 101—382 R **4 Claims**

1. A flexographic printing roll comprising a rigid base tube having perforations in the form of a plurality of small apertures and shallow external grooving extending circumferentially away from said apertures so that fluid pressure appearing at the apertures is distributed circumferentially by said grooving, and a circumferentially stretchable, elastomeric, engraved, seamless printing sleeve on said tube strained to grip the tube to retain the sleeve securely on the tube, said printing



sleeve covering said shallow external grooving such that increasing fluid pressure in said grooving relative to fluid pressure on the exterior of said sleeve would cause said printing sleeve to expand and be readily removable from said tube.

4,030,416
WATERLESS PRINTING MASTERS
Richard L. Schaok, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.
Division of Ser. No. 517,347, Oct. 23, 1974. This application July 30, 1976, Ser. No. 710,357
Int. Cl.² B41M 1/00; G03F 7/02
U.S. Cl. 101—450 **2 Claims**

2. A method of printing comprising selectively inking a printing master having image areas of ink receptivity and nonimage areas of ink releasability formed of a substrate, an overlying layer of a copolymer of 50–99 percent by weight of siloxane blocks cured to an ink releasable condition and organic ink receptive thermoplastic blocks, and contracting the resultant inked master with an image receiving surface to transfer said image.

4,030,417
UNIVERSAL FOUNTAIN SOLUTION FOR LITHOGRAPHIC OFFSET PRINTING
Stanislava N. Lipovac, Silver Sprlug, Md., assignor to Westvaco Corporation, Laurel, Md.
Filed Aug. 11, 1975, Ser. No. 603,291
Int. Cl.² B41M 1/00; C09D 5/20
U.S. Cl. 101—451 **36 Claims**

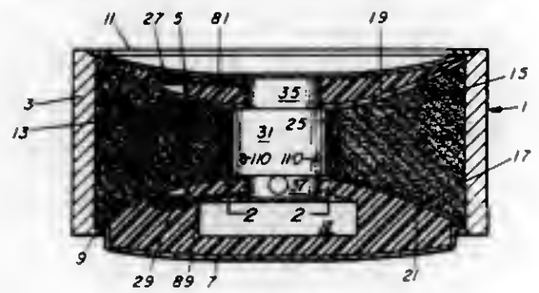
1. A method of treating an offset printing plate for printing comprising applying to an offset printing plate a fountain solution comprising water, a desensitizing gum, a monovalent hydroxide selected from the group consisting of potassium, sodium, lithium and ammonium hydroxides, a monovalent iodide selected from the group consisting of sodium, potassium and lithium iodides, and a fatty acid material having at least about 6 carbon atoms in the linear chain.

4,030,418
GRAVITY DEPLOYED MINE WITH COMBINED UPPER CLEARING CHARGE FIRING AND DELAYED MAIN CHARGE INITIATION
Norman Regber, Rockaway; Ferdinando V. Dukic, and Frank Diorio, both of Lake Hopatcong, all of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.
Filed Oct. 30, 1975, Ser. No. 627,176
Int. Cl.² F42B 21/00, 23/26, 1/02, 3/10
U.S. Cl. 102—8 **9 Claims**

1. In a high-explosive land mine comprising a housing containing a high-explosive main charge, a separate supplemental

explosive charge, and fuze means for first initiating said supplemental charge and then, after a predetermined delay time, initiating said main charge; said fuze means comprising:

a fuze body containing a fast firing train connected to said supplemental charge, and a slow firing train, including a delay element, connected to said main charge;



an arming member, slidable in said fuze body between a safe position and an armed position, at least a portion of each firing train carried by said arming member, both firing trains being completed by said arming member in its armed position only; and

means for initiating said firing trains substantially simultaneously, in response to a single firing signal.

4,030,419

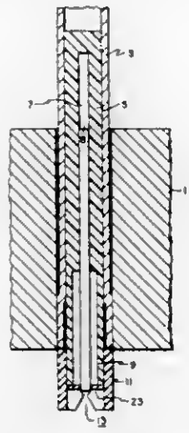
INSERT FOR EXPLOSIVELY EXPANDING A TUBE INTO ENGAGEMENT WITH A TUBE SHEET

Emil P. Loch, Tampa, Fla., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 20, 1975, Ser. No. 634,000

Int. Cl.² C06C *11/00*; **F42B** *1/02*, *3/00*

U.S. Cl. 102—24 R **5 Claims**



1. A resilient insert for explosively expanding tube into a tube sheet utilizing an explosive cord, said resilient insert comprising an outer diameter which is slightly smaller than the inner diameter of said tube, a length substantially longer than said tube sheet is thick, a bore extending from one end of said insert for receiving said explosive cord, said bore being substantially longer than the tube sheet is thick, but not extending all the way through said insert, a counterbore, a sleeve attached to the outside of the end of said insert having the bore and counterbore, one end of said sleeve extending beyond the end of said insert and having diametrically opposed slots, the bottom of said slots being disposed adjacent the end of said insert, the other end of said sleeve being abuttable against the end of said tube, a positioning wafer having an outer diameter slightly smaller than the inner diameter of said sleeve, said wafer having a centrally disposed opening which tightly embraces said explosive cord and abuts the end of the insert to position the explosive cord within the bore of the insert.

4,030,420

DEVICE FOR GROUND-CONTROLLED ACTIVATION OF PROXIMITY FUZES

Lars-Erik Skagerlund, Karlskoga, Sweden, assignor to AB Bofors, Bofors, Sweden

Filed Oct. 15, 1975, Ser. No. 622,784

Claims priority, application Sweden, Nov. 1, 1974, 7413757

Int. Cl.² F42C *13/04*, *13/00*

U.S. Cl. 102—70.2 P **10 Claims**

1. The combination of structure comprising a missile carrying an explosive charge, a proximity fuse in said missile, said proximity fuse comprising transmitter means in said missile for radiating energy, the radiated energy being operative upon reflection to produce echo signals, receiver means in said missile responsive to the reception of said echo signals from the ground surface as well as from obstacles on the ground and from a target for producing an output signal, means for producing a blocking signal of predetermined duration commencing with the firing of said missile, and signal processing means in said missile for selectively generating a control signal operative to initiate explosion of said explosive charge in said missile, said signal processing means comprising means for generating said control signal upon occurrence of an output signal from said receiver means, circuit means in said missile responsive to the presence of said blocking signal for inhibiting the generation of said control signal, and timing means in said missile for also inhibiting the generation of said control signal until a predetermined time interval has elapsed, preceding occurrence of a receiver output signal, during which interval no output signal was produced by said receiver means.

4,030,421

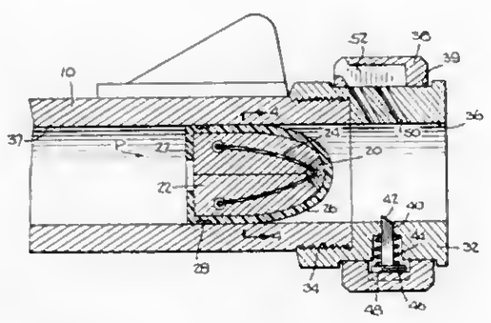
DUAL PURPOSE PROJECTILE AND WEAPON COMBINATION

Alan Litman, Pittsburgh, Pa., assignor to Smith & Wesson Chemical Company, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 590,540, June 26, 1975, abandoned, which is a division of Ser. No. 485,560, July 3, 1974, abandoned. This application July 2, 1976, Ser. No. 702,173

Int. Cl.² F42B *11/36*

U.S. Cl. 102—92.3 **4 Claims**



1. A dual purpose projectile for firing from a weapon comprising a body including a forward nose portion and a plurality of body segments, means located adjacent the nose of said projectile securing said segments one to the other for movement between first and second configurations, said segments in said first configuration being disposed in close juxtaposition one to the other and forming a substantially bullet-shaped projectile body having a predetermined diameter, said bullet-shaped projectile body having a longitudinal axis, said segments in said first configuration thereof being circumferentially spaced one from the other about said axis, said segments in said second configuration being spaced one from the other and forming a projectile body having a diameter larger than said predetermined diameter affording increased frontal area in a direction normal to the trajectory of the projectile when fired from the weapon, and means for releasably retaining said segments in said first configuration, said retaining means including a band encompassing said segments in the first configuration thereof adjacent the end of said projectile remote from its nose.

4,030,422

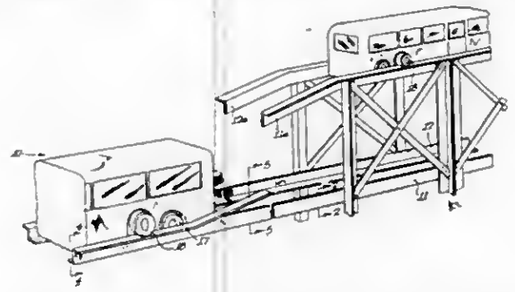
SWITCHING SYSTEM FOR GUIDED VEHICLES

Raymond F. Pasquan, 232 First Ave., Toronto, Ontario, Canada

Filed Dec. 8, 1975, Ser. No. 638,326

Int. Cl.³ E01B *25/06*

U.S. Cl. 104—131 **6 Claims**



1. A switching system for guided vehicles, comprising

a main guideway having a pair of horizontally spaced main guides, each main guide having a vertically disposed running surface and a horizontally disposed running surface, the vertically disposed surfaces on said main guides facing one another and extending upwardly from and outwardly of respective ones of said horizontally disposed running surfaces,

a secondary guideway having a pair of horizontally spaced secondary guides, each secondary guide having a vertically disposed running surface and a horizontally disposed running surface, the vertically disposed surfaces of said secondary guides facing one another and being spaced apart the same distance as said vertically disposed surfaces of said main guides, the horizontally disposed running surfaces of said secondary guides being located outwardly of said vertically disposed running surfaces of said secondary guides,

said secondary guides joining said main guides at a switching region, each of said vertically disposed surfaces of said secondary guides and said main guides being one in the same vertically disposed surface prior to the switching region and being co-extensive with each other in said switching region, said secondary guideway diverging vertically from said main guideway with said horizontally disposed surfaces of said secondary guides being at a level which is above said horizontally disposed surfaces of said main guides,

a vehicle having main support means for coacting with said horizontally disposed surfaces of said main guides for supporting said vehicle on said main guides, guide means for coacting with said vertically disposed surfaces on each side of said vehicle for providing lateral guidance, and retractable support means on both sides of said vehicle having a retracted and an extended position, said retractable support means in its retracted position being clear of all guides and adapted to be moved to its extended position prior to said vehicle reaching said switching region with said retractable support means being above and clear of said horizontally disposed surfaces of said secondary guides whereby when said vehicle reaches said switching region said retractable support means coacts with the horizontally disposed surfaces of said secondary guides to support said vehicle thereon, the coaction between said guide means and said vertically disposed surfaces being continuous.

4,030,423

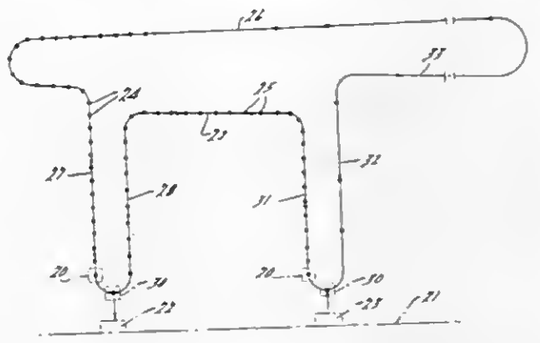
MATERIAL HANDLING SYSTEM

Robert Krammer, Royal Oak, Mich., assignor to Standard Conveyor Company, N. St. Paul, Minn.

Filed Nov. 29, 1974, Ser. No. 528,322

Int. Cl.² B61B *13/00*

U.S. Cl. 104—172 S **28 Claims**



1. In a material handling system having downwardly and upwardly extending conveyor legs, a powered endless member movable along a path carrying driving dogs, a series of workpieces carrying trolleys supported for free movement alongside said endless member, first means on each trolley movable between a retarding position coacting with a driving dog during travel on a downward leg to cause movement of the trolley with the driving dog, and a free position clear of the path of said driving dogs, second means on each trolley movable between a free position clear of the path of said driving dogs and a driven position in said path, means urging said second means toward its free position causing said driving dogs to pass both said first and second means of a blocked trolley, and actuating means for moving said second means to its driven position, said actuating means being selectively operable and located alongside an upward leg of the conveyor, means extending from the bottom of said upward leg to a predetermined height for preventing movement of said first means from its retarding position, causing a driving dog to engage said first means to lift a trolley to said predetermined height, and holding means at said predetermined height for preventing said trolley from dropping.

4,030,424

RIGID RAILWAY CAR TRUCK

Gerald D. Garner, Florissant; James C. Hammonds; Jan D. Holt, both of St. Charles, and Conway H. Melcher, Kirkwood, all of Mo., assignors to ACF Industries, Incorporated, New York, N.Y.

Filed Apr. 29, 1975, Ser. No. 572,930

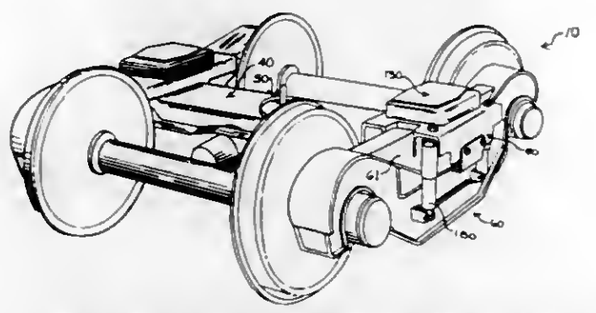
Int. Cl.² B61F *3/08*, *5/06*, *5/08*, *5/14*

U.S. Cl. 105—182 R **21 Claims**

1. A railway truck comprising:

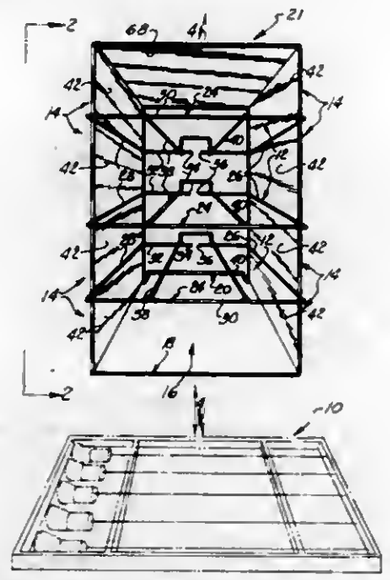
a pair of longitudinally spaced, transversely extending wheel axles having wheels and journal bearings mounted on opposite ends of said axles; a pair of transversely spaced side frames extending longitudinally of said truck each supported by said journal bearings outboard of said wheels; said side frames each having side frame openings at about the midpoint thereof; a vertically compressible spring assembly mounted within each of said side frame openings; a bolster extending transversely between said side frames, with opposite end portions of said bolster in vertical allignment with said side frame openings and supported on said spring assemblies for vertical movement relative to said side frames; a transom extending

transversely between said side frames located below said bolster and rigidly affixed at its opposite ends thereof to each of said side frames; said transom connected solely to said side frames maintaining said side frames in parallel relationship and resisting truck hunting; said transom having sufficient torsional flexibility to allow said side frames to rock relative to each other about an axis transverse to said truck; a bolster center bearing located centrally of said bolster adapted to provide a connection of said bolster to a railway car body; a pair of car body bearing assemblies mounted on said bolster, one on each



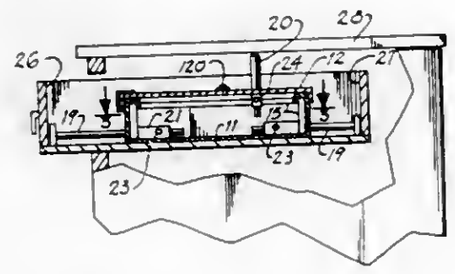
side of said bolster center bearing; said car body bearing assemblies each having an upper surface of low friction material, whereby said truck rotates with respect to said car body by virtue of said low friction material, and whereby the weight of the car body is supported by said car body bearing assemblies and is transferred through said bolster to said spring assemblies, and from said spring assemblies to said side frames and through said bearings and wheel axles to said wheels, and whereby horizontal forces applied to said car body are transmitted through said bolster center bearing through said bolster to said side frames.

4,030,425
ARTICLE SUPPORT ASSEMBLY
David L. Yeomans, 3985 Fairmount Blvd., Cleveland Heights, Ohio 44118
Filed Mar. 4, 1976, Ser. No. 663,997
Int. Cl.² A47B *3/00*
U.S. Cl. 108—111 11 Claims



1. A support assembly comprising a plurality of flat open rectangular gridworks disposed in a spaced apart parallel relationship, each of said gridworks being formed by a plurality of interconnected rod elements, a plurality of elongated side panels each of which is associated with corresponding outer edge portions of two of said flat gridworks and extends perpendicular to said gridworks, each of panels having a longitudinal extent which is substantially as great as the extent of the associated outer edge portions of the flat rectangular gridworks, a plurality of connector means connected with and disposed adjacent to a corner portion of each of said flat rectangular gridworks, a plurality of connector means connected with and disposed adjacent to a corner portion of each of said flat rectangular gridworks for connecting said panels with the associated gridworks and for holding said side panels and associated gridworks against relative movement.

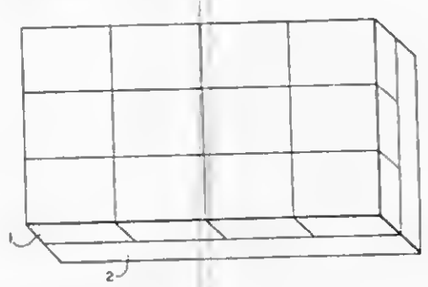
4,030,426
TRAV-L-SAFE
Joseph Lyons, 35 Bonnie Lane, Berkeley, Calif. 94708
Filed May 23, 1975, Ser. No. 580,309
Int. Cl.² E05G *1/02*
U.S. Cl. 109—51 3 Claims



1. A portable rectangular strong box adapted to be secured temporarily in the drawer of a desk or bureau against unlawful removal said portable strong box comprising: a bottom, integral substantially perpendicular sides and ends, each end having a horizontal aperture therein, and a two-part cover, one part of which has a vertical aperture therein, the said one part of said cover being fixed to the adjacent upper edges of said sides and to the adjacent upper edges of the corresponding end of said box, a hinge secured to the fixed one part of said cover, said hinge constructed and arranged to connect the second part of said cover to the fixed one part thereof, locking-means mounted on said second cover part constructed and arranged to releasably lock the hinged second cover part to the corresponding end of said box, box securing means within said box comprising three metal rods each rod having an inner end and an outer end, a pair of rod supporting means housed within said box each comprising a cylindrical sleeve fixed to the bottom of said box and at opposite ends thereof, respectfully, the longitudinal axis of each of said pair of sleeves being parallel to the plane of the bottom of said box, substantially at right angles to the plane of the corresponding apertured end thereof and in axial alignment with the horizontal aperture therein, the inner end of each rod of a pair of said metal rods being slidingly mounted in one of the cylindrical rod supporting sleeves and the length of each rod of said pair of rods being such that its outer end extends through the aperture in the corresponding end of said box to contact a corresponding wall of said drawer, rod fastening means within said box comprising a set screw in each of said rod supporting sleeves constructed and arranged to hold each rod of said pair of rods temporarily in its extended position in contact with the corresponding wall of said drawer, third rod supporting means comprising a third cylindrical sleeve, said third cylindrical sleeve secured on the underside of the apertured fixed cover part substantially perpendicular to the plane thereof and in axial alignment with the vertical aperture therein, the inner end of said third rod being slidably mounted in said third cylindrical sleeve the length of said third rod being such that its outer end extends through the vertical aperture in the fixed cover part to contact the underside of the top of said desk or bureau, and third rod fastening means comprising a set screw in said third cylindrical sleeve, said third set screw arranged to

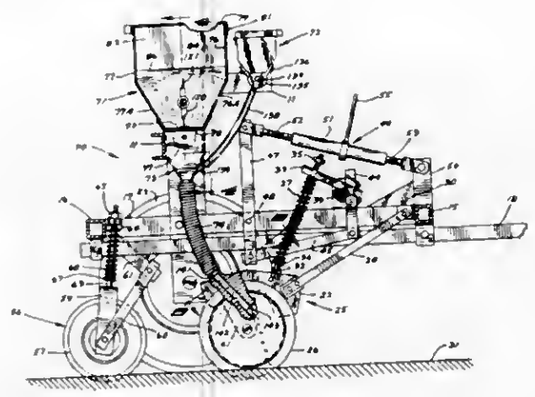
hold said third rod temporarily in its extended position in said third cylindrical sleeve in contact with the underside of the top of said desk or bureau.

4,030,427
ARMOR PLATE
David Goldstein, Adelphi, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.
Filed Oct. 30, 1974, Ser. No. 519,464
Int. Cl.² F41H *5/04*
U.S. Cl. 109—82 3 Claims



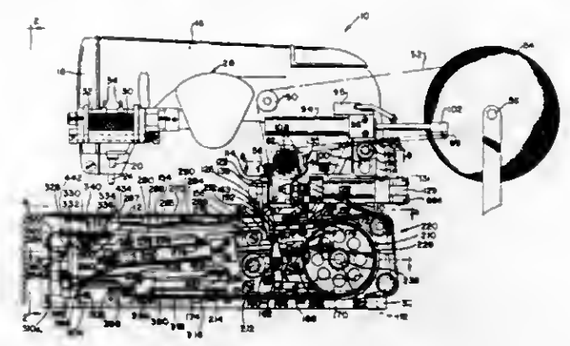
1. Armor plating comprising:
tiles arranged in an array, comprising titanium carbide particles finely dispersed in a matrix of tough crack resistant titanium-nickel alloy, the titanium carbide particles constituting from 30 to 60 weight percent of the tile and the matrix of titanium-nickel alloy the remainder, the composition of the matrix being from about 44 to about 46 titanium and from about 54 to about 56 nickel by weight percent, provided that the tile has a Rockwell-A hardness of at least 82, and further provided that the tile be at least 1⅛ inches on a side when square and have a diagonal of at least 1 inch when other than square,
A support layer fastened to the underside of said tiles and being composed of a material selected from the group consisting of (a) woven roving glass reinforced plastic, (b) alloys of aluminum which have a brinell hardness between 80–130, and (c) alloys of titanium which have a Rockwell C hardness of 5–40.

4,030,428
NATIVE GRASS SEED DRILL
James R. Truax, 3717 Vera Cruz Ave., Minneapolis, Minn. 55422
Filed Apr. 29, 1976, Ser. No. 681,596
Int. Cl.² A01C *5/00*
U.S. Cl. 111—85 13 Claims



1. An apparatus for planting native grass seed in the soil comprising: a frame, wheels rotatably mounted on the frame for supporting the frame for movement on the soil, a seed box mounted on the frame, said box having side walls and a bottom wall defining a chamber for storing native grass seed, a plurality of dividing plates separating the lower portion of said chamber into a plurality of transversely spaced seed bins, downwardly converging side walls associated with each of the dividing plates to provide each bin with downwardly converging surfaces for directing seeds to the bottom wall of each bin, an elongated discharge slot located in the bottom wall of each bin, flexible means located on the bottom wall in each bin, said flexible means having an elongated opening positioned in vertical alignment with the slot in the bottom wall of the bin, picker wheel means rotatably mounted on the frame, said picker wheel means having upper portions which extend through the discharge slots and elongated openings of the flexible means of each bin for moving seeds from the bins, an agitator unit located in each bin to continuously stir and move the seeds in the bin to keep a supply of seeds in the vicinity of the picker wheel means, each agitator unit having a plurality of paddles operable to agitate the seeds in the bins, said plurality of paddles including first and second end paddles terminating in ends that move adjacent the inclined surfaces of the side wall of each bin, means for rotating the agitator means and wheel means, a plurality of seed funnels attached to the seed box, said seed funnels being located below the bottom wall of the seed box and aligned with each of the wheel means and having a seed passage for receiving the seeds from the picker wheel means, each funnel having a neck surrounding a throat located below the picker wheel means, a plurality of furrow opening assemblies movably mounted on the frame operable to make a furrow in the soil, each furrow opening assembly including a planting shoe and furrow forming means, elongated flexible tubes attached to the outlet necks of the seed funnels and the planting shoes for delivering the seeds from the seed funnels to the planting shoes, said planting shoes having sufficiently large discharge openings for directing the seeds into the furrows.

4,030,429
SEWING MACHINE ATTACHMENT
Ronald J. Boser, Dix Hills, N.Y., and Walter P. Siegel, Lebanon, N.J., assignors to Special Sewing Systems, Inc., New York, N.Y.
Filed Aug. 18, 1976, Ser. No. 715,350
Int. Cl.² D05B *3/12*
U.S. Cl. 112—104 25 Claims



1. Apparatus for feeding labels to a sewing machine, said machine including a work support, feed advancing means, and a stitch forming means, and said apparatus comprising:
label storage means;
means for feeding and cutting predetermined lengths of labels from said label storage means;
means for engaging and folding the label upon itself;
means for orientating and advancing the folded label from an area remote from said stitch forming means to a delivery point; and
transporting means for advancing said folded label from said delivery point under said fabric for presentation to said feed advancing means whereby gripping said folded

label from said transporting means and feeding the same to said stitch forming area where it is attached to a garment being sewn.

4. In combination, a sewing machine including a work support, a sewing needle and feed advancing means defining a sewing station, and a label inserter for inserting a label to the underside of said fabric piece, said label inserter comprising:

a supply roll of ribbon;

means for feeding, cutting and clamping said ribbon into preselected lengths;

means defining a label feed path orientated substantially parallel to said work support;

label engaging and folding means operable to forcibly urge said label along said path whereby locating the folded edge of said label into a first position;

transporter means for receiving said label at said first position; and

means for forcibly moving said transporter means through a feed stroke into close proximity with said sewing station.

4,030,430

APPARATUS FOR SEWING SLIDE FASTENERS TO ELASTIC CARRIERS

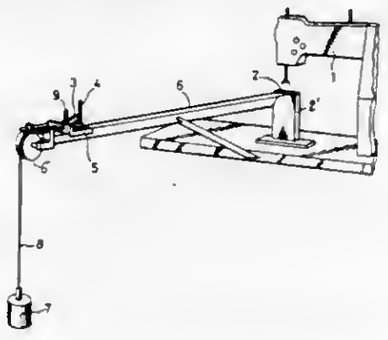
Hansjürgen Pickert, Kerkrade, Netherlands; Hans Dieter Sesselmann, Rodingen, Germany, and Leonardes August Timmers, Mechelen, Netherlands, assignors to William Prym-Werke KG, Stolberg, Rhineland, Germany

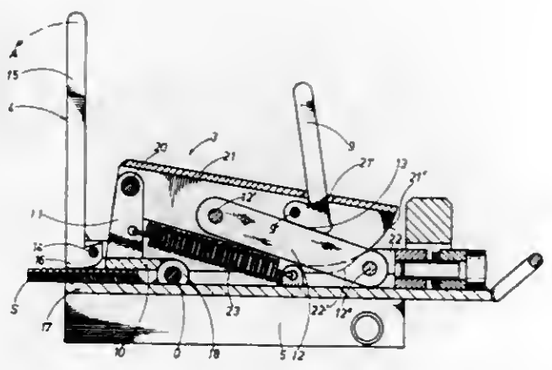
Filed Feb. 18, 1975, Ser. No. 550,489

Claims priority, application Germany, Feb. 16, 1974, 2407558

Int. Cl.² D05B *21/00*

U.S. Cl. 112—121.26 **8 Claims**





1. Apparatus for simultaneously sewing two coupled stringers of a slide fastener into portions of a carrier to opposite sides of an elongated slit therein, which is closed at one end, in which the carrier is elastic in the direction of the slit, the apparatus comprising a two-needle sewing machine having a needle plate; a slide having an upper substantially flat surface portion; holding means on said slide for releasably holding the coupled stringers of a slide fastener in the region of one end of the latter and the carrier in the region of its closed end of the slit therein on said slide, said holding means comprising a holding member connected to said slide and having an upright portion adapted to engage the carrier in the region of the closed end of the slit, and clamping means for clamping the slide fastener stringers in the region of said one end, said clamping means being movable between a clamping and a releasing position, and comprising a clamping plate having a bottom face facing said upper surface portion, hinge means connecting said clamping plate to said slide tiltable about an axis substantially parallel to said upper surface portion, a support member projecting upwardly from the clamping plate and having an upper end, a connecting member hingedly connected at one end to upper end of support member, a link pivotably connected at one to said connecting member and at the other end to said slide, a spring connected at opposite end to said support member and said slide, said holding means further comprising operating means connected to said connecting member and cooperating with said clamping plate for moving the latter between said clamping position in which said bottom face thereof is substantially parallel to said upper face portion of said slide so that the one end of said slide fastener may be clamped between said upper surface portion and said bottom face, and said releasing position; elongated guide means having one end fastened to said sewing machine and an opposite end for guiding said slide toward and away from said needle plate; and means connected to said slide for biasing the same with a constant force toward the opposite end of said guide means in a direction opposite to the advance of the slide fastener and the carrier during the sewing operation.

4,030,431

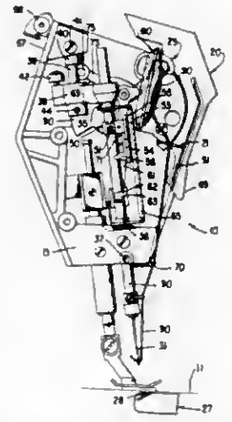
SEWING MACHINE TAKE-UP THREAD SHIELD

Adolph Martin, Rheinstetten-Neu, Germany, and William Joseph Edwards, Cranberry, N.J., assignors to The Singer Company, New York, N.Y.

Filed May 24, 1976, Ser. No. 688,880

Int. Cl.² D05B *49/00*

U.S. Cl. 112—241 **5 Claims**



5. In a sewing machine having a frame, stitch forming instrumentalities including a thread carrying needle endwise reciprocable in said frame, a loop taker carried in said frame for movement in cooperation with said needle to concatenate said needle thread in the formation of stitches, a take-up lever formed with a needle thread engaging eyelet and supported for movement of said eyelet within said frame, means for imparting movement to said take-up lever in timed relation with said needle and loop taker and in a path alternately to provide slack in said needle thread for concatenation by said loop taker and to withdraw slack in said needle thread to set stitches, said take-up lever being formed with a thread introduction slot leading from said eyelet to a mouth which is located externally on said take-up lever and which is accessible to the needle thread when slack is provided therein by the movement of said stitch forming instrumentalities,

means for preventing accidental unthreading of the take-up lever eyelet comprising: a thread shield formed with a take-up lever accommodating passageway having an open extremity; means for supporting said thread shield on said sewing machine frame with said passageway aligned with the path of motion of said take-up lever, with said thread shield extending between said take-up eyelet and said thread introduction slot mouth over that portion of the path of motion of said take-up lever in which sufficient slack thread is provided in order to make unthreading possible and with said open slot extremity arranged to expose said take-up lever over that portion of the path of motion of said take-up lever in which insufficient slack thread is provided in order to make unthreading possible.

4,030,432

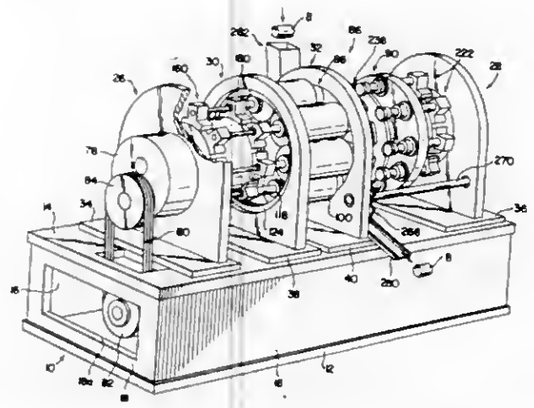
CAN TRIMMING APPARATUS

Stanley J. Miller, Hastings, and Richard J. Heniser, Grand Rapids, both of Mich., assignors to Gulf & Western Manufacturing Company (Hastings), Southfield, Mich.

Continuation-in-part of Ser. No. 543,930, Jan. 24, 1975, abandoned. This application Dec. 5, 1975, Ser. No. 636,978

Int. Cl.² B21D *24/16*

U.S. Cl. 113—7 R **35 Claims**



1. Apparatus for edge trimming the open end of a cup-shaped metal can body comprising, a frame, can body supporting spindle means having a spindle axis, means for supporting and moving said spindle means and a can body supported thereby along an arcuate path relative to said frame, said arcuate path having a second axis radially spaced from and parallel to said spindle axis, cutter means supported by said frame at a location along said path, and means to rotate said spindle means and said can body supported thereby about said spindle axis during movement of said spindle means and can body about said second axis and past said cutter means, said cutter means being positioned on said frame to sever an axial portion from the open end of said rotating can body moving therepast.

4,030,433

METHOD OF FORMING CAPTIVE CAN CLOSURE

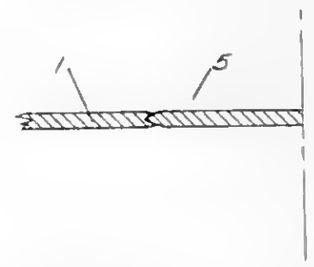
Herbert Arthur Bly, 10 Shadowstone Lane, Lawrenceville, N.J. 08648

Continuation-in-part of Ser. No. 440,739, Feb. 8, 1974, Pat. No. 3,963,153. This application Apr. 5, 1976, Ser. No. 673,612

Int. Cl.² B21D *51/44*

U.S. Cl. 113—121 C **1 Claim**

1. A method of integrally forming a sliding closure member in a can lid by sequential punching and die forming in four steps; firstly, punching said sliding portion, displacing it partially from the container lid, with complete shearing of the metal taking place; and secondly, forming the sheared edge of the closure member between two dies to round the inner and outer edges and extrude the metal, slightly increasing the projected area of the closure; thirdly, repositioning the sliding portion to its original position in the opening while clamping it between two rounded dies to reduce its projected area to that of the opening; and fourthly, forming the edges of the opening between two dies to conform to the rounded edges of the closure, causing extrusion of the edges of said opening, increasing its projected area and causing it to overlap and tightly



seal against the edges of the closure while forming guide grooves for the sliding member, and restoring the plane surface of the container top, further increasing sealing pressure.

4,030,434

VEHICLES OF THE SUBMERSIBLE TYPE

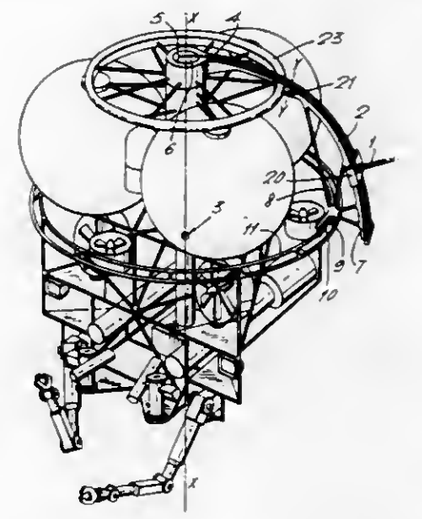
Roy Pedlar; Alan Roderick Spencer, and Colin Edwards, all of Bristol, England, assigoors to British Aircraft Corporation Limited, London, England

Filed Mar. 10, 1976, Ser. No. 665,577

Claims priority, application United Kingdom, Mar. 15, 1975, 10916/75

Int. Cl.² B63G *8/00*

U.S. Cl. 114—16 R **4 Claims**



1. A submersible vehicle having anchorage means for a cable link the anchorage means including,

an arcuate trackway formed in two pieces lying generally end-to-end within a plane including an axis passing through the centre of drag of the vehicle when submersed, and together describing an arc centred upon the said centre of drag,

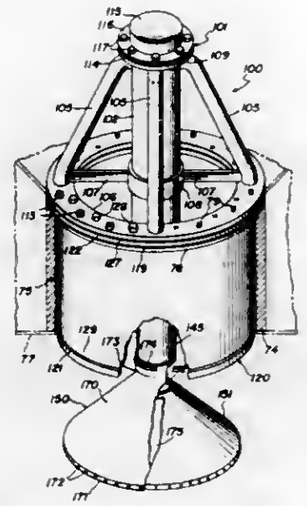
first and second locating means respectively locating the two pieces of the arcuate trackway on the vehicle, said locating means allowing bodily rotation of the arcuate trackway about said axis,

hinge means for hinging the two pieces together, and

trolley means, constrained to move along the arcuate trackway, to which a cable link is attachable, the arrangement being such that the arcuate trackway can rotate bodily about said axis, the trolley means can move along the arcuate trackway under the effect of a tension load in the cable link so that the resultant axis through which this load acts can pass through the centre of drag of the vehicle, and the two pieces of trackway can pivot with respect

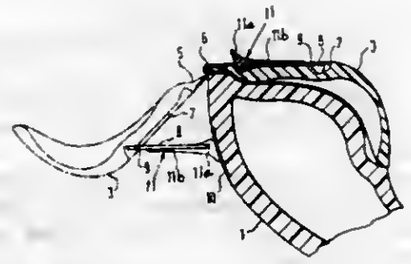
to each other to accommodate any irregularities in the locating means.

4,030,435
HOPPER VALVE MODULE FOR HOPPER DREDGE
Ezra Sensibar, Chicago, Ill., assignor to Construction Aggregates Corporation, Chicago, Ill.
Filed Apr. 22, 1976, Ser. No. 679,158
Int. Cl.² B63B *35/30*
U.S. Cl. 114—36 **44 Claims**



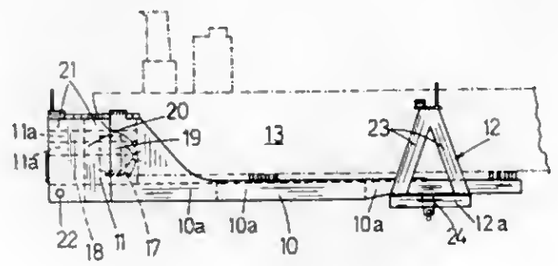
1. In a hopper dredge vessel having a hopper with an outlet at the bottom thereof, a removable hopper valve module comprising housing means removably mountable on the associated hopper adjacent to the outlet thereof, a valve member movable in use between a closed position closing the hopper outlet and an open position opening the hopper outlet, and drive means carried substantially solely by said housing means and coupled to said valve member for effecting movement thereof between the open and closed positions thereof, said valve module being connected to the associated vessel only adjacent to the hopper outlet and adaptably mounted so as to be readily attached and removed as a unit from the hopper.

4,030,436
FOLDABLE OUTBOARD SEAT FOR SAILBOATS
Helmuth Stöberl, 8201 Eggstatt-Bachham Haus near 9, Germany
Filed Oct. 3, 1975, Ser. No. 619,176
Claims priority, application Germany, Oct. 7, 1974, 2447710
Int. Cl.² B63B *29/00*
U.S. Cl. 114—39 **8 Claims**



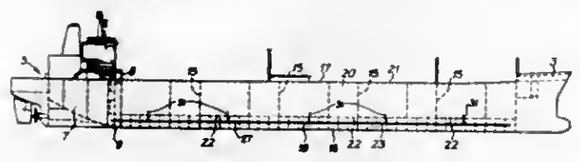
2. In combination with a sailboat having a hull with a deck well portion for storing an outboard seat, a seat member fitting said well having a back surface portion contoured to lie flush with the deck and a front surface portion contoured to provide a seat, said seat member having a forward edge pivotably connected to the sailboat hull adjacent the outer periphery of the sailboat, a seat bottom portion extending from said forward edge, and an up-standing back rest portion at the outer end of the seat portion, said seat member being pivoted from a storage position in said well inboard of said boat hull to an outboard position projecting laterally from the boat hull with the major portion of the seat bottom portion and all of the back rest portion lying beyond the boat hull.

4,030,437
SHIP'S DOCK
Bo Gunnar Bengtsson, Ockero, Sweden, assignor to Trascandica AG, Basel, Switzerland
Filed Mar. 25, 1976, Ser. No. 670,569
Claims priority, application Sweden, Mar. 27, 1975, 7503600
Int. Cl.² B63C *1/06*
U.S. Cl. 114—46 **7 Claims**



1. A ship's dock arranged to enable work to be carried out on a limited portion of a large ship having a hull defined by conventional length and breadth proportions, said dock being capable of raising said limited portion from the water in cooperation with the ballast tanks in said ship and comprising:
a. an elongate plane bottom portion provided with displacement tanks and having a length corresponding to about one half the length of said hull and a width substantially smaller than the breadth of said hull;
b. a stem portion having displacement and stabilizing tanks, located at one end of said bottom portion, raising above the level thereof and extending over a minor portion of the length of said bottom portion;
c. a separate U-shaped stabilizing body arranged at the end portion of said bottom portion remote from said stem portion, said body having an internal width greater than the breadth of said hull; said body adapted to be removeably secured to said bottom portion.

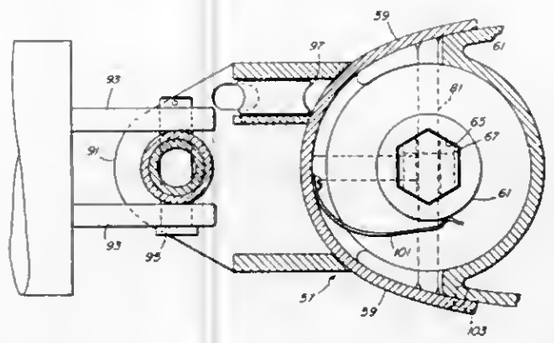
4,030,438
SHIPS FOR LIQUID CARGOES
Ian Edmund Telfer, Billericay, England, assignor to The British Petroleum Company Limited, London, England
Filed June 12, 1975, Ser. No. 586,360
Claims priority, application United Kingdom, July 5, 1974, 30017/74
Int. Cl.² B63B *25/08*
U.S. Cl. 114—74 R **11 Claims**



1. In a ship for carrying liquid cargoes having at least two longitudinal bulkheads separating a central tank area from wing tank areas and transverse bulkheads dividing the central and wing tank areas into a number of tanks, the improvement comprising two sets of tanks in each of the wing tank areas, one lower set, suitable for holding ballast, extending beneath the other upper set, suitable for holding cargo, but with the

tanks of the lower set having vertical portions extending to deck level and a horizontal flat extending along the length of the wing tank areas between the upper and lower sets of tanks, the flat being solid between the sets of tanks and perforated where it passes through the vertical portions of the lower set of tanks.

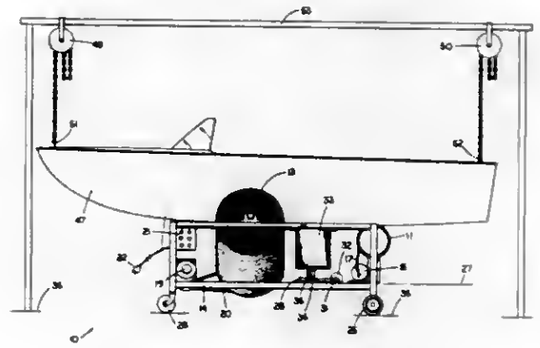
4,030,439
BOOM GOOSENECK FITTING PROVIDING MAINSAIL ROLLER-FURLING
Frederick E. Hood; Donald K. Mitchell, and Gary S. Uhring, all of Marblehead, Mass., assignors to Hood Sailmakers, Inc., Marblehead, Mass.
Filed Aug. 30, 1976, Ser. No. 718,949
Int. Cl.² B63M *9/04*
U.S. Cl. 114—106 **6 Claims**



1. A roller-furling mainsail rig comprising: A mast having a generally cylindrical sail-receiving compartment and an aft-facing slot through which the mainsail may be drawn from said compartment;
a curved plate conforming to the rear peripheral curvature of the mast cross-section at the lower end of the mainsail slot;
a reel for furling the main sail;
a bracket on the inward side of said plate for rotatably supporting said reel within the mast, said mast being apertured near its base to receive said reel when the plate is mounted to the mast;
a boom provided with means for securing the clew of the mainsail; and
hinge means for mounting said boom on the opposite side of said plate from said reel whereby by mounting said plate on said mast, said roller-furling reel and said boom are in co-operative relationship.

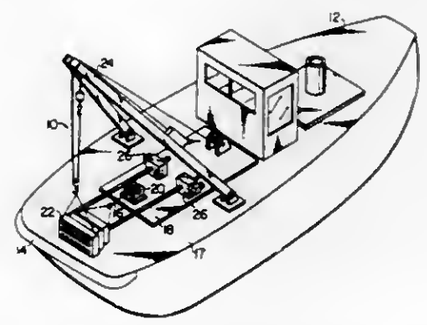
4,030,440
BOAT CLEANING MACHINE
Floyd David Wickersham, R.R. 1, Leesburg, Ind. 46538
Filed Mar. 24, 1976, Ser. No. 670,049
Int. Cl.² B63B *59/00*
U.S. Cl. 114—222 **11 Claims**

1. Boat cleaning equipment which comprises:
a frame having a first dimension parallel to the longitudinal axis of a boat suspended above it;
bottom-cleaning means mounted upon said frame for cleaning the bottom of a boat, said bottom cleaning means having a bottom cleaning surface at least a portion of which is positioned to contact the bottom of a boat suspended above it, the bottom cleaning surface being movable relative to a boat suspended adjacent thereto and relative to said frame;
first drive means for moving the bottom cleaning surface relative to a boat suspended adjacent thereto and relative to said frame;
side cleaning means mounted upon said frame for cleaning the sides of a boat, said side cleaning means having side cleaning surfaces, at least a portion of which are positioned to contact the sides of a boat suspended above the bottom cleaning surface, the side cleaning surfaces being movable relative to a boat suspended adjacent thereto and relative to said frame;
second drive means for moving the side cleaning surfaces relative to a boat suspended adjacent thereto and relative to said frame; and



roller means operable on a stationary surface to facilitate moving said frame along the first dimension of said frame parallel to the longitudinal axis of a boat suspended above the bottom cleaning surface.

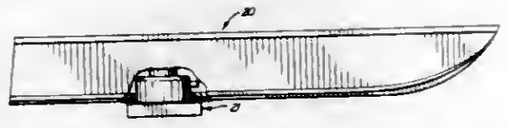
4,030,441
DEVICE FOR CONNECTING TUGBOAT WITH SHIP TO BE TUGGED
Toshio Nagata, Tokyo; Kunijiro Kawasaki, Sasebo; Ryuichiro Takahama, Sasebo; Yoshifusa Miyatani, Sasebo, and Sozo Funakoshi, Sasebo, all of Japan, assignors to Kohsn Sendan Kikai Kabushiki Kaisha; Sasebo Jukogyo Kabushiki Kaisha and Nishi Nippon Harbor Service Kabushiki Kaisha, all of, Japan
Filed Nov. 17, 1975, Ser. No. 632,275
Claims priority, application Japan, Mar. 18, 1975, 50-31852
Int. Cl.² B63B *21/56*
U.S. Cl. 114—242 **2 Claims**



1. A device for connecting a tugboat with a ship to be tugged thereby, comprising:
a tug rope which may be paid out from said tugboat, and one end of which is secured to an anchor means mounted on said tugboat;
an electromagnet adapted to secure one end of said tug rope to the hull of said ship and to which is secured the other end of said tug rope; said electromagnet including a casing having a beam member therein, a plurality of magnetic pole members each having a pair of opposing yokes and disposed in two rows in side-by-side relation within said casing, a plurality of electric coils for exciting said magnetic pole members and surrounding all of said yokes of said magnetic pole members, and a plurality of spring assemblies affixing said magnetic pole members to said beam member within said casing; said spring assemblies

each having a rod pivoted to said magnetic pole member at its one end, and at least one coil spring surrounding said rod and located on said beam member, and elastic deformation of said coil spring permitting the movement of each of said magnetic pole members.

4,030,442
MARINE PROPULSION DEVICE
Herbert O. White, 4242 E. Wilshire Drive, Phoenix, Ariz. 85008
Filed Aug. 26, 1976, Ser. No. 717,604
Int. Cl.² B63H *25/46*
U.S. Cl. 115—14 **7 Claims**



1. A propulsion device for use in combination with a marine vessel, said propulsion device comprising:

a. a housing for attachment to said vessel below the waterline thereof and including a water conducting channel extending through said housing and having first and second open ends,

said channel having first and second water paths defined therein and extending longitudinally through said channel;

b. a propeller for urging water through said channel and journalled within said housing for unidirectional rotation about a normally vertical axis,

said propeller having a first sector described by the cylinder of rotation thereof lying in said first water path and second sector described by the cylinder of rotation thereof lying in said second water path;

c. a first gate pivotally carried by said housing within said channel intermediate said propeller and said first open end and movable between a first position and a second position for selectively obstructing respective said water paths and for exposing water to said second and said first sectors, respectively, of said propeller;

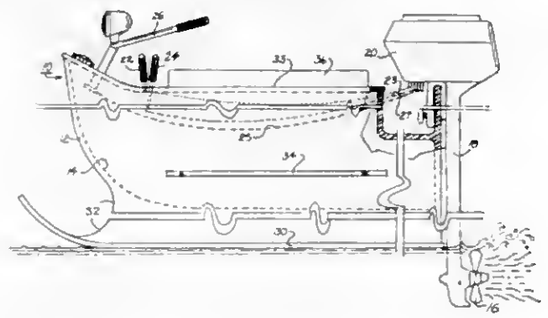
d. a second gate pivotally carried by said housing within said channel intermediate said propeller and said second open end and movable between a first position and a second position for selectively obstructing respective said water paths and for exposing water to said second and said first sectors, respectively, of said propeller;

e. means for operative synchronous movement of said first and said second gates between respective said first and said second positions,

whereby said vessel is propelled in one direction when water is selectively exposed to said first sector and is propelled in a reverse direction when water is selectively exposed to said second sector.

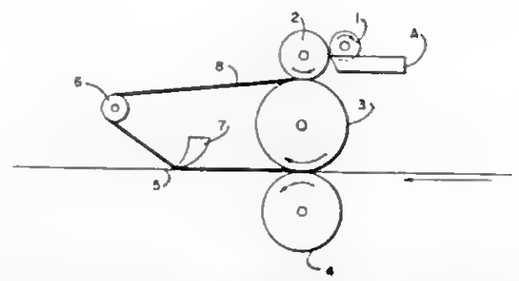
4,030,443
SPORTS WATERCRAFT
Donald C. Price, 23844 Gratiot, East Detroit, Mich. 48205
Filed Mar. 29, 1976, Ser. No. 671,628
Int. Cl.² B63B *35/00*
U.S. Cl. 115—70 **2 Claims**

1. Improvement in sports watercraft having a floatable hull, a propeller means including a rotatable propeller shaft and propeller for propelling said watercraft in water, a motor for driving said propeller, a throttle for controlling the speed of said motor and steering mechanism for rotating the propeller shaft to steer said watercraft in water, said improvement comprising the bottom portion of said hull being rounded in shape like a boat and formed with an exterior radius to provide maximum bouyancy for a given depth of displacement of said hull, the interior of the said hull having a radius with the same center as said exterior radius, said motor and propeller being exterior of said hull, a single water ski disposed beneath and joined to said hull so that at low speeds said watercraft floats in the water by means of said hull and at high speeds said hull is lifted substantially entirely out of the water by means of said water ski, whereby at said high speeds said watercraft rides on top of the water, said hull having a flat deck portion for supporting an occupant of said watercraft in a straddling position, and means on both sides of said hull for supporting the feet of said occupant, a single rib structure, said water ski joined to



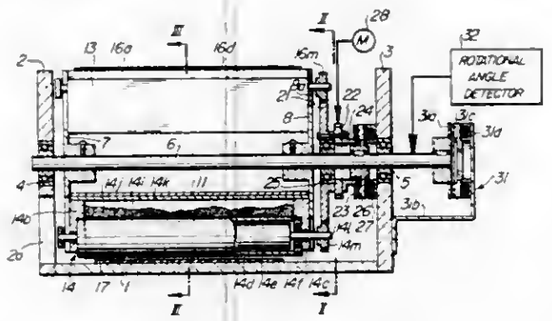
said hull by said rib structure which spaces said water ski from the bottom of said hull, the width of said rib structure being no greater than that of said water ski, said water ski being formed in one continuous piece from end to end thereof over its entire length, said rib structure being formed integral with said hull and in one continuous piece from end to end thereof over its entire length, said water ski joined solidly to said rib structure continuously over the entire length of the latter, there being no break or interruption in either said rib structure or said water ski over the entire length thereof.

4,030,444
CONTINUOUS SILK SCREEN WITH DIRECT ROLL COATER
George L. Collins, Murray Hill, and John R. Costanza, North Plainfield, both of N.J., assignors to Celanese Corporation, New York, N.Y.
Filed Nov. 26, 1975, Ser. No. 635,478
Int. Cl.² B05C *1/14*
U.S. Cl. 118—257 **4 Claims**



1. In a roll coater having a takeup roll located in a coating bath, a nip roll located adjacent to the takeup roll, providing a sufficient separation between the takeup roll and the nip roll to meter the desired thickness of coating onto the nip roll, and driver rolls interposed on either side of a substrate to be coated, said nip roll located adjacent one of said driver rolls, wherein the driver rolls drive the substrate through the coater, the improvement of which comprises interposing between said one driver roll and the side of the substrate to be coated, a silk screen band which receives the coating from the nip roll, and which band is maintained in contact with the side of the substrate to be coated by a resilient blade located downstream of said driver rolls, wherein the band moves in the direction of flow of the substrate between the driver rolls at a speed equal to the line speed of the substrate.

4,030,445
MULTICOLOR DEVELOPING DEVICE
Hisayoshi Takenaga, and Teruo Yotsukura, both of Hitachi, Japan, assignors to Hitachi, Ltd., Japan
Filed Feb. 26, 1976, Ser. No. 661,794
Claims priority, application Japan, Feb. 28, 1975, 50-26564
Int. Cl.² G03G *15/08*
U.S. Cl. 118—645 **8 Claims**



1. A multicolor developing device comprising:

a rotary shaft;

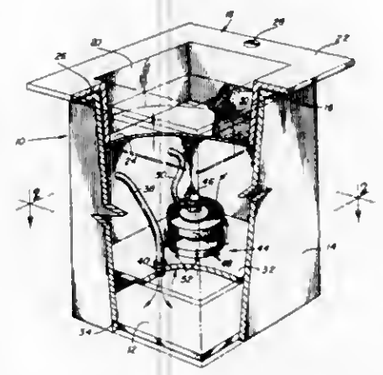
a plurality of developing units each including a magnetic roller and a sleeve and adapted to carry developing particles along the outer periphery of the sleeve, said magnetic roller and sleeve being rotatable relative to each other;

support means for supporting said developing units about the rotary shaft such that said developing units are located radially equidistantly with respect to the axis of rotation of said rotary shaft and are spaced a predetermined distance apart from one another;

a drive gear mechanism comprising a first gear mounted coaxially on the rotary shaft by means of a bearing and adapted to engage in driving relation with either the magnetic roller or the sleeve of the respective developing units, and a clutch adapted to lock the first gear with respect to said rotary shaft; and

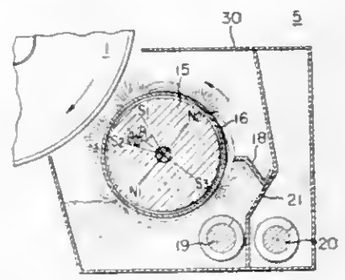
braking means for stopping the rotation of said rotary shaft.

4,030,446
DIRECTED FLOW IONIZATION CHAMBER IN ELECTROSTATIC COATING
Allan V. Karr, Stratford, Conn., assignor to Electrostatic Equipment Corporation, New Haven, Conn.
Filed Apr. 30, 1976, Ser. No. 682,183
Int. Cl.² B05B *5/02*
U.S. Cl. 118—654 **6 Claims**



1. Electrostatic fluidized bed coating apparatus comprising, in combination: a housing having a porous support member mounted therein to define within said housing a fluidization chamber thereabove in a plenum therebelow; electrode means having multiple charge-concentrating portions thereon; and means for directing air in a flow path conforming substantially to the form of and into contact with said charge-concentrating portions of said electrode means, to thereby ionize the air, said electrode means and said air-directing means being so disposed as to pass air through said plenum in a flow path from said directing means, into contact with said electrode means, and upwardly through said support member and into said coating chamber, whereby the resultant ionized air may be used to charge and fluidize a particulate coating material supported in said coating chamber on said support member.

4,030,447
DEVELOPING DEVICE
Toru Takahashi, Tokyo; Kimio Nakahata, Kawasaki, and Hidejiro Kadowaki, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Oct. 7, 1975, Ser. No. 620,402
Claims priority, application Japan, Oct. 10, 1974, 49-116899
Int. Cl.² G03G *15/09*
U.S. Cl. 118—658 **13 Claims**



1. A device for developing latent images comprising:

means for supporting a surface having a latent image to be developed;

a container for containing developer therein;

magnetic means supported in said container for producing magnetic fields, said magnetic means having adjacent magnetic poles of identical polarity disposed at a developing position opposed to said surface to be developed, wherein said adjacent poles are vertically spaced; and

a non-magnetic member interposed between said surface to be developed and said magnetic field producing means, said non-magnetic member being movable relative to said magnetic field producing means to convey the developer, attracted thereto by said magnetic fields, from said container to said developing position in magnetic brush form of sufficient height at the developing position to contact said surface, wherein said adjacent poles of identical polarity produce a field therebetween which repels the conveyed developer from the surface of the non-magnetic member at the developing position, and wherein said non-magnetic developer conveying member is disposed to move downwardly at said developing position so that the force of gravity aids the repelling force of the magnetic field between said identical poles to project the developer onto said surface.

4,030,448
CAT LITTER DISPENSING CONTAINER
Judi Nuttall, 1722 Union Blvd., Allentown, Pa. 18103
Filed Apr. 13, 1976, Ser. No. 676,430
Int. Cl.² A01K *23/00*
U.S. Cl. 119—1 **4 Claims**

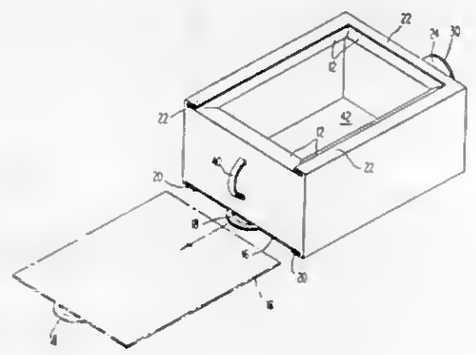
1. A container for cat waste dispensing, comprising:

a. means forming a chamber for containing the cat waste, said means having a plurality of openings communicating with said chamber;

b. closure means for each of said openings;

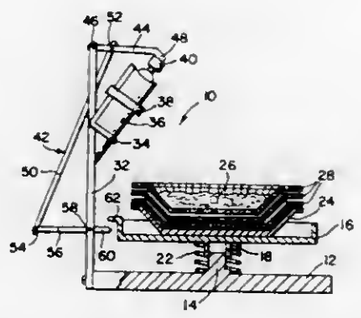
c. means for engaging said closure means and retaining them with respect to each of said openings to seal off said chamber, said closure means being readily removable to open said chamber and provide access thereto; and

d. said container having an extension forming a narrow neck portion providing a conduit communicating with said



chamber, one end of said extension providing one of said openings.

4,030,449
PET LITTER DEODORIZING APPARATUS
Roy M. Ruddick, and Marie T. Ruddick, both of P.O. Box 1627, Crystal River, Fla. 32629
Filed May 19, 1976, Ser. No. 687,652
Int. Cl.² A01K 29/00
U.S. Cl. 119—1 2 Claims



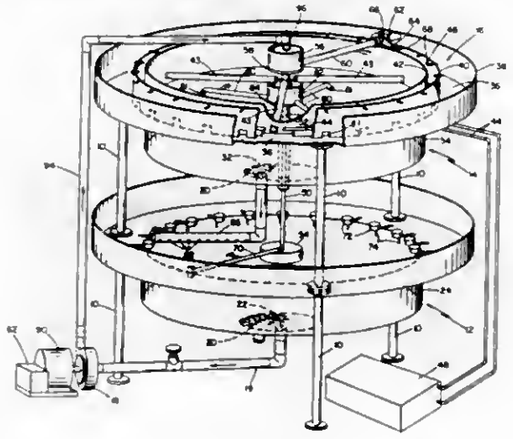
1. Apparatus for deodorizing a pet litter comprising: a base; a platform mounted on said base for vertical movement; spring means acting between said platform and said base for urging said platform to an upper position, said platform adapted to move to a lower position in response to the application of the weight of a pet to said platform, said platform being adapted to carry a pet litter pan thereon; a support projecting upward from said base means on said platform for carrying an aerosol container of deodorant with the actuating valve and nozzle assembly of said container aimed for spraying said deodorant toward said platform; a linkage means carried by said support for actuating said valve and nozzle assembly in response to upward movement of said platform from the lower to the upper position, said linkage means including a feeler adapted to engage said platform when said platform is in a position intermediate said upper and lower positions.

4,030,450
FISH RAISING
David P. Hoult, Wellesley, Mass., assignor to American Fish Company, Wellesley, Mass.
Continuation of Ser. No. 482,751, June 24, 1974, abandoned.
This application July 3, 1975, Ser. No. 592,733
Int. Cl.² A01K 61/00
U.S. Cl. 119—3 23 Claims

17. A method of raising food fish over a period of months comprising the steps of:

continuously maintaining said fish for a period of months in a generally uniform volume of water in a tank of uniform volume

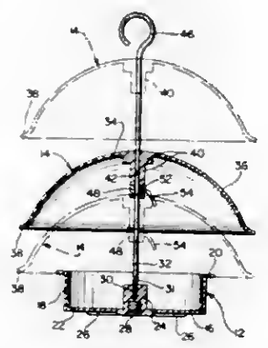
periodically intermittently recirculating said water by removing it from said tank and reintroducing it into said tank in a generally closed system by causing it at intervals



periodically intermittently to flow in said system for increasing lengths of time within said intervals over said period of months as said fish grow in size and

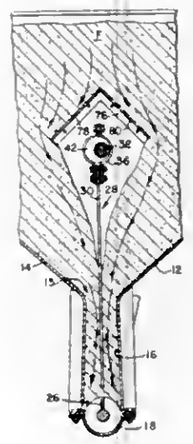
feeding said fish an increasing quantity of food at said intervals over said period of months as said fish grow in size.

4,030,451
BIRD FEEDER
Isobel Miller, Greenville, N.H., assignor to Droll Yankees, Inc., Foster, R.I.
Filed Dec. 1, 1975, Ser. No. 636,553
Int. Cl.² A01K 39/00
U.S. Cl. 119—51 R 6 Claims



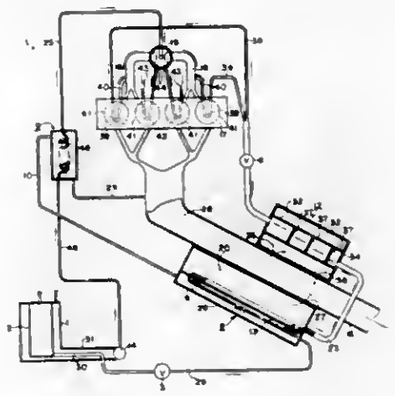
4. A bird feeder and the like comprising a generally circular dish member for receiving feeder material having a base and upstanding sides terminating in a peripheral portion, a rigid rod secured to said base and extending upwardly therefrom, a generally dome-shaped rigid hood member slidably mounted on said rod and means for adjustably positioning said hood member on said rod so that the lower peripheral edge of said hood member may be elevated with respect to said dish peripheral portion or it may be selectively lowered to a position wherein said edge is level with or lower than said peripheral portion, the diameter of said hood peripheral edge being substantially greater than the diameter of said dish, whereby when the lower peripheral edge of said hood member is approximately level with or slightly below said dish peripheral portion, sufficient space exists therebetween for small birds to gain feeding access to said dish member.

4,030,452
FEED DISPENSING HOPPER
Everett M. Keen, and Anthony J. Siciliano, both of Vineland, N.J., assignors to Diamond International Corporation, New York, N.Y.
Filed Oct. 28, 1975, Ser. No. 626,178
Int. Cl.² A01K 5/02
U.S. Cl. 119—52 B 7 Claims



1. A feed dispensing hopper apparatus of the traveling or mobile type for simultaneously dispensing feed into a plurality of feed troughs comprising a plurality of feed discharge outlets spaced apart from each other along a base of a hopper, feed conveying means for simultaneously conveying feed to and out through said outlets, means facilitating the funnelling of feed under gravity toward said conveying means, and means for preventing compacting of feed in the vicinity of said means facilitating the funnelling of feed, said means facilitating the funnelling of feed including downwardly converging wall portions of said hopper apparatus, and said means for preventing compacting of feed including a mouth at the lower end of said downwardly converging wall portions and downwardly diverging extensions from said wall portions down from said mouth whereby feed will tend to descend down to and past said mouth and thereafter will tend to spread out upon descending down past said mouth, said downwardly diverging extensions extending for a significant distance beyond said mouth, said conveying means being located at the bottom of said diverging extensions and just above said base, an agitator supported above said means facilitating the funnelling of feed and extending down through said mouth, between said diverging extensions to just above said feed conveying means, a rotatable shaft extending between upper ends of said downwardly converging wall portions and across other opposite walls of said hopper, a plurality of bearing members fixed on said shaft in eccentric relationship thereto, with said bearing members supporting said agitator in both a suspended and a sliding relationship thereto as said bearing members are rotated with said shaft whereby said agitator is raised and lowered with respect to said shaft by said bearing members, a canopy having at least two downwardly inclined or diverting sides extending at least partly around said shaft and over said agitator, and power transmission means for simultaneously driving said conveying means and said shaft on which said agitator is suspended.

4,030,453
METHOD OF WATER ADMIXING TO FUEL OIL FOR AN INTERNAL COMBUSTION ENGINE AND APPARATUS THEREFOR
Takeshige Sugimoto, 537, Higashikawa, Tosayama, Tosa, Kochi, Japan
Filed Oct. 31, 1975, Ser. No. 627,882
Claims priority, application Japan, July 16, 1975, 50-86206
Int. Cl.² F02B 43/08; F02D 19/00; F02M 31/00
U.S. Cl. 123—3 12 Claims



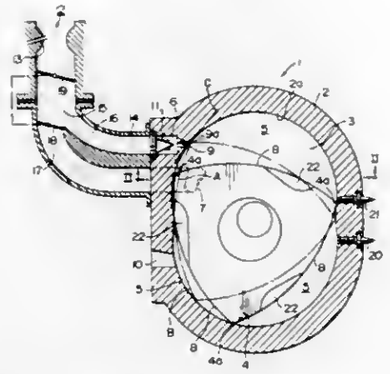
1. In a method for combusting a fuel air mixture in a combustion chamber of an internal combustion engine, the improvement which comprises reducing the amount of fuel consumption necessary for running the internal combustion engine by admixing superheated water vapor which is free of water particles of relatively large sizes with the fuel and air mixture, said superheated water vapor being produced by first heating water in at least one stage at temperatures sufficient to convert it into water vapor and ultimately contacting this water vapor with the heated cylinder head of the internal combustion engine by means of communicating passageways provided in the walls of said heated cylinder head to convert the water vapor to superheated water vapor which is in the state of at least being partially cracked such that the water molecules are partially decomposed to hydrogen plus other gases, separately heating fuel and air at predetermined temperatures to produce vaporized fuel and hot air, mixing the separated heated superheated water vapor, hot air and vaporized fuel and combusting the gaseous mixture thus-formed in the combustion chamber under controlled combustion conditions.

9. In an apparatus for obtaining a fuel mixture to be fed into a combustion chamber of an internal combustion engine, the improvement which comprises water supply means for connecting the water to heating devices, which heating devices are heated by means of the exhaust gases of the internal combustion engine at temperatures sufficient to convert the water to steam, one of said heating devices being such that it contains a plurality of porous metallic catalytic gratings in series having a strong affinity for oxygen by which the steam may be passed therethrough, said gratings being capable of being heated to a red hot state by the exhaust gases so that they serve as a filter to remove the larger droplets of water and part of the oxygen from the steam by a catalytic action, means for transporting the steam to the heated cylinder head of the internal combustion engine, whereby the steam enters the cylinder head by passageways in the walls of the cylinder head and is converted to superheated steam which is in the state of at least being partially cracked such that the water molecules are partially decomposed to hydrogen and other gases, means for heating fuel oil and air separately in a heating device utilizing the exhaust gas of the internal combustion engine as the heat source to produce vaporized fuel and hot air, means for admixing the superheated steam, vaporized fuel and hot air thus-separately heated and means for transferring the gaseous mixture into the internal combustion chamber.

4,030,454
ROTARY PISTON ENGINES

Kenichi Yamamoto; Yutaka Kirose, and Tooru Maeda, all of Hiroshima, Japan, assignors to Toyo Kogyo Co., Ltd., Hiroshima, Japan

Filed Dec. 11, 1975, Ser. No. 639,705
Claims priority, application Japan, Feb. 28, 1975, 50-25480; Feb. 28, 1975, 50-25481; Apr. 1, 1975, 50-40032; Sept. 29, 1975, 50-118092
Int. Cl.² F02B *53/00*
U.S. Cl. 123—8.45 **12 Claims**



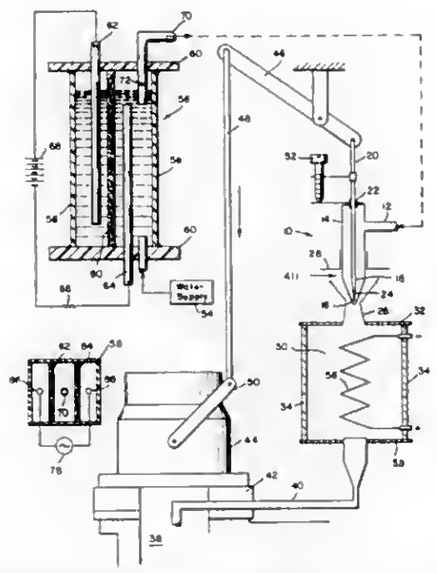
1. Rotary piston engines which comprise a casting including a rotor housing having an inner wall of a multi-lobed trochoidal configuration and a pair of side housings secured to the opposite sides of the rotor housing to define therein a cavity of multi-lobed trochoidal configuration, and a substantially polygonal rotor disposed in said cavity for rotation with apex portions in sliding engagement with the inner wall of the rotor housing so that working chambers of variable volume are defined between the inner wall of the rotor housing and flanks of the polygonal rotor, first intake port means formed in said rotor housing, second intake port means formed in at least one of said side housings and having an effective area which is larger than that of the first intake port means, intake passage means including main passage means, first branch passage means connected at one end to said main passage means and at the other end to said first intake port means, and second branch passage means connected at one end to said main passage means and at the other end to said second intake port means, fuel supply means for supplying fuel to said main passage means, throttle valve means disposed in said main passage means, control valve means disposed in said second branch passage means, control means for closing said control valve means when the opening of said throttle valve means is below a first predetermined value and opening it when said opening of the throttle valve means is above said first predetermined value so that fuel is supplied to said working chamber only through said first intake port means when the opening of said throttle valve means is below said first predetermined value.

4,030,455
ANTIPOLLUTION CARBURETOR DEVICE FOR INTERNAL COMBUSTION ENGINES

Philippe F. Van Eeck, 11827 Kearsarge St., Los Angeles, Calif. 90049

Continuation-in-part of Ser. No. 366,270, June 4, 1973, abandoned. This application Sept. 3, 1974, Ser. No. 502,716
Int. Cl.² F02D *19/12*
U.S. Cl. 123—25 E **23 Claims**

1. In an internal combustion engine, the improvement in improving the combustion of a hydrocarbon fuel-air mixture in the engine comprising means for defining a water-soluble catalytic agent and means for supplying water with said catalytic agent means dissolved therein from a source to the fuel-air mixture prior to supply thereof to the engine for enhancing

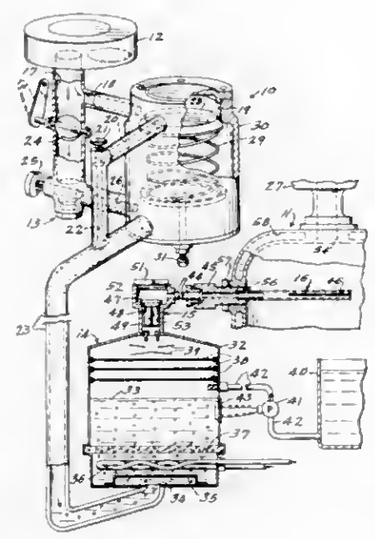


combustion of said hydrocarbon fuel and for controlling the products of combustion thereof.

4,030,456
VAPOR INJECTOR FOR INTERNAL COMBUSTION ENGINES

Daniel J. M. Corpus, 7181 Ridgedale Lane, Lambertville, Mich. 48144

Filed Nov. 5, 1975, Ser. No. 629,096
Int. Cl.² F02D *19/00*
U.S. Cl. 123—25 B **6 Claims**

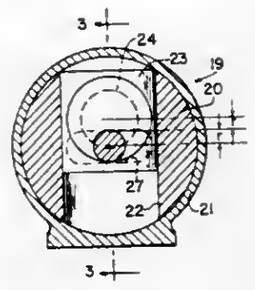


1. An improved vapor injector for an internal combustion engine comprising, in combination, nozzle means for injecting vapor into the engine, means for generating vapors for injection into the engine, means for drawing air through said vapor generating means whereby such air becomes mixed with vapors, means for supplying such air-vapor mixture to said nozzle means, said vapor generating means including housing means for holding a body of vapor generating liquid, means for supplying air to the bottom of such body of liquid, such air bubbling upwardly through such body of liquid, means for heating such liquid and air as such air bubbles upwardly and such liquid and porous means for dispersing such air into small bubbles as such air bubbles upwardly in such liquid, and valve means for controlling the flow of air to said vapor generating means in response to the load requirements of the engine, wherein said valve means includes first and second separate air passages between an air inlet and said vapor generating means, needle valve means for limiting air flow through said first passage, throttle valve means for controlling air flow through said second passage, and means for controlling said throttle valve means along with an engine control throttle whereby said second passage is substantially closed when the engine throttle is closed and said second passage is opened as the engine throttle is opened.

4,030,458
ROTARY PISTON ENGINE

August Uno Lamm, 365 Moseley Road, Hillsborough, Calif. 94010

Continuation of Ser. No. 383,802, July 30, 1973, abandoned, and a continuation-in-part of Ser. No. 264,807, June 21, 1972, Pat. No. 3,799,035, which is a continuation of Ser. No. 878,637, Nov. 21, 1969, abandoned. This application Jan. 29, 1975, Ser. No. 544,870
Int. Cl.² F02B *57/02*
U.S. Cl. 123—44 D **5 Claims**

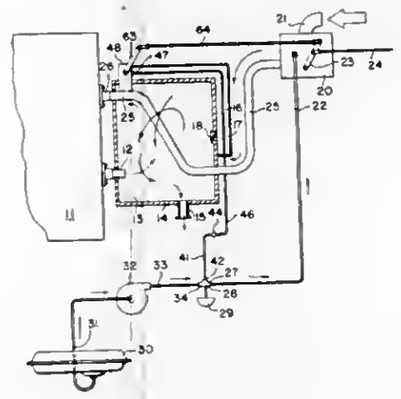


1. A rotating piston engine comprising the combination of: a stator; a rotor mounted in the stator for rotation about a first axis; means forming a cylinder in the rotor and having its longitudinal axis perpendicular to said first axis; a crankshaft having a first crank with a given throw radius; the crankshaft being mounted in the stator for rotation about a second axis parallel with the first axis and spaced therefrom a distance equal to the throw radius; means forming an elongate opening in said rotor to allow free entry of said crankshaft into said cylinder means, said opening having a length extending laterally of the cylinder and a width extending lengthwise thereof; said crankshaft including an entry portion projecting through said opening means, said entry portion having a cross section which extends from the rotational axis of the shaft more in other directions than towards the axis of said first crank, said entry portion cross section being sized commensurate with the width of the opening for movement along its length.

4,030,457
VAPOR CARBURETOR

Peter Hawryluk, Saskatoon, Canada, assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Oct. 21, 1975, Ser. No. 624,534
Int. Cl.² F02M *13/02*
U.S. Cl. 123—34 A **1 Claim**



1. A fuel feed system for an internal combustion engine which selectively heats the fuel supply line and the air supply line prior to mixture of the fuel air intake of the engine, comprising

an internal combustion engine fitted with a carburetor fed by a first fuel line from a fuel pump and an air intake, joined to a fuel-air engine intake pipe,

a first chamber, the interior of which is supplied by exhaust gas from said engine, with the said fuel-air intake pipe led through said first chamber to the intake duct of said engine.

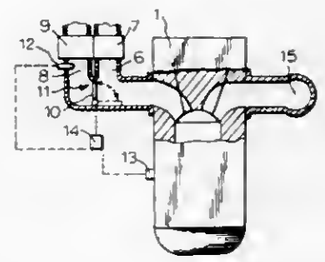
a second fuel line joined by a valve to the first fuel line by a remote-controlled valve which serves to channel the flow of fuel from the fuel pump alternately into said first fuel line or into said second fuel line,

a second chamber, the interior of which is joined by thermostatic valve control means to the interior of the first chamber, with the said second fuel line led through said second chamber to a regulating valve joining said second fuel line to the fuel-air intake pipe at a location adjacent the outlet end of said first fuel line in said first chamber, such that air in the fuel-air intake pipe may be heated independently and at a different temperature from the fuel in the second fuel line and such that fuel in the second fuel line and such that fuel in the second fuel line will be admitted into the fuel-air intake pipe through the regulating valve after both the fuel and the air have been independently heated.

4,030,459
MULTICYLINDER ENGINE

Kenji Hori, Nagaokakyo, and Shigeo Nakamura, Joyo, both of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 29, 1975, Ser. No. 645,296
Int. Cl.² F02B *75/18, 75/10*
U.S. Cl. 123—52 M **9 Claims**



1. Multicylinder engine, characterized in that it comprises a cylinder for over-concentrated mixed gas and a cylinder for under-concentrated mixed gas, a suction manifold for over-concentrated mixed gas, of which one end is connected with a forming device for over-concentrated mixed gas to supply the mixed gas to said cylinder for over-concentrated mixed gas, a suction manifold for under-concentrated mixed gas, of which one end is connected with a forming device for under-concentrated mixed gas to supply the mixed gas to said cylinder for under-concentrated mixed gas, a manifold communicating

hold provided between said two suction manifolds, an opening and closing valve provided in said communication hole, and a detector for detecting the speed of revolution of the engine and a detector for detecting the negative pressure of the manifold to operate said valve, wherein said valve is opened to open said communication hole when the engine is operating at a heavy load or at a high rotational speed.

4,030,460
IGNITION TIMING CONTROL APPARATUS FOR INTERNAL COMBUSTION ENGINE

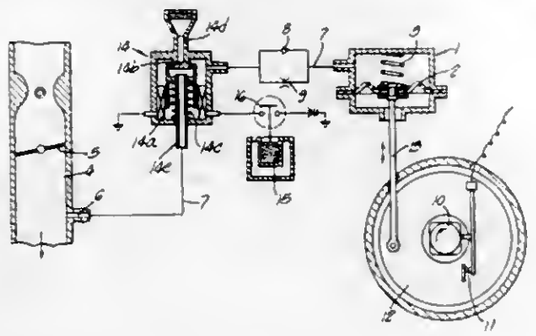
Minoru Tanaka, Chofu, and Syoichi Otaka, Saitama, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 21, 1975, Ser. No. 634,154

Claims priority, application Japan, Nov. 28, 1974, 49-143093[U]

Int. Cl.² F02P *5/14*

U.S. Cl. 123—117 A **2 Claims**



1. For use with an internal combustion spark ignition engine connected to drive a vehicle through an automatic transmission having a torque converter or fluid coupling, the engine including an intake passage, a throttle valve in said intake passage, and a distributor having a movable spark adjusting base, ignition timing control apparatus for the engine comprising, in combination: a vacuum actuator having a movable wall connected to the spark adjusting base, a spring urging said movable wall toward a spark advance position, an increase of vacuum intensity in said vacuum actuator moving said movable wall toward a spark retard position against said spring, a conduit connecting the vacuum actuator to said intake passage of the engine downstream from said throttle valve, a selector valve in said conduit having a valve element movable to connect the vacuum actuator to either the engine intake passage or to atmosphere, a member responsive to engine temperature connected to operate the selector valve to cause said vacuum actuator to be connected to atmosphere when the engine temperature is below a predetermined value or to cause said vacuum actuator to be connected to the intake passage downstream from the throttle valve when the engine temperature is above said predetermined value, a check valve and a restricted orifice mounted in parallel in said conduit between the selector valve and the vacuum actuator, said check valve permitting flow through the conduit from the vacuum actuator but preventing reverse flow, whereby a reduction of vacuum intensity in the engine intake passage when the engine is warm causes said check valve to close and causes the restricted orifice to delay advance of the ignition timing, but an increase of vacuum intensity in the engine intake passage causes an immediate retarding of the ignition timing.

4,030,461
INTERNAL COMBUSTION ENGINE DEVICE

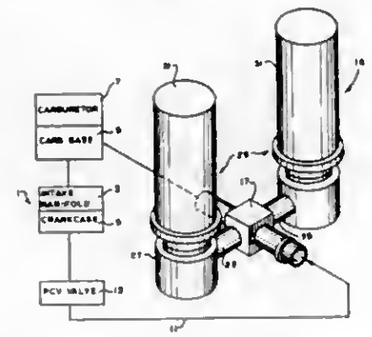
Melvin L. Polette, 2223 Wilding Drive, Overland, Mo. 63114

Filed Apr. 29, 1976, Ser. No. 681,453

Int. Cl.² F02M *25/06*

U.S. Cl. 123—119 B **9 Claims**

1. In an internal combustion engine system including an air inlet manifold, a carburetor for admitting air to the manifold, a crankcase, a tubular connection from the crankcase to deliver gases from the crankcase to the inlet of the engine, said tubular connection having in it a pollution control valve, the improvement comprising a device connected in the tubular connection between the pollution control valve and the inlet,



said device including restriction means connected in series in said tubular connection between said pollution valve and said inlet; a closed valve chamber; passage means between said restriction and said closed valve chamber; and balanced movable valve means for variably restricting said passage means.

4,030,462
AIR-FUEL RATIO CONTROLLER FOR INTERNAL-COMBUSTION ENGINE

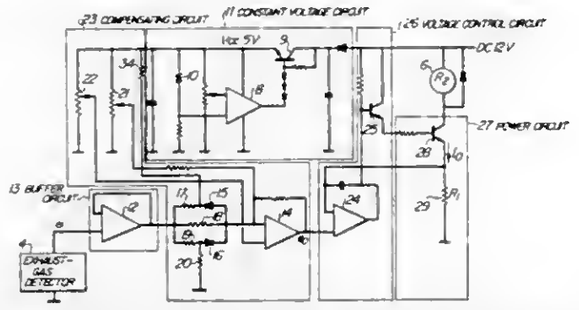
Takao Sasayama, Hitachi, and Torazo Nishimiya, Mito, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Mar. 5, 1976, Ser. No. 664,383

Claims priority, application Japan, Mar. 10, 1975, 50-28057

Int. Cl.² F02N *3/00*

U.S. Cl. 123—119 EC **5 Claims**



1. An air-fuel ratio controller for an internal-combustion engine comprising air-fuel mixture supply means for changing the air-fuel ratio of the mixture being fed to the engine in response to an input signal, means for conducting the air-fuel mixture from the supply means to the engine cylinders, catalyst means for removing harmful constituents from the exhaust gases, an exhaust pipe for conducting the exhaust gases from the engine to the catalyst means, a detector installed on the exhaust pipe to detect the conditions of the exhaust gases, said detector having output characteristics such that, centering around a first range of actual air-fuel ratio of the mixture being fed to the engine, there are a first region where the output sharply varies away from either side of the first range and a second region where the variation in output is moderate a certain value away from the first range, means for outputting a first signal inversely proportional to the rate of output variation relative to the first region of air-fuel ratio in the output characteristics of the detector, means for outputting a second signal inversely proportional to the rate of output variation relative to the second regions of air-fuel ratio in the output characteristics of the detector, said first and second signal outputting means both serving as means for compensating the output of the detector, first connector means for connecting the output of the detector with the inputs of the first and second signal outputting means which serve the compensating means, and second connector means for applying the output of the compensating means to the input of the air-fuel mixture supply means.

4,030,463
INTERNAL COMBUSTION ENGINE WITH RETURN LINE FOR EXHAUST GASES

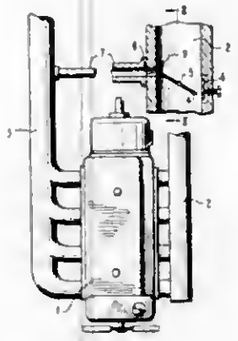
Jurgen Frey, Stuttgart; Andreas Weber, Lorch, and Adolf Triffterer, Nurtingen, all of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed Aug. 2, 1974, Ser. No. 494,761

Claims priority, application Germany, Aug. 4, 1973, 2339626

Int. Cl.² F02M *25/06*

U.S. Cl. 123—119 A **19 Claims**



1. An internal combustion engine with a return line for returning exhaust gases from an exhaust system of the engine to an inlet line provided with a throttle valve means, the inlet line being provided with a control cross-section for controlling the exhaust gas quantity to be conducted back into the engine, the control cross section being disposed upstream of the throttle valve means with a closed and substantially closed throttle valve and being disposed downstream of the throttle valve means with an open throttle valve means, characterized in that the return line means terminates in a control orifice disposed in the control cross section of the inlet line, the control orifice directly supplying the exhaust gases from the exhaust system to the inlet line such that with a slightly open throttle valve means corresponding to a partial load of the engine the exhaust gases from the exhaust system are supplied from said control orifice directly into the control cross-section of the inlet line whereby the exhaust gases are intermixed with inlet gases at the throttle valve means with the quantity of the exhaust gas flow into the control cross-section being solely determined by the position of the throttle valve means and the configuration of the control orifice.

4,030,464
FUEL-AIR MIXTURE HEATING DEVICE FOR USE WITH INTERNAL COMBUSTION ENGINE

Shunzo Yamaguchi, Nishio; Tadashi Ozaki, Gamagori, and Toshiaki Konomi, Susono, all of Japan, assignors to Nippon Soken, Inc., Nishio and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, both of, Japan

Filed Nov. 27, 1974, Ser. No. 527,762

Claims priority, application Japan, Dec. 7, 1973, 48-137175; Apr. 23, 1974, 49-46150

Int. Cl.² F02M *31/00*

U.S. Cl. 123—122 AC **12 Claims**

1. In an internal combustion engine including an intake pipe and an exhaust pipe,

a system for heating the intake pipe of the internal combustion engine comprising:

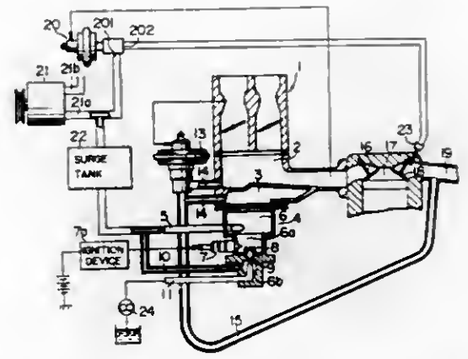
a combustion equipment disposed adjacent to said intake pipe for heating the same, and including a combustion chamber for burning an air-fuel mixture therein, and an ignition device disposed in said combustion chamber for igniting the air-fuel mixture;

air supply means for supplying air to said combustion equipment;

fuel supply means for supplying fuel to said combustion equipment, the amount of fuel being in proportion to the amount of air supplied to said combustion equipment;

pipe means provided between said intake pipe of said internal combustion engine and said combustion equipment for operatively communicating said combustion equipment with said intake pipe; and

valve means disposed in said pipe means for opening the passage of said pipe means to thereby communicate said



combustion equipment with said intake pipe and for keeping the pressure in said combustion chamber around atmospheric pressure to enable the stable combustion of said air-fuel mixture in said combustion chamber, said valve means responding to at least one of the parameters representing the operating conditions of said internal combustion engine to control the opening degree of said passage, whereby the amount of burned gas in said combustion equipment to be supplied to said intake pipe through said pipe means is controlled to enable the optimum combustion of the air-fuel mixture in said combustion equipment.

4,030,465
MULTI-CYLINDER INTERNAL COMBUSTION ENGINE

Tatsuro Nakagami, Kyoto, and Yuhiko Kiyota, Nagaokakyo, both of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 26, 1976, Ser. No. 718,196

Claims priority, application Japan, Oct. 22, 1975, 50-127806

Int. Cl.² F02M *13/06*

U.S. Cl. 123—127 **14 Claims**

1. A multi-cylinder internal combustion engine comprising:

a. a plurality of cylinders;

b. a carburetor for feeding a lean gaseous mixture of fuel and air to said plurality of cylinders and having an air intake with a Venturi portion and a throttle valve therein;

c. an intake manifold having branches connected between said carburetor and said cylinders for distributing the lean gaseous mixture from said carburetor to all said plurality of cylinders; and

d. fuel adding means for feeding a rich gaseous mixture of fuel and air to some of said branches of said intake manifold, said fuel adding means having:

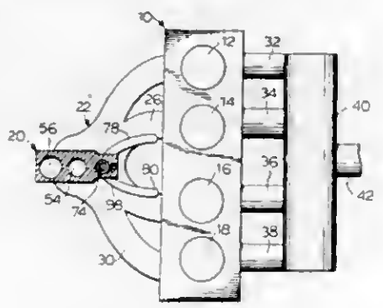
d_1. an air passageway device having an upstream end and having an orifice at said upstream end communicated with the atmosphere and having a downstream end communicated with the manifold branches for said some of cylinders;

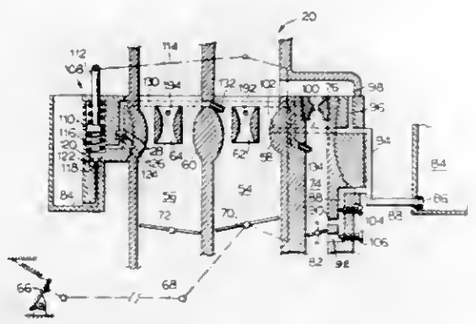
d_2. a throttle valve device in said air-passageway device between the upstream end and the downstream end;

d_3. a fuel feed passageway communicated with said air passageway device both on the upstream side and on the downstream side of said throttle valve device;

d_4. a fuel source connected to said fuel feed passageway; and

d_5. an air passageway connected between a middle por-





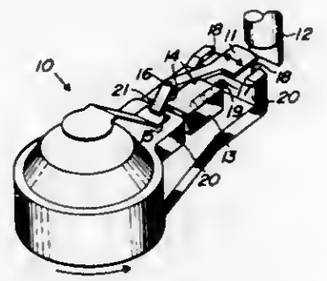
tion of said fuel feed passageway and the Venturi portion of said carburetor.

4,030,466

SYNCHRONOUS ROTOR INDEXING MECHANISM

Melvin Arthur Lace, Prospect Heights, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 31, 1974, Ser. No. 537,748
Int. Cl.² F22B *7/06*
U.S. Cl. 123—146.5 A **1 Claim**



1. In a voltage distribution system of an internal combustion engine, the engine having spark plugs and a crankshaft, the distribution system having a housing, a device for synchronously indexing the distribution system, the device comprising:

a shaft rotatable in response to the rotation of the crankshaft of the combustion engine,

an insulating element fixedly mounted on the shaft,

contact means comprising a contact arm pivotably mounted on the insulating element for supplying high voltage pulses and having an outer end free,

a multiplicity of terminal means for receiving the high voltage pulses, the terminal means being mounted in the housing of the distribution system and being connected to the spark plugs,

a weight mounted on the insulating element for radial motion outward under centrifugal force and adapted to coact with a portion of the contact means, causing the contact means to advance relative to the insulating means, and wherein said contact portion and said weight comprise a rack-and-pinion mechanism for causing the contact arm to coact with the weight; and

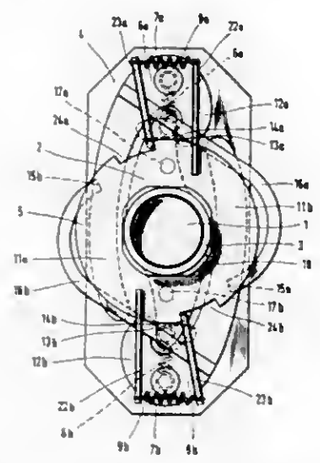
yielding means to oppose the outward motion of the weight, whereby the high voltage pulses are indexed to the proper terminal means at the firing time of time of the high voltage pulses for efficiently firing the combustible mixture in an engine cylinder.

4,030,467

CENTRIFUGAL ADJUSTING MECHANISM FOR IGNITION INTERRUPTERS OF INTERNAL COMBUSTION ENGINES

Ekkehard Schild, Ingolstadt, Germany, assignor to Bayerische Motoren Werke Aktiengesellschaft, Germany

Filed Aug. 4, 1975, Ser. No. 601,662
Claims priority, application Germany, Aug. 16, 1974, 2439366
Int. Cl.² F02P *5/06*
U.S. Cl. 123—146.5 A **11 Claims**



1. A centrifugal force adjusting mechanism for ignition contact breakers of internal combustion engines, which includes a plurality of co-axial main structural parts rotatable with respect to one another and flyweights operative to rotate said main structural parts against spring forces to effect advance and delay adjustment in a plurality of rotational speed ranges, characterized by a pair of said flyweights supported at a first of said main structural parts, each flyweight of said pair having first abutment surface means being in driving abutment against first counter surface means on a second of said main structural parts in at least a first rotational speed range to effect relative rotation of said main structural parts in a first direction of adjustment, and each flyweight of said pair being associated with second abutment surface means adapted to drivingly abut second counter surface means on a third of said main structural parts only in a second rotational speed range to effect relative rotation of said main structural parts in a second opposite direction of adjustment.

4,030,468

IGNITION SYSTEM FOR INTERNAL COMBUSTION ENGINES

Noboru Sugiura, Ibaraki; Yasunori Mori, Hitachi, and Seiji Suda, Mito, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Mar. 18, 1976, Ser. No. 667,952
Claims priority, application Japan, Apr. 2, 1975, 50-39154
Int. Cl.² F02P *1/00*
U.S. Cl. 123—148 E **6 Claims**

1. In an ignition system for internal combustion engines comprising:

an ignition coil having at least a primary winding,

a first transistor with a base, collector and emitter,

a direct potential source,

impedance means,

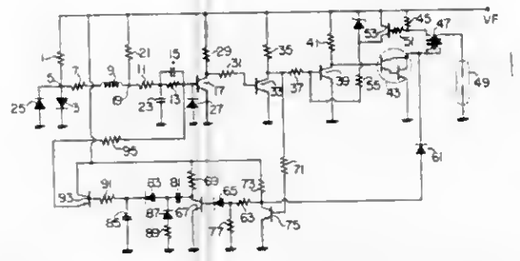
first connecting means for connecting said primary winding

of the ignition coil, said collector and emitter of said first transistor and said impedance means in series across said direct source,

means for producing an alternating signal voltage in synchronism with an engine rotation,

first control means having a predetermined operating voltage level for controlling the base current of said first transistor on the basis a relationship between the operating voltage level and the alternating signal voltage, and

second control means for controlling the base current of said first transistor in response to a voltage across said impedance means to suppress primary current of said ignition coil to a predetermined value, the improvement which comprises



first detecting means for detecting a duration during which said first transistor operates in a non-saturated region, and

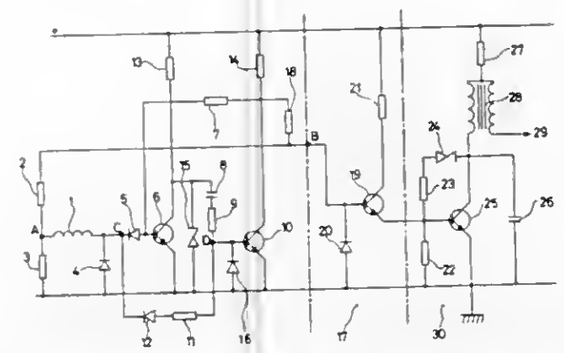
third control means for controlling the relation between the operating voltage level of said first control means and the alternating signal voltage in response to an output of said first detecting means, wherein the operating voltage level of said first control means shifts with respect to the alternating signal voltage in accordance with the non-saturated operating duration of said first transistor, for controlling the conduction starting time for the primary current of said ignition coil so as to decrease the non-saturated operating duration of said first transistor.

4,030,469

ELECTRONIC IGNITION CIRCUIT

Louis Chateau, Rosny-sur-Bois, France, assignor to Ducellier & Cie, Paris Cedex, France

Filed Nov. 26, 1975, Ser. No. 635,359
Claims priority, application France, Dec. 12, 1974, 74.40897
Int. Cl.² F02P *1/00*
U.S. Cl. 123—148 E **5 Claims**



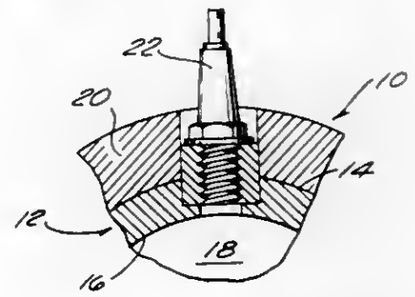
1. An electronic ignition circuit, particularly for the internal combustion engine of a motor vehicle, comprising the combination of a detector winding, a first transistor having its base connected via a first diode to one end of the detector winding, a second diode connecting said one end of the detector winding to an earth, a second transistor connected to control a power output stage for producing spark impulses, first and second resistors in series between a point in the power output stage and earth, the opposite end of the detector winding being connected to the junction of said first and second resistors, a capacitor, third and fourth resistors and a third diode connected in series between the collector of said transistor and said one end of the detector winding, the base of said second transistor being connected to the junction of the third and fourth resistors, and the first, second and third diodes being connected with their cathodes towards said one end of the detector winding whereby, in use, when the voltage at said one end of the detector winding is even weakly negative with respect to that at said opposite end thereof the first transistor is turned off so that said capacitor charges to turn on the second transistor and trigger the power output stage into producing a spark.

4,030,470

LINED ENGINE BLOCK MEMBER INCLUDING A THREADED OPENING AND METHOD FOR PROVIDING SAME

E. Douglas Betts, Gurnee, Ill., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Dec. 12, 1974, Ser. No. 531,920
Int. Cl.² F02F *1/08*
U.S. Cl. 123—193 C **7 Claims**



1. An engine block member defining a portion of a combustion chamber including a liner having an outer surface and an inner surface forming at least a portion of an interior wall of the combustion chamber, first and second concentric apertures in said liner, said first aperture extending entirely through the thickness of said liner from said outer surface to said inner surface, said second aperture having an inner dimension larger than the inner dimension of said first aperture, extending from said liner outer surface, and terminating short of said liner inner surface, an insert fitting tightly inside said second aperture and including an internally threaded opening for threadably receiving a part adapted to communicate with said combustion chamber, and an outer body cast substantially continuously along said liner outer surface and along at least a part of said insert.

4,030,471

OPPOSED PISTON ENGINE

Frank Ginkel, 2611 Reed Road, Escondido, Calif. 92025

Filed Oct. 29, 1975, Ser. No. 626,660
Int. Cl.² F02B *57/00, 75/32*
U.S. Cl. 123—197 R **19 Claims**

1. An internal combustion engine comprising:

a first member including a cylinder,

a second member,

means supporting said members for relative rotation on a transverse axis of said cylinder,

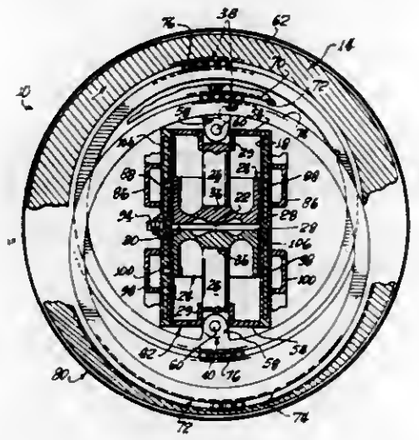
a piston in each cylinder having an outer end extending through one end of the cylinder and an opposite inner end,

each piston being movable in its cylinder through inward compression and outward power strokes and each cylinder containing a combustion chamber at the inner end of the corresponding piston which undergoes contraction during the compression strokes and expansion during the power strokes of the piston,

a circular cam ring surrounding each cylinder endwise with the central axis of the ring parallel to and spaced laterally from said member rotating axis,

bearing means rotatably mounting each cam ring about its circumference on said second member for relative rotation of the ring and second member on the axis of the ring,

means pivotally connecting the outer end of each piston to the corresponding cam ring on a pivot axis parallel to said



member rotation axis and ring axis, whereby reciprocating motion of each piston in its cylinder produces a driving torque on said members tending to drive said members in relative rotation on said member rotation axis, and

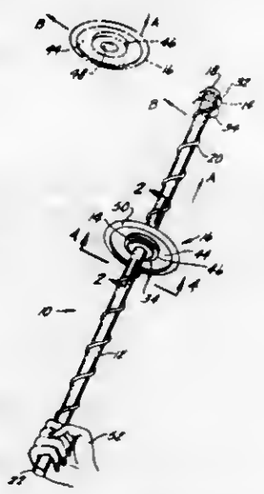
engine actuating means for supplying a combustible medium to said combustion chamber of each cylinder, effecting combustion of the medium in the chamber, and exhausting combustion products from the chamber in timed relation to the strokes of the corresponding piston to drive the latter through its power strokes.

4,030,472

AERIAL TOY AND LAUNCHING STICK APPARATUS

Michael L. Watkins, 12542 Euclid St., Garden Grove, Calif. 92640

Filed June 16, 1976, Ser. No. 696,493
Int. Cl.² F31B *3/04*
U.S. Cl. 124—5 **9 Claims**



1. An aerial toy and launching apparatus which comprises:

a. an elongate toy launching stick having a gripping end and an opposite toy launching end,

said stick being formed with at least major portions adjacent the launching end having a generally uniform cross section and including means defining a generally helical guide about the periphery of the stick along said major portions,

b. a stop disposed at the launching end of the stick and fixed relative thereto,

said stop having portions projecting radially outwardly beyond adjacent surfaces of the stick,

c. a sliding member of generally tubular configuration and having inner dimensions slightly larger than outer dimensions of said major portions of the stick, for permitting sliding therealong, and less than those of the radially projecting portions of the stop, for preventing the member from sliding therepast,

said sliding member including guide following means on inner portions thereof for constraining the member to follow said helical guide and for thereby causing the member to rotate about the stick when the member is slid along the major portions thereof,

d. an aerial toy which includes means defining a generally centrally positioned aperture for permitting the toy to be installed over the sliding member, said aperture being larger than the radially projecting portions of the stop to permit the toy to pass thereby, and

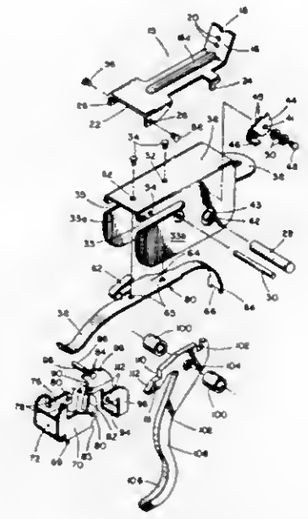
e. mounting means for releasably mounting the toy to the sliding member in a manner causing the toy to move in unison when the member is slid along the major portions of the stick and for then releasing the toy from the sliding member, to cause launching thereof from the stick, in response to the sliding member being abruptly stopped by said stop at the launching end of the stick.

4,030,473

CROSSBOW TRIGGER

John W. Puryear, Tulsa, Okla., assignor to Brunswick Corporation, Skokie, Ill.

Filed June 25, 1975, Ser. No. 590,378
Int. Cl.² F41C *19/00*
U.S. Cl. 124—35 R **10 Claims**



1. In a trigger unit for a crossbow having a biasable bowstring, the trigger unit being capable of being secured to a crossbow stock and having:

a. a U-shaped housing with a top, left and right sides, interior and exterior protions, and forward and rear sections;

b. sight means movably attached to the forward section's exterior portion;

and each of the following pivotably mounted in the housing interior:

c. sear means for releasably holding a bowstring;

d. finger lever means in the rear section of the housing for releasably locking the sear means;

e. safety means for limiting the rotational movement of the finger lever means, the safety means having a safety position notch;

the improvement comprising only one unitary, leaf-type spring, and no coiled springs, for performing the functions in (1), (2), (3), (4), and (5) below and having:

1. a center portion atached to the top of the trigger housing;
2. a first finger portion means extending forward beyond the housing's forward section for clamping a crossbow bolt in a predetermined position on the stock;
3. a second finger portion means extending forward beyond the housing's forward section and folding back upon itself aeross the forward section's exterior portion for continuously biasing the movable sight means;
4. a third finger portion means extending rearward for continuously biasing the finger lever means; and
5. a fourth finger portion means extending rearwardly of the housing for engaging the safety means' safety position notch, whereby accidental disengagement of the safety means is prevented.

6. In a trigger unit for a crossbow having a biasable bowstring, the trigger unit being capable of being secured to a crossbow stock and having:

a. a U-shaped housing with a top, left and right sides, interior and exterior portions, and forward and rear sections;

b. sight means movably attached to the forward section's exterior;

and each of the following pivotably mounted in the housing interior:

c. sear means for holding a bowstring;

d. finger means lever in the rear section for controlling the sear means' movement;

e. safety means for preselectively restraining the firing lever's movement, the safety means having a position notch;

the improvement comprising:

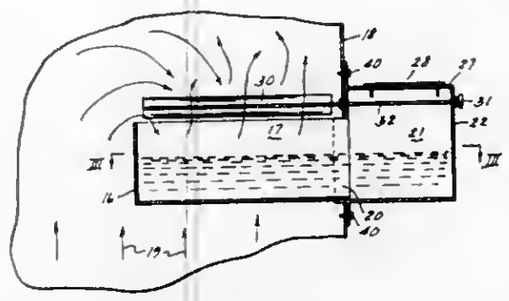
flat bolt stop plate means, on the sear means, for automatically providing a uniform preselected space between the end of a crossbow bolt and a portion of the bowstring, in its biased position, intended to strike the bolt's end when the bowstring is released.

4,030,474

AIR TREATING DISPENSER

Harold Ben Brown, 2951 Village Drive, Marietta, Ga. 30062

Filed Oct. 8, 1975, Ser. No. 620,549
Int. Cl.² F24F *3/14*
U.S. Cl. 126—113 **2 Claims**



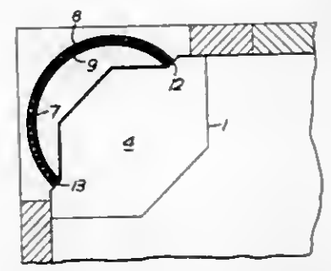
1. An air odor treatment system for buildings comprising: in combination, a forced air temperature treating system including a central air temperature treating unit discharging to a plenum, the plenum discharging to a plurality of air ducts delivering treated air to various areas within a building structure, an evaporation unit carried by the plenum with an open topped evaporation tray interior of the plenum, a reservoir and filling chamber exterior of the plenum, the reservoir having a closable opening thereto located exterior of the reservoir, the tray and chamber being in liquid flow communication through an opening in a wall of the plenum, the tray and chamber at least partially filled with a liquid consisting essentially of a mixture of odorants, odor neutralizers and a hydrocarbon solvent, the mixture being evaporatable within the plenum and having a boiling point above a maximum temperature within the plenum at a normal operation, at least one air control vane positioned interior of said plenum adjacent the open top of said tray, said air control vane being carried by said evaporation unit, means allowing adjustment of the attitude of said vane with respect to the open top of said tray, said means including a manually actuatable control located exterior of said plenum, and said vane effective to vary the evaporation rate of the liquid within the tray by modifying the air flow within the plenum whereby the amount of liquid evaporated into the air discharging from the plenum is controllable within a range by manually repositioning the attitude of the air control vane.

4,030,475

FIREPLACE

Knut Tronstad, Oslo, Norway, assignor to Aksjeselskapet Jotul, Oslo, Norway

Filed Oct. 8, 1975, Ser. No. 620,710
Claims priority, application Norway, Dec. 4, 1974, 744381
Int. Cl.² F24B *7/00*
U.S. Cl. 126—121 **6 Claims**



1. A fireplace insert including a housing defining a fireplace opening, a rear wall opposite said opening, means defining a room behind said rear wall and a vertically extending opening at one end of said room, and a fireplace screen disposed within said room, said screen being movable from a first position substantially wholly disposed within said room and through said room opening to a second position substantially wholly exposed in and substantially wholly closing said fireplace opening, said room being defined by at least one vertically extending wall substantially semi-circular in shape in a longitudinal direction, said fireplace screen lying generally concentrically with the latter wall, said screen in its first position lying substantially wholly behind said rear wall, said rear wall and said one wall being longitudinally spaced one from the other and defining an air duct in said insert for circulation of air.

4,030,476

HEATED CABINET FOR FOOD

Lester R. Hock, Hacienda Heights, Calif., assigoor to Bevles Co., Inc., El Monte, Calif.

Filed Mar. 5, 1976, Ser. No. 664,153
Int. Cl.³ A47G *23/04;* **F24C** *15/18*
U.S. Cl. 126—246 **11 Claims**

1. A cabinet for holding heated food comprising:

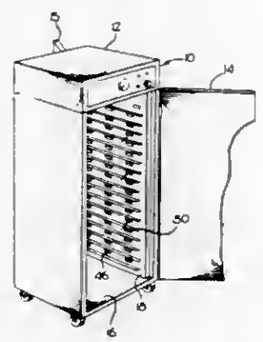
a housing defining an interior;

blower means for circulating air within said interior, coupled to said housing;

heater means coupled to said housing for heating said circulating air; and

closed air distribution means, for directing heated air from said blower means past food in said interior, said distribution means including at least one inlet plenum communicating with said blower means and having a plurality of graduated openings for distributing heated air into said interior, said openings being graduated such that the area

defined by said openings increases with increased distance from said blower means;



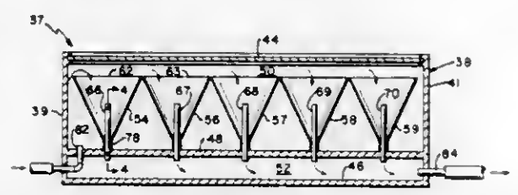
whereby an even distribution of heated air throughout said interior of said cabinet is achieved assuring that all the food in said cabinet is maintained uniformly heated.

4,030,477

SOLAR COLLECTOR WITH CONICAL ELEMENTS

Philip D. Smith, 385 Camelback Road, Pleasant Hill, Calif. 94523

Filed Nov. 20, 1974, Ser. No. 525,583
Int. Cl.² F24J *3/02*
U.S. Cl. 126—270 **3 Claims**



1. A device for collecting energy from a source of radiant energy, including the combination of means forming a conical ray reflecting surface which diverges outwardly from an apex toward a collecting end through which rays of the radiant energy are received, said reflecting surface being adapted to reflect said rays toward a focal axis which extends through the apex, an elongate energy absorbing structure mounted radially within the conical surface and extending along said focal axis, said structure comprising an elongate hollow enclosure having an open front end facing in the direction at which the reflecting surface diverges and an open rear end facing in the direction of the apex, said structure including an outer surface adapted to absorb the radiant energy of said reflected rays, a plurality of cells mounted within the enclosure, said cells having a hexagonal cross-sectional configuration whereby the plurality of cells forms a honeycomb-type structure with common sidewalls of adjacent cells forming a side of the hexagonal configuration, each of said cells being defined by radiant energy absorbing and thermal energy conducting sidewalls with the cells extending along parallel axes longitudinally of the enclosure between open front and rear ends through which fluid is directed, and means to direct a fluid in heat exchange relationship with the energy absorbing structure to absorb thermal energy by receiving thermal energy by convection from the enclosure.

4,030,478

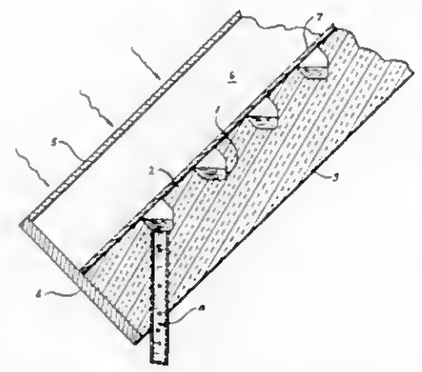
SOLAR ENERGY COLLECTORS

Emil Routzong Beaver, Jr., 4148 S. Crane Road, Tipp City, Ohio 45371

Filed Apr. 15, 1976, Ser. No. 677,493
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 **4 Claims**

1. In a solar heat exchanger, the combination comprising:

a. base member of insulating material having an upper surface for frontwardly facing the sun,
b. a circuitous grooved pathway formed in said upper surface of the base member,
c. said grooved pathway having side walls disposed substantially normal to said upper surface and sloping bottom wall portions joined to the lower parts of the side walls, said bottom wall portions intersecting at substantially the central portion of the grooved pathway, whereby the rays impinging on said walls and wall portions are generally redirected into said pathway,



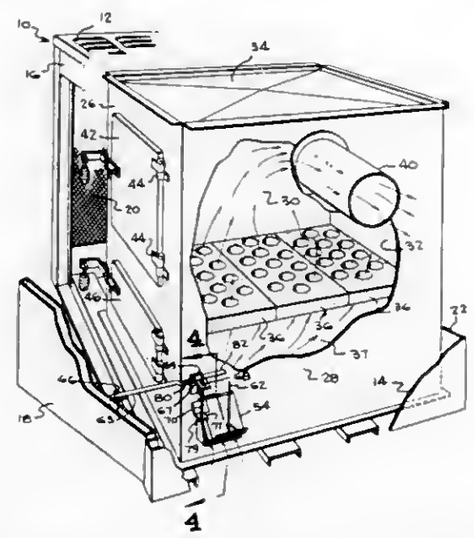
d. a solar energy transmitting sheet in contiguous contact with said upper surface of the base member and overlying said grooved pathway to form a closed circuitous conduit,
e. said base member having frame means extending outwardly therefrom,
f. a transparent sheet and means to secure said transparent sheet to said frame in spaced relation to said solar energy transmitting sheet to form a dead air space therebetween, and
g. means to introduce a heat absorbing fluid into said closed circuitous conduit.

4,030,479

SOLID FUEL HEATER WITH BLOWBACK PREVENTION MEANS

Nolan J. Webb, Marionville, Mo., assignor to McNeil Corporation, Akron, Ohio

Filed June 23, 1976, Ser. No. 698,826
Int. Cl.² F23L *3/00*
U.S. Cl. 126—287 **12 Claims**



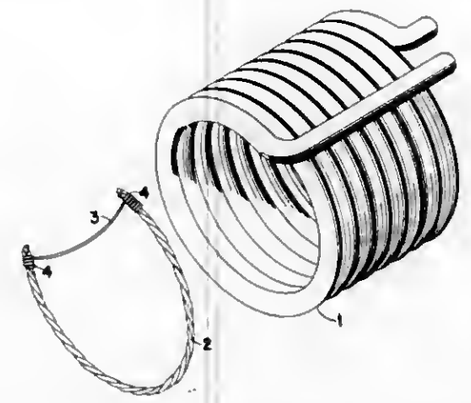
1. A solid fuel burning heating unit comprising a closed combustion chamber having a fuel feed door movable between an open position, combustion air inflow control means for varying the flow of combustion air into said closed combustion chamber and an outer housing enclosing said closed combustion chamber with the outer housing having an outer housing door permitting access to the fuel feed door and camming means conneeted to said combustion air inflow control means for insuring that said combustion air inflow control means is positioned to permit the inflow substantial quantities of air into said combustion chamber door when said outer housing door is opened.

4,030,480

OCULAR DECOMPRESSION PROCESS

Ernst Jochen Meyer, 174 School St., Belmont, Mass. 02178

Filed May 13, 1976, Ser. No. 686,056
Int. Cl.² A61B *17/38;* **A61N** *1/42;* **A61F** *9/00*
U.S. Cl. 128—1.5 **1 Claim**



1. A method for reducing intraocular pressure, comprising the following steps in the order listed, of which those designated (a), (f), (g) and (j) are conventional, and those designated (b), (c), (d), (e), (h), (i) and (k) are wherein the improvement comprises,

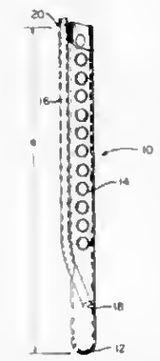
a. inducing anesthesia
b. introducing a metallic wire, band, or ring, hereinafter the thermal electrode, through or immediately adjacent to the anterior chamber of the eyeball in such manner that (i) the pupil of the eye is not obstructed, and (ii) those portions of the thermal electrode not within sclera or anterior chamber are everywhere covered by fibrous or epithelial tissues,
c. introducing a second metallic band or wire, hereinafter the antenna electrode, of greater cross section than the thermal electrode, onto the surface of the surface of the sclera of the eyeball, in such manner (i) that the antenna electrode is everywhere covered by fibrous or epithelial tissues, (ii) that each of the ends of the antenna electrode overlaps one of the ends of the thermal electrode, (iii) that the antenna electrode forms more or less the arc of a circle, and (iv) that the circle described by the aforesaid arc is susceptible, by passive rotation of the eyeball, of being brought into a plane more or less parallel to the frontal plane of the face,
d. connecting each end of any thermal electrode which is not a ring with that end of the antenna electrode which overlaps it, so as to establish a closed loop electrical circuit,
e. connecting each end of any thermal electrode which is not a ring and which is not connected with an antenna electrode with the opposite end of that thermal electrode so as to form a closed loop electrical circuit,
f. closing, by means of surgical sutures, the sites at which the thermal and antenna electrodes were introduced beneath the tissues, so that these electrodes and their junctions are everywhere covered by tissue and are nowhere exposed to air,
g. infiltrating an aqueous solution under that portion of the conjunctiva which covers the thermal electrode,
h. positioning, immediately anterior to the eyeball and more or less coaxial with the circle described by the electrode(s), an insulated induction coil which is wired into and is part of a tuned radio-frequency circuit,
i. impressing upon the aforesaid induction coil, a radio-frequency voltage sufficient to induce a current in the circuit formed by the electrode(s), such that the segment of the thermal electrode which is not bathed in fluid becomes hot and by its heat creates a passage through which fluid may drain from the anterior chamber into the fibrous tissue on the surface of the eyeball,
j. controlling the onset, intensity, and duration of the radio-frequency voltage by means of electronic measuring and timing devices.
k. repeating steps (g), (h), (i), and (j) above at such intervals and for such periods of time as may be required to maintain a sufficient drainage of fluid from the eye.

4,030,481

MANOMETRIC PRESSURE SENSING AND LIQUID EVACUATING DEVICE FOR INTRAOPERATIVE HIATAL HERNIA REPAIR

Lucius D. Hill, 522 McGilvra Blvd. E., Seattle, Wash. 98102

Filed Oct. 29, 1975, Ser. No. 626,759
Int. Cl.² A61B *5/10;* **A61M** *25/00*
U.S. Cl. 128—2 S **5 Claims**



1. A pressure-sensing and liquid-evacuating device for measuring sphincter pressure during intraoperative hiatal hernia repair operations, comprising:

a nasal gastric suction tube for emptying liquids from the stomach and having a tip, a plurality of openings adjacent the tip for allowing passage of liquids into the tube, and an open upper end adapted to be connected to a vacuum source, and
a smaller, soft, flexible pressure-sensing tube secured to said nasal gastric suction tube and having an uncovered, pressure-sensing single opening located externally of the nasal gastric suction tube and a short distance from the tip of said nasal gastric suction tube, with the pressure sensing opening adapted to be exposed directly to the interior of the stomach or esophagus, and engagable by the sphincter muscle whereby the pressure of the stomach, sphincter muscle and esophagus can be sensed immediately following the repair while simultaneously removing liquid from the stomach.

3. A pressure-sensing and liquid-evacuating device for measuring sphincter pressure during intraoperative hiatal hernia repair operations, comprising:

a nasal gastric suction tube for emptying liquids from the stomach and having a tip, a plurality of openings adjacent the tip for allowing passage of liquids into the tube, and an open upper end adapted to be connected to a vacumm source, and
a smaller, soft, flexible pressure-sensing tube secured to said nasal gastric suction tube and having a pessure-sensing opening located a short distance from the tip of said nasal gastric suction tube whereby the pressure of the stomach, sphincter muscle and esophagus can be sensed immedi-

ately following the repair while simultaneously removing liquid from the stomach,

said pressure-sensing opening being located a known distance up from the tip of the suction tube so that the location of the pressure-sensing opening in the gastroesophageal junction can be accurately determined by sensing the location of the tip of the nasal gastric suction tube.

4,030,482

CONTACT FEVER THERMOMETER

José Miguel Antonio Rosario Navato, Manchester, Mo., assignor to Lake St. Louis Research Products, Inc., Lake St. Louis, Mo.

Filed Nov. 20, 1975, Ser. No. 633,813
Int. Cl.² A61B *10/00*
U.S. Cl. 128—2 H **11 Claims**

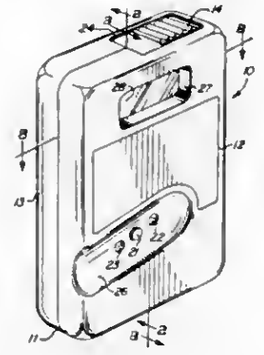
1. A contact fever thermometer adapted to be applied to the skin of the human body to visually indicate the temperature of the tissue immediately beneath the thermometer comprising a substantially rigid metal substrate, adhesive applied to one face of the substrate for adhering the substrate to the skin, said substrate being a substantially flat member having a length and a width of ½ inch or less so that when it is adhered to the skin the skin conforms generally to the shape of the substrate thereby to insure good thermal contact between the skin and the substrate so that the substrate substantially assumes the average temperature of the tissue to which it is adhered, a dark background on the other face of the substrate, and a plurality of numerical display areas on said dark background, each of said numerical display areas being comprised of a layer of liquid crystals which change color in response to changes in temperature within a specified temperature range with the liquid crystals in each of said numerical display areas being adapted to change color in response to changes in temperature within a different temperature range than do the liquid crystals in the other display areas whereby when said thermometer is applied to the skin, one of said numerical display areas displays a most clearly visible numerical temperature thereby indicating the average temperature of the tissue beneath the substrate, each of said layers of liquid crystals forming said numerical display areas being initially of a color substantially the same as said background at temperatures below a minimum threshold temperature and above a maximum threshold temperature, the span of temperatures between said minimum and maximum threshold temperatures constituting said range of temperatures, two of said display areas being in superimposed relation with one another on said substrate with the maximum threshold temperature of one of said superimposed numerical display areas being below the minimum threshold temperature of the other of said superimposed numerical display areas whereby only one of the superimposed numerical display areas is visible at one time.

4,030,483

PULSE RATE MONITORING DEVICE

Jack D. Stevens, 1229 S. Barkley, Mesa, Ariz. 85204

Filed Apr. 26, 1976, Ser. No. 680,136
Int. Cl.² A61B *5/02*
U.S. Cl. 128—2.05 T **5 Claims**



1. A cardiac monitor comprising:

a hand-held case comprising two interlocking parts defining an enclosure for housing electronic pulse sensing circuitry,

one of said parts defining a cover for said case having an exposed indentation in its surface for receiving along at least a part of its length a part of a finger of the hand of the user holding the case,

electronic circuitry mounted within said case for receiving signals representative of successive pulses of a cardiac wave, counting means for recording said successive pulses sensed, and digital readout means for indicating periodic summations of said counting means, and

dual purpose means mounted within said indentation and connected to said electronic circuitry for energization of said circuitry and sensing of said successive pulses upon positioning of the finger of the user in said indentation,

said dual purpose means comprising a switch for electronically energizing said electronic circuitry upon positioning of the finger of a user in said indentation, an electric light bulb energized by said electronic circuitry and illuminating the finger in said indentation, and a sensor connected to said electronic circuitry for sensing the changing illuminated condition of the finger during successive pulses of the cardiac wave,

said switch electric light bulb and sensor being spacedly arranged within and along the length of said indentation, and

said indentation comprising an open trough form-fitting the thumb of a user.

4,030,484

NON-INVASIVE BLOOD PRESSURE MONITOR

Walter J. Kuska, Harwood Heights, and Edward J. McGowan, Jr., Villa Park, both of Ill., assignors to Stoelting Company, Chicago, Ill.

Continuation-in-part of Ser. No. 523,567, Nov. 14, 1974, abandoned. This application Sept. 1, 1976, Ser. No. 719,425
Int. Cl.² A61B *5/02*
U.S. Cl. 128—2.05 R **7 Claims**

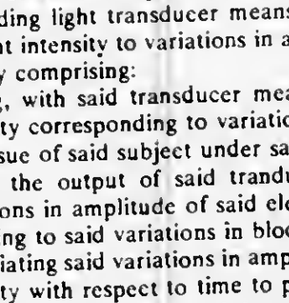
1. A monitor of subcutaneous blood pressure comprising:

a. a body having a contact face for bearing against the skin of a subject, a back face and an opening in said body extending from said contact face to said back face;

b. a diaphragm operatively mounted in said opening for deflection of the same in a direction perpendicular thereto having a contact face in continous and substantially flush relation generating a strain output therein from a subcutaneous with the contact face of said body and having means for securing the edge of said diaphragm thereto with substantially a rigidly-mounted edge-fixity;

c. a means for operationally holding the contact faces of the body and the diaphragm therein at a determinable contact bearing pressure against the skin of the subject;

d. an electrical strain-sensor opertively connected to an input source of electrical power mounted on the back face of said diaphragm having an electrical output in direct relation to the strain input from the deflection of the diaphragm under subcutaneous blood pressure;



e. electrical bridge and amplifier circuit operatively-connected to the electrical output from the strain-sensor; and

f. pressure indicating and recording means operatively-connected to the electrical output from the bridge and amplifier circuit.

4,030,485

METHOD AND APPARATUS FOR CONTINUOUSLY MONITORING SYSTOLIC BLOOD PRESSURE

Glenfield Warner, 3010 Matis St., Ville St. Laurent, Quebec, Canada H4R 1A3

Filed Nov. 12, 1974, Ser. No. 523,196
Int. Cl.² A61B *5/02*
U.S. Cl. 128—2.05 A **18 Claims**

1. A method for continuously monitoring systolic pressure in a human or animal subject by means of a calibrated instrument including light transducer means for converting variations in light intensity to variations in amplitude of an electrical quantity comprising:

detecting, with said transducer means, variations in light intensity corresponding to variations in blood volume of the tissue of said subject under said transducer means;

whereby the output of said tranducer means comprises variations in amplitude of said electrical quantity corresponding to said variations in blood volume;

differentiating said variations in amplitude of said electrical quantity with respect to time to provide a differentiated amplitude representative of the rate of said variations in blood volume;

periodically selecting a sample of said differentiated amplitude; and

adding to said sample an amplitude of a like electrical quantity representative of a reference pressure;

to thereby produce an electrical signal whose amplitude is proportional to systolic pressure of said subject ; and

providing said electrical signal to a display means to drive said display means whereby the magnitude of said systolic pressure is displayed on said display means.

15. A calibrated instrument for continuously monitoring the systolic pressure of a human or animal subject comprising;

transducer means for detecting variations in light intensity corresponding to variations in blood volume of the tissue of said subject under said transducer means;

means for converting said variations in light intensity to variations in amplitude of an electrical quantity;

differentiating means for differentiating said variations in amplitude of said electrical quantity with respect to time to provide a differentiated amplitude representative of the rate of said variations in blood volume;

sampling means for periodically selecting a sample of said differentiated amplitude;

means for providing an amplitude of a like electrical quantity representative of a reference pressure;

adding means to add said sample and said amplitude representative of reference pressure;

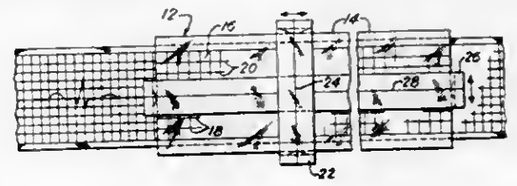
whereby to produce an electrical signal whose amplitude is proportional to the systolic pressure of said subject; display means for receiving said electrical signal and displaying the magnitude of the systolic pressure.

4,030,486

APPARATUS FOR MEASURING DEFLECTION AND TEMPORAL VALUES ON ELECTROCARDIAC TRACINGS

George Eastman, 102 Old Clairton Road, Pittsburgh, Pa.

Division of Ser. No. 831,954, June 10, 1969, Pat. No. 3,884,221. This application May 15, 1975, Ser. No. 577,873
Int. Cl.² A61B *5/04*
U.S. Cl. 128—2.06 R **3 Claims**



1. Apparatus for measuring voltage deflection values and temporal values on electrocardiographic tracings comprising,

transparent reading means having a grid integral therewith constructed and arranged to divide the tracing into discrete units of voltages and time,

first cursor means slidably engaging two opposing sides of said reading means and detachable therefrom and constructed and arranged to delineate a discrete time value on the tracing, and

second cursor means slidably engaging two other opposing sides of said reading means and detachable therefrom and constructed and arranged to delineate a discrete voltage value on the tracing.

4,030,487

FOLDABLE VIBRATION MASSAGE DEVICE

Dennis B. McEachran, Spokane, Wash., assignor to Quadrelax Corporation, Spokane, Wash.

Filed Apr. 21, 1976, Ser. No. 678,875
Int. Cl.² A61H *29/00*
U.S. Cl. 128—24.1 **12 Claims**

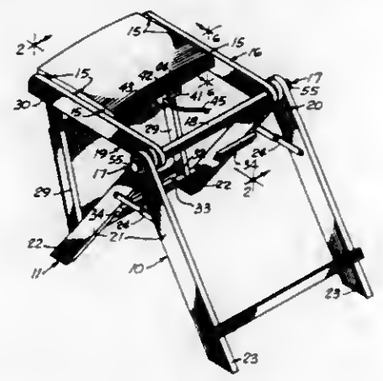
1. A vibration massage device, comprising:

an A-frame comprised of two spaced pairs of upright leg members pivoted at upper ends thereof for movement about a horizontal axis between (a) a storage condition wherein the four legs are in alignment along the horizontal axis with edges thereof being coplanar; and (b) an expanded condition wherein the legs of each pair form an inclusive acute angle about the horizontal axis;

a cushioned pad;

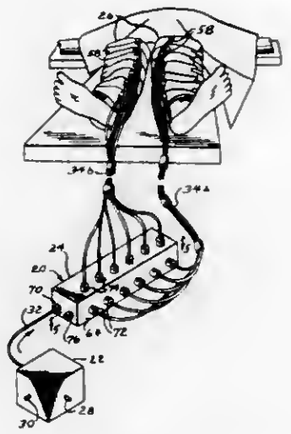
means for removably mounting the pad to the A-frame;

spring means for suspending the cushioned pad on the mounting means and for isolating vibrations of the cushioned pad from the A-frame and mounting means;



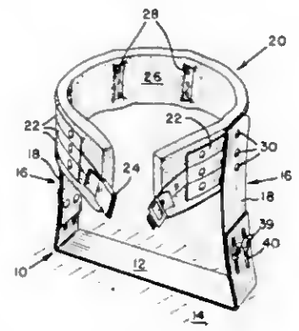
a vibrating unit on the pad for vibrating the cushioned pad to massage an area of a user's body in contact with the pad.

4,030,488
INTERMITTENT COMPRESSION DEVICE
James H. Hasty, Cary, Ill., assignor to The Kendall Company, Boston, Mass.
Filed Oct. 28, 1975, Ser. No. 626,018
Int. Cl.² A61H *1/00*
U.S. Cl. 128—24 R 21 Claims



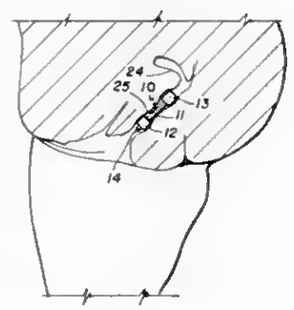
1. A device for applying compressive pressures against a patient's limb from a source of pressurized fluid, comprising:
an elongated pressure sleeve for enclosing a length of the patient's limb, said sleeve having a plurality of separate closed fluid pressure chambers progressively arranged longitudinally along the sleeve from a lower portion of the limb to an upper portion of the limb proximal the patient's heart relative said lower portion;
means for intermittently forming a pressure pulse from said source during periodic compression cycles;
means for separately connecting said pulse to said chambers at the start of the compression cycles;
means for developing progressively diminishing rates of pressure increases in progressively located upper chambers during the compression cycles to apply a compressive pressure gradient against the patient's limb by the sleeve which progressively decreases from said lower to upper limb portions; and
means for intermittently connecting said chambers to an exhaust means during periodic decompression cycles between said compression cycles.

4,030,489
TRACTION APPARATUS
William L. Buckner, Rte. 2, Sanford, N.C. 27330
Filed Sept. 17, 1975, Ser. No. 614,133
Int. Cl.² A61H *1/02*
U.S. Cl. 128—75 10 Claims



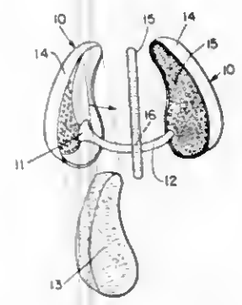
1. A portable lumbo-sacral traction apparatus comprising: a free-standing integrally formed U-shaped supporting frame; a suspension belt adapted to be worn around the lower thoracic region of a patient rigidly and releasably secured to such frame, said belt including at least one pre-shaped encircling member adapted to extend substantially completely around the lower thoracic region of a patient, means for releasably securing said encircling member about the lower thoracic region of a patient, a cushioning pad contiguous with said encircling member and adapted to at least partially encircle the lower thoracic region of a patient with said encircling member, and means joining said encircling member to said cushioning pad; and means releasably securing said suspension belt to said U-shaped frame whereby the U-shaped frame applies upward tension to the suspension belt to remove weight from the lower lumbo-sacral and pelvic regions of a patient when a patient is being acted upon by the apparatus.

4,030,490
FEMALE PROTECTIVE DEVICE
George N. Vogel, Box 705, Buzzards Bay, Mass. 02532
Filed Nov. 14, 1975, Ser. No. 631,811
Int. Cl.² A61F *5/46*
U.S. Cl. 128—130 4 Claims



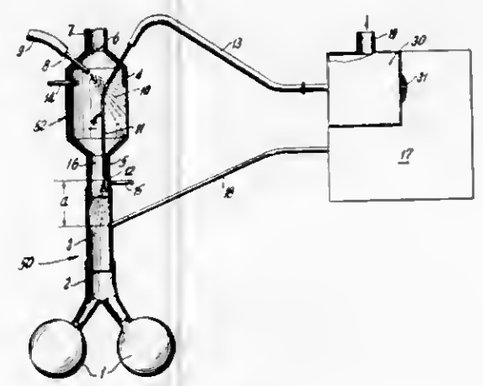
1. A female protection device comprising,
a. an elongated slender shaft having a first sharp end and a second end,
b. a first enlargement concentrically fixed to the shaft adjacent to but spaced from the sharp end of the shaft, and
c. a second enlargement fixed to the second end of the shaft.

4,030,491
NASAL FILTER
Alvin Mattila, 2 Beaver St., San Francisco, Calif. 94114
Filed Oct. 31, 1975, Ser. No. 627,517
Int. Cl.² A61M *15/08*
U.S. Cl. 128—140 N 5 Claims



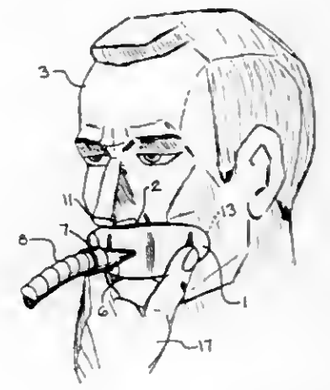
1. A nasal filter device adapted to be inserted into the nostrils of the nose, comprising a pair of walled containers each having an open side and an opposite perforated side, each open side facing toward the other open side, flexible bridge means having distal end portions extending through said respective open sides and disposed in respective said containers and fixed thereto, a pair of perforated covers complementally configured to span respective open sides of said containers, each said cover having an aperture, said flexible bridge means extending through said apertures, said covers operative to move towards each other on said bridge means, and porous filter means removably disposed in said containers, said containers having substantially the shape of said nostrils.

4,030,492
DEVICE FOR SUPPORTING HUMAN BREATHING AND ARTIFICIAL RESPIRATION
Georg Simbruner, Vienna, Austria, assignor to Dragerwerk Aktiengesellschaft, Germany
Filed Jan. 28, 1976, Ser. No. 653,148
Claims priority, application Austria, Feb. 5, 1975, 866/75
Int. Cl.² A61M *16/00*
U.S. Cl. 128—145.8 10 Claims



1. A device for supplying human breathing and artificial respiration, comprising a tracheal tube having one first tubular end connectible to the person's trachea, an opposite second tubular end connectible to atmosphere and an intermediate tubular portion connected between said one tubular end and said opposite tubular end and defining an interior pressure chamber therein, said one tubular end, said pressure chamber and said opposite tubular end defining a continually opened flow passage therethrough, at least one first breathing gas conduit connected into said pressure chamber and discharging breathing gas across said flow passage to provide a constant pressure in said tracheal tube, and at least one second breathing gas conduit connected into said pressure chamber and having a discharge extending substantially axially toward said first tubular end with respect to said flow passage, and control means connected to said second breathing gas conduit for controlling the gas supply thereto in accordance with the respiration rhythm.

4,030,493
RESPIRATORY MOUTHPIECE
William T. Walters, and Marvin D. Parlette, Jr., both of Toledo, Ohio, assignors to Conceptual Products, Inc., Toledo, Ohio
Filed June 18, 1976, Ser. No. 697,410
Int. Cl.² A61M *16/00*
U.S. Cl. 128—147 5 Claims

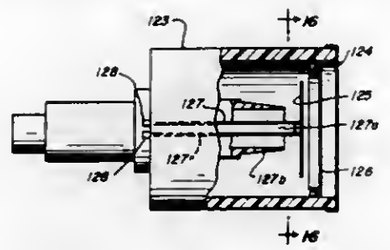


1. A flexible, resilient respiratory mouthpiece for a therapeutic breathing apparatus comprising
a. a substantially ovate, concave face plate,
b. a ridge along the periphery of the concave side of said face plate having a height above the face plate greater than the wall thickness of the face plate in the regions across the shorter diameter of the face plate, and a height above the face plate no greater than the said wall thickness in the regions of the ovate extremities of the face plate and
c. a tube defining an elongated opening in the center of the face plate and extending inwardly on the concave side of the face plate, adapted to fit over a mouthpiece holder of a breathing apparatus;
d. the mouthpiece being a one piece integral molding of an elastomeric material having sufficient stiffness and flexibility to provide a seal against air pressure entering the mouth from the breathing apparatus when the ridge is pressed inwardly against the outer surfaces around a patient's mouth.

4,030,494
FLUID CONNECTORS
Francis Tenczar, 8931 S. Bell, Chicago, Ill. 60620
Division of Ser. No. 412,553, Nov. 5, 1973. This application Nov. 15, 1976, Ser. No. 741,630
Int. Cl.² A61M *5/00*; F16L *47/00*
U.S. Cl. 128—214 R 6 Claims

1. A connector assembly to prevent entry of contaminants, including
a pair of terminal connectors, each terminal connector having a housing, a conduit extending from one end of each housing and communicating with the interior of the housing, an openable end of each housing closed by a heat penetratable and fusible plastic barrier,
coupling means within each housing communicating with the conduit,
a penetrator element associated with one of the coupling means, and
a conductive heating element positioned at least adjacent one barrier, and conductor means joining said heating

element and said coupling means, whereby said plastic barriers may be adjoined and a power source may energize the element to penetrate the adjoined plastic barrier



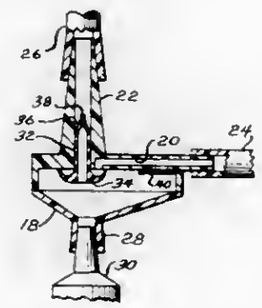
and, at the same time, fuse and sterilize the penetrated portions, whereby relative movement between adjoined plastic barriers and the penetrator element allows the coupling means to be joined.

4,030,495

TWIN CHECK VALVE PUMP SYSTEM HAVING FAIL-SAFE CHARACTERISTIC

Robert Anthony Virag, Lake Zurich, Ill., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Nov. 7, 1975, Ser. No. 629,835
Int. Cl.² A61M 5/18
U.S. Cl. 128—214.2 **9 Claims**



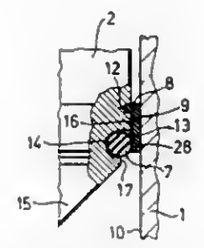
1. A multiple valve pump device which comprises a pumping chamber adapted for pressurizing and depressurizing fluid in said chamber, a first, one-way inlet valve communicating with said pumping chamber and adapted to permit fluid flow therein, a second, one-way outlet valve communicating with the pumping chamber and adapted to permit fluid flow out of said chamber, and an upstream inlet flow path for providing fluid to the pumping chamber through the inlet valve, said second outlet valve being biased to prevent outflow of fluid below a predetermined pressure, the improvement comprising, in combination, a porous member in communication with the interior of said pumping chamber on one side of said member and in communication with said inlet flow path on its other side, to permit selective fluid communication between said pumping chamber and inlet flow path through said porous member without passing through said first valve, said porous member being capable of allowing passage of a first fluid material, while preventing the passage of a second fluid material, whereby said second fluid can be pumped, but said pump device is prevented from pumping in the presence of substantial quantities of said first material.

4,030,496

SYRINGE FOR INJECTING LIQUIDS INTO BLOOD VESSELS OF LIVING BODIES

Donald Peter Stalt, Steinmaur, and Willi Zenger, Zurich, both of Switzerland, assignors to Contraves AG, Zurich, Switzerland

Filed July 12, 1976, Ser. No. 703,898
Claims priority, application Switzerland, July 28, 1975, 9799/75
Int. Cl.² A61M 5/00
U.S. Cl. 128—215 **5 Claims**



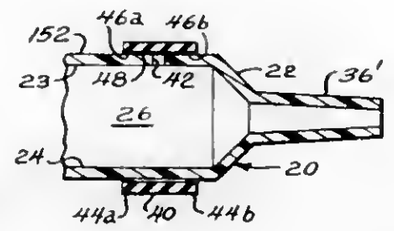
1. A syringe for injecting liquids into blood vessels of living bodies, comprising a cylinder having opposed ends, one end of the cylinder being provided with a flange and the other end of the cylinder being provided with a catheter connection, a piston arranged for two-and-fro movement in the cylinder, said piston having a groove, a sealing ring arranged in said groove, said piston having a channel which is substantially parallel to said groove, a substantially L-shaped slide ring arranged between the sealing ring and an inner wall of the cylinder, said L-shaped slide ring having a first leg and a second leg, the first leg sealing bearing against the inner wall of the cylinder, said second leg being inserted in said channel to operatively connect the slide ring with piston, said piston including an inclined portion extending to a tip of the piston, said piston having a substantially cylindrical shoulder extending from said groove to the start of the inclined portion of the piston tip, said cylindrical shoulder extending at least to the region of the center of the deformed sealing ring.

4,030,497

SYRINGE ASSEMBLY

William J. Binard; Anthony J. Ciarico, both of Cary; Leonard R. Anglada, Arlington Heights, and Bhupendra C. Patel, Elgin, all of Ill., assignors to The Kendall Company, Boston, Mass.

Division of Ser. No. 627,982, Nov. 3, 1975, Pat. No. 4,000,741, which is a continuation-in-part of Ser. No. 509,757, Sept. 27, 1974. This application July 2, 1976, Ser. No. 702,164
Int. Cl.² A61M 5/00
U.S. Cl. 128—215 **3 Claims**



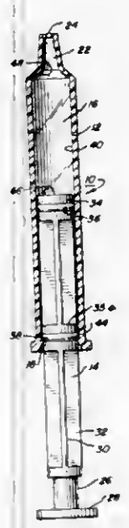
1. A syringe, comprising:
a barrel having a chamber for retaining fluid, and opening means communicating between the chamber and the outside of the barrel;
a tip for attachment to a fluid receiving device;
a plunger having one end received in the chamber for pumping fluid from the chamber; and
a flexible balloon secured to the barrel over said opening means and defining a cavity communicating with fluid in the chamber through the opening means, said balloon inflating above a predetermined pressure to relieve pressure generated by the syringe.

4,030,498

SYRINGE

Douglas L. Tompkins, Northbrook, Ill., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Continuation of Ser. No. 517,998, Oct. 25, 1974, abandoned. This application July 22, 1976, Ser. No. 707,684
Int. Cl.² A61M 5/00
U.S. Cl. 128—218 P **7 Claims**



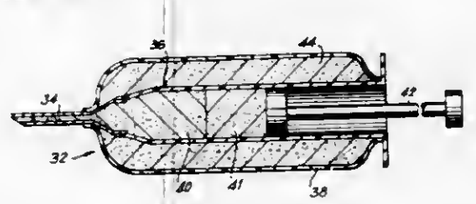
1. In a syringe comprising a barrel defining a bore and having a discharge portion, and a plunger extending into said bore and movable therewithin, the improvement comprising, in combination: inner sealing means carried by said plunger and movable axialy within said bore in an area proximate to said discharge portion for substantially preventing leakage of medicament or other biologic fluid contained in the space forward of said inner sealing means adjacent said discharge portion; outer sealing means carried by said plunger, said outer sealing means being spaced axially from said inner sealing means and movable axially within said bore in an area behind the travel area of said inner sealing means; said plunger having an axial length within the bore of more than one-half of the functional length of the bore void of sealing rings; and means for preventing said outer sealing means from moving in the area in which said inner sealing means travels.

4,030,499

METHOD AND APPARATUS FOR PROVIDING LIVING BEINGS WITH ABSORBABLE IMPLANTS

Louis Bucalo, 155 Roberts St., Holbrook, N.Y. 11741

Continuation-in-part of Ser. No. 537,572, Dec. 30, 1974. This application June 7, 1976, Ser. No. 693,134
The portion of the term of this patent subsequent to Sept. 28, 1993, has been disclaimed.
Int. Cl.² A61M 1/00, 31/00
U.S. Cl. 128—260 **7 Claims**



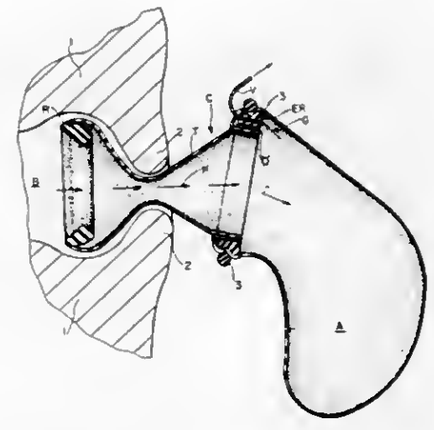
1. Method of treating a living being, with a solid composition which affects the health or appearance of said living being, which comprises implanting in a molten injectable condition in the internal tissue of the living being, sufficiently close to the outer skin of the living being to be influenced by an elevation of temperature of the outer skin, a depot of at least one composition which is safely absorbable by the living being and which solidifies at the temperature of the body of the living being while being molten and injectable at a higher temperature at which it is implanted, the implanting temperature not adversely affecting the living being during the implanting, and said solid composition responding to an increase in temperature at the outer skin of the living being adjacent the location of the solid composition to assume a condition according to which said solid composition is absorbed more rapidly by the body of the living being than if the temperature at the outer skin adjacent the solid composition is not elevated, and thereafter whenever it is desired to increase the rapidity with which the solid composition is absorbed by the body applying heat to the outer skin adjacent the solid composition for reducing the time that the latter remains unabsorbed by the body.

4,030,500

FECAL MATTER COLLECTOR

Hadar Yngve Ronnquist, 95082 Nikkala, Sweden

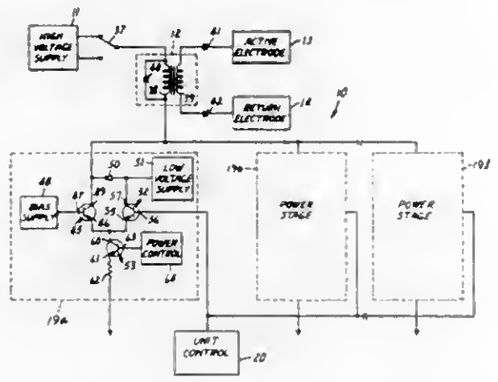
Continuation of Ser. No. 518,952, Dec. 16, 1974, abandoned. This application Dec. 5, 1975, Ser. No. 638,033
Int. Cl.² A61F 5/44
U.S. Cl. 128—283 **1 Claim**



1. A fecal matter collector including a continuous closed tubular member of flexible and resilient material having a first end operatively associated with a user's rectum, said first end being inserted within the rectum, said member having an intermediate length of restricted cross section placed at and extending through the anal opening of a user at the place of the sphincter muscle of the user, a second end of said member external of the rectum, said ends being of substantially greater dimensions than that of said restricted intermediate length and being open, a solid ring of resilient material operatively connected with each said open end of the tubular member and conjointly therewith forming the overall continuous closed tubular member, said ring at the internal end of said member being attached in the interior of the tube at the open end, and having a flattened conical configuration for association with the interior of the rectum proximate the anal opening and anal sphincter thereof, and adapted for maintaining the tube in operative association within the rectum of a user, a collector bag of substantially uniform resilient and continuous material, said bag having an open end and being removably connected to said second external end of said tubular member, the external ring being integrated with the exterior of the tube material proximate the second open end and having an external groove therein, said collector bag having the open end thereof positioned externally of said ring, and a resilient material solid ring disposed externally of the end of the bag, and associating this end in the groove of the ring and resiliently interconnecting the collector bag with the tubular member and adapting the

bag for easy removal for cleaning and/or replacement, and at the external ring a gas and air vent opening to permit escape of gaseous material from the collecting bag to the exterior.

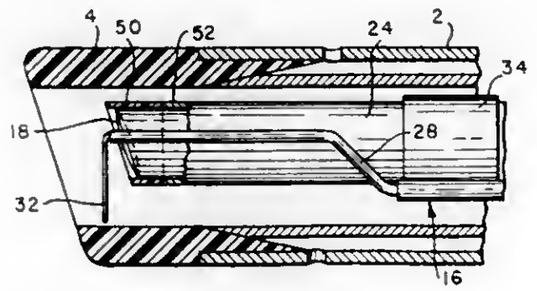
4,030,501
HIGH FREQUENCY-HIGH VOLTAGE LEVEL ELECTROSURGICAL UNIT
G. Kent Archibald, White Bear Lake, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Filed Jan. 26, 1976, Ser. No. 652,144
Int. Cl.² A61B *17/36*; A61N *3/02*
U.S. Cl. 128—303.14 **6 Claims**



1. In an electrosurgical unit for selectively providing high frequency, cutting currents or high voltage level coagulation currents to the body of a patient by means of electrosurgical patient electrodes which are driven by power stages actuatable by a control signal, which unit includes at least a pair of patient electrodes, a unit control means for supplying said control signal, a source of high voltage, a power transformer having a primary winding connected in series with said high voltage source and a secondary winding connected in series with said electrodes, and a plurality of power stages that are connected in parallel with one another and in series with said transformer primary winding, said power stages each including:
- a power switching element having an input terminal connected to one side of the power transformer primary winding, an output terminal and a control terminal;
- a constant current means connected in series with the output terminal of said switching element;
- a power control means for variably adjusting the amount of current flowing through said current means;
- a bias supply means connected to the control terminal of said switching element for supplying a bias voltage thereto;
- a voltage source clamping means connected to the input terminal of said switching element to supply a sufficient level of voltages to said input terminal that said switching element is prevented from operating in a saturated state in order that each of the entire power stages has a constant current flowing therethrough; and
- a signal source means that is driven by said control signal and is connected to the output terminal of said switching element to control the actuation thereof and supply current to said current means whenever current flow through said switching element is interrupted.

4,030,502
ANTI-ARCING RESECTOSCOPE
Jose Juan Iglesias, 1341 North Avenue, Elizabeth, N.J. 07200
Filed Dec. 5, 1975, Ser. No. 638,061
Int. Cl.² A61B *17/32*
U.S. Cl. 128—303.15 **4 Claims**

1. A resectoscope comprising a sheath having a beaked distal end, a telescope within and extending longitudinally of the sheath and having a distal end having a lens adjacent the beaked distal end of the sheath, a tube extending longitudinally of the sheath and the telescope and engaging and at least partially surrounding the telescope to support and stablize it, the tube having a distal end adjacent the distal end of the telescope, a cutting loop assembly adjacent and extending longitudinally of the telescope and having a depending bare wire loop which is positioned distal to the distal end of the telescope and is adapted to be charged with electricity, means



for reciprocating the cutting loop assembly to move the bare wire loop toward and away from the distal end of the telescope, the distal end extremity of the tube being positioned distally of the distal end of the telescope and proximally of the most proximal position of the bare wire loop to prevent electrical arcing between the bare wire loop and the distal end of the telescope.

4,030,503
EMBOLECTOMY CATHETER
William T. Clark, III, 6 Davis Blvd., New Orleans, La. 70121
Filed Nov. 5, 1975, Ser. No. 628,982
Int. Cl.² A61B *17/22*
U.S. Cl. 128—304 **8 Claims**

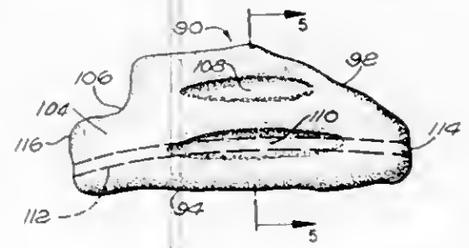
1. A thrombolectomy catheter comprising
a flexible shaft having forward and rear ends,
a handle on the rear end of the shaft,
a wire having a forward extremity extending beyond the forward end of the flexible shaft,
a rounded blunt member on the forward extremity of the wire, and
a spiral helix surrounding the forwardly-projecting portion of the wire and extending rearwardly from the rounded blunt member the forward portion of said helix having a rounded forwardly-disposed surface, and said helix having a sharp rearwardly-disposed outer edge portion.

4,030,504
NASAL HEMOSTAT AND METHOD OF CONSTRUCTION OF NASAL HEMOSTAT
Donald E. Doyle, 8147 Armor Road, Los Angeles, Calif. 90046
Filed Aug. 15, 1975, Ser. No. 605,148
Int. Cl.² A61B *17/12*; **A61M** *29/02*
U.S. Cl. 128—325 **9 Claims**

1. A nasal hemostat adapted for insertion into a nasal cavity, comprising:
a tampon of contracted material adapted to be expanded upon the contact with a fluid, said tampon prior to contraction initially having a generally domed-shape with a substantially linear bottom wall, a convex top wall, two parallel side walls, and a substantially rectangular tongue continuous with said bottom wall protruding from the posterior end of said tampon, a first side wall having an upper and lower elongated recess formed longitudinally therein to respectively receive the middle and inferior

conchae of the lateral wall of the nasal cavity when the tampon is operatively positioned, said tongue terminating near the pharynegal orifice of the auditory tube when the tampon is operatively positioned, said contracted tampon being adapted to apply hemostatic pressure to substantially all parts of the nasal cavity when expanded in operative position including the inferior, middle and superior meatus, the inferior, middle and superior conchae, and the sphenoethmoidal recess; and
an elongated breathing tube extending longitudinally through said contracted tampon between the anterior and the posterior ends, said tube extending through said tongue to allow nasal breathing when the tampon is expanded in operative position within the nasal cavity.

9. A method of constructing a nasal hemostat from a material which is expansible upon contact with fluids to form a tampon adapted to apply pressure against substantially all of the walls of a nasal cavity when expanded in operative position, comprising the steps of:
forming said tampon with a substantially linear bottom wall,
a convex top wall, two substantially parallel side walls,



and a substantially rectangular tongue continuous with the bottom wall and protruding from the posterior end of said tampon, said top and bottom walls being relatively narrow;
forming at least an upper and a lower elongated recess longitudinally in a first one of said side walls, said recesses being adapted to respectively receive the middle and inferior conchae of the lateral wall of the nasal cavity when the tampon is expanded in operative position;
positioning an elongated hollow breathing tube within said formed tampon, said tube extending through the tampon from the anterior end through said tongue to allow nasal breathing when the tampon is expanded in operative position;
wetting the formed tampon with a fluid;
compressing the wetted tampon into a contracted state by centripetal forces directed substantially towards the breathing tube so that no portion of said tampon is folded over any other portion of the tampon; and,
allowing the compressed tampon to dry in said contracted state.

4,030,505
METHOD AND DEVICE FOR DISINTEGRATING STONES IN HUMAN DUCTS
Arthur N. Tessler, New York, N.Y., assignor to Calculus Instruments Ltd., New York, N.Y.
Filed Nov. 28, 1975, Ser. No. 636,241
Int. Cl.² A61B *17/22*
U.S. Cl. 128—328 **10 Claims**

1. Method for removing concretions within human ducts comprising:
A. axially abutting a concretion within a human duct, while outwardly distending the walls of said duct adjacent said concretion;
B. generating a series of high voltage electrical pulses of sufficiently low amperage to avoid harm to human tissues;
C. directing said pulses within an insulating medium extending into said duct to the situs of said concretion
D. selectively discharging said pulses radially outwardly across the surface of said concreatioo; and
E. flowing a liquid peripherally of said discharging of pulses, so as to direct an hydroelectric impact against said concretion.

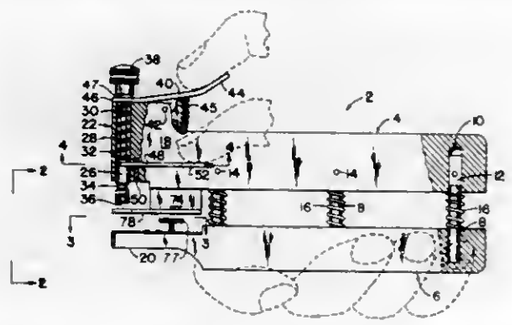
6. A device for removing concretions within human ducts comprising:
A. A a flexible conduit of inert material of a size to be extensible within said ducts to the situs of said concretions and having an inlet and an outlet and including:
i. a flexible positive electrode extending coaxially within and terminating at said outlet of said conduit and being embedded in electrically insulative material; and
ii. a negativve electrode peripherally embedded in said conduit apart from said positive electrode and terminating at said outlet of said conduit, as a continuous electrically conductive surface encircling and coextensive with said positive electrode, said negative electrode being supported apart from said positive electrode so as to define a liquid carrying outer annulus extending the length of said conduit, such that liquid may be delivered simultaneously and coextensively with an electrical discharge, as hydroelectric cavitation upon said concretions and as insulating medium intermediate said electrodes,

B. a harp distender supported at said outlet of said flexible conduit and extending beyond said electrodes, means for moving said sharp distender so as to distend outwardly said ducts in the area of said electrodes; and
C. a bigh voltage, low amperage pulse generating apparatus operatively connected to said positive electrode and said negative electrode, such that electrical discharges radiate from said positive electrode across the surface of said concretions.

4,030,506
EARLOBE PIERCING DEVICE
David McDonald, Mill Valley, Calif., assignor to Golden M Enterprises, Inc., Mill Valley, Calif.
Filed Dec. 15, 1975, Ser. No. 641,197
Int. Cl.² A61B *17/00*; **B25C** *5/06*
U.S. Cl. 128—330 **15 Claims**

1. In an earlobe piercing device having first and second jaws mounted for relative movement towards and away from each other for positioning a jaw on each side of an earlobe positioned therebetween, a plunger slidably mounted on the first jaw and including means for engaging an earlobe piercing stud, and means for forcing the plunger in an axial direction towards the second jaw so that an earlobe when placed between the jaws can be pierced with a free end of the stud

engaged by the plunger, the improvement comprising: jaws defined by substantially parallel bars having a sufficient length to be hand-held and operated by a user, the plunger being positioned adjacent one end of the bars, first means adjacent the one end and positioned to be operated by fingers of the



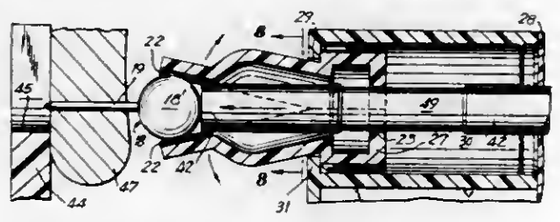
same hand holding the device for releasing the piston forcing means, and second means positioned adjacent the one end of the bars and also positioned to be operated by a finger of the same hand holding the device for retracting and thereby energizing the plunger forcing means in preparation for a subsequent release thereby by the first means.

4,030,507

STERILE EARLOBE-PIERCING ASSEMBLY

Samuel Mann, Englewood, N.J., assignor to Inverness Corporation, Englewood, N.J.

Continuation-in-part of Ser. No. 543,380, Jan. 23, 1975, abandoned. This application Dec. 15, 1975, Ser. No. 641,045
Int. Cl.² A61B 17/00
U.S. Cl. 128—330 22 Claims



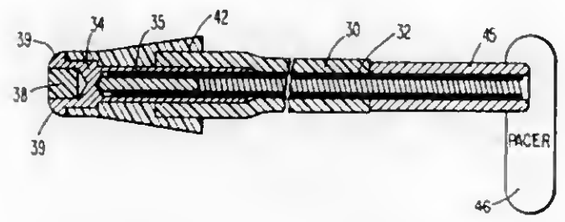
1. An earlobe piercing assembly comprising in combination a piercing earring including an enlarged portion and a piercing pin extending therefrom, a cartridge configured to receive said piercing earring and substantially envelop said earring, said cartridge including an elongated opening partially supporting said piercing pin, and a further opening proximate said enlarged portion of said earring, and in longitudinal alignment with said elongated opening, said elongated opening having a smaller lateral dimension that said further opening and said enlarged portion of said earring, plunger means adapted to be longitudinally displaced, said plunger means including earlobe support means, said displacement of said plunger means effecting an entry of said plunger means through said further opening of said earring cartridge into contact with said enlarged portion of said earring and a forcing of the enlarged portion of the piercing earring into said elongated opening to thereby forcibly expand said elongated opening along the lengthwise extent thereof and further force said enlarged portion of said piercing earring out of the cartridge through and guided by the first elongated opening, and housing means for receiving said cartridge and positioning said cartridge openings in alignment with said plunger means and preventing displacement of said cartridge when said plunger means is displaced through aid earring cartridge to effect a forcing of said earring from said cartridge.

4,030,508

LOW OUTPUT ELECTRODE FOR CARDIAC PACING

Hilbert J. Th. Thalen, Duinkampen, Netherlands, assignor to Vitatron Medical B.V., Dieren, Netherlands

Filed Feb. 4, 1976, Ser. No. 655,156
Int. Cl.² A61N 1/04, 1/36
U.S. Cl. 128—418 8 Claims



1. A catheter for use in a cardiac pacing system, the catheter serving to deliver stimulus pulses from a pacer to a patient's heart, said catheter comprising:

a. a conductor extending substantially the length of the catheter, and having an insulating casing around it;

b. a stimulating tip at one end of said catheter, said tip connected electrically to said conductor and having a rounded annular exposed surface, said exposed surface defining a central opening having a diameter of at least 1 mm and having an axial length much less than its outer diameter; and

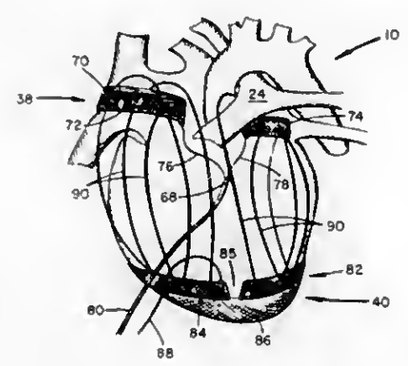
c. an element of isolating material positioned within said opening.

4,030,509

IMPLANTABLE ELECTRODES FOR ACCOMPLISHING VENTRICULAR DEFIBRILLATION AND PACING AND METHOD OF ELECTRODE IMPLANTATION AND UTILIZATION

Marlin S. Heilman, Gibsonia; Alois A. Langer, Pittsburgh, both of Pa.; Mieczyslaw Mirowski, Owings Mills; Morton M. Mower, Baltimore, both of Md., and David M. Reilly, Pittsburgh, Pa., assignors to Mieczyslaw Mirowski, Owings Mills, Md.

Filed Sept. 30, 1975, Ser. No. 620,026
Int. Cl.² A61N 1/36
U.S. Cl. 128—419 D 31 Claims



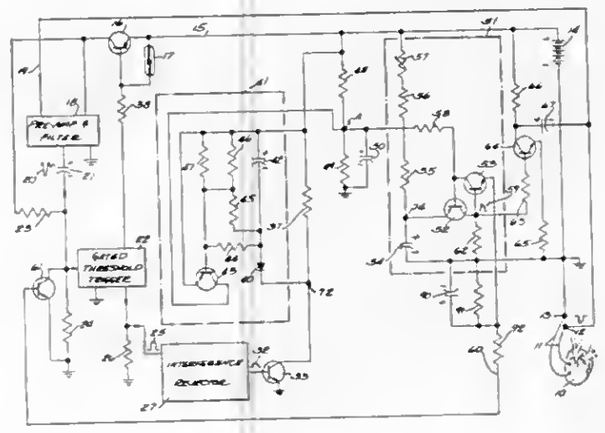
1. The combination of an implantable cardioverting electrode and pacing electrode, the combination comprising: conductive base electrode means for associating with the base of the heart; conductive apex electrode means of substantially frustoconical shape throughout at least a portion thereof, for lying adjacent but exterior to the apex of the heart and conforming to the contours thereof; and an auxiliary electrode insulated from both said base and said apex electrodes and extending from the surface of one of said base or said apex electrodes in the direction of the heart, said auxiliary electrode serving to deliver pacing energy to the heart.

4,030,510

STANDBY HEART PACER

David L. Bowers, West Allis, Wis., assignor to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 18,051, March 10, 1970, abandoned. This application Nov. 5, 1975, Ser. No. 628,956
Int. Cl.² A61N 1/36
U.S. Cl. 128—419 PG 9 Claims



1. A standby heart pacer comprising:

a. a selected-rate pace pulse generator having output terminals adapted to be connected to the heart and to stimulate with pace pulses the heart at regular time intervals in the absence of natural heart action,

b. power source terminals,

c. a timing network included in said pace pulse generator and adapted to set the time period between pace pulses, said timing network being connected with a power source terminal,

d. detector means directly connected to at least one output terminal and responsive to heart activity signals to produce corresponding detector output signals,

e. means responsive to said pace pulse generator pace pulses to produce a detector output signal inhibiting signal on occurrences of a pace pulse,

f. a hysteresis means interposed between said detector means and said pace pulse generator timing network said hysteresis means being actuated by detector signals in the absence of an inhibiting signal, to set a single repeatable time interval between detection of natural heart activity signals and the generation of a first pace pulse independently of the regular time interval between pace pulses produced by said generator, the instant at which said hysteresis device is set being coincident with the natural heart activity signal,

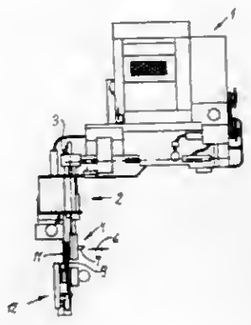
g. means controlled by said hysteresis means for preventing said timing network in said pace pulse generator from producing a pace pulse for the duration of said repeatable time interval and for enabling production of a pace pulse at the end of said repeatable time interval, whereupon ensuing pace pulses at regular time intervals are determined by said pace pulse generator timing network and continue until a natural heart activity signal resets the repeatable time interval in said hysteresis device, and coincidentally inhibits said pace pulse generator for said repeatable time interval.

4,030,511

CONTROL SYSTEM FOR CIGARETTE PRODUCING AND PROCESSING MACHINES OR THE LIKE

Günter Wahle, Reinbeck, Germany, assignor to Hauni-Werke Korber & Co., KG, Hamburg, Germany

Continuation of Ser. No. 406,396, Oct. 15, 1973, abandoned, which is a continuation of Ser. No. 111,807, Feb. 2, 1971, abandoned. This application Oct. 15, 1974, Ser. No. 515,009
Claims priority, application Germany, Feb. 7, 1970, 2005665; May 6, 1970, 2022174
Int. Cl.² A24B 7/14
U.S. Cl. 131—21 R 9 Claims



1. In a production line for rod-shaped articles which constitute or form part of smoker's products, a combination comprising a machine for making rod-shaped articles, said machine having devices for draping flexible wrapping material around rod-like filler material for severing the draped filler material to form discrete rod-shaped articles and for conveying said discrete articles along a predetermined path, said devices having parts movable at a first speed and at a substantially higher second speed; prime mover means having variable-speed output means connected with said movable parts of said devices; first speed increasing means for accelerating said output means to said first speed; second speed increasing means for accelerating said output means from said first to said second speed at a slower first rate or at a faster second rate; and means for restricting said second speed increasing means to acceleration of said output means at said slower first rate.

4,030,512

HAIR LACQUER OR SETTING LOTION CONTAINING BI- OR TRI-SEQUENCED COPOLYMER

Christos Papantoniou, Epinay-sur-Seine, and Quintino Gaetani, Bondy, both of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France

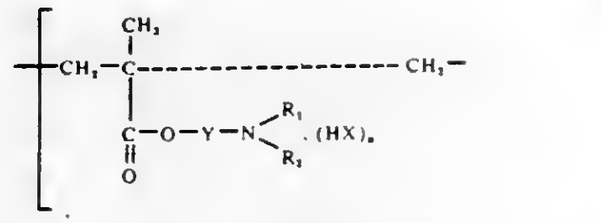
Filed Dec. 29, 1975, Ser. No. 645,211
Claims priority, application Luxembourg, Dec. 30, 1974, 71577
Int. Cl.² A45D 7/00; A61K 7/11
U.S. Cl. 132—7 11 Claims

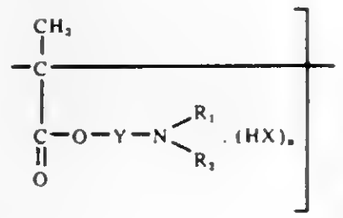
1. A hair lacquer or hair setting lotion composition comprising in a solvent selected from the group consisting of water, ethanol, isopropanol, a liquified gaseous propellant, and a mixture thereof, 0.2 to 10 percent by weight of a bi- or tri-sequenced copolymer, the sequences in the chain of said copolymer having a schematic formula selected from the group consisting of

i. AAA—BBB

ii. AAA—BBB—AAA and

iii. BBB—AAA—BBB, A having the formula





wherein

Y represents a saturated hydrocarbon chain having 2–4 carbon atoms or a hydrocarbon chain having 2–4 carbon atoms and interrupted by a heteroatom selected from the group consisting of sulfur and oxygen,

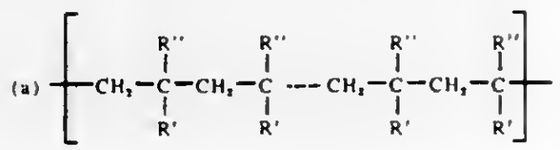
R_1 and R_2 each independently represent alkyl having 1–4 carbon atoms,

n is 0 or 1 and

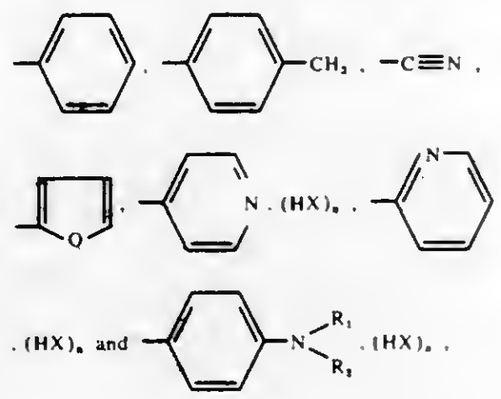
HX represents an acid selected from the group consisting of hydrochloric acid, hydrobromic acid, lactic acid and acetic acid,

B having a formula selected from the group consisting of

(a)

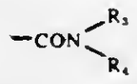


wherein when R'' is hydrogen, R' is selected from the group consisting of



and

when R'' is CH_3, R' is selected from the group consisting of

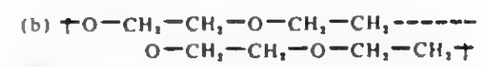


$-COOR_3$ and $-COOH$, wherein R_1, R_2, *n* and HX have the meanings given above, R_3 is a saturated hydrocarbon chain having 6–18 carbon atoms, R_4 is methyl or ethyl and R_5 is a saturated hydrocarbon chain having 1–18 carbon atoms,

b. $-O-CH_2-CH_2-O-CH_2-CH_2 - - - O-CH_2-CH_2-O-CH_2-CH_2-$

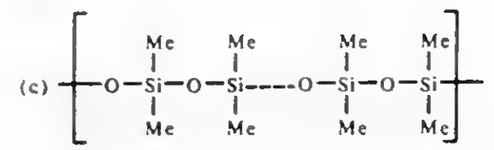
and

(b)



and

(c)



said bi- or tri-sequenced copolymer having a molecular weight between 1,000 and 1,000,000.

11. A process for styling or setting the hair comprising applying to the hair an effective amount of the composition of claim 1, rolling the hair on rollers and applying external heat to the hair for a period of time ranging from 3 to 20 minutes to dry the same.

4,030,513

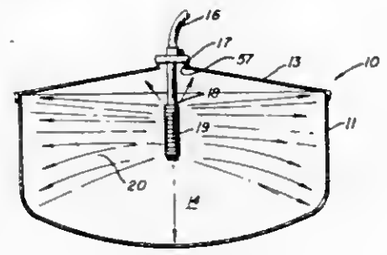
TANK WASHER

Wray V. McKenzie, Downers Grove, Ill., assignor to Babson Bros. Co., Oak Brook, Ill.

Filed Nov. 5, 1975, Ser. No. 628,890

Int. Cl.² B08B *3/02, 9/00*

U.S. Cl. 134—167 R **10 Claims**



1. In a tank washer apparatus having a liquid supply tube provided with a delivery end portion free of internal obstructions for delivering tank washing liquid, annular shoulder means on the distal end of said delivery portion, and mounting means for mounting the supply tube to a tank, the improvement comprising

a spray head rotatably carried by said supply tube and having means responsive to the delivery of washing liquid under pressure thereto from said delivery portion to rotate said spray head and provide a plurality of outwardly directed distributed streams of washing liquid moving transversely in a preselected tank washing spray pattern, said spray head including a plurality of internested annular elements in coaxial end-to-end relationship to define a tubular assembly thereof, adjoining pairs of said elements cooperatively defining spray ports for providing said streams of washing liquid, securing means outwardly of said supply tube for securing said elements in said end-to-end relationship to form a rotary spray head assembly, said shoulder means defining a coaxial annular bearing for rotatively supporting said assembly for rotation about the axis of the supply tube delivery portion.

4,030,514

SHORTENABLE UMBRELLA

Tilmann Schultes, Solingen-Weyer, Germany, assignor to Kortenbach & Rauh Kommanditgesellschaft, Solingen, Germany

Claims priority, application Germany, Aug. 9, 1975, 2535634

Filed July 26, 1976, Ser. No. 708,996

Int. Cl.² A45B *19/04*

U.S. Cl. 135—25 R **3 Claims**

1. A shortenable umbrella having blades carrying the umbrella canopy in opened condition, the blades being shortenable at least by a factor of two by folding, and having a shortenable rod and a crown secured on the shortenable rod and at least one fork operatively connected to a slider displaceably disposed on the shortenable rod for pivoting the blades, comprising

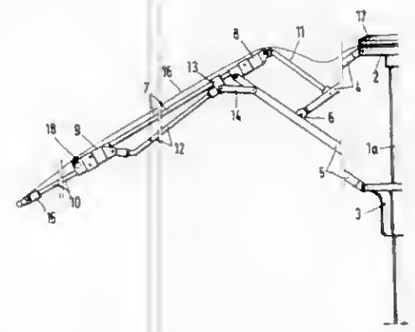
an innermost blade part being pivoted on said crown,

an outermost blade part having an extension,

a middle blade part operatively connected to said innermost and outermost blade parts, respectively,

a middle hinge pivotally connecting said middle blade part and said innermost blade part,

a control rod operatively connected said extension of said outermost blade part, said outermost blade part being hinged foldably onto said middle blade part by means of said control rod,



said control rod having an inner end, said control rod operatively cnaging directly and positively without slipping on said outermost blade part,

a slide hinge pivotably fastened to said inner end of said control rod, said slide hinge being displaceably disposed on said middle blade part in the vicinity of said middle hinge,

a fork opcratively connected to the slider and pivotally connected to said middle blade part at a first pivot point,

a short connecting rod pivotally connected to said fork at a second pivot point and to said slide hinge, the latter being articulated play-free operatively on said fork by means of said short connecting rod,

said short connecting rod being as little as possible longer than the distance between said second pivot point on said fork and said first pivot point of said fork on said middle blade part.

4,030,515

TELESCOPIC UMBRELLA

Heinz Weber, Hilden, Germany, assignor to Telesco Brophey Limited, Montreal, Canada

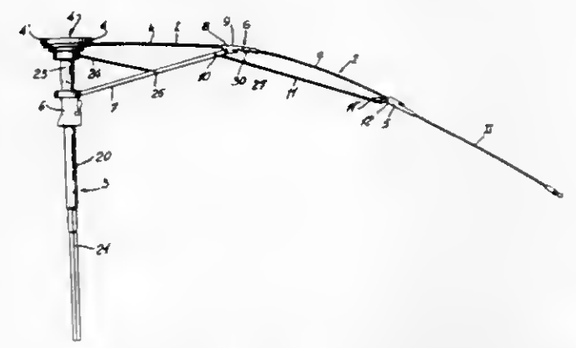
Filed July 19, 1976, Ser. No. 706,211

Claims priority, application Germany, July 21, 1975, 2532525; May 3, 1976, 2619052

Int. Cl.² A45B *19/04, 19/06*

U.S. Cl. 135—25 R **5 Claims**

1. An umbrella frame comprising a stick, a crown fixed at one end of the stick, a plurality of dome ribs hinged from the periphery of the crown, a main runner slidable on the stick, each dome rib including an inner and a middle section telescopic within the inner section, and an outer section hingedly connected to the outer end of the middle seciton for movement between a position colinear with the middle section and a position with the outer section folded over the middle section, a first geats slidable on the inner section, a stretcher member hinged to the main runner at one end thereof and to the geats at the other end thereof, a second geats member slidable on the inner section and connected to the end of the middle dome rib section, an auxiliary runner slidable on the stick between the main runner and the crown, a strut member hinged to the auxiliary runner and to the stretcher member, and a control link hinged to the stretcher member a short distance from the hinge point with the frist geats at one end thereof and at the ohter end the control member is hingedly connected to an inner extension of the outer dome rib section to form a quadrilateral with the middle dome rib section, the inner extension of the outer section and a portion of the stretcher member between the hinge point of the control link and the first geats, whereby as the main runner is slid on the stick away from the crown, the dome rib section can pivot



downwardly to a position parallel with the stick as the first geats member slides on the inner dome rib section, allowing the quadrilateral to be collapsed leaving the middle dome rib section and the outer dome rib section fully extended, and as the runner is further moved on the stick to a position beyond the length of the strut member, it will cause the geats to slide on the dome rib section away from the crown, and the control link will cause the outer dome rib section to fold onto the middle dome rib section.

4,030,516

FLOAT CONTROLLABLE VALVE

Werner Föller, Stuhr, Helligenrode, Germany, assignor to Gestra-KSB Vertriebsgesellschaft mbH & Co. Bremen, Bremen, Germany

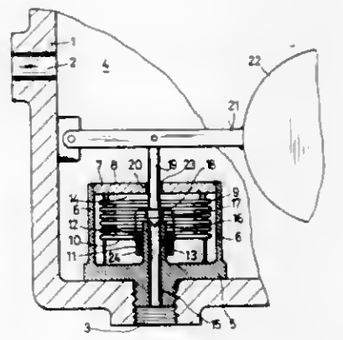
Filed Jan. 22, 1976, Ser. No. 651,657

Claims priority, application Germany, Jan. 28, 1975, 2503302

The portion of the term of this patent subsequent to Sept. 23, 1992, has been disclaimed.

Int. Cl.² F17T *1/20*

U.S. Cl. 137—192 **6 Claims**



1. A float controllable valve responsive to the level of fluid comprising:

a housing having an internal chamber including an input supply opening and a discharge opening;

a membrane capsule disposed in the interior of said housing and formed with at least a first throttle inlet bore communicative to the interior of said membrane capsule with the internal chamber of said housing at a pressure side, said membrane capsule including a rigid inlet nozzle extending into the interior of said membrane capsule and having a nozzle bore communicating with said discharge open-

ing, said inlet nozzle having a valve seat in the interior of said membrane capsule between the throttle bore and the nozzle bore;

a locking member slidably disposed and extending into the interior of said membrane capsule and having one end in sealing contact with said valve seat;

a pivotable lever arm having a float secured at one end and disposed outside of said membrane capsule and having its opposite end pivotably coupled to said housing, said lever arm being pivotable coupled to the opposite end of said locking member; and

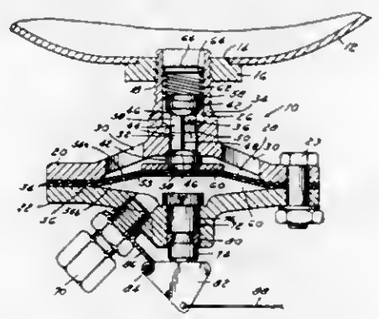
a movable wall portion formed with a second throttle bore through which said rigid inlet nozzle extends, said wall portion being longitudinal moveable with respect to said nozzle and connected to said locking member and membrane capsule, so that when the fluid contacts the float and lifts the locking member from the valve seat, a pressure differential is created on both sides of the movable wall portion so that an additional opening force is exerted on said locking member.

4,030,517

CONDENSATE VALVE ASSEMBLY

Kenneth E. Pyle, Marine City, Mich., assignor to Reef-Baker Corporation, Marine City, Mich.

Division of Ser. No. 546,736, Feb. 3, 1975, Pat. No. 3,977,426.
This application Dec. 15, 1975, Ser. No. 640,471
Int. Cl.² F16T *1/00*; F16K *31/126*
U.S. Cl. 137—203 **1 Claim**



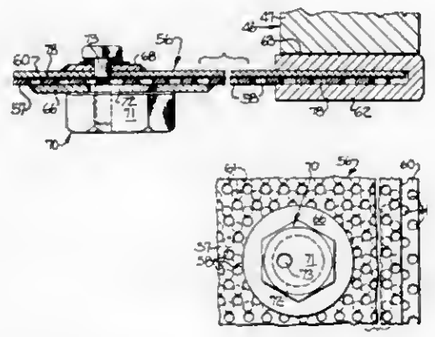
1. A condensate valve comprising a housing, an open-top liquid chamber in the upper portion of said housing for the accumulation of liquid, a liquid inlet to said liquid chamber, a second chamber in said housing beneath said liquid chamber having an outlet port, said housing having a partition separating said chambers, a passage extending downward through said partition from said liquid chamber to said second chamber, a valve member reciprocable in said passage, said valve member having a first sealing portion disposed in said liquid chamber and having a second sealing portion disposed in said second chamber, said first and second sealing portions being larger in diameter than said passage, said partition having valve seats at opposite ends of said passage, said sealing portions being engageable with said valve seats at the opposite limits of movement of said valve member to close said passage against the flow of liquid from said liquid chamber, said valve member between said sealing portions being so formed relative to said passage as to allow liquid to pass from said liquid chamber to said second chamber when said valve member is between its opposite limits, a flexible diaphragm defining the bottom of said second chamber, a fluid pressure chamber in said housing beneath and separated from said second chamber by said diaphragm, said valve member being movable by said diaphragm to its upper limit in response to fluid pressure in said pressure chamber, removable spring means in said liquid chamber for moving said valve member to its lower limit when the pressure in said pressure chamber is relieved, said housing comprising an upper part having said liquid chamber, said second chamber and said partition, a lower housing part having said pressure chamber, means removably securing said upper and lower housing parts together, said diaphragm being marginally clamped between said upper and lower housing parts, said valve member comprising upper and lower separable parts held in abutting relation by said spring means and said diaphragm, said upper part of said valve member having said first sealing portion and said lower part of said valve member having said second sealing portion, said valve member between said sealing portions being in the form of an elongated stem of reduced cross-section relative to said sealing portions, said upper part of said valve member being an integral piece composed of said first sealing portion and the upper end portion of said stem, said lower part of said valve member being an integral piece composed of said second sealing portion and the lower end portion of said stem, said upper part of said valve member being removable upon removal of said spring means through the open top of said liquid chamber and the lower part of said valve member being removable upon separation of said housing parts and removal of said diaphragm, a drain or shutoff device comprising a plunger reciprocably mounted on said lower housing part beneath said valve member capable of raising said diaphragm to raise said valve member to its upper limit or to an intermediate position between its upper and lower limits, and means for raising said plunger including a bell crank lever pivoted on said lower housing part, and a pull member for pivoting said bell crank lever.

4,030,518

AIR FLOW CONTROL APPARATUS

David E. Wilcox, Millbrae, Calif., assignor to Flanders Filters, Inc., Washington, N.C.

Division of Ser. No. 530,007, Dec. 5, 1974, Pat. No. 3,986,850.
This application July 30, 1976, Ser. No. 710,025
Int. Cl.² F16K *3/36*
U.S. Cl. 137—246 **10 Claims**



1. A valve for selectively and accurately regulating the volume of air flowing across a relatively large area and such that the volume of air flowing across all portions of the area is substantially uniform, said valve comprising

a first substantially flat plate having myriad relatively small, regularly spaced apertures extending therethrough,

a second substantially flat plate having myriad apertures extending therethrough, said apertures in said second plate being of a size and spacing generally corresponding to the size and spacing of the apertures in said first plate,

means for mounting said first and second plates in an overlying, relatively movable face to face relationship,

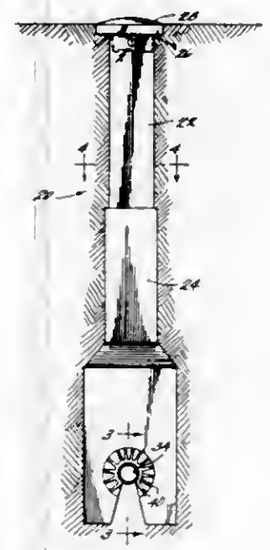
a non-evaporating fluid interposed between the full area of the opposing faces of said first and second plates, said fluid being adapted to prevent the flow of air laterally between said plates to thereby assure that the air flow through all portions of the overlying plates may be accurately controlled by the relative positioning of the apertures therein.

4,030,519

VALVE COVER FOR BURIED VALVE, PERMITTING ACCESS THERETO

Frank R. Zinn, Culpeper, Va., assignor to Bingham and Taylor, Culpeper, Va.

Filed Apr. 23, 1976, Ser. No. 679,748
Int. Cl.² F16L *58/00*
U.S. Cl. 137—364 **8 Claims**



1. A valve cover for covering a buried valve and permitting access thereto comprising:

a hollow elongated housing member having opposed apertures adjacent one end thereof for each receiving a pipe section which extends therethrough with a valve between said sections being within said housing,

a cast collar attached to and covering at the opposite end of said member for permitting access to said valve when said housing and valve are in place, and

a plurality of flexible fingers each attached at one end to said housing about each of said apertures and extending outward therefrom to engage a pipe section to define a tapering passage for locking said valve and pipe sections securely to said cover.

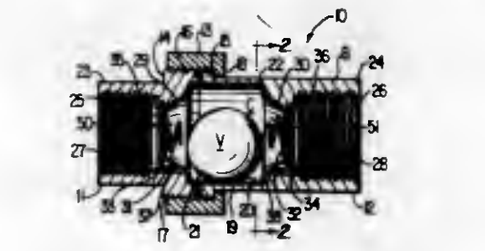
4,030,520

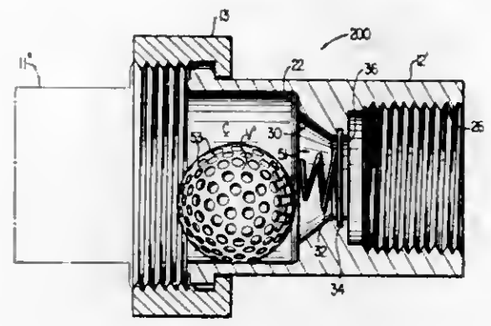
BALL-TYPE SAFETY VALVE

Asa D. Sands, 3606 Federal St., Camden, N.J. 08105

Filed Aug. 5, 1976, Ser. No. 711,977
Int. Cl.² F16K *15/00*
U.S. Cl. 137—513.5 **7 Claims**

1. In a flow operated safety valve, the combination of a valve body defining a valve chamber having a longitudinal axis with flow passages at opposite ends of said axis, a cylindrical inner surface about said valve chamber, transverse walls at opposite ends of said valve chamber separating said valve chamber from said flow passages and defining annular shoulders at opposite ends of said chamber, a valve port through each of said transverse walls coaxial with said valve chamber, at least one of said valve ports being defined by a frusto-conical valve seat facing said chamber and by a cylindrical surface at the end of said valve seat remote from said chamber, an annular groove formed in said cylindrical surface of said one valve port, a convolute coil spring having a large end coil seated in said annular groove and tapering axially in the direction of said chamber to a small end located within the confines of said valve seat, a ball valve of smaller diameter than said chamber disposed in the chamber and movable toward and away from said valve seat, said safety valve body when in normal use being mounted in a flow line with its longitudinal axis horizontal so that said ball valve normally rests on the lowest portion of said cylindrical inner surface of said valve chamber out of contact with said valve seat and said spring, said ball valve being responsive to an excess rate of fluid flow above a predetermined maximum flow rate in the direction of said seat to move against said spring compressing same and seating upon said conical valve seat, thus substantially reducing the flow of fluid through said valve, and restricted leak passage means for bypassing fluid around said ball valve and said valve seat.



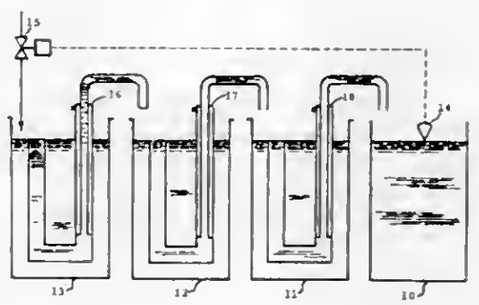


4,030,521

METHOD FOR LIQUID LEVEL CONTROL

Tom Orvar Björn Karlsson, Floda, Sweden, assignor to Nordnero AB, Kungalv, Sweden

Filed May 14, 1975, Ser. No. 577,318
Claims priority, application Sweden, May 16, 1974, 7406510
Int. Cl.² F04F *5/00*
U.S. Cl. 137—566 **2 Claims**



1. A system for maintaining desired liquid levels in each tank of a multi-tank processing line for treating materials, said system comprising a line of several tanks having at least one processing tank on one end of said line and at least one rinsing bath tank on the other end of said line, whereby material to be treated travels tank by tank from said processing tank toward said rinsing bath tank, means for initially supplying liquid to the last rinse tank of the line responsive to a control by the liquid level in the first processing tank of the line, a plurality of air-lift pumps, at least one of the pumps being located between each of two individually associated neighboring tanks in said line of tanks to transport the excess liquid of one tank to the immediately preceding tank, with the direction of liquid transport being from said rinse tank toward said processing tank, whereby said material to be treated travels through said line in one direction and said liquid is transported through said

line in an opposite direction, the intake leading to the suction side of the associated one of said air-lift pumps forming an over flow level control in each of said tanks, and the pressure side of said air-lift pump being positioned to provide the inlet to the next preceding one of said tanks, whereby the liquid of each tank is maintained at a desired level without any danger of back flow from a preceding tank into a succeeding tank.

4,030,522

HYDRAULIC CONTROL VALVE ARRANGEMENT

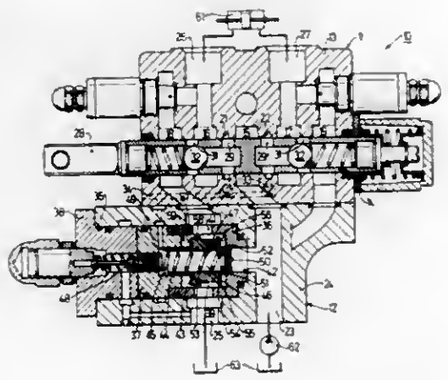
Joachim Heiser, Stuttgart, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Apr. 18, 1975, Ser. No. 569,173

Claims priority, application Germany, Apr. 26, 1974, 2420242

Int. Cl.² F15B *13/042*; **F16K** *11/00*

U.S. Cl. 137—596.13 **7 Claims**



1. Hydraulic control valve arrangement for controlling flow of fluid to at least one fluid actuated consumer device, comprising housing means provided with inlet passage means connected to a source of hydraulic pressure fluid, consumer passage means connected to a consumer device, return passage means connected to a reservoir, and a bore intersecting said passage means; a first valve member movable in said bore between a neutral position preventing flow of fluid from said inlet passage means to the consumer device and from the latter to said return passage means, and a plurality of active positions for permitting flow from said inlet passage means to the consumer device, respectively flow from the latter to said return passage means, said first valve member forming a first throttle between said inlet passage means and the consumer passage means which varies as a function of the movement of said first valve member away from its neutral position; a bypass passage in said housing means between said inlet passage means and said return passage means, said bypass passage including a valve seat and a chamber downstream of said valve seat; a second valve member in said bypass passage movable between a closed position engaging said valve seat and an open position, said valve member having a pair of opposite first pressure faces, one of which being subjected to the fluid pressure in said inlet passage means and said second valve member including a piston portion having a pair of opposite ends in said chamber between said first pressure faces and having a diameter greater than the remainder of said second valve member, a first collar on one of said opposite ends of said piston portions which is adjacent said valve seat and having an outer peripheral surface closely adjacent to a peripheral surface defining said chamber and forming therewith a second throttle, and a damping collar on said piston portion axially spaced from said first collar and forming in said chamber to one side of said damping collar a damping chamber; control passage means communicating with said bore downstream of said first throttle and directing fluid pressure to the other of said first pressure faces so that said second valve member is biased by the pressure difference produced by said first throttle to said open position; spring means biasing said second valve member to said closed position; said opposite ends of said piston portions forming together with said first and second damping collars, respectively, a pair of second pressure faces, one of which is located downstream of said second throttle so that the pressure difference produced by said second throttle acts on said second pair of pressure faces to bias said second valve member in a direction opposite to the force produced by said spring means.

4,030,523

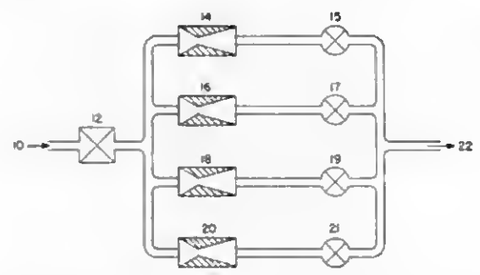
DIGITAL FLOW CONTROL SYSTEM

Robert E. Cram, Ridgecrest; Walter Gill, and James A. Loundagin, both of China Lake, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 19, 1976, Ser. No. 677,944

Int. Cl.² G05D *7/06*

U.S. Cl. 137—599 **1 Claim**



1. A fluid flow control system having digital flow characteristics comprising:

an inlet port for admitting fluid flow to the system;

regulating means connected to said inlet port for assuring a predetermined pressure in said fluid flow to sustain downstream venturi action;

four manifold branches each connected to said regulating means providing fluid flow paths therefrom;

four clear-aperture, cavitation venturis one of which is mounted in each manifold branch to receive the fluid flow therein and having throat areas which are in the ratio of 1:2:2:5 to provide incremental decimally related fluid flow from said inlet port;

four bistable, electrically-actuated control valves one of which is mounted in each of said manifold branches for selectively controlling the fluid flow therein;

an electrical switch having five wafers and eleven positons;

an electrical energy source connected to inputs of each of said five wafers;

circuit means connecting said four bistable, electrically actuated control valves to four of the five wafers of said electrical switch such that each position of said switch sequentially steps said total flow rate from zero to full flow in ten percent steps;

means connected to the fifth wafer of said electrical switch for obtaining an electrical output indicative of the selected switch position corresponding to the selected percentage of full flow rate; and

an exit port connected to said four manifold branches for collecting the gas flow outputs therefrom into a single fluid flow stream for feed to a fluid utilization means.

4,030,524

COUPLER

Jack Alan McMath, Fort Thomas, Ky.; Paul R. Wilder, Cincinnati, Ohio, and Larry Lee Alderson, Valley Center, Kans., assignors to Dover Corporation, New York, N.Y.

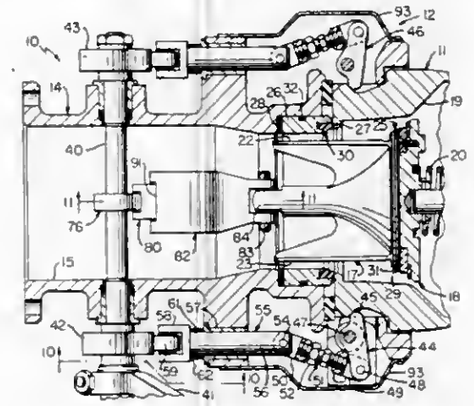
Filed May 19, 1975, Ser. No. 578,505

Int. Cl.² F16L *29/00, 37/28*

U.S. Cl. 137—614.06 **19 Claims**

1. A coupler for receiving an adapter or the like having a passage therein and valve means to close the passage, said coupler including a body, means to lock and unlock the

adapter to said body, said locking and unlocking means being resiliently urged into its unlocking position, said body having a passage therein, valve means in said body passage and movable to an open position to provide communication between said body passage and the adapter passage, actuating means to move said valve means between its open and closed positions and to move said locking means to its locking or unlocking position, said valve means causing movement of the valve



means in the adapter passage to an open position when said valve means is moved to its open position by said actuating means, and latch means to prevent movement of said locking and unlocking means until said body has received the adapter in the position in said body in which said locking and unlocking means can lock the adapter to said body, said latch means preventing said actuating means from moving said valve means until said locking and unlocking means has locked the adapter to said body.

4,030,525

CORROSION-RESISTANT SHEET STEEL WELD

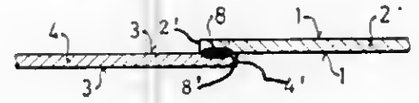
Gerd Bässler, Kornwesthelm, and Arno Altpeter, Sindelfingen, both of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed July 18, 1975, Ser. No. 596,988

Claims priority, application Germany, July 18, 1974, 2434519

Int. Cl.² F16L *9/16*; **B32B** *15/18*

U.S. Cl. 428—586 **13 Claims**



1. Corrosion-resistant sheet steel weld in which two overlapping steel sheets (**2, 4; 10, 13; 18, 19; 21, 23, 26**) are placed with their respective end portions in overlapping relationships comprising

two overlapping steel sheets (**2, 4; 10, 13; 18, 19; 21, 23, 26**);

a coating of corrosion-resistant metal (**1, 3**) at adjacent, overlapping surfaces of said sheets;

a resistance weld seam (**8, 14, 38, 22**) formed at the interface of said sheets at least in the regions of the overlap of said projections and the other sheet;

and means providing for localized current density upon welding comprising openings (**5, 11, 20, 24**) formed in at least the end portions of at least one of the steel sheets extending from adjacent the outer edge of the end portion inwardly in said end portion leaving projections (**6, 15, 25**) between said openings, said openings having a depth less than the extent of overlap of said sheets.

4,030,526

MULTIPLE LOOM

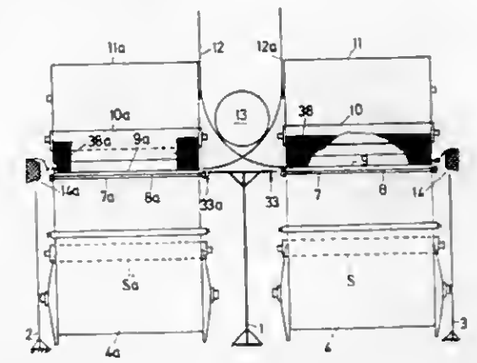
Christian Klener, Eloyes, France, assignor to Tex International, S.A., Luxembourg, Luxembourg

Filed Mar. 29, 1976, Ser. No. 671,065

Claims priority, application Luxembourg, Apr. 11, 1975, 72272

Int. Cl.² D03D *33/00*

U.S. Cl. 139—18 **5 Claims**



1. An improved loom system comprising:

at least a pair of vertical looms located side-by-side and having harness means for forming sheds between vertical wrap yarns, the sheds being disposed on either side of and adjacent a common plane;

reed combs associated with the shed of each loom, each comb including an upper, substantially horizontal planar surface area across its width;

a weft feeder for each loom, each weft feeder comprising a flexible lance with a weft clamp at its extremity;

arcuate guide means for each weft feeder lance for guiding its travel in an arcuate path from a generally vertical to a generally horizontal direction parallel to and contiguous with the upper surface of the reed comb of its respective loom;

means for cyclically driving each weft feeder along its arcuate guide and through its respective shed in the manner of a reciprocating stroke;

said weft feeder guide means being disposed on either side of and adjacent said common plane extending between the sheds;

whereby said weft feeder lances are driven through the respective loom sheds in opposite directions on either side of and adjacent said common plane.

4,030,527

AUTOMATIC CABLE FORMING SYSTEM

Jacques L. Roch, San Jose, Calif., assignor to Xynetics, Inc., Santa Clara, Calif.

Filed June 21, 1976, Ser. No. 698,184

Int. Cl.² B21F *27/00*; **H01R** *43/00*

U.S. Cl. 140—92.1 **51 Claims**

1. An automatic cable forming system incorporating an X-Y positioner for automatically laying a plurality of individual wires in a predetermined pattern to form a complex cable, including

an array of individual spools each including a tensioning device to produce a predetermined tension on a wire as it is unspooled,

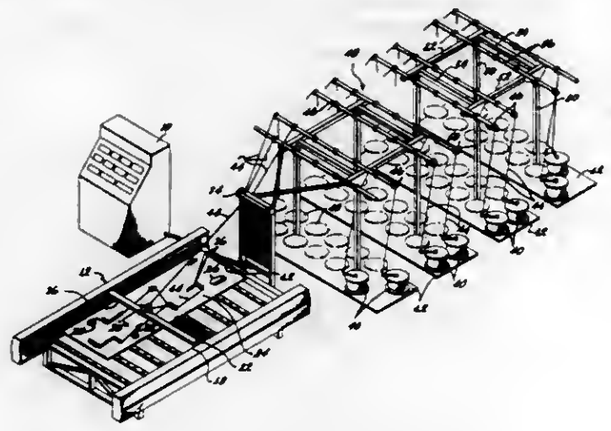
a plurality of individual capstan pulleys each receiving an individual wire from one of the spools,

a single capstan drive for engaging one capstan pulley at a time for individually feeding the plurality of wires from the spools,

a plurality of individual clamps for clamping the plurality of individual wires except the wire fed from the capstan pulley engaged by the capstan drive, and

a single wire head coupled to the X-Y positioner for receiving the wire fed from the capstan pulley engaged by the

capstan drive for laying the wire in a predetermined pattern and with the single wire head individually receiving each one of the plurality of wires as each wire is fed from its capstan pulley for laying the pulurality of wires in the predetermined pattern to form the complex cable.

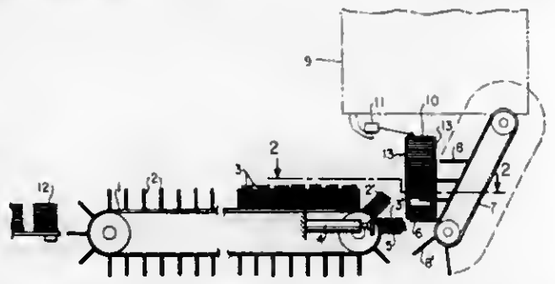


4,030,528

MAGAZINE FOR BAGS SUCH AS SACKS

Bent Horning, Copenhagen Valby, Denmark, assignor to F. L. Smidth & Co., Cresskill, N.J.

Filed Oct. 28, 1975, Ser. No. 626,479
Claims priority, application United Kingdom, Oct. 28, 1974, 46449/74
Int. Cl.² B65B *3/00*
U.S. Cl. 141—1 **25 Claims**



15. A method for stacking bags such as sacks by transferring bundles of said bags from a first supply position to a second position for successive removal by filling spouts traversing a generally arcuate path about an associated packing apparatus, each bundle including at least one bag, which comprises:

a. successively placing said bundles of bags on a first bag transporting means having a bag receiving position and a bag discharging position;

b. transferring said bundles of bags to the bag discharging position of said first bag transporting means;

c. successively transferring said bundles of bags from the discharging position of said first bag transporting means to a second bag transporting means when said second bag transporting means is in a predetermined bag receiving position;

d. positioning and supporting said bags by said second bag transporting means in generally upright stacked relation adjacent the arcuate path of said filling spouts for successive removal thereof by said filling spouts;

e. monitoring the position relative to said filling spouts of the foremost bag of said stack of bags;

f. activating said second bag transporting means in response to signals provided when the position of the foremost bag is without a predetermined range due to successive removal of each foremost bag from said stack; and

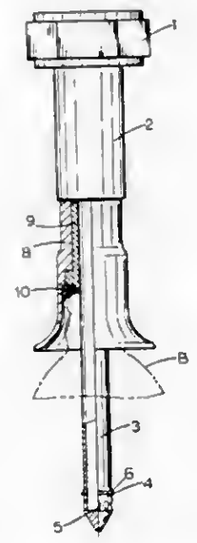
g. activating said first bag transporting means to move at least one bundle comprising at least one bag to its bag discharging position in dependent response to the assumption by said second bag transporting means of a predetermined bag receiving position.

4,030,529

FILLER TUBE

Alexander Ritchie Duncan, Scarborough, Canada, assignor to The Molson Companies Limited, Spruce Grove, Canada

Filed Sept. 29, 1975, Ser. No. 617,493
Claims priority, application Canada, Nov. 22, 1974, 214443
Int. Cl.² B67C *3/02*; **B65B** *3/04*
U.S. Cl. 141—392 **1 Claim**



1. A bottle filler tube assembly including a valve adaptor serving as the mounting for the upper end of an axially bored liquid filling tube of elongated tubular configuration, a downwardly and outwardly flared bottle centering housing slidably mounted on said tube, a gasket within said housing adapted to contact the upper end of a bottle to be filled, the tip of said tube being closed and tapered at 30° to the longitudinal axis of said tube, the lower end of said tube having a plurality of circumferentially unobstructed spaced filler holes and a collar fixedly disposed on said tube adjacent the upper terminal end of said tip, the diameter of said collar being greater than the diameter of said tube and that of the upper terminal end of said tip whereby said collar acts as a stop limiting the amount of downward movement of said housing.

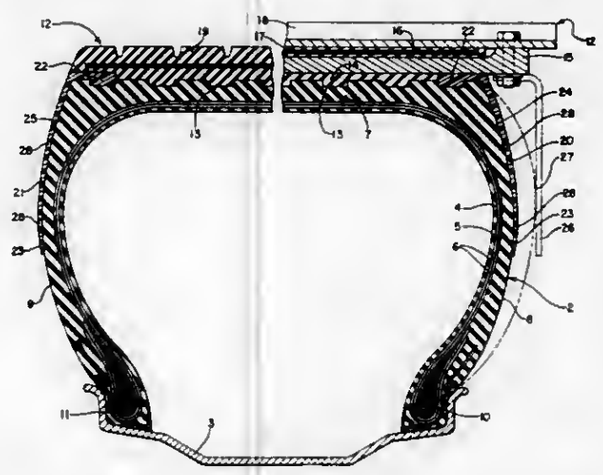
4,030,530

SIDEWALL PROTECTOR FOR A TIRE

Walter W. Curtiss, Jr., Brimfield, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Jan. 5, 1976, Ser. No. 647,273
Int. Cl.² B60C *27/00*
U.S. Cl. 152—187 **8 Claims**

1. In a tire comprising components of a tire carcass including at least one layer of reinforcement cords, a traction element and a pair of sidewalls which at least partially surround the carcass, the improvement comprising a non-rigid shield for covering and protecting at least one of the upper sidewall portions of the tire against punctures, the shield being separate from the portion of the sidewall which the shield covers such that stresses experienced by the sidewall during flexing will not be imparted to the shield, the shield being configured to at least engage the most deflected portion of the sidewall during flexing thereof, the shield being composed of elastomeric material which is sufficiently resilient to absorb cuts inflicted by sharp objects such as rocks, the shield being generally L-shaped, in section, and comprising, (I) an annulus for at least covering the adjacent upper sidewall portion, (II) a cylindrical portion which is secured between the two components of traction element and tire carcass, and (III) means carried by the cylindrical portion for forming a mechanical interlock with at least one of said two components of the tire.

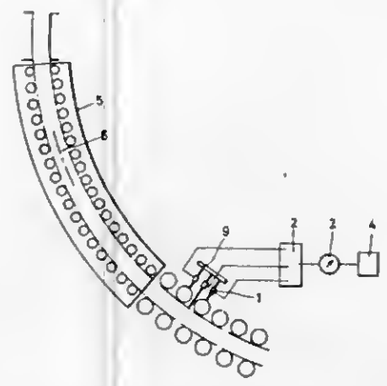


4,030,531

METHOD AND APPARATUS FOR MONITORING AND OBVIATING DEFORMATIONS OF CONTINUOUS CASTINGS

Klaus Wunnenberg, Duisburg, and Joachim Dubendorff, Krefeld, both of Germany, assignors to Mannesmann Aktiengesellschaft, Dusseldorf, Germany

Filed Jan. 26, 1976, Ser. No. 652,364
Claims priority, application Germany, Feb. 4, 1975, 2504986
Int. Cl.² B22D *11/16*
U.S. Cl. 164—4 **11 Claims**



1. In the method of monitoring and obviating a critical deformation of a shell of a continuously cast casting which left a continuous casting mold and is guided from the mold by a supporting section including guiding rollers and subjected to the direct action of a coolant; which includes measuring relative to a reference line the bulging of a casting shell between two adjacent guiding rollers;

locating said guiding rollers at the solidification zone of the casting;

measuring the instantaneous distance of said guide rollers relative to said reference line;

sensing the differential between said measurements;

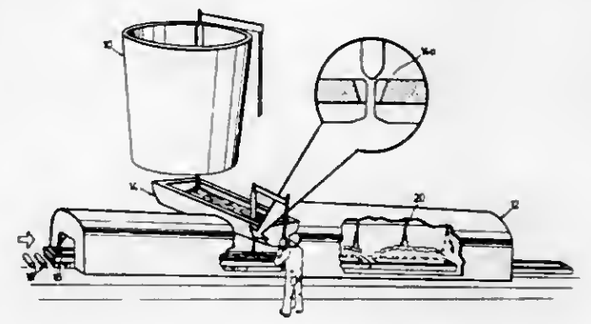
and controlling and regulating the speed at which the casting travels in accordance with the degree of said bulging as expressed by said differential.

4,030,532

METHOD FOR CASTING STEEL INGOTS

Lars Tiberg, Fagersta, Sweden, assignor to Fagersta AB, Fagersta, Sweden

Continuation-in-part of Ser. No. 585,766, June 10, 1975, abandoned. This application May 25, 1976, Ser. No. 689,803
Int. Cl.² B22D *7/00*
U.S. Cl. 164—66 **13 Claims**



1. A method for casting steel ingots in molds comprising the steps of:

pouring the steel into elongated horizontal moldshaving an open upper surface to form ingots;

moving said molds longitudinally under a casting tundish at a uniform rate during casting;

maintaining the surface temperature of said ingots in the range of 40° below the liquidus temperature to 50° above the liquidus temperature of the steel for at least 10 seconds after casting so that the upper surface of said ingots remains fluid to allow slag inclusions to float to said upper surface;

solidifying said upper surface of said ingots between 10 seconds and 2 minutes after casting by lowering the ingot surface temperature to a temperature between solidus temperature and a temperature 100° C below solidus temperature, the solidifying of said upper ingot surface to occur before the interior of said ingot is solidified; and

maintaining said solidified upper surface at a temperature between the solidus temperature and a temperature 200° C below solidus temperature so that said upper surface is sufficiently hot to deform plastically when the interior of the ingot solidifies and shrinks to thereby reduce the formation of pores or segregates in the ingots.

4,030,533

CONTINUOUS CASTING SYSTEM

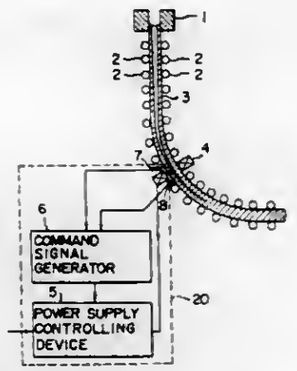
Yasuo Itoh; Yoshitake Suzuki, both of Kisarazu; Hirohiko Shibutami, Kitakyushu; Koichi Hirano, Kitakyushu, and Muneo Tagami, Kitakyushu, all of Japan, assignors to Nippon Steel Corporation, Tokyo and Kabushiki Kaisha Yaskawa Denki Seisakusbo, both of, Japan

Division of Ser. No. 588,698, June 20, 1975, Pat. No. 3,987,841. This application May 14, 1976, Ser. No. 686,362
Claims priority, application Japan, June 24, 1974, 49-71394
Int. Cl.² B22D *11/10*, *11/16*
U.S. Cl. 164—147 **4 Claims**

1. A continuous casting system having an electromagnetic agitator, which comprises:

electromagnetic agitator control means operable to control operation of said electromagnetic agitator when a magnetic substance approaches same, and including first detecting means provided on the inlet side of said electromagnetic agitator for deenergizing said agitator upon detection of a magnetic substance approaching said agita-

tor, and second detecting means provided on the outlet side of said electromagnetic agitator for energizing said



agitator after both detecting means cease to detect the magnetic substance.

4,030,534

APPARATUS FOR CONTINUOUS CASTING USING LINEAR MAGNETIC FIELD FOR CORE AGITATION

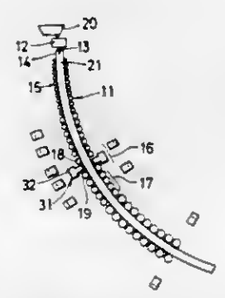
Yasuo Ito, and Yoshitake Suzuki, both of Kisarazu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Division of Ser. No. 431,605, Jan. 8, 1974, Pat. No. 3,952,791. This application Jan. 14, 1976, Ser. No. 649,019

Claims priority, application Japan, Apr. 18, 1973, 48-46371

Int. Cl.² B22D *11/12*

U.S. Cl. 164—147 **4 Claims**



1. In a continuous casting apparatus having a mold, a device for withdrawing the cast object from the mold and a group of rolls along the path of the withdrawn cast object for supporting the cast object during withdrawal, the improvement comprising the combination of: a fixedly positioned non-rotatable electromagnetic agitator at a position along the path of the withdrawn cast object opposite the crater of molten metal within the cast object, said electromagnetic agitator having a core on opposite sides of the path of the cast object having a plurality of deep slots therein facing the cast object, coils wound around the cores at the bottoms of the deep slots, and a housing of non-magnetic material over the cores on opposite sides of the path of the cast object, said housing for the cores having a head over the portions of the cores between the slots, said housing protecting the core and the coils; and a plurality of roll sof non-magnetic material adjacent the magnetic agitator on opposite sides thereof in the direction of the path of the withdrawn cast object for supporting the cast object being withdrawn from the mold, said non-magnetic material rolls having a diameter from one-fourth to one-half that of the remainder of the rolls, and the pitch between the smaller diameter rolls being no greater than that between the larger rolls, said smaller diameter rolls being subdivided into at least two portions in the direction of their length.

4,030,535

MOLDING SYSTEM

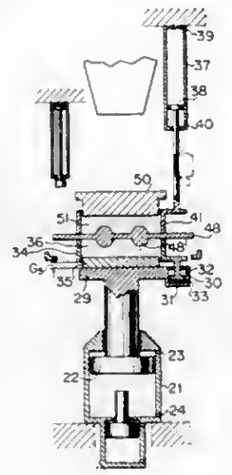
Yoshimi Saka, Suzuka, Japan, assignor to Hitachi Metals, Ltd., Japan

Filed Apr. 18, 1975, Ser. No. 569,292

Claims priority, application Japan, Apr. 19, 1974, 49-43393; July 24, 1974, 49-84151

Int. Cl.² B22C *15/08, 11/10*

U.S. Cl. 164—207 **8 Claims**



1. A molding system comprising:

a plurality of equidistantly spaced parallel pouring lines,

rail means extending at a right angle to said spaced pouring lines,

a truck means mounted for selective displacement along said rail means,

at least one pair of flaskless molding machines mounted on said truck means such that an alignment of one of said molding machines at one of said pouring lines automatically aligns the other of said molding machines with a next adjacent pouring line, each of said molding machines including:

a drag means for receiving a material forming a portion of a product mold,

a cope means arranged at the molding machine for receiving a material forming the remaining portion of the product mold,

a squeeze table means arranged at the molding machine for selectively compressing the material in said drag means and said cope means,

a drag memory means operatively connecting said drag means to said squeeze table means for memorizing and maintaining a predetermined relative position between said drag means and said squeeze table means at an end of a compressing operation by said squeeze table means.

and wherein each of said molding machines further include a mold pusher means for delivering a product mold from a respective molding machine to a respective pouring line.

4,030,536

APPARATUS FOR CONTINUOUS CASTING OF METALS

William Simon Rodenchuk, Montreal, and Anthony Garth Eccles, Oakville, both of Canada, assignors to Alcan Research and Development Limited, Montreal, Canada

Division of Ser. No. 465,552, April 30, 1974, Pat. No. 3,933,192. This application Nov. 3, 1975, Ser. No. 628,321

Claims priority, application United Kingdom, Apr. 30, 1973, 20553/73

Int. Cl.² B22D *11/08*

U.S. Cl. 164—274 **8 Claims**

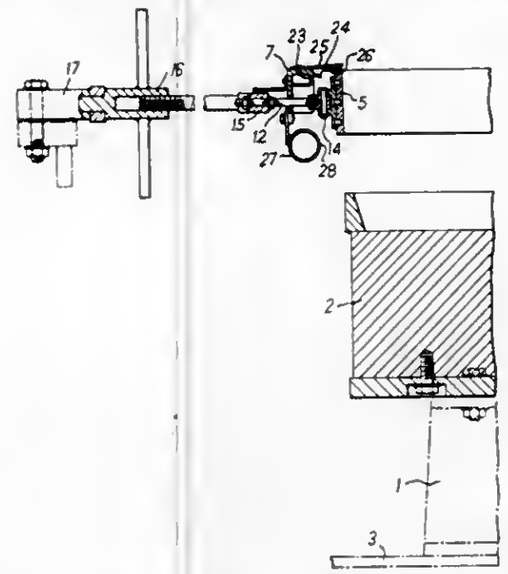
2. In apparatus for continuously casting a substantially rectangular section ingot in combination

a. a rectangular mould adapted to receive and contain a supply of molten metal, said mould having an open outlet end and side walls formed of heat conductive metal,

b. means for initially closing the open outlet end of the mould and for progressively withdrawing an ingot from said mould at a controllably variable rate as the surface portion of said ingot solidifies,

c. means for applying coolant liquid to the walls of the mould around its periphery to cool the walls,

d. means for applying coolant liquid direct to the surface of



the emerging ingot at a position adjacent the outlet end of said mould, the

e. means for progressively curving at least the long side walls of said mould convexly outwardly, about an axis of curvature parallel to the direction of advance of metal through the mould, during the performance of the casting operation, each of said side walls being curvable about said axis throughout substantially its full cooled extent in said last-mentioned direction to and including the margin of the side wall at the mould outlet end.

4,030,537

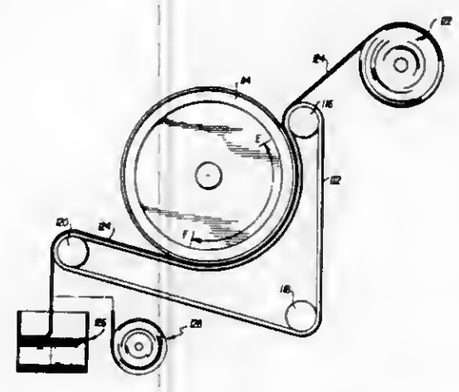
THIN GAUGE CASTING WHEEL BAND

George C. Ward, Carrollton, Ga., assignor to Southwire Company, Carrollton, Ga.

Filed June 25, 1975, Ser. No. 590,236

Int. Cl.² B22D *11/06*

U.S. Cl. 164—278 **5 Claims**



1. In a machine for continuously casting molten metal wherein a flexible band is guided into closed relationship with an arcuate portion of the peripheral groove of a rotatable casting wheel to form a casting mold, and including means for applying a coolant to the external surface of the flexible band to conduct heat from said band and solidify the molten metal, the improvement comprising a porous support belt arranged to support and urge said band into engagement with the casting wheel peripheral groove over said arcuate portion, said means for applying the coolant being arranged to supply the coolant to said band through said porous support belt, said support belt being guided away from and returned to said peripheral groove by a plurality of guide wheels, said flexible band being wound upon itself to form a roll thereof, and including means for feeding said flexible band from said roll into closed relationship with said peripheral groove at the point on said casting wheel at which said support belt is returned to said peripheral groove.

4,030,538

DEVICE FOR ADJUSTING THE QUANTITY OF MOLTEN METAL USED IN PRESSURE CASTING

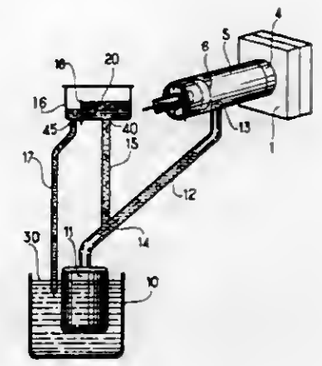
Henri Carbonnel, Antony, France, assignor to Groupement pour les Activities Atomiques et Advancees "GAAA" S.A., Le Plessis Robinson, France

Filed June 30, 1976, Ser. No. 701,277

Claims priority, application France, July 7, 1975, 75.21254

Int. Cl.² B22D *17/30*

U.S. Cl. 164—312 **4 Claims**



1. A device for adjusting the quantity of molten metal used in pressure casting, the device comprising:

a supply container for molten metal,

a pump operatively positioned with respect to said molten metal supply container for pumping molten metal upwardly from said supply container,

a pressure chamber positioned above said supply container for injecting molten metal into a mold,

a rising pipe connecting said pump to said pressure chamber to feed molten metal to said pressure chamber,

a level-determining tank positioned above said supply container at the level of said pressure chamber and having a level-determining overflow,

a branch pipe rising from a fork in said rising pipe and connected to the bottom of said level-determining tank for continuous feeding of molten metal to said level-determining tank in parallel with said pressure chamber whereby, in operation, the level of molten metal in said pressure chamber, and hence the quantity supplied to the mold, is determined by the level of said overflow in said tank; and

a return pipe projecting downward from the bottom of said level-determining tank to the side of said overflow opposite said branch pipe for returning the overflowing metal in said tank to said supply container.

4,030,539

CROSS-CURRENT PIPE HEAT-EXCHANGER FOR GASES

Manfred Stute, Esslingen, and Eggert Tank, Fellbach, both of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed Aug. 28, 1974, Ser. No. 501,365

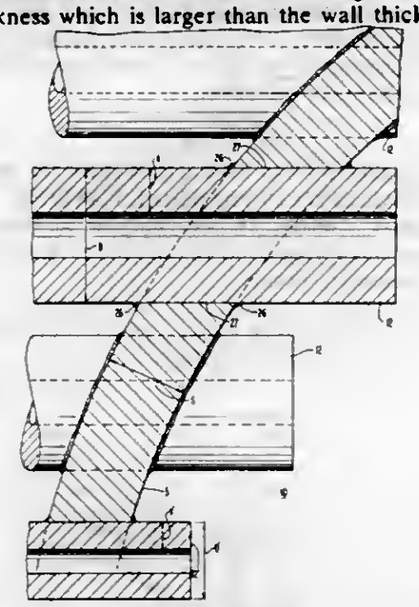
Claims priority, application Germany, Aug. 28, 1973, 2343310

Int. Cl.² F28F *9/04;* **F28D** *7/06*

U.S. Cl. 165—134 **24 Claims**

1. A heat-exchanger comprising: a plurality of individual

heat-exchanger pipes, means for directing the flow of a heat-absorbing gas through said individual heat exchange pipes, means for fixedly connecting each of said individual heat exchange pipes to said flow directing means, at least some of said plurality of individual heat exchange pipes at least at the area of connection with said flow directing means having a wall thickness which is larger than the wall thickness of the



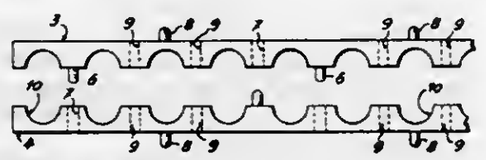
remaining individual pipes of said plurality of individual heat exchange pipes.

4,030,540

TUBE NEST FOR HEAT EXCHANGERS, AND MODULAR ELEMENTS FOR SAID NEST CONSISTING OF THERMOPLASTIC TUBES, AND PROCESS FOR MANUFACTURING THE MODULAR ELEMENTS AND THE TUBE NESTS

Carlo Roma, Rome, Italy, assignor to Bellell Industrie Meccaniche S.p.A, Italy

Filed Mar. 21, 1973, Ser. No. 343,196
Claims priority, application Italy, Apr. 20, 1972, 49783/72
Int. Cl.² F28F 9/26
U.S. Cl. 165—172 **3 Claims**



1. A tube nest for heat exchanger which is easily constructed from flexible modular elements spirally windable on a reel comprising:

a. a plurality of modular elements forming a rectangular box shaped structure, each module being stackable, flexible and planar;

b. each modular element comprising a combination a plurality of flexible thermoplastic tubes in a parallel and spaced apart single layer arrangement, a plurality of rigid spacers each comprising two parts, each part having an inner face with semicircular grooves and an outer flat face such that when said two parts are mated, parallel and spaced apertures are formed to retain said thermoplastic tubes of the modular element, pins and bores adjacent at least some of said semicircular grooves on the inner faces of each part forming a connection means to connect said two parts to form said rigid spacer;

c. abutting modular elements joined at abutting flat surfaces of said rigid spacers by outer pins and bores as coupling means in said flat surfaces, said coupling means aligning the tubes of adjacent modular elements in either staggered or in-line position; and

d. a tube head being mounted on the ends of said plurality of tubes.

4,030,541

MULTI-ELEMENT TYPE RADIATOR OF PLASTIC MATERIAL

Erwin Gross, Burgsolms, and Hans Vowinkel, Florsheim am Main, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed June 6, 1975, Ser. No. 584,402
Claims priority, application Germany, June 8, 1974, 2422715
Int. Cl.² F28F 9/02
U.S. Cl. 165—175 **3 Claims**

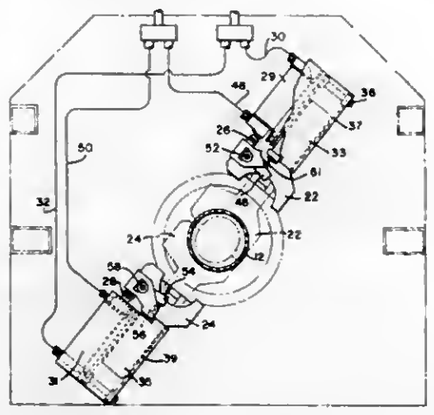
1. A multi-element radiator made of plastic material and comprising vertical water pipes connected to upper and lower collecting channels, each radiator element being composed of a plurality of said vertical pipes connected at their upper and lower ends to relatively thin-walled cylindrical tube sections of substantially uniform diameter and the end-faces of adjacent tube sections being connected to form horizontal tubular channels of substantially uniform diameter along the length thereof, the ends of said pipes being of diminished cross-section at their junctions with said tube sections and being aligned with a radius of said tube sections.

4,030,542

DRILL STRING MAKE-UP AND BREAK-OUT MECHANISM

Curtis Eugene Poe, Reynoldsville, and Ronald Murray Cheers, Bridgeport, both of W. Va., assignors to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Continuation-in-part of Ser. No. 618,792, Oct. 2, 1975, abandoned. This application Sept. 22, 1976, Ser. No. 725,679
Int. Cl.² E21B 33/03; B25B 13/50
U.S. Cl. 166—77.5 **13 Claims**



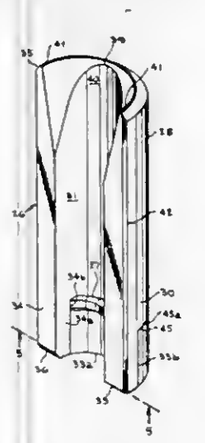
1. A drill string make-up and break-out mechanism for use on a drill platform comprising; a pair of pipe-holding members mounted on the drill platform and circumferentially spaced adjacent the drill pipe, each pipe-holding member having a stop member connected thereto adapted to contact grooves formed in the drill pipe, the grooves in the drill pipe being constructed and the stop members being constructed so that one stop member prevents rotation of said pipe in one direction; and the other stop member prevents rotation of said pipe in the other direction; and means for fluidly simultaneously actuating said pipe-holding members, said pipe-holding members being adapted to vertically support the pipe when actuated into contact with the pipe.

4,030,543

WELL TUBING MANDREL WITH COMBINATION GUARD, GUIDE AND LATCH ARRANGEMENT

Ferdinend M. McGinn, Lafayette, La., assignor to Production Specialties, Inc., Lafayette, La.

Filed Sept. 13, 1976, Ser. No. 722,535
Int. Cl.² E21B 23/00
U.S. Cl. 166—117.5 **2 Claims**



1. In a mandrel for use in a well tubing including:

a. a body having an open bore extending therethrough for alignment with the well tubing;

b. a valve receptacle formed in said mandrel body and offset from the open bore of said body;

c. combination guard and guide means formed at the upper end of said valve receptacle and offset from the open bore of said body, said combination guard and guide including:

1. a body of generally semicircular shape having a portion which forms part of the mandrel body that is offset from the open bore of said mandrel body and is adjacent and above said valve receptacle;

2. said semicircular body including sides extending toward the open body bore to define the front of said combination guard and guide;

3. said sides each having a substantially vertical edge extending from the upper to the lower end of said body;

4. a tapering surface formed on the upper end of said body and extending generally inwardly and downwardly to form an opening in said guard and guide of a desired configuration to restrict access to said valve receptacle immediately therebelow; and

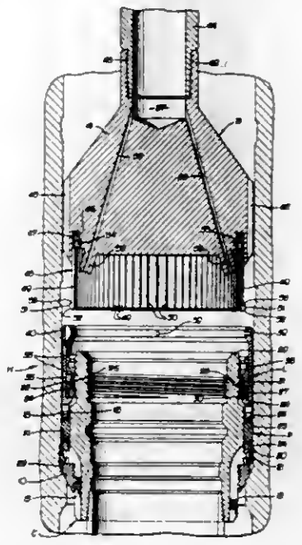
d. projection means adjacent the lower end of said semicircular body and extending inwardly of said semicircular body to form lug means to assist in retaining a valve in said valve receptacle.

4,030,544

WELLHEAD SEAL APPARATUS AND PULLING TOOL FOR RELEASING AND RETRIEVING SUCH APPARATUS

Arthur G. Ahlstone, Ventura, Calif., assignor to Vetco Offshore Industries, Inc., Ventura, Calif.

Division of Ser. No. 475,586, June 3, 1974, Pat. No. 3,944,273. This application Nov. 24, 1975, Ser. No. 634,366
Int. Cl.² E21B 23/00
U.S. Cl. 166—182 **11 Claims**



1. In seal apparatus between a wellhead and a hanger disposed in the wellhead for supporting a tubular pipe string extending into a well bore: packing means; locking means for locking said packing means in sealing relation to the hanger including a locking member actuable longitudinally to lock said locking means and retractable to release said locking means and packing means; said locking member having a circumferentially continuous pulling shoulder; and pulling tool means including instrumentalities deflectable inwardly by said locking member to enable said instrumentalities to move past said shoulder to a position therebelow, said instrumentalities deflecting outwardly under said shoulder for engagement with the underside of said shoulder to retract said locking member.

4,030,545

APPARATUS FOR CLEANSING WELL LINER AND ADJACENT FORMATIONS

Rostislav Nebolsine, 64 E. 86th St., New York, N.Y. 10028

Continuation-in-part of Ser. No. 539,111, Jan. 7, 1975, Pat. No. 3,945,436. This application Mar. 15, 1976, Ser. No. 666,976
Int. Cl.² E21B 33/124, 33/127, 43/25
U.S. Cl. 166—191 **7 Claims**

5. Apparatus for cleaning well liners having apertures or the walls of an open cavity, and the adjacent underground formations, comprising:

at least two substantially elongate outer pipe sections adapted to be positioned within a well, said outer pipe sections being positioned in substantial vertical, spaced axial alignment;

an inner, flexible pipe extending through and including means for supporting said outer pipe sections and having means on one end adapted to be connected to a high pressure fluid source;

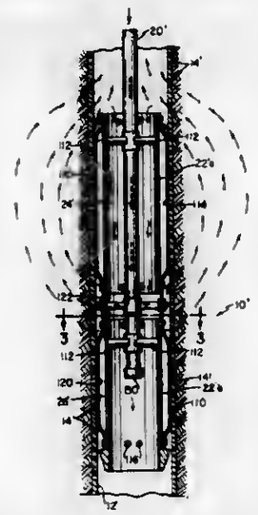
at least two elongate packers, each of said packers surrounding a respective one of said outer pipe sections;

a flexible material connecting adjacent ends of adjacent outer pipe sections, thereby defining flexible joints so that said adjacent pipe sections and the respective packers associated therewith are articulated;

means defining a fluid outlet communicating with said inner

flexible pipe and communicable with the adjacent underground formations; and

said packers each having a length such that the sealed



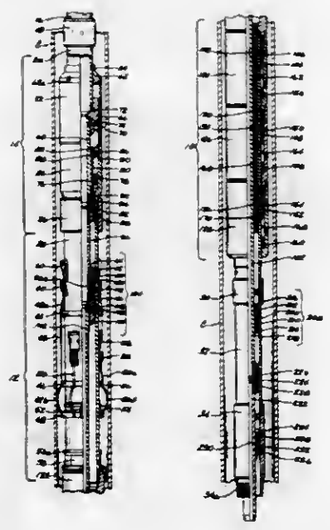
lengths of the liner or cavity are sufficiently long to cause the fluid, upon being applied to said inner pipe, to flow outwardly through the underground formation in arc-shaped paths at a distance away from the liner or cavity.

4,030,546

SWIVEL ASSEMBLY

Jerry L. Rogers, New Orleans, La., and Chudleigh B. Cochran, Houston, Tex., assignors to Brown Oil Tools, Inc., Houston, Tex.

Filed July 28, 1975, Ser. No. 599,628
Int. Cl.² E21B *43/10*
U.S. Cl. 166—208 **27 Claims**



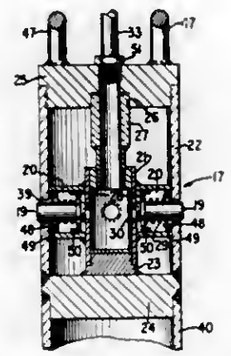
1. A swivel device comprising:
a. generally tubular housing means;
b. core means rotatably carried within said housing means;
c. fluid seal means between said housing means and said core means, defining a plurality of fluid chamber means between said housing means and said core means;
d. fluid pressure communicating passage means interconnecting each of said fluid chamber means;
e. bearing fluid means contained within said fluid chamber means and said fluid pressure communicating passage means to function as load bearing means and as rotational bearing means between said housing means and said core means; and
f. said fluid chamber means arrayed such that load, supported by said bearing fluid means in said fluid chamber means as load bearing means, is generally equally distributed among said fluid chamber means.

4,030,547

APPARATUS FOR CRYOTHERMAL FRACTURING OF ROCK FORMATIONS

Sigmund L. Ross, Brooklyn, N.Y., assignor to Rose Shuffman, Executrix, Scarsdale, N.Y.

Division of Ser. No. 523,887, Nov. 14, 1974, Pat. No. 3,978,921, which is a continuation-in-part of Ser. No. 148,048, May 28, 1971, Pat. No. 3,759,329, which is a continuation-in-part of Ser. No. 823,306, May 9, 1969, Pat. No. 3,581,821. This application Apr. 29, 1976, Ser. No. 681,740
Int. Cl.² E21B *43/26, 23/04*
U.S. Cl. 166—212 **3 Claims**



2. An anchoring device for use in a hole in a rock formation which comprises a body member having peripheral surface dimensioned for disposition when inserted in said hole in proximate spaced relation to the inner side wall of said hole, gripping means for gripping the side wall of said hole, said gripping means comprising a plurality of pistons mounted on said body member for movement laterally outwardly with respect to said body member until the ends thereof make pressure contact with the side wall of the hole, means responsive to pressurized gas to move said pistons outwardly to establish said ends thereof in gripping relation with said side wall, gas supply means connected to said body member for supplying gas into operative relation with said pistons for moving said pistons outwardly to establish the ends thereof in gripping relation with said side wall, said gas supply means comprising a valve which controls supply of pressurized gas into said operative relation with said pistons, and means for moving said valve to open position when said anchoring means has been positioned in said hole to thrust said pistons outwardly responsive to release of pressurized gas and thereby establish said ends thereof in gripping relation with the side wall of the hole.

4,030,548

ECONOMICALLY DISSOLVING BARIUM SULFATE SCALE WITH A CHELATING AGENT

Edwin A. Richardson, Houston, and Ronald F. Scheuerman, Bellaire, both of Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Apr. 28, 1976, Ser. No. 680,937
Int. Cl.² C02B *5/06;* **C23F** *14/02;* **E21B** *43/27*
U.S. Cl. 166—279 **5 Claims**

1. A process for dissolving barium sulfate solid from a remote location into which fluid can be flowed comprising:
flowing fluid into the remote location so that a stream of fluid contacts and flows along the surfaces of the barium sulfate solid, and

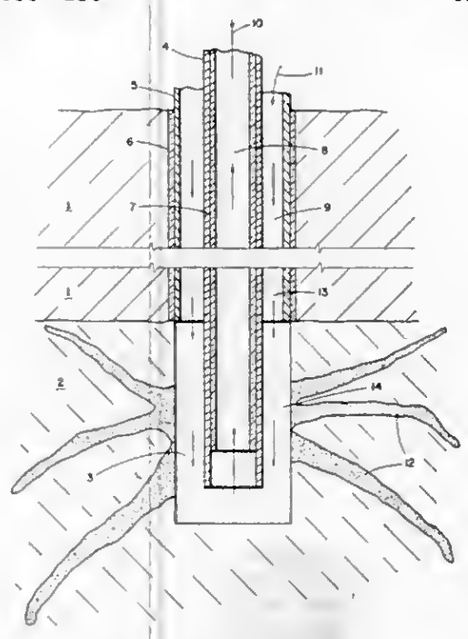
adjusting the composition and flow rate of the fluid so that (a) the barium sulfate solid is contacted by a stream of aqueous solution in which each portion contains enough dissolved aminopolyacetic acid salt chelating agent to be effective in dissolving barium sulfate scale, (b) substantially all upstream portions of the barium sulfate solid are contacted by succeeding portions of the aqueous solution that are substantially unsaturated with respect to the dissolved barium-chelant complex, and (c) said aqueous solution contains from about 0.02–0.05 moles per liter of the chelating agent.

4,030,549

RECOVERY OF GEOTHERMAL ENERGY

Larry S. Bouck, Tulsa, Okla., assignor to Cities Service Company, Tulsa, Okla.

Filed Jan. 26, 1976, Ser. No. 652,022
Int. Cl.² E21B *43/24;* **F28F** *19/00;* **F28D** *21/00*
U.S. Cl. 166—280 **12 Claims**



1. A process for the formation of a structure for the transfer of energy between a locus in a borehole and a subterranean formation comprising:
a. drilling a borehole from the surface into the formation,
b. fracturing and propping the formation adjacent to the locus by injecting a reactive slurry into the formation at a pressure above the fracturing pressure of the formation, the slurry comprising finely divided aluminum and a reactive metal oxide in a fluid carrier,
c. igniting the reactive slurry within the formation so that the aluminum and the metal oxide therein react to form a liquid metal within the fracture system formed in the formation, and
d. allowing the liquid metal in the formation to cool and solidify within the fracture system.

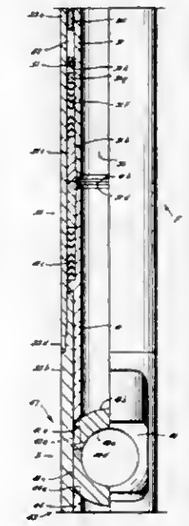
4,030,550

METHOD OF OPERATING A SUBSURFACE SAFETY VALVE IN RESPONSE TO AN INCREASE OR DECREASE IN AMBIENT WELL FLUID PRESSURE

James D. Mott, Houston, Tex., assignor to Hydril Company

Division of Ser. No. 566,202, April 9, 1975, Pat. No. 3,987,849, which is a continuation of Ser. No. 399,455, Sept. 21, 1973, abandoned, which is a division of Ser. No. 214,679, Jan. 3, 1972, Pat. No. 3,788,594. This application Jan. 7, 1976, Ser. No. 646,993
Int. Cl.² E21B *43/12*
U.S. Cl. 166—314 **10 Claims**

6. A method of operating a well fluid ambient pressure responsive subsurface safety valve disposed in a well tubing to control the flow of well fluids through the bore of the tubing to control the flow of well fluids through the bore of the tubing including the steps of:
sensing with the safety valve both increasing and decreasing pressure changes in the well fluid pressure in the bore of



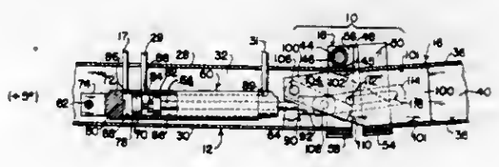
the well tubing from a preselected ambient well fluid pressure for operating the safety valve; and
closing the safety valve to block flow through the bore of the well tubing at the sursurface location responsive to either sensed pressure change in the bore of the well tubing.

4,030,551

FOLDING FLEX TOOLBAR

Charles Boetto, Naperville; Wayne L. Orkwiszewski, Romeoville, and Donald E. Connor, Plainfield, all of Ill., assignors to International Harvester Company, Chicago, Ill.

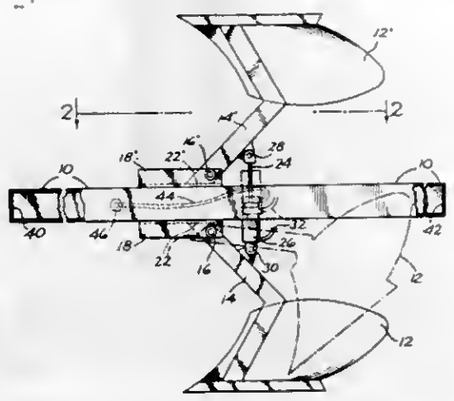
Filed Apr. 12, 1976, Ser. No. 676,090
Int. Cl.² A01B *15/14, 73/00*
U.S. Cl. 172—126 **13 Claims**



1. In an articulated sectional tool bar for carrying agricultural earth-working tools, in combination, a normally horizontal main tool bar section and an outer wing section, as offset hinge connecting said sections in end-to-end relationship for swinging movement of the wing section between a normal lowered operative earth-working position where such tools as may be carried thereby may follow a rolling terrain, and a slightly inclined raised inoperative position where such tools are clear of the ground for implement turnabout purposes, a crank arm on said wing section, a hydraulic cylinder pivotally mounted on the main section and having a positive displacement piston therein and a cooperating plunger capable of moving a full stroke projecting therefrom and which is responsive to the stroke of the said positive displacement piston, said cylinder provided with an internal abutment which determines the forward limited motion of the positive displacement piston, said positive displacement piston being effectively engageable with said plunger during forward movement of the former to transmit its limited motion to the plunger to move

the plunger a fraction of its full stroke and to raise the wing section to its slightly inclined raised inoperative position, a hydraulic fluid line in communication with said cylinder rearwardly of said positive displacement piston and effective when pressurized to drive said positive displacement piston forwardly, and means effective between the outer end of the plunger and said crank arm for applying torque to the latter to thereby raise said wing section progressively during outward projection of the plunger under the influence of said positive displacement piston.

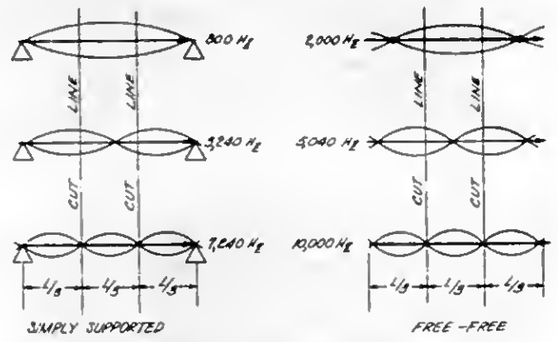
4,030,552
PLOW TRIP
Glen Armon Watts, Rte. 1, Box 258, McMinnville, Oreg. 97127
Continuation of Ser. No. 369,981, June 14, 1973, abandoned. This application June 4, 1976, Ser. No. 692,937
Int. Cl.² A01B *65/00*
U.S. Cl. 172—663 **3 Claims**



1. In combination with a plow having a support, a ground-working plow member mounted on the support for movement relative thereto-between an outwardly extended this position and an inwardly retracted position,
   a. a fluid pressure piston-cylinder unit operatively interconnecting the support and plow member, the piston-cylinder unit having a piston rod of substantially smaller diameter than the cylinder bore extending fro one end of the cylinder.
   b. means communicating only the piston end of the cylinder of said unit with a source of hydraulic fluid pressure for urging the plow member toward said outwardly extended position,
   c. a constant volume sealed chamber carried by the support and containing only compressible gas, and
   d. conduit means communicating the chamber with the piston rod end of the cylinder for confining compressible gas only for movement between the piston rod end of the cylinder and the chamber during extension and retraction of the piston-cylinder unit.

4,030,553
PERCUSSION TOOL WITH NOISE REDUCING CHARACTERISTICS AND METHOD OF MAKING
Thomas H. Rockwell, 11801 Summers Road, Chesterland, Ohio 44026
Filed June 23, 1975, Ser. No. 589,022
Int. Cl.² B25D *17/12, 17/24*
U.S. Cl. 173—1 **13 Claims**

1. A method of constructing a longitudinally extending percussion tool of predetermined length for use in combination with an apparatus having means for delivering longitudinally directed impacts to an impact receiving portion of the tool, said method comprising the steps of:
   a. operating a longitudinally extending monolithic prototype percussion tool of said predetermined length having an impact receiving portion and a working end portion by impacting the tool to generate the resonant audible noise frequencies radiated by the prototype tool during use;
   b. identifying a resonant audible noise frequency radiated over the length of the prototype tool during operation;
   c. establishing a mode shape for the longitudinally extending percussion tool by determining the resonant mode shape for the prototype tool which corresponds to the frequency identified in step (b);
   d. providing a plurality of tool sections, each of predetermined length and which when joined to each other form a tool having an impact receiving portion and a working end portion and having a length equal to the length of the monolithic prototype tool and a strutural discontinuity at

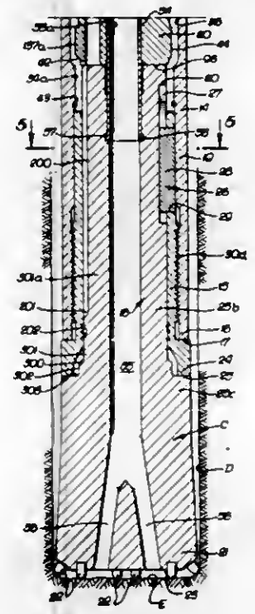


APPROXIMATE SHAPES OF THE FIRST THREE SIMPLY-SUPPORTED AND FREE-FREE BENDING MODES. THE CUT LINES SHOW THE LOCATIONS OF THE THREADED JOINTS RELATIVE TO THE MODE SHAPES

   at least one predetermined location along the length of the tool, which location is a predetermined longitudinal distance from an antinode of the mode shape established for said longitudinally extending percussion tool to introduce an impedence mismatch at that location, and joining the plurality of tool sections to each other to form a percussion tool; and
   e. providing said impact receiving portion in a configuration and at a location relative to the length of the tool that the tool is combinable with an apparatus having means for impacting the impact receiving portion of the tool with the impact receiving portion of the tool disposed for engagement with the impacting means.

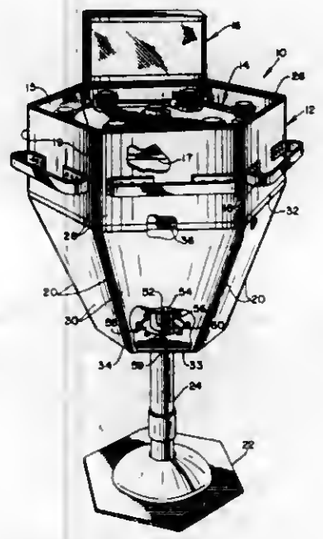
4,030,554
BORE HOLE AIRHAMMER AND ANVIL BIT
Archer W. Kammerer, Jr., Columbus, N.C., and Alfred R. Curington, Inman, S.C., assignors to Bakerdrill, Inc., Spartanburg, S.C.
Filed July 7, 1975, Ser. No. 593,692
Int. Cl.² B23Q *5/027*
U.S. Cl. 173—17 **26 Claims**

15. Percussion drilling apparatus: comprising an anvil bit adapted to be impacted against by a hammer piston; said anvil bit having bleeder passage means including an upper inlet portion opening through the upper extremity of said anvil bit, said passage means extending downwardly in said anvil bit to a lower outlet portion located above the lower end of said anvil bit; said anvil bit having a peripheral sealing portion



below said lower outlet portion adapted to be sealed against by a housing structure when said bit is disposed therein.

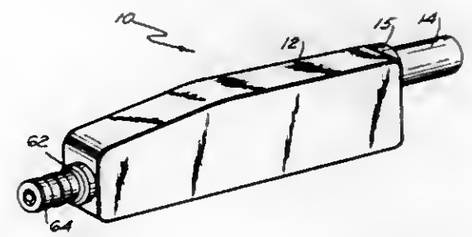
4,030,555
WIGGLE TABLE ELECTRONIC BALL GAME DEVICE
John G. Boyce, and Richard G. Boyce, both of Box 249, Carlsbad, N. Mex. 88220
Filed Mar. 15, 1976, Ser. No. 666,939
Int. Cl.² A63F *7/16*
U.S. Cl. 273—110 **12 Claims**



1. A game of skill device comprising a cabinet, a field of play supported within said cabinet, a ball freely supported upon said field of play and movable by gravity upon the surface thereof;
   a pedestal pivot means interposed between said cabinet and said means urging said field of play into a horizontal position and which yieldably resists movement in any direction away from a horizontal position;
   a stop means for limiting the magnitude of angular displacement toward which said field of play can be urged in a direction away from a horizontal position;
   and means forming a lock device by which said field of play can be locked into a fixed position respective to said pedestal whereby said field of play can no longer be tilted in a direction away from said locked position;
   said lock device includes a magnetically actuated armature,

means by which said armature is removably captured between said cabine and said pedestal at a location spaced from said pivot means in such a manner that relative movement therebetween can be effected only when the armature is displaced from captured relationship to said cabinet and pedestal.

4,030,556
MINIATURE IMPACT TOOL
Raymond J. Phillips, 879 Raymond Hill Road, Oakdale, Conn. 06370
Filed Sept. 22, 1975, Ser. No. 615,453
Int. Cl.² B25D *1/00*
U.S. Cl. 173—120 **6 Claims**



1. A miniature impact tool comprising:
   rotary means adapted for being driven in a rotary motion;
   linear reciprocating means abutting said rotary means for converting the rotary motion to a linear motion, said linear reciprocating shock including a toolholder, said toolholder including a cylindrical flange located on an intermediate portion of said toolholder, said toolholder including a body that is cylindrically shaped for a predetermined axial distance on one side of said cylindrical flange, the end of said one side of said toolholder away from said cylindrical flange having a segment of circle cross-sectional area forming a flat area in the axial direction extending from said cylindrical shape, the other side of said cylindrical flange being cylindrically shaped and having threading and an aperture arrangement adapted to hold a tool at the end of said other side away from said cylindrical flange;
   a threaded sleeve connected to said toolholder threading;
   a housing enclosing said rotating means and a substantial portion of said linear reciprocating means, said housing including a housing aperture, said housing aperture having an outer section enclosing a portion of said toolholder including said flange and being of a diameter larger than the diameter of said toolholder flange and said housing aperture having an inner section enclosing a portion of said toolholder and being of a diameter smaller than said toolholder flange; and
   retaining means for retaining said toolholder including 0 rings encircling and abutting a portion of said toolholder positioned on both sides of said toolholder flange, and a retainer having an aperture for insertion of said toolholder, said retainer inserted in the outer portion of said housing aperture and connected to said housing, said retainer located for abutting one of said 0 rings.

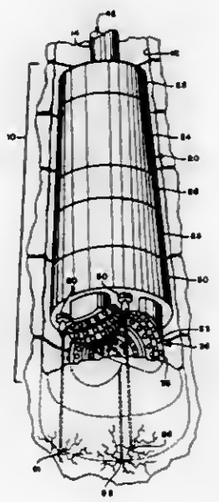
4,030,557
WELL DRILLING APPARATUS AND METHOD
Robert L. Alvis, and Melvin M. Newsom, both of Albuquerque, N. Mex., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.
Filed May 3, 1976, Ser. No. 682,806
Int. Cl.² E21B *7/00*
U.S. Cl. 175—4.5 **6 Claims**

1. In a drilling apparatus utilizing drilling mud under pres-

sure and comprising drill string and drill bit, and improvement comprising:

at least one barrel from which projectiles may be impelled;

at least one magazine for containing a plurality of said projectiles;



means responsive to drilling mud pressure for moving a projectile from said magazine into, through, and out of said barrel; and

means integral with said projectile for firing said projectile upon its exit from said barrel to impel said projectile into rock to be drilled.

4,030,558

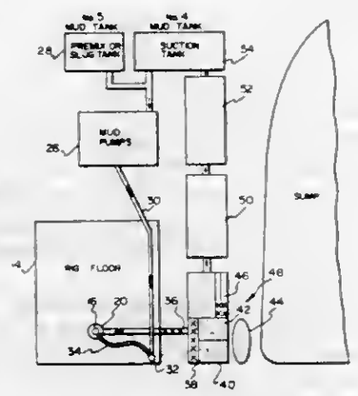
WEAR DETERMINATION OF DRILLING BITS

H. Rodney Morris, 1932 - 26th Ave. SW., Calgary, Alberta, Canada

Filed Sept. 15, 1975, Ser. No. 613,323

Int. Cl.² E21B *13/00*

U.S. Cl. 175—39 **25 Claims**



1. In a rotary drilling operation, a method for determining the wear of the bit comprising the steps of:

circulating a drilling fluid through the borehole and around the bit with sufficient velocity to remove the formation cuttings and the cuttings, fragments and dust worn loose from the bit,

placing a magent in sufficiently close proximity to the removed cuttings, fragments and dust to attract a portion of the ferrous cuttings, fragments and dust present therein to the magnet thereby separating the ferrous material for the removed formation cuttings,

removing the attracted ferrous material from the magnet,

examining the ferrous material under an image magnification device suitable for the observation of the shape and color of the cuttings and fragments forming a portion of the ferrous material so as to permit an evaluation of the observed shape and color of the ferrous cuttings and fragments with respect to the shape and color of ferrous cuttings and fragments indicative of known conditions of rotary bit wear.

4,030,559

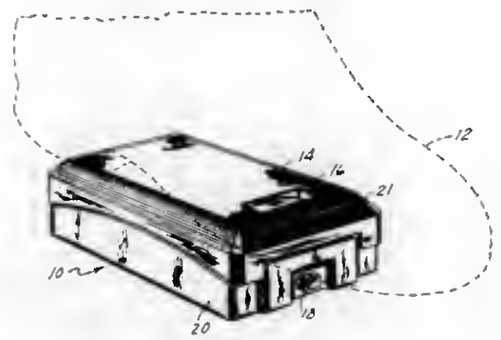
PORTABLE WEIGHING SCALE

Leonard A. Fish, 21 W. Geothe St., Chicago, Ill. 60610, and Robert L. Moore, 919 Coronet Lane, La Grange, Ill. 60525

Filed May 19, 1975, Ser. No. 578,889

Int. Cl.² G01G *23/02, 23/14, 21/08*

U.S. Cl. 177—159 **15 Claims**



1. A portable weighing scale comprising a base, a weighing platform, forming the entire upper surface of the weighing scale, means for resiliently supporting said platform on said base, said platform having an aperture in its upper surface, a weight-indicating dial supported on said base and operatively connected with said platform for rotating in response to a weight resting on said platform to provide an indication of the magnitude of said weight, said indication being visible through said aperture, latch means for holding said dial in weightindicating position, and release means for selectively releasing said latch means, whereby said weight-indicating dial can be inspected after said weight is removed from said platform, said release means incorporating a manually operable latch releasing control supported by said base at a position remote from said platform.

4,030,560

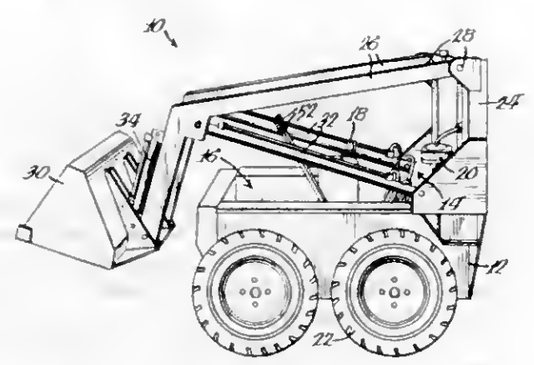
HYDRAULIC SKID STEERING CONTROL SYSTEM

Donald J. Parquet, and Carl O. Pedersen, both of Burlington, Iowa, assignors to J. I. Case Company, Racine, Wis.

Filed Mar. 29, 1976, Ser. No. 671,627

Int. Cl.² B62D *11/04*

U.S. Cl. 180—6.48 **7 Claims**



1. In a skid steer vehicle having a vehicle body with first and second ground engaging members on opposite sides of said body, first and second fluid translating devices connected to the respective ground engaging members for operation in the

forward and reverse directions and having an arm movable in opposite directions from a neutral position by a manually actuated lever, and a connection between each arm and lever, each connection comprising a master cylinder having a master piston slidable therein with a direct connection between said master piston and said lever, a slave cylinder having a slave piston slidable therein and connected to said arm, a first conduit connecting one end of said master cylinder to one end of said slave cylinder to define a first hydraulic chamber on one side of said pistons and including a portion of each of said cylinders, a second conduit connecting an opposite end of said master cylinder to an opposite end of said slave cylinder to define a second chamber on an opposite side of said pistons and including a portion of each of said cylinders, first biasing means cooperating with said master piston and normally maintaining said master piston in a centered position intermediate opposite ends of said master cylinder, second biasing means cooperating with said slave piston and normally maintaining said slave piston in a centered position intermediate opposite ends of said slave cylinder, a hydraulic fluid reservoir connected to said master cylinder with said master cylinder having first and second ports in close proximity to opposite sides of said master piston when said piston is in a centered position so that both said chambers are in communication with said reservoir, whereby movement of said control lever in either direction from a neutral position will move said master piston and block one of said ports so that said slave piston is moved as a function of movement of said master piston by transfer of hydraulic fluid between said cylinders and said first and second biasing means will return both pistons to centered positions, when said lever is released, so that both chambers are again in communication with said reservoir.

4,030,561

SAFETY KICKSTARTER FOR MOTORCYCLES

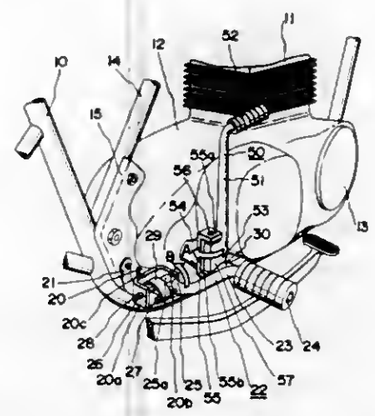
Michiyoshi Hashimoto, and Hisahumi Shako, both of Asaka, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 29, 1976, Ser. No. 653,636

Claims priority, application Japan, Feb. 5, 1975, 50-16770[U]

Int. Cl.² B62J *25/00*

U.S. Cl. 180—33 R **4 Claims**



1. In a motorcycle, in combination, a kickstarter pivotally mounted on the motorcycle for pivotal movement between a working and a retracted position, and a footrest pivotally mounted on the motorcycle adjacent the kickstarter for pivotal movement between a working and a retracted position, and means on said kickstarter and footrest for permitting the kickstarter to be pivotable to its working position only when the footrest is in its retracted position, while when the footrest is in its working position the kickstarter is locked against pivotal movement to its working position.

4,030,562

MOTOR AND PEDAL PROPELLER CYCLE

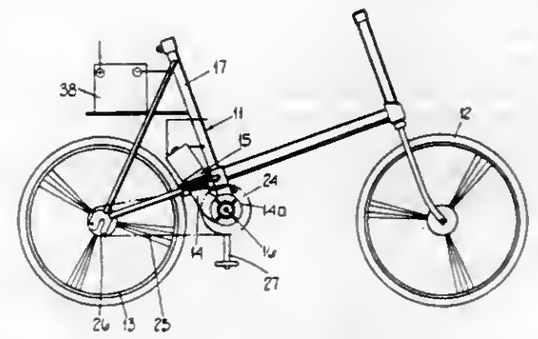
Peter Watson Leighton, Burnley, and Charles Patrick Duncan Davidson, Droitwich, both of England, assignors to Lucas Industries Limited, Birmingham, England

Filed Jan. 21, 1976, Ser. No. 650,877

Claims priority, application United Kingdom, Feb. 27, 1975, 8177/75

Int. Cl.² B62K *11/00*

U.S. Cl. 180—34 **14 Claims**



1. An electrically assisted pedal cycle including a frame, a ground engaging wheel rotatably mounted on the frame, a pedalshaft supported by the frame with its axis extending transverse to the plane of the frame, the shaft being supported for rotational movement and limited axial movement relative to the frame, coupling means whereby rotation of the shaft relative to the frame at least in one direction can be transmitted to said ground engaging wheel to propel the cycle, means operable by rotation of the shaft in said one direction to move the shaft axially relative to the frame in one axial direction, electrical switch means operable by axial movement of the shaft relative to the frame in said one axial direction, an electric motor and associated power source carried by the frame, the electric motor being capable of driving said ground engaging wheel, and said electrical switch means being so associated with the electric motor and its associated power source that energisation of the elector motor is dependent upon operation of said electrical switch means.

4,030,563

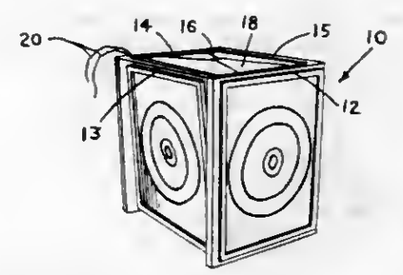
SPEAKER SYSTEM OF CUBIC CONFIGURATION

Edward F. Zinna, 244 Bay 13th St., Brooklyn, N.Y. 11214

Filed Sept. 16, 1976, Ser. No. 723,723

Int. Cl.² H04R *1/40*

U.S. Cl. 181—147 **10 Claims**



1. A speaker system for use in the home or office, and which is designed for hanging from a ceiling or support on a flat surface such as a table, comprising: four speakers each having a thin thickness, said four speakers being arranged to form a cubic arrangement where each one of said speakers forms one of the four side surfaces of the cubic arrangement, two of said speakers lying diametrically opposed to one another and each being canted at an acute angle relative to a vertical plane perpendicular to the other two of said four speakers so that

the bottom edge surfaces of said two speakers lie closer together than the top edge surfaces thereof; a top panel connecting the top edge surfaces of said four speakers; and means on said top panel for attaching said top panel to a ceiling or the like, whereby said two speakers face downwardly toward the floor when hung from a ceiling via said means for attaching and allow for a maximum efficiency of the system.

4,030,564

LOUD SPEAKER WITH STABLE DAMPING

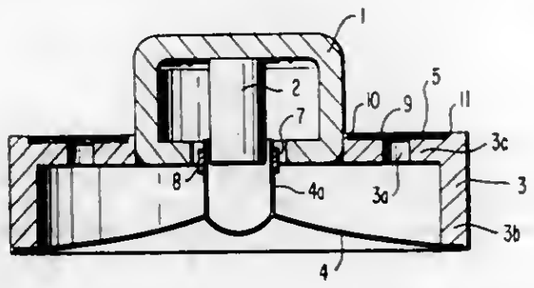
Tadasi Itagaki, Tokorozawa, Japan, assignor to Pioneer Electronic Corporation, Tokyo and Tokorozawa Electronic Corporation, Tokorozawa, both of, Japan

Continuation-in-part of Ser. No. 481,411, June 20, 1974, abandoned. This application Oct. 30, 1975, Ser. No. 627,415

Claims priority, application Japan, June 28, 1973, 48-76021[U]

Int. Cl.² G10K *13/00*; H04R *7/00, 1/28*

U.S. Cl. 181—166 **5 Claims**



1. In a loud speaker of the type having an annular frame concentrically surrounding a central magnet and supporting said magnet by means of transversely extending wall portion fixed to one edge of the annular frame and including a central yoke upon which said magnet is mounted and having a diaphragm fixed at its periphery to the other edge of said annular frame remote from said wall portion, the improvement comprising: air communication holes within the wall portion of said frame facing said diaphragm, and a regularly woven metal wire gauze covering the air communication holes to provide stable vibration damping to the loud speaker diaphragm, and wherein said air communication holes extend through the wall portion of the frame in a circumferentially spaced array, the surface of said wall portion of said frame is recessed annularly and said metal wire gauze comprises a unitary annular strip fixed to the surface of the wall portion remote from said diaphragm and fixedly carried within said recess and overlies all of the holes.

4,030,565

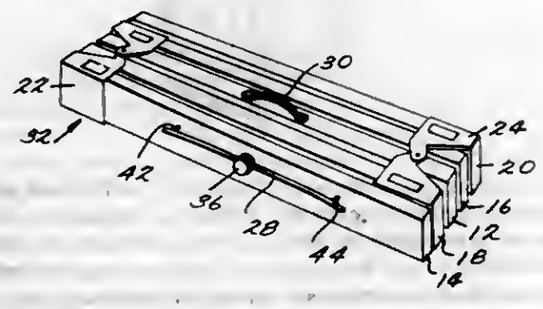
COLLAPSIBLE SAWHORSE PACKAGE

Reynald Chaput, 5140 Inwood Drive, Jackson, Mich. 39206

Filed Dec. 3, 1975, Ser. No. 637,412

Int. Cl.² F16M *11/00*

U.S. Cl. 182—151 **5 Claims**



1. A collapsible sawhorse package comprising:
two pivotally movable gripping brackets each having a pair of legs mounted therein so that said legs are movable between open and closed positions, said pairs of legs being positioned oppositely from one another so that the legs within said pairs are positioned alternately on opposite sides of a centrally located ridge board, wherein each said gripping brackets holds one end of said centrally located ridge board and at least one leg of the opposite pair of legs, said ridge board and each of said legs is provided with at least one opening extending therethrough, wherein each opening is positioned along said ridge board and said legs respectively so that when said ridge board and said legs are formed into said package the openings are aligned and securing means for maintaining said package in a rigid condition, said securing means includes a pin, said pin having a length sufficient to allow the pin to at least pass through the aligned openings in the package formed from said ridge board and said legs and holding means for holding said pin within said aligned openings so as to secure said ridge board and said legs together.

4,030,566

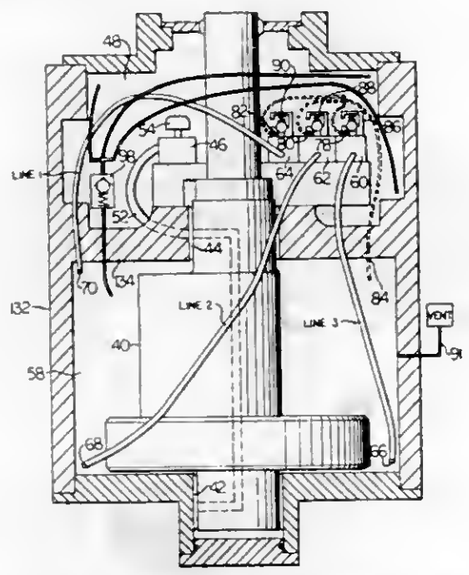
HYDRAULIC SYSTEM FOR ROCK BREAKER

Delwin E. Cobb; George J. Jackson; Richard E. Livesay, all of Peoria County, and Orrin A. Stemler, Tazewell County, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 28, 1975, Ser. No. 626,384

Int. Cl.² F01M *3/00*

U.S. Cl. 184—6.2 **7 Claims**



1. A lubricating system for a mechanism having movable elements and tiltable in operation at least 90 degrees from a first position of normal operation, comprising:
a housing;
a shaft support bearing in said housing;
a rotatable shaft rotatably mounted in said bearing;
a scavenge compartment in said housing for collecting oil subsequent to lubrication of said shaft;
a plurality of scavenge pumps mounted in said housing and having separate inlets so located that at least one inlet is submerged in oil in said compartment regardless of the orientation of said housing;
an oil collection tank for receiving oil from said scavenge pumps;
deaeration means disposed between said scavenge pumps and said collection tank for removing air from said oil prior to delivery of said oil to said tank;
a lubrication pump for drawing oil from said tank and supplying a quantity of said oil for lubricating said shaft; and
vent means for communicating air and vapors from said oil collection tank to said scavenge compartment.

4,030,567

SPRING DRUM

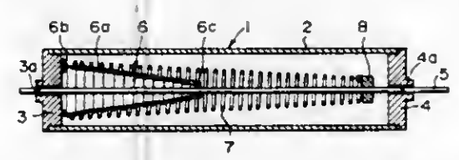
Toshihiro Kondo, Cholu, Japan, assignor to Toshihiro Kondo, Tokyo and Fujl Photo Film Co., Ltd., both of, Japan

Filed July 8, 1976, Ser. No. 703,608

Claims priority, application Japan, July 11, 1975, 50-96545

Int. Cl.² F03G *1/00*; A47G *5/02*

U.S. Cl. 185—37 **10 Claims**



1. A spring drum for driving a web-like member by a spring force comprising in combination:
a cylindrical drum,
a shaft extending through said drum coaxially therewith, said cylindrical drum and said shaft being rotatable relative to each other,
a cone shaped member having a bottom end of largest diameter and a top end of smallest diameter, said cone shaped member being provided within said drum coaxially therewith, said shaft extending through said cone shaped member, and
a cone shaped coil spring having a bottom end of largest diameter and a top end of smallest diameter, said cone shaped coil spring being provided within said drum coaxially therewith and around said cone shaped member, the bottom end of said coil spring being fixed to the bottom end of said cone shaped member,
one end of said coil spring being fixed to one of said drum and said shaft, and the other end of said coil spring being fixed to the other of said drum and said shaft.

4,030,568

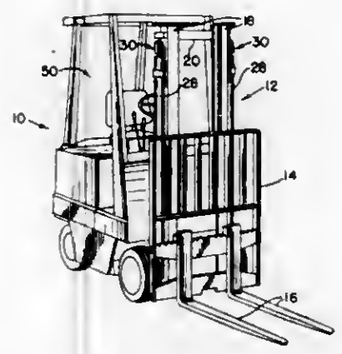
HIGH VISIBILITY MAST FOR LIFT TRUCKS

Lloyd K. Heinold, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 24, 1976, Ser. No. 670,030

Int. Cl.² B66F *9/06*

U.S. Cl. 187—9 E **5 Claims**



1. In a lift truck, a mast assembly supported on said truck, said mast assembly comprising: a pair of vertically extending laterally spaced-apart mast uprights, said mast uprights each including inner and outer relatively movable telescoping members, load bearing carriage means including forks thereon supporting a load to be lifted, said carriage means being movably mounted upon said mast uprights, carriage lift actuator means mounted upon said mast uprights for selectively moving said carriage means relative to said outer members, said lift actuator means being mounted upon said mast uprights entirely laterally outwardly thereof, thereby leaving the space between said mast uprights unobstructed for good operator visibility, said actuator means including a pair of hydraulic jacks having cylinder portions and rod portions extendible from said cylinder portions, said cyliner portions being fixedly mounted upon said outer members, and chain means connected at first and second points to said outer members and said carriage, respectively, sheave assembly means for said chain means, said sheave assembly means being mounted upon and movable with said rod portions of said hydraulic jacks, wherein said sheave assembly means include a sheave support member and vertically extending pin means and flange plate means mounted upon said inner members for engaging said pin means upon extension of said rod portions to transmit movement of said rod portions to said inner members.

4,030,569

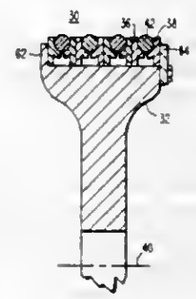
TRACTION ELEVATOR SYSTEM HAVING CABLE GROOVE IN DRIVE SHEAVE FORMED BY SPACED, ELASTICALLY DEFLECTABLE METALLIC RING MEMBERS

Harry Berkovitz, Glen Rock, N.J., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 7, 1975, Ser. No. 620,441

Int. Cl.² B66B *11/08*

U.S. Cl. 187—20 **6 Claims**

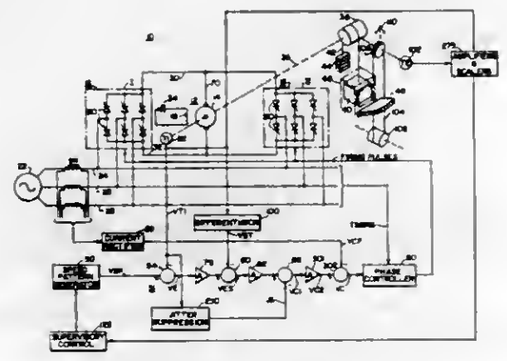


1. An elevator system, comprising:
an elevator car,
a counterweight,
drive means including a drive motor connected to a drive sheave, said drive sheave having a periphery rotatable about a drive axis,
cable groove means on the periphery of said sheave which defines at least one cable groove,
and a cable interconnecting said elevator car and said counterweight while disposed about said drive sheave in said at least one cable groove,
said cable groove means including first and second independent, metallic ring portions spaced apart along the drive axis of said drive sheave, each of said first and second metallic ring portions including a washer shaped portion having inner and outer edges and first and second opposed parallel surfaces, and a projecting portion which extends outwardly from one of said parallel surfaces, said first and second metallic ring portions being disposed with the projection portions adjacent one another to cooperatively define the cable groove, said inner edges of the washer shaped portions being in contact with predetermined surfaces of said drive sheave, said washer shaped portions of the first and second metallic ring portions being elastically and rotatably deflectable towards one another about predetermined circumferential longitudinal axes, from unstressed positions by said cable acting on said outwardly extending projecting portions, with the magnitude of the rotational deflections being proportional to forces in the cable, said first and second metallic ring portions increasing their surface area in contact with the cable as the washer shaped portions rotatably deflect, to increase the tractive effort between the drive sheave and cable when said drive motor rotates said sheave.

4,030,570
ELEVATOR SYSTEM

William R. Caputo, Wyckoff, N.J., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 10, 1975, Ser. No. 639,336
Int. Cl.² B66B 1/28
U.S. Cl. 187—29 R 14 Claims

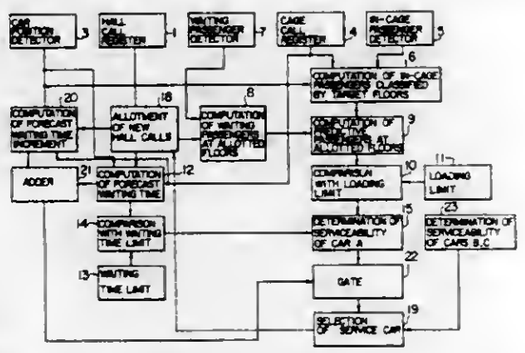


1. An elevator system comprising:
an elevator car mounted for vertical movement in a guided path,
drive means including a direct current motor for driving said elevator car in its guided path,
power means providing a direct current voltage for said direct current motor,
jitter suppression means providing a jitter suppression signal proportional to a selected system parameter which may cause vertical oscillation of said elevator car,
and control means providing a control signal modified by said jitter suppresson signal, said modified control signal being applied to said power means to control the magnitude of the direct current voltage applied to said direct current motor while attenuating vertical oscillation of said elevator car.

4,030,571
ELEVATOR CONTROL SYSTEM

Takashi Kaneko; Takeo Yuminaka; Tatsuo Iwasaka, and Hiroshi Kinoshita, all of Katsuta, Japan, assignors to Hitachi, Ltd., Japan

Filed Apr. 18, 1975, Ser. No. 569,401
Claims priority, application Japan, Apr. 22, 1974, 49-44507; June 5, 1974, 49-62898
Int. Cl.² B66B 1/18
U.S. Cl. 187—29 R 15 Claims

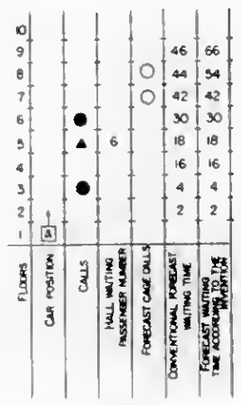


1. An elevator control system for controlling a plurality of elevator cars arranged for parallel operation for servicing a plurality of service floor landings of a building, comprising hall call registering means disposed at each floor, cage call registering means disposed in each said car for registering a cage call instructing target floors, means for generating a signal representative of a car position, means for computing the service condition of each said car for hall calls in response to said car position signal, means for selecting suitable ones of said cars for servicing a new hall call, and means responsive to said selecting means for allotting said new hall call to said selected cars, said servicing car selecting means comprising means for computing a forecast of the changed service condition of each said car for the hall calls allotted thereto already when said new hall call originated from one of the floors is provisionally allotted thereto, and means for selecting a car to service said new hall call whose changed service condition for each hall call already allotted thereto falls within acceptable limits.

4,030,572
ELEVATOR CONTROL APPARATUS

Takashi Kaneko; Tatsuo Iwasaka, and Takeo Yuminaka, all of Katsuta, Japan, assignors to Hitachi, Ltd., Japan

Filed Oct. 8, 1975, Ser. No. 620,761
Claims priority, application Japan, Oct. 11, 1974, 49-116102
Int. Cl.² B66B 1/18
U.S. Cl. 187—29 R 14 Claims



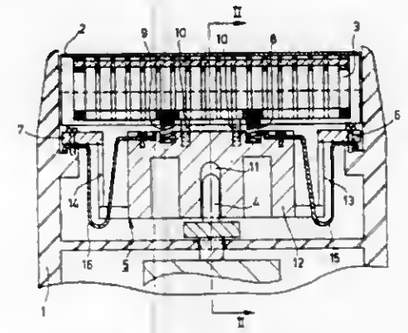
1. In an elevator system comprising cage call register means, hall call register means and a plurality of elevator cars in juxtaposition serving a plurality of floors in response to said cage call register means and said hall call registers means; an elevator control apparatus comprising means for detecting the number of waiting-prospective passengers on each floor hall, means for setting the ratios of said hall-waiting-prospective passengers proceeding to respective floors, and means for forecasting and calculating cage calls on the basis of said number of hall-waiting-prospective passengers detected by said detector means and said destination ratios set by said setting means, said cage calls being registered by said hall waiting-prospective passengers joining a car.

4,030,573
APPARATUS DRIVEN BY AN ELECTRIC MOTOR

Leo Buzzi; Valentin Buzzi; Walter Opietnik; Helmut Liebl, and Peter Malobabic, all of Klagenfurt, Austria, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 7, 1976, Ser. No. 647,119
Claims priority, application Austria, Jan. 10, 1975, 156/75
Int. Cl.² F16F 7/10
U.S. Cl. 188—1 B 9 Claims

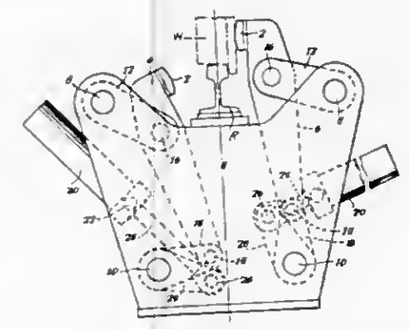
9. An electromotively driven housed apparatus construction comprising a reciprocatingly driven vibratory element having a plane of movement, first hinge means hingeably coupling one side of said element in said plane of movement to the housing of said apparatus, second hinge means hingeably coupling the other side of said element in said plane of movement to the housing of said apparatus, a first resilient springlike member coupled between said element and said housing for exerting a first force in said plane of movement between said housing and said element, and a second resilient springlike element for exerting a second force, opposite to said first force, in said plane of movement between said housing and said element, said resilient springlike elements taking up alternately occurring tensile and pressure loads, thereby relieving said hinges of said loads and thus substantially increasing the life of said hinges.



4,030,574
RAIL WHEEL GRIPPERS

David Arthur Evans, Bristol, England, assignor to Strachan & Henshaw Limited, Bristol, England

Filed Jan. 7, 1976, Ser. No. 647,084
Claims priority, application United Kingdom, May 19, 1975, 21259/75
Int. Cl.² B61K 7/08
U.S. Cl. 188—62 15 Claims

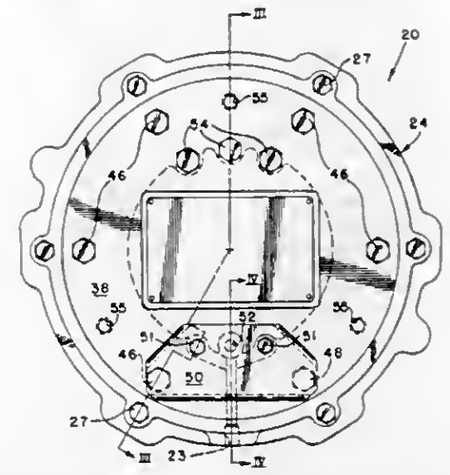


2. A rail gripper for use upon at least one wheel of a rail vehicle running on a rail of a track for the vehicle, and comprising, in combination, opposed clamping members adapted to respectively grip opposite sides of said wheel, a mounting mechanism for each clamping member, support means for each said mounting mechanism each said mounting mechanism comprising, an upwardly extending carrier arm having an upper region on which said clamping member is secured and a lower region remote from said upper region, means pivotally connecting said support meand to said carrier arm lower region comprising a first pivot arm having respective pivot axes on the support and the carrier arm lower region, guide means separate and independent of said firs pivot arm and pivotally connected to said support and said carrier arm upper region said guide means having a pivot axis on the carrier arm upper region, said carrier arm having an axis defined by and extending between said upper and lower region pivot axes, said first pivot arm having an axis defined by and extending between the pivot axes thereof, said carrier arm axis and first pivot arm axis together defining an included angle, said carrier arm and said first pivot arm being relatively displaceable to increase said included angle from a first inoperative position wherein said clamping member is lowered to substantially the level of said rail to a second operative position wherein said clamping means is raised to engage said wheel, and drive means connected to said mechanism for displacing said carrier arm and said first pivot arm.

4,030,575
PISTON ASSEMBLY WITH SAFETY VENT MEANS FOR BRAKES AND THE LIKE

Rodger L. Moring, Bristol, and Richard E. Frauenhoff, Montgomery, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 22, 1975, Ser. No. 624,792
Int. Cl.² B60T 11/30
U.S. Cl. 188—71.1 18 Claims



1. A piston assembly adapted for use in a brake or clutch comprising
a piston having an opening formed therethrough,
a pressure plate disposed in axial alignment with respect to said piston,
a plurality of fastening means releasably attaching said piston to said pressure plate, and
cover means comprising a substantially flat plate detachably mounted directly on an outboard side of said piston and disposed thereon to cover said opening in sealing relationship therewith and having an end portion extending inwardly towards said piston to fully cover at least one of said fastening means whereby said cover means must be detached from said piston prior to release of the fastening means covered thereby.

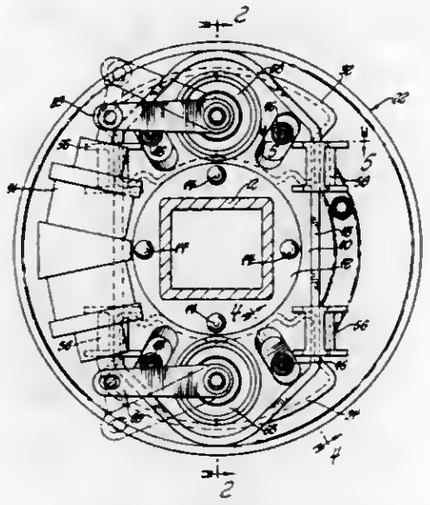
4,030,576
DISC BRAKE ASSEMBLY INCLUDING A SELF-CONTAINED ACTUATOR WITH WEAR TAKE-UP AND ANTI-DRAG DEVICE

William L. Pringle, Grosse Pointe Shores, Mich., assignor to United States Steel Corporation, Pittsburgh, Pa.

Division of Ser. No. 567,126, April 11, 1975, Pat. No. 3,974,897. This application Apr. 16, 1976, Ser. No. 677,693
Int. Cl.² F16D 65/74
U.S. Cl. 188—71.8 18 Claims

1. A brake assembly comprising: a friction disc, a brake shoe, a suppport plate mounted adjacent said friction disc, guide pins extending between said support plate and said brake shoe for movably supporting said brake shoe, return spring means for urging said brake shoe toward said support plate, a self-contained actuator carried by said support plate for urging said brake shoe toward said friction disc; said actuator including a cylinder, an actuated piston within said cylinder operatively engaging said brake shoe, an actuating piston, a rotatable threaded shaft member for translating rotational motion to axial motion operatively connected to said actuating piston, means for rotating said shaft member, a fluid-filled chamber between said actuated and actuating piston defining a fluid link therebetween whereby axial movement of said actuating piston causes axial movement of said actuated piston, wear take-up and anti-drag means for permitting substantially free forward movement of said actuated piston in unison with said actuating piston to move said brake shoe toward said friction disc and for limiting retraction of said actuated piston

and said brake shoe against the force of said spring means to a predetermined maximum distance, and fluid supply means contained within said cylinder for supplying additional fluid to said chamber in response to retraction of said actuating piston



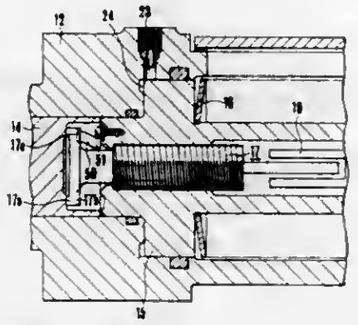
a distance greater than the predetermined maximum for said actuated piston and brake shoe to thereby accommodate the increase in volume of said chamber occasioned by the resultant separation of said pistons.

4,030,577

NEGATIVE DISC BRAKE WITH A CLEARANCE-TAKEUP MECHANISM

Yutaka Ogawa, Tokyo, and Hiroshi Hirai, Saitama, both of Japan, assignors to Akebono Brake Industry Co., Ltd. and Ishikawajima-Harima Jukogyo Kabushiki Kaisha, both of Tokyo, Japan

Filed Aug. 8, 1975, Ser. No. 602,991
Claims priority, application Japan, Aug. 13, 1974, 49-96676
Int. Cl.² F16D 65/56
U.S. Cl. 188—71.9 3 Claims



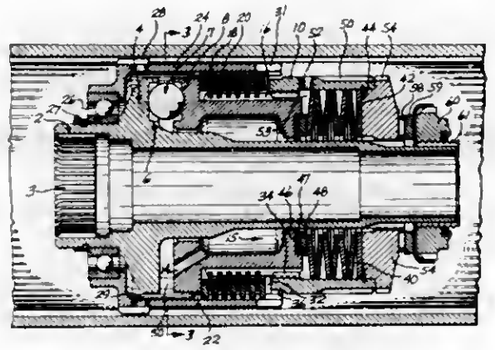
1. A negative disk brake comprising a cylinder assembly having a thrusting mechanism wherein a thrusting force of an actuating spring is normally transmitted to a thrusting piston through an actuating piston and an adjustment screw which is in screwed engagement with the actuating piston; the thrusting piston normally pushing against a rotor a first friction pad disposed on one side of the rotor; said actuating piston moving against the thrusting force of said actuating spring in the direction of taking off the brake when fluid pressure is applied; and a caliper assembly having a reaction member which pushes against the opposite side of the rotor a second friction pad disposed on the opposite side of the rotor by a reaction force resulting from the thrusting force exerted on the first friction pad to push the first friction pad against said rotor in a brake applying action of said thrusting mechanism, the negative disc brake being characterized in that the internal end of a spiral spring which exerts a turning force on said adjustment screw is drivingly coupled to the adjustment screw while the external end of the spiral spring is coupled to a lid member which is secured to a member secured to the cylinder assembly; that a cup-shaped cover is secured to the lid member; and that a resilient ring which engages with the outer circumference of said cup-shaped cover is secured to the inner circumferential end part of the cylinder assembly, said negative disc brake further comprising a spring on the actuating piston for preventing the head portion of the adjustment screw from coming into direct contact with the actuating piston.

4,030,578

TORQUE LIMITER

Michael John Cacciola, Puyallup, and Leonard Olaf Mjolsnes, Mercer Island, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed May 3, 1976, Ser. No. 682,829
Int. Cl.² B60T 7/12
U.S. Cl. 188—134 5 Claims



1. An apparatus for limiting the amount of torque from a drive source supplied to a torque responsive element, and for locking such drive source when the drive torque is in excess of a predetermined and adjustable maximum limit, which is adapted to operate in either of two directions of rotation and automatically resets when the excessive drive torque is removed, comprising:

an input cam extending along the length of the apparatus, said cam including a flange with an input cam plate;

an output cam including an output cam plate and a spline around the outside circumference of said cam, said cam adapted to slidably mount coaxially over a portion of said input cam;

a stator rotatably secured to said input cam and encompassing said output cam and a portion of said input cam, said stator having a spline along its inside circumference, said stator being secured to a substantially rigid structure;

means for sensing excessive torque from said drive source and for slidably displacing in an axial direction said output cam with respect to said input cam;

means for axially locking said output cam to said input cam and to said stator and said rigid structure when a condition of excess torque has been reached and exceeded;

means for unlocking said output cam to said stator and said rigid structure when excessive torque has been removed; and,

means for adjusting the amount of input torque required to lock said output cam to said stator.

4,030,579

LINEAL LOCK FOR X-RAY APPARATUS

Leslie James Sell, Orangeville, Canada, assignor to Picker X-Ray Mfg. Limited, Bramalea, Canada

Filed Mar. 26, 1975, Ser. No. 562,141
Int. Cl.² B60T 13/04
U.S. Cl. 188—171 23 Claims

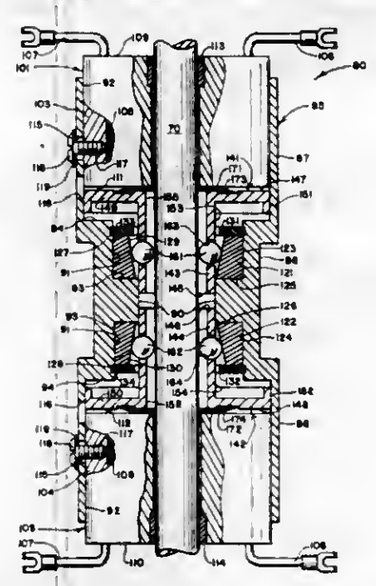
18. A lineal lock interposed between two relatively movable components of an X-ray apparatus, comprising:

a. an elongated member having a longitudinally extending surface;

b. a locking unit movable longitudinally of said member and including;

i. a housing structure;

ii. a plurality of components movably carried in said housing structure for engaging said surface; iii. wedging means interposed between said housing structure and said components for selectively wedging said components into clamping engagement with said surface;



iv. biasing means coupled to said wedging means for normally effecting such clamping engagement; and,

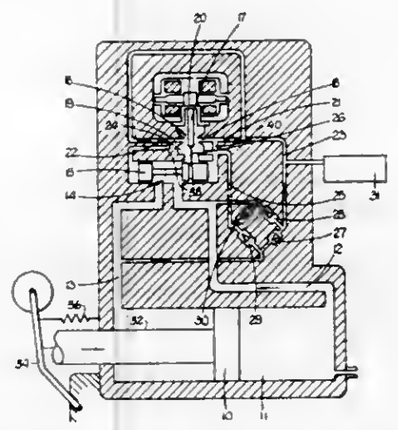
c. circuit means connected to the electromagnet, the circuit means being operatable momentarily to reverse the polarity of such magnetic field prior to de-energization of said electromagnet, whereby the reversed magnetic field exerts a momentary repulsion force on said wedging means to assist said biasing means in effecting clamping engagement.

4,030,580

DAMPING DEVICE FOR A VEHICLE SUSPENSION

Stanley George Glaze, Brierley Hill, England, assignor to Lucas Industries Limited, Birmingham, England

Filed Aug. 8, 1975, Ser. No. 602,998
Claims priority, application United Kingdom, Aug. 15, 1974, 35934/74
Int. Cl.² F16F 9/19, 9/34
U.S. Cl. 188—299 3 Claims



1. A damping device for a vehicle suspension interposed between the vehicle body and a wheel movable with respect thereto, said damping device being responsive to a damping control signal and comprising:

a fluid containing cylinder connectable to one of said vehicle body or wheel;

a piston slidable in the cylinder and connectable to the other of said vehicle body or wheel;

a pair of fluid passages having first and second ends, the first end of one of said fluid passages being in fluid communication with one end of said cylinder, the first end of the other of said fluid passages being in fluid communication with the other end of said cylinder;

a damping control valve connected to the second ends of said fluid passages and containing a movable means establishing a variable orifice in said passages which controls the rate of fluid flow between the ends of said cylinder and the damping action of said damping device;

an electrically actuatable pilot valve means operable, responsive to the damping control signal, by the pressures existing between a high pressure supply line to said pilot valve means and a low pressure discharge line from said pilot valve means for controlling said damping control valve; and

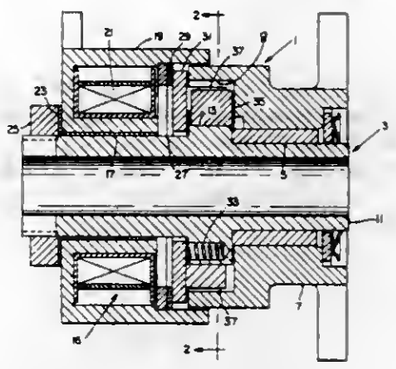
an array of non-return valves interposed between the ends of said cylinders and said supply and discharge lines for said pilot valve means and arranged to permit fluid flow only from said cylinder to said high pressure supply line and from said low pressure discharge line to said cylinder.

4,030,581

ELECTROMAGNETIC ROLLER CLUTCH

Paul F. Giometti, Horseheads, N.Y., assignor to Facet Enterprises, Inc., Tulsa, Okla.

Filed Aug. 25, 1975, Ser. No. 607,165
Int. Cl.² F16D 67/06, 15/00, 27/10
U.S. Cl. 192—16 11 Claims



1. An electromagnetic clutch comprising:

a driving member and a driven member having opposing non-parallel surfaces;

roller members positioned between said opposing non-parallel surfaces;

means for providing relative rotation between said members when the clutch is disengaged;

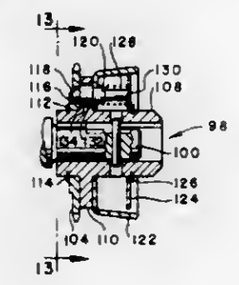
electromagnetic actuating means mounted adjacent said driven and driving members, said electromagnetic actuating means comprising:

a housing core rotatably mounted to said driven member;

a coil fixedly mounted within said housing core, said driven member being rotatable relative to said housing core and coil when said clutch is engaged; and

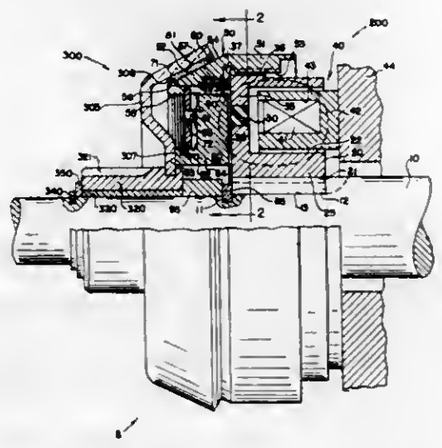
an armature member mounted to said driven member, said armature member further comprising a plurality of fingers formed and arranged to move said roller members into engagement with said opposing surfaces to provide a friction drive between said driving and driven members.

4,030,582
QUICK DISCONNECT COUPLING
Robert Saul Brown, Spartanburg; Paul W. Eschenbach, Inman, and Herbert Ray King, Spartanburg, all of S.C., assignors to Milliken Research Corporation, Spartanburg, S.C.
Division of Ser. No. 572,432, April 28, 1975, Pat. No. 3,998,075. This application Apr. 6, 1976, Ser. No. 674,112
Int. Cl.² F16D *11/00*
U.S. Cl. 192—67 P 1 Claim



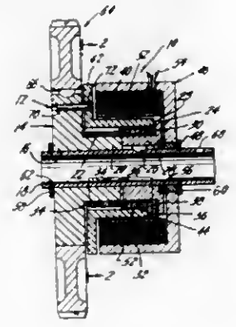
1. A quick disconnectable drive connection for a rotating shaft comprising: a cylindrical member adapted to be connected to a shaft, a sprocket member telescoped over said cylindrical member, a plurality of openings in said sprocket member, a first collar member connected to said cylindrical member adjacent said sprocket member, a plurality of openings in said first collar member, a second collar member telescoped over said cylindrical member having a plurality of pins connected thereto and projecting outwardly therefrom towards said sprocket member and spring means operably associated with said second collar member to urge said second collar member towards said first collar member to project said pins through the openings in said first collar member and said sprocket member to cause said sprocket to be capable of rotation with said first collar member, said spring means including springs around the base of said pins and bearing against a plate fixed to said cylindrical member.

4,030,583
FAIL SAFE ELECTRIC CONE CLUTCH
Donald L. Miller, Horseheads, N.Y., assignor to Facet Enterprises, Inc., Tulsa, Okla.
Filed Sept. 11, 1975, Ser. No. 612,421
Int. Cl.² F16D *13/75, 27/10*
U.S. Cl. 192—84 C 7 Claims



1. An electromagnetic device for transmitting torque comprising:
input means;
output means coaxially disposed with said input means;
means for driving said output means, said driving means transferring torque from said input means to said output means, said driving means further comprising:
an adjustable friction ring member;
an inner body member coaxially disposed with said friction ring member for rotational movement therewith; and
means for biasing said adjustable friction ring member into engagement with said output means;
means for electromagnetically actuating said friction device, said actuating means disposed with respect to said inner body member to form a circuitous flux path, said actuating means comprising:
a magnetic armature; and
means for adjusting said armature with respect to said inner body member; whereby when said electromagnetic means is energized a circuitous flux path is formed between said armature and said inner body member;

4,030,584
NORMALLY DISENGAGED ELECTRO-MAGNETIC SPRING CLUTCH CAPABLE OF FIELD ADJUSTMENT OF THE WRAP ANGLE
Robert D. Lowery, Willowick, and Alphonso W. Mehrbrodt, Brecksville, both of Ohio, assignors to Marquette Metal Products Company, Cleveland, Ohio
Filed May 24, 1976, Ser. No. 689,040
Int. Cl.² F16D *13/08, 27/10*
U.S. Cl. 192—84 T 11 Claims

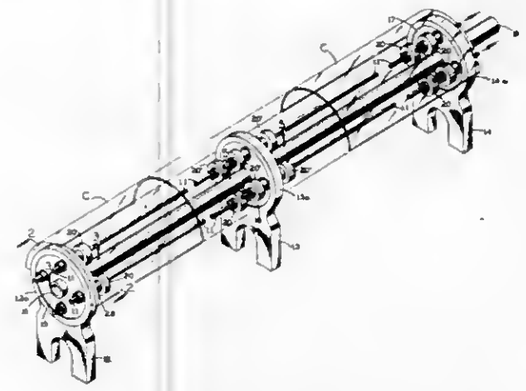


1. In combination with a normally disengaged electro-magnetic spring clutch having a helical spring surrounding first and second drums and in interference fit with the first drum and connected to a rotatable armature, the armature being rotationally arrested upon energization of an electro-magnetic coil to effect contraction of the helical spring into interference fit with the other of said first and second drums, an adjustment means for permitting selection of a predetermined elapsed time from energization to torque transmission comprising:
a. a lost-motion coupling means for inter-connecting the armature with said first drum to allow rotative movement of the first drum relative to the armature when the rotation of the latter is arrested to provide an engaged condition of operation; and
b. disconnection means for permitting the armature to be moved to uncouple the lost-motion means without disconnection of the spring with the armature and first drum and recoupling of the lost-motion connection with the armature, spring and the first drum in a different relative angular position.

4,030,585
BAR STOCK GUIDE ARRANGEMENT FOR SCREW MACHINES
Paul Ducanis, 17401 NW. 2nd Ave., Miami, Fla. 33169
Filed Oct. 10, 1976, Ser. No. 728,546
Int. Cl.² B23B *25/00*; B23Q *3/00*
U.S. Cl. 193—38 17 Claims

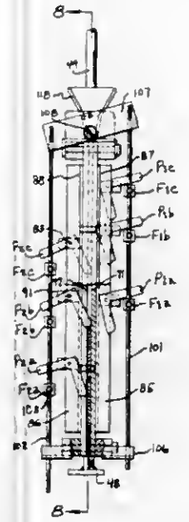
1. In a bar stock guide arrangement at the inlet side of a screw machine, said guide arrangement comprising rigid cross plates spaced apart at intervals along the path of the bar stock at the inlet side of the screw machine and having substantially horizontal openings therethrough for passing the bar stock, the improvement which comprises:

an annular fitting defining a longitudinal passageway for the bar stock;
a plurality of guide members mounted in each fitting at circumferentially spaced locations around said longitudinal passageway for the bar stock;
spring means in each fitting resiliently biasing said guide



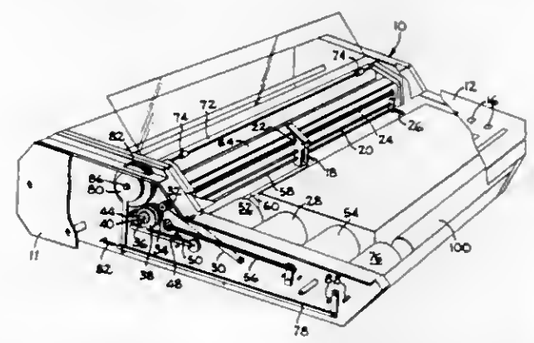
member inward toward said longitudinal passageway for engagement with the bar stock to restrain it against vibrating transversely; and
means rotatably mounting each fitting in each cross plate at said opening therein for permitting the fitting to rotate in unison with the bar stock when the bar stock is rotated by the screw machine.

4,030,586
PLURAL COIN RESPONSIVE MECHANISM FOR A DISPENSING MACHINE
Elmer G. Etes, 1436 Blaisdell St., Rockford, Ill. 61103
Filed July 9, 1975, Ser. No. 594,535
Int. Cl.² G07F *5/08*
U.S. Cl. 194—59 7 Claims



1. A coin responsive mechanism for use in dispensing machines of the type having a coin stop for controlling a dispensing operation, said coin responsive mechanism including a generally vertical coin chute having first and second parallel sidewalls and first and second parallel end walls extending between the sidewalls with the side and end walls spaced apart to receive coins of several different denominations and to provide a gravity drop of coins to the coin stop, said first and second sidewalls respectively having first and second slots extending lengthwise thereof intermediate the end walls of the chute, said first and second slots in said first and second sidewalls being offset in opposite directions relative to a medial plane that is parallel to and equidistant from said first and second end walls whereby a portion of said second sidewall is disposed opposite said first slot and a portion of said first sidewall is disposed opposite said second slot, a first gauging pawl means mounted for movement through said first slot into said chute and having an end portion extending across said chute into engagement with said portion of said second sidewall to block upward movement of at least one preselected combination of coins in the chute, and a second gauging pawl means mounted for movement through said second slot into said chute and having an end portion extending across said chute into engagement with said portion of said first sidewall to block upward movement of at least one other combination of coins in said chute, said first and second slots each overlapping said medial plane, said first and second pawl means each having coin abutment faces on said end portions thereof that overlap said medial plane.

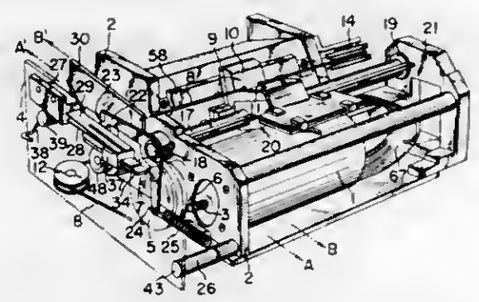
4,030,587
COMPUTER TERMINAL
Alexander D. R. Walker, 1200 Dale Ave., Apt. 106, Mountain View, Calif. 94040
Continuation of Ser. No. 448,192, March 5, 1974, abandoned. This application Dec. 8, 1975, Ser. No. 638,832
Int. Cl.² B41J *3/04*
U.S. Cl. 197—1 R 3 Claims



1. A dot matrix printer of the kind comprising a print head assembly for printing at least one vertical column in a character having a width of a plurality of columns, a rotatable lead screw, a lead screw follower mounted on the print head assembly and selectively engageable with the lead screw for causing the print head assembly to move along the lead screw when the lead screw is rotated and the lead screw follower is engaged therewith, lead screw motor means connected with the lead screw for rotating the lead screw to drive the print head assembly across a printing surface in a printing direction away from an initial location in a sequence of movements of one full character width each, control means connected with the motor means to operate the motor means to rotate the lead screw in response to a signal supplied thereto representative of a character to be printed, return spring means connected with the print head assembly for moving the print head assembly in a reverse direction when the lead screw follower is disengaged from the lead screw to position the print head assembly at the initial location to begin a new line of printing, rotatable commutator means connected to be driven synchronously with the lead screw and in response to operation of said motor means, for generating a series of column signals only during a printing cycle indicative of individual column positions of a character each time the print head assembly is driven to move through one character-width movement in the printing direction, print head driver means operatively connected with the commutator means and the print head and responsive to said column signals from the synchronously driven commutator means for actuating the print head at a plurality of successive column positions to print a character as the print head assembly traverses one character-width movement, without interrupting such movement, and rotary detent means coupled to the lead

screw, actuatable between a normal condition precluding rotation of the lead screw and an actuated condition permitting rotation of the lead screw through an angular displacement corresponding to movement of the print head assembly through a single character-width movement in the printing direction; and detent actuator means responsive to an electrical signal, for actuating the detent means to its actuated condition.

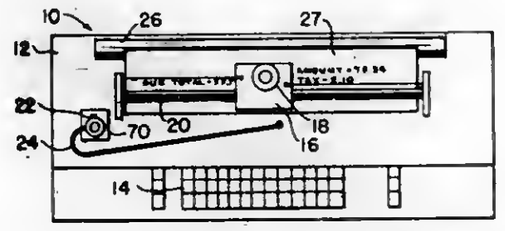
4,030,588
PRINTER
Takayoshi Hanagata, Yokohama; Hideki Gushima, Kodaira, and Mitsuaki Seki, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Continuation of Ser. No. 368,534, June 11, 1973, abandoned. This application Apr. 8, 1975, Ser. No. 566,075
Claims priority, application Japan, June 19, 1972, 47-61166
Int. Cl.² B41J *3/04*
U.S. Cl. 197—1 R **12 Claims**



1. A printer comprising:
a. a printing head for printing characters, symbols, numerals or the like on a recording medium;
b. carriage means adapted to move said printing head thereon along a lateral direction of said recording medium;
c. means for feeding said recording medium along a longitudinal direction thereof;
d. means for pressing said printing head against said recording medium;
e. means for releasing said pressing means from pressing said printing head against said recording medium;
f. a reversible stepping motor for developing a driving force to move said printing head on said carriage means and to actuate said releasing means;
g. first transmitting means for transmitting the rotational driving force of said motor to said carriage means;
h. second transmitting means for transmitting the rotational force of said motor to said releasing means; and
i. control means coupled to said stepping motor for generating first and second stepping pulses having first and second frequencies, respectively to move said printing head on said carriage means at different speeds corresponding to the pulse frequencies applied to the motor.

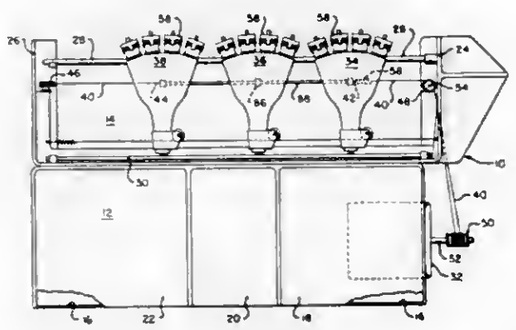
4,030,589
DATA PROCESSING MACHINE
Clarence W. Kessler, Dayton, Ohio, assignor to NCR Corporation, Dayton, Ohio
Continuation of Ser. No. 354,453, April 25, 1973, abandoned. This application Jan. 12, 1976, Ser. No. 648,543
Int. Cl.² B41J *5/30*
U.S. Cl. 197—1 R **19 Claims**

1. A data reader for use with a printer having a movable print head comprising in conbination:
a. a platen for receiving a recording medium having data recorded thereon, the position of said medium being controlled by said platen;
b. a carriage having a shaft and being movable in a line direction, said shaft supporting said movable print head at times;
c. read means mounted on the carriage shaft when said movable print head is removed, for converting recorded data on said recording medium into electrical signals, and being removed from said shaft when said print head is mounted thereon;



d. switching means for activating said read means and deactivating said print head when reading the data from said recording medium; and
e. utilization means for receiving and utilizing the electrical signals from said read means.

4,030,590
SPACING AND CONNECTING A PLURALITY OF PRINT HEADS
Gary A. Wojdyla, Ithaca, N.Y., assignor to NCR Corporation, Dayton, Ohio
Filed Oct. 3, 1975, Ser. No. 619,289
Int. Cl.² B41J *3/04*
U.S. Cl. 197—1 R **2 Claims**

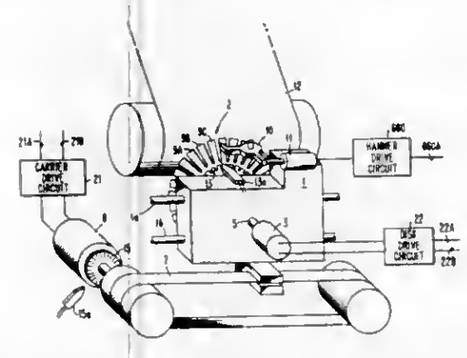


1. In a printer having a plurality of print heads, each print head having a bearing member secured thereto, a
drive member releasably connected to the bearing member of each of said print heads,
shaft means journaling said bearing members and supporting said print heads for travel therealong,
means for driving said print heads along said shaft means, and an elongated bar member releasably connecting the drive member of each of said print heads for spacing said heads a predetermined distance and connected at the ends of said bar member with said driving means for providing the driving means between said print heads.

4,030,591
CONTROLS FOR A MOVABLE DISK PRINTER
Blair Robertson Martin, Owego; Johann Hans Meier, Vestal, and Jerry Wesley Raider, Endicott, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Sept. 25, 1975, Ser. No. 616,803
Int. Cl.² B41J *1/32*
U.S. Cl. 197—53 **2 Claims**

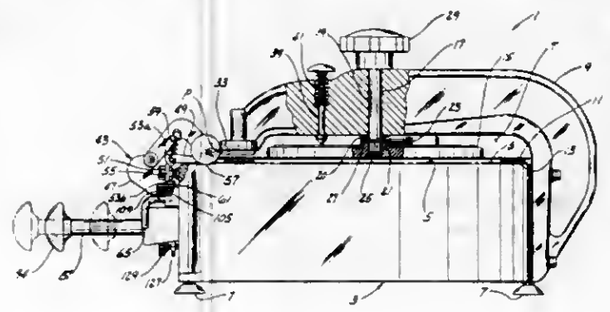
1. In a printer for printing at a plurality of print positions along a print line on a document the combination of,

a carrier,
a carrier drive motor for moving said carrier across said print line past said print positions,
a rotatable type element mounted on said carrier,
a print hammer mounted on said carrier operable to impact said type element when a selected character is positioned at a print position,
type element drive means for intermittently rotating said type element a variable distance from one character print position to another character print position, the length of time required to move between any two particular character positions being dependent on the particular location of the particular characters on the type element,



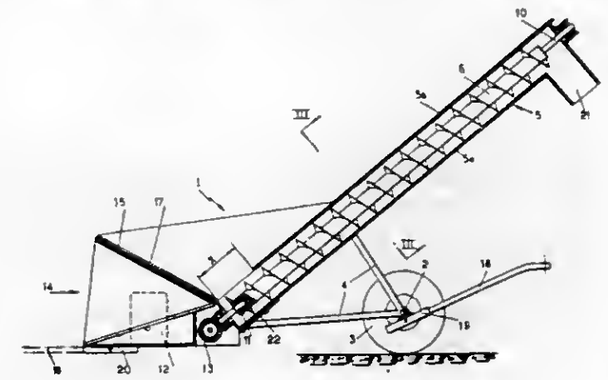
carrier speed determining means for generating a signal which is a function of the length of time required to rotate said type element from one particular character positon to another selected character position,
carrier drive means for selectively actuating said carrier drive motor to drive said carrier past a particular print position at a selected one of a plurality of different predetermined speeds in response to said speed determining means, and
means for actuating said print hammer at a time which is dependent upon the speed of said carrier.

4,030,592
STENCIL CUTTING APPARATUS
Duncan L. Lampman, Carterville, Ill., assignor to Diagraph-Bradley Industries, Inc., Herrin, Ill.
Filed Jan. 20, 1976, Ser. No. 650,739
Int. Cl.² B41J *1/24*
U.S. Cl. 197—6.4 **14 Claims**



1. Apparatus for cutting a stencil comprising:
a frame;
a type disk having a circular series of type characters on one face thereof;
means for rotatably mounting said disk relative to said frame so as to bring a selected character to a stencil cutting station;
means for pressing a stencil against said selected character at said station;
a carriage for holding a stencil to be cut with the stencil between said disk and said pressing means; and
means for moving the carriage and the stencil carried thereby comprising an axially movable plunger, a rack segment on the plunger, a pinion gear engageable by the rack segment as the plunger is moved axially, and a drive from the pinion gear to said carriage including a one-way clutch for indexing said carriage laterally with respect to said station a predetermined increment corresponding to the desired spacing between type characters of the stencil to be cut, said plunger being operably connected to said pressing means for actuation of the latter, and being movable relative to the frame from a starting position to a second position and then is movable from its second position to its starting position, said plunger effecting actuation of said pressing means as it is moved between its starting and second positions, said plunger being further movable from said starting position to a third position and thence to its said starting position for indexing said carriage said predetermined increment, said pinion gear being engageable by said rack segment as said plunger is moved from its starting position to said third position and said drive being driven by said pinion gear via said one-way clutch as said plunger is moved from its third position to its starting position thereby to move said carriage through said predetermined increment.

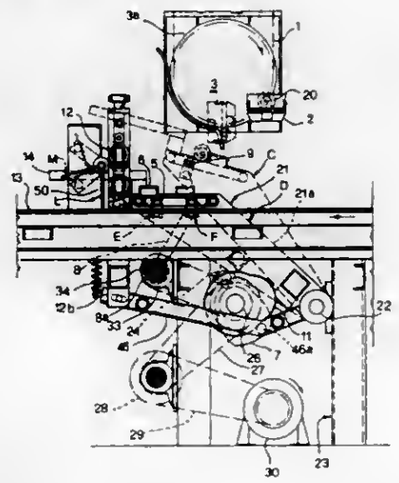
4,030,593
LOADING APPARATUS
Regis Pierre Debolfles, Abbecourt, 02300 Chauny, France
Filed Mar. 16, 1976, Ser. No. 667,289
Int. Cl.² B65G *47/16*
U.S. Cl. 198—308 **8 Claims**



1. Apparatus for loading bulk matter by transporting the same to a higher elevation with respect to the ground comprising:
screw conveyor means for transporting bulk matter, said conveyor means having an aperture for entrance of bulk matter for conveyment thereof;
a container having a bottom portion adapted for contacting the ground to place said container in a reset position, said container receiving said conveyor means in a transverse relationship with respect to the ground when said container is placed in said rest position and having said aperture located within said container above ground level, said container forming a shovel for movement of bulk matter therein from a ground level comprising:
a. means defining a first opening in the side of said container for receiving bulk matter therethrough, said first opening disposed at ground level when said container is in said rest position; and
b. a first guide wall bridging said first opening with said aperture, said first guide wall for guiding bulk matter to said aperture from said first opening as said container is moved relative to said bulk matter; and
said container formed for providing a hopper comprising:
a. means defining a second opening in said container at an elevation higher than said aperture when said container is in said rest position; and

b. a second guide wall removably mounted within said container for obturating said first opening, said guide wall for aiding guiding of bulk matter to said aperture from said second opening.

4,030,594
DOUGH TRANSFER APPARATUS
Antonio Polin, Verona, Italy, assignor to Ing. Polin & C dl Polin Ing. Antonio & C. S.a.s., Verona, Italy
Filed Apr. 12, 1976, Ser. No. 675,867
Claims priority, application Italy, Sept. 26, 1975, 3543/75
Int. Cl.² B65G *47/52*
U.S. Cl. 198—489 **3 Claims**



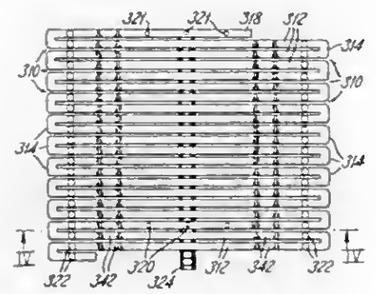
1. An apparatus for automatically transferring pieces of dough onto a movable platform from an apparatus above it and, in particular, for transferring pieces of dough from a prefermentation chamber onto the movable platform located below it, comprising:

a transfer platform on which are rested the pieces of dough coming from the apparatus overhead to be transferred to the movable platform below, said transfer platform oscillating between an upper furthermost fixed position, below the area where the pieces of dough are discharged from the apparatus overhead, and a lower furthermost fixed position, a slight distance above the movable platform, said transfer platform comprising the upper surface of an endless belt sliding between two parallel idle drums and a crosswise support member fixed to said upper surface, parallel with said drums, said crosswise support lining up and supporting said pieces of dough, which are transferred by gravity from said overhead apparatus to said transfer platform, while said transfer platform is in the upper fixed position, in which said transfer platform is slanted, so that said piece of dough will not roll backwards because of gravity;

mechanical means for providing the transfer platform with an oscillating motion and for keeping the transfer platform locked in the said furthermost fixed positions for a predetermined amount of time; and

other mechanical means for causing the pieces of dough to be discharged from the transfer platform when the latter is in its lower furthermost fixed position, said other mechanical means causing the upper part of the said belt to slide alternatively in the two directions between two furthermost positions, between a first position in which the working area on the upper part of the said belt is sufficient to receive the pieces of dough, and a second position in which the said working area is outside the said upper part.

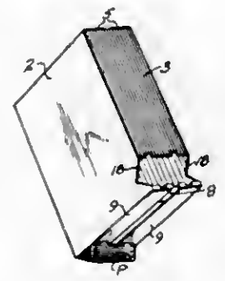
4,030,595
LATERALLY FLEXIBLE CONVEYOR CONSTRUCTION
Alan Keith McCombie, London, England, assignor to Molins Machine Company, Limited, England
Division of Ser. No. 234,833, March 15, 1972, abandoned, which is a continuation of Ser. No. 875,402, Nov. 10, 1969, abandoned. This application July 21, 1975, Ser. No. 597,434
Claims priority, application United Kingdom, Nov. 14, 1968, 54034/68; Jan. 24, 1969, 4195/69; Jan. 24, 1969, 4196/69; Feb. 14, 1969, 8313/69; Feb. 28, 1969, 10941/69
Int. Cl.² B65G *17/06*
U.S. Cl. 198—778 **21 Claims**



1. A conveyor comprising an elongated self-supporting article support element formed by a row of laterally extending slightly spaced leg portions joined together successively at opposite sides of the support element to form a zig-zag construction embodied within a common plane, the leg portions being sufficiently long and thin to be flexible in the common plane of the support element to permit the support element to move along a laterally curved path, and being torsionally flexible to permit the support element to pass around a pulley, during which latter movement one end of each leg portion twists relative to the other end, and including a substantially inextensible, laterally flexible tension member carried by and extending along the length of the support element to withstand the tensile force applied to the conveyor during operation and to relieve the support element of any significant tensile force, said tension member being connected to said support element only at spaced points greater than the pitch of successive leg portions.

15. A conveyor component comprising a row of parallel flexible legs integrally joined alternately at opposite ends to form a zig-zag configuration, at least one leg having a downwardly extending stud portion for engaging a tension member during use, and the end portion of the leg at the respective ends of the row being of reduced thickness, whereby a plurality of conveyor components can be joined together to form a conveyor.

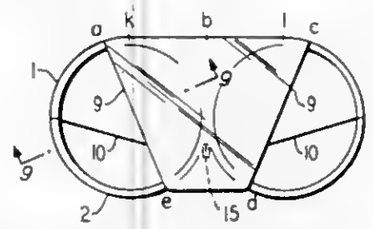
4,030,596
CARTONS
Robert O. Snyder, 51 Arthur Street, S., and Otto W. Klink, 26 Center Street, both of Elmira, Ontario, Canada
Filed May 24, 1976, Ser. No. 689,484
Int. Cl.² B65D *5/52, 25/24*
U.S. Cl. 206—45.26 **5 Claims**



1. A carton having a wall structure consisting of mutually

opposed side and end walls; a bottom; and a top; a removable tab defining an article dispensing aperture in a selected one of said walls adjacent said bottom and having its ends extending into the two neighbouring walls; and a pedestal cooperating with said bottom and inclining said carton from the vertical towards said aperture so that said articles are always presented by gravity to said aperture for removal therefrom, said pedestal being formed by said tab upon removal from said wall and upon said cooperation with said bottom.

4,030,597
COIN CONTAINER
Peter A. McCarthy, 106 Athens Ave., South Amboy, N.J. 08879
Filed Aug. 23, 1976, Ser. No. 716,820
Int. Cl.² A45C *11/28*
U.S. Cl. 206—.83 **11 Claims**



9. A coin container comprising:

a. a first molded section forming a first pair of parallel semi-cylindrical channels;

b. a second molded section forming a second pair of parallel semi-cylindrical channels having a diameter substantially equal to said first pair of channels;

c. first means for securing said second section to said first section wherein said first and second pairs of channels jointly define a pair of parallel cylinders;

d. second means in said first section for allowing entry of coins into said cylinders from one end thereof; and

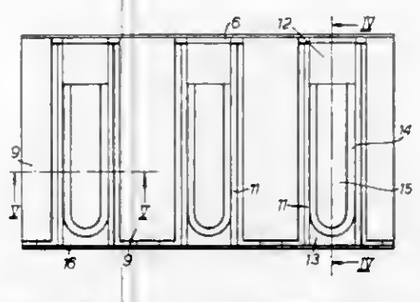
e. third means in said first section for preventing entry and exit of coins into and out of said cylinders from the opposite end thereof;

wherein said securing means includes;

f. first and second flanged lips formed on said second section; and

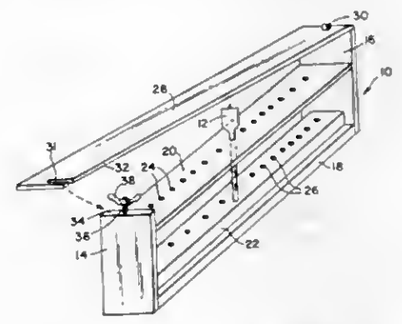
g. first and second locking lugs formed on said second and third means, respectively, for engaging said flanged lips.

4,030,598
DISPENSING CONTAINER FOR RAZOR BLADE UNITS
Harry Pentney, Spencers Wood, England, assignor to The Gillette Company, Boston, Mass.
Filed Apr. 29, 1976, Ser. No. 681,563
Claims priority, application United Kingdom, Apr. 29, 1975, 17795/75
Int. Cl.² B65D *83/10*
U.S. Cl. 206—356 **1 Claim**



1. A molded plastic one-piece dispensing container for razor blade units having blade means permanently fixed to a head portion including guard and cap members, said container comprising a plurality of compartments arranged side-by-side for the storage of blade units, each of said compartments having opposed side walls, a rear wall, a front wall with a dispensing opening, said side walls having inturned flange portions, abutment means depending from said flange portions and extending partially across said opening, and spring means for biasing said blade units so that margins thereof are urged against an underside of said flange portions and a front edge thereof is aligned with said abutment means, said spring means comprising a leaf spring molded integrally with and extending from said rear wall and between upstanding projections which limit downward displacement of a blade unit located in said compartment, said leaf spring being displaceable by manual pressure applied to an exposed cap member of a blade unit to permit said blade unit to be depressed below the level of said depending abutment means and slid forwardly out of said container compartment.

4,030,599
SPADE BIT HOLDER
Rudolph C. Bruni, 409 Walnut St., Point Marion, Pa. 15474
Filed July 19, 1976, Ser. No. 706,260
Int. Cl.² B65D *85/20;* **A47F** *7/03*
U.S. Cl. 206—379 **5 Claims**



1. A container for drills comprising spaced side members interconnected by means of a base member, top and bottom racks having a plurality of holes for supporting said drills, each hole in said top rack being aligned over a hole in said bottom rack, said top and bottom racks extending between and fastened to said side members, a swing-away cover pivotably secured to the top of one side member by means of a pivot screw and extending to the top of the other side member, and removable cover locking means at said other side member for locking or unlocking said swing-away cover.

4,030,600
COLLAPSIBLE BULK SHIPPING CONTAINER
Harry D. Heaps, Bala Cynwyd, Pa., assignor to Connelly Containers, Inc., Bala Cynwyd, Pa.
Filed June 26, 1975, Ser. No. 590,499
Int. Cl.² B65D *19/06, 45/00*
U.S. Cl. 206—386 **16 Claims**

1. A collapsible bulk shipping container comprising:

a. a pallet,

h. a rectangular tray secured to said pallet and comprising:

i. plate means secured to the upper surface of said pallet,

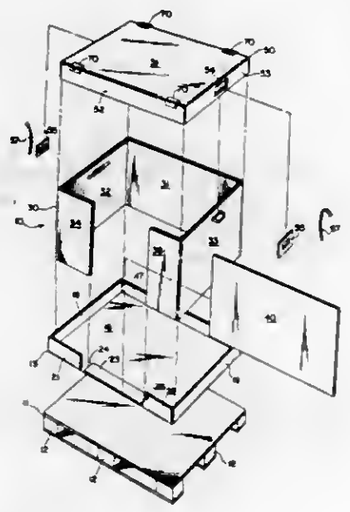
ii. upstanding peripheral wall means, and

iii. detent means overlying said plate means at spaced locations about a said upstanding wall means, said detent means comprising the edges of a flap severed from said wall means,

c. a collapsible upstanding, peripherally extending wall element within said upstanding wall means of said tray and comprising a blank scored to provide three container wall panels and a pair of partial wall panels at opposite ends of said blank, said wall element having a resiliency at the scores thereof urging said partial wall panels toward each other, said partial wall panels being adjacent said upstanding wall means having said detent means there-

along, the edges of said partial wall panels being in engagement with said detent means,

d. a closure panel extending across the space left by said partial wall panels, and



e. a top for closing said container in cooperative juxtaposition with said wall element.

4,030,601

HOLDERS FOR TAPE CASSETTES

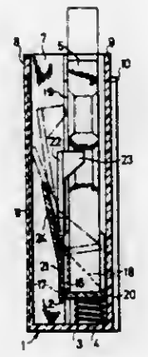
Peter Ackeret, Kusnacht, Switzerland, assignor to IDN Inventions and Development of Novelties AG, Lenzerheide, Switzerland

Filed May 30, 1975, Ser. No. 582,118

Claims priority, application Germany, June 5, 1974, 2427109

Int. Cl.² B65D *85/672*

U.S. Cl. 206—387 10 Claims



1. A holder for tape cassettes and the like, the holder comprising a housing having at least one compartment with an open front side to slidably receive a slider in the compartment, a slider in the housing and adapted to linearly transport a cassette into and out of said compartment, the slider having a cassette-engaging rear wall spaced inwardly from said open front side of the housing and the slider having an open and unobstructed front side permitting removal of the cassette from the slider by sliding movement and without tilting, stop means to limit the length of sliding movement of said slider, locking means being provided to hold the slider in its compartment against the force exerted by a spring in the housing and urging the slider into its open position, and cassette reel retention members brakingly engaging into the cassette reel apertures when said slider is locked, said retention members being pivotable in a plane perpendicular to the direction of sliding in response to and upon movement of the slider into its open position thereby disengaging from said reel apertures.

4,030,602

DEVICE FOR SEPARABLY COUPLING SECTION OF CASSETTES FOR MOTION PICTURE FILM OR THE LIKE

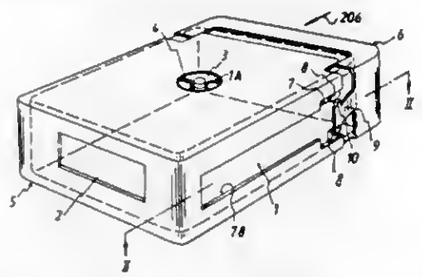
Günter Müller, and Reimund Kluge, both of Unterhaching, Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Apr. 7, 1976, Ser. No. 674,592

Claims priority, application Germany, Apr. 26, 1975, 2518762

Int. Cl.² B65D *85/42, 85/672, 7/24*

U.S. Cl. 206—404 9 Claims



1. In a magazine, particularly in a cassette for motion picture film or the like, a housing comprising at least two discrete sections; and means for separably coupling said sections to each other, including at least one detent having a male detent member on one of said sections and a socket in the other of said sections, said detent member being movable to and from an operative position in which said detent member extends into said socket and couples said sections to each other, the depth of said socket and the thickness of said detent member being such that the entire detent member is received in said socket in said operative position thereof and the area of said socket being larger than the area of said detent member so that, when moved to said operative position, said detent member fills only a portion of said socket, the unfilled portion of said socket being accessible from the outside of said housing.

4,030,603

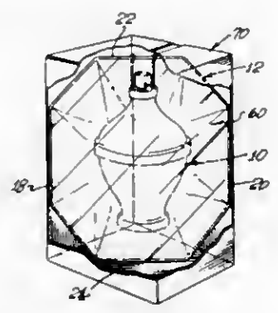
PROTECTIVE PACKAGE AND METHOD THEREFOR

Robert L. Angell, Glendora, Calif., assignor to Angell and Associates, Ontario, Calif.

Continuation of Ser. No. 370,801, June 18, 1973, abandoned. This application June 18, 1975, Ser. No. 588,088

Int. Cl.² B65D *81/02, 81/14, 65/44*

U.S. Cl. 206—521 7 Claims



1. In combination:

a box having a rectangular shape;

a shock-resistant protective package in said box suspending at least one fragile article out of contact with said box, said protective package neutralizing direct shock transfer to the fragile article, said protective package including:

a substantially thin continuous rod-like shock-resistant frame member completely surrounding said fragile article, said rod being small in that cross-sectional dimension taken transverse the longitudinal axis thereof as compared to said fragile article;

means supporting said fragile article in all directions inwardly of said frame member including a wrapping of heat treat-shrunken material having at least one aperture therein for the passage of air therethrough, said wrapping tightly covering the entire perimeter of said frame member and extending inwardly therefrom into contact with said fragile article, said wrapping being in firm physical contact with said frame member and with said fragile article; and

said protective package enclosed within said box, said wrapped frame member of said protective package being diagonally disposed within said box and thereby held in firm retention against diagonally opposed corners of said box whereby said wrapped fragile article is prevented from contacting the inner surfaces of said box.

4,030,605

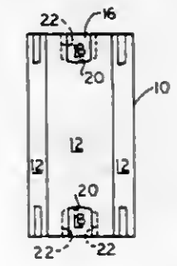
HOLDER AND DISPENSER FOR REMOVABLE JEWELRY INSERTS

Joseph J. McCarthy, 264 Broadway, Malden, Mass. 02148

Filed June 14, 1976, Ser. No. 695,782

Int. Cl.² B65D *85/54*

U.S. Cl. 206—525 10 Claims



1. Holder and dispenser for removable jewelry inserts comprising a tube sufficiently large to receive a human finger and a plurality of holding means on the exterior of said tube for releasably holding removable jewelry inserts.

4,030,604

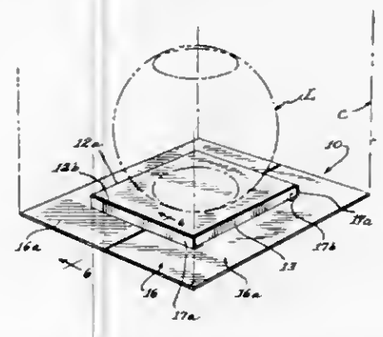
FOLDABLE SUPPORT MEMBER AND BLANK THEREFOR

Larry R. Hildebrand, Center Valley, and John F. Carpenter, Lancaster, both of Pa., assignors to Packaging Corporation of America, Evanston, Ill.

Filed Mar. 5, 1976, Ser. No. 664,410

Int. Cl.² B65D *81/04*

U.S. Cl. 206—521 16 Claims



1. A support member formed of foldable sheet material for supporting an object, comprising a pair of base panels disposed in substantially coplanar relation; a pair of intermediate panels overlying said base panels and having corresponding peripheral portions foldably connected to said base panels; side wall panels foldably connected to said intermediate panels and extending angularly relative to the plane of said base panels; a top panel for engaging and subtending the object and being disposed in spaced overlying relation with respect to said intermediate panels and being foldably connected to corresponding peripheral portions of said side walls; and at least one tuck flap foldably connected to said top panel and having a first portion interposed between said intermediate panels and the plane of said base panels and frictionally held therebetween, and a second portion foldably interconnecting said first portion and said top panel and being angularly disposed relative thereto.

4,030,606

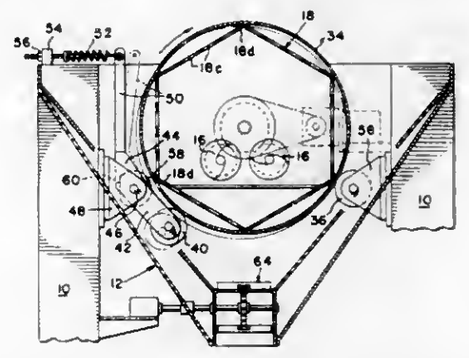
VIBRATING TUBULAR SCREEN

Leward N. Smith, Remus, and Larry L. Morey, Mount Pleasant, both of Mich., assignors to Morbark Industries, Inc., Winn, Mich.

Filed Mar. 24, 1976, Ser. No. 669,997

Int. Cl.² B07B *1/26*

U.S. Cl. 209—287 5 Claims



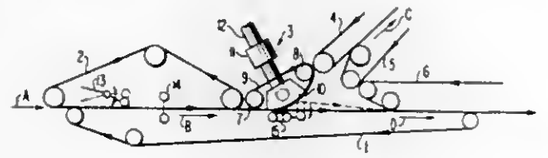
1. A vibratory screen for screening particulate material comprising a frame, an elongate tubular screen, first means on said frame supporting one end of said screen for rotation about its axis, second means on said frame cooperable with said first means to support said screen for rotation about its axis with said axis inclined to the horizontal, drive means for driving said screen in rotation about its axis, said second means engaging said screen at a location interjacent the ends thereof and including yieldable means deflectable in accordance with the weight of material in said screen, and vibratory means on said second means operable to impart a radially directed vibratory force to said screen when said yieldable means has been deflected by an amount representative of a predetermined weight of material in said screen.

4,030,607

FLAT-ARTICLE SEPARATING APPARATUS FOR AN AUTOMATIC MAIL HANDLING SYSTEM AND THE LIKE

Kazuyoshi Suda; Tomoyuki Isono; Takashi Uchida, and Kiyoshi Tsuda, all of Tokyo, Japan, assignors to Nippon Electric Co., Ltd., Tokyo, Japan

Filed Apr. 29, 1975, Ser. No. 572,808
Claims priority, application Japan, Apr. 30, 1974, 49-48502
Int. Cl.² B07C 5/06
U.S. Cl. 209—74 R 7 Claims



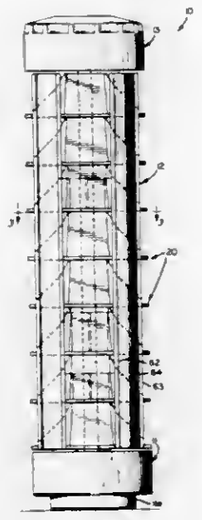
1. A flat-article separating apparatus for an automatic mail handling system, comprising:
means for feeding flat articles along an article transport path;
means installed on said transport path for sucking and transporting said flat article from said transport path on to a regular route;
means disposed upstream of said sucking means for detecting the thickness of said flat article, said thickness detecting means including first and second limit switches, said switches having first and second predetermined limits wherein at least two ranges of flat article thickness may be sensed, one where said first and second limits are exceeded and a second where said first limit is exceeded but not said second limit;
means disposed near said sucking means and responsive to said detecting means for compressing said flat article to the sucking means, and a control circuit responsive to said first and second limit switches to actuate said compressing means when said thickness detected by said detecting means is within said second range.

4,030,608

ARTICLE DISPLAY STAND

Fred Howard, New York, N.Y., assignor to Wix Corporation, Gastonia, N.C.

Filed May 5, 1976, Ser. No. 683,308
Int. Cl.² A47G 5/02
U.S. Cl. 211—131 9 Claims



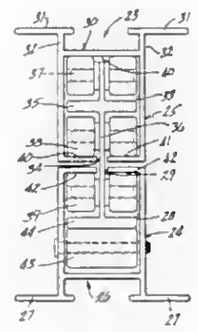
1. An upright, easily disassembled display stand comprises: a base means; a plurality of separable, stacked trays supported on the base means for rotation about a substantially vertical central axis, said trays defining a plurality of substantially horizontal article support surfaces; at least one pair of opposed, facing, spaced apart, generally vertically exending elongate channel members removably interconnected with and carried by marginal edge portions of at least two of the trays and extending therebetween and indicia bearing panels received between and removably carried by said at least one pair of channel members and extending between said at least two trays for identifying articles carried by the trays.

4,030,609

STORAGE AND DISPLAY APPARATUS EMPLOYING CANTILEVERED ROLLER TRACK

Richard E. Liebetrau, Cadillac, and Larry J. Miller, Reed City, both of Mich., assignors to Swiss Aluminium Ltd., Chippis, Switzerland

Filed Apr. 1, 1976, Ser. No. 672,665
Int. Cl.² A47F 5/00
U.S. Cl. 211—162 13 Claims



1. A roller carrier useful in either the horizontal or vertical plane which comprises a generally rectangular, longitudinally extended first track member, said first track member possessing a generally H-shaped cross section defining a support section and a track section; a generally rectangular, longitudinally extended second track member of substantially identical length and cross sectional configuration to said first track member, said second track member disposed adjacent and above said first track member whereby said respective track sections are in face-to-face juxtaposition; a longitudinally extending connecting track located within and between said first and said second track members, said connecting track possessing a generally I-shaped cross section defined by a vertically extending central web member including a laterally extending base member, and roller motive means located within the track sections of said first and said second track members adapted to support said second track member and connecting track, respectively, in spaced relationship above said first track member, said roller motive means comprising a plurality of paired rollers rotatably attached in fixed position on the web member of said connecting track, said paired rollers situated in spaced-apart relationship to each other in both the longitudinal and the transverse plane whereby said rollers are in operative position to contact the respective inner surfaces of the track sections of said first and said second track members, and a plurality of single rollers located and anchored in the lowermost area of the track section of said first track member and in contact with the base member of said connecting track, said roller motive means further adapted to enable said second track member and said connecting track to reciprocate a finite distance in relation to said first track member.

7. The carrier of claim 1 wherein said carrier is employed in the horizontal plane as a lower support for a vertically extended load.

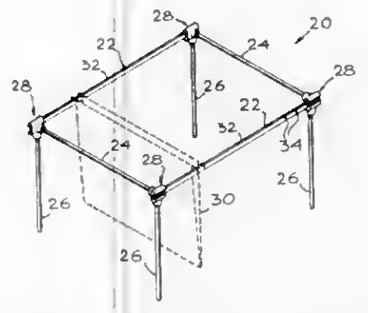
9. The carrier of claim 7 wherein said load comprises a vertically extended, planar display member, and said carrier further comprises a longitudinally extending, downward projecting guide channel adapted to retain the upper horizontal edge of said display member.

4,030,610

HANGING FILE FRAME WITH RESILIENT CORNER MEMBERS

Robert L. Alexander, Erlanger, Ky., assignor to Hunt Manufacturing Co., Philadelphia, Pa.

Filed Aug. 25, 1975, Ser. No. 607,346
Int. Cl.² B42F 17/08
U.S. Cl. 211—182 19 Claims



1. A hanging file folder support frame, which comprises:
a. a pair of elongate file folder support rails adapted for suspending hanging file folders from upper surfaces thereof, and
b. means for maintaining said support rails in a mutually spaced relationship and at an elevation to enable suspension of hanging file folders therefrom,
said maintaining means including a pair of transverse interconnecting members, a plurality of supporting legs and four corner fittings,
said corner fittings being formed of strong resilient material and being constructed to receive end portions of said transverse interconnecting members and upper end portions of said supporting legs, and for releasably receiving end portions of said rails, whereby a generally rectangular, rigid parallelepiped file support frame is formed with said rails at an uppor portion thereof, and
each of said corner fittings having wall portions defining an opening into which an end portion of one of the rails is installed and defining an entry into said opening for the passage of the rail into the said opening in a direction transverse to the length of the rail and the portions of the walls adjacent said entry include locking portions disposed over corresponding portions of said rail end portion when the rail end portion is installed in said opening, whereby to releasably lock the rail end portion into the opening, said locking portions being flexible sufficiently to permit entry of the rail end portion into, and removal of the rail end portion from, the opening.

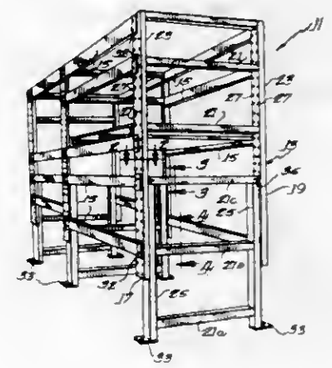
4,030,611

ADJUSTABLE STORAGE RACKS

Anthony N. Konstant, Mount Prospect, Ill., assignor to Speedrack Inc., Skokie, Ill.

Filed June 15, 1976, Ser. No. 696,301
Int. Cl.² A47F 5/10
U.S. Cl. 211—191 8 Claims

1. An adjustable storage rack which comprises an end frame having front and rear columns which are interconnected with each other to achieve a fixed fore-and-aft spacing, said columns including aperture means at spaced vertical intervals for the attachment of horizontal beams having connectors for mating connection therewith, wherein the improvement comprises said columns including apertured vertical members which extend downward from the top of said end frame but which terminate a substantial distance above the floor, and also including a pair of vertical posts which extend to the floor and the upper portions of which are affixed to the inward surfaces of said apertured members to provide an overlapping region, said posts being unapertured tubes the upper ends of which are closed, while the bottom ends of said apertured vertical members are open.

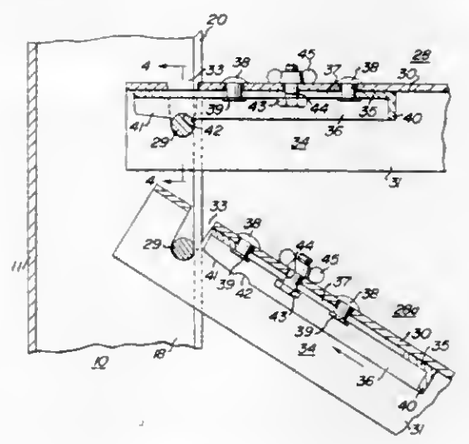


4,030,612

PALLET RACKS

Robert Gray, c/o Bay Products Division, American Metal Works, Inc., 8701 Torresdale Ave., Philadelphia, Pa. 19136

Filed June 3, 1976, Ser. No. 692,424
Int. Cl.² A47F 5/10
U.S. Cl. 211—192 12 Claims



1. A rack comprising
front and rear corner uprights, parallel horizontal beams respectively connecting front uprights and parallel horizontal beams respectively connecting rear uprights,
said corner uprights have fixed horizontal members in the interiors thereof at selected locations,
struts of inverted block U-shape extending between front and rear uprights at each end, and
means for detachably connecting the ends of said struts to said fixed horizontal members,
said struts as part of said last mentioned means having slots arc their ends for reception of said horizontal members, and
slidable members interiorly disposed with respect to said struts and guided by said struts for retaining said horizontal members in said slots.

4,030,613

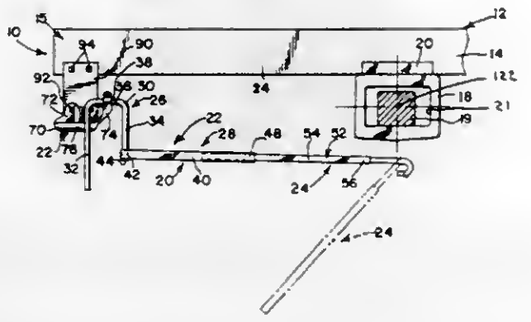
UNCOUPLING LEVER ARRANGEMENT FOR RAILROAD CARS WITH STANDARD DRAFT GEAR CUSHIONING

Osvaldo F. Chierici, Elmhurst, Ill., assignor to Holland Company, Lombard, Ill.

Continuation of Ser. No. 578,321, May 16, 1975, abandoned. This application Aug. 27, 1976, Ser. No. 718,357

Int. Cl.² B61G 3/08

U.S. Cl. 213—166 5 Claims



1. In a railroad car adapted to ride on track rails and having a coupler mounted at the car centerline of draft and at one end of the car for side to side swinging movement and movement longitudinally of the car in response to buff and draft forces and including a lock lifter for uncoupling the coupler, which car is equipped for standard draft gear cushioning of said buff and draft forces and a standard striker opening, and an uncoupling device therefor including a lever assembly comprising a lock lifter section including a hook eye at one end thereof operatively engaging the lock lifter to actuate same and for support by the coupler, and a handle section including a handle segment at one end thereof pivotally secured to a body bracket mounted on the car to one side of the end of the car, which handle section has a hand grip portion to be grasped by an operator for manually operating the lever assembly to actuate the lock lifter, whereby the lever assembly is supported in its operative position between the bracket and the lock lifter and may be swung about a pivot position to move said hook eye to operate said lock lifter by the operator manually swinging the handle section, the improvement wherein:

said handle section comprises:

an elongate tubular rectilinear bar of quadrilateral transverse cross sectional configuration,

said handle segment being of U-shaped configuration defining a pair of spaced apart parallel legs and a connecting portion connecting said legs,

said handle segment legs and connecting portion being in coplanar relation,

said handle segment connecting portion being rectilinear intermediate said handle segment legs and extending normally thereof,

one of said handle segment legs being secured to one end of said handle section bar in perpendicular relation thereto and disposed inboard of the car relative to the other of said handle segment legs,

and the other of said handle segment legs projecting below said handle section bar and forming the operator hand grip portion of the handle section,

said other of said handle segment legs being spaced outboard of said one end of said handle section bar,

said lock lifter section comprising:

an elongate tubular rectilinear bar of quadrilateral transverse cross sectional configuration having the hook eye affixed to one end of same,

said handle section bar other end and said lock lifter section bar other end being in substantially coaxial adjustable telescoping torque transmitting relation, which one of said bars being received inside the other bar for supporting said other ends of said bars from the between the lock lifter and body bracket,

said bars at said other ends thereof being of substantially complemental transverse cross sectional configuration, with said bars at said other ends thereof being proportioned for free fitting of said one bar within said other bar,

said one handle segment leg being proportioned in length to dispose said bars substantially horizontally and approximately at the level of the lock lifter, with said handle segment connecting portion being substantially horizontally disposed,

with said other ends of said bars, under the action of gravity when the lever assembly is in its operating position, being canted relative to each other to dispose surface portions at both said other ends thereof in bearing engagement with surface portions of said bars that repectively oppose same, and with said bar surface portions being of substantially line configuration extending transversely of said bars, respectively,

said body bracket including a slideway portion extending generally longitudinally of the car on which said handle segment connecting portion rests and extends crosswise thereover to form said pivot position and pivotally secure the handle section to the body bracket,

said bracket slideway portion being disposed approximately at the level of the car centerline of draft,

said one handle segment leg serving as a lever arm through which said bars are swung about said pivot position by the operator grasping the hand grip portion to move said hook eye to actuate said lock lifter,

said bracket slideway portion being convexly contoured longitudinally of said handle segment connecting portion, and said handle segment connecting portion having a convexly rounded exterior surface whereby said bracket slideway portion and said hand segment connecting portion have engaging surface portions, where said handle segment portion rests on said bracket slideway portion, that approximate a point contact,

said bar surface portions having a static friction that exceeds that of said handle segment and bracket slideway engaging surface portions to provide means for making said other ends of said bars in stationary relation to said other when the lever assembly is supported in its operative relation against thrusts acting longitudinally of said bars when coupler side swing and buff and draft impacts are occasioned free of fixed connection therebetween,

whereby said lever assembly is adjustable lengthwise of said bars by manually moving said bars lengthwise thereof at said other ends of said bars to provide the operating length of the lever assembly on application of the lever assembly to its operative position, and during use, said making means holds the lever assembly to said operating length thereof when coupler side swing and buff and draft impacts are occasioned, and the lever assembly shifts as a unit sidewise of the car at said body bracket and handle segment engaging surface portions when coupler side swing and draft and buff impacts are occasioned.

4,030,614

RECIPROCAL TRANSFER APPARATUS

Yukinori Taneda, Yokohama, and Takashi Kobayashi, Fujisawa, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Feb. 13, 1976, Ser. No. 658,066

Claims priority, application Japan, Feb. 14, 1975, 50-17932

Int. Cl.² B65G 47/91

U.S. Cl. 214—1 BT 4 Claims

1. A pick and place unit comprising:

a stationary frame provided thereon with a pair of plates and guide members;

a movable frame for which ends of travelling distance are defined by said pair of plates and supported slidably in a predetermined direction by the guide members;

a pair of hooks rotatably supported on said movable frame, provided with rotating force by means of springs, and adapted to engage the movable frame with the stationary frame by engaging with said plates of the stationary frame at the ends of travel of the movable frame;

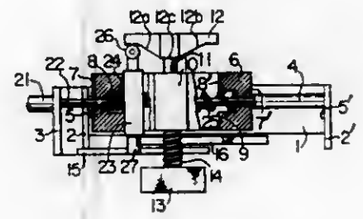
a lifting shaft supported by said movable frame slidably in the direction perpendicular to the sliding direction of said movable frame, and biased in one direction by means of a spring;

a cam fixed on one end of said lifting shaft;

a chuck for holding an article to be moved and fixed on the other end of said lifting shaft;

a driving shaft slidably extending through said movable frame in the sliding direction of said movable frame;

a driving block extending through said movable frame in the direction perpendicular to the sliding direction of said



movable frame, mounted on the movable frame through a pair of springs, slidably provided in the sliding direction of the movable frame, and fixed on said driving shaft;

a cam follower rotatably supported by one end of said driving block, engaging with said cam, and elevating or lowering said lifting shaft by the travel of the driving block;

another cam follower rotatably supported on the other end of said driving block, engaging with said hooks, and rotating said hooks by the travel of the driving block, thereby causing the movable frame and the stationary frame to be engaged or disengaged with or from each other; and

a driving device for causing said driving shaft to slide in the sliding direction of the movable frame.

4,030,615

MANIPULATOR FOR MOVEMENT OF ARTICLES IN A CONTROLLED ENVIRONMENT CHAMBER, ESPECIALLY A HIGH VACUUM CHAMBER

Diether Josef Guggi, Aachen, and Rolf Klein, Julich, both of Germany, assignors to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung, Germany

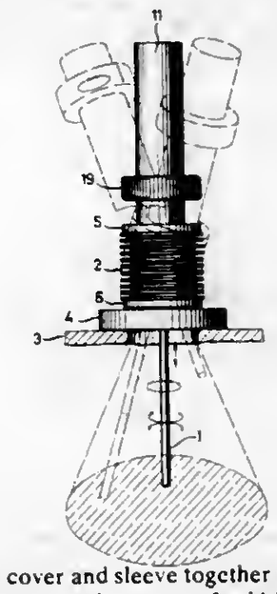
Filed Aug. 5, 1975, Ser. No. 602,148

Claims priority, application Germany, Aug. 6, 1974, 2437735

Int. Cl.² B65G 47/90

U.S. Cl. 214—1 BB 8 Claims

1. A manipulator for use in manipulating articles within a controlled environment chamber having a wall; a flexible bellows, a flange sealingly connected to one end of said bellows and adapted for being sealingly connected to the chamber wall, an outer cover sealingly connected to the other end of the bellows, a ball in the bellows, a ball cup stationary on the chamber and supporting said ball, a manipulator rod slidable in the ball and having one end extending into said closed cover and the other end extending into said chamber, at least one of said ball and manipulator rod being rotatable on the axis of the said rod, a sleeve in said cover coaxial with said one end of said manipulator rod having one end sealingly connected to said other end of said bellows and the other end closed, magnetic means on said one end of said manipulator rod in said sleeve, magnet means in said cover movable therein along said sleeve and magnetically coupled to said magnetic means, first means for moving said magnet means axially along said sleeve to move said manipulator rod axially, second means for rotating said magnet means on the axis of said manipulator rod for rotating the said rod, and third means



for tilting said cover and sleeve together with said manipulator rod about the geometric center of said ball.

4,030,616

DEVICE FOR THE REMOVAL OF EMPTY CONTAINERS FROM THEIR MANDRELS

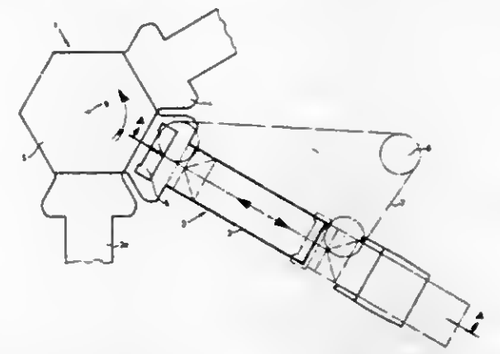
Wilhelm Vetten, Dusseldorf, Germany, assignor to Jagenberg-Werke AG, Dusseldorf, Germany

Filed Apr. 8, 1976, Ser. No. 674,997

Claims priority, application Germany, May 7, 1975, 2520504

Int. Cl.² B66C 1/66

U.S. Cl. 214—1 BB 8 Claims



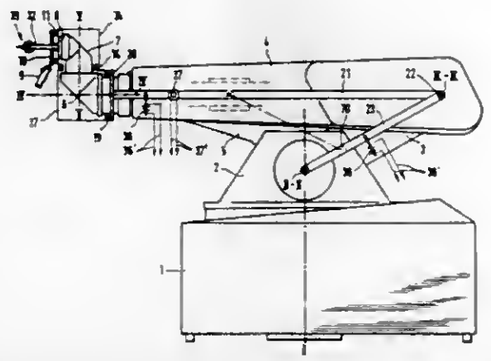
1. In a device for stripping empty containers from a plurality of mandrels associated with a mandrel wheel and comprising a mandrel wheel, a plurality of mandrels projecting radially from said wheel, means for rotating said wheel and said mandrels, and radially displaceable means for stripping empty containers from said mandrels, the improvement which comprises supporting means carried by said wheel in association with each mandrel and of such size that upon rotation of said wheel said stripping means contacts the supporting means of the next mandrel before it ceases to contact the supporting means of the immediately preceding mandrel, whereby the stripping means is always positively supported.

4,030,617

ROBOT DEVICE

Hans Richter, Augsburg, Germany, assignor to Keller & Knappich Augsburg Zweigneiderlassung der Industrie-Werke Karlsruhe Augsburg Aktienegesellschaft, Germany

Filed July 21, 1975, Ser. No. 597,825
Claims priority, application Germany, July 22, 1974, 2435156
Int. Cl.² B66C 1/10
U.S. Cl. 214—1 CM 20 Claims



1. In a robot device, for the mechanical manipulation of tools or workpieces controlled by variable programs, including a multipart hand element, movable about plural axes of rotation, secured on a multipart arm element, also movable about plural axes of rotation, a programming device which can be programmed by following a program track to be covered with a programmer, and drives, respective to each axis of rotation of the hand element and the arm element, operable to displace the parts thereof about the associated axes, the improvement comprising, in combination, a manually operable multipart framework mounted on the hand-arm unit, constituted by said hand element and said arm element, to extend parallel to said unit, for limited displacement relative to said unit; a number of switches equal to the number of axes of rotation of said unit, and each respective to a single axis of rotation, operatively associated with the parts of said unit and each operable to activate and deactivate the drive respective to the associated axis of rotation; said hand element having a terminal part for mounting either a track guide or a tool adapted to follow, mechanically, said program track; at least a part of said framework being displaceable relative to said unit during such mechanical following of said program track; said switches controlling the associated drives responsive to such relative displacement of parts of said scaffold to effect corresponding movements of the parts of said hand-arm unit; and respective displacement pickups operatively associated with each axis of rotation of said unit and with said programming device, and each operable to feed the track program into said programming device responsive to relative displacement of the parts of said unit about the associated axis.

4,030,618

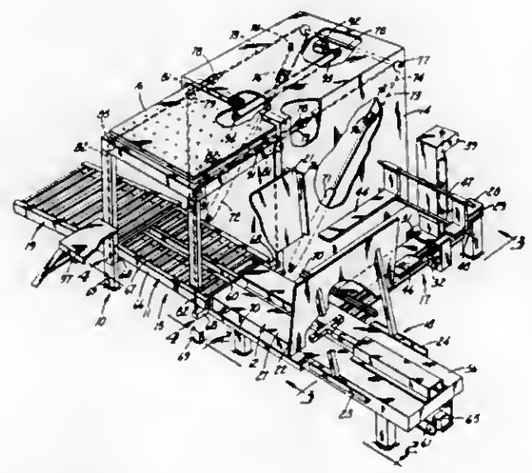
SEMI-AUTOMATIC PALLETIZER

Norman S. Kelley, and Florentin J. Pearne, both of Whittier, Calif., assignors to Aircraft Mechanics, Inc., Colorado Springs, Colo.

Filed May 1, 1975, Ser. No. 573,524
Int. Cl.² B65G 57/24
U.S. Cl. 214—6 P 8 Claims

4. A palletizer comprising a frame, an elevator supported on said frame for powered vertical movement between a lowered position and a raised position, an arranging table supported on said frame for powered movement between an extended position over said elevator and a retracted position clear of said elevator, a platform on said frame adjacent and horizontally aligned with said elevator when said elevator is in said lowered position, said platform being adapted to support a stack of empty pallets, power means for producing a lateral force on pallets for moving empty pallets onto said elevator and for removing loaded pallets from said elevator while said elevator is in said lowered position, said elevator providing anti-friction roller support means providing a substantially constant predetermined drag having a value sufficient to prevent movement of pallets supported by said elevator while said elevator is raised and lowered, said predetermined drag being sufficiently small to allow rolling movement of pallets with respect to said elevator when a predetermined lateral force is applied to such pallets.

7. A palletizer for use with pallets which can be handled by fork type handling equipment comprising a frame, an elevator supported on said frame for powered vertical movement between a lowered position and a raised position, an arranging table supported on said frame for powered movement between an extended position over said elevator and a retracted position clear of said elevator, a platform on said frame adjacent to and horizontally aligned with said elevator when said elevator is in said lowered position, said platform being adapted to support a stack of empty pallets, a pusher supported on said frame for powered movement between a rest position and an operated position, said pusher operating to push the bottom pallet in a stack of pallets from said platform



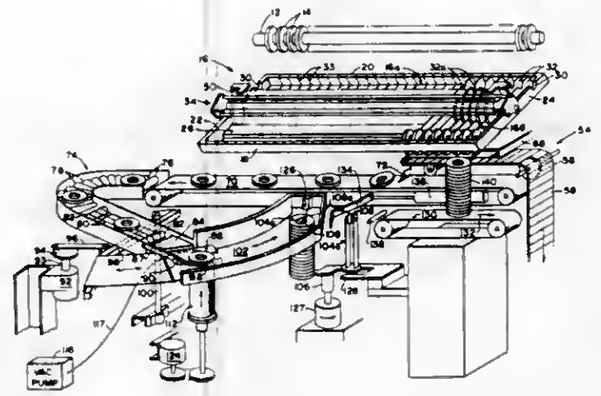
onto said elevator when said elevator is in said lowered position, and a fork lift mechanism supported on said frame for powered horizontal movement between rest position with its fork clear of said platform and an extended position with its fork over said platform, said fork lift mechanism being operable to insert its fork into the first pallet in the stack of pallets immediately above the bottom pallet in such stack, to raise said first pallet and all pallets thereabove clear of such bottom pallet, and thereafter to lower such first pallet to said platform after said pusher moves such bottom pallet to said elevator, said pusher operating to separately engage an empty pallet and a loaded pallet on said elevator and to remove said loaded pallet from said elevator while positioning an empty pallet thereon without producing contact between the loaded and empty pallets, said pusher including a first member for engaging and pushing an empty pallet, a second pusher member for engaging and pushing a loaded pallet, and a single power drive connected to operate both said first and second pusher members, said power drive including a lost motion drive allowing movement of said first pusher member without corresponding movement of said second pusher member during one portion of pusher operation and causing simultaneous movement of both of said pusher members during another portion of the pusher operation.

4,030,619

APPARATUS AND METHOD FOR STACKING ROLLS OF PRESSURE SENSITIVE TAPE

Ernest C. Hiscoe, Hudson, N.H., assignor to Nashua Corporation, Nashua, N.H.

Filed Oct. 14, 1975, Ser. No. 622,155
Int. Cl.² B65G 57/16
U.S. Cl. 214—6 M 17 Claims



4. Apparatus for handling rolls of pressure sensitive tape that are initially carried on a mandrel in a spaced relationship, comprising, in combination,

a plurality of spaced apart, substantially parallel plates that separate the opposed faces of adjacent rolls when the mandrel is withdrawn from the rolls,

a table that supports said plates, said table having a roll feeder portion that holds a row of the rolls, and

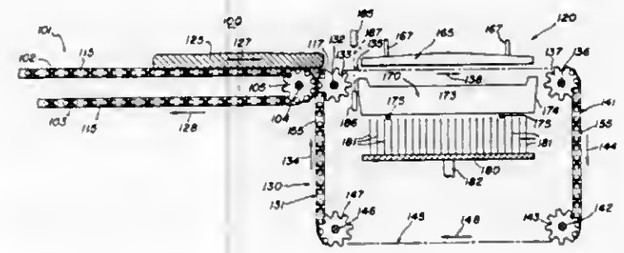
a drop off mechanism that subtends said feeder portion and is movable between a first position in which it supports all of the rolls in said feeder portion and a second position in which it is clear of said feeder portion.

4,030,620

APPARATUS AND METHOD FOR LOADING CONTAINERS

Maynard R. Euverard, Clarendon Hills, and Henry A. Helde, Addison, both of Ill., assignors to Velten & Pulver, Inc., Chicago Ridge, Ill.

Filed Dec. 15, 1975, Ser. No. 640,728
Int. Cl.² B65G 57/16
U.S. Cl. 214—6 P 30 Claims



1. A loader for depositing into a container having a plurality of openings in the bottom thereof a set of grouped individual items to be maintained in a predetermined relation with respect to each other, said loader comprising a support for holding a container in a loading station, a conveyor for transporting a set of grouped individual items to the loading station and disposed above said support and in general registration therewith, a plurality of upwardly extending pins substantially greater in number than the individual items disposed beneath said support and in general registration therewith and having the upper ends thereof disposed essentially in a common surface, means for moving said pins between a receiving position wherein said pins extend through the openings in an associated container on said support with the upper ends of said pins adjacent to and immediately below said loading station and a depositing position wherein said pins are withdrawn from the openings in the associated container on said support, and means for shifting the associated set of grouped individual items at said loading station from said conveyor when said pins are in said receiving position without lateral constraint of the associated set of grouped individual items while maintaining the associated set of grouped individual items in general registration with an associated container on said support gently to transfer the associated set of grouped individual items onto the upper ends of said pins, whereby subsequent shifting of said pins to said depositing position gently deposits the associated set of grouped individual items in the associated container while preserving the individual items therein and maintaining them in the predetermined relation with respect to each other.

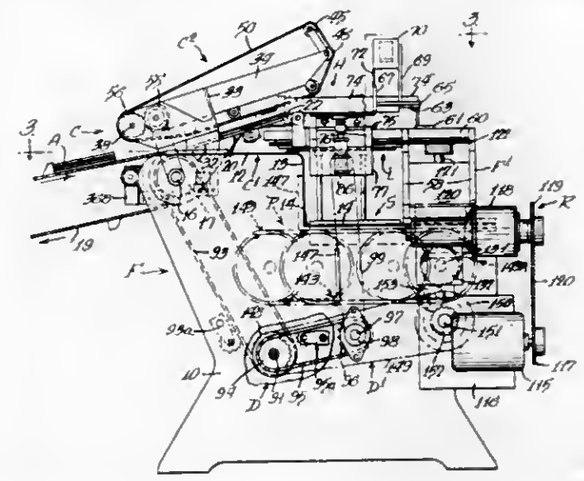
21. A method of loading into a container having a plurality of openings in the bottom thereof a set of grouped individual items to be maintained in a predetermined relation with respect to each other, said method comprising the steps of providing at a loading station a container having a plurality of openings in the bottom thereof, carrying a set of grouped individual items on a powered conveyor section of interconnected free rollers into said loading station overlying and in general registry with said container, moving a plurality of upwardly extending pins substantially greater in number than the individual items upwardly through the openings in the bottom of said container so that the upper ends of said pins are disposed just beneath said conveyor section, causing relative movement between the set of grouped individual items and said conveyor section to feed the set of grouped individual items off of the trailing end of said conveyor section without lateral constraint of the associated set of grouped individual items gently to transfer the set of grouped individual items onto the upper ends of said pins, and thereafter withdrawing said pins from the openings in said container gently to deposit the set of grouped individual items in said container while preserving the individual items therein and maintaining them in the predetermined relation with respect to each other.

4,030,621

COMPENSATING STACKER FOR MAGAZINES

Kermit E. Swanson, Naperville, and Frank J. Kuzel, Chicago, both of Ill., assignors to R. R. Donnelley & Sons Company, Chicago, Ill.

Filed Jan. 8, 1976, Ser. No. 647,366
Int. Cl.² B65G 57/16
U.S. Cl. 214—6.5 14 Claims



1. In a stacker for printed periodicals which includes a frame, drive means on the frame for driving the stacker through successive machine cycles, driven infeed means to feed a small lift of printed periodicals forwardly into the stacker on each machine cycle, a stacking station forward of

and below said infeed means to receive said lifts seriatim on top of one another, and delivery means which is operable intermittently to move stacks consisting of predetermined numbers of successive lifts seriatim out of said stacking station, an improvement consisting of apparatus for reversing the orientation of certain of said lifts so the stacks are effectively compensated, said apparatus comprising, in combination:

upper substantially horizontal lift supporting means which is positioned directly above the stacking station to receive successive lifts of periodicals from the infeed means, said upper lift supporting means being movable;

first drive means for moving said upper lift supporting means in timed relationship with the infeed means to drop each lift vertically a predetermined period of time after it is received;

lower substantially horizontal lift supporting means positioned between the upper lift supporting means and the stacking station, said lower lift supporting means being movable between a closed position and an open position;

second drive means for moving said lower lift supporting means between said positions;

lower lift support control means for actuating said second drive means in timed relationship with the infeed means to close said lower lift supporting means for receiving a lift from the first lift supporting means and to thereafter open said lower lift supporting means;

a turntable operatively associated with but independent of said lower lift supporting means to rotate lifts supported on said lower lift supporting means;

turntable drive means for rotating said turntable in 180° increments;

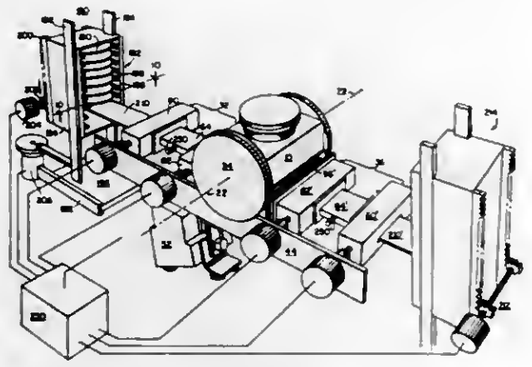
and turntable drive control means for operating said turntable drive means only when certain predetermined lifts in each of said predetermined number of successive lifts are on said lower lift supporting means, whereby only said certain lifts are rotated and each stack contains some lifts in a first orientation and some lifts which are turned 180° from said first orientation.

4,030,622

WAFER TRANSPORT SYSTEM

Norman B. Brooks, Carlisle, and Michael M. Olmstead, Bedford, both of Mass., assignors to Pass-Port Systems, Inc., Billerica, Mass.

Filed May 23, 1975, Ser. No. 580,350
Int. Cl.² C23C *13/08*
U.S. Cl. 214—17 B **21 Claims**



1. Apparatus for transporting an article into and out of a sealed chamber through opposed entrance and exit apertures in the walls thereof, comprising:

A. means defining a rigid track extending through said apertures from one side of said chamber to the other and having at least a portion thereof enclosed for isolating it from its environment,

B. environment-isolating and vibration decoupling means surrounding each of said apertures and extending from said chamber to an enclosed portion of said track to form a seal for said chamber while vibration-isolating said chamber from said track,

C. first and second valves interposed in said track on the entrance and exit sides of said chamber, respectively, for passage of articles therethrough, and

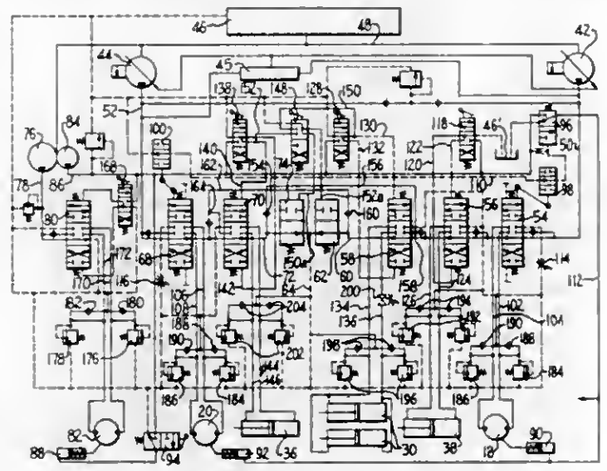
D. means for vibrating said track to advance articles on the track along the track.

4,030,623

HYDRAULIC CIRCUITRY FOR AN EXCAVATOR

John W. Bridwell, Peoria; Donald L. Hopkins, and Kenneth R. Lohbauer, both of Joliet, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Continuation of Ser. No. 207,027, Dec. 13, 1971, abandoned. This application Apr. 29, 1976, Ser. No. 681,366
Int. Cl.² E02F *3/32*
U.S. Cl. 214—138 R **17 Claims**



1. A hydraulic system for an excavator having a boom, a stick, and a bucket supported on a rotatable platform, said system comprising:

a first and a second variable displacement pump driven by an internal combustion engine;

a pair of independent translation motors;

a slew drive motor for controlling the movement of the platform;

a boom control motor;

a stick control motor;

a bucket control motor;

a first series of interrupted series connected distributors connecting said first pump first to the first translation motor and lastly to said stick control motor; and,

a second series of interrupted series connected distributors connecting the second pump first to the second of said translation motors, then to said bucket control motor, and lastly to said boom control motor; and,

the last distributor in each of said series being operative to combine fluid from the other series for operation of its respective control motor.

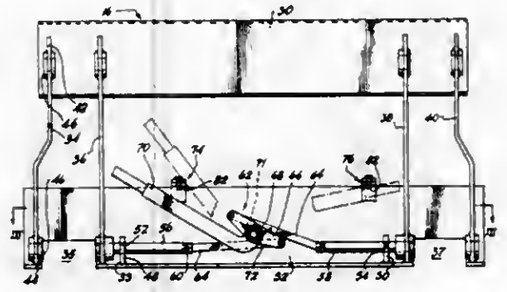
4,030,624

LOADER VEHICLES

Harry Matthews, Worsley, England, assignor to Massey-Ferguson Services N.V., Curacao, Netherlands

Filed Dec. 31, 1975, Ser. No. 645,833
Claims priority, application United Kingdom, Jan. 4, 1975, 00352/70
Int. Cl.² E02F *3/81*
U.S. Cl. 214—145 A **9 Claims**

1. An implement coupling mechanism detachably secured to load lifting means for ready attachment and detachment of a load carrying implement comprising a bracket for supporting the implement, a selectively engageable portion thereof, first and second members on the loading lifting means, securing means for engaging said engageable portion of said bracket to lock said bracket to said first member in a first portion of said securing means, a lug on the implement for engagement by said securing means for selectively locking the implement to said bracket and said second member in a second position of said securing means, said first member located inbetween said engageable portion of said bracket and said lug, said securing means located on said bracket means to permit said securing means to unlock said implement by disengaging said lug and said second member without unlocking said bracket when said securing means moves from the second to the first position, said bracket remaining engaged by said engageable portion of said bracket and said first member being engaged by said securing means, said bracket being disengageable from said lifting means by movement of said securing means to a third position.

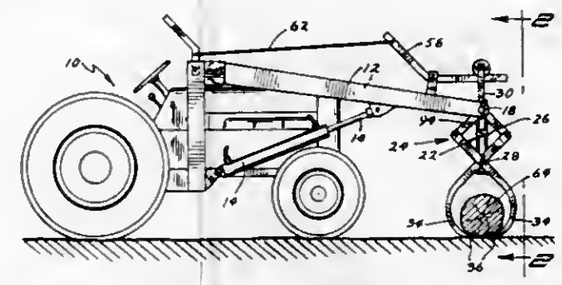


4,030,625

LOADER ATTACHMENT FOR HANDLING LOGS, BALES AND THE LIKE

Edward L. Koehnen, Akeley, Minn. 56433

Filed Aug. 26, 1976, Ser. No. 717,949
Int. Cl.² B66C *1/62*
U.S. Cl. 214—147 G **6 Claims**



1. A loader attachment for use with a prime mover having parallel, spaced apart, power actuated, front end loader support arms extending outwardly therefrom; said loader attachment including:

a. a main horizontal frame support bar pivotally mounted in outer ends of said support arms;

b. a pair of vertical guides extending downwardly from the said frame support bar in spaced relation to each other and symmetrically about the center of the frame support bar;

c. a horizontal hook support bar extending through the vertical guides;

d. two pairs of jaw-forming hooks, each having central portions pivotally supported, one pair at each end of said hook support bar in approximate vertical alignment beneath said frame support bar;

e. a rigid link pivotally connecting an upper, outer end portion of each of said hooks with a vertically aligned portion of said frame support bar;

f. a hook support bar lifting strap intergral with and extending upwardly from said hook support bar;

g. said guides being of configuration to permit movement of said hook support bar between a first lower position wherein each of the hooks of each pair of hooks is in closed, adjacent relationship to the other hook of said pair of hooks, and a second upper position wherein said hooks are spaced at a maximum distance away from each other; and

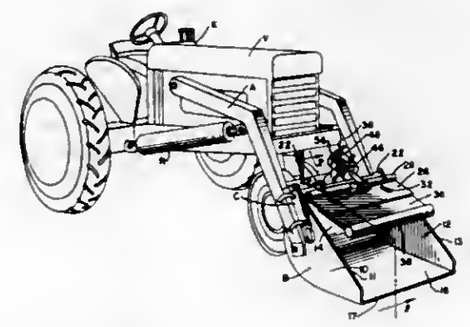
h. means for moving said hook support bar lifting strap to move said hook support bar between said first and said second positions.

4,030,626

CLAMP FOR SCOOP LOADER

Harvey Durham, P.O. Box 164, Manila, Ark. 72442

Filed May 7, 1976, Ser. No. 684,430
Int. Cl.² E02F *3/44*
U.S. Cl. 214—767 **4 Claims**



1. In a scoop loader including a material scooping bucket mounted on a vehicle which has an hydraulic system for positioning the bucket with respect to the vehicle, and the bucket having transversely spaced side walls and a rear wall, and having a bottom wall extending longitudinally in the outward directions from the rear will which joins a transversely extending top overlying an open space in the bucket above the bottom wall, a material clamping assembly comprising:

a. first bucket means attached to the top of the bucket and including brackets mutually spaced apart transversely of the bucket and carrying pivots aligned along a transverse axis, the axis of the pivots being displaced outwardly of said top and rear wall and being located above said open space of the bucket;

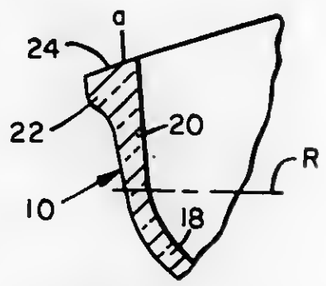
b. clamping blade means rotatably mounted on said pivots and having a transverse width approaching but less than the spacing between the side walls so that the blade means can be moved to a retracted position inside the bucket, the height of the blade means being such that its lower edge approaches the bottom wall of the bucket when the blade means is in retracted position;

c. a crank arm fixed with respect to the blade means and extending outwardly from said pivot axis;

d. second bracket means mounted to the top of the bucket above said axis of the pivots and having trunnion bearings located outwardly of the top and above said open space of the bucket; and

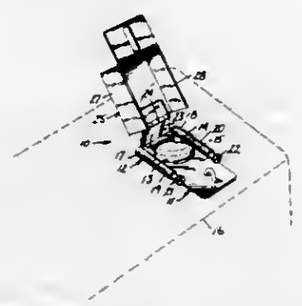
e. an hydraulic ram having a body and having trunnion means located intermediate the ends of the body and mounted for rotation about said trunnion bearings in said second bracket means, and the ram having a piston rod coupled to said crank arm and operative under the control of said hydraulic system to move the arm selectively to orient the blade means in any position between retracted position and an extended position where the blade means extends outwardly from said pivot axis.

4,030,627
TV BULB FUNNEL CONSTRUCTION
William P. Lentz, Addison, N.Y.
Filed May 10, 1976, Ser. No. 684,628
Int. Cl.² H01J 5/20, 29/00
U.S. Cl. 220—2.1 A 8 Claims



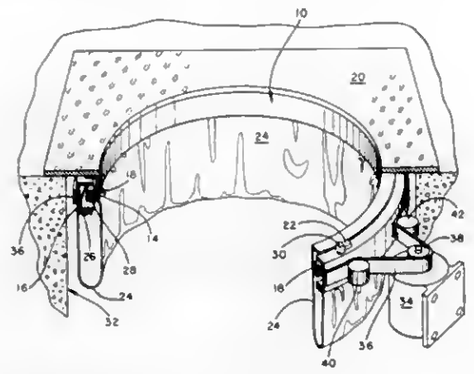
1. An improved funnel construction for use in a TV bulb which comprises, an open mouth portion having wall portions converging toward a yoke portion and a neck portion extending from said yoke portion, said funnel having an axis extending centrally through said neck portion, said wall portions terminating at said open mouth portion in a seal edge; said wall portions extending substantially linearly from an imaginary reference plane, which extends perpendicular to said funnel axis and through said wall portions, to said seal edge; a flange portion projecting outwardly of said linear wall portions adjacent said seal edge and forming a portion of said seal edge, and said linear wall portions uniformly increasing in thickness from said reference plane toward said seal edge.

4,030,628
TAMPER-PROOF CONTAINER CAP COVER
Lawrence Hippert, Jr., Rte. No. 3, New Ulm, Minn. 56073
Filed Aug. 16, 1976, Ser. No. 714,769
Int. Cl.² B65D 25/00, 54/14, 43/16
U.S. Cl. 220—85 P 7 Claims



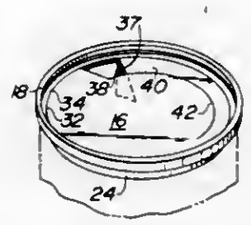
1. A tamper-proof two-piece cover for caps on container spouts comprising:
a. a first collar;
b. a second collar;
c. means for detachably mounting said collars together about the spout of the container; enclosure means for completely enclosing said mounting means and the cap on the spout;
d. a hinge pivotably connecting said enclosure means to said second collar; and
e. latch means for securing said enclosure means to said first collar whereby said mounting means and cap are completely enclosed and inaccessible.

4,030,629
FLEXIBLE HATCH COVER
Igor V. Melnikov, East Brunswick, N.J., assignor to Kimberly-Clark Corporation, Neenah, Wis.
Filed June 28, 1976, Ser. No. 700,458
Int. Cl.² B65D 55/00
U.S. Cl. 220—211 5 Claims



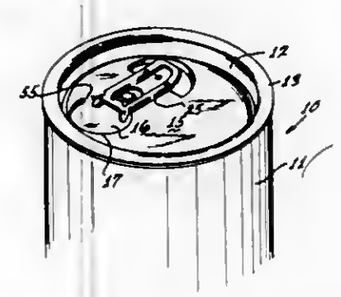
1. A flexible hatch cover comprising,
a container having an opening,
a rim about the circumference of said opening,
a second rim about the circumference of said opening and movable in a rotary manner with respect to said first rim,
a flexible sleeve having one end attached around the circumference of said first rim and the other end attached around the circumference of said second rim and a length sufficient to at least substantially close the opening, and
means for rotating said second rim with respect to said first rim.

4,030,630
ALL PLASTIC RECLOSABLE CONTAINER CLOSURE
Carl F. Yealy, New Oxford, Pa., assignor to Penland Container, Inc., Hanover, Pa.
Filed June 18, 1975, Ser. No. 588,097
Int. Cl.² B65D 51/22
U.S. Cl. 220—258 6 Claims



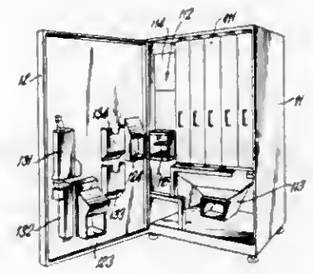
1. An all plastic reclosable container closure comprising first and second plastic closure members, said first member being comprised of a thermoplastic material and having a flat substantially disc shaped central section and a peripheral portion integrally connected to and substantially surrounding said central section, part of said peripheral portion being adapted to be fixedly secured to a container to cover an opening in said container, said central section being connected to said peripheral portion by a first thin plastic portion which completely surrounds said central section, the thickness of said thin plastic portion being substantially less than the thickness of either said central section or said peripheral portion whereby said central section can be torn from said peripheral portion, part of said central section being composed of a tab element connected to the remaining part of said central section by a second thin plastic portion which completely surrounds said tab element, the thickness of said second thin plastic portion being substantially less than the thickness of said central section, said central section being further composed of a partial spiral portion one end of which is located adjacent said tab element whereby said central section can be torn from said peripheral portion by pushing said tab element inwardly and lifting the said one end of said partial spiral section, said entire central section including said tab element lying substantially in a single plane, said second closure member being adapted to cover said central section and being adapted to be releasably connected to the peripheral portion of said first closure member whereby said container closure is opened by removing said second closure member, pushing said tab portion inwardly and tearing said central section from said peripheral portion.

4,030,631
EASY-OPEN ECOLOGY END
Omar L. Brown, Dayton, Ohio, assignor to Ermal C. Fraze, Dayton, Ohio
Filed Aug. 27, 1975, Ser. No. 608,044
Int. Cl.² B65D 41/32
U.S. Cl. 220—269 26 Claims



1. An easy-opening end structure for use with a container wherein the contents of the container are normally under pressure comprising:
an end wall of sheet material;
means cooperating with the end wall for attachment to a container;
means in said end wall defining a panel at least partially circumscribed by a scoreline to form an opening in said end wall;
tab means including a lifting end and an opening end;
said opening end of said tab including depending finger means operative to bear against said panel in an opening sequence,
means to affix said tab means to said end wall such that the opening end thereof overlies said panel whereby the tab remains affixed to said end wall after formation of said opening;
means integral with the end wall to secure said panel to said end wall subsequent to rupture of said scoreline;
said means to secure said panel being located laterally of said affixing means;
said scoreline including a portion located between the opening end of the tab and said affixing means;
said tab being a longitudinally rigid lever operative in response to raising the lifting end thereof to cause the opening end of the tab to bear against said panel and to initiate rupture of the portion of the scoreline located between the opening end of the tab and the affixing means by a class 2 lever action; and
said tab being operative as a class 1 lever subsequent to the initial rupture of said portion of said scoreline to effect rupture of the remainder of said scoreline progressively from said portion of the scoreline towards said means to secure said panel and to urge said panel downwardly and laterally during the progressive rupture of said scoreline.

4,030,632
FOOD VENDING MACHINE WITH COOKING APPARATUS
Ikuo Harashima, Tsesaki, Japan, assignor to Sankyo Electric Company, Limited, Isesaki, Japan
Filed May 28, 1976, Ser. No. 690,923
Claims priority, application Japan, May 29, 1975, 50-71330[U]; Sept. 8, 1975, 50-109175; Oct. 3, 1975, 50-136173[U]; Dec. 1, 1975, 50-162343[U]; Dec. 10, 1975, 50-167078[U]
Int. Cl.² G07F 9/10
U.S. Cl. 221—150 A 18 Claims

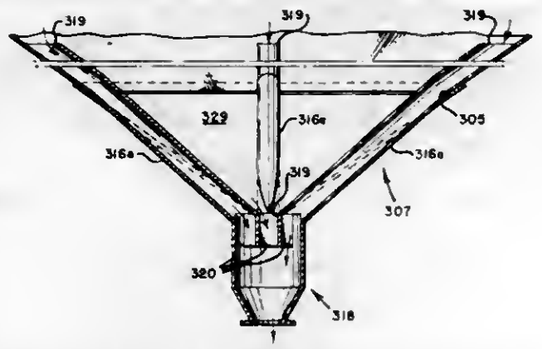


1. In vending apparatus for dispensing foods having a vending control circuit which generates a vending signal when said foods are sold and a cooking apparatus for cooking the foods sold said cooking apparatus including a cooking chamber having a door to provide access to the chamber, a cooking device and manually operated switch means for activating the cooking device, an improvement comprising:
locking means for locking the door of the cooking chamber in a closed condition;
first detecting means for detecting said vending signal;
first timer means which is activated by said first detection means to operate during a first predetermined time period;
means for releasing said locking means in response to an output from said first timer means;
a second timer means connected to said output of said first timer means through said manually operated switch means, said second timer means being activated in response to the operation of said manually operated switch means during said first predetermined time period when said first timer means is in operation, and operating during a second predetermined time period, which is shorter than said first predetermined time period; and
said cooking device being connected to the output from said second timer to be operated during said second predetermined time period.

4,030,633
SYSTEM FOR CONTROLLING SEGREGATION WITHIN A BIN DURING MATERIAL WITHDRAWAL
Glen W. Fisher, Seattle, Wash., assignor to Technovators, Inc., Seattle, Wash.
Continuation of Ser. No. 449,055, March 7, 1974, abandoned, which is a continuation of Ser. No. 354,173, April 25, 1973, abandoned, which is a continuation-in-part of Ser. No. 254,883, May 19, 1972, abandoned. This application Aug. 29, 1975, Ser. No. 609,801
Int. Cl.² B65G 65/30
U.S. Cl. 222—1 23 Claims

21. A method of withdrawing particulate material from a bin having a hoppered bottom, comprising the steps of:
controlling downward flow of particulate material through the bin by withdrawing particulate material from the bin at a plurality of points located solely in the bin bottom to form a plurality of discharge streams drawn from respective portions of a horizontal bin cross sectional plane;
combining the discharge streams into a composite output stream under uniform flow conditions without cross flow

therebetween in proportion to the areas of said bin cross sectional plane from which they are respectively drawn.



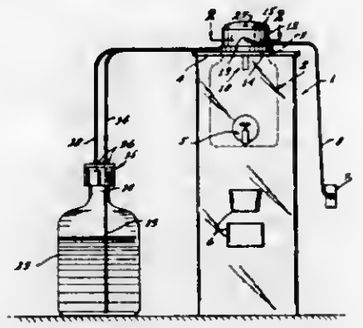
whereby the composition of the output stream is substantially uniform.

4,030,634

BOTTLED WATER TRANSFER DEVICE

David R. Osborn, 30695 Calle Chueca, San Juan Capistrano, Calif. 92675

Filed Mar. 16, 1976, Ser. No. 667,421
Int. Cl.² B67D *5/54*
U.S. Cl. 222—23 7 Claims



1. Water transfer apparatus adapted for use in combination with a bottled potable water dispenser apparatus on a support surface having an exteriorly exposed olla having an upwardly disposed opening substantially above the support surface and wherein the olla is adapted for normal reception of an inverted bottle of potable water for filling the olla for valved dispensing of the potable water from the olla comprising:

a. olla closure means for substantially closing the upper opening of the olla and including a non-siphon water conduit passing therethrough for communication with the interior of the olla;

b. a closure adapted for sealing engagement with an open neck of a bottle of potable water, at a level substantially below the opening of the olla, and including a pressurized gaseous fluid inlet conduit for communication with the headspace of the bottle and an eduction tube for withdrawing water from the bottle;

c. motor operated gaseous fluid pressure generating means carried by said olla closure and operatively connected to the inlet conduit of the bottle for pressurizing the headspace of the bottle for pressure delivery of water from the bottle to the interior of the olla through a conduit communicating the eduction tube and the non-siphon water conduit; and

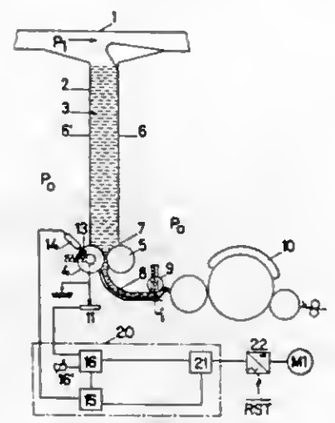
d. means carried by said olla closure and responsive to water level in the olla for controlling delivery of water to the olla in response to pressurization of the headspace of the bottle.

4,030,635

METHOD AND APPARATUS FOR PRODUCING A CONTINUOUS EVEN STRAND OF FIBERS

Kurt Hablützel, Wiesendangen, and Hansruedi Lamparter, Winterthur, both of Switzerland, assignors to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed Dec. 4, 1973, Ser. No. 421,688
Claims priority, application Switzerland, Dec. 5, 1972, 17649/72
Int. Cl.² D01G *15/40*
U.S. Cl. 222—55 12 Claims



1. A method of producing an even continuous strand of fibers at an exit end of at least one flock depositing chute, said method comprising the steps of

delivering fiber flock into the chute at a preset air pressure;

removing air from the chute to create a pressure drop within the chute to compress the flock therein;

removing a fiber strand from the chute between a pair of take-off rolls wherein one of the rolls is a sensing roll;

measuring the density of the fiber strand removed from the chute;

comparing the measured density of the fiber strand with a present value to obtain a difference value;

initiating and completing an integration of the obtained difference values in a period of time equal to a single revolution of the sensing roll; and

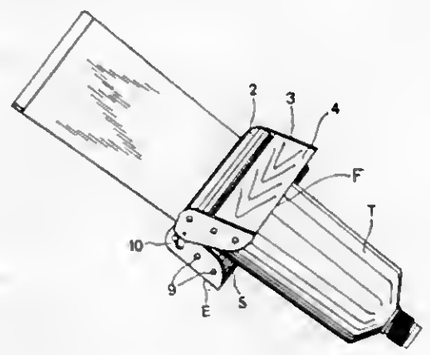
varying said pressure drop as a function of the integrated difference values to maintain an even continuous strand.

4,030,636

TUBE SQUEEZING DEVICE

Claude Drancourt, Grenoble, France, assignor to Societe Presstub, France

Filed Mar. 15, 1976, Ser. No. 666,979
Claims priority, application France, Mar. 14, 1975, 75.08645
Int. Cl.² B65D *35/28*
U.S. Cl. 222—102 7 Claims



1. A tube squeezing device for use in manually emptying deformable tubes of the type containing soft paste, comprising:

an upper jaw, including a first, generally horizontal transverse plate engageable by the fingers and having generally vertical, rearwardly extending first end plates on the opposite ends thereof;

a lower jaw, including a second, generally horizontal transverse plate also engageable by the fingers and having generally vertical, rearwardly extending second end plates on the opposite ends thereof, the outer ends of said second end plates each having upwardly extending portions thereon arranged to mesh with the outer ends of said first end plates;

a rotatably mounted first shaft connecting the meshed portions of said first and said second end plates for pivotally connecting said upper and said lower jaws, with said first and said second transverse plates in opposed relationship, the outer ends of said second end plates having aligned apertures therein beneath said first shaft;

a second shaft having its opposite ends received within said aligned apertures;

a first squeezing cylinder received on said rotatable first shaft;

a second squeezing cylinder rotatably carried by said second shaft, and disposed generally below said first squeezing cylinder in opposed relationship;

The space between said upper and said lower jaws being open and unobstructed when said jaws are pivoted apart whereby a tube can be inserted therebetween, with the end thereof in engagement with said first and said second squeezing cylinders; and

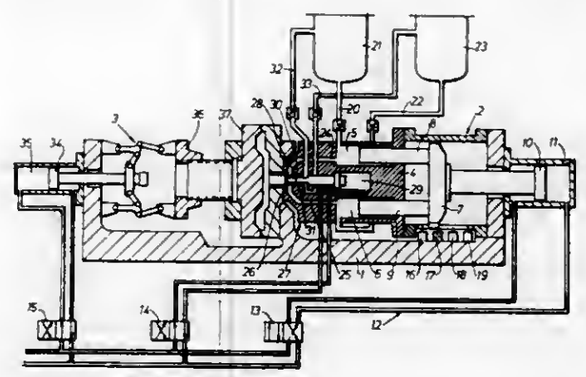
means operable upon pivotal movement of said upper and lower jaws toward each other to positively rotate said first squeezing cylinder, to thereby laminate between said first and said second cylinders a tube placed between said jaws with the end thereof inserted between said cylinders, said opposed first and second transverse plates being engageable with and exerting pressure on the body of said tube during such pivotal movement of said jaws to thereby squeeze said soft paste out of the tube.

4,030,637

APPARATUS FOR DOSING AND MIXING FLUID REACTANTS

Heinrich Boden, Leverkusen, and Ulrich Knipp, Schildgen-Nittum, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Feb. 9, 1976, Ser. No. 656,234
Claims priority, application Germany, Mar. 12, 1975, 2507727
Int. Cl.² B65D *5/52*
U.S. Cl. 222—137 4 Claims



1. Apparatus for dosing and mixing at least two fluid reactants, comprising

a. a dosing unit comprising a housing containing dosing cylinders arranged side by side which are connected to storage containers for the reactants through pipes, and a yoke on which dosing pistons corresponding to the cylinders are arranged and which is provided with a drive, and

b. a mixing head with mixing chamber and outlet aperture, said mixing chamber containing an ejection control member comprising a piston adapted to traverse the mixing chamber so that in a first position said ejection control member allows the reaction components to enter said mixing chamber and in a second position said ejection control member allows the reactants to return to said storage containers, and

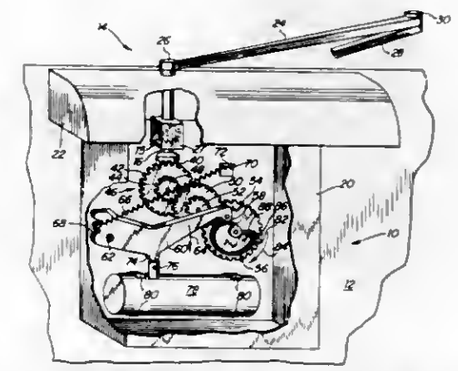
c. conduits connecting the dosing unit to the mixing head characterized in that the housing of the dosing unit and the mixing head together form a rigid block with the conduits connecting the dosing cylinders with the mixing chamber in the form of channels inside this block.

4,030,638

FLUID DISPENSER SYSTEM

Joseph P. Lanno, 20 Beacon St., Newton, Mass. 02167

Filed June 1, 1976, Ser. No. 691,386
Int. Cl.² B05B *12/02*
U.S. Cl. 222—180 2 Claims



1. A periodically activated fluid dispenser system, driven by a door-closer unit having an output shaft driven by motion of an associated door, comprising: a fluid dispenser container; a cam member; a follower member, responsive to said cam member, for activating said fluid dispenser container to dispense fluid at least once during each rotation of said cam member; an input drive member driven by said output shaft; a ratchet mechanism responsive to said input drive member for producing unidirectional rotary motion; and a gear train mechanism responsive to said unidirectional rotary motion output from said ratchet mechanism to drive said cam member through only a portion of a full rotation upon each operation of the output shaft.

4,030,639

CHARCOAL ADSORBER FILTER FILL SYSTEM

Harold Cheney Parish, Upper Arlington; Michael Duane Allard, Columbus; Jack Leland Pettit, Columbus, and Ivars Sigurds Sputgis, Columbus, all of Ohio, assignors to Pennwalt Corporation, Philadelphia, Pa.

Filed Apr. 28, 1975, Ser. No. 572,580
Int. Cl.² B65D *47/08;* B67D *5/08*
U.S. Cl. 222—189 12 Claims

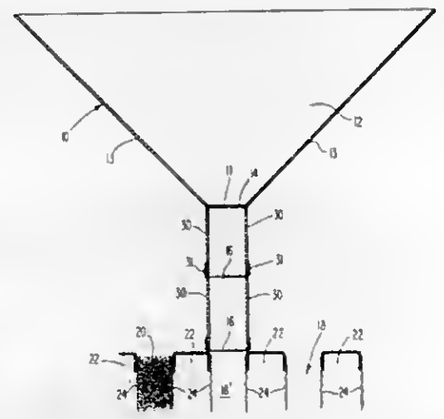
1. Apparatus for filling filter cells with granular adsorbent material from above the cells to obtain uniform density in the cells, comprising:

a. a horizontally elongated hopper for containing granular adsorbent material, said hopper including a metering plate extending longitudinally substantially the length of said hopper and forming a portion of the bottom of said hopper, said metering plate having a first plurality of holes therein for flow therethrough of granular adsorbent material downward out of said hopper;

b. a pair of side walls, each wall extending downward from

said bottom of said hopper from a position outboard said metering plate, said pair of side walls thereby forming a downwardly extending discharge chute; and

c. A plurality of rigid distribution meshes, each mesh substantially parallel to and the same area as said metering plate and rigidly secured to both side walls of said pair, within said discharge chute, said meshes disposed one above another so granular adsorbent material exiting said



hopper through said discharge chute must pass through said meshes seriatim; whereby substantially uniform density of granular adsorbent material in a filter cell being filled results by at least a portion of granular adsorbent material impinging at least one of said distribution meshes as said granular adsorbent material vacates said hopper through said holes and flows downward through said discharge chute.

4,030,640

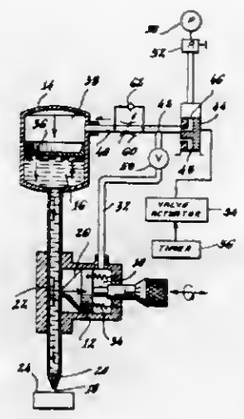
METHOD AND APPARATUS FOR DISPENSING VISCOUS MATERIALS

Paul S. Citrin, Danbury, and Frank Gurski, Brookfield, both of Conn., assignors to Indicon Inc., Danbury, Conn.

Filed Nov. 10, 1975, Ser. No. 630,278

Int. Cl.² B65D *37/00*

U.S. Cl. 222—207 **13 Claims**



1. In a high viscosity material dispenser having a discharge port in material flow communication with a deformable tube coupled to receive material from a reservoir from where the high viscosity material is obtained for dispensing with a normally open pinch valve operatively located between the discharge port and the reservior to deform the tube for the discharge of material, the improvement comprising

first means for simultaneously pressurizing the material in the reservoir and closing the pinch valve to deform the tube against pressurized material and reduce the volume of the tube for the dispensation of a desired amount of high viscosity material contained in the segment of the tube located between the pinch valve and the discharge port, and second means for simultaneously reducing pressurization of the material in the reservoir and opening the pinch valve to enable the tube to increase its volume for a suck-back of the material at the discharge port and a crisp cut-off from dispensed material.

4,030,641

IMPLEMENTS FOR DELIVERING PARTICULATE MATERIAL TO THE GROUND

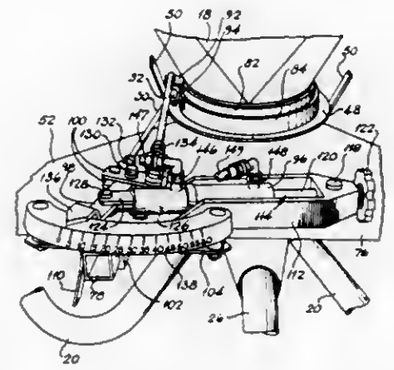
Alfred J. Bailey, Berkswell, and Malcolm Dean, Green Lane, both of England, assignors to Massey-Ferguson Services N.V., Curacao, Netherlands Antilles

Filed July 11, 1975, Ser. No. 595,208

Claims priority, application United Kingdom, Aug. 7, 1974, 34756/74

Int. Cl.² A01C *17/00*; **E01C** *19/20*; **F01B** *31/00*

U.S. Cl. 222—317 **3 Claims**



1. An implement for spreading particulate material on the ground comprising a frame, a hopper mounted on the frame for the particulate material, a spreading mechanism mounted on the frame below the hopper, and a metering mechanism supported on the frame to control the rate of passage of the particulate material from the hopper to the spreading mechanism, the metering mechanism comprising metering members in face-to-face contact defining at least one opening for the passage of particulate material from the hopper to the spreading mechanism, the metering members being supported on the frame for pivotal movement about a generally vertical axis and movable relative to each other to infinitely vary the size of said opening from closed to fully open, a double-acting hydraulic ram operably connected to the metering members to position the metering members relative to each other, a setting indicator to indicate the position of the metering members relative to each other and adjustable mounting means mounting the double-acting hydraulic ram on the frame, for adjusting the position of said opening relative to the spreading mechanism.

4,030,642

ROTARY FEEDER CONSTRUCTION

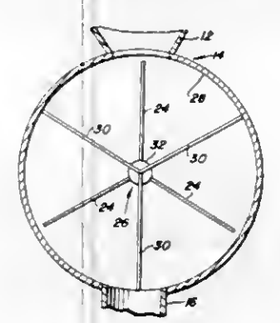
Charles B. Morrison, Oregon, Ohio, assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Nov. 15, 1973, Ser. No. 416,061

Int. Cl.² G01F *11/24*

U.S. Cl. 222—368 **6 Claims**

1. In a rotary feeder for feeding particulate matter from a supply source to a zone of use, the combination comprising a housing having a curved inner wall surface, a valve rotatably mounted in said housing and having a central shaft and a plurality of vanes having material engaging surfaces radially extending from said shaft, first alternate imperforate vanes having edges in close proximity to said housing inner wall surface whereby said first alternate vanes rotate with substantially no clearance between said vanes and the housing inner wall surface, second alternate vanes defining clearances, at least in part, through which gases may pass in the normal course of valve rotation; said housing being in communication with a particulate material inlet and a particulate material



outlet whereby rotation of said rotary valve will sweep particulate matter from said inlet to said outlet over said housing inner wall surface.

4,030,643

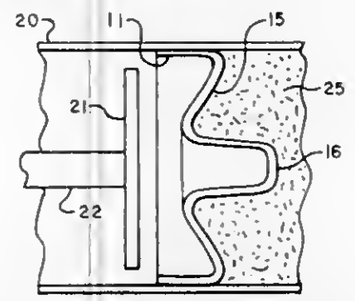
CONTENTS-CONSERVING PLUNGER FOR CARTRIDGE

Dick T. van Manen, Canandaigua, N.Y., assignor to Voplex Corporation, Pittsford, N.Y.

Filed Dec. 11, 1975, Ser. No. 639,619

Int. Cl.² B67D *5/42*

U.S. Cl. 222—386 **6 Claims**



1. A plunger for a cartridge having an open rear end and a dispensing nozzle at a forward end, said plunger comprising relative to said cartride:

a. an annular wall for engaging the inside of said cartridge;

b. a flexible forward wall integral with the forwardmost region of said annular wall and movable between forward and rearward positions;

c. said forwardmost region of said annular wall curving into said forward wall in a relatively small radius of curvature of more than 90°;

d. a projection extending forward from the central region of said forward wall, said projection being shaped to fit into a rearward region of said nozzle;

e. said forward wall curving into said projection in a relatively small radius of curvature of more than 90°;

f. said forward wall being in said rearward position when said plunger is seated in said rear end of said cartridge;

g. said projection extending forward of a plane intersecting said forwardmost region of said annular wall when said forward wall is in said rearward position;

h. the volume of the portion of said projection extending forward of said plane being less than the volume of said contents around said projection in a space rearward of said plane when said plunger is seated in said rear end of said cartridge and said forward wall is in said rearward position;

i. said forward wall of said plunger being movable forward to said plane to dispense said volume of said contents around said projection when said forward wall is forced against said forward end of said cartridge; and

j. said forward movement of said forward wall being arranged to force substantially all of said projection into said rearward region of said nozzle for dispensing most of said contents from said rearward region of said nozzle.

4,030,644

NON-RETURN SAFETY VALVE ASSEMBLY AND PRESSURE PACK INCORPORATING SAME

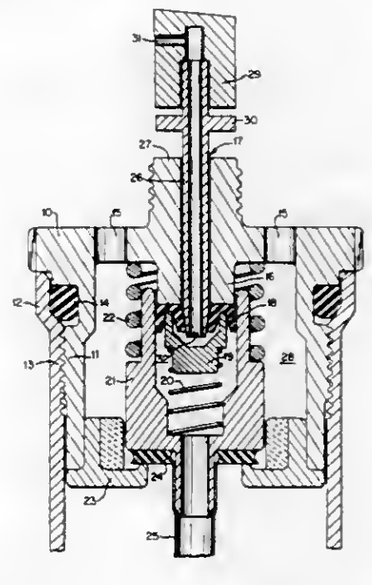
John Joseph Creighton, 100 Park Road, East Hills, New South Wales, Australia (2213)

Filed May 21, 1976, Ser. No. 688,677

Claims priority, application Australia, Feb. 26, 1976, 11473/76

Int. Cl.² B65D *8/14*

U.S. Cl. 222—396 **10 Claims**



1. A valve assembly for use in a container for dispensing fluids under the influence of pressure within the container comprising

a. an outer valve casing having screw threads thereon to cooperate with screw threads on the container to couple the two together in conjunction with a sealing ring to provide an air-tight but releasable connection,

b. relief holes on the top of the casing to allow the escape of excess propellant pressure or liquid,

c. a centrally and axially located upstanding neck on the outer valve casing,

d. an internally extending locating flange on the under side of the outer valve casing, and coaxial with said axially located neck,

e. a bore passing through the axially located neck and the internally extending locating flange,

f. a cylindrical inner valve casing having an internal axial bore which is a sliding outer fit around said locating flange,

g. an annular valve insert supported below the inner valve casing by the outer valve casing and said annular valve insert capable of bearing against the bottom of said inner valve casing to form a gas and liquid-tight seal,

h. an inverted-U cross-section ring gasket mounted coaxially on the lower face of the locating flange, the outer edge of said ring gasket bearing against the periphery of the internal axial bore of the cylindrical inner valve casing to form a gas and liquid-tight seal between said inner valve casing and the said internally extending locating flange,

i. a dip-tube extending into the internal axial bore of the cylindrical inner valve casing down through the annular valve insert into the container,

j. a valve stopper with an annular upstanding wall which seats in the inverted-U ring gasket,

k. a spring inserted between the base of the axial bore of the inner valve casing and the valve stopper to urge the latter

into contact with the inverted-U ring gasket to form a gas and liquid-tight seal, and

l. an actuator discharge tube which passes down the bore through the neck of the outer valve casing sufficiently far to be able to bear upon the spring-urged valve stopper and depress it to break the seal when said actuator tube is pressed,

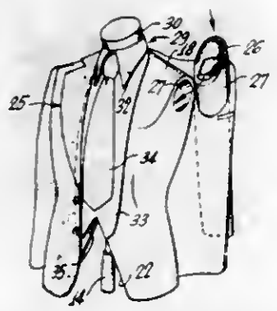
said actuator discharge tube sliding through the inverted-U ring gasket to form a seal with the exterior surface of the actuator discharge tube and said actuator discharge tube having gaps in the periphery of its lower edge to allow the contents of the container to escape.

4,030,645

CLOTHING DISPLAY FORM

Morris A. Wolf, 7048 Macapa Drive, Los Angeles, Calif. 90068

Filed June 28, 1976, Ser. No. 700,469
Int. Cl.² A41H *5/00*
U.S. Cl. 223—68 **11 Claims**



1. A clothing display form for a sleeved garment such as a sport coat, comprising:

a torso-shaped section simulating the upper portion of a human body, including the shoulders thereof;

two elongated arm sections composed of relatively rigid and smooth-surfaced material shaped to substantially fill the sleeves of the garment and having a preselected shape for holding the sleeves in the same shape, said arm sections having upper end portions positionable alongside the shoulder-simulating portions of the torso-shaped section;

said torso-shaped section having two generally circular socket openings in its opposite sides immediately below the shoulder-simulating portions thereof, and having annular flanges extending inwardly from said socket openings and inclined downwardly therefrom into the torso-shaped section;

and a stud on each of said arm sections positioned to project laterally from the side adjacent said torso-shaped section into the socket opening, said studs being spaced below the upper ends of said arm sections to position said upper ends relative to the shoulder-simulating portions, and being inclined downwardly and inwardly at an angle corresponding to the incline of said flanges, and the undersides of the studs being curved surfaces cooperating with the flanges to position the arm sections in preselected positions relative to the torso-shaped section as an incident to the engagement of the studs and the flanges;

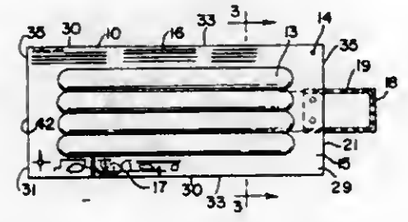
said socket openings being substantially larger in area than the cross-sectional area of said studs to permit rapid positioning of the arm sections in the sleeves of a garment and alongside the torso section with the studs inserted in the socket openings, and to gravitate into correct positions relative to the torso section, and also to permit free swinging of the arm sections relative to the torso section while in a sleeved garment, whereby the garment can be quickly arranged on the form.

4,030,646

SURVIVAL BELT/BAG

John Switack, and Elva Jane Switack, both of 11 Los Altos Square, Los Altos, Calif. 94022

Filed Jan. 20, 1975, Ser. No. 542,193
Int. Cl.² A45F *3/00*
U.S. Cl. 224—9 **1 Claim**



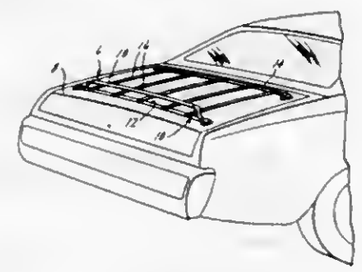
1. A survival belt/bag adapted to be worn about the waist as a belt or for enclosing a substantial portion of the body when as a bag, comprising impervious flexible, resilient, two-ply inflatable sheet material, foldable longitudinally on spaced fold lines of belt size dimensions, for wearing in the folded condition as a belt, plural air chambers between said fold lines, which may be inflated when unfolded to convert the belt to the bag, wherein it may be worn about the body providing insulation against the elements, and a belt-buckle container for attaching the ends of the folded belt/bag together about a person's waist, said container adapted to carry survival items.

4,030,647

VEHICLE ACCESSORY RACK

William A. Rasor, Birmingham; Walter S. Van Dine, Lexington, and Frank A. Whitney, Algonac, all of Mich., assignors to Masco Corporation, Taylor, Mich.

Filed May 22, 1975, Ser. No. 579,928
Int. Cl.² B60R *9/06*
U.S. Cl. 224—29 R **2 Claims**



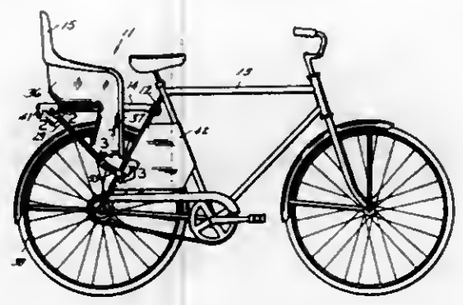
1. A rack adapted to be secured to the outer surface of a motor vehicle, said rack comprising a generally rectangular frame, a plurality of convex joint members extending from said frame, a plurality of socket members, each of said socket members being resiliently deformable and receiving one of said convex members in a snap-in relationship providing the attachment of said convex and socket members as a ball and socket joint and permitting limited universal relative movement between said members, a rigid bracket means having a partially concave portion engaging a portion of each of said convex members and retaining each of said convex members in one of said socket members, fastening means extending through said bracket means and socket members for securing said rack to said outer surface, said rigid bracket means including a portion thereof bearing against the upper surface of said frame thereby preventing upward movement thereof.

4,030,648

CARRIER SUPPORT APPARATUS

Melvin Kermit Johnson, Lake Orion, and Regis Victor Pilarski, Utica; Jay Walter Jensen, Romeo, all of Mich., assignors to The Firestone Tire & Rubber Company, Akron, Ohio

Filed Sept. 20, 1976, Ser. No. 724,646
Int. Cl.² B62J *1/28*
U.S. Cl. 224—31 **8 Claims**



1. In an auxiliary bicycle seat and carrier support apparatus, the combination comprising:

a carrier member, said carrier member provided with support rack engaging channel means on the bottom thereof, said carrier member provided with a downwardly depending buttress element in front of said support rack engaging channel means; and

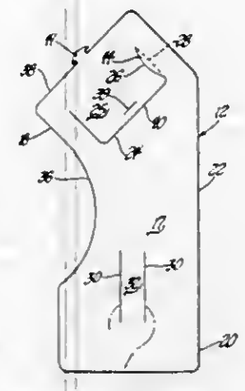
a support rack adapted for selective mounting upon a bicycle frame, said support rack configured for mating engagement with said channel means, said support rack provided with an integral biased latch member adapted to engage said buttress element so as to lockably retain said carrier member in mating engagment with said support rack.

4,030,649

CLOTHES HANGER CARRIER

Victor W. Potoroka, 8610 S. Keeler Ave., Chicago, Ill. 60652

Filed Apr. 1, 1976, Ser. No. 672,545
Int. Cl.² B65D *71/00*
U.S. Cl. 224—45 T **5 Claims**



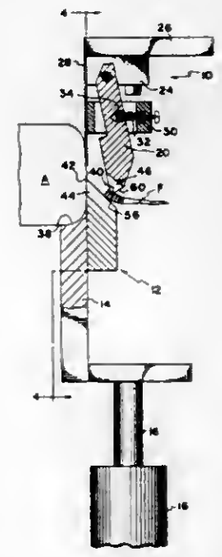
1. An over-the-shoulder carrier for hand carrying articles such as one or more clothes hangers of the type having a garment-support portion and an open hook extending from the top of the support portion, said carrier comprising a single-picce and single thickness body, free of separate assembled elements, stamped or otherwise formed from suitable sheet material of commercially uniform thickness, said body having a longitudinal general centerline. a handle end having a free edge disposed at an angle within the plane of said body and not normal to said centerline and adapted to be rolled to form part of a tubular handle, a hanger hook-engaging end formed near its middle with spaced longitudinal cuts to provide a hook-engaging loop and an intermediate shoulder-engaging portion connecting said ends and being free of fadded elements said body having substantially flat opposite sides both free of any projections which extend normal to the plane of said body so as to be reversible for right or left shoulder carrying.

4,030,650

TAIL FLASH REMOVAL APPARATUS

John W. Oberloler, Beaverton, Mich., assignor to Lyle Development, Inc., Beaverton, Mich.

Filed July 8, 1976, Ser. No. 698,732
Int. Cl.² B26F *3/02*
U.S. Cl. 225—100 **6 Claims**



1. Apparatus for removing an integral web of flash from a molded plastic article such as a container or the like, said apparatus comprising opposed first and second jaw assemblies mounted for reciprocatory movement toward and away from each other between a spaced apart open position and an overlapped actuated position, article seating means on one of said jaw assemblies operable when said assemblies are in their open position to locate an article having an integral web of flash on said one of said jaw assemblies with said web projecting between said jaw assemblies, spaced apart flash engaging teeth on each of said jaw assemblies, the teeth on one jaw assembly being aligned with the spaces between the teeth on the other of said jaw assemblies, inclined cam surfaces on the teeth of said first jaw assembly for forcing flash engaged between the teeth of said assemblies outwardly away from said article as said jaw assemblies move toward said actuated position, and hinge means on said second jaw assembly accommodating outward movement of the teeth of said second jaw assemblies with said flash.

4,030,651

INTERFLOOR TUBE ASPIRATOR MUFFLER

William Robert Weiss, Walnut Creek, Calif.; James Judson Cooksey, Colonial Heights, Va.; Wilbur Leon Stables, Matoaca, Va., and Harry Lee Newell, Jr., Richmond, Va., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Sept. 21, 1976, Ser. No. 725,055
Int. Cl.² B65H *17/32*; **C10K** *1/04*
U.S. Cl. 226—97 **12 Claims**

8. An apparatus to convey a continuous running length of yarn through an obstruction for use during the production of multifilament, synthetic yarn, said apparatus comprising:

A. an elongated tube, said elongated tube having an entrance and an exit end for yarn passage;

B. a source of air under pressure, said source of air under pressure being connected to said elongated tube so as to create a suction therethrough when operational; and

C. a muffler, said muffler being located downstream of said source of air under pressure and being connected to and replacing a portion of said elongated tube corresponding in length to said muffler, said muffler comprising:

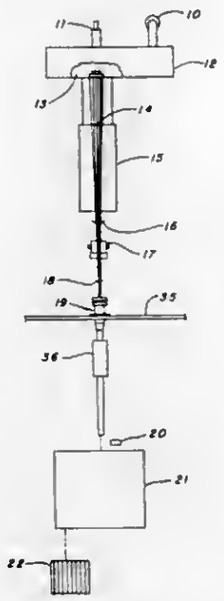
i. housing means, said housing means comprising:

a. an inlet end, said inlet end being shaped so as to couple with said elongated tube downstream of said source of air under pressure without blocking said yarn passage therethrough;

b. an outlet end, said outlet end being shaped so as to couple with said elongated tube upstream of said exit end of said elongated tube without blocking said yarn passage therethrough; and

c. an elongated section extending between said inlet end and said outlet ends of said housing means;

ii. a perforated tube, said perforated tube having a diameter substantially smaller than the diameter of said housing means, said perforated tube being disposed between said inlet and said outlet ends of said housing means and having an open area of from 40 to 60%.



iii. a plurality of baffle means, said baffle means being disposed approximately perpendicular to the central axes of said perforated tube and said housing means and being shaped so as to encircle said perforated tube with their peripheries being surrounded by said elongated section of said housing means, said baffle means forming in conjunction with said perforated tube and said housing means a plurality of annular resonant chambers; and

iv. sound absorbing material disposed throughout each of said resonant chambers;

D. means for connecting said inlet end of said housing means with said elongated tube downstream of said source of air under pressure; and

E. means for connecting said outlet end of said housing means with said elongated tube upstream of said exit end;

whereby the noise level of said apparatus when said source of air under pressure is operational is reduced up to 33.5 Δ dB (A) by said muffler.

4,030,652

EQUALIZING DEVICE FOR MOVEMENTS IN PACKING MACHINES, ESPECIALLY MACHINES FOR MAKING BAGS AND THE LIKE

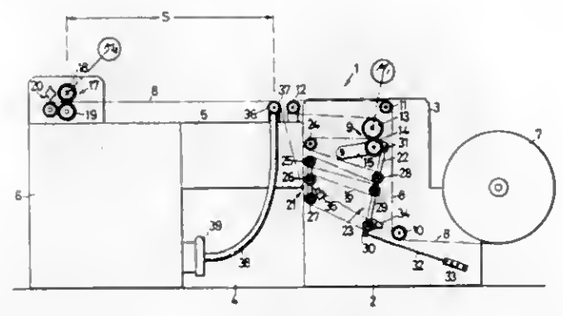
Ehrhart Schulze, Fellbach, Germany, assignor to Felix Stiegler Maschinenfabrik, Stuttgart, Germany

Filed Apr. 5, 1976, Ser. No. 673,421

Claims priority, application Germany, Apr. 3, 1975, 2514600

Int. Cl.² B65H 17/42

U.S. Cl. 226—114 3 Claims



1. In combination: supply reel means for receiving and supplying foil-shaped packing material, first withdrawing means for withdrawing packing material from said supply reel means, first driving means for continuously driving said first withdrawing means, equalizing means for receiving withdrawn packing material from said first withdrawing means and equalizing the movement thereof, second withdrawing means for withdrawing packing material from said equalizing means, and second driving means for intermittently driving said second withdrawing means, said equalizing means including a pivotally supported lever with a first set of rotatably mounted rollers differently spaced from each other, said equalizing means also including stationary supporting means, a second set of rotatably mounted guiding rollers supported by said supporting means and equally spaced from each other, spring means continuously urging said pivotally supported lever to pivot said first set of rollers away from said second set of rollers, said first set of rollers and said second set of rollers being arranged relative to each other so as to permit passing packing material received by said first withdrawing means over a first roller of said first set of rollers and from there over a first roller of said second set of rollers and from the latter to the successive second roller of said first set of rollers, and from there to the successive second roller of said second set of rollers and successively back and forth from one set of rollers to the other set of rollers while in each set of rollers progressively passing from one roller to the next roller, the distance between the rollers of said first set of rollers increasing in the direction of intended movement of packing material from over the rollers of said first set of rollers, the distance between the centers of rotation of each two adjacent rollers of said first set of rollers meeting the relationship $a \times 2^n$ in which a designates the distance between the first and second rollers of said first set of rollers when looking in the direction in which the packing material is to move in succession over the rollers of said first set of rollers, and in which n stands for a whole number of the row of numbers 0,1,2,3,4 . . . designating the order of the respective distance.

4,030,653

METHOD AND APPARATUS FOR SPLICING TIRE CORD FABRIC

Joel M. Kahaner, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

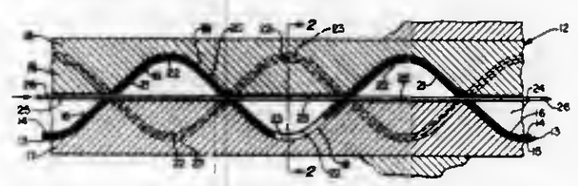
Filed Sept. 17, 1973, Ser. No. 398,053

Int. Cl.² B27F 7/02

U.S. Cl. 227—25 9 Claims

1. A splicing apparatus used in axially joining two pieces of fabric composed of longitudinally extending warp cords held in parallel array by weft threads, comprising:

a. means for holding adjacent ends of the two pieces of fabric in overlapped relation such that the warp cords of the overlapped ends are generally parallel, said means including means for forming parallel rows of waves of interconnecting troughs and ridges in the overlapped ends such that, (i) the longitudinal axes of the rows are parallel and angularly disposed to the warp cords, and (ii) the troughs and ridges of adjacent rows of waves are staggered transversely of the overlapped ends of fabric;



b. at least one pair of combs with outstanding teeth for splicing the overlapped ends of fabric, the teeth of each of the combs being a plurality of parallel splicing rods which are connected at one end thereof; and

c. means for guiding the combs into splicing engagement with the overlapped ends of fabric from opposing longitudinal sides thereof, said means including means for guiding the plurality of splicing rods of each of the combs into piercing engagement with, and through the waves of alternate rows of waves intermediate the troughs and ridges thereof, such that the splicing rods, like each of the rows of waves, are angularly disposed to the warp cords.

4,030,654

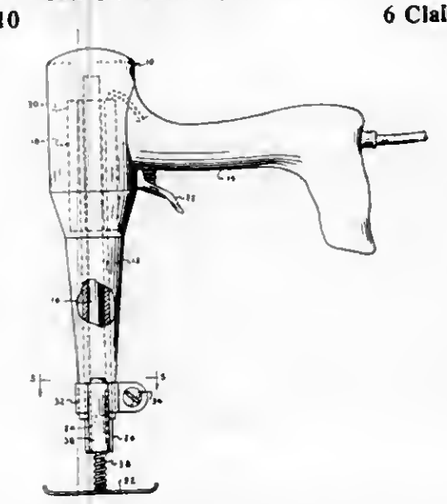
HAMMER TOOL FOR CARPET STRIP

Alvin York, Kouts, Ind., assignor to Eva Imogene Jefferson, Wheatfield, Ind. and Peggy Joe Koehler, Valparaiso, Ind., part interest to each

Filed July 22, 1976, Ser. No. 707,752

Int. Cl.² B25C 7/00

U.S. Cl. 227—110 6 Claims



1. A hammer device for driving nails in a carpet strip comprising:

a hammer shaft;

housing means supporting said hammer shaft for reciprocating movement;

drive means for imparting reciprocating movement to said hammer shaft;

a tubular member forming the distal end of said housing means;

sleeve means on said housing means;

elongated means longitudinally movable in said sleeve means;

spaced guide runners for straddling said carpet strip provided at the distal end of said elongated means; and

spring means coacting between said sleeve means and said elongated means for biasing said guide runners spaced from said sleeve means.

4,030,655

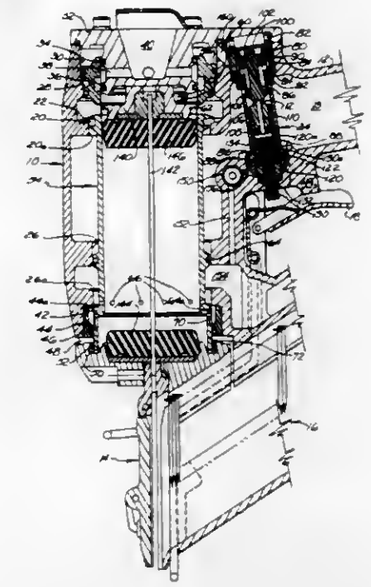
IMPROVED FASTENER APPLYING DEVICE

Robert G. Rothfuss, Bellevue, Ky., and Carl T. Becht, Cincinnati, Ohio, assignors to Senco Products, Inc., Cincinnati, Ohio

Continuation of Ser. No. 446,632, Feb. 28, 1974, abandoned, which is a continuation of Ser. No. 210,812, Dec. 22, 1971, abandoned. This application Jan. 8, 1976, Ser. No. 647,430

Int. Cl.² B25C 1/04; F15B 13/042

U.S. Cl. 227—130 7 Claims



1. In a fastener applying device including a tool body adapted to be connected to a supply of air under pressure, a cylinder in said tool body, a piston and fastener driver reciprocable in said cylinder in opposed working and return strokes from a full up position to a full down position and back, a return air reservoir in said body, a first port communicating between said cylinder and said reservoir just above the full down position of said piston, a resilient bottom stop free of engagement with said cylinder, and means in said tool body fixing said stop to said tool body, the improved structure comprising:

a. a first vent passage providing communication between the lower portion of said cylinder and atmosphere,

b. a second vent passage providing communication between the upper portion of said cylinder and atmosphere,

c. a second port communicating between said return air reservoir and said cylinder adjacent the lower end thereof,

d. said cylinder incorporating an external annular valve element, and being reciprocable in said tool body,

e. said tool body presenting an internal annular valve seat cooperating with said annular valve element to constitute a main valve for controlling air into said cylinder,

f. said tool body at its lower end having an annular sealing element below said first vent passage,

g. the lower end of said cylinder engaging said sealing element when said cylinder is in main valve closing position,

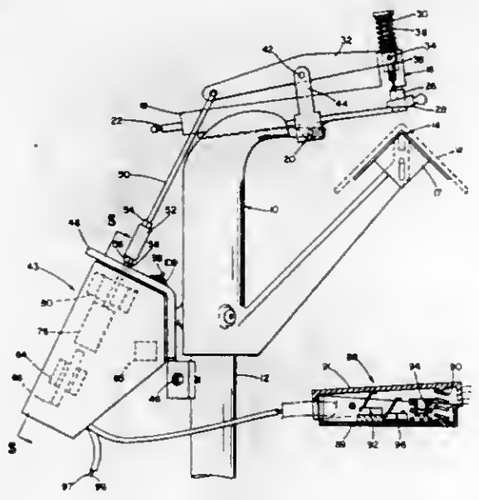
h. the upper end of said cylinder having a portion to close said second vent passage when said cylinder is in main valve opening position,

i. said cylinder having also a portion to close said second port when said cylinder is in main valve opening position;

whereby, when said cylinder is moved to main valve opening position, concurrently said first vent passage is opened, said

second vent passage is closed, and said second port is closed; and when said cylinder is moved to main valve closing position, concurrently said first vent passage is closed, said second vent passage is opened, and said second port is opened.

4,030,656
STAPLER
Stanley H. Gordon, Concord, Mass., assignor to Acme Staple Company, Inc., Franklin, N.H.
Filed Aug. 9, 1976, Ser. No. 712,689
Int. Cl.² B27F 7/22
U.S. Cl. 227—131 **16 Claims**



8. In a stapler or the like having a driving head pivotally mounted on a support member for movement toward an anvil and an operating rod pivotally mounted on said driving head and extending therefrom adjacent said support member for moving said driving head,

an electromagnetic power device for moving said operating rod comprising

plunger means mounted on said support member for linear movement through an advancing stroke from a first inoperative position to a second position and through a driving stroke from said second position toward a third position

advancing coil means for moving said plunger means from said first position to said second position

driving coil means for moving said plunger means from said second position toward said third position and

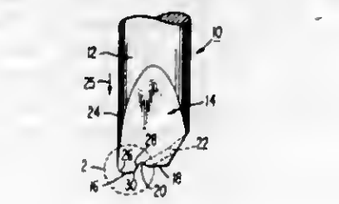
circuit means including sequentially operable switch means for energizing first said advancing coil means and thereafter said driving coil means to move said plunger means first through said advancing stroke and thereafter through said driving stroke.

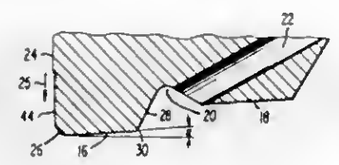
4,030,657
WIRE LEAD BONDING TOOL
Harvey Dow Gibson Scheffer, Westfield, N.J., assignor to RCA Corporation, New York, N.Y.
Filed Dec. 26, 1972, Ser. No. 318,530
Int. Cl.² B23K 21/02
U.S. Cl. 228—1 R **2 Claims**

1. A wire bonding tool for ultrasonically bonding a lead to a contact comprising:

an elongated shank portion extending in a first direction,

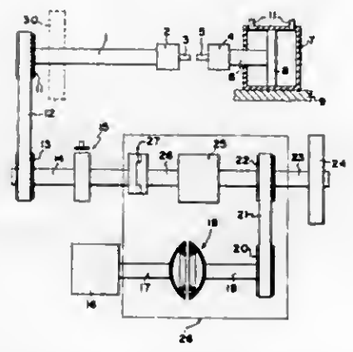
a tip portion disposed at one end of said shank portion, said tip portion having a forward edge, a rearward edge and a planar bottom surface for engaging said lead during said bonding, said bottom surface tapering toward said shank portion in a second direction from said forward edge to





said forward edge such that said bottom surface forms an angle of less than 90° with said first direction.

4,030,658
FRICTION OR INERTIA WELDING APPARATUS
Thomas D. Parrish, 4504 Cedardale Lane, Flushing, Mich. 48433
Filed Aug. 5, 1976, Ser. No. 711,734
Int. Cl.² B23K 27/00
U.S. Cl. 228—2 **7 Claims**



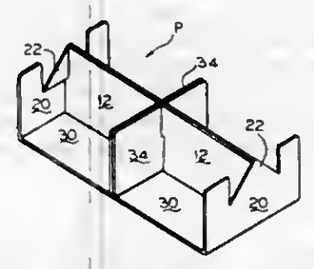
1. Apparatus for welding workpieces comprising means for holding a first workpiece; means for holding a second workpiece in confronting engagement with said first workpiece; means mounting one of said holding means for rotation relative to the other; driving means; and drive transmitting means interconnecting said driving means and said one of said holding means, said drive transmitting means including a flywheel, torque converter means interposed between said flywheel and said driving means, and clutch means interposed between said flywheel and said one of said holding means for selectively engaging and disengaging said driving means with and from said one of said holding means.

4,030,659
PARTITION ARRANGEMENT
Jeffrey M. Gardner, Wheaton, Ill., assignor to Container Corporation of America, Chicago, Ill.
Filed June 28, 1976, Ser. No. 700,389
Int. Cl.² B65D 5/48
U.S. Cl. 229—42 **2 Claims**

1. In a heavy duty four cell partition arrangement formed from a unitary blank of sheet material such as paperboard or the like, the combination of:

a. a vertically disposed first double-ply center member including a pair of co-extensive panels hingedly interconnected at their upper edges and disposed in face to face relation;

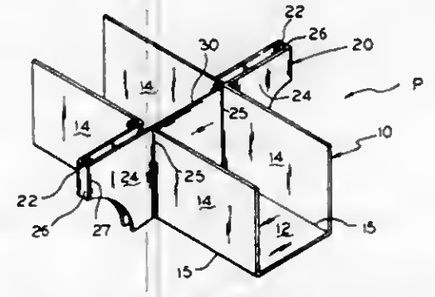
b. a vertically disposed second double-ply center member extending normal to said first center member and including a pair of co-extensive panels disposed in face to face relation and presenting in their upper edges slots aligned with similar slots presented in the lower edges of the panels of said first center member to provide interlocking engagement between said first and second center members;



c. a pair of vertically disposed opposed end members which are parallel to the plane of said second center member, and which have portions foldably joined to end edges of said first center member by integral gusset elements;

d. a horizontally disposed bottom wall including a pair of co-planar bottom wall panels each being foldably connected at its opposite end edges to lower edges of one of said end member panels and to one of said second center member panels.

4,030,660
PARTITION ARRANGEMENT
Joseph J. Rada, Country Club Hills, and Jeffrey M. Gardner, Wheaton, both of Ill., assignors to Container Corporation of America, Chicago, Ill.
Filed Oct. 1, 1976, Ser. No. 728,512
Int. Cl.² B65D 5/48
U.S. Cl. 229—42 **2 Claims**



1. In a multi-cell partition formed from a unitary blank of foldable sheet material such as paperboard, the combination of:

a. a pair of longitudinal sections disposed in end-to-end relation and each comprising a horizontal panel having joined to and upstanding from opposed side edges thereof a pair of vertical panels;

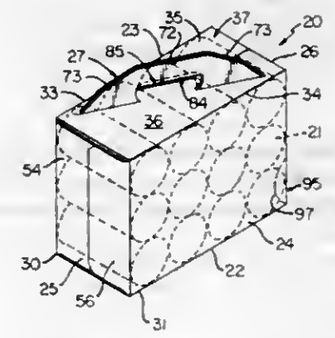
b. a transverse section lying in a vertical plane between said longitudinal sections and comprising:

i. a pair of outer members each including a pair of vertical panels foldably joined to and extending outboardly from related end edges of respective longitudinal section vertical panels and having outboard edges foldably joined to each other;

ii. an inner member including a pair of parallel vertical panels foldably joined to and extending upwardly from related end edges of respective longitudinal section horizontal panels and having upper edges joined to each other;

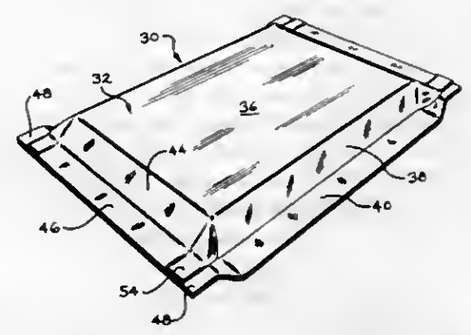
iii. said inner member vertical panels having extensions which project outboardly of said longitudinal section vertical panels and which are interposed between the respective outer member vertical panels to provide added strength for said partition.

4,030,661
CARTON AND BLANK FOR MAKING SAME
Melville T. Farquhar, Richmond, Va., assignor to Reynolds Metals Company, Richmond, Va.
Filed Apr. 12, 1976, Ser. No. 675,754
Int. Cl.² B65D 5/46
U.S. Cl. 229—52 B **20 Claims**



1. A carton comprising, a bottom wall, a pair of side walls adjoining opposite side edges of said bottom wall with each of said side walls having an edge remote from said bottom wall, a pair of extension flaps each adjoining and extending from an associated remote edge, said extension flaps being fastened together to define a rectangular top wall for said carton, and cut and score means in each of said pair of extension flaps defining an associated handle portion with the handle portions from only said pair of extension flaps being disposed against each other to define a handle for said carton, said score means in each extension flap including a pair of spaced score lines disposed in spaced relation substantially along a diagonal in opposite corners of said rectangular top wall to thereby define an integral hinge for an associated handle portion, said diagonal score lines in said corners providing a comparatively rigid attachment for said handle portions with said rigid attachment assuring said handle has optimum strength due to less likelihood of upward bowing of said top wall.

4,030,662
PACKAGE AND METHOD AND APPARATUS FOR PRODUCING SAME
Larry C. Gess, 13345 Dunlap Road, La Salle, Mich. 48145
Filed May 14, 1975, Ser. No. 577,354
Int. Cl.² B65D 65/12, 65/14, 75/36
U.S. Cl. 229—87 R **9 Claims**



1. A package for containing an object, said package comprising a first sheet of material having an object-receiving central portion with two straight opposite side edges and two end edges, said sheet having two upstanding side walls along the opposite side edges thereof, and two outwardly-extending flanges at the outer edges of the side walls, only end portions

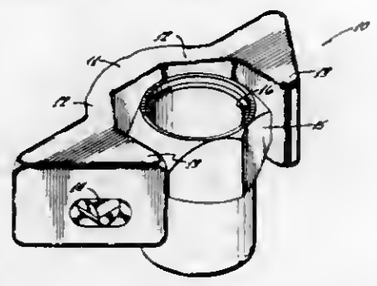
of said side walls being bent outwardly on themselves along lines which extend longitudinally of the side walls and are centrally located between longitudinal edges of the side walls with intermediate portions of said side wall between said end portions being straight and with inner surfaces of said end portions which would otherwise face the object being in contiguous relationship, and a second sheet of material, the width of which is less than that of said first sheet by substantially the heighth of both of the side walls, said second sheet having side edge portions affixed to said outwardly-extending flanges and having end portions affixed to end portions of said first sheet to form a closed spaced between the central portion of said first sheet and said second sheet, said second sheet being substantially straight as viewed in transverse cross section anywhere along the length of said second sheet.

4,030,663

TUBE ADAPTOR FOR CENTRIFUGE ROTOR BUCKET

Thomas E. Conn, Palo Alto, and Victor J. Grilli, Mountain View, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed Apr. 4, 1974, Ser. No. 457,710
Int. Cl.² B04B 5/02
U.S. Cl. 233—26 **3 Claims**



1. An apparatus having a centrifuge bucket for supporting test tubes, said apparatus comprising:
- a thin, flat, disc-shaped plate having a diameter adapted to be fit within the inside diameter of the cavity of the centrifuge bucket and having an axial aperture located in the center of said plate;
- a first series of partitions circumferentially spaced along the outer edge of said plate and made integral with and extending normal to one side of said plate;
- a second series of partitions circumferentially spaced within said first series of said partitions on said plate and made integral with and extending normal to said one side of said plate;
- a thin, flat, disc-shaped tray having a diameter slightly less than the diameter of said bucket, said plate having a bottom side opposite said one side of said plate, said tray located adjacent said bottom side of said plate; and
- an elongate, generally rod-shaped lifting handle, one end of said lifting handle being connected to the center of said tray, said one end of said handle extending through said hole in said plate to a position adjacent said bottom side of said plate to connect with said tray, the other end of said handle extending away from said one side of said plate in a direction opposite said bottom side of said plate, so that movement of said other end of said handle will move said plate in conjunction with said tray.

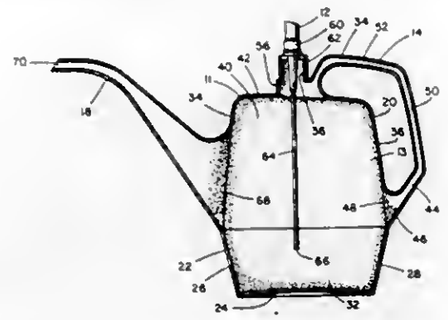
4,030,664

SPRAYING AND WATERING CAN

Cosmo N. Tisbo, Barrington, and Thomas A. Tisbo, Roselle, both of Ill., assignors to Custom Plastics, Inc., Elk Grove Village, Ill.

Filed Apr. 12, 1976, Ser. No. 675,712
Int. Cl.² A01G 25/14; B05B 9/043
U.S. Cl. 239—289 **1 Claim**

1. A spraying and watering can adapted to deliver selectively water or water mist to a plant comprising: a blow-molded polyethylene integral container having a substantially closed reservoir, said reservoir having a substantially rectangular bottom, said bottom being crowned inward of the reservoir to improve the stability of the container, said reservoir having a lower portion formed integral with the bottom, an upper portion formed integral with the lower portion and having a substantially rectangular top formed integrally therewith, a hollow generally C-shaped handle having its lower end formed integral with a narrower side of the upper portion adjacent to the junction of the upper portion with the lower portion, said handle having an upper end formed integral with the top adjacent to the center of the top, said handle having a grip portion adjacent to the top to provide a convenient means for holding the container, said bollow handle providing a conduit between the portion of the reservoir adjacent to the



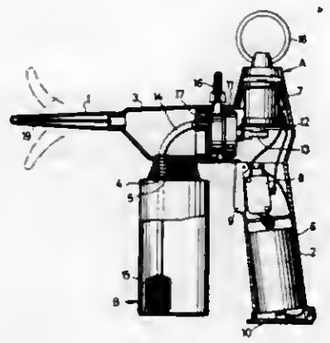
junction between the upper portion and the lower portion and the top of the reservoir, said handle having a vent in the grip portion adjacent to the junction of the handle with thc top of the reservoir, a curved tapered spout having one end formed integral with a narrower side of the upper portion opposite the side having the lower end of the handle formed integral therewith and the other end having an opening for pouring water from said reservoir, a sprayer sealingly mounted in the top adjacent to the center of the top and positioned in line with the handle and the spout and being positioned between the handle and the spout adjacent to the upper end of the handle, and said sprayer having a draw tube extending into the lower portion of the reservoir, whereby the spraycr may be operated conveniently by an operator holding the container at the grip portion.

4,030,665

APPARATUS FOR FOAMING LIQUID COSMETIC SUBSTANCES

Masaya Koyama, Osaka, Japan, assignor to Goldwell GmbH, Darmstadt-Eberstadt, Germany

Filed July 9, 1975, Ser. No. 594,468
Int. Cl.² A61M 11/02; B05B 9/04; B01F 5/18
U.S. Cl. 239—373 **7 Claims**



1. A portable hand-held electrical apparatus for foaming liquid cosmetic substances having a self-contained electrical supply, comprising:

a pistol-like housing including a housing part and a handle part, said housing part having an interior space, a bulkhead in said interior space separating said housing part into a pumping chamber and a flow communication chamber, said flow communication chamber having an inlet means and an outlet means;

a vessel connected to said inlet means for flow communication between said vessel and said flow communication chamber for supplying a supply of a cosmetic substance adapted to be foamed and removably connectable with said housing part;

an air supply duct having one end entering said vessel and another end connected to said bulkhead with the portion therebetween in said flow communication chamber;

air pump supply means including an electrically driven pump in said pumping chamber having an inlet communicating with the exterior of said housing part to obtain ambient air and an outlet operatively connected to said other end of said duct for passing an air stream into said duct through said flow communication chamber;

electrical supply containing means in said handle part including means connected to said electrically driven pump for energization thereof to drive said electrically driven pump;

said means to drive said pump comprising:

an electric motor for driving said pump, and

a battery insertable into said electrical supply containing means for providing said self-contained electrical supply;

foam generator means in the form of a porous open-cell member immersed in the substance and being disposed at said one end of said air supply duct and receiving said air stream supplied thereto by said pump through said duct and introducing said air stream into the substance in the form of a plurality of small bubbles to produce foam; and

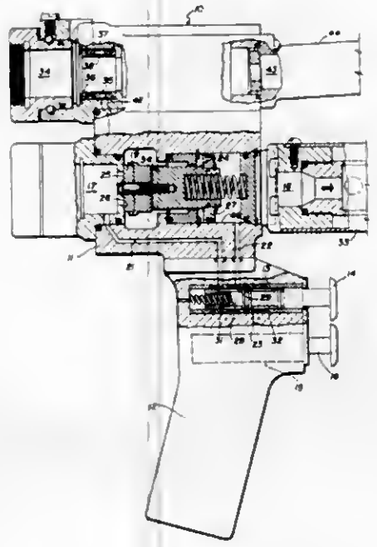
a resilient delivery nozzle means connected to the outlet means of said flow communication chamber of said housing part and communicating with said vessel through said flow communication chamber for dispensing the foam devcloped in said vessel, said resilient delivery nozzle means being bendable in all directions for altering thereof in relation to the position of the hand-held apparatus.

4,030,666

FIRE FIGHTING NOZZLE

John P. Gagliardo, Shrewsbury, Mass., assignor to Feecon Corporation, Westborough, Mass.

Filed Jan. 22, 1976, Ser. No. 651,290
Int. Cl.² B05B 11/02
U.S. Cl. 239—526 **20 Claims**



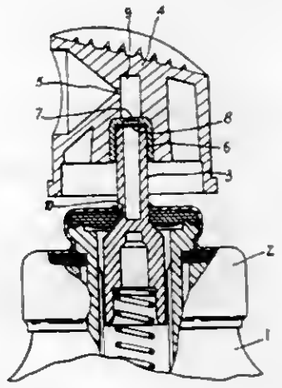
1. Fire fighting nozzle, comprising
- a. a housing,
- b. a hand grip extending from the housing,
- c. a pilot valve mounted in the hand grip with an actuating button extending from the hand grip in position for operation by a finger, the pilot valve consisting of a spindle slidably carried in a bore in the hand grip, the spindle extending from the bore and from the grip to constitute the said actuating button,
- d. an inlet opening in the housing,
- e. an outlet opening in the housing,
- f. a main valve located in the housing, the main valve comprising an axially-slidable piston having a first end of small area engaging a valve seat and a second end of relatively large area to which fluid from the inlet opening is admitted by the pilot valve, and
- g. passages connecting the inlet opening to the pilot valve and to the main valve, the pilot valve normally causing fluid from the inlet opening to maintain the main valve in a first condition wherein fluid cannot pass from the inlet opening to the outlet opening, the pilot valve on occasion allowing the main valve to move to a second condition wherein fluid is allowed to pass from the inlet opening to the outlet opening, a first passage extending from the inlet opening in the housing to the bore in the grip, a second passage extending from the bore in the grip to the said second end of the piston, and a third passage extending from the bore in the grip to the exterior of the grip, the pilot valve spindle having two axially-spaced reduced portions one of the reduced portions bridging the first and second passages when the pilot valve is in its normal condition, while the other reduced portion bridges the second and third passages when the pilot valve has its button depressed.

4,030,667

PUSH-BUTTON HAVING A CALIBRATED OUTLET FOR A CONTAINER UNDER PRESSURE

Felix Francois Le Guillou, Le Neubourg, France, assignor to Etablissements Valois S.A., Le Neubourg, France

Filed June 5, 1975, Ser. No. 584,229
Claims priority, application France, June 5, 1974, 74.19302
Int. Cl.² B05B 11/34
U.S. Cl. 239—573 **1 Claim**



1. In an aerosol valve for atomizing a liquid having a propulsive gas dissolved therein, and including a cap member adapted to be sealingly secured to a top opening of a pressurized container for the liquid and dissolved gas, a hollow, depressable valve stem slidingly extending upwardly through the cap, said valve stem being open at its upper end, closed at its lower end, and having a passageway through a wall thereof communicating with the hollow interior of the stem whereby the liquid and dissolved gas may be charged into or discharged from the container when the valve stem is depressed, and means biasing the valve stem upwardly against the cap member, the improvements characterized by:
- a. a push-button having a recessed end for removable fit over the upper end of the valve stem,
- b. a hollow expansion chamber formed within the push-but-

ton, opening to the recess and configured to form a continuation of the hollow valve stem when the push-button is mounted thereon,

c. a spray nozzle within said push-button, and opening laterally to said hollow expansion chamber,

d. an atomizing opening communicating the expansion chamber and the spray nozzle,

e. means within the recess face of said push-button for defining a small diameter orifice at the lower end of the expansion chamber, said orifice having a diameter smaller than that of the atomizing opening, serving as the sole means of fluid communication between the hollow valve stem and the expansion chamber, such that said orifice permits continued expansion of the liquid and dissolved gas in the expansion chamber after push-button release and thereby preventing a solid liquid discharge stream, the formation of large liquid droplets, and the overflow of liquid from the spray nozzle when the push-button is released after a discharge operation, and

f. a filter screen disosed within said recess and overlying and adjacent to and being upstream of said orifice.

4,030,668

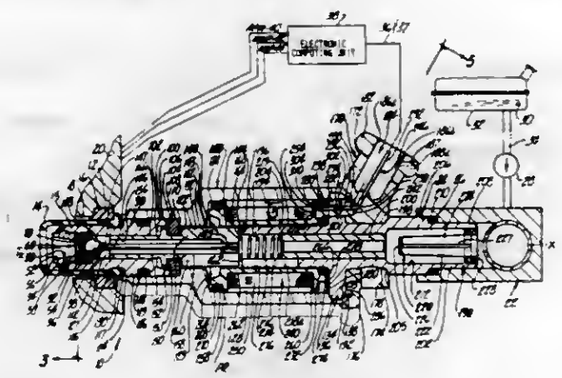
ELECTROMAGNETICALLY OPERATED FUEL INJECTION VALVE

Alexander Michael Kiwior, Warren, Mich., assignor to The Bendix Corporation, Southfield, Mich.

Filed June 17, 1976, Ser. No. 697,173

Int. Cl.² B05B 1/14

U.S. Cl. 239—585 **7 Claims**



2. In a fuel injection valve adapted to be suitably mounted on an internal combustion engine so as to be communicated with an intake passage of a combustion chamber thereof comprising:

a. actuator housing means having a central actuator housing stepped-bore therethrough along a valve axis, said actuator housing stepped bore comprising an actuator portion;

b. valve seat and orifice means comprising a metering orifice and a partly-spherical surface about said valve axis having a circular seating edge circumscribing said metering orifice; and

c. actuator means comprising armature means and valve head and stem means,

i. said armature means comprising a guide element, an armature element, and a central passage through at least said guide element, said guide element being loosely received in said actuator portion, and said armature element comprising a flow inlet passage communicating with said central passage, and

ii. said valve head and stem means comprising a flexible stem with a stem length intermediate a free end and a fixed end, said free end terminated in at least a partly spherical valve head slightly smaller than said partly spherical surface so as to cooperate with said circular seating edge thereof to provide a circular seal, said fixed end fixed centrally to said armature element, and said stem length telescoped by and flexible within said central passage.

4,030,669

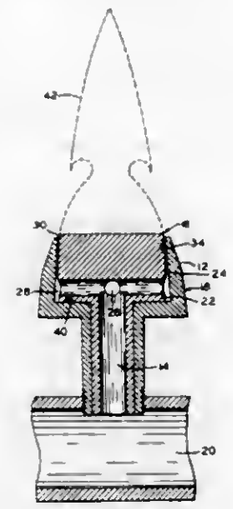
BURNER, ESPECIALLY FOR GASEOUS FUELS

Fausto Celorio Mendoza, Cumbres de Acultzingo No. 185, Mexico 10, D.F., Mexico

Filed Feb. 21, 1975, Ser. No. 551,659

Int. Cl.² B05B 1/06

U.S. Cl. 239—590 **3 Claims**



1. A burner, especially for gaseous fuels, comprising; an outer body, a recess formed into one end of said outer body having a side wall, an inner body disposed in said recess and having a side wall spaced from said side wall of said recess and forming a turbulence chamber surrounding said inner body, said side walls forming an annular gas discharge gap therebetween at the outer end of said recess, the side walls of said inner and outer bodies converging with the axis of said recess toward said gap, said recess having a shoulder at the bottom facing the open end of the recess, said inner body having a shoulder facing away from the open end of the recess and engaging the said shoulder at the bottom of the recess, said inner body having a flat end in about the plane of the open end of the recess, said outer body having a central tubular shank projecting therefrom at the end opposite said recess, said inner body having a stem fitted into said shank of said outer body, and conduit means for supplying gaseous fuel to the turbulence chamber in a region thereof spaced axially from said gap.

4,030,670

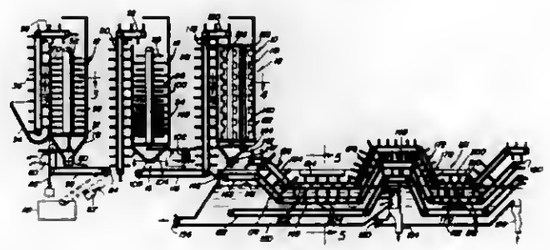
GARBAGE RECYCLING APPARATUS

Frank W. Abernathy, 603 Shadow Lane, Jonesboro, Ark. 72401

Continuation-in-part of Ser. No. 484,450, June 28, 1974, abandoned. This application Dec. 17, 1975, Ser. No. 641,592

Int. Cl.² B02C 21/00

U.S. Cl. 241—14 **20 Claims**



1. The method of recycling compacted waste including various forms of paper and pulp wood products, metal and glass containers, and plastics, said method comprising:

a. decompacting the waste at a metered rate;

b. weighing the decompacted waste at a metered rate and

separating the heavier portions of waste from the remainder thereof;

c. coarse shredding the remaining waste at a metered rate and in a manner to gradually reduce the remaining waste to increasingly smaller shredded material;

d. fine shredding the shredded material at a metered rate;

e. passing the fine shredded material through a pulverizing mill at a metered rate to break up and pulverize the pieces of glass therein;

f. moving the discharge from the pulverizing mill through a wash bath on an upper foraminated horizontal conveyor belt disposed above a lower generally horizontal conveyor belt while subjecting the material being washed to alternating upward and downward jets of air under pressure;

g. collecting the smaller particles of glass which fall through the foraminated belt on the lower belt;

h. passing the remaining washed material through a second rinse bath on an upper foraminated horizontal conveyor belt disposed above a lower generally horizontal belt supporting the collected smaller particles and subjecting the remaining washed material on the upper belt to further alternating up and down jets of air under pressure and collecting, on the lower belt, the smaller particles of glass which fall through the upper belt;

i. separately drying the remaining washed material and the collected particles of glass;

j. spreading the remaining dried material in a thin layer and acting upon the thin layer with a field of magnetic flux to remove the ferrous materials therefrom; and

k. electrostatically separating particles of aluminum from the remaining material after the magnetic separation of ferrous materials therefrom.

4,030,671

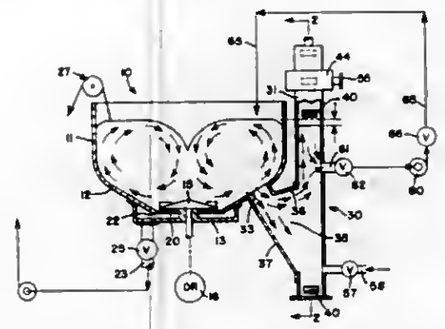
APPARATUS FOR PULPING WASTE PAPER MATERIALS

Joseph Walter Couture, Dorval, Canada, assignor to The Black Clawson Company, Middletown, Ohio

Filed June 4, 1976, Ser. No. 692,885

Int. Cl.² B02C 23/36

U.S. Cl. 241—15 **8 Claims**



7. The method of operating apparatus for recovering paper making fiber from waste paper products including substantial quantities of plastic film and other lightweight non-paper contaminants which comprises:

a. a tub for receiving such waste paper products and water to at least a predetermined minimum level,

b. a rotor mounted for rotation in said tub to pulp such waste paper products to aqueous slurry form,

c. means for extracting from said tub a liquid suspension of small particles of less than a predetermined maximum size,

d, an outlet in said tub bottom separate from said extracting means,

e. junk removing means including a casing adjacent said tub and of at least the same height, and

f. a chute connecting said outlet with said casing and providing for liquid flow between said tub and said casing, which method comprises the steps of:

i. intermittently withdrawing liquid from said casing at a level below said minimum level in said tub at a sufficient rate to reduce the liquid level in said casing below that in said tub and thereby to induce flow of liquid and lightweight contaminants from said tub to said casing by way of said chute,

ii. collecting and removing the lightweight contaminants which accumulate in the upper portion of said casing, and

iii. recirculating said withdrawn liquid back to said tub.

4,030,672

PROCESS AND AN APPARATUS FOR PRODUCING FLUFFED FIBER MATERIALS

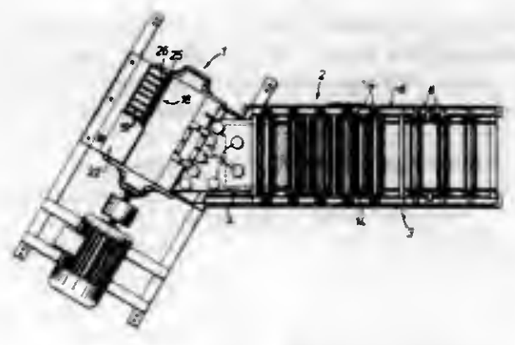
Lennart Rickard Borgqvist, Oxie, Sweden, assignor to Kamas Industri Aktiebolag, Malmo, Sweden

Filed Jan. 27, 1976, Ser. No. 652,690

Claims priority, application Sweden, Jan. 31, 1975, 7501080

Int. Cl.² B02C 13/286

U.S. Cl. 241—18 **16 Claims**



1. A process for providing fluffed fibrous material from cellulosic, in particular fibrous materials, by defibration, the process comprising feeding both blocks of cellulosic materials and at least one strip of cellulosic materials from a roll continuously into a defibration unit, disintegrating said blocks and strips in a dry state by means of yielding impact elements mounted on a rotor, the disintegrated material thus obtained being fluffed and mixed so as to form a homogenous mixture, and discharging said mixture through a sieve.

4,030,673

DOUBLE WIRE-WINDING MACHINE WITH AUTOMATIC TRANSFER

Louis Veyrassat, Rolle, Switzerland, assignor to Maillefer S.A., Switzerland

Filed Sept. 8, 1975, Ser. No. 611,147

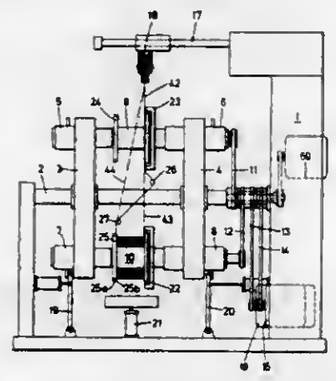
Claims priority, application Switzerland, Sept. 27, 1974, 13126/74

Int. Cl.² B65H 67/04

U.S. Cl. 242—25 A **6 Claims**

1. A double winding machine for winding metal wire and having an automatic wire-transfer device, said machine comprising a support, two pairs of coaxial reel-spindles borne by said support, at least two reels, each provided with a wire-securing groove and adapted to be held by a respective said pair of reel-spindles, two snagging members, each mounted on a respective said reel-spindle of each of said pairs, and a deflection device operated at the time of said transfer for changing the path of travel of said wire, wherein said deflection device comprises wire-pushing means adapted to engage said wire in a said snagging member associated with an empty said reel, a deflector adapted to cause relative displacement of said path of travel of said wire with respect to a full said reel

in the vicinity thereof for engaging said wire in said securing groove of said full reel, and control means for actuating both



said wire-pushing means and said deflector, said control means being arranged for actuating said deflector just prior

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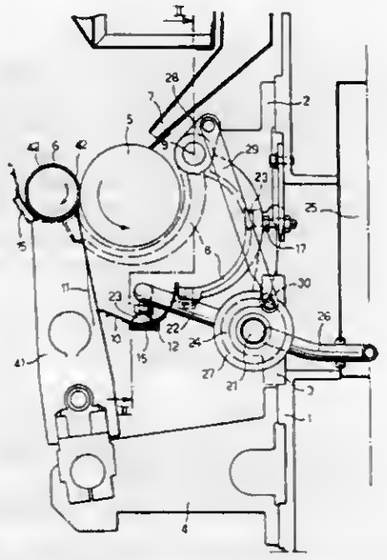
4,030,674

DEVICE FOR INCORPORATING AN IDENTIFICATION MARKER IN A ROLL OF TEXTILE SUBSTANCE

Augusto Vedani, Turbigo (Milan), Italy, assignor to Sant'Aodrea Novara Officine Meccaniche e Fonderie S.p.A., Novara, Italy

Filed Apr. 15, 1976, Ser. No. 677,206
Claims priority, application Italy, Oct. 3, 1975, 69459/75
Int. Cl.² B65C *5/00*; B65H *75/02*
U.S. Cl. 242—55 **12 Claims**



1. An automatic device for incorporating an identification marker in a reel or roll of a textile substance wound on a rotary support member, the device comprising:

stationary support means;

a container for holding a plurality of the markers;

an applying member for placing a new leading end of the textile substance against the rotary support member, for commencing winding, the applying member being movably mounted on the support means;

a marker positioning means for automatically removing a respective marker from the marker container and positioning the marker on the applying member, the marker positioning means being movably mounted on the support means;

drive means for actuating the marker positioning means to position the marker on the applying member;

drive means for actuating the applying member to place the textile substance leading end and the marker against the rotary support member; and

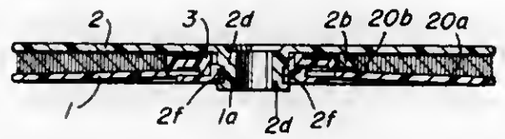
coordinating means coordinating the actuation of the marker positioning means drive means and the applying member drive means, whereby the marker positioning means positions the marker on the applying member before the applying member reaches the rotary support member and places the textile substance leading end and marker against the rotary support means.

4,030,675

APPARATUS FOR FILM AND TAPE WINDING

Werner Eissfeldt, Blutenstrasse 3, 62 Wiesbaden-Rambach, Germany

Filed Jan. 26, 1976, Ser. No. 652,044
Claims priority, application Germany, Jan. 25, 1975, 2503116
Int. Cl.² G11B *23/02*; B65H *75/22*
U.S. Cl. 242—55.18 **12 Claims**



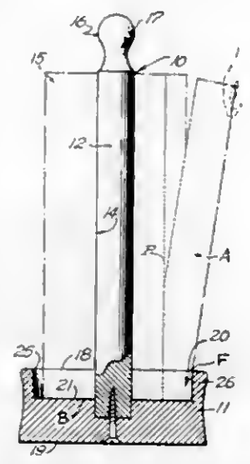
1. Apparatus for the handling and storage of recorded tapes or motion picture film on reproducing apparatus without the necessity of rewinding after use, said apparatus comprising a pair of spaced first and second reel plates (**1**, **2**, **9**, **10**), said first plate being stationary and having a hub (**2***d*, **9***d*) extending centrally and axially therefrom and being attached centrally and axially to said second reel plate, said second reel plate having winding means (**3**, **9***a*) thereon, an exit opening (**2***c*, **10***d*) in said first reel plate, and means for varying the distance between the reel plates whereby tape or film stored in a wound roll in said apparatus may be pulled through said exit opening when said distance is enlarged, said wound roll then being free to rotate together with said winding means on said second reel plate.

4,030,676

PORTABLE HOLDER FOR ROLL OF PERFORATED PAPER TOWEL

James G. Bardsley, Rte. I, Box 645, Sutter Creek, Calif. 95685

Filed Jan. 29, 1976, Ser. No. 653,452
Int. Cl.² A47K *10/16*
U.S. Cl. 242—55.54 **4 Claims**



1. A free standing portable holder for supporting conventional perforated paper towelling rolled on a hollow core center and means for facilitating gradual tearing off of first or outer sheets of paper towel therefrom by manual gripping of the upper outer corner of such sheets by one hand only comprising:

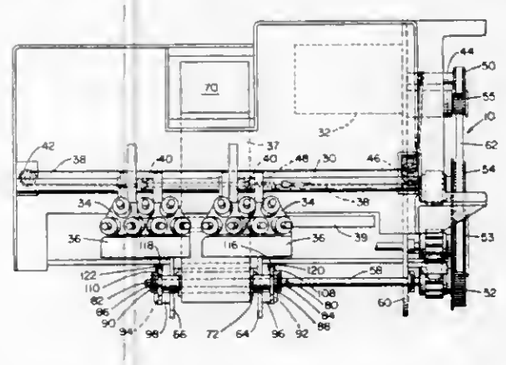
1. a pedestal base adapted to rest upon a horizontal surface;
2. a pole extending upwardly from said base having a diameter adapted to fit within the hollow core of such roll of paper towelling for supporting the latter with its axis normal to the horizontal surface upon which said base rests;
3. an annular rim on the upper surface of said base and extending upwardly a distance substantially comparable to the diameter of said pole and concentric to said pole for circumscribing the lower portion of the roll of paper towelling thereon; and
4. an internal edge on the upper end of said annular rim engageable by the lower portion of a sheet of towelling extending tangentially from said roll in a spaced relation to the line of perforations between such sheet of towelling and the roll thereof for providing a fulcrum point for engaging such sheet at a sufficient distance above said base to facilitate separation of such sheet from the roll thereof between perforations therebetween, first at the upper end of the line of perforations and gradually downward from top to bottom of such perforations by a downward pull exherted manually upon the upper outer corner of such sheet.

4,030,677

RECORD MEDIA REWIND MECHANISM

Gary A. Wojdyla, and Kenneth W. Hanna, both of Ithaca, N.Y., assignors to NCR Corporation, Dayton, Ohio

Filed Mar. 8, 1976, Ser. No. 665,036
Int. Cl.² B65H *17/08*
U.S. Cl. 242—65 **18 Claims**



1. A take-up assembly for record media comprising

frame means,

rotary drive means journaled in said frame means,

roller means adjacent said drive means for winding of said record media on said roller means by driving contact of said drive means with said record media, and

support means operably associated with said roller means and pivotally movable with respect to said frame means permitting said roller means to move from said drive means upon winding of said record media on said roller means and permitting removal of said roller means from said frame means.

4,030,678

TAPE WINDING DEVICE

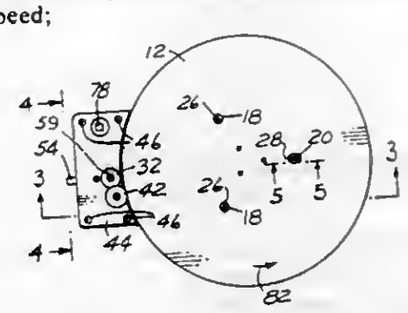
Ralph E. Simpson, 2445 N. Highland Road, Upland, Calif. 91786

Filed June 18, 1976, Ser. No. 697,433
Int. Cl.² B65H *17/02*
U.S. Cl. 242—67.2 **10 Claims**

1. Tape winding means particularly suited for the automatic winding of a pile of loose tape dumped by a computer into a relatively tight roll, said tape winding means comprising:

a flat tape deck mounted for horizontal rotation about an axis, said tape deck having three hub posts mounted equidistantly from said axis and equiangularly spaced therearound to form a hub about which said tape can be wound, at least one of said hub posts having a vertical slot sized to receive said tape so that an end of the tape can be threadedly connected to that post to permit subsequent pulling of said tape thereby; two of the three hub posts having vertical outer sides and the other post having a tape receiving outer side that slopes slightly inwardly from the vertical, towards said axis, in the upward direction;

motor means for rotating said deck about said axis at relatively fast speed;



control means for turning said motor means on and off; and

tape guide and tensioning means for guiding tape disposed for winding about said hub toward that hub in proper position for the rapid formation of said roll therearound, when said motor means is turned on, while exerting sufficient pressure on the incoming tape to keep it under proper tension to ensure adequate tightness in the resulting roll;

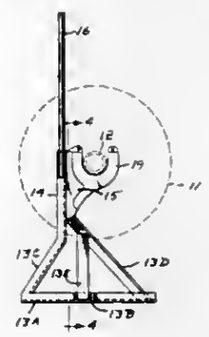
whereby a pile of loose tape can be automatically wound around said hub to form a tight roll that can be lifted away from the hub because of the slight inward slope of the outer side of said other post.

4,030,679

STAND FOR A ROLL OF FLOOR COVERING MATERIAL

Herve Joseph Pelletier, Middlesex Road, Topsham, Maine 04086

Filed Apr. 2, 1976, Ser. No. 672,863
Int. Cl.² B65H *17/02*
U.S. Cl. 242—68 **6 Claims**



1. A stand for a roll of a floor covering material having a maximum outside diameter and provided with a core having protruding ends, said stand comprising a pair of supports, each support including a floor engaging base and an upright provided with an upwardly opening U-shaped receiver for an end of said core and located a distance above said base greater than the maximum radius of the roll, at least one end of said base being useable as a fulcrum, and each upright support also including a lever portion extending vertically relative to said base beyond said receiver a distance greater than said maximum radius and at one side of the receiver whereby said supports may have spaced apart loading positions in which

each base is supported by its fulcrum end with its receiver in a position such that on relative movement between that support and the roll, the core ends enter the receivers with the roll on the floor, the lever portions then enabling the supports to be erected with the cross rods seated in the receivers.

4,030,680

AUTOMATIC DEVICE FOR SEIZING THE END OF A DRAWN PRODUCT FOR A DRUM OF A DRAWING BENCH

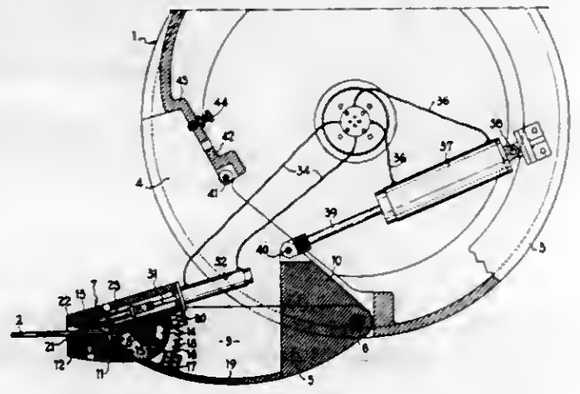
Christian Maurice Maudras, and Carol Stanik, both of Revigny-sur-Ornain, France, assignors to Societe Metallurgique de Revigny, Revigny-sur-Ornain, France

Filed Aug. 18, 1976, Ser. No. 715,582

Claims priority, application France, Aug. 20, 1975, 75.25762

Int. Cl.² B21C *17/10*

U.S. Cl. 242—78.3 **11 Claims**



1. A device for automatically seizing a drawn product end for a drum of a drawing bench, the device comprising said drum which has a peripheral wall and is rotatable about an axis, means defining a cavity in the drum wall, an elongated element pivotably mounted in the cavity and having a shape substantially corresponding to the shape of the cavity and constituting a movable portion of the drum wall and pivotable between an extended position and a withdrawn position in which withdrawn position said element is returned into said cavity so as to substantially reconstitute the wall of the drum, a gripping mechanism for gripping said product end and pivotably mounted on said element, the gripping mechanism being adapted to be substantially in alignment with said product end in said extended position of said element, said cavity being upwardly inclined in the wall of the drum, with respect to the direction of rotation of the drum, from a lower edge of the drum, said element being a cranked lever having a first arm which extends inwardly of the drum and a second arm which has an elongated shape substantially corresponding to the shape of said cavity and has a U-shaped cross-section and constitutes a fork comprising two branches and an intermediate portion which closes said cavity in said withdrawn position, said lever being pivotably mounted by a cranked portion thereof intermediate said arms in an upper end of the cavity and pivotable about an axis which is oblique with respect to said axis of the drum, the gripping mechanism being mounted between said branches of the fork at an end of the second arm remote from the first arm to pivot in the plane of the second arm.

4,030,681

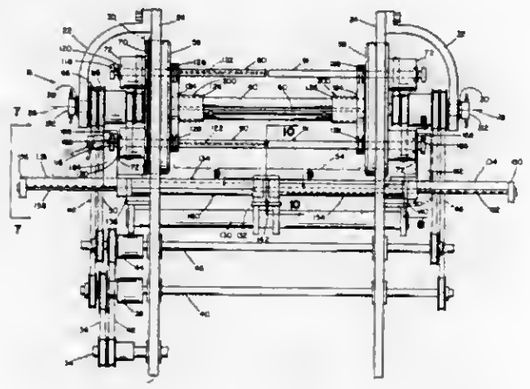
ROLL WINDER

Charles M. Schott, Jr., Gloucester, Mass., assignor to Gloucester Engineering Co. Inc., Gloucester, Mass.

Filed Mar. 2, 1976, Ser. No. 663,211

Int. Cl.² B21C *47/00*; **B65H** *17/02*

U.S. Cl. 242—81 **13 Claims**



1. A winder suitable for winding plastic film in the absence of a winding core comprising a pair of axially aligned arbors, one protruding from each of two opposed side supports of the winder machine, the arbors moveable axially toward each other to a winding position and moveable away axially from each other for stripping from the wound roll, and means for introducing and maintaining pressurized air at the roll-engaged support surfaces of said arbors during said outward stripping movement of said arbors, as the arbors disengage the opposite ends of the roll, said means defining substantially equal length flow paths between the roll and the arbor in each direction from the point of introduction of air to each end of the roll, until the roll leaves the arbor.

4,030,682

LOCKING MECHANISM FOR VEHICLE SAFETY BELTS

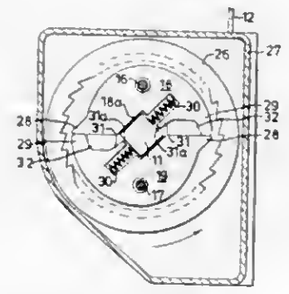
Jan-Olof Wallin, Mariefred, Sweden, assignor to Granges Essem Aktiebolag, Vasteras, Sweden

Filed Dec. 22, 1975, Ser. No. 643,116

Claims priority, application Sweden, Dec. 23, 1974, 74162637

Int. Cl.² A62B *35/02*; **B65H** *75/48*

U.S. Cl. 242—107.4 B **9 Claims**



1. A locking mechanism to be used in vehicles for retractable safety belts having a strap, the mechanism comprising: a reel having an axis and on which the strap is coiled up when not in use means biasing said reel in a belt-retraction direction; a supporting means attached to said reel for rotation with it; at least two latching means, two respective pivot pins attached to said support means said two latching means being pivotally mounted on said two respective pivot pins and positioned diametrically and symmetrically in relation to said reel and in parallel with it; each of said latching means having

substantially an identical shape and being positioned in a given plane perpendicular to said axis of said reel and in continuous abutment with each other in said plane to turn simultaneously under the influence of centrifugal force about their respective said pivot pins from a free position to a latching position; and a stop means fixed in relation to said real and positioned to engage with said at least two latching means when said at least two latching means reach their latching positions to lock said reel in the unwinding direction.

4,030,683

THREAD BRAKE FOR DOUBLE THREAD TWISTER

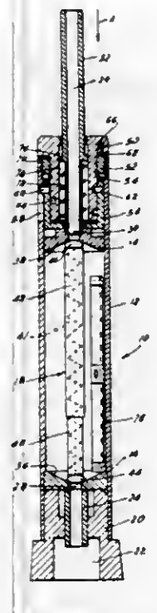
Heinrich Eckholt, Muenster, Germany, assignor to Hamel GmbH Zwirnmaschinen, Muenster, Germany

Filed Sept. 22, 1976, Ser. No. 725,494

Claims priority, application Germany, Sept. 26, 1975, 2543018

Int. Cl.² D01H *13/10*; **B65H** *59/06*, *59/22*

U.S. Cl. 242—149 **22 Claims**



1. A thread brake comprising:

a housing defining a relatively narrow thread passage and along said passage a relatively wide compartment having a wall at said passage;

a braking element in said compartment normally lying in a braking position against said wall at said passage and displaceable laterally of said passage into a position clear of said passage, whereby a thread extending along said passage is normally pinched by said braking element against said wall;

a threading element in said housing and having an elongated relatively narrow open course, said threading element being displaceable between a position with said course out of alignment with said passage in said compartment and a threading position with said course aligned with said passage in said compartment; and

operating means for displacing said threading element from outside said housing into said threading position and for simultaneously displacing said braking element out of said braking position.

4,030,684

YARN TENSIONING DEVICE

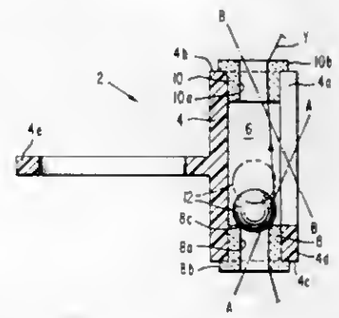
Nathan Levin, 416 Highgate Drive, Trenton, N.J. 08618

Filed July 3, 1975, Ser. No. 592,871

Int. Cl.² B65H *59/22*

U.S. Cl. 242—152.1 **7 Claims**

1. A yarn tensioning device having a housing, said housing having a yarn passageway of predetermined length extending vertically therethrough, spaced upper and lower inserts received within the upper and the lower ends of said passageway, respectively, each of said inserts an uninterrupted wall providing an uninterrupted opening extending therethrough for the passage of yarn, said lower insert being provided with an uninterrupted circularly shaped seat around its said opening, a ball received within said passageway and between said inserts in seated position upon said seat in said lower insert, the relative dimensions of said ball, of said lower insert and of said passageway being such that lateral movement of said ball is restrained by the surface of said passageway thereby to retain said ball in its said seated position upon said lower insert, and said housing having an aperture extending therethrough in communication with said passageway, said aperture being disposed between said inserts, whereby said device may be threaded by threading the yarn in turn through said aperture and through said openings in each of said inserts.



4,030,685

MAGNETIC TAPE MAGAZINE

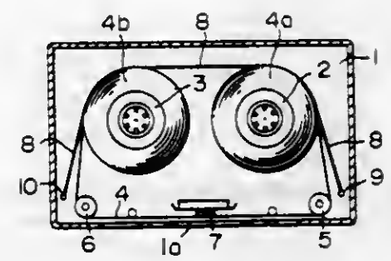
Osamu Suzuki; Goro Akashi; Akira Kasuga, and Kenji Sega, all of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Aug. 15, 1975, Ser. No. 605,046

Claims priority, application Japan, Aug. 16, 1974, 49-94046

Int. Cl.² G11B *23/10*

U.S. Cl. 242—199 **6 Claims**



1. A magnetic tape magazine comprising a casing, a take-up core, a feed-out core and a magnetic tape wound in convolutions on said take-up core and a feed-out core wherein the improvement comprising a flexible belt having first and second ends and being tensioned around and contacting the tape convolutions wound on said cores for exerting a pressure on the tape convolutions and mounting means for attaching said first and second ends to said casing.

4,030,686

POSITION DETERMINING SYSTEMS

William W. Buchman, Los Angeles, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Sept. 4, 1975, Ser. No. 610,214

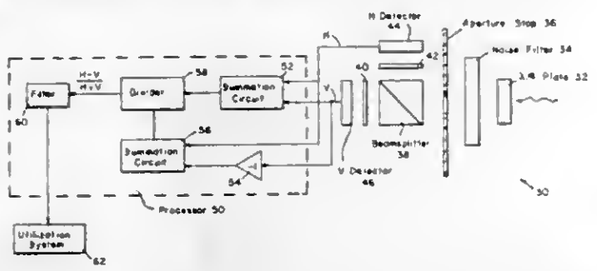
Int. Cl.² F41G *7/00*, *7/18*; **F42B** *15/10*, *15/02*

U.S. Cl. 244—3.13 **8 Claims**

1. A system for providing position signals comprising:

first means for transmitting a beam of electromagnetic energy which has encoded thereon, as a polarization state of

the energy, angular position along at least one dimension across said beam with the transition of the polarization state being from elliptical polarization of a first sense at one edge of the beam, through linear polarization, to elliptical polarization of the opposite sense at the opposite edge of the beam; and



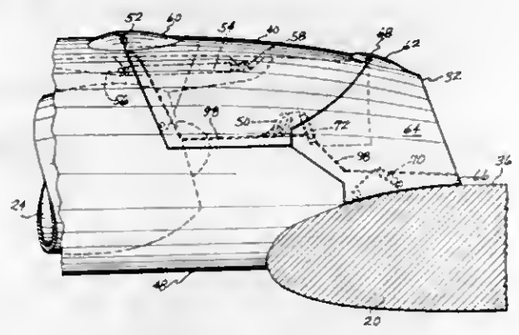
second means for receiving a portion of said transmitted energy, decoding its polarization state and providing therefrom position signals indicative of the angular position of the received energy within said beam and along said dimension.

4,030,687

ARTICULATED NOZZLE FOR UPPER SURFACE BLOWN AIRCRAFT

Donald William Hapke, Issaquah, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Feb. 23, 1976, Ser. No. 660,564
Int. Cl.² B64C *15/08*
U.S. Cl. 244—12.5 2 Claims



1. In an upper surface blown aircraft having an engine surrounded by a nacelle, the engine developing thrust by discharge of exhaust gases through an exhaust outlet and being mounted on and operationally associated with the wing of the aircraft, the exhaust outlet being so oriented to the wing so as to discharge the exhaust gases across the upper airfoil surface of the wing when the engine is in operation, the combination comprising,

a. an exhaust nozzle mounted to the nacelle positioned to receive the guide the exhaust gases from the outlet of the engine, said exhaust nozzle having an upper and lower portion;
b. a thrust reverser door;
c. first mounting means for mounting the upper portion of said exhaust nozzle to the nacelle;
d. second mounting means for mounting the thrust reverser door to the nacelle;
e. hinge means for connecting the aft portion of said reverser door to the upper portion of said exhaust nozzle;
f. connecting means for connecting the upper portion of said exhaust nozzle to the lower portion of said exhaust nozzle; and
g. actuating means connected to said reverser door and said exhaust nozzle for effecting a movement of said reverser door and the upper portion of said exhaust nozzle from a first position directing the exhaust gases rearwardly when the aircraft is in cruise mode, to a second position for use in takeoff and landing wherein the upper portion of said exhaust nozzle is moved upward relative to the lower portion thereby increasing the outlet area of said exhaust nozzle, and wherein the upper portion of said exhaust nozzle and said reverser door are tilted relative to the first position thereby directing the exhaust gases rearwardly and downwardly and causing lateral spreading of the exhaust gases across the wing.

4,030,688

AIRCRAFT STRUCTURES

Luigi Pellarini, 30 Lachlan Ave., Sylvania, New South Wales 2224, Australia

Filed Feb. 18, 1975, Ser. No. 550,855
Claims priority, application Australia, Feb. 26, 1974, 6731/74
Int. Cl.² B64C *3/08*
U.S. Cl. 244—13 9 Claims

1. An aircraft comprising a narrow delta planform fuselage whose longitudinal section contours form low drag-high lift aerodynamic airfoils, said delta planform fuselage carrying two comparatively small span shoulder type wings at the level of the upper surface of the fuselage in tandem and in cascade, the rear wing being of larger span than the forward wing, the mean aerodynamic chords of the wings forming zero to small negative angles of incidence in respect of the zero-lift angle of incidence of the fuselage mean aerodynamic chord, the rear wing of the aircraft being so constructed that the side and top surfaces of the fuselage blend smoothly with the upper surface of the rear wing while the surfaces of the fuselage below the rear wing meet with normal continuity with the under surface of the rear wing, the wings being positioned in tandem and in cascade so as to cause generation of additional air flow momentum above the fuselage rearward of the forward wing and above the central portion of the rear wing; a twin tail located at the rear of the fuselage with a trailing edge elevator located between the twin tail and forming the trailing edge of the fuselage; the trailing edge of the rear and forward wings being substantially at right angles to the longitudinal axis of the aircraft and said delta fuselage carrying a power plant system above the upper surface of the fuselage and as far as stability requirements permit rearward in respect of the centre of gravity of the aircraft.

4,030,689

CANOPY RELEASE ACTIVATING DEVICE FOR PARACHUTES

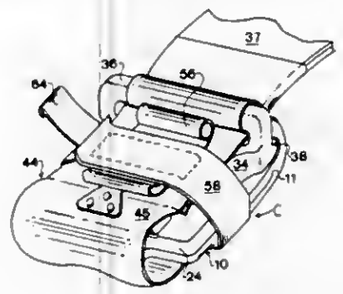
Jose E. Rodriguez, 6107 A Yadkin Road, Fayetteville, N.C. 28303

Filed Feb. 9, 1976, Ser. No. 656,744
Int. Cl.² B64D *17/38*
U.S. Cl. 244—151 B 5 Claims

1. An activating device for parachute canopy release systems of the type wherein a male fitting is suspended from a canopy riser and includes a heel and nose portion which are received respectively within a corresponding recess and beneath a metallic slider member of a female fitting, which in turn is attached to the chute harness, said activating device comprising:

a. at least one fabric strip of a length sufficient to be threaded through the under portion of said female fitting with both ends wrapping around and substantially over the assemblage of said male and female fittings, and also having end portions overlapping each other;

b. a bracket means secured to said fabric strip and pivotally attached to said female fitting in operative engagement with said slider;
c. said bracket means being movable between a first locking position wherein said slider overlies a portion of said male fitting in its assembled position within said female fitting, and a second release position wherein said slider is removed from its overlying position atop the male fitting,



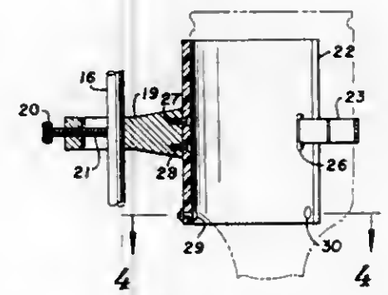
said bracket means being moved from said first to said second position by a downward movement of the lower end of said fabric strip, whereby said riser and canopy are thereby released; and
d. quick release fabric fastening means for holding said lower end in a first, upper locking position overlapping the upper end of said strip until it is desired to release said canopy, whereupon said lower end is released and pulled downwardly away from said upper end.

4,030,690

MEDICAL EQUIPMENT DEVICE FOR CONTROLLING DISPOSITIONS OF INTRAVENOUS BOTTLES

Burton C. Hanauer, Avon, and Charles Richard Patton, Bloomington, both of Minn., assignors to Hanauer Machine Works Incorporated, Avon, Minn.

Continuation-in-part of Ser. No. 515,438, Oct. 16, 1974, abandoned. This application Dec. 29, 1975, Ser. No. 644,833
Int. Cl.² A47K *1/08*
U.S. Cl. 248—311.3 3 Claims



1. Intravenous bottle retaining means comprising

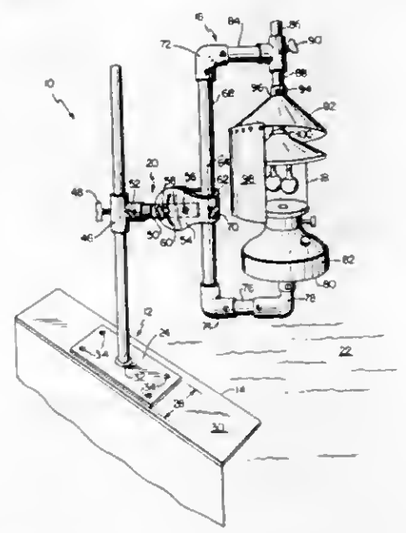
a. a support bracket means having pole gripping means at the inner end thereof and an intravenous bottle receiver at the outer end thereof;
b. said intravenous bottle receiver comprising an open-ended generally radially flexible split sleeve consisting essentially of resilient rubber material and having means securing said split sleeve to the outer end of said support bracket means, three substantially equally arcuately spaced apart radially inwardly extending hemispherical projections of small diameter disposed adjacent the bottom edge of said split sleeve for engaging and releasably supporting an intravenous bottle in inverted upright disposition within said split sleeve and generally above said projections; and
c. strap means arranged for releasable securing to opposed free edges of said split sleeve for releasably drawing said opposed free edges arcuately toward each other.

4,030,691

NIGHT FISHING RIG

John F. Fleshman, 680 Golden Gate Pt., Sarasota, Fla. 33577

Filed July 16, 1976, Ser. No. 706,042
Int. Cl.² A47B *73/00, 23/00*
U.S. Cl. 248—225.3 5 Claims



1. An apparatus for a boat to support a lantern over the water for night fishing comprising:

boat mounting means including: an opposed plurality of pressure plates associating with said boat and compressing a surface of said boat therebetween whereby a detachably fixed and rigid relationship is provided between said mounting means and said boat; and a removably attached vertical tube of extended length;

lantern holding means including: a circular platform providing support and lateral constraint for said lantern; a cap for resting atop said lantern and vertically constraining said lantern, the displacement between said platform and said cap being adjustably fixed to accommodate individually a plurality of lanterns of different sizes; and

support means to adjustably join together said boat mounting means and said lantern holding means including: a sliding and rotating connector for adjustably attaching to said vertical tube of extended length whereby said lantern holding means may be vertically elevated or lowered and horizontally rotated; a horizontal extension rotatably and detachably fastened at one end to said sliding and rotating connector whereby said lantern holding means may be vertically rotated; and pivoting means pivotally and adjustably attached at one side to the other end of said horizontal extension and, at the other side, slidably and adjustably fastened to said lantern holding means whereby said lantern holding means may be pivoted and translated relative to said vertical tube of extended length.

4,030,692

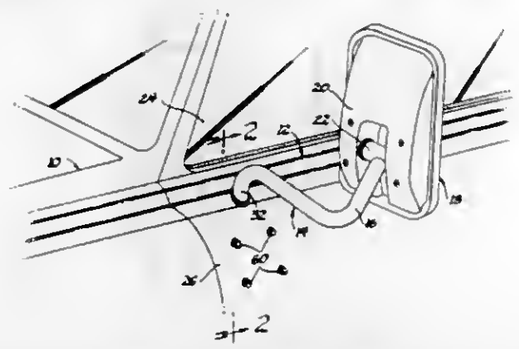
MIRROR MOUNTING STRUCTURE

Jane M. Szilagyi, Center Valley, Pa., assignor to Delbar Products, Inc., Perkasie, Pa.

Continuation-in-part of Ser. No. 586,334, June 6, 1975, abandoned. This application June 4, 1976, Ser. No. 693,028
Int. Cl.² A47G *1/12*; B60R *1/06*
U.S. Cl. 248—487 11 Claims

1. An outside rear view mirror assembly adapted to be mounted to a body portion of a vehicle and which body portion includes an exterior wall member defining one side of a chamber within the vehicle body, an opening in said wall member and communicating with said chamber, said assembly comprising a mirror head, a support arm adapted to be mounted upon said exterior wall, member said support arm including a first leg portion disposed exteriorly of the vehicle

body, means for adjustably supporting the mirror head upon said first leg portion, said supporting arm including a second leg portion extending through said wall opening and projecting within said body chamber, bracket means disposed within said body chamber, said bracket means including first and



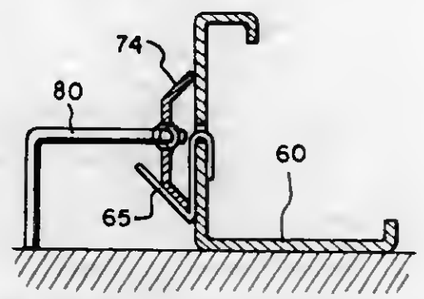
second plate members, means for fastening said first plate member to said exterior wall member, and means for adjustably connecting said first and second plate members for clamping and rotatably supporting said second leg portion therebetween.

4,030,693

LONGITUDINAL JOINT ASSEMBLY IN COMBINATION WITH A PAVING FORM

Walter Frederick Kinnucan, Jr., 140 Blackstone, LaGrange, Ill. 60525

Filed Feb. 11, 1976, Ser. No. 657,086
Int. Cl.² E01C *19/50*
U.S. Cl. 249—9 **8 Claims**



I. The combination of a paving form and:

a plurality of hangers, each having a straight connector portion, a support-holder portion extending from one end of the connector portion, and an attaching portion extending from the other end of the connector portion attaching each hanger to the form so that the support-holder portion extends at an acute angle relative to the connector portion:

a longitudinal joint, having a base portion and a pair of side walls, the longitudinal joint being positioned against the form with the base portion spaced from and substantially parallel to the form, one side wall of the longitudinal joint being received in the acute angle defined by each hanger connector and support-holder portions, both to support the joint vertically and restrain the joint from horizontal displacement away from the form, which joint also defines a plurality of concave-convex apertures for receiving a cylindrical tie bar along the axis of the longitudinal joint; and

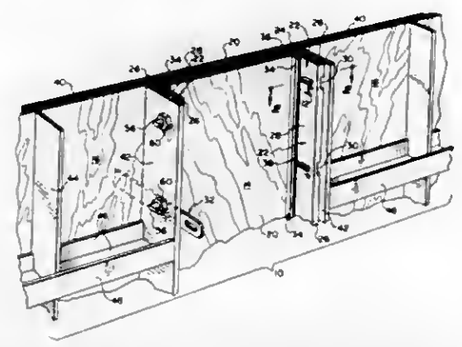
a plurality of tie bars, each having a first end portion and a second end portion extending at right angles to the first end portion, with the second end portion inserted through one of the concave-convex apertures of the joint into the space between the form and the joint.

4,030,694

COMPOSITE CONCRETE WALL FORM UNIT WITH A SPECIAL TRANSITION BOLT

Vernon R. Schimmel, Arlington Heights, Ill., assignor to Symons Corporation, Des Plaines, Ill.

Filed July 14, 1976, Ser. No. 705,086
Int. Cl.² E04G *9/04, 17/04, 11/08*
U.S. Cl. 249—196 **12 Claims**



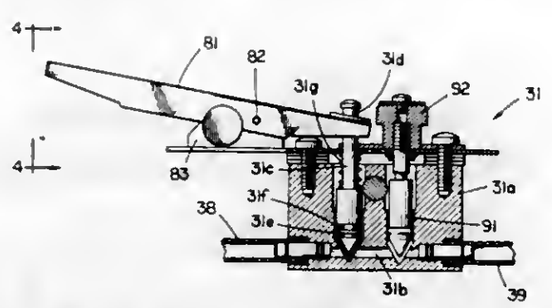
1. In a concrete wall form, a composite fill-in panel unit comprising three rectangular upstanding metal-clad panels arranged in edge-to-edge relationship and including a medial panel and a pair of outside panels, each of said panels embodying a rectangular facing and a rectangular reinforcing frame including opposed parallel vertical side rails, the side rails of said panels being provided with vertically spaced pairs of opposed bolt-receiving openings at different horizontal levels, the side rails of adjacent panels abutting each other, fastening bolts projecting through registering openings in the side rails of abutting panels, and reaction members associated with said fastening bolts for drawing such abutting panels hard against each other, the facings of said outside panels being embodied in a single continuous sheet which bridges the facing of the medial panel and lies flat against the same in face-to-face coextensive relationship and constitutes, in effect, a common and complete facing for the three panels.

4,030,695

PULSE FOG GENERATOR

Russell R. Curtis, Indianapolis, Ind., assignor to Curtis Dyna Products Corporation, Westfield, Ind.

Division of Ser. No. 492,035, July 26, 1974, Pat. No. 3,993,582. This application Jan. 21, 1976, Ser. No. 650,860
Int. Cl.² F16K *13/00, 25/00, 35/02*
U.S. Cl. 251—113 **2 Claims**



1. A control valve for controlling the flow of fog-producing fluid to a pulse fog generator, said control valve including a housing having a rectilinear fluid flow passage which is circular in cross-section extending through the housing, a valve member supported in said housing for adjustable movement transverse to said passage, a conical cavity formed in said housing whose longitudinal axis intersects the centerline of said passage and the junction of said passage and cavity lies wholly upon the inclined side surface of the conical cavity, said valve member including a stem slidable within a bore in

said valve body and extending from the valve housing, a valve closure element carried by said stem and unitarily molded of an elastomeric material, said closure element having a conical configuration closely fitting said conical cavity and thus blocking said passage when said stem is in one limiting position, an integral generally annular collar on said closure element spaced above the conical portion thereof and engaging said bore to provide a dynamic seal for said stem, actuating means for moving said stem into and out of said one limiting position, said actuating means including a lever pivotally mounted intermediate its ends, said lever having a unidirectional connection to said portion of said valve stem extending from the valve housing, so that upon manual depression of one end of said lever said valve stem is lifted out of said passage blocking position, and a pin supported for longitudinally axial movement transverse to the plane of pivotal movement of said lever, said pin being engaged by said lever and positioned on the opposite side of the pivotal axis of said lever from said unidirectional connection of the lever and said extending valve stem portion whereby engagement of said lever with said pin limits the pivotal movement of said lever in valve stem lifting direction, said pin carrying a radially extending abutment which, when engaging said lever, prevents pivotal motion of the lever, a coiled spring encircling said pin and exerting an axially directed biasing force thereon urging said pin into a position in which said abutment engages said lever and prevents pivotal motion thereof, one end of said spring extending rectilinearly into abutting relation to said lever, whereby said spring is stressed in compression when said pin is axially moved to disengage said abutment from said lever and is stressed in torsion when subsequently said lever is pivotally moved in valve stem lifting direction.

2. A control valve for controlling the flow of fog-producing fluid to a pulse fog generator, said control valve including a housing having a rectilinear fluid flow passage which is circular in cross-section extending through the housing, a valve member supported in said housing for adjustable movement transverse to said passage, a conical cavity formed in said housing whose longitudinal axis intersects the centerline of said passage and the junction of said passage and cavity lies wholly upon the inclined side surface of the conical cavity, said valve member including a stem slidable within a bore in said valve body and extending from the valve housing, a valve closure element carried by said stem and unitarily molded of an elastomeric material, said closure element having a conical configuration closely fitting said conical cavity and thus blocking said passage when said stem is in one limiting position, said conically configurated portion of said valve closure element being provided with two diametrically opposite flattened portions each having a surface area larger than the area enclosed by the junction of said circular cross-sectioned fluid flow passage and said conical cavity, each of said flattened surface portions being disposed at one of the junctions between said circular cross-sectioned passage and said conical cavity, so that when said closure element is in said one limiting position said cavity and passage junctions are not engaged by said closure element, and an integral generally annular collar on said closure element spaced above the conical portion thereof and engaging said bore to provide a dynamic seal for said stem, and actuating means for moving said stem into and out of said one limiting position.

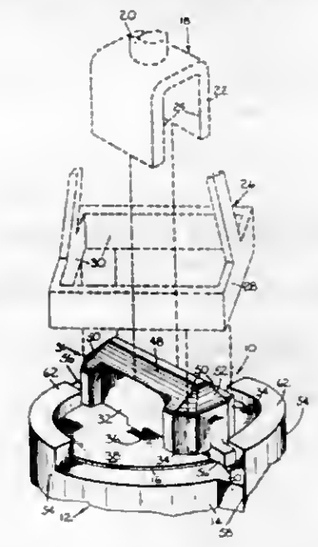
4,030,696

VALVE POSITIONING HANDLE

Earl A. Bake, Pittsburgh, and E. Frederick Schoenewels, Coraopolis, both of Pa., assignors to Rockwell International Corporation, Pittsburgh, Pa.

Division of Ser. No. 636,844, Dec. 2, 1975, abandoned. This application May 25, 1976, Ser. No. 690,201
Int. Cl.² F16K *51/00*
U.S. Cl. 251—288 **3 Claims**

1. A valve positioning handle for operating a valve means having a central axis, a body and a valve member disposed within the body for rotation about the axis by selective use of either of a pair of torque applying tools, which pair of torque applying tools includes an inverted U-shaped wrench having a pair of parallel legs and a square shaped wrench having four mutually perpendicularly disposed parallel side legs aligned to make contact with an upper surface of the body when the square shaped wrench is used on the valve positioning handle, said valve positioning handle comprising: an elongated extended fitting operatively connected to the valve member and extending in length substantially normal to the axis in coaxial alignment therewith; a pair of axial grooves formed in the sides of the fitting, each of said grooves having a base wall and longitudinally spaced end walls, the spaced base walls of the grooves being equally radially spaced on opposite sides of the axis a distance equal to the spacing between the parallel legs of said U-shaped wrench, with the end walls being spaced



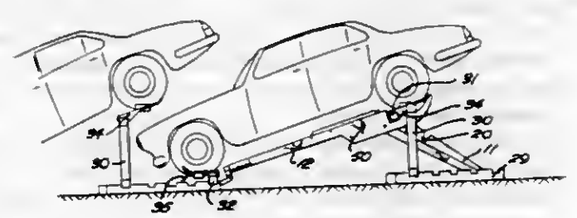
substantially the length of said legs whereby the legs may be slidably axially received in said grooves; a quadruplet of side walls formed on the ends of the fittings radially outward of the grooves parallel to and equally radially spaced with respect to the axis, said side walls oriented oblique to and radially outward of the grooves, said side walls defining equally circumferentially spaced surfaces for exteriorally slidably receiving the legs of said square shaped wrench; and a pair of tabs extending longitudinally from said fitting to be aligned with vertical surfaces on said body for contact therewith to limit the degree of rotation of said fluid isolation means within said body, said tabs being axially located below said upper surface of said body to prevent contact of said tabs by said square shaped wrench when said square shaped wrench is used on said valve positioning handle.

4,030,697

VEHICLE JACKS

Christopher Thomas Robinson, c/o Sir Thomas Robinson & Son (Grimsby) Ltd., Wharncliffe Road, Fish Docks, Grimsby, DN31 3QQ, Lincolnshire, England

Filed June 23, 1975, Ser. No. 589,779
Int. Cl.² B66F *11/00*
U.S. Cl. 254—8 R **9 Claims**



1. A jack member for use in raising and lowering a vehicle to and from a position inclined to the horizontal, the jack

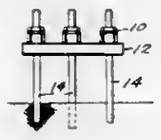
member comprising an elongate approach ramp, an elongate lifting ramp, pivoting means extending transversely of the longitudinal axes of said ramps, whereby said ramps are connected together adjacent one of their ends, a pressure fluid ram pivotally connected to the ramps to rotate said lifting ramp with respect to said approach ramp from a first position to a second position, said lifting ramp including a surface defining a track along which track a vehicle wheel can run when the jack member is in its first position, support means provided at the said one end of said lifting ram, to receive means for cradling said vehicle wheel, and means allowing said wheel cradling means to come into supporting engagement with said vehicle wheel then said pressure fluid ram has rotated said lifting ramp from said first position, in which said vehicle wheel runs along said ramps, into said second position in which the said one ends of said ramps are raised above their other ends.

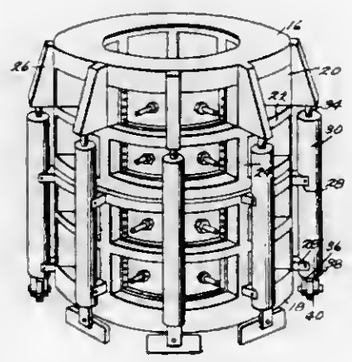
4,030,698

RELEASABLE GRIPPER ASSEMBLY FOR A JACKING MECHANISM

John H. Hansen, One Granada Circle, Mount Sinai, N.Y. 11766

Filed Mar. 31, 1976, Ser. No. 672,628
Int. Cl.² B66F *1/08*
U.S. Cl. 254—106 **15 Claims**





1. A jack assembly for releasably securing a platform or the like to a cylindrical caisson or the like, for relative linear movement of the platform in either direction axially of the caisson, comprising:

frame means for encompassing a longitudinal outer surface portion of the caisson, and having upper and lower relatively movable portions;

motor means interconnecting the upper and lower portions of the frame means for causing relative movement therebetween along the longitudinal axis of the caisson;

means for fastening the upper or lower portion of the frame means to the platform;

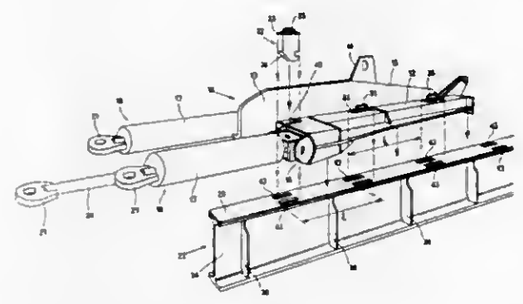
a plurality of arcuate-shaped inflatable gripper means releasably secured to the upper and lower portions of the frame means and having inner pad means for grippingly engaging the outer surface of the caisson when the gripper means is inflated, each gripper means being removably replaceable in the frame means without removing the frame means from the caisson.

4,030,699

HANDLING DEVICE FOR SHIFTING HEAVY LOADS ALONG A SLIDING TRACK

Wolfram Heimke, Chemin les Goules Antibes, France, assignor to Union Industrielle et D'Entreprise, Paris, France

Filed Jan. 5, 1976, Ser. No. 646,612
Claims priority, application France, May 2, 1975, 75.13814
Int. Cl.² B65G *7/00*
U.S. Cl. 254—108 **5 Claims**



1. A device for shifting a heavy load by slidingly displacing the same along a sliding track, comprising at least one movable platform provided with double acting hydraulic jacks the respective piston rods of which are connected to said load, said platform resting, through the intermediary of a supporting element, on a guiding rail associated to said track, locking means for locking said platform on said rail, said locking means comprising at least one catching element, mounted in a vertical shaft provided in said platform, so as to be vertically movable in said shaft between a lower position wherein a portion of said catching element projects from the lower surface of said supporting element, and a raised position wherein said catching element does substantially not project from said lower surface of said supporting element, said catching element having a general configuration of a prism with a rectangular base and being provided at its upper end with an integral plate the periphery of which protrudes over the periphery of said prism, and which is provided with a handle, said rail being provided with a plurality of regularly spaced rail apertures distributed over the length of said rail and adapted to receive said projecting portion of said catching element when the latter is in said lowered position, said projecting portion being provided at its front end, with reference to the direction of displacement of said load, with an oblique surface forming a sliding ramp adapted to cooperate with the front edge of any one of said rail apertures, and said projecting portion further being provided at its rear end with a locking surface adapted to cooperate with the rear edge of any one said rail apertures.

4,030,700

MANUALLY OPERATED LOG BREAKING DEVICE

Victor A. Dushku, c/o Borden, Studentstaden 2, 75233 Uppsala, Sweden

Filed July 19, 1976, Ser. No. 706,379
Claims priority, application United Kingdom, Aug. 29, 1975, 35810/75
Int. Cl.² B66F *15/00*
U.S. Cl. 254—113 **8 Claims**

1. A manually operated mechanical log breaking device comprising

a longitudinal extending lever member;

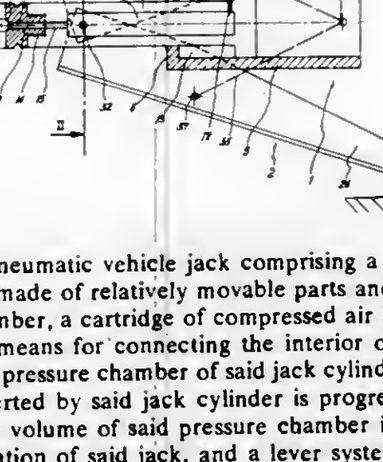
a first pressure plate extending from one end portion of said lever member;

a second pressure plate joined to said first pressure plate in a hinged relationship;

a third pressure plate;

a link system interconnecting said third plate and said first and second plates with said third plate spaced from said first and second plates,

said link system comprising an axle and three lever members, one end of each of said



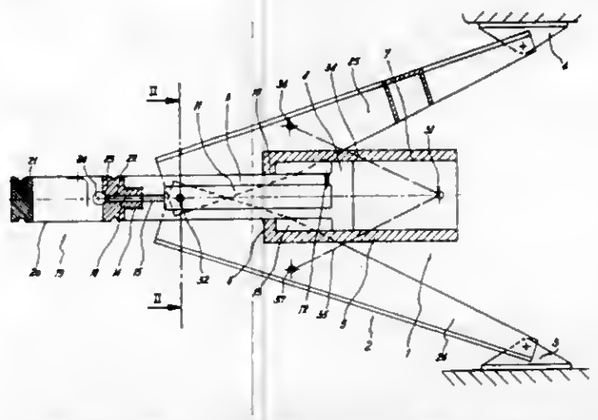
members being hingedly connected to said axle, said members extending from said axle and being hingedly connected to said first, second and third pressure plates respectively.

4,030,701

PNEUMATIC VEHICLE JACK

Pierre Joseph Pingon, 7 avenue du Parmelan, 74 Annecy (Haute Savoie), France

Filed Apr. 6, 1976, Ser. No. 674,736
Claims priority, application France, Apr. 11, 1975, 75.11343; Dec. 12, 1975, 75.38064
Int. Cl.² B66F *3/24*
U.S. Cl. 254—124 **9 Claims**



1. A pneumatic vehicle jack comprising a pneumatic jack cylinder made of relatively movable parts and having a pressure chamber, a cartridge of compressed air having a limited volume, means for connecting the interior of said cartridge with said pressure chamber of said jack cylinder, whereby the force exerted by said jack cylinder is progressively reduced when the volume of said pressure chamber increases during the operation of said jack, and a lever system connected to said movable parts of said jack cylinder and acting between the ground and the vehicle to be lifted, said lever system comprising levers so disposed as to reduce the force exerted by the jack cylinder at the beginning stage of the jack operation and for multiplying said force during the last stage of the said operation, so that a substantially constant lifting force is provided by said vehicle jack.

4,030,702

APPARATUS AND METHOD FOR PNEUMATICALLY RODDING MULTI-PASSAGE CABLE HOUSING CONDUITS

William P. Ware, Charlotte, N.C., and Robert D. Wheeler, Rock Hill, S.C., assignors to Thomas Industries of Tennessee, Inc., Matthews, N.C.

Filed Aug. 26, 1976, Ser. No. 718,013
Int. Cl.² B65H *59/00*
U.S. Cl. 254—134.4 **14 Claims**

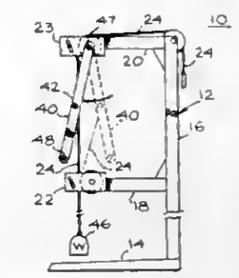
1. Pneumatic rodding apparatus for driving cable pull lines through multi-passage conduits having communicating gaps between passages at intervals along the length thereof, said apparatus including shaped carriers for insertion within each said passages and having means to which the end of cable pull lines are attached, a manifold for closing the entrant end of the conduit, the exit end of the conduit being left open, the manifold having a first set of openings which communicate with said conduit passages and a further set of smaller sized openings through which the pull lines feed to the first set of openings, a stand for rotatably supporting a reel on which the pull lines are uniformly wound in side by side relation, means for blowing air into the manifold to simultaneously drive the carriers through the conduit passages, and braking means for tensioning the pull lines as they unwind from the reel so that the carriers advance in unison as they are driven through the conduit passages to the exit end of the conduit.

4,030,703

SIMPLE MACHINE

Henry M. Bissell, 6321 Riggs Place, Los Angeles, Calif. 90045

Filed Nov. 22, 1974, Ser. No. 526,256
Int. Cl.² B66D *1/00*
U.S. Cl. 254—135 R **25 Claims**



1. A mechanism for pulling a load comprising:

at least one load support member;

means for readily securing the load support member in a selected position;

a unidirectional motion member coupled to the load support member for engaging a deflectible tensile member attached to the load, which load is to be connected adjacent a free end of said tensile member; and

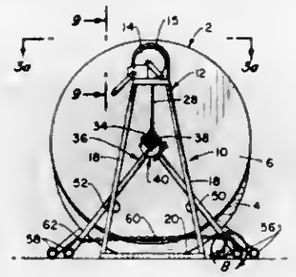
a pivoted deflection member for bearing against the tensile member between the unidirectional motion member and the load and transversely deflecting the tensile member to pull the load relative to the support member by successive increments as the slack in the tensile member is taken up through the unidirectional motion member.

4,030,704

WIRE OR CABLE REEL SUPPORT

Carl Beierle, 12613 Brooklake St., Los Angeles, Calif. 90066, and Harry Irik, 2025 Ashland Ave., Santa Monica, Calif. 90405

Filed July 25, 1975, Ser. No. 599,045
Int. Cl.² B66C *23/60*
U.S. Cl. 254—139.1 **16 Claims**



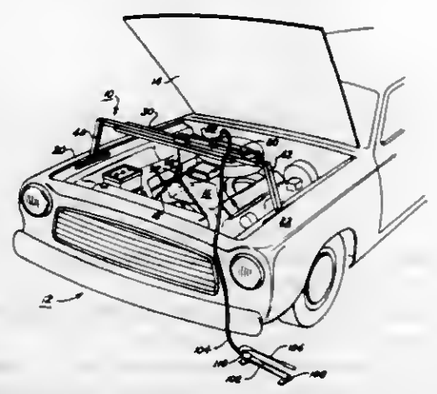
1. A reel lift and support for lifting and supporting a reel of cable or the like to permit unwinding of cable or the like therefrom, comprising: means for sequentially lifting one end of said reel for placement of a support member, as hereinafter defined, on each side of said reel; a slideably disposable horizontal support means adapted for use in lifting and supporting said reel and adapted for releasable cooperative association with said reel; a pair of support members for positioning on each side of said reel and adapted to be cooperatively, supportingly and releasably associated with said horizontal support means, said pair of support members, each comprising a support block to receive said horizontal support means in supportive relationship, a first elongate leg member, fixedly secured to said support block and a second, spaced, elongate leg member pivotally secured to said support block for movement towards and away from said first elongate leg member, said first and second elongate leg members lying in the same plane; and retaining means for selectively positioning and retaining said second elongate leg member with respect to said first elongate leg member, whereby said pair of support members support said reel in elevation to permit rotation thereof.

4,030,705

VEHICLE SUPPORTED MOTOR LIFT

Jacob Bontrager, 809 3rd Ave. NE., Jamestown, N. Dak. 58401

Filed Jan. 19, 1976, Ser. No. 649,917
Int. Cl.² B66C *23/60*
U.S. Cl. 254—139.1 **12 Claims**



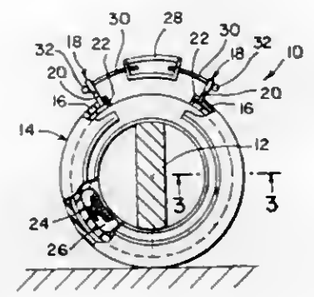
1. A lift for the motor of a vehicle having lateral longitudinal side structures defining a motor compartment, comprising a generally horizontally disposed beam for mounting above the motor in a transverse position, leg means connected to each end of said beam for supporting the beam on the two lateral side structures of the motor compartment above the motor therein and including means at the bottom for seating on compartment side structures and holding said beam in an elevated position, a lift mechanism on said transversely positioned beam having a means for connecting the lift mechanism to the vehicle motor, a power operated means for raising said connecting means to lift the vehicle motor, and a means for controlling the operation of said power means.

4,030,706

HIGHWAY GUARD RAIL BUMPER GUARD

James S. Ward, Stratford, Conn., assignor to James S. Ward, Stratford, Conn.

Filed Sept. 8, 1976, Ser. No. 721,465
Int. Cl.² E04H *17/00*
U.S. Cl. 256—1 **6 Claims**



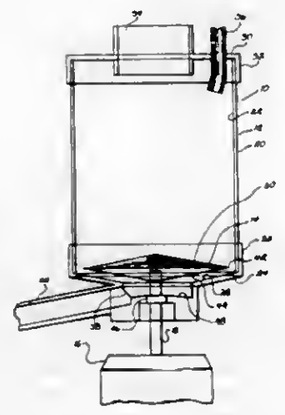
1. A highway guard rail bumper guard comprising:
at least two vehicle tires arranged concentrically one within the other, each of said tires having a minor circumferential segment thereof removed to thereby provide spaced ends on each said tire;
fastening elements carried by the outermost of said tires adjacent each of the ends thereof;
clamping means connected between said fastening elements; and
an annularly extending layer of a particulate incompressible material disposed within the innermost of said tires.

4,030,707

BLENDER

George C. Moreton, Winston-Salem, N.C., assignor to Electronic Data Controls Corporation, Winston-Salem, N.C.

Filed Sept. 15, 1975, Ser. No. 613,269
Int. Cl.² B01F *7/26*
U.S. Cl. 259—8 **2 Claims**



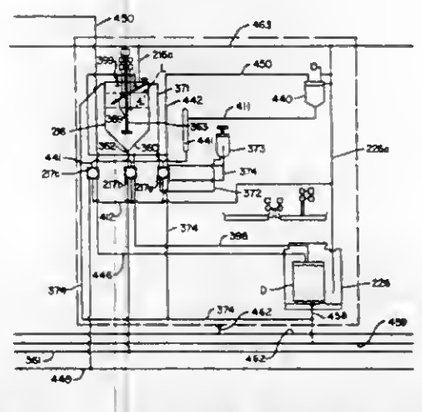
1. A blender for blending liquids, liquids and powders, or similar products comprising a bowl having a generally upstanding cylindrical side wall and a bottom wall, a blending disc mounted in said bowl for rotation about a generally vertical axis coaxial with the cylindrical side wall of said bowl, said disc having a generally circular periphery closely adjacent, said cylindrical side wall and an undersurface closely adjacent the bottom wall of said bowl, said bowl having means for receiving product components above said disc and a discharge port in said bottom wall below said disc for discharge of blended product therethrough, and means for rotating said disc to effect blending of said product components and to create a centrifugal draft at the disc periphery and undersurface, said disc periphery and undersurface being sufficiently close to said bowl side wall and bottom wall to prevent product flow therepast during said centrifugal draft created by the rotating disc while being spaced sufficiently therefrom to permit product flow therepast to said discharge port when said disc is not rotating, the uppersurface of said disc being inclined upwardly and outwardly from a depressed central portion to direct the product centrifugally upward during rotation of said disc, said disc having a port extending therethrough from said depressed central portion downwardly to the undersurface thereof.

4,030,708

PROCESS FOR INTRODUCING PARTICULATE MATERIAL INTO A CONTAINER

Arthur J. Stock, Lakewood; Donald E. Christofer, Willowick, and Joseph E. Brinza, Euclid, all of Ohio, assignors to Stock Equipment Company, Cleveland, Ohio

Division of Ser. No. 409,386, Oct. 25, 1973, Pat. No. 3,966,175, which is a division of Ser. No. 182,088, Sept. 20, 1971, Pat. No. 3,835,617. This application Mar. 24, 1976, Ser. No. 669,906
Int. Cl.² B01F *3/12*
U.S. Cl. 259—8 **13 Claims**



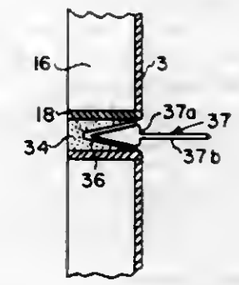
1. A process of preparing a dispersion of a predetermined proportion of finely divided particles in a liquid comprising introducing a dispersion of said particles in said liquid into a container; allowing said dispersion to settle so that in the container there is a first level of a mixture and above said first level a second level of a liquid that is essentially free of said particles and of a specific gravity less than the specific gravity of the mixture of particles and liquid that has settled; sensing the vertical height location of said first level of said mixture of particles and liquid in said container, sensing the vertical height location of said second level of said liquid in said container; adjusting the amount of the liquid in said container by removing liquid between said first and second levels in accordance with the sensed heights of said first and second levels to achieve a desired proportion of total liquid to total particles in said container; and mixing the resulting mixture of particles and liquid to provide a dispersion of a predetermined proportion of said finely divided particles in said liquid to be stored in a second container.

4,030,709

METHOD OF PLUGGING TAPHOLES IN PHOSPHORUS FURNACES

E. Dwayne Shepard, and Gordon H. Scherbel, both of Pocatello, Idaho, assignors to FMC Corporation, Philadelphia, Pa.

Filed Mar. 4, 1976, Ser. No. 663,845
Int. Cl.² C21B *7/12*
U.S. Cl. 266—45 **4 Claims**



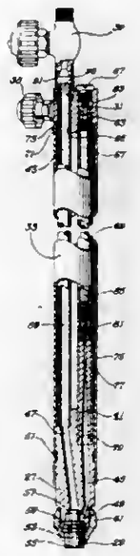
1. A method of plugging tapholes in a phosphorus furnace comprising the steps:
a. providing a hollow plug member having walls of matted refractory ceramic fibers and conforming generally, at its point of contact, to the opening of the taphole, said member containing at least one hollow end and adapted to receive a supportive backing plug through said hollow end;
b. placing the hollow plug member over a rigid, heat resistant supportive backing plug adapted to make contact with the inner surface of the hollow plug member;
c. inserting the hollow plug member while mounted on the supportive backing plug into the taphole and applying sufficient force to effect a seal between the outer walls of said hollow plug member and taphole opening;
d. retaining the backing plug in place until sufficient molten furnace material solidifies against the the hollow plug member thereby plugging the taphole, and
e. removing the backing plug.

4,030,710

FLOATING TUBE TORCH

Larry R. Turney, Denton, Tex., assignor to Victor Equipment Company, Denton, Tex.

Filed Nov. 28, 1975, Ser. No. 636,072
Int. Cl.² B23K *7/02*
U.S. Cl. 266—48 **4 Claims**



1. A cutting torch that obviates the tendency to bow because of unequal heating of tubes therewithin comprising:

a. a torch head;
b. a torch tip connected in fluid tight relationship with said torch head;
c. a body having a first passageway adapted to conformingly receive a pre-heat tube assembly and a second passageway adapted to conformingly receive a cutting oxygen tube assembly; said body having a fuel inlet passageway and an oxygen inlet passageway;
d. a barrel connected with said body;
e. a fuel flow control valve sealingly connected with said fuel inlet passageway of said body;
f. an oxygen flow control valve sealingly connected with said oxygen inlet passageway of said body;
g. a pre-heat tube assembly disposed within said barrel and connected with said fuel inlet passageway and said fuel flow control valve and with said oxygen inlet passageway and said oxygen flow control valve; said pre-heat tube assembly being sealingly connected to said torch head; said pre-heat tube assembly comprising an outer tube having inserted therewithin an injector tube and a mixer tube; said mixer tube having a bore traversing longitudinally thereof with its entrance adjacent the downstream end of said injector tube; said injector tube having a mixer at its downstream end, means spacing said mixer at a predetermined distance from entrance of said bore of said mixer tube, and at its upstream end a slidable gas separator for allowing expansion and contraction without varying said predetermined distance;
h. a cutting oxygen flow control valve;
i. a cutting oxygen tube assembly sealingly connected with said torch head and said cutting oxygen flow control valve; and
j. said pre-heat tube assembly and said cutting oxygen tube assembly being disposed in side by side relationship; only one of said outer tube of said pre-heat tube assembly and said cutting oxygen tube assembly being sealingly and rigidly connected to said body and the other thereof slidably engaging said body so as to permit body movement longitudinally thereof to compensate for periodic differential expansion between the slowly cooled pre-heat tube assembly with its slow flow of oxygen and fuel therewithin and the more rapidly cooled cutting oxygen tube assembly with its periodic rapid flow of cutting oxygen therethrough and thereby preventing periodically altering the angle of said torch head and tip with respect to said barrel and body.

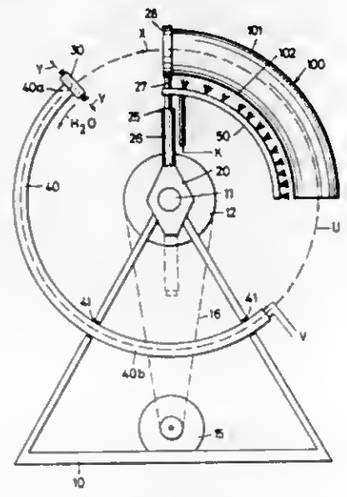
4,030,711

METHOD AND APPARATUS FOR THE SURFACE HARDENING OF THE INNER SURFACE OF TUBE BENDS

Vinzenz Siller, Hamburg, Germany, assignor to Esser-Werke GmbH vorm. Westmootan-Werke, Warsteln, Sauerland, Germany

Filed May 29, 1975, Ser. No. 581,746
Claims priority, application Germany, May 31, 1974, 2426580; May 31, 1974, 2426579; Aug. 10, 1974, 2438558
Int. Cl.² C21D *9/08*
U.S. Cl. 266—123 **12 Claims**

1. An apparatus for continuously surface hardening the inner surface of tube bends of a constant radius of curvature by means of flame hardening, said apparatus comprising a support frame, a shaft horizontally journalled in the support frame, at least one mounting bracket assembly mounted on the shaft and extending in a direction perpendicular thereof, the mounting bracket assembly including means for fastening a tube bend at one end, the free end of the mounting bracket assembly defining a circular path during rotary movement of the shaft, a stationary mounting bracket connected at one end to the support frame and mounting at its opposite end a flame hardening burner, the flame hardening burner adapted to be received within the internal cavity of the tube bend, the stationary mounting bracket adapted to include the supply lines leading to the flame hardening burner and being of an arcuate



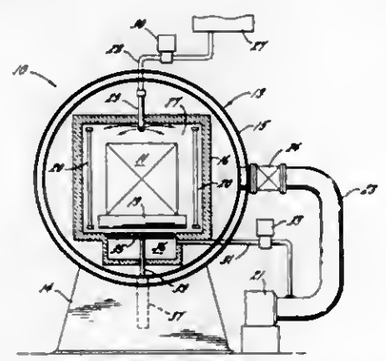
configuration of a radius corresponding to the radius of the circular path described by the tube bend during its movement.

4,030,712

METHOD AND APPARATUS FOR CIRCULATING A HEAT TREATING GAS

Ronald D. Rogers, Rockford, Ill., assignor to Alco Standard Corporation, Valley Forge, Pa.

Filed Feb. 5, 1975, Ser. No. 547,107
Int. Cl.² C21D *1/74*
U.S. Cl. 266—252 **7 Claims**



1. A heat treating furnace having a walled enclosure defining a heating chamber, heating elements within the chamber for heating a work load disposed in the chamber, means including an inlet for admitting a substantially continuous flow of processing gas into said chamber, means including an outlet for exhausting a substantially continuous flow of gas from said chamber, and power-operated means for repeatedly increasing and decreasing the effective volume of said chamber and for imparting a back and forth pulsating motion to the gas while the gas is within said chamber and is flowing from said inlet to said outlet thereby to circulate the gas back and forth within the chamber and past the work load with a pulsating action as the gas flows from said inlet to said outlet.

4,030,713

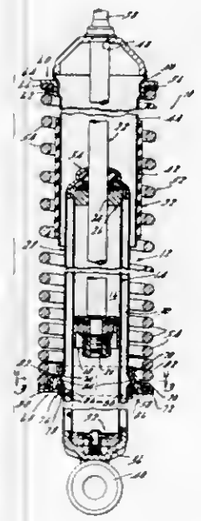
VEHICLE SUSPENSION DEVICE

Dale A. Palmer, Monroe, Mich., assignor to Monroe Auto Equipment Company, Monroe, Mich.

Filed Jan. 20, 1975, Ser. No. 542,618
Int. Cl.² F16F *13/00*
U.S. Cl. 267—8 R **7 Claims**

1. A vehicle suspension device comprising,
a telescopic shock absorber including an elongated tubular housing,

a piston reciprocally disposed within said housing and connected to one end of a piston rod extending axially outwardly from one end of said housing,
attachment means on the outer end of said piston rod and one end of said housing for securing said device to the sprung and upsprung portions of an associated vehicle,
a tubular dirt shield supported on said one end of said piston rod and extending coaxially of said rod and said housing,
said dirt shield being larger in diameter than said housing and adpated to telescopically receive the adjacent end of said housing therewithin,
said dirt shield including a generally tubular-shaped dirt shield member and a cap secured to said piston rod and said dirt shield member, said dirt shield member being formed with a radially outwardly extending shoulder adapted to operatively support one of said spring support means,
a helical coil spring extending coaxially of said housing and



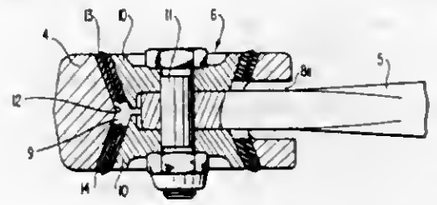
said dirt shield, with said dirt shield being disposed substantially entirely within said coil spring, and
first and second spring support means for operatively supporting said spring on said shock absorber,
one of said spring support means comprising an annular spring engaging member having an axially extending portion arranged coaxially of said shock absorber and a radially outwardly extending flange portion and adapted to have one axial end of said spring bear thereagainst, said one support means also comprising first and second circumferentially extending members disposed at least in part between the outer periphery of said shock absorber and the inner periphery of said axial portion of said spring engaging member, said circumferentially extending members each having radially outwardly projecting areas adapted to nestingly receive a radially outwardly projecting portion on said shock absorber and thereby at least in part support said annular member upon said shock absorber.

4,030,714

CONNECTING ELEMENT FOR WHEEL SUSPENSIONS OF MOTOR VEHICLES

Einhard Kleinschmit, Esslingen-Hegensberg; Peter Tattermusch, Obersulm, and Günther Haverbeck, Plochingen, all of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed June 21, 1976, Ser. No. 698,081
Claims priority, application Germany, June 20, 1975, 2527408
Int. Cl.² B66G *11/24*
U.S. Cl. 267—21 A **10 Claims**



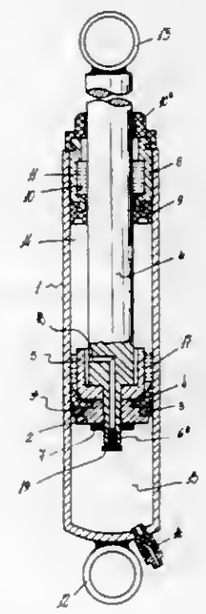
1. An elastic connecting element between a cross guide member and a support rod of a subdivided triangular guide means of a vehicle, the support rod being disposed to the rear of the cross guide member as viewed in the vehicle longitudinal direction, and connecting pin means including two clamping cone means and a clamping bolt, said clamping bolt extending through the clamping cone means as well as through the end portion of the support rod and clamping the clamping cone means by way of corresponding elastic intermediae members of at least approximately corresponding conical shape in a mounting aperture provided in the cross guide member and substantially shaped corresponding to the clamping cone means, the support rod projecting into said mounting aperture by way of a lateral opening provided in the cross guide member.

4,030,715

PNEUMATIC SHOCK ABSORBER FOR SUSPENSION OF CARS AND/OR SIMILAR VEHICLES

Hector Oscar Duran, Moreto Street 678, Buenos Aires, Argentina

Filed July 9, 1975, Ser. No. 594,262
Claims priority, application Argentina, Aug. 1, 1974, 255022
Int. Cl.² B60G *11/26*
U.S. Cl. 267—64 R **8 Claims**



1. A pneumatic shock absorber for use in a suspension

comprising, in combination, an elongated housing having a longitudinal axis and an internal surface bounding an enclosed space for a gaseous medium; a piston accommodated in said space for reciprocation axially of said housing and subdividing said space into two chambers, said piston having a peripheral surface juxtaposed with said internal surface of said housing; a piston stem connected to said piston and passing through one of said chambers and through said housing coaxially therewith to the exterior of said housing; means for so connecting said housing and said piston stem, respectively, to different relatively movable parts of the suspension that said longitudinal axis of said housing is upright and said one chamber is situated upwardly of said piston; means for communicating said chambers with one another, including an interspace bounded by said peripheral surface of said piston and said internal surface of said housing, and a passage provided in said piston stem and having a port which communicates said passage with said one chamber upwardly of said piston; means for controlling the cross-sectional area of said communicating means to thereby determine the rate of flow of the gaseous medium therethrough between said chambers and thus to control the extent and speed of reciprocation of said piston axially of said housing, including a sealing ring mounted on said piston intermediate said interspace and said one chamber and having a deflectable portion which sealingly contacts said internal surface and said housing when the pressure in said one chamber exceeds that in the other chamber and which is deflected out of contact with said internal surfaces of said housing when the pressure in said other chamber exceeds that in said one chamber, and a body of liquid lubricant which constitutes a liquid seal in said one chamber on said sealing ring and has an upper level, said sealing ring and said liquid seal permitting flow of the gaseous medium through said interspace in direction from said other into said one chamber but preventing such flow in the opposite direction; and means for separting said liquid seal from said port and thus from said passage to thereby prevent said liquid lubricant from escaping from said one into said other chamber through said passage, including a cup-shaped member connected to said piston for reciprocation therewith and extending upwardly therefrom beyond said upper level of said liquid seal and surrounding a compartment in said one chamber which is filled with the gaseous medium and with which said port communicates, whereby said liquid seal is confined between said cup-shaped and said internal surface of said housing.

4,030,716

PNEUMATIC SUSPENSION ELEMENT

Herbert Freitag, Koblenz-Metternich, Germany, assignor to Stabilus GmbH, Koblenz-Neuendorf, Germany

Filed July 2, 1975, Ser. No. 592,787

Claims priority, application Germany, July 5, 1974, 7422901[U]

Int. Cl.² F16F *5/00*

U.S. Cl. 267—64 R **5 Claims**

1. A pneumatic suspension element comprising:

a. a cylinder having an axial wall radially bounding a cavity in said cylinder and a first radial wall sealing said cavity in one axial direction;

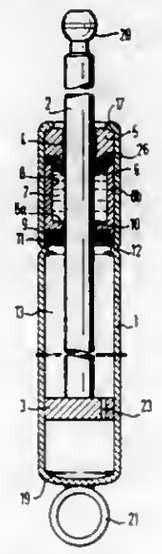
b. an annular, second, radial wall bounding said cavity in the other axial direction;

c. an annular partition fixedly mounted in said cavity and axially separating a first portion of said cavity adjacent said first radial wall from a second portion of said cavity adjacent said second radial wall;

d. a piston axially movable in said first portion and axially dividing the same into two compartments;

e. a piston rod fastened to said piston and axially extending from said first portion through said partition, said second portion, and said second radial wall outward of said cavity,

1. said partition being formed with capillary passages extending therethrough between said portions and constituting first sealing means radially interposed between said piston rod and said axial wall axially adjacent said partition for preventing flow of fluid between said portions in the absence of a difference of fluid pressure between said portions, while permitting fluid flow from one of said portions to the other portion



when the fluid pressure in said one portion is higher than in said other portion; and

f. second sealing means radially interposed between said piston rod and axial wall axially adjacent said second radial wall for preventing outward flow of fluid from said second portion of said cavity.

4,030,717

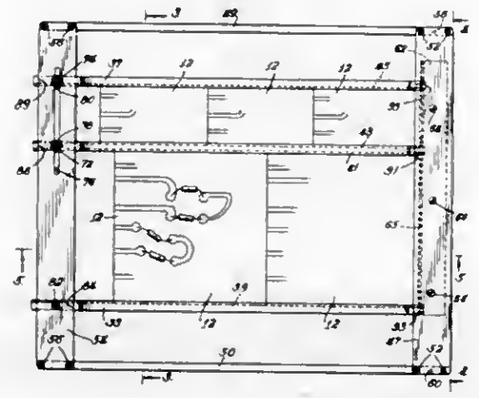
ADJUSTABLE PRINTED CIRCUIT BOARD PALLET

Frank V. Serlovsky, Westchester, Ill., assignor to D.N.S. Precision Machining, Cicero, Ill.

Filed Apr. 26, 1976, Ser. No. 680,242

Int. Cl.² B25B *5/02, 5/14*

U.S. Cl. 269—118 **6 Claims**



1. A pallet for holding printed circuit boards on conveying means in a solder wave machine, said machine flowing molten solder in a wave to solder connections on the underside of the board, said pallet comprising:

a frame;

a pair of longitudinally-extending first and second bars mounted on said frame;

attaching means for mounting said frame to said conveying means;

means defining a pair of oppositely disposed longitudinally-extending grooves in said bars for receiving the opposite side marginal edges of printed circuit boards;

a transversely disposed plow bar mounted on the front portion of said frame; and

means defining a lengthwise extending groove in said transversely disposed plow bar in a common plane with said longitudinally-extending grooves for receiving end marginal edges of printed circuit boards, the lower edge of said plow bar extending below said plane so that the undersides of printed circuit boards cut into and spread out the wave of molten solder for distributing it over the underside of printed circuit boards mounted on said pallet.

4,030,718

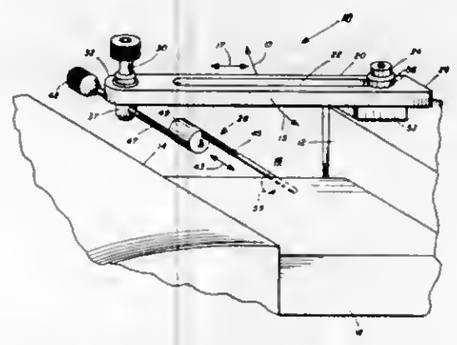
UNIVERSALLY ADJUSTABLE VISE STOP

Alexandros Philipoff, 135 Castilian Apts., Winter Park, Fla. 32789

Continuation-in-part of Ser. No. 452,954, March 20, 1974, abandoned. This application Oct. 8, 1975, Ser. No. 620,559

Int. Cl.² B23Q *3/18*

U.S. Cl. 269—315 **7 Claims**



1. A work stop for use with work holding means of the type having a pair of opposing jaws defining a corridor therebetween, said jaws being movable one with respect to the other to hold a work piece in said corridor said work stop comprising:

a bar fixed at one end thereof to the periphery of one of said jaws;

means for changing the dimension of said bar into said corridor;

means for rotating said bar with respect to said one jaw;

a stop arm pivotably mounted on the other end of said bar and spaced from said one jaw, said stop arm adapted to extend through said corridor and bear against said work piece held between said jaws;

means operable independent of movement of said bar for changing the length of said arm in said corridor;

said bar including a first hole in said another end;

a holding screw extending through said first hole and having a second hole transverse to said first hole;

a collar surrounding a portion of said holding screw out of said first hole, said collar having a third hole axially aligned with said second hole;

a nut engaging said holding screw on a side of said bar opposite said collar; and wherein

said arm extends through said second and third holes and is locked therein by rotation of said nut.

4,030,719

CHILD IMMOBILIZING DEVICE FOR X-RAYS

William Joseph Gabriele, and Joseph Michael Gabriele, both of Fenton, Mich., assignors to Contour Fabricators, Inc., Fenton, Mich.

Filed Aug. 30, 1976, Ser. No. 718,943

Int. Cl.³ A61F *5/37*

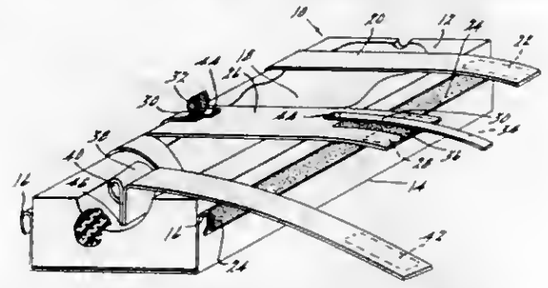
U.S. Cl. 269—328 **11 Claims**

1. An immobilizing device for use in medical procedures which comprises:

a cellular foam insert contoured with a cavity adapted to partially envelop and restrain a patient;

a plurality of restraining strap means to provide an immobilizing force on the patient;

a rigid base designed to support said cellular foam insert wherein said rigid base is comprised of a horizontal portion and two substantially vertical, longitudinal walls connected to said horizontal portion; and



a fastening means used to secure said plurality of restraining straps to said rigid base.

4,030,720

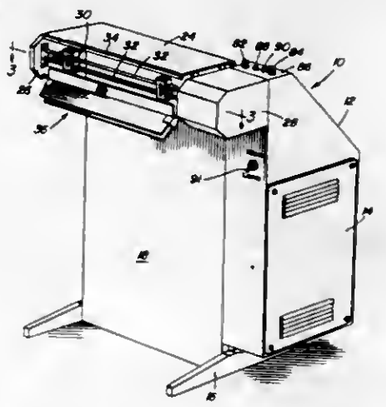
PAPER STACKER

Gary E. Jones, 103 Phillips Road, East Greenwich, R.I. 02818

Filed Feb. 17, 1976, Ser. No. 658,377

Int. Cl.² B65H *45/00*

U.S. Cl. 270—61 F **10 Claims**



1. In combination with a sheet folding and stacking apparatus having a web feeding device for withdrawing a continuous web from a buffer zone and a web folding device for depositing the web onto a folded stack, a synchronizing control system for regulating operation of a pair of drive motors drivingly connected to the web feeding and folding devices, respectively, comprising means for generating a common train of electrical pulses at a fixed pulse rate, digital divider means connected to the generating means for producing two trains of driving pulses of different pulse rates, and drive means for respectively supplying the driving pulses at the different pulse rates to the drive motors to effect operation of the web feeding and folding devices in synchronized relation to each other.

4,030,721

AUTOMATIC MANUSCRIPT DISCHARGING DEVICE FOR COPYING MACHINES

Takefumi Kurosaki, Isehara, Japan, assignor to Rank Xerox Ltd., London, England

Filed July 27, 1976, Ser. No. 709,155

Int. Cl.² B65H *29/06*

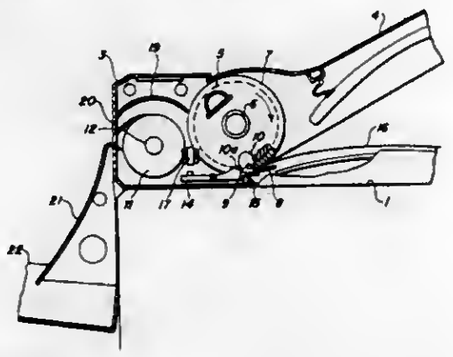
U.S. Cl. 271—3 **2 Claims**

1. An automatic document ejection device adapted for incorporation in a platen cover of a copying machine having a platen glass for placement of documents to be exposed by the copying machine comprising:

a pivotal cover overlying the platen glass;

a rotatable, document discharging roller having a gripper for gripping the lead edge of a document placed on the platen glass

a drive mechanism for rotating said discharging roller through a predetermined angle



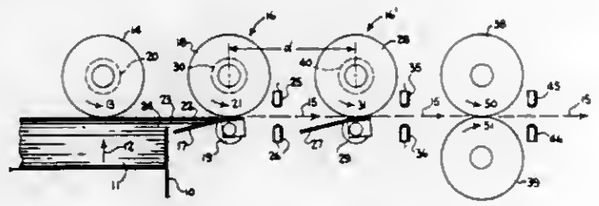
means for closing said gripper as said pivotal cover is closed; and for opening said gripper when said discharging roller is rotated through the predetermined angle said drive mechanism being activated as said pivotal cover is lifted to discharge the gripped document.

4,030,722

SHEET-MATERIAL SEPARATOR AND FEEDER SYSTEM

Robert Irvine, Riverside, and Harry E. Luperti, Wilton, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed May 13, 1975, Ser. No. 577,002
Int. Cl.² B65H *3/46, 7/18*
U.S. Cl. 271—10 **20 Claims**



1. An automatic material separating and feeding system separating a range of inter-mixed thicknesses of sheet-like material and feeding the separated sheet-like material in seriatim to a material-handling device, said material separating feeder system comprising:

means defining a material handling feed path;

stacking means disposed at the beginning of said feed path for stacking a quantity of inter-mixed thicknesses of sheet-like material;

a feeding means disposed adjacent said stacking means for feeding a portion of said quantity of material towards a first separating means;

a first separating means disposed along said feed path downstream from said stacking means for separating and feeding the material towards a second separating means, said first separating means comprising a first forward material thrusting element and a first adjacent material retarding element for separating multiple sheet-like materials disposed therebetween, a first independent clutching means for engaging and disengaging said first forward material thrusting element, said first forward material thrusting element including an overrunning clutch for allowing sheet-like material to be pulled forward by a subsequent forward material thrusting element when said first forward material thrusting element is disengaged; and

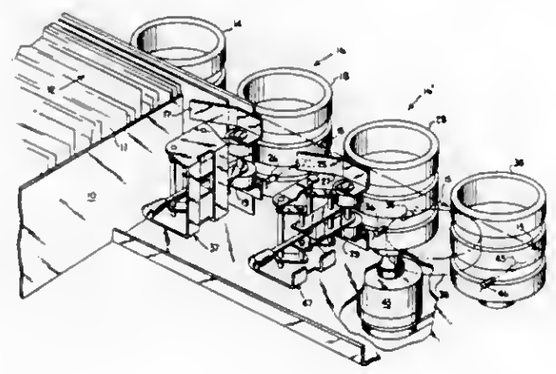
a second separating means disposed along said path downstream from said first means a distance less than a minimum length for said sheet-like material in said range of sheet-like materials, so that at one time during the separation of said sheet-like material, said sheet-like material will be in a bite of both separating means, said second separating means for separating and feeding the material towards a material-handling device, said second separating means comprising a second forward material thrusting element and a second adjacent material retarding element for separating multiple sheet-like materials disposed therebetween, a second clutching means for engaging and disengaging said second forward material thrusting element, said second forward material thrusting element including an over-running clutch for allowing sheet-like material to be pulled forward by a subsequent forward material thrusting element when said second forward material thrusting element is disengaged, said second separating means working cooperatively with said first separating means, such that said sheet-like material is fed to said material-handling device one sheet at a time in seriatim.

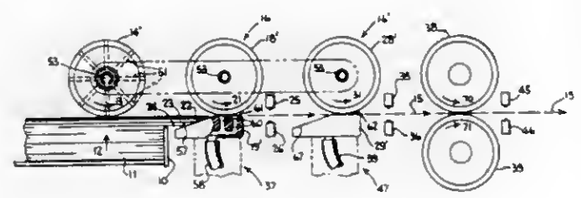
4,030,723

VACUUM-CONTROLLED, SHEET-MATERIAL SEPARATOR AND FEEDER SYSTEM

Robert Irvine, Riverside, and Harry E. Luperti, Wilton, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed Dec. 15, 1975, Ser. No. 640,900
Int. Cl.² B65H *3/10, 7/18*
U.S. Cl. 271—11 **29 Claims**





1. An automatic, vacuum-controlled, material separating and feeding system separating a range of inter-mixed thicknesses of sheet-like material and feeding the separated sheet-like material in seriatim to a material-handling device, said material separating feeder system comprising:

means defining a material handling feed path;

stacking means disposed at the beginning of said feed path for stacking a quantity of inter-mixed thicknesses of sheet-like material;

a vacuum-controlled feeding means disposed adjacent said stacking means for feeding a portion of said quantity of material towards a first separating means;

a first vacuum-controlled separating means disposed along said feed path downstream from said stacking means for generally separating thicker sheet-like material of said range of intermixed thicknesses, and feeding the separated material towards a second vacuum-controlled separating means, said first separating means comprising a first forward material thrusting element and a first adjacent material retarding element for separating multiple sheet-like materials disposed therebetween, a first independent clutching means for engaging and disengaging said first forward material thrusting element, said first forward material thrusting element including an over-running clutch for allowing sheet-like material to be pulled forward by a subsequent forward material thrusting element when said first forward material thrusting element is disengaged; and

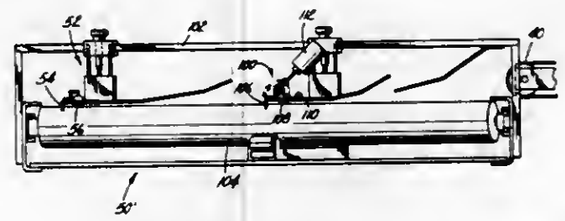
a second vacuum-controlled separating means disposed along said feed path downstream from said first vacuum-controlled separating means for generally separating thinner sheet-like material of said range of inter-mixed thicknesses, and feeding the separated material towards a material-handling device, said second separating means disposed along said feed path downstream from said first separating means a distance less than a minimum length for said sheet-like material in said range of sheet-like materials, so that at one time during the separation of said sheet-like material, said sheet-like material will be in the bite of both separating means, said second separating means comprising a second forward material thrusting element and a second adjacent material retarding element for separating multiple sheet-like materials disposed therebetween, a second clutching means for engaging and disengaging said second forward material thrusting element, said second forward material thrusting element including an over-running clutch for allowing sheet-like material to be pulled forward by a subsequent forward material thrusting element when said second forward material thrusting element is disengaged, said second vacuum-controlled separating means working cooperatively with said first vacuum-controlled separating means, such that said sheet-like material is fed to said material-handling device one sheet at a time in seriatim.

4,030,724

HIGH OPERATOR EFFICIENCY DUPLICATING SYSTEM

Eber Lyle Goodwin, Arlington Heights, Ill., assignor to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed Aug. 14, 1975, Ser. No. 600,992
Int. Cl.² B65H *31/24, 29/60, 31/40*
U.S. Cl. 271—64 **7 Claims**



1. A duplication system comprising:

duplicating means for preparing copies on copy sheets and forwarding the copies in a series along a linear path to a discharge location;

a direction changing device located adjacent the discharge end of said duplicating means for accepting sheets therefrom and redirecting their motion in a direction substantially normal to the copy sheet path through the duplicator;

a sheet distributor having a feed-in conveyor and sheet receiving pockets arranged to receive the copy sheets approaching the same along said substantially normal direction, said direction changing device and said sheet distributor being of widths to accommodate more than twice the single sheet dimension of the sheets issuing from the duplicating means so as to accommodate two parallel independent sheet tracks; and

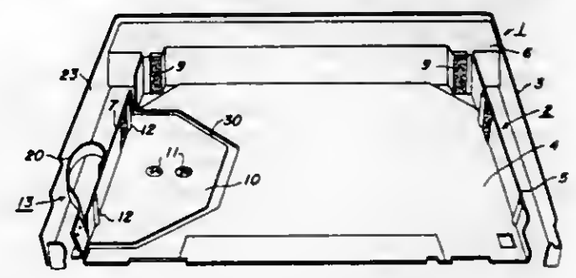
means associated with the direction changing device for selectively forwarding sheets received from said duplicating means in said substantially normal direction along either of said tracks to distinct portions of the pockets of said sheet distributor.

4,030,725

PAPER TRAY FOR COPYING MACHINES

Kiyoshige Fukui; Akira Tamamura, and Minoru Nishimoto, all of Ebina, Japan, assignors to Rank Xerox Ltd., London, England

Filed July 27, 1976, Ser. No. 709,154
Claims priority, application Japan, Dec. 9, 1975, 50-145911
Int. Cl.² B65H *1/22*
U.S. Cl. 271—164 **9 Claims**



1. In a copier including a detachably insertably mounted paper tray, said paper tray having a movable sheet side guide therein, the improvement comprising:

camming means operatively connected to said movable sheet side guide; actuator means on the copier positioned to engage said camming means and apply a force thereto as the tray is inserted into the copier,

and wherein said actuator means reduces the pressure applied to said camming means automatically once said paper tray is inserted completely into the copier;

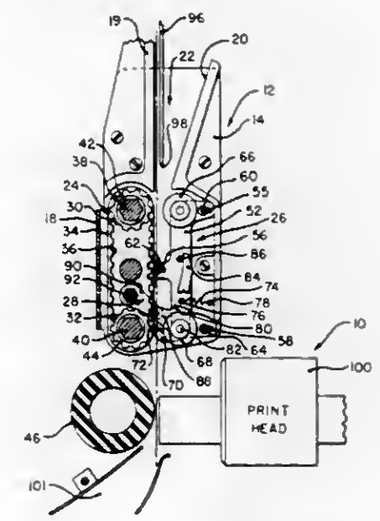
said camming means being movable by said actuator means as the tray is inserted into the copier to automatically move said movable sheet side guide of said paper tray toward paper within said paper tray and thereby automatically adjust the paper tray to conform to the size of sheets within the tray when said tray is inserted into the copier.

4,030,726

DOCUMENT FEEDING MECHANISM

Horst H. Biedermann, Augsburg, Germany, assignor to NCR Corporation, Dayton, Ohio

Filed Dec. 11, 1975, Ser. No. 639,684
Int. Cl.² B65H *9/06*
U.S. Cl. 271—246 **4 Claims**



1. A document feeding mechanism for use with a business

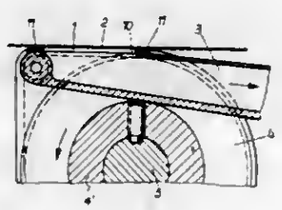
machine having a document entrance throat comprising: frame means;
transport means and document engaging means mounted on said frame means on opposed sides of said throat;
said document engaging means having first and second spaced engagement means thereon, and an abutment means positioned in said throat to enable a document inserted in said throat to abut thereagainst;
moving means for moving said document engaging means so as to bring said first engagement means into engagement with said transport means to retain a document therebetween and thereafter move said abutment means out of said throat and simultaneously move said second engagement means into engagement with said transport means to retain said document therebetween; and
means for driving said transport means;
said document engaging means comprising:
a support means and means for mounting said support means on said frame means for pivotal movement relative to said transport means and movement towards and away from said transport means;
said first engagement means being rotatably mounted on a first end of said support means and said second engagement means being rotatably mounted on a second end of said support means; and
said abutment means being located at said second end of said support means.

4,030,727

SHEET TRANSFER DEVICE FOR PRINTING PRESSES

Willi Jeschke, Heidelberg, Germany, assignor to Heidelberger Druckmaschinen Aktiengesellschaft, Heidelberg, Germany

Filed Dec. 22, 1975, Ser. No. 642,696
Claims priority, application Germany, Dec. 20, 1974, 2460504
Int. Cl.² B65H 5/22
U.S. Cl. 271—276 8 Claims



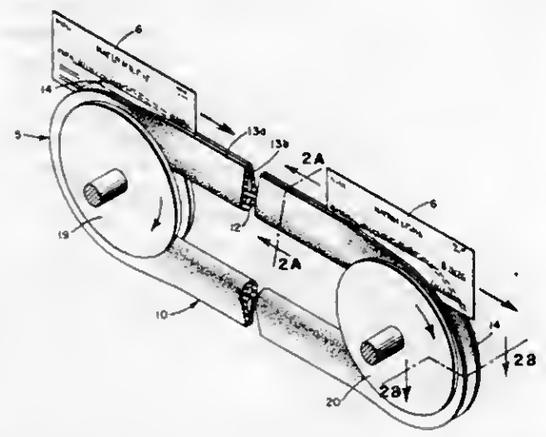
1. In a printing press, a sheet transfer device comprising a plurality of conveyor belts of relatively narrow cross section compared to the width of a sheet being transferred thereby, and suction-producing means disposed in vicinity of said plurality of conveyor belts, said suction-producing means comprising an elongated suction chamber formed with an elongated orifice extending in the sheet transferring direction and having a sealing bead respectively located at the forward and rearward ends of said elongated orifice in the sheet transferring direction and between said belts, each sealing bead extending outwardly from said orifice so as to underlie and engage a sheet supported by said belts, said conveyor belts of relatively narrow cross section extending along said elongated orifice at the opposite elongated sides of said elongated suction chamber and forming with said sealing beads a sealing extension of said elongated orifice of said suction chamber underlying the sheet being transferred.

4,030,728

DOCUMENT TRANSPORT APPARATUS

Harry L. Wallace, Garden City, and William B. Templeton, Howell, both of Mich., assignors to Burroughs Corporation, Detroit, Mich.

Filed Apr. 21, 1976, Ser. No. 678,750
Int. Cl.² B65H 5/14
U.S. Cl. 271—277 7 Claims



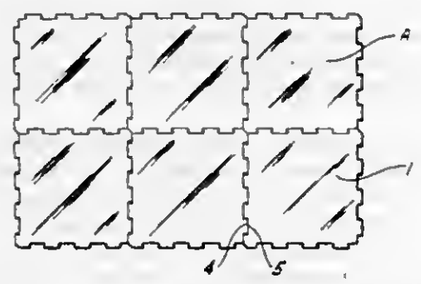
1. Apparatus for serially transporting sheet material such as documents or the like over predetermined transport path comprising:
a. an endless belt including
i. a resilient compressible tubular base member forming a loop, and
ii. gripping members each having a proximate edge and a distal edge, said proximate edges of said gripping members being attached to and projecting from respective opposite sides of said base member, and said distal edges being in close contiguity to each other outside said loop when said base member is normally uncompressed; and
b. a pair of rotatable supporting members within said loop situated at opposite ends of said transport path, at least one of said supporting members constituting a pulley having a groove in which said belt is entrained as it travels through said transport path, said groove being dimensioned to compress the portion of said base member entrained in said groove to thereby separate said distal ends of said gripping members attached to said compressed base portion.

4,030,729

ICE SKATING SURFACE

Elmer O. Nathaniel, 9178 Villaridge, St. Louis, Mo. 63123

Filed July 23, 1975, Ser. No. 598,362
Int. Cl.² A63J 3/00
U.S. Cl. 272—3 4 Claims



4. An artificial ice skatig surface comprising a plurality of flat planar components formed of resinous material from the class consisting of high density polyethylene, polypropylene, and fluorinated polyethylene, each of said components being

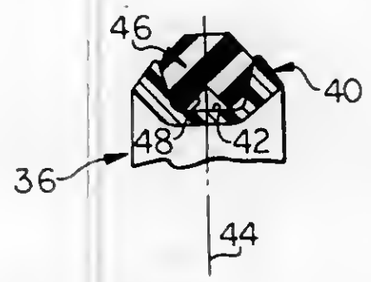
of quadrilateral configuration having first and second pairs of opposed sides, each of said sides being provided with alternating projections and recesses disposed in a plane normal to the flat planar surface of the related component, the recesses on one side being transversely aligned with the projections on the opposed side for interlockable engagement with projections on the confronting side of an adjacent component for integrating said components into the aforesaid surface, said recesses on each side of each component being rectilinear and having the bases of the recesses on each side being aligned each of said components having first and second sets of diagonally related corner portions, one set of diagonally related corners comprising meeting portions of the bases of recesses provided at the ends of the adjacent component sides, said meeting recess base portions being perpendicular to each other to form a right angular corner, the other set of diagonally related corners comprising portions of projections provided at the ends of the adjacent component sides which portions merge to form an integrated corner element each such corner element in the zone of merger having a bevel edge coplanar with the bases of said recesses and projections whereby said bevel edges are planarwise perpendicular with the flat plane of the related components, whereby the bevel edge at one corner of a component is presented in continuity with the meeting point of the right angular corner of an adjacent component so as to be presented for abutment against the like bevel edge of a third component during integration of said components to form said surface.

4,030,730

SYMMETRICAL SEAL ASSEMBLY FOR A HINGE JOINT

Roy L. Maguire, Edelstein, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 31, 1975, Ser. No. 627,824
Int. Cl.² F16J 15/34
U.S. Cl. 277—92 7 Claims



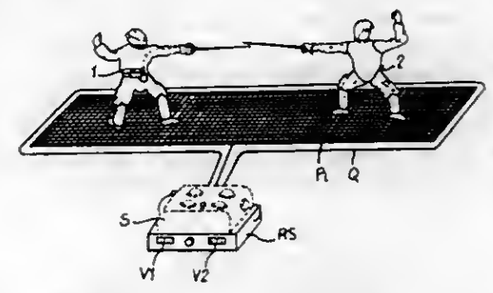
1. A seal assembly comprising:
first and second members mounted for relative rotation about a common axis, and defining first and second axially facing end walls respectively,
a resilient seal ring defining a continuous outwardly facing annular channel so as to be of continuously uniform, generally U-shaped cross-section, the cross-section thereof being substantially symmetrical in relation to the mid-circumferential plane of said seal ring, said seal ring being positioned between the first and second axially facing end walls; and
a resilient load ring disposed within said annular channel and sized to urge first and second portions of the seal ring into contact with the first and second axially facing end walls respectively.

4,030,731

ELECTRONIC EQUIPMENT FOR RADIO CONTROL OF FENCING BOUTS

Guy Delcayre, La Fleche, France, assignor to Anvar Agence Nationale de Valorisation de la Recherche, Neuilly-sur-Seine, France

Filed Aug. 4, 1975, Ser. No. 601,290
Claims priority, application France, Aug. 2, 1974, 74.26859
Int. Cl.² A63B 69/02
U.S. Cl. 273—1 F 32 Claims



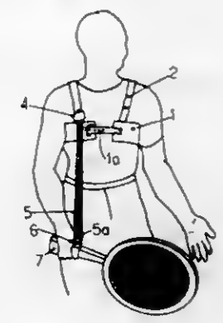
1. Apparaus for scoring fencing bouts in which each fencer carries a weapon having first and second electrically conductive parts, said weapon comprising for each fencer a unit including:
means for transmitting a signal of a predetermined frequency,
means for generating pulses for application to a first electrically conductive part of the respective weapon carried by a fencer,
receiver means having an input for connection to a second electrically conductive portion of the respective weapon carried by a respective fencer,
switch means on the weapon,
means connected between said switch means and said transmitting means and responsive to a touch made by the weapon on the body of the other fencer to produce a command signal to operate the transmitting means of the unit of the fencer making a touch to produce a signal indicating the touch,
said receiver means of the unit of the fencer making the touch also including means responsive to reception of pulses from the unit of the other fencer on the weapon associated with said receiving means for blocking the command signal from affecting the transmitting means of said unit.

4,030,732

HARNESS FOR THE TEACHING OF TENNIS

Max Vincent, 12 Rue de la Republique 06500, Menton, France

Filed Oct. 15, 1975, Ser. No. 622,707
Claims priority, application France, Oct. 17, 1974, 74.39737
Int. Cl.² A63B 61/00
U.S. Cl. 273—29 A 6 Claims



1. A tennis practice appliance to be worn by a tennis trainee

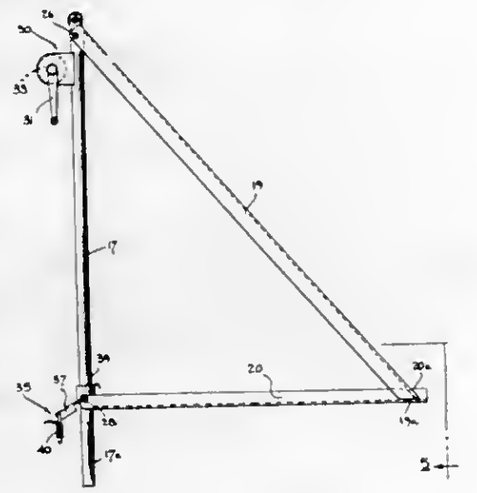
comprising: an elongated flexible band having a length to encircle the chest of a tennis trainee, said appliance and band having front and back sections when worn by the trainee; means at each end of said band cooperating to secure said band around the chest of said trainee; said band having secured thereto a pair of elongated shoulder braces, each said brace having its ends secured to said front and back sections of said band such that when said appliance is worn by said trainee, one of said braces extends over the left shoulder and the other of said braces extends over the right shoulder of said trainee; an elongated elastic link, said link having connecting means at each of its ends for conecting one of its ends to at least one of said braces at the front section of said appliance and for connecting its other end to a tennis racquet; a pair of elongated elastic tapes, each of said tapes having one of its ends attached to said back section of said band and means at its other end for releasable attachment to a lower garment, such as the belt section of a skirt or trousers of a tennis trainee.

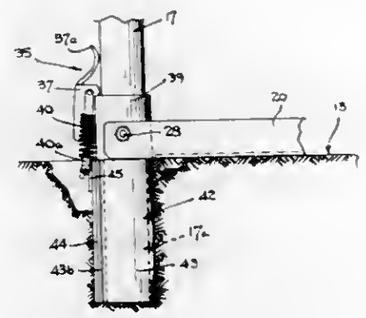
4,030,733

PORTABLE TENNIS COURT

Larry D. Merrihew, 23721 Maidstone Place, and Phillip Zeck, 24321 Doble Ave., both of Harbor City, Calif. 90710

Filed May 28, 1976, Ser. No. 690,998
Int. Cl.² A63B *71/02*
U.S. Cl. 273—29 BB **7 Claims**





1. A tennis court structure for installation on a playing surface comprising:

a playing net,

a pair of collapsible stanchion-brace assemblies for supporting said net therebetween, each of said assemblies including a stanchion, a first brace bar, one end of said bar being pivotally attached to said stanchion near one end thereof, a second brace bar, one end of said second bar being pivotally attached to said stanchion at a point therealong and spaced from said one end of said first brace bar attachment, the opposite ends of said bars being joined to each other to form a triangular configuration with said stanchion, and a latching assembly pivotally attached to said stanchion near the point of attachment of said second bar, and

an anchor pad for supporting each of said stanchion-brace assemblies, said anchor pads being installed in said playing surface and each comprising a hollow member having a pair of flanges extending therefrom, a plate member attached to said flanges, and a catch member attached to said plate member and projecting therefrom,

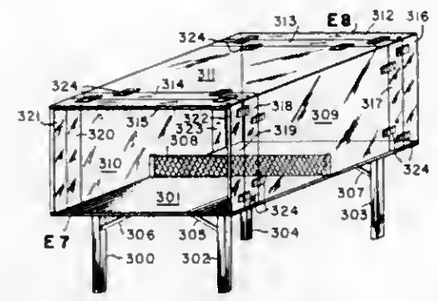
the other end of each of said stanchions being fitted in the hollow ends of an associated one of said pads with said stanchion latching assembly engaging the catch member of said plate member, the brace bars of one assembly extending towards the bars of the other assembly with said second bars running along the playing surface and braced thereagainst to support the stanchions against the inward pull of the net.

4,030,734

TABLE TENNIS GAME APPARATUS HAVING MULTI-REBOUND SURFACES

Nicholas T. Castellucci, 6901 Alcoma Drive, Penn Hills, Pa. 15235

Filed Nov. 17, 1975, Ser. No. 632,507
Int. Cl.² A63B *39/00*
U.S. Cl. 273—30 **8 Claims**



1. A table tennis ball game apparatus comprising:

a substantially horizontal playing surface of sufficient length to enable two players to stand and play at opposing end thereof;

a net transversing said playing surface dividing said playing surface substantially in half;

a supplemental rebounding surface; means attached to said horizontal playing surface for suspending said supplemental rebound surface above and substantially parallel to said horizontal playing surface and net, to allow a playing ball to pass between said net and said supplemental rebounding surface, the speed of the ball not being appreciably changed upon said ball rebounding from said supplemental rebound surface.

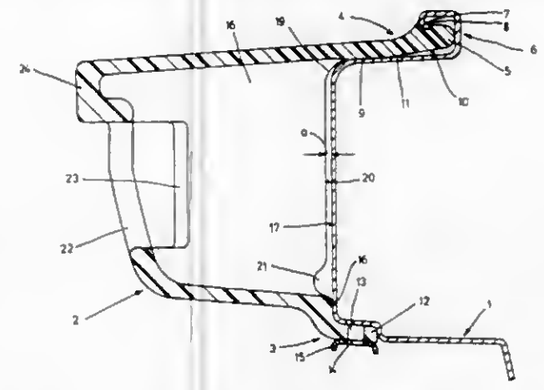
4,030,735

BUMPER ARRANGEMENT AND CONNECTION

Friedrich Jacob, Stelmke; Gerhard Voigt, Wolfsburg, and Freidhelm Frank, Fallersleben, all of Germany, assignors to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed Dec. 2, 1975, Ser. No. 636,987
Claims priority, application Germany, Dec. 6, 1974, 2457676
Int. Cl.² B60R *19/08*
U.S. Cl. 293—71 R **4 Claims**

1. A bumper for an object to be protected, e.g., an automobile, with a closed profile-section support means comprised of a rigid rear support means and a front hollow section made of some deformable material, said hollow section partly embracing the rigid support means with two freely extending parallel shank regions of said hollow section and being connected in at least one of these regions with the rigid support means by screw bolts, said hollow section also containing reinforcing ribs with front edges arranged at a distance from, and opposite, a front portion of the rigid support means so as to form a small gap, characterized in that only a first one of the free shank regions of the hollow section is connected with the rigid support means by screw bolts, the hollow section at the beginning of the first free shank region is provided with a support edge that bears on the front portion of the rigid support means, and a second one of the free shank regions of the



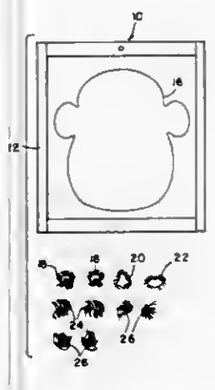
hollow section is hooked into a holding element of the rigid support means, said holding element having an approximately U-shaped cross section with an inwardly directed hook at its outer end, which hook is positioned so as to grip a recess in the end of the second free shank region towards the rear on the side facing away from the first shank region, a clearance adapted to permit the establishment of the hooked connection is provided between the other side of the end of the second free shank region and the holding element, and a surface of the second free shank region preceding the holding element bears against the rigid support means.

4,030,736

MAGNETIC TARGET THROWING GAME

Victor Petrusek, 18511 Gottschalk Ave., Homewood, Ill. 60430

Filed Jan. 2, 1976, Ser. No. 646,161
Int. Cl.² A63B *71/04;* **A63H** *33/26*
U.S. Cl. 273—95 R **2 Claims**



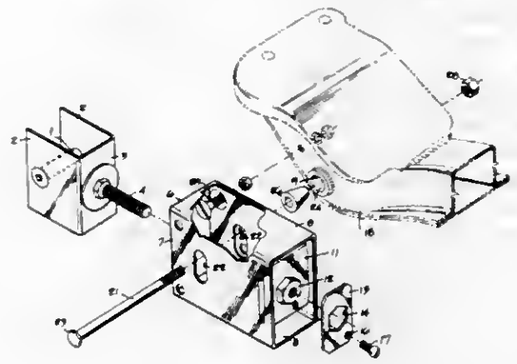
1. A game comprising a rectangular package having a frame, and a backing of magnetic susceptible material, an incomplete outline of an object on said backing within the frame, said package adapted to be suspended from a vertical surface, a plurality of magnetic tabs each simulating on one surface thereof a different feature of said object to complement the incomplete outline of said object, and tufts of hair extending from the margins of said surface outwardly to simulate the particular element of a tab, and acting as a stabilizer for the tab while being thrown at the target.

4,030,737

ADJUSTABLE MOUNTING FOR PIVOTAL WHEEL SUPPORT

Alvin C. Bridges, 1099 California Ave., Burlingame, Calif. 94010

Filed Aug. 1, 1975, Ser. No. 601,077
Int. Cl.² B62D *17/00*
U.S. Cl. 280—661 **7 Claims**



1. In an adjustable wheel pivot mounting,

a bracket frame having parallel spaced guidewalls,

means to mount the bracket frame on a frame member of a vehicle,

a hollow pivot support frame having opposite walls slidable and non-rotatable in said bracket frame between said guidewalls,

a wheel pivot shaft extended across the pivot support frame and held on the walls thereof transversely to said guidewalls,

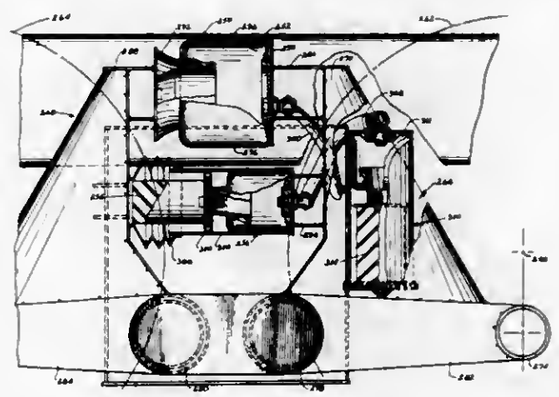
and coacting adjusting means connected to said frames and being manipulatable for moving said pivot support frame between said guidewalls in a direction at right angles to the pivot shaft relatively to said bracket frame, thereby to adjust the location of said pivot shaft.

4,030,738

TANDEM AXLE VEHICLE SUSPENSION SYSTEM

Elwood H. Willetts, 102 S. Penataquit Ave., Bay Shore, N.Y. 11706

Filed July 19, 1976, Ser. No. 706,730
Int. Cl.² B60G *5/04*
U.S. Cl. 280—681 **2 Claims**



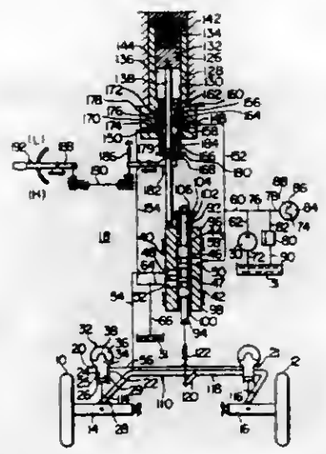
1. A multiple axle vehicle suspension structure, comprising, in combination: transversely extending axles spaced from one another longitudinally with respect to the longitudinally axis of said vehicle suspension structure, frame members spaced transversely with respect to one another and extending between said axles, opposing rocker beam assemblies separately trunnioned in said structure at an elevation beneath the elevation of said frame members, said opposing rocker beam as-

semblies being pivotally supported at longitudinally extending ends thereof by said axles, multiple spring means reactive with respect to said axles for operationally equalizing the load as between said axles, said multiple spring means comprising a primary spring subassembly disposed intermediate and cooperative with upstanding and opposing faces on each of said opposing rocker beam assemblies, and a second subassembly responsive to said primary spring subassembly, said multiple spring means comprising an elastomeric member disposed between upstanding and opposing faces of said rocker beam assemblies, an air spring disposed remotely from said elastomeric member within said suspension structure and transversely between said axles, an hydraulic subassembly responsive to said elastomeric member and said air spring, said elastomeric member serving to dampen road-induced excitations of said axles and said hydraulic subassembly serving to damper excitations induced within said air spring, said multiple spring means further comprising a seperable canister assembly including at least two portions, a first of said canister portions being integral with the suspension structure, a second of said portions being removable from said first portion, a first end of said air spring being integral with said first canister portion, a second end of said air spring movable with respect to said first end of said air spring and being integral with one face of a bolt plate, an opposite face of the bolt plate being integral with a movable end of said hydraulic subassembly, an axially opposite end of said hydraulic subassembly being integral with a spacer member integral with said second removable canister portion, a sleeve member integral with said bolt plate and extending substantially coaxially about said hydraulic subassembly, a first relatively low-friction liner disposed internally between said sleeve member and said spacer member, a second relatively low friction liner disposed externally of said sleeve member and between the sleeve member and said removable canister, whereby substantially axial alignment between said air spring and said hydraulic subassembly is preserved during their operational working stokes.

4,030,739
SUSPENSION SYSTEM

Mituo Hiruma, Kodaira, Japan, assignor to Nissan Motor Co., Ltd., Japan

Filed Sept. 9, 1975, Ser. No. 611,641
Claims priority, application Japan, Sept. 10, 1974, 49-103419
Int. Cl.² B60G *11/28*
U.S. Cl. 280—708 **7 Claims**



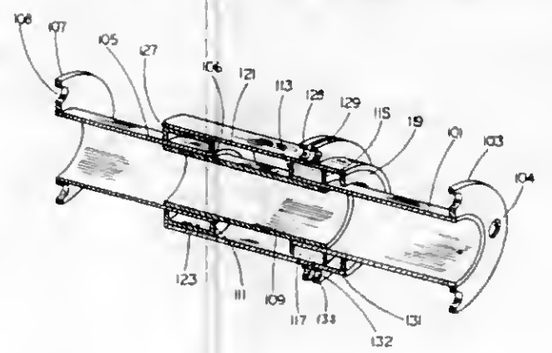
1. A suspension system for a vehicle comprising, a retractable and extensible suspension unit having a cylinder which has defined therein a fluid chamber of variable volume filled with pressurized fluid and is communicable in operation with a pressurized fluid source and alternatively with a drain line, level regulator means for maintaining the level of a vehicle body substantially constant independently of a load applied thereto and located externally of said suspension unit, said level regulator means having means operable to a position for normally obstructing fluid communication between said source and said fluid chamber and to a position for providing fluid communication therebetween to allow supply of pressurized fluid into said fluid chamber for lengthening said suspension unit in response to falls of the level of said vehicle body due to increases in a load applied thereto and operable to a position for normally obstructing fluid communication between said drain line and said fluid chamber and to a position for providing fluid communication therebetween to allow discharge of fluid from said fluid chamber for shortening said suspension unit in response to rises of the level of said vehicle body due to decreases in said load applied thereto, level selector means operatively connected to said level regulator means for hydraulically and selectively operating said level regulator means to a position effective to provide communication between said source and said fluid chamber for lengthening said suspension unit and to a position to provide fluid communication between said drain line and said fluid chamber for shortening said suspension unit independently of said load applied to the vehicle body, said level selector means comprising a casing formed therein with a bore, a piston slidably fitted in said bore and defining therein a second fluid chamber which is filled with pressurized fluid and is communicable in operation with said pressurized fluid source and with a drain line, the pressure of fluid in said second fluid chamber urging said piston in one direction, a piston rod extending from said piston outwardly of said casing through said second fluid chamber and operatively connected to said level regulator means, biasing means for urging said piston in another direction opposite to said one direction, valve means operable for alternatively obstructing and providing communication between said source and said second fluid chamber and for alternatively obstructing and providing communication between said drain line and said second fluid chamber, and operating means for selectively operating said valve means for providing communication between said source and said second fluid chamber to allow supply of pressurized fluid thereinto and to provide communication between said drain line and second fluid chamber to allow discharge of fluid therefrom, said piston being moved in said one direction by the pressure of fluid in said second fluid chamber against the action of said biasing means to operate said level regulator means through said piston rod to provide communication between said drain line and said fluid chamber of said suspension unit for shortening thereof when pressurized fluid is supplied into said second fluid chamber, said piston being moved in said another direction by the action of said biasing means against the pressure of fluid in said second fluid chamber to operate said level regulator means through said piston rod to provide communication between said source and said fluid chamber of said suspension unit for lengthening thereof when fluid is discharged from said second fluid chamber.

4,030,740
EXPANSION JOINT

Edward L. Kniss, Jr.; Dennis L. Hixenbaugh, both of Louisville, Ky.; Jerry A. Maudlin, Perkin, and Nicholas J. Brozeock, Clarksville, both of Ind., assignors to American Air Filter Company, Inc., Louisville, Ky.

Filed July 1, 1975, Ser. No. 592,122
Int. Cl.² F16L *55/00*
U.S. Cl. 285—16 **8 Claims**

1. An expansion joint for two ducts compising: first and second opposed conduits mounted onto an inner sleeve, said first conduit being slidably mounted onto said inner sleeve and said second conduit including means affixing said second conduit to said inner sleeve; and, said opposed conduits having outwardly extending receiving means on facing ends with an outer sleeve extending around said ends thereof, the outwardly extending means of the first conduit includes a flexible packing material therein sealingly engaging said first conduit and said outer sleeve, said first conduit being in sliding relation with said outer sleeve, said second conduit including means affixed against movement relative to said outer sleeve, said outer sleeve being in two sections, a first section and a



second section, said first and second sections having opposed facing flanges thereon, said facing flanges including connecting means whereby said packing material may be removed and replaced.

4,030,741
CORD GRIPS

Alfred Walter Fidrych, Stonington, Conn., assigoor to Harvey Hubbell, Incorporated, Orange, Conn.

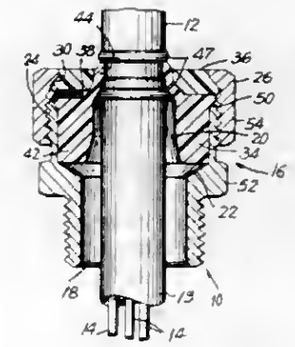
Filed Jan. 20, 1975, Ser. No. 542,394
Int. Cl.² F16L *5/00*
U.S. Cl. 285—161 **14 Claims**

1. Apparatus fo restraining a cord member comprising, a substantially cylindrical body having a threaded section and an inner wall which defines a bore section having a longitudinal axis substantially concentric with the longitudinal axis of said cylindrical body, said cord being mountable in said bore section, a sealing element in said bore section in contact with said inner wall and the cord to provide a seal between the body and the cord, means for restraining the cord against longitudinal displacement in the bore comprising an open-sided ring formed of at least two segments which define therebetween an opening for receiving the cord, hinge means joining said segments together at one end thereof for relative pivotal movement in a plane substantially normal to the longitudinal axis of the bore whereby said ring can open and close on said cord in a plane substantially normal to the longitudinal axis of the bore, one edge of said hinge means being defined by a slot having an open end in communication with said central opening and a closed end extending outwardly from said central opening to a point inside the adjacent perimeter of said ring to leave a narrow, relatively flexible hinge member, opposed portions of the edge of said hinge means adjacent the open end of the slot being sufficiently close to provide two stop abutments which abut when the open ring sides abut to limit the contraction of said ring, camming surfaces formed on the periphery of said two segments, and rotatable means having a threaded section engaging the threaded section of said body and a camming surface for engaging said camming surfaces of said two segments, whereby upon rotation of said rotatable means in one direction, said ring is pressed between said camming surfaces and said sealing element and slides with relatively low friction therebetween such that said segments close to grip the cord.

4,030,742
FITTING FOR CONDUIT AND ELECTRICAL CABLE

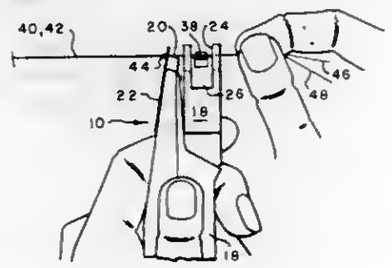
Jonah Eidelberg, Huntington Station, and Thomas Mooney, Mount Sinai, both of N.Y., assignors to I-T-E Imperial Corporation, Spring House, Pa.

Continuation of Ser. No. 366,657, June 4, 1973, Pat. No. 3,913,956, which is a continuation of Ser. No. 194,969, Nov. 2, 1971, abandoned, which is a continuation-in-part of Ser. No. 89,303, Nov. 11, 1970, abandoned. This application Oct. 10, 1975, Ser. No. 621,368
The portion of the term of this patent subsequent to Oct. 21, 1992, has been disclaimed.
Int. Cl.² H02G *3/00*
U.S. Cl. 285—343 **6 Claims**



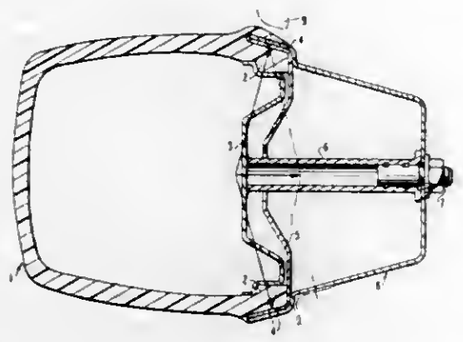
1. A fluid-tight strain relief fitting for connection with an end of a cable having a resilient outer sheath surrounding a plurality of conductors movable therein, comprising a generally tubular body having an internal bore extending into said body and passing therethrough, a bushing telescopically received within said bore and having a through bore for receiving said cable and including a base portion nesting within said body and a sleeve of reduced wall thickness extending beyond said body and terminating at its free end in an inwardly directed peripheral lip, said base portion having a substantially cylindrical portion and an outwardly extending flange at one end thereof adjacent said sleeve and axially spaced from the free end of said base portion, said flange matingly abutting a lip on said body circumferentially about their outer and inner surfaces respectively, a ring coaxially abutting said sleeve free end and at least one of the abutting faces of said sleeve and said ring being tapered, said bushing being made of a rigid plastic material, and means cooperating with said body for longitudinally urging said ring towards said base portion, thereby, circumferentially permanently contracting said sleeve and forcing the free end of said sleeve containing said lip to flow through and beyond said ring and into tight sealing contact with and depressing said resilient sheath and causing annular radial permanent contraction of a portion of said sleeve about said resilient sheath, said contraction displacing sheath material on both sides of said contracted sleeve portion to firmly anchor said fitting to said cable and firmly lock said conductors against movement within said cable and form a fluid tight seal with the cable sheath and body, at least a portion of said sleeve being sandwiched and embraced between said cable and said ring and a portion of the outer face of said sleeve coinciding with the inside face of said ring, when said ring is in its advanced position towards said bushing base portion, the radial dimensions of the sleeve and the base portion being selected so that the sleeve will deform inwardly about the base portion whereby said ring will engage the one end of the base portion and force said flange into sealing engagement with said lip.

4,030,743
SYNTHETIC YARN DEVICE
William P. Warthen, Spartanburg, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.
Filed May 24, 1976, Ser. No. 689,162
Int. Cl.² D03J 3/00; B26F 3/08; B32B 31/18
U.S. Cl. 289—18 2 Claims



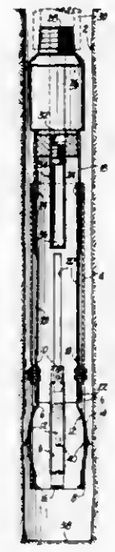
1. An apparatus to sever the tails of two tied yarns comprising: a source of power, heater means operably associated with and mounted on said source of power, switch means mounted on said source of power in line with said heater means on one side thereof, a notched plate mounted on said source of power on the other side of said heater means in line with said switch means and a slot in said switch means in line with the notch in the notched plate to accommodate a tied yarn.

4,030,744
MOTOR VEHICLE BUMPER
Norbert Schwuchow, Sindelfingen, and Hubert Hutal, Grafenau, both of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany
Filed Nov. 3, 1975, Ser. No. 628,244
Claims priority, application Germany, Nov. 6, 1974, 2452593
Int. Cl.² B60R 19/00
U.S. Cl. 293—71 R 9 Claims



1. A motor vehicle bumper of elastic material, which includes edge areas adapted to be brought into abutment by a plate means against inclined outwardly directed walls of a mounting support means, wherein the plate means has a spacing from the mounting support means substantially on all sides and the bumper has an approximately U-shaped profile, and wherein spacer sleeve means are secured at the plate means, which are provided at the free end with a threaded insert means, said threaded insert means enabling a fastening of the plate means at a vehicle cross bearer, wherein the plate means project approximately roof-shaped from the spacer sleeve means between the edge areas of the bumper.

4,030,745
TOOL RETRIEVER FOR WELLS
William N. Schoeffler, and Romona B. Schoeffler, both of Rte. 1, Box 389, Carencro, La.
Filed June 16, 1976, Ser. No. 696,854
Int. Cl.² E21B 31/12
U.S. Cl. 294—86.14 8 Claims

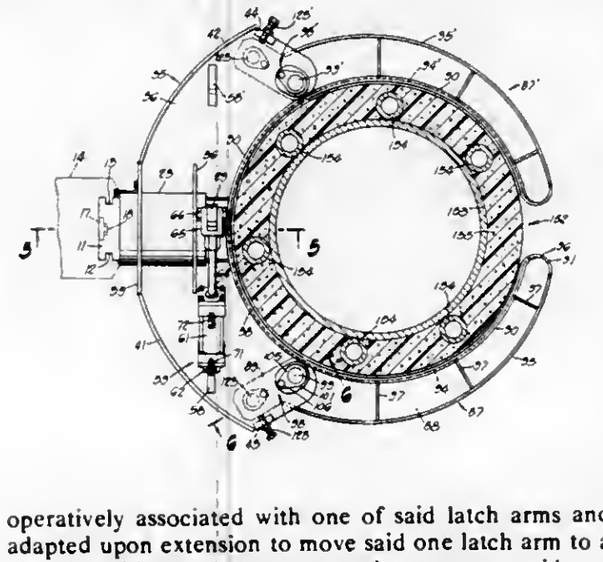


1. A retriever for loose articles in wells, comprising:
a generally tubular body member adapted to be lowered into a well;
a plurality of circumferentially spaced downwardly extending resilient fingers fixed at their upper ends to a lower portion of said body member, said resilient fingers being normally spaced apart to receive a loose article therebetween and each having an inturned lower end defining a hook portion, said fingers being configured to define downwardly and outwardly sloping cam surfaces along at least the upper portions thereof;
a ring member surrounding the upper portions of said fingers and being movable downwardly along said cam surfaces to thereby flex said fingers inwardly to move said hook portions toward each other and thereby grasp a loose article in said well;
actuator means for moving said ring member downwardly relative to said tubular body member; and
interengageable latching means on said ring and on said fingers adjacent the lower ends of said cam surfaces to latch said ring against upward movement relative to said fingers after said ring has been moved downwardly over said cam surfaces and thereby prevent release of a loose article held by said hook portions and comprising protuberances on said fingers, each having a downwardly facing surface engageable with an upwardly facing surface of said ring member.

4,030,746
PIPE HANDLING HEAD
Faustyn Cornell Langowski, Houstoo, Tex., assignor to BJ-Hughes Inc., Long Beach, Calif.
Filed Apr. 26, 1976, Ser. No. 680,301
Int. Cl.² B66C 1/10; E21B 19/00
U.S. Cl. 294—88 19 Claims

1. A head for grasping and guiding a length of pipe which comprises:
a base,
a body,
first pivot means for pivotally mounting said body on said base,
first power actuated means for pivoting said body on said first pivot means,

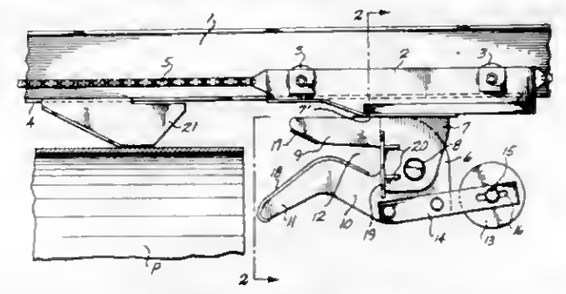
a pair of latch arms, each having a proximal end and a distal end,
other pivot means for mounting said latch arms by their proximal ends on said body in opposed relation to one another for pivotal movements between closed positions, in which said latch arms are disposed to define a substantial portion of an opening for the reception of a length of pipe and to retain the length of pipe in the opening against lateral movement out of the opening, and open positions, in which the distal ends of said latch arms are separated to permit the length of pipe to pass laterally from said opening through the space between the distal ends of
said pair of latch arms, and
second power actuated means for pivoting said latch arms between said open and closed positions, wherein said second power actuated means for pivoting said latch arms comprises:
a pair of double acting hydraulic piston-cylinder means extensible and contractible responsive to hydraulic fluid pressure, one of said pair of piston-cylinder means being



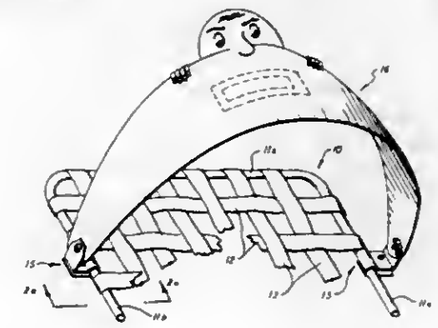
operatively associated with one of said latch arms and adapted upon extension to move said one latch arm to a closed position and upon contaction to move said one latch arm to an open position, the other of said pair of piston-cylinder means being associated with the other of said latch arms and adapted upon extension to move said other latch arm to a closed position and upon contraction to move said other latch arm to an open position,
first hydraulic fluid conduit means for simultaneously supplying hydraulic fluid pressure to said pair of piston-cylinder means to extend them,
second hydraulic fluid conduit means for simultaneously supplying hydraulic fluid pressure to said pair of piston-cylinder means to contract them, and
pilot check valve means in said first conduit means closable for maintaining hydraulic fluid pressure in said pair of piston-cylinder means to hold said pair of piston-cylinder means extended, including means responsive to hydraulic fluid pressure in said second conduit means for opening said pilot check valve means for relieving said hydraulic fluid pressure in said pair of piston-cylinder means so that said pair of piston-cylinder means can be contracted.

4,030,747
SHEET STRUCTURE HOISTING GRIPPER
Charles Richard Morse, Anchorage, Alaska, and Alan Leslie Ross, Seattle, Wash., assignors to Charles Richard Morse, Anchorage, Alaska
Filed Feb. 20, 1976, Ser. No. 659,938
Int. Cl.² B66C 1/22
U.S. Cl. 294—92 17 Claims

7. In sheet structure handling mechanism including lifting means and gripping means carried by the lifting means for lifting engagement with a sheet structure, the gripping means including a bifurcate gripper forming a throat engageable with the sheet structure and pivot means supporting such gripper for free tilting relative to the lifting means effected by downward force exerted on such gripper by the weight of the sheet structure, which tilting binds the gripper to the sheet structure, the improvement comprising the gripper throat being elongated and having a closed end, the pivot means being adjacent to said closed end of the throat and substantially aligned with the length of the throat, and positioning means for normally holding the gripper in a position in which its elongated throat is substantially horizontal.

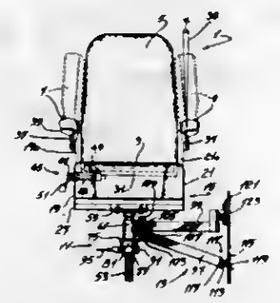


4,030,748
SUN SHADE APPARATUS
Helmut E. Brock, 551 Loughlin Road R.D. 6, Binghamton, N.Y. 13904
Filed Oct. 7, 1975, Ser. No. 620,383
Int. Cl.² A47C 7/66
U.S. Cl. 297—184 2 Claims



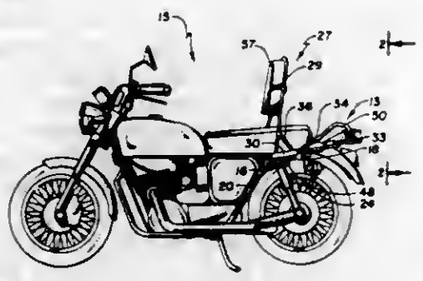
1. A sun shade assembly for attachment to a chair having a pair of generally parallel side frame members spaced apart on opposite sides of the chair, comprising, in combination: first and second clamping means for mounting at a plurality of desired positions along respective ones of said side frame portions, each of said clamping means comprising an upper and a lower plate member and means for bolting said upper and lower members together with a respective one of said side frame portions of said chair clamped therebetween, said upper plate member having an upstanding tab portion having a bolt hole; and an elongated semi-flexible plastic sheet extending between and having its ends pivotally attached to and frictionally engaged by respective ones of said clamping means, the length of said plastic sheet member exceeding the distance between said side frame portions of said chair whereby said plastic sheet member is held bowed in a generally arcuate shape, each end of said plastic sheet member being bolted to the upper member of a respective one of said clamping means by means of a bolt passing through said bolt hole and the end of said plastic sheet member, and compressible washer means carried on each said bolt between each upstanding tab portion and the end of said plastic sheet member, said plastic sheet member having a central portion of greater width than said ends of said plastic sheet member.

4,030,749
DIESEL CAB SEAT ASSEMBLY
Charles Strahm, Laval, Canada, assignor to Mount Royal Transportation Equipment Ltd., Montreal, Canada
Filed Dec. 15, 1975, Ser. No. 640,855
Int. Cl.² A47C 1/02
U.S. Cl. 297—345 8 Claims



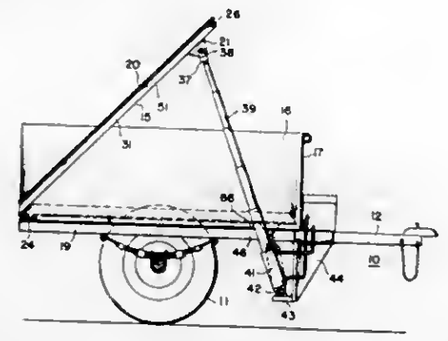
1. A seat assembly for a locomotive cab or the like comprising:
a. a seat portion;
b. a back portion pivoted at a rear portion of said seat portion;
c. a height adjusting mechanism mounted on and beneath said seat portion;
d. means for wall mounting said seat assembly on the wall of a cab, said means for wall mounting said seat assembly comprising a cantilever support, said cantilever support comprising a central, downwardly-extending arm and two, horizontally-diverging arms, said arms being held at one end by an upstanding leg of an angle bracket, the other end of each of said horizontal arms being formed with a plate, said plate being engagable in a guide channel mounted on the wall of said cab, the other end of said downwardly-extending arm being provided with a leveling screw assembly which is threadable in a holder mounted on the end of said downwardly-extending arm being provided with a leveling screw assembly which is threadable in a holder mounted on the end of said downwardly-extending arm, and which is inserted in a perforated plate fixed on the side wall of the locomotive thus allowing forward and aft mobility of the whole seat assembly.

4,030,750
SISSY BAR FOR A MOTORCYCLE
Doug Abram, 7101 - 65th Ave. North, Minneapolis, Minn. 55428
Filed Feb. 28, 1975, Ser. No. 553,896
Int. Cl.² B62J 1/00, 1/28
U.S. Cl. 297—375 10 Claims



1. A sissy bar for a motorcycle having a seat comprising, in combination:
a longitudinally movable backrest extending above the seat comprising;
two sliding portions;
an upwardly extending portion having two ends at the bottom thereof pivotally attached to each of the sliding portions; and
means for tilting the backrest comprising two telescoping members pivotally attached to each end of the upwardly extending portion and each of the two sliding portions, respectively, the telescoping members fitting one within the other, and wherein the outer one of each of the telescoping members has means for locking each of the two telescoping members together to prevent relative movement therebetween whereby the upwardly extending portion can be inclined to a desired position and locked into place;
a support bar having a forward end and a rearward portion surrounding the seat upon the forward end of which the backrest is mounted and wherein the rearward portion of the support bar comprises means for limiting the rearward longitudinal movement of the backrest;
fastening means fixedly secured to the support bar for attaching the support bar to the motorcycle; and
locking means for operatively connecting the backrest and the support bar so that the backrest can be longitudinally moved to a desired position relative to the seat and locked into place.

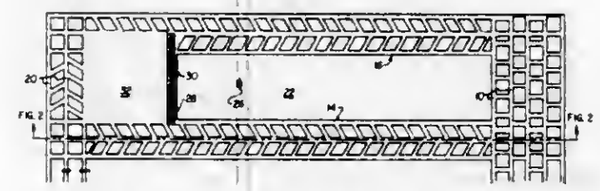
4,030,751
PORTABLE TRAILER DUMP BED
George R. Bobka, Sarasota, Fla., assignor to The Raymond Lee Organization, Inc., New York, N.Y.
Filed Jan. 5, 1976, Ser. No. 646,617
Int. Cl.² B60P 1/16
U.S. Cl. 298—1 A 2 Claims



1. A cargo vehicle formed with an open box structure formed of a floor plate joined to a forward and to opposed side walls, which box structure is fixed to the vehicle, together with a removable dump bed plate, the rear end of which is detachably jointed by a hinge to the rear of the floor plate of the said box structure, said dump bed plate of a size to extend between the side walls of the open box structure, with hydraulic means detachably mounted to the underside of the forward section of the dump bed plate and to the vehicle for elevation of the forward end of said plate so as to pivot said plate about said hinge, with the forward edge and the side edges of said plate fitted with gasket material that contacts the fixed front and side walls of the box structure when the dump bed plate is in the retracted position and during elevation of the dump bed plate.

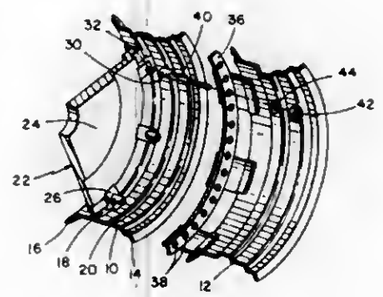
4,030,752
LONGWALL MINING OF THICK UNDERGROUND MINERAL SEAMS
Terry Lee Simpson, Westminster, Calif., assignor to Atlantic Richfield Company, Los Angeles, Calif.
Filed Mar. 8, 1976, Ser. No. 664,436
Int. Cl.² E21C 41/04
U.S. Cl. 299—11 9 Claims

1. A method of minimg thick seam underground mineral deposits underlying a competent rock layer comprising the steps of:
a. driving main entries from a portal to the boundaries of the mineral seam to be mined,
b. driving parallel submain development entries from the main entries into the top of the seam so that the rock layer forms the mine roof,
c. driving spaced apart sets of parallel panel entries at right angles to said submain development entries along a first path to the bottom of said seam,
d. continuing said parallel sets of panel entries along a second path coincident with the bottom of said seam until the boundaries of the mining area are reached,



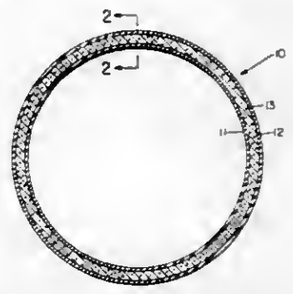
e. connecting the extremities of said panel entries with bleeder entries to define a series of longwall panels to be sequentially mined,
f. mining said panels in retreat under the protection of advancing roof support structures to induce the caving of overlying strata therebehind,
g. driving auxiliary sets of panel entries at right angles to said first set of panel entries beneath and in the same direction as said submain entries,
h. interconnecting said auxiliary sets of panel entries with additional bleeder entries to define an additional longwall panel, and
i. mining said additional longwall panel in retreat so as to induce sublevel caving therebehind.

4,030,753
DUAL WHEEL CONSTRUCTION
Elmo R. Meiners, Anchor, Ill., assignor to M & W Gear Company, Gibson City, Ill.
Filed May 2, 1975, Ser. No. 573,983
Int. Cl.² B60B 11/00
U.S. Cl. 301—36 R 7 Claims



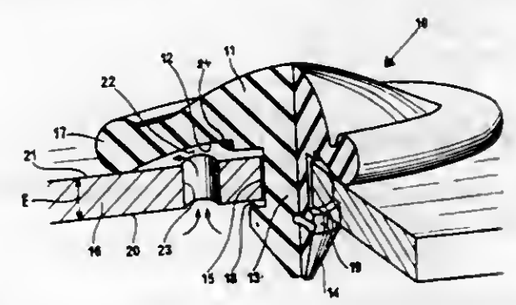
2. In a dual wheel construction of the type including first and second separate rims, one of the rims including a hub assembly for attachment to an axle, said hub assembly including a plurality of fastening means for attaching a hub plate to the one rim, the improvement comprising, in combination:
a plurality of separate, circumferentially arranged plates fixed to the other rim and projecting laterally therefrom toward the one rim, said plates being spaced about the circumference of the other rim and having unattached projecting ends;
a closed circular ring member having one edge connected with all of the plates; and
means for connecting the ring member with the fastening means and simultaneously maintain the projecting ends of the plate in contact with the one rim.

4,030,754
COMPOSITE LIGHTWEIGHT WHEEL RIM
John Barton Merlette, Sandy, Utah, assignor to Hercules Incorporated, Wilmington, Del.
Filed Jan. 21, 1976, Ser. No. 651,373
Int. Cl.² B60B 5/02
U.S. Cl. 301—98 6 Claims



1. A rim for a spoked wheel comprising an inner ring, an outer ring spaced from said inner ring, and a hardened resin foam filling the space between said rings and bonding said rings together, said inner and outer rings each made from a plurality of plies of composite material, each ply having a plurality of parallel fibers positioned in a resin matrix.

4,030,755
METHOD AND APPARATUS FOR FLUIDIFYING POWDEROUS SUBSTANCES
Wolfram Heimke, Antibes, France, assignor to Union Industrielle et d'Entreprise, Paris, France
Filed Dec. 31, 1975, Ser. No. 645,641
Claims priority, application France, Apr. 2, 1975, 75.10247
Int. Cl.² B65G 53/16
U.S. Cl. 302—29 6 Claims



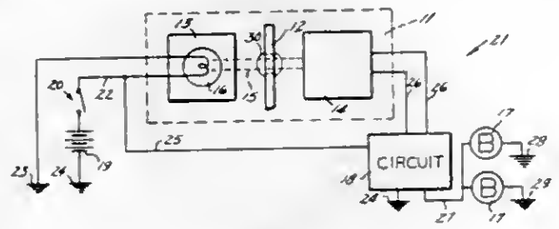
1. An apparatus for fluidifying powderous substances which are in contact with a wall such as the wall of a hopper or a conveyor, said apparatus being entirely made of a resilient material and comprising a substantially circular flattened dome the arch of which is integrally connected at its concave side to an axially extending substantially cylindrical holding stud adapted to be inserted into a circular mounting hole provided to this end in said wall, said stud having a tapered end and being provided near said tapered end with an annular blocking shoulder having a diameter larger than that of said mounting hole, the distance between the plane containing the surface of said annular blocking shoulder and the plane containing the lower annular edge of said dome prior to insertion of said apparatus into said mounting hole being substantially smaller than the thickness of said wall, the arrangement being such that when said holding stud is inserted in said mounting hole provided in said wall and said blocking shoulder engages one surface of said wall, the concave side of said dome forms with the opposite surface of said wall a substantially semi-lenticular chamber adapted to be connected to a source of pressurized fluid through an inlet hole provided in said wall at a location adjacent said mounting hole.

4,030,756

MAGNETIC DAMPENED INERTIAL SENSOR FOR BRAKE AND SWAY CONTROLS

Edward Joseph Eden, Jackson, Mich., assignor to Tekoosha Engineering Company, Tekonsha, Mich.

Filed Dec. 29, 1975, Ser. No. 644,600
Int. Cl.² B60T *8/16*
U.S. Cl. 303—24 A **5 Claims**



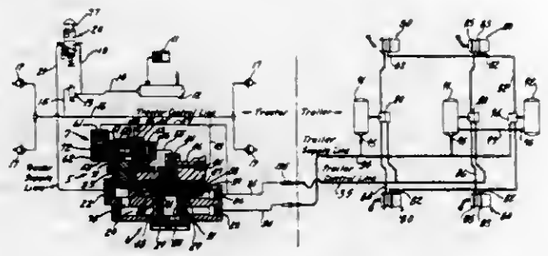
1. A pendulum type inertial sensing device for controlling brakes in towed vehicles by interference with light transmission comprising:
a frame;
a rigid pendulum arm;
a pivot operably connected to said frame from which said pendulum arm depends;
a magnetically attractable material at the lower end of said pendulum arm;
a magnet beneath said pivot and supported by said frame and in selected spaced-apart relation to said magnetically attractable material;
a light source;
a light monitoring target toward which said light source is directed;
a light interrupter on said arm which selectively attenuates light from said light source to said target in accord with the positioning of said arm;
an electric braking circuit controlled by the light transmitted between said source and said target and pulsing a power output therethrough; and
brakes energized by said braking circuit in accord with the movement of said arm.

4,030,757

TRACTOR-MOUNTED CARGO-TRAILER BRAKE CONTROL SYSTEM

Harold Durling, Elsie, Mich., assignor to Midland-Ross Corporation, Cleveland, Ohio

Filed Feb. 17, 1976, Ser. No. 658,508
Int. Cl.² B60T *15/36*
U.S. Cl. 303—28 **6 Claims**



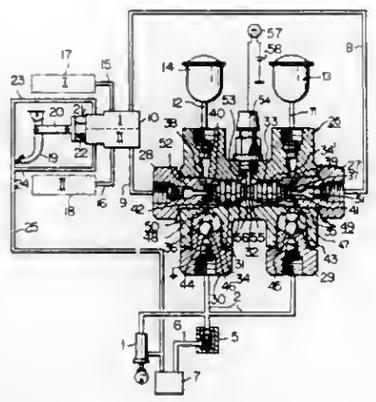
1. A positive-pressure air-brake system for activating brake actuators of a tractor and a trailer connected thereto comprising:
an air pressure source mounted on a tractor;
a first control line from said source to said actuators of the tractor;
normally-closed brake-actuation valve means in said control line having mechanism for venting the downstream portion of said control line at closed position;
said trailer brake-actuators comprising spring means acting on the trailer brakes for parking and emergency brake actuation, first air-motor means for overriding said spring means to maintain the brakes in released condition, second-air motor means for applying the trailer brakes for normal stops;
a tractor protection valve having a first port connected by a direct supply line with said source, a second port connected with said first motor means, a third port connected with said second motor means, and a normally open passageway between said first port and said second port;
said protection valve comprising pressure-sensitive throttle means for closing said first port, second spring-loaded normally-closed valve means openable to place said passageway in fluid communication with said third port, a spring-return reciprocable wall of an expansible chamber engageable with the second valve means on expansion of the chamber to open the second valve means, said expansible chamber being connected on the side of said wall away from said second valve means in fluid communication with said first control line at a point thereon downstream from said brake actuation valve means;
differential pressure-sensing means connected in fluid communication with said first control line at a point downstream from said brake actuation valve means, and with said third port to measure the difference in fluid pressure therebetween, said differential-pressure sensing means being constructed to communicate fluid pressure from said first control line to said throttle means to close said passageway when the pressure in said first control line is greater than that at said third port, said throttle means being responsive to greater pressure communicated from said source than in said first control line to open said passageway.

4,030,758

DUAL SYSTEM HYDRAULIC BRAKING APPARATUS FOR VEHICLE

Yoshihiro Hayashida, Chigasaki, Japan, assignor to Tokico Ltd., Japan

Continuation of Ser. No. 456,660, April 1, 1974, abandoned.
This application Mar. 24, 1976, Ser. No. 669,876
Int. Cl.² B60T *15/46*
U.S. Cl. 303—84 A **3 Claims**



1. In a dual hydraulic braking system for use in a vehicle:
a pair of braking systems;
a pair of hydraulic accumulators, one for each system;
a hydraulic pump for supplying hydraulic fluid to said systems;
and valve means comprising:
a valve body having a cylinder bore;
means for closing the opposite ends of said bore;
a piston slideably mounted in said bore and cooperating with said bore to define a pair of chambers,
each chamber being located between a closed end of the bore and an adjacent end of said piston;

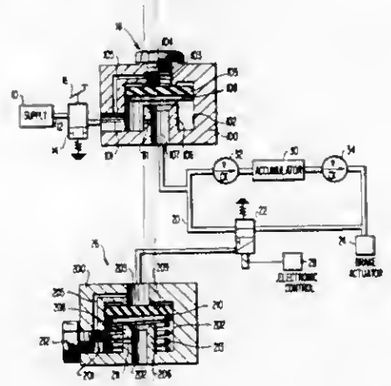
means for biasing said piston to a central position in said bore;
a pair of first passages, each first passage communicating between said hydraulic pump and one of said chambers;
a pair of check valves disposed in said valve body, each check valve being located in one of said first passages to prevent hydraulic fluid flow from a chamber to said hydraulic pump;
a pair of second passages, each second passage communicating between one of said chambers and one of said hydraulic accumulators;
a pair of third passages including a port located in the means for closing an end of said cylinder bore, each said port being surrounded by a valve seat, each third passage communicating between one of said chambers and one of said braking systems;
and means on the opposite ends of said piston to close the third passage adjacent an end of said piston to prevent fluid flow therethrough when said piston is moved in either direction from its central position, each of said accumulators being connected to one of said third passages downstream of said valve seats through a respective transverse passage formed integrally in said valve body, and the means on a respective end of said piston engaging one of said valve seats to effect closure of a third passage.

4,030,759

PNEUMATIC ANTI-SKID BRAKE SYSTEM HAVING PROPORTIONAL PRESSURE CONTROL MEANS

Carmelo Gemmellaro, Turin; Virginio Maggioni, Rosta (Turin), and Renzo Moretti, Cambiano (Turin), all of Italy, assignors to Fiat Societa per Azioni, Turin, Italy

Filed May 22, 1975, Ser. No. 580,006
Claims priority, application Italy, May 30, 1974, 68689/74
Int. Cl.² B60T *8/02*
U.S. Cl. 303—119 **2 Claims**



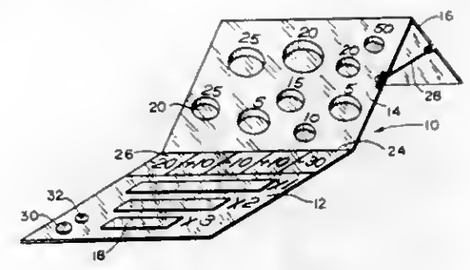
1. In a pneumatic anti-skid braking system for at least one wheel of a vehicle, of the type comprising:
a pressure source of compressed air, brake actuator for said at least one wheel of said vehicle,
means interconnecting said pressure source and said brake actuator, said interconnecting mean including braking control valve means operated by brake operating means to apply braking pressure from said pressure source to said brake actuator,
anti-skid control means sensitive to the dynamic state of said at least one vehicle wheel and operating to produce an output control signal when said at least one vehicle wheel is in an incipient skidding state,
first valve means in said interconnecting means and connected to said anti-skid control means, said first valve means operating to cause a controlled release of braking pressure when a control signal is received from the output of said anti-skid control means,
second valve means in said interconnecting means, said second valve means operating to control the rise in braking pressure after the output signal from said anti-skid control means is removed,
the improvement wherein there are provided: accumulator means in parallel with said first valve means two unidirectional valves one on each side of said accumulator means, said unidirectional valves being oriented such that said accumulator charges up to the braking pressure in said actuator during normal braking, retains said pressure upon release of said brake actuator in anti-skid operation of said first valve means under the control of said output signal from said anti-skid control means, and discharges said pressure to the braking circuit upon removal of the anti-skid control signal to share said pressure with said brake actuator.

4,030,760

TIDDLYWINKS GAME

Edwin K. Danowski, Racine, Wis., assignor to General Converters & Assemblers, Inc., Racine, Wis.

Filed Dec. 23, 1975, Ser. No. 643,752
Int. Cl.² A63B *71/04*
U.S. Cl. 273—95 E **14 Claims**



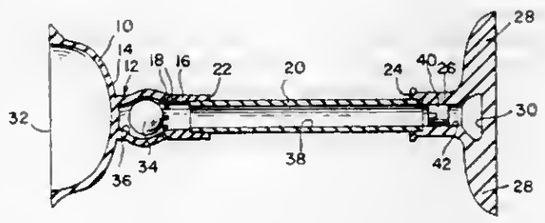
1. In a tiddlywinks game of the type having shooter chips, shot disks, a launch area, and a target receptacle, the improvement comprising:
a major target surface, said surface both having sufficiently slippery surface characteristics and being sufficiently slanted to the horizontal whereby said shot disks may slide thereacross when thereon, said surface having a lowermost edge adjacent said launch area; and
at least one target receptacle under and attached to said target area and having an open mouth flush with said major surface.

4,030,761

DART

Hans Daller, c/o H. Daller Realty Ltd., 3256 Eglinton Ave. East, Scarborough, Ont., Canada M1J 2H6

Filed Sept. 8, 1976, Ser. No. 721,336
Int. Cl.² A63B *65/02*
U.S. Cl. 273—106.5 A **6 Claims**



1. A dart comprising a suction cup, a protrusion fixedly secured to the convex exterior surface of said suction cup, said protrusion including a cavity and an open mouth portion, said open mouth portion disposed at the free end of said protrusion and communicating to said cavity, a spherical bulgelike excursion in the walls of said protrusion, said excursion extending radially outwardly from said cavity, a plurality of holes being

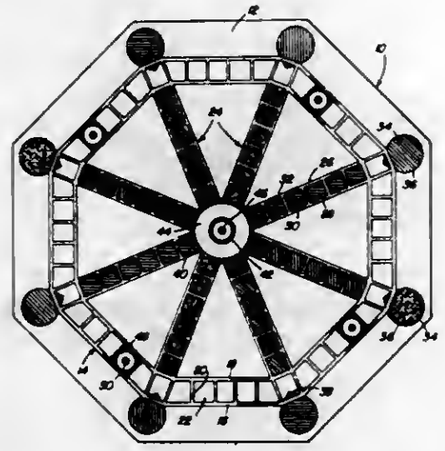
disposed in spaced apart relationship about the circumference of said excursion intermediate the widest portion thereof and said open mouth portion of said protrusion, means to selectively vent said cavity to the atmosphere when said suction cup is disposed in a lower position than said open mouth portion, a whistle sound generating apparatus, means to fluidly communicate said open mouth portion to said whistle sound generating apparatus, a plurality of stabilizing fins affixed to the proximal end of said dart.

4,030,762

BOARD GAME WITH DIAGONAL PATHS

Bennett J. Gilmore, 1114 Phillips Drive, P.O. Box 1091, Dumas, Tex. 79029

Filed Apr. 8, 1976, Ser. No. 675,204
Int. Cl.² A63F 3/00
U.S. Cl. 273—134 AD 1 Claim



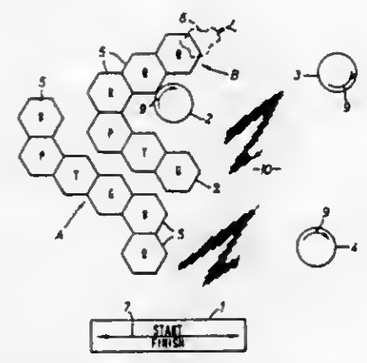
1. A game device for playing a game by a plurality of teams of players with each team including at least two players, said game device comprising a game board having a substantially planar upper surface, said game board being of octagonal configuration, an octagonal path of movement delineated on said game board in concentric, inward spaced relation to the periphery of the game board with the octagonal path of movement being divided into a plurality of segments with the apices of the octagonal path of movement being in alignment with the apices of the game board, four distinguishably colored diagonal paths of movement delineated on said game board and extending transversely between opposed apices of the octagonal path of movement, said diagonal paths being divided into a plurality of segments, a home base area delineated on the game board outwardly of each of the apices of the octagonal path of movement, said home base areas being distinguishably colored the same colors as the four diagonal paths of movement with the oppositely disposed home base areas having the same color as the diagonal path of movement oriented in ninety degree spaced relation around the periphery of the octagonal path of movement, and game pieces separated into groups having the same colors as the diagonal paths of movement and the home base areas, said groups of game pieces being assigned to the teams of players with each team's game pieces being the same color and the game pieces of each team player being distinguishable by shape from the game pieces of the other team player, said game pieces being movable from a home base area of the same color as the game pieces assigned to a team toward an opposite home base area along the octagonal path of movement or diagonal paths of movement in accordance with a chance device and selection of a mode of movement by a player.

4,030,763

DICE GAME

Peter James Calvert Quigley, 9 Milton Road, Eastbourne, Sussex, England

Filed Jan. 29, 1976, Ser. No. 653,453
Int. Cl.² A63F 9/14
U.S. Cl. 273—134 D 7 Claims



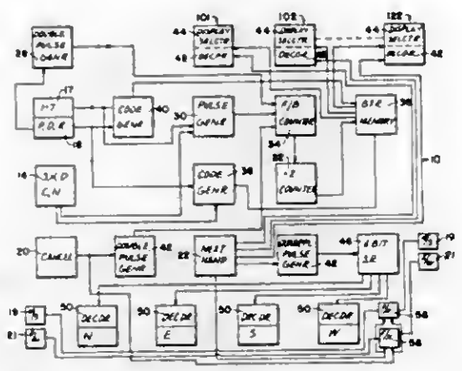
1. A game for playing on a flat playing surface by at least two players, comprising at least one playing die bearing a variety of markings for determining each player's moves by chance depending on which marking on the die is indicated after a throw, at least two sets of a plurality of playing pieces, one set for each player, each set having the same number of pieces, each playing piece of a set being polygonal in plan view when placed on the playing surface and bearing a different respective marking identical with one of the respective variety of markings on the die, and a plurality of direction indicator means for placing on the playing surface, each and for indicating a direction of travel so as to prescribe a general path to be followed by the playing pieces over the playing surface.

4,030,764

BRIDGE BIDDING INDICATOR

Albert V. Mattos, 397 Southerland Drive, Toronto, Ontario, Canada (M4G 1K2)

Filed June 2, 1976, Ser. No. 692,095
Int. Cl.² A63B 71/06
U.S. Cl. 273—148 A 2 Claims



1. A bridge bidding indicator comprising:
a frame formed with a plurality of recesses for holding respective packs of cards;
a display unit disposed on said frame, said display unit including a multiplicity of electrically actuable indicia representative of a suit or no-trump, the number of tricks, and pass, double and re-double, said display unit including a plurality of light-emitting diodes for displaying said indicia, said indicia being representative of a suit or no-trump, each of said indicia including a plurality of separately actuable elements, said indicia being disposed in a plurality of rows and columns intersecting with said rows, each of said rows being indicative of a round of a multiplicity of biddable rounds, and each of said columns being indicative of a bid submittable successively by one and the same player;
a signalling unit disposed on said frame, said signalling unit including a plurality of manipulable means indicating said plurality of inidica for selective actuation thereof on said display unit by a player, the first of said rows of said display unit including a plurality of electrically actuable designations representative of respective players, and wherein said designations are actuable and successively shiftable by said manipulable means in, and along said first row respectively; and
circuit means disposed on said frame for causing the display of said indicia on said display unit in a plurality of successive columns and rows, respectively, in dependence of successive actuation of said manipulable means by respective players, said circuit means including code generator means for digitally encoding said indicia, counting means for counting the number of said indicia encoded by said code generator means, and wherein said manipulable means include erase means for cancelling the display shown by the last actuation of one of said manipulable means, wherein said counting means include a forward-/backward counter actuable for a forward count of said indicia and for backward counting by actuation of said erase means, and wherein a subsequent actuation of said manipulable means to supersede the crased display causes the count of said number of said indicia to include only displayed indicia, the manipulable means including clearing means connected to said electrically actuable indicia for clearing and resetting all of said display indicia thereon, said manipulable means including a first keyboard having a first plurality of keys indicating one of the suits or a no-trump, respectively, a second keyboard having a second plurality of keys indicating one of the pass, double and re-double bids, respectively, and a third keyboard having a third plurality of keys indicating one of the rounds, respectively, said circuit means including addressing means for routing said encoded indicia to a selected location at an intersection of one of said rows and columns in dependence on the number of indicia counted by said counting means and decoding means, and including display selector means for decoding and displaying the decoded indicia routed to said selected location by said addressing means, and wherein said circuit means includes a single pulse generator connected to said first and third keyboards for generating a single pulse, and a first double pulse generator connected to said second keyboard for generating a first double pulse, a second double pulse generator connected to said erase means for generating a second double pulse upon depression of one of said keys, respectively, a divide-by-two counter connected to the output of said forward/backward counter, and wherein said single and said first double pulse generators are connected to the output of said forward/backward counter, for the latter to count in a forward direction, and said second double pulse genrator is connected to said forward/backward counter to count in a reverse direction.

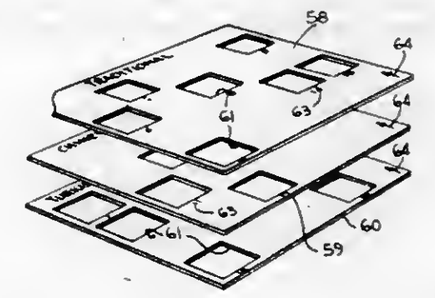
4,030,765

STORAGE DEVICE FOR SHARED GAME PIECES

John William Brown, 1847 W. Estes Ave., Chicago, Ill. 60626

Filed Feb. 18, 1976, Ser. No. 659,106
Int. Cl.² A63F 3/00
U.S. Cl. 273—148 R 1 Claim

1. In combination,
means for providing a plurality of storage compartments, each of said compartments having an access means therein,
a plurality of playing pieces for a plurality of varieties of chess games, and
a plurality of templates having different aperture arrays,
each of said templates cooperating with said access means to provide access to a different plurality of compartments,



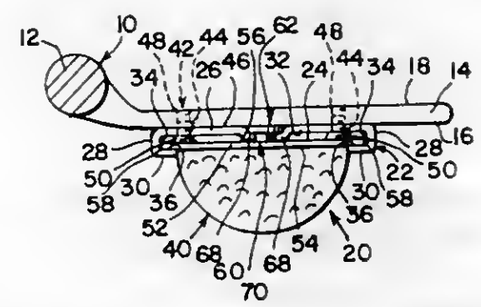
each of said different plurality of compartments containing the pieces for a different chess game.

4,030,766

GOLF CLUB WITH ALIGNING MEANS

Josiah F. Derr, 335 E. 2nd, Berwick, Pa. 18603

Filed July 8, 1976, Ser. No. 703,458
Int. Cl.² A63B 53/04, 69/36
U.S. Cl. 273—163 R 10 Claims



1. In a golf club having a club shaft and a head with its face in substantially vertical plane,
A. housing means having a chamber contained therein and including a base portion, a pair of side walls integrally formed with said base portion and a pair of spaced apart front walls each integrally formed with said side walls and extending in a plane substantially parallel to said base portion for defining said chamber,
B. fastener means extending through said base portion for securing said housing means to the golf club head,
C. alignment means adapted to be received within said chamber in relatively fixed position with respect thereto, said alignment means including a frame member adapted to extend between said side walls and within said chamber and a spherical section secured to said frame member extending exteriorally of said chamber and including a generally spherical surface having the same diameter of a golf ball and when viewed from above definding essentially a hemispherical mass, and
D. restraining means engageable with said alignment means and said housing means to prevent removal of said alignment means when the golf club is in use.

4,030,767

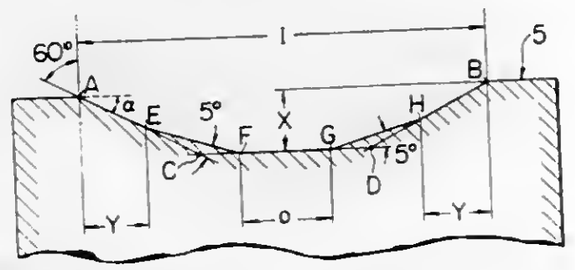
CHROME INSERT RING

Isao Taolguchi, Yono, Japan, assignor to Nippon Piston Ring Co., Ltd., Tokyo, Japan

Filed Aug. 2, 1976, Ser. No. 710,488
Claims priority, application Japan, Aug. 2, 1975, 50-93697
Int. Cl.² F16J 15/00, 9/12
U.S. Cl. 277—235 R 6 Claims

1. A hard metal insert piston ring of the type having a groove in the periphery thereof, said groove being filled with said hard metal, the cross section of said groove having a flat

bottom wall and two flat side walls extending angularly from the surface of said piston ring towards said flat bottom surface and towards one another, the improvement characterized by; said cross section of said groove having additional flat side



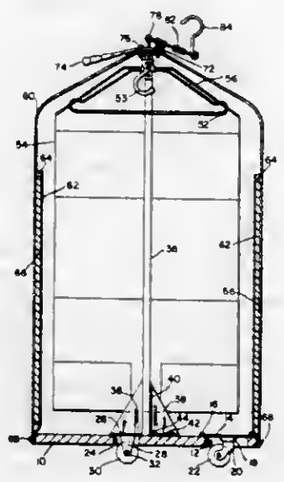
walls between said first mentioned side walls and said flat bottom surface, all said walls and said bottom surface meeting at angles greater that the angle between imaginary extensions of said first side walls and said flat bottom surface.

4,030,768

STEERABLE WHEELED GARMENT BAG

Max J. Lugash, 201 Ocean Ave., Santa Monica, Calif. 90402

Filed Nov. 17, 1975, Ser. No. 632,364
Int. Cl.² B62B 3/00
U.S. Cl. 280—47.17 6 Claims



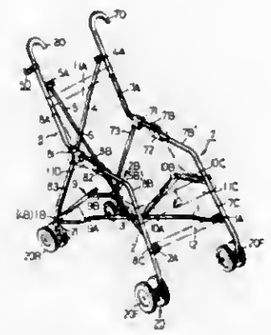
1. Wheeled hand luggage comprising:
a. a vertically elongate enclosure having top, bottom, side, front and rear walls;
b. a tanden pair of wheels mounted on said bottom wall of said enclosure;
c. rigid means connecting said top wall of said enclosure with said bottom wall of said enclosure and positioned within said enclosure;
d. means at the upper end of said rigid means for suspending garments within said enclosure;
e. one of said pair of wheels being mounted at the front portion of said bottom wall and the other of said wheels being mounted centrally on the said longitudinal axis of said bottom wall and adjacent said rigid means;
f. and said front wheel being castered about a vertical pivot and said centrally mounted wheel being non-castered.

4,030,769

STRUCTURES FOR FOLDING BABY-CARRIAGES, CHAIRS, AND THE LIKE

Luke Shih-Cheng Peng, No. 30-1 Lane, 350, Wu Hsing Street, and Herbert Chia-Chen Yu, No. 2-4, Alley 12, Lane 118, Jen Ai Road, Sec. 3, both of Taipei, China /Taiwan

Filed May 24, 1976, Ser. No. 689,598
Int. Cl.² B62B 11/00
U.S. Cl. 280—42 5 Claims



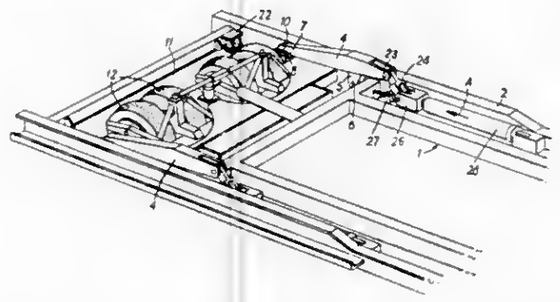
1. A collapsible carriage structure comprising:
a collapsible bottom cross-frame formed by a first pair of intersecting interpivoted rigid elements;
a collapsible back cross-frame formed by a second pair of intersecting interpivoted rigid elements, said bottom and back cross-frames articulately interconnected at a pair of respective ends;
two collapsible side brace assemblies each comprising an upper, lower and middle section, said upper sections including handle means,
said upper sections articulately interconnected to the respective upper ends of the back cross-frame, and inclined backward and parallel to each other when unfolded,
said lower sections articulately interconnected to the respective front ends of the bottom cross-frame, and inclined backward and parallel to each other when unfolded,
said middle section forming a generally horizontal arm rest comprising:
a horizontally disposed lower extension of said upper section;
a horizontally disposed upper extension of said lower section; and
a knuckle member joining said extensions together to form a collapsible joint;
two rigid rear support legs each connected on one end to a respective one of said lower extensions of said upper sections by means of a triangular knuckle member and each articulately connected to the respective rear end of said bottom cross-frame;
means for releasably locking said structure in the open position; and,
pairs of double wheel sets disposed on the lower end of said lower sections of said side assemblies and on the lower end of said rear legs;
said cross-frames and side brace assemblies capable of being cooperatively collapsed so as to cause the carriage structure to occupy a diminished cross-sectional area.

4,030,770

REAR WHEEL JACKING SYSTEM

Kenneth B. Board, Stow Maries, England, assignor to Atel Products Limited, Southend-on-Sea, England

Filed Oct. 28, 1975, Ser. No. 626,487
Claims priority, application United Kingdom, Nov. 1, 1974, 47449/74
Int. Cl.² B62D 33/08
U.S. Cl. 280—43.23 9 Claims



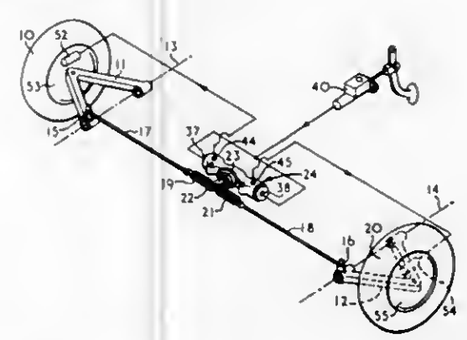
1. A cargo lifting vehicle comprising chassis means, said chassis means comprising a relatively forwardly directed end, a relatively rearwardly directed end, first side frame member means, second side frame member means, said first and second side frame member means comprising and being at generally opposite sides of said chassis means, at least first and second wheel means situated inboard of said side frame member means, rigid support means operatively interconnecting said first and second wheel means to each other and effective to maintain the axes of said first and second wheel means elevationally fixed with respect to each other, said rigid support means being situated inboard of said side frame member means as to have the ability of upward and downward movement relative to said side frame member means, linkage means operativcly connected to said rigid support means and to said side frame member means for movement relative to both said rigid support means ands said side frame member means, and power applying means operatively connected to said linkage means, said power applying means being effective when energized to cause selective upward and downward movement of said rigid support means and wheel means relative to said side frame member means.

4,030,771

VEHICLE BRAKING SYSTEM

Alastair John Young, Leamington Spa, England, assignor to Automotive Products Limited

Filed May 25, 1976, Ser. No. 689,842
Claims priority, application United Kingdom, June 5, 1975, 24329/75; Oct. 15, 1975, 42118/75
Int. Cl.² B60T 8/24
U.S. Cl. 280—88 7 Claims



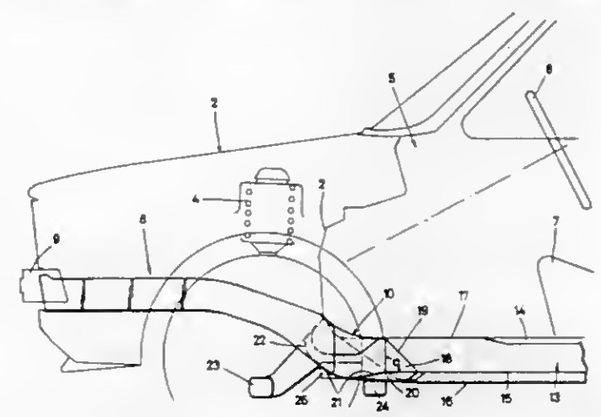
1. In a vehicle having a body supported by a resilient suspension system, a first wheel on one side of the vehicle and a second wheel on the other side of the vehicle, a first suspension component which moves with vertical movement of the first wheel relative to the vehicle body during vehicle cornering and a second suspension component which moves with vertical movement of the second wheel relative to the vehicle body during vehicle cornering, a fluid pressure braking system which comprises:
a driver-controlled source of fluid pressure;
a first brake operative to brake said first wheel;
a second brake operative to brake said second wheel;
a first brake actuator acting on said first brake;
a second brake actuator acting on said second brake;
a first fluid pressure modulating valve connected between the driver-controlled source and said first brake actuator;
a second fluid pressure modulating valve connected between the driver-controlled source and said second brake actuator;
and a control mechanism responsive to vehicle suspension movements during vehicle cornering to modify the performance of one of the modulating valves so that any pressure which acts in the brake actuator associated with the inboard of said first and second wheels is lower than any pressure which acts in the brake actuator associated with the outboard of said first and second wheels, said control mechanism comprising a valve loading element operable on each of said modulating valves and a cross-linkage including a first spring connecting the valve loading element to said first suspension component and a second spring connecting the valve loading element to said second suspension component to provide a controlling biassing load on the valve loading element which is proportional to and in the same sense as differences in the vertical positions, relative to the vehicle body, of the first and second wheels.

4,030,772

FRAME

Friedrich Jacob, Stelmke, and Dieter Morsch, Braunschweig, both of Germany, assignors to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed Oct. 21, 1975, Ser. No. 624,571
Claims priority, application Germany, Oct. 25, 1974, 2450763
Int. Cl.² B62D 21/00
U.S. Cl. 280—106 R 7 Claims



1. A frame for a vehicle, particularly a motor vehicle, the frame having
a. means forming two side members each extending between a respective front wheel and rear wheel of the vehicle;
b. means forming two longitudinal members arranged in at least one end region of the vehicle, said longitudinal members, throughout at least portions of their lengths, being laterally displaced with respect to the side members in the direction toward the longitudinal axis of the vehicle, said longitudinal members having downwardly inclined ends;

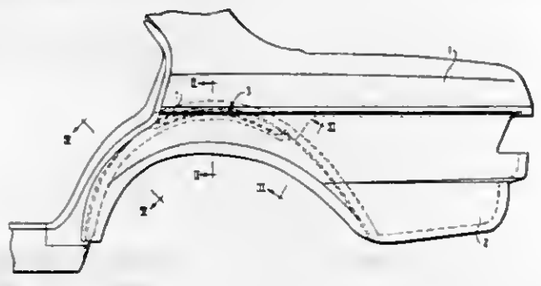
c. means forming a central longitudinal propeller shaft tunnel;
d. means forming two cross members which extend in opposite directions from said longitudinal propeller shaft tunnel of the vehicle, said cross members having projecting portions extending into said end region of the vehicle and supporting said downwardly inclined ends of respective ones of said longitudinal members;
e. means forming a bottom plate extending from said tunnel to each of said side members; and
f. said cross members being force-transmittingly connected with said tunnel, with the corresponding side members, and with said bottom plate, and being provided with attachments for supporting an axle mount.

4,030,773

FENDER, ESPECIALLY REAR FENDER FOR PASSENGER MOTOR VEHICLES

Rudolf Meixner, Sindelfingen, and Günter Kling, Boblingen, both of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed June 9, 1975, Ser. No. 584,861
Claims priority, application Germany, June 12, 1974, 2428477
Int. Cl.² B62D *25/16*
U.S. Cl. 280—153 R **13 Claims**



1. In a fender construction for a wheeled vehicle having a body of the type including wheel casing means, an improved fender construction comprising an upper fender part non-detachably connected to said vehicle, a separate lower fender part detachably connected to said vehicle, said upper fender part and said lower fender part being disposed with adjacent portions along an approximately horizontal separation plane over the longitudinal length of the fender parts, and an inwardly disposed sheet metal closure member arranged within a portion of said lower fender part, said sheet metal closure member being non-detachably rigidly connected to said lower fender part and detachably threadedly connected to said wheel casing means, wherein said sheet metal closure member provides a seal with respect to a portion of said vehicle body such as to seal the body portion from the environment.

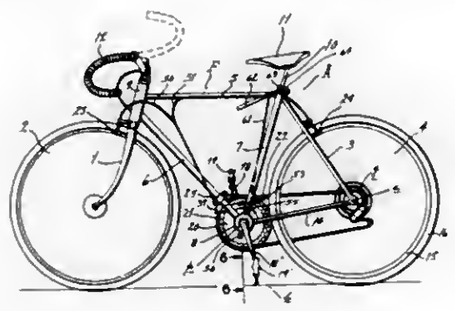
4,030,774

PEDAL ACTUATED BICYCLE BRAKE WITH COORDINATING SUPPORTING STAND

Edwin E. Foster, 1801 Camp Craft Road, Austin, Tex. 78746

Filed Feb. 6, 1975, Ser. No. 547,574
Int. Cl.² B62M *1/02*; B62L *5/10*
U.S. Cl. 280—261 **24 Claims**

1. For use with a bicycle having a frame, front and rear wheels supported on said frame, a pedal crank assembly with a main shaft and pedal cranks, and front and rear wheel caliper brakes, a brake control assembly comprising an elongated latch link disposed proximate said main shaft and having forward and rearward end portions, a lever arm having opposed ends, said lever arm being swingably mounted at one of its ends on said frame, said lever arm at its other end being pivotally engaged to the forward end portion of said latch link whereby the latter is permitted limited movement in a direction generally mounted of said bicycle by virtue of the swingable mounting of said lever arm, means connecting said front and rear brakes to said lever arm between its ends, means urging said lever arm forwardly from its swingable mounting when said brakes are in non-braking condition, a cam provided on said latch link in its rearward portion, cam support means mounted on said main shaft for rotation thereabout, at least one cam follower mounted on said cam support means for movement therewith, said cam and cam follower being



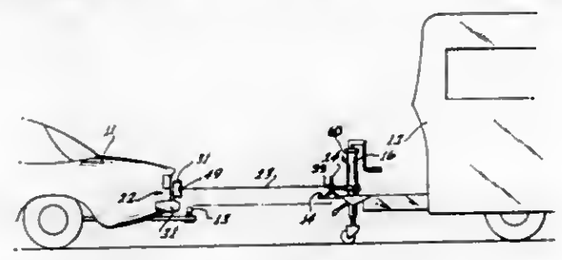
unengaged during forward pedaling of said bicycle, said cam and said cam follower being engageable upon back pedaling of said bicycle whereby said latch link is caused to move in said generally rearward direction causing tension to be placed upon said brake connecting means thereby effecting braking action, and means engaged to said latch link for disengaging said cam and cam follower to release the bicycle from braked condition.

4,030,775

APPARATUS FOR ALIGNING HITCHES OF TOWING AND TOWED VEHICLES

John C. Hill, Carmichael, Calif., assignor to Pro-Tec Industries, La Habra, Calif.

Filed Jan. 2, 1976, Ser. No. 646,187
Int. Cl.² B60D *1/14*
U.S. Cl. 280—477 **6 Claims**



1. In a tow car, having on its rear end a first coupling unit connectable to a complementary second coupling unit on the front end of a trailer, apparatus on the tow car operable to signal to the tow car driver in order to guide him while backing up the tow car to bring its coupling unit into position to hook up to the trailer's coupling unit, said apparatus comprising:
a housing mounted on said tow car;
a spool body;
first means for mounting within said housing said spool body to pivot about a horizontal and a vertical axis;
a flexible member retractably wound within said spool body;
a second means formed on the end of said flexible member;
a third means mounted on said trailer and adapted to be coupled to said second means;
fourth means mounted on said first means to indicate when said spool pivots about said vertical axis; and
fifth means mounted on said housing adjacent said first means to indicate when said flexible member is fully retracted within said spool body; wherein:
said first means comprises a first U-shaped yoke having a spool body pin mounted within said first yoke;

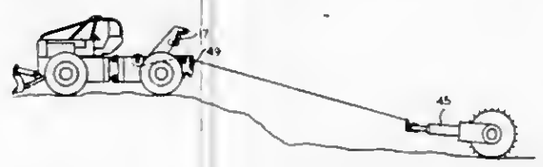
said fourth means comprises a potentiometer having a body and a rotatable shaft therein;
said rotatable shaft fixedly mounted to said first yoke substantially at the center thereof so that said first yoke and said spool body depend therefrom.

4,030,776

FAIRLEAD AND IMPLEMENT HITCH AND METHOD OF IMPLEMENT RETRIEVAL

William H. Brickoell, St. Thomas, and Gerald N. Sunderlage, London, both of Canada, assignors to Clark Equipment Company, Buchanan, Mich.

Filed Mar. 19, 1976, Ser. No. 668,774
Int. Cl.² B60D *1/18*
U.S. Cl. 280—477 **7 Claims**



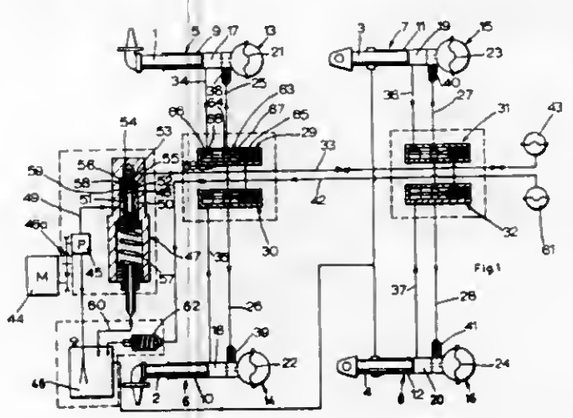
1. In a vehicle adapted for towing an implement having a drawbar, said vehicle having a pair of side frames, the combination comprising a power winch, a length of cable wound upon the winch which is adapted to be paid out from the rear of the vehicle and retracted by the winch, a horizontal roller supported between the side frames and mounted behind the winch which provides an anti-friction surface for paying out and retracting the cable, and a hitch on the rear of the vehicle frame situated with respect to said cable to cause the implement drawbar, when pulled by the winch, to be brought into abutting engagement with the vehicle, said hitch including an opening in the vehicle frame, said opening comprising a pair of vertically extending slots, one in each of the side frames, the slots being provided in a vertical plane tangent to the surface of said roller and being accessible from the bottom and adapted to receive portions of the implement drawbar in hitching relationship.

4,030,777

VEHICLE SUSPENSION SYSTEM

Karl Rabenseifner, Pappenheim, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Continuation of Ser. No. 502,824, Sept. 3, 1974, abandoned.
This application Nov. 10, 1975, Ser. No. 630,718
Claims priority, application Germany, Sept. 22, 1973, 2347793; Dec. 20, 1973, 2363443
Int. Cl.² B60G *11/26*
U.S. Cl. 280—714 **21 Claims**



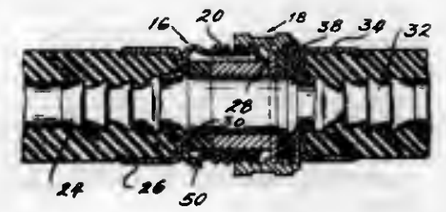
1. A suspension system for a vehicle having a frame, a plurality of wheels and at least two axles mounting the wheels comprising:
a. means defining a source of fluid under pressure;
b. a plurality of fluid suspension means, each coupled to the vehicle frame and to a wheel of the vehicle, different fluid suspension means being coupled to different wheels, each fluid suspension means including:
i. a cylinder, and
ii. a piston mounted for reciprocating movement in the cylinder, the cylinder and a face of the piston defining a pressure chamber in the cylinder;
c. a supply line coupled to the source of fluid for conducting fluid under pressure from the source of fluid toward the fluid suspension means;
d. a return line coupled to the source of fluid for conducting fluid away from the fluid suspension means to the source of fluid;
e. means for maintianing a residual fluid pressure in the return line; and
f. a system of conduits coupled to the fluid suspension means, the supply line and the return line so as to define an integrated system of fluid flow path, the conduit system including:
i. a pressure line for each flud suspension means, each pressure line communicating with the supply line and with the pressure chamber of a fluid suspension means and thereby being adapted to deliver fluid under pressure from the supply line to said pressure chamber, and
ii. a control line for each of at least one of the fluid suspension means, each control line communicating with the return line and with the pressure chamber of a fluid suspension means and thereby being adapted to conduct fluid away from said fluid suspension means toward the return line, the control line maintaining constant communication with the pressure chamber of said fluid suspension means only when the piston of said fluid suspension means is in a position relative to the cylinder of said fluid suspension means corresponding to a vertical position of an associated wheel of the vehicle relative to the frame of the vehicle lower than a predetermined level, said communication between the pressure chamber of said fluid suspension means and the control line being interrupted by the piston of said fluid suspension means when said piston of said fluid suspension means is in a position relative to the cylinder of said fluid suspension means corresponding to a vertical position of said associated wheel relative to the frame of the vehicle which is higher than said predetermined level, the residual fluid pressure being maintained in the return line being equal to a predetermined minimum fluid pressure in the pressure chamber of said at least one fluid suspension means, neglecting flow losses.

4,030,778

LEAKPROOF COUPLING MEANS FOR GARDEN HOSES AND THE LIKE

William Kaut, Jr., 12 Alden Lane, Creve Coeur, Mo. 63141

Filed May 19, 1975, Ser. No. 578,473
Int. Cl.² F16L *33/20*
U.S. Cl. 285—174 **7 Claims**



1. Improved means for the leak-proof coupling together of male and female threaded members including a tubular male threaded member having a passage therethrough, a surface on one end of said member and external threads thereon, said

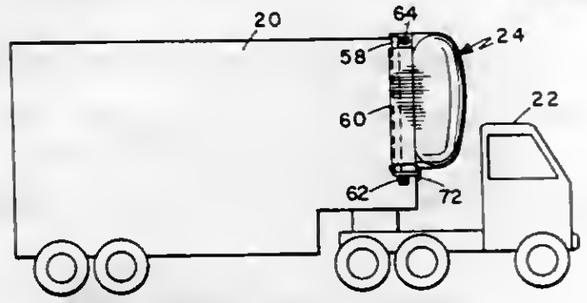
end surface on the male member extending inwardly to define an opening into the male member that is smaller in diameter than the diameter of the passage therethrough, a tubular female threaded member having internal threads adapted to be cooperatively engageable with the external threads on the male member and an edge surface on one end thereof, means forming an annular flange on the male threaded member extending radially into the passage therein at a location spaced from the end surfaee, means forming an annular inwardly extending ledge on the female member at a location spaced from the end edge surface thereon, said flange and said ledge extending radially inwardly to define openings in the respective male and female members that are smaller in diameter than the diameter of the opening into the male member defined by the end surface thereon, said flange and said ledge being located in spaced and opposed substantially parallel relationship to each other on opposite sides of the threads on the male and female members when the threads on the respective members are cooperatively engaged, said means comprising a resilient tubular member having an outer side wall at least a portion of which is of approximately the same diameter as the diameter of the opening into the male member defined by the end surface thereon, said resilient member being insertable to extend through the opening defined by the end surface on said male member and into the passage therein with the end surface on said male member acting as a guide during insertion and engaging the outer side wall of the resilient member to provide support therefor, at least a portion of the resilient member inserted into the passage in said male member having a smaller outer diameter than the diameter of the passage in said male member so as to form an air space around the resilient member in the passage in the male member, and said resilient member having spaced apart substantially parallel, radial, end surfaces thereon which are spaced apart a distance at least equal to the length of the threads on one of said members and sufficiently to simultaneously resiliently sealably engage the annular flange and the annular ledge when the male member is partly threaded into the female member, and sufficiently so that any further threading of the male member into the female member thereafter causes said resilient member to be axially compressed to improve the sealed condition between the resilient member and the male and female members.

4,030,779

INFLATABLE STREAMLINING STRUCTURE FOR VEHICLES

David W. Johnson, 1884 Sunset Blvd., San Diego, Calif. 92103

Filed Mar. 18, 1976, Ser. No. 668,327
Int. Cl.² B62D 35/00
U.S. Cl. 296—1 S 10 Claims



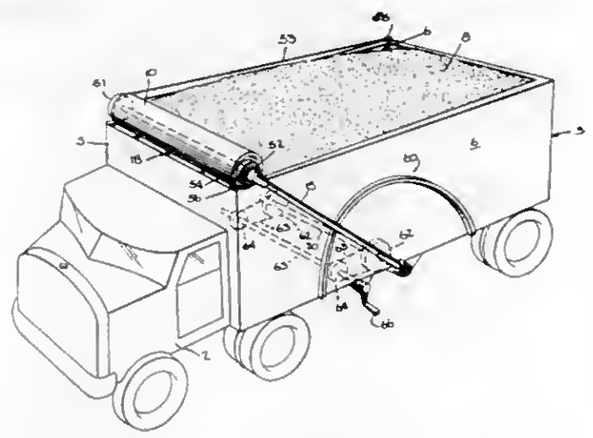
1. A structure for streamlining vehicles comprising:
a. an inflatable body comprising when inflated a substantially continuous tube defining the perimeter of said streamlining structure;
b. a substantially continuous skirt attached to the perimeter of said inflatable body and attachable to the sides of a vehicle adjacent one end thereof to define a substantially continuous fairing between said one end of said vehicle and said inflatable body when the latter is inflated.

4,030,780

COVER ASSEMBLY

Raymond H. Petretti, Whitestone, N.Y., assignor to Tooeray Covers, Inc., Whitestone, N.Y.

Filed Apr. 14, 1975, Ser. No. 567,498
Int. Cl.² B60P 7/02
U.S. Cl. 296—100 18 Claims



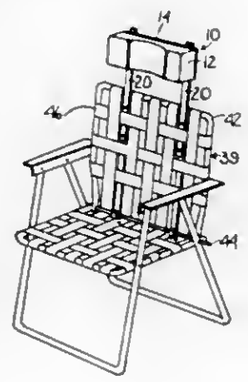
1. A cover assembly for an open body comprising a flexible cover having first and second ends, a rotatable rod at one end of the open body, the first end of said cover being anchored to the one end of said open body, the second end of said cover being attached to said rod and said cover being rolled around said rod, the rod being movable from one end of the open body to the other end of the open body, means for rotating said rod to unroll the cover, means for anchoring the first end of the cover to one edge of the open body, said means for rotating said rod comprising at least two pulleys mounted on the rotatable rod, one of said pulleys having a cable attached at one end to said one pulley and anchored at its other end to one end of the open body and the other of said pulleys having a cable attached at one end to said other pulley and anchored at the other end to the other end of the open body, said rod being mounted on an arm pivoted to the open body and means to swing said arm back and forth along the side of the open body, whereby movement of the arm and thus the rod from one position to the other will wind the cable around one of the pulleys and simultaneously unwind the other cable from the other pulley thereby causing the rod to rotate.

4,030,781

HEADREST

Harold P. Howard, 8451 W. Ten Mile Road, Oak Park, Mich. 48237

Filed Jan. 21, 1976, Ser. No. 651,031
Int. Cl.² A47C 7/36
U.S. Cl. 297—397 3 Claims



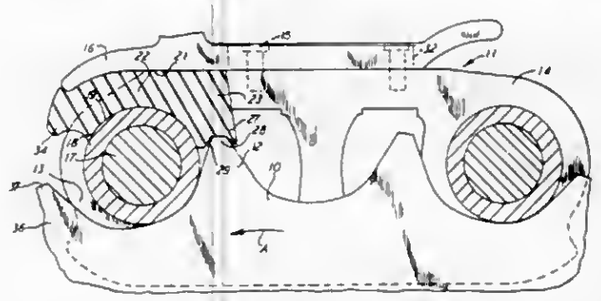
1. A headrest and lawn chair combination comprising:
a pillow;
a support plate fixedly attached to said pillow and generally conforming to the shape of said pillow;
two upper longitudinal members positioned substantially parallel to each other, each one of said upper members having a pillow attaching end and an opposite lower end;
means carried by said plate to releasably attach said upper members to said plate at said pillow attaching end of each of said upper members;
two lower longitudinal members, each one of said lower members having a chair attaching end and an opposite upper end;
means releasably and adjustably joining said lower end of each of said upper members to said upper end of each of said lower members permitting a selected range of total lengths for the resulting combination;
U-shaped attaching elements formed on the chair attaching ends of each of said lower members, said elements each having a base section carried by said lower members and downwardly disposed legs;
a lawn chair having a horizontally disposed seat frame and an upright, U-shaped back frame, said back frame having an upper base section and downwardly disposed legs, the ends of which are pivotally connected to said seat frame;
a horizontally disposed connecting rod pivotally connecting said back frame legs to said seat frame;
means supporting said seat and back frames, respectively, in said horizontal and upright positions; and
a plurality of interwoven webs carried by said back frame, said headrest upper and lower members being positioned through said interwoven webs such that a portion of said upper members abuts a forward portion of said back frame base section and said U-shaped attaching elements engage said horizontal connecting rod, said legs of each of said U-shaped attaching element being spaced a sufficient distance from each other and of a sufficient flexibility that said U-shaped attaching elements will tightly engage said horizontal connecting rod in a snap-lock fashion to securely and releasably attach said headrest to said lawn chair.

4,030,782

CRAWLER TRACTOR TRACK CHAIN DRIVE ASSEMBLY

John Merlin Baylor, Bettendorf, Iowa, assignor to J. I. Case Company, Racine, Wis.

Filed June 25, 1976, Ser. No. 699,703
Int. Cl.² B62D 5/20
U.S. Cl. 305—57 8 Claims



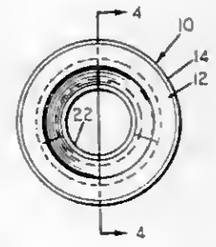
1. A crawler tractor track chain drive assembly comprising a drive sprocket having teeth and spacings therebetween, a track chain including a plurality of track chain links disposed in pairs in end-to-end relation along said track chain and with each of said pairs being two of said chain links laterally spaced apart from each other across said chain, a track plate removably attached to each of said pairs of said links and extending thereover, a plurality of connectors extending laterally of said chain and between said pairs of said links for articularly connecting said pairs of said links together in a chain arrangement, each of said connectors being spaced from an adjacent one of said plates and being disposed toward said sprocket and received in said spacings for driving engagement with said teeth, and an elastomeric member snugly disposed in the space between said connector and said plate and thereby being secured in a fixed position on said track chain and extending beyond said connector in the direction of the length of said chain to be disposed to be engaged by said sprocket teeth and thereby minimize noise ereated by engagement of said sprocket with said chain.

4,030,783

SELF-ADJUSTING SPHERICAL BEARING

Albert R. McCloskey, Fairfield, Conn., assignor to Heim Universal Corporation, Fairfield, Conn.

Continuation of Ser. No. 440,472, Feb. 7, 1974, abandoned.
This application June 6, 1975, Ser. No. 584,784
Int. Cl.² F16C 9/06, 23/04, 25/04, 35/06
U.S. Cl. 308—72 5 Claims



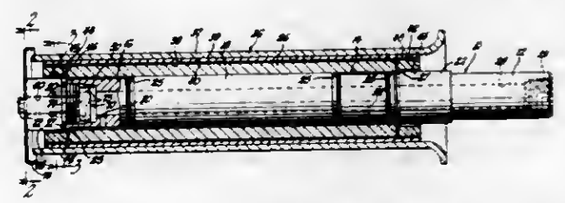
1. A spherical bearing assembly having an inner race member and an outer race member, the inner surface of the outer race member being a concave spherical bearing surface, the outer surface of the inner member being a complementary convex spherical bearing surface, the inner member including a spool member having a frusto-conical portion disposed on its outer bearing surface and at least three spherical segments, each segment having a frusto-conical depression on its inner bearing surface complementary to said frusto-conical portion, said segments disposed on and held together to form other races with said spool member by the registration of said furstoconical portion in said complementary fursto-conical depression, whereby the frusto-conical portion and depression cooperate to provide rotational redundancy and positional centering of the segments on the spool.

4,030,784

GAS BEARING ROLL SHELL ASSEMBLY WITH SELECTIVE DRIVE MEANS

Donald J. King, Huron; Loren E. Lura, Sandusky, and Ewalt Maurushat, Huron, all of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed June 18, 1976, Ser. No. 697,350
Int. Cl.² F16C 17/16
U.S. Cl. 308—107 10 Claims



1. A gas bearing roll shell assembly for textile machinery and the like having selective drive means comprising:
an axle having an intermediate enlarged diameter portion and supply passage means having an inlet adjacent an axial end thereof adapted for connection to a source of gas under pressure,
restrictive passage means through said enlarged diameter portion leading from said supply passage means to an outer circumferential surface thereof,
a rotatable roll shell surrounding said enlarged diameter portion with a small radial clearance whereby said roll

shell is adapted to be radially supported on a layer of gas supplied from said supply passage means via said restrictive passage means,

a first thrust ring fixed on said roll shell adjacent an axial end thereof and surrounding said axle between said intermediate portion and said axial end of said axle, a second thrust ring fixed on said roll shell adjacent an opposite axial end thereof and surrounding an opposite annular end portion of said axle,

and means for selectively driving said roll shell during operation comprising a plurality of circumferentially spaced turbine buckets recessed into the bore of said second thrust ring,

first part chordal passage means in said annular end portion of said axle having first inlet means for receiving gas under pressure from said supply passage means and first outlet means aligned in the axial direction with said turbine buckets,

a valve rotatably mounted in said annular end portion of said axle for rotary movement between a neutral drive position whereat said inlet means are closed off from said supply passage means and a first drive position whereat said inlet said inlet means are in fluid communication with said supply passage means for receiving gas under pressure therefrom and directing the same onto said turbine buckets to drive said roll shell in a forward direction,

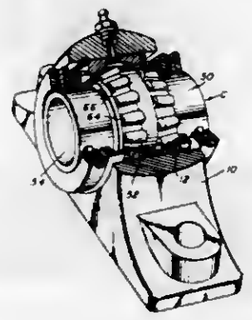
said valve further having exterior portions for manually rotating said valve between said neutral and said first drive positions during operation.

4,030,785

BEARING CARTRIDGE

Elmer D. Robinson, and Hilarius S. Struttmann, both of Ithaca, N.Y., assignors to Borg-Warner Corporation, Chicago, Ill.

Filed June 21, 1976, Ser. No. 697,814
Int. Cl.² F16C *1/24*
U.S. Cl. 308—187 **4 Claims**



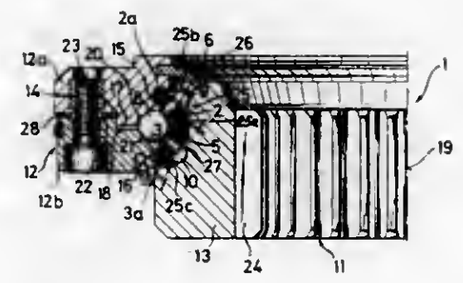
1. A bearing cartridge for use in a bearing-housing having a cylindrical bore therethrough for receiving said cartridge, said bore having at least one cylindrical recess therein to receive a snap ring and the like to retain said cartridge in said housing and in operating position, said cartridge comprising a unitary, lubricated and adjusted structure of an inner race member having a central cylindrical bore to receive a shaft and an outer race member with an outer cylindrical surface defining the outer surface of said cartridge, said inner race member having a pair of spaced raceways, said outer race member having a pair of spaced raceways each of which is radially disposed opposite a raceway of said inner race member, a set of rollers positioned between each inner and oppositely disposed outer raceway, and sealing means positioned between the inner race member and the outer race member outwardly of said sets of rollers, said sealing means retaining lubricant in said cartridge, said outer race member being constructed of multiple parts integrally joined to one another, said cartridge being insertable and removable from said housing as a unitary structure and being retained in said housing by a snap ring received in said at least one cylindrical recess in said housing.

4,030,786

MULTI-ROW ANTI-FRICTION BEARING

Wilhelm Schluter, Dortmund-Gartenstadt, and Heinz Pohler, Herdecke-Kirchende, both of Germany, assignors to Hoesch Werke Aktiengesellschaft, Dortmund, Germany

Filed Jan. 5, 1976, Ser. No. 646,770
Claims priority, application France, Jan. 6, 1975, 75.00268; Jan. 7, 1975, 75.00381
Int. Cl.² F16C *19/04, 19/70*
U.S. Cl. 308—227 **15 Claims**



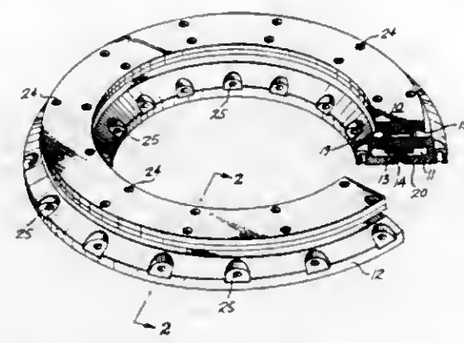
1. In an anti-friction precision bearing preloaded for absorbing simultaneously radial and axial forces and torque stresses: an annular bearing body comprising in combination an inner bearing ring and an outer bearing ring, one of said bearing rings being divided into at least two axially superimposed individual sections and having its plane of division extending transverse to the axis of said anti-friction bearing, the other one of said bearing rings being an undivided single ring, at least two annular rows of anti-friction elements arranged between said inner and outer bearing rings, at least three annular supporting wire means arranged between said inner and outer rings and forming the raceways for said rows of anti-friction elements, two of said wire means being arranged in said undivided single ring and each one of said two wire means having one raceway only, and the third one of said wire means having two raceways and being seated between two of said at least two axially superimposed individual bearing ring sections, those anti-friction elements which cooperate with the wire element having two raceways having their axes of rotation respectively extending substantially perpendicular to said last mentioned two raceways, and connecting means interconnecting said superimposed bearing sections.

4,030,787

TURNTABLE BEARING

Joseph Brogan, Kent, and Irwin Gerald Baker, Bellevue, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Mar. 30, 1976, Ser. No. 671,925
Int. Cl.² F16C *19/10*
U.S. Cl. 308—227 **10 Claims**



1. A turntable bearing comprising:

a lower support ring having a groove therein along the top surface of said ring extending around the circumference of said ring with said groove having an inner and outer surface and a shape which is wider at its bottom than at its top;

an inner bearing having a circular ring shape adapted to fit within said groove and adapted to contact the inside surface of said groove;

an outer bearing having a circular ring shape adapted to fit within said groove and adapted to contact the outside surface of said groove;

a tee ring adapted to fit within said groove and between said inner bearing and said outer bearing;

means for securing said tee ring to said inner bearing and said outer bearing; and,

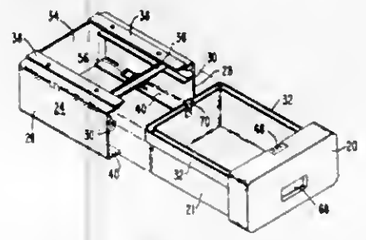
means for raising or lowering said inner bearing, said tee ring, and said outer bearing within said groove.

4,030,788

NON-EXPOSED DRAWER LOCK

Raymond A. Bleeker, Grand Rapids, Mich., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 28, 1975, Ser. No. 626,168
Int. Cl.² A47B *88/00*
U.S. Cl. 312—333 **8 Claims**



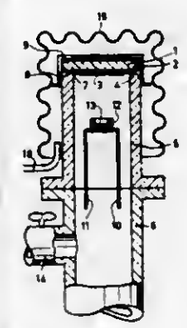
1. In combination, a drawer case, a drawer including a front panel, slidable in said drawer case and locking means for locking said drawer to said drawer case; said locking means including a locking bar and a lock, said locking bar being mounted on said drawer case for limited reciprocal motion with resect to said drawer case, said lock being mounted in the front panel of said drawer and adapted to interconnect with said locking bar; said locking means permitting limited relative slidable movement between said drawer and said drawer case while said locking bar and said lock are interconnected.

4,030,789

METHOD OF MANUFACTURING AN ELECTRIC DISCHARGE TUBE

Paulus Philippus Maria Schampers, and Pieter Adrianus De Rijke, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 583,982, June 5, 1975, abandoned. This application Sept. 27, 1976, Ser. No. 727,049
Claims priority, application Netherlands, June 14, 1974, 7407952
Int. Cl.² H01J *9/18*
U.S. Cl. 316—19 **4 Claims**



1. A method of manufacturing an electric discharge tube of the type having, in an envelope composed of a first portion which is hermetically sealed to a second portion, a radiation sensitive layer on said first portion and a system of electrodes arranged opposite said radiation sensitive layer, comprising the steps of: forming said radiation sensitive layer on said first portion of the tube envelope in a first evacuated vessel which is temporarily closed by that first portion of the tube envelope using a liquid metal sealant of a gallium containing material, degassing the system of electrodes in a second evacuated vessel assembled of said second portion of the tube envelope and auxiliary closing member which are temporarily sealed together using a liquid metal sealant of said gallium containing material, filling said first and said second vessel with an inert gas at a pressure substantially equal to the ambient pressure on said vessels, disconnecting said first portion of the tube envelope from said first vessel and transporting said first portion to said second vessel, whereby the inert gas protects the radiation-sensitive layer on said first portion from exposure to the atmosphere during the transfer step, disconnecting the auxiliary closing member from said second vessel, sealing said first portion to said second portion of the tube envelope using a liquid metal scalant of said gallium containing material and evacuating the tube.

4,030,790

PROCESS FOR FABRICATING LENSES FOR MANUFACTURING CATHODE RAY TUBE SCREEN STRUCTURES

G. Norman Williams, and Thomas W. Schultz, both of Seneca Falls, N.Y., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed Sept. 15, 1976, Ser. No. 723,233
Int. Cl.² H01J *9/42*
U.S. Cl. 316—23 **8 Claims**

1. In manufacturing color cathode ray tube screen structures, a lens fabricating process utilizing optical scanning exposure apparatus having a positionally locatable light beam source comprising the steps of:

selecting a matrix of data points on the viewing screen of a cathode ray tube;

altering the positional location coordinates of said light beam source of said optical scanning exposure apparatus to effect light beam impingement at each of said data points;

recording said altered positional location coordinates of said optical scanning exposure apparatus;

constructing a cathode ray tube having a viewing screen structure with a field of phosphor elements fabricated in accordance with said altered position location coordinates of said optical scanning exposure apparatus;

measuring the error of impingement of an electron beam on said elements of said phosphor field at said viewing screen of said cathode ray tube;

varying said recorded altered positional location coordinates of said optical scanning exposure apparatus in accordance with said measured error of impingement; and

submitting said varied positional location coordinates of said optical scanning exposure apparatus to a lens design program to provide lens manufacturing information.

4,030,791

ELECTRICAL CONTACT SYSTEM

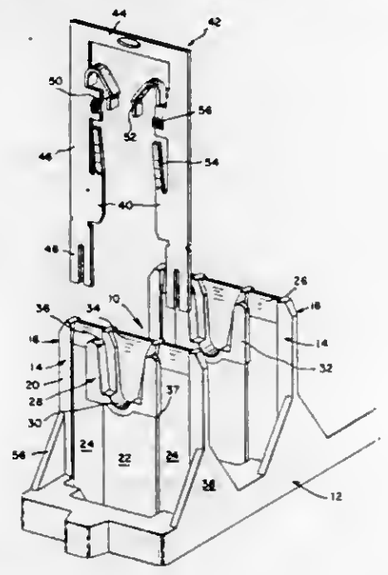
Wilmer Lee Sheesley, Dauphin, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Aug. 6, 1976, Ser. No. 712,309
Int. Cl.² H01R *39/00*
U.S. Cl. 339—5 M **2 Claims**

1. An electrical contact system for supplying a current from a circuit board to a motor suspended between two walls which comprises:

a. two pair of conductive contact members with one member of each pair being the mirror image of the other

member, each contact member positioned over an edge of an opposing surface of said walls and having an elongated body with contact means on its lower end adapted to electrically engage a circuit on a circuit board and on the upper end a cantilever spring arm extending generally in a curving manner from the body so that the arm's free end projects downwardly, said free end being arcuate and facing the arcuate free end of the contact member position near the other side of the same wall; and



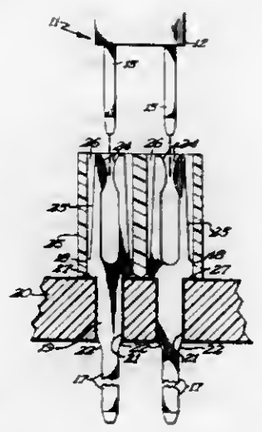
b. two pair of conductive collet tabs each having a cylindrical tube section and a strap extending laterally from the base of the cylindrical tube section each pair of collet tabs being positioned on opposite ends of the motor with electrical wires therefrom being fixed to said straps so that when the motor is suspended between the two walls said cylindrical tube sections are received in the arcuate free ends of the cantilever spring arms whereby an electrical current may pass from the circuit board to the motor.

4,030,792

TUNING FORK CONNECTOR

Charles Floyd Fuerst, Brooklyn Park, Minn., assignor to Fabri-Tek Incorporated, Minneapolis, Minn.

Filed Mar. 1, 1976, Ser. No. 662,802
Int. Cl.² H05K *1/08*
U.S. Cl. 339—17 LC **5 Claims**



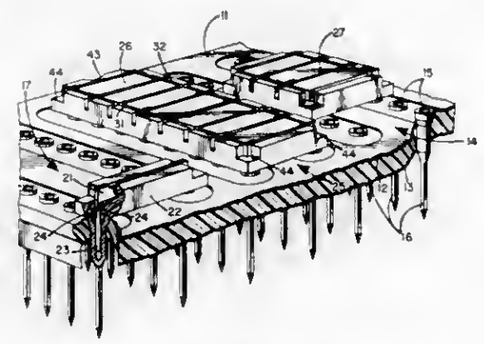
1. A female connector for connection to blade type male contacts, comprising:
   a. a planar mounting substrate;
   b. said planar mounting substrate containing a plurality of receiving holes;
   c. a plurality of female contacts, each of said female contacts including a neck portion and a connector portion, each of said female contacts being press-fitted into a corresponding one of each of said receiving holes with said neck portion of each of said female contacts abutting the walls of a corresponding one of said receiving holes into which it is inserted;
   d. an insulative housing covering each of said female contacts at least partially, said insulative housing containing a plurality of entry chambers, each of said entry chambers having a bottom portion and a top portion;
   e. each of said entry chambers extending individually through said insulative housing and having a cross-shaped cross section in planes parallel to said mounting substrate with each of said cross sections being comprised to two intersecting cross members with one of said cross member being sized to accommodate the width of one of said female contacts inserted therein, and the other cross member being sized to accommodate the width of a male contact blade which may be inserted therein;
   f. each of said entry chambers having isoplanar walls along its length to allow said insulative housing to forceably slide over said female contacts generally without interference with the contour of each of said female contacts which would prevent such sliding; and
   g. the diameter of each of said entry chambers being generally the same as th diameter of corresponding ones of said female contacts to allow each of said female contacts to be removed individually through the top or bottom portion of each corresponding one of said entry chambers into which it is inserted.

4,030,793

ELECTRONIC PROGRAMING JUMPER PINS AND DUAL-IN-LINE ASSEMBLY THEREOF

Richard J. Hanlon, Attleboro, Mass.; Nell F. Damon, Manville, and Herbert G. Yeo, Lincoln, both of R.I., assignors to Augat, Inc., Attleboro, Mass.

Filed June 30, 1975, Ser. No. 591,438
Int. Cl.² H01R *31/08*
U.S. Cl. 339—19 **15 Claims**



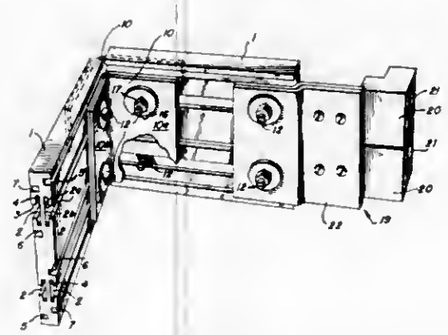
1. A programming jumper pin assembly for electrically interconnecting selected holes in a dual-in-line array of holes in a substantially flat electrical printed circuit panel board, said assembly comprising:
   an insulator of generally flat, rectangular configuration having a pair of spaced parallel longitudinal slots cut into one flat side thereof adjacent the longitudinal edges of said insulator, said longitudinal slots extending substantially the full length of said insulator, a plurality of spaced parallel transverse slots cut into said flat side, each said transverse slot being normal to and intersecting both of said longitudinal slots, said longitudinal and transverse slots being of substantially the same width, and a hole through said insulator at each intersection of one of said longitudinal slots with one of said transverse slots; and
   an electrically conductive jumper pin having at least two elongated spaced parallel contacts interconnected at respective one ends thereof by a cross bar, said cross bar residing in one of said longitudinal and transverse slots in said insulator, the other ends of said contacts projecting through said holes in said insulator and being adapted to enter and electrically interconnect at least two holes in said dual-in-line array of holes in said panel board.

4,030,794

BUS BAR AND SWITCHBOARD ASSEMBLAGE

Gustave Rozenboom, Kokomo, and Bernard C. Rickmann, Peru, both of Ind., assignors to Square D Company, Park Ridge, Ill.

Continuation of Ser. No. 512,671, Oct. 7, 1974, abandoned, which is a continuation of Ser. No. 388,179, Aug. 14, 1973, abandoned. This application Aug. 25, 1975, Ser. No. 607,386
Int. Cl.² H01R *9/22*
U.S. Cl. 339—22 B **7 Claims**



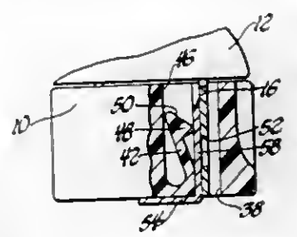
1. A bus bar comprising an elongated rigid extruded one piece body of electrically conductive material and of a cross section which is substantially a right angled parallelogram throughout its entire length, each of the faces of the body being planar throughout its entire length and width, and at least two opposite faces being relatively wide and identical with each other; said body having a pair of identical parallel slots of T-shaped cross section extending the full length thereof and disposed with the T-leg portions intersecting said opposite faces, respectively, of the body, and with the T-head portions parallel to said opposite faces, respectively, of the body; said slots further being positioned endwise of the elongated cross section relative to the longitudinal axis of the body so that upon rotation of the body 180° about said axis each said slot will occupy the same position and have the same orientation that the other slot occupied and had, respectively, prior to said portion of the body; and thereby to provide flat, continuous relatively wide electrical contact surfaces coextensive in length and width with said opposite faces, respectively, in all rotated positions of the body about its longitudinal axis; said body having a second pair of T-slots identical,. respectively, with the T-slots of the first mentioned pair; the T-slots of said second pair being positioned at said opposite faces, respectively, and each T-slot of each pair being diametrically opposite, relative to said axis, to a T-slot of the other pair, and said diametrically opposite slots being equidistant from said axis, so that upon rotation of the body 180° about its longitudinal axis the slots at one face will occupy the same position and have the same orientation that the slots at the opposite face had prior to said rotation, and each slot of each pair being identical with the diametrically opposite slot of the other pair; the T-slots of each pair being at opposite sides of the longitudinal axis from the other pairs being spaced equidistantly from said axis, said body cross section being rectangular and of a width several times its thickness, and further having parallel grooves, each parallel with the slots and each having parallel entry side walls which are perpendicular to the planes of said faces of the body, at least one side wall of each groove having parallel alternate ribs and valleys extending endwise of the associated groove for threaded engagement with bolts; said grooves being open through said opposite faces of the body, and being parallel to the axis of the body.

4,030,795

LOCKING DEVICE FOR ELECTRICAL PLUGS

John A. Niemano, 2056 Wilshire Drive SE., Grand Rapids, Mich. 49506

Filed Mar. 5, 1976, Ser. No. 664,197
Int. Cl.² H01R *13/44*
U.S. Cl. 339—37 **6 Claims**



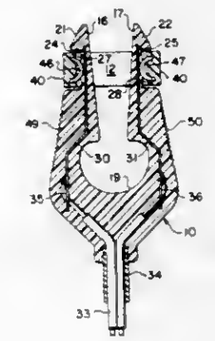
1. A locking device for use with electrical plugs having extended terminals with holes provided in the ends thereof, and comprising; a body member having slots provided therein and which are receptive of the entended terminals of an electrical plug, a first means provided within said body member and biased to extend within said slots for latching engagement with said terminals upon the alignment of the holes in the ends of said terminals therewith, and a second means for holding said first means in a retracted disposition and allowing for the disassociation of said terminals from said body member, said second means being separate and apart from said body member and formed for insertion in said slots and to extend relatively between said terminals and said first means.

4,030,796

ELECTRICAL CONNECTOR

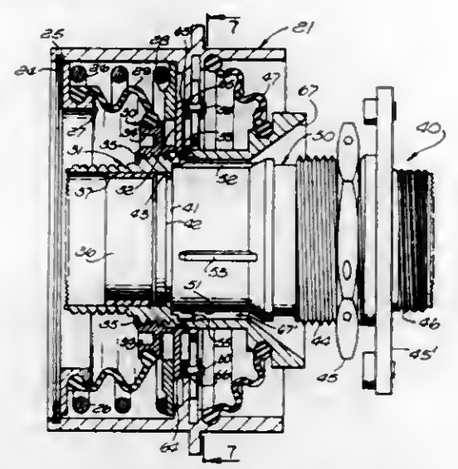
Michael D. Patzer, Boulder, Colo., assignor to Valleylab, Inc., Boulder, Colo.

Filed Jan. 16, 1976, Ser. No. 649,622
Int. Cl.² H01R *13/62*
U.S. Cl. 339—61 R **14 Claims**



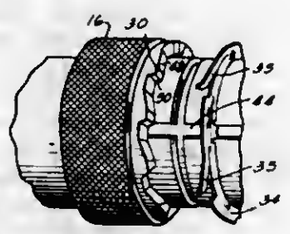
8. A male electrical connector comprising: a base portion, at least two substantially parallel resilient prongs extending from the base portion, a notch having a bottom portion defined in the outer side portion of each prong, at least one electrical conductor positioned within a prong and exposed at the bottom portion of the notch defined therein, and outwardly facing inclined surfaces defined between the terminus of each prong and the notch defined therein, the inclined surfaces extending to the terminus of each prong and being in a diverging relationship from the termini of the prongs to the notches defined in the prongs with the greatest distance between the termini of the prongs in the undeformed condition being less than the distance between the bottom portions of the notches.

4,030,797
ELECTRICAL CONNECTOR
Gerald R. Nieman, Phoenix, Ariz., assignor to International Telephone and Telegraph Corporation, New York, N.Y.
Continuation of Ser. No. 585,878, June 11, 1975. This application July 12, 1976, Ser. No. 704,316
Int. Cl.² H01R 13/62
U.S. Cl. 339—64 M 1 Claim



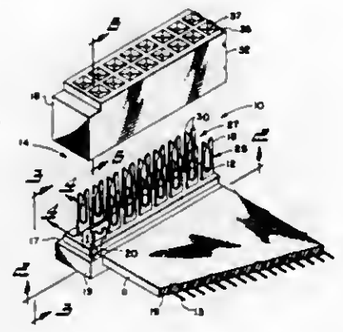
1. An electrical connector comprising: a housing having an approximately symmetrical longitudinal axis therethrough and having an opening completely therethrough; a contact carrying plug shell; a guidance plate having a pair of slots therein, said guidance plate having an approximately rectangular hole therein surrounding said plug shell, said plug shell having undersize parallel flats on opposite outside surfaces thereof at said guidance plate location to rotate therewithin; a pair of guide pins substantially fixed to said housing on opposite sides thereof, said pins being located in respective ones of said slots, said slots extending generally in a line normal to the lengthwise dimension of said guidance plate hole; a forward rubber bellows fixed between said housing and said plug shell covering said guidance plate at the forward end of said housing; a retaining ring fixed to the other end of said housing; a rear spring plate bearing against said retaining ring forward thereof; a front spring plate forward of said rear spring plate inside said housing; a helically coiled spring in compression between said rear and front spring plates, said housing having a shoulder to limit forward movement of said front spring plate; a shell plate fixed relative to said plug shell, said housing having an annular recess forward of said front spring plate, said shell plate being slidable on said front spring plate in said recess; and a rear rubber bellows fixed between said rear spring plate and said plug shell.

4,030,798
ELECTRICAL CONNECTOR WITH MEANS FOR MAINTAINING A CONNECTED CONDITION
Alfred Paoli, Chicago, Ill., assignor to Akzona Incorporated, Asheville, N.C.
Filed Apr. 11, 1975, Ser. No. 567,273
Int. Cl.² H01R 13/54
U.S. Cl. 339—89 R 3 Claims



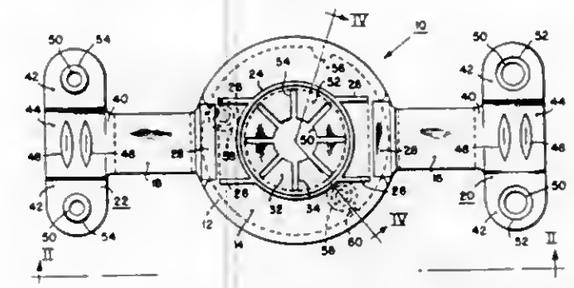
1. An electrical connector comprising a plug shell, a receptacle shell, a coupling nut for interconnecting said shells, said coupling nut being mounted for rotation on one of said shells and having threads adapted to cooperate with corresponding threads on the other of said shells, said coupling nut having a plurality of ratchet teeth extending therefrom, said ratchet teeth each having a forward face and a rearward face formed at different angles relative to a plane normal to the axis of rotation of said coupling nut, and an elongate spring arm mounted on one of said shells and urged into contact with said ratchet teeth, said arm comprising an intermediate portion and a hooked free end terminal portion, said hooked terminal portion bearing against one of the forward and rearward faces of said ratchet teeth for impeding but not preventing rotation of said coupling nut in its uncoupling direction while maintaining rotation of said coupling nut in its coupling direction substantially unimpeded, said forward face being formed at a lower angle than said rearward face, relative to a plane normal to the axis of the coupling nut, and when said coupling nut is turned during coupling, said forward face moves, relative to the free end of said spring arm, in the direction which extends from the free end of said arm toward the other end of said arm, whereby frictional forces acting between said ratchet teeth and said arm places said arm in compression during coupling.

4,030,799
JUMPER CONNECTOR
John T. Venaleck, Painesville, Ohio, assignor to A P Products Incorporated, Painesville, Ohio
Filed Feb. 9, 1976, Ser. No. 656,303
Int. Cl.² H01R 9/08
U.S. Cl. 339—99 R 18 Claims



1. A multiconductor electrical cable termination, comprising:
a multiconductor electrical cable including a plurality of conductors and electrical insulation about said conductors maintaining the latter electrically insulated from each other,
a plurality of electrical contacts, each including terminal means connecting at least one of said conductors directly through said electrical insulation to form an electrical junction, and contacting means on each of said contacts for electrically connecting each of said contacts to an external member placed to engagement therewith, and
a housing including base means for directly holding said contacts and said cable in relatively fixed position, said base means comprising a body integrally molded about at least a portion of each of said contacts and a portion of said cable, whereby said base means, said contacts and said cable form an integral structure.

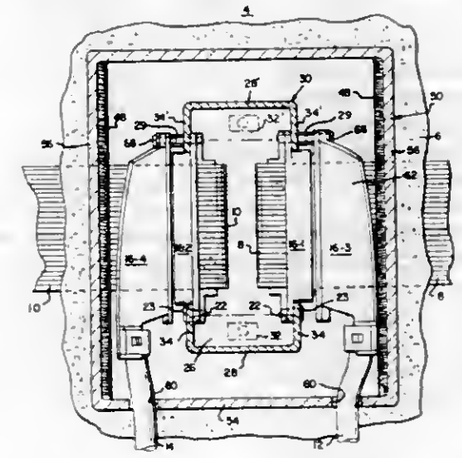
4,030,800
CONNECTOR CAP WITH CORD GRIP
John Vidoni; Bhartoor Lingaraju, and John C. Timmins, all of Allentown, Pa., assignors to Square D Company, Park Ridge, Ill.
Continuation of Ser. No. 546,330, Feb. 3, 1975, abandoned. This application Mar. 4, 1976, Ser. No. 663,860
Int. Cl.² H01R 13/58
U.S. Cl. 339—107 1 Claim



1. In a dead front electrical connector cap integrally molded of a semi-rigid dielectric material, a back plate comprising
A. a wall extending across said back plate and having a hole therein for accommodating a cord threaded there through from rear to front, the area of said wall defining said hole being provided with a plurality of angularly spaced very narrow recesses extending radially outward from the center of said hole thereby to form of said area a plurality of closely spaced apart flexible segments normally disposed in a common plane with said wall and resiliently deflectable out of said common plane, said very narrow recesses having a width substantially less than the width of said flexible segments, said relatively wide segments and said very narrow recesses therebetween providing a flexible structure to define a variable diameter aperture which also provides an effective barrier against entry of foreign matter,
B. a pair of arms connected to and extending from diametrically opposite areas of said wall, and
C. a pair of clamp parts respectively connected to and carried by said arms, said arms being connected to said wall for being disposed in rearwardly converging relation, with said clamp parts disposed in embracing relation to said cord for being secured together and thereby clamping said cord therebetween.

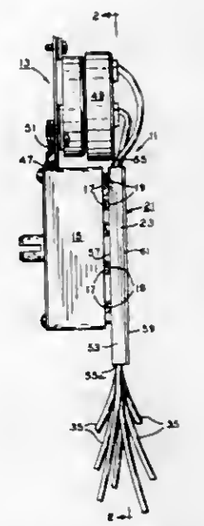
4,030,801
ELECTRICAL CONNECTOR JUNCTION FOR CARPETED FLOOR
Edward Dennman Bunnell, Palm Harbor, Fla., assignor to AMP Incorporated, Harrisburg, Pa.
Filed Aug. 24, 1976, Ser. No. 717,317
Int. Cl.² H02G 3/08, 3/10
U.S. Cl. 339—121 5 Claims

1. Electrical junction means on a carpeted floor for first and second flat cables which extend along said floor and underneath the carpeting means on said floor, said cables having first and second multi-compact electrical connectors on their ends, each of said connectors having a mating side and a rearward side, said cables extending to said rearward sides, said junction means comprising:
a base frame member comprising a flat sheet metal base plate disposed on said floor, said base plate having upwardly extending sidewalls extending from two opposite edges thereof, said sidewalls having flanges extending inwardly from their upper edges toward each other and parallel to said base plate, each of said sidewalls having mounted ears extending inwardly from its vertically extending side edges,
said connectors extending between, and being secured to, said mounting ears in back-to-back relationship with said mating sides facing in opposite directions and away from each other, said cables extending from said rearward sides of said connectors and being reversely flexed, said cables extending across said floor away from said base frame member,
said carpeting having a first slit therein and having at each end of said first slit additional slits extending normally of said first slit in opposite directions, said first slit and said additional slits forming an opening in said carpeting and a pair of flaps on opposite sides edges of said opening,



said sidewalls extending through said opening, said flaps extending upwardly from said floor and being supported on said flanges,
a cover member extending over said flaps, said cover member having depending cover sidewalls, fastening means extending through said cover member and into said flanges, said fastening means serving to clamp said cover member against said flaps and to clamp the free edges of said cover sidewalls against portions of said carpeting which are adjacent to said base frame member.

4,030,802
TERMINAL BLOCK ASSEMBLY AND MULTIPLE CONNECTOR ASSEMBLY THEREFOR
David C. Lennon, Morrison, Ill., and Richard A. Wandler, Clinton, Iowa, assignors to General Electric Company, Fort Wayne, Ind.
Filed Dec. 29, 1975, Ser. No. 645,045
Int. Cl.² H01R 33/72
U.S. Cl. 339—192 R 16 Claims



1. A multiple connector assembly adapted to be removably mounted to a plurality of male terminal spade portions comprising a casing having at least one face; a plurality of female terminals in said casing and respectively including an integral strip of electrical conductive material having a generally cylin-

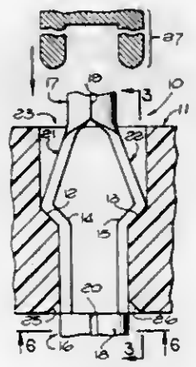
dric section at one end thereof, a bore within said cylindric section having a generally continuous circumferential portion crosswise of said strip for electrical contacting engagement with the male terminal spade portion, and means adjacent the other end of the strip for electrical connection with an electrical lead; means within said casing for locating said female terminals therein including a plurality of predeterminately spaced openings with said at least one face for receiving the male terminal spade portions and having generally cylindric sidewalls engaged about said cylindric sections to align said bores with said openings, and a plurality of pairs of opposed wall means intersecting with said cylindric sidewalls, said electrical connection means being disposed between said wall means pairs for abutting engagement therewith to predeterminately limit rotational movement of said cylindric sections in said openings; and means in said casing for passing thereinto electrical leads to connect with said electrical connection means, the male terminal spade portions being received in constant electrical contacting engagement across said continuous circumferential portions of said bores irrespective of any diametral positions the male terminal spade portions may be inserted through said openings into said bores when the multiple connector assembly is removably mounted to the male terminal spade portions.

4,030,803

ELECTRICAL CONTACT AND RETENTION MEANS THEREFOR

Jack E. Langenbach, Newport Beach, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Nov. 19, 1975, Ser. No. 633,431
Int. Cl.² H01R 9/06
U.S. Cl. 339—217 S 5 Claims



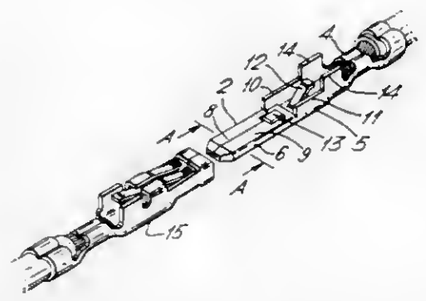
1. An electrical contact assembly comprising: an insulator body having a hole extending completely through the thickness thereof, and a shoulder on each of two opposite sides of said hole extending toward each other, said hole having different but rectangular cross sections at both of first and second opposite ends thereof, said hole having one cross sectional dimension wider at said first end than the corresponding one at said second end because of said shoulders, and a second dimension uniform throughout the thickness of said insulator body; first means in said hole having a leaf spring for each of said shoulders and a bend in each to snap onto and to seat on said shoulders when said leaf springs are slidably inserted into said hole; and second means connected to both of said leaf springs adjacent said second hole end to abut the external surface of said insulator body and to act as a stop when said leaf springs are seated as aforesaid, said second means including a first cylinder having an outside diameter greater than said second dimension, a portion of one end of said cylinder abutting said insulator external surface, a contact being fixed to both ends of said leaf springs that are positioned at said hole first end.

4,030,804

ELECTRICAL TERMINAL

Masahiro Enomoto, Tokyo, Japan, assignor to AMP Incorporated, Harrisburg, Pa.

Filed July 13, 1976, Ser. No. 704,883
Claims priority, application United Kingdom, Aug. 7, 1975, 32967/75
Int. Cl.² H01R 13/04
U.S. Cl. 339—258 S 2 Claims



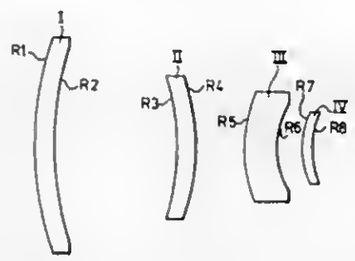
1. An electrical terminal stamped and formed from a single piece of single thickness sheet metal stock comprising a forward contact portion, a mounting portion and a rear wire connecting portion, the contact portion comprising a double thickness tab formed by folding over single thickness stock and the mounting portion being of channel section, forward ends of the channel walls being offset longitudinally of the terminal in a transition region between the contact portion and the mounting portion, one end extending forwardly of the tab rear and the other end terminating at the tab rear.

4,030,805

INFRA-RED LENSES

Philip John Rogers, Meliden, Wales, assignor to Pilkington P-E Limited, St. Helens, England

Filed Feb. 10, 1975, Ser. No. 548,587
Claims priority, application United Kingdom, Feb. 15, 1974, 7105/74
Int. Cl.² G02B 1/00, 9/34
U.S. Cl. 350—2 24 Claims



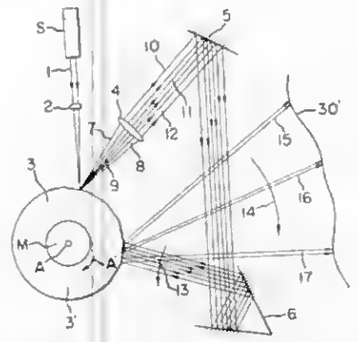
1. An infra-red lens of very high aperture greater than F/0.75 comprising from front to back in the order given at least one positive meniscus first element convex towards the front, a negative meniscus second element concave towards the front, a positive meniscus third element convex towards the front and a positive fourth element having a front surface convex towards the front, all of said elements being spaced apart.

4,030,806

SCANNING OPTICAL SYSTEM

Takeshi Goshima, Tokyo, and Noritaka Mochizuki, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 25, 1975, Ser. No. 607,502
Claims priority, application Japan, Sept. 11, 1974, 49-104735
Int. Cl.² G02B 27/17
U.S. Cl. 350—7 28 Claims



1. A scanning optical system for moving a light beam to cause it to scan an object, which comprises in combination:

a. a source of light for emitting a light beam;

b. first polygonal mirror means having a plurality of reflection surfaces optically disposed in confrontation to said light source, and rotating in a predetermined direction;

c. a converging optical system disposed to converge the light beam from said [light source on the reflection surfaces of said] first polygonal mirror means;

d. a collimating optical system disposed in a light path for a diverging light beam which moves angularly and repetitively in a single direction and which results from said converged light beam being reflected at said first polygonal mirror means, said system converting said diverging light beam into a unidirectionally and repetitively moving parallel light beam; and

e. second rotary polygonal mirror means having a plurality of reflection surfaces optically disposed in confrontation to said collimating optical system, wherein said second mirror means rotates at the same speed and in synchronism with rotation of said first polygonal mirror means along the moving direction of said light beam; and reflects said [reflecting a] parallel light beam formed by said collimating optical system so as to cause it to scan the object.

4,030,807

OPTICAL SCANNING SYSTEM WITH CANTED AND TILTED REFLECTORS

Douglas W. Briney, Yorba Linda, Calif., assignor to General Dynamics Corporation, Pomona, Calif.

Filed Feb. 9, 1976, Ser. No. 656,557
Int. Cl.² G02B 27/17; G01J 1/20
U.S. Cl. 350—7 9 Claims

1. A scanning apparatus for use in an optical seeker system comprising:

a primary optic axis,

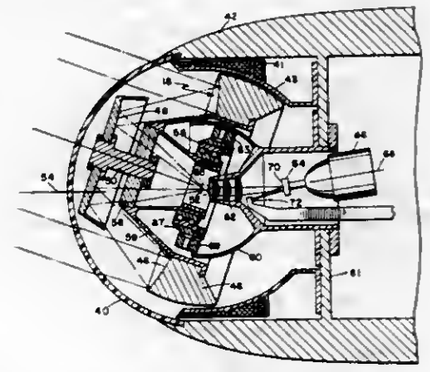
first beam director means having a reflective surface canted with respect to said primary optic axis for folding and directing incident radiation,

means for spinning said first beam director about said primary optic axis and producing a first scanning component,

second beam director means positioned for intercepting the radiation diverted by the first beam director means, said second beam director means having a spin axis tilted with respect to said primary optic axis and including a beam director surface canted with respect to said spin axis,

means for spinning said second beam director means about said spin axis of said second beam director for producing a second scanning component,

a sensor positioned to receive the radiation diverted from said second beam director,



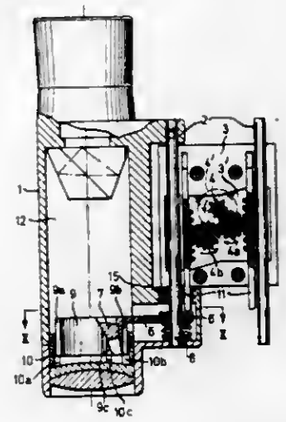
said beam director surface further folding the incident radiation to scan the radiation over said sensor.

4,030,808

BINOCULAR TELESCOPE

Joachim Hornschu, Oberkochen, and Arthur Jung, Konigsbronn, Brenz, both of, Germany, assignors to Carl Zeiss-Stiftung, Oberkochen, Germany

Filed Oct. 7, 1975, Ser. No. 620,392
Claims priority, application Germany, Oct. 19, 1974, 7435008[U]
Int. Cl.² G02B 21/20
U.S. Cl. 350—36 11 Claims



10. A binocular telescope, comprising two telescopes each of which has its own housing with an offset arm for hinge mounting, a bridge having spaced parallel hinge elements independently connected to the respective hinge mountings of said housings, each telescope comprising its optical system including an axially movably guided focusing lens element and mount, said mount including an offset arm with a flat shoulder surface that is normal to the axis of lens-mount guidance, drive means including a manual actuator carried by said bridge, one of said hinge elements at each housing-to-bridge connection including a pin that is slidably guided on the hinge axis, said drive means having an axially displacing actuating connection to each of said pins, and spring means preloading each mount for shoulder-surface abutment with an end of the associated one of said pins.

4,030,809

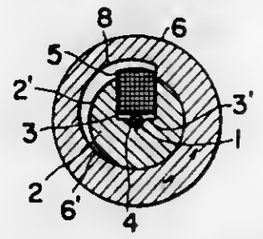
OPTICAL CONNECTOR

Makoto Onishi, Kokubunji; Katsuyuki Nagano, Kokubunji; Toshiki P. Tanaka, Kokubunji; Sadao Matsuoka, Kanagawa, and Mitsuo Tanaka, Ohme, all of Japan, assignors to Hitachi, Ltd., Japan

Filed July 9, 1975, Ser. No. 594,363
Claims priority, application Japan, July 17, 1974, 49-81111
Int. Cl.² G02B 5/16
U.S. Cl. 350—96 C 5 Claims

1. An optical fiber connector comprising, in combination: a first holding member having an axis, at least one first groove

extending axially in the surface of said axis, and at least one second groove extending axially in the base of the surface of said at least one first groove, said at least one second groove receiving a plurality of optical fiber sections to be connected optically therein; a second holding member extending along said axis and having a surface which contacts said first holding member and is diametrically graded at a portion thereof facing said first groove in said first holding member; and a coupling member, fitted in said first groove and being forcedly urged towards said optical fiber sections in said second groove of said first holding member by the relative displacement of said first and second holding members so that the diametrically



graded portion of said second holding member contacts said coupling member and forces said coupling member against said optical fiber sections, to thereby fixedly hold said optical fiber sections in said second groove of said first holding member, wherein said first holding member is a hollow cylinder having said first groove formed axially in the inner surface thereof and said second groove formed axially in the base of said first groove, and said second holding member comprises a central cylinder extending axially within said hollow cylinder, the outer surface of said central cylinder having said diametrically graded surface portion facing said at least one first groove in said hollow cylinder.

4,030,810

METHOD OF COUPLING LIGHT CONDUCTORS

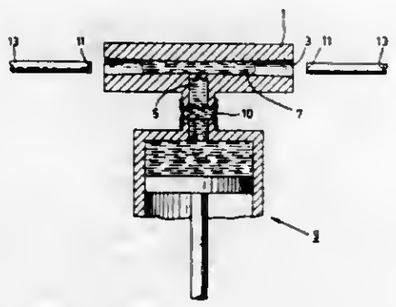
Glok Djan Khoe, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 2, 1975, Ser. No. 573,969

Claims priority, application Netherlands, May 24, 1974, 7406963

Int. Cl.² G02B 5/14

U.S. Cl. 350—96 C 2 Claims



1. A method of coupling light conductors using a connecting plug, having a body having a continuous longitudinal duct therethrough for receiving the conductors to be coupled, a transverse duct having a first end opening into a side wall of the longitudinal duct and a second end, and means for connecting said second end to a suction/pressure device, comprising the sequential steps of injecting a transparent liquid through the transverse duct into the longitudinal duct, inserting ends of the conductors into the longitudinal duct from opposite directions at least until they contact the injected liquid, sucking a porion of said liquid back through the longitudinal duct so as to suck said ends toward each other, such that at least a space between said ends remains filled with liquid, and sealing said transverse duct.

4,030,811

DEVICE FOR COUPLING A LIGHT SOURCE TO AN OPTICAL FIBER

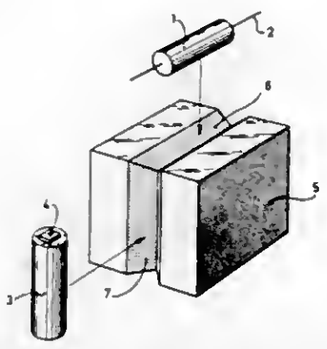
Glok Djan Khoe; Gerard Kuyt, and Adrianus Jacobus Jozef Franken, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 9, 1976, Ser. No. 675,495

Claims priority, application Netherlands, May 14, 1975, 7505629

Int. Cl.² G02B 5/14

U.S. Cl. 350—96 C 6 Claims



1. A device for coupling a light source to an optical fiber, comprising cylindrically-shaped supports for the light source and optical fiber respectively, a coupling-member having two substantially orthogonal V-shaped grooves the cylindrical supports being secured in the V-shaped grooves

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4,030,812

LYOTROPIC BIREFRINGENT FILMS

Elwood L. Strebel, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 587,240, June 16, 1975. This application Apr. 16, 1976, Ser. No. 677,701

Int. Cl.² G02F 1/13

U.S. Cl. 350—157 5 Claims

1. As an article of manufacture, a retarder for plane-polarized light beams consisting essentially of the transparent combination of essentially isotropic substrate and coating thereon comprising substantially colorless vitreous anisotropic birefringent residue of lyotropic nematic mesomorph.

4,030,813

CONTROL ELEMENT HAVING LIQUID LAYER ATTAINABLE TO GEOMETRICALLY UNEVEN STATE IN RESPONSE TO ELECTRICAL SIGNAL

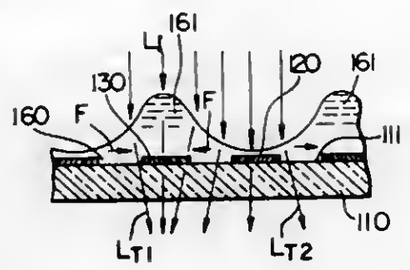
Tadao Kohashi, and Toshiharu Kurosawa, both of Kawasaki, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Dec. 17, 1975, Ser. No. 641,821

Claims priority, application Japan, Dec. 20, 1974, 49-147460; Sept. 2, 1975, 50-106731

Int. Cl.² G05D 25/00

U.S. Cl. 350—161 S 41 Claims



1. A control element including a liquid material which is

attainable to a geometrically uneven state in response to an electrical signal, the element comprising:

a support member of a solid material;

a liquid material supported by and in intimate contact with said support member; and

means for creating in said liquid material a patterned electric field having an electric vector in a direction parallel to an interface between said support member and said liquid material, so that a portion of said liquid material makes an electroosmotic movement when said electric field is present in said liquid material;

said liquid material comprising at least one silicon compound having at least one of a first functional group having chemical affinity with organic solid material useful as the material of said substrate plate and a second functional group having chemcial affinity with inorganic solid materials useful as the material of said substrate plate.

4,030,814

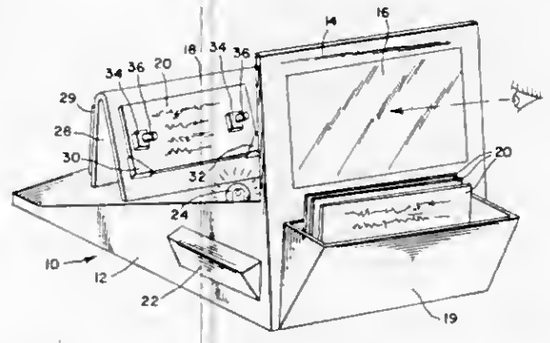
RECIPE MAGNIFIER AND VIEWER

Howard J. Clifton, and Doris V. Clifton, both of 32 Garretson Ave., Staten Island, N.Y. 10304

Continuation of Ser. No. 485,509, July 3, 1974, abandoned. This application Dec. 3, 1975, Ser. No. 637,162

Int. Cl.² G02B 27/02

U.S. Cl. 350—238 1 Claim



1. An improved data viewing device comprising in combination:

a frame including a generally horizontal base member with a flat undersurface and having an at least partially opened top;

a magnifier positioned on a support at the front of said base and extending upwardly and rearwardly of said base for enlarging data for a viewer;

a hollow storage rack on said magnifier support below said magnifier and positioned for holding data cards and for exposing top portions of the data cards to a viewer looking toward said magnifier for selection for viewing;

a card stand positioned rearwardly of said magnifier on said base and extending upwardly and rearwardly in a plane generally parallel to that of said magnifier;

means for removably holding an opaque data card on said stand at a lower level than said magnifier; and

light means mounted on said frame intermediate said magnifier and said card stand for illuminating said card while held on said stand.

4,030,815

HYDROSTATIC BEARING APPARATUS

Zygmunt M. Andrevski, Princeton, and Michael Jay Lurie, E. Brunswick, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Oct. 31, 1975, Ser. No. 627,667

Int. Cl.² G02B 7/02

U.S. Cl. 350—255 18 Claims

8. In a system utilizing lens means interposed in the path of a beam of light to focus a spot of light on successive regions of the surface of a rotating disc; apparatus for maintaining the dimensions of the light spot focused on said successive regions substantially independent of variations, if any, in the height of said successive regions, said apparatus comprising:

a. a housing for said lens means;

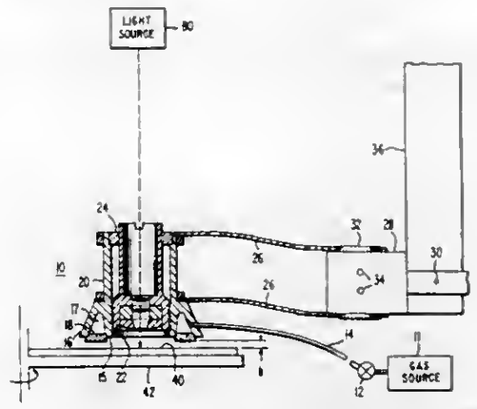
b. a support structure;

c. a movable frame mounted on said support structure for movement in a direction substantially parallel to said path of said beam of light;

d. a pressurized lubricant source;

e. hydrostatic pad means, disposed in a lower portion of said housing such that the focus of said light spot on successive regions of said surface of said rotating disc is not obstructed, and coupled to said lubricant source, for providing a lubricant film of a chosen thickness between said housing and said disc surface;

f. adjustable means for fixing an operating location for said movable frame; and



g. spring means for preloading the hydrostatic bearing formed by said lubricant film during occupancy of said operating location by said frame; said spring means comprising a first leaf spring having a first end connected to an upper portion of said housing and a second end connected to an upper portion of said frame, and a second leaf spring having a first end connected to said lower portion of said housing and a second end connected to a lower portion of said frame; said spring means also serving to orient said housing in such manner that the axis of said lens means is substantially aigned with said light path; the dimensions and characteristics of said leaf springs being such that said spring means is provided with a spring modulus which is appreciably smaller than the effective spring modulus of said lubricant film.

4,030,816

VARIABLE FOCUS RIGHT ANGLE MIRROR FOR LASER BEAM MANIPULATION

William H. Beike, and Joseph C. Hafele, both of Peoria, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

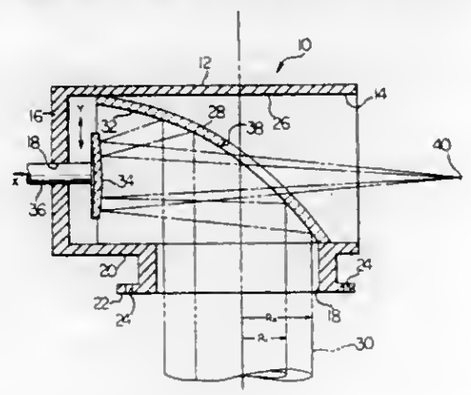
Filed Apr. 22, 1976, Ser. No. 679,420

Int. Cl.² G02B 5/10

U.S. Cl. 350—294 4 Claims

1. A mirror system for controlling a supply laser beam comprising a housing, an opening in said housing, a first mirror having the surface of a partial paraboloid of revolution, said first mirror having a reflective parabolic surface and being positioned to reflect the supply laser beam passing through said opening substantially 90° from the direction of travel of the supply laser beam, said first mirror having an opening disposed therein, and a second mirror disposed rearwardly of said first mirror and positioned to reflect the laser beam reflected from said first mirror through said opening in said first mirror, means for supporting said second mirror

relative to said housing, said second mirror having a reflective surface positioned to reflect the laser beam reflected from the



reflective surface of said first mirror forwardly through said opening in said first mirror to a point of focus.

4,030,817
APODIZATION FILTER

William E. Westell, Weston, Mass., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 22, 1976, Ser. No. 669,354
Int. Cl.² G02B *5/22*; **G01J** *1/56*
U.S. Cl. 350—314 **8 Claims**

1. In combination with a radiometric scanning system including a scanning means, an aperture defining means, and a radiometric detector, the improvement therewith comprising an apodization filter interposed between said aperture defining means and radiometric detector, said apodization filter defining a field of view and comprising a light transmitting medium which comprises an interior portion and edges, said edges extending radially outwardly from said interior portion, said interior portion being of low and essentially uniform diffuse density such that said interior portion transmits substantially all incident light impinging thereupon, said edges having a diffuse density equal to

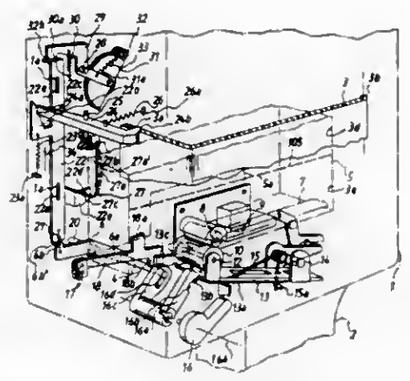
$$-\log \frac{1}{\sqrt{2\pi}\sigma} \int_{-\infty}^{x} e^{-\frac{1}{2}(x/\sigma)^2} dx$$

where x represents the distance towards the interior from said edges; σ, the standard deviation of a cumulative Gaussian; and e, the base e having a value of 2.718.

4,030,818
MOTION PICTURE SOUND CAMERA

Wolfgang Geisslinger, Munich, and Peter Ungnadner, Unterhaching, both of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed May 8, 1975, Ser. No. 575,631
Claims priority, application Germany, May 10, 1974, 2422685
Int. Cl.² G03B *23/02*
U.S. Cl. 352—72 **17 Claims**



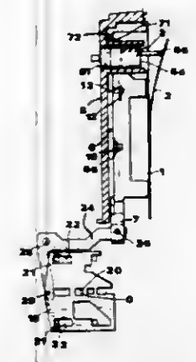
1. In a motion picture sound camera for use with containers for motion picture sound film a portion of which is accessible or with relatively small containers for motion picture film without a sound track, a combination comprising a housing having a chamber for film containers and a cover which is movable between open and closed positions to respectively afford and prevent access to said chamber, a container for motion picture sound film being insertable into said chamber in a predetermined orientation so that said accessible portion of the film therein is located in a predetermined portion of said chamber, whereas a relatively small film container which is inserted in said chamber leaves said portion of said chamber unoccupied; a sound recording mechanism mounted in said housing and including a component movable between retracted and extended positions in which said component is respectively remote from and engages the accessible portion of sound film in a container in said chamber; locking means mounted in said housing and movable between operative and inoperative positions in which said locking means respectively prevents and permits opening of said cover; and control means including actuating means movable between first and second positions, a first power train normally operative to respectively move said component to said extended and retracted positions in response to movement of said actuating means to said first and second positions, and a second power train operative to respectively move said locking means to said operative and inoperative positions in response to movement of said actuating means to said first and second positions said actuating means comprising a handgrip member, a first control member which operates said first power train in response to manual movement of said handgrip member, and a second control member which operates said second power train in response to manual movement of said handgrip member, blocking means for blocking the operation of said first power train in a direction to move said component to said extended position when said portion of said chamber is unoccupied, said first power train comprising a carrier normally movable back and forth long a predetermined path in response to movement of said actuating means to said first and second positions and said blocking means comprising a device normally extending into said portion of said chamber and into said path to thereby prevent the movement of said carrier in a direction to return said component from said retracted to said extended position in response to movement of said actuating means from said second to said first position, said device being held out of said path by a container for sound film while such container occupies said portion of said chamber; and film transporting means

in said housing and a film frame counter movable to and from a starting position, one of said power trains comprising means for effecting the movement of said frame counter to said starting position in response to movement of said actuating means to said second position.

4,030,819
CINEMATIC EQUIPMENT SHUTTER SELECTOR MECHANISM

Roberto Bencini, c/o Dr.Ing. Misitano A.G. Via Padova, 217, 20127 Milan, Italy

Filed Feb. 4, 1974, Ser. No. 439,558
Int. Cl.² G03B *41/00*
U.S. Cl. 352—79 **3 Claims**

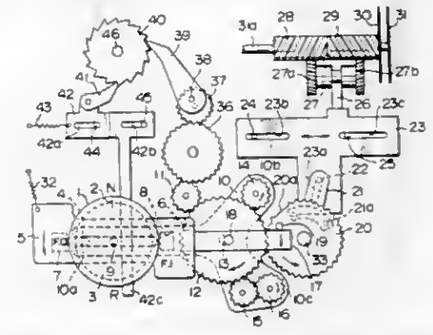


1. An aperture selector mechanism for dual film projectors having a drive spindle, comprising in combination: a projector frame, a first intermediate hub for the super 8 film spools to be co-operatively received into said drive spindle of the dual film projector, a second intermediate hub for the standard 8 film spools to be co-operatively received into the drive spindle of the dual film projector, the said first hub having a relatively small flange and the said second hub having a relatively large flange, an aperture plate having an aperture for the standard 8 film and an aperture for super 8 film, an aperture change-over lever manually displaceable from a first to a second position, and automatically displaceable from the said second to the said first position, articulation means connecting the change-over lever to the said aperture plate, the first position corresponding to the selection of the aperture for the super 8 film, the second position corresponding to the selection of the standard 8 film aperture, first resilient means acting on the change-over lever to resiliently bias said lever towards said first position, second resilient means resiliently biasing a first deplaceable means to project outside the projector frame, said first deplaceable means co-operable with the change-over lever to releasably lock the change-over lever in the said second position under the action of the said second resilient means, the said first resilient means causing the change-over lever to be automatically shifted from the said second to the said first position, the said second resilient means releasably locking the said change-over lever in said second position, the said first deplaceable means unlocking the change-over lever when it is pressed by the relatively small flange of the said first intermediate hub, a press finger formed in said change-over lever preventing the said second hub from being co-operatively received in the said drive spindle due to the physical interference with the relatively large flange of the said second hub, when the change-over lever is located in said first position.

4,030,820
AUTOMATIC FADING DEVICE FOR MOTION PICTURE CAMERA

Tetsuo Nishizawa, Kawagoe, Japan, assignor to Fuji Photo Optical Co., Ltd., Omiya, Japan

Filed Dec. 5, 1975, Ser. No. 638,195
Claims priority, application Japan, Dec. 9, 1974, 49-147977[U]
Int. Cl.² G03B *21/36*
U.S. Cl. 352—91 C **3 Claims**



1. A fading device for a motion picture camera, comprising a pair of sectors rotated relatively to each other to vary the angle of a light passing section formed thereby for effecting the fade-in or fade-out, the sectors being rotated relatively to each other by means of a mechanism driven by a motor by way of a change-over means including a light passing angle varying member which is operable to change the direction of relative rotation of said sectors, a rotatable fade operating member operatively connected with said change-over means, an indicator board carrying a first index indicating that the fade-out is possible when the sectors are opened and a second index indicating that the fade-in is possible when the sectors are closed, a pair of windows which selectively make said indices appear therethrough, said indicator board and said windows being movable relatively to each other, and said fade operating member being associated with said windows, and means operatively connecting said indicator board with said light passing angle varying member to move said board to make the corresponding index appear indicating whether fade-out or fade-in is possible.

4,030,821
REAR SCREEN PROJECTOR WITH REMOTE PROJECTION CAPABILITY

Frank C. Badalich, Chicago, Ill., assignor to Bell & Howell Company, Chicago, Ill.

Filed Jan. 9, 1976, Ser. No. 647,834
Int. Cl.² G03B *21/28*, *21/30*
U.S. Cl. 353—71 **11 Claims**

1. In a slide projection apparatus having a slide handling mechanism, the apparatus being convertible for projection of an image from a slide alternatively onto a remote surface and a built-in screen, the apparatus having projection means substantially enclosed within a housing, the projection means comprising:

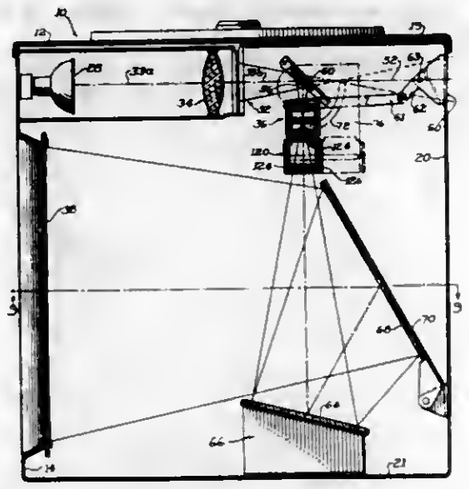
a focusable projection lens;

lens carrier means supporting said projection lens and being mounted for pivotable movement of said lens relative to said slide handling mechanism between a first orientation for projection of an image onto the remote surface, and a second orientation for projection of an image onto the built-in screen;

first lens focusing means accessible externally of said housing being coupled internally of said housing to said lens; and

second lens focusing means arranged fixedly within said housing for focusing of said lens for a predetermined

image to screen distance when said lens mounting means is moved relative to said focusing means upon movement



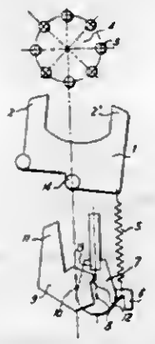
from said first lens orientation to said second lens orientation.

4,030,822

MECHANISM FOR CONTROLLING THE ADVANCE OF A MAGAZINE IN A TRANSPARENCY PROJECTOR

Serge Besancenot, 20, Avenue de Levry, 93270 Sevran, France

Filed Oct. 22, 1975, Ser. No. 624,829
Int. Cl.² G03B *23/00*
U.S. Cl. 353—103 5 Claims



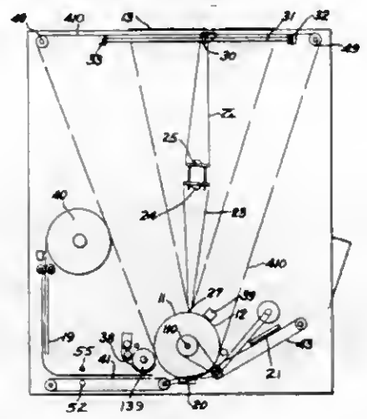
1. An arrangement for controlling the advance of a magazine in a transparency projector comprising a fork for advancing the magazine, a control member, a return spring acting on said fork and having one end constantly fixed to said control member, said control member being pivotally mounted about a fixed axis, an operating member having a cam-shaped portion cooperating with said control member, means for advancing the operating member towards the fork initially for pivoting the control member due to the action of the cam-shaped portion, said fork being pivoted by the return spring until an extreme position is reached, means on said cam-shaped portion for locking the fork against the magazine in said extreme position, and means for releasing said fork from engagement with the magazine upon withdrawal of said operating member, said fork being always urged in the same direction by said spring.

4,030,823

COPYING MACHINE

Richard D. Brugger, 4818 Walker Blvd., Erie, Pa. 16509, and Charles L. Lovercheck, 2319 S. Shore Drive, Erie, Pa. 16504

Filed Mar. 13, 1975, Ser. No. 557,973
Int. Cl.² G03G *15/30*
U.S. Cl. 355—8 13 Claims



1. A machine for copying documents comprising,
a document support,
a frame,
a cylindrical drum,
means supporting said drum on said frame to rotate about its longitudinal axis,
a photo conductor sheet supported on the outer periphery of said drum,
means holding said photo conductor sheet to the outer periphery of said drum,
a lens frame supported on said machine,
said lens frame supporting a first lens and a second lens,
means to move said lens frame through an arcuate path having its center of curvature on the outer periphery of said drum and at a speed proportional to the peripheral speed of said drum,
a means to support a supply of paper for receiving an image from said photo conductor sheet, and
conveyor means for carrying said paper from said supply into close relation with said drum and then to a dispensing means.

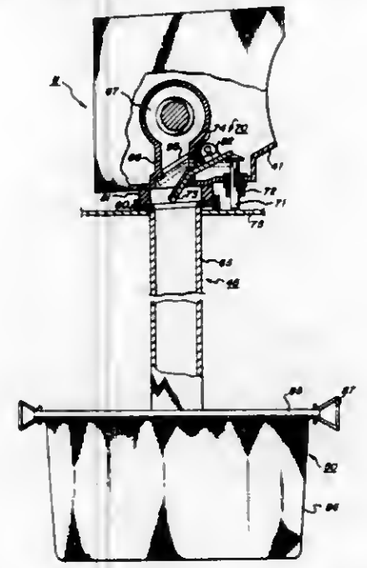
4,030,824

REPRODUCING APPARATUS HAVING AN IMPROVED IMAGING SURFACE CLEANING SYSTEM

Richard S. Smith, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 3, 1975, Ser. No. 628,183
Int. Cl.² G03G *21/00*
U.S. Cl. 355—15 6 Claims

1. A reproducing apparatus comprising:
an imaging surface;
a first frame;
means for removing residual material from said imaging surface, said removing means being supported by said first frame;
a second frame;
means remote from said removing means for storing said residual material removed from said imaging surface by said removing means, said storing means being supported in said second frame;
means for transporting said residual material from said removing means to said storing means including selectively connectable conduit means extending between said removing means and said storing means;
means for supporting one of said frames for movement relative to the other of said frames between a first position wherein said conduit means is connected between said removing means and said storing means and a second position wherein said conduit means is disconnected between said removing means and said storing means; and



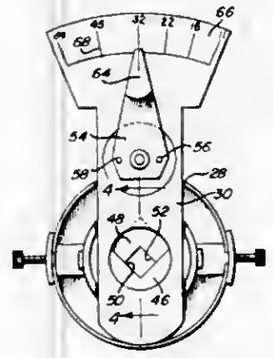
whereby upon movement of said one frame to said second position, said conduit portions are disconnected and upon movement of said one frame to said first position said conduit portions are connected together.

4,030,825

VARIABLE SIZE AND ANGULARLY ADJUSTABLE PROJECTION DIAPHRAGM

John N. Ghougasian, 666 W. 188 St., New York, N.Y. 10040

Filed Dec. 29, 1975, Ser. No. 644,899
Int. Cl.² G03B *27/76*
U.S. Cl. 355—71 10 Claims



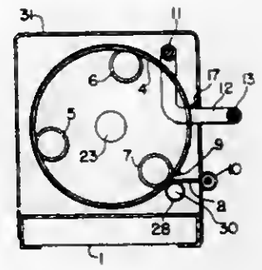
1. In combination with a camera including a forward lens assembly, means defining a film plane spaced rearward of said lens assembly and a halftone screen disposed immediately forward of said film plane, a projection diaphragm assembly including a support frame supported from said camera along the axis of said lens assembly for angular displacement about said axis, said diaphragm assembly including a pair of superposed plates disposed substantially normal to said axis and supported from said frame for inverse rectilinear oscillation along parallell paths extending generally diametrically of said axis, said plates having variably registrable openings formed therethrough of similar shapes and positioned relative to said axis whereby the aperture of said diaphragm assembly defined by registered portions of said openings is centered relative to said axis and the cross sectional shape of said aperture remains substantially constant throughout changes in the effective size of the aperture effected by inverse shifting of said plates relative to said frame.

4,030,826

EXPOSURE STATION FOR A CONTACT PRINTING DEVICE

Arlon G. Sangster, P.O. Box 414, Sterling, Mass. 01564

Filed May 27, 1975, Ser. No. 580,580
Int. Cl.² G03B *27/22*
U.S. Cl. 355—104 3 Claims



1. Apparatus for making prints comprising a translucent cylinder, means supporting the same, a source of light located therein, means rotatably mounting said cylinder,
a flexible cover member attached longitudinally to the cylinder at one end of the cover member, the other end of the cover member being free and the cover member passing about the cylinder,
the free end of the cover member being adapted for manual pulling action, rotating the cylinder from an original position where the cover member is fully wound on said cylinder to a work loading station where said cover member is unwound and extended from said cylinder, spring biased return means to return the cover member and the cylinder to said original position upon release of said free end of said cover member,
a brake for the cylinder, means for normally applying the brake to stop rotation of the cylinder at any position thereof, and manual means to release the brake and to allow rotation of said cylinder,
said manual brake release means including a rod which is located above and adjacent the cover member in the work loading station of the cover member and which is operable by the operator as he loads the apparatus, said rod being substantially parallel to said cylinder and extending substantially across said cover member.

4,030,827

APPARATUS FOR THE NON-DESTRUCTIVE EXAMINATION OF HETEROGENEOUS SAMPLES

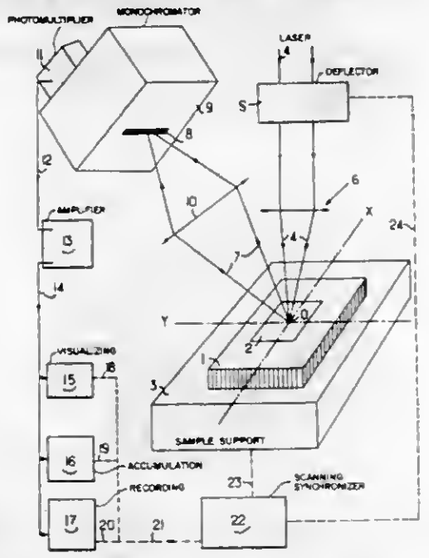
Michel Delhaye, Villeneuve D'Ascq; Yves J. M. Moschetto, Haubourdin, and Paul Dhamelincourt, Villeneuve D'Ascq, all of France, assignors to Institut National de la Sante et de la Recherche Medicale (Inserm), Paris, France

Filed Dec. 2, 1974, Ser. No. 528,804
Claims priority, application France, Dec. 3, 1973, 73.42945
Int. Cl.² G01J *3/44*
U.S. Cl. 356—75 6 Claims

1. Apparatus utilizing the Raman effect for the production of micrographic images of the polyatomic components of a sample, comprising:
a. a selectively moveable support for the sample,
b. a source of monochromatic radiation,
c. means permitting the non-destructive illumination of all or part of the sample by the monochromatic radiation,
d. optical means for converging Raman radiations scattered by the sample in the direction of a monochromator,
e. a monochromator for receiving the Raman radiations scattered by the sample, permitting the determination of the differences between the frequencies of the scattered

radiations and the frequency of the monochromatic radiation, and selecting and transmitting one of the Raman radiations,

f. photoelectric means for detecting the Raman radiation transmitted by the monochromator and

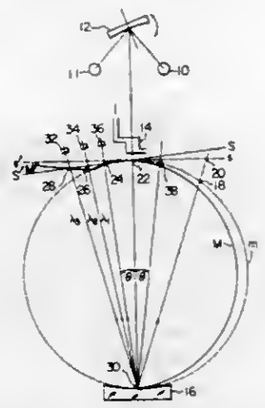


g. means for the production of micrographic images of the shape, position and distribution of the polyatomic components of the sample utilizing information furnished by the photoelectric detection means.

4,030,828
SPECTROPHOTOMETER

Shigeru Sonobe; Makoto Watanabe, both of Katsuta; Iwao Kato, Mito, and Tomoyoshi Sato, Sapporo, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Mar. 23, 1976, Ser. No. 669,705
Claims priority, application Japan, Mar. 26, 1975, 50-35472
Int. Cl.² G01J *3/42*
U.S. Cl. 356—96 5 Claims

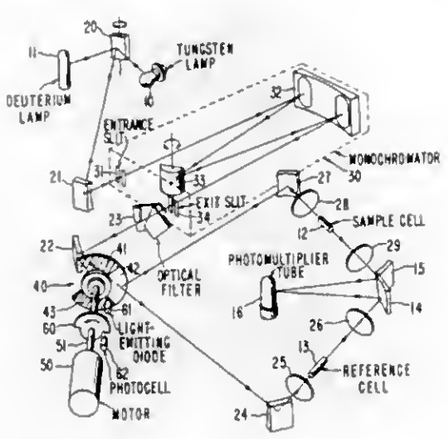


1. In a spectrophotometer, comprising a light source, a concave for receiving perpendicularly to the grating face thereof a light beam from said light source through an inlet slit, and a detector for detecting a diffracted beam from said concave grating through an exit slit; the improvement wherein said concave grating is composed of a stigmatic concave grating and that at least an exit slit is provided substantially in a plane region encompassed by a meridional image line and a sagittal image line of the diffracted light ray from said stigmatic concave grating.

4,030,829
KEYING WAVEFORM GENERATOR FOR SPECTROPHOTOMETER

Gerald E. Hooper, Los Altos Hills, Calif., assignor to Varian Associates, Palo Alto, Calif.

Filed Apr. 12, 1976, Ser. No. 676,075
Int. Cl.² G01J *3/42*
U.S. Cl. 356—97 16 Claims

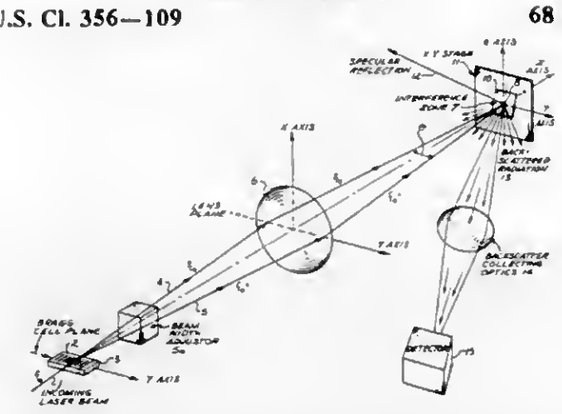


11. A double beam spectrophotometer comprising a rotatable optical chopper for directing a radiation beam alternately through separate channels to a photodetector, means for generating a bipolar square wave signal indicative of the rotational position of said optical chopper, means for integrating said square wave signal to provide a substantially triangular waveform, and means for monitoring particular cyclically recurring points on said triangular waveform to generate a plurality of pulse trains, each pulse train corresponding to a particular event occurring in the operation of said spectrophotometer, the pulses of said pulse trains being electrical timing signals for synchronizing particular events in the operation of said spectrophotometer with the rotational motion of said optical chopper.

4,030,830
PROCESS AND APPARATUS FOR SENSING DEFECTS ON A SMOOTH SURFACE

Sandor Holly, Falls Church, Va., assignor to Atlantic Research Corporation, Alexandria, Va.

Filed Jan. 5, 1976, Ser. No. 647,264
Int. Cl.² G01B *9/02*
U.S. Cl. 356—109 68 Claims



29. A process for sensing the effective magnitude and/or number and/or spatial distribution of individual depression and/or protrusion defects on a high-precision smooth surface of an article which may have said defects randomly distributed and relatively spatially-distant each from the other and which additionally may have relatively spatially-distant rough spots comprising adjacent randomly-distributed defects, comprising:

a. producing two coherent optical radiation beams of the same intensity, one of said beams having a different frequency from said other beam, the frequency difference Δf being within the radio frequency range;

b. converging said beams to form an interference zone comprising a fringe pattern within the zone of convergence, said fringe pattern continuously moving laterally at a rate equal to Δf;

c. adjusting the cross-sectional area of the fringe pattern in the x–y plane so that it is substantially smaller than said surface and no larger than an area which includes about an average predetermined spatial incidence of about one defect per pattern area on said surface;

d. adjusting λ_s to a width which is at least about 2 times wider than the effective cross-sectional dimension of a predetermined, maximum-size defect as indicated by backscatter signal magnitude;

e. positioning at least the portion of said article bearing said smooth surface within the fringe pattern in such manner that said surface lies substantially in a plane defined by the x and y axes of the fringe pattern and the angle of incidence of the bisector of the pair of converging beams forming the fringe pattern is at an angle relative to said surface at the point of incidence such as to provide an angle of specular reflection, wherein substantially all specularly-reflected radiation bypasses a receiver of the backscattered optical radiation;

f. continuously spatially displacing the interference zone and/or said smooth surface relative to each other while maintaining the relative orientation of said surface and said fringe pattern substantially as defined in (e) surpa;

g. continuing said relative displacement in such manner that substantially the entire predetermined area of said surface or sufficient area to determine the presence of unacceptable defects is scanned by said fringe pattern; and

h. as said relative displacement continues, continuously sensing the AC signal component of the backscattered radiation, wherein, at any given instantaneous moment of scan, in the case comprising sensing of a single defect within the cross-sectional area of the fringe pattern:

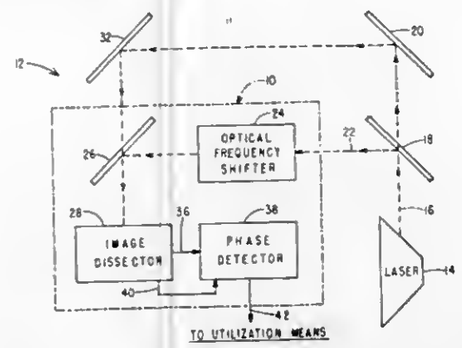
1. a substantially zero AC signal indicates smooth, defect-free surface; and

2. a substantially non-zero AC signal indicates the presence of a defect, the effective width of which is substantially proportional to the AC signal amplitude.

4,030,831
PHASE DETECTOR FOR OPTICAL FIGURE SENSING

Sankaran Gowrinathan, Westport, Conn., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 22, 1976, Ser. No. 669,412
Int. Cl.² G02B *9/02*
U.S. Cl. 356—109 2 Claims



1. Interferometric apparatus for generating an analog voltage output signal corresponding to the optical quality of a test surface, said apparatus comprising:

light source means for providing a test surface illuminating interrogation beam and a reference beam capable of producing interference patterns as a function of the optical phase difference between wavefronts in said beams;

frequency shifter means, mounted in the path of one of said beams, for introducing a predetermined frequency shift in said one of said beams;

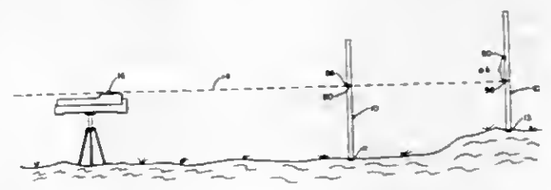
image dissector means, mounted so as to be responsive to interference between said reference beam and said interrogation beam, for providing a frequency modulated electrical signal characterized by a carrier frequency equal to said predetermined frequency shift and frequency modulated in accordance with said optical phase difference, said image dissector means comprising signal generator means, for generating electrical sweep signals that vary as a predetermined function of time and a scanning photo-electric detector means, responsive to said sweep signals, for effecting predetermined scans of said interference patterns; and

phase detector means, responsive to said frequency modulated electrical signal, for providing an analog output signal which varies with changes in said optical phase difference, said phase detector means comprising phase lock loop means, responsive to said frequency modulated electrical signal, for demodulation thereof to provide an intermediate analog signal corresponding to rate of change of said phase difference, and integrator means, connected to said phase lock loop means, for integration of said intermediate analog signal with respect to time so as to provide said analog output signal.

4,030,832
AUTOMATIC GRADE ROD AND METHOD OF OPERATION

Joseph F. Rando, Cupertino; Arthur Sobel, Los Altos Hills, and Richard W. Davidson, Santa Clara, all of Calif., assignors to Spectra-Physics, Inc., Mountain View, Calif.

Filed Feb. 10, 1975, Ser. No. 548,607
Int. Cl.² G01B *11/26*; G01C *3/08*, *15/06*
U.S. Cl. 356—152 21 Claims



18. A method of establishing a location or physical object at a pre-determined distance perpendicular from the plane of a modulated laser beam by means of an elongate scale which is mounted for movement with a modulated laser beam detector including the steps of moving said beam detector and scale conjointly along a path which intersects said beam plane transversely, detecting the intersection of the laser beam on the detector, aligning said beam detector on the beam plane of the beam, and establishing said location or physical object with respect to the portion of said scale which is at said predetermined distance from said beam detector.

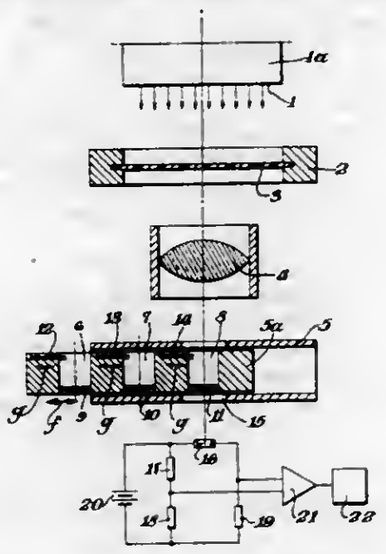
4,030,833
COLOR FILTER DETERMINING APPARATUS

Siegfried Barbieri, Brixen, Italy, assignor to Durst AG Fabrik Fototechnischer Apparate Bozer, Gerbergasse, Italy

Filed Mar. 6, 1975, Ser. No. 555,933
Claims priority, application Italy, Mar. 13, 1974, 4835/74
Int. Cl.² G01J *3/50*
U.S. Cl. 356—175 14 Claims

1. A color filter determining apparatus for determining the required insertion of color filters in the path of colored light projected from a color head incorporating the color filters comprising a housing, color windows in the housing relating to

the color components in the projected light, light filters in each of the windows to cause differently colored light components to pass through them, adjustable optical diaphragms in each of the color windows for adjusting the amount of each of the color light components projected through each of the color windows whereby a predetermined balanced color combination is caused to pass through the color windows when the



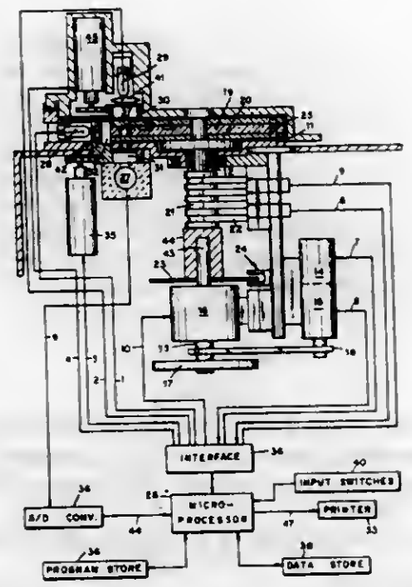
color filters are inserted in the projected light to provide the predetermined measured color balance, and a light intensity measuring means is mounted on the housing in optical line with at least one of the color windows for determining when the predetermined balance of light components is passing through the color windows from the color head and its color filters inserted in the path of light projected from it.

4,030,834

DYNAMIC MULTISTATION PHOTOMETER

Martin L. Bauer, Oak Ridge; Wayne F. Johnson, Loudon, and Dale G. Lukomy, Knoxville, all of Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Apr. 8, 1976, Ser. No. 675,085
Int. Cl.² G01N *21/24*; B04B *9/02*
U.S. Cl. 356—197 **4 Claims**



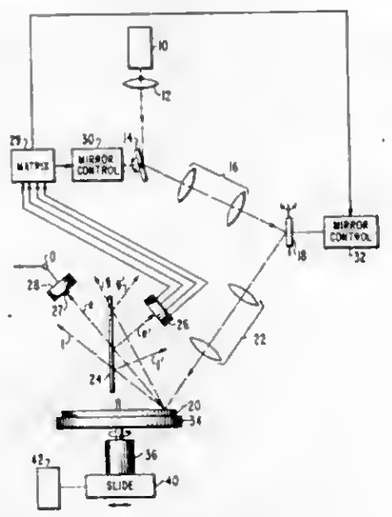
1. In a minature fast photometer analyzer including a rotor holder, a driving shaft coupled to said holder, a removable rotor provided with a plurality of cuvetes positioned close to the outer edge of said rotor and adapted to receive respective samples and reagents thereinto upon acceleration of said rotor, said rotor adapted to be fixedly positioned onto said rotor holder, a photomultiplier, a filter, and a light source, the cuvetes of said rotor adapted to be sequentially passed between said light source and filter and said photomultiplier upon rotation of said rotor holder and rotor by said driving shaft, a printer, means for transmitting and processing the output signals of said photomultiplier and conveying them to said printer, said output signals being a function of the transmission/absorbence signals received throught respective ones of said rotor cuvetes containing said respective samples and reagents therein, a thermistor mounted in said rotor for monitoring the temperature thereof, a first pair of slip rings coupled to said drive shaft and electrically coupled to said thermistor, a first pair of brushes associated with and contacting said first pair of slip rings for conveying an output signal from said thermistor, and means for energizing said lamp and providing a high voltage to said photomultiplier, the improvement comprising a clutch/brake unit provided with an idler shaft and being coupled to said rotor holder drive shaft, said idler shaft having a flywheel affixed thereto, a drive motor provided with an output shaft, drive belt coupled to said motor output shaft and to said idler shaft, means for energizing said drive motor and means for selectively energizing the brake or clutch of said clutch/brake unit, whereby said brake is adapted to be energized with said clutch deenergized until a desired speed is reached by said drive motor and then said brake is adapted to be deenergized while said clutch is then energized and said rotor holder and affixed rotor are then brought up to a desired running speed in a rapid manner to effect the rapid mixing of said respective samples and reagents within said respective cuvetes thus minimizing the presence of any bubbles and froth therein such that the rapid acquisition of said output signals can be effected.

4,030,835

DEFECT DETECTION SYSTEM

Arthur Herbert Firester, Skillman, and Istvan Gorog, Princeton, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed May 28, 1976, Ser. No. 691,206
Int. Cl.² G01N *21/32*
U.S. Cl. 356—111 **8 Claims**



7. A method for detecting defects in a spiral groove formed in a surface of a disc which comprises:

rotating said disc;

forming a beam of light, directed toward the grooved surface of said rotating disc and converging toward a point beyond said surface to illuminate a region of said rotating disc spanning a plurality of convolutions of said spiral groove, while establishing relative translation between said grooved surface of said rotating disc and said beam in such a manner that a succession of regions of said grooved surface are scanned by said light beam in a coarse spiral pattern having a pitch appreciably greater than the pitch of said spiral groove;

intercepting the zero diffraction order component of light diffracted by defect-free regions of said grooved surface when illuminated; and

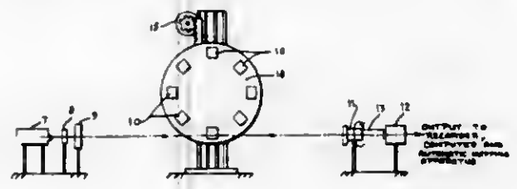
detecting the presence of light in a region surrounding the location of said zero diffraction order component interception.

4,030,836

METHOD FOR MAPPING SURFACES WITH RESPECT TO ELLIPSOMETRIC PARAMETERS

Tennyson Smith, Thousand Oaks, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Oct. 28, 1975, Ser. No. 626,148
Int. Cl.² G01N *21/40*
U.S. Cl. 356—118 **1 Claim**



1. The method of mapping and utilizing for nondestructive testing purposes certain ellipsometric parameters of a discrete surface area of a structural member comprising the steps of

scanning said discrete surface area from an oblique angle with a polarized monochromatic light beam,

analyzing the light beam reflected from said surface area with a rotating analyzer,

detecting with detector means the outputs of the rotating analyzer,

recording the output values of the detector means for rotating analyzer azimuth orientation of 0°, 45° and 90° at a multiplicity of positions along each sweep of light beam scan, deriving ellipsometric parameters from said recorded output values by means of equations

$$\psi = (\tfrac{1}{2} \arccos\left(1 - \frac{2 I_0}{I_{90} + I_0}\right)$$

$$\Delta = \arccos\left\{\left(\frac{2 I_{45}}{I_0 + I_{90}}\right)^{-1}\right\} \text{ and}$$

$$\sin 2\psi$$

$$R = I_r/I_i.$$

plotting, for each rotating analyzer azimuth orientation, the ellipsometric parameter values at their appropriate coordinate positions relative to the scanned surface area boundaries,

converting the derived ellipsometric parameter values into values of ellipsometric physical parameters for refractive index, absorption coefficient and material thickness,

plotting said ellipsometric physical parameter values at their appropriate coordinate positions relative to the scanned surface area boundaries, and

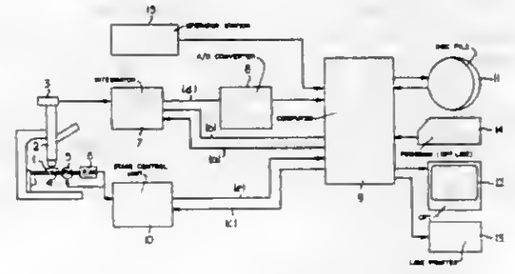
correlating said plotted ellipsometric parameter values and said plotted ellipsometric physical parameter values with an S-map of said discrete surface area.

4,030,837

METHOD AND APPARATUS FOR AUTOMATICALLY MEASURING DISTRIBUTION OF REFLECTANCE OF COALS

Kojiro Kojima, Kunitachi; Yoshihisa Sakurai, Yokohama; Tetuya Sugai, Tokyo, and Masayoshi Motegi, Yokohama, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Sept. 29, 1975, Ser. No. 617,490
Int. Cl.² G01N *21/22*
U.S. Cl. 356—209 **6 Claims**



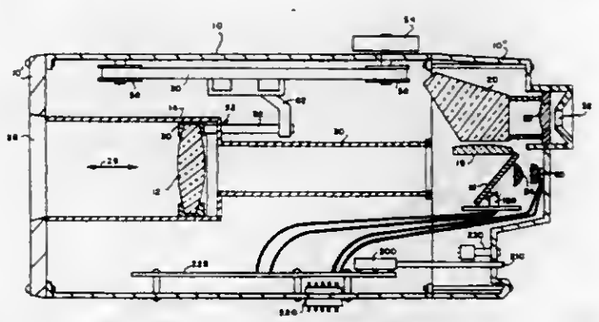
1. A method for measuring the reflectance of the coals wich comprises providing a movable sample stage below a microscope, said stage moving stepwise by a predetermined distance at each predetermined time, placing a sample on said sample stage, projecting light onto said sample, conducting light reflected by said sample to a photodetector via said microscope for converting said reflected light to an electrical output, integrating said output, repeating the above measuring operation at each such movement of said stage so as to measure the reflectance at a large plurality of points, introducing into a calculation unit outputs accumulated in said integrating unit by the instruction of a control unit controlling the movement of said stage, said calculation unit and a record indication unit, said calculation unit conducting an operation for measuring the distribution of the reflectance, and displaying the results of such calculation unit operation so as to indicate the distribution of the reflectance.

4,030,838

PHOTOMETER MODE INDICATOR

Joe Leroy Fessler, Tigard, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Continuation of Ser. No. 519,366, Oct. 30, 1974, abandoned. This application Mar. 1, 1976, Ser. No. 662,650
Int. Cl.² G01J *1/42*
U.S. Cl. 356—219 **4 Claims**



1. An apparatus for facilitating the measurement of light intensity when using a digital photometer or similar device having readout incorporating memory, comprising:

first means for providing a visually observable optical image of a scene;

second means for sensing the light intensities within a small acceptance angle of a selected portion of said scene

operatively associated with said first means and for providing a visually observable indication of said selected portion; and

third means operatively associated with both said first and said second means for simultaneously providing said sensed light intensities as an output signal for use by the digital photometer readout and for modifying the visually observable indication of said selected portion for indicating a memory mode of the digital photometer.

4,030,839

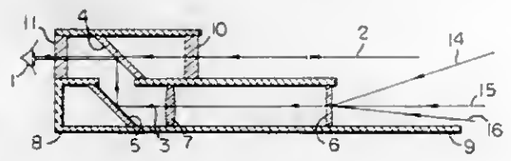
FREQUENCY SELECTIVE REFLEX SIGHT

Glenn Edward Rickert, R.R. No. 9, Huntington, Ind. 46750

Continuation-in-part of Ser. No. 245,849, April 20, 1972, abandoned, which is a continuation-in-part of Ser. No. 732,234, May 27, 1968, abandoned, which is a continuation-in-part of Ser. No. 610,302, Jan. 19, 1967, Pat. No. 3,524,710. This application Oct. 1, 1973, Ser. No. 402,376

Int. Cl.² G02B *27/34*

U.S. Cl. 356—251 **9 Claims**



1. A reflex sight for superimposing a view of a target and an image of reticle indicia comprising in combination:

light conducting reticle indicia comprising a light transmitting portion on an otherwise opaque background;

refractive collimating means having a positive focal length and displaced from the reticle indicia a distance approximately equal to its focal length to collimate an image of said reticle indicia;

first and second plane reflecting surfaces arranged in periscopic relation with the first surface being substantially fully reflective, said first and second surfaces in conjunction with said collimating means adapted to provide a displaced collimated image of said reticle indicia;

the second plane reflecting surface comprising frequency selective beam combining means through which a target may be viewed and reflected from which said collimated reticle image may be viewed, said second plane reflecting surface adapted to reflect over a substantial range of color frequencies of more than one basic color and to transmit over a substantial range of color frequencies of more than one basic color with the ratio of reflection to transmission varying for different color frequencies to thereby favor reflection over transmission in one portion of the visible spectrum while favoring transmission over reflection in another portion of the visible spectrum, said reticle indicia, said collimating means and said combining means being positioned with respect to each other so as to allow alignment of the reticle indicia image and the target with ambient light illuminating the reticle indicia being light from the target area to thereby provide a reticle image having an intensity which is proportional to the target intensity.

4,030,840

WAVEFORM SAMPLER

Robert A. Lawton, Boulder, and James R. Andrews, Lafayette, both of Colo., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 25, 1976, Ser. No. 670,468

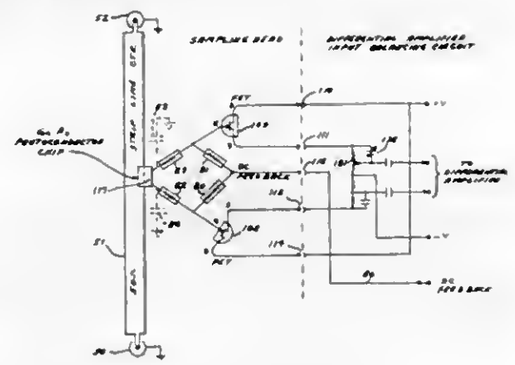
Int. Cl.² G01R *13/34*

U.S. Cl. 356—256 **6 Claims**

1. A waveform sampler comprising:

a. an electrical transmission line having a center conductor and an electrical signal input connection and an electrical signal output connection;

b. a chip of photoconductive material having a first and a second electrical contact forming a first photoconductor therebetween and providing a first electrical signal output and a third and fourth electrical contact forming a second photoconductor therebetween, and providing a second electrical signal output;



c. means for positioning the said chip of photoconductive material such that the said first and said third electrical contacts of the chip are in electrical contact with the said center conductor;

d. means for illuminating the said first photoconductor; and

e. means cooperating with the said first and the said second electrical output signals for providing an electrical signal proportional to the difference in the said first and the said second electrical signals.

4,030,841

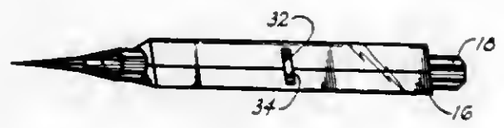
TRIANGULAR HOLDER AND INSTRUMENT

Darrell S. Balasty, 2624 N. McVicker, Chicago, Ill. 60639

Filed July 24, 1975, Ser. No. 598,665

Int. Cl.² B43K *23/00*

U.S. Cl. 401—6 **5 Claims**



1. A writing instrument holder comprising a substantially elongated walled hollow housing having a triangular outer wall shape open at least one end and adapted to frictionally engage a writing instrument therein, one wall of said housing being discontinuous, a slotted aperture communicating between said one wall and the hollow portion of said housing, a pair of recesses in spaced apart relation on said one wall, each recess being on an opposite side of said slotted aperture, a channel communicating between one of said recesses and an opposing wall of said housing, and connecting means adapted to engage said recesses.

4,030,842

COMBINATION WRITING INSTRUMENT AND INFORMATION STORAGE APPARATUS

John White, and David Abbots, both of Alexander Drive, Brookfield, Conn. 06804

Filed Aug. 3, 1976, Ser. No. 711,120

Int. Cl.² B43K *29/00*

U.S. Cl. 401—195 **10 Claims**

1. A combination writing instrument and information storage apparatus comprising:

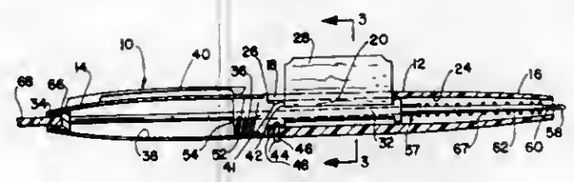
an elongated barrel having first and second free ends and a first longitudinal open-ended chamber therein, a longitudinal slot being located in an outer surface of said barrel and extending into said first chamber;

an elongated cap element having a second longitudinal chamber therein, said cap element having a first free end and a second end;

an elongated tubular spindle dimensioned to be partially inserted through said second free end of said barrel and within said first longitudinal chamber, said spindle having a third longitudinal open-ended chamber therein, said spindle having a first free end and a second free end;

means for securing said first free end of said elongated tubular spindle to said second frec end of said elongated cap element, said second and said third longitudinal chambers being partially coextensive;

rotatable securing means for rotatably securing said elongated tubular spindle partially within said barrel, said first



and said second longitudinal chambers being partially coextensive;

cartridge-type writing means dimensioned to reside within said first, said second, and said third longitudinal chambers when said barrel is rotatably affixed to said spindle and said spindle is fixedly secured to said cap element;

means for extending and retracting said writing means through said first free end of said barrel; and

a flexible sheet fixedly secured on one end thereof to the outer surface of said spindle and extending outwardly through said longitudinal slot, the rotation of said spindle in one direction about the longitudinal axis thereof retracting said flexible sheet within said first longitudinal chamber of said barrel, the rotation of said spindle in the other direction about the longitudinal axis thereof extending said flexible sheet out of said slot.

4,030,843

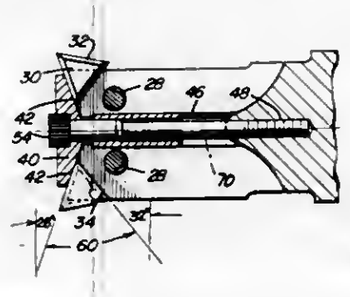
TRIPLE CORNER BORING BAR

Fredrick Eugene Harp, 733 W. Granite St., Siloam Springs, Ark. 72761

Filed Jan. 12, 1976, Ser. No. 648,747

Int. Cl.² B23B *27/16, 29/02*

U.S. Cl. 408—197 **3 Claims**



1. A boring bar tool for triangular cutting inserts comprising: a body member having a centerline; a single slot diametrically across the distal end of the body member, said slot forming only two bendable segments of said body member; only two triangular cutting inserts; a recess portion in each segment formed by a side surface and an angular surface, said angular surface being disposed at an angle of about 32° from a plane perpendicular to said centerline and at an angle of about 11 degrees from an axis perpendicular to said centerline, each recess supporting a single triangular cutting insert; a central aperture along said centerline formed by opposing further recesses in said segments and aligned with a threaded portion in said body member; an adjusting plug means having a tapered conical end portion, a cylindrical hub portion and a bolt receiving aperture extending through the center of said portions, said tapered conical end portion being disposed at an angle of about 28° from said plane when said hub portion is received in said central aperture; an adjusting bolt means cooperating with said threaded portion to adjustably secure the plug means to said body member; and two clamping means cooperating with said segments to draw the bendable segments together to firmly lock each cutting insert as adjusted between said side surface and a portion of the opposed segement.

4,030,844

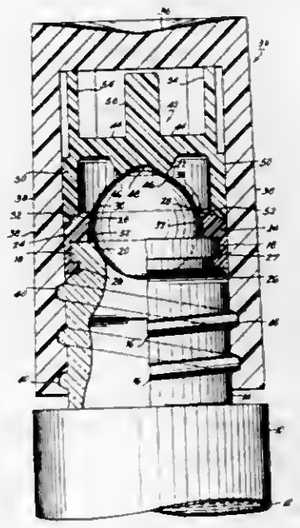
ROLL-ON DISPENSER BOTTLE ASSEMBLY

Jack Lench, West Babylon, and Luigi M. Ferrari, Douglaston, both of N.Y., assignors to Del Laboratories, Inc., Farmingdale, N.Y.

Filed Dec. 2, 1975, Ser. No. 636,915

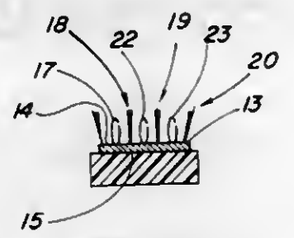
Int. Cl.² B43K *7/00*

U.S. Cl. 401—213 **5 Claims**



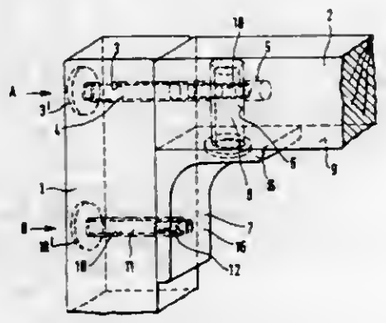
1. A dispenser bottle assembly with closure cap comprising a bottle, said bottle having a cylindrical neck with a circular mouth, said neck being provided with a male thread, a substantially cylindrical retainer, said retainer being mounted on the outlet end of said neck, a spherical ball, said ball being seated on the mouth of the neck under said retainer whereby a minor portion of said ball protrudes from said retainer and the ball is trapped between the neck and the retainer, said retainer having an extension terminating at an inner circular flexible lip adjacent the upper surface of said ball, the end of said lip which is spaced away from said mouth defining a circle having a diameter less than the diameter of said ball, and a closure cap, said closure cap having a crown and a skirt, said closure cap skirt depending from said crown and having a female thread at one end, said female thread engaging said male thread to mount said cap on said neck, said cap having an inner ball-seating central protuberance and an inner annular camming surface adjacent to said crown, said protuberance being in contact with the surface of said ball, whereby said protuberance presses said ball towards said bottle and thereby seats said ball in the mouth of said bottle, said camming surface depending from said crown and terminating in contact with said lip, whereby said circular lip is pressed against said ball to provide essentially hermetic closure sealing of said bottle.

4,030,845
TOOTHBRUSH WITH SELF-CONTAINED DENTIFRICE AND DISPOSABLE HANDLE
Dennis D. Deckert, 8550 E. 196th St., Noblesville, Ind. 46060
Filed May 17, 1976, Ser. No. 687,347
Int. Cl.² A46B 11/00
U.S. Cl. 401—268 7 Claims



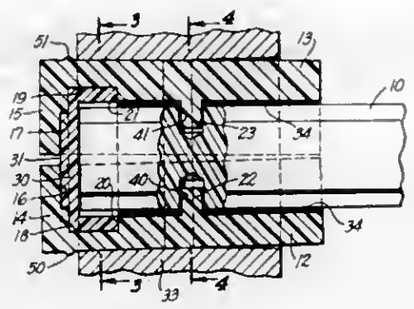
1. A teeth-cleaning device comprising:
a base having an elongated configuration and further having a top surface and a bottom surface;
a plurality of upstanding and straight bristles fixedly mounted to said base and extending outwardly from said top surface being flexible and resilient and arranged in a plurality of spaced apart and parallel rows;
a plurality of flexible and resilient loop-configured bristles fixedly mounted to said base and extending outwardly from said top surface being arranged in a plurality of spaced apart and parallel lines interspaced between and separating apart said rows, said loop-configured bristles each having an outer rounded distal end with a pair of legs extending therefrom toward and attached to said base, said legs being spaced apart defining a dentifrice-holding area with one of said legs being severed between said distal end and said base allowing release of said dentifrice; and,
dentifrice means positioned on said loop-configured bristles within said holding area and being operable to release onto teeth when rubbed against said teeth in the presence of a liquid release agent.

4,030,846
FURNITURE FRAME JOINT
Reinhard-Heinrich Flötotto, Brackweder Str. 52, D 4830 Gutersloh, Germany
Filed June 9, 1976, Ser. No. 694,357
Claims priority, application Germany, June 10, 1975, 2525791
Int. Cl.² F16B 7/18
U.S. Cl. 403—231 11 Claims



1. In a knock-down sectional furniture frame incorporating first and second frame members and a coupling for fixing said frame members together with he end of said first member abutting the side of the said second member the improved coupling which comprises a first transverse bore into said first member, a longitudinal bore extending from said end of said first member and intersecting said first transverse bore, a second transverse bore in said second member in alignment in said longitudinal bore in said first member, a third transverse bore in said second member from said second transverse bore, a metal fitting adapted to fit in the angle between said members, a connector element rigidly fixed to said metal fitting and adapted to be inserted into said first transverse bore, a connector piece insertable through said second transverse bore and said longitudinal bore and engageable with said connector element, and a fixing element in said third transverse bore and engageable with said metal fitting.

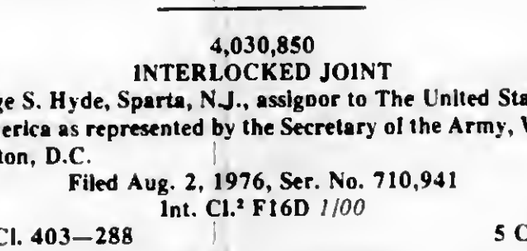
4,030,847
ADAPTER FOR FIBERGLASS TOOL HANDLES AND OTHER FIBERGLASS CONNECTIONS
Joseph Allen Carmien, Sun Valley, Calif., assignor to Nupla Corporation, Sun Valley, Calif.
Filed June 10, 1976, Ser. No. 694,844
Int. Cl.² F16B 21/00
U.S. Cl. 403—263 8 Claims



1. An adapter for connecting a tool head to a fiberglass tool handle and for making other attachments to fiberglass members in which the tool head or other member has an opening in which the end of the handle or the like is inserted, said adapter comprising a closed cap dimensioned to fit closely over the end of said handle, a pair of adapter sections having a combined exterior formed substantially complementarily to the interior of said tool head opening, said adapter sections being mounted in overlying relationship to said cap and in engagement with the adjacent exterior of said handle so that said handle portion and cap are substantially completely enclosed by said adapter sections, each of said adapter sections having a recess formed complementarily to and adapted to fit around one end of said cap, the depth of said recess being substantially equal to the wall thickness of said cap, said cap having greater compressive strength than said handle to prevent damage to the end of said handle by excessive compressive force directed against it during assembly or use, said cap also acting as a guide to provide proper alignment of said adapter sections and tool head with respect to said handle.

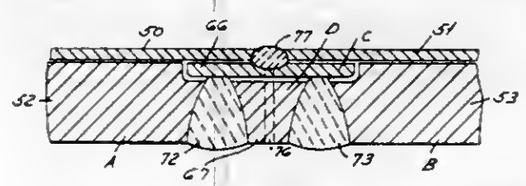
4,030,848
LINED EQUIPMENT WITH DUAL BASE METAL INSERTS
Hibbard G. Kelfert, Torrance, Calif., and Frank J. Waters, deceased, late of Northridge, Calif., by Ethel M. Waters, administratrix, assignors to Fansteel Inc., North Chicago, Ill.
Filed Oct. 18, 1976, Ser. No. 733,246
Int. Cl.² F16B 5/08
U.S. Cl. 403—272 10 Claims

1. A wall assembly joint formed between abutting ends of layered elements each comprising a layer of first metallic material and a layer of second metallic material in face-to-face relation,
a. an intermediate filler base member interposed between the ends of said layer of first metallic material and fusion welded to each of said ends,
b. an inlaid insert of said first metallic material underlying the abutting ends of the other of said layered elements and bridging said fusion welds between the filler base member and the ends of said layer of first metallic material, said inlaid insert being welded to said ends by said fusion welds, and



c. a fusion weld joining the abutting ends of said second metallic material.

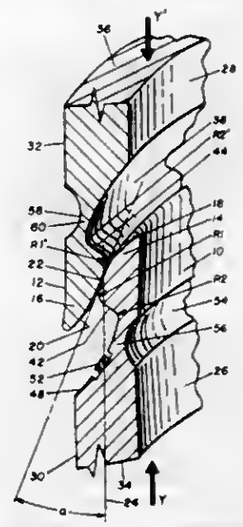
4,030,849
LINED EQUIPMENT AND METHOD OF FABRICATION
Hibbard G. Kelfert, Torrance, Calif., and Frank J. Waters, deceased, late of Northridge, Calif., by Ethel M. Waters, administratrix, assignors to Fansteel Inc., North Chicago, Ill.
Filed Oct. 18, 1976, Ser. No. 733,244
Int. Cl.² F16B 5/08
U.S. Cl. 403—272 11 Claims



1. A wall assembly joint formed between abutting ends of layered elements each comprising a layer of first metallic material and a layer of second metallic material to face-to-face relation,
a. an intermediate filler member of first material interposed between the ends of the layered elements of first material and fusion welded to each of said ends,
b. an inlaid insert of second material underlying the abutting ends of the layered elements of second material, and bridging said fusion welds between the filler base member and the layered elements of first material, and
c. a fusion weld joining the abutting ends of the layered elements of second material and the inlaid insert of second material to provide a relatively smooth surface in the second layer.

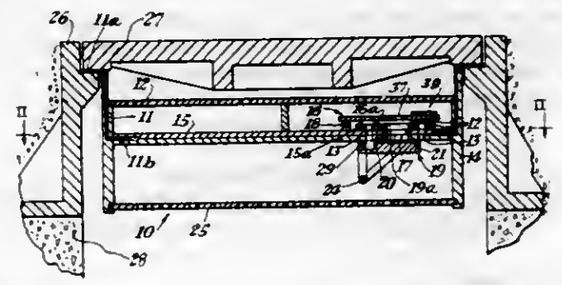
4,030,850
INTERLOCKED JOINT
George S. Hyde, Sparta, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.
Filed Aug. 2, 1976, Ser. No. 710,941
Int. Cl.² F16D 1/00
U.S. Cl. 403—288 5 Claims

1. An interlocked joint which comprises:
a hollow male section having an annularly triangularly shaped male flange located on a peripheral edge of said hollow male section, said male flange having a convex male flank surface disposed on an exterior wall of said male section, a male shouder section positioned adjacent to said male flank surface, an annular male flank groove located adjacent to said male shoulder section, said male flank groove having an annular gasket groove operatively disposed therein, and a first annular deflecting groove disposed in an interior wall of said male section, said male flank groove and said first annular deflecting groove being oppositely positioned on said hollow male section to provide a male necked down flange section;
a hollow female section having an annularly triangularly shaped female flange located on a peripheral edge of said hollow female section, said female flange having a convex female flank surface disposed on an interior wall of said female section, a female shoulder section positioned adjacent to said female flank surface, an annular female flank groove located adjacent to said female shoulder section, a second annular deflecting groove disposed in an exterior wall of said female section, said female flank groove and said second annular deflecting groove being oppositely on said hollow female section to provide a female necked down flange section; and



gasket means proximately disposed in said annular gasket groove for providing an hermetic seal between said male section and said female section when said hollow male and female sections are axially aligned with each other and forcibly pushed into interlocking engagement with each other, said male and female flanges being deflected away from each other when said male and female flank surfaces slide over each other, said male flange entering into said female flank annular groove and said female flange entering into said male flank annular groove to permit said male and female shoulder sections to make contact with each other and to resist movement of said male and female sections away from each other.

4,030,851
MANHOLE CLOSURE INCLUDING A TWO-WAY PRESSURE RELIEF VALVE
Walter C. Graybeal, 2100 N. 61st Ave., Hollywood, Fla. 33024
Filed Nov. 3, 1976, Ser. No. 738,522
Int. Cl.² E02D 29/14
U.S. Cl. 404—25 9 Claims



1. A gaseous pressure compensating manhole closure for diverting runoff water away from a sewer system adapted to be mounted in a conventional manhole opening frame with the conventional manhole cover mounted therein, the device comprising:
a cylindrical housing;
a rigid plate disposed in said housing forming a receiving upper chamber;

a pressure relief valve means coupled to said plate to allow fluid communication through said plate;

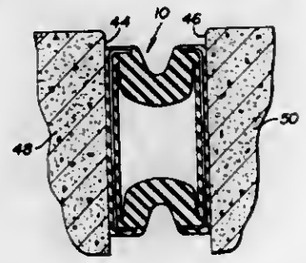
an annular supporting rim attached to said housing sized to be received mounted about the manhole opening frame perimeter.

4,030,852

COMPRESSION SEAL FOR VARIABLY SPACED JOINTS

Richard D. Hein, Wabash, Ind., assignor to The General Tire & Rubber Company, Akron, Ohio

Filed July 15, 1975, Ser. No. 596,127
Int. Cl.² E01C 11/10
U.S. Cl. 404—66 9 Claims



1. A reinforced elastomeric seal adapted for installation in lateral compression within a longitudinal space defined between the face to face surfaces of adjacent members to effect a seal between the member surfaces, comprising in combination: (a) a hollow elongated resilient elastomeric body having two generally vertical side walls respectively opposed external sealing surfaces adapted for engagement with said member surfaces, a horizontally compressible upper buckling wall merging along its edges into the respective upper edges of said side walls, and a horizontally compressible lower buckling wall merging along its edges into the respective lower edges of said side walls, said buckling walls having relatively thick central portions that buckle under compression and exert resisting forces that force said sealing surfaces of said side walls into sealing engagement with said member surfaces and said buckling walls also having relatively thin sloping edge portions adjacent said upper edges of said side walls that allow inward flexing of said buckling walls toward said side walls during said compression of the buckling walls; (b) a respective series of vertical spaced apart metal reinforcing ribs disposed within each said side wall and along the length of each said side wall with the top and the bottom of each rib of said ribs being respectively formed to extend generally horizontally within and into both a portion of said upper support wall and a portion of said lower support wall and with the alternate adjacent top ends and the alternate bottom ends of each rib of said series of said ribs being joined together in a reverse curve configuration and forming a metal member of continuous length for each series of reinforcing ribs, said ribs as formed being adapted to distribute the said resisting forces exerted by said upper and lower compressible buckling walls across the sealing surface of each said side wall; and (c) a series of fibers extending along and within said elastomeric body and linking together the top, the midsection and the bottom of each rib of said series of reinforcing ribs to reinforce said elastomeric seal against stretch during both its fabrication and its use.

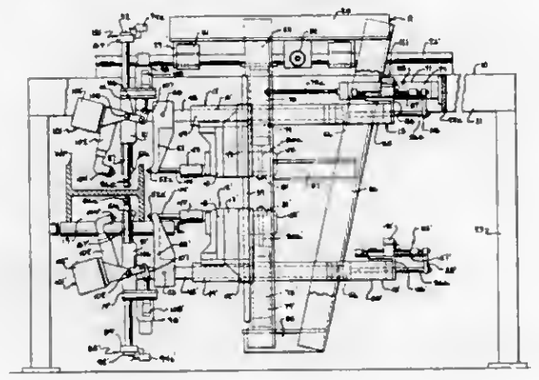
4,030,853

DRILL APPARATUS

Nell J. Mizen, 1603 Greenmount St., Rockford, Ill. 61107

Filed July 30, 1976, Ser. No. 709,960
Int. Cl.² B23B 39/18, 47/18
U.S. Cl. 408—10 21 Claims

1. An apparatus for drilling holes in a workpiece comprising: a stationary support frame, work locating means for locating a workpiece relative to the stationary support frame, a drill carriage mounted on the stationary support frame for movement relative thereto along a linear path, a drill head mounted on the carriage and having drill means rotatable about an axis paralleling said linear path, a work engaging head mounted on said drill head for movement relative thereto along a feed path paralleling said linear path, said work engaging head having a first work engaging face opposing the drill means, feed means connected to said drill head and to said work engaging head for selectively moving the latter along said feed path in drill feed and drill retracting directions, said feed means being operative in said drill feed direction to bring the drill means and the first work engaging face on the work engaging head



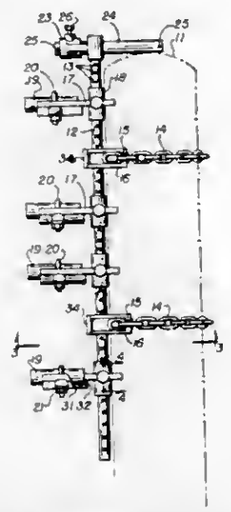
into engagement with respective front and rear facing surfaces on the workpiece and to thereafter advance the drill means into the workpiece, said drill carriage being freely movable along said linear path relative to the support frame during movement of said first work engaging head relative to the drill head by said feed means.

4,030,854

UTILITY POLE DRILL GUIDE

Roland K. Granois, San Mateo, Calif., assignor to Pacific Utilities Supply Co., San Francisco, Calif.

Filed May 13, 1976, Ser. No. 686,130
Int. Cl.² B23B 47/28, 49/02
U.S. Cl. 408—115 B 8 Claims



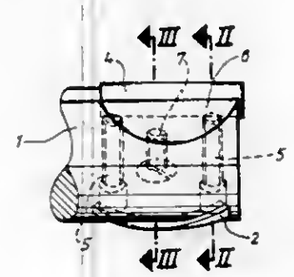
1. An adjustable drill guide assembly for use in drilling holes in wooden utility poles comprising a pair of parallelly aligned longitudinal members each having a series of longitudinally spaced apart holes, a plurality of V-shaped brackets slideably connected at their ends between the members, positioning pins located in the ends of the V-shaped brackets and disposable into the holes in the members, so that the V-shaped brackets can be spaced apart at a desired distance from one another along the members, holders disposed perpendicularly to the members on the V-shaped brackets, drill guide bushings fitting into the holders, and chain tightener means running from one member around the pole and attaching to the opposite member for holding the assembly on the pole.

4,030,855

REAMING TOOL

Dieter Kress, Aalen, Germany, assignor to Mapal Dr. Kress KG, Aalen, Germany

Filed Dec. 5, 1973, Ser. No. 421,955
Claims priority, application Germany, Dec. 11, 1972, 2260470
Int. Cl.² B23B 51/00
U.S. Cl. 408—226 6 Claims



1. A reaming tool comprising:

a. a shank having an axis and an axially terminal head portion;

b. a single blade fastened to said head portion,

1. said blade having a cutting edge elongated in the direction of said axis, radially projecting from said shank, and facing in a circumferential cutting direction; and

c. two guide ribs fastened to said head portion,

1. said guide ribs being each elongated in a helix about said axis and radially projecting from said head portion in circumferentially spaced relationship.

2. the projecting portions of said guide ribs being axially coextensive with said cutting edge over substantially the entire length of said cutting edge and radially coextensive with said cutting edge,

3. one of said guide ribs and said cutting edge projecting from said head portion in diametrically opposite directions,

4. the other guide rib being offset from said cutting edge in a direction opposite to said cutting direction,

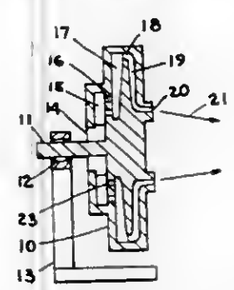
5. the angular center-to-center spacing of said guide ribs relative to said axis being much greater than the angular spacing of the circumferential center of said other guide rib from said cutting edge.

4,030,856

ROTOR WITH JET NOZZLES

Michael Eskell, 7994-41 Locke Lee, Houston, Tex. 77042

Continuation-in-part of Ser. No. 568,895, April 17, 1975, Pat. No. 4,003,673. This application Feb. 20, 1976, Ser. No. 659,797
Int. Cl.² F01D 1/18
U.S. Cl. 415—80 5 Claims



1. In a rotating rotor, wherein a working fluid enters said rotor through an entry and is accelerated by said rotor, the improvement comprising:

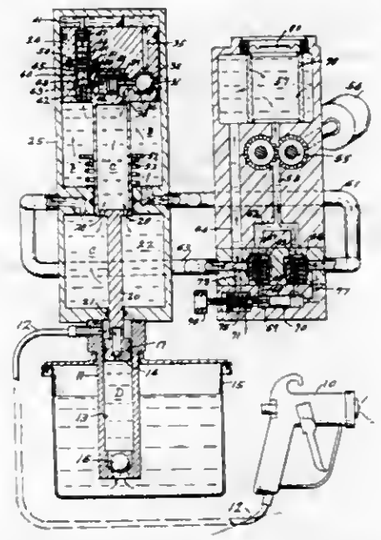
a. discharging said working fluid through an inwardly extending fluid passage, with said passage being arranged to allow movement of said working fluid forwardly in the direction of rotation for additional acceleration of said working fluid, with said working fluid being discharged from said rotor via an exit opening communicating with the inward end of said fluid passage.

4,030,857

PAINT PUMP FOR AIRLESS SPRAY GUNS

Gary C. Smith, Jr., Oregon, Ohio, assignor to Champion Spark Plug Company, Toledo, Ohio

Filed Oct. 29, 1975, Ser. No. 626,742
Int. Cl.² F04B 49/00
U.S. Cl. 417—46 3 Claims



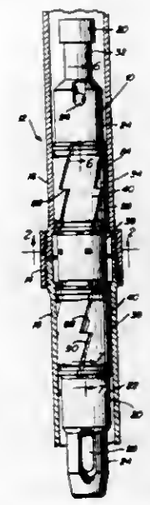
1. A system for supplying paint to a spray gun comprising, in combination, a paint pump, a hydraulic motor for actuating said paint pump, a hydraulic pump having a discharge line for supplying liquid to actuate said hydraulic motor, control means for regulating said hydraulic pump output comprising an unloading mechanism responsive to a predetermined pressure in the discharge line between said hydraulic pump and said hydraulic motor to open a bypass passage from said discharge line to the inlet side of said hydraulic pump, said unloading mechanism including a normally closed cup-shaped bypass valve in said bypass passage, said valve having an orifice in its head which, when fluid flows therethrough reduces the pressure beneath said valve and holds the valve in an open position, so long as flow in said bypass passage persists, whereby said hydraulic pump operates at substantually no load so long as said predetermined pressure persists in said discharge line, and means to adjust the predetermined pressure at which said unloading mechanism operates.

4,030,858

MULTI-STAGE RABBIT

Otis C. Coles, Jr., P.O. Box 12155, El Paso, Tex. 79912

Filed Sept. 29, 1975, Ser. No. 617,715
Int. Cl.¹ F04B 47/12
U.S. Cl. 417—56 13 Claims



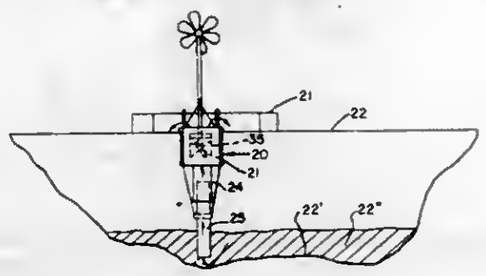
1. A plunger assembly adapted to be pneumatically reciprocated within an eductor tube string along a longitudinal axis

for lifting fluid in an annular passage formed between the tube string and the plunger assembly, comprising an elongated mandrel having a radially enlarged section adjacent an upper longitudinal end thereof, and a radially expansible packer device mounted on the mandrel in abutment with said radially enlarged section for wiping engagement with the tube string, and packer device including passage means responsive to directed flow of the fluid from said annular passage therethrough during reciprocation of the packer device in wiping contact with the tube string for imparting rotation to the plunger assembly about said longitudinal axis.

4,030,859
FLOATING AERATOR HAVING MEANS TO VARY THE LENGTH OF THE DRAFT PIPE

Dale L. Henegar, Bismarck, N. Dak., assignor to Lake Aid Inc., Bismarck, N. Dak.

Filed Sept. 2, 1975, Ser. No. 609,581
Int. Cl.² F04B *21/00*; **B01F** *3/04*
U.S. Cl. 417—61 **4 Claims**



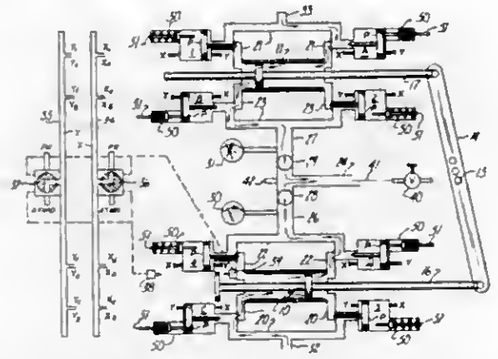
1. A water circulating device for circulating and aerating the water in a lake, a pond, or reservoir comprising a floatation raft, a shaft rotatably mounted on said raft to rotate about a vertical axis, a wind drive motor for driving said shaft, a cylindrical mixing chamber mounted beneath said raft, said chamber having a cylindrical side wall and a bottom wall and having an opening formed by the side walls upper edge located above the surface of the lake, pond, or reservoir, said shaft projecting downward into said mixing chamber, a propellor mounted to the lower end of said shaft within the mixing chamber, a plurality of vertically elongated pipes, said plurality including uppermost and lowermost pipes, said pipes being mounted in telescoping relation with the uppermost pipe fixed to the bottom of the mixing chamber, said chamber having an opening in the bottom communicating with said uppermost pipe, said lowermost pipe being slidably mounted relative to said raft and said uppermost pipe, means on said raft to selectively adjust said lowermost pipe upward and downward relative to the raft and the uppermost pipe and relative to the bottom of the lake so that the lowermost edge of the lowermost pipe may be located near the bottom of the lake, said propellor having pitched blades, so that upon rotation of the propellor in the chamber by the wind driven motor rotating the shaft, the propellor in the chamber will draw water up from the bottom of the lake into the lower end of the lowermost pipe up through the plurality of pipes into the mixing chamber, with the water moving upward to the surface and over the upper edge of the side wall to aerate the water.

4,030,860
VARIABLE PROPORTIONAL METERING APPARATUS

Ronald E. Standlick, 4506 Sudbury St., Warren, Mich. 48092

Filed Mar. 15, 1976, Ser. No. 666,747
Int. Cl.² F04B *35/00, 23/06, 7/02, 21/02*
U.S. Cl. 417—63 **3 Claims**

1. An apparatus for metering proportional quantities of two fluids to obtain a desired mixture of the fluids, comprising,
- a reference cylinder having opposite ends, a piston, and a piston rod,
- a controlled cylinder having opposite ends, a piston, and a piston rod,
- a beam having opposite ends, a pin pivotally mounting said beam intermediate its said ends,
- means pivotally connected said piston rods to said opposite ends of said beam whereby the travel directions of said pistons in said cylinder is controlled proportional to one another with said pistons moving in opposite directions;
- said beam controlling proportional travel of said pistons to provide metering of proportional quantities of said fluids,
- a bi-directionally powered inlet valve on each end of each said cylinder; a bi-directionally powered outlet valve on each end of each said cylinder;
- supply ducts for furnishing one fluid under pressure to both said inlet valves on said reference cylinder; supply ducts for furnishing another fluid under pressure to both said inlet valves on said controlled cylinder;
- outlet ducts receiving the one fluid from said outlet valves on said reference cylinder; outlet ducts for receiving the other fluid at said outlet valves at said controlled cylinder; and
- means receiving the fluids from said outlet ducts for mixing the fluids together,

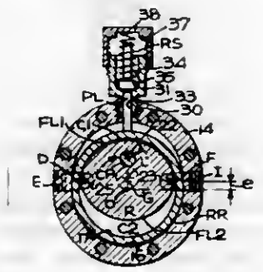


each said inlet valve on one end of each said cylinder being cross-paired with one said outlet valve on the opposite end of each said cylinder;
- power means for operating said valves between open and closed positions; and
- control means for closing one cross-pair of said valves and opening said other cross-pair of said valves on both said cylinders in one direction of opposite travel of said pistons so that fluids under pressure introduced at one said end of each said cylinder cause said pistons to move and to force the fluids out said other end of said cylinders;
- said control means reversing the condition of said valves in the opposite direction of travel of said pistons from open-to-closed and from closed-to-open so that the fluids under pressure are introduced at the opposite ends of said cylinders causing said pistons to move in the opposite direction of travel to force fluids out the opposite ends of said cylinders.

4,030,861
VARIABLE DISPLACEMENT ROTARY PISTON EXPANSIBLE CHAMBER DEVICE

A. Frank Putz, 401 N. 89th St., Wauwatosa, Wis. 53226

Continuation-in-part of Ser. No. 553,332, Dec. 16, 1974. This application Nov. 17, 1975, Ser. No. 632,853
Int. Cl.² F04C *15/00*
U.S. Cl. 418—27 **38 Claims**



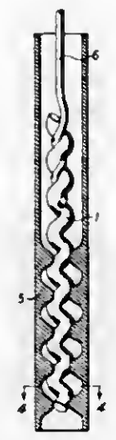
1. A rotary piston, variable volume device comprising, in combination,

- a housing having an elongated cavity therein and spaced inlet and exhaust ports which communicate with said cavity,
- a shaft rotatably journalled in said housing and extending into said cavity,
- a chamber-defining member positioned within said cavity and having an internal cylindrical bore surrounding said shaft whose cross section is a closed curve,
- a cylindrical rotary piston rotatable within said bore with its axis parallel to the shaft axis and having first and second arcuately spaced apices which divide said bore into first and second variable volume chambers on opposite sides of said rotary piston,
- means including a force transmitting member carried by said shaft for operatively coupling said piston to said shaft so that they rotate together in a one-to-one ratio while concurrently permitting rocking movement of said rotary piston relative to said force transmitting member and to said shaft about a surface radially removed from the geometric center of the piston cross section and so that said first and second apices remain in continuous contact with said bore in all positions of said shaft, said force transmitting member constituting the sole motion controlling means between said shaft and said rotary piston and said first and second apices being cammed on said bore so that said rotary piston reciprocates within said bore as it rotates together with said shaft and varies the volumes of said first and second chambers inversely from minimum to maximum and back to minimum during each revolution of said shaft, said chamber-defining member being movable within said cavity in a direction longitudinal of said cavity to vary the eccentricity between the axis of said shaft and the center of said closed curve defining said bore cross section and thus change the volumetric displacement of said device.

4,030,862
HELICAL GEAR PUMP AND METHOD OF MANUFACTURING THE SAME

Erik Larsson, Dalagatan 86A, 113 43 Stockholm, Sweden

Filed Apr. 21, 1975, Ser. No. 569,670
Claims priority, application Sweden, Apr. 22, 1974, 7405395
Int. Cl.² F01C *1/10, 21/08*; **F04C** *1/06*; **B23P** *15/10*
U.S. Cl. 418—48 **6 Claims**

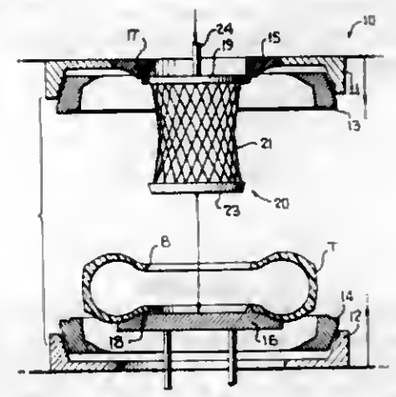


1. Helical gear pump having a single-threaded rotor screw which is rotatable in a stator which is internally double-threaded, each stator thread having twice as large pitch as the thread of the rotor screw, said rotor screw having a configuration substantially identical to that obtained by winding a wire or bar having a uniform, circular cross-section into a cylindrical helix, the outer diameter of said rotor screw being about twice as large as the diameter of said wire or bar, said bar or wire having a non-circular configuration within a cross-section plane drawn normal to the central axis defined by said cylindrical helix.

4,030,863
VENTING RETAINER FOR CURING TUBE

Kenneth T. MacMillan, 4992 Wesleyan Woods Drive, Macon, Ga. 31201

Filed July 19, 1976, Ser. No. 706,374
Int. Cl.² B29H *5/02, 5/04*
U.S. Cl. 425—17 **20 Claims**

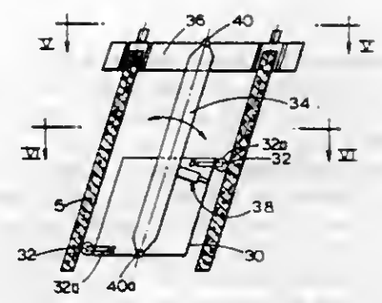


1. A venting retainer for a tire curing bladder comprising means for generally porously encapsulating an exterior surface of a tire curing bladder to vent air from between the exterior surface of the bladder and the tire interior, said encapsulating means being an element made separately from the bladder.

4,030,864
APPARATUS FOR MAKING INCLINED HOLLOW CONCRETE COLUMNS USING SLIDING FORMWORK

Tomas Berge Einstabland, Asker, and Torlak Opedal, Hosle, both of Norway, assignors to Ingenior F. Selmer A/S, Oslo, Norway

Filed June 24, 1975, Ser. No. 589,833
Int. Cl.² E046 *11/28*
U.S. Cl. 425—65 **5 Claims**



1. An apparatus for molding inclined free-standing hollow columns of concrete, said apparatus comprising:
- a slip form unit positionable above an already formed solidified section of a column and serving as a mold for the formation of additional sections of the column;
- a combined carrier and guide means supporting at an upper portion thereof said slip form unit, said carrier and guide means comprising a lower portion adapted to be positioned within the column, a support stem pivoted at the lower end thereto to said lower portion, and a platform pivoted to an upper portion of said stem, said slip form unit being supported by said platform;
- means, mounted on said carrier and guide means and adapted to contact the inner surface of the already formed solidified section of the column, for imparting a lateral displacement to said carrier and guide means and to said slip form unit and for thereby controlling and adjusting the inclination of said slip form unit, with re-

spect to the already formed solidified section of the column, for molding the next additional section of the column;

steering means between said lower portion of said carrier and guide means and said stem for selectively pivoting said stem about the pivot connection thereof with said lower portion; and

means, operatively connected to said carrier and guide means, for raising said carrier and guide means and said slip form unit to positions for forming the next additional section of the column.

4,030,865

APPARATUS FOR SIMULTANEOUS DEFIBERIZATION OF WASTE PAPER STOCK AND UNIFORM DISPERSION AND ACCUMULATION OF THE DEFIBERIZED FINE FIBER STOCK FOR DRY WEB FORMATION

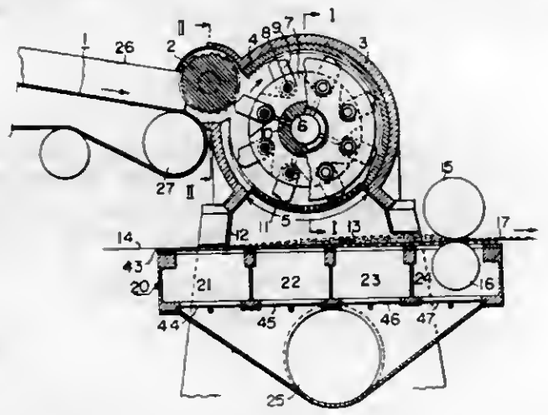
Tadashi Kobayashi, 1560-2 Tenma, Fuji, Shizuoka, Japan

Filed July 3, 1975, Ser. No. 592,910

Claims priority, application Japan, July 8, 1974, 49-77413

Int. Cl.² B29C *13/00;* **B29D** *7/00*

U.S. Cl. 425—82 **1 Claim**



1. An apparatus for simultaneous defiberization of waste paper stock and uniform dispersion and accumulation of the defiberized fine fiber stock for dry web formation comprising in combination:

a. a defiberizing drum (3) having an opening therein, conveyoring means for radially delivering thereinto roughly crushed waste paper stock, having a return roll (27) outside said drum at said opening, and a feed belt (1) guided by said return roll (27) to guide the paper stock to said drum, a saw-tooth feed gear (2) in said opening above said return roll (27) for feeding the paper stock, into said drum, inner cylindrical teeth (4) disposed inside the drum circumference with a lower outlet section (5) having drop apertures (11) therein for the delivery of said defiberized fine stock formed through said section (5);

b. a hollow rotary shaft (6) rotatably disposed in said defiberizing drum;

c. a multitude of swing hammers (9) affixed swingably around said hollow rotary shaft (6) both circumferentially and axially at respectively regular intervals, said swing hammers (9) having milling edges (38) formed at the top facing said teeth (4) with a suitable clearanee maintained between said edges (38) and said teeth (4);

d. air vents (10) on the hollow rotary shaft for passing outer air through said shaft to the inside of said drum; and,

e. a suction wire sheet (43) for receiving and supporting a thin paper sheet to receive and accumulate fine stock thereon, said suction wire sheet (43) being disposed under said drop apertures (11).

4,030,866

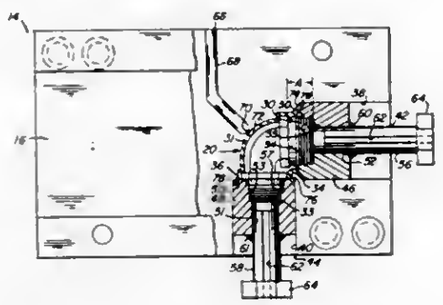
MOLDING APPARATUS

Edward A. Madej, Verona, Pa., assignor to Robroy Industries, Verona, Pa.

Filed Nov. 24, 1975, Ser. No. 634,516

Int. Cl.² B29C *27/14*

U.S. Cl. 425—116 **8 Claims**



1. In a molding apparatus for applying a protective coating to an irregularly sized article comprising,

a shell having upper and lower body portions,

said upper and lower shell portions each having a cavity of a preselected configuration to receive an article for coating,

a fluid inlet extending through said shell into said cavities,

connecting means for securing together said upper and lower shell portions to position said cavities in overlying relation and surrounding an article to be coated, said secured shells provide a mold cavity and openings extending through said respective shell portions into said mold cavity,

seal means for sealing said openings in said mold cavity,

an article to be coated housed within said mold cavity and carrying therewith said seal means on its end portions being secured to the end portions of the article to be coated within said cavities to retain the article in spaced relation with said shell portions and to form an annular molding surface which surrounds the article and terminates adjacent the end portions thereof in radially extending annular portions,

a moisture resistant, resilient polymeric liquid adapted to be introduced through said fluid inlet to fill said cavity and occupy the annular molding surface thus surrounding the article and forming a resilient polymeric coating on the surface of the article, and

providing annular resilient portions extending radially on the end portions of the article.

4,030,867

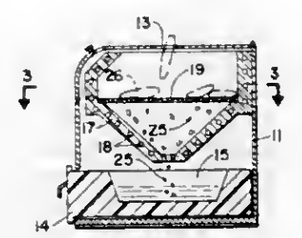
APPARATUS FOR FORMING A BAR OF SOAP FROM LEFTOVER PIECES

Don D. Everman, California, Md., assignor to Lawrence Peska Associates, Inc., New York, N.Y.

Filed July 19, 1976, Ser. No. 706,140

Int. Cl.² B29C *5/00;* **B29B** *5/06;* **C11D** *13/16*

U.S. Cl. 425—144 **6 Claims**



1. Apparatus for molding soap bars from leftover pieces of soap, comprising an outer casing with a hinged and slotted door in the upper surface thereof;

an open topped hopper fixed within the casing under the slotted door, said hopper including insulating walls defining a chute at the bottom thereof;

an apertured partition, extending laterally within the hopper so as to retain the pieces of soap within the hopper when they are introduced through the slotted door;

a mold slideably positioned within the casing, below the chute and adapted for being withdrawn through an aperture in the casing;

heating means, so situated within the hopper as to melt the pieces of soap resting on the partition;

control means for activating and deactivating the heating means; and

weight sensing means for sensing the weight of the pieces of soap and providing a triggering signal to the control means when the weight of the accumulated pieces of soap is equal to the weight of a complete bar, whereby the pieces of soap are then melted, the molten soap flowing through the apertured partition, down the chute and into the mold to form a new bar whereupon the heater is deactivated.

4,030,868

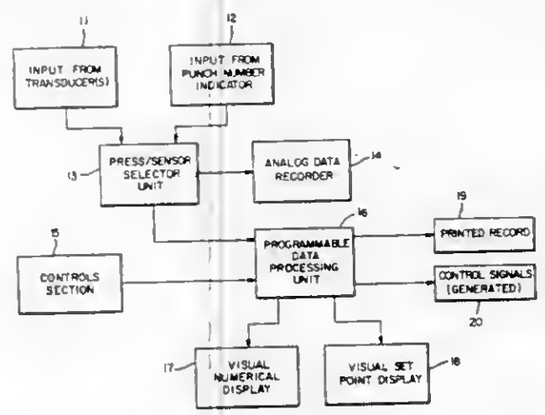
FORCE MEASUREMENT AND ANALYSIS PARTICULARLY RELATING TO ROTARY TABLET PRESSES

Joseph James Williams, West Caldwell, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Mar. 15, 1976, Ser. No. 666,734

Int. Cl.² B29C *3/06*

U.S. Cl. 425—149 **41 Claims**



1. Instrumentation for use in connection with tablet presses having at least one tablet die and an associated punch set, such as high-speed rotary tablet presses, comprising:

a. first means operatively connected with a tablet press for obtaining tablet formation information representative of one or more tabletting events from any tablet die/punch set combination of said press and for identifying said tablet die/punch set combination;

b. second means connected to said first means for converting the tablet formation information into a convenient first data form; and

c. data processing means connected to said second means for processing in a pre-established manner said tablet formation information in said first data form and providing output signals representative thereof, including, where appropriate, tablet press control signals, said data processing means including third means for selectively making available for processing tablet formation information from a desired one or more of the tablet press die/punch set combinations.

4,030,869

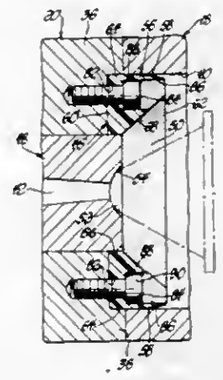
LOCATING RING FOR INJECTION MOLDS

Leonard G. Miller, Bloomfield Hills, and Raymond P. Hale, St. Clair Shores, both of Mich., assignors to Molmec, Inc., Walled Lake, Mich.

Filed July 15, 1975, Ser. No. 596,078

Int. Cl.² B29F *1/022*

U.S. Cl. 425—247 **14 Claims**



1. An injection molding assembly for injection molding plastic components and comprising; a stationary platen having an opening therein, a movable platen, a first mold part having an inlet passage and supported on said stationary platen, a second mold part supported on said movable platen for movement into and out of engagement with said first mold part, an injection nozzle disposed in said opening for injecting plastic material into said inlet passage in said first mold part, an annular locating ring attached to said first mold part and disposed in said opening for locating said first mold part relative to said stationary platen, said locating ring being made of plastic, said locating ring including an outer peripheral surface engaging said opening in said stationary platen for positioning said first mold part relative to said stationary platen, said outer peripheral surface of said locating ring including a tapered portion extending radially inwardly for guiding said locating ring into said opening in said stationary platen, said locating ring including a first face engaging said first mold part and a second face spaced therefrom and disposed in said opening in said stationary platen, said outer peripheral surface including an axially extending portion extending from said first face toward said second face and terminating at said tapered portion, said tapered portion extending radially inwardly from said axially extending portion to said second face, said axially extending portion being in abutting engagement with said opening in said stationary platen to prevent transverse movement of said first mold part relative to said stationary platen, said locating ring including a central opening therethrough, said central opening including an inclined portion extending radially inwardly from said second face thereof, said locating ring including cavities extending thereinto from said first face thereof to define an outer annular wall defining said outer peripheral surface and an inner annular wall defining said central opening and a base connecting said annular walls and defining said second face and ribs extending between said annular walls and said base.

4,030,870

REFRIGERATOR CONSTRUCTION AND THE MANUFACTURE OF PANELS THEREFOR

Donald A. Bunce, Wirral, England, assignor to Kelvinator, Inc., Grand Rapids, Mich.

Filed Oct. 15, 1974, Ser. No. 514,831

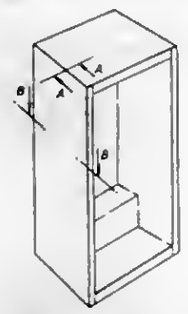
Claims priority, application United Kingdom, Feb. 21, 1974, 7914/74

Int. Cl.² B29C *17/02*

U.S. Cl. 425—383 **11 Claims**

1. An apparatus for forming thermoplastic panels for refrigerators, freezers or the like comprising clamp means for

clamping in a fixed position a flat sheet of thermoplastic material, said sheet having a plurality of peripheral edges, heater means operable to simultaneously heat selected peripheral portions of said sheet along at least two spaced lines, said lines being adjacent and parallel to each other and to at least one of said edges, and fold means operable to fold peripheral por-



tions of said sheet along said lines to form a channel of predetermined width, said fold means initially applying a force to a relatively unheated peripheral portion of said sheet after said selected peripheral portions have been heated, said force causing peripheral portions of said sheet to fold along said lines.

4,030,871

MOLD APPARATUS

John Farley Cobb, Van Buren, Ark., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed June 23, 1976, Ser. No. 699,082

Int. Cl.² B29C *17/04*

U.S. Cl. 425—388 **6 Claims**

1. Mold apparatus for thermoforming an article to include a first hollow portion which is spaced from and overhangs a second portion of said article, said mold apparatus comprising:

a plurality of mold elements including a first, carrier element having a base portion and a turned portion projecting from said base portion, and a second element movably mounted to the distal end of said turned carrier portion, and comprising a plurality of segments;

first spring means for urging said segments yieldably into a series stacked arrangement, second spring means for yieldably urging said series stacked arrangement into a preselected turned relationship with said turned portion of the carrier to define a resiliently flexible returned mold, said mold elements cooperatively defining a mold apparatus about which a sheet may be thermoformed to define a wall having a hollow turned projection on a base and a returned hollow portion extending from the distal end of the turned projection and being spaced from and overhanging said base, said first and second spring means cooperatively permitting facilitated removal of said elements from said hollow molded article portion by permitting turning of said elements relative to each other during such removal.

4,030,872

COMBINED MOULD ELEMENT AND SEALING RING

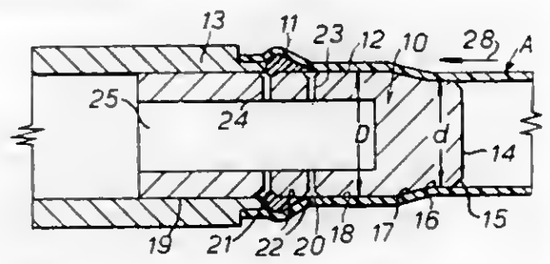
Gunnar Parmann, Mathopen, Norway, assignor to Rieber & Son Plastic-Indnstri A/S, Bergen, Norway

Filed Aug. 28, 1975, Ser. No. 608,758

Claims priority, application Norway, Sept. 2, 1974, 743130; Nov. 4, 1974, 743955; Nov. 4, 1974, 743954; Apr. 24, 1975, 751460

Int. Cl.² B29C *17/00*

U.S. Cl. 425—393 **32 Claims**



1. A combined mould element and sealing ring, suitable for sealing off a joint between a socket end and an insert end of two cooperating pipes formed from thermoplastic material

and for being used as a portion of a body of a mould for both fabricating said socket end of the one pipe and simultaneously inserting said ring in an internal groove in the socket end produced thereby,

said combined mould element and sealing ring having inner and outer surfaces defining therebetween a unitary body,

the main bulk of said body being composed of elastically yielding material,

whereas said body has within its contour at least one zone composed of relatively non-elastic material capable of rendering said zone stable as regards its shape compared with the remainder of said body.

4,030,873

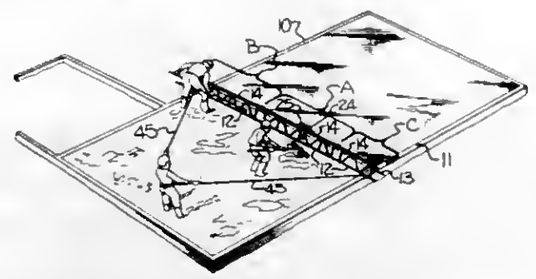
VIBRATING CONCRETE SCREED

Donald R. Morrison, Charlotte, N.C., assignor to Lewis T. Morrison, Orange Park, Fla., a part interest

Filed Apr. 26, 1976, Ser. No. 680,116

Int. Cl.² B28B *1/08*

U.S. Cl. 425—456 **8 Claims**



1. A vibrating concrete screed comprising

a. an elongate open structure frame including a pair of spaced apart screed plates adapted to engage and level concrete as said screed is moved over the concrete,

b. bearings fixed on said frame and spaced inwardly from each end of said frame,

c. a vibrating element consisting of a semiflexible shaft loosely supported for rotation in said bearings and extending throughout the length of said frame and beyond said bearings spaced inwardly from each end of said frame, and

d. drive means carried by said frame for rotating said shaft at a sufficient speed to cause deflection of the portions of said shaft between and beyond said bearings and to impart uniform vibrations throughout the lengths of each of said screed plates.

4,030,874

METHOD OF AND APPARATUS FOR CONTROLLING COMBUSTION

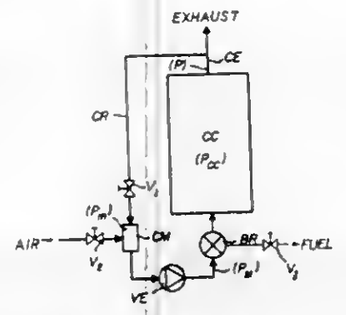
Bernard Vollerin, Geneva, Switzerland, assignor to Battelle Memorial Institute, Carouge, Geneva, Switzerland

Filed Apr. 22, 1976, Ser. No. 679,100

Claims priority, application Switzerland, Dec. 15, 1975, 16207/75

Int. Cl.² F23M *9/00*

U.S. Cl. 431—9 **10 Claims**



1. A method of operating a combustion chamber comprising the steps of:

feeding a fluid combustible with a combustion-sustaining gas to said chamber and burning said combustible therewith to form an exhaust gas in said chamber mixing a recirculated portion of said exhaust gas with an oxygen-containing gas to form said combustion-sustaining gas and feeding the mixture underpressure into said chamber;

establishing a predetermined normal ratio between the mass-flow rate of said exhaust gas and the mass-flow rate of said oxygen-containing gas,

continuously detecting pressure in said chamber; and

increasing said ratio on surging of the pressure in said chamber and decreasing said ratio on recession of said pressure.

4,030,875

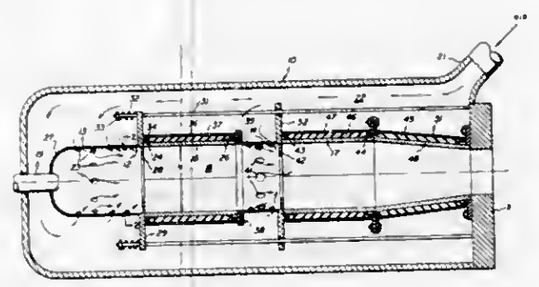
INTEGRATED CERAMIC-METAL COMBUSTOR

Clayton M. Grondahl, Elnora, and Bruce W. Gerhold, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 22, 1975, Ser. No. 643,540

Int. Cl.² F23D *15/02*

U.S. Cl. 431—352 **11 Claims**



1. In a gas turbine combustion apparatus wherein said combustion apparatus is lined on the inside with a layer of ceramic material confining the sequential zones of combustion maintained downstream of means for introducing fuel into said combustion apparatus, means are provided in flow communication with the outside of the combustion liner for supplying air, holes are located passing through the combustion liner in flow communication with said means for supplying air for the transport of air through said combustion liner into said combustion apparatus and means are disposed at the downstream end of said combustion apparatus for conducting the combustion products from said combustion liner into a turbine structure, the improvement comprising:

a continuous combustion liner construction in which at least one metal liner length and one ceramic liner length are disposed in series, said one metal liner length being disposed upstream of said one ceramic liner length;

each ceramic liner length being free of holes through the wall thereof in flow communication with said means for supplying air, the requisite holes being located in each metal liner length employed.

4,030,876

METHOD AND APPARATUS FOR REGENERATING ACTIVATED CARBON

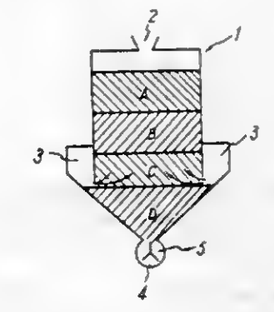
Kiyoshi Akae, Kyoto; Masaya Kitada, Nishinomiya, and Yoshiyuki Uno, Ibaraki, all of Japan, assignors to Unitika Ltd., Amagasaki, Japan

Filed June 10, 1975, Ser. No. 585,458

Claims priority, application Japan, June 12, 1974, 49-67410; Jan. 23, 1975, 50-11118

Int. Cl.² F27B *15/00*

U.S. Cl. 432—14 **7 Claims**



1. A method for regenerating activated carbon using a furnace of the columnar type having a treatment chamber of substantially uniform sectional shape and area along a vertical direction and having an upper end provided with a spent carbon feed port and lower end provided with reactivated carbon delivery port comprising the steps of:

feeding through said feed port spent carbon having a bulk density of at least 0.35g/cm², a particle size distribution of 5 to 40 mesh and a water content of 50% to 120% by weight;

discharging carbon from said delivery port so as to cause a stabilized downward movement of the spent carbon in said chamber; and,

forming drying, burning and reviving treatment zones through which the carbon successively passes in its stabilized downward movement through said chamber by introducing a high temperature combustion gas to said chamber at the lower portion of said reviving treatment zone so as to cause said gas to flow upwardly through and substantially uniformly contact the stabilized downwardly moving carbon and so as to heat said carbon to a maximum temperature of about 900°C in said reviving treatment zone.

4,030,877

FURNACE WASTE GAS HEAT RECOVERY DEVICE AND METHOD OF USING SAME

Philip W. Robinson, 7831 Seventh St., Downey, Calif. 90241

Filed Nov. 26, 1975, Ser. No. 635,342

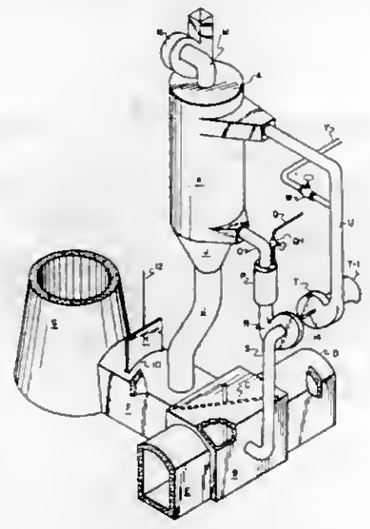
Int. Cl.² F24H *7/02*; **F24J** *3/00*; **F24H** *1/00*

U.S. Cl. 432—29 **8 Claims**

6. A method of recovering heat from hot waste gases that

flow from a heat emitting device to a stack said device being heated by fuel mixed with air, said method including the steps of:

a. diverting at least a portion of said hot waste gases to a plurality of first passages defined by a heat conducting material;
b. drawing said hot waste gases through said first passages at a desired velocity;
c. discharging air under pressure from the ambient atmosphere into a plurality of second passages to be heated by



said hot waste gases flowing through said first passages, said air discharging from said second passages at a pressure greater than that as which it entered said second passages;
d. transforming hot pressurized air discharging from said second passages into rotational power;
e. using said rotational power to pressurize air from the ambient atmosphere entering said second passages; and
f. mixing said hot pressurized air after said transformation with said fuel prior to the latter burning to heat said heat emitting device.

4,030,878

METHOD AND APPARATUS FOR THE CONNECTION OF A ROTARY DRUM DRIVE OF A ROTARY FURNACE

Paul Kunath, Cologne, Germany, assignor to Klockner-Humboldt-Deutz Aktiengesellschaft, Germany

Filed Jan. 20, 1976, Ser. No. 650,619

Claims priority, application Germany, Jan. 23, 1975, 2502612

Int. Cl.² F27B *7/00, 9/40*

U.S. Cl. 432—45 **19 Claims**

1. A method of reconnecting the armature of a motor to an electrical supply shortly after disconnection, in an installation in which the motor drives a rotary drum which undergoes damped oscillations after disconnection, and before the drum damps to a standstill condition, comprising the steps of:

measuring the direction of movement of the oscillating drum; and

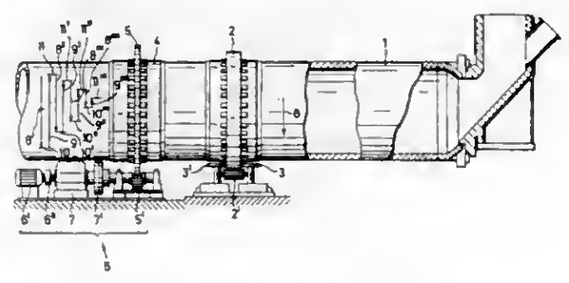
reconnecting the armature to the supply upon detection that the drum is not moving in a direction opposite to the normal driving direction.

19. An installation comprising:

a rotary drum which undergoes damped oscillating motion when a driving force is removed;

a drive motor coupled to said drum;

means measuring the direction of movement of the oscillating drum; and



means reconnecting the motor to a supply upon detection that the drum is not moving in the direction opposite to the normal driving direction.

4,030,879

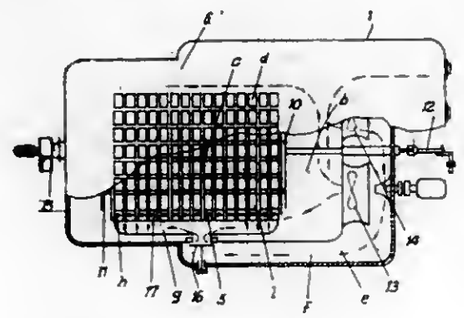
APPARATUS FOR DRYING CERAMIC BODIES

Virgil Corneliu Stanasila; Mihai Florica, and Onut Antoniu Lungu, all of Bucharest, Romania, assignors to Institutul de Cercetare Proiectare si Documentare Pentru Industria Materialelor de Constructii, Bucharest, Romania

Filed Oct. 24, 1975, Ser. No. 625,668

Int. Cl.² F27B *9/00*

U.S. Cl. 432—144 **4 Claims**



1. An apparatus for drying ceramic bodies, comprising:

a housing forming a drying chamber and a furnace which produces a heating medium;

a rack in said housing formed by an array of parallel horizontal spaced-apart pipes and bars extending transversely to said pipes to form a multiplicity of drying columns;

a platform vertically displaceable beneath said rack and adapted to be lowered to discharge the lowermost ceramic body of respective stacks thereof received in said columns from said housing;

pneumatic means at the bottom of said rack for retaining each of said stacks against downward movement at the next to the lowermost body, thereby enabling the lowermost body to be removed on said platform;

a pair of panels flanking said stack and movable to displace said heating medium into said rack and around said stacks;

crank means operatively connected to said panels for periodically displacing same to impart movement to the medium in said rack; and

means for circulating said medium through said chamber and said pipes and for removing excess medium from said chamber, said pipes being provided with opening discharging said medium in the region of said stacks.

4,030,880

PROCESS FOR IMPROVING DYEABILITY

Winfried Thomas Holfeld, Wilmington, and Alfred John Strohmaier, Seaford, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 9, 1975, Ser. No. 621,089

Int. Cl.² D06P *1/00*

U.S. Cl. 8—15 **5 Claims**

1. In a melt-spinning and drawing process for the preparation of synthetic polycarbonamide filaments, the improvement for achieving more uniform acid dyeability comprising applying to the filaments, prior to drawing, a finish in an amount to provide from 0.05 to 0.5% by weight of the filaments of at least one dye-leveling agent containing at least 1.0 milliequivalents per gram of a sulfonic or sulfate group and selected from the group consisting of:

a. aromatic sulfonic acids and their condensation products;
b. sulfated derivatives of C_{10} to C_{22} unsaturated fatty acids and their alkyl esters; and
c. alkali metal and ammonium salts of (a) and (b),

and thereafter drawing the filaments containing the finish to increase their molecular orientation.

4,030,881

COLORATION PROCESS

Violet Boyd; Brian Ribbons Fishwick, and Brian Glover, all of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Oct. 8, 1975, Ser. No. 620,694

Claims priority, application United Kingdom, Oct. 31, 1974, 47112/74; Mar. 25, 1975, 12425/75

Int. Cl.² C09B *1/00, 5/62;* **D06P** *5/02*

U.S. Cl. 8—39 C **3 Claims**

1. Process for the coloration of aromatic polyester or cellulose triacetate textile materials which comprises applying to the said textile materials by an aqueous dyeing, padding or printing process an aqueous dispersion of a disperse anthraquinone or azo dyestuff free from carboxylic acid or sulphonic acid groups, said dyestuff containing from 2 to 4 carboxylic acid ester groups, and subsequently giving the colored textile material a treatment in an aqueous solution of an alkali metal hydroxide or alkali metal carbonate having a pH above 8 and at a temperature between 50° and 85° C.

4,030,882

SOLVENT DYEING COMPOSITIONS AND A METHOD OF DYEING POLYESTER FIBERS THEREWITH

Samuel E. Blackwell, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 2, 1975, Ser. No. 538,071

Int. Cl.² C09B *1/00, 5/62*

U.S. Cl. 8—39 R **5 Claims**

1. A composition useful in nonaqueous, hydrophobic solvent dyeing comprising from 5–75 parts by weight of at least one nonionic, disperse dye and conversely from 95–25 parts by weight of one or more surfactants having a HLB rating of four to eight.

4,030,883

PROCESS FOR TREATING NATURAL POLYAMIDE FIBRES OF ASYMMETRIC STRUCTURE, SUCH AS WOOL, WITH LIQUID AMMONIA

Maryvonne J. Vaesken; Alain E. Bultez, and Jean-Paul Dalle, all of Saint Quentin, France, assignors to Opi Cryochimie S.A., Grugies, France

Filed Feb. 4, 1975, Ser. No. 546,902

Claims priority, application France, Feb. 4, 1974, 74.03571

Int. Cl.² D06M *1/18*

U.S. Cl. 8—115.5 **3 Claims**

1. In a process for treating natural polyamidic fibers of asymmetric structure wherein the fibers are treated with liquid ammonia in order to improve their properties, the improvement consisting of contacting said fibers with liquid ammonia containing an effective amount of an acid or salt containing an acetate or chloride anion for from 5 to 30 minutes.

4,030,884

METHOD FOR CONTINUOUSLY WASHING A YARN WITH A WASHING LIQUID

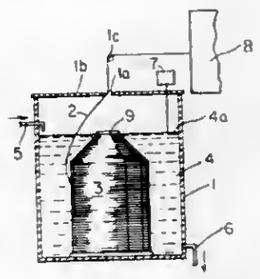
Yasunori Nagata, Osaka; Hirotaka Itoh, Neyagawa; Susumu Yazaki, Settsu; Takayuki Hamamura, Kyoto, and Shigeo Yoshiya, Fujiidera, all of Japan, assignors to Kanebo, Ltd., Japan

Division of Ser. No. 465,611, April 30, 1974, Pat. No. 3,964,279. This application Jan. 22, 1976, Ser. No. 651,575

Claims priority, application Japan, May 7, 1973, 48-50514; July 4, 1973, 48-75567; Nov. 21, 1973, 48-131306

Int. Cl.² D06B *1/04*

U.S. Cl. 8—151.2 **6 Claims**



1. A method for continuously washing a yarn with a washing liquid, comprising the steps of:

standing upright a yarn supply package in which the yarn is wound on a bobbin,

continuously drawing off the yarn from said yarn package upwardly, and,

supplying, concurrently with said drawing operation, a washing liquid to a top end of said yarn package while allowing said washing liquid to flow downwardly from said top end of said yarn package over the outer surface of said yarn package, a portion of said washing liquid being allowed to penetrate into said yarn package.

4,030,885

BILIRUBIN DETERMINATION

Manik L. Das, Crestwood, Mo., assignor to Sigma Chemical Company, St. Louis, Mo.

Filed Sept. 11, 1975, Ser. No. 612,300

Int. Cl.² G01N *33/16*

U.S. Cl. 23—230 B **8 Claims**

1. In a method for colorimetrically determining bilirubin in a sample solution wherein the color of the azobilirubin formed from the coupling reaction of diazo reagent with bilirubin is measured, the improvement comprising adding a sulfhydryl compound to the sample solution after the azobilirubin has formed therein.

4,030,886

SATURATION ANALYSIS

Russell James Bayly; Virginia Edith May Chambers, and Reginald Monks, all of Amersham, England, assignors to The Radiochemical Centre Limited, England

Filed Dec. 5, 1974, Ser. No. 530,021

Claims priority, application United Kingdom, Dec. 11, 1973, 57433/73

Int. Cl.² C07J *1/00, 5/00;* **G01N** *33/16;* **G01T** *1/00*

U.S. Cl. 23—230.6 **5 Claims**

1. A method of performing a saturation analysis of a steroidal compound by causing the compound which is to be analysed and a radioactively labelled version of the said compound to compete for reaction with a specific reagent for the said compound, which is present in an amount insufficient to combine with all of said compound and the labelled version

thereof, separating the bound compound from the unbound compound and measuring the radioactive concentration of one or both of the bound and unbound compound,

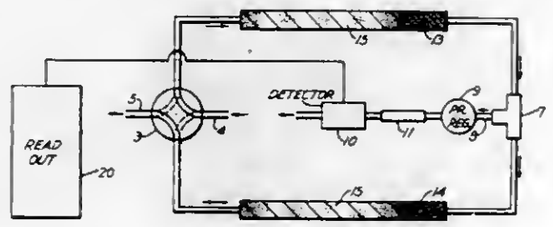
characterized in that the radioactively labelled version of the steroidal compound is labelled with selenium - 75.

4,030,887

CARBON MONOXIDE DETECTION APPARATUS AND METHOD

Albert A. Poli, Pittsburgh; Clayton J. Bossart, Monroeville, and Thomas P. Benzie, Pittsburgh, all of Pa., assignors to Mine Safety Appliances Company, Pittsburgh, Pa.

Filed June 18, 1976, Ser. No. 697,381
Int. Cl.² G01N *31/06, 31/10*
U.S. Cl. 23—232 E **6 Claims**



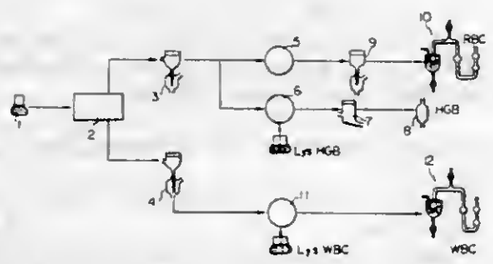
6. A method of detecting carbon monoxide in air, comprising passing a stream of air through a first bed of regenerable air-drying substance and then through porous inactive material, conducting some of the dried air leaving said inactive material to a carbon monoxide detector and the rest through carbon monoxide removing catalytic material offering substantially the same resistance to air flow as said inactive material, conducting the air from said catalytic material through a second bed of regenerable air-drying substance having substantially the same volume and resistance to air flow as the first bed, exhausting the air leaving the second bed to the atmosphere, then reversing the air flow through said beds and material and conducting some of the air leaving said catalytic material to said detector while the rest of the air flows through said inactive material and the first bed to atmosphere, and indicating the amount of carbon monoxide detected by the detector every time the air flow to the detector comes from said inactive material.

4,030,888

AUTOMATIC BLOOD ANALYZER

Hiroshi Yamamoto, Kobe, and Masaaki Oka, Kakogawa, both of Japan, assignors to Toa Medical Electronics Co., Ltd., Kobe, Japan

Filed Feb. 17, 1976, Ser. No. 658,578
Claims priority, application Japan, Feb. 28, 1975, 50-24531
Int. Cl.² G01N *33/16*
U.S. Cl. 23—253 R **4 Claims**



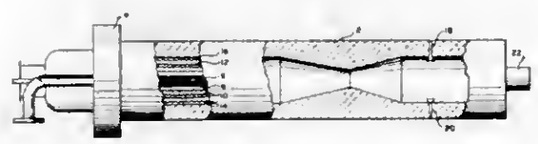
1. In a system of automatic blood analysis for measuring white blood counts, red blood counts, hemoglobin and hematocrit of whole blood incorporating dilution, addition of reagents, agitation, mixing, corpuscular counting and hemoglobin determination, the combination which comprises means for determining white cell counts in a first flow channel and hemoglobin in a second flow channel with single blood dilution, and means for subjecting a portion of a sample in the flow channel for determining hemoglobin to a double blood dilution thereby enabling determination of red cell counts and the hematocrit.

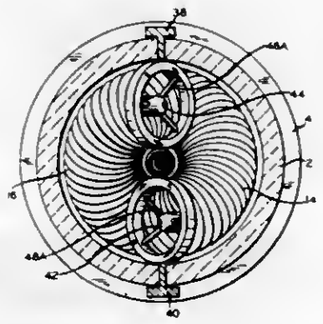
4,030,889

CARBON BLACK REACTOR WITH ADJUSTABLE FLAME LENGTH

Thomas J. Gunnell, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Mar. 4, 1976, Ser. No. 663,933
Int. Cl.² C01B *49/00*; C10B *47/00*
U.S. Cl. 23—259.5 **11 Claims**





1. A carbon black reactor comprising

a. a housing defined by a wall having an essentially cylindrical interior defining a longitudinal axis,

b. at least one burner located inside of said housing for combusting fuel and oxidant to form hot combustion gases comprising

aa. a fuel discharge nozzle for introducing fuel into said housing,

bb. oxidant feed means for feeding oxidant into said housing essentially parallel to the direction of said fuel discharge and into admixture with said fuel leaving said discharge nozzle,

said burner defining a main discharge axis for the fuel and oxidant, said discharge axis being located at a distance from said longitudinal axis,

c. means attached to said housing for turning said burner essentially in a plane which is essentially parallel to said longitudinal axis and around a pivot axis to adjust the pivot angle which is defined as the angle between the direction of the longitudinal axis of said housing and the main discharge axis of said burner,

d. hydrocarbon feed means attached to said housing for feeding hydrocarbon into said housing and into contact with said hot combustion gases, and

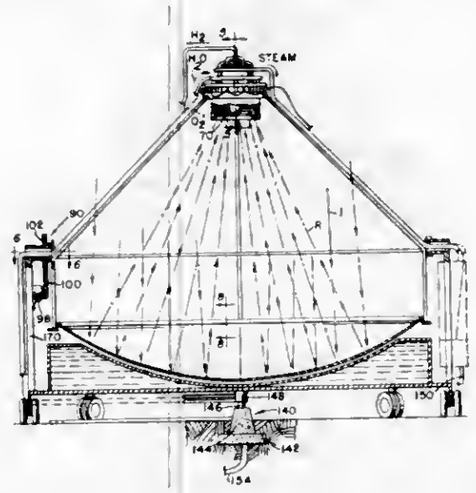
e. withdrawal means attached to said housing for the withdrawal of carbon black-containing smoke from said housing.

4,030,890

SOLAR POWER SYSTEM

Richard E. Diggs, S. 12A Road, P.O. Box 776, Carthage, Mo. 64836

Filed Oct. 20, 1975, Ser. No. 624,409
Int. Cl.² B01D *57/00*; B01J *7/00*; C01B *13/00*; F24J *3/02*
U.S. Cl. 23—281 **10 Claims**



1. Apparatus for separating hydrogen and oxygen from water comprising:

a housing exposed to incident solar energy and having defined therein a chamber for storing water;

means for conducting water into said chamber;

a solar energy reflecting means for reflecting solar energy toward said housing;

first heat transfer means located on said housing to receive said incident solar energy and be heated thereby to form a first source of heat energy, said first heat transfer means being connected to said chamber in a manner such that said heat energy from said first source is transferred to water in said chamber in amounts sufficient to boil same to produce steam;

solar energy reflecting means connected to said first heat transfer means for reflecting part of said incident solar energy to form reflected solar energy;

separating means connected to said housing and connected to said chamber to receive steam therefrom, said separating means having second heat transfer means positioned thereon to receive said incident and said reflected solar energy and be heated thereby to form a second source of heat energy, said second heat transfer means being connected to said separating means and transferring heat from said second source of heat energy to said steam in amounts sufficient to separate said steam into hydrogen and oxygen components;

said separating means including a case connected to said housing having means therein for defining an arcuate path over which said hydrogen and oxygen components pass for creating rotational movement of said hydrogen and oxygen components to separate same by centrifugal forces generated thereon by said rotational movement and

removal means on said housing for removing said separated hydrogen and oxygen components from said separating means.

4,030,891

SINTERED CERMET CONTAINING GROUND MONOCRYSTALS

Vladimir Ilich Alexandrov, ulitsa Ostrovityanova, 31, kv. 281; Vyacheslav Vasilievich Osiko, ulitsa Vavilova, 48, kv. 63, both of Moscow; Ernest Nikolaevich Muraviev, ulitsa Popova, 10, kv. 36, Fryazino Moskovskoi oblasti; Eduard Georgievich Spiridonov, Preobrazhensky val, 24a, kv. 1, Moscow; Vladimir Mikhailovich Tatarintsev, Leninsky prospekt, 45, kv. 112, Moscow, and Vladimir Grigorievich Gordon, 13 Parkovaya, 31, korpus 1, kv. 83, Moscow, all of U.S.S.R.

Filed Dec. 2, 1974, Ser. No. 528,774
Int. Cl.² C22C *1/09*
U.S. Cl. 75—234 **5 Claims**

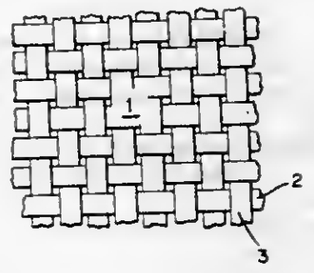
1. A heat-resistant sintered material consisting of a matrix made of a metal-ceramic selected from the group consisting of chromium-aluminium oxide, chromium-chromium oxide and nickel-zirconium carbide and a filler of ground monocrystals with a particle size of from 1 μm to 2 mm of a refractory oxide selected from the group consisting of ruby, zirconia, hafnium dioxide, magnesium oxide, magnesium-aluminium spinel, yttrium oxide, erbium oxide, yttrium aluminium garnet and beryllium oxide.

4,030,892

FLEXIBLE ELECTROMAGNETIC SHIELD COMPRISING INTERLACED GLASSY ALLOY FILAMENTS

Lewis Isaac Mendelsohn, Morristown, and Ethan Allen Nesbitt, Beach Haven, both of N.J., assignors to Allied Chemical Corporation, Morristown, N.J.

Filed Mar. 2, 1976, Ser. No. 663,172
Int. Cl.² B21C *37/00*; C04B *35/00*; H01H *1/00*
U.S. Cl. 428—226 **11 Claims**



1. A flexible electromagnetic shield which comprises interlaced filaments, said filaments comprising at least one metal alloy that is at least 50% glassy, said metal alloy having the composition M_aX_b, where M is at least one element selected from the group consisting of iron and cobalt, X is at least one element selected from the group consisting of boron, carbon and phosphorus, "a" ranges from about 75 to 85 atom percent, "b" ranges from about 15 to 25 atom percent, and a maximum permeability of at least about 50,000 and a coercivity of less than about 0.08 Oe.

4,030,893

METHOD OF PREPARING LOW-SULFUR, LOW-ASH FUEL

Leonard J. Keller, Dallas, Tex., assignor to The Keller Corporation, Dallas, Tex.

Filed May 20, 1976, Ser. No. 688,467
Int. Cl.² C10L *5/00, 9/00*; C10G *1/00*
U.S. Cl. 44—1 B **17 Claims**

1. A method of preparing low-sulfur, low-ash fuel from coal comprising the steps of:

a. comminuting the coal in the presence of an alcohol containing 1–4 carbon atoms, inclusive, to a size wherein a major part of said coal is of −100 mesh size;

b. forming an admixture of the resulting comminuted coal

and said alcohol; said admixture containing at least 40 percent by weight of said coal;

c. separating said admixture into three streams, said streams being a first underflow stream comprising primarily a first slurry of high density solids, a first middling stream comprising primarily a first slurry of said coal particles, and a first overflow of stream comprising primarily said alcohol, a liquor of constituents dissolved from the comminuted coal in said alcohol and colloidal constituents suspended in said alcohol and said liquor;

d. separating said first underflow of said first slurry of high density solids into a second underflow comprising a second viscous slurry of sulfur and solids that would form ash residue if burned with the coal, and a second overflow comprising a dilute slurry of coal in said alcohol and the liquor of constituents dissolved from the comminuted coal in said alcohol;

e. separating said first middling stream into a third underflow comprising a second slurry of high density solids, a second middling stream comprising primarily a second slurry of said coal with only a minor amount of said high density solids and sulfur therein, and a third overflow comprising primarily said alcohol, a liquor comprising constituents dissolved in said alcohol and colloidal constituents suspended in said alcohol and said liquor;

f. separating said first overflow into a fourth underflow and a fourth overflow;

g. refining said fourth overflow into respective desired constituents and said alcohol; and

h. forming a low-sulfur, low-ash fuel from said second middling stream.

4,030,894

STABILIZED FUEL SLURRY

Louis Allen Marlin, Crestwood, and Victor D. Beaucaire, Orland Park, both of Ill., assignors to Interlake, Inc., Oak Brook, Ill.

Filed June 30, 1975, Ser. No. 591,312

Int. Cl.² C10L *1/32*

U.S. Cl. 44—51 **12 Claims**

1. A method of preparing a stabilized fuel slurry having liquid fuel oil present in the range of from about 30% by weight to about 70% by weight, solid fuel particles with diameters as large as about ¼ inch present in the range of from about 25% by weight to about 65% by weight, water present in the range of from about 2% by weight to about 30% by weight and an emulsifier capable of forming a thixotropic water external-oil high internal phase emulsion present in the range of from about 0.2% by weight to about 5% by weight, said method comprising providing a liquid fuel oil adding an emulsifier and solid fuel particles having diameters as large as about 2 inches and water to the liquid fuel oil, and agitating the solid fuel particles with the water, liquid fuel oil and emulsifier to form a thixotropic water external-high internal phase emulsion and to comminute the solid fuel particles in a liquid environment and to form a stabilized fuel slurry having solid fuel particles with diameters as large as about ¼ inch.

4,030,895

APPARATUS FOR PRODUCING COMBUSTIBLE GASES FROM CARBONACEOUS MATERIALS

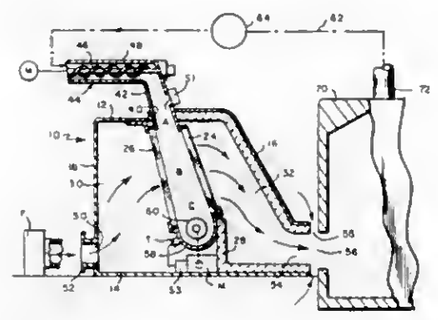
Robert A. Caughey, Clinton Road, Antrim, N.H. 03440

Filed Mar. 17, 1976, Ser. No. 667,673

Int. Cl.² C10J *3/00*

U.S. Cl. 48—111 **17 Claims**

1. A reactor for producing combustible gases suitable for delivery to the fire box of a furnace comprising means defining a confining retort, spaced grates, means supporting the grates in said retort so as to slope downwardly from the top at one side to the bottom at the other side, said grates defining a narrow space between them for gravitational movement of a bed of bio-mass material therebetween from the top of the retort to the bottom, said grates dividing the retort into a combining chamber at the upwardly facing sides of the grates and a plenum chamber at the downwardly facing sides of the grates, said combining chamber embodying a refractory lining



including a fire wall rising from the bottom of the retort to the lower ends of the grates so as to separate the two chambers, means supported across the open space between the grates at their lower ends within the retort which constitutes an ash pit which extends the entire transverse length of the grates below the grates, means for supplying bio-mass material to the space between the grates at the top to form a bed of bio-mass material in the space defined by said grates, and an inlet opening at the bottom of the plenum chamber for supplying primary air thereto.

4,030,896

REGENERATION OF ADSORBENTS

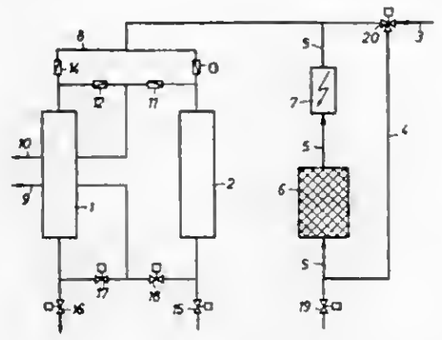
Hans Wimber; Wilhelm Rohde, and Jorg Reyhing, all of Munich, Germany, assignors to Linde Aktiengesellschaft, Wiesbaden, Germany

Filed Apr. 8, 1976, Ser. No. 675,230

Claims priority, application Germany, Apr. 14, 1975, 2516223

Int. Cl.² B01D *53/03*

U.S. Cl. 55—33 **15 Claims**



1. In an adsorption process for the separation of gases wherein gas to be separated is passed through one of several interchangeably connected absorbers, and a main stream of regenerating gas is passed in two sequential periods through another of said interchangeably connected adsorbers, the first period being an open cycle heating period to desorb the adsorbent, and the second period being an open cycle cooling period to cool the adsorbent to adsorption temperatures said stream of regenerating gas in both of said periods being from a common source,

the improvement which comprises, during said cooling period, branching partial stream of regenerating gas from said main stream, heating said partial stream with heating means, and passing resultant heated partial stream over a heat accumulator, and during said heating period, passing said main stream of regenerating gas across said heat accumulator to recover heat stored in said accumulator during the cooling period, and further heating said main stream with said heating means to heating period regeneration temperature, said heating means comprising a heater yielding a source of heat independent of said adsorbers.

15. A heater-accumulator consisting essentially of a substantially cylindrical housing and disposed concentrically within said housing, a thermally insulated pipe, electric heating means disposed within said thermally insulated pipe, said pipe and said housing defining a concentric space; heat accumulator packing arranged in and completely filling said concentric space, a support comprising a grating for said packing, and switching valve and conduit means for allowing flow in sequence across the heat accumulator packing and heating means and vice versa.

4,030,897

DEGASSING OF LIQUIDS

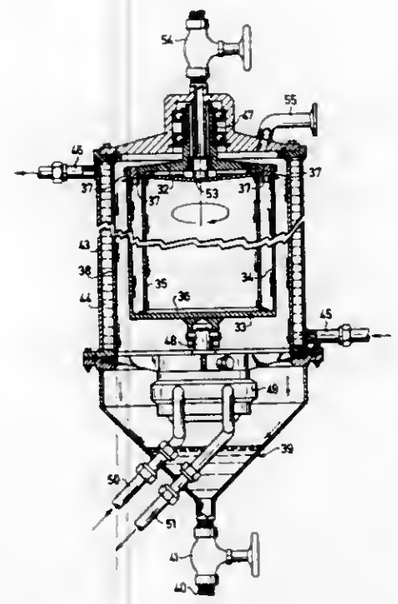
Rudolf Pelzer, Herzogenrath, and Heinz Scholl, Eschweiler, both of Germany, assignors to Saint-Gobain Industries, Neuilly-sur-Seine, France

Filed Nov. 25, 1975, Ser. No. 635,374

Claims priority, application France, Nov. 28, 1974, 74.38961

Int. Cl.² B01D *19/00*

U.S. Cl. 55—42 **8 Claims**



1. A method of degassing viscous liquids comprising the steps of

feeding the liquid to be degassed through a duct to the interior of a centrifuge vessel located within an enclosure in which the gas pressure is reduced,

simultaneously rotating said vessel about an axis passing through said duct,

directing the flow of liquid from said duct in a direction substantially perpendicular to the direction of flow from said duct by means of a distributor plate within said vessel transverse to said axis of rotation,

continuing the flow of liquid in a zig-zag path from the inside to the outside of said vessel over inner surfaces of a plurality of coaxial annuli and removing gas from said annuli and enclosure,

and discharging the liquid from said enclosure.

4,030,898

QUICK FREEZING APPARATUS

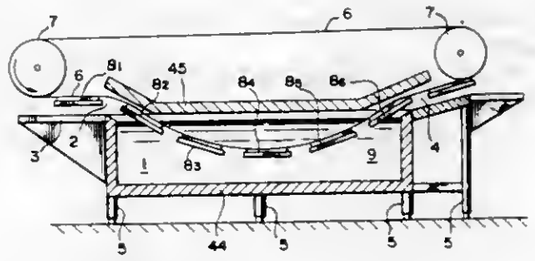
Masahiro Morita, 4-15, 3-chome, Nishigahara, Kita, Tokyo, Japan

Filed Nov. 19, 1975, Ser. No. 633,401

Claims priority, application Japan, Nov. 27, 1974, 49-135551

Int. Cl.² A23G *9/00*; **F25D** *17/02*

U.S. Cl. 62—345 **13 Claims**



1. An apparatus for quick freezing articles, comprising a tank charged with a freezing medium which is liquid at the normal temperature and in a low temperature range under atmospheric pressure; continuous conveying means for containing the articles to be frozen, said conveying means being made of a thin, flexible material having a high temperature conductivity; guiding means for guiding and dipping said conveying means into the medium in said tank, so that liquid pressure in said medium causes said conveying means to come in intimate contact with the article to be frozen contained therein, the temperature of said medium being immediately transmitted to said article; driving means for continuously moving said conveying means; and means for continuously circulating and cooling said medium at least above said conveying means.

4,030,899

COOLING DEVICE

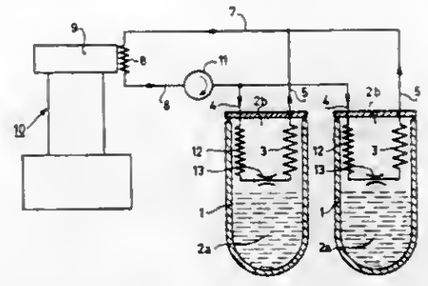
Joannes Wilhelmus Van Litsenburg, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 19, 1975, Ser. No. 642,329

Claims priority, application Netherlands, Feb. 24, 1975, 7502146

Int. Cl.² F25B *19/00*

U.S. Cl. 62—514 R **4 Claims**



1. A cooling device for maintaining a low operating temperature in an enclosure, comprising boundary means defining said enclosure and containing a liquefied gas, said enclosure having an inlet duct conveying a flow of cooled medium to said enclosure, and an outlet duct for conveying said cooled

medium from said enclosure, said ducts passing through at least one boundary wall defining said enclosure, the path between said inlet duct and said outlet duct including the serial connection of a heat exchanger, a restriction means and a cooling element, said restriction means being situated between said heat exchanger and said cooling element, said heat exchanger being coupled in good heat exchanging contact in said enclosure.

4,030,900

COOLING DEVICE

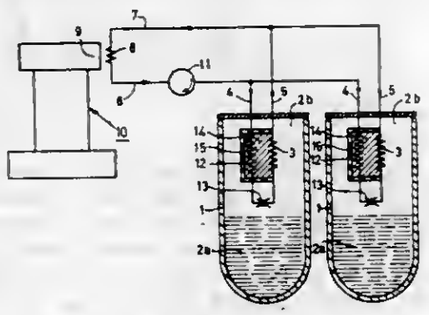
Joannes Wilhelmus Van Litsenburg, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 19, 1975, Ser. No. 642,347

Claims priority, application Netherlands, Feb. 24, 1975, 7502147

Int. Cl.² F25B *19/00*

U.S. Cl. 62—514 R **6 Claims**



1. A cooling device for maintaining a low operating temperature in an enclosure, comprising, boundary means defining said enclosure and containing a liquified gas, said enclosure having an inlet duct conveying a flow of cooled medium to said enclosure, and an outlet duct for conveying said cooled medium from said enclosure, said ducts passing through at least one boundary wall defining said enclosure, the path between said inlet duct and said outlet duct including the serial connection of a heat exchanger, a restriction means and a cooling element, said restriction means being situated between said heat exchanger and said cooling element, means positioning said heat exchanger in said enclosure in heat exchanging contact with said cooling element, and means for heat insulating said heat exchanger from said enclosure.

4,030,901

METHOD FOR DRAWING FIBERS

Peter Kaiser, Middletown, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed July 19, 1976, Ser. No. 706,927

Int. Cl.² C03B *37/02*

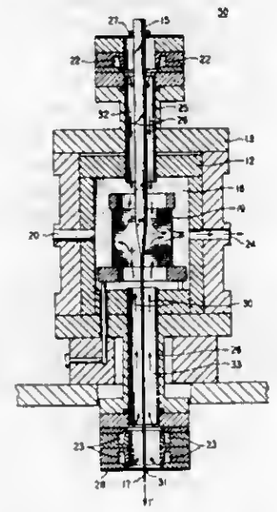
U.S. Cl. 65—2 **1 Claim**

1. A method for drawing fibers comprising the steps:

heating a preform in a furnace so that the preform begins to flow forming a fiber,

pulling the fiber from the furnace, and

flushing the preform, the fiber and a heater within a chamber located in the furnace with counteracting inert gas flows, by injecting the gas from ports located at opposite ends of the furnace into the chamber and exhausting the gas from the chamber through a port located near the



heater within the chamber, the gas flows protecting the preform and the fiber from contamination.

4,030,902

FLOAT GLASS BAND WIDTH CONTROL METHOD

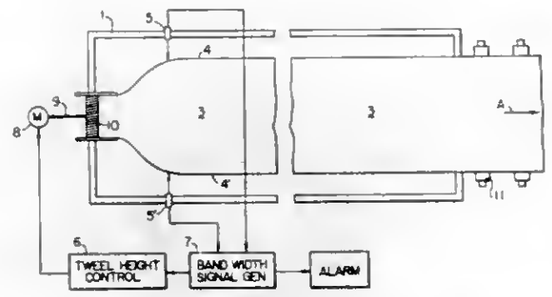
Yasuyuki Nagae, Sakai, Japan, assignor to Central Glass Co., Ltd., Ube, Japan

Continuation of Ser. No. 523,545, Nov. 13, 1974, abandoned. This application Apr. 1, 1976, Ser. No. 672,560

Claims priority, application Japan, Nov. 14, 1974, 49-127187

Int. Cl.² C03B *18/02*

U.S. Cl. 65—29 **4 Claims**



1. A method for controlling the width of a glass band manufactured through a float method wherein melted glass is charged into a melted metal bath chamber by way of an inlet of the chamber provided with a tweel, which is characterized by:

detecting visible rays emitted from both side edges of a portion of said glass band in said chamber so as to produce only two continuous electric position signals respectively representing positions of both side edges of a portion of said glass band in said chamber, the visible rays being detected as images by a single pair of image pick-up tubes which are respectively diametrically disposed on the both side walls of the chamber above the metal bath;

said image pick-up tubes being aimed in a direction to receive an image of the respective side edges; converting said two continuous electric position signals into a width signal representing the width of said glass band; and

continuously regulating the position of said tweel in accordance with said width signal so as to maintain substantially constant the width of said glass band.

4,030,903

EXUDED TRANSITION METAL FILMS ON GLASS-CERAMIC ARTICLES

Hermann L. Rittler, Horseheads, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Continuation-in-part of Ser. No. 431,148, Jan. 1, 1974, Pat. No. 3,962,514. This application Dec. 24, 1975, Ser. No. 644,130

Int. Cl.³ C03B *32/00*; **C03C** *15/00, 17/00, 3/22*

U.S. Cl. 65—32 **8 Claims**

1. A method of providing a glass-ceramic article having an exuded surface film comprising at least one transition metal compound selected from the group consisting of Mn_3O_4, Fe_3O_4, Co_3O_4, $NiAl_2O_4$, $CoAl_2O_4$, $FeAl_2O_4$, $ValO_4$, $NiFe_2O_4$, $CoFe_2O_4$, $MnFe_2O_4$, $MnTiO_3$, $CoTiO_3$, $FeTiO_3$, Co_2TiO_4 and $CoMn_2O_4$ on at least a portion of the surface thereof which comprises the steps of:

a. compounding a batch for a glass composition consisting essentially, in weight percent on the oxide basis as calculated from the batch, of about 55–80% SiO_2, 14–35% Al_2O_3, 0–5% Li_2O, 0–7% TiO_2, 0–10% ZrO_2, 3–13% total of said $TiO_2 + ZrO_2$, 0–3% F, and 0.1–10% total of transition metal oxide additives containing one or more of the transition metals manganese, iron, cobalt, chromium, nickel and vanadium in a combination which will provide one or more of said Mn_3O_4, Fe_3O_4, Co_3O_4, $NiAl_2O_4$, $CoAl_2O_4$, $MnAl_2O_4$, $FeAl_2O_4$, $ValO_4$, $NiFe_2O_4$, $CoFe_2O_4$, $MnFe_2O_4$, $MnTiO_3$, $CoTiO_3$, $FeTiO_3$, Co_2TiO_4 and $CoMn_2O_4$ transition metal compounds on the surface of said article, said additives being selected in the indicated proportions from the group consisting of 0–5% MnO_2, 0–5% Fe_2O_3, 0–3% CoO, 0–2% Cr_2O_3, 0–3% V_2O_5 and 0–10% NiO, the foregoing constituents comprising at least about 90% by weight of said composition and said composition being capable of forming a principle crystal phase selected from the group consisting of beta-spodumene and beta-quartz solid solutions upon thermal crystallization thereof;

b. melting said batch at a temperature in the range of about 1600°–1650° C. for a time in the range of about 6–16 hours to provide a molten glass;

c. forming the molten glass into a glass article;

d. exposing the glass article to a temperature in the range of about 700°–800° C. for a time in the range of about 1–4 hours to obtain nucleation of the glass;

e. thereafter exposing the article to a temperature in the range of about 800°–1200° C. for a time in the range of about 1–8 hours to obtain crystallization of the glass by the formation of a principal crystal phase selected from the group consisting of beta-quartz and beta-spodumene solid solution therein; and

f. exposing the article to a temperature in the range of about 500°–1000° C. in a reducing atmosphere for a time in the range of about ½–10 hours to develop said exuded surface film comprising said transition metal compounds thereon.

5. A method of providing a glass-ceramic article having an exuded ferromagnetic surface film comprising at least one transition metal compound selected from the group consisting of Mn_3O_4, Fe_3O_4, $MnAl_2O_4$, $NiAl_2O_4$, $NiFe_2O_4$, $MnFe_2O_4$, $MnCr_2O_4$, $MnNb_2O_6$, $NiNb_2O_6$, $Ti_2Nb_{10}O_{29}$, and $Mn_2Al_2(SiO_4)_3$ on at least a portion of the surface thereof which comprises the steps of:

a. compounding a batch for a glass composition consisting essentially, in weight percent on the oxide basis as calculated from the batch, of about 10–60% MnO_2, at least one oxide selected in the indicated proportion from the group consisting of 10–70% SiO_2, 13–43% Al_2O_3, and 0–35% B_2O_3, essentially including at least about 5% B_2O_3 and 20% Al_2O_3 when SiO_2 is absent, not exceeding about 5% B_2O_3 when Al_2O_3 is absent, and not exceeding about 10% B_2O_3 when both SiO_2 and Al_2O_3 are present, at least about 60% total of $MnO_2 + SiO_2 + Al_2O_3 + B_2O_3$, 0–30% Nb_2O_5, 0–35% La_2O_3, 0–10% Ta_2O_5, 0–15% BaO, 0–10% SnO_2, 0–4% ZnO, 0–10% ZrO_2, 0–20% TiO_2, 0–5% Fe_2O_3, 0–10% NiO, 0–3% Cr_2O_3, 0–3% CoO and 0–10% K_2O;

b. melting the batch at a temperature in the range of about 1500°–1600° C. for a time in the range of about 6–16 hours;

c. forming the molten glass into a glass article;

d. exposing the glass to a temperature in the range of about 600°–1200° C. for a time in the range of about 4–24 hours to obtain crystallization of the glass; and

e. exposing the crystallized glass to a temperature in the range of about 500°–1000° C. in a reducing atmosphere for a time in the range of about 178 –10 hours to develop said exuded surface film comprising said transition metal compounds therein.

4,030,904

SURFACE COATING OF GLASS CONTAINERS WHILE ANNEALING

Christopher John Battye, St. Albans, and Roger John Dorey, Harpenden, both of England, assignors to United Glass, Ltd., Staines, England

Continuation-in-part of Ser. No. 503,786, Sept. 6, 1974, abandoned. This application Aug. 8, 1975, Ser. No. 603,014

Claims priority, application United Kingdom, Sept. 10, 1973, 42473/73

Int. Cl.² C03C *17/28*

U.S. Cl. 65—60 A **17 Claims**

1. A method of treating glass containers wherein the containers, after forming and before annealing, are subjected to the action of a material which forms a metal oxide coating on the surface thereof and to the spray application of a spray reagent comprising a solution, emulsion or suspension of a polymeric material resistant to oxidation and thermal degradation when maintained at a temperature of 550° C for a period of several minutues, said polymeric material being polyphenylene sulfide, polyphenylene oxide, a polyimide, a polyimide-amide or polybenzoxazole, a polyphenylquinoxaline, a polybenzamidazole, poly-bis-benzimidazo-benzophenanthroline, a polyimidazopyrrole, a Diels-Alder polyphenylene, a polybenzothiazole, a poly(alkyl-aryl ether), a carborane-siloxane, a cyclodisilazane or poly(p-oxybenzoyl), whereafter the containers are annealed.

4,030,905

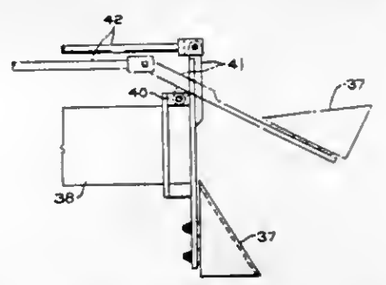
GROOVING GLASS BATCH

Charles T. Hawkins, Verona, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Oct. 30, 1975, Ser. No. 627,163

Int. Cl.² C03B *3/00*

U.S. Cl. 65—135 **10 Claims**



1. In an apparatus for the manufacture of glass comprising a glass melting furnace having a bottom, side walls, a front wall, a back wall and a roof; further having, in the vicinity of said back wall, means for charging glass batch materials into said furnace; further having, in the vicinity of said front wall, means for discharging molten glass from said furnace; and further having overhead means for supplying heat to at least a portion of said furnace for melting glass batch materials forming molten glass therefrom; wherein a portion of said furnace is for moving glass batch materials as a layer of batch floating

on molten glass along a longitudinal axis of the furnace in a general direction away from said back wall and toward said front wall while melting said floating glass batch materials; the improvement comprising

a support arm extending into said furnace at least partially transversely to the longitudinal axis of said furnace;

a blade mounted on said arm for vertical movement with respect to said support arm from an upper position above said batch materials entering said furnace to a lower position in contact with said batch materials; and

means for reciprocally moving said support and transversely to the longitudinal axis of said furnace, whereby said blade may be moved through said batch materials when said blade is positioned therein.

7. In the making of glass wherein glass batch materials are charged to a glass melting furnace having a bottom, side walls, a front wall, a back wall and a roof and wherein said charged glass batch materials are caused to move away from said back wall toward said front wall between said side walls by floating as a layer on molten glass and wherein heat is supplied from above to said glass batch materials to melt them, forming molten glass, and wherein molten glass is discharged from said furnace in the vicinity of said front wall and formed into useful articles; the improvement comprising

moving a blade substantially horizontally through the floating glass batch materials along a path substantially transverse to the movement of the glass batch materials through the furnace, and

repeating said blade moving step after a sufficient time interval to provide for the making of spaced depressions in the floating layer of glass batch materials which depressions are of an initial depth above that which would expose molten glass upon which the glass batch materials float.

4,030,906

HERBICIDAL N-HALOACETYL-1,2-DIHYDRO-4H-3,1-BENZOXAZINE

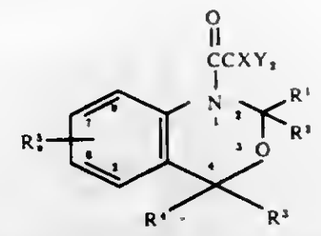
John W. Kobzina, Walnut Creek, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 509,979, Sept. 27, 1974, Pat. No. 3,917,592. This application Oct. 20, 1975, Ser. No. 623,842

Int. Cl.² A01N 9/22

U.S. Cl. 71—66 **17 Claims**

1. A method for controlling undesirable vegetation which comprises applying to the vegetation or the locus thereof a herbicidally effective amount of the compound of the formula



wherein X is fluoro, chloro or bromo, Y is hydrogen, fluoro, chloro, or bromo, R^1 is hydrogen or alkyl of 1 to 6 carbon atoms, R^2 is hydrogen or alkyl of 1 to 6 carbon atoms, R^3 is hydrogen or alkyl of 1 to 6 carbon atoms, R^4 is hydrogen or alkyl of 1 to 6 carbon atoms, R^5 is chloro, bromo or alkyl of 1 to 6 carbon atoms, and *n* is 0, 1 or 2.

4,030,907

COPPER ALGAECIDE OF INCREASED STABILITY AND METHOD OF PRODUCING THE SAME

Lester Ray McNall, Fullerton, Calif., assignor to Thompson-Hayward Chemical Co., Kansas City, Kans.

Filed June 12, 1974, Ser. No. 478,827

Int. Cl.² A01N 11/04

U.S. Cl. 71—67 **19 Claims**

1. A concentrated aqueous algaecide composition having an improved stability against photodecomposition, said composition consisting essentially of an aqueous solution of at least 50% by weight of a complex formed by reacting about 1 part of a water soluble copper salt and about 1 to 2 parts of an alkanolamine having at least one alkanol group of 1 to 10 carbon atoms and at least 0.5% based on the weight of the complex of a water-soluble ionizable ammonium compound and having a pH greater than 7.

2. The algaecide composition of claim 1 wherein the ammonium compound is selected from the group consisting of diammonium citrate, diammonium phosphate and ammonium nitrate.

4,030,908

N-[3-(4-METHYL-3-CYCLOHEXENYL)BUTYL]AMINES AND THEIR USE AS PLANT GROWTH REGULATORS

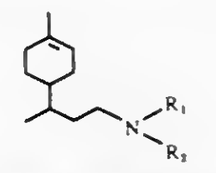
Jerry G. Strong, Fanwood, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 221,384, Jan. 27, 1972, Pat. No. 3,890,384. This application Feb. 27, 1975, Ser. No. 553,771

Int. Cl.² A01N 5/00

U.S. Cl. 71—78 **6 Claims**

1. A method for regulating growth of tobacco plants by inhibiting terminal and secondary bud growth and controlling the axillary growth known as suckers comprising contacting said plant with an amount effective to attain such regulation and control of a compound having the general formula:



wherein R_1 and R_2 are each selected from the group consisting of hydrogen and alkyl (C_1-C_8).

4,030,909

HERBICIDAL COMPOSITIONS

Adolf Fischer, deceased, late of Mutterstadt, Germany (by Caecilia Emma Fischer, heiress-at-law), assignor to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Oct. 22, 1975, Ser. No. 624,941

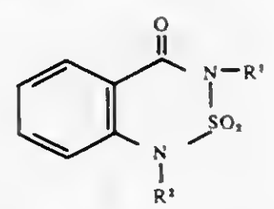
Claims priority, application Germany, Nov. 14, 1974, 2453908

Int. Cl.² A01N 9/12

U.S. Cl. 71—91 **9 Claims**

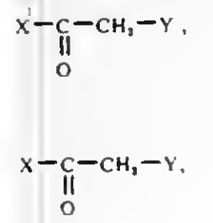
1. A herbicidal composition consisting essentially of an inert carrier having dispersed therein a herbicidally effective amount of a mixture of

a. a benzothiadiazinone dioxide of the formula

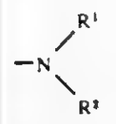


where R^1 denotes alkyl of a maximum of 4 carbon atoms and R^2 denotes hydrogen, an alkali metal ion, a diloweralkylammonium ion or a dilowerhydroxyalkylammonium ion, and

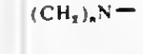
b. a glycolic acid amide of the formula



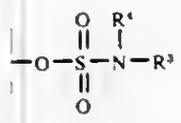
where X denotes



R^1 denoting alkyl, alkenyl, alkynyl or alkoxyalkyl of a maximum of 4 carbon atoms and R^2 denoting unsubstituted phenyl, phenyl monosubstituted or disubstituted by methyl or ethyl, or X denotes a mono- or bicyclic radical of the formula



n denoting one of the integers 4, 5, 6, 7 and 8, and Y denotes



R^3 denoting hydrogen or alkyl of a maximum of 4 carbon atoms and R^4 denoting alkyl of a maximum of 4 carbon atoms or

R^5 denoting alkyl of a maximum of 4 carbon atoms or methylsulfonyl, and compound a and compound b are in a weight ratio of 1:4 to 4:1.

4,030,910

SUBSTITUTED PYRIDINYLOXY(THIO)PHENYL -ACETAMIDES, -UREAS AND UREA DERIVATIVES, HERBICIDAL COMPOSITIONS AND METHODS CONTAINING SAME

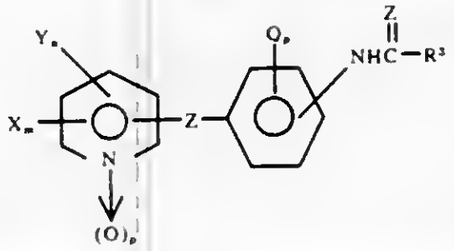
Howard Johnston, Walnut Creek, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 435,615, Jan. 22, 1974, Pat. No. 3,931,201. This application Oct. 16, 1975, Ser. No. 623,158

Int. Cl.² A01N 9/22, 9/12; C07D 213/62, 213/89

U.S. Cl. 71—94 **33 Claims**

1. A compound corresponding to the formula:



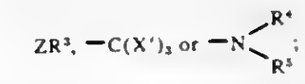
wherein:

each *p* independently represents an integer of 0 or 1;

each X independently represents bromo, chloro, iodo or fluoro;

m represents an integer of 0 to 4, inclusive;

each Y independently represents nitro, ZR^3,



n represents an integer of 0 to 2, inclusive;

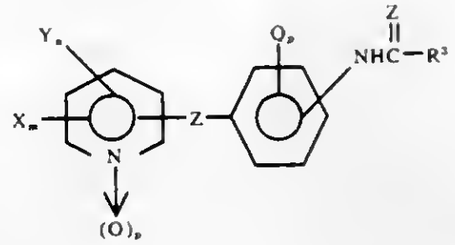
each Z independently represents oxygen or sulfur;

Q represents methyl, ethyl, halo, nitro or trifluoromethyl;

each X′ independently represents hydrogen or halo;

R^3 represents alkyl of from 1 to 3 carbon atoms; and R^4 and R^5 each independently represent hydrogen or alkyl of from 1 to 4 carbon atoms.

25. The method of selectively controlling undesired plant growth in the presence of desired crop plants which comprises applying to plants and/or their habitats a herbicidally-effective amount of a compound of the formula:



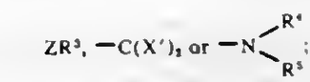
wherein:

each *p* independently represents an integer of 0 or 1;

each X independently represents bromo, chloro, iodo or fluoro;

m represents an integer of 0 to 4, inclusive;

each Y independently represents nitro, ZR^3,



n represents an integer of 0 to 2, inclusive;

each Z independently represents oxygen or sulfur;

Q represents methyl, ethyl, halo, nitro or trifluoromethyl;

each X′ independently represents hydrogen or halo;

R^3 represents alkyl of from 1 to 3 carbon atoms; and

R^4 and R^5 each independently represent hydrogen or alkyl of from 1 to 4 carbon atoms in the presence of an inert carrier therefor.

4,030,911

SULFIDE HERBICIDE ANTIDOTE COMPOSITIONS AND METHOD OF USE

Duane R. Arneklev, Plentywood, Mont., and Don R. Baker, Orinda, Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 394,230, Sept. 4, 1973, abandoned. This application June 27, 1975, Ser. No. 591,239

Int. Cl.² A01N 9/12

U.S. Cl. 71—98 **7 Claims**

1. The method of protecting a crop from injury due to a thiocarbamate herbicide, comprising applying to the habitat prior to planting from about 0.01 to about 15 parts by weight for each part by weight of the thiocarbamate herbicide an antidote compound corresponding to the formula

wherein R_1 is selected from the group consisting of, chloroalkyl, having from 1 to 4 carbon atoms, inclusive, hydroxyethyl, carboxymethyl, β-S-ethylthiocarboxylaminoethyl and dichloroacetamidoethyl; and R_2 is selected from the group consisting of alkyl, having from 1 to 8 carbon atoms, inclusive, chloroalkyl, having from 1 to 4 carbon atoms, inclusive, cyanoalkyl, having at least one cyano group and an alkyl moiety having from 1 to 4 carbon atoms, inclusive, β-S-ethylthiocarboxylaminoethyl and dichloroacetamidoethyl.

4,030,912

CERTAIN OXIMINYL ALLOPHANATES AND THEIR USE AS HERBICIDES

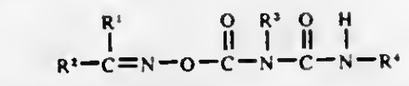
Peter Anthony Bukowick, New Castle, Del., assignor to Hercules Incorporated, Wilmington, Del.

Continuation of Ser. No. 350,128, April 11, 1973, Pat. No. 3,957,867. This application Oct. 28, 1975, Ser. No. 626,524

Int. Cl.² A01N 9/20

U.S. Cl. 71—120 **9 Claims**

1. A herbicidal composition comprising (1) application aid material and (2) an effective quantity of phytotoxic material comprising a compound of the formula:



in which when R^1 and R^2 are taken separately, R^1 is selected independently from the group consisting of hydrogen and C_1-C_7 alkyl and R^2 is selected independently from the group consisting of C_1-C_7 alkyl and phenyl, and, when taken together with the carbon atom to which they are attached R^1 and R^2 form a C_2-C_8 cycloalkyl group; R^3 is selected from the group consisting of C_1-C_7 alky, allyl, phenyl, 3-halophenyl and 3,4-dihalophenyl; and R^4 is selected from the group consisting of C_1-C_7 alkyl; allyl, cyclohexyl, phenyl, halophenyl, tolyl, anisolyl, nitrophenyl, 3,4-dihalophenyl, 1-naphthyl, p-toluene sulfonyl, trihalomethylphenyl and 2,6-dinitro-4-trihalomethylphenyl.

4,030,913

METHOD OF STABILIZING PYROPHOROUS IRON POWDER

Joachim Wegener, Aachen, Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 26, 1976, Ser. No. 690,079

Claims priority, application Germany, June 3, 1975, 2524517

Int. Cl.² C23F 9/02, 11/14

U.S. Cl. 75—.5 R **8 Claims**

1. A method of stabilizing pyrophorous iron powder in a liquid medium, characterized in that the powders are contacted with organic compounds which contain oxygen bound to nitrogen.

4,030,914

METHOD OF TREATING ALUMINUM DROSSES, SKIMS AND SLAGS

Pandelis N. Papafingos, and Richard T. Lance, both of Riverside, Calif., assignors to Alumax Mill Products, Inc., Riverside, Calif.

Filed Apr. 12, 1976, Ser. No. 676,170

Int. Cl.² C22B 21/00

U.S. Cl. 75—68 R **2 Claims**

1. In a process for recovering aluminum from drosses, in which aluminum drosses are melted under a cover flux for the separation of aluminum metal values from the dross, the improvement wherein the metal flux consists essentially of potassium chloride and calcium chloride, with a calcium chloride content of from about 3 to about 20%.

4,030,915

PROCESS FOR PRODUCING RAW COPPER CONTINUOUSLY IN ONE STAGE FROM UNREFINED SULFIDIC COPPER CONCENTRATE OR ORE

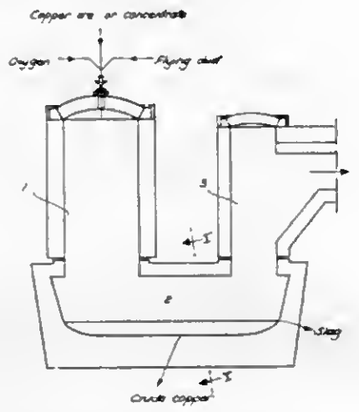
Olavi August Aaltonen, Pori; Bengt Torsten Andersson, Espoo; Jyrki Tapani Juusela, Pori; Matti Johannes Palperi, Imatra, and Tapio Kalevi Tuominen, Pori, all of Finland, assignors to Outokumpu Oy, Helsinki, Finland

Filed Aug. 21, 1975, Ser. No. 606,532

Claims priority, application Finland, Nov. 11, 1974, 743266

Int. Cl.² C22B 15/00

U.S. Cl. 75—74 **1 Claim**



1. A process for producing clean raw copper continuously in one stage from at least one raw material low in iron selected from the group consisting of sulfides, copper concentrates and ores containing as impurities at least one element selected from the group consisting of lead, antimony, bismuth and arsenic comprising the steps of:

feeding the raw material into an upper part of a reaction zone, while

feeding air or oxygen enriched air into said upper part of said reaction zone for producing a suspension of said raw material in said reaction zone, and

controlling the amount of oxygen fed into said reaction zone for controlled oxidation of said raw material to produce a melt containing essentially only raw copper and slag below said reaction zone, and so that said raw copper in equilibrium with the slag contains less than 0.5% by weight of sulfur and 0.2–1.5% by weight of oxygen,

feeding said suspension downwards at a temperature of 1300°–1700° C, through said reaction zone,

causing said suspension to impinge against the melt below said reaction zone, guiding aside any gases and flying dusts associated with said suspension, and

separating and removing said slag at a temperature of 1250°–1450° C and said raw copper at a temperature of 1150°–1350° C.

4,030,916

PROCESS FOR RECOVERING LEAD FROM THE ACTIVE MATERIAL OF USED BATTERIES

Max Liniger, Basel, Switzerland, assignor to Andreas M. Liniger, Basel, Switzerland

Filed Jan. 6, 1976, Ser. No. 646,767

Claims priority, application Switzerland, Jan. 8, 1975, 153/75

Int. Cl.² C22B 13/00

U.S. Cl. 75—77 **7 Claims**

1. A process for recovering lead from the active material of used lead batteries, said material having been separated from the other battery parts in the form of lead sludge, said process comprising drying the lead sludge to remove substantially all water; grinding the dried sludge to a particle size approximating that of the original active material; intimately mixing the ground dried sludge with anhydrous carbon powder; heating

the resulting mixture in a closed furnace to decompose and reduce the lead compounds in the sludge to metallic lead, the carbon powder being oxidized; filtering and compressing the gaseous reaction products produced by the heating step; cooling said compressed gaseous reaction products to liqueify the SO_2 content thereof; and removing said liquefied SO_2 from the remaining gaseous reaction products.

4,030,917

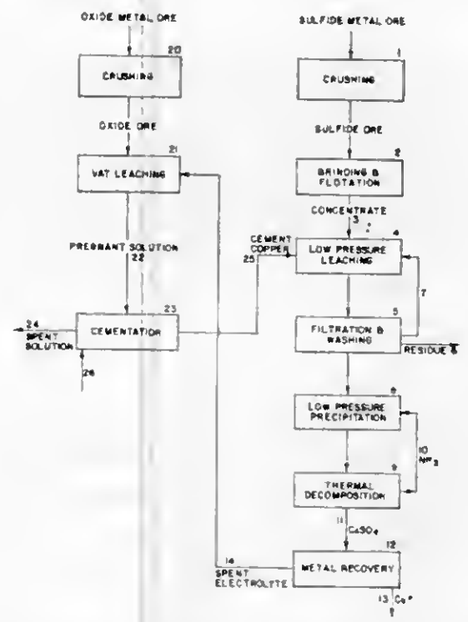
HYDROMETALLURGICAL PROCESSING OF METAL SULFIDES

Anthony G. Fonseca, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Filed Nov. 12, 1975, Ser. No. 631,015

Int. Cl.² C22B 15/10

U.S. Cl. 75—103 **5 Claims**



1. A method for recovery of both sulfur and metal values from copper sulfide ores comprising (a) adding a non-sulfide metal containing material to balance the sulfide/recoverable metal mole ratio in the ore to at least 1 to 1, while (b) leaching the metal sulfides at pH of at least 7 in the presence of NH_3 and O_2, and (c) recovering all sulfur and metal values from the leach solutions.

4,030,918

INDIUM CONTAINING DENTAL ALLOY POWDER

Pei Sung, Lawrenceville, and Frederic James Schweder, Trenton, both of N.J., assignors to Johnson & Johnson, New Brunswick, N.J.

Filed May 27, 1976, Ser. No. 690,496

Int. Cl.² C22C 30/00

U.S. Cl. 75—134 B **14 Claims**

1. An amalgamatable dental alloy comprising particles with each particle being a homogeneous mixture of 35 to 50 percent silver, 20 to 30 percent copper, 25 to 35 percent tin and 2 to 8 percent indium.

4,030,919

CONTINUOUS METHOD OF AND APPARATUS FOR MAKING BARS FROM POWDERED METAL

Paul M. Lea, III, Dolton, Ill., assignor to Amsted Industries Incorporated, Chicago, Ill.

Filed Mar. 21, 1975, Ser. No. 560,577

Int. Cl.² B22F 3/16, 3/20

U.S. Cl. 75—214 **5 Claims**

1. A continuous method of forming a bar from a powdered metal comprising,

successively introducing outwardly of one end a quantity of powdered metal into an open ended and horizontally disposed die cavity of fixed diameter, applying a horizontally disposed reciprocating compacting means movable between a retraction position outside of said die and a compaction position within said die to compact each quantity of powdered metal into bonded segments of a bar of which at least a length of the bar frictionally engages the walls of the die cavity and serves as a stop means against which subsequent quantities of powdered metal are compacted and bonded to form further segments of the bar,

measuring the frictional resisting force of the length of the bar in the cavity relative to a predetermined resisting force at which a subsequent quantity of powdered metal is compacted into a segment of predetermined physical characteristics,

controlling the travel of the compacting means by varying the retraction position of said compacting means while maintaining the compaction position thereof constant so that the quantity of powdered metal introduced in the die cavity to achieve a compaction compensates for deviations of the measured force from the predetermined resisting force and the successive quantity of powdered metal is bonded to the bar as a segment having the desired physical characteristics,

and forcing the bar through the die so that at least a length of said bar serves as the stop means.

4,030,920

PROCESSING COMPOSITIONS CONTAINING GLYCOLS FOR COLOR TRANSFER PROCESSES COMPRISING DIRECT POSITIVE SILVER HALIDE DEVELOPEMENT

Arthur David Kuh, Penfield, and Paul Brainard Condit, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 12, 1976, Ser. No. 675,660

Int. Cl.² G03C 7/00, 5/54, 1/40, 5/24

U.S. Cl. 96—29 D **23 Claims**

20. In a process for producing a photographic transfer image in color from an imagewise-exposed photosensitive element comprising a support having thereon at least one photosensitive internal-image silver halide emulsion layer having associated therewith a ballasted redox dye releaser; said process comprising treating said photosensitive element with an alkaline processing composition in the presence of a silver halide developing agent and a fogging agent to effect development of each of said exposed silver halide emulsion layers, whereby an imagewise distribution of dye is formed as a function of development and at least a portion of it diffuses to a dye image-receiving layer to provide said transfer image, the improvement comprising including in said alkaline processing composition a compound which is a saturated aliphatic or alicyclic glycol having from 3 to 10 carbon atoms or a saturated, aliphatic or alicyclic amino alcohol having from 2 to 10 carbon atoms.

4,030,921

ELECTROPHOTOGRAPHIC PHOTOSENSITIVE MATERIAL

Kato Akira; Itoh Akira; Uchida Tohru, all of Hachioji, and Ishihara Masao, Hino, all of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Hachioji, Japan

Filed Nov. 10, 1975, Ser. No. 630,413

Claims priority, application Japan, Nov. 19, 1974, 49-133262

Int. Cl.² G03G 5/04

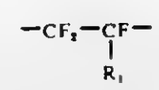
U.S. Cl. 96—1.5 **4 Claims**

1. A photosensitive article for electrophotography having a conductive substrate and a photosensitive coating of a dried solution or dispersion comprising a photoconductive material, a binder and a fluorine-containing compound characterized

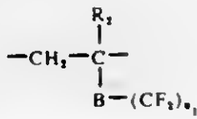
by a plurality of units represented by the following structural formula:

$$-[X]_a-[Y]_b-$$

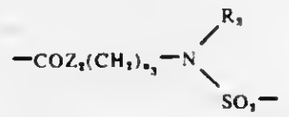
wherein:
X is a fluorine-containing monomeric unit selected from the group consisting of:

a)


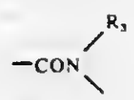
wherein R_1 is F, Cl or CF_3; and

b)


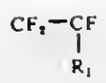
wherein:
R_2 is H or CH_3,
B is
i. $-COZ_1(CH_2)_n$ - where Z_1 is —O— or —NH— and n_3 is an integer of 1 – 4,
ii. —OOC—;

(iii)


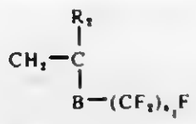
where Z_2 is —O— or —NH—, n_3 is an integer of 1 – 4 and R_3 is an alkyl group having 1 – 4 carbon atoms; or

(iv)


where R_3 is an alkyl having 1 – 4 carbon atoms, and n_1 is an integer of 1 – 18;
and Y represents a monomer copolymerizable with X; with the proviso that when
X is



then m_1/m_1+m_2 is 0.95 – 0.1 and when
X is



then m_1/m_1+m_2 is 1.0 – 0.1

4,030,922
IMAGE RECORDING METHOD

Satoru Honjo, and Seiji Matsumoto, both of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Sept. 26, 1975, Ser. No. 617,130
Claims priority, application Japan, Sept. 26, 1974, 49-109987
Int. Cl.² G03G *13/22*
U.S. Cl. 96—1 R **14 Claims**

1. An image recording method using image-wise modulated radiation comprising forming electric latent images of the image-wise modulated radiation on two recording surfaces, said surfaces being on opposite sides of a support; and then converting said electric latent images to an edge enhanced first image and a second image non-edge enhanced, or edge enhanced to a lesser degree in comparison with said first image, wherein said first and second images are formed from said latent image using one of the following combinations (i) - (ix):

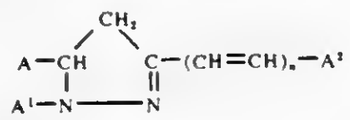
	Edge Enhanced First Image	Non-edge Enhanced Second Image
(i)	Carlson process electrophotography	Photomigration recording method
(ii)	Carlson process electrophotography	Photoelectrophoretic recording method
(iii)	Ionographic method	Photomigration recording method
(iv)	Ionographic method	Photoelectrophoretic recording method
(v)	Inversion electric field electrophotography	Photomigration recording method
(vi)	Inversion electric field electrophotography	Photoelectrophoretic recording method
(vii)	Carlson process electrophotography	Carlson process electrophotography
(viii)	Carlson process electrophotography	Combination of ionography and Photomigration recording method
(ix)	Ionographic method	Ionographic method

4,030,923
MIXTURE OF BINDER MATERIALS FOR USE IN CONNECTION WITH A CHARGE TRANSPORT LAYER IN A PHOTOCONDUCTOR

Donald Lester Krause, Boulder, and Kenneth Dale Presley, Loveland, both of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 11, 1975, Ser. No. 639,795
Int. Cl.² G03G *5/04*
U.S. Cl. 96—1.5 **12 Claims**

1. An improved layered electrophotoconductive imaging element containing a conductive substrate, a charge generating layer and a charge transport layer, said charge transport layer comprising a tri-aryl pyrazoline compound having the formula:



wherein n is zero or one, and A, A^1 and A^2 are each aryl radicals, the improvement comprising:

said charge transport layer including said triaryl pyrazoline compound and a mixture of binder materials comprising about 10 to 25% by weight acrylic resin and about 75 to 90% by weight polycarbonate.

4,030,924
METHOD OF PRODUCING PHOTOGRAPHIC IMAGES

Emiel Alexander Hofman, Mortsel, Belgium, assignor to AGFA-GEVAERT N.V., Mortsel, Belgium

Continuation of Ser. No. 429,631, Dec. 28, 1973, abandoned. This application Oct. 29, 1975, Ser. No. 626,766
Claims priority, application United Kingdom, Oct. 11, 1967, 46444/67
Int. Cl.² G03C *5/26, 5/38, 1/06, 1/48*
U.S. Cl. 96—61 R **8 Claims**

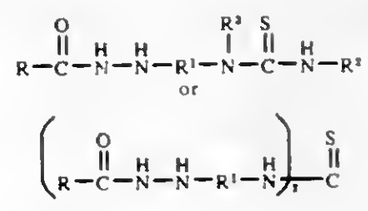
1. A process of forming a photographic image, wherein a photographic material comprising a supported light-sensitive silver halide layer is imagewise exposed and is then continuously advanced at substantially constant speed in successive order into and through four processing stations for treating said exposed material with the following baths in order: a developing bath comprising an aqueous developing or activating liquid for converting the exposed silver halide to metallic silver, a stabilizing bath comprising an aqueous solution containing about 20-300 g per liter of a water-soluble alkaline thiocyanate for converting undeveloped silver halide to a substantially light-insensitive complex, a fixing bath comprising an aqueous solution containing about 50-300 g per liter of a water-soluble alkaline thiosulfate for transforming unexposed silver halide into a water-soluble complex and a washing bath comprising water for removing water-soluble silver salts from said layer to produce a permanent quality print, each such station comprising a tray containing the corresponding bath through which the material is transported and each such bath being maintained at about room temperature, said material being advanced at a speed such that it is immersed in each such bath for a period of 1-15 seconds and the total processing time for all four such processing stations is not more than 60 seconds.

4,030,925
PHOTOGRAPHIC COMPOSITIONS AND ELEMENTS INCLUDING INTERNAL LATENT IMAGE SILVER HALIDE GRAINS AND ACYLHYDRAZINOPHENYLTHIOUREA NUCLEATING AGENTS THEREFOR

Ronald E. Leone; Wayne W. Weber, II, and Donald P. Wrathall, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 601,891, Aug. 6, 1975, abandoned. This application June 29, 1976, Ser. No. 701,050
Int. Cl.² G03C *1/06, 5/54, 1/40, 1/48*
U.S. Cl. 96—73 **32 Claims**

30. An image transfer film unit comprising
a. a photographic element including
1. a layer containing a blue-sensitive silver halide emulsion having associated therewith an immobile material capable of releasing a mobile yellow image dye,
2. a layer containing a green-sensitized silver halide emulsion having associated therewith an immobile material capable of releasing a mobile magenta image dye, and
3. a layer containing a red-sensitized silver halide emulsion having associated therewith an immobile material capable of releasing a mobile cyan image dye, wherein each of said silver halide emulsions comprises silver halide grains having metal dopants occluded therein, said grains being substantially unfogged on their surfaces and being chemically sensitized on their surfaces
1. to a level which will provide a maximum density of less than 0.4 when developed in a test surface developer of the composition indicated below for 5 minutes at 27° C after exposure to a light intensity scale for a fixed time of from 1×10^{-2} to 1 second when said photosensitive composition is coated at a coverage of between about 3 and 4 g of silver per square meter, and
2. to at least a level which would provide a maximum density of at least 0.5 using undoped silver halide grains of the same grain size and halide composition when coated, exposed and developed in like manner,
b. an image-receiving layer,
c. means containing and adapted to introducing an alkaline processing composition into contact with said silver halide emulsions,
d. a silver halide surface developing agent located in said processing composition of said photographic element, and
e. from 0.5 to 25 mg per mole of silver of a nucleating agent incorporated within at least one of said silver halide emulsion layers, said nucleating agent having the formula



wherein
R is hydrogen, phenyl, alkylphenyl, cyanophenyl, halophenyl, alkoxyphenyl, alkyl cycloalkyl, haloalkyl, alkoxyalkyl or a phenylalkyl substituent;
R^1 is a para-phenylene or 3-alkyl, 3-halo- or 3-alkoxy-substituted para-phenylene group;
R^2 is an alkyl substituent having from 1 to 12 carbon atoms; a cycloalkyl substituent; a haloalkyl, alkoxyalkyl or phenylalkyl substituent; phenyl or naphthyl; or an alkylphenyl, cyanophenyl, halophenyl or alkoxyphenyl substituent;
R^3 is hydrogen, benzyl, 4-alkoxybenzyl, 4-halobenzyl or 4-alkylbenzyl;
said alkyl moieties of R have from 1 to 4 carbon atoms;
said alkyl moieties, except as otherwise noted, in each instance include from 1 to 6 carbon atoms; and
said cycloalkyl moieties have from 3 to 10 carbon atoms;
the test surface developer consisting essentially of:

water (52° C)	500.0 cc
N-methyl-p-aminophenol sulfate	2.5 grams
sodium sulfite, desiccated	30.0 grams
hydroquinone	2.5 grams
sodium metaborate	10.0 grams
potassium bromide	0.5 grams
water to make 1 liter.	

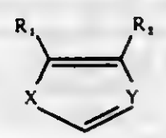
4,030,926
LIGHT-SENSITIVE MATERIAL CONTAINING A DYE-FORMING COMBINATION OF A HETEROCYCLIC COMPOUND AND A CYCLIC DIHALODICARBONYL COMPOUND IN A POLYMERIC BINDER

Kurt-Rainer Stahlke, Krefeld; Werner Krafft; Rudolf Meyer, both of Leverkusen, and Hans Jürgen Rosenkranz, Krefeld, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed July 7, 1975, Ser. No. 593,305
Claims priority, application Germany, July 11, 1974, 2433373
Int. Cl.² G03C *1/52*
U.S. Cl. 96—90 R **5 Claims**

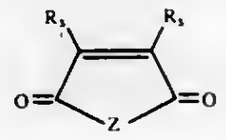
1. A light sensitive storage material for optical data recording comprising in a supported or self-supporting layer comprised of a polymeric hydrophobic binder selected from the group consisting of homopolymers and copolymers of mono-

mers which have copolymerizable olefinic double bonds, polyvinyl acetals and cellulose esters and a dye-forming combination of a heterocyclic compound of the formula



I

X represents oxygen, sulfur or the group >N—R_3,
Y represents nitrogen or the group C—R_4,
R_1 and R_2, which may be the same or different represent hydrogen or an alkyl or aryl group of may together represent the group required for completing a condensed benzene or naphthalene ring which may be substituted,
R_3 represents hydrogen or an alkyl or aryl group and
R_4 represents hydrogen or an alkyl group; and of a cyclic dihalodicarbonyl compound of the formula



II

in which
Z represents oxygen or the group >N—R_6 or

R_5 represents chlorine or bromine,
R_6 represents hydrogen or an alkyl group and
R_7 and R_8, which may be the same or different represent hydrogen or an alkyl group said heterocyclic compound of formula I and said cyclic dihalodicarbonyl compound of formula II being in amounts effective to provide said dye-forming combination upon exposure to ultraviolet light in a first range of wavelengths with capability of forming an image which is in a state of luminescence upon exposure to ultraviolet light in a second range of wavelengths not including said first range, and in a proportion of said heterocyclic compound of formula I being in at least double the molar quantity of the compound of formula II.

4,030,927

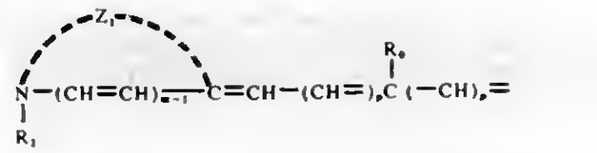
SUPERSENSITIZING COMBINATIONS OF HALOGEN SUBSTITUTED BENZOTRIAZOLES AND CYANINE DYES

Tadaaki Tani, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

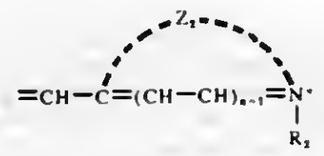
Filed Jan. 14, 1976, Ser. No. 649,000
Claims priority, application Japan, Jan. 16, 1975, 50-7309
Int. Cl.² G03C *1/14, 1/19, 1/34, 1/40*
U.S. Cl. 96—100 **21 Claims**

1. A silver halide photographic emulsion supersensitized by a combination of

1. at least one cyanine sensitizing dye containing therein two 5- and/or 6-membered nitrogen-containing heterocyclic nuclei, which may be the same as or different from each other, and which are attached, through a conjugated methine chain consisting of three, five or seven methine groups, to each other, wherein the cyanine sensitizing dye has the following General Formula (I), which represents a resonance structure:



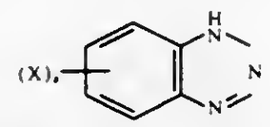
I



(I)

wherein *l*, *m* and *n* each represents 1 or 2, *p* represents 0, 1 or 2, R_9 represents hydrogen atom, an alkyl group, a carboxyalkyl group, a hydroxyalkyl group, an alkoxy group, an alkylthio group, an aralkyl group or an aryl group, and X^- represents an inorganic or organic acid anion, where the dye forms an intermolecular salt when *l* is 1, R_1 and R_2 each represents an aliphatic group, which may be saturated or unsaturated, or an aryl group, an Z_1 and Z_2 each represents a non-metallic atomic group necessary to complete a 5- or 6-membered nitrogen-containing heterocyclic ring; and

2. at least one benzotriazole compound substituted with at least one halogen atom having the following formula;



wherein X represents a chlorine, bromine or iodine atom, and s represents an integer from 1 to 4, and where when *s* equals 2, 3 or 4, the halogen atom substituents may be the same as or different from one another, both (1) and (2) being present in supersensitizing amounts.

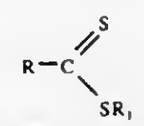
4,030,928

PROCESS OF SENSITIZING SILVER HALIDE EMULSION WITH A DITHIOESTER

Siegfried Gahler, Wolfen; Karl-Wilhelm Junge, Dessau; Gunther Fischer, Leipzig; Steffen Schelthauer, and Horst Viola, both of Dresden, all of Germany, assignors to VEB Filmfabrik Wolfen-Fotochemisches Kombinat, Wolfen, Germany

Filed Nov. 18, 1975, Ser. No. 632,936
Int. Cl.² G03C *1/28*
U.S. Cl. 96—107 **5 Claims**

1. Method for increasing the sensitivity of a photographic silver halide-gelatin emulsion which is chemically ripened comprising at the beginning of the chemical ripening adding to the emulsion a dithioester of the formula



in which R is alkyl, α-hydroxyalkyl, α-hydroxyaralkyl, phenyl fluorenyl-3- or o- or p-substituted phenyl or α-naphthyl, the o- or p- located substituents being a F, OH, dialkylamino, sulfo, phenyl, phenylazo or anilidocarbonyl group and R_1 is alkyl or aralkyl in the proportion of about 0.5 to 50 mg. dithioester per mole silver halide.

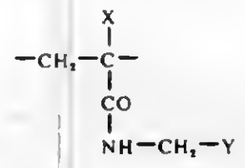
4,030,929

PHOTOGRAPHIC SILVER HALIDE EMULSION

Karsten-Josef Idel, Krefeld; Wilhelm Saleck, Schildgen; Erich Wolff, Leverkusen, and Dieter Freitag, Krefeld, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

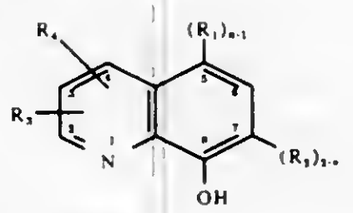
Filed Sept. 14, 1976, Ser. No. 723,084
Claims priority, application Germany, Sept. 19, 1975, 2541754
Int. Cl.² G03C *1/72*
U.S. Cl. 96—114 **5 Claims**

1. A light sensitive photographic silver halide emulsion containing from 500 mg to 500 g per mol of silver halide of a copolymer comprising 0.1 to 20 mol% of recurring structural unit of the formula I:



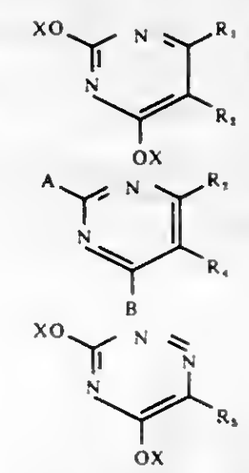
I

in which
X represents hydrogen, halogen or an alkyl group having 1 to 4 carbon atoms, and
Y represents an 8-hydroxyquinoline group of the formula II attached to the remainder of formula I through its 5- or 7-position:



(II)

in which
R_1 or R_2 represents hydrogen or an alkyl group having 1 to 4 carbon atoms,
R_3 and R_4 which may be the same or different represent hydrogen or an alkyl group having 1 to 4 carbon atoms, and is 1 when the 8-hydroxyquinoline group is attached through its 5-position, and 2 when the 8-hydroxy quinoline group is attached through its 7-position and 80 to 99.9 mol % of recurring structural units derived from one or more ethylenically unsaturated copolymerisable comonomers consisting essentially of water soluble compounds.



(I)

(II)

(III)

in which A and B each represents different substituents selected from the group consisting of an amino group and a —OX group; X is selected from the group consisting of a hydrogen atom, an alkali metal atom, a silver atom, a mercury atom and a gold atom; R_1 and R_2 each is selected from the group consisting of an alkyl group, an alkoxy group, an aralkyl group, an allyl group, an acyl group, an aryl group, an aryloxy group, each having up to 21 carbon atoms, a hydrogen atom and a halogen atom; and R_3, R_4 and R_5 each is selected from the group consisting of a hydrogen atom, a halogen atom and an alkyl group having up to 21 carbon atoms, said compound represented by the general formulae (I) to (III) being present in an amount of about 1×10^{-2} to about 5 moles per mole of the silver salt oxidizing agent (a); and wherein said components (a) to (d) may be present in the same layer or may be distributed individually or in combination in more than one layer.

4,030,930

HEAT-DEVELOPABLE LIGHT-SENSITIVE MATERIAL

Kenji Sashihara; Takao Masuda; Yasuhiro Noguchi; Nobuyoshi Sekikawa, all of Asaka, and Tadao Shishido, Minami-ashigara, all of Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Feb. 18, 1975, Ser. No. 550,503
Claims priority, application Japan, Feb. 15, 1974, 49-18378
Int. Cl.² G03C *1/02, 1/76*
U.S. Cl. 96—114.1 **9 Claims**

1. A heat-developable light-sensitive material comprising a support having thereon one or more layers containing

a. an organic silver salt oxidizing agent;
b. a catalytic amount of about 0.001 to about 0.5 mole per mole of (a) of a light-sensitive silver halide or a compound capable of forming a light-sensitive silver halide through reaction with the organic silver salt component (a);
c. a reducing agent; and
d. at least one compound represented by the following general formulae (I) to (III)

4,030,931

HEAT DEVELOPABLE LIGHT-SENSITIVE MATERIAL

Yasuhiro Noguchi; Toshinao Ukai; Kenji Sashihara, and Takao Masuda, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed May 19, 1975, Ser. No. 578,833
Claims priority, application Japan, May 17, 1974, 49-55114
Int. Cl.² G03C *1/02*
U.S. Cl. 96—114.1 **21 Claims**

1. A heat-developable light-sensitive material comprising a support having coated thereon at least one layer containing (a) an organic silver salt, (b) a light-sensitive silver halide or a light-sensitive silver halide-forming component and (c) a reducing agent comprising at least one ester selected from the group consisting of

1. esters of (a) mono- or poly-hydric alcohols or phenols and (b) carboxylic acids derived from phenol derivatives in which at least one of the o-positions thereof is substituted with a substituent selected from the group consisting of an alkyl group having 1 to 20 carbon atoms, a cycloalkyl group having 5 to 7 carbon atoms, and an alkylsulfonyl group having 1 to 20 carbon atoms, and
2. esters of (a) mono- or poly-carboxylic acids and (b) alcohols derived from polyhydric phenols in which at least one of the o-positions thereof is substituted with a substituent selected from the group consisting of an alkyl group having 1 to 20 carbon atoms, a cycloalkyl group having 5 to 7 carbon atoms, and an alkylsulfonyl group having 1 to 20 carbon atoms

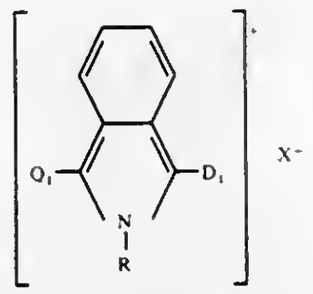
wherein said reducing agent component (c) is present in an amount ranging from about 0.1 mole to about 10 moles per mole of said organic silver salt component (a).

4,030,932
SILVER HALIDE SENSITIZED WITH DYES CONTAINING AN ISOINDOLE NUCLEUS

Derek David Chapman, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 28, 1975, Ser. No. 581,463
Int. Cl.² G03C 1/10, 1/16
U.S. Cl. 96—127 14 Claims

1. A photographic silver halide emulsion spectrally sensitized with a cyanine dye comprising an isoindole nucleus represented by the formula



wherein R is an alkyl or substituted alkyl group;

Q_1 is a methine chain having an odd number of carbon atoms terminated with a nitrogen atom contained in a basic heterocyclic nucleus of the type used in cyanine dyes;

D_1 is a halogen atom, an alkoxy group, or a methine chain having an even number of carbon atoms terminated with a nitrogen atom contained in a basic heterocyclic nucleus of the type used in cyanine dyes; and

X^- represents an anion.

4,030,933
PHOSPHORUS AND HALOGEN CONTAINING POLYMERS OF BIS-HYDROXYETHYL TEREPHTHALATE AS FLAME RETARDANT ADDITIVES

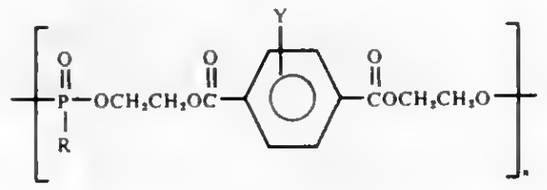
Anthony B. Conciatori, Chatham, and Robert W. Stackman, Morristown, both of N.J., assignors to Celanese Corporation, New York, N.Y.

Filed Apr. 7, 1975, Ser. No. 566,005
Int. Cl.² C09K 3/28
U.S. Cl. 106—15 FP 18 Claims

1. A process for preparing phosphorus and halogen containing polymers useful as flame retardant additives which process comprises reacting a halogenated derivative of bis-hydroxyethyl terephthalate with a halogen containing phosphorus monomer having the formula

wherein R represents a radical selected from the group consisting of (a) alkyl, (b) bromoalkyl, (c) chloroalkyl, (d) alkylamido and (e) dialkylamido radicals, wherein the alkyl substituents of the foregoing may contain from 1 to 10 carbon atoms, (f) cyclohexyl, (g) phenyl, (h) benzyl, (i) tolyl and (j) xylyl, and X represents a halogen atom wherein said reaction is carried out in a molar ratio of halogenated derivative of bis-hydroxyethyl terephthalate to halogen containing phosphorus monomer of from about 0.33 to 1 to about 3 to 1, and at a temperature of from about −40° to about 200° C. and a pressure of from about 0.01 to about 100 atmospheres.

9. A phosphorus and halogen containing polymer of the formula



wherein the Y attached to the aromatic ring represents 1 to 4 halogen atoms; the R represents a radical selected from the group consisting of (a) alkyl, (b) bromoalkyl, (c) chloroalkyl, (d) alkylamido and (e) dialkylamido radicals, wherein the alkyl substituents of the foregoing may contain from 1 to 10 carbon atoms, (f) cyclohexyl, (g) phenyl, (h) benzyl, (i) tolyl and (j) xylyl; and n is an integer greater than 1.

4,030,934
COLORING COMPOSITION FOR LINE- OR PATTERN-DRAWING ELEMENTS

Zenshiro Iijima, Tokyo, Japan, assignor to Kawamura Seichu Kogyo Kabushiki Kaisha, Tajimi (Gifu), Japan

Filed Apr. 24, 1975, Ser. No. 571,238
Claims priority, application Japan, Aug. 28, 1974, 49-98642; Aug. 7, 1974, 49-90503
Int. Cl.² C08D 11/00, 11/06
U.S. Cl. 106—23 8 Claims

1. A heat-erasable coloring composition for line-or pattern-drawing elements which comprises at least one acidic sublimating substance selected from the group consisting of benzoic acid salicylic acid, phthalic anhydride, maleic anhydride and mixtures thereof, having disperse thereinto a coloring agent present in an amount 0.001-0.1 parts by weight per part of acidic sublimating substance, said coloring agent being capable of developing its color under acidic conditions and being selected from the group consisting rhodamine lactone and crystal violet lactone.

2. A composition according to claim 1, additionally comprising a metal salt of a higher fatty acid selected from the group consisting of calcium stearate and calcium oleate in an amount of 0.01–0.5 parts by weight per part of acidic sublimating substance to increase the sublimation rate of said acidic sublimating substance.

4,030,935
GLASS

Mikhail Mikhailovich Shults, prospekt Engelsa, 63, korpus 3, kv. 51; Anatoly Ivanovich Parfenov, Novocherkassky prospekt, 40, kv. 30, both of Leningrad; Alexandr Dmitrievich Shnypkov, Gatchinsky raion poselok Kummunar, ulitsa Pionerskaya, 11, kv. 64, Leningradskaya oblast; Vladimir Georgievich Krunchak, Institutsky prospekt, 9, kv. 49; Sarra Borisovna Evnina, V.O. 15 Linia, 16, kv. 19, both of Leningrad; Vladimir Alexandrovich Dolidze, ulitsa Sergo Zakariadze, 10, kv. 10, and Valentina Mikhailovna Tarasova, prospekt Plekhanova, 148, kv. 19, both of Tbilisi, all of U.S.S.R.

Filed Apr. 22, 1976, Ser. No. 679,485
Int. Cl.² C03C 3/04, 3/10
U.S. Cl. 106—52 1 Claim

1. Glass essentially consisting of the following components, in terms of percent by weight:

silicon dioxide	58.5 to 64.7
zirconium dioxide	14.1 to 20.0
aluminum oxide	0.1 to 3.0
lanthanum oxide	0.1 to 3.0
strontium oxide	0.1 to 4.0
calcium oxide	0.1 to 3.0
sodium oxide	0.1 to 6.0
lithium oxide	1.2 to 5.0
potassium oxide	3.0 to 14.0

4,030,936
BINDER FOR ALUMINA CONTAINING REFRACTORIES

Melvin M. Willis, 5232 Kentwater Pl., Yorba Linda, Calif. 92686

Filed July 7, 1975, Ser. No. 593,210
Int. Cl.² C04B 35/10
U.S. Cl. 106—65 10 Claims

7. A refractory mixture consisting essentially of an alumina containing mixture having between about 75 and 90 percent by weight of alumina and between 1 and 15 percent by weight of a binder consisting essentially of:

H_3PO_4: 8 moles

$Al_2(SO_4)_3$: 0.5 to 1.5 moles

Na_2SO_4: 0.5 moles to 5 moles.

4,030,937
CERAMIC DIELECTRIC MATERIAL HAVING IMPROVED TEMPERATURE STABILITY

Tomotoshi Nakai; Kazuaki Utsumi, and Tomeji Ohno, all of Tokyo, Japan, assignors to Nippon Electric Co., Ltd., Tokyo, Japan

Filed Apr. 2, 1976, Ser. No. 673,120
Claims priority, application Japan, Apr. 9, 1975, 50-43592
Int. Cl.² H01B 3/12; C04B 35/46, 35/50
U.S. Cl. 106—73.2 8 Claims

1. A ceramic composition containing $La_2Ti_2O_7$, $Sr_2Nb_2O_7$, and $\frac{1}{2}\ Mg_xTi_{2-2x}O_{4-2x}$, where x lies in the range 0 to 1.0, represented as

$$\alpha[La_2Ti_2O_7]\cdot\beta[Sr_2Nb_2O_7]\cdot\gamma[\tfrac{1}{2}Mg_xTi_{2-2x}O_{4-2x}],$$

where $\alpha+\beta+\gamma=1.0$, and falling within the polygonal region surrounded by the lines A-1-B1-C1-D1-E1-F1-G1 on a ternary coordinate plane, in which said A1, B1, C1, D1, E1, F1 and G1 have the values as follows:

	α	β	γ
A1	1.00	0	0
B1	0.20	0	0.80
C1	0	0.25	0.75
D1	0	0.40	0.60
E1	0.20	0.50	0.30
F1	0.20	0.65	0.15
G1	0.15	0.85	0

and compositions on the line A1-B1, line C1-D1, and line G1-A1 being excluded from said composition.

4,030,938
METHOD FOR THE MANUFACTURE OF BOROSILICATE GLASSES

Ian M. Thomas, Temperance, Mich., assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Feb. 3, 1976, Ser. No. 655,024
Int. Cl.² C03C 3/08; C04B 35/16
U.S. Cl. 106—73.5 5 Claims

1. A process for producing an amorphous carbon free, homogeneous borosilicate product comprising

a. combining a boron alkoxide and an at least partially hydrolyzed silicon tetraalkoxide

b. fractionally distilling the product of step (a) in the presence of free water for a time sufficient to remove all alkanol by product.

4,030,939
CEMENT COMPOSITION

William A. Mallow, San Antonio, Tex., assignor to Southwest Research Institute, San Antonio, Tex.

Filed July 30, 1975, Ser. No. 600,258
Int. Cl.² C04B 35/16
U.S. Cl. 106—74 14 Claims

1. A cement composition consisting essentially of,

a. spray-dried hydrated sodium silicate powder having a weight ratio of SiO_2:Na_2O in the range of from about 2.4:1 to about 3.22:1,

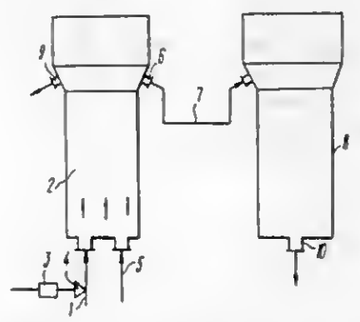
b. a silica polymer-forming agent selected from the group consisting of potassium silicofluoride and sodium silicofluoride, and

c. water.

4,030,940
METHOD OF PRODUCING FINE DISPERSE ALKYLATED SILICA COMPOUNDS

Alexei Alexeevich Chuiko, Prospekt Naukl 99, kv. 48; Valentin Anatolievich Tertykh, ulitsa Sapernoe pole 9/21, kv. 40; Vllyam Alexandrovich Sobolev, ulitsa P.Lumumby 13, kv. 12; Valery Mikhailovich Maschenko, ulitsa Oktyabrskoi revoljutsil, 17/5, kv. 11; Vyacheslav Valentinovich Pavlov, ulitsa K.Libknekhta, 22, kv. 7; Alexei Dmitrievich Chugai, ultisa Gvardeiskaya, 4, all of, Kiev; Nikolai Vasiilevich Khaber, ulitsa Sevastopolskaya, 4, kv. 6; Anatoly Borisovich Kondratenko, ulitsa Nikolaevoi-Tereshkovol, 30, both of Kalush, Ivano-Frankovskol oblastl; Vasily Ivanovich Vatamanjuk, ulitsa Sovetskaya, 98, kv. 16, Ivano-Frankovsk; Mikhail Ivanovich Khoma, ulitsa Sevastopolskaya, 8, Kalush, Ivano-Frankovskol oblastl; Alexandr Nikolaevich Kutin, ulitsa Polyarnaya, 20, kv. 8, Moscow; Jury Davydovich Shaposhnikov, ulitsa Scherbakovskaya, 5, kv. 153, Moscow, and Malvina Leontievna Galashina, 3 Frunzenskaya ulitsa 1, kv. 91, Moscow, all of U.S.S.R.

Filed Nov. 3, 1975, Ser. No. 628,243
Int. Cl.² C09C 1/28
U.S. Cl. 106—308 Q 6 Claims



1. A method of producing fine-disperse alkylated silica and controlling the concentration of grafted alkyl groups on said silica, comprising the steps of treating fine-disperse silica with vapours of water at a temperature of 110°–120° C to a humidification degree ranging from 2 to 40 micromoles H_2O/m^2 SiO_2, treating the thus humidified fine-disperse silica with vapours of alkylchlorosilane at a temperatue of 250°–310° C in a fluidized bed; isolating the resultant fine-disperse aklylated silica from gaseous reaction products at a temperature of 390°–400° C.

4,030,941
METHOD FOR REDUCING THE VISCOSITY AND FOR REFINING KAOLIN CLAYS

Albert C. Kunkle, and Carl E. Kollmar, Jr., both of Macon, Ga., assignors to J. M. Huber Corporation, Locust, N.J.
Continuation-in-part of Ser. No. 591,737, June 30, 1975. This application Oct. 12, 1976, Ser. No. 731,141
Int. Cl.² C09C 1/42
U.S. Cl. 106—309 27 Claims

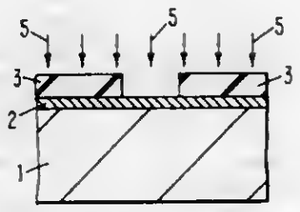
1. A method for reducing the viscosity of crude kaolin clay ores for producing clay pigments comprising contacting a clay/water slurry of said crude kaolin clay with an inorganic polymer complex having the general formula:

$$[Al(OH)_x A_{3-y}]_z$$

wherein $x = 6$ to 24, $y = 1.0$ to 2.75 and A is selected from the group consisting of Cl^-, $(SO_4^=)_{0.5}$ and NO_3^-

4,030,942
SEMICONDUCTOR MASKING FOR DEVICE FABRICATION UTILIZING ION IMPLANTATION AND OTHER METHODS

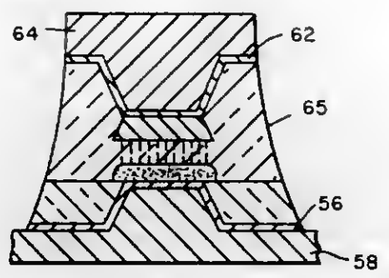
William Andrew Keenan, Montpelier, and Charles Thomas Kroll, Essex Center, both of Vt., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Oct. 28, 1975, Ser. No. 626,141
Int. Cl.² H01H 21/265
U.S. Cl. 148—1.5 16 Claims



1. In a process of manufacturing semiconductor devices utilizing ion implantation to implant ions into a region of a semiconductor body, the improvement comprising the steps of: depositing aluminum nitride as an implantation screen on the surface of the implantation region; ion implanting said ions through said screen; and thereafter dissolving said aluminum nitride in water.

4,030,943
PLANAR PROCESS FOR MAKING HIGH FREQUENCY ION IMPLANTED PASSIVATED SEMICONDUCTOR DEVICES AND MICROWAVE INTEGRATED CIRCUITS

Don H. Lee, Agoura; Kenneth P. Weller, Rancho Palos Verdes, and William F. Thrower, Cerritos, all of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.
Filed May 21, 1976, Ser. No. 688,662
Int. Cl.² H01L 21/265
U.S. Cl. 148—1.5 4 Claims

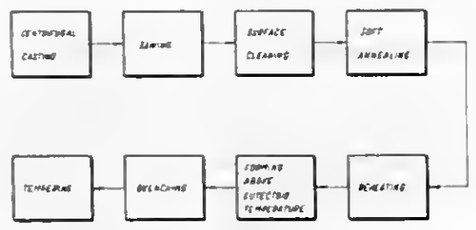


1. A planar process for fabricating high frequency semiconductor devices including the steps of:

a. providing a high-resistivity semiconductor substrate,
b. forming an insulating ion implantation mask on the surface of said substrate,
c. implanting conductivity type determining ion species through an opening in said mask and into said substrate to form a buried region therein,
d. selectively implanting additional ion species above said buried region to thereby form a semiconductor device and including a region thereof extending to the surface of said substrate,
e. removing a selected region of said substrate to thereby expose at least a portion of said buried region, and
f. making ohmic contacts to both said buried region and said implanted region extending to the substrate surface, whereby appropriate operating or modulating bias or control potentials may be applied to said ohmic contacts to control the flow of microwave energy from said semiconductor device.

4,030,944
PRODUCTION OF ANNULAR PRODUCTS FROM CENTRIFUGALLY CAST STEEL STRUCTURES

Karel Sommer; Jiří Zdrazil; Milan Kubínek, all of Brno; Jaroslim Bahna, Ilava; Stanislav Kyselica, Trenclanske Teplice; František Habrovec, and Jiří Škarek, both of Brno, all of Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia
Filed Apr. 15, 1976, Ser. No. 677,427
Int. Cl.² B22D 13/02; C21D 9/08
U.S. Cl. 148—2 11 Claims



1. In a method of forming annular products from a hypereutectoid steel composition which has been initially centrifugally cast into a hollow ingot having the shape of a solid of revolution, the steps of initially cooling the just-cast ingot from the casting temperature to a temperature below the eutectoid temperature of the steel composition, directly dividing the ingot into a plurality of intermediate annuli during the initial cooling step, soft-annealing the resulting intermediates at a prescribed temperature above the eutectoid temperature to obtain a spheroidized carbidic phase, re-heating the soft-annealed intermediates to a temperature in the austenitization range, and hot-working the re-heated intermediates into the form of the final product.

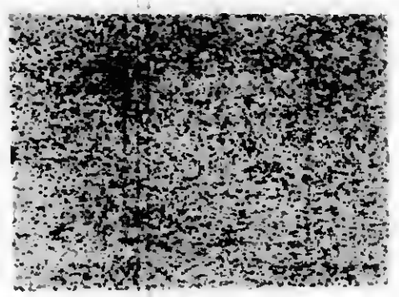
4,030,945
RINSING COATED METALLIC SURFACES

Wilbur S. Hall, Plymouth Meeting, and Lester Steinbrecher, Southampton, both of Pa., assignors to Amchem Products, Inc., Ambler, Pa.
Continuation of Ser. No. 152,993, June 14, 1971, Pat. No. 3,795,546, which is a continuation-in-part of Ser. No. 791,762, Jan. 16, 1969, Pat. No. 3,592,699, and Ser. No. 791,801, Jan. 16, 1969, Pat. No. 3,585,084, each is a continuation-in-part of Ser. No. 554,336, June 1, 1966, abandoned. This application Jan. 4, 1973, Ser. No. 321,067
The portion of the term of this patent subsequent to June 15, 1988, has been disclaimed.
Int. Cl.² C23F 7/26
U.S. Cl. 148—6.2 46 Claims

1. A method for modifying the properties of a polymeric resinous-coated metallic surface comprising: forming a polymeric resinous coating on a metallic surface by treating the surface with an acidic aqueous coating composition comprising a polymeric resinous coating-forming material and an oxidizing agent and thereafter treating the polymeric resinous coating with an aqueous rinse solution containing hexavalent chromium in an amount at least sufficient to improve the corrosion resistant properties of said coating.

4,030,946
ELIMINATING PRIOR PARTICLE BOUNDARY DELINEATION

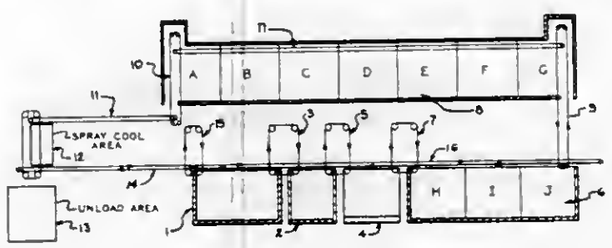
Donald R. Muzyka, Reinholds, and Robert F. Walley, Shoemakersville, both of Pa., assignors to Carpenter Technology Corporation, Reading, Pa.
Filed Apr. 13, 1976, Ser. No. 676,508
Int. Cl.² B22F 1/04
U.S. Cl. 148—11.5 P 23 Claims



1. A method for substantially eliminating prior powder particle boundary delineation in articles made from prealloyed powder densified to at least about 99% of theoretical density which includes placing in an enclosure a predetermined amount of the prealloyed powder with a predetermined amount of a surfactant and having substantially less then theoretical density, said surfactant comprising at least one metallic element which is a strong oxide and sulfide former and a weak carbide former as compared to the elements of said prealloyed powder, heating said prealloyed powder and surfactant to a predetermined temperature above the carbide solvus temperature and below the solidus temperature of said prealloyed powder, and densifying said prealloyed powder while it is above said carbide solvus temperature to at least about 99% of theoretical density with said surfactant available at the surfaces of the powder particles.

4,030,947
HEATING TREATMENT METHOD AND SYSTEM OF UTILIZING SAME

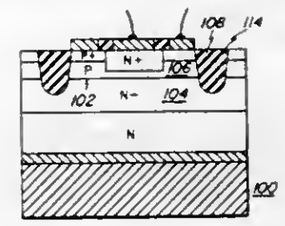
Eugene L. Kemper, 38520 Delta Drive, Mount Clemens, Mich. 48043
Filed Sept. 10, 1975, Ser. No. 612,190
Int. Cl.² C21D 1/04
U.S. Cl. 148—12.9 16 Claims



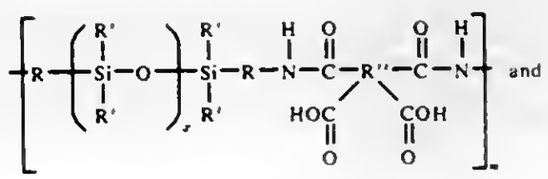
1. A method for heat treating a metallic substance, comprising the steps of:
solution heat treating said metallic substance by causing contact between said metallic substance and a predetermined fluid solution-heat-treat media;
quenching the solution heat treated metallic substance by causing contact between said solution heat treated metallic substance and a predetermined fluid quenching media;
subjecting said metallic substance to a predetermined ultrasonic treatment during said quenching step;
naturally aging said metallic substance; and
artificially aging said metallic substance.

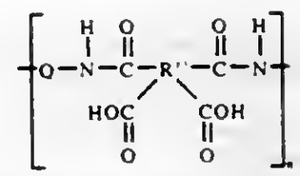
4,030,948
POLYIMIDE CONTAINING SILICONES AS PROTECTIVE COATING ON SEMICONDUCTOR DEVICE

Abe Berger, 1504 Barclay Place, Schenectady, N.Y. 12309
Filed July 21, 1975, Ser. No. 597,971
Int. Cl.² H01L 21/56
U.S. Cl. 148—33.3 9 Claims

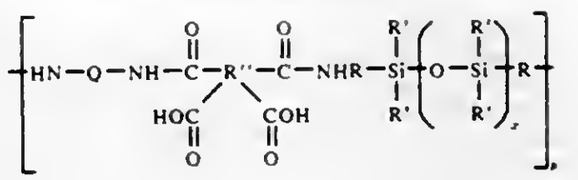


1. A semiconductor element comprised of a body of semiconductor material having at least two regions of opposite-type semiconductivity and a P-N junction disposed between each pair of regions of opposite type semiconductivity:
and end portion of at least one P-N junction exposed at a surface of the body; and
at least one layer of conformal protective coating material disposed on the exposed end portion of the at least one P-N junction, the layer comprising a copolymer which is a reaction product of a tetracarboxylic acid dianhydride, a diamine and a di(aminoalkyl) siloxane, which is a copolymer having recurring structural units of a block copolymer of the formulas:


and



and a random polymer of the formula:



wherein:
R is a divalent hydrocarbon radical;
R′ is a monovalent hydrocarbon radical wherein each R′ may be the same radical or a different radical from the others;
R″ is a tetravalent organic radical;
Q is a divalent organic radical which is a residue of an organic diamine;
x is an integer having a value of from 1 to 10:

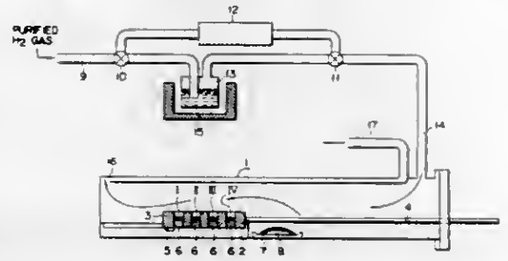
m is an integer greater than 1 and
n is an integer greater than 1,
p is an integer greater than or equal to 0,
and the recurring units designated by *m*, *n*, and *p* are such that the mole percent of silicone diamine in the total polymer constitutes 18 to 45 mole percent of the total diamines in the copolymer.

4,030,949

METHOD OF EFFECTING LIQUID PHASE EPITAXIAL GROWTH OF GROUP III-V SEMICONDUCTORS

Yoshiji Horikoshi, Seki, and Yoshitaka Furukawa, Musashino, both of Japan, assignors to Nippon Telegraph and Telephone Public Corporation, Tokyo, Japan

Filed June 26, 1975, Ser. No. 590,554
Claims priority, application Japan, July 4, 1974, 49-75817
Int. Cl.² H01L *21/208*
U.S. Cl. 148—171 4 Claims



1. In a method for manufacturing a buried type semiconductor laser comprising:
a. the step of preparing a GaAs single crystalline substrate;
b. the step of effecting alternately the liquid phase epitaxial crystal growth of an $Al_{0.3}Ga_{0.7}As$ layer and an $Al_{0.05}Ga_{0.95}As$ layer on said GaAs single crystalline substrate;
c. the step of coating SiO_x on the surface of said $Al_{0.05}Ga_{0.95}As$ layer to form a stripe-shaped pattern and etching said $Al_{0.05}Ga_{0.95}As$ layer by an etching solution to form a stripe-shaped $Al_{0.05}Ga_{0.95}As$ layer on said $Al_{0.3}Ga_{0.7}As$ layer; and
d. the step of effecting the liquid phase epitaxial crystal growths of an $Al_{0.3}Ga_{0.7}As$ layer and a GaAs layer on said $Al_{0.3}Ga_{0.7}As$ layer and stripe-shaped $Al_{0.05}Ga_{0.95}As$ layer;
the improvement which is characterized in that said liquid phase epitaxial growths are carried out in a mixed gas atmosphere of GaCl and H_2.

4,030,950

PROCESS FOR CUBE-ON-EDGE ORIENTED BORON-BEARING SILICON STEEL INCLUDING NORMALIZING

Jack W. Shilling, Monroeville; Amitava Datta, Pittsburgh, and Frank A. Malagari, Jr., Freeport, all of Pa., assignors to Allegheny Ludlum Industries, Inc., Pittsburgh, Pa.

Filed June 17, 1976, Ser. No. 696,966
Int. Cl.² H01F *1/04*
U.S. Cl. 148—112 12 Claims

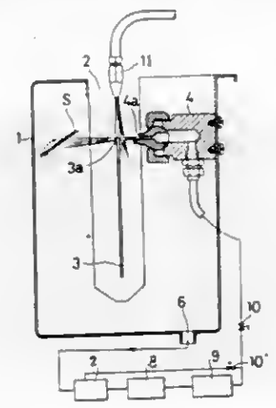
1. In a process for producing electromagnetic silicon steel having a cube-on-edge orientation and a permeability of at least 1870 (G/O_e) at 10 oersteds, which process includes the steps of: preparing a melt of silicon steel containing from 0.02 to 0.06% carbon, from 0.0006 to 0.0080% boron, up to 0.0100% nitrogen, no more than 0.008% aluminum and from 2.5 to 4.0% silicon; casting said steel; hot rolling said steel; cold rolling said steel; decarburizing said steel, applying a refractory oxide base coating to said steel; and final texture annealing said steel; the improvement comprising the steps of normalizing said cold roller steel at a temperature of from 1300 to 2000° F in a hydrogen-bearing atmosphere having a dew point of from +20 to +110° F for a period of time sufficient to lower said steel's carbon content to a level below 0.005%, said temperature, dew point and time being monitored so as to result in a steel having at least 320 parts per million of oxygen, based on the total weight of the steel, within 10 microns of the surfaces of said steel; and forming an opaque refractory oxide base coating on said steel.

4,030,951

METHOD OF HARDENING SAW TEETH

Toushichi Ishizawa, Shizuoka, Japan, assignor to Fuji Sangyo Kabushiki Kaisha, Fujieda and Seiya Ishizawa, Shizuoka, both of, Japan

Filed May 24, 1976, Ser. No. 689,465
Claims priority, application Japan, May 26, 1975, 50-63205
Int. Cl.² C21D *9/24*
U.S. Cl. 148—147 4 Claims



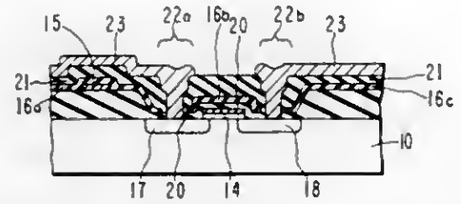
1. A method for hardening sawteeth comprising moving intermittently a band saw in the lengthwise direction thereof, forming in air a water stream running from a point forward at least from the top ends of sawteeth with respect to the moving direction of the band saw and contacting the water stream with the top ends of the sawteeth while the band saw is not moved, blowing flames to the top ends of the sawteeth in said state to blow away the running water at parts covering the top ends of the sawteeth by the force of the flames and heat only the top ends of the sawteeth at a prescribed hardening temperature, then moving the band saw againg and cooling the heated top ends of the sawteeth by the running water.

4,030,952

METHOD OF MOS CIRCUIT FABRICATION

Robert L. Luce, Los Altos Hills; Joseph P. Perry, Sunnyvale, and James D. Sansburry, Palo Alto, all of Calif., assignors to Fairchild Camera and Instrument Corporation, Mountain View, Calif.

Continuation of Ser. No. 461,836, April 19, 1974, abandoned.
This application Oct. 6, 1975, Ser. No. 619,994
Int. Cl.² H01L *21/225*
U.S. Cl. 148—187 7 Claims



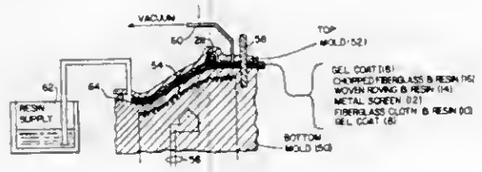
1. A method of fabricating a metal-oxide-semiconductor structure in a semiconductor substrate, said structure having source and drain regions separated by a gate region, comprising the steps of:
forming a layer of selected dopant-containing material on surface portions of said semiconductor substrate overlying said source and drain regions to be formed with simultaneous diffusion of dopant from said material into said substrate,
removing portions of said selected dopant-containing material over said source and drain regions,
forming a first oxide insulation material on said semiconductor surface over said source and drain regions and beneath said dopant-containing material, and
forming a second oxide insulation material over said dopant-containing material and over exposed portions of said first oxide insulation material whereby said first oxide insulation material, said dopant-containing material, and said second oxide insulation material cooperatively function as a protective layer for said metal-oxide-semiconductor structure.

4,030,953

METHOD OF MOLDING FIBERGLASS REFLECTING ANTENNA

Joseph Fredrick Rutschow, Sunnyvale, and Bruno Zucconi, Alameda, both of Calif., assignors to Scala Radio Corporation, San Leandro and Millifiect, Sunnyvale, both of, Calif.

Filed Feb. 11, 1976, Ser. No. 657,045
Int. Cl.² H01Q *15/16*
U.S. Cl. 156—79 2 Claims



1. Method of fabricating a fiberglass reflecting antenna, comprising the steps of:
a. spraying a gel coat layer into a first convex antenna mold, said first mold having a predetermined curvature;
b. applying a layer of resin impregnated fiberglass cloth on top of the gel coat in the first convex mold;
c. placing an electromagnetic reflecting surface on top of the layer of resin impregnated cloth;
d. placing a plurality of layers of dry fiberglass woven roving into the first convex mold on top of the reflecting surface;
spraying a gel coat layer into a second concave antenna mold, said second concave mold having both a shape and a predetermined curvature complimentary to said first convex mold;
f. applying a layer of chopped fiberglass and resin on top of the gel coat layer in the second mold;
g. anchoring a plurality of mounting brackets to said chopped fiberglass and resin layer in the second mold;
h. placing said first convex mold and said second concave mold together;
i. injecting resin into the space between said molds;
j. pressing said molds together while the injected resin hardens so that the electromagnetic reflecting surface assumes the predetermined curvature of said molds;
k. heating said molds to an elevated temperature that substantially relieves shrinkage induced stress in the fiberglass; and
l. removing the antenna from the molds after cooling.

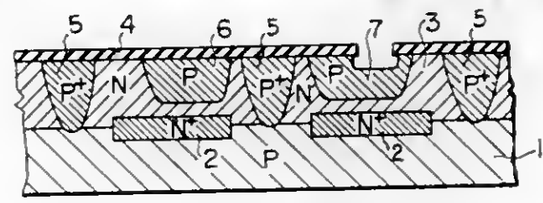
4,030,954

METHOD OF MANUFACTURING A SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE

Noboru Horie, Kodaira, Japan, assignor to Hitachi, Ltd., Japan

Filed Sept. 30, 1975, Ser. No. 617,991
Claims priority, application Japan, Sept. 30, 1974, 49-111472
Int. Cl.² H01L *7/50*
U.S. Cl. 156—628 8 Claims

1. In a method of manufacturing at least two transistors, having current gains different from each other, in a semiconductor integrated circuit, the improvement comprising the steps of
a. providing a semiconductor substrate having at least first and second collector regions each having a first conductivity type, electrically isolated from each other, respectively extending to a principal surface of the semiconductor substrate,
b. diffusing an impurity of a second conductivity type, opposite to said first conductivity type, at the same time in said first and second collector regions, from said principal surface, to form first and second base regions in said first and second collector regions, respectively,
c. partially removing a surface portion of said first base region to form a depression therein, and
d. diffusing an impurity of said first conductivity type in said first base region beneath said depression and said second region from said principal surface, to form emitter regions therein, respectively.

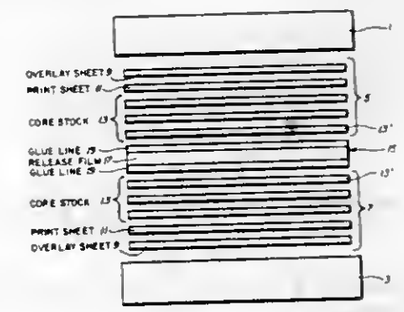


4,030,955

METHOD OF MANUFACTURE DECORATIVE LAMINATE TO PROVIDE GLUE ADHERABLE BACK SURFACE

Christo Antonio, Princeton, and Wyman F. Uhl, Sterling, both of Mass., assignors to Litton Business Systems, Inc., Fitchburg, Mass.

Filed Nov. 5, 1974, Ser. No. 521,054
Int. Cl.² B32B *31/00*
U.S. Cl. 156—235 2 Claims



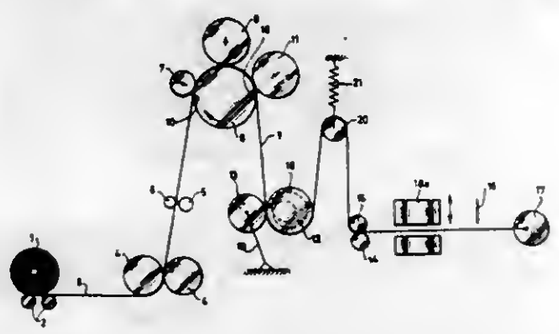
1. A process for forming a laminate comprising the steps of assembling a plurality of superimposed plies of thermosetting resin impregnated sheets between heated platens, placing a release medium between the heated platens and adjacent the back surface of the bottom most ply of said sheets, transferring a glueable coating from said release medium to said back surface while consolidating said assembly by applying heat and pressure through said heated platens and applying sufficient heat to cure said resin thereby firmly anchoring said glueable coating to said bottom-most ply, said glueable coating being formed of a substance including a material selected from the group consisting a polyvinyl alcohol, animal glue and starch.

4,030,956

METHOD OF MANUFACTURING PLASTIC BAGS IN A CONTINUOUS WAY

Arnoldus Willem Jan Leloux, Dedemsvaart, Netherlands, assignor to Wavin B.V., Zwolle, Netherlands

Continuation-in-part of Ser. No. 337,493, March 2, 1973, abandoned. This application Dec. 12, 1975, Ser. No. 640,133
Claims priority, application Netherlands, Mar. 15, 1972, 7203390
Int. Cl.² B32B 31/26
U.S. Cl. 156—290 6 Claims



1. A method of continuously manufacturing plastic bags from a length of thermoplastic foil having two superposed walls, comprising the steps of:

a. continuously moving the foil to bring the lower of the walls against a heating element while the upper wall remains exposed,

b. heating the lower wall, by means of the heating element, through its entire thickness to the plasticizing temperature of the foil and simultaneously heating the upper wall through only a portion of its thickness to the plasticizing temperature of the foil, the portion of the thickness of the upper wall extending to the upper surface of the upper wall remaining unplasticized at all times, the heating taking place along longitudinally spaced-apart lines transverse to both the longitudinal direction of the foil and the direction of movement of the foil,

I. without compressing the walls together against the heating element, and

II. while maintaining the portion of the superposed walls being heated in an untensioned condition,

c. thereafter moving the heated foil between first and second pressure surfaces to press the heated superposed walls together, the first pressure surface engaging the upper surface of the upper wall, and

d. maintaining the first pressure surface of a temperature below the softening temperature of the foil.

4,030,957

COPOLYAMIDES CONTAINING CAPROLACTAM, LAURICLACTAM AND HEXAMETHYLENE DIAMINE ADIPATE

Fritz Raabe, Bonn, and Eduard de Jong, Bonn-Beuel, both of Germany, assignors to Plate Bonn Gesellschaft mit beschrankter Haftung, Bonn, Germany

Division of Ser. No. 467,233, May 6, 1974, Pat. No. 3,950,297. This application Feb. 11, 1975, Ser. No. 548,966
Claims priority, application Germany, May 12, 1973, 2324159
Int. Cl.² C09J 3/16
U.S. Cl. 156—331 13 Claims

1. A process for heat-sealing together surfaces of materials comprising applying to at least one of the surfaces to be sealed a composition comprising a copolyamide consisting essentially of recurring units of caprolactam, lauriclactam, hexamethylene diamine adipate and a hexamethylene diamine salt of an aliphatic dicarboxylic acid of the formula

HOOC—$(CH_2)_n$—COOH

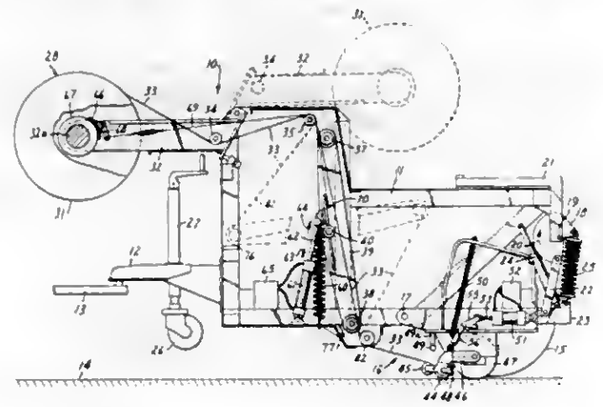
in which n is 7, 8, 10 or 11 joining said surfaces, heating the materials to be sealed to a temperature sufficient to melt the copolyamide and cooling the materials.

4,030,958

PAVEMENT-STRIPING APPARATUS

Heinrich F. Stenemann, Woodbury, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Aug. 9, 1976, Ser. No. 712,679
Int. Cl.² B26D 5/00; G05G 15/00
U.S. Cl. 156—350 12 Claims



1. Apparatus for applying a pavement-marking tape to a paved surface comprising:

a. a frame;

b. a support on the frame for rotatably supporting a roll of said tape;

c. an application head on the frame for applying tape to the paved surface comprising:

i. an engagement roller that is movable to and away from the paved surface;

ii. keeper means for holding tape adjacent the engagement roller such that movement of the engagement roller to the paved surface presses the tape into engagement with the paved surface;

iii. a pressure roller for pressing the tape after it has been engaged against the paved surface by the engagement roller; and

iv. cutter means for cutting tape that extends between the engagement roller and pressure roller after the engagement roller has been moved away from the paved surface;

the tape extending in a continuous length from the roll of tape to its position adjacent the engagement roller such that application of tape onto a paved surface by the engagement roller during movement of the apparatus along the paved surface applies a pulling force on the tape that results in unrolling of tape from the roll;

d. accumulator means located between the roll of tape and the application head and comprising a set of guides through which the tape is threaded, said guides being movable against an adjustable biasing pressure from a first position which provides a serpentine path for tape traveling from the roll of tape to the application head to at least a second position which provides a more direct path for the tape;

e. timer means for initiating movement of said engagement roller to and away from the paved surface; and

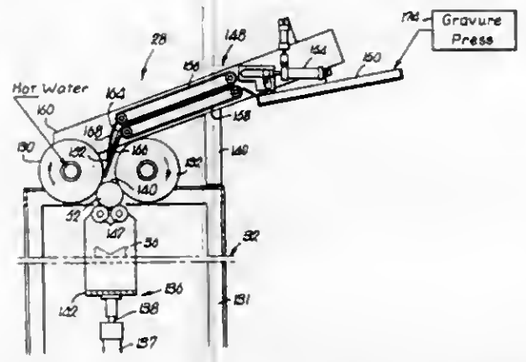
f. tape-starting means actuatable by said timer means prior to movement of said engagement roller to the paved surface and comprising means for relaxing said biasing pressure so as to allow easier movement of said accumulator from its first position to its second position.

4,030,959

APPARATUS FOR TRANSFERRING DESIGN IMAGE TO WAX ARTICLES

Merlin M. Meisner; Raymond M. Matulis, and James R. Mackey, all of Overland Park, Kans., assignors to Hallmark Cards, Incorporated, Kansas City, Mo.

Division of Ser. No. 486,820, July 10, 1974, Pat. No. 3,974,014. This application Mar. 9, 1976, Ser. No. 665,255
Int. Cl.² B44B 9/00; B32B 1/08; C11C 5/02
U.S. Cl. 156—457 11 Claims



1. Apparatus for transferring an ink design image from a sheet of waxed paper having said image on a waxed surface thereof, to a generally cylindrical wax body, comprising:

first and second elongated, adjacent, axially rotatable rollers positioned in parallel, side-by-side relationsbip to permit said waxed body to be placed in rotative bridging engagement between said rollers;

means to axially rotating said first and second rollers in unison in the same direction;

pressure means located to bear against the surface of said wax body remote from said rollers when said body is placed in rotative bridging contact therewith; and

means operable to insert said design bearing waxed sheet into the nip presented between one of said rollers and the wax body with said design facing the latter when said body is placed in said bridging position between said first and second rollers.

4. Apparatus for successively transfering design images from separate sheets of waxed paper having said image on a waxed surface thereof to cylindrical wax bodies, comprising:

finishing means for trueing the bodies and operable to remove surface irregularities therefrom including at least two elongated, adjacent, axially rotatable cylindrical rollers positioned in parallel, side-by-side alignment for permitting said cylindrical bodies to be successively placed in rotative, bridging contact therewith, means for rotating said rollers in unison in the same direction, and means for heating one of the rollers to a temperature sufficient to soften the surfaces of said wax bodies;

cooling means operable to harden the softened surfaces of said wax bodies by spraying the wax bodies with cooling water;

drying means including air blowing means for stripping water applied to wax bodies to effect cooling thereof;

means for transferring said design image onto said waxed body including first and second elongated, axially rotatable transfer rollers positioned in parallel, side-by-side relationship for permitting said wax bodies so be placed in rotative, bridging contact between said first and second transfer rollers, means for axially rotating the latter in unison in the same direction, pressure means for bearing against the surfaces of said wax bodies remote from said first and second transfer rollers when the bodies are placed therebetween in rotative bridging contact therewith, means operable to insert said design image facing the latter when said body is placed in said bridging position and means for heating at least one of said rollers.

means for stripping said sheets from said wax articles; and

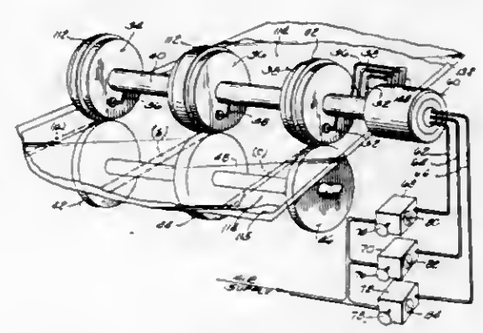
means for moving said wax bodies successively through the finishing, cooling, drying, transfer and stripping sections of said apparatus.

4,030,960

PNEUMATIC SEALING WHEEL

Robert H. Pratt, Milwaukee, Wis., assignor to Pratt Manufacturing Corporation, Milwaukee, Wis.

Filed Sept. 19, 1975, Ser. No. 615,132
Int. Cl.² B30B 3/04, 15/34
U.S. Cl. 156—555 2 Claims



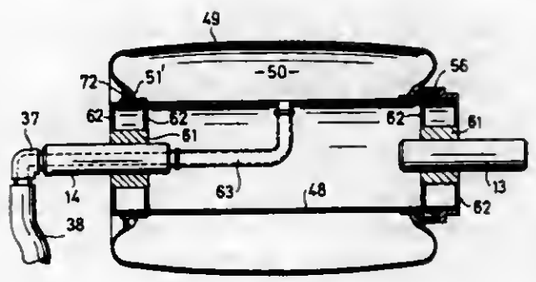
1. In a packing machine for processing superimposed webs of material which are to be sealed together along at least three laterally spaced lines extending longitudinally of the web, having anvil wheels one for each of said sealing lines, having laterally spaced sealing wheels one above each anvil wheel positioned to coact with the anvil wheels in exerting sealing pressure on the webs of material, and having a common shaft for said sealing wheels, the improvement comprising a pneumatic tire on each sealing wheel, and means providing for changes in the pneumatic pressure of each tire to compensate for dimensional or positional abnormalities and insure the exertion of proper sealing pressure by each wheel on said webs relative to the other wheel, said means for providing for changes in the pneumatic pressure in each tire including air ducts in said shaft, a duct in each wheel communicating at one end with an air duct in said shaft and at its other end with the interior of its tire, and means for independently introducing air under pressure into each of the ducts of said shaft.

4,030,961

DEVICE FOR ASSEMBLING GLASS SHEETS AND LAYERS OF PLASTIC MATERIAL

Franz-Josef Straeten, Aachen; Rudolf Pelzer, Herzogenrath; Karl-Josef Felten, Wuerselen, all of Germany, and Wilhelm-Josef Stevens, Kirchrath, Netherlands, assignors to Saint-Gobain Industries, Neuilly-sur-Seine, France

Filed July 31, 1975, Ser. No. 600,826
Claims priority, application France, Aug. 14, 1974, 74.28189
Int. Cl.² B30B 3/04, 9/22
U.S. Cl. 156—580 11 Claims



1. Apparatus for the assembly of sheets of glass with sheets of plastic material comprising a pair of rollers between which a plurality of sheets pass, said rollers being provided with a hollow elastic covering with a length corresponding at least to

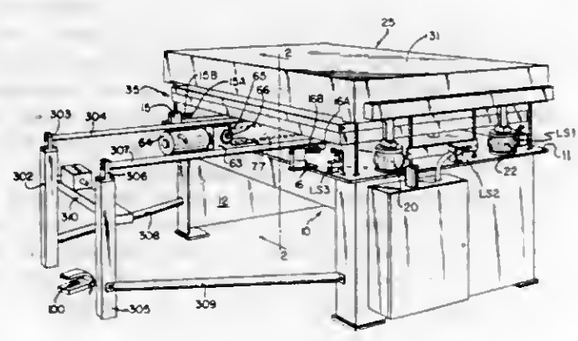
the width of the sheets to be assembled, said hollow elastic covering having an internal space for receipt of a fluid under pressure and inflation thereby, said elastic covering being elongated in the axial direction and mounted on a cylindrical drum by rim means affixed to respective ends of the covering, at least one of said rim means being movably adjustable longitudinally of said drum so that the shape of the covering can be modified to accommodate sheets of glass having different shapes of bends and curves.

4,030,962

HEAT TRANSFER PRESS

John Herman Fitzwater, Warwick, R.I., assignor to Fitzwater Engineering Company, Warwick, R.I.

Filed Feb. 26, 1976, Ser. No. 661,743
Int. Cl.² B44C *1/16*; **B30B** *5/02, 15/34*
U.S. Cl. 156—583 **3 Claims**



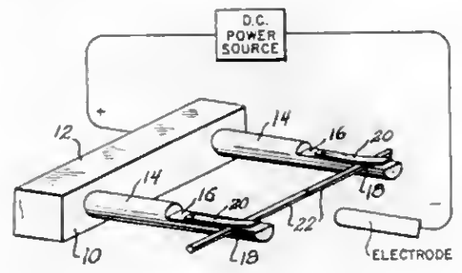
1. A heat transfer press comprising a table top having a plurality of clearance holes, a first sprocket and a second sprocket mounted in spaced relation to said table, a chain connecting said first sprocket with said second sprocket, drive means to rotate said first sprocket, said chain and said second sprocket, a left side rod and a right side rod, each mounted to said table top, two bearing left side pads slidably mounted to said left side rod, two bearing right side pads slidably mounted to said right side rod, four expandable air lift cylinders, each provided with a heat dissipating lug, fastened to said table top, a pneumatic connection to each of said four expandable air lift cylinders, a heated upper platen comprising a body having a face and a plurality of ribs which form a plurality of chambers therebetween, means fastening each of said heat dissipating lugs to said body, insulating material fastened to said body to close said chambers, a plurality of radiant heating tubes fastened in said chambers to heat said face, means applying electrical current to said radiant heating tubes, a plurality of rods fastened to said body and passing, respectively, through said plurality of clearance holes, a plurality of compression spring mechanisms, one for each of said plurality of rods, interposed between the end of, respectively, each rod and said table to yielding urge said heated upper platen toward said table top to compress said four expandable air lift cylinders, a cold lower platen, fastened to said two bearing left side pads and to said two bearing right side pads for movement into and out of register with said heated upper platen, and pneumatic means for cylically expanding said four expandable air lift cylinders.

4,030,963

ARC-MELTING PREPARATION OF SINGLE CRYSTAL LAB_6 CATHODES

Edwin D. Gibson, and John D. Verhoeven, both of Ames, Iowa, assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Jan. 27, 1976, Ser. No. 652,695
Int. Cl.² B01J *17/10*; **C01B** *35/18*; **C01F** *17/00*
U.S. Cl. 156—602 **5 Claims**



1. A method for preparing single crystals of lanthanum hexaboride comprising:

mounting two rods of compacted lanthanum hexaboride powder by one end as a first electrode on an electrode holder electrically connected to the positive terminal of a DC electrical power source the opposite end of each rod being free, said two rods of lanthanum hexaboride being mounted slidably longitudinally on the electrode holder, the rods being on the same longitudinal axis, the free end of one rod contacting the free end of the other rod

striking an arc, under an inert atmosphere, at the point of contact between the rods with a second electrode electrically connected to the negative terminal of the power source;

increasing the power from the electrical source until a small zone of molten lanthanum hexaboride powder is formed at the space between the rods; and

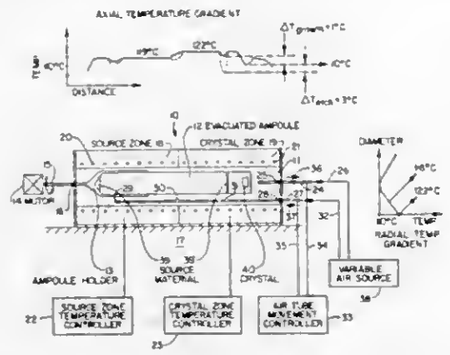
moving the second electrode slowly longitudinally along both rods, while maintaining the power constant, thereby forming a small moving zone of molten lanthanum hexaboride powder along the rods, to form a single rod of a single crystal of lanthanum hexaboride.

4,030,964

TEMPERATURE CYCLING VAPOR DEPOSITION HgI_2 CRYSTAL GROWTH

Michael M. Schieber; Israel Beinglass, and Giora Dishon, all of Jerusalem, Israel, assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Apr. 29, 1976, Ser. No. 681,639
Int. Cl.² B01J *17/30*; **C01G** *13/04*
U.S. Cl. 156—610 **5 Claims**



1. A method for vapor phase growth of mercuric iodide crystals consisting of the steps of positioning a rotatable ampoule containing a purified mercuric iodide source in one end thereof into a two-zone horizontal furnace, controlling the temperature in each of the zones of the furnace, oscillating the temperature of the source for causing growth and reevaporation of a crystal forming in the opposite end of the ampoule by directing airflows radially inwardly at separated places along the length of the ampoule and varying the volume of the airflows to provide controllably variable airflows along the length of the ampoule, directing a further airflow about the opposite end of the ampoule, rotating the ampoule, axially moving the first mentioned airflows during growth of a crystal at the opposite end of ampoule, varying the volume of the further airflow, and axially moving the further airflow during growth of a crystal in a direction away from the ampoule end opposite the movement of the axial airflows first mentioned airflows, thereby producing a sharper temperature gradient at the crystal growth interface and shortening the effective distance between the available source material and the interface.

4,030,965

CRYSTAL GROWTH PROCEDURE

David A. Hammond, Willoughby Hills, and Carl F. Swinehart, University Heights, both of Ohio, assignors to The Harshaw Chemical Company, Cleveland, Ohio

Filed June 9, 1976, Ser. No. 694,279
Int. Cl.² B01J *17/08*; **C01F** *11/20*; **C01D** *1/30, 3/20*
U.S. Cl. 156—616 R **9 Claims**

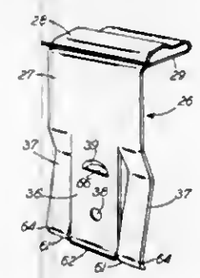
1. A method of growing a macrocrystal ingot of a material selected from the group consisting of an alkali metal halide and an alkaline earth metal halide in a Stockbarger furnace comprising placing a crucible charged with the salt into the furnace, heating the salt to melt the same and slowly growing the ingot under quiescent conditions with the growth commencing at the bottom of the crucible and moving upward, the improvement comprising melting down the salt while in contact with a gas composed primarily of helium, hydrogen or a mixture of the two at a reduced pressure of between 60 and 125 mm of mercury and thereafter growing the ingot from said melt in contact with an inert gas maintained at a higher pressure of at least five times that used during the meltdown.

4,030,966

METHOD OF HYDROTHERMALLY GROWING QUARTZ

Carl F. Hornig, Kingston; Kenneth M. Kroupa, Lee, both of N.H., and Earle E. Simpson, Georgetown, Mass., assignors to Western Electric Company, Inc., New York, N.Y.

Filed June 27, 1975, Ser. No. 590,888
Int. Cl.² B01J *17/04*; **C01B** *33/12*
U.S. Cl. 156—623 Q **2 Claims**



1. In a method of hydrothermally growing a substantially stress-free quartz crystal from a planar quartz crystal seed plate having first and second major faces on opposite sides thereof, in which at least a portion of the seed plate adjacent one edge is inserted into and clamped in a supporting clip, and in which the seed plate is of a type which grows in thickness perpendicular to the plane of the seed plate, and in length and width from respective edges thereof in respective directions in the plane of the seed plate, the improvement which comprises the steps of:

clamping the major faces of the seed plate between first and second clamping fingers projecting from a body portion of the supporting clip, with each clamping finger engaging a respective one of the faces, at least one of the clamping fingers having a stress-relieving aperture formed therethrough of a small cross-sectional area in comparison to the cross-sectional area of the clamping finger and at least one of the clamping fingers including a projecting stop spaced from junctions of the first and second clamping fingers with the body portion, the stress-relieving aperture being essentially positioned intermediate the stop and a seed plate engaging end of the supporting clip;

limiting the extent to which the portion of the seed plate is inserted into the supporting clip between the first and second clamping fingers by engaging the one edge of the seed plate with the projecting stop so that the edge is spaced from the junctions of the first and second clamping fingers with the body portion of the supporting clip to permit substantially unobstructed stress-free growth of the quartz crystal from the edge in its respective direction in the plane of the seed plate; and

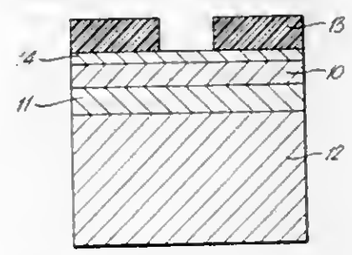
hydrothermally growing a portion of the major face of the quartz crystal seed plate which is engaged by the clamping finger having the stress-relieving aperture, through the stress-relieving aperture in the clamping finger in a direction perpendicular to the plane of the seed plate to reduce stress-cracking of the quartz crystal during the hydrothermal growing thereof.

4,030,967

GASEOUS PLASMA ETCHING OF ALUMINUM AND ALUMINUM OXIDE

Sidney Ivor Joseph Ingrey, Aylmer; Heinz Josef Nentwich, and Robert Gordon Poulsen, both of Ottawa, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Aug. 16, 1976, Ser. No. 714,631
Int. Cl.² C23F *1/02*
U.S. Cl. 156—643 **8 Claims**



1. A process for gaseous etching of aluminum and aluminum oxide, including an initial step of plasma etching in the presence of a gaseous trihalide comprising at least in part, a boron trihalide.

4,030,968

DISPOSAL OF PAPER PULP MILL SLUDGE

Krishan N. Goel, Grand Mere, and Osman J. Walker, St. Lambert, both of Canada, assignors to Consolidated-Bathurst Limited, Montreal, Canada

Continuation-in-part of Ser. No. 645,421, Dec. 30, 1975, abandoned. This application July 1, 1976, Ser. No. 701,611
Claims priority, application Canada, Dec. 22, 1975, 242540
Int. Cl.² D21C *3/22, 11/00*; **C02C** *5/10*
U.S. Cl. 162—16 **12 Claims**

8. A process suitable for the disposal of surplus sludge from a wood pulping process comprising the step of injecting said surplus sludge into the digestion step of the wood pulping process whereby said sludge is digested and a wood pulp is formed, a first portion of said digested sludge being retained as a part of the pulp yield, a second portion of said digested sludge being discharged as a ventable gas, and a third portion of said digested sludge being employed as a nutrient for the

microbiological purification of spent pulping liquor effluent with an activated sludge.

4,030,969

METHOD OF DISPERSING A BLEACHING AGENT INTO A STREAM OF FIBROUS CELLULOSIC PULP MATERIAL IN A THROTTLING NOZZLE

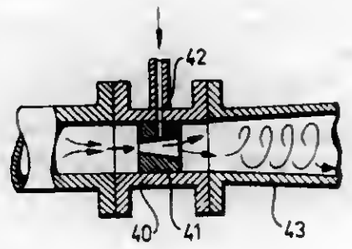
Arne Johan Arthur Aspund; Rolf Bertil Reinhall, both of Lidingo, and Per Johan Ingemar Ahrel, Frovi, all of Sweden, assignors to Defibrator AB, Stockholm, Sweden

Continuation-in-part of Ser. No. 369,298, June 12, 1973, abandoned. This application Jan. 20, 1975, Ser. No. 542,221

Claims priority, application Sweden, June 13, 1972, 7776/72

Int. Cl.² D21B 1/12; D21C 9/10

U.S. Cl. 162—23 **2 Claims**



1. A method of admixing and dispersing a liquid solution of a bleaching agent into a stream of fibrous cellulosic pulp material comprising:

a. disintegrating fibrous cellulosic material in a defibrating zone in an atmosphere of steam above 100° C and at superatmospheric pressure to form a fibrous cellulosic pulp material;

b. passing a stream of the fibrous cellulosic pulp material together with the steam under pressure into a throttling zone of reducing pressure;

c. subjecting said stream and steam to an instantaneous reduction of pressure by passing said stream and steam through a throttling nozzle in said throttling zone;

d. introducing a liquid solution of the bleaching agent into said stream as said stream passes through said nozzle;

e. discharging said stream and bleaching solution into an expansion zone ahead of said throttling nozzle to enhance dispersion of the bleaching agent into the fibrous cellulosic pulp material; and then

f. passing the fibrous cellulosic pulp material to a collection zone.

4,030,970

SURFACE SIZING OF PAPER WITH AN ACRYLIC COPOLYMER WHERE SCUM FORMATION IS MINIMIZED

Yoichi Tominaga, Muko, and Yasuo Shibahara, Kyoto, both of Japan, assignors to Sanyo Chemical Industries, Ltd., Kyoto, Japan

Filed May 30, 1974, Ser. No. 474,544

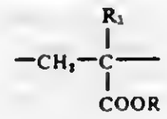
Claims priority, application Japan, May 31, 1973, 48-61503

The portion of the term of this patent subsequent to Dec. 9, 1992, has been disclaimed.

Int. Cl.² D21H 3/44

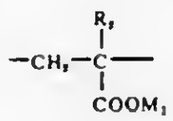
U.S. Cl. 162—168 R **14 Claims**

1. A process for surface-sizing paper which comprises applying to the surface of the paper a surface sizing composition for paper which forms substantially no scum in a surface sizing press operation even after 8 hours, which composition comprises a copolymer having copolymerized acrylic or methacrylic ester units (A) of the formula (1):



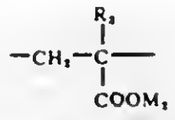
(1)

wherein R_1 is H or methyl, and R is a hydrocarbon radical having 1-18 carbon atoms, copolymerized acrylic or methacrylic acid alkali metal salt units (B) of the formula (2):



(2)

wherein R_2 is H or methyl and M_1 is an alkali metal and copolymerized acrylic or methacrylic acid salt units or acid units (C) of the formula (3):



(3)

wherein R_3 is H or methyl, and M_2 is ammonium or a combination of ammonium with a lower alkyl amine cation and/or H, wherein said copolymer has a carboxylic equivalent of 90–500 in the free carboxylic form and a molar ratio of units (B) to (C) of 5–50:95–50.

4,030,971

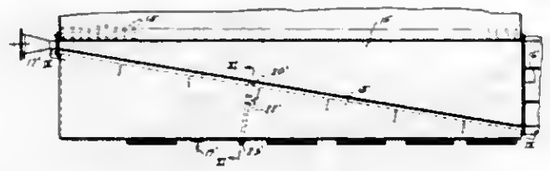
SYSTEM COMPENSATING FOR PRESSURE FLUCTUATIONS IN A PAPER MACHINE HEADBOX

Edgar J. Justus, Beloit, Wis., assignor to Beloit Corporation, Beloit, Wis.

Continuation-in-part of Ser. No. 532,647, Dec. 13, 1974, abandoned. This application Oct. 29, 1975, Ser. No. 626,824

Int. Cl.² D21F 1/06

U.S. Cl. 162—216 **18 Claims**



12. The method of dampening pressure surges in a supply system for conducting paper stock through a stock conduit under pressure to a slice opening which comprises:

absorbing pressure fluctuations by transmitting the fluctuations to an air chamber through a diaphragm wall of flexible material positioned as a wall of the stock conduit;

dividing the chamber into a support compartment directly exposed to the entire diaphragm and a supply compartment with an air flow attenuation wall between the compartments and continually supplying air at a predetermined pressure to the supply compartment.

4,030,972

FLUIDLY DRIVEN CONTROL ROD

Malcolm Duane Groves, Suffield, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Apr. 22, 1974, Ser. No. 463,011

Int. Cl.² G21C 7/08

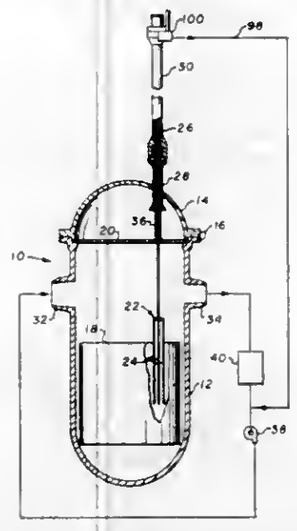
U.S. Cl. 176—36 R **9 Claims**

1. In a nuclear reactor including a reactor vessel and a neutron absorber for vertical reciprocation in said vessel, a neutron absorber actuator assembly comprising:

a. a housing extending upward from said vessel and including an actuator cylinder extending vertically therewithin;

b. a piston rod drivingly connected to said neutron absorber and extending thereabove and including a head portion near the upper end thereof and sized for free movement within said cylinder between raised and lowered positions;

c. piston means freely encircling said piston rod below said head portion for longitudinal movement relative thereto and sized to engage the undersurface of said piston rod head portion and to have a larger diameter than said



piston rod head portion for close sliding relation with the wall of said cylinder;

d. a fluid source operatively connected to said actuating cylinder for selectively applying a net upward force to said piston to raise said piston and piston rod to said raised position; and

e. means for latching said piston rod comprising a selectively energizable electromagnet means associated with said housing and a part of said piston rod made of magnetic material so positioned with respect to said electromagnet means as to megnetically latch said piston rod in said raised position.

4,030,973

GRIPPING DEVICE, ESPECIALLY FOR USE IN MANIPULATING CONTROL BARS IN A NUCLEAR REACTOR

Bernhard Hoffmeister, Wilhelmshaven, and Gerhard Dose, Laudenbach, Bergstrasse, both of Germany, assignors to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Germany

Filed July 2, 1974, Ser. No. 485,264

Int. Cl.² G21C 7/08

U.S. Cl. 176—36 R **8 Claims**

1.

a. A device in combination for gripping alternatively elongated control rods, or fuel elements;

b. a gripper body which is guided within a guiding post for movement in vertical direction;

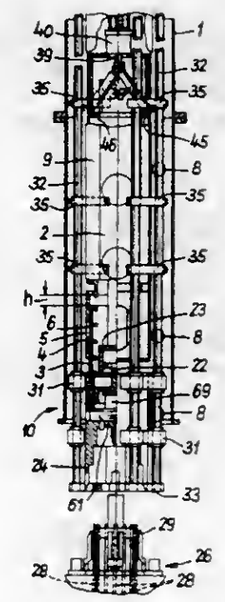
c. a rod head gripping tool which — interchangeable for a fuel element gripping tool — is detachably connected to the lowr end of said same gripper body;

d. said rod head gripping tool being provided at its lower end with a clutch device for detachably connecting this rod head gripping tool and a head bar to which the upper ends of said elongated rods of a bundle are fastened therewith;

e. a plate positioned below said clutch device and having a perforation through which said head bar and the rods connected thereto can pass with small clearance around the rods; said plate radially confining said rods when in surrounding relation thereto;

f. a plurality of separate straight guide members fastened each with one lower end to said plate and extending upwardly therefrom in parallel spaced relationship in such arrangement that said guide members define a space within which said gripper body and said rod head gripping tool can be moved in vertical direction;

g. guiding means seated on said rod head gripping tool slidably engage said guide members;



h. at least two independently operable catch means spaced along the longitudinal axis of and connected to said guide members near the upper ends thereof; the difference of said spacing corresponding to the possible difference of length of said elongated rods;

i. and latch elements supported by said gripper body which can be adjusted into a first position in which said latch elements reach under said catch means and into a second position in which they freely pass said catch means; and means within said gripper body for selectively operating said latch elements, said means controlling the engagement of said gripper tool to said gripper body.

4,030,974

CORE REACTOR

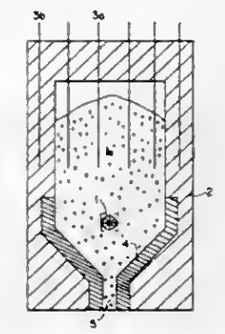
Hanns-Joachim Neef, Julich, Germany, assignor to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung, Julich, Germany

Filed Sept. 9, 1974, Ser. No. 504,535

Claims priority, application Germany, Sept. 8, 1973, 2345431

Int. Cl.² G21C 3/26

U.S. Cl. 176—58 PB **3 Claims**



1. A ball-pile reactor having a fill of elements selected from

the group consisting of fuel and breeder elements which pass through said reactor with a cooling medium from a charging side in a dump material layer, an absorber rod arrangement including control rods that directly engage said elements, said control rods being movable into said fill from the charging side in the pass-through direction of the elements, said reactor comprising a reflector of graphite having the graphite of its wall below the range of movement of said control rods doped with a substance constituting a neutron poison selected from the group consisting of hafnium, boron, and other elements having a neutron cross section Σ_a (in cm.$^{-1}$) such that $e^{-\Sigma a \cdot d} \leq 10^{-3}$, in which Σ_a stands for the macroscopic effective cross section for neutron absorption measured in cm.$^{-1}$, and d stands for the thickness of the reflector wall measured in cm., said neutron poison doping only that part of the reflector which surrounds the range of the fill not penetrated by the control rods.

4,030,975

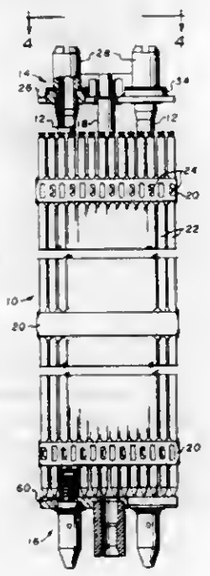
FUEL ASSEMBLY FOR A NUCLEAR REACTOR

Andrew James Anthony, Tariffville, and John Jefferson Hutchinson, Windsor, both of Conn., assignors to Combustion Engineering, Inc., Windsor, Conn.

Division of Ser. No. 373,207, June 25, 1973. This application Oct. 6, 1975, Ser. No. 619,560

Int. Cl.² G21C 3/30

U.S. Cl. 176—78 6 Claims



1. An improved nuclear fuel assembly of the type having a plurality of elongated fuel elements supported in a generally parallel array by fuel support structures which are rigidly attached to vertically extending hollow structural members at least one of which is in turn connected to upper and lower end fittings, said upper and lower end fittings including upper and lower end plates respectively, and means for alignment of the fuel assembly within a reactor core comprising at least one vertically extending post, adapted to slidably engage corresponding openings in the reactor core structure, extending from the upper and lower end fitting plates, wherein the improvement comprises:

a threaded spindle extending from said at least one vertically extending post to penetrate an aperture in said end fitting plate, said aperture having substantially the same diameter as said spindle;

a shoulder on said at least one vertically extending post to limit the penetration of said spindle;

an inwardly extending flange on one end of said structural member defining an opening in said end having substantially the same diameter as said spindle; and

a nut, disposed in the interior of said structural member and retained therein at said one end of said member by said inwardly extending flange, said nut threadably engaging said threaded spindle to clamp said flange between said nut and said end fitting plate.

4,030,976

PROCESS FOR PREPARING A PRODUCT HAVING A BIOLOGICAL ACTIVITY

Roger Paul, Beaumont en Auge, France, assignor to Etablissement Ani, chez Me Beck, avocat, Vaduz, Liechtenstein

Filed Dec. 15, 1975, Ser. No. 640,800

Claims priority, application Switzerland, Jan. 8, 1975, 129/75

Int. Cl.² C12B 1/00

U.S. Cl. 195—29 7 Claims

1. A process for preparing a product having a biological activity towards animal, human or vegetable tissue to be treated comprising culturing the bacterium strain NCIB 11144 in a nutritious nitrogen-containing medium further containing ammoniacal iron citrate and at least one phosphate with a portion of the nitrogen in this culture medium being provided by the tissue of said animal, human or vegetable tissue to be treated by the product.

4,030,977

METHOD FOR PURIFICATION OF PHYSIOLOGICALLY ACTIVE SUBSTANCE USING ENZYME-ENZYME INHIBITOR SYSTEM

Setsuro Fujii, Tokushima; Yasumichi Kajita, Kyoto; Seizi Hiraku, Takatsuki; Heizo Kira, Ibaragi; Hideki Aishita, Takatsuki; Keiko Muryobayashi, Ibaragi; Hiroshi Terashima, Takatsuki; Akira Akimoto, Osaka; Ken Taniguchi, Higashinose, and Minoru Wada, Kishiwada, all of Japan, assignors to Ono Pharmaceutical Co., Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 426,143, Dec. 19, 1973, abandoned. This application Mar. 19, 1976, Ser. No. 668,378

Claims priority, application Japan, Dec. 19, 1972, 47-127396

Int. Cl.² C12D 13/10

U.S. Cl. 195—66 R 4 Claims

1. A method for isolating and purifying kallikrein contained in mammalian tissue or body fluid which comprises contacting an extract of said tissue or said body fluid with a material formed of an insoluble carrier chemically coupled to a proteolytic enzyme inhibitor for kallekrein, said material being selected from an insolubilized naturally occurring enzyme inhibitor so as to bind said kallikrein and eluting said kallikrein therefrom using first 0.1 M acetate buffer of pH 4.0 and second 0.1 N acetic acid solution and immediately adding the eluate drop-wise to 2M Tris-amino-methane HCl buffer of pH 8.0 to 10.0, wherein said process is carried out by contacting said extract of said tissue or said body fluid with insoluble carrier chemically coupled to soybean trypsin inhibitor and then with insoluble carrier chemically coupled to bovine lung trypsin inhibitor.

4,030,978

NOVEL ASSEMBLY, COMPOSITIONS AND METHODS

Irwin J. Abramson, Baltimore, Md., assignor to Becton, Dickinson and Company, East Rutherford, N.J.

Filed July 29, 1976, Ser. No. 709,661

Int. Cl.² C12K 1/04

U.S. Cl. 195—75 12 Claims

1. An assembly for maintaining anaerobic, aerobic or facultative microorganisms, which comprises;

a tubular container having a first, hermetically sealed end and a second end hermetically sealed with a removable closure, said container with said closure defining a collection chamber;

a composition partially filling said collection chamber, said composition comprising, in parts by weight,

1,000 parts ion free water

0.01–0.5 parts oxygen indicator

1.8–2.2 parts sodium phosphate, tribasic

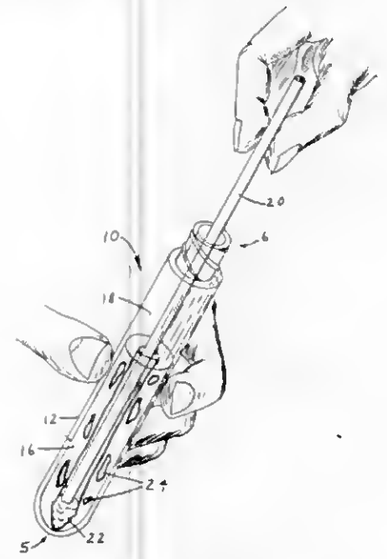
0.9–1.1 parts potassium phosphate, dibasic

0.09–0.11 parts calcium chloride

0.09–0.11 parts magnesium chloride hexahydrate

7.5–8.5 parts sodium chloride

0.5–1.5 parts sodium thioglycolate



0.5–1.5 parts cysteine hydrochloride

5–20 parts agar;

said composition having a consistency of from about 170–350 grams/cm² and having a pH of 6.9–7.8;

the remaining portion of said chamber being filled with an oxygen free gas.

4,030,979

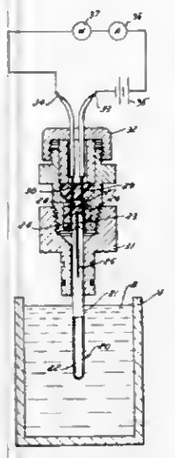
METHOD OF DETECTING HYDROGEN-PRODUCING BACTERIA

Walter Henry Zuber, Stowe, Vt., assignor to Walter H. Zuber, Jr., Stowe, Vt.

Filed Dec. 10, 1975, Ser. No. 639,457

Int. Cl.² C12K 1/04

U.S. Cl. 195—103.5 M 12 Claims



1. A method of detecting the presence of bacteria capable of producing hydrogen in a liquid culture medium which comprises the following steps:

a. qualitatively and quantitatively detecting hydrogen by subjecting the liquid culture medium to a hydrogen-sensing device;

b. qualitatively and quantitatively redetecting hydrogen by resubjecting the liquid culture medium to the hydrogen-sensing device of step (a) sometime thereafter; and

(c) relating any change in the hydrogen concentration to bacterial content.

4,030,980

APPARATUS AND METHOD FOR IDENTIFICATION OF SELECTED CLINICAL YEAST

Orville A. Beckford, Port Washington, and Helen F. B. Dauzickas, Babylon Village, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed May 15, 1975, Ser. No. 577,799

Int. Cl.² C12K 1/10

U.S. Cl. 195—139 17 Claims

1. Apparatus to grow and identify a number of isolated cultures including:

a plate including a plurality of discrete spaced wells defined by substantially vertical walls and an integral bottom wall,

a cover member disposed on said plate sealing the individual tops of said wells; and,

aperture means extending through a said vertical wall in communication with a respective one of each of said wells to expose the same to atmospheric air whereby a number of isolated cultures may be concomitantly grown.

4,030,981

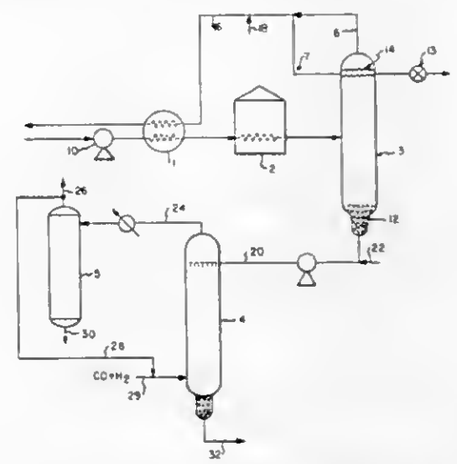
PROCESS FOR MAKING OIL FROM AQUEOUS REACTIVE SLUDGES AND SLURRIES

Howard V. Hess, Glenham; William F. Franz, Gardiner, and Edward L. Cole, Fishkill, all of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 16, 1974, Ser. No. 532,967

Int. Cl.² C10B 53/02, 57/04, 57/06; C10G 1/00

U.S. Cl. 201—2.5 3 Claims



1. A process for making low sulfur oil from an aqueous charge containing cellulose and other carbohydrates comprising coking said charge at a temperature in the range of 400° to 550° F under a pressure of 300 to 1200 psig for 5 minutes to 2 hours to form an aqueous slurry containing coked solids; removing from 50 to 99 percent of the liquid from said slurry; contacting the thus concentrated slurry with hot pressurized carbon monoxide at a pressure of between about 500 to 5000 psig at a temperature of between 500° and 750° F to form a low sulfur oil, gases and carbon and inorganic solids and separating said oil from said carbon and inorganic solids and gases.

4,030,982

PROCESS OF MAKING FORMCOKE FROM NON-CAKING OR WEAKLY CAKING COALS

Everett Gorin, Pittsburgh; William A. Jasulaitis, Bridgeville; Frank W. Theodore, Pittsburgh, and George E. Wasson, Eighty-Four, all of Pa., assignors to Consolidation Coal Company, Pittsburgh, Pa.

Filed July 10, 1975, Ser. No. 594,906

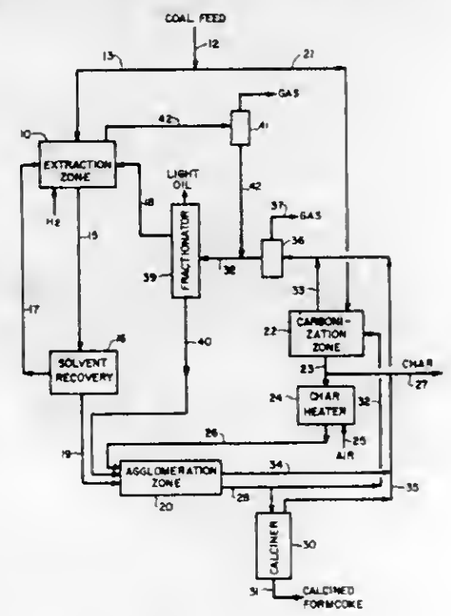
Int. Cl.² C10B 53/08, 55/00

U.S. Cl. 201—6 4 Claims

1. In the process of making formcoke from a normally non-caking or weakly caking coal wherein a mixture of carbo-

naceous solids and carbonaceous binder derived from said coal is tumbled under adiabatic conditions at an elevated temperature in a rotary kiln adapted to rotate about its longitudinal axis, to thereby form agglomerates having a predetermined size which are thereafter calcined to produce formcoke suitable for use in a blast furnace, the improvement comprising:

a. subjecting said coal, in a finely divided state, to solvent extraction in a solvent extraction zone in the presence of hydrogen under extraction conditions to thereby produce a product consisting of an effluent gas and an effluent slurry;



b. subjecting said effluent slurry to distillation in a solvent recovery zone, to thereby recover at least part of the solvent as distillate;

c. blending the undistilled remainder of said effluent slurry and any feed coal and any pitch that may be added, with sufficient hot char to maintain the blended product at a forming temperature between about 385° and 475° C. in said rotary kiln;

d. tumbling said blended product in said rotary kiln until agglomerates of predetermined size are formed; and thereafter

e. heating said agglomerates in a calcining zone until formcoke is produced which is suitable for use in a blast furnace.

4,030,983

METHOD OF RESTRICTING DUST DEVELOPMENT WHEN FEEDING COAL INTO COKE OVENS

Kurt Günther Beck; Wolfgang Rohde; Diethard Habermehl, and Werner Siebert, all of Essen, Germany, assignors to Bergwerksverband GmbH and Didier Engineering GmbH, both of Essen, Germany

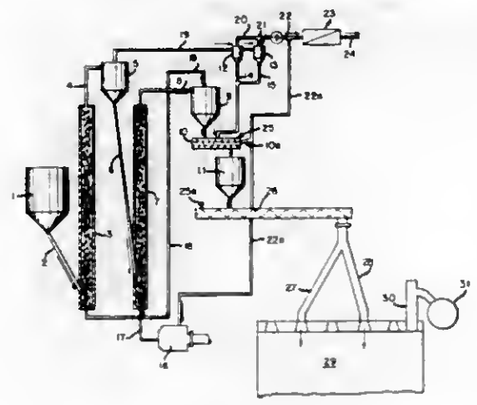
Continuation-in-part of Ser. No. 646,751, Jan. 6, 1976. This application Apr. 5, 1976, Ser. No. 673,895

Claims priority, application Germany, Apr. 4, 1975, 2514859

Int. Cl.² C10B *53/04, 55/02*

U.S. Cl. 201—23 **12 Claims**

1. A process for producing coke from preheated coal whereby the amount of coal dust and the risk of explosion are reduced, comprising preheating the coal to a temperature between about 150° and 250° C, thereafter mixing the coal



with about 0.5 to 3% by weight of moist coal tar and then gravity-pouring the thus-treated coal into the coke oven.

4,030,984

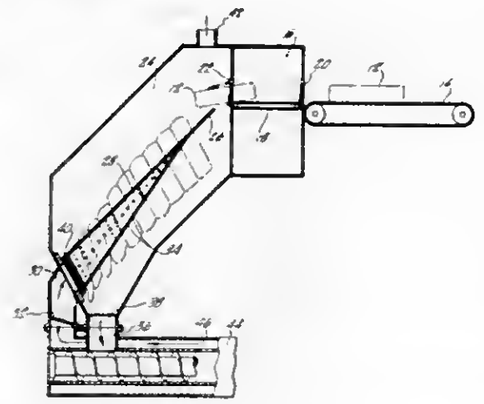
SCRAP-TIRE FEEDING AND COKING PROCESS

Ren W. Chambers, Newport Beach, Calif., assignor to Deco Industries, Irvine, Calif.

Filed June 12, 1975, Ser. No. 586,265

Int. Cl.² C10B *47/20, 51/00, 57/04, 57/08*

U.S. Cl. 201—25 **5 Claims**



1. A process of feeding scrap tires into a reactor for the recovery of carbonaceous raw materials comprising:

suspending the intact tires in a melt chamber on a cone shaped suspending member, the hollow center portion of said tires being positioned over the apex of said cone shaped member and

said tires moving down said member during melting, said chamber having substantially inert hot gases flowing therethrough;

allowing the hot gases to flow past said tires melting the carbonaceous material;

feeding the melted carbonaceous material into a reactor tube which converts the material to volatile hydrocarbons;

collecting in the melt chamber the non-meltable portions of the scrap tires.

4,030,985

APPARATUS FOR DESALTING SALINE WATER

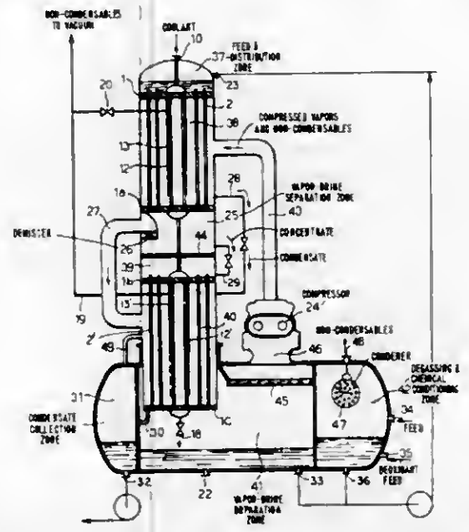
Diego Barba; Antonino Germanà; Giuseppe Liuzzo, and Giovanni Tagliaferri, all of Rome, Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed Dec. 17, 1975, Ser. No. 641,474

Claims priority, application Italy, Dec. 20, 1974, 30811/74

Int. Cl.² B01D *3/02, 3/00, 1/26*

U.S. Cl. 202—174 **7 Claims**



1. An apparatus for desalting saline water, which comprises:

a vertical elongated tubular shell closed at its upper end by a domed end-wall and at its lower end by a lower header plate (1c);

said shell defines together with said end-wall and an upper header plate (1) an upper zone (37) for the feeding and distribution of the saline water to be desalted; said upper zone (37) providing a pool of saline water fed in through a pipe (23);

said shell defines with said upper header plate (1) and an upper intermediate header plate (1*a*) first evaporation and condensation zones (38); a first bundle of vertical tubes (2) extends through said condensation zone (38), the upper ends of said tubes protruding through said upper head plate (1), being submerged in said pool of said upper zone (37) and being provided with means for flowing in the inside of the tubes (2) saline water in the form of a thin falling film; the lower ends of said tubes (2) protruding through said upper intermediate header plate (1*a*) in a first separation zone (25) for the separation of vapor from the residual brine; said first condensation zone (38) includes a vertical tubular collector (13) for the uncondensable gases, said collector (13) being foraminous in its lower part, provided on the inside with cooling means and connected at its upper part to a suction equipment;

said first separation zone (25) for the separation of vapor from the brine is defined by said shell, said upper intermediate header plate (1*a*) and a lower partition plate (44);

said partition plate (44) defines with the shell and a lower intermediate header plate (1*b*) a lower feeding and distribution zone (39) providing a pool of saline water;

said lower intermediate header plate (1*b*) defines with said shell and said lower header plate (1*c*) a second evaporation and condensation zone (40); a second bundle of vertical tubes (2') extends through said second evaporation and condensation zone (40), the upper ends of said second bundle of vertical tubes tubes (2') protruding through said lower intermediate header plate (1*b*) being submerged in said pool in said lower feeding and distribution zone (39) and being provided with means for flowing in the inside of said tubes (2') saline water in the form of a falling and thin film; the lower ends of said second bundle of vertical tubes tubes (2') protruding through said lower header plate (1c) in a second separation zone (41) for the separation of vapor from the residual brime; said second evaporation and condensation zone (40) includes a vertical tubular collector (13') for the uncondensable gases, said collector (13') being foraminous in its lower part, provided on the inside with cooling means and connected at its upper part to a suction equipment;

said first separation zone (25) and said lower feeding and distribution zone (39) are connected by means of a pipe (24) for delivering said brine collecting in said first separation zone (25) to said pool of said lower feeding and distribution zone (39);

said first and second condensation zones (40) are connected by means of a pipe (28) for delivering the condensate collecting in said first condensation zone (38) to said second condensation zone (40);

said first separation zone (25) and said second condensation zone (40) are connected by means of a pipe (27) for delivering, through a demister (26) housed in the upper part of said first separation zone (25), said vapor recovered in said first separation zone (25) to said second condensation zone (40);

said shell is supported by a base section comprising a horizontal closed-ended vessel having a pair of inner impervious vertical partitions; said partitions define in said vessel a collecting chamber (31) for the condensate at one end of the vessel, a degassing and conditioning chamber (42) for the feeding saline water at the other end of the vessel, and said second separation zone (41) extending between the partitions; the lower portion of said shell protrudes in sealing contact with said vessel into said zone (41);

said second separation zone (41) is connected through an upper aperture with the intake side of a compressor and the delivery side of said compressor is connected to said upper condensation zone (38);

a downcomer tube opens at its upper end through the lower header plate (1c) into said second condensation zone (40) and at its lower end into said condensate collecting chamber (31);

said condensate collecting chamber (31) and said second condensation zone (40) are connected by a conduit (49) for the purpose of equilibrating the pressures therein;

pump means are provided for discharging the condensate from the condensate collecting chamber (32) and other pump means are providing for connecting the bottom region of both said second separating chamber (41) and said degassing and conditioning chamber (42) to said upper feeding zone (37) to thereby deliver to the latter the saline water to be desalted.

4,030,986

CONTROL FOR MAXIMIZING CAPACITY AND OPTIMIZING PRODUCT COST OF DISTILLATION COLUMN

Francis G. Shinskey, Foxboro, Mass., assignor to The Foxboro Company, Foxboro, Mass.

Filed May 14, 1975, Ser. No. 577,497

Int. Cl.² B01D *3/42*

U.S. Cl. 203—2 **23 Claims**

1. The method of maximizing capacity and optimizing product cost of a distillation column which utilizes a reflux condenser that receives and condenses overhead fluids from the column to maintain the operating pressure in the column at a minimum value, which method comprises:

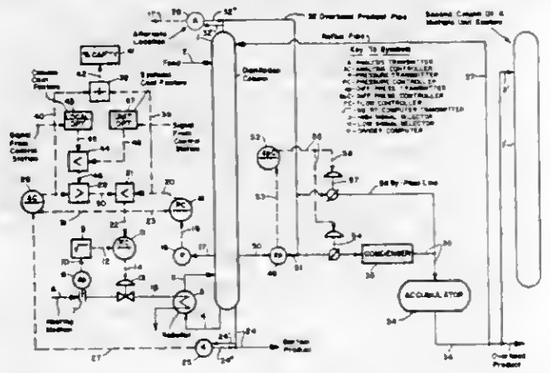
1. producing a flow control signal and utilizing that control signal to regulate the rate of flow of heating medium to said column to maintain said rate at a preselected set-point value;

2. producing a pressure control signal which is inversely proportional to said operating pressure and utilizing that control signal to modify said rate in a direction to increase said rate when said operating pressure is below a preselected set-point value representative of a safe maxi-

mum limit and to decrease said rate when said operating pressure exceeds said set-point value;

3. producing a purity control signal which is proportional to the purity of a product of said column and utilizing that signal to modify said rate in a direction to increase said rate when said purity is below a preselected set-point value representative of a minimum acceptable purity value and to decrease said rate when said purity is above said set-point value;
4. producing a cost factor control signal which is a function of cost factors relating to the production of said product and utilizing that control signal to modify said rate in a direction to optimize said product cost;
5. utilizing only one of said latter three named control signals at any time to modify said rate by a selective process wherein said purity control signal is compared with cost factors control signal and the higher of these control signals is selected and compared with said pressure control signal and the lower of these latter compared control signals is utilized to modify said rate, whereby

only said cost factor control signal will be selected utilized to modify said rate when that control signal exceeds said purity control signal but is less than said pressure control signal and



will modify said rate to maintain said rate at a value that will result in optimizing the product cost during such time as said purity exceeds said set-point value representative of a minimum acceptable purity value and said operating pressure is below said set-point value representative of said safe maximum limit,

only said purity control signal will be selected to modify said rate when that control signal is below said set-point value representative of said minimum acceptable purity value and will increase said rate to return said purity to said minimum acceptable value during such time as said operating pressure is below said set-point value representative of said safe maximum limit, and

only said pressure control signal will be selected to modify said rate when the operating pressure exceeds said set-point value representative of said safe maximum limit and will reduce said rate to return said operating pressure to said safe maximum limit; and

6 producing a velocity control signal which is proportional to the velocity of fluids flowing in said column and utilizing that control signal to reduce said velocity when the value of said velocity exceeds a set-point value representative of approaching flooding conditions to thereby prevent flooding from occurring.

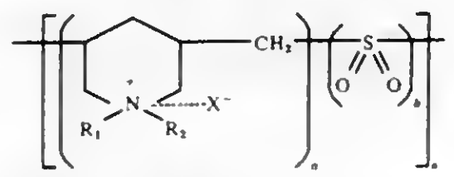
4,030,987

ZINC PLATING METHOD

Shigeru Fujita, Omiya; Koichi Murayama, Tokyo, and Toyohito Kaneda, Yono, all of Japan, assignors to Kabushiki Kaisha Japan Metal Finishing Company, Tokyo, Japan

Filed Mar. 4, 1976, Ser. No. 663,695
Claims priority, application Japan, Mar. 8, 1975, 50-28191
Int. Cl.² C25D *3/22*
U.S. Cl. 204—55 R **6 Claims**

1. In a zinc plating method which comprises carrying out electrodeposition in an aqueous alkaline zinc plating bath, the improvement comprising adding to said bath a brightening effective amount of an aromatic aldehyde and a polyamine sulfone represented by the formula



where: each of R_1 and R_2 is a member selected from the group consisting of hydrogen, an allyl group, straight-chain and branched-chain alkyl groups each having 1 to 16 carbon atoms, an aralkyl group, and hydroxyalkyl groups of the formula $HO\text{-}(CH_2)_m$, where m is an integer of 1 to 6;

X^- is a member selected from the group consisting of halogen ion, HSO_4^-, HSO_3^-, $HCOO^-$, and CH_3COO^-;

n is an integer such that the number average molecular weight becomes 2,000 to 350,000; and

a and b are natural numbers having a relation such that $a:b = 100:10$ to 100.

4,030,988

PROCESS FOR PRODUCING HALOGEN AND METAL HYDROXIDES WITH CATION EXCHANGE MEMBRANES OF IMPROVED PERMSELECTIVITY

Walther Gustav Grot, Chadds Ford, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 425,079, Dec. 17, 1973, Pat. No. 3,969,285. This application Apr. 27, 1976, Ser. No. 680,873
Int. Cl.² C25B *1/16*
U.S. Cl. 204—98 **2 Claims**

1. In a process of production of halogen and metal hydroxide of an alkali or alkaline earth metal, or combination thereof, by electrolysis of a halide of said metal employing anode and cathode sections separated by an ion exchange film, said improvement comprising passing ions of said metal through a fluorinated ion exchange polymer film comprising

a. a first surface formed from an intermediate fluorinated polymer containing pendant sulfonyl halide groups attached to carbon atoms which have at least one fluorine atoms connected thereto in which

i. at least 40% of the sulfonyl halide groups to a depth of at least one micron in the intermediate polymer have been reacted with a di- or poly-amine comprising at least two groups with one primary amine groups and a second amino group either primary or secondary, said first surface facing the cathode section; and

ii. the polymer of (i) has been subjected to an elevated temperature of between 170° C. and the degradation temperature of the reacted polymer for a period of time to increase permselectivity;

b. a second surface containing pendant sulfonyl groups attached to carbon atoms which have at least one fluorine atom connected thereto with at least a majority of the sulfonyl groups present as $-(SO_2NH)_mQ$, or $-(SO_3)_nMe$ wherein Q and Me represent ions of said metal, and m and n represent the valence of said metal.

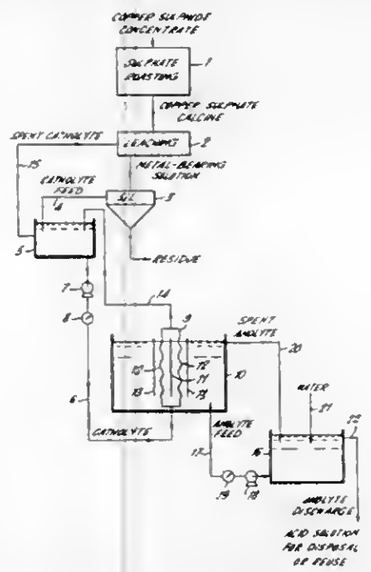
4,030,989

ELECTROWINNING PROCESS

Milton Graham Montgomery Atmore, and Roy Duncan Macpherson, both of Johannesburg, South Africa, assignors to Anglonor S. A., Luxembourg, Luxembourg

Filed May 11, 1976, Ser. No. 685,148
Int. Cl.² C25B *1/22*; C25C *1/08, 1/12, 1/11*
U.S. Cl. 204—104 **17 Claims**

1. A process for the recovery of a metal from a sulphurous feed material containing the metal, which process comprises leaching the sulphurous feed material with an aqueous leach solution to form an aqueous metal-bearing solution containing sulphate ions and ions of the metal; removing solids from the metal-bearing solution; and thereafter electrowinning the metal from the metal-bearing solution in an electrolytic cell having an anode compartment containing an anode and a cathode compartment containing a cathode, said compartments being separated by an ion-permeable, substantially



fluid-impermeable membrane, by flowing the metal-bearing solution through the cathode compartment and flowing an aqueous acidic anolyte through the anode compartment, a potential difference being maintained between the anode and the cathode so as to electrodeposit ions of the metal from the metal-bearing solution onto the cathode and to cause the passage of sulphate ions through the membrane from the cathode compartment to the anode compartment.

4,030,990

PROCESS FOR RECOVERING ELECTROLYTIC COPPER OF HIGH PURITY BY MEANS OF REDUCTION ELECTROLYSIS

Norbert L. Piret; Hans Joachim Rabben; Herbert Kudelka, all of Duisburg, and Siegbert Schmidt, Moers-Vinn, all of Germany, assignors to Duisburger Kupferhutte, Duisburg, Germany

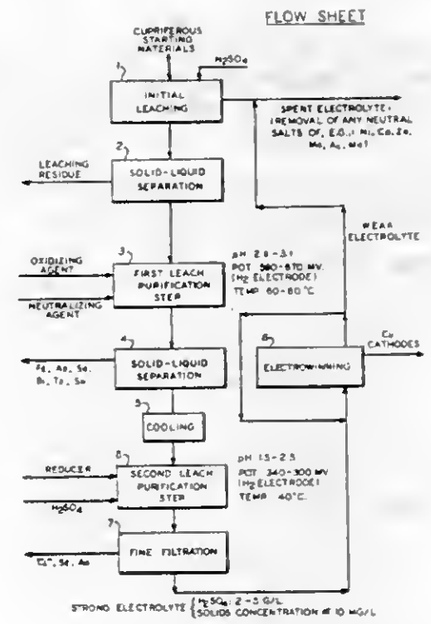
Filed June 22, 1976, Ser. No. 698,558
Claims priority, application Germany, Oct. 30, 1975, 2548620
Int. Cl.² C25C *1/12*
U.S. Cl. 204—108 **33 Claims**

1. Process for producing high purity electrolytic copper with an electric conductivity of at least 58.8 mho × m/mm², and a maximum semi-hard temperature of 200° C by reduction electrolysis of a copper sulphate solution obtained by sulphuric acid leaching of crude cupriferous materials and containing in solution impurities which interfere with the electrolysis, characterized in that prior to the electrolysis the copper sulphate solution is subjected to purification to at least partially remove said impurities, comprising:

a first step in which the copper sulfate solution is maintained at a pH of 2.7–3.3, and a potential of at least 575 mv in relation to the standard hydrogen electrode for precipitation of part of said impurities, and the precipitated impurities are removed from the solution, and

a second step in which the potential of the solution is reduced for formation of copper (I) compounds of at least part of the remaining impurities and precipitation of said copper (I) compounds, and the precipitated copper (I) compounds are removed from the solution,

and electrolyzing solution subjected to said first and second steps to produce said high purity electrolytic copper.

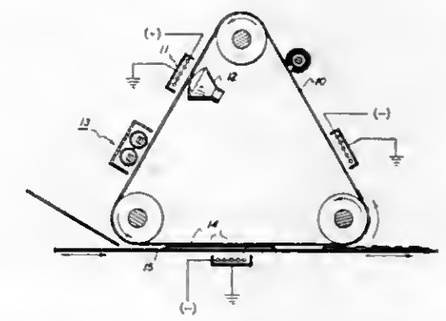


4,030,991

PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS

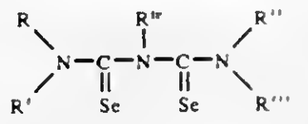
Joseph Y. C. Chu, Fairport, and W. H. H. Gunther, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 454,896, March 26, 1974, Pat. No. 3,994,791. This application Jan. 15, 1976, Ser. No. 649,443
Int. Cl.² B01J *1/10*
U.S. Cl. 204—158 R **1 Claim**



1. A process for preparation of a solid phase dispersion of inorganic photoconductive materials in an insulating polymeric matrix comprising:

a. forming a polymeric composition from a film forming insulating polymeric resin and at least one organoselenium compound of the formula



wherein

R, R′, R″, R‴ and R^{iv} are independently selected from hydrogen, alkyl, of 1 – 10 carbon atoms, phenyl, substituted phenyl, benzyl and substituted benzyl; and

b. subjecting said polymeric composition to sufficient energy to decompose said organoselenium compound whereby elemental selenium is deposited within the organic polymeric composition in substantial conformity

with the distribution of said energy throughout the composition.

4,030,992

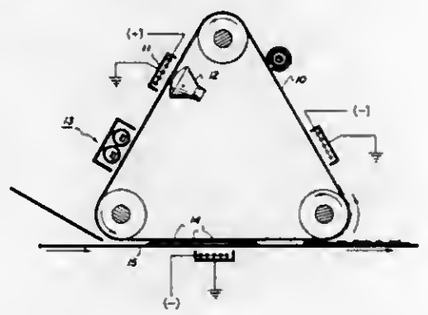
PROCESS FOR PREPARATION OF A SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS

Joseph Y. C. Chu, Fairport, and W. H. H. Gunther, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 454,896, March 26, 1974, Pat. No. 3,994,791. This application Jan. 15, 1976, Ser. No. 649,446

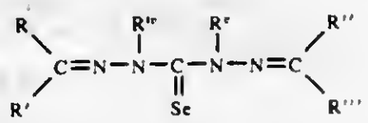
Int. Cl.² B01J *1/10*

U.S. Cl. 204—158 R **1 Claim**



1. A process for preparation of a solid phase dispersion of inorganic photoconductive materials in an insulating polymeric matrix comprising:

a. forming a polymeric composition from a film forming insulating polymeric resin and at least one organoselenium compound of the formula



wherein R, R', R'', R''', R^{tv} and R^{v} are independently selected from hydrogen, alkyl of 1 – 10 carbon atoms, phenyl, substituted phenyl, benzyl, and substituted benzyl; and

b. subjecting said polymeric composition to sufficient energy to decompose said organoselenium compound whereby elemental selenium is deposited in the organic polymeric composition in substantial conformity with the distribution of said energy throughout the composition.

4,030,993

PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS

Joseph Y. C. Chu, Fairport, and W. H. H. Gunther, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

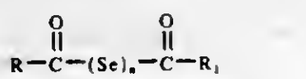
Division of Ser. No. 454,896, March 26, 1974. This application Jan. 15, 1976, Ser. No. 649,385

Int. Cl.² B01J *1/10*

U.S. Cl. 204—158 R **1 Claim**

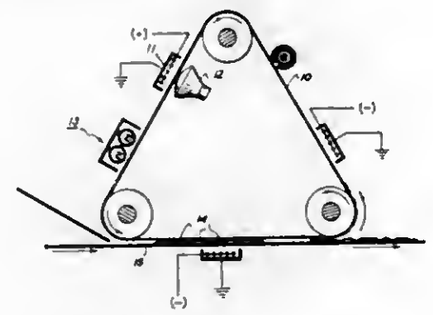
1. A process for preparation of a solid phase dispersion of inorganic photoconductive materials in an insulating polymeric matrix, said process comprising:

a. forming a polymeric composition from a film forming insulating polymer resin and at least one organo-selenium compound of the formula



wherein

R and R_1 are independently selected from the group consisting of benzyl, alkyl substituted benzyl, alkoxy substituted benzyl, acryl substituted benzyl, amino substituted benzyl, amido substituted benzyl, arylalkyl substituted benzyl, aryl substituted benzyl, alkoxy alkyl substituted benzyl, aryloxy alkyl substituted benzyl, amino alkyl substituted benzyl, hydroxyl alkyl substituted benzyl, alkyl amino substituted benzyl, aryl amino substituted benzyl, alkyl carbonyl substituted benzyl, alkyl thio substituted benzyl, alkyl seleno substituted benzyl, carboxy amido substituted benzyl, halogen substituted benzyl, carboxyl substituted benzyl, cyano substituted benzyl, and nitro substituted benzyl; alkyl, alkoxy, amino substituted alkyl, amido



substituted alkyl, aryl alkyl, alkoxy alkyl, aryloxy alkyl, hydroxy substituted alkyl, carbonyl substituted alkyl, thio substituted alkyl, seleno substituted alkyl, carboxy, amino substituted alkyl, halogen substituted alkyl, carboxy substituted alkyl, cyano substituted alkyl, and nitro substituted alkyl; cyclo alkyl and substituted cyclo alkyl; heterocyclic radicals; and acyl radicals; and

n is 1 or 2.

b. subjecting said polymeric composition to sufficient energy to decompose said organoselenium compound whereby elemental selenium is deposited in the organic polymeric composition in substantial conformity with the distribution of said energy throughout the composition.

4,030,994

SUBSTITUTIVE FLUORINATION OF ORGANIC COMPOUNDS

Janos Kollonitsch, Westfield, N.J., assignor to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 154,695, June 18, 1971, abandoned, which is a continuation-in-part of Ser. No. 60,645, Aug. 3, 1970, abandoned. This application Oct. 9, 1973, Ser. No. 404,555

Int. Cl.² C08F *2/46, 2/54, 8/00*

U.S. Cl. 204—159.11 **8 Claims**

1. A process for the substitutive fluorination of an organic compound containing at least one replaceable hydrogen atom, wherein the organic compound is either unsubstituted or substituted and is selected from the group consisting of

1. mono- and polynuclear carbocyclic aromatic compounds,
2. mono- and polynuclear alicyclic compounds,
3. alkanes and alkenes,
4. amino acids,
5. fatty acids,
6. polymers, and
7. heterocycles

which comprises contacting the organic compound in the liquid or solid state with a reagent selected from the group consisting of a fluoroxy perfluoroalkane of 1–5 carbon atoms and fluoroxy pentafluorosulfur in the presence of a free radical initiator which is light or ionizing radiation.

4,030,995

ALKALINE PHOSPHATASE ISOENZYME DETERMINATION

William H. Starkweather, Oakville, Mo., assignor to Sigma Chemical Company, St. Louis, Mo.

Filed July 13, 1976, Ser. No. 704,831

Int. Cl.² G01N *27/26*

U.S. Cl. 204—180 G **18 Claims**

1. In an electropboretic process of determining alkaline phosphatase isoenzymes in a sample comprising a step of applying said sample to a support medium, a step of subjecting the support medium to a differential electric potential to separate said isoenzymes, and a step of rendering said isoenzymes detectable, the improvement wherein said support medium is chosen from the group consisting of agarose gels and cellulose acetate membranes, said support medium containing a buffer and a non-ionic detergent diffused through it.

4,030,996

ELECTRODE TYPE GLOW DISCHARGE METHOD AND APPARATUS

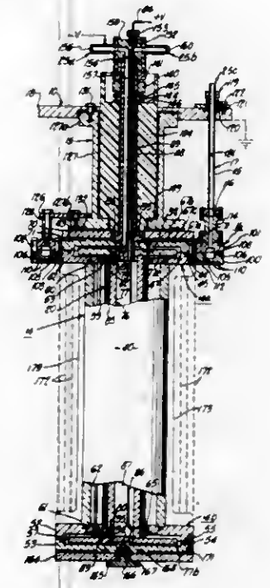
Alan S. Penfold, Playa del Rey, and John A. Thornton, Los Angeles, both of Calif., assignors to Telic Corporation, Santa Monica, Calif.

Division of Ser. No. 178,240, Sept. 7, 1971, Pat. No. 3,884,793. This application Mar. 3, 1975, Ser. No. 554,486

The portion of the term of this patent subsequent to May 20, 1992, has been disclaimed.

Int. Cl.² C23C *15/00*

U.S. Cl. 204—192 R **5 Claims**



1. A method of intentionally sputtering material from a target cathode onto a workpiece, comprising the steps of:

forming a magnetic field of approximately 300 gauss and below within a confined trap region for high and low energy electrons along said cathode, said magnetic field having field lines closely contiguous to and substantially parallel with a central portion of said cathode, said trap region including a cathode sheath within the trap region, substantially all of said high energy electrons being generated on the surface of said cathode by secondary emission;

applying a voltage to said cathode;

disposing said cathode within a gaseous environment of a pressure of approximately 10^{-2} torr or below; and

supporting within said gaseous environment a workpiece intended to be sputter coated, thereby to coat said workpiece with material sputtered from said target cathode.

4,030,997

METHOD OF ALIGNING LIQUID CRYSTALS

Leroy J. Miller, Canoga Park, and Jan Grinberg, Los Angeles, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Apr. 21, 1975, Ser. No. 570,304

Int. Cl.² G02F *1/16;* **C23C** *15/00*

U.S. Cl. 204—192 E **8 Claims**

1. A method of achieving an alignment of liquid crystals or liquid crystalline mixtures such that their directors assume a tilt from the perpendicular of a substrate comprising the steps of:

a. overcoating the surfaces of said substrates with a thin layer of materials taken from the group consisting of SiO and SiO_2,

b. ion beam etching said overcoated surfaces at an angle less than 40°,

c. treating said etched surfaces with a mixture of a long chain aliphatic alcohol having the formula $CH_3(CH_2)_nCH_2OH$ where n ranges from 2 to about 18 and an aliphatic amine,

d. washing said treated surfaces with an inert organic solvent, and

e. using said surfaces to construct a device whereby said liquid crystals will be placed in contact with said surfaces.

4,030,998

ANODE ADJUSTMENT

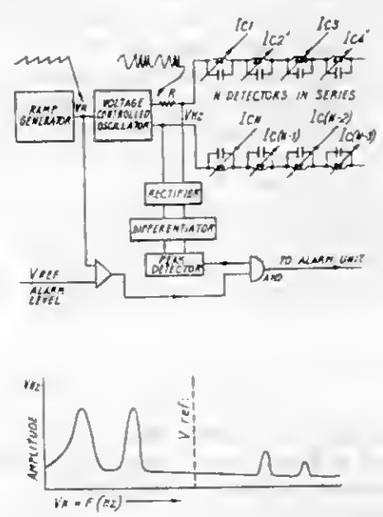
Michel Raymond Barrault, Hoylake, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Aug. 4, 1975, Ser. No. 601,497

Claims priority, application United Kingdom, Aug. 16, 1974, 36166/74

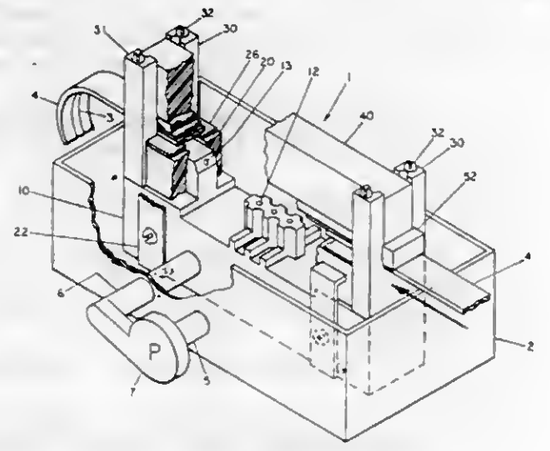
Int. Cl.² C25D *21/12;* **C25C** *7/06*

U.S. Cl. 204—219 **6 Claims**



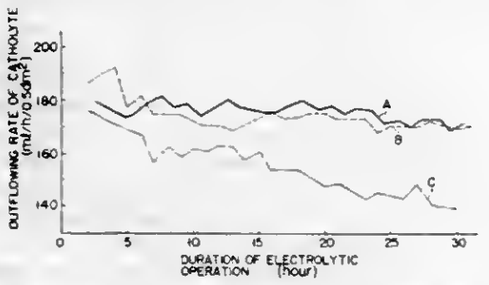
1. In combination with an electrolytic cell having a substantially horizontal flowing mercury cathode and metal anodes suspended on current lead-in rods which pass in vertically adjustable manner through the cell cover, an apparatus for detecting electrical shorting of the anode and the mercury cathode by detecting the variation from a predetermined value of the current flowing in any one of the current lead-in rods which comprises a plurality of saturable resonant circuit devices arranged in a network, each device comprising a fixed capacitor and a saturable inductor including a coil wound on a ferromagnetic core which is arranged near a current lead-in rod so that the permeability of the ferromagnetic core is controlled by the current being carried by the lead-in rod whereby the resonant frequency of the device is a function of said current and changes rapidly with increasing field, and wherein the network is connected to a means for measuring changes in resonance frequency of one or more of said devices.

4,030,999
STRIPE ON STRIP PLATING APPARATUS
Robert M. Allen, Mill Valley, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.
Filed Oct. 6, 1975, Ser. No. 619,952
Int. Cl.² C25D *5/02, 5/08*
U.S. Cl. 204—206 **2 Claims**



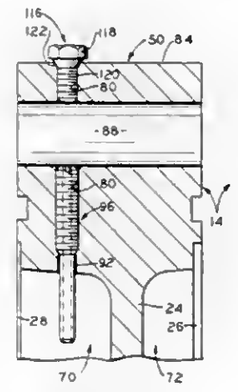
1. An apparatus for continuously placing a stripe of a first metallic material on a strip of a second material as said strip is transported through said apparatus comprising:
- a pair of spaced rails having a predetermined spacing less than the width of said strip for supporting said strip along its lateral edges;
- means for maintaining a fluid-tight seal between said edges of said strip and said rails;
- means disposed between said rails for continuously jettting a fluid containing said first metallic material against said strip as said strip is transported through said apparatus;
- means forming an electrode wire screen positioned between said fluid jetting means and said strip;
- said fluid jetting means comprising a plurality of fluid jets spaced along a line in said spacing between said rails for jetting said fluid through said wire screen and against said strip, and at least one fluid jet disposed, respectively, at opposite ends of said line of fluid jets for jetting a fluid inwardly and in opposition to back-spray of said fluid from said strip for preventing the escape of fluid from said spacing between said rails; and
- means for discharging spent fluid from said apparatus.

4,031,000
DIAPHRAGM FOR ELECTROLYTIC PRODUCTION OF CAUSTIC ALKALI
Tadashi Nakamura; Hisami Hagiwara, and Yoshikazu Kokubu, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed May 30, 1974, Ser. No. 474,820
Claims priority, application Japan, June 7, 1973, 48-64204
Int. Cl.² C25B *1/14, 13/02*
U.S. Cl. 204—252 **4 Claims**



1. In an electrolytic cell for producing an alkali hydroxide comprising a diaphragm dividing said cell into an anolyte chamber and a catholyte chamber, the improvement which comprises said diaphragm comprising a dual microporous layer having an anode side and a cathode side, the anode side microporous layer thereof being made of an acid-resistant material 0.01 to 0.3 millimeter thick bored with micropores having a mean diameter of from 0.05 to 1.5 microns, and the cathode side microporous layer thereof being made of an alkali-resistant material 1 to 6 millimeters thick bored with micropores having a mean diameter of from 3 to 100 microns.

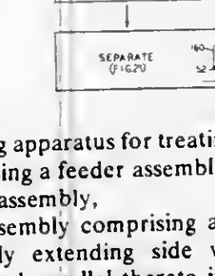
4,031,001
ELECTROLYTIC CELL FOR THE PRODUCTION OF ALKALI METAL HYDROXIDES HAVING REMOVABLE ORIFICES FOR METERING FLUIDS TO THE ANODE AND CATHODE COMPARTMENTS
Primo Bosa, Vancouver, Canada, assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.
Filed Aug. 29, 1975, Ser. No. 608,956
Int. Cl.² C25B *1/26, 9/00, 15/08*
U.S. Cl. 204—257 **12 Claims**



1. In an electrolytic cell which includes at least a pair of juxtapositioned cell modules, each module including a housing having an anode and a cathode disposed thereon and establishing separate anode and cathode compartments separated by a fluid impermeable web member, said housing further including a first header for supplying fluid to said anode compartment and a second header for supplying fluid to said cathode compartment, wherein the improvement comprises:
- said housing having a first aperture communicating between said first header and said anode compartment and a second aperture communicating between said second header and said cathode compartment; and, a first member having a first fluid orifice therein positioned in said first aperture and a second member having a second fluid orifice therein positioned in said second aperture for metering fluid flow into said anode and cathode compartments from said first and second headers, respectively, wherein said first and second members each include a body portion releasably threadedly retained in said first and second aperture and a neck portion penetrating said anode and cathode compartments, respectively.

4,031,002
PASSIVATING METALS ON CRACKING CATALYSTS WITH ANTIMONY COMPOUNDS
Dwight L. McKay, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.
Division of Ser. No. 550,584, Feb. 18, 1975, abandoned. This application June 11, 1976, Ser. No. 695,218
Int. Cl.² C10G *11/04, 9/16*
U.S. Cl. 208—113 **11 Claims**

1. A process for catalytic cracking of hydrocarbons wherein
a. a hydrocarbon feed is introduced into a cracking zone,
b. said feed is contacted in said cracking zone with the cracking catalyst under cracking conditions whereby the feed is cracked,
c. the cracked feed is removed from said cracking zone for further processing, and
d. metals deposited on said cracking catalyst and tending to deactivate said cracking catalyst are passivated by contacting said cracking catalyst with an antimony compound having the general formula

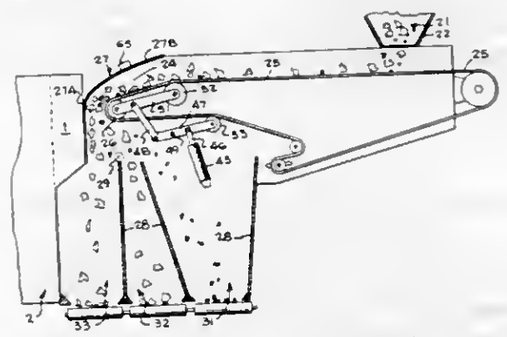


wherein the radicals R which can be the same or different are hydrocarbyl radicals having from 1 to about 18 carbon atoms per molecule.

4,031,003
FIELD TO GIN COTTON HANDLING AND STORGE SYSTEMS
Glover A. Husky, 3003 Manioca Road, Lubbock, Tex. 79403
Continuation-in-part of Ser. No. 428,384, Dec. 26, 1973, Pat. No. 3,879,049, which is a continuation-in-part of Ser. No. 513,145, Oct. 8, 1974, abandoned. This application Apr. 14, 1975, Ser. No. 568,004
Int. Cl.² B03B *9/00*
U.S. Cl. 209—3 **10 Claims**

1. A preginning apparatus for treating field harvested cotton modules comprising a feeder assembly, a dispersing assembly, and a separator assembly,
- said feeder assembly comprising a base and rigid vertical longitudinally extending side wall and, spaced away therefrom and parallel thereto in closed position, a pivotal side door assembly and, below said closed pivotal side door and said rigid side door, a movable conveyor, said side wall firmly fixed to said base
- said pivotal side door comprising a frame pivotally attached to said base and extending along a pivotal axis parallel to the length of said rigid side door, and an extensible loading frame movably attached to the top of said pivotal frame,
- said extensible frame being movably mounted on said pivotal frame for movement in a direction perpendicular to said pivotal axis and a plurality of parallel roller means located on said extensible frame, each of said roller means having an axis of rotation parallel to said direction of extension;
- said movable conveyor comprising an elongated belt attached to means to move said belt along direction of its length;
- said dispersing assembly comprising a plurality of spaced apart parallel beating elements extending in a plane at an upwardly oblique angle to the direction of movement of said belt, each of said parallel elements being operatively connected to a means for moving said elements in non-intersecting paths through a common volume of the space between said beating elements;
- said separator assembly comprising a pneumatic separator, a discharge duct for cotton and a discharge duct for waste; and a feed belt leading to aid separator; and
- said dispersing means located adjacent to said belt of said separator assembly, and
- power means operatively attached to means for moving said pivotal side door about its pivotal axis, and power means operatively attached to said extensible frame means for movement thereof towards and away from said pivotal axis, and power means operatively attached to said means to move said conveyor belt, and power means attached to said beating elements of said dispersing assembly and power means operatively attached to said separator assembly to supply an air stream to said pneumatic separator.

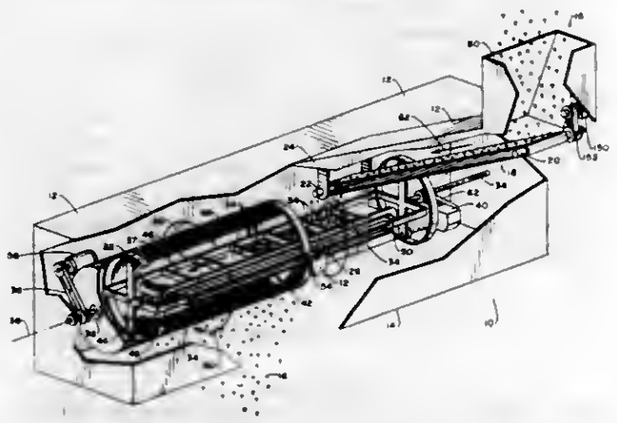
4,031,004
FEED SYSTEM FOR AN ELECTROMAGNETIC EDDY CURRENT MATERIALS SEPARATOR
Edward J. Sommer, Jr., 1908 Beechwood Ave., Nasbville, Tenn. 37212; Garry R. Kenny, Rte. 1, College Grove, Tenn. 37046; Frank S. Knoll, 4257 Melrose Ave., Jacksonville, Fla. 32210, and David W. Mitchell, 3946 St. Johns Ave., Apt. 92, Jacksonville, Fla. 32205
Filed May 24, 1976, Ser. No. 689,662
Int. Cl.² B03C *1/30*
U.S. Cl. 209—212 **4 Claims**



1. A feed system for delivering feedstock to the region of influence of the magnetic field of an eddy current magnet in an electromagnetic eddy current materials separator, comprising
- a. a conveyor assembly having
  - i. a first end and a second end,
  - ii. first and second guide means located at said first and second ends,
  - iii. a conveyor belt,
  - iv. both guide means being operatively connected to the inner surface of said conveyor belt for maintaining said belt under tension,
  - v. the first end of the conveyor assembly being disposed adjacent to and upstream of the region of influence of the magnetic field of said magnet,
- b. means for supplying feedstock to the conveyor apparatus near the second end thereof,

c. means for detecting the presence of a blockage preventing feedstock from being delivered by the conveyor to the region of influence of the magnetic field of the eddy current magnet and producing a blockage signal in response to the existence of such blockage,
d. means responsive to said blockage signal for lowering or retracting the first guide means.

4,031,005
CONTROLLABLE SORBENT BROADCASTER
James J. Der, Monterey Park, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.
Filed Aug. 23, 1976, Ser. No. 716,916
Int. Cl.² B07B *1/02*
U.S. Cl. 209—236 **5 Claims**

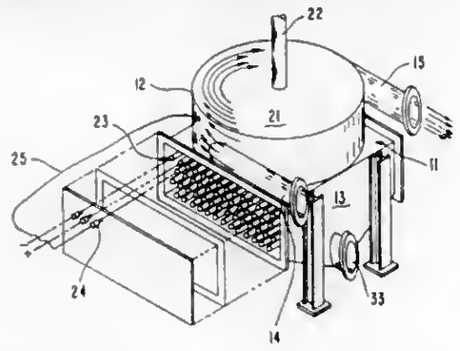


1. A contollable sorbent broadcaster comprising:
a. an endless belt assembly moving in a substantially horizontal plane formed between a pair of rollers;
b. means disposed adjacent one end of said endless belt assembly for depositing sorbent materials onto said endless belt;
c. means connected to said endless belt assembly for rotating said endless belt assembly about its longitudinal axis such that said sorbent materials fall uniformly; and
d. means disposed to receive said sorbent material falling from said endless belt for releasing said sorbent material at a controlled rate over a drop area.

4,031,006
VORTEX COAGULATION MEANS AND METHOD FOR WASTEWATER CLARIFICATION
Ernest R. Ramirez, Lemont, and Dennis L. Johnson, Woodridge, both of Ill., assignors to Swift and Company Limited, Chicago, Ill.
Continuation-in-part of Ser. No. 666,341, March 12, 1976, abandoned. This application May 17, 1976, Ser. No. 687,236
The portion of the term of this patent subsequent to May 25, 1993, has been disclaimed.
Int. Cl.² B01D *12/00*
U.S. Cl. 210—44 **23 Claims**

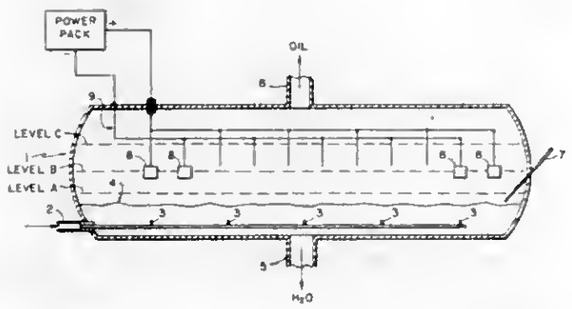
1. An improved vortex coagulation method for wastewater clarification, comprising the steps of: tangentially introducing a flow of wastewater having impurities into the bottom of a vortex column having a vertical axis; flowing said wastewater flow in an upward spiral through said vortex column; urging the impurities toward the periphery of the vortex column; coagulating impurities near the periphery; supplying a dense zone of bubbles below said vortex column; passing said bubbles upwardly through said vortex column, said bubble passage being concentrated in a central core lying along said axis; establishing a tangential outflow path for the water, bubbles and impurities; and contacting said bubbles with said impurities to form buoyant agglomerates of bubbles and impurities, said contacting being in a venturi-like manner within said outflow path.

13. An improved vortex coagulation apparatus for wastewater clarification comprising: a bubble supply compartment; a means for introducing a supplemental water supply into the



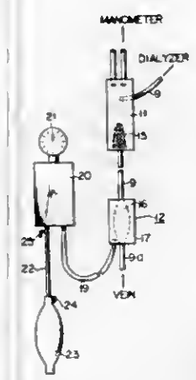
compartment; a cylindrical chamber having a substantially vertical axis, said chamber being mounted above and in communication with said compartment; an inlet in tangential communication with the peripheral bottom of said chamber; and an outlet in tangential communication with the peripheral top of said chamber.

4,031,007
SLOP OIL TREATING SYSTEM
Austin V. Sierra, Jr., Sulfur, La., assignor to Cities Service Company, Tulsa, Okla.
Filed Aug. 16, 1976, Ser. No. 714,468
Int. Cl.² B01D *17/04, 17/06*
U.S. Cl. 210—59 **3 Claims**



1. A method of treating slop oil in an electric coalescer apparatus, in which the oil-water emulsion feed is treated with chemicals, the mixture is fed to the coalescer, and the emulsion mixture is broken by direct electric current to give oil and water layers, wherein the improvement comprises:
a. employing a probe that produces a signal when the interface between the oil and water layers approaches a predetermined level in the coalescer, and
b. employing vertically-placed extensions on the bottoms of at least two of the coalescer plates, said extensions acting as a warning device, said improvement offering a continuous method of treatment.

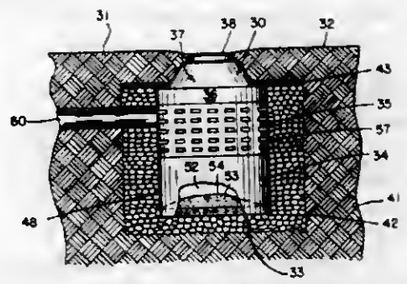
4,031,008
ARTIFICIAL KIDNEY DEVICE
Gousuke Anno, Kawasaki, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Tokyo, Japan
Continuation-in-part of Ser. No. 529,500, Dec. 4, 1974, Pat. No. 3,986,956. This application Dec. 22, 1975, Ser. No. 643,301
Claims priority, application Japan, Dec. 23, 1974, 49-147859
Int. Cl.² B01D *31/00*
U.S. Cl. 210—137 **34 Claims**



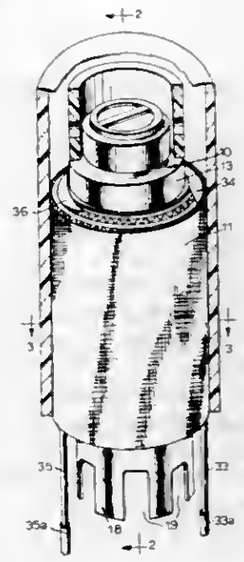
1. An artificial kidney device for a human being comprising:
a dialyzer for removing specified components from blood;
blood pumping means for transporting blood from an artery of the human being to the dialyzer and creating a blood pressure in the dialyzer above arterial pressure;
means forming a flow passage in communication with said dialyzer for transporting blood passed through the dialyzer to a vein of the human being;
means for maintaining a substantially constant ultrafiltration pressure in said dialyzer including an inner tube forming part of said flow passage and an outer tube surrounding said inner tube and defining a closed chamber therewith, the pressure within said inner tube being subject to change in accordance with prevailing blood pressure in said dialyzer;
means for providing a substantially constant predetermined pressure in excess of atmospheric pressure within said closed chamber;
said inner tube being formed of material deformable in response to pressure differentials created between the inside of said inner tube and said chamber to enlarge or restrict said flow passage through said inner tube so that the pressure inside said inner tube will balance the substantially constant predetermined pressure in said closed chamber to thereby maintain said ultrafiltration pressure in the dialyzer substantially constant;
means including a gas filled reservoir coupled with said chamber for absorbing any pressure fluctuation in said chamber in response to deformation of said inner tube, and
means for preventing ingress of gas from said reservoir into said chamber thereby minimizing the quantity of gas flowing into said flow passage in the event of a rupture of said inner tube.

4,031,009
COMBINED LEACHING AND SUMP CATCH-BASIN
Robert M. Hicks, 124 Main St., Westford, Mass. 01886
Continuation of Ser. No. 455,790, March 28, 1974, abandoned. This application Oct. 9, 1975, Ser. No. 620,866
Int. Cl.² B01D *21/10*
U.S. Cl. 210—164 **3 Claims**

1. In a surface drainage system the combination of:
a generally cylindrical wall of stone formed in the earth and extending vertically below ground surface level to define a hole of predetermined depth and breadth greater than conventional catch basin dimensions;
a pre-cast, reinforced concrete, catch basin of predetermined, oversize height and breadth substantially filling said hole, and of hollow cylindrical configuration, said catch basin having:
a solid circular bottom wall;
a solid, hollow, cylindrical, lower side wall, of uniform annular cross section upstanding from said bottom wall to substantially half the height of said catch basin, and sealed by a sealing joint to said bottom wall, to form a sealed, unapertured, undrained sump receptacle for collecting drain water, silt, leaves and the like up to substantially half the volume of said catch basin without leakage into the surrounding environment;
a solid, hollow, cylindrical, upper side wall, upstanding from said lower side wall and having a pattern of leaching apertures spaced from top to bottom thereof, each aperture extending from the inside to the outside of said upper side wall for leaching cleared water, rising from said sump receptacle up to the level of said apertures, out into said wall of stone and surrounding earth,
a sealing joint connecting said upper side wall to said lower side wall
and cone and grille means forming an opening at the top of said catch basin for receiving surface drainage.



4,031,010
COMBINED DIALYZER AND ADSORBER UNIT
Yukihiko Nose, Cleveland Heights, Ohio, assignor to Takeda Chemical Industries, Ltd., Osaka, Japan
Continuation of Ser. No. 466,513, May 2, 1974, abandoned. This application Sept. 5, 1975, Ser. No. 610,882
Int. Cl.² B01D *31/00*
U.S. Cl. 210—202 **11 Claims**



1. An artificial kidney apparatus comprising, in combination, a combined dialyzer and adsorber unit having a cylindrical container having a top cover with an aperture therein and an apertured bottom cover and a mass of adsorbent therein, a

flat tube of membrane material permeable to uremic wastes and toxic materials in blood wrapped in a coil around said cylindrical container, a screen layer between each of the coils of the tube, a blood inlet tube connected to one end of the flat tube and a blood outlet tube connected to the other end of the flat tube, said blood tubes extending to the exterior of the sleeve, and a unit cover over said coil around said cylindrical container and over the end of the container having the top cover thereon and being spaced from the top cover sufficiently to give access to the aperture in the cover, the bottom of said cover being completely open for exposing the entire area of the edges of said screen layers toward the bottom of said unit, said container and covers being of a moldable plastic inert to the dialysate, said aperture in said top cover being sufficiently large to receive liquid flowing simultaneously through all of said screen layers around the entire circumference of said screen layers;

a dialysate holding tank;

a unit holder tank in which said unit is positioned with said unit cover at the top thereof;

a dialysate intake line extending from said dialysate tank to unit holder tank;

a dialysate pump;

a suction line extending from said adsorber outlet to the intake of said dialysate pump; and

a return line from the outlet of said dialysate pump to said diaylsate holding tank,

whereby when dialysate fills said unit holder tank with the uncovered edges of said screen layers immersed in dialysate and dialysate is caused to flow through the unit, dialysate flows evenly over the turns of the coil along the screen layers around the entire periphery of the unit and all of the coil is utilized for exchange of impurities from the blood within the coil to the dialysate flowing over the outside of the coil.

4,031,011

MAGNETIC FILTER APPARATUS

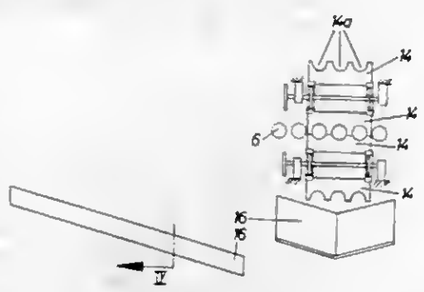
Friedrich Dorgathen, Hosel, Germany, assignor to Montanus Industrieanlagen GmbH, Essen, Germany

Filed June 19, 1975, Ser. No. 588,404

Claims priority, application Germany, June 21, 1974, 2429849

Int. Cl.² B01D *35/06*

U.S. Cl. 210—222 **8 Claims**



1. A magnetic filter apparatus for removing magnetisable material from a liquid contaminated therewith, comprising:

a. a container for receiving contaminated liquid;

b. a plurality of magnetic bars operatively engaged with support means for securing said bars in spaced, substantially mutually parallel relationship, thereby defining a plurality of gaps between successive bars;

c. drive means for moving said support means and said magnetic bars;

d. guide means defining a path for said support means and said magnetic bars, said path extending at least partially within the liquid in said container and partially above the liquid in said container;

e. cleaning means, disposed substantially vertically above the surface of the liquid in said container and at a position contiguous with said path for said support means, for operative engagement with said magnetic bars for removing magnetisable material therefrom; and,

f. discharge means disposed vertically intermediate said cleaning means and the surface of the liquid in said container for receiving magnetisable material removed from said bars by said cleaning means;

wherein said cleaning means comprises a plurality of wiper blades, with recesses of complementary geometrical configuration with respect to the geometrical shape of the magnetic bars, arranged to extend substantially around the periphery of at least one of said magnetic bars, and means for moving said wiper blades across the surfaces of said magnetic bars.

4,031,012

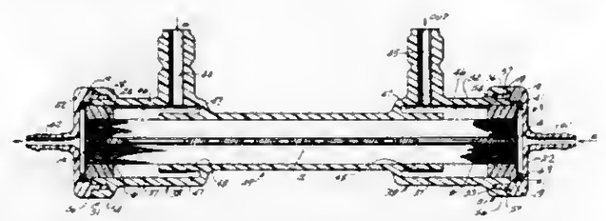
SEPARATORY APPARATUS

Paul W. Gies, Santa Ana, Calif., assignor to Gies Pharmaceuticals, Inc., Santa Ana, Calif.

Filed Sept. 17, 1975, Ser. No. 614,268

Int. Cl.² B01D *13/00*

U.S. Cl. 210—321 A **31 Claims**



1. A separatory apparatus comprising a supporting core, at least one layer of selectively permeable continuously hollow fibers positioned on the supporting core, core extenders attached to the core where the fibers terminate, and potting compound attaching at least the terminal portions of the fibers to the core extenders, the core extenders being fabricated from a material with about the same rigidity and about the same density as the potting compound.

4,031,013

METHOD AND APPARATUS FOR FIBER SUSPENSION DEWATERING

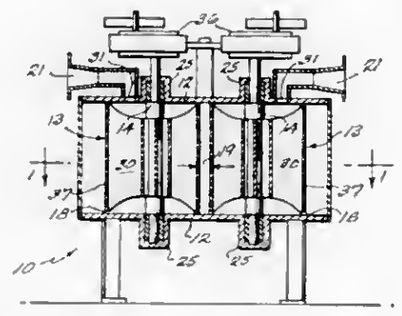
Arne Skretting, Karlstad, Sweden, assignor to Kamyr Aktiebolag, Karlstad, Sweden

Filed Mar. 26, 1975, Ser. No. 562,185

Claims priority, application Sweden, Apr. 2, 1974, 7404409

Int. Cl.² B01D *33/06, 33/10*

U.S. Cl. 210—326 **2 Claims**



1. Apparatus for dewatering a fiber suspension comprising

a. a sealed housing having an inlet at a first pressure for introduction of a fiber suspension having a relatively low solids concentration, and a first outlet at a second pressure less than said first pressure for removal of a fiber suspension having a relatively high solids concentration,

b. first and second drums mounted for rotation about vertical axes in the vicinity of said first outlet, each of said drums having a perforated exterior surface in substantial 360° engagement with suspension in said housing and an inner liquid chamber, and said exterior surfaces of said drums cooperating for pressing liquid from suspension passing therebetween into the interior chamber of the drums, said drums having a nip point therebetween,

c. means for adjustably mounting shafts defining said drums' vertical axes so that the nip between the drums can be adjusted and thereby the concentration of suspension exiting said first outlet,

d. a pair of second outlets from said housing at a third pressure intermediate said first and second pressures, a said second outlet being located above each of said drum chambers and spaced from the shaft mounting each drum for rotation about a vertical axis,

e. means for rotating said drums about their vertical axes in a direction so that solids engaged thereby are adapted to flow toward said first outlet, and

f. means for substantially preventing the passage of fiber suspension through said first outlet without passing through said nip point, said means including a first member having an extending edge thereof adjacent the periphery of said first drum at a point spaced toward said outlet from said nip point, and a second member having an extending edge thereof for cooperation with said second drum, whereby fiber suspension introduced into said inlet will pass through said nip, liquid being extracted therefrom, and will pass through said first outlet after addition thereto of an amount of liquid from the interior chambers of said drums.

4,031,014

METHOD OF REDUCING FRICTION LOSS

Thomas J. Griffin, Jr., Sand Springs, Okla., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 656,675, Feb. 9, 1976. This application June 22, 1976, Ser. No. 698,666

Int. Cl.² C09K *3/00*

U.S. Cl. 252—8.55 R **27 Claims**

1. A method of reducing the friction loss generated by an organic liquid flowing through a confining conduit which comprises:

mixing up to about 0.9 gallon per 1000 gallons of said organic liquid of an organic phosphate ester reaction product comprising the reaction of

a pentavalent phosphorous compound with a hydroxy ether of the formula ROR_1OH wherein R is a C_1 to C_6 allyl group, R_1 is a C_2 or C_3 alkylene group and the total carbon atoms of R and R_1 range from 3 to about 8; and

when the total carbon atoms of R and R_1 is 3 or 4, with a long chain monohydric aliphatic alcohol containing at least 5 carbon atoms; when the total carbon atoms of R and R_1 are five or more with an alcohol selected from the group consisting of a long chain monohydric aliphatic alcohol containing at least 5 carbon atoms, a short chain monohydric aliphatic alcohol containing from one to four carbon atoms or a mixture of said alcohols, said reaction being conducted at a temperature ranging from about 70 to about 90° C for a period of time of from about 1.5 to about 6 hours and a sufficient quantity of a basic salt containing a multivalent metal cation to provide friction reduction.

16. A method of reducing the friction loss generated by an organic liquid flowing through a confining conduit which comprises mixing 0.9 gallon per 1000 gallons of said organic liquid of an organic phosphate ester reaction product comprising the reaction of,

P_2O_5 with a hydroxy ether compound of the formula ROR_1OH wherein R is a C_1 to C_6 alkyl group and R_1 is a C_2 or C_3 alkylene group and the total carbon atoms of R and R_1 ranges from 3 to about 8; and

when the total carbon atoms of R and R_1 is 3 or 4 with a long chain aliphatic monohydric alcohol containing from 5 to about 12 carbon atoms, when the total carbon atoms of R and R_1 is 5 to 8, with an alcohol selected from the group consisting of a long chain monohydric aliphatic alcohol containing from 5 to about 12 carbon atoms, a short chain monohydric aliphatic alcohol containing from 1 to 4 carbon atoms or a mixture of said alcohols, the individual mole ratios of the hydroxy ether, the long chain alcohol and the short chain alcohol to P_2O_5 are within the ranges of 0.4:1 to 4.5:1; 0:1 to 4.0:1 and 0.5:1 to 5.0:1 respectively, said reaction being conducted at a temperature ranging from about 70° to about 90° C for a period of time of from about 1.5 to about 6 hours, and a sufficient basic salt containing a multivalent metal cation to provide friction reduction.

27. The method of claim 16 wherein the confining conduit is a wellbore.

4,031,015

NITRILE-AMINE REACTION PRODUCTS

Clark Ober Miller, Willoughby Hills, Ohio, assignor to The Lubrizol Corporation, Cleveland, Ohio

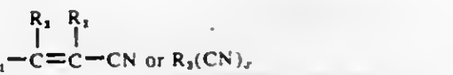
Filed Mar. 26, 1973, Ser. No. 345,022

Int. Cl.² C10M *1/32*

U.S. Cl. 252—50 **12 Claims**

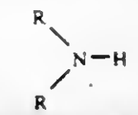
1. A lubricant composition comprising a major amount of a lubric ting oil and a minor but sludge dispersing amount of at least one organonitrogen composition made by

A. reacting (i) one equivalent of one olefin or halogenated olefin containing at least about 30 carbon atoms with 0.5 to 1.5 equivalents of (ii) at least one α,β-unsaturated nitrile of the formula



wherein R_1 and R_2 are hydrogen or substantially hydrocarbyl radicals of 1 to about 28 carbons, R_3 is a C_2 to C_{28} substantially hydrocarbyl group containing at least one unsaturated linkage alpha, beta to at least one nitrile group and x is 2 to about 10 at a temperature of about 100° C up to the decomposition temperature of a component of the reaction mixture to form an organonitrile intermediate and

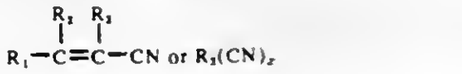
B. further reacting at a temperature of 30° C up to the decomposition point of the reactants or the products an equivalent of said intermediate with about 0.5 to 5 equivalents of a nitrogen compound chosen from the group contisting of (i) at least one amine of the formula



wherein each R is independently hydrogen, a substantial hydrocarbyl group or a hydroxyl-substituted substantial hydrocarbyl group having up to about 30 carbon atoms; (ii) at least one alkylene polyamine containing up to about 10 nitrogen atoms; (iii) at least one heterocyclic amine containing at least one -NH- group incorporated in the cycle, 3 to 10 atoms in the cycle and a total of about 2 to 30 carbon atoms; and (iv) mixtures of at least two of (i), (ii) or (iii).

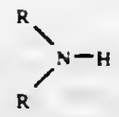
7. A fuel composition comprising a major amount of a normally liquid fuel and a minor but corrosion inhibiting amount of at least one organonitrogen composition made by the process comprising

A. reacting (i) one equivalent of at least one olefin or halogenated olefin containing at least about 30 carbon atoms with 0.5 to 1.5 equivalents of (ii) at least one α,β-unsaturated nitril of the formula



wherein R_1 to R_3 are hydrogen or substantially hydrocarbyl radicals of 1 to about 28 carbons, R_2 is a C_2 to C_{28} substantially hydrocarbyl group containing at least one unsaturated linkage alpha, beta to at least one nitrile group and x is 2 to about 10, at a temperature of about 100° C up to the decomposition temperature of a component of the reaction mixture of form an organonitrile intermediate and

B. further reacting at a temperature of 30° C up to the decomposition point of the reactants or the products an equivalent of said intermediate with 0.5 to 5 equivalents of a nitrogen compound chosen from the group consisting of (i) at least one amine of the formula



wherein each R is independently hydrogen, a substantially hydrocabyl group or a hydroxyl-substituted substantially hydrocarbyl group having up to about 30 carbon atoms; (ii) at least one alkylene polyamine containing up to about 10 nitrogen atoms; (iii) at least one heterocyclic amine containing at least one —NH— group incorporated in the cycle, 3 to 10 atoms in the ring and a total of about 2 to 30 carbon atoms; and (iv) mixtures of at least two of (i), (ii), or (iii).

4,031,016

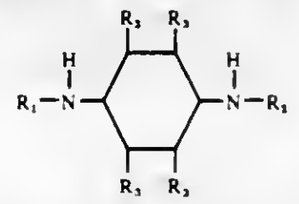
BASE OIL COMPOSITIONS HAVING IMPROVED LIGHT STABILITY

Hans Berger; Gerhard De Lind Van Wijngaarden, and Jacobus H. Breuker, all of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Dec. 15, 1975, Ser. No. 641,052
Int. Cl.² C10M *1/34*
U.S. Cl. 252—50 **18 Claims**

1. A base oil composition comprising a major portion of a hydroprocessed base oil and a daylight stability enhancing amount of

1. a compound of the general formula:



(I)

wherein R_1 is a substituted or unsubstituted aliphatic, aromatic or a four to eight member heterocyclic group comprised of from one to five hetero-atoms selected from the class of nitrogen, oxygen, phosphorus and sulfur; R_3 is hydrogen or the same group as R_1, and each R_2, which may be the same or different, is selected from the class consisting of hydrogen and an alkyl group of from one to six carbon atoms; and

2. a singlet oxygen quencher.

4,031,017

PHOSPHOSULFURIZED HYDROCARBON MODIFIED N-(HYDROXY AND ALKYL-SUBSTITUTED BENZYL) ALKYLENE POLYAMINE

Albert R. Sabol, Munster, Ind., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed Apr. 7, 1976, Ser. No. 674,614
Int. Cl.² C09B *49/00*
U.S. Cl. 252—46.7 **6 Claims**

1. A product obtained by the condensation of a (1) C_{30} to C_{100} alkyl-substituted phenol, (2) an alkylene polyamine, (3) a source of formaldehyde, and (4) a phosphosulfurized hydrocarbon derived from P_2S_5 and a 500 up to 2240 $\overline{M}_n$ olefin polymer used in the respective molar reactant proportions of the four reactants of 1.0:0.1–10.0:1.0–10.0:0.5–3.0.

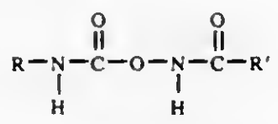
4,031,018

AUXILIARY ANTIOXIDANTS

Zatis L. Murphy, Cypress, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Jan. 28, 1976, Ser. No. 653,068
Int. Cl.² C10M *1/38*
U.S. Cl. 252—47.5 **4 Claims**

1. A lubricant composition comprising a major amount of an ester lubricant base stock selected from the group consisting of esters of carboxylic acids and an oxidation inhibiting amount of a mixture consisting essentially of 1) an antioxidant selected from the group consisting of arylamines and phenothiazine and 2) a N-acyl-O-carbamylhydroxyl-amine auxiliary antioxidant corresponding to the formula



wherein R and R′ each represent a hydrocarbyl radical selected from the class consisting of straight-chain, branched-chain and cyclic aliphatic radicals of 2 to 12 carbon atoms, said hydrocarbyl radicals being saturated or unsaturated; or an aromatic hydrocarbyl radical selected from the class consisting of aryl, alkaryl and aralkyl radicals of 6 to 14 carbon atoms.

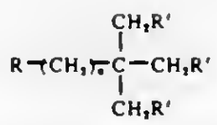
4,031,019

ALCOHOL ESTERS OF FATTY ACIDS AS USEFUL METALWORKING LUBRICANTS

Edward W. Bell, Peoria, Ill., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Continuation-in-part of Ser. No. 267,314, June 29, 1972, abandoned. This application Oct. 3, 1975, Ser. No. 619,411
Int. Cl.² C10M *1/24*
U.S. Cl. 252—56 S **8 Claims**

1. A continuous steel casting mold lubricant composition consisting essentially of a mixture of compounds having the formula:



where $n = 1$; R = H—, CH_3—, or R′; or where $n = 2$, R = H—, or CH_3—; and R′ = isolinoleoyloxy, isooleoyloxy, stearoyloxy, or palmitoyloxy radicals, said mixture of compounds containing from a trace to about 45 mole percent of isolinoleoyloxy radicals, from about 44 to about 76 mole percent of isooleoyloxy radicals, from about 3 to about 18 mole percent of stearoyloxy radicals, and from about 5 to about 13 mole percent of palmitoyloxy radicals, said mixture also containing from a trace to about 59 mole percent of isolated trans double bonds, from 0 to about 16 mole percent of conjugatable double bonds, and from a trace to about 40 mole percent of nonconjugatable double bonds.

4,031,020

CENTRAL SYSTEM FLUID COMPOSITION

Kensuke Sugiura, Kawasaki; Mineo Kagaya, Yokohama; Tokuo Fujisou, Kawasaki; Hiroyuki Aoki, Urawa; Takeichiro Takehara, and Shigenori Kurata, both of Yokohama, all of Japan, assignors to Nippon Oil Company, Ltd., Tokyo and Nissan Motor Co., Ltd., both of, Japan

Filed May 29, 1975, Ser. No. 582,404
Claims priority, application Japan, May 31, 1974, 49-60898
Int. Cl.² C10M *1/24*
U.S. Cl. 252—56 R **15 Claims**

1. A central system fluid composition consiting essentially of 5–30% by weight of a viscosity index improver and the balance being essentially a hydrocarbon base oil, which is characterized in that the hydrocarbon base oil is composed of 50–100% by weight, based on its total weight, of at least one chief base oil component selected from the group consisting of

A. polybutenes with an average molecular weight of 100–500,

B. homo- or copolymers of at least one α-olefin containing 2–12 carbons, excepting butenes, said homo- or copolymer having a molecular weight of 100 to 500 and wherein the copolymers are obtained by copolymerizing a mixture of said α-olefins with each other; and

C. hydrogenation products boiling at 250°–380° C of high aromatic hydrocarbons which are obtained by cracking petroleum oils,

and 0–50% by weight, based on its total weight, of a mineral oil,

and wherein the viscosity index improver is composed of at least one component selected from the group consisting of

1. polymethacrylates with an average molecular weight of 50,000–200,000, which are obtained by polymerizing at least one ester of a saturated, monohydric aliphatic alcohol of 1–18 carbons with methacrylic acid, and

2. copolymers with an average molecular weight of 40,000–200,000 selected from the group consisting of ethylene-propylene copolymers, butadiene-styrene copolymers and isoprene-styrene copolymers.

10. In an improved central system fluid composition comprising a major proportion of a base oil, a viscosity index improver and an effective amount up to 10% of at least one additive selected from the group consisting of detergents, antioxidants, metal deactivators and antifoaming agents, the improvement wherein the base oil and viscosity index improver comprises the composition of claim 1.

4,031,021

MAGNETIC TONER COMPOSITIONS

Philip H. Deming, 5 Orchard Hill, Newtown, Conn. 06470

Filed Mar. 25, 1974, Ser. No. 454,270
Int. Cl.² G03G *9/08*
U.S. Cl. 252—62.1 P **16 Claims**

1. A magnetic toner composition for use in decorating a magnetically imaged substrate in magnetic printing machines for transfer to a reading medium comprising a particulate blend of

A. between about 50% and about 99% by weight of magnetic particles having a contrasting color with respect to the color of said reading medium and

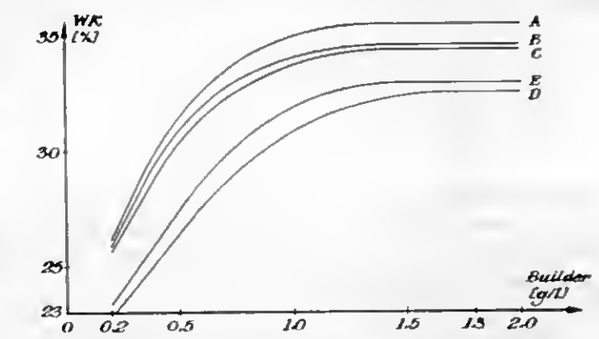
B. between about 1% and about 50% by weight of non-magnetic, frictionally electrifiable particles in a concentration sufficient to physically adhere to the magnetic particles and to be also present as a separate phase of particles substantially non-adhering to the magnetic particles and having a color non-contrasting with the color of said reading medium.

4,031,022

BUILDERS FOR DETERGENT AND CLEANING COMPOSITIONS

Wilhelm Vogt, Hurth-Efferen; Eberhard Auer, Erftstadt Liblar; Günter Lenz, Frechen-Bachem; Karl Merkenich, Hurth-Efferen; Klaus Henning, Hurth-Hermulheim, and Joachim Kandler, Erftstadt Lechenich, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Division of Ser. No. 472,298, May 22, 1974, abandoned. This application Mar. 2, 1976, Ser. No. 663,053
Claims priority, application Germany, May 28, 1973, 2327141
Int. Cl.² C11D *3/20, 7/26*
U.S. Cl. 252—89 R **5 Claims**



1. Detergent and cleaning compositions in which the principal cleaning components are an anion-active, cationic, amphoteric, ampholytic or non-ionic surfactant and an organic builder consisting of a copolymer of alpha-hydroxyacrylic acid and acrylic acid, said copolymer having a specific viscosity within the range 0.05 and 1.0 determined on 1 weight % solution of the copolymer in aqueous 2N-sodium hydroxide solution at 20° C, and containing between about 9 and 85 mol % of acrylic acid and the said copolymer being present in the compositions in a proportion within the range 10 and 90 weight %.

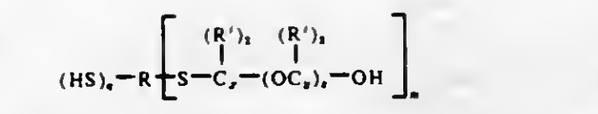
4,031,023

LUBRICATING COMPOSITIONS AND METHODS UTILIZING HYDROXY THIOETHERS

Jerry Lee Musser, Chardon, and Frederick William Koch, Willoughby Hills, both of Ohio, assignors to The Lubrizol Corporation, Cleveland, Ohio

Filed Feb. 19, 1976, Ser. No. 659,454
Int. Cl.² C10M *1/38*
U.S. Cl. 252—48.2 **25 Claims**

1. A transmission or railroad diesel lubricating composition comprising a major amount of a lubricating oil and a minor amount, sufficient to improve the oxidative stability of the lubricating composition, of one or more additives of the formula:



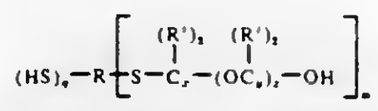
wherein R is a hydrocarbyl or substituted hydrocarbyl containing up to about 30 carbon atoms, wherein the substituents for the substituted hydrocarbyl are selected from the group consisting of halo, nitro, lower alkoxy, lower alkylthio, and

and R has a valence of $m + q$; each R′ is independently selected from hydrogen, hydrocarbyl or substituted hydrocarbyl of up to about 20 carbon atoms, wherein the substitu-

ents for the substituted hydrocarbyl are selected from the group consisting of halo, nitro, lower alkoxy, lower alkylthio, and

x and y are independently an integer of from 2 to 5; z is an integer of from zero to 5; q is an integer of from zero to 4; and m is an integer of from 1 to 5 with the proviso that the sum of $m + q$ is from 1 to 6.

21. A concentrate, suitable for the preparation of transmission or railroad diesel lubricating compositions, which comprises a substantially inert, normally liquid organic diluent and from about 10% to about 90% of at least one additive of the formula:

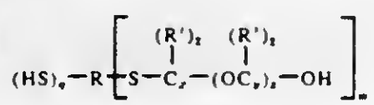


wherein R is hydrocarbyl or substituted hydrocarbyl containing up to about 30 atoms, wherein the substituents for the substituted hydrocarbyl are selected from the group consisting of halo, nitro, lower alkylthio, and

and **R** has a valence of $m + q$; each R′ is independently selected from hydrogen, hydrocarbyl or substituted hydrocarbyl of up to about 20 carbon atoms, wherein the substituents for the substituted hydrocarbyl are selected from the group consisting of halo, nitro, lower alkoxy, lower alkylthio, and

x and y are independently an integer of from 2 to 5; z is an integer of from zero to 5; q is an integer of from zero to 4; and m is an integer of from 1 to 5 with the provisio that the total of $m + q$ is from 1 to 6.

25. A method of lubrication in transmission or railroad diesel environments which comprises contacting a lubricating surface with an effective amount of a lubricating composition comprising a major amount of a lubricating oil and a minor amount sufficient to improve the oxidative stability of the lubricating compositon of at least one additive of the formula:



wherein R is hydrocarbyl or substituted hydrocabyl containing up to about 30 carbon atoms, wherein the substituents for the substituted hydrocarbyl are selected from the group consisting of halo, nitro, lower alkoxy, lower alkylthio, and

and **R** has a valence of $m + q$; each R′ is independently selected from hydrogen, hydrocarbyl or substituted hydrocarbyl of up to about 20 carbon atoms, wherein the substituents for the substituted hydrocarbyl are selected from the group consisting of halo, nitro, lower alkoxy, lower alkylthio, and

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4,031,024

PROCESS FOR IMPROVING THE STABILITY AND SHAPING OF ANHYDROUS SODIUM METASILICATE, AND THE COMPOSITIONS CONTAINING SAME, AND THE RESULTING PRODUCTS

Georges Vrisakis, Collonges-Au-Mont-d'Or, France, assignor to Societe Francaise des Silicates Speciaux "Sifrance", Coubevoie, France

Filed June 9, 1975, Ser. No. 584,755

Claims priority, application France, June 10, 1974, 74.19931

Int. Cl.² C11D *3/08, 3/22, 11/00, 17/06*

U.S. Cl. 252—135 **10 Claims**

1. A process for improving the stability and facilitating the form of sodium metasilicate containing by weight less than 10% of water, and the compositions containing same, characterized in that said sodium metasilicate is combined with at least one gluconic compound selected from the group consisting of gluconic acid and water soluble sodium salts thereof in the ratio of 100 grams of sodium metasilicate per 2 to 10 cm^3 of a saturated aqueous solution of the gluconic compound, and 1–10% by weight of a non-ionic surface active agent, to obtain a particulate product having improved resistance to caking and formation of dust.

10. A particulate composition containing by weight from 20% to 60% of sodium metasilicate, from 0.2% to 2% of gluconic compound selected from the group consisting of gluconic acid and sodium salt thereof, and from 1% to 5% of a non-ionic surface active agent, the resulting product having improved resistance to caking and formation of dust.

4,031,025

CHITOSAN DERIVATIVE, SEQUESTERING AGENTS FOR HEAVY METALS

Guy Vanlerberghe, Montjay-la-Tour, and Henri Sebag, Paris, both of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France

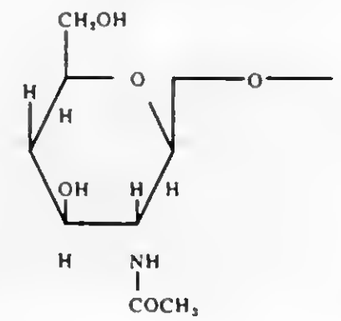
Division of Ser. No. 504,953, Sept. 11, 1974, Pat. No. 3,953,608, which is a division of Ser. No. 251,263, May 8, 1972, Pat. No. 3,879,376. This application Jan. 14, 1976, Ser. No. 648,939

Claims priority, application Luxembourg, May 10, 1971, 63142; Apr. 18, 1972, 65186

Int. Cl.² C02B *5/06*

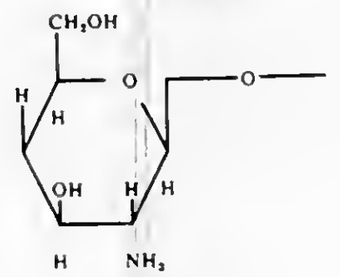
U.S. Cl. 252—180 **4 Claims**

1. A sequestering agent for ions of a heavy metal in an aqueous solution consisting essentially of a chitosan derivative consisting of randomly distributed patterns of the formulae:

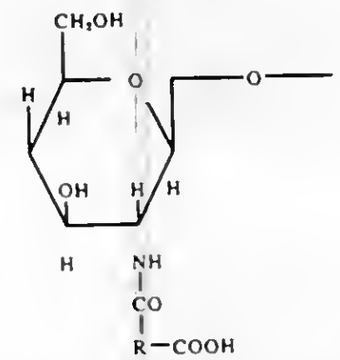


(A)

-continued

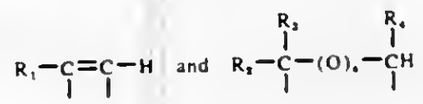


and



(C)

the proportions of these three patterns being, respectively, 5 to 30% for A, 5 to 40% for B and 30 to 90% for C, R representing a member selected from the group consisting of



wherein R_1 represents a member selected from the group consisting of hydrogen and methyl, n is equal to (a) 0, in which case R_2, R_3 and R_4, each independently, represent a member selected from the group consisting of hydrogen, methyl, hydroxy, acetoxy, amino, monoalkylamino or dialkylamino wherein the alkyl moiety of each has 1–12 carbon atoms and wherein each is optionally interrupted by one or more nitrogen atoms or substituted by one or more amino, hydroxyl, mercapto, carboxyl, alkylthio wherein the alkyl moiety has 1 to 8 carbon atoms and sulfonic groups, alkylthio wherein the alkyl moiety has 1–4 carbon atoms and carries an amino residue, and a residue of glutathion, at least one of R_2, R_3 and R_4 being hydrogen and radicals R_2 and R_3 being able to form together a methylene radical, and (b) 1, in which case R_2, R_3 and R_4 each represent hydrogen, and the salts formed by this derivative with a base selected from the group consisting of sodium hydroxide, potassium hydroxide, ammonia, lime, magnesia and alkanolamine and an acid selected from the group consisting of hydrochloric, phosphoric, acetic, lactic, tartaric and citric.

4,031,026

DIPHENYLMETHANE DIISOCYANATE COMPOSITIONS

Arthur Ibbotson, Manchester, England, assignor to Imperial Chemical Industries Limited, London, England

Filed May 10, 1976, Ser. No. 684,963

Claims priority, application United Kingdom, May 19, 1975, 21293/75

Int. Cl.² C07C *119/48*

U.S. Cl. 252—182 **10 Claims**

1. A diphenylmethane diisocyanate composition which comprises diphenylmethane diisocyanate, a diphenylmethane diisocyanate uretonimine group-containing derivative, a reaction product of diphenylmethane diisocyanate and a diol of molecular weight less than 175 and not more than 10% by weight of methylene bridged polyphenyl polyisocyanates of isocyanate functionality higher than two, the composition having an isocyanate functionality of not more than 2.3.

4,031,027

CHEMICAL SURFACE COATING BATH

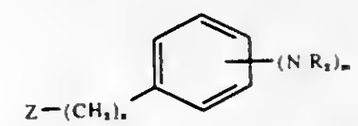
(B) **Saul Kessler, Canoga Park, Calif., assignor to Joseph W. Aldlin, Los Angeles, Calif.**

Division of Ser. No. 607,127, Aug. 25, 1975, Pat. No. 3,996,115. This application Dec. 8, 1975, Ser. No. 638,842

Int. Cl.² C25D *11/08, 11/30*

U.S. Cl. 252—186 **9 Claims**

1. A composition for the chemical finishing of metal surfaces comprising an aqueous vehicle containing an inorganic oxidant capable of forming a passivated metal salt or metal oxide layer on said metal surface and from 0.1 to 50 grams per liter of an additive comprising the reaction product of (a) a halogenated compound of flourine, chlorine, bromine or iodine and an inorganic cation selected from Groups 1*b*, 2, 3*a*, 4*b*, 5*b*, 6*b*, or 8 and (b) an alkarylamine of the formula:



where n is an integer from 0 to 4, m is an integer from 1–2 and R is selected from hydrogen, lower alkyl or 1–9 carbon atoms, lower alkanol of 1–8 carbon atoms, aryl or aralkyl and Z is CX_3 where X is fluoro, chloro, bromo, or iodo.

4,031,028

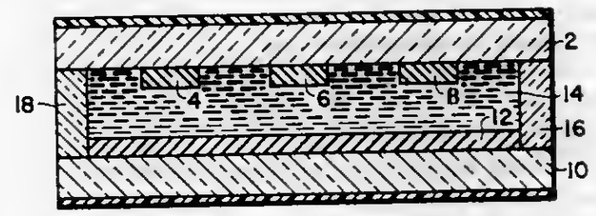
NEMATIC LIQUID CRYSTAL COMPOSITION

Robert Craig Maze, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed June 18, 1976, Ser. No. 697,506

Int. Cl.² G02F *1/13;* **C09K** *3/34*

U.S. Cl. 252—299 **3 Claims**



1. The liquid crystal composition consisting essentially of the compounds N-(p-methoxybenzylidene)-p-butylaniline, N-(p-ethoxybenzylidene)-p-butylaniline, p[(butyloxybenzylidene)-amino] benzonitrile, p-pentyloxyphenyl-p′-pentylbenzoate, and p-pentylphenyl-p′-cyanobenzoate, said compounds to be present in said composition in substantially eutectic proportions.

4,031,029

PROCESS FOR PRODUCING URANIUM OXIDE RICH COMPOSITIONS FROM URANIUM HEXAFLUORIDE USING FLUID INJECTION INTO THE REACTION ZONE

John Cecil Colter, Wilmington, N.C.; Dean B. James, Saratoga, Calif.; Walter Gill Kelth, and Reza Akbari-Kenari, both of San Jose, Calif., assignors to General Electric Company, San Jose, Calif.

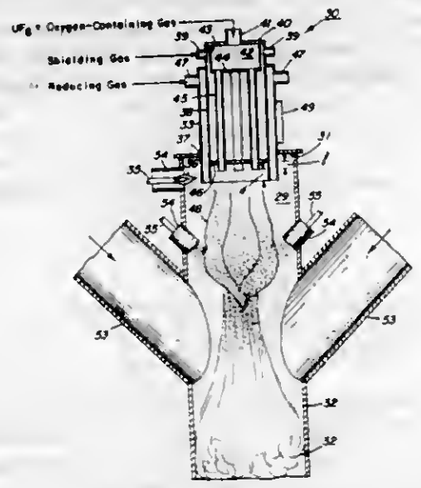
Filed July 2, 1975, Ser. No. 592,508

Int. Cl.² C01G *43/02*

U.S. Cl. 252—301.1 R **20 Claims**

1. In the method of preparing a uranium oxide rich composition from uranium hexafluoride in a reaction zone in the presence of an active flame comprising the steps of introduc-

ing a first gaseous reactant comprising a mixture of uranium hexafluoride and an oxygen-containing carrier gas into the reaction zone, separately introducing a second gaseous reactant comprising a reducing gas into the reaction zone and separately introducing a shielding gas into the reaction zone between the first gaseous reactant and the second gaseous reactant which temporarily prevents substantial mixing and reaction between the first gaseous reactant and the second gaseous reactant until sufficient cross diffusion of the reactants and the shielding gas occurs as the reactants and the shielding gas pass through the reaction zone, resulting in a reaction forming a primary flame and producing a particulate



uranium dioxide rich composition and gaseous reaction products, and introducing a third gaseous reactant comprising an oxygen-containing gas into contact with the particulate uranium dioxide rich composition and gaseous reaction products thereby converting the gaseous reaction products in the reaction zone in a secondary flame to an oxidized form and oxidizing the uranium dioxide rich composition to a higher oxide of uranium, the improvement comprising the step of directly introducing an atomized fluid having a high latent heat of evaporation into the reaction zone at a location in the reaction zone so that the atomized fluid is converted to a gas and cools the materials in the reaction zone.

4,031,030

PROCESS FOR TREATING RAW GAS PRODUCED BY THE PRESSURE GASIFICATION OF COAL

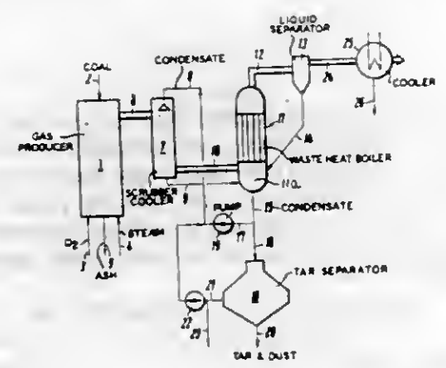
Paul Rodolph, Bad Homburg, Germany, assignor to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Filed Mar. 10, 1976, Ser. No. 665,670

Claims priority, application Germany, Sept. 20, 1975, 2542055

Int. Cl.² C10K *1/06*; C01B *2/02*

U.S. Cl. 252—373 **8 Claims**



1. In a process for treating raw gas produced by the gasification of coal with oxygen and water vapor under a pressure of 5–120 atmospheres and elevated temperatures, said raw gas leaving said gasification at a temperature in the range of 400°–800° C, in a first condensing stage cooling said raw gas to a temperature in the range of 150°–220° C and to 3°–25° C below its dew point, said first condensing stage including a scrubbing and cooling zone for spraying condensate into said raw gas, withdrawing condensate from said first condensing stage and removing tar and dust from said condensate in a separation zone, recylcing condensate substantially free of dust and/or tar from said separation zone to said scrubbing and cooling zone, conducting the raw gas from said first condensing stage directly to a second condensing stage, withdrawing condensate from said second condensing stage and dephenolizing and purifying it separately from the condensate from the first condensing stage, said dephenolized and purified condensate from the second condensing stage containing a lower amount of salts than the condensate recycled to the scrubbing and cooling zone.

4,031,031

METHOD FOR TREATING CATALYST USED FOR CATALYTIC REACTIONS OF HYDROCARBONS AT THE TIME OF CATALYST REMOVAL

Kineo Yamaguchi, Urawa; Katsuhiko Kawakami, and Yukimasa Nakamoto, both of Kurashiki, all of Japan, assignors to Nippon Mining Co., Ltd., Tokyo, Japan

Filed Apr. 30, 1975, Ser. No. 573,231

Claims priority, application Japan, Apr. 30, 1974, 49-47550

Int. Cl.² B01J *21/20*, *23/94*

U.S. Cl. 252—414 **10 Claims**

1. A method of treating a catalyst used in the desulfurization or cracking of a hydrocarbon oil in a reactor, which comprises:

a. washing said catalyst by the addition of mineral oil followed by wetting said catalyst by the addition to the mineral oil in a concentration of at least about 0.1% by weight of the mineral oil of

i. an oleophilic surface active substance, or

ii. an oleophilic surface active substance and a chelating agent;

for a period of time sufficient to reduce dust scattering and to prevent spontaneous combustion of the catalyst upon removal and at a temperature of from about 20° to about 300° C;

followed by

b. removing the liquid present in the reactor; and

c. removing the thus-treated catalyst from the reactor.

10. A method of treating a catalyst used in the desulfurization or cracking of a hydrocarbon oil in a reactor, which comprises:

a. wetting said catalyst with

i. mineral oil and an oleophilic surface active substance in a concentration of at least about 0.1% by weight of the mineral oil, or

ii. mineral oil, and in a concentration of at least about 0.1% by weight of the mineral oil, a combination of an oleophilic surface active substance and a chelating agent;

for a period of time sufficient to reduce dust scattering and to prevent spontaneous combustion of the catalyst upon removal and at a temperature of from about 20° to about 300° C;

followed by

b. removing the liquid present in the reactor; and

c. removing the thus-treated catalyst from the reactor.

4,031,032

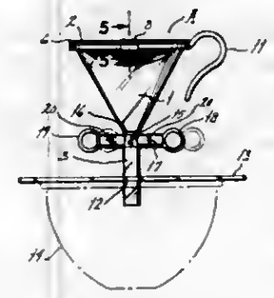
LIQUID PHASE SEPARATOR WITH VALVED OUTLET MEANS

Elizabeth S. Jablecki, 1422 Damon Court, SE., Rochester, Minn. 55901

Filed June 10, 1975, Ser. No. 585,475

Int. Cl.² B01D *23/28*, *35/00*

U.S. Cl. 210—474 **6 Claims**



1. A device for separating immiscible liquids having different specific gravities and different visually determinable characteristics comprising a container of transparent material having an upper end portion and a lower end portion, said container having a relatively large opening in the upper end portion thereof for entry of immiscible liquids to be separated, said container lower end portion being of reduced cross section relative to the container upper portion and constituting an elongated conduit, said container having a relatively small discharge opening at the end of said elongated conduit remote from said container upper portion, valve means disposed within said elongated conduit, said elongated conduit being provided with transversely aligned openings defining bearings, said valve means extending through said aligned openings and being journalled therein for rotative movement about an axis perpendicular to the longitudinal axis, said valve means comprising an elongated cylindrical body having at least one transverse bore therethrough for disposition within said elongated conduit such that through movement along an axis perpendicular to the longitudinal axis of said device, said bore is movable between open and closed condition with respect to the flow of liquid from said container upper portion into and through said elongated conduit.

4,031,033

METHOD FOR PRODUCING POWDERED WETPROOFED MATERIAL USEFUL IN MAKING GAS-DIFFUSION ELECTRODES

Evgueni Bogdanov Budevski; Iliya Dimitrov Iliev; Anastasiya Rostislavova Kaisheva; Sergei Sergeev Gamburtzev, and Elena Borisova Vakanova, all of Sofia, Bulgaria, assignors to ZLEHIT pri BAN, Sofia, Bulgaria

Continuation-in-part of Ser. No. 486,785, July 9, 1974, abandoned, which is a continuation of Ser. No. 235,063, March 15, 1972, abandoned. This application May 30, 1975, Ser. No. 582,475

Claims priority, application Bulgaria, Mar. 29, 1971, 17175

Int. Cl.² H01M *4/08*; H01B *1/06*

U.S. Cl. 252—511 **3 Claims**

1. A method of producing a powdered wetproofed material useful for the production of gas-diffusion electrodes, the method comprising the steps of (1) combining an aqueous suspension of a powder consisting of electrochemically inactive, electrically conductive micropore-free grains consisting of carbon black in an amount between 1 and 5 percent by total weight of said aqueous suspension, with an aqueous dispersion of a high molecular weight polyolefin wetproofing agent consisting of polytetrafluoroethylene, said aqueous dispersion of said polyolefin including a dispersion stabilizer, (2) mixing at ambient temperature until the resulting mixture is homogenized and (3) removing the liquid phase by filtration, drying and disintegrating the obtained solids, removing the stabilizer from the solids by heating, and again disintegrating said solids, thereby obtaining the powdered wetproofed material.

4,031,034

ALTERING PERFUME GREEN NOTES USING TRITHIOACETONE

Richard Arnold Wilson, Westfield; Ira Katz, West Long Branch; Manfred H. Vock, Locust, all of N.J., and Edward J. Shuster, Brooklyn, N.Y., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Continuation-in-part of Ser. No. 528,461, Nov. 29, 1974, abandoned, which is a continuation-in-part of Ser. No. 166,683, July 28, 1971, abandoned. This application Mar. 1, 1976, Ser. No. 662,819

Int. Cl.² C11B *9/00*

U.S. Cl. 252—522 **2 Claims**

1. A process for altering, modifying or enhancing the crushed-leaf notes and leafy green notes of a perfume or a cologne which comprises adding thereto from 0.05% up to 10% by weight of trithioacetone.

4,031,035

POLYURETHANE-AMIDE RESINS BASED UPON ISOCYANATE TERMINATED PREPOLYMERS OF BIS-(2-HYDROXYETHYL)TEREPHTHALATE

Arthur M. Reader, Waynesboro, Va., assignor to Celanese Corporation, New York, N.Y.

Division of Ser. No. 506,082, Sept. 16, 1974, Pat. No. 3,969,394. This application Feb. 27, 1976, Ser. No. 662,276

Int. Cl.² C08G *18/10*, *18/34*

U.S. Cl. 260—2.5 AM **10 Claims**

8. A process for producing a polyurethane cellular material which comprises reacting a polycarboxylic acid compound with a polyisocyanate compound, wherein said polycarboxylic acid corresponds to the formula:

$$R_1(CO_2H)_{n+1}$$

where R_1 is a polyvalent organic radical containing between 2 and 12 carbon atoms; and n is a positive integer having a value of 1 to about 5, and wherein said polyisocyanate compound is a product of the reaction of bis(2-hydroxyethyl) terephthalate with a molar excess of an isocyanato-derivative corresponding to the formula:

$$R(NCX)_{m+1}$$

where R is a polyvalent organic radical containing between 2 and about 22 carbon atoms; X is an oxygen or sulfur atom; and m is a positive integer having a value of 1 to about 5; and wherein the viscosity of the reaction mixture is sufficiently high to entrap the gas evolving from the condensation reaction of the polycarboxylic acid with the polyisocyanate.

4,031,036

USE OF BIS(FLUOROALIPHATICSULFONYL) IMIDES IN CATIONIC POLYMERIZATION

Robert J. Koshar, Mahtomedi, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed June 9, 1975, Ser. No. 585,101

Int. Cl.² C08F *4/00*; C08G *2/06*, *59/68*, *65/10*

U.S. Cl. 260—2 N **22 Claims**

1. The process comprising the steps of mixing monomer selected from the group consisting of epoxy compound or resin, vinyl ether, N-vinyl compound, aziridine, vinyl aromatic and acetal with a bis(fluoroaliphaticsulfonyl)imide or salt thereof as a catalyst for polymerization thereof, and polymerizing said monomer.

4,031,037
THREE-DIMENSIONAL POLYMERIC GEL MATERIALS CONTAINING PHOSPHORIC ACID RESIDUES CAPABLE OF DISSOCIATION AND A METHOD FOR THEIR PREPARATION

Jaroslav Kalal, No. 135 Belohorska, Prague 6; Jiri Coupek, No. 1580 Pankrac, Prague 4; Svatopluk Pokorny, No. 17 Mrstikova, Prague 10; Frantisek Svec, No. 2042 Bendlova, Kladno, and Karel Bouchal, No. 6 N. Belojanise, Prague 5, all of Czechoslovakia

Continuation-in-part of Ser. No. 500,080, Aug. 23, 1974, abandoned. This application Feb. 20, 1975, Ser. No. 551,271

Claims priority, application Czechoslovakia, Aug. 29, 1973, 6008/73

Int. Cl.² C08F *8/40*

U.S. Cl. 260—2.2 R **13 Claims**

1. An organic polymeric composition prepared by directly reacting a macroporous copolymer matrix of (a) an acrylic or methacrylic acid ester monomer containing at least one functional hydroxyl group or an acrylic or methacrylic acid derivative monomer containing at least one epoxide group and (b) a cross-linking monomer containing at least two double bonds, said cross-linking monomer (b) being at least 10% by weight based on the total weight of the monomers, with a member selected from the group consisting of phosphoric acid, phosphorus pentoxide, phosphorus halide, phosphorus oxyhalide and complexes of phosphoric acid with strong Lewis acids, at a temperature of 0° to 110° C. in the presence of an organic solvent selected from the group consisting of dry benzene, toluene and xylene for at least 2 hours to covalently bond phosphoric acid moieties to said hydroxyl or epoxide groups.

4,031,038
WATER INSOLUBLE CHELATE EXCHANGE RESINS HAVING A CROSSLINKED POLYMER MATRIX AND PENDANT THERETO A PLURALITY OF METHYLENEAMINOPYRIDINE GROUPS

Robert R. Grinstead, Walnut Creek, and Wilmonte A. Nasutavicus, Lafayette, both of Calif., assignors to The Dow Chemical Company, Midland, Mich.

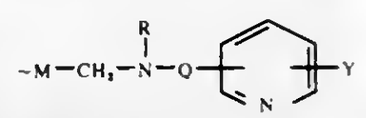
Filed June 16, 1975, Ser. No. 587,185

Int. Cl.² B01D *15/04*; C08F *26/06*

U.S. Cl. 260—2.2 R **20 Claims**

1. A water-insoluble chelate exchange resin having a crosslinked polymer matrix and pendent thereto a plurality of methyleneaminopyridine groups of Formula III:

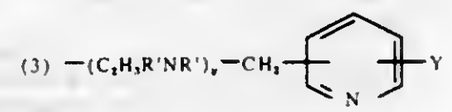
(III)



wherein M is the matrix resin;
Y is H or C_1–C_4 alkyl;
Q is
1. —CH_2—;
2. —$(C_2H_3R'NR')_x$—CH_2— where each R′ is H or CH_3 and x is 1 or 2; or
3. —, —NH—, —C_2H_4—; and

each R is
1. H, C_1–C_4 alkyl, or C_2–C_4 hydroxyalkyl;

and when Q is —CH_2—, R can also be:
2. allyl, benzyl or o-hydroxybenzyl;

(3) 

wherein each R′ is H or CH_3 and y is 0 or 1;
4. —$(CH_2)_m$OY where m is 2 or 3;
5. —$C_2H_3R'NR_1R_2$ where R′ is H or CH_3, R_1 is H, C_1–C_4 alkyl, C_2–C_4 hydroxyalkyl, phenyl or benzyl, and R_2 is H, C_1–C_4 alkyl or C_2–C_4 hydroxyalkyl;
6. —C_2H_4SR''' where R‴ is C_1–C_4 alkyl;
7. —$C_nH_{2n}COOY$ where n is 1 or 2;
8. —$C_nH_{2n}SO_3^-$ where n is 1 or 2; or
9. —CH_2Z where Z is —$CONH_2$ or —$NHCONH_2$.

4,031,039
METHOD FOR TREATING WASTE HIGH-POLYMER MIXTURE

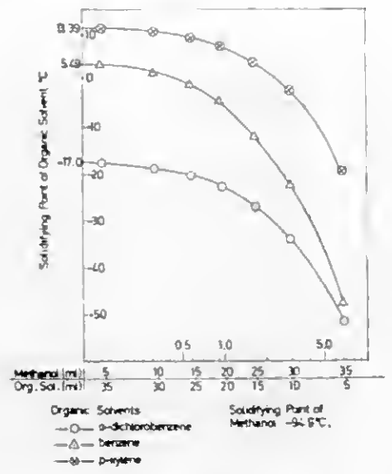
Yoshiaki Mizumoto, and Shigeo Hasegawa, both of Hiroshima, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 23, 1976, Ser. No. 716,585

Claims priority, application Japan, Sept. 2, 1975, 50-105612

Int. Cl.² B29H *19/00*; C08J *11/04*

U.S. Cl. 260—2.3 **7 Claims**



1. A method for treating a waste high-polymer mixture by fractionating the mixture consisting essentially of five groups of high polymers, comprising polyolefinic, polystyrenic, polyvinyl-chloride, thermosetting, and natural high polymers, taking advantage of their dissimilar solubilities in different organic solvents, which comprises bringing the mixture into contact with o-xylene, p-xylene, or m-xylene, the isomers being used either singly or in a combination of two or more, at a temperature between 5° and 50° C to dissolve and fractionate the polystyrenic high polymers, and then at a temperature between 90° and 150° C to dissolve and fractionate the polyolefinic high polymers, and finally dissolving and fractionating the polyvinyl chlorides by heating the remainder in at least one solvent selected from the group consisting of tetrahydrofuran, cyclohexanone, dioxane, and methylethylketone, at a temperature between 5° and 60° C, whereby said waste mixture is fractionated into four groups of high polymers, comprising polyolefinic, polystyrenic, polyviny-chloride, and a mixture of thermosetting and natural high polymers.

4,031,040
POLYURETHANES PREPARED FROM HYDROXYMETHYL ISOCYANURATES

Marinus J.A.M. Den Otter, Munstergeleen; Anne Te Nijenhuis, and Albert A. Van Geenen, both of Brunssum, all of Netherlands, assignors to Stamicarbon B.V., Geleen, Netherlands

Filed June 20, 1975, Ser. No. 588,944

Claims priority, application Netherlands, June 20, 1974, 7408244; June 12, 1975, 7506981

Int. Cl.² C08G *18/14*

U.S. Cl. 260—2.5 AW **19 Claims**

1. Process for preparing polyurethanes containing isocyanurate rings from a polyol containing one or more isocyanurate rings, this process being characterized in that said polyol

selected from the group consisting of tris-hydroxymethyl isocyanurate, bis-hydroxymethyl isocyanurate, mixed hydroxymethylhydroxy (C_2 – C_6 alkyl) isocyanurates, derivatives of bis- or tris-hydroxymethyl isocyanurate or a mixed hydroxymethyl-hydroxy (C_2 – C_6 alkyl) isocyanurate in which one or more hydroxymethyl groups have been replaced by hydroxypolyoxymethylene groups containing 2–4 oxymethylene groups, oligomers obtained by intercondensation of the above-mentioned compounds during the preparation of the above-mentioned compounds, derivatives of said compounds in which the hydroxy groups are partly etherified and/or esterified, and mixtures of these compounds, is made to react with an organic polyisocyanate or a mixture of polyisocyanates, the ratio of isocyanate groups of said polyisocyanate or mixture to hydroxy groups of said polyol being between 1.0 and 1.5, in the presence of one or more compounds accelerating the reaction of isocyanate groups with hydroxyl groups, wherein said polyol contains at least 2% by weight of solvent.

4,031,041
CLOTH COMPRISING ASBESTOS FIBERS AND METHOD OF PRODUCING SAID CLOTH

Pierre Bouy, Enghien; Michel Juillard, Orsay, and Jean-Luc Bourgeois, Paris, all of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed July 31, 1975, Ser. No. 600,218

Claims priority, application France, July 31, 1974, 74.26563

Int. Cl.² B29D *27/00*

U.S. Cl. 260—2.5 M **21 Claims**

1. A method of obtaining a sheet comprising asbestos fibers and a fluorocarbon polymeric resin, which process comprises, in a first stage asbestos fibers and at least one solid particulate mineral filler substance are mixed at substantially high speed of at least about 800 R.P.M. in the dry state, in a second stage at least one fluorocarbon polymeric resin latex is added and mixed with the resulting dry mixture, and finally a sheet is then formed from the resulting mixture.

10. A method of obtaining a micro-porous membrane according to claim 1, wherein at least one of the mineral filler substances introduced during the first stage is a pore-forming agent, and in that the pore-forming agent is removed at a later stage.

19. A novel microporous sheet wherein it is obtained by the method of claim 10.

4,031,042
ORGANOSILICONE POLYMERS AND POLYESTER URETHANE FOAM PRODUCED THEREWITH

Bela Prokai, Mahopac, and Bernard Kanner, West Nyack, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

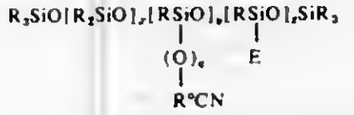
Division of Ser. No. 457,510, April 3, 1974, Pat. No. 3,954,824. This application Aug. 27, 1975, Ser. No. 608,222

The portion of the term of this patent subsequent to June 3, 1992, has been disclaimed.

Int. Cl.² C08G *22/44*

U.S. Cl. 260—2.5 AH **14 Claims**

1. A solution composition comprising components (1), (2), (3) and (4) wherein: component (1) comprises a siloxane-polyoxyalkylene block copolymer having the average composition,



wherein: R is alkyl having from 1 to 10 carbon atoms, R° is bivalent alkylene of from 2 to 12 carbon atoms, E is an organic-capped polyoxyalkylene block, at least 75 weight percent of the polyoxyalkylene content of the copolymers being constituted of oxyethylene, q is zero or one, x is zero or a positive number having an average value up to about 20, y has an average value from about 2 to about 20, and z has an average value from about 2 to about 30, provided the average weight of said copolymers attributable to said polyoxyalkylene blocks is from about 50 to about 85 weight percent; component (2) is a water soluble organic acidic component present in said solution in an amount from about 5 to about 90 parts by weight per 100 parts by weight of said block copolymer; component (3) is a water soluble, silicon-free organic surfactant; and component (4) is a water soluble glycol; the combined total weight of components (3) and (4) present in said solution ranging from about 5 to about 90 parts by weight per 100 parts by weight of said block copolymer.

4,031,043
PROCESS FOR THE MANUFACTURE OF FOAMS FROM EPOXIDE RESINS

André Schmitter, Hegenheim, France, and Wolfgang Selz, Pfeffingen, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed July 21, 1975, Ser. No. 597,607

Claims priority, application Switzerland, July 29, 1974, 10466/74

Int. Cl.² C08J *9/00*

U.S. Cl. 260—2.5 EP **14 Claims**

1. In the process for the manufacture of foams having a density of 0.2 to 0.8 g/cm³, from epoxide resins and amine curing agents, the improvement which comprises adding to the warmed mixture to be cured and foamed, an organic sulphohydrazide as the blowing agent, an organic compound which contains amide groups obtained by reacting a carboxylic acid with an amine, and acetic acid salt of a metal of group II*a* or II*b* of the Periodic Table.

4,031,044
POLYETHER BASED, HIGH RESILIENT POLYURETHANE FOAM

Wallace G. Joslyn, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Continuation-in-part of Ser. No. 461,186, April 15, 1974, abandoned. This application Nov. 11, 1976, Ser. No. 740,992

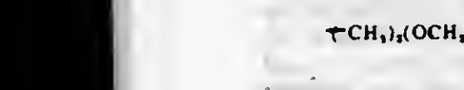
Int. Cl.² C08G *18/14*

U.S. Cl. 260—2.5 AH **7 Claims**

1. A method of preparing a one-shot polyether based, high resilient polyurethane foam which method includes the steps of

1. preparing a homogeneous mixture consisting essentially of
   A. 100 parts by weight of a base polyether polyol selected from a group consisting of
      i. a polyether triol containing at least 40 mole percent primary hydroxyl groups and having a molecular weight in the range of 2,000 to 8,000 grams per mole, and
      ii. a mixture of (i) and an additional polyether polyol having an average of at least two hydroxyl groups, wherein said polyether polyol is present in the mixture (ii) to at least 40 weight percent of the total polyether polyol content of (ii),
   B. a sufficient amount of organic polyisocyanate to give from 90 to 120 percent, on a stoichiometric basis, of isocyanate radicals for each hydroxyl radical in the composition,
   C. a catalytic amount of a catalyst for the production of the high resilient polyurethane foam,
   D. 1 to 10 parts by weight of a blowing agent,
   E. a foam stabilizing amount of a copolymer of the general formula

wherein *h* has an average value of about 3, *d* has an average value of about 1, and G is essentially



II. thereafter allowing the mixture to foam, and
III. curing the foamed composition.

4,031,045

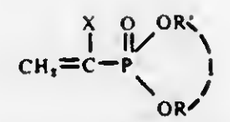
FOAMABLE PVC RESIN FORMULATION, PROCESS FOR FOAMING, AND PRODUCT THEREOF

Jagadish Chandra Goswami, New City, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Filed July 28, 1976, Ser. No. 709,562
Int. Cl.² C08J 9/10
U.S. Cl. 260—2.5 R **8 Claims**

1. A foamable resin formulation which consists essentially of:

a. a copolymer consisting essentially of from about 70% to about 90%, by weight, of vinyl chloride, from about 5 to 15%, by weight, of vinyl acetate and about 5% to 15% by weight of a bis(hydrocarbyl)vinylphosphonate of the formula



wherein X is selected from the group consisting of hydrogen, halogen, cyano, phenyl and C_1–C_{18} alkyl and where R and R′ are C_1–C_{12} alkyl groups;

b. an effective amount of a plasticizer selected from the group consisting of polyester plasticizers made from the reaction of a dibasic acid and dihydric alcohol, epoxy plasticizers made by the epoxidation of vegetable oils or fatty acids and mixtures thereof for plasticization of the copolymer; and

c. an effective amount for expansion of a 4,4′-oxybis (benzene sulfonyl hydrazide) blowing agent.

4,031,046

EXOTHERMIC LINING FOR METALLURGICAL PURPOSES AND METHOD OF MAKING THE SAME

Julianna Tisza, Zurich, Switzerland, assignor to Firma TIDO Chemisch-technische Produkte GmbH, Vienna, Austria

Filed Mar. 31, 1975, Ser. No. 563,586
Claims priority, application Austria, Apr. 2, 1974, 2723/74
The portion of the term of this patent subsequent to Apr. 15, 1992, has been disclaimed.
Int. Cl.² C08L 1/02, 3/02
U.S. Cl. 260—17.2 **21 Claims**

1. A material for making an exothermic lining, comprising, by weight,

40 to 60%	aluminum dross,
1 to 12%	fibrous filler,
3 to 6%	binder,
0.01 to 1%	wetting agent selected from the group consisting of anion-active compounds, non-ionic compounds, and mixtures thereof,
7 to 25%	aluminum powder and/or aluminum chips,
3 to 15%	iron oxide and/or manganese dioxide, and
not exceeding 6%	cryolite.

4,031,047

NON-AQUEOUS STOVING LACQUERS CONTAINING ε-CAPROLACTAM AS REACTIVE DILUENT

Rolf Dhein, Krefeld; Karl Zabrocki, Buettgen; Wolfgang Beer, and Rolf Kuchenmeister, both of Krefeld, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Aug. 12, 1975, Ser. No. 604,013
Claims priority, application Germany, Feb. 7, 1975, 2505246
Int. Cl.² C09D 3/52, 3/66
U.S. Cl. 260—21 **1 Claim**

1. A non-aqueous stoving lacquer containing

a. 35–89% by weight, based on the sum of components (a) to (c), of a polyester with an oil content of from 0 to 50% by weight, based on component (a), an acid number of from 5 to 50, an OH number of from 70 to 450 and an average molecular weight determined by vapor pressure osmosis of from 300 to 6000;

b. 10–40% by weight, based on the sum of components (a) to (c), of an aminoplast resin with an average molecular weight determined by vapor pressure osmosis of from 120 to 1250 and

c. 1 to 25% by weight, based on the sum of components (a) to (c), of ε-caprolactam.

the molar ratio of caprolactam to aminoplast resin being from 0.001:1 to 7:1.

4,031,048

PAINT COMPOSITION FOR MARKING PAVED SURFACES

Reynold E. Holmen, White Bear Lake, and Stanley J. Olander, Woodbury, both of Minn., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Continuation of Ser. No. 239,712, March 30, 1972, abandoned. This application Nov. 13, 1972, Ser. No. 306,688
Int. Cl.² C09D 3/64, 3/70, 5/22
U.S. Cl. 260—22 CQ **10 Claims**

1. A paint composition that rapidly congeals to traffic-bearing condition when sprayed at an elevated temperature onto a paved surface, comprising

1. a paint vehicle that includes a nonvolatile organic film-forming paint binder and that
   a. is a liquid at normal ambient temperatures of 40° F to 110° F, but
   b. forms a durable adherent nontacky paint film when applied as a thin coating and exposed to said normal ambient temperatures;
2. a film-forming thermoplastic substantially neutral polyamide reaction product of diphenolic acid, polycarboxylic acid and polyamine, diphenolic acid comprising at least one weight-percent of the ingredients of the reaction product and the reaction product
   a. comprising at least about 5 weight-percent of the non-volatile organic ingredients of the paint composition,
   b. being a solid at said normal ambient temperatures,
   c. being substantially insoluble in the paint vehicle at said normal ambient temperatures, and
   d. forming an at least substantially dissolved sprayable liquid blend with the paint vehicle at an elevated temperature above 110° F; and
3. pigments in an amount sufficient to color the paint composition.

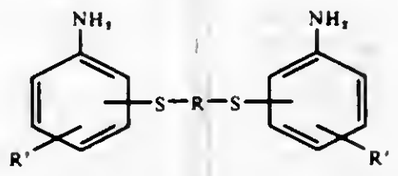
4,031,049

POLYURETHANE CROSS-LINKING AGENTS

Frank N. Hirosawa, Monterey Park, and Ming H. Lee, Glendale, both of Calif., assignors to Furane Plastics, Inc., Los Angeles, Calif.

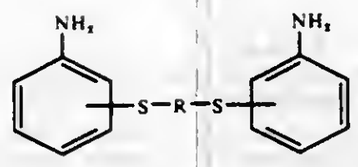
Continuation-in-part of Ser. No. 60,742, Aug. 3, 1970, abandoned. This application Apr. 22, 1974, Ser. No. 462,811
Int. Cl.² C08G 18/32
U.S. Cl. 260—2.5 AM **28 Claims**

1. The process of making a highly resilient cellular polyurethane which comprises reacting a polyalkylene polyol having reactive hydrogen atoms as determined by the Zerewitinoff method, an organic poly-functional isocyanate, water, and a gel catalyst, said reduction being carried out in the presence of a blowing catalyst and a cross-linking agent comprising at least one compound selected from those of the formula:



wherein R is selected from the group consisting of a hydrocarbon and a hydrocarbon bearing a non-reactive substituent, and R′ is selected from the group consisting of hydrogen, a hydrocarbon and a hydrocarbon bearing a non-reactive substituent.

24. A process of making an elastomeric polyurethane plastic which comprises mixing an organic polyisocyanate with a mixture of an organic compound having reactive hydrogen atoms as determined by the Zerewitinoff method having a molecular weight of at least about 500, and 0.005 to 10 parts by weight per 100 parts by weight of polyol of at least one compound of the formula:



wherein R is selected from the group consisting of a hydrocarbon and a hydrocarbon bearing a non-reactive substituent.

4,031,050

CATIONIC ELECTRODEPOSITABLE COMPOSITIONS OF BLOCKED NCO AND ACID SALT OF ADDUCT OF AMINE AND POLYEPOXIDE

Robert D. Jerabek, Glenshaw, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 400,088, Sept. 24, 1973, abandoned, which is a division of Ser. No. 193,590, Oct. 28, 1971, abandoned, which is a continuation-in-part of Ser. No. 47,917, June 19, 1970, Pat. No. 3,799,854. This application Feb. 5, 1975, Ser. No. 547,275
Int. Cl.² C08G 18/80; C08J 3/06; C08L 63/00
U.S. Cl. 260—29.2 TN **6 Claims**

1. A composition comprising:

A. a synthetic hydroxyl-containing adduct which is the reaction product of a primary or secondary amine and a polyepoxide, said adduct being solubilized with acid to provide cationic groups in said adduct,

B. a blocked polyisocyanate stable at ordinary room temperature in the presence of said adduct and reactive with said adduct at elevated temperatures.

4,031,051

HYDROLYZED REACTION PRODUCT OF A POLYEPOXIDE WITH A PHENOLIC COMPOUND HAVING A GROUP HYDROLYZABLE TO A CARBOXYL AND CURING AGENT THEREFOR

Rostyslaw Dowbenko, Gibsonia, and Joseph R. Marchetti, Greensburg, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 497,004, Aug. 13, 1974, Pat. No. 3,960,795. This application Feb. 9, 1976, Ser. No. 656,542
Int. Cl.² C08G 59/16; C08J 3/06; C25D 13/06
U.S. Cl. 260—29.2 TN **8 Claims**

1. An aqueous composition comprising:

A. the solubilized reaction product of

1. a polyepoxide having an epoxy equivalency greater than 1.0, and
2. a compound containing at least one phenolic hydroxyl group and containing at least one group hydrolyzable to a carboxyl group and having the following structural formula:

wherein *n* and *m* are integers of at least 1, wherein R is an organic radical containing at least one aryl group and wherein at least one of the hydroxyl groups is attached to at least one of the aryl groups of R, and wherein W is a group hydrolyzable to a carboxyl group, and

B. a curing agent selected from the class consisting of aminoplast resins, phenolic resins and blocked or semi-blocked polyisocyanates and combinations thereof.

4,031,052

AQUEOUS STOVING LACQUER CONTAINING ε-CAPROLACTAM AS A REACTIVE DILUENT

Rolf Dhein; Jochen Schoeps, and Rolf Kuchenmeister, all of Krefeld, Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Aug. 12, 1975, Ser. No. 604,012
Claims priority, application Germany, Aug. 17, 1974, 2439548
Int. Cl.² C08G 51/24; C09D 3/52
U.S. Cl. 260—29.4 R **3 Claims**

1. Aqueous stoving lacquers based on a mixture of

A. polymers which contain carboxyl groups or salts thereof and hydroxyl groups,

B. aminoplast resins, and

C. a reactive diluent which is miscible with water, characterised in that the reactive diluent used contains ε-caprolactam.

4,031,053

PROTECTIVE COLLOIDS FROM ALCOHOLYSIS PRODUCTS OF POLYALCOHOLS AND POLYACRYLATE ESTERS

Rex L. Bunkley, Kingsville, Tex., and Thomas M. Powanda, Middlesex, N.J., assignors to Celanese Corporation, New York, N.Y.

Filed Feb. 5, 1976, Ser. No. 655,581
Int. Cl.² C08L 31/04
U.S. Cl. 260—29.6 RW **11 Claims**

1. In the process for preparing a stable dispersion of polymers of ethylenically unsaturated monomers which comprises reacting said monomers in water in the presence of a protective colloid and an anionic or nonionic surfactant or mixture thereof with a free radical polymerization catalyst under polymerization conditions, the improvement of which comprises using as the protective colloid a polymer of the transesterification product of 1 to about 3 moles of a 2-4 hydroxy group containing alcohol, and about 1 mole of a tri- or tetra-acrylate or methacrylate ester of a tri- or tetra- polyol.

4,031,054

FLAME-RETARDANT BINDER COMPRISING VINYLIDENE HALIDE-BIS(HYDROCARBYL)VINYL PHOSPHONATE POLYMER LATICES BLENDED WITH ANTIMONY OXIDE AND CHLOROPARAFFIN

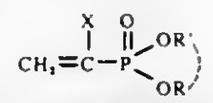
Jung Il Jin, Irvington, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 398,624, Sept. 19, 1973, Pat. No. 3,904,570. This application June 4, 1975, Ser. No. 583,812

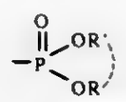
Int. Cl.² C08L *27/00*

U.S. Cl. 260—29.6 T **10 Claims**

1. A flame retardant polymer latex composition comprising: (1) from about 30% to about 95%, by weight, of a polymer which consists essentially of: from about 20% to about 85%, by weight of at least one halogen-containing α,β-ethylenically unsaturated monomer; from about 10% to about 75%, by weight of at least one bis(hydrocarbyl) vinylphosphonate of the formula:



in which X is selected from the group consisting of hydrogen, halogen, cyano, phenyl, alkyl of from 1 to 18 carbon atoms and the grouping



and each R and R′ are hydrocarbyl of from 1 to 18 carbon atoms; from about 5% to about 35%, by weight of at least one third comonomer selected from the group consisting of alpha olefins, vinyl esters of carboxylic acids, C_1–C_{20} alkyl esters of acrylic and methacrylic acid, ethylenically unsaturated dicarboxylic acids, anhydrides of ethylenically unsaturated dicarboxylic acids, C_1–C_{20} mono- and dialkyl esters of ethylenically unsaturated dicarboxylic acids, amides of ethylenically unsaturated carboxylic acids and the diacetone derivatives of said amides; vinyl aryl compounds; C_1–C_{20} alkyl vinyl ethers; C_4–C_{20} dienes, and glycidyl esters of acrylic and methacrylic acid; and from about 1% to about 5%, by weight of N-methylol crylamide; (2) from about 5% to about 25% by weight of antimony oxide; and (3) up to about 45%, by weight of chloroparaffin.

4,031,055

METAL COMPOUND STABILIZED COATING COMPOSITIONS

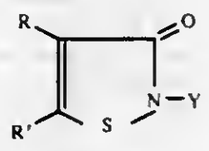
John A. Dupont, Glenside; Walter Kooch, Feasterville, and Joseph D. Scott, Philadelphia, all of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 139,877, May 3, 1971, abandoned. This application May 28, 1975, Ser. No. 581,592

Int. Cl.² C09D *3/74, 3/80, 5/14*

U.S. Cl. 260—29.6 MM **14 Claims**

1. A coating composition which comprises an aqueous dispersion of a vinyl or acrylic emulsion polymer having a pH greater than 9.0, a mildew-controlling amount of an isothiazolone of the formula



wherein Y is a hydrogen atom, a (C_1–C_{10}) alkyl group, a (C_6–C_{10}) aryl group, or a (C_7–C_{10}) aralkyl group;

R is a hydrogen atom, a halogen atom, or a (C_1–C_4) alkyl group,

R′ is a hydrogen atom, a halogen atom, or a (C_1–C_4) alkyl group, or

R and R′ can be taken together to complete a benzene ring, optionally substituted with one or more halogen atoms, nitro groups, (C_1–C_4) alkyl groups, cyano groups, or (C_1–C_4) alkoxy groups, and a stabilizing amount of a metallic compound of zinc, molybdenum, copper (cuprous, cupric), lead or mercury.

4,031,056

PROCESS FOR THE REMOVAL OF VINYL CHLORIDE FROM LATEXES CONTAINING POLYVINYL CHLORIDE

Piyush J. Patel, Somerville, and William Miringoff, Willingboro, both of N.J., assignors to Tenneco Chemicals, Inc., Saddle Brook, N.J.

Continuation-in-part of Ser. No. 553,869, Feb. 27, 1975, abandoned. This application Feb. 2, 1976, Ser. No. 654,251

Int. Cl.² C08L *27/06*

U.S. Cl. 260—29.6 PT **13 Claims**

1. The process for the removal of vinyl chloride from an aqueous latex that contains from about 1000 parts to 50,000 parts by weight of vinyl chloride per million parts by weight of latex and from 5% to 50% by weight of a polymer selected from the group consisting of polyvinyl chloride and copolymers of vinyl chloride with at least one monomer copolymerizable therewith, said polymer being present in the latex as particles ranging in size from 0.01 micron to 2 microns, that comprises the steps of

a. maintaining the latex at a temperature in the range of 20° C. to 70° C.,

b. passing a stream of the latex through a rapidly-rotating perforated disc to form a fine spray of minute droplets of the latex,

c. passing said spray into an evacuated chamber that is maintained at a pressure below about 400 torr, and

d. recovering from said evacuated chamber an aqueous latex of reduced vinyl chloride content.

4,031,057

LIQUID AMINOPLAST POLYFUNCTIONAL RESIN COMPOSITIONS

Frank J. Hahn, Wilbraham, and James O. Santer, East Longmeadow, both of Mass., assignors to Monsanto Company, St. Louis, Mo.

Filed Apr. 28, 1975, Ser. No. 572,037

Int. Cl.² C08K *5/16*

U.S. Cl. 260—32.6 R **7 Claims**

1. A composition of matter wherein at least 80 volume percent of the organic moiety comprises a thermosettable solution of a N,N′-bis(alkoxymethyl)uron and a polyfunctional resin wherein the solution viscosity at 25° C. is less than 1000 centipoises, wherein the alkyl radicals of the alkoxy groups of the uron are selected from the group consisting of C_1 to C_8 alkyl radicals and wherein the polyfunctional resin contains sufficient alcoholic hydroxyl and carboxyl groups to provide a functionality greater than 2 and has a number average molecular weight in the range of 300 to 5000.

4,031,058

HOT MELT SEALANTS

Richard Joseph Cella, Jr., Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 570,721, April 23, 1975, abandoned. This application Dec. 19, 1975, Ser. No. 642,234

Int. Cl.² C08K *5/02, 5/10;* **C08F** *18/14*

U.S. Cl. 260—33.8 UA **7 Claims**

1. A hot melt adhesive comprising

a. 100 parts by weight of a random ethylene/methyl acrylate/maleic acid monoethyl ester polymer in which polymerized methyl acrylate units are present in the amount of about 50–60 wt. %, in which polymerized maleic acid monoethyl ester units are present in the amount of about 3–5 wt. %, and in which polymerized ethylene units are present in the amount of about 35 to 47 wt. %, the maleic acid monoethyl ester units are from 5 to 50% neutralized with ions selected from the class consisting of sodium ions and potassium ions;

b. about 50 to 150 parts by weight of an inorganic filler;

c. about 50 to 250 parts by weight of a tackifying resin, and

d. about 10 to 50 wt. %, based on the weight of the tackifying resin, of a plasticizer.

4,031,059

LOW DENSITY ABLATOR COMPOSITIONS

Eric L. Strauss, Englewood, Colo., assignor to Martin Marietta Corporation, Denver, Colo.

Continuation of Ser. No. 435,234, Jan. 21, 1974, abandoned, which is a continuation-in-part of Ser. No. 243,954, April 15, 1972, abandoned, which is a continuation-in-part of Ser. No. 763,893, Sept. 30, 1968, abandoned. This application Jan. 28, 1976, Ser. No. 652,906

Int. Cl.² C08L *83/04*

U.S. Cl. 260—37 SB **46 Claims**

1. A low density ablator composition having a density of not greater than 0.25 g/cc for providing ablation protection comprising:

100 parts by volume of a siloxane elastomer resin selected from the group consisting of methyl-phenyl-vinyl polysiloxane, dimethyl polysiloxane and methyl-phenyl polysiloxane the viscosity of which is equal to or less than 10,000 centipoise; about 1600 to about 1800 parts by volume of a low density filler comprising about 600 to about 900 parts by volume ground cork sized from 0.0165 to 0.0331 inch per 100 parts of resin; from about 500 to 800 parts by volume of hollow silica or glass microspheres sized from 0.0030 to 0.0080 inch per 100 parts of resin; up to about 260 parts by volume of hollow phenolic resin microballoons sized from 0.0030 to 0.0080 inch per 100 parts of resin; up to about 6 parts by volume carbon fibers per 100 parts of resin; and, up to about 6 parts by volume of silica fibers per 100 parts of resin.

23. A low density ablator composition having a density not greater than 0.30 g/cc for providing ablation protection comprising:

100 parts by volume of a siloxane elastomer resin selected from the group consisting of methyl-phenyl-vinyl polysiloxane, dimethyl polysiloxane and methyl-phenyl polysiloxane the viscosity of which is equal to or less than 10,000 centipoise; about 1180 parts by volume of filler comprising about 1175 parts by volume silica or glass microspheres sized from 0.0030 to 0.0080 inch per 100 parts resin; and, from 6 parts silica fibers.

4,031,060

PROCESS OF PIGMENTING POLYAMIDES

Raymond Leo Hackert, Salisbury, Md., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sept. 17, 1976, Ser. No. 724,097

Int. Cl.² C08L *77/00*

U.S. Cl. 260—37 N **8 Claims**

1. In a polymerization process to form a pigmented polyamide from a nylon salt wherein an aqueous dispersion of a finely divided mineral pigment is added to the polymerforming reactants prior to completion of the polymerization, the improvement comprising preparing the dispersion by milling a concentrated slurry of the pigment in water in the presence of a dispersing agent to separate agglomerated pigment particles and mixing the milled slurry with a concentrated aqueous solution of a nylon salt to flocculate the pigment particles and with additional milling forming a flocculated dispersion containing from about 25 to 45% of the pigment.

4,031,061

RIGID POLYVINYL CHLORIDE COMPOSITIONS WITH HIGH HEAT-DEFLECTION TEMPERATURES

James L. Thomas, Hamilton Square, N.J., assignor to FMC Corporation, Philadelphia, Pa.

Filed Nov. 12, 1975, Ser. No. 631,112

Int. Cl.² C08K *3/26*

U.S. Cl. 260—42.29 **1 Claim**

1. A polyvinyl chloride molding composition consisting essentially of an intimate mixture of 10 to 50%, based on polyvinyl chloride weight, of a plasticizer consisting of from 85 to 100% by weight diallyl phthalate and 0 to 15% by weight of a polymerizable unsaturated glycol-polybasic acid polyester containing sufficient unsaturated acid so that it will thermoset when appropriately catalyzed with a vinyl polymerization catalyst, a polymerization catalyst for the diallyl phthalate and a stabilizer for the polyvinyl chloride, 40 to 100% by weight of finely divided ground limestone based on the combined weight of polyvinyl chloride and plasticizer, the remainder being a polyvinyl chloride of which at least 50% by weight is suspension grade, and such composition when molded and cured having heat-deflection temperatures in excess of 100° C.

4,031,062

POLYOLEFIN COMPOSITION AND PROCESS FOR PREPARING THE SAME

Kenzo Shirayama; Shinichiro Kita, and Masanori Fujimoto, all of Niihama, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Continuation-in-part of Ser. No. 287,167, Sept. 7, 1972, abandoned. This application Sept. 26, 1974, Ser. No. 509,591

Claims priority, application Japan, Sept. 14, 1971, 46-71375; Feb. 2, 1972, 47-12073

Int. Cl.² C08K *3/20*

U.S. Cl. 260—42.45 **7 Claims**

1. A process for preparing a polyolefin composition having high adhesive strength which comprises reacting together for 30 seconds to 10 minutes (1) a crystalline polyolefin, (20 at least one unsaturated acid component selected from the group consisting of unsaturated aliphatic carboxylic acids and anhydrides thereof and (3) magnesium oxide in an amount of from 5 to 20% by weight based on the weight of the polyolefin, at a temperature above the melting point of said polyolefin.

4,031,063

POLYESTER RESIN COMPOSITIONS

Anthony B. Conciatori, Chatham, and Robert W. Stackman, Morristown, both of N.J., assignors to Celanese Corporation, New York, N.Y.

Filed Mar. 17, 1975, Ser. No. 558,748

Int. Cl.² C08G *63/18, 63/26, 63/60, 63/68*

U.S. Cl. 260—860 **3 Claims**

1. A chemically stable polyester block copolymer containing a recurring prepolymer condensate of equimolar proportions of 1,12-dodecanediol and $\alpha,\alpha,\alpha',\alpha'$-tetramethylpimelic acid, and containing a recurring prepolymer condensate of equimolar proportions of resorcinol and 2,3-dichloro-2,3-dimethylsuccinic acid.

4,031,064

AMINOPLAST CURING AGENTS

Karl Schnee, Maintal; Dieter Tichy, Frankfurt am Main, and Steffen Piesch, Oberursel, all of Germany, assignors to Cassella Farbwerke Mainkur Aktiengesellschaft, Germany

Filed Apr. 18, 1975, Ser. No. 569,408

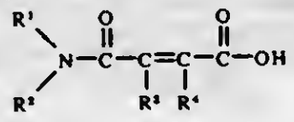
Claims priority, application Germany, Apr. 20, 1974, 2419124

Int. Cl.² C08G *12/26*

U.S. Cl. 260—67.6 R **12 Claims**

1. In the curing of uncured aminoplast condensation products with an acidic curing agent that under elevated tempera-

ture helps convert the condensation product to a cured resin, the improvement according to which the curing agent is

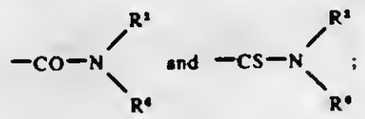


or a salt thereof

wherein

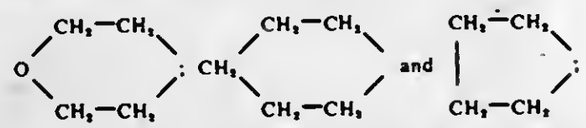
R^3 and R^4 are independently hydrogen or methyl;

R^1 is selected from the group consisting of hydrogen; alkyl with 1 to 20 carbon atoms which may also be substituted by hydroxy, phenoxy or alkoxy with 1 to 4 carbon atoms; phenyl or naphthyl which may be substituted by fluorine, chlorine, bromine or hydroxy;



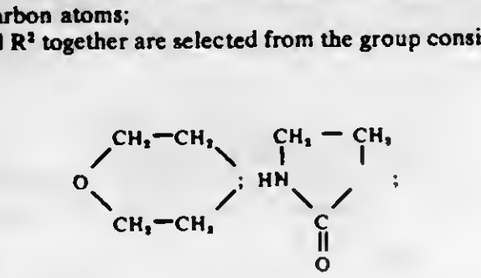
R^5 and R^6 being independently selected from the group consisting of hydrogen; alkyl with 1 to 4 carbon atoms; hydroxyalkyl with 1 to 4 carbon atoms and phenyl; or

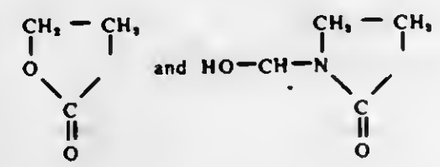
R^2 and R^6 are selected from the group consisting of



R^2 and is selected from the group consisting of hydrogen; alkyl with 1 to 4 carbon atoms and hydroxyalkyl with 1 to 4 carbon atoms;

R^1 and R^2 together are selected from the group consisting of





4,031,065

MANUFACTURE OF THERMOPLASTIC POLYESTER MOLDING COMPOSITIONS OF HIGH VISCOSITY

Claus Cordes, Weisenheim, and Hans-Josef Sterzel, Dannstadt-Schauernheim, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Feb. 23, 1976, Ser. No. 660,137

Claims priority, application Germany, Mar. 6, 1975, 2509790; Nov. 22, 1975, 2552424

Int. Cl.² C08G *63/52*

U.S. Cl. 260—75 R **10 Claims**

1. A process for the manufacture of thermoplastic polyesters having a melt viscosity of more than 6,000 poise, as measured at 250° C, and having a relative viscosity of more than 1.6, as measured in a 2:1 mixture of phenol and o-dichlorobenzene at 25° C, by polycondensation, in the melt, of aliphatic and/or cycloaliphatic diols with dicarboxylic acids and/or esters thereof, wherein the polycondensation is effected for at least some of the time at a temperature above 220° C and preferably above 230° C, and in the presence of from 0.1 to 10% molar of an aliphatic diol containing at least one olefinic double bond and/or of an aliphatic dicarboxylic acid containing at least one olefinic double bond or an ester thereof, the olefinic double bond not being directly adjacent to the carboxyl or ester groups.

10. Thermoplastic polyesters having a melt viscosity of more than 6,000 poise, as measured at 250° C, and a relative viscosity of more than 1.6, as measured on a 2:1 mixture of phenol and o-dichlorobenzene at 25° C, consisting of aliphatic and/or cycloaliphatic diols on the one hand and dicarboxylic acids or esters thereof on the other hand and from 0.1 to 10% molar of an aliphatic diol containing at least one olefinic double bond and/or of an aliphatic dicarboxylic acid containing at least one olefinic double bond or an ester thereof, the olefinic double bond not being directly adjacent to the carboxyl or ester groups.

4,031,066

FLEXIBLE POLYBUTADIENE RESIN COMPOSITION HAVING EXCELLENT ELECTRICAL PROPERTIES

Atsushi Mori, Ichihara, and Hiroo Muramoto, Chiba, both of Japan, assignors to Nippon Soda Company Limited, Tokyo, Japan

Filed Mar. 4, 1975, Ser. No. 555,143

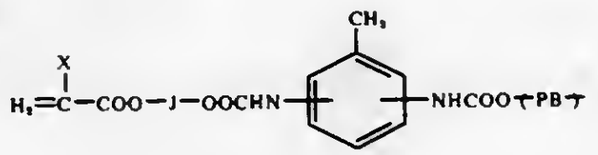
Claims priority, application Japan, Mar. 7, 1974, 49-25716

Int. Cl.² C08G *18/62*

U.S. Cl. 260—77.5 CR **2 Claims**

1. A flexible polybutadiene resin composition having 100 parts of (a), 5 to 120 parts of (b), and 50 to 500 parts of (c), where

a. is a thermosetting resin selected from the group consisting of the 2-hydroxy-alkyl-acrylate compound and the 2-hydroxy-alkyl-methacrylate compound having the following formula:



(wherein X = H or CH_3;

and J = $-CH_2-CH_2-$ or $-CH(CH_3)-CH_2-$)''

b. is a solid plasticizer petroleum resin composition selected from the polymer group consisting of petroleum resins produced from the mixture of olefinic compounds having 6 to 9 carbon atoms, hydrogenized petroleum resin having 6 to 9 carbon atoms, coumarone resin, indene resin and terepene resin; and,

c. is a vinyl monomer.

4,031,067

POLYTRIAZINES AND A PROCESS FOR THEIR PRODUCTION

Rudolf Sundermann, New Martinsville, W. Va.; Günther Rottloff, Cologne, and Ernst Grigat, Odenthal-Gloebusch, both of Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed July 22, 1976, Ser. No. 707,552

Claims priority, application Germany, July 24, 1975, 2533126

Int. Cl.² C08G *18/00, 18/71*

U.S. Cl. 260—77.5 R **2 Claims**

1. A mixture which can be converted into a high molecular weight polymer of polytriazine structure which is substantially insoluble in solvents comprising

I. 30 to 70 mol percent of an N-cyanosulphonamide corresponding to the formula

$$A(SO_2-NH-CN)_n$$

wherein A is an aliphatic, cycloaliphatic or aromatic polyvalent radical and n is a number from 2 to 5,

II. 70 to 30 mol percent of an aromatic cyanic acid ester corresponding to the formula

$$Ar(OCN)_m$$

wherein Ar is an aromatic radical or an aromatic radical interrupted by bridge members, and m is a number from 2 to 5.

4,031,068

NON-MIGRATORY SULFONYL AZIDE ANTIOXIDANTS

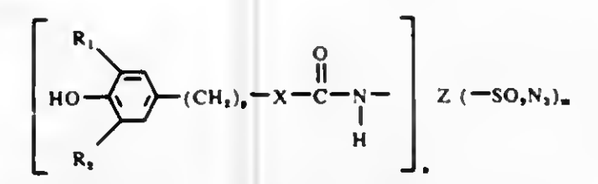
Stephen E. Cantor, Cheshire, Conn., assignor to Uniroyal Inc., New York, N.Y.

Filed July 26, 1976, Ser. No. 708,676

Int. Cl.² C08K *5/43*; C07C *117/00*

U.S. Cl. 260—79.3 R **54 Claims**

1. A sulfonyl azide antioxidant of the formula



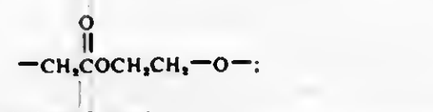
wherein:

R_1 is alkyl of from 1 to 12 carbon atoms, cyclohexyl, C_1–C_{10} alkyl-cyclohexyl, benzyl, or C_8–C_{11} alkylbenzyl;

R_2 is hydrogen or has one of the values assigned to R_1, with the proviso that R_1 and R_2 together have at least 2 carbon atoms;

g has a value of from 0 to 5;

X is a divalent bridge member selecteo from $-CH_2O-$, $-CH_2NH-$, or



m and n are each 1 or 2; and

Z is, depending on the values of m and n, a divalent, trivalent or tetravalent group selected from:

a. an alkylene group of from 2 to 5 carbon atoms when each of m and n is 1,

b. a divalent or trivalent benzene group when n is 1 and m is 1 or when m is 1 and n is 2, and

c. a divalent, trivalent or tetravalent group selected from naphthylene, diphenyl ether, and benzene groups when each of m and n is 1 or 2.

20. A method of protecting from oxidative deterioration a polymer, normally subject to oxidative deterioration, said polymer having a carbon-hydrogen bond, comprising mixing with the said polymer, in an amount effective to protect said polymer against oxidative deterioration, an antioxidant as in claim 1.

4,031,069

TETRAPEPTIDES

Ernest D. Nicolaides; Francis John Tinney, and James Clark French, all of Ann Arbor, Mich., assignors to Parke, Davis & Company, Detroit, Mich.

Filed Mar. 1, 1976, Ser. No. 662,381

Int. Cl.² C07C *103/52*

U.S. Cl. 260—112.5 LH **9 Claims**

1. A tetrapeptide represented by the formula

$$A\text{-}R_1\text{-Ser(benzyl)-Tyr(benzyl)-}R_2\text{-}R_3$$

wherein A is t-butoxycarbonyl, cyclohexylcarbonyl, benzyloxycarbonyl or p-nitrobenzyloxycarbonyl, R_1 is L-Trp, L-Thr(benzyl), L-Met or Gly; Tyr(benzyl) is L-Tyr(benzyl) or D-Tyr(benzyl), Ser(benzyl) is L-Ser(benzyl) or D-Ser(benzyl), R_2 is D-Ala, β-Ala, D-Leu or D-Val and R_3 is lower alkoxy, hydrazino, amino, lower alkylamino or di(lower alkyl)amino.

4,031,070

TETRAPEPTIDES

Francis John Tinney, Ann Arbor, Mich., assignor to Parke, Davis & Company, Detroit, Mich.

Filed Mar. 1, 1976, Ser. No. 662,405

Int. Cl.² C07C *103/52*

U.S. Cl. 260—112.5 LH **4 Claims**

1. A tetrapeptide represented by the formula

$$A\text{-}R_1\text{-}R_2\text{-Ser(benzyl)-Tyr(benzyl)-}R_3$$

wherein A is t-butoxycarbonyl, cyclohexylcarbonyl, benzyloxycarbonyl or p-nitrobenzyloxycarbonyl; R_1 is L-Trp or L-His(benzyl), R_2 is L-Trp or L-His(benzyl), Ser(benzyl) is L-Ser(benzyl) or D-Ser(benzyl), Tyr(benzyl) is L-Tyr(benzyl) or D-Tyr(benzyl), and R_3 is lower alkoxy, hydrazino, amino, lower alkylamino or di(lower alkyl)amino.

4,031,071

TETRAPEPTIDES

Eugene Leroy Wittle, and Ernest D. Nicolaides, both of Ann Arbor, Mich., assignors to Parke, Davis & Company, Detroit, Mich.

Filed Mar. 1, 1976, Ser. No. 662,406

Int. Cl.² C07C *103/52*

U.S. Cl. 260—112.5 LH **4 Claims**

1. A tetrapeptide represented by the formula

$$A\text{-Ser(benzyl)-Tyr(benzyl)-D-Ala-Leu-}R_1$$

wherein A is t-butoxycarbonyl, cyclohexylcarbonyl, benzyloxycarbonyl or p-nitrobenzyloxycarbonyl; Ser(benzyl) is L-Ser(benzyl) or D-Ser(benzyl), Tyr(benzyl) is L-Tyr(benzyl) or D-Tyr(benzyl), Leu is L-Leu or D-Leu, and R_1 is lower alkoxy, hydrazino, amino, lower alkylamino or di(lower alkyl)amino.

4,031,072

TETRAPEPTIDES

Alfred Campbell, Ann Arbor, Mich., assignor to Parke, Davis & Company, Detroit, Mich.

Filed Mar. 1, 1976, Ser. No. 662,407

Int. Cl.² C07C *103/52*

U.S. Cl. 260—112.5 LH **8 Claims**

1. A tetrapeptide represented by the formula

$$A\text{-Pro-Pro-Tyr(benzyl)-Ser(benzyl)-}R_1$$

wherein A is t-butoxycarbonyl, cyclohexylcarbonyl, benzyloxycarbonyl or p-nitro-benzyloxycarbonyl; Pro is L-Pro or D-Pro, Tyr(benzyl) is L-Tyr(benzyl) or D-Tyr(benzyl), Ser(benzyl) is L-Ser-(benzyl) or D-Ser(benzyl), and R_1 is lower alkoxy, hydrazino, amino, lower alkylamino or di(lower alkyl)amino.

4,031,073

MONOAZO PIGMENTS CONTAINING BARBITURIC ACID OR THIO- OR IMINO-DERIVATIVES THEREOF

Rudolf Mory, Dornach, and Stefao Hari, Allschwil, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

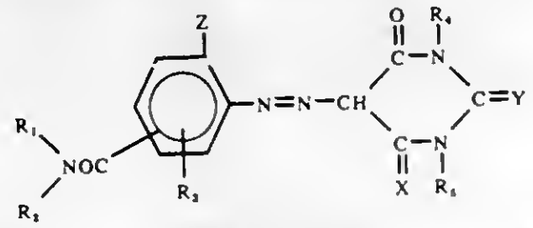
Continuation-in-part of Ser. No. 489,277, July 17, 1974, abandoned. This application Nov. 25, 1975, Ser. No. 635,210

Claims priority, application Switzerland, July 27, 1973, 10997/73

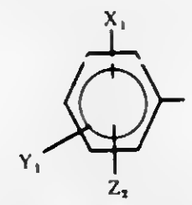
Int. Cl.² C09B *29/36*; **C09D** *11/00*; **D06P** *1/08, 3/00*

U.S. Cl. 260—154 **9 Claims**

1. A monoazo pigment of the formula



wherein R_1 denotes H, alkyl containing 1–4 atoms or an aryl radical of the formula



wherein X_1 denotes H, chloro, alkyl containing 1–4 C atoms, alkoxy containing 1–4 atoms, alkoxy carbonyl containing 2–5 C atoms, nitro, trifluoromethyl or cyano, Y_1 and Z_2 denote H, chloro or alkyl, R_2 denotes H, or alkyl containing 1–4 atoms, R_3 denotes H, chloro or alkyl containing 1–4 atoms, R_4 and R_5 denote H, alkyl contaning 1–4 C atoms, phenyl or phenyl substituted by chloro, alkyl containing 1–4 atoms or alkoxy containing 1–4 C atoms, X denotes O or imino, Y denotes O, S or imino, and Z denotes chloro, alkyl containing 1–4 C atoms, alkoxy containing 1–4 C atoms, or phenoxy, and wherein the carbonamide group is located in the m- or p-position to the azo group.

4,031,074

PROCESS FOR THE PREPARATION OF 11β-HYDROXY-18-ALKYL-ESTRANE COMPOUNDS

Hendrik Paul deJongh, Oss, and Cornelis Wilhelmus van Bokhoven, Berlicum, both of Netherlands, assignors to Akzona Incorporated, Asheville, N.C.

Filed July 18, 1975, Ser. No. 597,271

Claims priority, application Netherlands, Sept. 2, 1974, 7411607

Int. Cl.² C07J *71/00, 5/00*

U.S. Cl. 260—239.55 C **34 Claims**

1. Process for the preparation of an 11β-hydroxy-18-alkyl steroid of the estrane series, the alkyl having 1 to 4 carbon atoms, which steroid may be substituted in the 3- and/or 17-position by an oxo group or a functional derivative thereof, in the 1, 2, 3, 4, 5, 6, 7, 15 and/or 16-position by hydroxy, acyloxy derived from an organic carboxylic acid having 1–18 carbon atoms, alkoxy having 1–2 carbon atoms, tetrahydropyranyloxy or trimethylsilyloxy in the 1, 6, 7, 9, 11α and/or 16-position with alkyl having 1–2 carbon atoms and in the 17α-position with saturated or unsaturated alkyl having 1–4 carbon atoms next to hydroxy, acyloxy derived from an organic carboxylic acid having 1–18 carbon atoms, alkoxy having 1–2 carbon atoms, tetrahydropyranyloxy or trimethylsilyloxy in 17β-position, and which may have a double bond in the 4,5-, 5,6-, or 5,10-position, which comprises reacting the corresponding 11β-hydroxy-13-methyl-gonane compound with an excess of an acyl hypoiodite and reacting the thus-obtained estrano-18, 11β-lactone with a compound RX, in which R = alkyl and X = MgBr or Li and thereafter reducing the thus-obtained 11β-hydroxy-18-alkyl-18-ketone to the 11β-hydroxy-18-alkyl-steroid of the estrane series.

4,031,075

ALKYLATED PREGNANES AND PROCESS FOR OBTAINING SAME

Gilbert Frederick Woods, Glasgow; Robert Thomas Logan, Lanark; George McGarry, Airdrie, and Robert Gibson Roy, Larkhall, all of Scotland, assignors to Akzona Incorporated, Asheville, N.C.

Continuation of Ser. No. 487,336, July 10, 1974, abandoned. This application Mar. 4, 1976, Ser. No. 663,893

Claims priority, application United Kingdom, July 11, 1973, 33149/73

Int. Cl.² C07J *71/00*

U.S. Cl. 260—239.55 D **6 Claims**

1. 11β-Hydroxy-16α, 17α-isopropylidenedioxy-21-methyl-$\Delta^{1,4}$-pregnadiene-3,20-dione.

4,031,076

METHAMPICILLIN LYSINATE AND ITS METHOD OF MANUFACTURING

Young Sul Kim, 302-62, Yichon-dong, Yong San-Ku, Seoul, South Korea

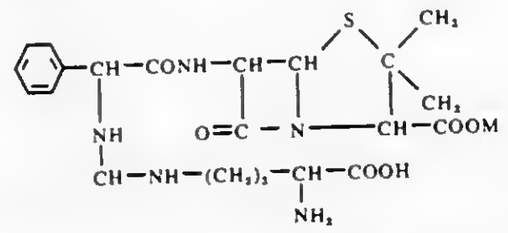
Filed July 29, 1976, Ser. No. 709,644

Claims priority, application South Korea, July 31, 1975, 1686

Int. Cl.² C07D *499/68*

U.S. Cl. 260—239.1 **1 Claim**

1. Methampicillin Lysinate having superior water solubility and the formula:



wherein M is selected from the group consisting of hydrogen, sodium, potassium, calcium and aluminum.

4,031,077

ANTIBACTERIAL 3-PHOSPHONO PENAMS

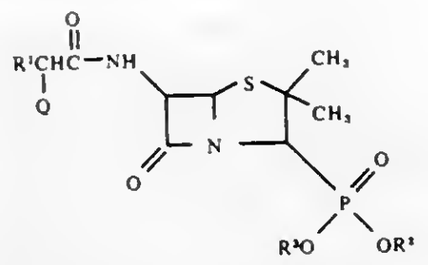
Wayne E. Barth, East Lyme, Conn., assignor to Pfizer Inc., New York, N.Y.

Continuation-in-part of Ser. No. 619,634, Oct. 6, 1975, abandoned. This application Apr. 26, 1976, Ser. No. 680,423

Int. Cl.² C07D *499/32*

U.S. Cl. 260—239.1 **12 Claims**

1. A compound of the formula (I)



(I)

and the pharmaceutically acceptable salts thereof, wherein

R^2 and R^3 are the same or different and are selected from the group consisting of hydrogen and methyl;

R^1 is selected from the group consisting of phenyl, phenoxy, 1,4-cyclohexadienyl, thienyl and phenyl monosubstituted by a member of selected from the group consisting of hydroxy, and aminomethyl, and Q is selected from the group consisting of hydrogen, amino, carboxy and sulfo; provided that:

when R^1 is selected from the group consisting of phenoxy and phenyl monosubstituted by aminomethyl, Q is hydrogen;

when Q is carboxy, R^1 is selected from the group consisting of phenyl and thienyl;

and when Q is sulfo, R^1 is phenyl.

4,031,078

BENZODIAZEPINE DERIVATIVES

Andre Szente, Basel, Switzerland, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

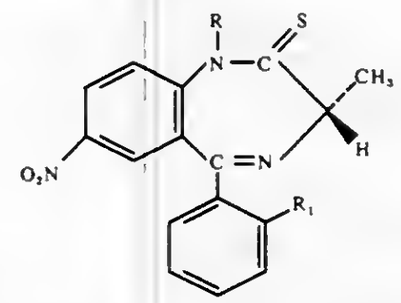
Filed Oct. 14, 1975, Ser. No. 622,291

Claims priority, applicatioo Switzerland, Oct. 21, 1974, 14049/74

Int. Cl.² C07D *243/22*

U.S. Cl. 260—239.3 D **4 Claims**

1. A compound of the formula



wherein R represents a hydrogen atom or a lower alkyl group and R_1 represents a hydrogen or halogen atom or a trifluoromethyl group,

which has the absolute configuration S at the carbon atom in the 3-position.

4,031,079

INTERMEDIATES FOR 2-AMINOBENZODIAZEPINE-5-ONES

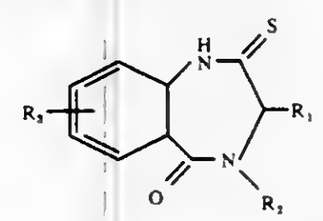
Richard J. Mohrbacher, Maple Glen, and Philip P. Grous, Philadelphia, both of Pa., assignors to McNeil Laboratories, Incorporated, Fort Washington, Pa.

Division of Ser. No. 615,667, Sept. 22, 1975. This application June 23, 1976, Ser. No. 699,097

Int. Cl.² C07D *243/20, 243/22*

U.S. Cl. 260—239.3 D **2 Claims**

1. A compound having the formula:



wherein:

R_1 is a member selected from the group consisting of hydrogen and aryl, said aryl being a member selected from the group consisting of phenyl, trifluoromethylphenyl and phenyl substituted with from 1 to 3 members selected from the group consisting of halo, loweralkyl, hydroxy, and loweralkoxy;

R_2 is loweralkyl; and

R_3 is a member selected from the group consisting of hydrogen, halo, nitro, loweralkoxy and loweralkyl.

4,031,080

16-ALPHA-METHYL-17 ALPHA-BROMO-1,4-PREGNADIENE-21-OL-3,20-DIONE-DERIVATIVES

Gaetano Palladino, Milan, Italy, assignor to Lark S.p.A., Milan, Italy

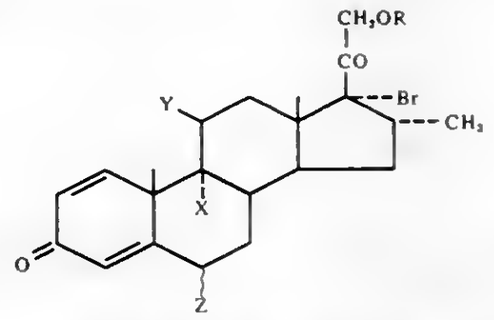
Filed Jan. 29, 1976, Ser. No. 653,612

Claims priority, application United Kingdom, Feb. 1, 1975, 4473/75

Int. Cl. C07j *17/00*

U.S. Cl. 260—239.55 R **11 Claims**

1. A 16alpha-methyl-17alpha-bromo-1,4-pregnadiene-21-ol-3,20 -dione-derivative of the structure :



wherein R is a member selected from the group consisting of hydrogen and an acyl radical, X is a member selected from the group consisting of hydrogen, bromine and fluorine atoms, Y is a member selected from the group consisting of hydrogen hydroxyl and oxygen, Z is a member selected from the group consisting of hydrogen, and alpha- or beta-oriented fluorine atoms.

4,031,081

BICYCLIC INTERMEDIATES FOR PREPARING 16-FLUORINATED PROSTAGLANDIN ANALOGS

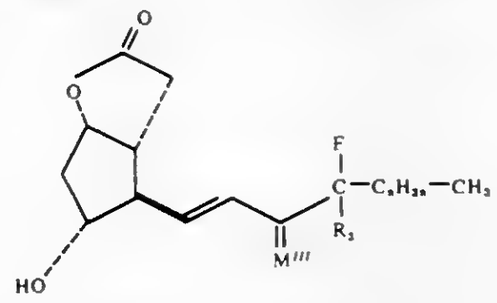
Barney J. Magerlein, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 381,155, July 20, 1973, abandoned, which is a continuation-in-part of Ser. No. 248,013, April 27, 1972, abandoned. This application Feb. 21, 1975, Ser. No. 551,826

Int. Cl.² G07D *307/93*

U.S. Cl. 260—240 R **15 Claims**

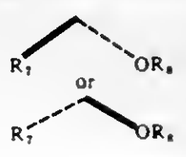
10. An optically active compound of the formula



or a racemic compound of that formula and the mirror image thereof,

wherein C_nH_{2n} is alkylene of one to 9 carbon atoms, inclusive, with one to 6 carbon atoms, inclusive, in the chain between $-CFR_2-$ and the terminal methyl;

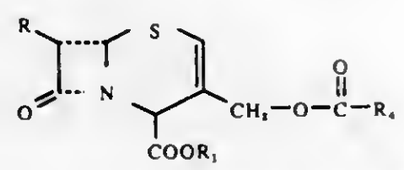
wherein M^{III} is



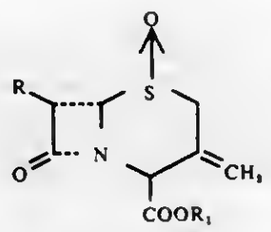
wherein R_7 and R_8 are hydrogen or alkyl of one to 4 carbon atoms, inclusive, being the same or different; and wherein R_2 is hydrogen, methyl, ethyl, or fluoro.

4,031,082
PROCESS FOR PREPARING 3-ACYCLOXYMETHYL-2-CEPHEM COMPOUNDS
Ta-Sen Chou, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.
Filed Jan. 19, 1976, Ser. No. 650,585
Int. Cl.² C07D 501/04
U.S. Cl. 260—243 C **13 Claims**

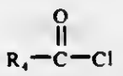
1. A process for preparing a compound of the formula



which comprises reacting a 3-exomethylenecepham sulfoxide of the formula

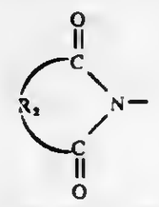


with a mixture of an acyl chloride of the formula



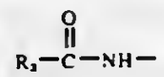
and the corresponding acid anhydride of said acyl chloride at a temperture of from about 70° C. to about 130° C., in which, in the above formulae, R_4 is C_1–C_4 alkyl, R_1 is a carboxylic acid protecting group, and R is

1. an imido group of the formula



in which R_2 is C_2–C_4 alkenylene or 1,2-phenylene;

2. an amido group of the formula



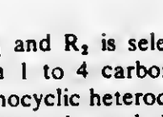
in which R_2 is

a. hydrogen, C_1–C_2 alkyl, halomethyl, benzyloxy, 4-nitrobenzyloxy, 2,2,2-trichloroethoxy, 4-methoxybenzyloxy, 3-(2-chlorophenyl)-5-methyl-isoxazol-4-yl;

b. the group R′ in which R′ is phenyl or phenyl substituted with 1 or 2 halogens, nitro, cyano, trifluoromethyl, C_1–C_4 alkyl, or C_1–C_4 alkoxy;

c. a group of the formula $R'—(O)_m—CH_2—$ in which R′ is as defined above and *m* is 0 or 1;

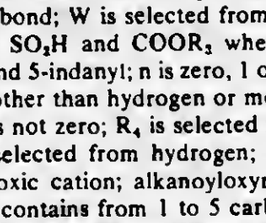
d. a group of the formula



in which R″ is R′ as defined above, 2-thienyl, or 3-thienyl, and R_1 is as defined above; or

e. a group of the formula $R'''—CH_2—$ in which R‴ is 2-thienyl, 3-thienyl, 2-furyl, 3-furyl, 2-thiazolyl, 5-tetrazolyl, 1-tetrazolyl, or 4-isoxazolyl; or R is

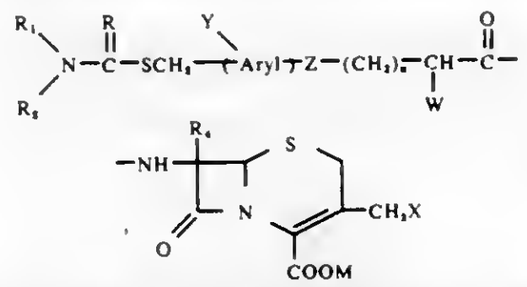
3. an imidazolidinyl group of the formula



in which R′ is as defined above and U is nitroso or acetyl.

4,031,083
CEPHALOSPORIN ANTIBIOTICS
Fortuna Haviv, Montreal, Canada; Abraham Patchornik, Ness-Ziona, and Janina Altman, Haifa, both of Israel, assignors to Yeda Research and Development Co., Ltd., Rehovot, Israel
Filed Oct. 24, 1975, Ser. No. 625,541
Int. Cl.² C07D 501/22, 501/32, 501/30
U.S. Cl. 260—243 C **32 Claims**

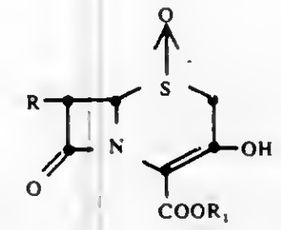
1. A compound selected from a base of the formula:



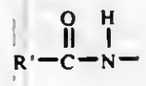
wherein each of R_1 and R_2 is selected from hydrogen and lower alkyl of from 1 to 4 carbon atoms or NR_1R_2 taken together form a monocyclic heterocyclic group selected from pyrrolidino, piperidino and morpholino; R is oxygen or sulfur; Aryl is selected from phenyl and 2-thienyl; Y is selected from hydrogen, chlorine, bromine, a straight or branched lower alkyl group of from 1 to 4 carbon atoms and a lower alkoxy group of from 1 to 4 carbon atoms with the proviso that when Aryl is 2-thienyl, Y is hydrogen; Z is selected from a bond, oxygen, sulfur and imino with the proviso that when Aryl is 2-thienyl, Z is a bond; W is selected from hydrogen, methyl, amino, hydroxy, SO_3H and $COOR_3$ wherein R_3 is selected from hydrogen and 5-indanyl; n is zero, 1 or 2 with the proviso that when W is other than hydrogen or methyl and Z is other than a bond, n is not zero; R_4 is selected from hydrogen and methoxy; M is selected from hydrogen; a pharmaceutically acceptable nontoxic cation; alkanoyloxymethyl wherein the alkanoyl moiety contains from 1 to 5 carbon atoms and may be straight or branched; alkanoylaminomethyl wherein the alkanoyl moiety contains from 1 to 5 carbon atoms and may be straight or branched and wherein the amino nitrogen atom may be substituted with an alkyl group of from 1 to 4 carbon atoms; alkoxycarbonylaminomethyl wherein the alkoxy moiety contains from 1 to 4 carbon atoms and may be straight or branched and wherein the amino nitrogen atom may be substituted with an alkyl group of from 1 to 4 carbon atoms; p-(alkanoyloxy)benzyl wherein the alkanoyl moiety contains from 1 to 5 carbon atoms and may be straight or branched; and aminoalkanoyloxymethyl wherein the alkanoyl moiety contains from 2 to 15 carbon atoms and the amino nitrogen may be mono- or di-substituted with a lower alkyl group of from 1 to 4 carbon atoms; X is hydrogen or acetoxy; and pharmaceutically acceptable salts thereof.

4,031,084
PROCESS FOR CEPHALOSPORIN ANTIBIOTIC INTERMEDIATES
Stjepan Kukolja, and Douglas O. Spry, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.
Filed Oct. 23, 1975, Ser. No. 625,281
Int. Cl.² C07D 501/04
U.S. Cl. 260—243 C **10 Claims**

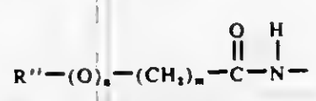
1. The process for preparing a 3-hydroxy-3-cephem sulfoxide ester of the formula



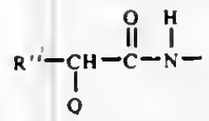
wherein R is H_3N^+—, phthalimido, succinimido, an acylamido group of the formula



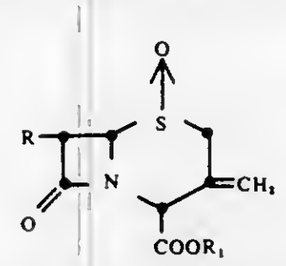
where R′ is hydrogen, C_1 - C_6 alkyl, cyanomethyl, halomethyl; or an acylamino group of the formula



wherein R″ is phenyl or phenyl substituted by halogen, C_1–C_4 lower alkyl, C_1–C_4 lower alkoxy, nitro or carboxy, and *m* and *n* are independently 0 or 1; or R is substituted arylacylamido group of the formula



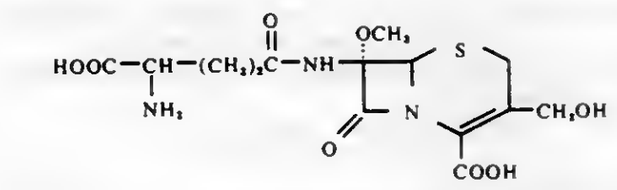
wherein R″ has the same meanings as defined above and Q is protected hydroxy, protected amino, carboxy, $—SO_2NH_2$ or the group $—SO_3H$; and R_1 is a carboxylic acid protecting group; which comprises (a) reacting in an inert solvent a 3-exomethylenecepham sulfoxide ester of the formula



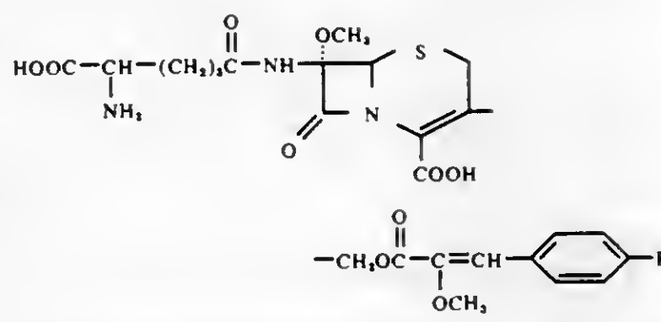
wherein R and R_1 have the same meanings as defined above, with at least two moles of ozone per mole of said 3-exomethylenecepham sulfoxide ester at a temperature between −90° and 20° C., and (b) decomposing the intermediate oxidation products.

4,031,085
PREPARATION OF 3-HYDROXYMETHYL-7β-AMINOADIPOYL-7α-METHOXY-3-CEPHEM-4-CARBOXYLIC ACID
Seemon H. Pines, Murray Hill, and Matthew A. Kozlowski, South River, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.
Continuation of Ser. No. 517,123, Oct. 23, 1974, abandoned. This application Feb. 17, 1976, Ser. No. 658,325
Int. Cl.² C07D 501/02
U.S. Cl. 260—243 C **2 Claims**

1. The process of preparing the compound



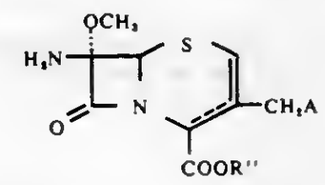
which comprises reacting the compound of the formula



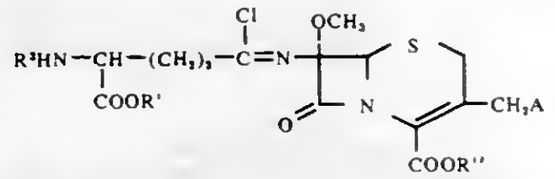
wherein R is hydroxy or sulfo-oxy in an aqueous system at between about pH 3.5–6.5 at 60°–70° C., and recovering the product thereby produced.

4,031,086
PROCESS FOR CLEAVAGE OF 7-AMINO-ADIPOYLAMINO SIDE CHAIN IN CEPHALOSPORINS
Sandor Karady, Mountainside, N.J., and Joseph S. Amato, Brooklyn, N.Y., assignors to Merck & Co., Inc., Rahway, N.J.
Filed Mar. 5, 1976, Ser. No. 664,341
Int. Cl.² C07D 501/04
U.S. Cl. 260—243 C **4 Claims**

1. The process of preparing the compound of the formula:



wherein the dotted line represents that the unsaturation can be in the 2- or the 3-position, A is hydrogen or acetoxy, and R″ is methyl, benzyl or benzhydryl; which comprises reacting the compound



wherein R^3 is phthaloyl or mesyl, and R' and A are as defined; in approximately equimolar amount with

LI[MeCuBuO]

at a temperature between about −100° C. to about 0° C.; followed by quenching in pH 7–8 buffer solution and recovering the desired product.

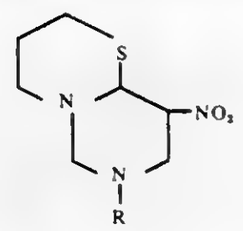
4,031,087

3,4,7,8-TETRAHYDRO-9-NITRO-7-SUBSTITUTED-2H,6H-PYRIMIDO-(4,3-B)(1,3)THIAZINES

James E. Powell, Modesto, Calif., assignor to Shell Oil Company, Houston, Tex.

Filed June 27, 1975, Ser. No. 590,983
Int. Cl.² C07D *279/08*
U.S. Cl. 260—243 R **1 Claim**

1. A compound of the formula

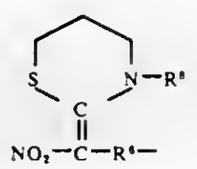


wherein R is

A. A moiety containing one to thirty carbon atoms, which is one of

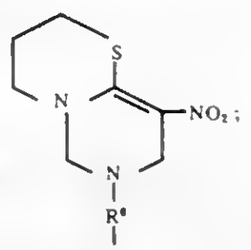
1. alkyl;
2. alkyl substituted by one or more of
   a. halogen;
   b. cyano;
   c. cycloalkyl or alkylcycloalkyl in which the ring contains three to twelve carbon atoms;
   d. furanyl, tetrahydrofuranyl, dioxolanyl, thienyl, thiopyranyl, pyridinyl, pyrrolidinyl and morpholino;
   e. phenyl, optionally substituted on the ring by one of bromine, chlorine or iodine, nitro, cyano lower alkyl, lower alkoxy, lower alkylthio, amino (—$N(R^3)(R^3)$) or phenoxy, R^3 being hydrogen, alkyl, hydroxyalkyl, or phenyl or phenalkyl optionally substituted as indicated above;
   f. hydroxyl, carboxy or alkoxycarbony;
   g. R^3 —O—, R^3—S—, R^3—S(O)—, R^3 —$S(O)_2$—, R^3—C(O)—or R^3—O—C(O)—;
   h. —$N(R^3)(R^4)$ or —R^5—$N(R^3)(R^4)$ wherein R^5 is alkylene in which one or more carbon atoms has been replaced by nitrogen (—NR^7—) or oxygen (—O—) bonded to carbon, and R^4 is one of the moieties represented by R^3 or is —R^6 —$N(R^7)(R^7)$, wherein R^6 is alkylene or one of the moieties repesented by R^5, and R^7 is one of the moieties represented by R^3 or R^4 or R^7 is:

(a)

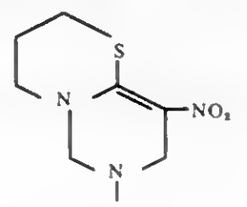


wherein R^8 is hydrogen, alkyl, alkenyl, alkythioalkyl, alkoxyalkyl, cycloalkylalkyl, cyanoalkyl, haloalkyl, haloalkenyl, or phenalkyl, as these moieties are described above or is:

(b)



(3)



4. alkenyl, alkynyl or cycloalkyl, or any of these substituted as indicated for alkyl in (2), above;
5. phenyl, optionally substituted as indicated above;

or is

B. —$N(R^9)(R^9)$ wherein R^9 is hydrogen alkyl or alkanoyl of one to ten carbon atoms; benzoyl or phenyl and salts of such compound.

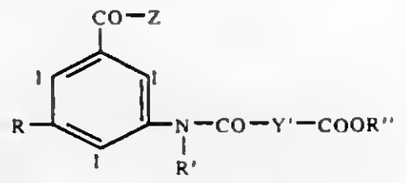
4,031,088

IODINATED ANILIC ACIDS

James H. Ackerman, Bethlehem, N.Y., assignor to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 323,710, Jan. 15, 1973, abandoned, which is a division of Ser. No. 109,631, Jan. 25, 1971, Pat. No. 3,770,820, which is a division of Ser. No. 25,262, April 2, 1970, Pat. No. 3,666,760, which is a continuation-in-part of Ser. No. 808,653, March 19, 1969, Pat. No. 3,609,147, which is a continuation-in-part of Ser. No. 715,558, March 25, 1968, abandoned, which is a continuation-in-part of Ser. No. 550,614, May 17, 1966, abandoned, said Ser. No. 808,653, is a continuation-in-part of Ser. No. 715,583, March 25, 1968, abandoned. This application June 10, 1974, Ser. No. 478,052
Int. Cl.² C07D *295/00*
U.S. Cl. 260—247.2 A **5 Claims**

1. A compound of the formula



wherein Y' is a single bond, vinylene, or an alkylene bridge having from one to eight carbon atoms or such a group interrupted by from one to three members selected from O, S, SO and SO_2, said members, when more than one, being separated by at least two carbon atoms; Z is morpholino, pyrrolidino or piperidino; R is H_2N, HOOC—Y'—CO—NH, HOOC—Y'—CO—N(lower alkyl), T—CO—NH, T—CO—$NHCH_2$, or (T—CO)N(lower alkyl, where T is hydrogen, cycloalkyl of 3–6 ring members, or alkyl of 1–8 carbon atoms optionally interrupted by from 1 to 4 oxygen atoms, each oxygen, when more than one, being separated by at least two carbon atoms; R' is hydrogen, lower-alkyl, hydroxy-lower-alkyl, lower-alkoxylower-alkyl, or lower-alkoxy-lower-alkoxy-lower-alkyl; and R'' is hydrogen or lower-alkyl.

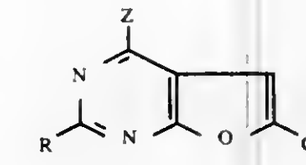
4,031,089

FURO (2,3d) PYRIMIDINES

Claude P. Fauran, Paris; Guy R. Bourgery, Colombes; Guy M. Raynaud, and Nicole A. M. Dorme, both of Paris, all of France, assignors to Delalande S.A., Courbevoie, France

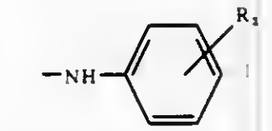
Division of Ser. No. 506,826, Sept. 17, 1974, Pat. No. 4,007,187. This application Aug. 18, 1976, Ser. No. 715,377
Claims priority, application France, Oct. 2, 1973, 73.35190; May 20, 1974, 74.17484
Int. Cl.² C07D *491/04*
U.S. Cl. 260—247.5 DP **3 Claims**

1. A compound having the formula

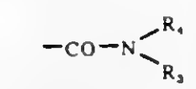


in which R is alkyl having one to 4 carbon atoms, phenyl, or phenyl substituted with at least one halogen or by a trifluoromethyl, and

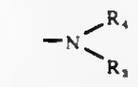
Z is



in which R_2 is



wherein



is morpholino, pyrrolidino, piperidino or hexamethyleneimino.

4,031,090

STABILIZED ISOCYANURATE

David Goldstein, East Brunswick; William Henry Kibbel, Jr., Pennington, and Roger C. Hollenbach, Kendall Park, all of N.J., assignors to FMC Corporation, Philadelphia, Pa.

Filed Jan. 23, 1976, Ser. No. 651,942
Int. Cl.² C07D *251/36, 251/32*
U.S. Cl. 260—248 C **2 Claims**

1. In the process of preparing a stabilized composition of matter containing as its essential components 10–70% of an alkali metal dichloroisocyanurate, 25–75% of cyanuric acid or the alkali metal salts thereof, and 5–50% of an inorganic salt, the pH of which is at least 9 and preferably 9–13 in aqueous media, the improvement of increasing the dissolution rate of said composition comprising (a) combining the ingredients in powder form to produce a homogeneous mixture; (b) compacting the homogeneous mixture under pressure and (c) crushing and screening the compacted materials of step (b) to provide a −10+70 mesh granular material.

4,031,091

PROCESS FOR PURIFYING CRUDE CYANURIC ACID

Sidney Berkowitz, Highland Park, and John D'Angelo, Old Bridge, both of N.J., assignors to FMC Corporation, Philadelphia, Pa.

Division of Ser. No. 447,824, March 24, 1974. This application Dec. 29, 1975, Ser. No. 644,573
Int. Cl.² C07D *251/32*
U.S. Cl. 260—248 A **1 Claim**

1. A novel free-flowing cyanuric acid composition having at least 90% cyanuric acid crystals with particle sizes between 400 and 650 microns and containing about 0.01 to about 0.08% phosphate values produced by mixing sufficient amounts of crude cyanuric acid with an aqueous phosphoric acid solution containing about 10 to about 30% phosphoric acid to form a 10 to 45% crude cyanuric acid slurry;

heating the slurry to a temperature of about 180° to about 220° C under at least the autogenously developed pressure to digest the crude cyanuric acid;

cooling the digested cyanuric acid to precipitate the cyanuric acid crystals; and

recovering the novel cyanuric acid composition.

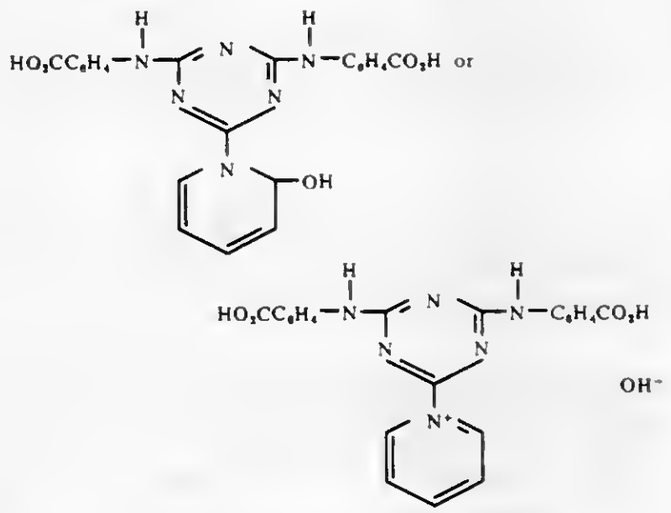
4,031,092

1,3-BIS-(CARBOXY-PHENYLAMINO)-s-TRIAZINES

Elwood L. Strebel, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed June 16, 1975, Ser. No. 587,240
Int. Cl.² C07D *251/70*
U.S. Cl. 260—249.6 **2 Claims**

1. As a composition of matter substantially chlorine free 1,3-bis(carboxyphenylamino)triazine 5-pyridinium complex forming lyotropic nematic phase in concentrated solution in aqueous ammonium hydroxide and having nuclear magnetic resonance spectra consistent with the structures:



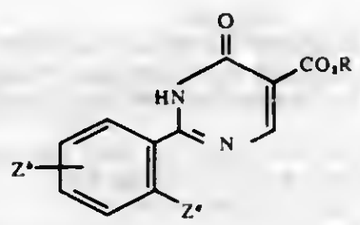
4,031,093

1,6-DIHYDRO-6-OXO-2-(ORTHO-SUBSTITUTED PHENYL)PYRIMIDINE-5-CARBOXYLIC ACID DERIVATIVES

Peter Frederick Juby, Jamesville, and Richard Anthony Partyka, Liverpool, both of N.Y., assignors to Bristol-Myers Company, New York, N.Y.

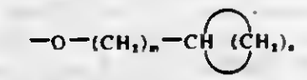
Continuation-in-part of Ser. No. 611,765, Sept. 9, 1975, abandoned. This application Apr. 23, 1976, Ser. No. 679,630
Int. Cl.² C07D *239/22*
U.S. Cl. 260—251 R **62 Claims**

1. A compound of the formula



Ia

wherein Z^a is —O—C_1—C_6 alkyl, —O—C_2—C_6 alkenyl or



in which *m* is 0 or an integer from 1 to 6 and *n* is an integer from 2 to 7, Z^b has the meaning stated above for Z^a and in addition may be hydrogen, halogen, amino, C_1-C_6 alkylamino, di(C_1-C_6)alkylamino, or carb(C_1–C_6)alkoxy, and R is selected from the group consisting of hydrogen, C_1–C_{10} alkyl, pivaloyloxymethyl, acetoxymethyl and methoxymethyl, or a pharmaceutically acceptable salt thereof, provided that when Z^a is methoxy, Z^b is not hydrogen.

4,031,094
N-META-TRIFLUOROMETHYLPIPERAZINES

Don Pierre Rene Lucien Gludicelli, Fontenay-sous-Bois, and Henry Najer, Paris, both of France, assignors to Synthelabo, Paris Cedex, France

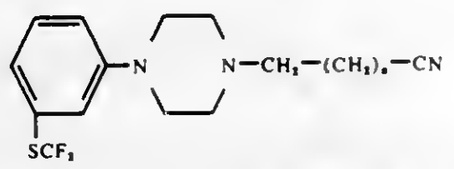
Division of Ser. No. 402,783, Oct. 2, 1973, Pat. No. 3,954,763, which is a continuation-in-part of Ser. No. 349,869, April 10, 1973, abandoned. This application Jan. 22, 1976, Ser. No. 651,274

Claims priority, application France, Apr. 10, 1972 72.12442

Int. Cl.² C07D 295/14

U.S. Cl. 260—268 PH **2 Claims**

1. A compound of the formula:



wherein *n* is an integer from 1 to 6 and the pharmaceutically acceptable salts thereof.

4,031,095
HINDERED PIPERIDINE CARBOXYLIC ACIDS, METALS SALTS THEREOF AND STABILIZED COMPOSITIONS

Chester E. Ramey, Spring Valley, and John J. Luzzi, Carmel, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

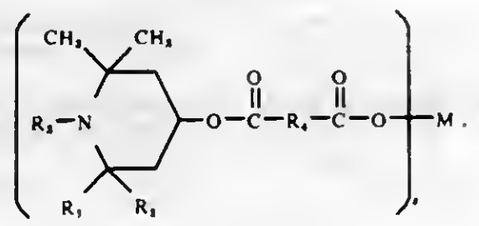
Filed June 30, 1975, Ser. No. 592,006

The portion of the term of this patent subsequent to Nov. 18, 1992, has been disclaimed.

Int. Cl.² C07D 211/46

U.S. Cl. 260—270 C **14 Claims**

1. A compound of the formula



wherein

R_1 and R_2 independently of each other are straight- or branched-chain alkyl having from 1 to 6 carbon atoms, or together with the carbon to which they are bound form a cyclopentyl or cyclohexyl ring, which is substituted or substituted with a methyl group,

R_3 is hydrogen, alkyl having 1 to 12 carbon atoms, β-methoxyethyl, alkenyl having 3 to 4 carbon atoms, propargyl, benzyl, or alkyl substituted benzyl,

R_4 is straight-chain alkenylene of 2 to 4 carbon atoms, 1,2-cycloalkylene or cycloalkenylene having 4 to 6 carbon atoms, 2,3-bicycloalkylene or bicycloalkenylene having 7 to 8 carbon atoms or 1,2-, 1,3- or 1,4-phenylene, or a straight-chain alkylene of 1 to 4 carbon atoms substituted by alkyl of 1 to 18 carbon atoms or alkenyl of 2 to 18 carbon atoms, provided that the straight-chain alkylene substituted by alkyl has more than 8 carbon atoms,

M is a metal selected from the group consisting of nickel, manganese, copper, zinc, cobalt, tin and dialkyl tin, and

z has a value of from 1 to 4, the value of z being the same as the available valence of M.

4,031,096
FLUORESCENT AZABENZANTHRONIC DYES

Giampiero Pieri, Saronno (Varese); Filippo Maria Carlini, Novara; Camillo Paffoni, Pogno (Novara), and Gioacchino Boffa, Novara, all of Italy, assignors to Montedison S.p.A., Milan, Italy

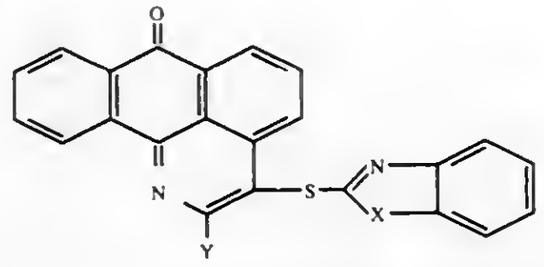
Filed Apr. 21, 1976, Ser. No. 679,030

Claims priority, application Italy, Apr. 24, 1975, 22723/75

Int. Cl.² C09B 5/14

U.S. Cl. 260—272 **3 Claims**

1. A fluorescent azabenzanthronic dye having the general formula (I):



(I)

wherein X = —NH— or —S—; and Y = —OCH_3 or —OC_2H_5.

4,031,097
DESCARBOXYLYSERGIC ACID

Nicholas J. Bach; David A. Hall, and Edmund C. Kornfeld, all of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 504,395, Sept. 9, 1974, Pat. No. 3,954,772, which is a continuation-in-part of Ser. No. 389,281, Aug. 17, 1973, abandoned. This application Nov. 3, 1975, Ser. No. 628,306

Int. Cl.² C07D 457/00

U.S. Cl. 260—285.5 **3 Claims**

1. Descarboxylysergic acid.

4,031,098
CAMPTOTHECIN ANALOGUES

Tsutomu Sugasawa, Kobe, Japan, assignor to Shionogi & Co., Ltd., Japan

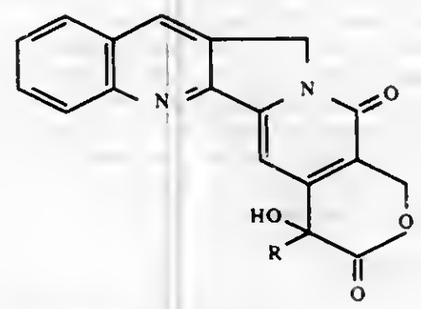
Filed Jan. 5, 1976, Ser. No. 646,596

Claims priority, application Japan, Feb. 20, 1975, 50-21359

Int. Cl.² C07D 491/22

U.S. Cl. 260—287 C **4 Claims**

1. A compound of the formula:



wherein R is allyl, propargyl or benzyl.

4,031,099
4-HYDROXY-3-NITRO-5,6,7,8 TETRAHYDRO-CARBOSTYRILS

Derek Richard Buckle, Redhill; Barrie Christian Charles Cantello, Horsham, and Harry Smith, Maplehurst, all of England, assignors to Beecham Group Limited, England

Filed Oct. 7, 1974, Ser. No. 512,949

Claims priority, application United Kingdom, Oct. 11, 1973, 47508/73

Int. Cl.² C01D 215/18; A61K 31/47

U.S. Cl. 260—289 K **5 Claims**

1. The compound which is 4-hydroxy-7-methyl-3-nitro-5,6,7,8-tetrahydrocarbostyril.

5. The compound which is 6,7-dimethyl-4-hydroxy-3-nitro-5,6,7,8-tetrahydrocarbostyril.

4,031,100
PROCESS FOR MAKING 2,6-DIFLUOROPYRIDINE

Thomas J. Glacobbe, Concord, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Filed Aug. 23, 1976, Ser. No. 716,863

Int. Cl.² C07D 213/81

U.S. Cl. 260—290 HL **17 Claims**

1. The improvement in the process of preparing 2,6-difluoropyridine by reacting KF with an alpha-chloropyridine which is 2,6-dichloro- or 2-chloro-6-fluoropyridine, at an elevated temperature in an aprotic, polar solvent, whereby practical rates of conversion are attained without resort to temperatures in excess of about 185°,

said improvement comprising:

a. providing a mixture of solid KF particles and a solution in dimethyl sulfoxide of

1. said alpha-chloropyridine reactant, and

2. a catalytically effective amount of a catalyst which is $(CH_3)_4N^+Cl^-$, $(CH_2)_4P^+Cl^-$ or both;

said mixture containing less than 0.1 gram of acids, bases or organic hydroxy compounds and less than about 1 gram of water, per 100 grams of dimethyl sulfoxide; and

b. intensely stirring said mixture and maintaining the temperature thereof within the range of from about 100° to about 185°,

the reaction being carried out under an inert atmosphere if a reaction temperature above about 180° is employed.

4,031,101
CIS-2, 6-DIMETHYL-α,α-DIPHENYL-1-PIPERIDINEBUTANOL COMPOUNDS

Robert Willerton Fleming, Ann Arbor, Mich., assignor to Parke, Davis & Company, Detroit, Mich.

Filed Apr. 15, 1976, Ser. No. 677,094

Int. Cl.² C07D 211/32

U.S. Cl. 260—293.84 **3 Claims**

1. cis-2,6-Dimethyl-α,α-diphenyl-1-piperidinebutanol and acid-addition salts thereof.

4,031,102
CYCLOPENTENO[b]PYRIDINE DERIVATIVES

Adrian Charles Ward Curran, South Cave; Roger Crossley, Reading, and David George Hill, Cookham, all of England, assignors to John Wyeth & Brother Limited, Maidenhead, England

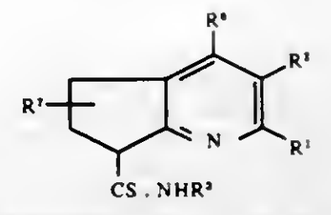
Continuation-in-part of Ser. No. 600,257, July 30, 1975, which is a continuation-in-part of Ser. No. 460,265, April 11, 1974, abandoned, which is a continuation-in-part of Ser. No. 403,289, Oct. 3, 1973, abandoned. This application Oct. 20, 1975, Ser. No. 624,080

Claims priority, application United Kingdom, Oct. 21, 1972, 48595/72; Oct. 15, 1973, 7424/73; July 21, 1973, 34866/73; Aug. 16, 1973, 38701/73

Int. Cl.² C07D 221/16

U.S. Cl. 260—294.8 C **7 Claims**

1. A compound of formula



or in acid addition salt thereof with a pharmaceutically acceptable acid, wherein R^1, R^2 and R^6 are the same or different and are selected from hydrogen and alkyl containing from 1 to 6 carbon atoms, R^2 is hydrogen or alkyl of 1 to 6 carbon atoms, R^7 represents hydrogen or 1 or 2 groups selected from alkyl of 1 to 6 carbon atoms (which may be substituted by alkoxy of 1 to 6 carbon atoms or trifluoromethyl), phenylalkyl wherein the alkyl group has 1 to 6 carbon atoms or phenyl, and the phenyl or the phenyl portion of the phenylalkyl group of R^7 may be substituted by alkyl of 1 to 6 carbon atoms, lower alkoxy of 1 to 6 carbon atoms, halogen, nitro or trifluoromethyl, with the provisos that (1) when R^1 and R^2 or R^2 and R^6 are both alkyl they are selected from normal and secondary alkyl groups and (2) when two alkyl R^7 groups are present on the same carbon atom then they are both n-alkyl groups and when two R^7 alkyl groups are present on adjacent carbon atoms they are selected from normal and secondary alkyl groups.

4,031,103
1,8-NAPHTHYRIDINE COMPOUNDS

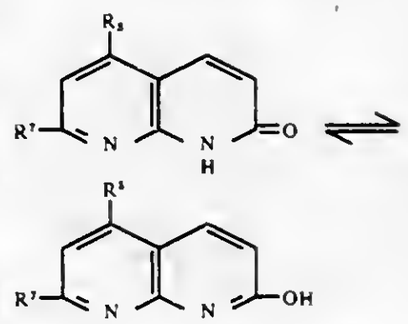
Hayden Windsor Richard Williams, Dollard des Ormeaux, and Clarence Stanley Rooney, Beaconsfield, both of Canada, assignors to Merck Sharp & Dohme (I.A.) Corporation, Rahway, N.J.

Division of Ser. No. 477,392, June 7, 1974, Pat. No. 3,962,262, which is a division of Ser. No. 350,285, April 11, 1973, Pat. No. 3,843,663. This application Dec. 9, 1975, Ser. No. 639,036

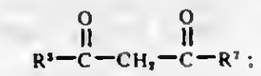
Int. Cl.² C07D 213/44

U.S. Cl. 260—295 N **3 Claims**

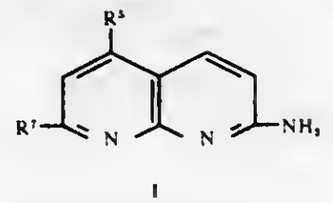
1. A process for the preparation of a 1,8-naphthyridine compound having the structures



which comprises admixing equimolar quantities of 2,6-diaminopyridine and a β-diketone of the structure



warming the admixture to its boiling point to initiate reaction providing a 2-amino-1,8-naphthyridine compound having the structure



I

and, reacting said 2-amino-1,8-naphthyridine with an alkali metal nitrite in the presence of trifluoroacetic acid or pentafluoropropionic acid wherein, in each of the foregoing structures R^8 is selected from the group consisting of lower alkyl, trifluoromethyl, pentafluoroethyl, phenyl, pyridyl, thienyl and naphthyl; R^7 is selected from the group consisting of lower alkyl, trifluoromethyl and pentafluoroethyl, and at least one of R^8 or R^7 is trifluoromethyl or pentafluoroethyl.

4,031,104

1,4-DIHYDROPYRIDINE CARBOXYLIC ACID ESTERS

Friedrich Bossert; Horst Meyer, both of Wuppertal, and Wulf Vater, Opladen, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

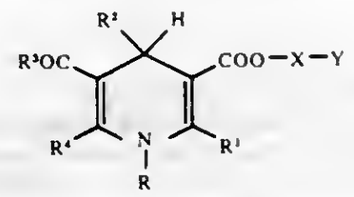
Division of Ser. No. 548,394, Feb. 10, 1975, Pat. No. 3,996,234, which is a division of Ser. No. 350,381, April 12, 1973, Pat. No. 3,905,970. This application Nov. 12, 1975, Ser. No. 631,119

Claims priority, application Germany, Apr. 18, 1972, 2218644

Int. Cl.² C07D *213/55*

U.S. Cl. 260—295.5 R **8 Claims**

1. A compound of the formula:



or a pharmaceutically acceptable nontoxic salt thereof wherein

R is hydrogen, straight- or branched-chain lower alkyl, alkenyl of 2 to 4 carbon atoms or alkynyl of 2 to 4 carbon atoms;

R^1 and R^4 are the same or different and are each hydrogen or straight or branched-chain lower alkyl;

X is straight- or branched-chain lower alkylene;

Y is the moiety NR'R'' wherein R' and R'' are the same or different and are each hydrogen or lower alkyl;

R^2 is pyridyl unsubstituted or substituted by one or two substituents selected from the group consisting of lower alkyl, lower alkoxy, nitro and halogen; and

R^3 is the moiety —OQ wherein Q is straight, branched or cyclic, saturated, partially unsaturated or unsaturated lower alkyl unsubstituted or substituted by one or two hydroxyl groups, alkoxyalkyl of up to 6 carbon atoms in both moieties or the moiety —O—X'—Y' wherein

X' is straight- or branched-chain lower alkylene and

Y' is the moiety NR'R'' wherein R' and R'' are the same or different and are each hydrogen or lower alkyl.

4,031,105

3-(N-2', 6'XYLYL)-CARBOXAMIDE PYRIDONE-2

Jose-Alfonso Canicio Chimeno, Barcelona, Spain, assignor to Laboratorios Hermes, S.A., Barcelona, Spain

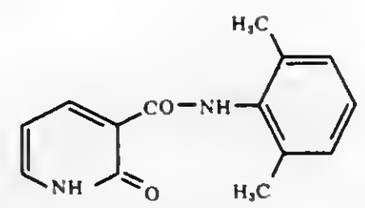
Division of Ser. No. 657,576, Feb. 12, 1976, Pat. No. 3,984,423, which is a continuation-in-part of Ser. No. 565,280, April 4, 1975, abandoned, which is a continuation-in-part of Ser. No. 505,774, Sept. 13, 1974, abandoned. This application Aug. 9, 1976, Ser. No. 712,722

Claims priority, application Spain, July 20, 1974, 428449

Int. Cl.² C07D *213/56*

U.S. Cl. 260—295.5 A **1 Claim**

1. A compound, 3-(N-2',6'xylyl)-carboxamide pyridone-2, formula (I)



and its tautomeric chemical entities.

4,031,106

SYNTHESIS OF AROMATIC AMINES BY REACTION OF AROMATIC COMPOUNDS WITH AMMONIA

Thomas Wayne DelPesco, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 429,028, Dec. 19, 1973, abandoned. This application Oct. 16, 1975, Ser. No. 622,890

Int. Cl.² C07D *213/73*

U.S. Cl. 260—296 R **8 Claims**

1. In a process of the present invention an aromatic compound selected from anthracene; phenanthrene; quinoline; isoquinoline and compounds having the formula $(X)_m$ $(Y)_n$ wherein X is benzene or pyridine, *m* is 1 or 2, *n* is 0, 1 or 2, and Y is alkyl having one to six carbon atoms, halogen, nitrile, hydroxy, $CONH_2$, alkoxy having one to six carbon atoms, aryloxy, amino and aralkyl, with the proviso that when Y is aryloxy, a secondary or tertiary arylamine or an aralkyl, *n* is 1 and when *n* is 2, the substituents Y may be the same or different, is aminated by reacting ammonia with said aromatic compound at a temperature of from about 150° C. to about 500° C. and at a pressure of from about 10 to 1000 atmospheres, in the presence of a conditioned $Ni/NiO/ZrO_2$ cataloreactant with a mole ratio of nickel to nickel oxide of 0.001 to 10, the improvement which comprises carrying out the reaction in intimate molecular contact with said conditioned cataloreactant containing a molar ratio of 0.0001 to 0.05 of a dopant to total nickel, wherein said dopant is selected from an oxide of lanthanum, samarium, holmium, europium, erbium, praseodymium, neodymium, tertium, ytterbium, dysprosium, yttrium and mixtures thereof.

4,031,107

METHOD FOR INTRODUCING AMINO GROUPS INTO BENZIMIDAZOLE OR IMIDAZOPYRIDINE COMPOUNDS

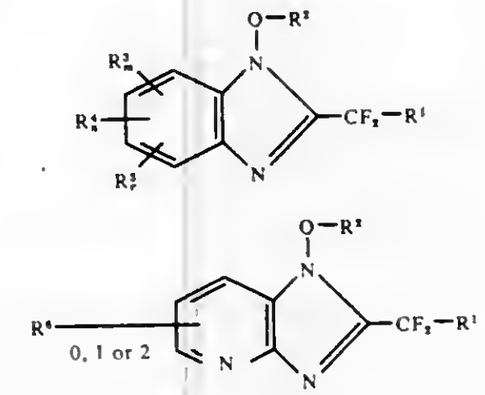
George O. P. O'Doherty, Greenfield, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Continuation-in-part of Ser. No. 535,233, Dec. 23, 1974, abandoned, which is a division of Ser. No. 314,882, Dec. 13, 1972, Pat. No. 3,875,173, which is a continuation-in-part of Ser. No. 102,266, Dec. 28, 1970, abandoned. This application Feb. 23, 1976, Ser. No. 660,210

Int. Cl.² C07D *235/14*, *471/04*

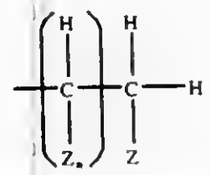
U.S. Cl. 260—296 H **12 Claims**

1. A process suitable for introducing an amino group into the benzene or pyridine ring of a benzimidazole or imidazopyridine compound, which comprises reacting a first compound of one of the formulae



wherein

R^1 represents hydrogen, chloro, fluoro, perfluoroalkyl of C_1–D_6, or radical of the formula



where each Z represents hydrogen or halo and n represents 0 or 1;

R^2 represents

1. alkyl of C_1–C_8;
2. alkenyl of C_2–C_8;
3. cycloalkyl of C_5–C_6;
4. benzyl;
5. phenethyl; or
6. tetrahydro-2-pyranyl;

each R^3 independently represents halo;

each R^4 independently represents nitro, $-CF_3$, $-CF_2Cl$, or $-CF_2H$;

R^5 represents cyano or loweralkylsulfonyl of C_1–D_4;

m represents an integer of from 0 to 3, both inclusive;

n represents an integer of from 0 to 2, both inclusive;

r represents 0 or 1;

and the sum of *m*, *n*, and *r* is an integer of from 0 to 3, both inclusive, and

each R^6 represents halogen, nitro, $-CF_3$, $-CF_2Cl$, $-CF_2H$, or loweralkylsulfonyl of C_1–C4, subject to the limitation that not more than one R^6 represents nitro, $-CF_3$, $-CF_2Cl$, $-CF_2H$, or loweralkylsulfonyl as defined; with a nucleophilic reagent selected from the group consisting of ammonia, and primary and secondary amines having a K_b from 10^{-2} to 10^{-11}.

4,031,108

2-HYDROXYMETHYL-3-BENZYLOXYPYRIDINE-6-EPOXYETHANE

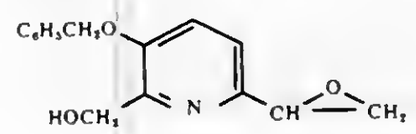
Susumu Nakanishi, East Lyme, Conn., assignor to Pfizer Inc., New York, N.Y.

Division of Ser. No. 615,463, Sept. 22, 1975, which is a division of Ser. No. 513,213, Oct. 9, 1974, Pat. No. 3,948,919, which is a continuation-in-part of Ser. No. 428,451, Dec. 26, 1973, abandoned. This application July 14, 1976, Ser. No. 705,039

Int. Cl.² C07D *405/04*

U.S. Cl. 260—297 R **1 Claim**

1. A compound of the formula



4,031,109

METHOD FOR THE PREPARATION OF X-FORM METAL PHTHALOCYANINE AND X-FORM METAL FREE COMPOUNDS

Clifford H. Griffiths, Brighton, and Richard C. Keezer, Pittsford, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 756,363, Aug. 30, 1968, abandoned. This application Nov. 22, 1972, Ser. No. 308,915

Int. Cl.² C09B *47/04*

U.S. Cl. 260—314.5 **11 Claims**

1. A method of preparing X-form metal phthalocyanine which comprises heating a metal phthalocyanine polymorph to from about 600° to about 650° C and allowing said polymorph to cool.

4,031,110

METHOD OF PREPARING 3,3-BIS (CHLOROMETHYL) OXETANE

Richard Frederick Stockel, Bridgewater, and Peter Carl Valenti, East Windsor, both of N.J., assignors to National Patent Development Corporation, New York, N.Y.

Filed July 13, 1976, Ser. No. 704,887

Int. Cl.² C07D *305/06*

U.S. Cl. 260—333 **14 Claims**

1. A process for making 3,3-bis(chloromethyl) oxetane which comprises:

a. reacting N,N-dialkyl formamide, wherein the alkyl group contains from 1 to 4 carbon atoms, with a chlorinating agent selected from the group consisting of $SOCl_2$, $POCl_3$, and $COCl_2$, at a temperature of from about 15° to about 125° C.,

b. reacting the product obtained from step (a) with pentaerythritol at a temperature of from about 15° C. to about 125° C. to make pentaerythritol monochlorohydrin,

c. reacting said pentaerythritol monochlorohydrin with $SOCl_2$ to form pentaerythritol trichlorohydrin under conditions which substantially minimize the formation of pentaerythritol monochlorohydrin and pentaerythritol dichlorohydrin,

d. reacting said pentaerythritol trichlorohydrin with a metal hydroxide selected from the group consisting of alkali metal hydroxides and alkaline earth metal hydroxides at a temperature in the range of from about 50° C. to the reflux temperature of the reaction mixture, to produce 3,3-bis(chloromethyl)oxetane, and

e. removing said 3,3-bis(chloromethyl)oxetane from the reaction mixture.

4,031,111

MACROCYCLIC HETERO IMINE COMPLEXING AGENTS

Charles John Pedersen, Salem, N.J., and Marilyn H. Bromels, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

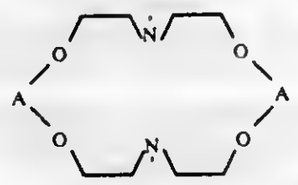
Continuation of Ser. No. 321,575, Jan. 8, 1973, Pat. No. 3,847,949, which is a continuation-in-part of Ser. No. 36,689, May 12, 1970, abandoned. This application Sept. 6, 1974, Ser. No. 503,777

The portion of the term of this patent subsequent to Nov. 12, 1991, has been disclaimed.

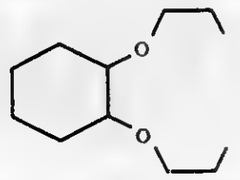
Int. Cl.² C07D *273/00*, *498/08*

U.S. Cl. 260—340.3 **2 Claims**

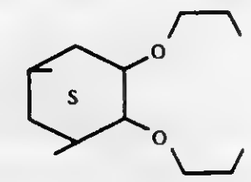
1. A macrocyclic compound of the formula



where A is a carbocyclic ring which is vicinally fused to the macrocyclic ring and is selected from the group consisting of (a) phenylene, naphthalene, phenanthralene, and anthralene, (b) the saturated analogs of (a), and the halo, nitro, nitroso, $-NH_2$, C_1–C_4 alkyl, C_2–C_4 alkenyl, C_6–C_{12} aryl, C_7–C_{16} aralkyl, C_1–C_4 alkoxy, cyano, hydroxy, carboxy or sulfo derivatives thereof, and the third valence of the nitrogen atoms is occupied with a member of selected from the group consisting of hydrogen,



and



4,031,112

CYCLIC ACETALS

Knut Oppenlaender, Ludwigshafen; Guenter Uhl, Worms; Herbert Helfert, Frankenthal; Hans-Georg Scharpenberg, Limburgerhof, and Kari Stork, Lampertheim, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

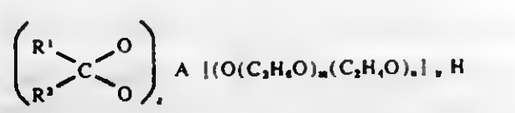
Filed Feb. 17, 1976, Ser. No. 658,524

Claims priority, application Germany, Mar. 12, 1975, 2510636

Int. Cl.² C07D *319/04*

U.S. Cl. 260—340.7 3 Claims

1. Cyclic acetals or ketals of the formula I



where R^1 is alkyl of 1 to 20 carbon atoms, alkenyl of 2 to 20 carbon atoms phenyl, p-nitrophenyl, hydroxyphenyl, p-dimethylaminophenyl, o-, m-, or p-chlorophenyl o-bromophenyl, R^2 is hydrogen or has one of the meanings defined for R^1, said meaning being identical to or different from R^1, or R^1 and R^2 together are an aliphatic five-membered or six-membered ring, A is a radical, free from hydroxyl groups, of a polyalcohol with $2z + y$ OH groups and of 3 to 6 carbon atoms, z is 1 or 2, y is 1 or 2, m is from 5 to 20 and n is from 10 to 100.

4,031,113

5-[5-(4-CHLOROPHENYL)-2-FURANYL]DIHYDRO-2(3H)-FURANONE

Stanford S. Pelosi, Jr., Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed Mar. 29, 1976, Ser. No. 671,095

Int. Cl.² C07D *407/04*

U.S. Cl. 260—343.6 1 Claim

1. The compound 5-[5-(4-chlorophenyl)-2-furanyl]dihydro-2(3H)-furanone.

4,031,114

ALPHA, BETA-BUTENOLIDE PREPARATION

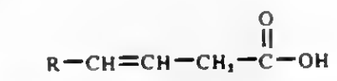
Victor P. Kurkov, San Rafael, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Mar. 29, 1976, Ser. No. 671,881

Int. Cl.² C07D *307/32*

U.S. Cl. 260—343.6 8 Claims

1. A method for preparing an alpha,beta-dehydro-gamma-butyrolactone which comprises contacting a carboxylic acid of the formula



wherein R is H or C_1 to C_{16} alkyl group, with oxygen and a catalyst comprising a noble metal halide, a copper or iron halide and an alkali metal halide at a temperature between 50° and 300° C and superatmospheric pressure.

4,031,115

4-PENTENOIC ACID CONVERSION

Victor P. Kurkov, San Rafael, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Mar. 29, 1976, Ser. No. 671,880

Int. Cl.² C07D *307/32*

U.S. Cl. 260—343.6 7 Claims

1. A method for preparing a gamma-chloromethyl-gamma-butyrolactone which comprises contacting 4-pentenoic acid with oxygen and a catalyst comprising a noble metal chloride, a copper or iron chloride and an alkali metal chloride at a temperature between 50° and 200° C and superatmospheric pressure.

4,031,116

PROCESS FOR PREPARING PURE 1-NITROANTHRAQUINONE

Karl-Werner Thiem, Cologne; Wolfgang Auge, Odenthal, and Rütger Neeff, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation of Ser. No. 499,734, Aug. 22, 1974, abandoned. This application July 20, 1976, Ser. No. 707,130

Claims priority, application Germany, Aug. 31, 1973, 2343978

Int. Cl.² C07C *76/00*

U.S. Cl. 260—369 19 Claims

1. Process for preparing 1-nitroanthraquinone substantially free from dinitroanthraquinone, which comprises:

i. nitrating anthraquinone or a mixture which contains anthraquinone with at least 90% nitric acid at a temperature of at least 0° C wherein the mole ratio of nitric acid to anthraquinone is less than 20 to 1;

ii. stopping the reaction when the anthraquinone conversion is at least 50% by cooling the reaction mixture to a temperature of at most 30° C and/or by adjusting the mole fraction of nitric acid in the reaction mixture to a value of at most 0.86;

iii. precipitating 1-nitroanthraquinone by adjusting the mole fraction of nitric acid to a value of from 0.7 to 0.4 and/or by reducing the temperature to at most 20° C; and

iv. separating the precipitated 1-nitroanthraquinone and subjecting it to vacuum distillation.

4,031,117

TESTOSTERONE DERIVATIVES

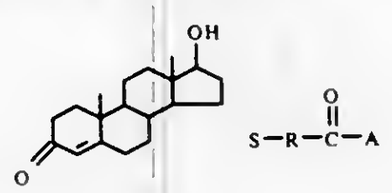
Pemmaraju Narasimha Rao, San Antonio, Tex., assignor to Becton, Dickinson and Company, Rutherford, N.J.

Filed Sept. 22, 1975, Ser. No. 615,812

Int. Cl.² C07J *1/00*

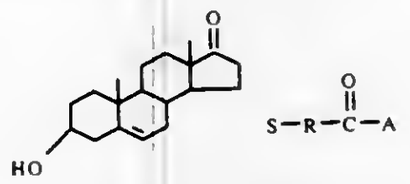
U.S. Cl. 260—397.1 21 Claims

1. A compound selected from the group consisting of compounds represented by the formula:



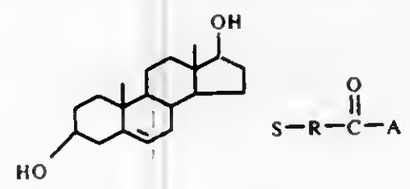
(a)

wherein R is an alkyl group of from 1 to 6 carbon atoms A is selected from the group consisting of —OH, —OM wherein M is an alkali metal barium, calcium, or strontium, and OY wherein Y is an alkyl group of from 1 to 6 carbon atoms.



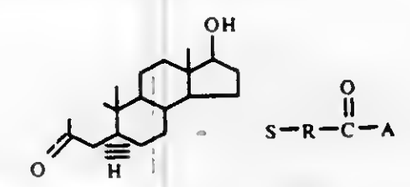
(b)

wherein R and A are as defined above and



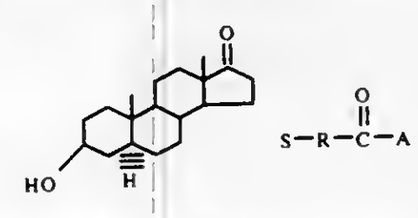
(c)

wherein R and A are as defined above.



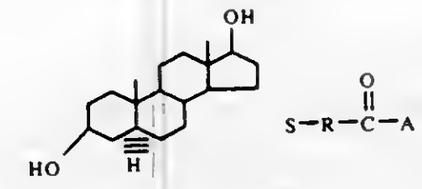
(d)

wherein R and A are as defined above



(e)

wherein R and A are as defined above, and



wherein R and A are as defined above.

4,031,118

ESTER-CONTAINING PROCESS AND COMPOSITIONS

Clark Ober Miller, Willoughby Hills, Ohio, assignor to The Lubrizol Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 398,034, Sept. 17, 1973, Pat. No. 3,957,854, which is a continuation-in-part of Ser. No. 152,425, June 11, 1971, abandoned, which is a division of Ser. No. 12,838, Feb. 19, 1970, abandoned, and a continuation-in-part of Ser. No. 823,990, May 12, 1969, abandoned. This application Dec. 29, 1975, Ser. No. 644,677

Int. Cl.² C07C *103/14*

U.S. Cl. 260—404.5 28 Claims

1. Oil-soluble carboxylic acid esters prepared by the esterification of

A. at least one carboxylic acid acylating agent having an average of at least fifty aliphatic carbon atoms per molecule exclusive of the carboxylic carbon atom; with

B. at least one polyoxyalkylene alcohol which is a demulsifier for aqueous emulsions, has an average molecular weight in the range of from about 1,000 to about 10,000, and is a block polymer comprising (1) a hydrophobic portion corresponding to the formula, $-CH(R')-CH_2-O-$, wherein R' is an alkyl group of up to three carbon atoms, and (2) from about 5% to about 40% by weight of a hydrophilic portion corresponding to the formula $-CH_2-CH_2-O-$; wherein the total amount of (A) and (B) used in the esterification is such that there is at least 0.001 equivalent of (B) for each equivalent of (A).

4,031,119

[PERFLUOROALKYL(ALKOXY)PHENYL]METHYLDICHLOROSILANES AND METHOD OF PREPARING SAME

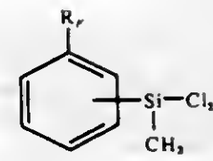
Alexei Ivanovich Ponomarev, prospekt Stachek, 59, korpus 2, kv. 47; Sergei Vasilievich Sokolov, ulitsa III Internatsionala, 67, kv. 222; Julia Alexeevna Larionova, prospekt Elizarova, 12, kv. 15; Alexandr Leibovich Klebansky, ulitsa Zhelyabova, 10, kv. 107, all of Leningrad; Vsevolod Volfovich Berenblit, Vsevolozhsky raion, poselok Kuzmolovsky, ulitsa Nagornaya, 23, kv. 10; Jury Pavlovich Doinakov, Krasnoe selo, ulitsa Narvskaya, 4, kv. 122, both of Leningradskaya oblast; Lev Moiseevich Yagupolsky, ulitsa Ivana Kudri, 41, kv. 48, Kiev; Vladlen Vasilievich Malovik, ulitsa Osipovskogo, 4/5, kv. 6, Kiev; Miron Onufrievich Lozinsky, ulitsa Voroshilova, 18, kv. 13, Kiev; Viktor Mikhailovich Belous, ulitsa Ujutnaya, 5a, kv. 3, Odessa; Boris Efimovich Gruz, ulitsa Kurskaya, 10, kv. 18, Kiev; Ljubov Antonovna Alexeeva, Proletarsky bulvar, 41, kv. 28, Odessa; Anatoly Kirillovich Ankudinov, ulitsa Lensoveta, 10, kv. 203, and Rufina Mikhailovna Ryazanova, Vitebsky prospekt, 81, korpus 1, kv. 6, both of Leningrad, all of U.S.S.R.

Filed Apr. 29, 1976, Ser. No. 681,521

Int. Cl.² C07F *7/12*

U.S. Cl. 260—448.2 B 4 Claims

1. [Perfluoroalkyl(alkoxy)phenyl]methyldichlorosilanes having the general formula



(f) (I),

where: $R_f = OCF_3$, OC_2F_5, $OC_2F_4OCF_3$, $C_2F_4OCF_2$, C_3F_7

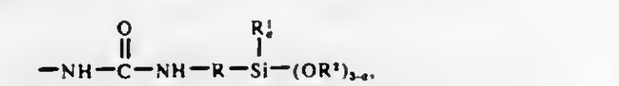
4,031,120

ISOCYANATOSILANE ADDUCTS

Nicholas J. Gervase, Erie, Pa., assignor to Lord Corporation, Erie, Pa.

Division of Ser. No. 506,829, Sept. 17, 1974. This application May 7, 1976, Ser. No. 684,417
Int. Cl.² C07F 7/10, 7/18
U.S. Cl. 260—448.8 R 13 Claims

1. An isocyanatosilane characterized by the presence of at least one reactive isocyanate group and containing a single silane grouping having the structure



said reactive isocyanate group being connected to said silane grouping through a divalent organic radical having at least one carbon atom, and wherein

R is a divalent aliphatic, cycloaliphatic or aromatic radical having from 1 to 20 carbon atoms;

R^1 is a monovalent aliphatic, cycloaliphatic or aromatic radical having from 1 to 20 carbon atoms;

R^2 is a monovalent aliphatic, cycloaliphatic or aromatic organic radical having from 1 to 8 carbon atoms; and

a is zero or 1.

4,031,121

ORGANOBROMOSILICONE FLUIDS

Paul L. Brown, Saginaw, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Sept. 22, 1976, Ser. No. 725,318
Int. Cl.² C07F 7/18
U.S. Cl. 260—448.8 R 8 Claims

1. A silicone fluid having a general formula

$$(BrCH_2)_3CCH_2O(R_2SiO)_xCH_2C(CH_2Br)_3$$

wherein each R is selected from the group consisting of hydrocarbon radicals containing from 1 to 18 carbon atoms, fluorinated hydrocarbon radicals containing from 1 to 18 carbon atoms, chlorinated hydrocarbon radicals containing from 1 to 18 carbon atoms and cyanohydrocarbon radicals containing from 1 to 18 carbon atoms, and *x* has a value of from 1 to 20.

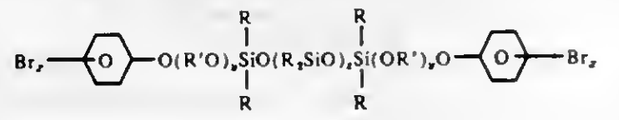
4,031,122

ARYLORGANOBROMOSILICONE COMPOUNDS

Paul L. Brown, Saginaw, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Sept. 22, 1976, Ser. No. 725,219
Int. Cl.² C07F 7/18
U.S. Cl. 260—448.8 R 7 Claims

1. A silicone compound having the general formula



wherein

x has an average value of from 2 to 3,

R' is selected from the group consisting of ethylene, propylene, and butylene radicals,

y has a value of from 1 to 10,

R is selected from the group consisting of hydrocarbon radicals containing from 1 to 18 carbon atoms, fluorinated hydrocarbon radicals containing from 1 to 18 carbon atoms, chlorinated hydrocarbon radicals containing from 1 to 18 carbon atoms and cyanohydrocarbon radical containing from 1 to 18 carbon atoms, and

z has a value of from 0 to 25.

4,031,123

METHANOL PRODUCTION IN A PARAFFINIC MEDIUM

Ramon L. Espino, New York, and Thomas S. Pletzke, Cambria Heights, both of N.Y., assignors to Chem Systems Inc., New York, N.Y.

Filed Nov. 21, 1975, Ser. No. 634,182
The portion of the term of this patent subsequent to June 10, 1992, has been disclaimed.
Int. Cl.² C07C 29/16
U.S. Cl. 260—449.5 6 Claims

1. A process for the production of methanol from feed gas containing hydrogen and carbon oxides in a hydrogen to carbon monoxide molar ratio of from 0.6/1 to 10/1 comprising passing said feed gas into a reaction zone containing methanol-forming catalyst particles in a paraffinic or cycloparaffinic inert liquid compound having from 6 to 30 carbon atoms at temperatures from 150° to 400° C and pressures from 200 to 10,000 psia, said conditions being selected so that the equivalent methanol concentration in the liquid corrected to 250° C and 1000 psig does not exceed 1.0 percent by weight, and withdrawing vapors containing methanol product.

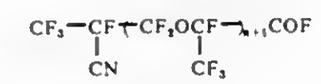
4,031,124

CYANOPERFLUOROETHER ACID FLUORIDES AND THEIR PREPARATION

James E. Nottke, Greenville, N.C., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 472,420, May 22, 1974, Pat. No. 3,933,767, which is a division of Ser. No. 262,590, June 14, 1972, Pat. No. 3,852,326. This application Oct. 16, 1975, Ser. No. 622,891
Int. Cl.² C07C 120/00, 121/453
U.S. Cl. 260—465.4 7 Claims

1. An acid fluoride of the formula



where *n* is an integer from 0 to 4.

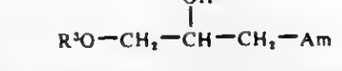
4,031,125

3-SULFONATE ESTER OF 2,3-DIHYDROXYPROPYLAMINE

Leonard M. Weinstock, Belle Mead; Roger J. Tull, Metuchen, and Dennis M. Mulvey, Milford, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 417,301, Nov. 19, 1973, Pat. No. 3,962,338, which is a continuation-in-part of Ser. No. 172,231, Aug. 16, 1971, abandoned, which is a division of Ser. No. 818,474, April 21, 1969, Pat. No. 3,657,237. This application Oct. 24, 1975, Ser. No. 625,616
Int. Cl.² C07C 143/68
U.S. Cl. 260—456 A 4 Claims

1. An optically active glycolamine in the sinister configuration substantially completely free from the rectus isomer having the structure



wherein R^3 is lower alkylsulfonyl, benzenesulfonyl or mono- to tri-substituted benzenesulfonyl wherein the substituents are similar or dissimilar and are lower alkyl, lower alkoxy, halo, amino or nitro; Am is the amino group or monoloweralkyl-substituted amino.

4,031,126

DRYING OF DIALKYL PEROXYDICARBONATES

James A. Manner, Akron, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Feb. 12, 1976, Ser. No. 657,526
Int. Cl.² C07C 68/08
U.S. Cl. 260—463 8 Claims

1. A process for reducing the dissolved water content of dialkyl peroxydicarbonate, which comprises:

contacting liquid dialkyl peroxydicarbonate with molecular sieves which selectively adsorb water from the peroxydicarbonate, the peroxydicarbonate containing dissolved water but being substantially free of phase water.

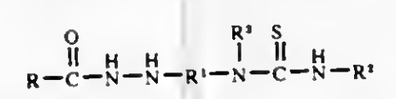
4,031,127

ACYL HYDRAZINO THIOUREA DERIVATIVES AS PHOTOGRAPHIC NUCLEATING AGENTS

Ronald E. Leone; Wayne W. Weber, II, and Donald P. Wrathall, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 601,888, Aug. 6, 1975, abandoned. This application June 29, 1976, Ser. No. 700,982
Int. Cl.² C07C 121/52, 121/60, 157/09; G03C 5/30
U.S. Cl. 260—465 D 45 Claims

1. A compound having the formula

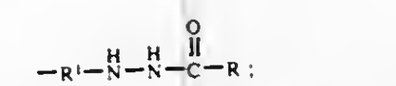


wherein

R is a hydrogen, phenyl, alkylphenyl, cyanophenyl, halophenyl, alkoxyphenyl, alkyl, cycloalkyl, haloalkyl, alkoxyalkyl or phenylalkyl substituent;

R^1 is a phenylene or alkyl, halo- or alkoxy substituted phenylene;

R^2 is an alkyl, haloalkyl, alkoxyalkyl or phenylalkyl substituent having up to 18 carbon atoms; a cycloalkyl substituent; phenyl or naphthyl; an alkylphenyl, cyanophenyl, halophenyl or alkoxyphenyl substituent or



R^3 is hydrogen, benzyl, alkoxybenzyl, halobenzyl or alkylbenzyl;

said alkyl moieties, except as otherwise noted, in each instance include from 1 to 6 carbon atoms; and

said cycloalkyl moieties have from 3 to 10 carbon atoms.

4,031,128

METHOD OF PREPARING ACRYLONITRILE

Khachik Egorovich Khcheyan, Volokolamskoe shosse, 1, kv. 55; Olga Mikhailovna Revenko, B. Pirogovskaya ulitsa, 29/31, kv. 107; Alla Nikolaevna Shatalova, Fortunatovskaya ulitsa, 27, kv. 1; Eleonora Grigorievna Gelperina, Schelkovskoe shosse, 44, korpus 1, kv. 19; Lidia Ivanovna Agrinskaya, Chertanovskaya ulitsa, 44, kv. 270, and Georgy Avanesovich Muradian, Suschevsky val, 23, kv. 40, all of Moscow, U.S.S.R.

Filed Apr. 22, 1976, Ser. No. 679,498
Int. Cl.² C07C 120/00
U.S. Cl. 260—465.9 4 Claims

1. A method of preparing acrylonitrile comprising reacting acetonitrile with methane in a molar ratio of 1:0.5–8, at a temperature within the range of from 650 to 1,000° C at a space velocity of from 1,000 to 23,000 hr^{-1} in the presence of oxygen or a mixture thereof with an inert gas and a catalyst selected from the group consisting of potassium bromide, potassium chloride, calcium bromide, bismuth oxide, molybdenum oxide and a mixture of bismuth oxide and molybdenum oxide, followed by isolation thereof.

4,031,129

15-DEOXY-PGE$_1$ AND METHOD FOR PREPARING SAME

Charles J. Sih, Madison, Wis., assignor to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed Jan. 26, 1972, Ser. No. 221,058
Int. Cl.² C07C 177/00
U.S. Cl. 260—468 D 4 Claims

1. dl-15-deoxyprostaglandin E_1.

3. A method for preparing dl-15-deoxyprostaglandin E_1 which comprises:

alkylating lithium cyclopentadiene with ethyl-7-bromoheptanoate at ice bath temperatures

oxygenating the resulting alkylated cyclopentadiene with singlet oxygen-producing reactants to produce an isomeric mixture of hydroxycyclopentenones

chromatographically separating the said mixture and recovering 2-(6'-carboethoxyhexyl)-4-hydroxy-cyclopenten-1-one

reacting the said recovered hydroxy ester with up to about four molar equivalent of dihydropyran in the presence of an acid catalyst and recovering 2-(6'-carboethoxyhexyl)-2-cyclopentene-4-tetrahydropyranoxy-1-one from the reaction mixture

reacting the said ether with 1-lithium-1-trans-octene in the presence of stoichiometric amounts of soluble tri-n-butylphosphine-copper iodide complex and recovering the formed prostanoic acid derivative from the reaction mixture

removing the tetrahydropyranyl group from the said derivative and chromatographically recovering dl-15-deoxoprostaglandin E_1 ethyl ester and

exposing the said ester to the action of an esterase-producing microorganism and recovering dl-15-deoxy-prostaglandin E_1 from the reaction mixture.

4,031,130

ALIPHATIC β-KETO ESTERS

Günter Renner; Immo Bole, and Quirin Scheben, all of Cologoe, Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Mar. 11, 1975, Ser. No. 557,268
Claims priority, application Germany, Mar. 16, 1974, 2412784
Int. Cl.² C07C 69/74
U.S. Cl. 260—468 K 11 Claims

1. In a process for the production of an aliphatic β-keto ester by gradually adding a dialkyl ketone selected from the group consisting of pinacolone and methyl isopropyl ketone into a solution of dialkyl carbonate and a basic condensation agent which is capable of catalysing the ketone condensation reaction, said condensation agent being in a molar ratio of 1:1 or more based on the ketone, whereby said condensation reaction mixture is heated to a temperature of from 20° to 80° C until a reaction product is obtained and subsequently the reaction product obtained is acidified to produce the aliphatic β-ketoester, the improvement according to which the condensation reaction is carried out in the presence of at least 0.1 mol of hexamethyl phosphoric acid triamide per mol of the said dialkyl ketone in the condensation reaction mixture.

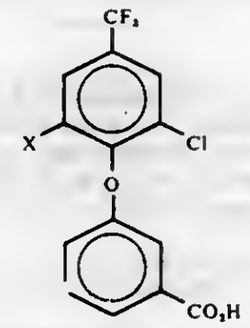
4,031,131

PROCESS FOR PREPARING PHENOXYBENZOIC ACIDS

Wayne O. Johnson, Warminster, Pa., assignor to Robm and Haas Company, Philadelphia, Pa.

Filed Sept. 29, 1975, Ser. No. 617,561
Int. Cl.² C07C 69/76
U.S. Cl. 260—473 G 10 Claims

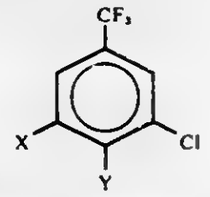
1. A method for preparing a compound of the formula



wherein X is a hydrogen atom or a chlorine atom, which comprises

a. reacting 3-hydroxybenzoic acid with at least two equivalents of an inorganic base to form the disalt of the 3-hydroxybenzoic acid,

b. reacting in a polar aprotic organic solvent the disalt with a benzotrifluoride of the formula



wherein Y is a chlorine atom or a fluorine atom and X is as defined above, and

c. acidifying the product of (b) with a strong inorganic acid.

4,031,132

ISOPROPENYL CYCLOPENTENE CARBOXYLIC ACIDS

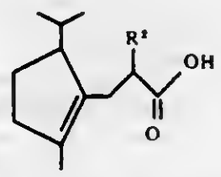
Peter Naegeli, Wettingen, Switzerland, assignor to Givaudan Corporation, Clifton, N.J.

Division of Ser. No. 490,166, July 19, 1974, Pat. No. 3,963,675, which is a division of Ser. No. 338,730, March 7, 1973, abandoned. This application Sept. 23, 1975, Ser. No. 615,964

Int. Cl.² C07C *61/38*

U.S. Cl. 260—514 L 3 Claims

1. A cyclopentene of the general formula



(Ib)

wherein R^2 represents a hydrogen atom or a lower alkyl group and the broken line denotes an optional bond.

4,031,133

PHENYLACETIC ACIDS

Jacques Georges Maillard, Paris, France, assignor to Laboratoires Jacques Logeais, Issy-les-Moulineaux, France

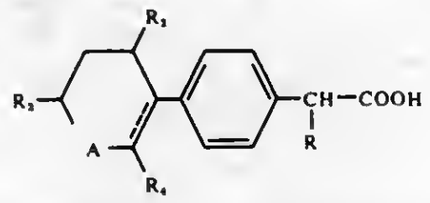
Filed Aug. 31, 1972, Ser. No. 285,127

Claims priority, application United Kingdom, Sept. 4, 1971, 41327/71

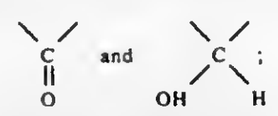
Int. Cl.² C07C *65/02*; A01N *9/00*

U.S. Cl. 260—520 R 4 Claims

1. Compounds having the formula:



in which A is selected from the group consisting of



R, R_2, R_3 and R_4 are each selected from the group consisting of hydrogen and alkyl groups; and their pharmaceutically acceptable salts; the number of carbon atoms in alkyl groups R and R_2 being from 1 to 4, and in R_3 and R_4 being from 1 to 8.

4,031,134

PHENOXY CARBOXYLIC ACID DERIVATIVE

Yasushi Nakamura, Ibaragi; Kunio Agatsuma; Yoshihiro Tanaka, both of Takarazuka, and Shunji Aono, Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

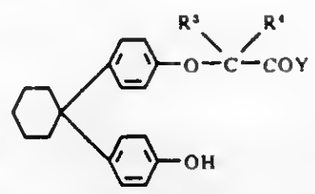
Division of Ser. No. 26,412, April 7, 1970, Pat. No. 3,716,583. This application Sept. 25, 1972, Ser. No. 292,110

Claims priority, application Japan, Apr. 16, 1969, 44-029905; Apr. 16, 1969, 44-029907; May 2, 1969, 44-034166; May 2, 1969, 44-034167; Oct. 3, 1969, 44-080041; Oct. 3, 1969, 44-080042; Dec. 19, 1969, 44-102809; Dec. 23, 1969, 44-104194

Int. Cl.² C07C *65/14*, *69/76*

U.S. Cl. 260—520 C 3 Claims

1. A phenoxyaliphatic carboxylic acid derivative of the formula,



wherein R^3 is methyl, R^4 is methyl, ethyl, or n-propyl and Y is hydroxyl or C_1-C_4 alkoxy.

4,031,135

MANUFACTURE OF ACRYLIC ACID BY OXIDATION OF PROPYLENE WITH OXYGEN-CONTAINING GASES IN TWO SEPARATE CATALYST STAGES

Heinz Engelbach, Limburgerhof; Richard Krabetz, Kirchheim; Gerd Duembgen, Darmstadt-Schauernheim; Carl-Heinz Willersinn, Ludwigshafen; Ulrich Lebert, Ludwigshafen, and Fritz Thiessen, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen Rhine, Germany

Filed July 11, 1975, Ser. No. 595,321

Claims priority, application Germany, July 31, 1974, 2436818

Int. Cl.² C07C *51/32*

U.S. Cl. 260—530 N 3 Claims

1. In a process for the manufacture of acrylic acid by oxidation of propylene with a gas containing molecular oxygen in two spatially separate oxidation stages wherein an acrolein-selective catalyst containing molybdenum, bismuth and iron in an oxidic form which at a bath temperature below 380° C and a residence time of up to 4 seconds is able to produce, in a single pass, a conversion of more than 80 mole% of the propylene employed is used in the first stage, and a catalyst containing molybdenum and vanadium in an oxidic form, which is selective for acrylic acid and which at a bath temperature below 350° C and a residence time of up to 4 seconds is able to produce, in a single pass, a conversion of more than 80% of the acrolein is used in the second stage, and in the oxidation a part of the off-gas, which has been substantially freed from condensable products, including water, and essentially consists of nitrogen and small amounts of unconverted propylene, oxygen, propane and carbon monoxide and carbon dioxide, is fed to the oxidation in addition to fresh propylene and air, the improvement which comprises

a. feeding the recycled off-gas and air in part to the first oxidation stage and in part to the second oxidation stage,

b. maintaining the molar ratio of propylene : oxygen : residual gases in the feed to the first stage at 1 :1.5–2.3 : 11–19,

c. maintaining the molar ratio of the total propylene fed in, to the total oxygen fed in, in the form of air or off-gas, before and after the first stage, and to the total residual gases fed in, at 1 : 1.9–2.5 : 13–25, with the proviso that

d. the air and recycled off-gas are divided between the two feed points in such a way that from 10 to 50% by volume of the total quantity of air and off-gas fed in is added after the first stage, and

e. admixing the air and off-gas to the reaction gas mixture after the first stage, immediately after it leaves the catalyst zone, so that the mixture is rapidly cooled to a temperature of from 150° to 320° C.

4,031,136

PROCESS FOR THE PREPARATION OF TRANS, TRANS-MUCONIC ACID

Lorenz Heiss, Hofheim, Taunus, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Jan. 22, 1976, Ser. No. 651,263

Claims priority, application Germany, Jan. 28, 1975, 2503313

Int. Cl.² C07C *51/09*

U.S. Cl. 260—537 N 2 Claims

1. Process for the preparation of trans, trans-muconic acid, which comprises reacting a glyoxalacetal with ketene at a temperature of from minus 30° to plus 60° C in the presence of a Lewis acid catalyst and hydrolyzing the β, β'-dialkoxy-adipic acid-alkylester formed with alkali.

4,031,137

CATALYSTS BASED ON CARBON SUPPORTS AND USE IN CATALYTIC DEOXIDATION PROCESS

Joseph Lawrence Schmitt, Jr., Bethel, Conn.; Philip Leroy Walker, Jr., State College, Pa., and George Augustus Castellion, Stamford, Conn., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 559,997, March 19, 1975, Pat. No. 3,978,000. This application Feb. 11, 1976, Ser. No. 657,115

Int. Cl.² C07C *103/19*

U.S. Cl. 260—559 AT 13 Claims

1. A process for the catalytic reduction of 6-hydroxynaphthacenes so as to form the corresponding 6-deoxy derivative thereof which comprises reducing a polar solvent solution of a 6-hydroxy hydronaphthacene with hydrogen in the presence of a catalyst composition comprising a porous carbon particulate support comprising carbon black spheres in packed relationship and bonded with a carbonized binder, said spheres having a particle size in the range of about 80 to 5000 angstrom units and said particulate having a pore volume of at least about 0.2 cubic centimeter per gram and a pore size distribution exhibiting peaks at a pore radius in excess of 10 angstrom units and, carried on said support, an effective amount of a platinum group metal, until about one mole of hydrogen has been absorbed for each mole of starting material used, and recovering the 6-deoxy derivative so formed.

4,031,138

STABLE SUBSTITUTED ACRYLAMIDES OR METHACRYLAMIDES

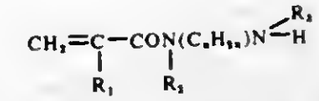
Edward C. Y. Nieh, and Philip H. Moss, both of Austin, Tex., assignors to Texaco Development Corporation, New York, N.Y.

Filed Mar. 18, 1976, Ser. No. 668,171

Int. Cl.² C07C *103/133*

U.S. Cl. 260—561 N 11 Claims

1. A stable N-(ω-monoalkylaminoalkyl) acrylamide or methacrylamide monomer characterized by the following structural formula:



where R_1 and R_2 are hydrogen or methyl, R_3 is isopropyl or t-butyl and *n* is 2 or 3, with the proviso that when R_1 is hydrogen, R_3 is t-butyl.

4,031,139

MANUFACTURE OF CYCLOHEXANONE OXIME

Guenther Rapp; Hugo Fuchs, both of Ludwigshafen, and Erwin Thomas, Freinsheim, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen Rhine, Germany

Filed Jan. 26, 1976, Ser. No. 652,421

Claims priority, application Germany, Feb. 26, 1975, 2508247

Int. Cl.² C07C *131/04*

U.S. Cl. 260—566 A 2 Claims

1. An improved process for the manufacture of cyclohexanone oxime by reaction of cyclohexanone with an aqueous hydroxylammonium/ammonium sulfate solution at temperatures above the melting point of cyclohexanone oxime by the countercurrent method, the improvement comprising: carrying out the reaction in the absence of solvents and neutralizing and/or buffering salts at pHs of 0.5 or less until a state of equilibrium is reached, removing the oxime produced during the reaction from the aqueous phase and extracting the aqueous phase with cyclohexanone and then subjecting the extracted aqueous phase to steam distillation.

4,031,140

4- AND 5-PHENYL PENTENAL ACETALS

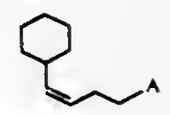
William Lewis Schreiber, Jacksoo, N.J.; Gerard Joseph Moeciano, Newtown, Pa.; Alan O. Pittet, Atlantic Highlands; Manfred Vock, Locust, both of N.J., and Edward Joseph Shuster, New York, N.Y., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Continuation-in-part of Ser. No. 507,542, Sept. 19, 1974, which is a division of Ser. No. 283,632, Aug. 25, 1972, Pat. No. 3,862,340. This application Apr. 12, 1976, Ser. No. 676,394

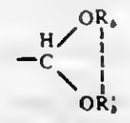
Int. Cl.² C07C *43/30*

U.S. Cl. 260—611 A 3 Claims

1. A compound having the structure:

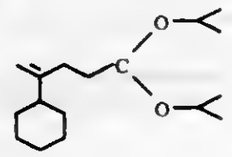


wherein A is the moiety:



and wherein R_5 and R_5' separately are the same or different lower alkyl.

3. A compound having the structure:

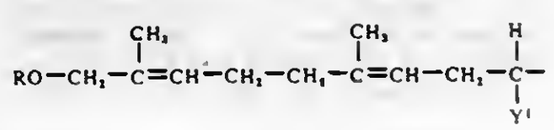


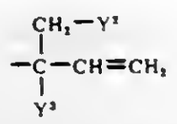
4,031,141
12-ALKOXY-3,7,11-TRIMETHYL-DODECATETRAENES

Werner Hoffmann, Neuhofen, and Manfred Baumann, Mannheim, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed July 9, 1976, Ser. No. 703,956
Claims priority, application Germany, July 23, 1975, 2532851
Int. Cl.² C07C *43/00, 43/14*
U.S. Cl. 260—614 R 2 Claims

1. A compound of the general formula I





(I)

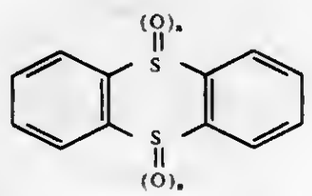
where R is CH_3, C_2H_5, n-C_3H_7 or iso-C_3H_7 and Y^1 and Y^2 are different and each is hydrogen or, together with Y^3, is an additional bond between the carbon atoms carrying Y^1 and Y^2, or Y^2 and Y^3, respectively.

4,031,142
PROCESS FOR THE DIRECTED CHLORINATION OF ALKYLBENZENES

John C. Graham, Warren, Mich., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed Aug. 1, 1975, Ser. No. 601,690
Int. Cl.² C07C *25/04*
U.S. Cl. 260—650 R 12 Claims

1. A process for the preparation of nuclear chlorinated alkylbenzenes which comprises reacting an alkylbenzene with chlorine at a temperature of about 0° to about 100° Celsius and in the presence of a catalyst system comprising a Lewis acid catalyst and a thianthrene co-catalyst characterized by the formula



where each *n* is 0 to 1.

4,031,143
REDUCTION USING $NaAlEt_2H_2$

Gunner E. Nelson, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed Mar. 5, 1973, Ser. No. 337,902
Int. Cl.² C07C *29/00*
U.S. Cl. 260—632 D 4 Claims

1. In a process for reducing a reducible compound by an addition reaction to $NaAlEt_2H_2$ followed by hydrolysis to remove the aluminum and recovering a reduced product, the improvement wherein the product from the addition reaction is subjected to oxidation with molecular oxygen prior to the hydrolysis whereby al—C_2H_5 bonds contained therein are converted to al—O—C_2H_5 bonds.

4,031,144
CHLORINATION OF TOLUENE

Eugene P. Di Bella, Piscataway, N.J., assignor to Tenneco Chemicals, Inc., Saddle Brook, N.J.

Filed Mar. 22, 1976, Ser. No. 669,438
Int. Cl.² C07C *25/28*
U.S. Cl. 260—650 R 9 Claims

1. The process for the production of monochlorotoluene containing at least 45 percent of parachlorotoluene which comprises contacting toluene with chlorine until from 0.7 to 1.1 gram atoms of chlorine has reacted per mole of toluene at a temperature in the range of −20° to 70° C. and in the presence of a catalyst system that comprises a ferrocene compound selected from the group consisting of ferrocene, alkyl-substituted ferrocenes derived from cyclopentadienes having as substituent one or two lower alkyl groups, and mixtures thereof and a co-catalyst selected from the group consisting of sulfur, sulfur monochloride, sulfur dichloride, carbon disulfide, and mixtures thereof in the amount of at least 0.1 part by weight of said co-catalyst per part by weight of the ferrocene compound.

4,031,145
PROCESS FOR THE PRODUCTION OF 3,4-DICHLOROTOLUENE

Eugene P. Di Bella, Piscataway, N.J., assignor to Tenneco Chemicals, Inc., Saddle Brook, N.J.

Filed Mar. 22, 1976, Ser. No. 669,440
Int. Cl.² C07C *25/04*
U.S. Cl. 260—650 R 10 Claims

1. The process for the production of dichlorotoluene containing at least 35 percent of 3,4-dichlorotoluene which comprises contacting para-chlorotoluene with chlorine until from about 0.6 gram atom to 0.9 gram atom of chlorine has reacted per mole of para-chlorotoluene in the presence of a catalyst system selected from the group consisting of

a. a ring-chlorination catalyst selected from the group consisting of iron, ferrocene, chlorides of iron, aluminum, zirconium, thallium, tin, indium, molybdenum, gallium, tungsten and mixtures thereof and a co-catalyst selected from the group consisting of sulfur, sulfur monochloride, sulfur dichloride, and carbon disulfide in the amount of at least 0.1 part by weight of the co-catalyst per part by weight of the ring-chlorination catalyst; b. a sulfide of a metal selected from the group consisting of iron, aluminum, zirconium, thallium, tin, indium, molybdenum, gallium, tungsten, and mixtures thereof; and
c. mixtures thereof, in the amount of at least 0.1 gram of the ring-chlorination catalyst or metal sulfide per mole of parachlorotoluenc and at a temperature in the range of −20° C. to 70° C. to form a reaction mixture that contains from 50 percent to 70 percent by weight of dichlorotoluene and separating from said reaction mixture a dichlorotoluene fraction containing at least 35 percent of 3,4-dichlorotoluene.

4,031,146
PROCESS FOR THE PRODUCTION OF 2,5-DICHLOROTOLUENE

Eugene P. Di Bella, Piscataway, N.J., assignor to Tenneco Chemicals, Inc., Saddle Brook, N.J.

Filed Mar. 22, 1976, Ser. No. 669,439
Int. Cl.² C07C *25/04*
U.S. Cl. 260—650 R 14 Claims

1. The process for the production of dichlorotoluene containing at least 55 percent of 2,5-dichlorotoluene which comprises contacting ortho-chlorotoluene with chlorine until from about 0.5 gram atom to 0.9 gram atom of chlorine has reacted per mole of ortho-chlorotoluene in the presence of a catalyst selected from the group consisting of

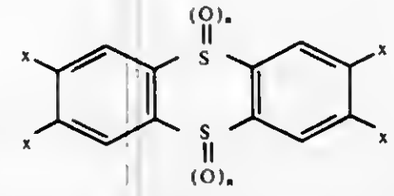
a. a ring-chlorination catalyst selected from the group consisting of iron, ferrocene, chlorides of iron, aluminum, zirconium, thallium, tin, indium, molybdenum, gallium, and tungsten and mixtures thereof and a co-catalyst selected from the group consisting of sulfur, sulfur monochloride, sulfur dichloride, and carbon disulfide in the amount of at least 0.1 part by weight of the ring-chlorination catalyst;
b. a sulfide of a metal selected from the group consisting of iron, aluminum, zirconium, thallium, tin, indium, molybdenum, gallium, and tungsten and mixtures thereof; and
c. mixtures thereof, in the amount of at least 0.1 gram of the ring-chlorination catalyst or metal sulfide per mole of ortho-chlorotoluene and at a temperature in the range of −20° C. to 70° C. to form a reaction mixture that contains from 50 percent to 75 percent by weight of dichlorotoluenes and separating from said reaction mixture a dichlorotoluene fraction containing at least 55 percent of 2,5-dichlorotoluene.

4,031,147
PROCESS FOR DIRECTED CHLORINATION OF ALKYLBENZENES

John C. Graham, Warren, Mich., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed Aug. 1, 1975, Ser. No. 601,219
Int. Cl.² C07C *25/04*
U.S. Cl. 260—650 R 34 Claims

1. A process for the preparation of nuclear chlorinated alkylbenzenes which comprises reacting an alkylbenzene with chlorine at a temperature of about −25° to about 150° Celsius and in the presence of a Lewis acid catalyst and a co-catalyst comprising a thianthrene compound or mixture of thianthrene compounds characterized by the formula:



where each *n* is 0 to 1 and each *x* is hydrogen or an electron-withdrawing substituent with the proviso that at least one *x* is an electron-withdrawing substituent.

4,031,148
METHOD OF SEPARATING CHLORINATED ALIPHATIC HYDROCARBONS FROM MIXTURES THEREOF BY LIQUID-LIQUID EXTRACTION

Jacques Helgorsky, Eaubonne, France, assignor to Rhone-Poulenc Industries, Paris, France

Continuation-in-part of Ser. No. 437,516, Jan. 28, 1974, abandoned. This application Mar. 11, 1976, Ser. No. 666,050
Claims priority, application France, Jan. 30, 1973, 73.03179
Int. Cl.² C07C *17/38*
U.S. Cl. 260—652 P 7 Claims

1. A method of at least partial separation of mixtures of at least two C_1 to C_3 chlorinated aliphatic hydrocarbons selected from the group consisting of CCl_4, $CHCl_3$, C_2H_3Cl, $C_2H_4Cl_2$, $C_2H_3Cl_3$, $C_2H_2Cl_4$, C_2HCl_5, C_2Cl_6, C_2H_5Cl, $C_2H_2Cl_2$, C_2Cl_4, $C_3H_6Cl_2$, and C_2HCl_3, comprising liquid-liquid extraction on such mixtures, in the presence of one or more extraction agents having at least partial water-miscibility, and adding from 0 to 50% by weight of water, the extraction agents being selected from the group consisting of dimethylsulfoxide, dimethylformamide, sulfolane, C_1 and C_2 alkylated derivatives of sulfolane, N-methylpyrrolidone, hexamethylphosphotriamide, propylene carbonate, ethylene carbonate, ethylene glycol, propylene glycol, glycerol, diethylene glycol, triethylene glycol, tetraethylene glycol, dipropylene glycol, polyethylene and polypropylene glycols having a molecular weight of less than 600, furfuryl alcohol, tetrahydrofurfuryl alcohol, 2-methoxy ethanol, 2-ethoxy ethanol, 2-butoxy ethanol, 2-(2-methoxy ethoxy) ethanol, 2-(2-ethoxy ethoxy) ethanol, and 2-(2-butoxy ethoxy)

4,031,149
LOW TEMPERATURE CATALYTIC COMBUSTION OF CHLOROHYDROCARBONS

Jamal S. Eden, Akron, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed July 22, 1974, Ser. No. 490,513
Int. Cl.² C07C *21/00*
U.S. Cl. 260—654 A 13 Claims

1. In the process of producing chlorinated derivatives of ethylene which includes the step of oxyhydrochlorination whereby hydrogen chloride is reacted with oxygen and ethylene, the improvement which comprises separating in a stream from said process any unwanted chlorinated ethylene derivatives and other by-products, injecting said stream into a combustion catalyst bed comprised of 5% to 20% by weight of UO_2 and 95% to 80% by weight of a material selected from the group consisting of Al_2O_3, SiO_2 and a mixture of Al_2O_3 and SiO_2, injecting air into said bed along with said stream, maintaining said bed at a temperature in the range of about 350° C. to about 450° C. to produce a mixture of hot combustion gases containing essentially hydrogen chloride and being essentially free of both elemental chlorine and chlorohydrocarbon materials, and recycling said mixture of gases to said oxyhydrochlorination step.

4,031,150
CATALYTIC DIMERIZATION OF NORBORNADIENE TO BINOR-S

George Suld, Springfield; Abraham Schneider, Overbrook Hills, and Harry K. Myers, Jr., Green Ridge, all of Pa., assignors to Suntech, Inc., St. Davids, Pa.

Filed Nov. 14, 1975, Ser. No. 631,978
Int. Cl.² C07C *13/28*; C06B *43/00*; B01J *31/12*
U.S. Cl. 260—666 PY 2 Claims

1. Process for the catalytic dimerization of norbornadiene comprising:

a. reacting a feed consisting essentially of norbornadiene in the presence of an effective amount of a two-component catalytic system of tris(triphenylphosphine) rhodium chloride and one of the following: diethylaluminum chlor-

ide, ethylaluminum dichloride and aluminum ethylsesquichloride; and wherein the range of mole ratio of norbonadiene to tris(triphenylphosphine) rhodium chloride is between from about 100 to about 1000; and wherein the range of mole ration of diethylaluminum chloride or ethylaluminum dichloride or aluminum ethylsesquichloride to tris(triphenylphosphine) rhodium chloride is between from about 0.5 to about 100; and wherein the reacting occurs in the presence of a suitable solvent selected from the group consisting of aromatic hydrocarbons, cycloparaffins, halogenated aromatics, halogenated paraffins and halogenated cycloparaffins; and thereby provides a homogeneous reaction medium;

b. the reacting occurring within a temperature range between from about 25° to about 150° C; and

whereby the major product is Binor-S.

4,031,151

SEPARATION OF HYDROCARBONS

Frank J. Healy, Morristown, and Paul R. Geissler, Edison, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 556,432, March 7, 1975, abandoned, which is a continuation-in-part of Ser. No. 457,056, April 1, 1974, abandoned. This application May 12, 1976, Ser. No. 685,459

Int. Cl.² C07C 7/13; C10G 25/04; B01D 15/08

U.S. Cl. 260—666 A **35 Claims**

1. In a process for continuously separating, in a liquid phase, the components of a liquid hydrocarbon feedstream wherein at least one of said components is selectively adsorbed by contact with a solid sorbent utilizing a simulated countercurrent flow system wherein liquid streams are allowed to flow downward through a desorption zone, a rectification zone and a sorption zone, each zone being serially and circularly interconnected and divided into a plurality of serially interconnected sections, each section being packed with a mass of said solid sorbent, the improvement which comprises:

a. introducing a first desorbent stream containing a desorbent and a C_8-C_{18} paraffinic diluent into the first section of said desorption zone;

b. withdrawing a desorption effluent containing a selectively sorbed component from the last section of said desorption zone;

c. introducing a second desorbent stream containing said paraffinic diluent and at least about 10 weight percent of said desorbent into the first section of said rectification zone;

d. introducing said hydrocarbon feedstream into the first section of said sorption zone;

e. withdrawing a raffinate effluent containing a less sorbed component from the last section of said sorption zone; and

f. wherein the concentration of said desorbent present in the first desorbent stream is higher than the concentration of said desorbent present in the second desorbent stream by at least 20 weight percent.

4,031,152

PREPARATION OF DERIVATIVES OF CYCLOBUTANE AND CYCLOBUTENE

Joachim H. Lukas; Frank Baardman, and Adriaan P. Kouwenhoven, all of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

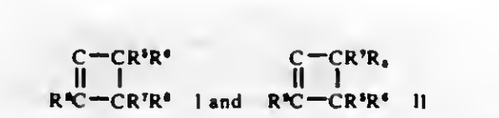
Division of Ser. No. 468,949, May 10, 1974, Pat. No. 3,965,204. This application Dec. 22, 1975, Ser. No. 643,419

Claims priority, application United Kingdom, May 10, 1973, 22362/73

Int. Cl.² C07C 3/03, 13/06

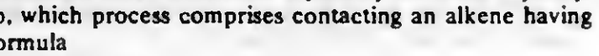
U.S. Cl. 260—666 A **12 Claims**

1. A process for the preparation of cyclobutene derivatives having the formulas



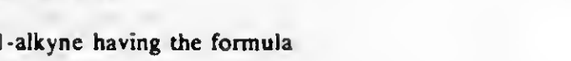
I and II

in which formulas I–II R^5 and R^6 each individually represents a primary or secondary alkyl group, R^8 and R^7 a hydrogen atom, a primary or secondary alkyl group, R^9 an alkyl group and R^5 and R^6 each individually represents a hydrogen atom when R^7 represents a primary or secondary alkyl group having at least 2 carbon atoms and R^8 a primary or secondary alkyl group, which process comprises contacting an alkene having the formula



III

with a 1-alkyne having the formula



IV

R^5, R^6, R^7, R^8 and R^9 in the formulas III–IV having the same meanings as in the formulas I–II, in the liquid phase in the presence of a dissolved Lewis acid derived from an element of Group III A of the Periodic Table of the Elements, titanium, tin, antimony, tantalum, rhenium, iron or zinc.

4,031,153

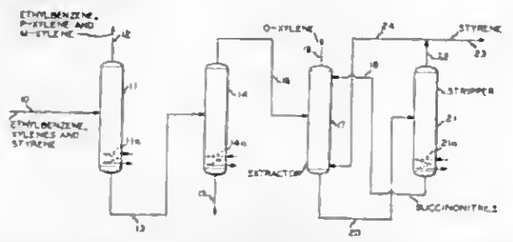
SEPARATION OF STYRENE FROM XYLENES

Donald M. Haskell, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sept. 25, 1975, Ser. No. 616,717

Int. Cl.² C07C 15/00

U.S. Cl. 260—669 A **12 Claims**



1. The method of separating styrene from a mixture comprising styrene, ethylbenzene, para-xylene, ortho-xylene and meta-xylene, which comprises fractionating the mixture to obtain a stream which consists essentially of ortho-xylene and styrene; introducing said stream consisting essentially of ortho-xylene and styrene into an intermediate region of a liquid-liquid extraction column; introducing a stream of succinonitrile into an upper region of said column; removing a raffinate stream enriched in ortho-xylene from the upper region of said column; removing an extract stream of succinonitrile enriched in styrene from the lower region of said column; and separating styrene from said extract stream.

4,031,154

BENZENE BY HYDROGENATIVE DEALKYLATION

Robert Raynold Edison, Olympia Fields, and Thorpe Dresser, Markham, both of Ill., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Sept. 15, 1975, Ser. No. 613,379

Int. Cl.² C07C 3/58

U.S. Cl. 260—672 R **10 Claims**

1. In the method in which a fresh feedstock consisting predominantly of aromatic hydrocarbon stream having a boiling point range within the range from 75° C to 230° C, is subjected to hydrodealkylation in a hydrodealkylation zone to prepare lower boiling normally liquid products of the group consisting of xylene, toluene, and benzene, the improvement which consists of recycling to extinction the naphthalene content of the crude reaction stream, whereby some of the recycled naphthalene is converted in the hydrodealkylation zone to products of said group of xylene, toluene, and benzene, the concentration of naphthalene in the total feedstock comprising recycle and fresh feedstock being maintained at a concentration less than about 10 percent by weight of total feedstock.

4,031,155

DUAL DESORBENT COMPOSITION AND TEMPERATURE SEPARATION PROCESSES

Frank J. Healy, Morristown, and Paul R. Geissler, Edison, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 617,491, Sept. 29, 1975, abandoned, which is a continuation of Ser. No. 457,056, April 1, 1974, abandoned. This application Mar. 26, 1976, Ser. No. 670,897

Int. Cl.² C10G 25/04; B01D 15/08; C07C 7/13

U.S. Cl. 260—674 SA **21 Claims**

1. In a process for continuously separating, in a liquid phase, the components of a liquid C_8 aromatic feedstream wherein at least one of said components is selectively adsorbed by contact with a solid sorbent material utilizing a simulated countercurrent flow system wherein liquid streams are allowed to flow downward through a desorption zone, a rectification zone and a sorption zone, each zone being serially and circularly interconnected and divided into a plurality of serially interconnected sections, each section being packed with a mass of said solid sorbent material, wherein said continuous separation is achieved by:

i. introducing a desorbent stream into the first section of said desorption zone;

ii. withdrawing a desorption effluent comprising at least one selectively sorbed component from the last section of said desorption zone;

iii. introducing said C_8 aromatic feedstream into the first section of said sorption zone; and

iv. withdrawing a raffinate effluent comprising a less sorbed component from the last section of said sorption zone,

the improvement which comprises:

a. introducing a first desorbent stream comprising a desorbent material selected from the group consisting of toluene, m-diisopropylbenzene, p-diethylbenzene, o-dichlorobenzene and a mixture of diethylbenzene isomers in an amount ranging from about 40 to about 100 weight percent and an inert paraffinic material having from 8 to 16 carbon atoms in an amount ranging from 0 to 60 weight percent into the first section of said desorption zone; and

b. introducing a second desorbent stream comprising said desorbent material in an amount ranging from about 10 to about 60 weight percent and said inert paraffinic material in an amount ranging from about 40 to about 90 weight percent into the first section of said rectification zone and wherein the concentration of said desorbent material present in the second desorbent stream is lower than the concentration of said desorbent material present in the first desorbent stream by at least 20 weight percent.

4,031,156

SEPARATION AND RECOVERY OF ETHYLBENZENE BY DUAL DESORBENT COMPOSITION AND TEMPERATURE SEPARATION PROCESSES

Paul R. Geissler, Edison, and Frank J. Healy, Morristown, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 556,435, March 7, 1975, abandoned. This application July 27, 1976, Ser. No. 708,924

Int. Cl.² C07C 7/13; B01D 15/08; C10G 25/04

U.S. Cl. 260—674 SA **19 Claims**

1. In a process for continuously separating, in a liquid phase, the components of a liquid C_8 aromatic feedstream containing ethylbenzene wherein at least one of said components is selectively adsorbed by contact with a solid sorbent material, utilizing a simulated countercurrent flow system wherein liquid streams are allowed to flow downward through a desorption zone, a rectification zone and a sorption zone, each zone being serially and circularly interconnected and divided into a plurality of serially interconnected sections, each section being packed with a mass of said solid sorbent material, the improvement which comprises:

a. introducing a first desorbent stream containing a desorbent and a diluent into the first section of said desorption zone;

b. withdrawing a desorption effluent containing a selectively sorbed component from the last section of said desorption zone;

c. introducing a second desorbent stream containing said diluent and at least about 15 weight percent of said desorbent into the first section of said rectification zone;

d. introducing said hydrocarbon feedstream into the first section of said sorption zone;

e. withdrawing a raffinate effluent containing a less sorbed component from the last section of said sorption zone; and

f. wherein the concentration of said desorbent present in the first desorbent stream is higher than the concentration of said desorbent present in the second desorbent stream by at least 20 weight percent.

4,031,157

METHOD FOR REMOVING ACETYLENIC COMPOUNDS FROM SATURATED, OLEFINIC AND DIENIC HYDROCARBONS OR MIXTURES THEREOF

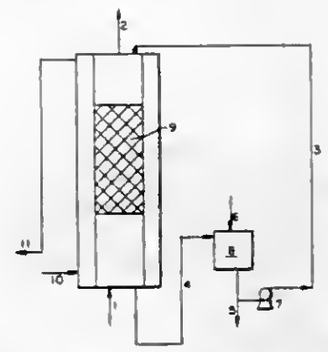
Carlo Rescalli, and Antonio Pacifico, both of San Donato Milanese, Italy, assignors to Snam Progetti S.p.A., San Donato Milanese, Italy

Filed May 21, 1975, Ser. No. 579,691

Claims priority, application Italy, May 21, 1974, 23011/74; Mar. 21, 1975, 21517/75

Int. Cl.² C07C 7/04

U.S. Cl. 260—676 R **1 Claim**



1. A method for removing acetylenic compounds from saturated, olefinic or dienic hydrocarbons or their mixtures which comprises removing said acetylenic compounds from said saturated, olefinic or dienic hydrocarbons or their mixtures by etherification with an alcohol or a glycol in presence of an acid ion-exchange resin, containing mercuric ions and subsequently removing the produced ethers by distillation.

4,031,158

METHOD FOR PREPARATION OF POLYOLEFIN OIL

Hiroshi Isa; Toshiyuki Ukigai, both of Yachiyo; Auri Tominaga, Tokyo; Ryozo Tanlyasu, Narashino, and Masuzo Nagayama, Tokyo, all of Japan, assignors to Lion Fat & Oil Co., Ltd., Tokyo, Japan

Filed July 22, 1976, Ser. No. 707,614
Claims priority, application Japan, July 29, 1975, 50-92198
Int. Cl.² C07C 3/18
U.S. Cl. 260—683.15 B 6 Claims

1. A method of preparing a polyolefin oil comprising polymerizing an olefin having 6 or more carbon atoms at a temperature in the range of from 50 to 150° C in the presence of a catalyst mixture consisting of a polyhydric alcohol derivative and an aluminum halide, said derivative being obtained by replacing hydrogen atoms of all the hydroxyl groups of the polyhydric alcohol by alkyl groups having 1 to 20 carbon atoms.

4,031,159

METHOD FOR PREPARATION OF POLYOLEFIN OIL

Hiroshi Mandai, Chiba; Toshiyuki Ukigai, Yachiyo; Auri Tominaga, Higashi-Iko, and Michito Sato, Yokohama, all of Japan, assignors to Lion Fat & Oil Co., Ltd., Tokyo, Japan

Filed July 22, 1976, Ser. No. 707,612
Claims priority, application Japan, July 29, 1975, 50-92199
Int. Cl.² C07C 3/18
U.S. Cl. 260—683.15 B 8 Claims

1. A method of preparing a polyolefin oil comprising polymerizing an olefin having 6 or more carbon atoms at a temperature in the range of from 50° to 150° C in the presence of a catalyst mixture consisting of a polyester and an aluminum halide, said polyester being obtained by esterifying all the carboxyl groups of a polycarboxylic acid having 2 to 20 carbon atoms with an aliphatic saturated alcohol having 1 to 20 carbon atoms.

4,031,160

2-AMINO-4-HYDROXY-5-CHLORO TOLUENE AND THE HYDROCHLORIDE THEREOF

Gregoire Kalopissis, Paris, and Andree Bugaut, Boulogne-sur-Seine, both of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France

Continuation of Ser. No. 273,810, July 21, 1972, abandoned, which is a continuation of Ser. No. 841,569, July 14, 1969, abandoned, which is a continuation-in-part of Ser. No. 525,291, Feb. 7, 1966, Pat. No. 3,591,323. This application June 30, 1975, Ser. No. 592,051
Claims priority, application France, May 6, 1965, 65.16140
Int. Cl.² C07C 91/42; A61K 7/12; D06P 1/32
U.S. Cl. 260—575 2 Claims

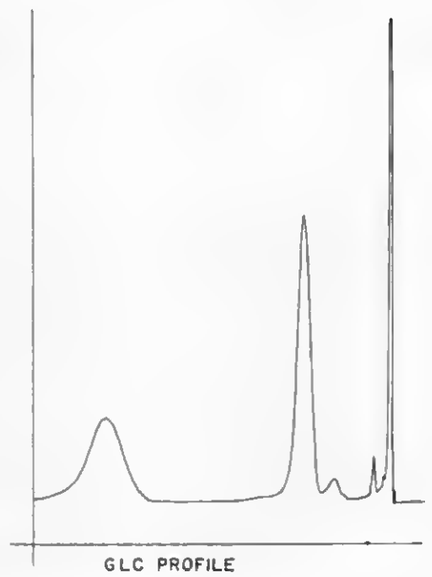
1. 2-amino-4-hydroxy-5-chloro toluene and its hydrochloride salt.

4,031,161

PROCESS FOR PRODUCING MIXTURE CONTAINING 4-(4'-METHYL-4'-HYDROXYAMYL)-Δ³-CYCLOHEXENE CARBOXALDEHYDE

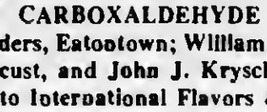
James Milton Sanders, Eatontown; William I. Taylor, Summit; Ira D. Hill, Locust, and John J. Kryschuk, Howell, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed June 9, 1976, Ser. No. 694,391
Int. Cl.² C07C 45/00
U.S. Cl. 260—598 10 Claims



1. A process for producing a mixture containing a major proportion of 4-(4'-methyl-4'-hydroxyamyl)-Δ³-cyclohexene carboxaldehyde having the structure:

comprising the step of intimately admixing myrac aldehyde having the structure:



with a hydrating reagent selected from the group consisting of:

i. mixture of lower alkanoic acid and p-toluenesulfonic acid;
ii. mixture of 30% aqueous sulfuric acid and tetrahydrofuran;
iii. mixture of 30% sulfuric acid and dimethyl formamide;
iv. mixture of 50% sulfuric acid and tetrahydrofuran;
v. mixture of 65% sulfuric acid and acetic acid;
vi. mixture of methane sulfonic acid and tetrahydrofuran;
vii. sulfonated co-polymer of styrene and divinyl benzene cation exchange resin;
viii. mixture of (a) sulfonated co-polymer of styrene and divinyl benzene cation exchange resin and (b) lower alkanoic acid; or
ix. mixture of aqueous hydrochloric acid and a lower alkanol

at a temperature in the range of from 0° C up to 120° C, the reaction being carried out over a period of time varying from 1 hour up to 48 hours and the concentration of hydrating reagent in the reaction mass varying from about 3 up to about 50%, the reaction being carried out in the presence of water.

4,031,162

POLYMER FILM WITH NARROW MOLECULAR WEIGHT DISTRIBUTION AND SARAN AND LAMINATES THEREOF

Harri J. Brax; Joseph F. Porinchak, both of Spartanburg, and Alan S. Weinberg, Greenville, all of S.C., assignors to W. R. Grace & Co., Duncan, S.C.

Division of Ser. No. 344,005, March 22, 1973, which is a division of Ser. No. 129,501, March 30, 1971, Pat. No. 3,741,253. This application Jan. 2, 1976, Ser. No. 646,081
Int. Cl.² C08L 63/00, 27/00
U.S. Cl. 260—837 PV 5 Claims

1. A saran composition useful for melt extruding to form a film or the like comprising a blend of

a. 5–40 weight percent of a polymer of vinylidene chloride prepared by a suspension polymerization method and
b. 60–95 weight percent of a polymer of vinylidene chloride prepared by an emulsion polymerization method,

said polymers each containing at least 50% by weight of vinylidene chloride.

4,031,163

HARDENABLE RESINS BASED UPON ALLYL COMPOUNDS

Norbert Vollkommer, Troisdorf, and Werner Trautvetter, Troisdorf-Spich, both of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Filed Mar. 25, 1975, Ser. No. 561,717
Claims priority, application Germany, Mar. 26, 1974, 2414364
Int. Cl.² C08G 45/04
U.S. Cl. 260—837 R 37 Claims

1. A cross-linked polymer having (in percent by weight):

a. Between 22 and 76 units of a residue of a nuclearly brominated or chlorinated xylyleneglycolbisallylether;
b. Between 11 and 54 units of a residue of maleic acid anhydride;
c. Between 6 and 57 units of a residue of a 1,2 epoxy compound.

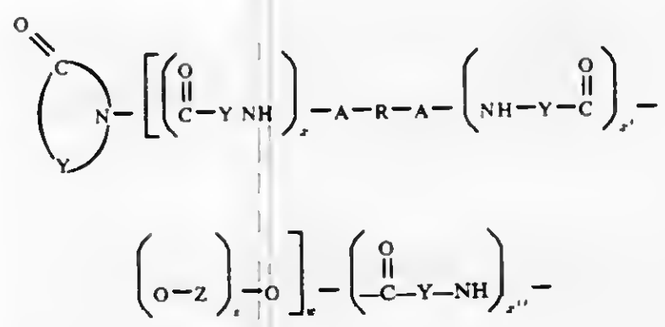
4,031,164

LACTAM-POLYOL-POLYACYL LACTAM TERPOLYMERS

Ross Melvin Hedrick, Creve Coeur, and James D. Gabbert, St. Louis, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Continuation of Ser. No. 477,134, June 6, 1974, abandoned, which is a continuation-in-part of Ser. No. 341,215, March 14, 1973, abandoned. This application Aug. 25, 1975, Ser. No. 607,654
Int. Cl.² C08L 77/00; C08G 69/16
U.S. Cl. 260—857 PG 34 Claims

1. A lactam-polyol-polyacyl lactam terpolymer having the general formula:



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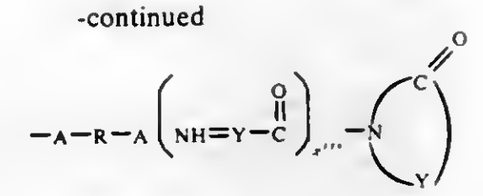


wherein $(O—Z)_z$ is a polyol segment having a molecular weight of at least 62 and Z is a hydrocarbon or substituted hydrocarbon group said group being alkylene, arylene, alkylene carbonyl, arylene carbonyl, and mixtures thereof;

A is a carbonyl group;

R is a divalent or polyvalent hydrocarbon group;

Y is an alkylene or substituted alkylene having from about 3 to about 14 carbon atoms;

x, x', x'', and x''' are integers and the total number of x's is equal to $2w + 2$;

z and w are integers of equal to one or more;

and said lactam-polyol-polyacyl lactam block terpolymers are comprised of at least about 18 to about 90 percent by weight of polyol blocks.

4,031,165

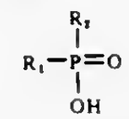
PROCESS FOR PREPARING POLYESTER ELASTOMERS

Noritsugu Saiki; Yoshihiko Takeuchi, and Hiroshi Sakai, all of Iwakuni, Japan, assignors to Teijin Limited, Osaka, Japan

Filed Sept. 29, 1975, Ser. No. 617,844
Claims priority, application Japan, Sept. 30, 1974, 49-111644; Oct. 3, 1974, 49-113284; Oct. 11, 1974, 49-116163; Oct. 11, 1974, 49-116164; Mar. 14, 1975, 50-30196; Mar. 27, 1975, 50-36121
Int. Cl.² C08G 81/00, 63/04
U.S. Cl. 260—860 6 Claims

1. In a process for preparing a block copolyester elastomer having a softening point of at least 120° C by reacting an aromatic polyester (I) having a reduced viscosity of at least 0.4 and derived from an aromatic dicarboxylic acid or its ester-forming derivative as a main acid component with an aliphatic polyester (II) having a reduced viscosity of at least 0.4 and derived from an aliphatic dicarboxylic acid or an aliphatic hydroxycarboxylic acid or an ester-forming derivative of each of these acids in the molten state; the improvement wherein

A. the aromatic polyester (I) is derived from a dicarboxylic acid component more than 70 mole % of which consists of terephthalic acid and diol component more than 70 mole % of which consists of tetramethylene glycol or trimethylene glycol,
B. the weight ratio of the aromatic polyester (I) to the aliphatic polyester (II) is 0.25 to 9, and
C. the reaction between the polyester (I) and the polyester (II) is carried out until a polymer is obtained which has an elasticity recovery of at least 50% after it is stretched 20% and then relaxed for 5 minutes, the reaction of the polyester (I) with the polyester (II) being carried out in the presence of a titanium-type catalyst, and after the reaction has proceeded to the stage of (C), at least one compound selected from the group consisting of phosphorus compounds of the formula



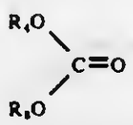
wherein R_1 and R_2 are identical to, or different from, each other, and represent a hydrogen atom, an alkyl, cycloalkyl, aralkyl or aryl group each containing not more than 20 carbon atoms or OR_3 in which R_3 represents a metal, ammonium or the same group or atom as R_1 independently from R_1.

diaryl dicarboxylates of the formula

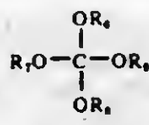
AOOC — X_n — COOB

wherein n is 0 or 1, X is a divalent organic group, and A and B are identical to, or different from, each other and represent a monovalent aryl group containing 6 to 20 carbon atoms and being free from an ester-forming functional group,

carbonic acid esters of the formula



wherein R_4 and R_5 are identical to, or different from, each other, and represent an aryl group containing no ester-forming functional group, and ortho-carbonate compounds of the formula



wherein R_6, R_7, R_8 and R_9 are identical to, or different from, each other, and represent a monovalent aryl group containing no ester-forming functional group,

being added in an amount which stops or inhibits the above reaction.

4,031,166

IMPACT-RESISTANT POLYSTYRENE, α-OLEFIN, BLOCK COPOLYMER BLENDS

Klaus Bronstert, Carlsberg; Gerhard Fahrbach, Schwetzingen; Eduard Krahe, Altrip; Volker Ladenberger, Schwetzingen, all of Germany; Ernst-Guenther Kastning, late of Assenheim, Germany (by Marie-Louise Hermine Kastning, heiress-at-law); Hans Mittnacht, Mannheim, Germany; Herbert Willersinn, Ludwigshafen, Germany, and Hans-Georg Trieschmann, Hambach, Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Continuation of Ser. No. 108,169, Jan. 20, 1971, abandoned. This application Feb. 19, 1974, Ser. No. 443,750

Claims priority, application Germany, Jan. 29, 1970, 2003916

Int. Cl.² C08L *53/02, 23/04, 23/10, 9/06*

U.S. Cl. 260—876 B **8 Claims**

1. An impact-resistant thermoplastic molding material for forming rigid products containing a mixture of:

A. from 70 to 99% by weight of a high molecular weight homopolymer of styrene or of a high molecular weight copolymer of styrene with up to 60% by weight of a styrene derivative bearing a substituent on the nucleus or a side chain; and

B. from 30 to 1% by weight of a soft component consisting essentially of a mixture of:

1. an α-olefin polymer and

2. a substantially gel-free uncrosslinked block copolymer of 15 to 60% by weight of a vinyl aromatic and 85 to 40% by weight of a diene hydrocarbon which has been prepared by anionic solution polymerization,

the relative weight ratio of (1) to (2) being from 15:1 to 1:3.

4,031,167

CROSSLINKING FLUOROCARBON COMPOSITIONS USING POLYALLYLIC ESTERS OF POLYCARBOXYLIC ACIDS

Elihu J. Arnooff, Framingham, and Kewal Singh Dhami, Shrewsbury, both of Mass., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Division of Ser. No. 402,302, Oct. 1, 1973, Pat. No. 3,911,192. This application June 5, 1975, Ser. No. 584,136

Int. Cl.² C08L *27/14, 27/16, 27/18, 27/20*

U.S. Cl. 260—884 **7 Claims**

1. A polymeric composition comprising a fluorocarbon polymer and a blend of at least two polyallylic esters, said polyallylic esters in said blend being incorporated in said mixture in an amount sufficient to promote crosslinking of said polymer, one of said polyallylic esters being a diallylic ester of a dicarboxylic acid in which the carboxylic groups are connected by an organic radical selected from the group consisting of alkylene, cycloalkylene, mixed alkylene-cycloalkylene and aralkylene radicals, and the other of said polyallylic esters being selected from the group consisting of triallyl esters and tetraallyl esters of aromatic and heterocyclic aromatic carboxylic acids and triallyl esters of isocyanuric acid, the ratio of said esters in said blend in such proportions so as to produce a combination of elongation and deformation resistance in said polymer which is greater than the average of such properties obtained with the individual esters when used alone.

4,031,168

COPOLYMERS OF ISOBUTYLENE AND A VINYLBENZENE AND GRAFT POLYMERS THEREOF WITH PIVALOLACTONE

William Henry Sharkey, and John Fergusoo Harris, Jr., both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 508,886, Sept. 24, 1974, abandoned. This application Sept. 25, 1975, Ser. No. 616,839

Int. Cl.² C08L *23/22*

U.S. Cl. 260—896 **8 Claims**

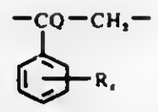
1. A graft copolymer of the formula

$X_mY_nY'_p(Z_q)_r$

wherein

X is an isobutylene monomer unit,

Y is a vinylbenzene monomer unit of the formula



in which

Q is hydrogen or lower alkyl

R is halogen, lower alkyl, chloro lower alkyl, lower alkoxy, or two adjacent R's together are methylenedioxy, and

s is an integer from 0 to 5,

Y' is a carboxylated Y unit,

Z is a pivalolactone monomer unit,

m represents the number of isobutylene monomer units in the copolymer,

n represents the number of non-carboxylated vinylbenzene monomer units in the copolymer,

p represents the number of carboxylated vinylbenzene monomer units in the copolymer and is 5 to 100% of $(n + p)$,

m and $(n + p)$ are in an m: $(n + p)$ ratio of 2:1 to 1000:1,

q represents the number of pivaloiactone monomer units per polypivalolactone side chain graft and is in the range of 2 to 500,

r represents the number of polypivalolactone side chain grafts in the graft copolymer and is substantially equal to p,

X, Y and Y' are randomly interconnected through carbon to carbon linkages with single Y and Y' units predominantly connected only to X units,

Z_q is a single polypivalolactone side chain grafted to a Y' unit through the carboxyl group, and

$(Z_q)_r$ is 3 to 80% by weight of the graft copolymer, and the copolymer has an $X_mY_nY'_p$ equivalent weight per carboxyl group of 200 to 1×10^5.

4,031,169

THERMOPLASTIC ELASTOMERIC POLYMER BLEND

Harris L. Morris, Woodbridge, Conn., assignor to Uniroyal Inc., New York, N.Y.

Filed Sept. 11, 1975, Ser. No. 612,419

Int. Cl.² C08L *23/16*

U.S. Cl. 260—897 A **15 Claims**

1. A thermoplastic, elastomeric and reprocessable polymer blend comprising

A. 30 to 90 parts by weight of a terpolymer rubber of (i) ethylene, (ii) an alpha-monoolefin having the structure CH_2=CH—R wherein R is an alkyl radical having from 1 to 12 carbon atoms, the ratio of ethylene to alpha-monoolefin being from 70/30 to 85/15 by weight, and (iii) dicyclopentadiene, and

B. correspondingly 70 to 10 parts by weight of a polyolefin resin,

the said terpolymer (A) having a zero shear viscosity not greater than 0.5×10^9 poises at 135° C, and the said blend having an ultimate tensile strength of at least 1000 psi, an elongation at break of at least 100%, and an elongation set at break not greater than 50%.

4,031,170

PHOSPHORUS COMPOUNDS

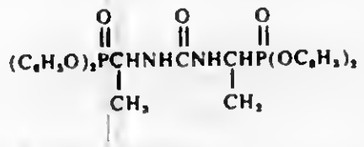
Gail H. Birum, Kirkwood, Mo., assignor to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 385,779, Aug. 6, 1973, Pat. No. 3,954,860. This application July 14, 1975, Ser. No. 595,956

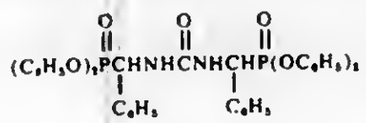
Int. Cl.² C07F *9/40*

U.S. Cl. 260—932 **4 Claims**

1. As a composition of matter



2. As a composition of matter



4,031,171

ULTRASONIC AIR HUMIDIFYING APPARATUS

Makoto Asao, Tokyo; Susumu Ito, Yokosuka, and Hidetoshi Umehara, Sagamihara, all of Japan, assignors to Mikuni Kogyo Kabushiki Kaisha, Tokyo, Japan

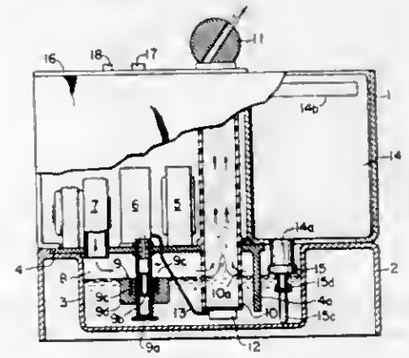
Filed Dec. 23, 1975, Ser. No. 643,867

Claims priority, application Japan, Dec. 25, 1974, 49-156751[U]

Int. Cl.² B01F *3/04*

U.S. Cl. 261—1 **12 Claims**

1. An ultrasonic air humidifying apparatus comprising an upper cabinet, a lower cabinet separably connected with said upper cabinet, a water vessel formed in said lower cabinet, a chassis board interposed between said upper cabinet and lower cabinet, a high frequency generator fixed on said chassis board, a conduit pipe secured to said chassis board and extending upward in its upper part through said cabinet and extending in its lower part into said water vessel and having holes in a position just above a standard level of water received in said water vessel, an ultrasonic vibrator assembly fixed to the lower end of said conduit pipe spaced from the



bottom of said water vessel and connected with said high frequency generator to produce mist from the water within said conduit pipe, a motor-blower fixed on said chassis board for introducing air into said conduit pipe through said holes and conveying the mist within said conduit pipe, and a water supply means for maintaining the water level in said water vessel constant.

4,031,172

PROCESS FOR PREPARING NITROCELLULOSE FOR USE IN SMALL ARMS

Edward H. Zeigler, Cumberland, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Continuation of Ser. No. 544,529, Jan. 27, 1975. This application Sept. 28, 1976, Ser. No. 727,555

Int. Cl.² G21C *21/00*

U.S. Cl. 264—3 B **5 Claims**

1. A process for preparting colloided nitrocellulose for use in small arms having a gravimetric loading density of at least 0.95 gm/ml., said process comprising,

a. preparing a syrup of nitrocellulose in diethylene glycol monomethyl ether, said nitrocellulose containing 13.35%N (minimum) and said syrup comprising from about 5% to about 35% by weight of nitrocellulose,

b. adjusting viscoty of said syrup to about 3000 centipoises,

c. forcing said viscosity-adjusted syrup under sufficient pressure into a streaming head containing about 90 orifices to extrude through said orifixs, each of said orifices being about 0.0135 inch in diameter,

d. vibrating said streaming head while said pressurized syrup is flowing therethrough to form falling droplets of said syrup about 14 inches below said streaming head, said vibrations being imparted to said streaming head in a direction parallel to the gravitational path of said falling droplets,

e. introducing said droplets into a gelling bath comprising an aqueous solution of diethylene glycol monomethyl ether, said bath solution containing at the initial point of contact with the droplets from about 30% to about 50% by weight of water and from about 50% to about 70% by weight of diethylene glycol monomethyl ether to rapidly gel the surface of the droplet so that no substantial distortion of the droplet occurs,

f. leaching the gelled droplet in the presence of water until substantially all of the diethylene glycol monomethyl ether in the gelled droplet has been replaced by water, and

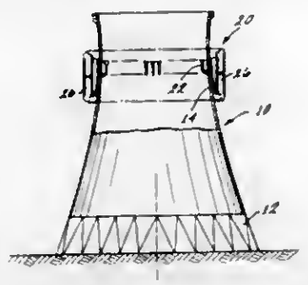
g. subjecting the resulting water-swollen gel to drying conditions to produce a colloided nitrocellulose having a gravimetric loading density of at least 0.95 gm/ml.

4,031,173

EFFICIENCY AND UTILIZATION OF COOLING TOWERS

Paul Rogers, 1801 Century Park East, Los Angeles, Calif. 90067

Filed Mar. 25, 1976, Ser. No. 670,122
Int. Cl.² F03D 9/00; F23L 17/02
U.S. Cl. 261—24 7 Claims



1. In a structure of the character described in combination, a cooling tower of the type in which a vertical draft of air is produced for purposes of cooling water for condensing exhaust steam, means comprising a rotor carried by the tower at an elevated position and means whereby the rotor rotates around the vertical axis of the tower on the exterior thereof and is exposed to wind, the rotor being constructed whereby it is caused to rotate by prevailing winds, and means for transforming energy generated by rotation of the rotor.

4,031,174

PROCESS OF PRILLING MOLTEN MATERIALS

Frank William Bennett, Woodbridge, England, assignor to Fisons Limited, London, England

Continuation-in-part of Ser. No. 437,216, Jan. 28, 1974, abandoned. This application July 10, 1975, Ser. No. 594,674
Claims priority, application United Kingdom, Feb. 9, 1973, 6592/73; Apr. 18, 1973, 18609/73
Int. Cl.² B01J 2/04
U.S. Cl. 264—14 10 Claims

1. In a process of prilling a molten material in a cooling tower comprising:

A. directing falling droplets of a molten material selected from the group consisting of sulfur and fertilizer materials into a cooling tower having a zone formed by an upwardly flowing carrier gas stream to cool and at least partially solidify the molten droplets, and

B. collecting the at least partially solidified droplets at the bottom of the cooling tower and permitting all the droplets to completely solidify,

the improvement wherein

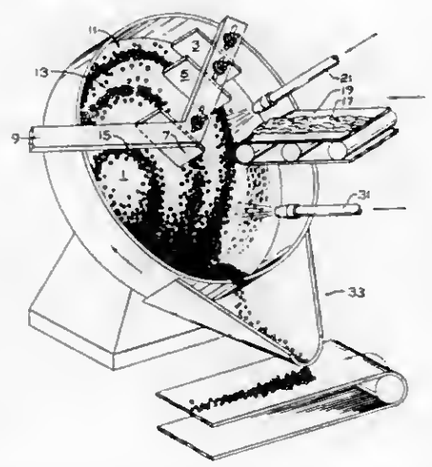
C. the carrier gas stream in said zone carries suspended therein, droplets of a volatile material having a mean drop diameter of 60 to 500 micrometers, said volatile material being such that it volatilizes into vapors on contact with the droplets of said molten material whereby heat is removed from the molten material droplets so as to cool and form at least a solidified skin on said droplets, said carrier gas being at least saturated with the vapors of the volatile material such that the carrier gas varies between a saturated and supersaturated state in respect to the vapors of volatile material, said carrier gas flowing counter-current to the molten droplets at a velocity of 0.1 to 10 meters per second with the proviso that the velocity of the carrier gas does not exceed the terminal velocity of the droplets of the falling molten material.

4,031,175

GLASS BATCH PELLETIZING METHOD

Joseph E. Cooper, Brakenridge, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 503,130, Sept. 4, 1974, and Ser. No. 622,296, Oct. 14, 1975, each is a continuation-in-part of Ser. No. 398,106, Sept. 17, 1973, abandoned, which is a continuation-in-part of Ser. No. 166,115, July 26, 1971, abandoned. This application Mar. 10, 1976, Ser. No. 665,642
Int. Cl.² B01J 2/12
U.S. Cl. 264—40.7 10 Claims



1. A method for forming particulate glass batch material into pellets having a controlled selected size range, comprising:

a. rotating in a clockwise direction a pelletizing disc inclined at about 40° to 55° from horizontal;

b. depositing onto the disc at approximately a four o'clock position a dry particulate glass batch mixture including sand, fine ground limestone, and fine ground dolomite, the mixture being at least about 20 percent by weight finer than 100 mesh and at least 15 percent by weight finer than 200 mesh;

c. spraying onto the disc on aqueous solution of 50 to 75 percent by weight alkali metal hydroxide;

d. permitting the materials deposited onto the disc and contacted with the alkali metal hydroxide solution to roll the disc and tumble over one another to form pellets of said dry mixture which are bound together by said aqueous solution;

e. controlling the relative flow rates of the dry glass batch mixture and the aqueous hydroxide solution in (b) and (c) above so as to produce uniformly sized pellets with uniform compositions;

f. controlling the moisture content of the materials on the disc so as to produce pellets having a moisture content of about 5 to 10 percent by weight; and

g. removing said pellets fom the disc as they attain a selected size range.

4,031,176

METHOD OF INJECTION MOLDING EXPANDED THERMOPLASTICS AND ARTICLES PRODUCED THEREBY

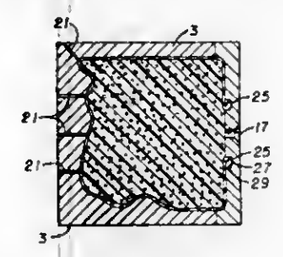
Robert A. Molbert, Salem, N.H., assignor to The General Tire & Rubber Company, Akron, Ohio

Filed May 3, 1971, Ser. No. 139,644
Int. Cl.² B29D 27/00; B29C 1/04
U.S. Cl. 264—45.2 9 Claims

1. A method of injection molding an expanded thermoplastic article to achieve a smooth skin over a substantial portion thereof, comprising the steps of:

a. injecting through a sprue opening in a cavity formed by a pair of closed hard metal injection mold members that are maintained at a temperature below about 100° F., there

being attached about and over said sprue opening and interiorly of said cavity a smooth-surfaced, thin, nonporous cured elastic rubber membrane, a short-shot of non-expanded molten expandable thermoplastic into said cavity and against said membrane, while simultaneously increasing the cavity pressure to a level below the injection pressure and above the thermoplastic expansion pressure of said molten non-expanded expandable thermoplastic, so that said non-expanded molten expandable thermoplastic forms a pocket in said membrane and



gradually cools and develops a smooth, thin skin adjacent said membrane, and

b. releasing the cavity pressure to permit expansion of said thermoplastic and deformation of said membrane into full conformance with the interior surface of said mold cavity to form an expanded article having a smooth, thin skin over that portion in contact with said membrane, said membrane being non-adherent to and releasable from the skin of said article and from the interior surface of said mold cavity.

4,031,177

PROCESS FOR THE MANUFACTURE OF ARTICLES OF TRANSLUCENT ALUMINA

Alain Auriol, and Paul Tritten, both of Tarbes, France, assignors to Compagnie Generale d'Electroceramique, Paris, France

Continuation of Ser. No. 273,581, July 20, 1972, abandoned, which is a continuation-in-part of Ser. No. 84,456, Oct. 27, 1970, abandoned. This application Oct. 17, 1975, Ser. No. 623,274
Claims priority, application France, Oct. 31, 1969, 69.37585; Aug. 3, 1971, 71.28434
Int. Cl.² F27B 9/04; F27D 7/06
U.S. Cl. 264—65 6 Claims

1. In a process for manufacturing articles of translucent alumina by sintering articles molded from a very pure fine powder containing a small portion of a grain-growth inhibiting substance, comprising the steps of:

a. preliminarily sintering said powder in an oxidizing atmosphere at a temperature between about 700° C and about 1100° C., followed by

b. final sintering at a temperature above 1700° C., in a nonoxidizing medium, the improvement which comprises conducting final sintering in a carbon monoxide atmosphere.

4,031,178

STRENGTH IMPROVEMENT IN MACHINED SIC BODIES

Curtis A. Johnson, and Svante Prochazka, both of Baliston Lake, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Apr. 9, 1976, Ser. No. 675,618
Int. Cl.² C04B 35/56
U.S. Cl. 264—65 8 Claims

1. A method for increasing the fracture strength of a machined polycrystalline silicon carbide body having a density of at least 85% of the theoretical density of silicon carbide and containing silicon carbide in an amount of at least 90% by weight of said body, machining said body inducing surface irregularities which significantly limit the fracture strength thereof, and firing said machined body in an atmosphere ranging in pressure from about 10^{-3} torr to 25 torr wherein the residual gases have no significant deteriorating effect on said silicon carbide body at a temperature ranging from about

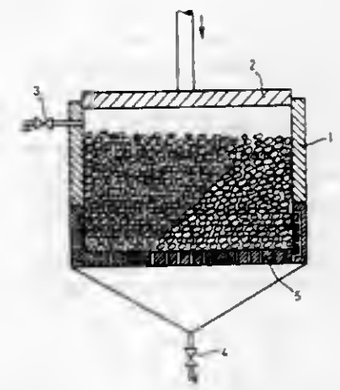
1400° C to 2100° C to increase the fracture strength thereof at room temperature by at least about 10% compared to that of the as-machined body, said body being free of constituent which are not chemically inert nor undergoe significant melting or vaporization at said firing temperature.

4,031,179

MANUFACTURE OF SHAPED ARTICLES OF FOAMED OLEFIN POLYMERS

Hermann Tatzel, Leutershausen; Wolfram Koegel, Mannheim; Gilbert Beck, Ludwigshafen; Ludwig Zuern, Bad Duerkheim, and Arndt Christian Caesar, Frankenthal, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed June 18, 1974, Ser. No. 480,404
Claims priority, application Germany, June 20, 1973, 2331304
Int. Cl.² B29F 5/02
U.S. Cl. 264—91 3 Claims



1. A process for the manufacture of shaped articles of foamed olefin polymers consisting essentially of

a. providing a gas-tight shaping means or mold having at least one movable wall means;

b. introducing completely foamed crosslinked olefin polymer particles into said gas tight shaping means or mold;

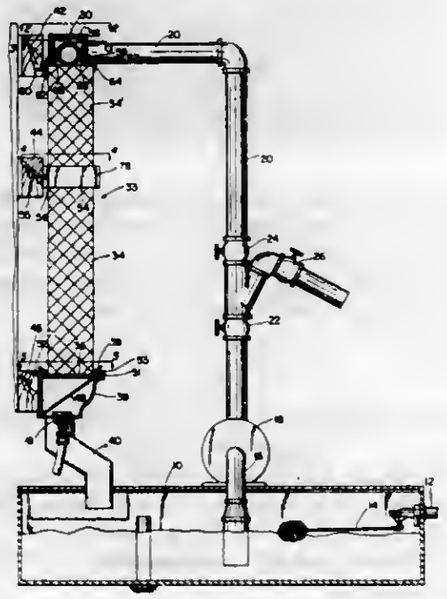
c. heating said particles by passing a gaseous or liquid heating medium through the mold, to temperatures which are from 5 to 150° above the crystallite melting point of said polymer;

d. simultaneously mechanically compressing said particles by said movable wall means;

e. reducing the air pressure in said shaping means or mold prior to or during said compression to a valve which is at least 50 mm of Hg below ambient atmospheric pressure to form a sintered foamed crosslinked olefin polymer article;

f. venting said mold and cooling said article; and,
g. removing said sintered foamed crosslinked olefin polymer article from said shaping means or mold.

4,031,180
COOLING PAD SYSTEM
Hoy R. Bohanon, Muskogee, Okla., assignor to Acme Eng. & Mfg. Corporation, Muskogee, Okla.
Filed June 22, 1976, Ser. No. 698,737
Int. Cl.² B01F *3/04*
U.S. Cl. 261—106 **6 Claims**



1. In an evaporative cooling system including a sump, a water conductor positioned along the top of an opening within a wall of a building and provided with a plurality of openings therealong, a pump for transferring water from the sump to the conductor, a gutter positioned along the bottom of the opening within the wall of the building, and a conduit connecting the gutter to the sump, the improvement comprising a plurality of individually distinct cooling cells, each cell consisting of a plurality of water absorbing sheets having corrugations, the corrugations of adjacent sheets intersecting each other, a plurality of support brackets positioned in spaced relationship along the gutter, a pan resting on said support brackets along the top of said gutter, said pan being provided with a plurality of openings therein, the bottom of said cooling cells resting on said pan, a plurality of pad cover brackets spaced apart from each other immediately above said water conductor and being provided with retainers on each side thereof located on opposite sides of said water conductor and terminating downwardly in flanges that are spaced apart from each other a distance corresponding to the distance between the faces of said cells such that the top portions of said cells are held securely between said flanges, and a plurality of pad covers connected between said pad cover brackets to form a continuous wall above said water conductor.

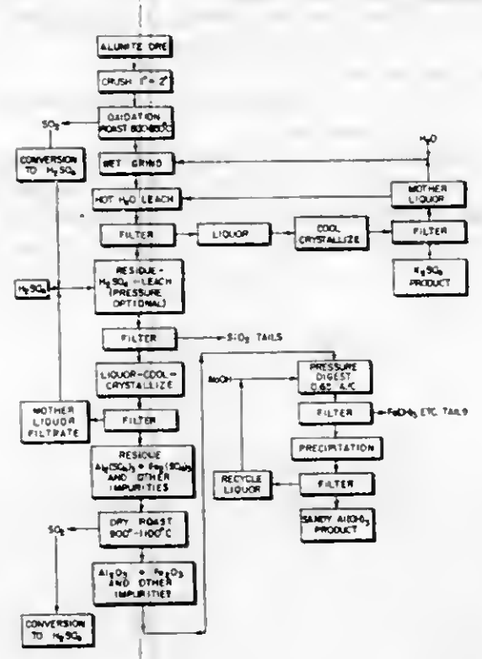
4,031,181
METHOD FOR MOLDING HIGH STRENGTH FACING
William H. Schaefer, and Richard E. Bender, both of San Diego, Calif., assignors to General Dynamics Corporation, San Diego, Calif.
Continuation of Ser. No. 550,259, Feb. 18, 1975, abandoned, which is a division of Ser. No. 332,956, Feb. 15, 1973, Pat. No. 3,889,951, which is a continuation-in-part of Ser. No. 241,176, April 5, 1972, Pat. No. 3,840,230. This application May 10, 1976, Ser. No. 684,525
Int. Cl.² B29D *3/02*
U.S. Cl. 264—135 **4 Claims**

1. The method of making a reinforcing facing for a game racket having an open frame connected to an elongated handle by a throat area which comprises:
impregnating a tow of substantially continuous, substantially parallel high Young's modulus fibers with a synthetic resin;
arranging said tow in a mold having an open frame area connected to a handle area by a throat area;
molding said tow into a substantially U-shaped cross-section in the frame area, modified through the throat area to a substantially rectangular cross-section in the handle area;
impregnating at least two sheets of high Young's modulus fiber cloth with a synthetic resin, said cloth having from about 0 to 50% woof fibers and from about 50 to 100% warp fibers;

placing said at least two sheets of fiber cloth over said tow in said mold so as to contact the base of said U-shape and cover the frame area, handle area and throat area;
placing said sheets of cloth with the warp fibers in each succeeding layer in the frame area at an angle of at least about 45° to the fibers in the preceding layer and placing said layers of cloth in the handle area at an angle of at least 30° to the fibers in the preceding layer, the warp fibers in all layers in the handle area being placed at angles of no more than about 60° to the handle centerline; and
applying pressure to said mold and hardening said resin to form a unitary facing comprising fibers in a resin matrix.

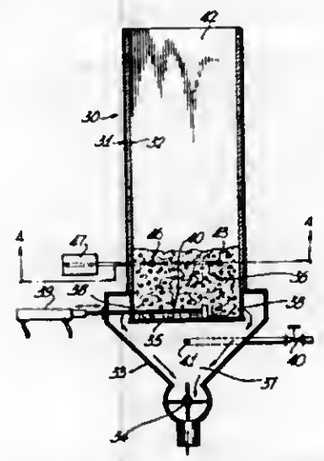
4,031,182
RECOVERY OF ALUMINUM FROM ALUNITE ORE USING ACID LEACH TO PURIFY THE RESIDUE FOR BAYER LEACH
Kent W. Loest, Broomfield, Colo., assignor to Southwire Company, Carrollton, Ga.; National Steel Corporation, Pittsburgh, Pa. and Earth Sciences, Inc., Golden, Colo., part interest to each
Filed Mar. 24, 1976, Ser. No. 669,621
Int. Cl.² C01F *7/06, 7/14*
U.S. Cl. 423—127 **7 Claims**

1. A process for recovering aluminum hydroxide from alunite ore which comprises:
a. grinding the ore to particulate form;
b. oxidation roasting the particulate ore to remove water and sulfur and convert the aluminum values to alumina;
c. grinding the calcined ore;
d. leaching the roasted and ground ore with water to remove compounds of sulfur and alkali metal including potassium sulfate resulting in a residue containing aluminum values and silicates, and a solution containing soluble sulfates including K_2SO_4;
e. separating the residue and solution of step (d);
f. leaching said residue of step (d) with a 10 to 35 percent solution of sulfuric acid to convert the aluminum values therein to soluble aluminum sulfate, and leaving a residue containing SiO_2, said leaching process to be carried out at a temperature between about 120 and 180° C.
g. separating the residue of step (f) from the solution of step (f);
h. crystallizing aluminum sulfate from the solution of step (f);
i. calcining the aluminum sulfate of step (h) to drive off sulfur dioxide and convert the aluminum sulfate to aluminum oxide;
j. digesting the calcined alumina of step (i) with caustic to convert the aluminum values therein to soluble aluminates;



k. filtering the liquid of step (j) to remove insoluble impurities;
l. precipitating aluminum hydroxide from the filtered liquid of step (k).

4,031,183
PROCESS FOR CALCINING LIMESTONE
Terence Arthur Rourke, Upper Long Beach Road, R.R. 3, Nelson, B.C., Canada (V1P 5P6)
Continuation-in-part of Ser. No. 559,193, March 17, 1973, abandoned. This application Feb. 17, 1976, Ser. No. 658,576
Int. Cl.² C01F *11/06*
U.S. Cl. 423—175 **3 Claims**



1. A process for the continuous production of calcined lime from limestone in a vertical kiln in which fuel is supplied through a plurality of injectors circumferentially spaced around the kiln in a single horizontal plane spaced from the lower end of the kiln and combustion air is supplied to said kiln, from a level below said injectors, counter current to the flow of limestone, comprising:
a. charging limestone ranging in size up to about five inches to the top of said kiln for downward movement therethrough;
b. continuously blowing air upwardly through said kiln in an amount sufficient to support combustion, and injecting fuel at a pressure in the range between 200 and 15000 psi through each of said injectors in a predetermined sequence at a rate between 100 and 500 injections per injector per minute, each of said injections occurring in a time period between 0.02 and 0.2 seconds, with a time period of 0.1 to 0.5 seconds between injections, the time period between injections being longer than the time of the injections thereby establishing lamellar flow of fuel and air in said kiln; and
c. withdrawing calcined lime at the lower end of said kiln.

4,031,184
PROCESS FOR RECLAIMING CEMENT KILN DUST AND RECOVERING CHEMICAL VALUES THEREFROM
Andrew T. McCord, Snyder, N.Y., assignor to Donald L. Christensen, Bismarck, N. Dak., a part interest
Filed Jan. 14, 1976, Ser. No. 649,064
Int. Cl.² C01D *3/08*
U.S. Cl. 423—197 **10 Claims**

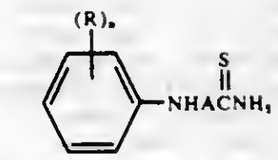
1. A process for reclaiming cement kiln dust in usable form and recovering the alkali values thereof comprising leaching the cement kiln dust at an elevated temperature with an aqueous solution of potassium chloride, treating the leached slurry of cement kiln dust with a relatively small amount of oily hydrocarbon in the order of 1% to 10% by weight based on the weight of solids in the slurry and a long chain fatty acid amounting to at least 0.1% by weight based on the weight of the added oily hydrocarbon to flocculate the solids in an aqueous phase, separating the solids, cooling the resulting aqueous phase to crystallize potassium chloride out of solution, and separating the crystallized potassium chloride from the solution.

4,031,185
PROCESS FOR MAKING NITROGEN OXIDES CONTAINED IN FLUE GAS HARMLESS
Hidetoshi Akimoto, Ibaraki; Ryuichi Kaji, Hitachi; Hideo Kikuchi, Hitachi; Yukio Hishinuma, Hitachi, and Yoshijiro Arikawa, Hitachi, all of Japan, assignors to Hitachi, Ltd. and Babcock-Hitachi K.K., both of, Japan
Filed Jan. 30, 1976, Ser. No. 653,949
Claims priority, application Japan, Feb. 3, 1975, 50-14182; Feb. 8, 1975, 50-16469; Feb. 8, 1975, 50-16470
Int. Cl.² B01D *53/34*
U.S. Cl. 423—239 **20 Claims**

1. A process for removing nitrogen oxides in a flue gas by conversion to nitrogen and water comprising adding ammonia gas to a flue gas containing nitrogen oxides and passing the resulting mixed gas over a catalyst of cuprous or cupric halide selected from the group consisting of cuprous chloride, cuprous bromide, cupric chloride, cupric bromide, and cupric iodide.

4,031,186
ARYLAMINOALKYLTHIOAMIDES
Peter deBenneville, Philadelphia, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.
Filed July 10, 1975, Ser. No. 594,917
Int. Cl.² A61K *31/165;* **C07C** *153/063*
U.S. Cl. 424—324 **19 Claims**

7. A method for treating a stomach ulcer which comprises administering to a patient in need of such treatment an effective amount of a compound of the formula:



wherein A is hydrocarbylene containing from one to three

carbon atoms; R is methyl, methoxy, ethoxy, halo or two R radicals on adjacent carbon atoms of the benzene ring may be joined together to form 1,3-butadienylene and *n* is an integer having a value of two to three or the nontoxic pharmacologically acceptable acid addition salts.

4,031,187

PROCESS FOR THE PRODUCTION OF NITRIC ACID

Diego Barba; Fabrizio Battistoni; Candido D'Agostini, and Giorgio Macchi, all of Rome, Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed Dec. 17, 1975, Ser. No. 641,613
Claims priority, application Italy, Dec. 20, 1974, 30827/74
Int. Cl.² C01B *21/04*
U.S. Cl. 423—392 **8 Claims**

1. A method for the production of nitric acid having a concentration of at least 98% by weight from a gaseous flow obtained by catalytic oxidation of ammonia and containing nitrogen oxide and water vapor, wherein said water is removed from said gaseous flow and said nitrogen oxide is converted into nitrogen peroxide, said peroxide is converted into superazeotropic nitric acid by chemical absorption in an aqueous solution of nitric acid and said superazeotropic nitric acid is submitted to distillation, which comprises: (a) introducing said gaseous flow at a temperature of 180°-200° C. at the bottom of a column for the condensation of said water and the oxidation of said nitrogen oxide, and introducing at the top of said column an aqueous solution of nitric acid having a concentration of from 40 to 60 wt.%; operating said column in countercurrent, at a pressure higher than the atmospheric one and not exceeding 10 atmospheres and at a temperature at the bottom of from the boiling point of the aqueous solution at 30 wt.% of HNO_3 to the boiling point of azeotrope HNO_3/H_2O and at a temperature at the top of from the condensation point of nitrogen peroxide to the condensation point of water vapor; recovering a gaseous flow containing the peroxide, practically devoid of water and nitrogen oxide at the top of the column, and nitric acid having a concentration ranging from 30 to 55 wt.% at the bottom; (b) recycling a portion of said nitric acid recovered in (a) to the top of the oxidation column after cooling and delivering the remaining portion at intermediate level of a distillation column operating at atmospheric pressure, so as to recover azeotropic nitric acid at the bottom and water vapor at the top; condensing said water vapor, recycling a portion of the latter as reflux and discharging the remaining portion; recycling said azeotropic acid at the top of the column of (a) after cooling, together with said recycle portion of nitric acid of (a); (c) liquefying said nitrogen peroxide recovered in (a) and bringing it into contact with a fraction of said remaining portion of water of (b), aqueous nitric acid and air in a chemical absorption stage to give superazeotropic nitric acid; and (d) distilling said superazeotropic nitric acid to produce nitric acid with a concentration of at least 98% by weight; said nitrogen peroxide recovered in (a) is fed at the bottom of an intermediate column for its physical absorption in a flow of superazeotropic nitric acid fed at the top of said intermediate column; said flow of superazeotropic nitric acid containing said absorbed nitrogen peroxide is fed at intermediate level of said distillation column of (d) wherein nitrogen peroxide is recovered at the top and a flow of superazeotropic nitric acid is extracted at the bottom, said flow of superazeotropic acid being delivered to the top of said intermediate column; a flow of aqueous nitric acid is also extracted from the bottom of said column of (d) for the purpose of providing said aqueous nitric acid delivered to stage (c); said nitrogen peroxide issuing from the top of said column of (c) is liquefied and provides the nitrogen peroxide feeding for said stage (c).

4,031,188

PROCESS FOR FORMING CARBONACEOUS FIBERS

Gunter A. Kohler, Grant Township, Washington County, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Feb. 13, 1975, Ser. No. 549,785
Int. Cl.² D01F *9/22*
U.S. Cl. 423—447.6 **5 Claims**

1. A method of forming carbonaceous fibers consisting essentially of the steps of:

a. substantially cyclizing polyacrylonitrile fibers by treating said fibers with a catalytic quantity of a gaseous form of an amine compound at elevated temperature and elevated pressure, wherein said amine compound has the formula:

wherein R_1, R_2 and R_3 may be the same or different and comprise the group consisting of hydrogen and lower alkyl groups having from one to four carbon atoms, and wherein said amine has a boiling point of 60° or less at standard pressure (760 TORR) and a pK_b of about 6 or less; and

b. oxidizing the substantially cyclized fibers in an oxidizing atmosphere at an elevated temperature; and

c. carbonizing the oxidized fibers by heating said fibers to at least 1000° C. in an inert atmosphere.

4,031,189

PROCESS FOR PREPARING COMPOSITION CONTAINING CARBON AND LOW SULFUR, NITROGEN AND ASH CONTENT

Wilfried Gemmeke, Essen; Heinrich Werner, Wattenscheid; Heinz Echterhoff, Essen, and Erich Rauff, Castrop-Rauxel, all of Germany, assignors to Verkaufsgesellschaft fur Teererzeugnisse (VFT), Essen, Germany

Filed Feb. 25, 1976, Ser. No. 661,070
Claims priority, application Germany, Mar. 13, 1975, 2510876
Int. Cl.² C01B *31/02*; C10B *53/00, 57/00*
U.S. Cl. 423—449 **28 Claims**

1. Process for the preparation of a composition comprised mainly of carbon and containing only a small amount of ash, nitrogen and sulfur, said process comprising:

A. drying a hydrous soot with hot flue gas of about 600° C in a direct current-operated dryer to form a dried soot having a water content of about 5 to about 20 percent by weight;

B. carbonizing said dried soot in a vertical flue oven by heating at a flue temperature of about 900° to about 1300° C for about 25 to about 40 hours; and

C. drying, comminuting and classifying the resulting composition.

4,031,190

HIGH STRENGTH HALIDE ALLOYS

Enrique Bernal G., Minnetonka; Barry G. Koepke, Burnsville, and Ralph B. Maciolek, Bloomington, all of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Sept. 29, 1975, Ser. No. 617,350
Int. Cl.² C01B *7/24*; C01D *3/04, 3/22*
U.S. Cl. 423—466 **2 Claims**

1. A crack-free optical fine-grained polygonized halide alloy body formed by compressive hot working of a single crystal halide alloy body at temperature between about 150° C and about 300° C to form in the body a polygonized fine-grained structure the body consisting essentially of a solid solution of potassium chloride and at least 0.1% of a second halide of the group consisting of potassium bromide and rubidium chloride, the amount of the second halide in the alloy being sufficient to prevent room temperature grain growth but being much less than the amount of potassium chloride and wherein the amount of the second halide in the alloy is insufficient to increase substantially the optical absorption at 10.6 microns by the halide body and also insufficient to increase substantially the brittleness of the halide body in comparison to a pure fine-grained polygonized body of potassium chloride, and wherein the alloy body has a yield strength of greater than about 3400 psi.

4,031,191

PROCESS FOR PRODUCING HYDROGEN FLUORIDE

Harry Otto Burrus, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 545,354, Jan. 30, 1975, abandoned, which is a continuation-in-part of Ser. No. 401,129, Sept. 27, 1973, abandoned. This application Sept. 29, 1976, Ser. No. 728,004
Int. Cl.² C01B *7/22*
U.S. Cl. 423—485 **11 Claims**

1. In a process for producing HF by reacting a metal fluoride selected from the group consisting of alkali metal fluorides and alkaline earth metal fluorides with a mineral acid, the reaction product thereafter being cooled, where in said process sulfur deposits accumulate in the cooling equipment, the improvement comprising adding to the cooling equipment when said equipment is not being used to cool the reaction product, sufficient SO_3 to remove the sulfur deposits and thereafter emptying the equipment.

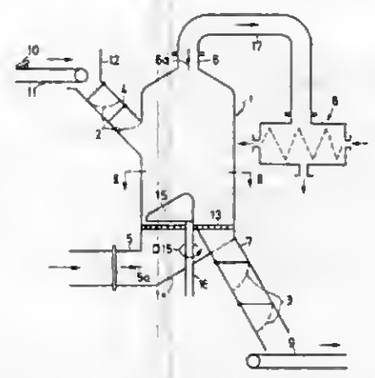
11. A process for removing sulfur deposits which accumulate in the cooling equipment in an HF manufacturing process consisting essentially of adding to the cooling equipment, when said equipment is not being used to cool the reaction product, sufficient SO_3 to remove the sulfur deposits and thereafter emptying the equipment.

4,031,192

METHOD OF HYGIENIC DISPOSAL OF CHLORINE-CONTAINING PLASTIC MATERIAL

Robert J. Häfell, Zurich, Switzerland, assignor to Von Roll AG, Gerlaflingen, Switzerland

Filed Aug. 27, 1975, Ser. No. 608,281
Claims priority, application Switzerland, Sept. 5, 1974, 12060/74
Int. Cl.² C01B *7/08*
U.S. Cl. 423—488 **8 Claims**



1. Method of hygienic disposal of scrap, waste, or refuse of high-polymer, chlorine-containing plastic material utilizing the steps of thermally treating the material in a closed vessel to thereby split off gaseous hydrochloric acid from said material and incinerating the essentially-free residue of the material remaining after the hydrochloric acid has been removed

comprising, in accordance with the invention, the steps of

placing the material on a steam pervious support in a closed vessel;

introducing super-heated steam from below said support through said support and through said material thereon to effect said thermal treatment step, said thermal treatment step comprising hydrolytically-thermally splitting off hydrochloric acid gas by thermally treating the chlorine-containing plastic material directly with super-heated steam by direct contact of said super-heated steam with said material in said vessel,

said super-heated steam forming a carrier gas for evolving gaseous hydrochloric acid being split off from the plastic material during said treatment;

removing the mixture of water, water-vapor and split-off gaseous hydrochloric acid from above the upper surface of said material on said support and evolving during said hydrolytic-thermal splitting step;

cooling and condensing said mixture of steam, water-vapor and split-off gas hydrochloric acid;

and wherein the step of introducing said superheated steam includes controlling the quantity of superheated steam supplied to said material in relation to said material and to the evolved hydrochloric acid gas which is split-off to result in gas-vapor mixture which, after the cooling and condensing step, has a maximum acid concentration of hydrochloric acid of 20.24%.

4,031,193

PROCESS FOR PREPARING CALCIUM FLUORIDE FROM HEXAFLUORO SILICIC ACID

Wilfried Becher, Heilbronn-Neckargartach, and Joachim Massonne, Hannover, both of Germany, assignors to Kali-Chemie Aktiengesellschaft, Hannover, Germany

Filed Feb. 14, 1975, Ser. No. 550,135
Claims priority, application Germany, Feb. 15, 1974, 2407238
Int. Cl.² C01F *11/22*; C01B *33/14*
U.S. Cl. 423—490 **2 Claims**

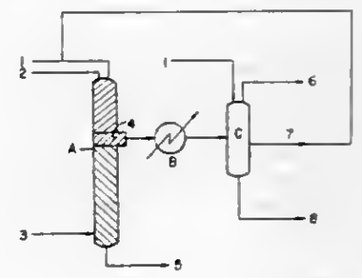
1. A process for the production of calcium fluoride, comprising the steps of reacting hexafluorosilicic acid having a concentration of between 10 to about 40% by weight with calcium carbonate in the presence of sulfate ion added in the form of a compound selected from the group consisting of iron-II sulfate and iron-III sulfate in a molar ratio of sulfate ion to hexafluorosilicic acid of between about 1:5 and 1:20 at a pH between about 2 and 6, whereby the sulfate ion provides for the formation of an easily separable mixture of calcium fluoride precipitate and aqueous silica sol, and separating said calcium flouride precipitate from said silica sol.

4,031,194

CONTINUOUS PROCESS FOR PREPARING BROMINE

Yoshihisa Ogawa; Tsunenori Inazaki, and Michihiro Kouda, all of Onoda, Japan, assignors to Nissan Chemical Industries, Ltd., Yamaguchi, Japan

Continuation of Ser. No. 497,628, Aug. 15, 1974, abandoned. This application Feb. 17, 1976, Ser. No. 658,767
Int. Cl.² C01B *7/10*
U.S. Cl. 423—500 **2 Claims**



1. A continuous process for the preparation of bromine which comprises:

1. cocurrently introducing an aqueous solution of a bromide or hydrobromic acid and chlorine gas into a contact tower; said contact tower being separated into an upper packed reaction section connected to a middle section having a bromine outlet port which in turn is connected to a lower packed distillation section; said cocurrent introduction being along the axis of said reaction section; wherein the aqueous solution of a bromide or hydrobromic acid is heated to less than 80° C in said reaction section while forming bromine in said aqueous solution; and wherein at least a part of said bromine is removed from the bromine outlet port; and
2. introducing steam into the lower part of said distillation section, thereby countercurrently contacting the aqueous solution descending from step (1) with said steam to heat said aqueous solution in said distillation section to a temperature greater than 90° C, thereby distilling the remaining bromine from the bromine outlet port.

4,031,195

REGENERATIVE METHOD REMOVAL OF SULFUR DIOXIDE FROM STACK GASES

Lewis W. Elston, Atlanta, Ga., assignor to Georgia Tech Research Institute, Atlanta, Ga.

Continuation-in-part of Ser. No. 359,997, May 14, 1973, abandoned. This application Feb. 4, 1976, Ser. No. 655,167

Int. Cl.² B01D *53/34*

U.S. Cl. 423—554 3 Claims

1. The method of quantitative removal of sulfur dioxide from effluent gases, which comprises the steps of:
   a. contacting an aqueous medium containing essentially BaO_2 with effluent gases which contain SO_2 for a time sufficient to absorb the SO_2 and to generate an amount of H_2O_2 to convert the SO_2 to $BaSO_4$, the amount of H_2O_2 being generated in response to a demand initiated by absorption of the SO_2 so that the medium is maintained at a pH ranging from 1.0 to 6.9; and
   b. removing the $BaSO_4$ from the aqueous medium.

4,031,196

PREPARING AQUEOUS ALKALINE SLURRY OF THALLIC OXIDE

John J. Leonard, Springfield, Pa., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Division of Ser. No. 579,758, May 22, 1975, abandoned. This application Aug. 24, 1976, Ser. No. 717,309

Int. Cl.² C01G *15/00*

U.S. Cl. 423—624 2 Claims

1. The method of preparing thallic oxide which consists of preparing a basic aqueous composition having a pH greater than 11.9, said basic aqueous composition containing at least 0.05 but not more than 3 molar thallous ion, said basic aqueous composition containing an amount of alkanoate ion at least approximately equal to the thallous ion, said basic aqueous composition containing sufficient metal hydroxide providing metal ion and sufficient hydroxide ion to provide said pH greater than 11.9, maintaining said basic aqueous composition at a temperature within the range from about 90° C to about 250° C, and contacting said basic aqueous composition within said temperature range with gaseous oxygen to oxidize the thallous ion to thallic ion and to form insoluble particles of thallic oxide precipitate according to the equation

$$4\,RCO_2Tl + 3O_2 + 4M^+ \xrightarrow[>11.9]{OH^-} 4RCO_2M + 2\,Tl_2O_3$$

wherein R is an alkyl group having from 1 to 4 carbon atoms, M^+ is said metal ion, and separating said particles of thallic oxide precipitate from said basic aqueous composition.

4,031,197

IN VITRO METHOD FOR DETERMINING ALLERGIC HYPERSENSITIVITY

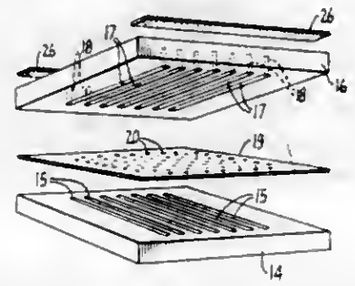
Vincent A. Marinkovich, Palo Alto, Calif., assignor to GTE New Ventures Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 354,881, April 25, 1973, Pat. No. 3,941,876. This application July 7, 1975, Ser. No. 593,649

The portion of the term of this patent subsequent to Mar. 2, 1993, has been disclaimed.

Int. Cl.² G01N *33/00*; **A61B** *10/00*

U.S. Cl. 424—1 6 Claims



1. The method of simultaneously determining hypersensitivity of a number of human patients to a number of allergens which comprises providing a sheet of paper coated with a water impervious material so as to leave on the paper a large number of uncoated islands so arranged that each island lies in a horizontal row of islands and also in a vertical row of islands, enclosing the sheet in a jig having liquid receiving troughs in register with each horizontal row of islands, filling each trough with a separate identified allergen to impregnate the island areas with allergen, removing the allergens from the troughs and filling the troughs with an aqueous wash liquid to wash excess allergens from the paper, removing the wash liquid from the troughs and then removing the paper from the jig, enclosing the paper in a jig having liquid receiving troughs in register with the vertical rows of islands, filling each trough with diluted blood serum of a different human patient to contact the island areas with serum, removing the serums from the troughs, filling the troughs with an aqueous wash liquid to remove unreacted serum from the island areas, removing the wash liquid from the troughs and removing the paper from the jig, immersing the paper in a solution of anti-immunoglobulin E specific antiserum labeled with a cellulose inert fluorescent material or with a cellulose inert radioactive material and identifying the island areas which contain fluorescent or radioactive material.

4,031,198

TECHNETIUM-LABELED COMPLEXES, PRODUCTION AND USE THEREOF

Richard A. Jackson, White Bear Lake, and Theodore F. Bolles, Woodbury, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 285,079, Aug. 30, 1972, Pat. No. 3,873,680. This application May 30, 1974, Ser. No. 474,377

Int. Cl.² G01N *23/00*; **G21H** *5/02*

U.S. Cl. 424—1 2 Claims

1. A stable radiopharmaceutical composition for preparing a biologically sterile liquid aqueous medium containing a liver specific agent labeled with technetium-99m comprising a compound for imparting liver specificity to technetium-99m selected from the group consisting of:
   N-acetyl penicillamine,
   2-mercaptoethylamine,
   2-mercaptoethanol,
   3-mercaptopropanol,
   4-mercaptobutanol,
   4-mercapto-2-methyl-2-butanol,
   2-mercaptoethylamine,
   6,8-dihydrothioctic acid,
   alpha-thio-2-furan pyruvic acid,

p-mercaptobenzoic acid, and mixtures thereof;
and a pharmaceutically-acceptable reducing agent for pertechnetate, said compound being present in an amount sufficient to provide a concentration of about 0.5 to about 1000 micromoles per milliliter in said aqueous medium; and said reducing agent being present in an amount sufficient to provide a concentration of about 0.01 to about 100 micromoles per milliliter in said aqueous medium.

4,031,199

PROCESS FOR THE PRODUCTION OF ALLERGEN-CONTAINING EXTRACTS

Otto Nieschulz, Hamburg; Günther Rüdiger, Reinbek, and Jürgen Maass, Kroeppelshagen, all of Germany, assignors to Merck Patent Gesellschaft mit beschränkter Haftung, Darmstadt, Germany

Division of Ser. No. 421,791, Dec. 5, 1973, Pat. No. 3,953,588. This application Dec. 15, 1975, Ser. No. 640,546

Claims priority, application Germany, Oct. 20, 1973, 2352724; Dec. 11, 1972, 2260455

Int. Cl.² A61K *39/100*

U.S. Cl. 424—12 6 Claims

1. In a process for preparing an allergen extract which includes pre-extracting an allergen-containing material having a plurality of allergens, a portion of which is more lipophilic in character than the remainder, with a lipophilic solvent consisting essentially of an aqueous solution of a neutral, water-soluble cyclic ether having a boiling point below 105° C. which is at least one member selected from the group consisting of tetrahydrofuran, tetrahydropyran and dioxane to extract said lipophilic portion; extracting resultant allergen-containing material with a hydrophilic aqueous or aqueous alcoholic allergen solvent; and recovering water-soluble allergens from said material; the improvement which comprises:
   sonicating said allergen-containing material to increase allergenic activity.

4,031,200

MANUFACTURE OF PHARMACEUTICAL UNIT DOSAGE FORMS

Robert Bruce Relf, Grove City, Ohio, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Dec. 15, 1975, Ser. No. 640,653

Int. Cl.² A61K *9/70*; **B31F** *1/00*

U.S. Cl. 424—27 7 Claims

1. A method of preparing solid pharmaceutical dosage forms comprising loading one or more medicaments to a therapeutically inert, edible web, fabricating same into a solid geometric form of predetermined dimensions having said medicament substantially internalized, said form being divisible into a plurality of unit dosage forms, said fabricating step comprising forming a continuous stack of a plurality of layers of web and subjecting said stack to pressure to densify and shape same into a continuous rod-like first geometric form, unitizing said geometric form into said plurality of unit dosage forms and sealing said unit dosage forms to completely internalize said medicament, said procedures including at least one non-destructive testing operation to assure uniform quality of said unit dosage forms.

4,031,201

FIBRES INCORPORATING ANTIBODIES, ANTIGENS AND ANTISERA, METHOD FOR THEIR PREPARATION AND THEIR USE

Onofrio Lostia, and Francesco Bartoli, both of Rome, Italy, assignors to Snam Progetti S.p.A., Milan, Italy

Filed July 29, 1975, Ser. No. 599,993

Claims priority, application Italy, July 31, 1974, 52379/74

Int. Cl.² A61K *9/70*, *39/00*, *39/12*

U.S. Cl. 424—27 4 Claims

1. A method for the preparation of porous fibres having microcavities containing antibody, antigen or antisera substances, and including selecting a spinning solvent and polymer which will not cause inactivation of the substances to be contained in said microcavities, comprising
   preparing the antibody, antigen or antisera substance to be embedded in the fibres and verifying the aspecific fixing of the substance on the material from which the fibres are to be made, and its lack of or non-significant inactivation, by treatment with the spinning solvents that are to be used in producing the fibres,
   mixing said substance with water or mixtures of glycerol and water,
   adding the mixture containing the substance to said polymer in solution,
   stirring until a homogeneous emulsion is obtained,
   spinning the emulsion through a spinneret immersed in a coagulation bath to produce porous fibres with said substance occluded within the microcavities in said fibres, and
   removing the coagulation liquor and the solvent of the polymer from the fibres by treatment thereof in a stream of air or other gas.

4,031,202

CONTROLLED RELEASE CONTRACEPTIVE ARTICLE

Robert Gene Laughlin, and Thomas William Gougeon, both of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Dec. 8, 1975, Ser. No. 638,775

Int. Cl.² A61M *31/00*

U.S. Cl. 424—28 11 Claims

1. An article of manufacture especially adapted for use as a contraceptive, comprising:
   a. a stable, insoluble container, at least part of the wall of said container comprising a microporous cellulose membrane;
   b. a spermicidal alkylene oxide nonionic surfactant releasably affixed to the outer surface of the article; and
   c. a solution consisting essentially of:
      i. a micelle-forming spermicidal alkylene oxide nonionic surfactant compound, and
      ii. a solvent for said surfactant compound, comprising water,
   said solution having a concentration above the critical micelle concentration of the surfactant compound, said solution being enclosed within the container.

4,031,203

HEPATITIS A ANTIGEN

Philip J. Provost, Harleysville; Oswald L. Ittensohn, Telford, and Maurice R. Hilleman, Lafayette Hill, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 530,623, Dec. 9, 1974. This application June 7, 1976, Ser. No. 693,668

Int. Cl.² A61K *39/12*

U.S. Cl. 424—89 3 Claims

1. A method for obtaining hepatitis A antigen in an amount effective to complex hepatitis A antibody comprising inoculating a non-human primate with hepatitis A virus, subsequently removing the liver at a time when the serum glutamic oxaloacetic transaminase enzyme and the serum isocitric dehydrogenase enzyme levels are elevated, perfusing the liver with physiological saline, comminuting the liver and adding saline to obtain a suspension containing from about 5% to about 25% by weight of liver, clarifying the suxpenxion, treating the suspension with CsCl gradient and selecting material having a buoyant density of from about 1.32 g/cm³ to about 1.36 g/cm³ of CsCl.

4,031,204
FELINE VIRAL RHINOTRACHEITIS VACCINE AND COMBINATION FELINE VIRAL RHINOTRACHEITIS-CALICIVIRUS VACCINE PREPARED THEREFROM

Eldon Davis, Lincoln, Nebr., assignor to Norden Laboratories, Inc., Lincoln, Nebr.

Filed Mar. 30, 1976, Ser. No. 671,792
Int. Cl.² A61K *41/00, 39/12*; C12K *7/00*
U.S. Cl. 424—90 **28 Claims**

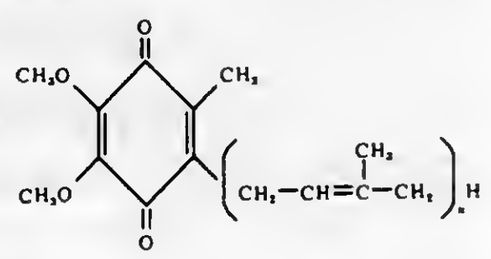
1. A modified live feline viral rhinotracheitis vaccine capable of inducing immunity in animals of the genus felidae without serious side effects comprising a modified live feline viral rhinotracheitis virus prepared by treating a feline viral rhinotracheitis virus which has been chemically modified by treatment with DNA inhibitor(s) so that said virus grows well at 30° C ± 2° C but not at 39° C with ultraviolet light until from about 90% to about 99% of the virus particles are killed, and a carrier therefor.

4,031,205
METHOD FOR TREATING NERVOUS BLADDER

Tojl Konishi, Tokyo, Japan, assignor to Eisai Co., Ltd., Tokyo, Japan

Filed Dec. 31, 1975, Ser. No. 645,912
Int. Cl.² A61K *37/48*
U.S. Cl. 424—94 **5 Claims**

1. A method for treating nervous bladder which comprises administering to a human suffering from nervous bladder an amount therapeutically effective for the treatment of nervous bladder of Ubiquinone *n* represented by the formula



wherein *n* represents one of the integer 9 or 10.

4,031,206
ANTIBIOTICS PRODUCED BY SPECIES OF PSEUDONOCARDIA

Walter D. Celmer, New London; Walter P. Cullen, East Lyme; Charles E. Moppett, Mystic; John B. Routlen, Lyme, all of Conn.; Riichiro Shibakawa, Handa, and Junsuke Tone, Chita, both of Japan, assignors to Pfizer Inc., New York, N.Y.

Filed Feb. 4, 1976, Ser. No. 655,075
Int. Cl.² A61K *35/70*
U.S. Cl. 424—117 **3 Claims**

2. Antibiotic substance Compound 41,043 which is soluble in acetone, chloroform, methylisobutyl ketone, ethyl acetate, ethanol dimethyl sulfoxide or dimethylformamide; insoluble in hexane, heptane, water or diethyl ether; has absorption maxima in ethanol in the ultraviolet light region of the spectrum at 225, 270, 300 and 350 nm with $E_{1\ cm}^{1\%}$ values of 444, 217, 183 and 91, respectively; has the average composition by weight of 50.10% carbon, 4.88% hydrogen, 9.15% nitrogen, 8.40% sulfur and 27.50% oxygen (by difference); has an optical roration of $\alpha_D + 77°$ (c = 1.0, acetone); and when pelleted in KBr exhibits characteristic absorption in the infrared region at the following wavelengths in microns: 3.00, 3.45, 5.72, 5.80, 5.90, 6.00, 6.45, 6.52, 7.22, 7.60, 8.00, 8.30, 8.60, 8.95, 9.35, 9.98, 10.15, 11.00, 12.68 and 13.35.

4,031,207
ANTIBIOTIC

Klaus Bauer; Werner Frommer; Wilfried Kaufmann; Georg Metzger; Martin Scheer; Delf Schmidt; Theo Schroder, all of Wuppertal, and Dietmar Schafer, Marburg, Lahn, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Feb. 26, 1976, Ser. No. 661,545
Claims priority, application Germany, Mar. 8, 1975, 2510161
Int. Cl.² A61K *35/74*
U.S. Cl. 424—118 **9 Claims**

1. An antibiotic characterized by being a neutral solid which does not migrate upon electrophoresis; contains carbon, hydrogen and oxygen in the weight ratio of carbon to hydrogen to oxygen of 50.8:7.2:42 respectively; is soluble in water, lower alcohols, chloroform and acetone and sparingly soluble in diethyl ether, petroleum ether and cyclohexane; is optically active with the specific rotation value $[\alpha]_D^{20}$ measured as a 1% solution in methanol being −32.97°; has a pronounced UV absorption band at 267 mm with an $E^{1\%}$/cm of 164; and exhibits characteristic absorption at the following infrared frequencies expressed in reciprocal centimeters: 3440, 2960, 2920, 2850, 1630, 1570, 1445, 1405, 1375, 1310 (weak), 1290 (weak), 1200, 1060, 1020, 895, 940, 905, 780 and 750.

4,031,208
ANTIBIOTIC

Klaus Bauer; Werner Frommer; Wilfried Kaufmann; Karl Georg Metzger; Martin Scheer; Delf Schmidt; Theo Schröder, all of Wuppertal, and Dietmar Schäfer, Marburg an der Lahn, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Feb. 26, 1976, Ser. No. 661,544
Claims priority, application Germany, Mar. 8, 1975, 2510160
Int. Cl.² A61K *35/74*
U.S. Cl. 424—119 **9 Claims**

1. An antibiotic characterized by being a neutral solid which does not migrate upon electrophoresis; contains carbon, hydrogen and oxygen substantially in the weight % ratio of carbon to hydrogen to oxygen of 56.19:6.54:37.25 respectively; starts to decompose upon heating slightly above about 142° C and decomposes rapidly above 177° C; is readily soluble in chloroform, acetone, ethyl acetate, acetonitrile, dimethylformamide, dimethylsulfoxide, methanol and ethanol and less soluble in water, diethyl ether, petroleum ether and cyclohexane; is optically active with the specific rotation value $[\alpha]_D^{20}$ measured as a 1% solution in methanol being −6.6°; has a pronounced UV absorption band at 307 nm with an $E^{1\%}$/cm of 351; and exhibits characteristic absorption at the following infrared frequencies expressed in reciprocal centimeters: 3450, 2980, 2940, 2900, 1710, 1615, 1450, 1415, 1375, 1310, 1290, 1255, 1215, 1195, 1130, 1040, 945, 905, 870, 840, 820, 785, 750 735 and 700.

4,031,209
AQUEOUS SOLUTION SUITABLE FOR DISSIPATING AVAILABLE IODINE CONTAINED IN AN IODOPHOR

Joseph Zenon Krezanoski, Los Altos, Calif., assignor to Flow Pharmaceuticals, Inc., Palo Alto, Calif.

Continuation-in-part of Ser. No. 315,793, Dec. 18, 1972, Pat. No. 3,911,107. This application June 2, 1975, Ser. No. 582,762
The portion of the term of this patent subsequent to Oct. 7, 1992, has been disclaimed.
Int. Cl.² A01N *11/00*; A61K *33/18*
U.S. Cl. 424—150 **19 Claims**

1. A sterile aqueous solution suitable for dissipating available iodine contained in an iodophor at a controlled rate, consisting essentially of:

a. from about 0.01% to about 5% by weight sorbic acid or a soluble salt thereof; and

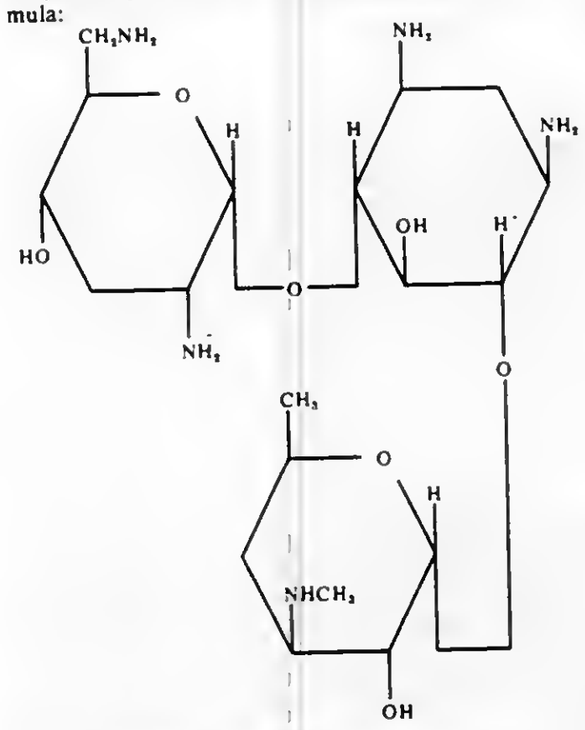
b. from about 0.01% to about 5% by weight ethylenediaminetetraacetic acid or a soluble salt thereof.

4,031,210
ANTIBIOTIC AMINOGLYCOSIDES, PROCESSES OF PREPARATION AND PHARMACEUTICAL COMPOSITIONS

Jean-Bernard Chazan, Paris, and Jean-Claude Gasc, Bondy, both of France, assignors to Roussel-UCLAF, Paris, France

Filed Nov. 11, 1975, Ser. No. 630,917
Claims priority, application France, Nov. 13, 1974, 74.37374
Int. Cl.² C07H *15/22*; A61K *31/71*
U.S. Cl. 424—180 **9 Claims**

1. The 4-0-[2',6'-diamino 2', 3', 6'-tridesoxy α, D-ribohexopyranosyl] 6-0-[3''-methylamino 3'', 4'', 6''-tridesoxy α, D-xylohexopyranosyl] 2-desoxy streptamine having the formula: (I



and its pharmaceutically acceptable salts.

8. A method for treating bacteria infections in humans and animals comprising administering to humans and animals a therapeutically effective amount of the compound of formula I as claimed in claim 1 or one of its therapeutically compatible salts

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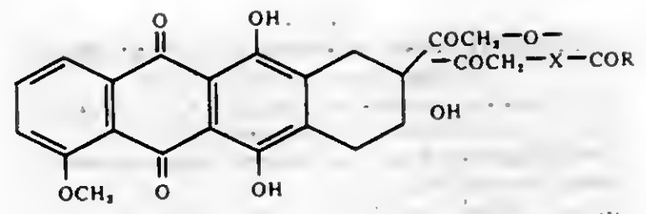
4,031,211
ADRIAMYCIN ESTERS, THEIR PREPARATION AND USE

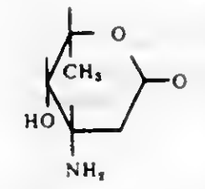
Bianca Patelli; Luigi Bernardi, both of Milan; Federico Arcamone, Nerviano (Milan), and Aurelio di Marco, Milan, all of Italy, assignors to Societa' Farmaceutici Italia S.p.A., Milan, Italy

Filed June 10, 1976, Ser. No. 694,656
Claims priority, application United Kingdom, June 20, 1975, 26271/75
Int. Cl.² A61K *31/70*; C07H *15/24*
U.S. Cl. 424—180 **8 Claims**

1. An adriamycin ester of the formula (I):



(I)



wherein X is O, S or NH and R is a straight chain alkyl having from 5 to 20 carbon atoms and the hydrochlorides thereof.

7. A method for inhibiting the growth of a tumor selected from the group consisting of ascites sarcoma 180, L 1210 leukemia, gross leukemia, solid sarcoma 180 comprising intravenously or intraperitoneally administering to a host afflicted with said tumor an amount of a compound according to claim 1, sufficient to inhibit the growth of said tumor.

4,031,212
3β-(4-OXO-α-L-RHAMNOSYL)-β-HYDROXY-BUFA-4,20,22-TRIENOLIDE

Walter Lösel, Ingelheim am Rhein; Werner Traunecker, Munster-Sarmsheim, and Wolfgang Hoefke, Budenheim, all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

Filed July 30, 1975, Ser. No. 600,500
Claims priority, application Germany, Aug. 5, 1974, 2437612
Int. Cl.² A61K *31/58*
U.S. Cl. 424—182 **3 Claims**

1. 3β-(4'-Oxo-α-L-rhamnosyl)-14β-hydroxy-bufa-4,20,22-trienolide.

2. A cardiotonic pharmaceutical dosage unit composition consisting essentially of an inert pharmaceutical carrier and an effective cardiotonic amount of the compound of claim 1.

4,031,213
PHARMACEUTICAL COMPOSITION AND METHOD FOR THE TREATMENT OF HYDROPIC CONDITIONS

Rolf Kuhn, Mannheim-Waldhof; Klaus Hardebeck, Ludwigshafen (Rhine), and Helmut Heinemann, Heidelberg, all of Germany, assignors to Boehringer Mannheim G.m.b.H., Mannheim-Waldhof, Germany

Filed Apr. 16, 1975, Ser. No. 568,640
Claims priority, application Germany, May 15, 1974, 2423606
Int. Cl.² A61L *13/00*
U.S. Cl. 424—229 **12 Claims**

1. Pharmaceutical composition for treating hydropic conditions comprising

a. 10 to 100 parts by weight of at least one member of 5-(4-chloro-5-sulfamoyl-2-thenylaminophenyl)-tetrazole and the parmacologically compatible salts thereof,

b. 50 parts by weight of 3-(3-oxo-7α-acethylthio-17β-hydroxy-4-androsten-17α-yl)-propionic acid-γ-lactone, and

c. a pharmaceutical diluent or carrier.

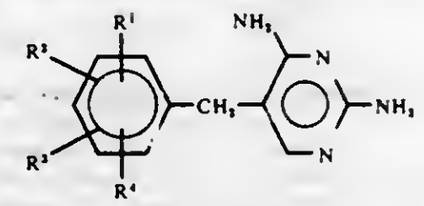
4,031,214

SULPHONAMIDE AND 2,4-DIAMINOPYRIMIDINE INJECTABLE SUSPENSION

Michael George Easterbrook, Meopham, England, assignor to Burroughs Wellcome Co., Research Triangle Park, N.C.

Continuation of Ser. No. 123,079, March 10, 1971, abandoned. This application Apr. 7, 1975, Ser. No. 565,964
Claims priority, application United Kingdom, Mar. 13, 1970, 12348/70
Int. Cl.² A61K 31/63, 31/635, 31/505
U.S. Cl. 424—229 17 Claims

1. An aqueous injectable preparation which comprises a suspension of a finely divided potentiator of the formula



wherein R^1, R^2, R^3 and R^4 are the same or different and can each be a hydrogen atom, a halogen atom, an alkyl group, an alkoxy group or a benzyloxy group or, when R^1, and R^2 are each hydrogen atoms, R^3 and R^4 taken together can be a methylene dioxy group substantially all of the particles of potentiator in the suspension having a largest dimension less than 50μm, in an aqueous solution of a pharmaceutically acceptable water soluble salt of a sulphonamide with a strong base, and wherein the pH of the preparation is in the range of from 9.75 to 12.0.

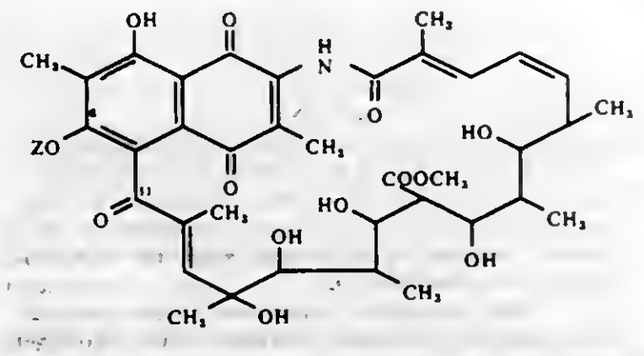
4,031,215

STREPTOVARICINONE C DERIVATIVES AS ANTIBIOTICS

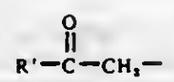
Kazuya Sasaki, Higashikurume; Takanobu Naito, Funabashi; Yoshio Momoki, Tokyo; Toshio Sega, Tokyo, and Toshiyuki Satomi, Tokyo, all of Japan, assignors to Kaken Chemical Co., Ltd., Tokyo, Japan

Filed Oct. 2, 1975, Ser. No. 618,843
Claims priority, application Japan, Nov. 11, 1974, 49-128967; Nov. 12, 1974, 49-129523; Feb. 18, 1975, 50-19470; Mar. 20, 1975, 50-32953
Int. Cl.² C07D 491/14, 491/18, 491/22
U.S. Cl. 424—244 14 Claims

1. A streptovaricinone C derivative of the formula:

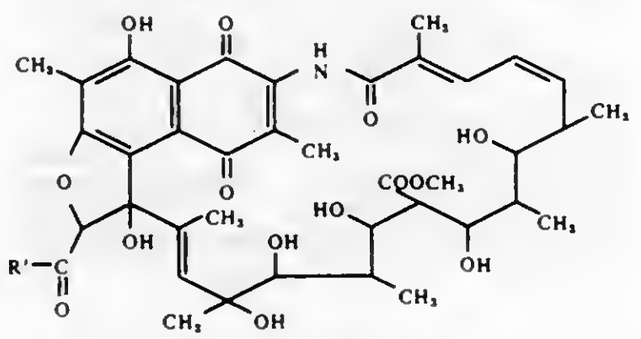


wherein Z is alkyl, a phenyl or a phenyl substituted by a halogen, an alkoxy group, an alkyl group or NO_2, a hydroxyalkyl, an alkenyl, a ketonyl having the formula



wherein R′ is a lower alkyl group containing up to 6 carbon atoms, a phenyl group, a 2-furyl group, an α-thienyl group, and substituted derivatives thereof, wherein the substituent is a C_1-C_6 alkyl group, a C_1-C_6 alkoxy group, an hydroxyl group, a nitro group or a halogen, a furyl-oxoalkyl, a thienyl-oxoalkyl, a phenacyl, a carbamylalkyl, a benzyl, a phenoxyadkyl, a cyanoalkyl, a phenethyl, a benzoyloxyethyl, a p-chlorophenacyl, a p-methoxyphenacyl, a p-nitrobenzyl, a p-methylbenzyl, an alkanoyl, a benzoyl, a benzenesulfonyl, an alkylsulfonyl or an alkoxy-carbonyl group wherein alkyl, alkoxy, alkenyl, alkanoyl and alkoxycarbonyl have 1-12 carbon atoms unless otherwise specified.

7. An aldol condensation product of the streptovaricinone C derivative of claim 1 having the formula:



wherein R′ is a lower alkyl group containing up to 6 carbon atoms, a phenyl group, a 2-furyl group, an α-thienyl group, and substituted derivatives thereof, wherein the substituent is a C_1-C_6 alkyl group, a C_1-C_6 alkoxy group, an hydroxyl group, a nitro group or a halogen.

11. A pharmaceutical composition which comprises an antibiotically effective amount of a streptovaricinone C derivative of claim 1 and a pharmaceutically acceptable carrier.

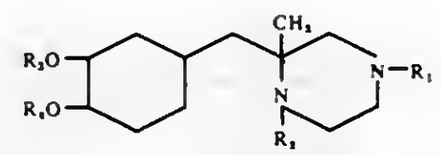
4,031,216

3-(3,4-DIALKOXY-BENZYL)-3-METHYL-PIPERAZINES

Richard Cyrus, Ludwigshafen am Rhine, and Manfred Raschack, Weisenheim am Sand, both of Germany, assignors to Knoll A.G. Chemische Fabriken, Ludwigshafen, Germany

Division of Ser. No. 600,870, July 31, 1975, Pat. No. 3,996,360. This application Aug. 31, 1976, Ser. No. 719,105
Claims priority, application Germany, Aug. 12, 1974, 2438725
Int. Cl.² C07D 241/04, 241/06; A61K 31/495
U.S. Cl. 424—250 9 Claims

1. A piperazine compound of the formula



and salts thereof with a physiologically tolerable acid, wherein R_1 is hydrogen; R_2 is hydrogen, straight chain alkyl having 1 – 5 carbon atoms, alkenyl having 3 to 4 carbon atoms, or hydroxyalkyl having 2 – 4 carbon atoms; and R_3 and R_4, which are the same or different, are alkyl having 1 – 4 carbon atoms.

8. A therapeutic composition for treating cardiac disease consisting essentially of a pharmaceutical excipient and an effective amount of a piperazine compound as in claim 1, or of a salt thereof with a therapeutically tolerable acid, as the active ingredient.

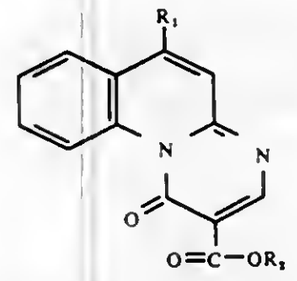
4,031,217

1-OXO-1H-6-SUBSTITUTED-PYRIMIDO(1,2-a)-QUINOLINE-2-CARBOXYLIC ACIDS AND ESTERS USEFUL AS ANTIULCER AGENTS

Saul B. Kadin, and Peter F. Moore, both of New London, Conn., assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 594,766, July 10, 1975. This application Aug. 10, 1976, Ser. No. 713,145
Int. Cl.² A61K 31/505
U.S. Cl. 424—251 7 Claims

1. A method for the control of gastric ulcers in mammalian subjects which comprises administering to the subjects an effective antiulcer amount of a compound having the formula



wherein R_1 is selected from the group consisting of alkoxy having from one to two carbon atoms and piperidino; and R_2 is selected from the group consisting of hydrogen and alkyl having from one to four carbon atoms; the pharmaceutically-acceptable cationic salts of those compounds wherein R_2 is hydrogen and the pharmaceutically-acceptable acid addition salts of those compounds wherein R_1 is piperidino.

4,031,218

7-(2,3-DIHYDROXYPROPYL-1,3-DI-N-PROPYLXANTHINE AND A PHARMACEUTICAL COMPOSITION CONTAINING SAME USEFUL AS A BRONCHIAL MUSCLE RELAXANT

Samir M. El-Antably, St. Ann, Mo., assignor to Mallinckrodt, Inc., St. Louis, Mo.

Filed Apr. 28, 1976, Ser. No. 680,936
Int. Cl.² A61K 31/52; C07D 473/04
U.S. Cl. 424—253 3 Claims

1. The compound 7-(2,3-dihydroxypropyl)-1,3-di-n-propylxanthine.

2. A method for the treatment of reversible airway obstruction due to bronchoconstriction in a living animal body which comprises administering to a living animal body suffering from said obstruction a therapeutically effective amount of the compound of claim 1.

3. A pharmaceutical composition comprising a pharmaceutically acceptable carrier and a therapeutically effective bronchodilater amount of the compound of claim 1.

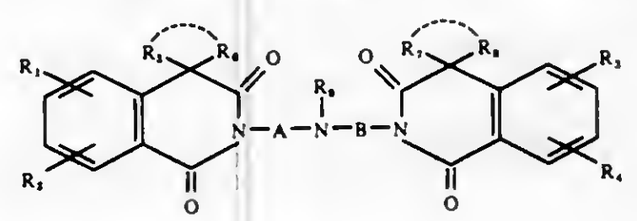
4,031,219

BIS-HOMOPHTHALIMIDES AND SALTS THEREOF

Eberhard Kutter; Volkhard Austel; Wolfgang Eberlein, all of Biberach; Joachim Heider, Warthausen, all of Germany; Walter Kobinger; Christian Lillie, both of Vienna, Austria, and Rudolf Kadatz, Biberach, Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

Filed July 13, 1976, Ser. No. 704,844
Claims priority, application Germany, July 30, 1975, 2533986; May 21, 1976, 2622690
Int. Cl.² C07D 217/24; A61K 31/47
U.S. Cl. 424—258 10 Claims

1. A compound of the formula



wherein

A and B are each straight alkylene of 2 to 4 carbon atoms which may have a methyl or phenyl substituent attached thereto,

R_1, R_2, R_3 and R_4 are each hydrogen, fluorine, chlorine, bromine, hydroxyl, amino, nitro, acetylamino, alkyl of 1 to 3 carbon atoms, alkoxy of 1 to 3 carbon atoms or (alkyl of 1 to 3 carbon atoms) thio,

R_5, R_6, R_7 and R_8 are each hydrogen, alkyl of 1 to 4 carbon atoms, phenyl-(alkyl of 1 to 4 carbon atoms) or methoxyphenyl-(alkyl of 1 to 4 carbon atoms), or

R_5 and R_6, together with each other, are straight alkylene of 2 to 5 carbon atoms, or

R_7 and R_8, together with each other, are straight alkylene of 2 to 5 carbon atoms, and

R_9 is hydrogen, alkyl of 1 to 6 carbon atoms or phenyl-(alkyl of 1 to 6 carbon atoms),

or a non-toxic, pharmaceutically acceptable acid addition salt thereof.

9. An antiarrhythmic pharmaceutical dosage unit composition consisting essentially of an inert pharmaceutical carrier and an effective antiarrhythmic amount of a compound of claim 1.

10. The method of preventing or alleviating cardiac arrythmia in a warm-blooded animal, which comprises perorally, parenterally or rectally administering to said animal an effective antiarrhythmic amount of a compound of claim 1.

4,031,220

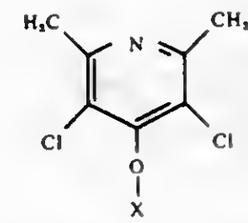
METHOD FOR THE TREATMENT OF MALARIA

William Henry George Richards, Orpington, England, assignor to Burroughs Wellcome Co., Research Triangle Park, N.C.

Filed Aug. 20, 1975, Ser. No. 606,004
Claims priority, application United Kingdom, Aug. 20, 1974, 36523/74
Int. Cl.² A61K 31/47, 31/44
U.S. Cl. 424—258 9 Claims

1. A method for the treatment or prophylaxis of malaria in a mammal which might be exposed to malaria or suffering from malaria which comprises the administration to the mammal of a non-toxic, effective antimalarial treatment or prophylaxis amount of the formulation comprising:

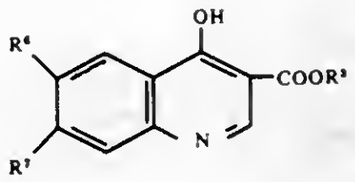
(a) a compound of the formula (1)



(1)

wherein X is hydrogen, an alkali metal, the ammonium radical or a group $H(CH_2)_nCO$— where n is an integer from 0 to 3, or a pharmaceutically and pharmacologically acceptable acid addition salt thereof when X is hydrogen; and

b. a compound of formula II



(II)

wherein R^6 is n-decyloxy, R^7 is ethoxy and R^3 is ethyl or a pharmaceutically and pharmacologically acceptable acid addition salt thereof.

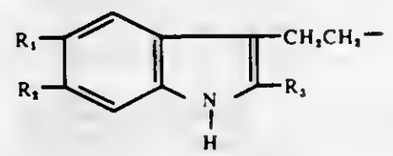
4,031,221

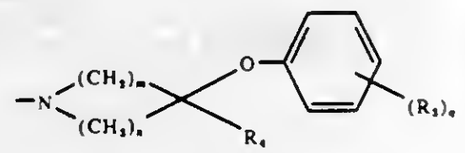
METHOD OF TREATING PAIN AND HYPERTENSION

Grover C. Helsley, Pottersville, and Joseph Strupczewski, Piscataway, both of N.J., assignors to American Hoechst Corporation, Bridgewater, N.J.

Division of Ser. No. 480,205, June 17, 1974, abandoned. This application June 19, 1975, Ser. No. 588,135
Int. Cl.² A61K *31/33, 31/40, 31/445*
U.S. Cl. 424—267 **36 Claims**

1. A method of treating pain and reducing blood pressure which comprises administering to a patient in pain or having elevated blood pressure an effective amount of a compound of the formula:





in which R_1 and R_2 are hydrogen, halogen, alkyl of from 1 to 2 carbon atoms, alkoxy of from 1 to 2 carbon atoms or phenalkoxy of from 7 to 9 carbon atoms; R_2 is hydrogen or alkyl of from 1 to 3 carbon atoms; R_4 is hydrogen or phenyl; R_5 is halogen, alkyl of from 1 to 4 carbon atoms, alkoxy of from 1 to 2 carbon atoms, nitro or trifluoromethyl; *m* is an integer from 1 to 3; *n* is 1 or 2; and *q* is 0, 1 or 2; or a physiologically tolerable acid addition salt thereof.

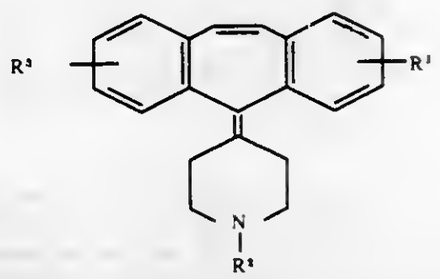
4,031,222

TRIFLUOROMETHYLTHIO (AND SULFONYL) DERIVATIVES OF CYPROHEPTADINE ANALOGS

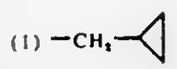
David C. Remy, North Wales, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

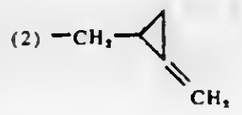
Filed Dec. 22, 1975, Ser. No. 642,863
Int. Cl.² C07D *211/70*
U.S. Cl. 424—267 **15 Claims**

1. A compound of structural formula:



or a pharmaceutically acceptable salt thereof, wherein
R^1 is $-SCF_3$ or SO_2CF_3,
R^2 is





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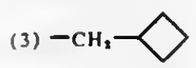
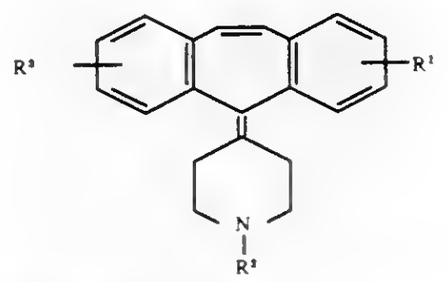


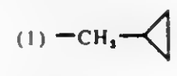
(4) $-CH_2CH_2OH$;

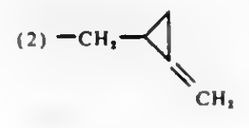
and
R^3 is hydrogen, C_{1-3} alkyl or fluoro.

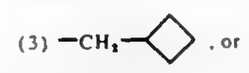
11. A method of treating psychoses which comprises the administration to a patient in need of such treatment an effective amount of a compound of structural formula:



or pharmaceutically acceptable salt thereof, wherein
R^1 is $-SCF_3$ or SO_2CF_3;
R^2 is



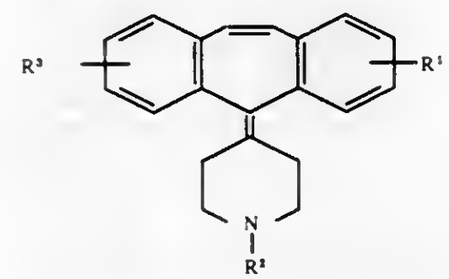




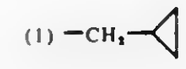
(4) $-CH_2CH_2OH$;

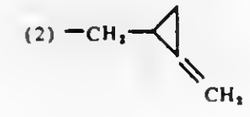
and
R^3 is hydrogen, C_{1-3} alkyl or fluoro.

13. A pharmaceutical composition in unit dosage form for the treatment of psychoses comprising a carrier and an effective amount of a compound of structural formula:



or a pharmaceutically acceptable salt thereof, wherein
R^1 is $-SCF_3$ or SO_2CF_3,
R^2 is





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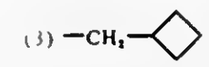


(4) $-CH_2CH_2OH$;

and
R^3 is hydrogen, C_{1-3} alkyl or fluoro.

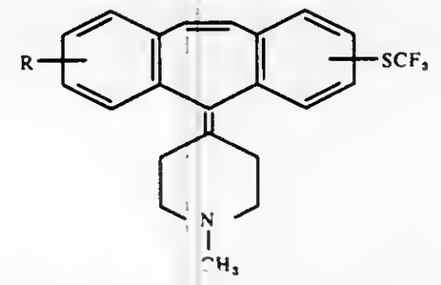
4,031,223

TRIFLUOROMETHYLTHIO DERIVATIVES OF CYPROHEPTADINE

David C. Remy, North Wales, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

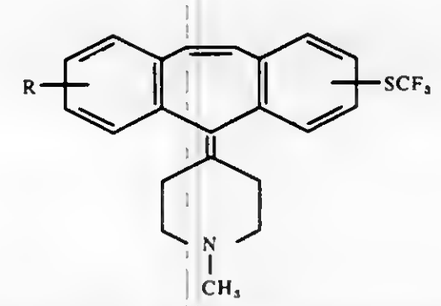
Filed Dec. 22, 1975, Ser. No. 642,864
Int. Cl.² C07D *211/70*
U.S. Cl. 424—267 **9 Claims**

1. A levorotatory or dextrorotatory enantiomer of a compound of structural formula:



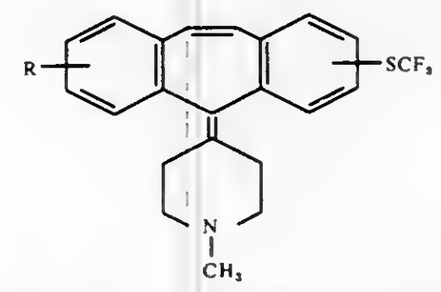
or pharmaceutically acceptable salt thereof, wherein R is hydrogen, fluoro or lower alkyl.

4. A method of treating psychoses which comprises the administration to a patient in need of such treatment an effective amount of a compound of formula:



or pharmaceutically acceptable salt thereof wherein R is hydrogen, fluoro, or lower alkyl.

6. A method of treating thrombosis which comprises the administration, to a patient in need of such treatment, an effective amount of a compound of formula:



or pharmaceutically acceptable salt thereof, wherein R is hydrogen, fluoro, or lower alkyl.

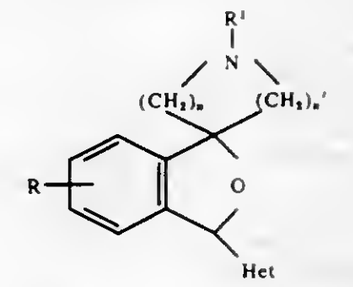
4,031,224

1,3-DIHYDRO-HETEROARYLSPIRO (ISOBENZOFURAN)S

Lawrence Leo Martin, Lebanon, and Brian J. Duffy, Flanders, both of N.J., assignors to American Hoechst Corporation, Bridgewater, N.J.

Filed Apr. 29, 1976, Ser. No. 681,509
Int. Cl.² C07D *405/14*
U.S. Cl. 424—267 **35 Claims**

1. A compound of the formula



wherein R is hydrogen, alkyl of from 1 to 6 carbon atoms, alkoxy of from 1 to 6 carbon atoms, trifluoromethyl or halogen; R^1 is hydrogen, alkyl of from 1 to 6 carbon atoms, phenalkyl of from 7 to 9 carbon atoms, benzoylalkyl of the formula $-(CH_2)_m-COPhR$, phenoxy carbonyl, alkoxycarbonyl of from 2 to 7 carbon atoms, alkenyl of from 2 to 6 carbon atoms, cycloalkylcarbonyl of from 4 to 7 carbon atoms or cycloalkylalkyl of from 3 to 6 carbon atoms; Het is thienyl, pyridyl, furyl, thiazolyl, pyrryl, oxazolyl, imidazolyl or pyrazinyl; *n* and *n'* are integers from 1 to 3, the sum of which is equal to 3, 4 or 5; and *m* is an integer from 1 to 3; or an optical antipode or a pharmaceutically acceptable acid addition salt thereof.

22. A method of treating depression which comprises administering to a patient in need of such treatment a pharmaceutically effective amount of a compound as defined in claim 1.

31. A pharmaceutical composition which comprises between about 0.5 and about 70 percent by weight of a compound defined in claim 1 as an essential active ingredient, the balance being a pharmaceutically acceptable carrier therefor.

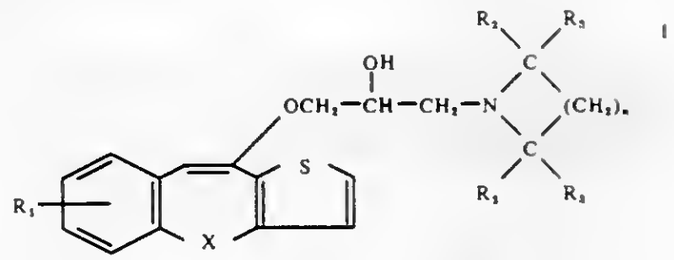
4,031,225

4H-BENZO[4,5]CYCLOHEPTA[1,2-b]THIOPHENES

Jean-Michel Bastian, Therwil, and Richard Berthold, Bottmingen, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

Filed June 14, 1976, Ser. No. 695,384
Claims priority, application Switzerland, June 18, 1975, 7922/75
Int. Cl.² C07D *409/12*
U.S. Cl. 424—267 **9 Claims**

1. A compound of formula I,



wherein
n is a whole number from 1 to 3,
R_1 is hydrogen, or halogen of atomic number from 9 to 35,
each of the two radicals R_2 are the same, and each is hydrogen or alkyl of 1 or 4 carbon atoms,

each of the two radicals R_2 are the same, and each is hydrogen or alkyl of 1 to 4 carbon atoms, and

X is carbonyl or methylene,

in the form of the free base or in the form of a pharmaceutically acceptable acid addition salt thereof.

4,031,226

N-[(1-PIPERIDINYL)ALKYL]ARYLCARBOXAMIDE DERIVATIVES

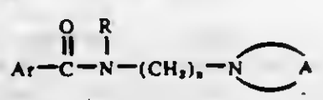
Willem Soudijn; Ineke van Wijngaarden, both of Oud-Turnhout, and Paul Adriaan Jan Janssen, Vosselaar, all of Belgium, assignors to Janssen Pharmaceutica N.V., Beerse, Belgium

Continuation-in-part of Ser. No. 604,282, Aug. 13, 1975, abandoned. This application June 21, 1976, Ser. No. 697,813

Int. Cl.² C07D *211/52, 401/04*

U.S. Cl. 424—267 **16 Claims**

10. A pharmaceutical composition in dosage unit form comprising per dosage unit an effective antiemetic or psychotropic amount of a compound selected from the group consisting of a N-[(1-piperidinyl)alkyl]arylcarboxamide derivative having the formula:

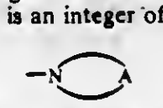


and the pharmaceutically acceptable acid salts thereof, wherein:

Ar is an aryl radical selected from the group consisting of phenyl, substituted phenyl, 2-thienyl, 2-furanyl, pyridinyl and 1-methyl-2-pyrrolyl, wherein said substituted phenyl is phenyl having from 1 to 3 substituents independently selected from the group consisting of halo, lower alkyl, lower alkyloxy, trifluoromethyl, nitro, hydroxy, amino, lower alkylcarbonyloxy and lower alkylcarbonylamino, provided that when more than 1 of said substituents are present only one thereof may be selected from the group consisting of hydroxy, amino, lower alkylcarbonyloxy and lower alkylcarbonylamino;

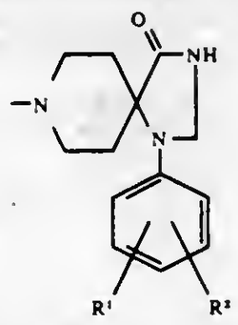
R is a member selected from the group consisting of hydrogen and lower alkyl;

n is an integer of from 2 to 3 inclusive; and



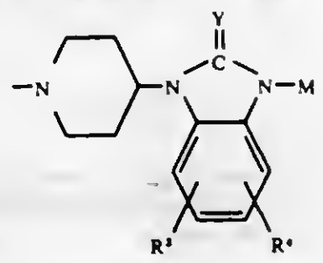
is a member selected from the group consisting of

a. a radical having the formula:



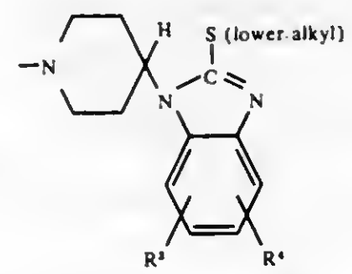
wherein R^1 and R^2 are each independently selected from the group consisting of hydrogen, halo, lower alkyl and trifluoromethyl;

b. a radical having the formula:



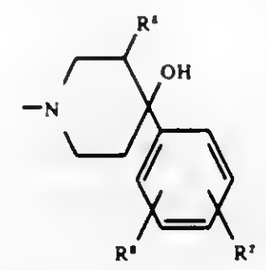
wherein R^3 and R^4 are each independently selected from the group consisting of hydrogen, halo, lower alkyl and trifluoromethyl; M is selected from the group consisting of hydrogen, lower alkyl, lower alkylcarbonyl and 2-cyanoethyl; Y is selected from the group consisting of O, S and lower alkylcarbonylimino; and the dotted line indicates that the double bond between the 3- and 4-carbon atoms of the piperidine nucleus is optional, provided that when there is a double bond between said 3- and 4-carbon atoms, then said Y is O and said M is hydrogen;

c. a radical having the formula:



wherein R^3 and R^4 are each independently selected from the group consisting of hydrogen, halo, lower alkyl and trifluoromethyl; and

d. a radical having the formula:



wherein R^6 is selected from the group consisting of hydrogen and methyl; R^6 is selected from the group consisting of hydrogen and halo; and R^7 is selected from the group consisting of hydrogen, halo, lower alkyl and trifluoromethyl;

in admixture with a pharmaceutical carrier.

4,031,227

SUBSTITUTED 2H,3H-2,1-BENZISOTHIAZOLE-S-OXIDES, METHOD OF USE AND PHARMACEUTICAL COMPOSITIONS THEREOF

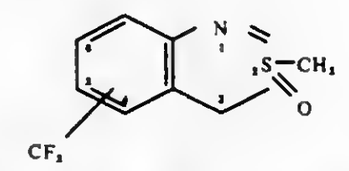
Thomas E. Jackson, Madison, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Filed Sept. 18, 1975, Ser. No. 614,380

Int. Cl.² C07D *275/06*

U.S. Cl. 424—270 **19 Claims**

1. A compound of the formula:



wherein the CF_3 group is in the 4-, 5- or 6-position.

4. A pharmaceutical composition for inducing sleep in mammals comprising an inert pharmaceutically acceptable carrier and a sleep-inducing effective amount of a compound of claim 1.

12. A method of inducing sleep in mammals comprising orally or parenterally administering to a mammal prior to sleep a sleep-inducing effective amount of a compound of claim 1.

16. A method of effecting tranquilization in mammals comprising orally or parenterally administering to a mammal in need of such treatment a tranquilizing-effective amount of a compound of claim 1.

4,031,228

5(6)-BENZENE RING SUBSTITUTED BENZIMIDAZOLE-2-CARBAMATE DERIVATIVES HAVING ANTI-PROTOZOAL ACTIVITY

Colin C. Beard, Palo Alto, Calif., assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.

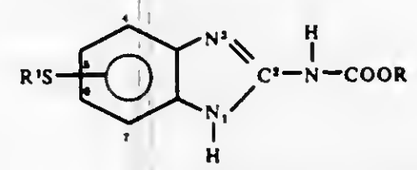
Continuation-in-part of Ser. No. 566,014, April 7, 1975, Pat. No. 3,962,437, which is a division of Ser. No. 371,365, June 19, 1973, Pat. No. 3,901,901. This application Mar. 22, 1976, Ser. No. 669,373

The portion of the term of this patent subsequent to June 8, 1993, has been disclaimed.

Int. Cl.² A61K *31/425, 31/54*

U.S. Cl. 424—270 **18 Claims**

1. A method for inhibiting the growth of protozoa which comprises administering to a host object containing or subject to attach by protozoa, an anti-protozal effective amount of a compound represented by the formula:



where R is a lower alkyl group having 1 to 4 carbon atoms; R^1 is a fused, bicyclic heterocyclic ring moiety having 5 or 6 atoms in each ring, the rings having 2 common atoms one of which is a nitrogen atom, and the other of which is a carbon atom, the carbon atom being covalently bonded to the nitrogen atom, a hetero sulfur atom in each ring and the sulfur atom between the heterocyclic ring moiety and the benzimidazole nucleus; the R^1S-substitution being at the 5(6)-position; or a pharmaceutically acceptable salt thereof.

4,031,229

PENICILLINS AND PROCESSES FOR THEIR PREPARATION AND USE

Hans-Bodo König; Karl Georg Metzger, and Wilfried Schröck, all of Wuppertal, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

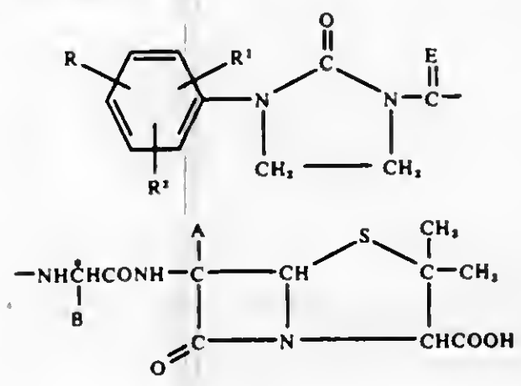
Filed June 4, 1976, Ser. No. 692,930

Claims priority, application Germany, June 24, 1975, 2528079

Int. Cl.² A61K *31/43*; **C07D** *499/66, 499/68, 499/70*

U.S. Cl. 424—271 **15 Claims**

1. A compound selected from the group consisting of a penicillin of the formula:



and the pharmaceutically acceptable salts thereof, wherein

the carbon atom designated * constitutes a center of chirality;

A is hydrogen or methoxy;

B is phenyl, hydroxyphenyl, halophenyl, methoxyphenyl, cyanophenyl, methylsulfonylphenyl, thienyl, cyclohexenyl or cyclohexa-1,4-dien-1-yl;

each of R, R^1 and R^2 is independently selected from the group consisting of hydrogen, halo, lower alkyl, halo(lower)alkyl, carboxy, formyl, carbo(lower alkoxy), lower alkanoyl, cyano, carbamyl, lower alkylcarbamyl, di(lower alkyl)carbamyl, lower alkylamino, di(lower alkyl)amino, pyrrolidino, piperidino, formamido, lower alkanamido, N-(lower alkyl)formamido, N-(lower alkyl)lower alkanamido, lower alkylidenimino, lower alkylsulfonamido, n-(lower alkyl)lower alkylsulfonamido, sulfamino, N-(lower alkyl)sulfamino, amidino, di(lower alkyl)aminomethylidenimino, pyrrolidinomethylidenimino, guanido, nitro, azido, carbo(lower alkoxy)amino, N-(lower alkyl)carbo(lower alkoxy)-amino, hydroxy, lower alkoxy, formyloxy, lower alkanoyloxy, lower alkoxycarbonyloxy, carbamyloxy, N-(lower alkyl)carbamyloxy, N,N-di(lower alkyl)-carbamyloxy, pyrrolidinocarboxyloxy, sulfamyl, N-(lower alkyl)sulfamyloxy, N,N-di(lower alkyl)-sulfamyloxy, mercapto, lower alkylthio, trifluoromethylthio, lower alkylsulfonyl, sulfo, lower alkylsulfinyl, trifluoromethylsulfonyl, sulfamyl, N-(lower alkyl)sulfamyl, N,N-di(lower alkyl)sulfamyl, pyrrolidinosulfonyl, and sulfothio; and

E is oxygen or sulfur.

4,031,230

NOVEL PENICILLINS AND THEIR PREPARATION

Rudolf Gottschlich; Werner Rogalski; Rolf Bergmann; Rosmarie Steinigeweg, and Helmut Wahlig, all of Darmstadt, Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany

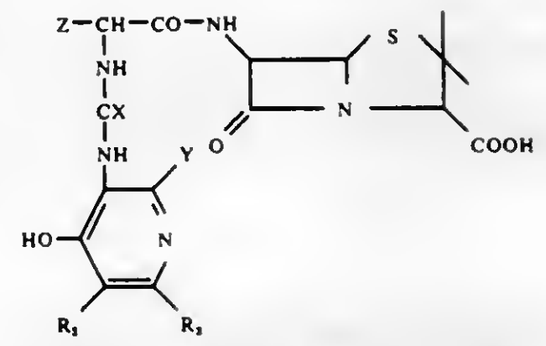
Filed Oct. 22, 1975, Ser. No. 624,763

Claims priority, application Germany, Aug. 9, 1975, 2535655; Oct. 25, 1974, 2450668

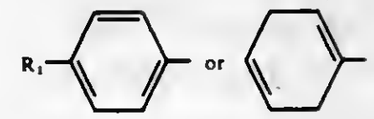
Int. Cl.² C07D *499/68*; **A61K** *31/43*

U.S. Cl. 424—271 **100 Claims**

1. A penicillin of the formula



wherein X is O or S; Y is H or alkyl of 1–4 carbon atoms; Z is



and R_1 is H or OH; and R_2 and R_3 each are H or collectively

with the carbons to which they are attached form a first benzene or pyridine ring which is unsubstituted, which is substituted by up to two of alkyl, alkoxy of 1–4 carbon atoms, dialkylamino or halogen, wherein alkyl and alkoxy in each instance are of 1–4 carbon atoms, or which is fused at two adjacent carbons thereof directly to a second benzene or pyridine ring; or a conventional penicillin in vivo hydrolyzable and physiologically acceptable ester thereof; or physiologically acceptable salt of either.

4,031,231

ANTIBACTERIAL COMPOSITION COMPRISING 3-FLUORO-D-ALANINE OR DEUTERO ANALOG IN COMBINATION WITH AUTO-ANTAGONIST INHIBITOR

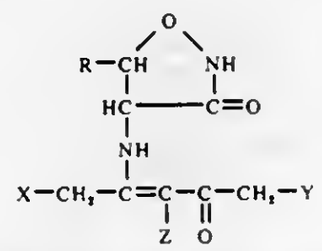
Frederick M. Kahan, Rahway, N.J., assignor to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 478,793, June 13, 1974, abandoned, which is a continuation-in-part of Ser. No. 387,571, Aug. 10, 1973, abandoned, which is a continuation-in-part of Ser. Nos. 314,878, Dec. 13, 1972, abandoned, and Ser. No. 223,360, Feb. 3, 1972, abandoned. This application Jan. 23, 1976, Ser. No. 651,878

Int. Cl.² A61U *31/42, 31/195*

U.S. Cl. 424—272 **15 Claims**

1. An antibacterial composition comprising as active ingredients a combination of 3-fluoro-D-alanine-type compound and 3-fluoro-D-alanine autoantagonist-inhibitor characterized in that the 3-fluoro-D-alanine-type compound is selected from the group consisting of 3-fluoro-D-alanine, 2-deutero-3-fluoro-D-alanine, 2,3-dideutero-3-fluoro-D-alanine, 2,3,3-trideutero-3-fluoro-D-alanine, and their lower alkyl ester or pharmacologically acceptable salt thereof; and the 3-fluoro-D-alanine autoantagonist inhibitor is cycloserine, terizidone, cis-cyclothreonine, transcyclothreonine or an N-substituted cycloserine compound having the formula



wherein R is hydrogen or methyl, and X, Y, and Z are hydrogen or loweralkyl, or pharmacologically acceptable salts thereof, the ratio of the 3-fluoro-D-alanine-type compound to the autoantagonist inhibitor being within the range of about 1:120 to about 200:1.

4,031,232

1-ALKYL-2-(PHENOXYMETHYL)-5-NITRO-IMIDAZOLES AND PROCESS FOR THEIR MANUFACTURE

Erhardt Winkelmann, Kelkheim, Taunus, and Wolfgang Raether, Dreieichenhain, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

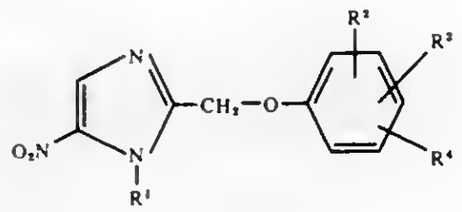
Filed Dec. 15, 1975, Ser. No. 641,091

Claims priority, application Germany, Dec. 16, 1974, 2459395

Int. Cl.³ A61K *31/415;* **C07D** *233/94, 233/95*

U.S. Cl. 424—273 **12 Claims**

1. A 1-alkyl-2-(phenoxymethyl)-5-nitro-imidazole of the formula



wherein R^1 is methyl or ethyl, R^2 is trifluoromethyl, trichloromethyl, nitro, cyano, methylsulfonyl, or ethylsulfonyl, R^3 is hydrogen, fluorine, chlorine, bromine, iodine, trifluoromethyl, trichloromethyl, cyano or nitro, and R^4 is hydrogen or methyl.

12. A method for treating protozoal diseases which comprises administering an effective amount of a compound as claimed in claim 1.

4,031,233

PHENOXYPHENYL IMIDAZOLYL METHANOLS AND KETONE DERIVATIVES THEREOF

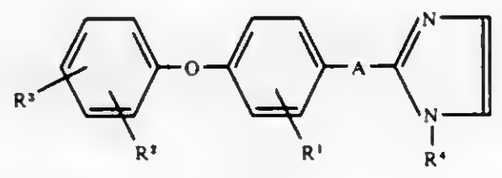
Falzulla G. Kathawala, West Orange, N.J., assignor to Sandoz, inc., E. Hanover, N.J.

Filed Feb. 9, 1976, Ser. No. 656,247

Int. Cl.² C07D *233/64*

U.S. Cl. 424—273 **27 Claims**

1. A compound which is a member of the group consisting of a free organic base of the formula



wherein

R^1 is a hydrogen atom, alkyl having from 1 to 4 carbon atoms, fluoro or chloro;

R^2 is a hydrogen atom, alkyl having from 1 to 4 carbon atoms, or alkoxy having from 1 to 4 carbon atoms, fluoro or chloro;

R^3 is a hydrogen atom, alkyl having from 1 to 4 carbon atoms, or alkoxy having from 1 to 4 carbon atoms, fluoro or chloro;

R^4 is alkyl having from 1 to 18 carbon atoms; and

A is either

and a

pharmaceutically acceptable acid addition salt thereof; provided that when R^3 and R^3 are on adjacent carbons they are not both alkyl or alkoxy which are branched.

4,031,234

1,5(6)-DISUBSTITUTED BENZIMIDAZOLE-2-CARBAMATE DERIVATIVES HAVING ANTHELMINTIC ACTIVITY

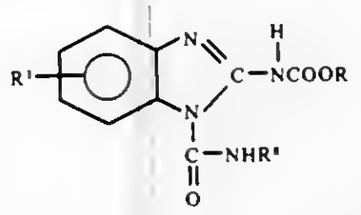
Colin C. Beard, Palo Alto; John A. Edwards, Los Altos, and John H. Fried, Palo Alto, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Division of Ser. No. 605,704, Aug. 18, 1975, Pat. No. 3,993,769, which is a division of Ser. No. 473,865, May 28, 1974, Pat. No. 3,929,822, which is a continuation-in-part of Ser. No. 417,963, Nov. 21, 1973, Pat. No. 3,929,821, which is a continuation-in-part of Ser. No. 319,299, Dec. 29, 1972, abandoned. This application June 18, 1976, Ser. No. 697,499

Int. Cl.² A61K *31/415*

U.S. Cl. 424—273 **36 Claims**

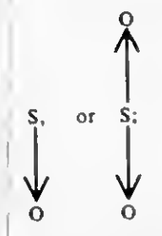
1. A composition for controlling helminths in mammals comprising a pharmaceutically acceptable non-toxic excipient and an anthelmintically effective amount of a compound represented by the formula:



(I)

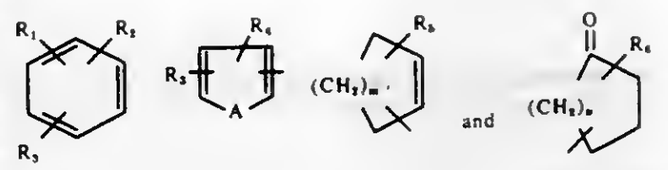
where

R is lower alkyl having 1 to 4 carbon atoms; R^1 is —SOR^5, —SR^5, —OR^5 or $M'(CH_2)_nMR^7$; R^5 is lower alkyl having from 1 to 6 carbon atoms, cycloalkyl having 3 to 7 carbon atoms, lower alkenyl or lower alkynyl having 3 to 6 carbon atoms, phenyl, benzyl or phenethyl; R^5 is lower alkenyl, lower alkynyl, benzyl or phenethyl; R^7 is lower alkyl having 1 to 4 carbon atoms or phenyl; M and M′ are independently O, S,



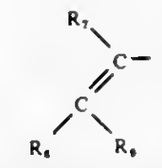
n is 1–4; and R^8 is phenyl, benzyl, phenethyl, or lower alkyl having 1 to 12 carbon atoms and optionally substituted wih a —COOR group where R is lower alkyl having 1 to 4 carbon atoms; the R^1 substitution being at the 5(6)-position; or a pharmaceutically acceptable salt thereof.

wherein Y is selected from the group consisting of the formulae:



(II) (III) (IV) and (V)

in which R_1 and R_2 are individually hydrogen, halogen, cyano, nitro, lower alkyl, lower alkenyl, lower alkynyl, lower alkoxy, lower alkoxyalkyl, halogen-substituted lower alkyl, halogen-substituted lower alkenyl, halogen-substituted lower alkynyl, lower alkylthio, lower alkylsulfoxyl, C_2-C_4 alkanoyl, C_2 alkanoyloxy, lower alkoxycarbonyl, lower alkenyloxycarbonyl, lower alkynyloxy-carbonyl, methylenedioxy, tetramethylene or trimethylene group; R_3 and R_4 are individually hydrogen, halogen, cyano, nitro, lower alkyl, lower alkenyl, lower alkynyl, lower alkoxy, lower alkoxyalkyl, halogen-substituted lower alkyl, halogen-substituted lower alkenyl, halogen-substituted lower alkynyl, lower alkylthio, lower alkylsulfoxyl, C_2-C_4 alkanoyl, lower alkoxycarbonyl, lower alkenyloxycarbonyl or lower alkynyloxycarbonyl group; A represents an oxygen atom or a sulfur atom; R_5 represents hydrogen, halogen, cyano, nitro or lower alkyl group; m is an integer of from 1 to 3; R_6 represents hydrogen, halogen, cyano, nitro or lower alkyl group; n is an integer of from 1 to 3; and the dotted line in the formula (V) represents a double bond present at a position conjugated or non-conjugated with the ketone (C=O), or Y represents a substituted ethylene group of the formula (VI)



(VI)

in which R_7, R_8 and R_9 constitutes a plane together with the double bond at β-γ position of the ester group, and are individually hydrogen, lower alkyl, lower alkenyl, lower alkynyl, or halogen; Z represents a straight or branched lower alkyl, lower alkenyl, lower alkynyl, lower alkoxy, cyano, halogen-substituted lower alkyl, halogen-substituted lower alkenyl group or an alicyclic group having 3 to 7 carbon atoms; R_{13} represents phthalimide, thiophthalimide, di- or tetrahydrophthalimide or dialkylmaleimide.

4. A insecticidal and miticidal composition comprising an insecticidally and miticidally effective amount of at least one substituted acetate compound as defined in claim 1 and in an inert carrier.

4,031,235

INSECTICIDAL SUBSTITUTED ACETATE COMPOUNDS

Keimei Fujimoto, Kobe; Nobuo Ohno, Toyonaka; Yoshitoshi Okuno, Toyonaka; Toshio Mizutani, Toyonaka; Isao Ohno, Minoo; Masachika Hirano, Toyonaka; Nobushige Itaya, Ikeda, and Takashi Matsuo, Amagasaki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

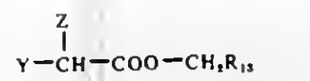
Division of Ser. No. 378,301, July 11, 1973, Pat. No. 3,996,244. This application July 16, 1975, Ser. No. 596,336

Claims priority, application Japan, July 11, 1972, 47-69805

Int. Cl.² A01N *9/22*

U.S. Cl. 424—274 **6 Claims**

1. A substituted acetate compound of the formula



(I)

4,031,236

NOVEL THIOPHENE DERIVATIVES AND THEIR PREPARATION

Hanns Ahrens; Helmut Biere; Clemens Rufer; Ralph Schmiechen; Eberhard Schroeder; Olaf Loge; Wolfgang Losert, and Ekkehard Schillinger, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

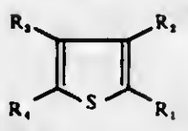
Filed May 20, 1975, Ser. No. 579,258

Claims priority, application Germany, May 21, 1974, 2424742

Int. Cl.² A61K *31/41, 31/38;* **C07D** *257/04, 333/24*

U.S. Cl. 424—275 **18 Claims**

1. A thiophene derivative of the formula



wherein one of R_1, R_2, R_3 and R_4 is R_x; 0, 1, or 2 thereof are R_y, and the remainder thereof are hydrogen atoms, wherein R_x is —S—CHR_5—CONHOH wherein R_5 is a hydrogen atom or alkyl of 1—6 carbon atoms, and wherein R_y is alkyl of 1–6 carbon atoms, alkoxy of 1–6 carbon atoms or a halogen atom, including, when R_5 is an alkyl group, their enantiomers, and pharmacologically acceptable salts thereof with inorganic and organic bases.

18. A method of inhibiting lipolysis which comprises administering systemically to a patient with an abnormally high serum free fatty acid level an amount of a compound of claim 1 effective to lower the free fatty acid level.

4,031,237

CARBAMATE INSECTICIDES FROM 5,8-DIHYDRO-5,8-METHANO-1-NAPHTHOL AND ITS DERIVATIVES

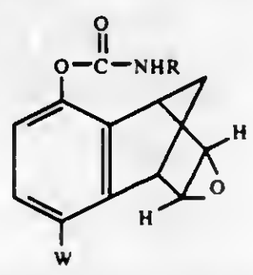
Stanley T. Gough, Branchburg; Michael A. Tobias, Edison, and Roger P. Napier, Somerville, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 764,969, Oct. 3, 1968, abandoned. This application Mar. 30, 1971, Ser. No. 129,628

Int. Cl.² C07D *303/36;* A01N *9/28*

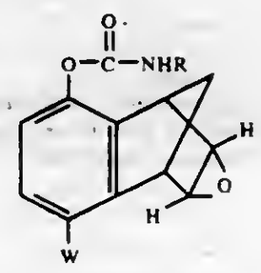
U.S. Cl. 424—278 **6 Claims**

1. A method for combatting insects that comprises contacting them with an insecticidally effective amount of a carbamate having the formula:



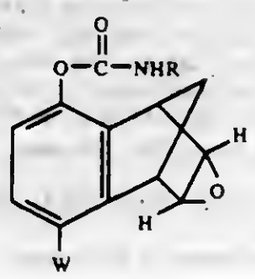
wherein R is alkyl (C_1–C_2) and W is hydrogen or alkoxy (C_1–C_3).

3. An insecticidal composition comprising a carrier and a carbamate having the formula:



wherein R is alkyl (C_1–C_2) and W is hydrogen or alkoxy (C_1–C_2).

5. A carbamate having the formula:



wherein R is alkyl (C_1–C_2) and W is hydrogen or alkoxy (C_1–C_3).

4,031,238

PROCESS FOR PREPARING INSTANT BEVERAGE CUBES

Joanne Reid, Boston, Mass.; Elpidio Leoncio de la Teja, Hackensack, and Francis Farrell, Madison, both of N.J., assignors to Thomas J. Lipton, Inc., Englewood Cliffs, N.J.

Filed May 30, 1975, Ser. No. 582,391

Int. Cl.² A23L *2/38;* A23F *3/00*

U.S. Cl. 426—285 **6 Claims**

1. A method of manufacturing a water-soluble solid beverage tablet comprising the steps of:

forming a mixture consisting essentially of 16 to 40% powdered glucose monohydrate, 50 to 70% granular sucrose and 1 to 10% powdered hygroscopic flavor material, the sucrose being adjusted to give a total sugar content of between 90 and 95%;

heating the mixture above 95° F in a sealed chamber until the mixture binds into a mass;

forming the mass into predetermined tablet shapes; and cooling the tablets.

4,031,239

CYCLOPROPANECARBOXYLATES FOR SYSTEMIC CONTROL OF ECTOPARASITES

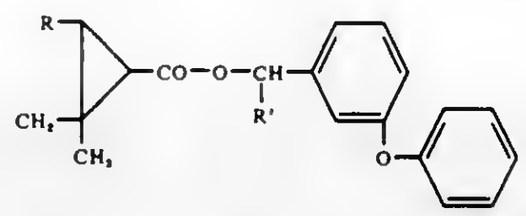
Michael Stanley Schrider, South Bound Brook, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 550,107, Feb. 13, 1975, abandoned. This application Dec. 22, 1975, Ser. No. 643,225

Int. Cl.² A01N *9/20;* A61K *31/275*

U.S. Cl. 424—304 **15 Claims**

1. A method for the systemic control of ectoparasites which attack warm-blooded animals comprising orally or parenterally administering to the animals a systemically effective amount against the parasites of a cyclopropanecarboxylic acid of the formula:



wherein R is 2,2-dichlorovinyl- or 2-methyl-propenyl- and R' is hydrogen or cyano.

4,031,240

2,5-DIHYDROXY BENZENE SULFONIC ACID MONO- AND DIESTERS

Antonio Esteve-Subirana, Barcelona, Spain, assignor to Laboratorios del Dr. Esteve S.A., Barcelona, Spain

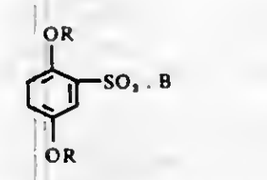
Continuation-in-part of Ser. No. 505,934, Sept. 13, 1974, Pat. No. 3,954,767, which is a continuation-in-part of Ser. No. 360,394, May 14, 1973, Pat. No. 3,876,651. This application Sept. 12, 1975, Ser. No. 612,775

Claims priority, application Switzerland, May 17, 1975, 7327/75

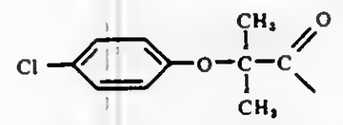
Int. Cl.² C07C 69/76

U.S. Cl. 424—308 **18 Claims**

1. Mono- and di-esters of salts of 2,5-dihydroxy benzene sulfonic acid, of general formula:



wherein each R residue is hydrogen or the residue of p-chloro phenoxy isobutyric acid of formula:



with the proviso that both Rs are not hydrogen simultaneously, and B is hydrogen or an equivalent of an inorganic or organic cation.

4,031,241

CERTAIN BROMOACETOXY ACETYLENES AS SLIME CONTROL AGENTS

Don R. Baker, Orinda, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

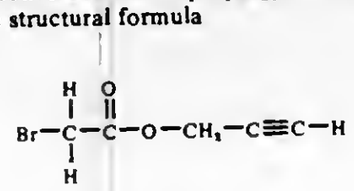
Continuation of Ser. No. 477,957, June 10, 1974, abandoned, which is a continuation of Ser. No. 313,230, Dec. 8, 1972, abandoned, which is a continuation-in-part of Ser. No. 121,189, March 4, 1971, abandoned. This application May 8, 1975, Ser. No. 575,772

The portion of the term of this patent subsequent to Jan. 16, 1990, has been disclaimed.

Int. Cl.² A01N *9/24*

U.S. Cl. 424—311 **1 Claim**

1. A method of reducing the growth of slime-forming microorganism in an aqueous system comprising adding to said system an effective amount of propargyl monobromoacetate which has the structural formula



4,031,242

DIACYLATED DERIVATIVES OF γ-GLUTAMYL DOPAMINE

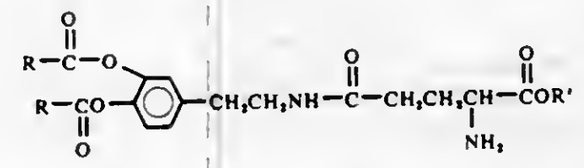
Peter Hadley Jones, Lake Forest; Carroll Wayne Ours, Zion, and Jaroslav Kynci, Lake Bluff, all of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Filed Sept. 11, 1975, Ser. No. 612,511

Int. Cl.² C07C *69/16, 69/28;* A61K *31/22, 31/23*

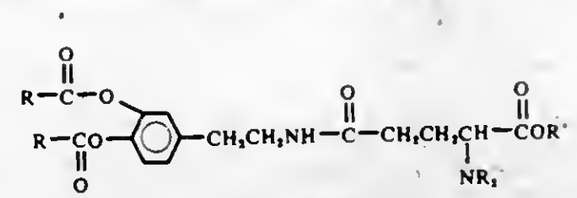
U.S. Cl. 424—311 **16 Claims**

1. A diacylated derivative of γ-glutamyl dopmaine selected from the group consisting of



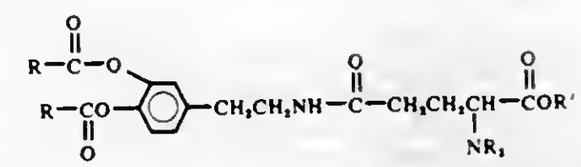
where R is a C_1–C_{12} straight or branched chain alkyl radical and R' is H, and a pharmaceutically acceptable acid addition salt thereof.

13. A method of increasing renal blood flow of warm-blooded animals which comprises administering to said mammals at least an effective amount of a renal vasodilator compound comprising a diacylated derivative of γ-glutamyl dopamine selected from the group consisting of



where R is a C_1–C_{12} straight or branched chain alkyl radical and R' is H, and a pharmaceutically acceptable acid addition salt thereof.

15. A pharmaceutical composition in unit dosage form effective in increasing renal blood flow which comprises an active portion comprising a diacylated derivative of γ-glutamyl dopamine selected from the group consisting of



where R is a C_1–C_{12} straight or branched chain alkyl radical and R' is H, and a pharmaceutically acceptable carrier.

4,031,243

2-(4-ISOBUTYL PHENYL)BUTYRIC ACID, SALTS THEREOF, AND PHARMACEUTICAL COMPOSITIONS CONTAINING THE SAME

Luis Aparicio; Nenesio Gayo; José Mª Carretero; Jose Luis Martin, and Armando Ron, all of Madrid, Spain, assignors to Juste, S.A. Quimico-Farmaceutica, Madrid, Spain

Filed July 3, 1975, Ser. No. 593,059

Int. Cl.² A61K *27/00, 31/19*

U.S. Cl. 424—317 **9 Claims**

1. 2-(4-Isobutylphenyl)butyric acid or a pharmaceutically acceptable salt thereof.

5. A pharmaceutical composition having antiinflammatory, analgesic and antipyretic properties comprising 2-(4-isobutylphenyl)butyric acid or a pharmaceutically acceptable salt thereof as defined in claim 1 together with a carrier therefor, the acid or salt being present in an amount from 200 to 400 mg per unit dose.

4,031,244

PHARMACEUTICAL COMPOSITIONS CONTAINING A 1-(2,6-DIMETHYL-PHENOXY)-2-AMINO-ALKANE AND METHOD OF USE

Herbert Koppe; Karl Zelle; Werner Kummer; Helmut Stahle, and Peter Danneberg, all of Ingelheim am Rhein, Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

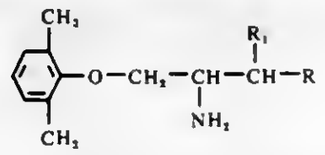
Division of Ser. No. 511,063, Oct. 1, 1974, Pat. No. 3,954,872, which is a continuation-in-part of Ser. No. 86,983, Nov. 4, 1970, abandoned, which is a continuation-in-part of Ser. No. 871,619, Nov. 14, 1969, abandoned, which is a continuation of Ser. No. 667,665, Sept. 14, 1967, abandoned. This application Jan. 29, 1976, Ser. No. 653,296

Claims priority, application Germany, Sept. 16, 1966, 88950; Aug. 17, 1967, 94024

Int. Cl.² A61K *31/135*

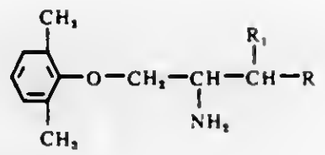
U.S. Cl. 424—330 **8 Claims**

1. A pharmacodynamic dosage unit composition consisting essentially of an inert pharmaceutical carrier and an effective anticonvulsive or antiarrhythmic amount of a racemic or optically active compound of the formula



wherein R is hydrogen or alkyl of 1 to 3 carbon atoms and R_1 is hydrogen or methyl, or a non-toxic, pharmacologically acceptable acid addition salt thereof.

5. The method of suppressing convulsions and alleviating cardiac arrhythmia in a warm-blooded animal in need of such treatment, which comprises administering to said animal an effective anticonvulsive or antiarrhythmic dose of a racemic or optically active compound of the formula



wherein R is hydrogen or alkyl of 1 to 3 carbon atoms and R_1 is hydrogen or methyl, or a non-toxic, pharmacologically acceptable acid addition salt thereof.

4,031,245

ALKENYL AND ALKANYLAMINES FOR TREATING DEPRESSION

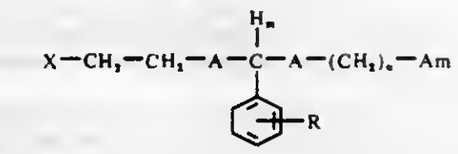
William John Welstead, Jr., Richmond, Va., assignor to A. H. Robins Company, Incorporated, Richmond, Va.

Division of Ser. No. 221,825, Jan. 28, 1972, Pat. No. 3,978,129. This application Apr. 7, 1976, Ser. No. 674,706

Int. Cl.² A61K *31/135*

U.S. Cl. 424—330 **9 Claims**

1. A process for treating depression in a living animal body which comprises administering to said animal body for its antidepressant effect an effective amount of a compound selected from phenyl-ω-haloalkenylamines and phenyl-ω-haloalkanylamines having the formula:



wherein,

Am is selected from lower-alkylamino and di-lower-alkylamino,

A is selected from methylene and methylidyne,

R is selected from hydrogen, lower-alkyl, lower-alkoxy, halogen and trifluoromethyl,

m is zero or one,

n is one or two,

X is halogen, and

a pharmaceutically acceptable acid addition salt thereof.

4,031,246

ARYLOXYALKYL DIKETONES

Joseph C. Collins, East Greenbush, and Guy D. Diana, Stephentown, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

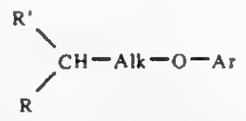
Continuation-in-part of Ser. No. 381,406, July 23, 1973, Pat. No. 3,933,837. This application May 12, 1975, Ser. No. 576,311

Claims priority, application United Kingdom, July 11, 1974, 30800/74

Int. Cl.² A01N *9/24*; **A61K** *31/12*; **C07C** *49/76*

U.S. Cl. 424—331 **47 Claims**

1. A compound of the formula



wherein:

Alk is alkylene of 3 to 10 carbon atoms optionally interrupted by an oxygen atom separated by at least two carbon atoms from the terminal bonds of Alk;

R and R' are alkanoyl of 2 to 6 carbon atoms;

and Ar is phenyl or phenyl substituted by one to three substituents selected from the group consisting of alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, alkylthio of 1 to 4 carbon atoms, alkoxyalkoxy of 3 to 6 carbon atoms, hydroxyalkoxy of 2 to 4 carbon atoms, halogen, nitro, acetyl, trifluoromethyl, trifluoromethoxy, hydroxy, and benzyloxy.

42. A composition for combatting arthropods by hindering their maturation which comprises an effective amount of at least one compound according to claim 1 in admixture with a suitable carrier or diluent.

44. A composition for combatting viruses which comprises an antivirally effective amount of at least one compound according to calim I in admixture with a suitable carrier or diluent.

4,031,247

FUNGICIDAL VINYL 2-SUBSTITUTED-THIOVINYL SULFONES

Philip S. Magee, Novato, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 657,679, Feb. 12, 1976, Pat. No. 3,988,376. This application Aug. 19, 1976, Ser. No. 715,959

Int. Cl.² A01N *9/12*

U.S. Cl. 424—337 **11 Claims**

1. A method for the control of fungi which comprises applying thereto a fungicidally effective amount of a compound of the formula

$$RSCH{=}CHSO_2CH{=}CH_2$$

wherein R is alkyl of 1 to 6 carbon atoms, phenyl or phenyl substituted with 1 to 3 of the same or different substituents selected from the group consisting of fluoro, chloro, bromo, nitro and alkyl of to 4 carbon atoms.

4,031,248

MICROBICIDAL AGENTS CONTAINING AS ACTIVE INGREDIENT MONOHYDROXYPHENYL CARBINOLS

Max Schellenbaum, Muttenz; Max Duennenberger, Frenkendorf, and Fulvio Casagrande, Binningen, all of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

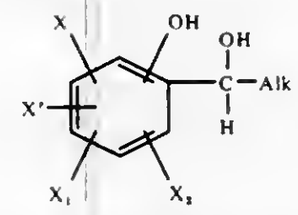
Division of Ser. No. 553,350, Feb. 26, 1975, Pat. No. 3,944,652, which is a division of Ser. No. 164,446, July 20, 1971, Pat. No. 3,879,477. This application Dec. 10, 1975, Ser. No. 639,558

Claims priority, application Switzerland, July 23, 1970, 11172/70

Int. Cl.² A01N *9/26*

U.S. Cl. 424—347 **10 Claims**

1. A composition for combatting bacteria or fungi comprising (1) a fungicidally or bactericidally effective amount of a compound of the formula



wherein each of X and X' is halogen, each of X_1 and X_2 is hydrogen or halogen, Alk is straight or branched chain alkyl having from 1 to 8 carbon atoms, and the hydroxy group is in the 2- or 4-position to the carbinol bridge, and (2) a carrier.

4,031,249

COMPOSITIONS CONTAINING CERTAIN 2,4-HALO-6-NITROPHENOLS OR DERIVATIVES THEREOF AND METHODS FOR USING SAME TO ERADICATE INTERNAL PARASITES IN WARM-BLOODED ANIMALS

Bruce Adam Forsyth, Croydon; David Ernest Pryor, Balwyn; Errol James McGarry, Bundoora, and Donald William Gerald Harney, Doncaster, all of Australia, assignors to ICI Australia Limited, Melbourne, Australia

Filed May 19, 1975, Ser. No. 578,811

Claims priority, application Australia, June 7, 1974, 7826/74; Apr. 7, 1975, 1153/75

Int. Cl.² A61K *31/055*; **C07C** *79/22*

U.S. Cl. 424—347 **10 Claims**

1. A compound chosen from the group consisting of 2-chloro-4-fluoro-6-nitrophenol and salts thereof with non-toxic bases.

3. A method of treating warm blooded animals to eradicate trematodes and nematodes; which method comprises administering to warm blooded animal in need of such treatment an effective amount of a compound selected from the group consisting of

2,4-dibromo-6-nitrophenol

2,4-dichloro-6-nitrophenol

2-chloro-4-fluoro-6-nitrophenol

2-bromo-4-fluoro-6-nitrophenol

2-iodo-4-fluoro-6-nitrophenol

2-bromo-4-chloro-6-nitrophenol

and salts thereof with a non-toxic base.

4,031,250

METHOD FOR IMPARTING RED COLOR TO ANIMAL FOOD

Gerhard Julius Haas, Woodcliff Lake, N.J.; Edwin Bernard Herman, Croton-on-Hudson, and Joaquin Castro Lugay, Thornwood, both of N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Filed Nov. 20, 1974, Ser. No. 525,710

Int. Cl.² A21D *2/00*; **A23K** *1/18*

U.S. Cl. 426—18 **9 Claims**

1. A method for imparting a meaty red color to an animal food comprising culturing *Monascus Purpureus* on a material selected from the group consisting of rice, corn, and mixtures thereof to obtain red pigments thereon, subdividing said material containing said pigment to a finely-divided form, and adding said finely-divided material to an animal food in an amount effective to impart a red color to said food.

4,031,251

DECAFFEINATION OF VEGETABLE MATERIAL

Geoffrey Margolis, Marysville; Dean Frederick Rushmore, Delaware, and Richard Tien-Szu Liu, Worthington, all of Ohio, assignors to Societe d'Assistance Technique pour Produits Nestle S.A., Lausanne, Switzerland

Filed Jan. 8, 1975, Ser. No. 539,535

Int. Cl.² A23F *1/10*

U.S. Cl. 426—387 **16 Claims**

1. A process for the decaffeination of aqueous extract of a vegetable material selected from the group consisting of tea and coffee comprising:

a. contacting said extract with non-ionic, hydrophobic polymer resin having a dipole moment of less than about 2.0 debye whereby sufficient caffeine and non-caffeine solubles are adsorbed by the resin to exhaust its activity;

b. separating the exhausted resin and decaffeinated extract;

c. leaching said exhausted resin and adherent caffeine and non-caffeine solubles with water to selectively remove caffeine;

d. eluting the caffeine-free resin with a wash solution comprising water and organic solvent to remove non-caffeine solubles;

e. removing said solvent from said resin by rinsing with water; and

f. contacting the rinsed resin with aqueous extract of vegetable material further to absorb caffeine.

4,031,252

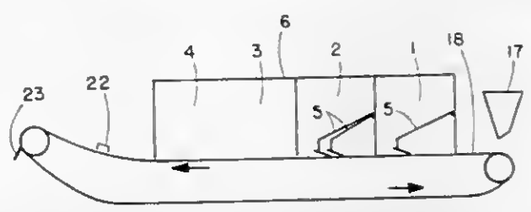
DOCTORING AND DRYING METHOD

John F. Sullivan, Drexel Hill; Richard P. Konstance, Philadelphia, and Wolfgang K. Heiland, Trevose, all of Pa., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Mar. 10, 1976, Ser. No. 665,588

Int. Cl.² F26B *3/00*; **A23P** *1/00*

U.S. Cl. 426—445 **2 Claims**



1. In a process for dyring comestibles and preparing them for puffing wherein pieces of comestibles are transported on a moving belt through a multi-zoned hot air dryer, the improvement which comprises, providing at least the first two zones of the dryer with a plurality of doctoring units, each of said units being a combination doctor blade and V-shaped member wherein the doctor blade is detachably fastened to the V-shaped member and the leading edge of the doctor blade is parallel to the plane of the moving belt and the leading edge formed by the two plane faces of the V-shaped member is generally perpendicular to the plane of the belt when the unit is in doctoring position and wherein each unit is provided with means for applying doctoring force and is supported by an extension arm which is pivotally mounted, arranging said units spacially to provide room for doctored pieces to tumble freely and to allow the complete width of the belt to be doctored, applying the units such that they doctor the comestibles from the belt and impart to the pieces a lateral movement combined

with a tumbling action, and then transferring the pieces directly to a puffing operation.

4,031,253

PROCEDURE FOR PRESERVING ROOT CROPS BY DEEP FREEZING AND THEIR PEELING

Mikko Tapani Suortti; Yrjö Mäkkki, both of Espoo, and Olavi Elis Nikkilä, Helsinki, all of Finland, assignors to Mikko Tapani Suortti and Yrjo Maikki, both of Espoo, Finland

Filed Nov. 3, 1975, Ser. No. 628,491

Claims priority, application Finland, Nov. 6, 1974, 3236/74

Int. Cl.² A23B 7/04

U.S. Cl. 426—482 **3 Claims**

1. In a process for preserving fully ripened potatoes and other root crops requiring peeling by boiling or parboiling followed by deep freezing, the improvement which comprises carrying out the boiling or parboiling and deep freezing while the crops are in the unpeeled state, peeling the crops in the deep frozen state and wherein the germ buds and up to 50% of the peel of the root crop are removed prior to deep freezing.

4,031,254

INSTANT CHEESE, CHEESE SAUCES AND RELATED COMPOSITIONS

Robert L. Kasik, Berwyn, and Marvin A. Peterson, Park Ridge, both of Ill., assignors to Beatrice Foods Co., Chicago, Ill.

Continuation-in-part of Ser. No. 455,510, March 27, 1974, Pat. No. 3,917,854. This application Nov. 3, 1975, Ser. No. 628,561

The portion of the term of this patent subsequent to Nov. 4, 1992, has been disclaimed.

Int. Cl.² A23C 19/12

U.S. Cl. 426—573 **20 Claims**

1. A dry composition which is capable of being instantly reconstituted with water to form a cheese-substitute, comprising a mixture of:

1. co-dried particles containing (a) at least one base neutralized casein wherein the base is selected from the group consisting of a magnesium, potassium, magnesium/potassium, sodium/potassium and sodium/magnesium base, and (b) at least one fat having a melting point of 130° F. or less, the weight ratio of the neutralized casein to the fat being 1:3-to-3:1; and
2. a congealing amount of an alkali metal or alkaline earth metal salt, oxide or hydroxide congealing agent; and wherein the moisture content of the composition is less than 10% by weight and the water-reconstituted pH of the composition is between 4.0 and 7.0.

4,031,255

FIXING ACETALDEHYDE IN SUCROSE

Peter Donato Malizia, Port Chester, N.Y., and William Alexander Mitchell, Lincoln Park, N.J., assignors to General Foods Corporation, White Plains, N.Y.

Filed July 3, 1975, Ser. No. 593,145

Int. Cl.² A23L 1/226

U.S. Cl. 426—534 **10 Claims**

1. An improved method for fixing acetaldehyde in sucrose which comprises:

a. obtaining, at a temperature of below about 20° C, a glassy, aqueous, supersaturated sucrose solution containing from about 80 to 93% sucrose, based on the combined weight of sucrose and water;

b. mixing acetaldehyde with said glassy, aqueous supersaturated sucrose solution sufficiently to at least partially dissolve the acetaldehyde therein and initiate crystallization of the sucrose;

c. contacting the resulting mixture with a stream of drying gas during the mixing operation to at least partially dry the mixture as crystallization proceeds; and

d. recovering, as a product, crystalline sucrose having acetaldehyde fixed therein.

4,031,256

FOODSTUFF FLAVOR COMPOSITIONS COMPRISING 3-FURYL ALKYL SULFIDES AND PROCESSES

William J. Evers, Middletown; Howard H. Heinsohn, Jr., Hazlet, and Bernard J. Mayers, Cliffwood, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

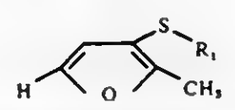
Continuation-in-part of Ser. No. 639,754, Dec. 11, 1975, abandoned, which is a continuation-in-part of Ser. No. 551,150, Feb. 19, 1975, abandoned. This application Sept. 15, 1976, Ser. No. 723,531

The portion of the term of this patent subsequent to May 30, 1992, has been disclaimed.

Int. Cl.² A23L 1/231

U.S. Cl. 426—535 **6 Claims**

1. A process for augmenting or enhancing the nutty notes of a foodstuff having a meaty flavor comprising the step of adding to said foodstuff from about 0.0005 ppm up to about 250 ppm of a 3-furyl alkyl sulfide compound having the structure:



wherein R_1 is selected from the group consisting of methyl and 3-methyl-1-butyl.

4,031,257

USE IN FOODSTUFF FLAVORING COMPOSITIONS OF FIVE OR SIX MEMBERED HETEROCYLIC OXATHIO COMPOUNDS

Richard A. Wilson, Westfield; John V. Pascale, Jackson, and Manfred Hugo Vock, Locust, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

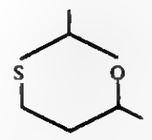
Filed July 8, 1975, Ser. No. 594,310

Int. Cl.² A23L 1/226, 1/231, 1/235

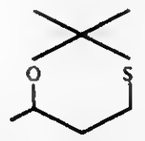
U.S. Cl. 426—535 **8 Claims**

1. A process for augmenting or enhancing the fruit or vegetable taste or aroma of a foodstuff comprising the step of adding to said foodstuff from 0.03 up to 50 ppm of an oxathio heterocyclic compound selected from the group consisting of:

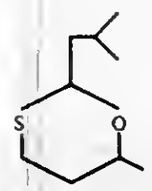
2,6-dimethyl-1,3-oxathiane having the structure:



2,2,6-trimethyl-1,3-oxathiane having the structure:

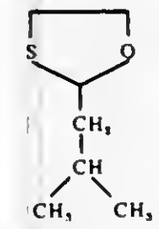


2-isobutyl-6-methyl-1,3-oxathiane having the structure:

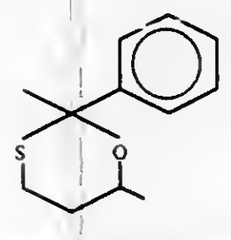


2,2-dimethyl-1,3-oxathiolane having the structure:

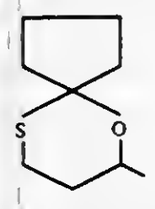
2-isobutyl-1,3-oxathiolane having the structure:



2,6-dimethyl-2-phenyl-1,3-oxathiane having the structure:



and 7-methyl(6-oxa-10-thiaspiro)4.5-decane having the structure:



4,031,258

INORGANIC SALTS OF DIPEPTIDE SWEETENERS

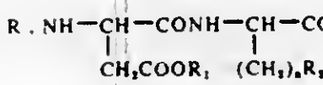
Gerhard J. Haas, Woodcliff Lake, N.J., and Jeffrey H. Berg, Riverdale, N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Filed Mar. 30, 1972, Ser. No. 239,792

Int. Cl.² A23L 1/236

U.S. Cl. 426—548 **19 Claims**

1. An artificially sweetened foodstuff comprising a foodstuff and a dry dipeptide salt sweetener selected from the formula



wherein:

The stereochemical configuration is DL-DL, DL-L, L-DL or L-L;

when R_1 is hydrogen, R is $H_2SO_4^+$, $H_4PO_4^+$, or $H_2NO_3^+$; *n* represents an integer of 0 to 5;

where R hydrogen, R_1 is sodium, potassium, calcium, or ammonium;

R_3 represents lower alkyl, lower alkylaryl and cycloalkyl;

R_2 represents

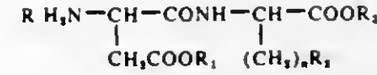
a. lower alkyl

b. a substituted or unsubstituted, partially saturated or totally saturated six carbon ring provided that when substituted, the substituent is at the four position and is hydroxy, lower alkoxy, lower alkyl or halogen; and

c. $S(O)_m$ (lower alkyl) provided that *n* is 1 or 2 and *m* is 0, or 2,

said dry dipeptide salt sweetener being present in an amount effective to sweeten the foodstuff, said dipeptide salt being faster to dissolve than the corresponding unsubstituted dipeptide sweetener.

15. A dry salt of a dipeptide sweetener selected from the formula



wherein:

the stereochemical configuration is DL-DL, DL-L, L-DL, or L-L;

n represents an integer of 0 to 5;

Where R is hydrogen, R_1 is sodium, potassium, calcium or ammonium;

Where R_1 is hydrogen, R is $H_2SO_4^+$, $H_4PO_4^+$, or $H_2NO_3^+$

R_3 represents lower alkyl, lower alkylaryl and cycloalkyl;

R_2 represents

a. lower alkyl

b. a substituted or unsubstituted, partially saturated or totally saturated six carbon ring provided that when substituted, the substituent is at the four position and is hydroxy, lower alkoxy, lower alkyl or halogen; and

c. $S(O)_m$ (lower alkyl) provided that *n* is 1 or 2 and *m* is 0, 1, or 2.

4,031,259

PROCESS OF PREPARING NUTRITIVE SWEETENING COMPOSITIONS

Joaquin Castro Lugay, Thornwood, and Jacob Richard Feldman, New City, both of N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Filed Aug. 13, 1975, Ser. No. 604,289

Int. Cl.² A23L 1/236

U.S. Cl. 426—548 **9 Claims**

1. A method for improving the solubility and stability of dipeptide nutritive sweetners, while at the same time producing a bulked sweetening composition having a broader spectrum of amino acids which comprises co-drying an aqueous solution of at least one of said sweeteners with a nutritious, bland low molecular weight polypeptide, the sweetener and polypeptide being present in solution at from about equimolar amounts to weight ratios of sweetener to polypeptide of 1:100, which sweetener and polypeptide are present at concentrations at which both are soluble.

4,031,260

SALTS OF DIHYDROCHALCONE DERIVATIVES AND THEIR USE AS SWEETENERS

Edward B. Westall, San Jacinto, and Alan W. Messing, Hemet, both of Calif., assignors to Nutrilite Products, Inc., Buena Park, Calif.

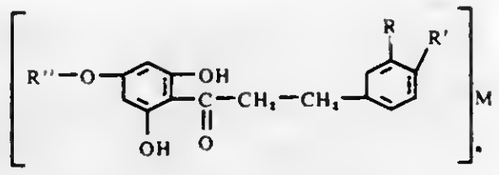
Division of Ser. No. 143,632, May 14, 1971, Pat. No. 3,984,394. This application July 19, 1976, Ser. No. 706,135

Int. Cl.² A23L 1/236

U.S. Cl. 426—548 **5 Claims**

5. Process of sweetening foods or beverages which com-

prises incorporating therein an effective sweetening amount of a monobasic metal salt of a dihydrochalcone of the formula



wherein R is selected from the group consisting of hydrogen and hydroxy, R' is selected from the group consisting of hydroxy and C_1 to C_2 alkoxy, and R'' is selected from the group consisting of neohesperidosyl, β-rutinosyl, and β-D-glucosyl, M is a mono- or divalent non-toxic metal selected from the group consisting of alkali metals and alkaline earth metals, and *n* is an integer corresponding to the valence of said selected of said selected metal M.

4,031,261

PREPARATION OF FAT-CONTAINING BEVERAGES

Jack R. Durst, Minneapolis, Minn., assignor to The Pillsbury Company, Minneapolis, Minn.

Continuation-in-part of Ser. No. 351,729, April 16, 1973, abandoned. This application Mar. 10, 1975, Ser. No. 556,757

Int. Cl.² A23G 9/00, 9/04

U.S. Cl. 426—565 **18 Claims**

1. A method of preparing fat containing beverages for frozen storage and reconstitution by thawing comprising mixing about ½ to 4 parts edible hydrophilic film former and water in proportion to form a saturated solution of the film former in the water as determined by the B saturation test for determination of a viscosity break point, vigorously mixing one part edible fat in a liquid state with the film former and water to encapsulate the fat and form a stable dispersion while the film former is saturated as determined by said test, thereafter adding at least 10% more water than that already present in the dispersion to dilute the dispersion to the reconstituted consistency of the fat containing beverage being prepared and providing 50–90% water in the final product, mixing to produce a smooth uniform dispersion and over-run and freezing to a hard solid mass.

4,031,262

ICE CREAM AND THE PROCESS FOR MAKING SAME

Michio Nakayama, and Setuko Nakayama, both of Hirakata, Japan, assignors to Eigo Tojo and Sadao Nakayama, both of, Japan

Filed July 13, 1976, Ser. No. 704,930

Claims priority, application Japan, July 18, 1975, 50-88516; July 18, 1975, 50-101802[U]

Int. Cl.² A23G 9/00, 9/04

U.S. Cl. 426—565 **16 Claims**

1. A process for making ice cream which comprises admixing soft ice cream and ice granules of about 1–350 mm^3 in size, in a ratio such that the content of ice granules is about 5–30 volume percent, and freezing the mixture.

4,031,263

MANUFACTURE OF FOOD POWDERS

Gregoire Kalopissis, Paris, and Guy Vanlerberghe, Montjay-la-Tour, both of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France

Continuation-in-part of Ser. No. 268,454, July 3, 1972, abandoned, which is a continuation of Ser. No. 882,720, Dec. 5, 1969, abandoned. This application July 9, 1974, Ser. No. 486,918

Claims priority, application Luxembourg, Sept. 12, 1968, 57499

Int. Cl.² A23C 9/00

U.S. Cl. 426—588 **4 Claims**

3. A dry powdered milk product having improved water dispersibility and anti-foaming properties consisting essentially of an intimate mixture of milk and a non-ionic surface active agent which is a fatty alcohol derivative having the formula

$$RO\text{+}C_3H_5O\ (A)\ .\ \text{+}H$$

wherein A is selected from the group consisting of $—CH_2OH$ and $—CH_2OCH_2CHOHCH_2OH$, *n* has a value of 2–10 when A is -13 CH_2OH and a value of 1–5 when A is $—CH_2OCH_2$. $CHOHCH_2OH$, R is selected from the group consisting of alkyl, alkenyl and carbonyl alkenyl, wherein each of said alkyl and alkenyl groups is a straight chain having 8–22 carbon atoms, the iodide index of R being about 30–95 and the melting point of fatty alcohols from which said derivative is prepared being less than 50° C, said non-ionic surface active agent being present in amounts of about 0.1–5 percent by weight of said product.

4,031,264

METHOD FOR PRODUCING DURABLE FRUIT-DAIRY AND VEGETABLE-DAIRY DRINKS

Angel Tomov Aroiski; Velichka Borissova Usheva; Peter Vassilev Gruev; Georgi Trendafilov Richev, and Zvetana Semkova Doncheva, all of Plovdiv, Bulgaria, assignors to DSO "Bulgarplod", Sofia, Bulgaria

Filed May 15, 1975, Ser. No. 577,574

Int. Cl.² A23L 2/02

U.S. Cl. 426—590 **5 Claims**

1. Method for producing durable fruit-dairy or vegetable-dairy drinks containing 20 to 40% natural fruit or vegetable mash and 36 to 46% sour milk derived from skimmed or whole milk, apple pectin, sugar syrup and 0.1–0.2% citric acid which comprises adding the sugar syrup to the sour milk, adding apple pectin to the resulting mixture followed by adding the fruit or vegetable mash, subjecting the resulting mixture to short time high temperature sterilization, cooling, bottling and additionally sterilizing the bottled drink.

4,031,265

METHOD OF REDUCING BITTERNESS IN CITRUS JUICES

Dante G. Guadagni, Moraga; Robert M. Horowitz, Pasadena; Bruno Gentili, Glendale, and Vincent P. Maier, Newport Beach, all of Calif., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed June 18, 1975, Ser. No. 587,922

Int. Cl.² A23L 2/02, 2/26

U.S. Cl. 426—599 **4 Claims**

1. A process for reducing bitterness in navel orange juice, said bitterness resulting from the presence of limonin in the juice, which comprises -

adding to the juice neodiosmin in an amount sufficient to reduce the bitterness therein.

4,031,266

RECONSTITUTABLE TOMATO BEVERAGE COMPOSITIONS

William A. Mitchell, Lincoln Park, N.J., and William C. Seidel, Monsey, N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Continuation of Ser. No. 442,721, Feb. 14, 1974, abandoned, which is a continuation of Ser. No. 306,248, Nov. 13, 1972, abandoned, which is a continuation-in-part of Ser. No. 167,019, July 28, 1971, abandoned. This application Nov. 26, 1975, Ser. No. 635,469

Int. Cl.² A23L 2/10

U.S. Cl. 426—599 **5 Claims**

1. A process for producing a dehydrated reconstitutable tomato beverage composition characterized by viscosities, taste, textures, and the general appearance of conventional tomato beverages upon reconstitution, Comprising placing a starch material in an aqueous slurry and adjusting the slurry to a pH of about 6.5 to 7.5, forming an aqueous admixture of said slurry, tomato solids and a different gelatinizable starch material, drum drying said admixture at temperatures from about 120° C to 150° C, fine grinding the same to a fine powder which will pass through a 100 U.S. mesh screen, the ratio of said starch material to water in said admixture being such that limited rupture of the starch material occurs during drying, said ratios being from about 1:9 to 4:1 parts starch to parts water, said pH adjustment effective to reduce off flavor in the dehydrated tomato beverage.

4,031,267

EXPANDED PROTEIN PRODUCT AND METHOD OF MAKING SAME

Martin F. Berry; Stanley H. Reesman; Marvin L. Smith, all of Battle Creek, and Peter Van Middlesworth, Climax, all of Mich., assignors to General Foods Corporation, White Plains, N.Y.

Continuation of Ser. No. 211,758, Dec. 23, 1971, abandoned. This application Aug. 25, 1975, Ser. No. 607,416

Int. Cl.² A23J 3/00

U.S. Cl. 426—656 **21 Claims**

9. An edible protein product comprising an expanded proteinaceous material, said product having an open, cellular, fibrous structure and a fatty glyceride content of from 8.13% up to about 35% by dry weight and prepared by heat processing and mechanically working a composition containing an admixture of a proteinaceous material having a protein content of at least 30% by weight, from 0 to about 35% by dry weight of added fatty glyceride, between about 0.1 to about 20% by dry weight of a non-proteinaceous and non-farinaceous finely divided filler material capable of binding up fatty glyceride, and 0.01 to 2.5% by weight of sulfur or a sulfur compound, said filler comprising microcrystalline cellulose or cellulose fiber or floc.

4,031,268

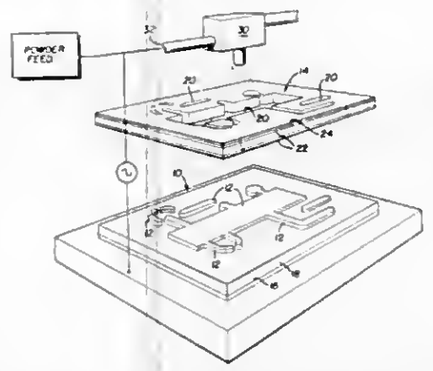
PROCESS FOR SPRAYING METALLIC PATTERNS ON A SUBSTRATE

Thomas E. Fairbairn, Westland, Mich., assignor to Sirius Corporation, Toledo, Ohio

Filed Jan. 5, 1976, Ser. No. 646,226

Int. Cl.² B05D 1/10

U.S. Cl. 427—12 **5 Claims**



1. In a method of spraying metallic patterns such as conductors of an electrical circuit onto a metallic supporting surface of a supporting base including cleaning and roughening the supporting surface; spraying a powdered bonding material onto the supporting surface by means of the flame spray process; spraying a powdered ceramic insulation layer onto the supporting surface by means of the flame spray process; and applying a self-supporting template to the ceramic-coated supporting surface, said template conforming the desired configuration of the electrical circuit conductors; the improvement comprising: spraying a powdered electrically conductive material through said template and onto said ceramic-coated surface by means of the flame spray process with a spray gun having a powder feed orifice and simultaneously apply a low amperage high voltage A.C. signal between the powder feed orifice of said gun and said metallic supporting surface; whereby an electrical circuit corresponding to the configuration of said template is formed on top of said ceramic-coated surface, with said ceramic coating insulating said current conductors from said metallic supporting surface.

4,031,269

ELECTROSTATIC IMAGE FORMING METHOD

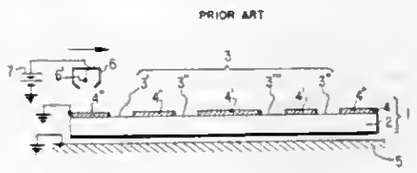
Isoji Takahashi, Asaka, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

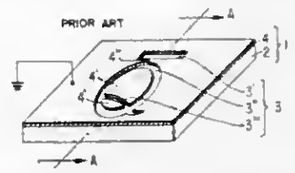
Filed June 25, 1974, Ser. No. 482,869

Claims priority, application Japan, June 25, 1973, 48-72021

Int. Cl.² G03G 13/00

U.S. Cl. 427—24 **10 Claims**





1. An electrostatic image forming method comprising:

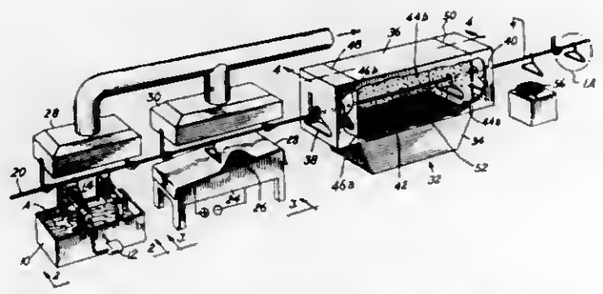
uniformly charging with corona discharge a first surface of an electrostatic image forming member comprising an electrically insulating support having a surface resistance greater than about $10^{12}\Omega/cm^2$ and a conductive layer having a surface resistance less than about $10^9\Omega/cm^2$ disposed on said insulating support, said layer having open portions which form a pattern therein and expose the recessed surface of said insulating support member, said support member comprising the only support for said conductive layer where an optional insulative intermediate layer may be disposed between said conductive layer and said support member, the pattern formed in said conductive layer resulting in conductive layer portions completely surrounded by recessed surface portions of said insulating support, the uniform charging being such that all conductive layer portions are electrically isolated from the earth during the charging so that the surfaces of all said conductive layer portions and said recessed surface portions of said insulating support are uniformly charged; and

subsequently grounding the surfaces of all of the charged conductive layer portions to the earth by connecting said last-mentioned portions to earth by an electrical conductor so as to remove the charges therefrom so that the charges in the said recessed surface portions of the insulating support remain as an electrostatic latent image.

4,031,270
METHOD OF FLOCKING METAL ARTICLES

Tracy W. Barnes, Peoria, Ill., assignor to Laidlaw Corporation, Peoria, Ill.

Continuation of Ser. No. 477,796, June 10, 1974, abandoned, which is a division of Ser. No. 314,138, Dec. 11, 1972, Pat. No. 3,850,659. This application June 2, 1975, Ser. No. 582,912
The portion of the term of this patent subsequent to Dec. 18, 1990, has been disclaimed.
Int. Cl.² B44C *1/08*; B05B *5/02*; B44D *1/092*
U.S. Cl. 427—27 **7 Claims**



1. A method for distributing and charging a flock material within an enclosure in order to apply said material to an electrically charged, adhesive coated coat hanger suspended in said enclosure comprising the steps of:

a. providing an enclosure containing a mass of flock material fibers with a mass surface and electrode means for imparting an electrostatic charge of a first polarity to said fibers, said hanger being suspended above the mass surface and being provided with a charge of opposite polarity,

b. directing a plurality of separate air streams intermittently for short time periods against the mass of flock material to lift fibers from the mass, entrain them in the air and carry them past the electrode means for imparting the charge of said fibers, thereby at least partially filling the space above said mass with charged fibers of the first polarity, and

c. depositing the fibers on the oppositely charged hanger.

4,031,271
ALKALI-RESISTANT RADIATION CURABLE ENE-THIOL COMPOSITIONS

Richard Wayne Bush, Columbia, Md., assignor to W. R. Grace & Co., New York, N.Y.

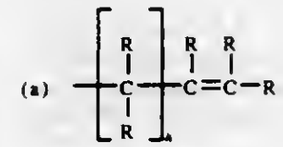
Filed Nov. 17, 1975, Ser. No. 632,326
Int. Cl.² B05D *3/06*
U.S. Cl. 427—43 **6 Claims**

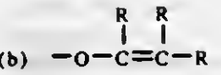
1. A composition capable of forming a solid, cured, alkali-resistant polythioether on exposure to radiation which comprises admixing

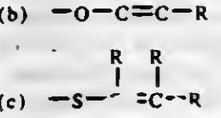
A. an ester-free, water insoluble polyene component of the formula:

$$[A-X)_m$$

wherein m is an integer of at least 2, wherein X is a member selected from the group consisting of:

(a) 

(b) 

(c) 

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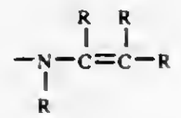
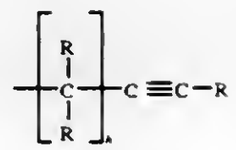
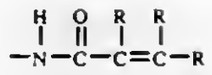
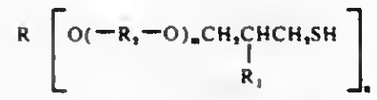
(d) 

(e) 

(f) 

where h is an integer from 1 to 9; R is a radical selected from the group consisting of hydrogen, fluorine, chlorine, furyl, thienyl, pyridyl, phenyl and substituted phenyl, benzyl and substituted benzyl, alkyl and substituted alkyl, alkoxy and substituted alkoxy, cycloalkyl and substituted cycloalkyl; said substituents on said substituted members selected from the group consisting of nitro, chloro, fluoro, acetoxy, acetamide, phenyl, benzyl, alkyl, alkoxy and cycloalkyl; said alkyl and alkoxy having from one to nine carbon atoms and said cycloalkyl having from three to eight carbon atoms; wherein [A] is free of reactive carbon-to-carbon unsaturation; and is a polyvalent chemically compatible member of the group consisting of carbonyl, ether, silane, silicate, phosphonate, phosphite, phosphate, alkyl and substituted alkyl, cycloalkyl and substituted cycloalkyl, aryl and substituted aryl, urethane and substituted urethane, urea and substituted urea, amine and substituted amine, amide and substituted amide, heterocyclic carbon containing radical, and mixtures thereof; said substituents on said members being defined above, said component having a molecular weight in the range from about 64 to 20,000; and a viscosity in the range from essentially 0 to 20 million centipoises at 70° C; and

B. polythiol of the formula



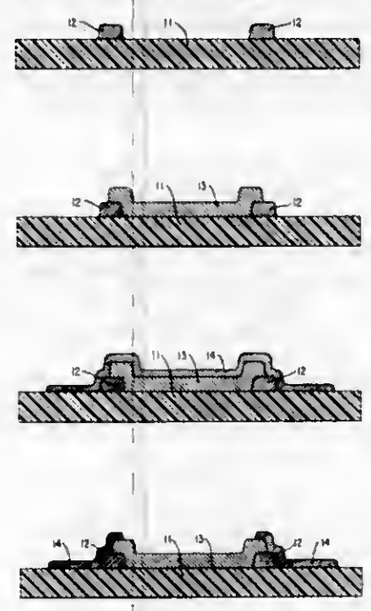
where R is an aliphatic hydrocarbon moiety containing 2–6 carbon atoms, R_2 is an alkylene group containing 2–6 carbon atoms, R_1 is hydrogen or —OH, n is 2–6, and m is 1–2.

4,031,272
HYBRID INTEGRATED CIRCUIT INCLUDING THICK FILM RESISTORS AND THIN FILM CONDUCTORS AND TECHNIQUE FOR FABRICATION THEREOF

Satya Pal Khanna, Indianapolis, Ind., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 9, 1975, Ser. No. 576,100
Int. Cl.² H01C *7/00*; B05D *5/12*
U.S. Cl. 427—96 **3 Claims**

1. Technique for fabricating a hybrid integrated circuit including the steps of successively depositing a thick film resistor and thin film conductive metallization upon a substrate characterized in that gold tabs are deposited upon the substrate by screen printing of a gold paste and subsequent



firing prior to deposition of the thick film resistor, the gold tabs serving as resistor termination pads.

4,031,273
CONTINUOUS PROCESS FOR OPTICAL BRIGHTENING

Gerhard Reinert, Allschwil, Switzerland; Jack Fallows, Shaw Oldham, England, and Paul Dussy, Basel, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Aug. 25, 1975, Ser. No. 607,398
Claims priority, application Switzerland, Sept. 3, 1974, 11947/74
Int. Cl.² D06M *1/14, 1/22*
U.S. Cl. 427—158 **14 Claims**

1. Process for the continuous optical brightening of synthetic polyamide fiber material from organic solvents, wherein

a. the fiber material is dry cleaned,

b. at least one ionic optical brightener is applied to the material from a solution, emulsion or dispersion in a non-polar organic solvent,

c. the material is dried,

d. the optical brightener is treated with hot aqueous acid, and

e. the fiber material is subsequently heat-treated.

4,031,274
METHOD FOR COATING CAVITIES WITH METAL

Irwin I. Besseo, Cincinnati, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Filed Oct. 14, 1975, Ser. No. 622,376
Int. Cl.² C23C *3/04*
U.S. Cl. 427—229 **9 Claims**

1. In a method for coating an article having an outer surface and a cavity within the article, communicating with the outer surface through a relatively small diameter opening and having a metallic inner surface, the steps of:

contacting the inner surface with a fluid comprising at least one organic compound including at least one metal selected from the group consisting of Al, Cr, Ni and their alloys and mixtures by flowing the fluid through the cavity and the small diameter opening, the compound being capable of decomposition to provide the metal; while

heating the inner surface at a first temperature to enable said decomposition to occur and to provide a metal deposit on the inner surface,

heating the deposit in a non-oxidizing atmosphere at a second temperature for a time sufficient to remove volatile materials from the deposit; and then,

rapidly increasing the temperature of the inner surface and of the deposit to a third temperature in the range of about 870° – 1100° C. within a period of up to about 30 minutes and heating in that range for a time sufficient to interdiffuse the deposit and the inner surface to provide an inner surface coating.

4,031,275
LOW TEMPERATURE VAPOR SEALING OF ANODIZED ALUMINUM

Andrew Alexander, Apollo, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Dec. 22, 1975, Ser. No. 642,894
Int. Cl.² C25D *11/24*
U.S. Cl. 427—248 R **7 Claims**

1. A method of forming a low temperature seal on anodized aluminum which comprises exposing said anodized aluminum to ammonia vapors to provide a seal thereto such that immersing said sealed anodized aluminum for a period of 15 minutes in a solution containing 2.0 wt.% chromic and 3.5 wt.% phosphoric acid at a temperature of 100° F produces a weight loss of not more than 2 mg./in.².

4,031,276
PREPARATION OF DENSIFIED WOOD IMPREGNATED WITH PHENOLIC RESINS

Nobutaka Nakamura, and Yukio Saeki, both of Fujieda, Japan, assignors to Sumitomo Durez Company, Ltd., Tokyo, Japan

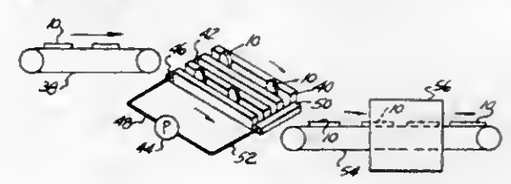
Filed July 21, 1975, Ser. No. 597,618
Claims priority, application Japan, July 24, 1974, 49-84225
Int. Cl.² B05D *3/12, 3/02, 1/18*
U.S. Cl. 427—369 **10 Claims**

1. In the process of preparing a densified wood product wherein wood is contacted with a resole phenol-formaldehyde resin solution to impregnate the wood with said resin solution and thereafter is dried and then heated to fix and cure the resin in the wood, said solution comprising a condensate of phenol and formaldehyde, the improvement which comprises impregnating the wood under a pressure of about 10 to about 50 Kgs/cm² with said resin solution in the presence of about 0.6 to about 4 parts by weight of an organic liquid selected from the group consisting of methanol, acetone, and mixtures thereof per part by weight of the solids content of said resin solution whereby the bending strength of the wood product is increased and the cured phenolic resin content of the wood product is enhanced.

4,031,277
METHOD OF COATING METAL WITH VINYLIDENE CHLORIDE-VINYL CHLORIDE COPOLYMER

Tull C. Lasswell, 230 Pawnee Path, Lake Orion, Mich. 48035, and John L. Monler, 1968 Harwood Drive, Oxford, Mich. 48051

Continuation-in-part of Ser. No. 195,508, Nov. 3, 1971, abandoned, which is a division of Ser. No. 851,261, Aug. 19, 1969, Pat. No. 3,635,369. This application Aug. 12, 1974, Ser. No. 496,375
Int. Cl.² B05D *3/02*
U.S. Cl. 427—388 R **11 Claims**



1. The method of providing a surface of a metallic part with a dry pliable coating, said method consisting of applying at room temperature to said surface of said metallic part a liquid solution consisting of vinylidene chloridevinyl chloride co-

polymer powder and a solvent for forming on said surface a wet coating of said solution, and of subsequently heating said metallic part at a temperature in the range of 160° F (71° C) to 250° F (121° C) for a time period of 20 to 10 minutes, wherein the solvent is selected from the group consisting of methyl-ethyl-ketone and cyclohexanone, the ratio by weight of the vinylidene chloride-vinyl chloride copolymer to the solvent is between one to one and one to two and the thickness of the resulting dry coating on the surface of said metallic part is comprised between 1 mil (25 microns) and 6 mils (150 microns) and is directly proportional to the concentration of vinylidene chloride-vinyl chloride copolymer in said solution and to the heating temperature and inversely proportional to the heating time duration.

4,031,278

HIGH HARDNESS FLAME SPRAY NICKEL-BASE ALLOY COATING MATERIAL

Mahesh S. Patel, Albertson, N.Y., assignor to Eutectic Corporation, Flushing, N.Y.

Filed Aug. 18, 1975, Ser. No. 605,549
Int. Cl.² B05D *1/08*
U.S. Cl. 427—423 **8 Claims**

1. A metal spray powder blend characterized by the property of forming a dense coating on a metal substrate consisting of,

particles of a nickel-base alloy powder intimately mixed with aluminum powder, a major portion of said nickel-base alloy powder having an average particle size falling within the range of about −100 mesh to +325 mesh,

said nickel-base alloy powder containing by weight about 2.5 to 20% Cr, 0.5 to 6% Si, 0.5 to 5% B, up to about 1% C, up to about 10% Fe and the balance essentially nickel,

said aluminum mixed with said nickel-base alloy powder having a particle size less than 15 microns and ranging by weight from about 0.5 to 5% of the total mixture and being in intimate association with the surface of the particles of said nickel-base alloy,

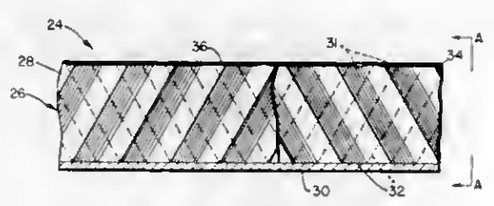
the ratio of average particle size of said nickel-base powder to the average particle size of said aluminum powder being over 5:1.

4,031,279

COMPOSITE CONSTRUCTION OF METALLIC STRIPS DISPOSED IN SIDE-BY-SIDE RELATIONSHIP

George D. Cremer, Lemon Grove, and John V. Long, El Cajon, both of Calif., assignors to International Harvester Company, San Diego, Calif.

Continuation-in-part of Ser. No. 335,320, Feb. 23, 1973, Pat. No. 3,916,054. This application June 30, 1975, Ser. No. 591,830
Int. Cl.² B32B *3/10, 3/12, 3/28;* **E04B** *2/28*
U.S. Cl. 428—44 **13 Claims**



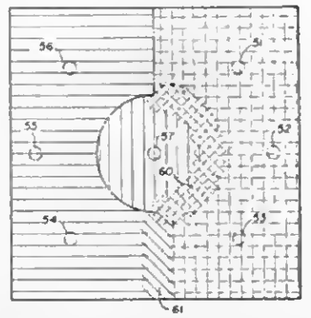
1. A member of composite construction comprising an assemblage of metal strips disposed in side-by-side relationship with the edges of the strips at opposite sides of the assemblage and those edges of the strips at one side of the assemblage being exposed and defining a working surface; means formed in said strips for providing interstices therebetween; and means for maintaining the strips in the assemblage in the aforesaid relationship, those portions of the metal strips including the edges thereof on one side of said assemblage being folded and extended toward an adjacent strip of the assemblage to thereby increase the continuity and smoothness of the working surface presented by said one side of said assemblage, said folded portions of said strip being free of attachment to the strips toward which they extend whereby the working surface of the composite member will have a high degree of compliance with components with which said member is associated.

4,031,280

METHOD AND APPARATUS FOR COLORING A PILE FABRIC, AND A PILE FABRIC PRODUCED THEREBY

John V. C. Weller; George C. Strydio, and Helmuth Vits, all of Greenville, S.C., assignors to Bigelow-Sanford, Inc., Greenville, S.C.

Filed Aug. 9, 1976, Ser. No. 712,675
Int. Cl.² B41F *15/04*
U.S. Cl. 428—88 **6 Claims**



1. In a process for the application of color designs to pile fabrics including introducing determined amounts of liquid color materials, at spaced apart points, into a receptacle having at least one resilient barrier for defining color transistions and positioned between a pair of said points, and then pressing the pile face of the pile fabric into the receptacle, whereby the color materials in the receptacle impregnate the pile fabric to provide a color design in the pile fabric; the improvement wherein said step of introducing color materials into said receptacle comprises introducing first and second liquid color materials of different color into said receptacle at first and second adjacent points respectively between which said flow of liquid materials is not inhibited by said resilient barrier, whereby said first and second liquid materials intermix in a region between said first and second points to color the portion of said pile fabric pressed into said region with a color that is a blend of the colors of said first and second liquid materials.

5. A multi-colored pile fabric having on its pile face first and second adjacent colored regions of different color that are sharply defined at the boundary therebetween, and third and fourth adjacent regions of different color, the colors of said third and fourth regions being intermixed and blended in a multitude of shades of blending of the colors of said third and fourth regions and between said third and fourth regions.

4,031,281

FLOCKED METALLIC LAMINATED WALLCOVERINGS

Ronald James Keeling, Cincinnati, Ohio, assignor to Formica Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 619,094, Oct. 2, 1975, abandoned. This application Sept. 21, 1976, Ser. No. 725,053
Int. Cl.² B32B *3/02, 33/00*
U.S. Cl. 428—90 **10 Claims**

1. A thermally and dimensionally stable wallcovering, weighing from about 6.0 to about 11.8 ounces per square yard, comprising, in superimposed relationship,

1. a woven or non-woven cellulosic or synthetic fabric weighing from about 0.5 to about 1.4 ounces per square yard,

2. a calendered coating atop said fabric of a filled vinyl chloride/-vinyl acetate copolymer, said coating weighing from about 3.5 to about 4.5 ounces per square yard,
3. a clear adhesive coating, atop said calendered coating, of a vinyl chloride/vinyl acetate copolymer, said adhesive coating weighing from about 0.2 to about 0.4 ounces per square yard,
4. a film of clear polyethylene terephthalate, metalized on one side and having a heat-sensitive adhesive coating on said metal and a thin, clear thermosetting polyester coating on the other side thereof, said metalized side being in contact with said (3),
5. a vinyl adhesive coated on said (4) and
6. flocking applied to the area of said (5).

4,031,282

SIMULATED TRADITIONAL SAND-FINISHED MASONRY

John L. McClinton, Hanover, Md., assignor to The Burns & Russell Company, Baltimore, Md.

Continuation of Ser. No. 269,213, July 5, 1972, abandoned. This application July 1, 1975, Ser. No. 592,356
Int. Cl.² B32B *3/00;* **B05D** *3/12*
U.S. Cl. 428—141 **24 Claims**

1. A panel member having a simulated traditional colonial sand-finished masonry appearance, with the characteristic rugged, roughened, unmolded and uncast surface, which surface is extremely hard, water-repellent and permanent but permits diffusion of moisture; said surface being applied to a porous substrate and consisting of a thin, pressure smeared coating of a composition comprising a cured thermosetting ethylenically unsaturated alkyd resin, a cured polymerizable vinyl monomer, and at least 50% by weight of sand as a finely-divided filler; said sand filler being treated with between about 0.01% and 2% by weight of an alkylene substituted silane or siloxane of the formula:

$$R_xSiX_{(4-x)}$$

in which **R** is an unsaturated group, X is a group which reacts with sand or moisture, and x is a whole number from 1 to 3; and said porous substrate comprising one or more materials selected from the group consisting of cinders, slag, concrete, haydite, clay, sand, sandlime, gasbetone, gravel, and cement.

4,031,283

POLYTETRAFLUOROETHYLENE FELT

Joseph P. Fagan, Huntington, Conn., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 633,837, Nov. 20, 1975, abandoned. This application Mar. 23, 1976, Ser. No. 669,602
Int. Cl.² D04H *1/44*
U.S. Cl. 428—280 **4 Claims**

1. A felt-like article comprised of filamentary polytetrafluoroethylene characterized by

a. predominantly horizontal coplanar superimposed layers of filamentary polytetrafluoroethylene components interrupted by occasional interlayered orientation, and

b. fibrils of polytetrafluoroethylene criss-crossing interstices of the felt-like article;

Wherein the article has a filter efficiency greater than 95% and an air porosity, measured at 0.5 inch W.G., of greater than 45 cubic feet per minute.

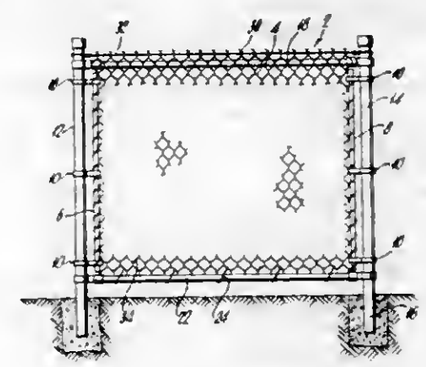
4,031,284

INSULATED AND GROUNDED FENCE FABRIC

Glen E. Ingraham, Lebanon, N.J., assignor to Colorguard Corporation, Raritan, N.Y.

Filed June 2, 1975, Ser. No. 582,834
Int. Cl.² D03D *15/02;* **A01K** *3/00;* **E04H** *17/04;* **B21F** *27/00*
U.S. Cl. 428—222 **14 Claims**

1. In a fence fabric construction formed of a plurality of individually coated wires each composed of a metal core enveloped by a heat-distintegrable electrically non-conductive coating, adjoining pairs of said coated wires being engaged at, at least, one point along their length, the improvement that comprises an elongated metal conductor element permanently interlocked by, and defining a passage through, each of said adjoining pairs of coated wires at the point of engagement



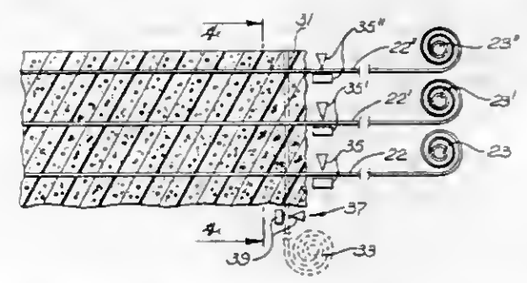
thereof with each other; said conductor element being disposed in electrical connection with the metal cores of each of said adjoining coated wires at each if said points of engagement.

4,031,285

LIGHTWEIGHT, REINFORCED FOAMED ORGANIC POLYMER AND CEMENTITIOUS MATERIAL STRUCTURE

Charles H. Miller, 54-065 Avenida Carranza, La Quinta, Calif. 92253, and Jose A. Mayrl, Centenario 1222 San Pedro Garza Garcia, N. Leon, Mexico

Division of Ser. No. 191,276, Oct. 21, 1971, Pat. No. 3,878,278. This application Dec. 16, 1974, Ser. No. 532,974
Int. Cl.² B32B *3/26*
U.S. Cl. 428—294 **14 Claims**



1. A lightweight reinforced structure having a substantial length dimension and greater width dimension than depth dimension,

comprising; a mixture obtained as a result of foaming organic polymer material insitu throughout cementitious material; and

at least one elongate reinforcing member embedded in said mixture intimately joined thereto under tension and gripped by said material substantially along its entire length, said elongate member being elongate in said length direction and relatively rigid in the depth dimension of said mixture.

4,031,286
FLUOROCARBON POLYMER COATING COMPOSITIONS CONTAINING MICA PARTICLES

Herman Ernest Seyman, Lint, Belgium, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 400,040, Sept. 24, 1973, Pat. No. 3,970,627. This application Feb. 25, 1976, Ser. No. 661,331

The portion of the term of this patent subsequent to July 20, 1993, has been disclaimed.

Int. Cl.² B32B *5/16*; **C08L** *27/18*; **B32B** *15/08*

U.S. Cl. 428—324 **7 Claims**

1. An aqueous coating composition consisting essentially of:

a. about 40–93%, by weight of the total of (*a*), (*b*) and (*c*) solids, of a particulate fluorocarbon polymer,

b. about 5–35%, by weight of the total of (*a*), (*b*) and (*c*) solids, of colloidal silica stabilized with sodium ions, having a particle size of 7–25 millimicrons, a specific surface area of 125–420 square meters per gram, a silica content of 30–50% by weight, and a pH of 8.4–9.9 at 25° C., or a mixture of said silica with water-soluble alkali metal silicate, in a ratio in the range between 75:25 and 10:90 by weight respectively,

about 2–25%, by weight of the total of (*a*), (*b*) and (*c*) solids, of irregularly shaped mica platelets 80% of which are 0.05–0.15 micron thick and 4–50 microns wide (longest dimension) and

d. water as a carrier.

5. An article bearing a fused coating of the composition of claim 1.

4,031,287
SELF-BONDING INSULATED WIRE

Kazuo Suzuki; Yoshiaki Hayashi, and Seiichi Nagamine, all of Ootsu, Japan, assignors to Kanegafuchi Chemical Industries Co., Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 349,885, April 10, 1973, abandoned. This application Apr. 17, 1975, Ser. No. 569,330

Claims priority, application Japan, Apr. 13, 1972, 47-37529

Int. Cl.² B32B *15/00*; **B05D** *3/02*

U.S. Cl. 428—379 **10 Claims**

1. A self-bonding insulated wire which comprises an electro-conductive wire and a varnish composition containing 100 parts by weight of a copolyamide and 10 to 25 parts by weight of a thermoplastic linear polyhydroxypolyetherester resin coated thereon.

4,031,288
BONDING TIRE CORD TO RUBBER

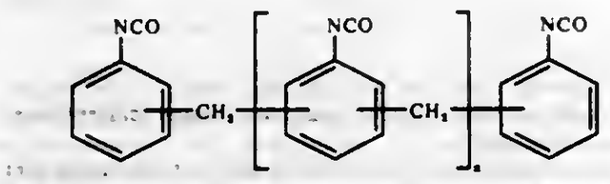
Roop S. Bhakuni, Copley, and Grover W. Rye, Cuyahoga Falls, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 197,942, Nov. 11, 1971, abandoned. This application June 18, 1975, Ser. No. 587,938

Int. Cl.² B29H *9/02*, *17/28*

U.S. Cl. 428—395 **12 Claims**

1. A tire polyester cord the surface of which contains an effective amount and less than 0.5 part by weight per 100 parts of cord of a polyisocyanate having the following structural formula



where *n* is greater than 1.2 and has a Brookfield viscosity measured at 25° C. using a No. 3 spindle revolving at 250 rpm of at least 1000 cps, said polyisocyanate being deposited from a solvent solution thereof as a first treatment and deposited thereon a second coating containing the addition product of a polyisocyanate and a water-soluble thermoplastic resin resulting from the reaction of an formaldehyde and a resorcinol, a resinous reaction product of a resorcinol and an formaldehyde and a rubber latex.

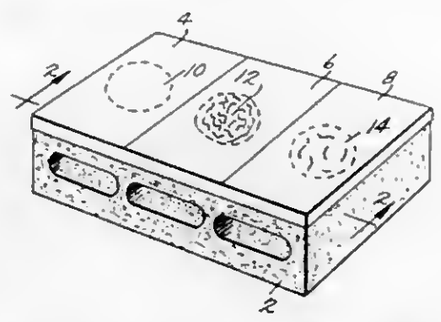
4,031,289
STAIN RESISTANT POLYESTER-COATED BLOCK

John A. Sergovic, Severna Park, Md., assignor to The Burns & Russell Company of Baltimore City, Baltimore, Md.

Filed May 11, 1976, Ser. No. 685,254

Int. Cl.² B32B *13/12*, *5/16*, *27/36*

U.S. Cl. 428—451 **32 Claims**



1. In a cast article of a cured resinous composition of an ethylenically-unsaturated polymerizable polyester resin and sand particles, said sand particles comprising at least about 50% by weight of said composition, and in which said sand particles and cured resin are bonded to one another by a bonding agent comprising an unsaturated silane also having attached to the silicon a group which reacts with the hydroxyl groups present in sand or moisture present in the surface of sand, and wherein the resinous composition also comprises styrene, p-methyl styrene, methyl methacrylate, vinyl acetate, diallyl phthalate, cyclopentadiene or ethyl acrylate as a polymerizable solvent, the improvement comprising employing as the polyester resin, a polyester made from a glycol component consisting of neopentyl glycol, or a mixture of neopentyl glycol, with up to 42 molar percent based on the total glycol of a glycol selected from the group consisting of propylene glycol, ethylene glycol and diethylene glycol, and a component consisting of isophthalic acid and maleic anhydride, the maleic anhydride being 10 to 33% of the total polyester resin by weight, said cast article having improved stain resistance.

6. In a masonry unit having an integral molded facing layer of a cured resinous composition of an ethylenically-unsaturated polymerizable polyester resin and sand particles, said sand particles comprising at least about 50% by weight of said composition and in which said sand particles and cured resin are bonded to one another by a bonding agent comprising an unsaturated silane also having attached to the silicon a group which reacts with the hydroxyl groups present in sand or moisture present in the surface of sand, and wherein the resinous composition also comprises styrene, p-methyl styrene, methyl methacrylate, vinyl acetate, diallyl phthalate, cyclopentadiene or ethyl acrylate as a polymerizable solvent, the improvement comprising, as the polyester resin, a polyester made from a glycol component consisting of neopentyl glycol or a mixture of neopentyl glycol with up to 42 molar percent based on the total glycol of a glycol selected from the group consisting of propylene glycol, ethylene glycol and diethylene glycol, and a component consisting of isophthalic acid and maleic anhydride, the maleic anhydride being 10 to 33% of the total polyester resin by weight, said masonry unit having improved stain resistance.

4,031,290
MERCAPTAN BLOCKED THERMOSETTING COPOLYMERS

Carl Clement Anderson, Menomonee Falls, Wis., and Rostyslaw Dowbenko, Bigsonia, Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 248,846, May 1, 1972. This application Sept. 20, 1976, Ser. No. 724,900

Int. Cl.² C08F *28/02*; **C08L** *67/06*, *67/08*

U.S. Cl. 428—480 **13 Claims**

1. A polymer prepared by the process comprising:

a. reacting

1. a polyester and

2. a mercaptan comprising an organic compound containing an —SH group and another group which is reactive with said polyester

to provide a mercapto-terminated reaction product;

b. reacting said mercapto-terminated reaction product with one or more ethylenically unsaturated monomers in the presence of a peroxygen or azo catalyst to form said polymer.

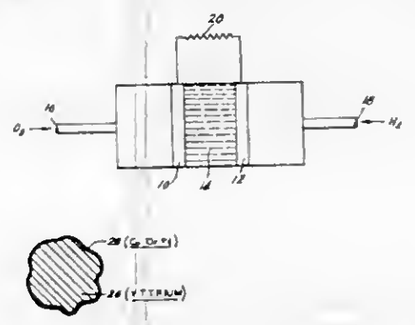
4,031,291
HYDROGEN-OXIDIZING CATALYST, AND FUEL CELL ELECTRODE USING SAME

Malcolm A. Fullenwider, Whitehall, Pa., assignor to Malcolm A. Fullenwider and Richard L. Ament, II, both of Allentown, Pa.

Filed Apr. 5, 1976, Ser. No. 673,670

Int. Cl.² H01M *4/86*, *4/94*

U.S. Cl. 429—40 **15 Claims**



1. A hydrogen-oxidizing catalyst, comprising a body of yttrium having thereon a thin surface layer of copper or platinum.

4,031,292
METHOD FOR THE PREPARATION OF AN ELECTROCATALYST

George L. Hervert, Woodstock, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Apr. 19, 1976, Ser. No. 678,003

Int. Cl.² H01M *4/00*

U.S. Cl. 429—40 **15 Claims**

1. A method for the preparation of an electrocatalyst which comprises treating a refractory inorganic oxide with a pyrolyzable organic compound at pyrolysis conditions to form at least a monolayer of a carbonaceous pyropolymer on the surface of said refractory inorganic oxide, thereafter impregnating the resulting composite with a complex of a soluble salt of at least one catalytically active metal and a sulfur-containing carboxylic acid, heating the impregnated composite to a temperature sufficient to remove the solvent, reducing the dried composite and recovering the resultant electrocatalyst.

4,031,293
MAINTENANCE FREE LEAD STORAGE BATTERY

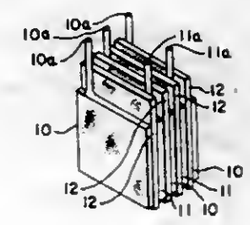
Ernst Voss, Niederhofheim, and Heinrich Rabeneick, Ffm.-Zeilsheim, both of Germany, assignors to Varta Batterie Aktiengesellschaft, Hannover, Germany

Filed Feb. 20, 1976, Ser. No. 659,959

Claims priority, application Germany, Mar. 6, 1975, 2509779

Int. Cl.² H01M *10/14*

U.S. Cl. 429—60 **5 Claims**



1. A maintenance-free lead storage battery having an electrode grid of lead or antimony-free lead alloy, a separator and sulfuric acid electrolyte in the pores of the separator and the active mass, and characterized in that

the weight of the negative active mass is less than 80% of the weight of the positive active mass, the quantity and concentration of the electrolyte is so proportioned that the acid density is no more than 1.07 grams per cm² after 20-hour current discharge; and comprising N negative electrodes and N+1 positive electrodes positioned in alternating positive and negative arrangement.

4,031,294
SPLASH-PROOF DEVICE FOR USE IN A STORAGE BATTERY

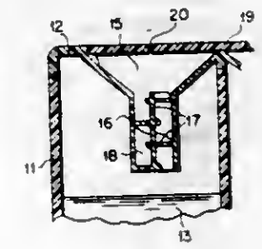
Ichiro Sano, Yokohama, Japan, assignor to The Furukawa Battery Co., Ltd., Yokohama, Japan

Filed Feb. 25, 1976, Ser. No. 661,266

Claims priority, application Japan, Feb. 27, 1975, 50-26727

Int. Cl.² H01M *2/12*

U.S. Cl. 429—82 **6 Claims**

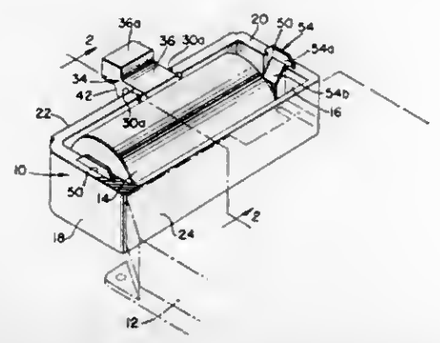


1. A splash-proof device for use in a storage battery comprising a cylindrical member provided in a cell cover of a storage battery integrally therewith and open at its bottom with a diameter of the resulting opening being equal to the inner diameter of the cylindrical member, and at least one helical splash-proof baffle having a width equal to at least ½ of the inner diameter of the cylindrical member, said baffle provided inside said cylindrical member.

4,031,295
COMBINATION HOUSING WITH COMPARTMENT AND EJECTOR MECHANISM FOR EJECTING A BATTERY THEREFROM

Anthony W. Rigazio, Oglesby, Ill., assignor to General Time Corporation, Thomaston, Conn.

Filed Mar. 11, 1976, Ser. No. 665,793
Int. Cl.² H01M 2/10
U.S. Cl. 429—100 **5 Claims**

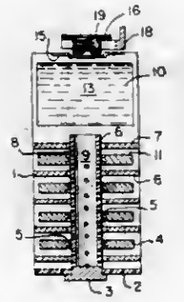


1. In combination a housing and an ejection means adapted for ejection of a battery from a seated position in a compartment within said housing, said compartment formed by a plurality of side walls and a bottom wall which surround closely and substantially encase said battery, said ejection means including a member substantially of Z-shaped outline having first and second lever arms and a pivot axis therebetween, said pivot axis comprised of a hinge formed integral with one of said walls and said member and in the region of the entrance to said compartment, both said one wall and bottom wall having a cutout, said first lever arm extending from said hinge within said cutouts and terminating below said battery whereby upon pivot movement of said member said first lever arm moves within said cutout into the area of said compartment for ejection of said battery, and said second lever arm having a finger engaging surface laterally removed from said compartment.

4,031,296
ELECTROCHEMICAL ENERGY CELL

Robert I. Sarbacher, Marina Del Ray, and John C. Bogue, Santa Monica, both of Calif., assignors to John C. Bogue, Santa Monica, Calif.

Continuation of Ser. No. 358,896, May 10, 1973, abandoned. This application Aug. 11, 1975, Ser. No. 603,786
Int. Cl.² H01M 6/36
U.S. Cl. 429—116 **10 Claims**



1. A reserve battery that remains in an inactive state until activated comprising:

a. a hollow cylindrical battery case being open at one end and having a circular opening at its other end, the axis of said circular opening being substantially coincident with the vertical axis of said cylindrical battery case;

b. an insulating disc closing said open end of said battery case, said insulating disc having a circular opening in substantially the center thereof;

c. a perforated hollow anode cylinder located inside said battery case, the vertical axis of said anode cylinder being substantially coincident with the vertical axis of said battery case and the axis of said circular opening of said insulating disc;

d. a plurality of anode electrodes surrounding said anode cylinder and electrically secured thereto, said plurality of anode electrodes being spaced apart along the length of said anode cylinder;

e. a plurality of cathode electrodes surrounding said anode cylinder, said cathode electrodes being electrically connected to said battery case, said plurality of cathode electrodes being spaced along the length of said anode cylinder in such a manner that said plurality of anode electrodes and said plurality of cathode electrodes are alternately spaced along the length of said anode cylinder;

f. a substantially cylindrical shaped anode terminal secured to said insulating disc and to one end of said anode cylinder, the other end of said anode cylinder being unsecured, said anode terminal covering said opening in said insulating disc;

g. a frangible envelope containing an electrolyte, said frangible envelope being located inside said battery case adjacent said other end of said battery case;

h. a flexible disc having a gas vent in substantially the center thereof, said flexible disc being secured to said other end of said battery case to close said circular opening in said other end of said battery case;

i. a gas valve located over said gas vent in said flexible disc, said gas valve being free to move under pressure from gas generated inside said battery case to permit gas to escape through said gas vent in said flexible disc; and

j. a spring biased plunger secured to said flexible disc for depressing said flexible disc to thereby break said frangible envelope to permit said electrolyte to flow into the area of said battery case housing said anode and cathode electrodes to activate said battery and said plunger having a gas vent therein communicating with said gas vent in said flexible disc.

4,031,297
POLYMERIZATION OF MONOMERS

Edwin Studley Smith, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 281,903, Aug. 18, 1972, which is a continuation of Ser. No. 881,870, Dec. 3, 1969, abandoned, which is a continuation-in-part of Ser. No. 335,413, Jan. 2, 1964, abandoned. This application Aug. 27, 1973, Ser. No. 391,905
Int. Cl.² C08F 2/02
U.S. Cl. 526—87 **3 Claims**

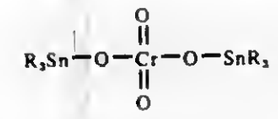
1. In a batch polymerization process for making a copolymer of uniform composition wherein a liquid mixture of polymerizable monomers is added to a reactor and a polymerization reaction commenced to form an initial volume of a polymerization medium comprised of (1) a liquid phase of the mixture of polymerizable monomers and (2) a solid phase of copolymer product and wherein the initial volume of the polymerization medium gradually decreases during the course of the polymerization reaction due to the copolymer being formed having a greater density than the polymerizable monomers being consumed, resulting in a final copolymer product of nonuniform composition, the improvement consisting of maintaining said initial volume of the polymerization medium constant throughout the polymerization reaction by continuously adding additional polymerizable monomers at that rate necessary to maintain said volume constant and in a ratio necessary to produce the desired copolymer of uniform composition.

4,031,298
POLYMERIZATION CATALYST AND METHOD

Thomas J. Pullukat, Hoffman Estates, Ill., assignor to Chemplex Company, Rolling Meadows, Ill.

Filed June 30, 1975, Ser. No. 591,942
Int. Cl.² C08F 4/02, 4/78, 10/00
U.S. Cl. 526—113 **19 Claims**

1. A catalyst for polymerizing one or more 1-olefins to an ultralow molecular weight and exceptionally broad molecular weight distribution, prepared by (1) forming a substantially dry intimate mixture of a finely divided support selected from the group consisting of silica, alumina, zirconia, thoria and mixtures thereof and an alkyl ester of titanium containing about 1–7 carbon atoms in the alkyl group in an amount to give about 1–10% of titanium on said support, (2) calcining said mixture from (1) to and at a temperature between about 400°–1000° C., (3) adding to the resulting calcined mixture from (2) an organotinchromate essentially of the formula



wherein each R is an individually selected hydrocarbon radical containing from 1–14 carbon atoms in an amount to give about 0.1–10% chromium in the final catalyst, and (4) activating the product from (3) by heating to and at a temperature between about 300°–500° C. in the presence of oxygen.

4,031,299
PROCESS FOR FORMING A POLYVINYL CHLORIDE EXTENDER RESIN BY INCORPORATING IN THE SUSPENSION POLYMERIZATION MEDIUM A PREHOMOGENIZED SOLUTION OF A POLYALLYL COMPOUND AND A LOW MOLECULAR POLYMER OF PROPYLENE

Chung H. Wei, Wilmington, Del., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Apr. 11, 1975, Ser. No. 567,328
Int. Cl.² C08F 4/00, 14/06, 114/06, 7/00
U.S. Cl. 526—193 **11 Claims**

1. A process for forming a polyvinyl chloride extender resin by suspension polymerization of a monomer charge containing vinyl chloride which comprises incorporating in the suspension polymerization medium an effective amount of (1) a pre-homogenized solution of a polyallyl compound selected from the group consisting of diallyl phthalate, diallyl ether, diallyl sulfide, diallyl oxalate, diallyl adipate, diallyl maleate, diallyl fumarate, triallyl cyanurate and triallyl phosphate and (2) of a low molecular weight polymer of propylene for controlling the rheological properties of the polyvinyl chloride resin.

4,031,300
HIGH MOLECULAR WEIGHT, HIGH UNSATURATION ISOBUTYLENE-CYCLOPENTADIENE COPOLYMERS

Warren A. Thaler, Matawan; Donald J. Buckley, Plainfield, both of N.J., and Joseph P. Kennedy, Akron, Ohio, assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 457,109, April 1, 1974, Pat. No. 3,928,297, which is a continuation-in-part of Ser. No. 151,038, June 8, 1971, Pat. No. 3,808,177. This application Nov. 13, 1975, Ser. No. 631,444
The portion of the term of this patent subsequent to Apr. 30, 1991, has been disclaimed.
Int. Cl.² C08F 232/06
U.S. Cl. 526—308 **2 Claims**

1. A substantially gel-free copolymer consisting of a major portion of isobutylene and about 5 to about 40 mol % cyclopentadiene, said copolymers having a number average molecular weight of about 90,000 to 120,000.

4,031,301
MICRO PARTICLE GENERATION

George Vinansky, Jr., Dover, and Emmanuel A. Lucia, Marlton, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

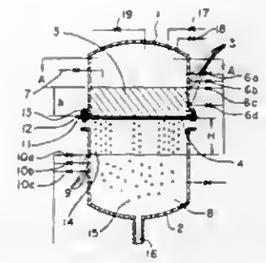
Filed Sept. 10, 1975, Ser. No. 612,052
Int. Cl.² B01J 2/04
U.S. Cl. 526—328 **8 Claims**

1. Process for generating micro particles comprising spraying one aerosal into another, the first aerosol containing solute dissolved in solvent conpletely, the second aerosol being a scavenger aerosol, said scavenger aerosol being a liquid exhibiting a greater chemical affinity for said solvent of said first aerosol than for said solute, said scavenger aerosol removing said solvent from said first aerosol thereby leaving behind said solute of said first aerosol as micro particles.

4,031,302
PROCESS FOR PREPARING GRANULAR RUBBER

Akihiko Shimizu, and Yasuhiro Sakanaka, both of Shin-nanyo, Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Japan

Filed Sept. 25, 1975, Ser. No. 616,894
Claims priority, application Japan, Sept. 25, 1974, 49-110176
Int. Cl.² C08C 1/15; C08F 6/22
U.S. Cl. 528—486 **6 Claims**



1. A process for preparing granular rubber, which comprises:

allowing a latex mixture of a rubber latex and an aqueous solution of a high molecular weight polyanion containing carboxylate groups, hydroxyl groups or a mixture thereof to fall freely drop-wise for a distance of from 1 to 80 cm. into an aqueous solution of an alkaline earth metal salt; wherein:

a. from 2 to 8 parts by weight of said polyanion is admixed with 100 parts by weight of rubber in the rubber latex;

b. said latex mixture has a viscosity of from 200–8,000 cps; and

c. said aqueous solution of an alkaline earth metal salt has a concentration of from 1 to 10 wt. %;

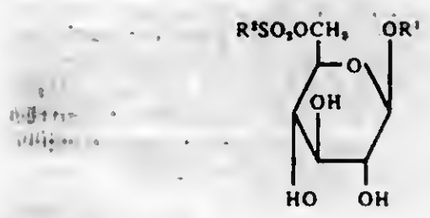
and recovering the granular rubber.

4,031,303
STERYL-β-D-GLUCOSIDE ESTERS AND METHOD OF PREPARATION

Hiromu Murai; Koji Kitaguchi; Tatsuo Suminokura; Akira Sano; Masahiro Kise; Masahiko Kitano, and Toshio Tomita, all of Kyoto, Japan, assignors to Nippon Shinyaku Co., Ltd., Japan

Filed Aug. 8, 1975, Ser. No. 603,110
Claims priority, application Japan, Aug. 14, 1974, 49-93621; Aug. 14, 1974, 49-93622
Int. Cl.² C07G 17/00
U.S. Cl. 536—5 **4 Claims**

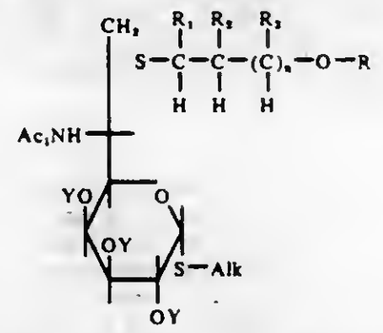
4. A compound of the formula:



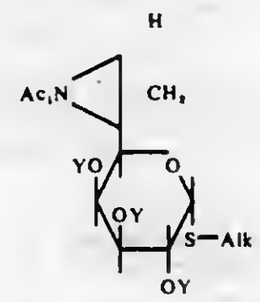
wherein
R^1 is selected from the group consisting of β-sitosteryl, campesteryl, stigmasteryl, and
R^2 is methyl, ethyl, phenyl, chlorophenyl, nitrophenyl or phenyl substituted with from 1 to 5 methyl groups.

4,031,304
PROCESS FOR PREPARING LINCOMYCIN DERIVATIVES
Brian Bannister, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.
Filed Jan. 30, 1976, Ser. No. 653,938
Int. Cl.² C07H *15/16*
U.S. Cl. 536—11 **18 Claims**

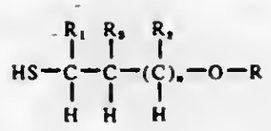
1. A process for making compounds of the formula:



wherein Alk is alkyl of not more than 4 carbon atoms; Ac_1 and Y is carboxacyl; R_1 is hydrogen, methyl or ethyl; R_2 is hydrogen, methyl or ethyl; R_3 is hydrogen, methyl or ethyl; n is 0 or 1; and R is hydrogen, alkyl of 1 to 6 carbon atoms, inclusive, or aralkyl of 7 to 12 carbon atoms, inclusive; which comprises heating at a temperature of from about 25° C. to about 180° C. compound of the formula:



wherein Ac_1 and Y are carboxacyl; and Alk is alkyl of not more than 4 carbon atoms, with a thiol of the formula:



wherein R_1 is hydrogen, methyl or ethyl; R_2 is hydrogen, methyl or ethyl; R_3 is hydrogen, methyl or ethyl; n is 0 or 1; and R is hydrogen, alkyl of 1 to 6 carbon atoms, inclusive, or aralkyl of 7 to 12 carbon atoms, inclusive, in the presence of an anhydrous lower hydrocarbon carboxylic acid.

4,031,305
POLYGALACTOMANNAN ETHER COMPOSITIONS
Ronald N. DeMartino, Wayne, N.J., assignor to Celanese Corporation, New York, N.Y.
Filed Nov. 17, 1975, Ser. No. 632,339
Int. Cl.² C08B *37/00*
U.S. Cl. 536—114 **3 Claims**

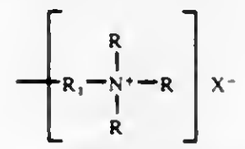
1. Sulfo-2-hydroxypropyl ethers of guar gum and the alkali metal and ammonium salts thereof having a degree of substitution between about 0.01 and 3.0.

4,031,306
POLYGALACTOMANNAN ALLYL ETHER COMPOSITIONS
Ronald N. DeMartino, Wayne, and Anthony B. Conciatori, Chatham, both of N.J., assignors to Celanese Corporation, New York, N.Y.
Filed Dec. 15, 1975, Ser. No. 640,519
Int. Cl.² C08B *37/00*
U.S. Cl. 536—114 **3 Claims**

1. Allyl ethers of guar gum having a degree of substitution between about 0.01 and 3.0.

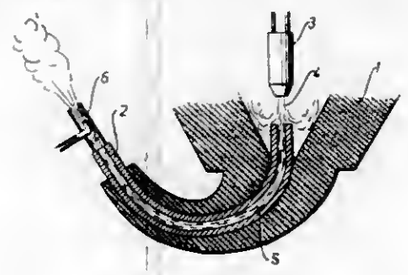
4,031,307
CATIONIC POLYGALACTOMANNAN COMPOSITIONS
Ronald N. DeMartino, Wayne, and Anthony B. Conciatori, Chatham, both of N.J., assignors to Celanese Corporation, New York, N.Y.
Filed May 3, 1976, Ser. No. 682,286
Int. Cl.² C08B *37/00*
U.S. Cl. 536—114 **3 Claims**

3. Quaternary ammonium ethers of polygalactomannan gum having a degree of substitution between about 0.01 and 3, wherein the quaternary ammonium ether substituents correspond to the formula:



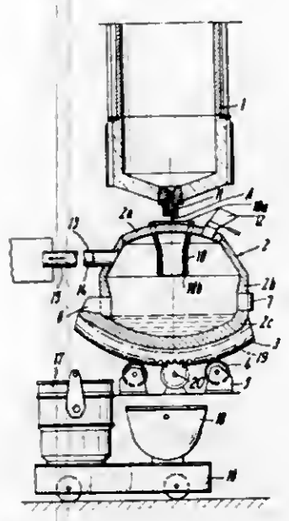
wherein R is an alkyl group containing between one and about six carbon atoms, R_1 is an alkylene or alkenylene group containing between one and about six carbon atoms, and X is chlorine or bromine.

4,031,308
DIRECT CURRENT ARC FURNACE HEARTH CONNECTION INSTALLATION
Bengt Fredrickson, and Sven-Einar Stenkvist, both of Vasteras, Sweden, assignors to ASEA Aktiebolag, Vasteras, Sweden
Filed Mar. 31, 1976, Ser. No. 672,305
Claims priority, application Sweden, Apr. 1, 1975, 7503675
Int. Cl.² H05B *7/00*
U.S. Cl. 13—9 R **2 Claims**



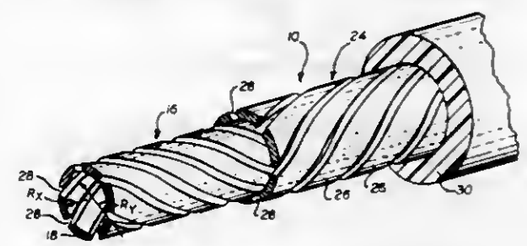
1. A method for drying a new hearth electrode installation of a DC electric arc furnace, the new installation comprising a metal billet extending through a wall portion of the furnace, the billet having an inside end which will be contacted by a melt in the furnace during operation of the furnace, and an outside end for an electrical connection, and at least slightly moist refractory surrounding the billet; said method comprising forming a hole lengthwise through the billet and passing hot gas through the hole to heat the billet until said refractory is substantially dried.

4,031,309
ARRANGEMENT FOR PRODUCING STEEL
Manfred Chitil, Essen-Frintrop, and Gotthard Hubatsch, Mulheimer (Ruhr), both of Germany, assignors to Klockner-Werke AG, Duisburg, Germany
Filed Oct. 22, 1975, Ser. No. 624,978
Claims priority, application Germany, Oct. 24, 1974, 2450495
Int. Cl.² F27D *3/10*
U.S. Cl. 13—10 **23 Claims**



1. In a steel-producing installation, a combination comprising a support element; a container element including an upper region having an inlet opening, a middle region having outlet means, and a lower region bounding a depression for a body of materials to be treated; means for treating the body in said depression to obtain molten steel and slag; means for mounting said container element on said support element for tilting relative thereto about a horizontal axis located at said inlet opening, between a normal operating position and at least one tilted position in which slag and steel are respectively tapped through said outlet means, including at least one mounting member rigid with one of said elements and having a cam surface which has centers of curvature defining said axis, and cam follower means mounted on the other of said elements and operative for contacting and following said cam surface of said mounting member during the tilting of said container element between said positions thereof; and means for continuously introducing starting materials into said container element in a path which leads toward said body through said inlet opening in and inbetween said positions of said container element as a result of the location of said axis at said inlet opening, whereby the latter substantially retains its spatial position relative to said path during tilting of said container element.

4,031,310
SHRINKABLE ELECTRICAL CABLE CORE FOR CRYOGENIC CABLE
Ludwik Jachimowicz, Elizabeth, N.J., assignor to General Cable Corporation, Greenwich, Conn.
Filed June 13, 1975, Ser. No. 586,561
Int. Cl.² H01B *7/34, 12/00*
U.S. Cl. 174—15 C **9 Claims**



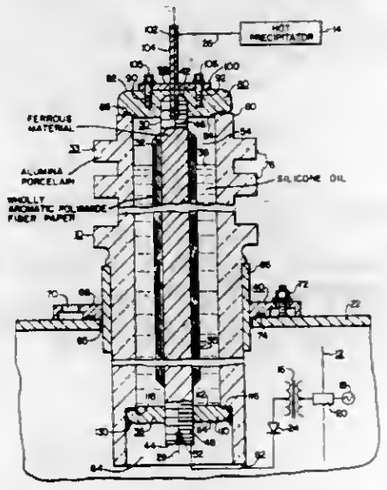
1. A cable core construction for a cryogenic electrical cable including in combination an inner metal strip having a helical lay of a predetermined angle and with successive convolutions spaced from one another, an outer metal strip having a helical lay with its angle of lay in the opposite direction and with successive convolutions spaced from one another, whereby the angle of lay of one strip is a right hand helix and the angle of lay of the other strip is a left hand helix, the outside surfaces of the convolutions of the inner strip being immediately adjacent to the inside surfaces of the convolutions of the outer strip for mutual support of one another, means fastening the inner and outer helixes to one another at both ends of the cable, and a plastic insulating jacket for the cable extending around the outside circumference of the outer helix.

4,031,311
ELECTRICAL BUSHING
Alfonso J. Mazanek, Hermitage, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Mar. 15, 1976, Ser. No. 666,809
Int. Cl.² H01B *17/26, 17/34*
U.S. Cl. 174—31 R **1 Claim**

1. A high temperature bushing assembly for interconnecting a high voltage direct current power supply and a hot precipitator in an ambient temperature up to 150° C, comprising:
an elongated ceramic insulating member having first and second ends, and an opening which extends between its ends, said insulating member including Al_2O_3 in its formulation, to increase the electrical volume resistivity of said insulating member,
a single elongated metallic electrical conductor having first and second ends disposed coaxially within said insulating member, said electrical conductor being constructed of a ferrous material to provide a relatively low coefficient of thermal expansion,
first and second sealing means each including a gasket member associated with the first and second ends, respectively, of said electrical conductor, which cooperate with the first and second ends, respectively, of said insulating member to provide a fluid-tight cavity within said insulat-

ing member while allowing thermally induced dimensional changes in said ferrous electrical conductor and insulating member,

solid insulating means disposed about said electrical conductor intermediate its ends, said solid insulating means including a plurality of layers of fibrous overlying wrappings formed of wholly aromatic polyamide fibers,



silicone oil disposed in the fluid-tight cavity, said silicone oil impregnating the fibrous wrappings of said solid insulating means, and mounting means on the insulating member including a tubular metallic member coaxial with the longitudinal axis of the insulating member, and a flange member which extends perpendicularly outward from the tubular metallic member.

4,031,312

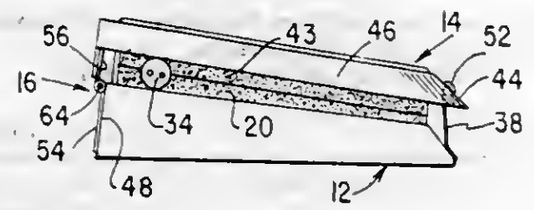
WEATHERPROOF ENCLOSURE FOR ELECTRICAL WIRING DEVICES

Allan Coleman, Highland Park, and Bernard Macklin, Rolling Meadows, both of Ill., assignors to Electrical Conductors, Inc., North Chicago, Ill.

Filed Aug. 14, 1975, Ser. No. 604,539

Int. Cl.² H05K *5/00*

U.S. Cl. 174—52 R **11 Claims**



1. A portable weatherproof enclosure comprising:

a housing;

a cover;

a spring-type hinge coupling the housing and the cover together enabling said cover to open and close upon said housing;

a gasket affixed to each of the housing and cover, wherein the gaskets are positioned within the housing and cover so that they will matingly abut each other when the cover and housing are in a closed position; and

a wiring device positioned within the housing, said wiring device being molded to an extension cord, and said extension cord passing between the gaskets of the cover and the housing.

4,031,313

PRINTED CIRCUITS WITH ARC-RETARDANCE

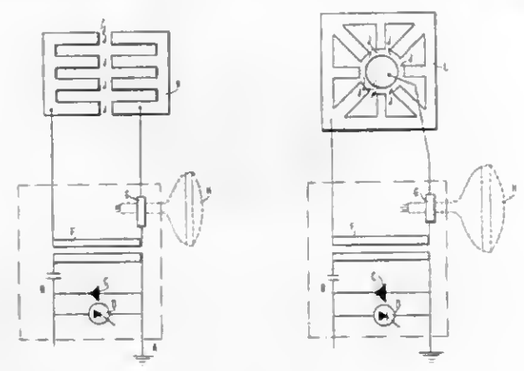
Arnold Franz, Troisdorf-Spich; Dirk Huthwelker, Troisdorf-Oberlar, and Lothar Jacob, Eckhausen, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Germany

Filed Feb. 3, 1975, Ser. No. 546,810

Claims priority, application Germany, Feb. 1, 1974, 2404777; July 1, 1974, 2431447

Int. Cl.² H05K *1/00*; **B32B** *15/02*

U.S. Cl. 174—68.5 **9 Claims**



1. A laminated material comprising a substrate material containing resin-impregnated layers, and an electrically conductive metal foil having a thickness between 5 and 100μ disposed on said substrate and an arc-retardant layer having a high insulation resistance of more than 10^{12} ohms arranged between the metal foil and the substrate material, and said layer having a thickness of from 20 to 300μ and consisting essentially of from about 60 to about 100% by weight of a heat-stable cross-linked acrylic resin or ketone resin which is free of aromatic groupings or heterocyclic rings containing at least one hetero-atom and conjugated double bonds and which is not converted to a graphite-containing structure upon being thermally decomposed and up to 30% by weight of an epoxy resin, a phenolic resin or a melamine resin.

4,031,314

ARRANGEMENT FOR CONNECTING INFORMATION TRANSDUCERS IN PROGRAM CONTROLLED PROCESSING SYSTEMS

Hans Bittermann, Munich, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Continuation of Ser. No. 576,276, May 12, 1975, abandoned, which is a continuation of Ser. No. 419,230, Nov. 27, 1973, abandoned, which is a continuation of Ser. No. 225,800, Feb. 14, 1972, abandoned. This application Jan. 5, 1976, Ser. No. 646,538

Claims priority, application Germany, Feb. 12, 1971, 2106730

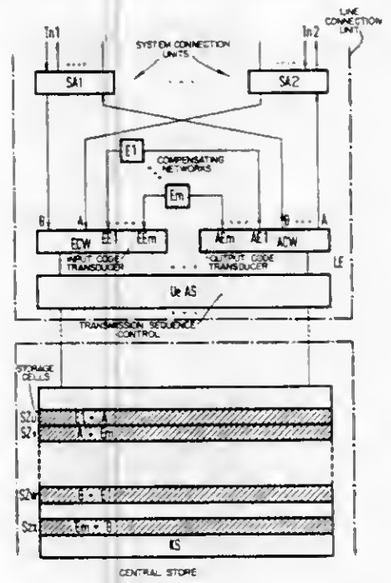
Int. Cl.² H04Q *3/54*

U.S. Cl. 178—3 **3 Claims**

1. A circuit arrangement for connecting information transducer means in a program controlled telecommunication switching system in which the transfer of information between incoming and outgoing line means occurs over a central memory, said line means being connected to a line connection unit, said central memory including a plurality of storage areas allocated to given incoming line means and accessible over input code transducers, each said storage area containing an address datum identifying an outgoing line means, each said outgoing line means being accessed, by means of said address datum, over an output code transducer, the circuit arrangement comprising:

a plurality of information transducer means having, respectively, input and output terminals, said input terminals being connected to outputs of said output code transducers, said output terminals being connected to inputs of said input code transducers,

each said information transducer means being identified by data accessible through an address contained in one of said storage areas allocated to an incoming connection through an incoming lines means,



the address identifying an outgoing connection being contained in the one of said storage areas allocated to the connected one of said information transducer means.

4,031,315

SOLID BODY IMAGE SENSOR HAVING CHARGE COUPLED SEMICONDUCTOR CHARGE SHIFT ELEMENTS AND METHOD OF OPERATION

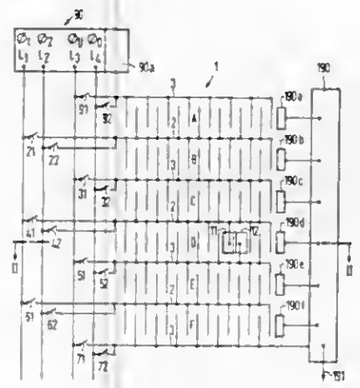
Hans-Jörg Pfleiderer, Zorneding, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sept. 9, 1975, Ser. No. 611,624

Claims priority, application Germany, Sept. 27, 1974, 2446232

Int. Cl.² H04N *3/14*; **H01L** *29/78, 27/14*

U.S. Cl. 358—212 **2 Claims**



1. In an image sensor of the type having image elements arranged in a matrix, wherein each of the image elements comprises a first and a second electrode arrangement, wherein each of the image elements are photosensitive and the image elements form charge-coupled shift registers in rows, wherein all of the first electrode arrangements in each row are connected to a respective one of a plurality of first control lines and all of the second electrode arrangements of each row are connected to a respective one of a plurality of second control lines, wherein the two control lines of a row are connectible via switches to drive lines, wherein the switches are operated by drive registers, and wherein output coupling devices are provided for output coupling image information, the improvement for a single-phase mode of operation wherein:

each first control line is located between adjacent rows of image elements and is connected in common to each of said first electrode arrangements of the adjacent rows of image elements;

each second control line is located between the other adjacent rows of image elements and is connected in common to each of said second electrode arrangements of the other adjacent rows of image elements;

two pairs of drive lines each having two drive lines are provided; and

a plurality of switches is provided, respective switches connecting each of said first control lines to the two drive lines of a first pair of said two pairs of drive lines and connecting each of said second control lines to the two drive lines of a second pair of said two pairs of drive lines.

4,031,316

APPARATUS FOR THE TIME DIVISION MULTIPLEX TRANSMISSION OF BINARY SIGNALS

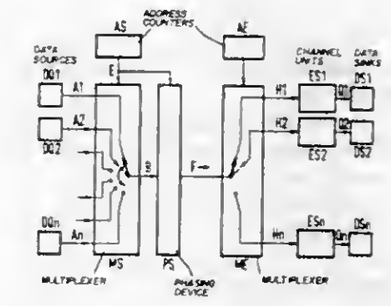
Konrad Reisinger, Zorneding, and Ludwig Hölzl, Sauerlach, both of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Mar. 19, 1976, Ser. No. 668,521

Claims priority, application Germany, Mar. 20, 1975, 2512271

Int. Cl.² H04L *5/00*

U.S. Cl. 178—50 **3 Claims**



1. In a system for the time division multiplex (t.d.m.) transmission of binary signals emitted from a plurality of data sources, each of which is connected to a respective input of a multiplexer which during a cycle of operation establishes a conductive connection between each said input and an output for transmission to a receiver over a transmission link, the improvement comprising:

address generator means for, during each said cycle, successively emitting as many address signals as there are data sources, each said address signal being coupled to said multiplexer for establishing the said conductive connections, respectively, between said inputs and said output, and

in-phasing means connecting said output of said multiplexer to said transmission link, said in-phasing means comprising:

a number of one word binary stores corresponding to the number of said data sources,

first, second and third intermediate stores, a start element of a binary word being stored in said first intermediate store responsive to a release signal, said second and third intermediate stores being set to their zero states,

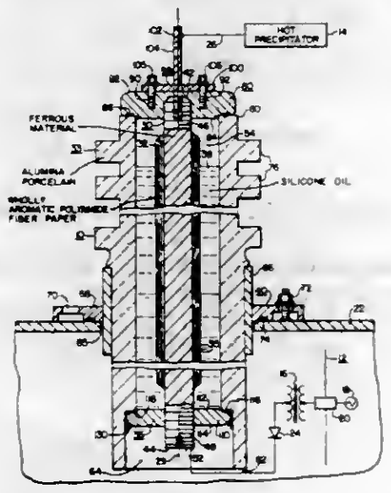
first, second and third switches for, respectively, coupling the contents of said first, second and third intermediate stores into the one of said word stores corresponding to the currently emitted address signal,

fourth, fifth and sixth switches, each having contacts connected to each of said word stores, a center contact of said fourth switch being connected to the output of said in-phasing means,

first adder means connecting a center contact of said fifth switch to an input of said second intermediate store and

ing member while allowing thermally induced dimensional changes in said ferrous electrical conductor and insulating member,

solid insulating means disposed about said electrical conductor intermediate its ends, said solid insulating means including a plurality of layers of fibrous overlying wrappings formed of wholly aromatic polyamide fibers,

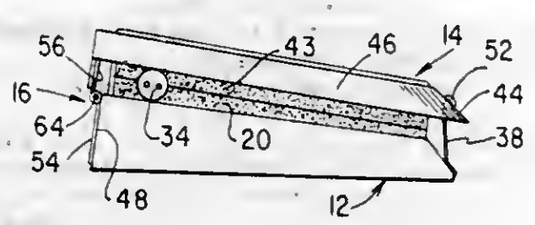


silicone oil disposed in the fluid-tight cavity, said silicone oil impregnating the fibrous wrappings of said solid insulating means, and mounting means on the insulating member including a tubular metallic member coaxial with the longitudinal axis of the insulating member, and a flange member which extends perpendicularly outward from the tubular metallic member.

4,031,312
WEATHERPROOF ENCLOSURE FOR ELECTRICAL WIRING DEVICES

Allan Coleman, Highland Park, and Bernard Macklin, Rolling Meadows, both of Ill., assignors to Electrical Conductors, Inc., North Chicago, Ill.

Filed Aug. 14, 1975, Ser. No. 604,539
Int. Cl.² H05K *5/00*
U.S. Cl. 174—52 R **11 Claims**



1. A portable weatherproof enclosure comprising:

a housing;

a cover;

a spring-type hinge coupling the housing and the cover together enabling said cover to open and close upon said housing;

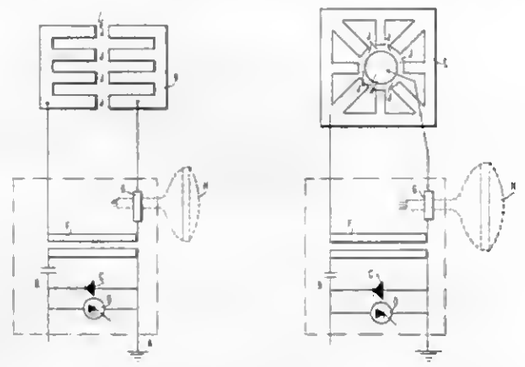
a gasket affixed to each of the housing and cover, wherein the gaskets are positioned within the housing and cover so that they will matingly abut each other when the cover and housing are in a closed position; and

a wiring device positioned within the housing, said wiring device being molded to an extension cord, and said extension cord passing between the gaskets of the cover and the housing.

4,031,313
PRINTED CIRCUITS WITH ARC-RETARDANCE

Arnold Franz, Troisdorf-Spich; Dirk Huthwelker, Troisdorf-Oberlar, and Lothar Jacob, Eckhausen, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Germany

Filed Feb. 3, 1975, Ser. No. 546,810
Claims priority, application Germany, Feb. 1, 1974, 2404777; July 1, 1974, 2431447
Int. Cl.² H05K *1/00*; **B32B** *15/02*
U.S. Cl. 174—68.5 **9 Claims**



1. A laminated material comprising a substrate material containing resin-impregnated layers, and an electrically conductive metal foil having a thickness between 5 and 100μ disposed on said substrate and an arc-retardant layer having a high insulation resistance of more than 10^{12} ohms arranged between the metal foil and the substrate material, and said layer having a thickness of from 20 to 300μ and consisting essentially of from about 60 to about 100% by weight of a heat-stable cross-linked acrylic resin or ketone resin which is free of aromatic groupings or heterocyclic rings containing at least one hetero-atom and conjugated double bonds and which is not converted to a graphite-containing structure upon being thermally decomposed and up to 30% by weight of an epoxy resin, a phenolic resin or a melamine resin.

4,031,314
ARRANGEMENT FOR CONNECTING INFORMATION TRANSDUCERS IN PROGRAM CONTROLLED PROCESSING SYSTEMS

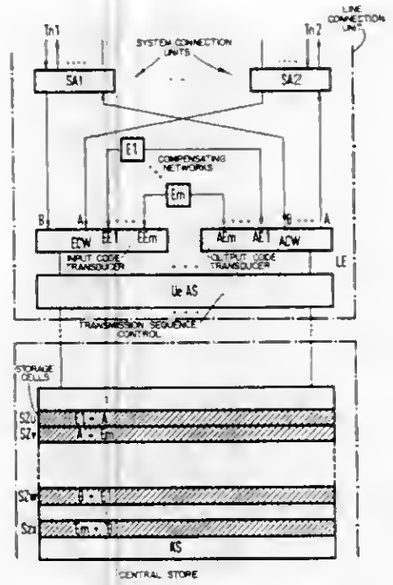
Hans Bittermann, Munich, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Continuation of Ser. No. 576,276, May 12, 1975, abandoned, which is a continuation of Ser. No. 419,230, Nov. 27, 1973, abandoned, which is a continuation of Ser. No. 225,800, Feb. 14, 1972, abandoned. This application Jan. 5, 1976, Ser. No. 646,538
Claims priority, application Germany, Feb. 12, 1971, 2106730
Int. Cl.² H04Q *3/54*
U.S. Cl. 178—3 **3 Claims**

1. A circuit arrangement for connecting information transducer means in a program controlled telecommunication switching system in which the transfer of information between incoming and outgoing line means occurs over a central memory, said line means being connected to a line connection unit, said central memory including a plurality of storage areas allocated to given incoming line means and accessible over input code transducers, each said storage area containing an address datum identifying an outgoing line means, each said outgoing line means being accessed, by means of said address datum, over an output code transducer, the circuit arrangement comprising:

a plurality of information transducer means having, respectively, input and output terminals, said input terminals being connected to outputs of said output code transducers, said output terminals being connected to inputs of said input code transducers,

each said information transducer means being identified by data accessible through an address contained in one of said storage areas allocated to an incoming connection through an incoming lines means,

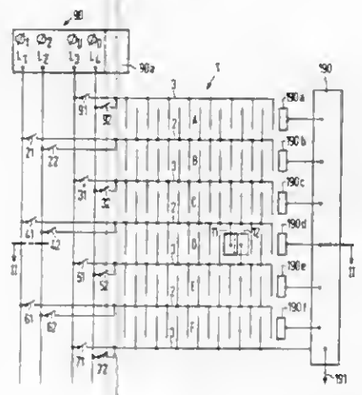


the address identifying an outgoing connection being contained in the one of said storage areas allocated to the connected one of said information transducer means.

4,031,315
SOLID BODY IMAGE SENSOR HAVING CHARGE COUPLED SEMICONDUCTOR CHARGE SHIFT ELEMENTS AND METHOD OF OPERATION

Hans-Jörg Pfleiderer, Zorneding, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sept. 9, 1975, Ser. No. 611,624
Claims priority, application Germany, Sept. 27, 1974, 2446232
Int. Cl.² H04N *3/14*; **H01L** *29/78, 27/14*
U.S. Cl. 358—212 **2 Claims**



1. In an image sensor of the type having image elements arranged in a matrix, wherein each of the image elements comprises a first and a second electrode arrangement, wherein each of the image elements are photosensitive and the image elements form charge-coupled shift registers in rows, wherein all of the first electrode arrangements in each row are connected to a respective one of a plurality of first control lines and all of the second electrode arrangements of each row are connected to a respective one of a plurality of second control lines, wherein the two control lines of a row are connectible via switches to drive lines, wherein the switches are operated by drive registers, and wherein output coupling devices are provided for output coupling image information, the improvement for a single-phase mode of operation wherein:

each first control line is located between adjacent rows of image elements and is connected in common to each of said first electrode arrangements of the adjacent rows of image elements;

each second control line is located between the other adjacent rows of image elements and is connected in common to each of said second electrode arrangements of the other adjacent rows of image elements;

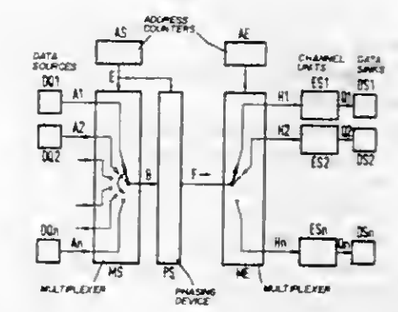
two pairs of drive lines each having two drive lines are provided; and

a plurality of switches is provided, respective switches connecting each of said first control lines to the two drive lines of a first pair of said two pairs of drive lines and connecting each of said second control lines to the two drive lines of a second pair of said two pairs of drive lines.

4,031,316
APPARATUS FOR THE TIME DIVISION MULTIPLEX TRANSMISSION OF BINARY SIGNALS

Konrad Reisinger, Zorneding, and Ludwig Hölzl, Sauerlach, both of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Mar. 19, 1976, Ser. No. 668,521
Claims priority, application Germany, Mar. 20, 1975, 2512271
Int. Cl.² H04L *5/00*
U.S. Cl. 178—50 **3 Claims**



1. In a system for the time division multiplex (t.d.m.) transmission of binary signals emitted from a plurality of data sources, each of which is connected to a respective input of a multiplexer which during a cycle of operation establishes a conductive connection between each said input and an output for transmission to a receiver over a transmission link, the improvement comprising:

address generator means for, during each said cycle, successively emitting as many address signals as there are data sources, each said address signal being coupled to said multiplexer for establishing the said conductive connections, respectively, between said inputs and said output, and

in-phasing means connecting said output of said multiplexer to said transmission link, said in-phasing means comprising:

a number of one word binary stores corresponding to the number of said data sources,

first, second and third intermediate stores, a start element of a binary word being stored in said first intermediate store responsive to a release signal, said second and third intermediate stores being set to their zero states,

first, second and third switches for, respectively, coupling the contents of said first, second and third intermediate stores into the one of said word stores corresponding to the currently emitted address signal,

fourth, fifth and sixth switches, each having contacts connected to each of said word stores, a center contact of said fourth switch being connected to the output of said in-phasing means,

first adder means connecting a center contact of said fifth switch to an input of said second intermediate store and

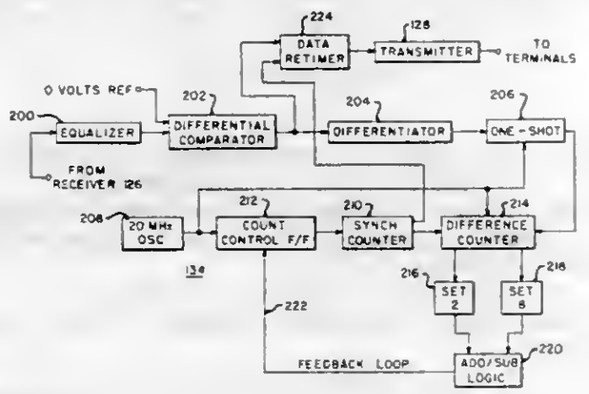
second adder means connecting a center contact of said sixth switch to an input of said third intermediate store.

4,031,317

DATA COMMUNICATIONS SYSTEM WITH IMPROVED DIGITAL PHASE-LOCKED LOOP RETIMING CIRCUIT

Herbert D. McClain, Quaker City; Bipin D. Parikh, and John K. Barkey, both of Cambridge, all of Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed Feb. 12, 1976, Ser. No. 657,425
Int. Cl.² H04L 7/02
U.S. Cl. 178—69.1 **48 Claims**



1. A digital phase lock loop circuit for synchronizing bit-shifted data with a retiming clock signal comprising:

means for detecting data transitions in said bit-shifted data and for generating an output data clocking signal in response thereto;

means for deriving a synchronous retiming clock signal;

for comparing said output data clocking signal with said synchronous retiming clock signal for deriving a digital count signal indicative of the phase shift of said output signal with respect to said synchronous clock signal; and

means responsive to said digital count signal for continuously digitally adjusting the phase of said retiming clock signal incrementally such that said output data clocking signal and said retiming clock signal are brought into synchronization.

4,031,318

HIGH FIDELITY LOUDSPEAKER SYSTEM

Lester M. Pitre, Orleans Parish, La., assignor to Innovative Electronics, Inc., Jefferson, La.

Filed Nov. 21, 1975, Ser. No. 634,239
Int. Cl.² H04R 1/02, 1/20, 3/12
U.S. Cl. 179—1 D **11 Claims**

1. A high fidelity loudspeaker system comprising:

an enclosed airtight speaker cabinet having three operative panels each having openings therein into the interior of said enclosure and speakers located within said openings closing them off with the backs of said speakers being exposed to said interior through said openings, at least some of said speakers having tubes surrounding them on their back, interior sides extending into said interior, the lengths of at least some of said tubes being substantially different, said tubes serving as anti-resonance decoupling means for said speakers.

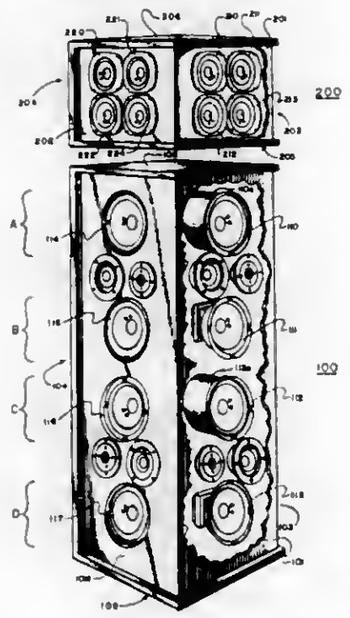
7. A high fidelity loudspeaker system comprising:

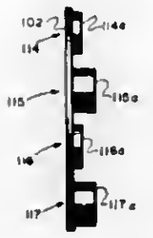
a vertically extended speaker column having three, vertical, operative speaker panels with speakers therein and a fourth back panel; and

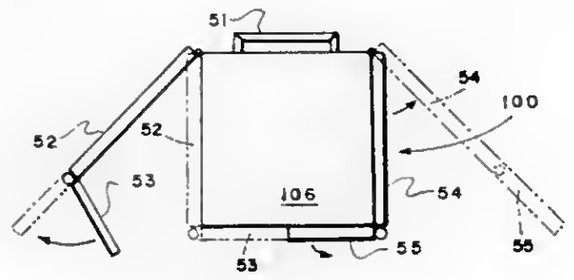
an outer, built-in protective casing for said three panels comprising two hinged wall sections each hinged to opposite side edges of said back panel which when closed cover all three panels and when open form two diagonally disposed sound reflecting surfaces, providing the reflective acoustic effect of said speaker column being located in a corner.

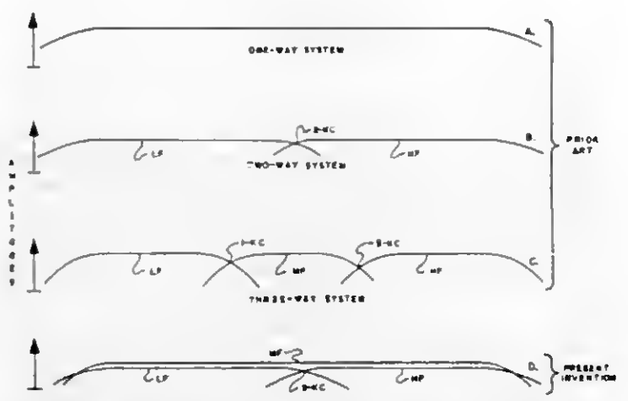
8. A high fidelity loudspeaker system comprising:

a first air-tight, closed cabinet having an array of woofer and tweeter speakers contained therein for reproducing low and high frequencies, respectively; and









a second, air-tight, closed but complementary cabinet physically separate from said first cabinet having an array of mid-range speakers contained therein for reproducing at least the mid-range frequencies, said two cabinets placeable together in juxtaposition one on top of the other, outside the enclosure of the other; the speakers in both said cabinets being driven to reproduce complementary sounds.

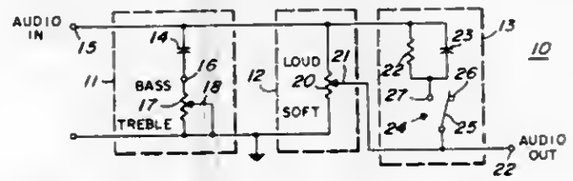
11. A high fidelity loudspeaker system comprising: an array of woofer, mid-range and tweeter speakers, having low, medium, and high frequency response respectively, wherein said woofers and tweeters include a single frequency cross-over electronic circuit means between them for feeding the low frequency signals only to said woofers and the high frequency signals only to said tweeters, respectively, for the driving thereof, and wherein said mid-range speakers include no frequency cross-over means between them and said woofers and wherein tweeters, said mid-range speakers being driven over at least substantially all of the full spectrum of audio frequencies, said woofers, tweeters and mid-range speakers being generally simultaneously driven to reproduce complementary sounds.

4,031,319

SINGLE CONTROL POWER-FREQUENCY CONTROL CIRCUIT

Samir Thakorbhai Desai, Roselle, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 12, 1975, Ser. No. 640,368
Int. Cl.² H04R 3/00
U.S. Cl. 179—1 D **14 Claims**



1. An improved single control power-frequency control circuit especially adaptable for use in controlling an audio electrical signal in an automotive entertainment device, comprising:

a first terminal for receiving an audio input signal throughout an audio frequency range,

a second terminal, and

an adjustable control means coupled between said first and second terminals for receiving said audio signal and providing a modified audio signal at said second terminal, said control means providing a single adjustment for selectively emphasizing certain frequencies within said audio frequency range in the modified audio signal while simultaneously substantially increasing the magnitude of the modified audio signal throughout the audio frequency range.

4,031,320

SOUND PRODUCING DEVICE

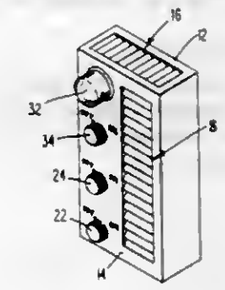
Bridget A. Brand, and Joseph Brand, both of 133 Drexel Road, Ardmore, Pa. 19003

Filed Mar. 19, 1976, Ser. No. 668,411
Int. Cl.² A61M 21/00
U.S. Cl. 179—1 AA **7 Claims**

1. An apparatus for inducing general relaxation and sleep comprising:

a. a housing having sound ventilating channels disposed therethrough; and

b. a sound producing means disposed within said housing for producing low frequency, periodic oscillatory sound of barely audible amplitude, said sound producing means producing a pre-selected sound having any of a variety of amplitudes between 20 and 50 and decibels, said pre-selected amplitude being controlled to within ±5 decibel percent, during said oscillatory sound period whereby a soft background level is attained which masks infrequent yet annoying bursts of consciously perceived noise.

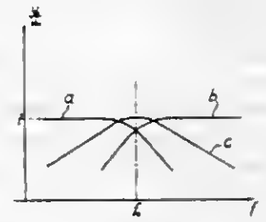


4,031,321

LOUDSPEAKER SYSTEMS

Knud Erik Bakgaard, Struer, Denmark, assignor to Bang & Olufsen A/S, Denmark

Continuation of Ser. No. 521,094, Nov. 5, 1974, abandoned. This application Feb. 17, 1976, Ser. No. 658,526
Claims priority, application United Kingdom, Nov. 6, 1973, 51482/73
Int. Cl.² H04R 1/24, 3/04, 3/14
U.S. Cl. 179—1 D **13 Claims**



1. A loudspeaker system comprising a first and a second main driver connected to common signal input terminals through crossover network means designed so as to pass signals of frequencies lower than a predetermined crossover frequency to said first driver and signals of frequencies higher than said crossover frequency to the second driver, while in a crossover frequency range the signals are passed to both drivers with an amplitude which for increasing frequencies is decreasing for said first driver and increasing for said second driver in such a manner that the transfer function of the loudspeaker system is approximated to a constant function inside and is substantially constant outside said crossover frequency range, characterized in that in addition to said two drivers there is provided at least one auxiliary compensation driver adapted to work in said crossover frequency range and being operable to reproduce an acoustic signal with a frequency-amplitude characteristic which, combined with the corresponding characteristics of the two main drivers, results in the total transfer function of the loudspeaker system being substantially constant inside and outside the crossover frequency range.

4,031,322

TELEPHONE OPERATED SIGNALLING SYSTEM

Steven T. Churchill, Wilton, Conn., assignor to Letot, Incorporated, Fairfield, Conn.

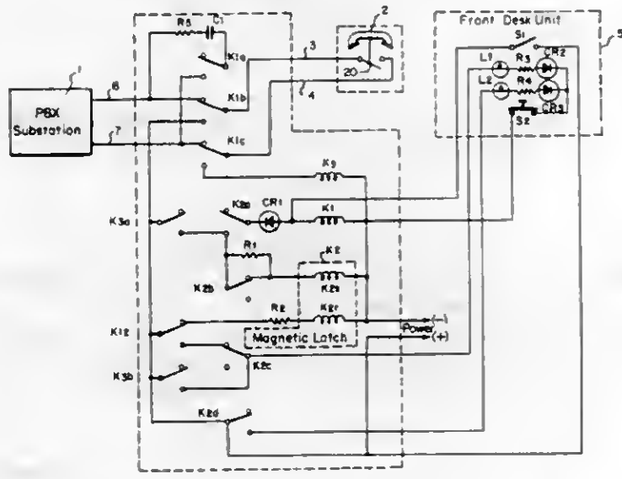
Filed Sept. 30, 1975, Ser. No. 618,148
Int. Cl.² H04M 11/02
U.S. Cl. 179—2 A **3 Claims**

1. A telephone operated signalling system having:

A. A telephone substation,

B. A telephone having a manually operated switch connected to said substation by telephone wires,

C. A desk unit having an actuation switch and indicating means for indicating status of a room,
D. Power means adapted to energize said indicating means, and
E. Circuit means including:
i. First means responsive to actuation of said actuation switch for disconnecting said telephone wires from said substation and connecting said telephone wires to said indicating means, and

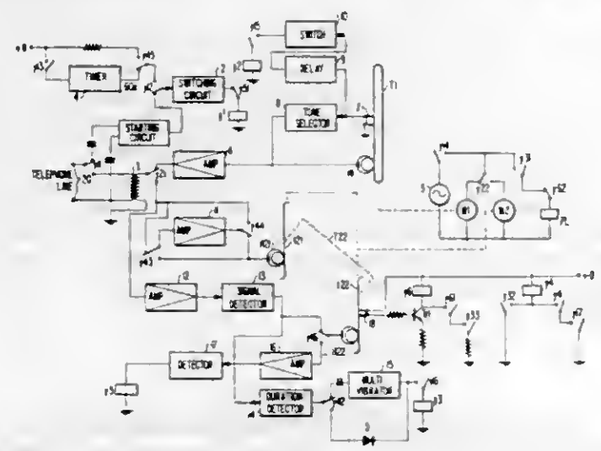


ii. Second means responsive to movement of said manually operated switch for changing energization of said indicating means;
the improvement comprising having indicator switch means positioned between said power means and said indicating means for disconnecting said indicating means from said power means during long periods of time that said telephone wires are connected to said indicating means.

4,031,323
REMOTE CONTROLLABLE TELEPHONE ANSWERING DEVICE HAVING A DUAL PLAYBACK CAPABILITY

Shizuo Ando, and Akira Okamura, both of Kawagoe, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Mar. 28, 1975, Ser. No. 563,031
Claims priority, application Japan, Mar. 29, 1974, 49-36215
Int. Cl.² H04M *1/64*
U.S. Cl. 179—6 E **5 Claims**

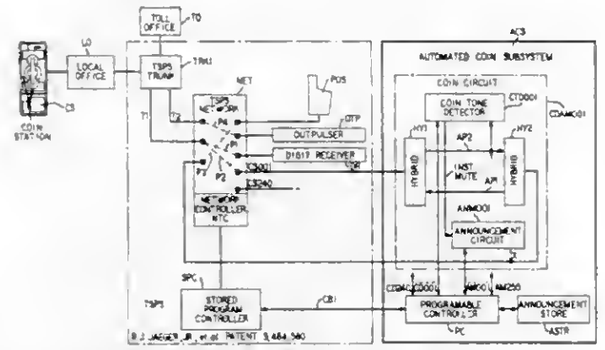


1. A remote controllable automatic telephone answering device adapted to be connected to a telephone line, said device comprising; an answer tape, means for reproducing an answer prerecorded on said answer tape and sending out said reproduced answer in response to the reception of a calling signal via said telephone line, a message tape, means for recording callers' messages on said message tape when it is unwinding, means for detecting a remote control signal received via said telephone line, first means for rewinding the message recording tape for a fixed time period in response to a first detection of a first said remote control signal and for reproducing any messages on the thus rewound part of said message tape, said fixed time period being independent of the duration of said remote control signal and independent of the amount of tape unwound, second means responsive to a subsequent detection of a second said remote control signal during the reproducing of said messages for rewinding said message tape for a period corresponding to the duration of the second remote control signal and for reproducing any messages on the part of said message tape thus rewound, and means for sending out said reproduced messages via said telephone line.

4,031,324
AUTOMATED COIN ARRANGEMENT PROVIDING INTERFERENCE FREE COIN DEPOSIT DETECTION DURING ANNOUNCEMENTS

Ronald Michael Dudonis, Englishtown, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 24, 1976, Ser. No. 689,600
Int. Cl.² H04M *17/00*
U.S. Cl. 179—6.3 R **19 Claims**



1. In combination,
generating means for generating voice announcements,
detecting means for detecting distinct signals originating at a telephone station, and
coupling means for coupling said generating means to a transmission path connectible to said telephone station to transmit said voice announcements thereover and for coupling said detecting means to said transmission path to detect said distinct signals received thereover from said telephone station,
said coupling means including isolating means for isolating said detecting means from said generating means.

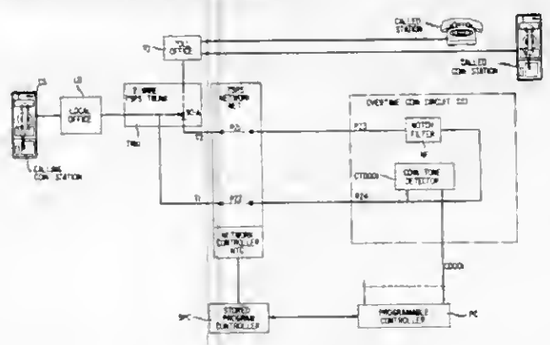
4,031,325
CALLED PARTY FRAUD PREVENTION IN AN AUTOMATED COIN SYSTEM

Ronald Michael Dudonis, Englishtown; Charles Glenn Morrison, Holmdel, both of N.J.; Robert Lawrence Potter, Naperville, Ill., and Kenneth Streisand, East Brunswick, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 21, 1976, Ser. No. 698,186
Int. Cl.² H04M *15/18*
U.S. Cl. 179—6.3 R **16 Claims**

1. Apparatus for preventing called party fraud in a coin station originated call wherein a connection is established between the calling coin station and a called station, which comprises
means for splitting the connection into a calling station portion and a called station portion,
a filter attenuating a frequency component in signals indicative of coin deposits,

a coin tone detector detecting signals indicative of coin deposits, and
extending means for extending said calling station portion to said coin tone detector and for extending said called station portion to said filter,

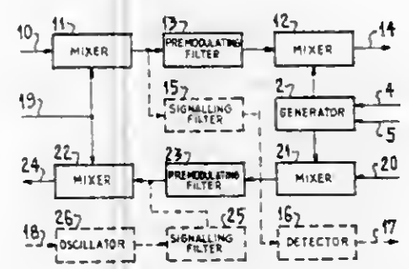


said extended called station portion being connected via said filter to said extended calling station portion to reconnect said calling and called stations.

4,031,326
TELEPHONE ARTERY WITH MULTIPLE ACCESS POINTS AND TELEPHONE NETWORKS WITH SUCH ARTERIES

Pierre Deman, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Oct. 30, 1975, Ser. No. 627,456
Claims priority, application France, Oct. 31, 1974, 74.36491
Int. Cl.² H04J *1/00*
U.S. Cl. 179—15 FS **6 Claims**

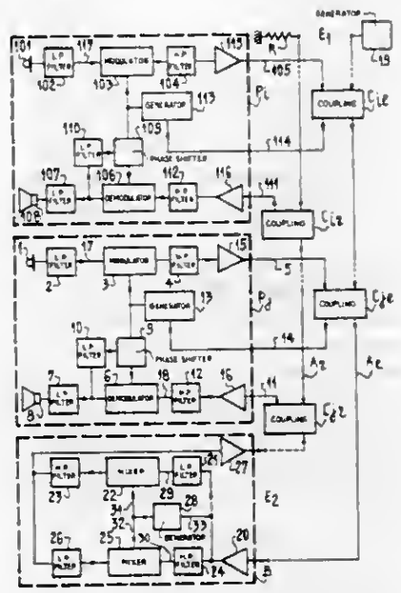


1. A two-way telephone artery, having first and second terminals, for transmitting in each direction channels forming part of a predetermined multiplexed set of g channels in a telephone system using premodulation and single sideband frequency multiplexing, said set of channels being such that any of its channels may be selectively translated into the pass-band of a premodulation filter by means of a mixer receiving said set and a carrier current associated with this channel, said artery having first and second transmission channels for transmitting telephone communication in first and second directions, and M access points, M at least equal to 3, at m of which, $1 \leq m \leq M$, m multiplexing and demultiplexing switching devices are respectively coupled to said artery for selectively inserting telephone channels in the group of channels transmitted by said first transmission channel at vacant positions of said set and selectively extracting telephone channels from the group of channels transmitted by said second transmission channel, the inserted and extracted telephone channels occupying the same frequency bands in said transmission channels, the i^{th} switching device ($i = 1, 2 \ldots m$) starting from said first terminal comprising p_i, $1 \leq p_i \leq g$ telephone channel circuits, each of said telephone channel circuits comprising first and second branches, said first branch comprising, in series, an input mixer having a first input, forming a first input of this channel circuit, for receiving a low frequency channel, and a carrier current input for receiving a current at the premodulation frequency, a premodulation filter having an output, and an output mixer having a first input coupled to said output of said premodulation filter, a carrier current input, and an output forming a first output of this channel circuit, said second branch comprising in series an input mixer having a first input forming a second input of this channel circuit and a carrier current input, a premodulation filter having an output, and an output mixer having a first input coupled to said output of said premodulation filter of said second branch, a carrier current input for receiving said current at the premodulation frequency and an output forming a second output of this channel circuit, each of said telephone channel circuits further comprising a digitally controllable variable frequency generator having an output connected to the carrier current inputs of said output mixer of said first branch and of said input mixer of said second branch, said i^{th} switching device further comprising, for $i < m$, a regrouping coupling device having inputs and an output, inserted by an input and its output in said first transmission channel, and having p_i other inputs connected respectively to the first outputs of said p_i telephone channel circuits, and a distribution coupling device having an input and outputs, inserted by its input and an output in said second transmission channel, and having p_i other outputs connected respectively to the second inputs of said p_i telephone channel circuits, said artery further comprising at said first terminal a terminal arrangement having an input coupled to said first transmission channel and an output coupled to said second transmission channel; the first inputs and second outputs of the p_m channels of the m^{th} switching device being respectively coupled to said first and second transmission channel of said artery at said second terminal through regrouping and distribution coupling devices respectively.

4,031,327
TELEPHONE SET AND SYSTEM UTILIZING FREQUENCY DIVISION MULTIPLEXING

Henri Butin, and Pierre Deman, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Apr. 6, 1976, Ser. No. 674,676
Claims priority, application France, Apr. 11, 1975, 75.11311
Int. Cl.² H04J *1/06*
U.S. Cl. 179—15 FD **3 Claims**



1. A telephone set having first and second inputs and an output, and comprising a transmitter channel for delivering to said output a variable carrier frequency output signal with double side-band amplitude modulation and carrier component and a receiver channel having an input coupled to said telephone set first input for receiving a multiplex high fre-

quency signal including, when said set is being used for communication, a multiplexed signal having the same carrier frequency as said output signal with double side-band amplitude modulation and carrier component;

said transmitter channel comprising: a programmable generator having an output, for supplying said output signal variable carrier frequency, and a sync input; and an amplitude modulator having a first input for receiving voice signals from a microphone, a second input and an output; said sync input being coupled to said second input of said telephone set for receiving a reference frequency, said second input of said modulator being coupled to said generator output, and said modulator output being coupled to said telephone set output;

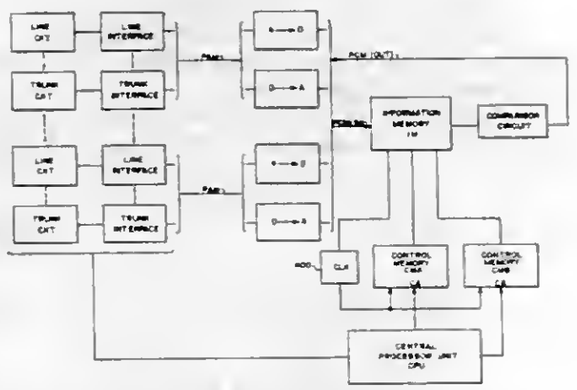
said receiver channel comprising: an electroacoustic transducer, a synchronous demodulator having a first input coupled to said receiver channel input for receiving said multiplex high frequency signal, a second input and an output for delivering to said transducer the modulating signal from said multiplexed signal and a control voltage; and a variable phase-shifter having a signal input coupled to said generator output, a control input coupled for receiving said control voltage and an output coupled to said demodulator second input.

4,031,328

CONFERENCING ARRANGEMENT FOR USE IN A PCM SYSTEM

Satyan G. Pitroda, Villa Park, Ill., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Sept. 18, 1975, Ser. No. 614,406
Int. Cl.² H04M *3/56*; H04Q *11/04*
U.S. Cl. 179—18 BC **4 Claims**



1. In a pulse code modulated communication system having

a. a plurality of channels, each of which is assigned a time slot,

b. an information memory for storing information from each of the plurality of channels, transmit information from each of the plurality of channels stored in a first fixed location of the information memory and receive information from each of the plurality of channels stored in a second fixed location of the information memory,

c. a first control memory having a control memory word corresponding to each of the plurality of channels for storing the address location within the information memory of the channel to which that channel is to be connected for conversation, and

d. control means for cyclically controlling the operation of the system, said control means during a time slot assigned to a channel writing the information from that channel into the information memory, reading the control memory word corresponding to that channel from the control memory to address the information memory to read out the information stored therein at the addressed location, and to transmit the information read therefrom to that channel, to thereby permit that channel to engage in conversation with another channel, the improvement comprising:

e. a second control memory having a control memory word corresponding to each of the plurality of channels for storing the address location within the information memory of a second channel to which that channel is to be connected for conversation, and

f. a comparison means for comparing and transmitting as an output thereof the larger of two samples of information coupled to it,

g. said control means during a time slot assigned to a channel writing the information from that channel into the information memory, reading the control memory words corresponding to that channel from each of the control memories for addressing the information memory to read out the information stored therein at the two addressed locations, and to transmit the information to said comparison means, the largest of the two samples of information coupled to said comparison means being coupled to that channel,

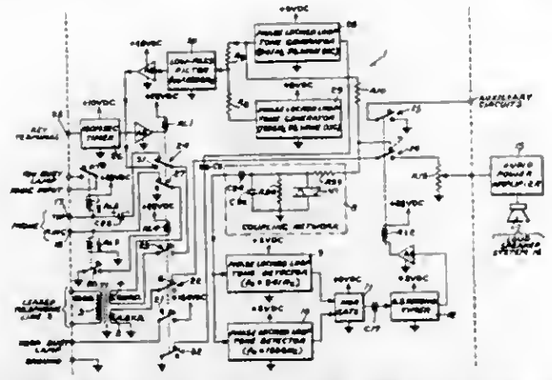
h. whereby 3-way conferencing between the plurality of channels can be provided.

4,031,329

TIME LIMITED TELEPHONE PAGING EMPLOYS A RELAY SWITCH ACTUATED BY DUAL FREQUENCY TONE

B. Ronald Saxon, Harrisburg, Pa., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Continuation of Ser. No. 479,005, June 13, 1974, abandoned. This application Apr. 2, 1976, Ser. No. 673,233
Int. Cl.² H04M *11/02*
U.S. Cl. 179—18 BF **23 Claims**



1. An arrangement to control a loud speaker system at a remote location from a local location comprising:

a telephone line having a given operating frequency band interconnecting said local location to said remote location;

said loud speaker system being normally disconnected from said telephone line;

a first source of a first audio control signal disposed at said local location, said first audio control signal having a first given frequency;

a second source of a second audio control signal disposed at said local location, said second audio control signal having a second given frequency different than said first given frequency;

first means coupled between said first and second sources and said telephone line at said local location to inject a short burst of said first and second audio control signals simultaneously into said operating frequency band of said telephone line;

second means coupled to said telephone line at said remote location to detect both said first and second audio control signals and provide only a logic "1" output signal only when both of said first and second audio control signals are detected simultaneously; and

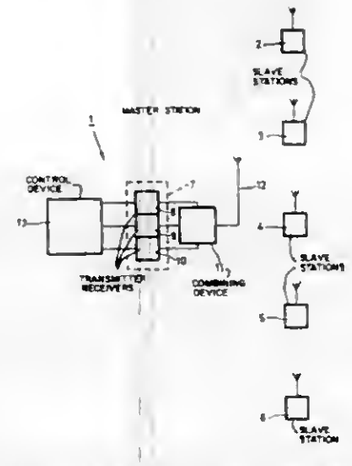
third means coupled to said second means responsive to said output signal to actuate a relay and a contact thereof which connects said loud speaker system to said telephone line for a given period of time after cessation of said first and second audio control signals to enable said loud speaker system to broadcast a page message transmitted on said telephone line from said local location.

4,031,330

DIGITAL RADIO TRANSMISSION SYSTEM

Johannes Cornelis van Leeuwen, Hilversum, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed June 5, 1975, Ser. No. 584,187
Claims priority, application Netherlands, June 10, 1974, 7407717
Int. Cl.² H04J *3/12*
U.S. Cl. 179—41 A **10 Claims**



1. A digital transmission system comprising

a master station having a transmit-receive device for transmission of time-compressed digital signals by means of a plurality of simultaneously generated carrier frequencies, comprising

first generator means for generating a frame synchronization pattern;

second generator means for generating a plurality of different signalling code words each representive of a given function;

switching means for connecting the said generators to the transmitter; and

control means having an output for operating said switching means for periodically transmitting said frame synchronization pattern simultaneously on each of said generated carrier frequencies, and for periodically transmitting a plurality of signalling code words selected as required for each carrier frequency in fixed time intervals situated within the frame duration determined by successive frame synchronizing patterns; a plurality of slave stations each comprising a transmit-receive apparatus for transmission and reception of time-compressed digital signals under the control of said master station, and

channel selection means for tuning the receiver in a first operating condition successively for given short periods to each of the carrier frequencies of the system.

4,031,331

TELEPHONE SPEECH NETWORK

Mevblbe Gulay Sencer, Ottawa, Canada, assignor to Northern Electric Company Limited, Montreal, Canada

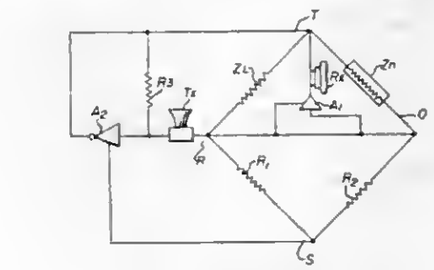
Filed Jan. 15, 1976, Ser. No. 649,557
Int. Cl.² H04M *1/58*
U.S. Cl. 179—81 A **4 Claims**

1. A telephone speech network, for connecting a transmitter and a receiver to a line powered telephone line, comprising:

a first amplifier, the output of which is connected in series with a line terminating resistance across the telephone line, the input to said amplifier being responsive to both the received signals on the telephone line and to the signals at the output of the transmitter;

a bridging resistance and a bridging impedance connected in series across said amplifier, for summing substantially equal magnitude receive signal currents and for subtracting substantially equal magnitude transmit signal currents, coupled from the output of the amplifier and from across the telephone line to the junction of said bridging resistance and impedance; and

a second amplifier means for connecting the resultant signals at said junction to said receiver.

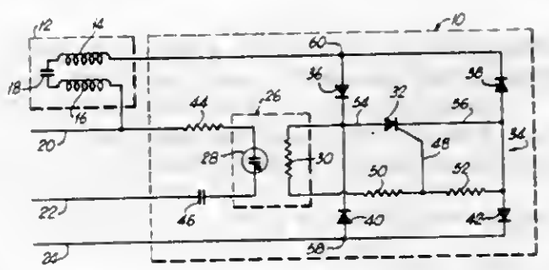


4,031,332

TELEPHONE RINGER INSOLATOR

Paul Sbylo, Arlington Heights, Ill., assignor to Cook Electric Company, Morton Grove, Ill.

Filed Feb. 2, 1976, Ser. No. 654,404
Int. Cl.² H04M *1/00*
U.S. Cl. 179—84 R **17 Claims**



1. An isolator for selectively coupling a means to be energized which is coupled to one of a pair of telephone lines to a reference potential in response to an activating signal on the telephone lines, said isolator comprising:

a controlled conduction means coupled between said means to be energized and said reference potential, and

an isolator means coupled to said telephone lines and to said controlled conduction means, said isolator means controlling said controlled conduction means to connect said means to be energized to said reference potential in response to said isolator means receiving said activating signal on said telephone lines.

4,031,333

CIRCUIT TO INDICATE THE SIMULTANEOUS OFF-HOOK CONDITION OF AT LEAST TWO OF A PLURALITY OF TELEPHONE SUBSETS ON THE SAME TELEPHONE LINE

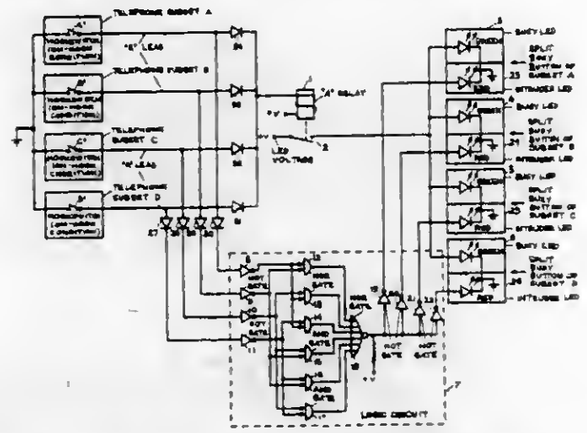
George Thomas Fouratt, Santa Maria, Calif., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed July 14, 1976, Ser. No. 705,218
Int. Cl.² H04M *1/00*
U.S. Cl. 179—81 R **16 Claims**

1. An indicator circuit for a telephone system to indicate when at least two of a plurality of telephone subsets on the same telephone line are simultaneously in off-hook condition comprising:

at least one indicator contained in one of said plurality of

subsets which when activated indicates that at least said one of said plurality of subsets and another of said plurality of subsets are in said off-hook condition simultaneously; and



a logic circuit coupled between all of said plurality of subsets and said indicator to produce an output signal to activate said indicator when at least said one of said plurality of subsets and said another of said plurality of subsets are detected to be in said offhook condition simultaneously.

4,031,334

APPARATUS FOR MAGNETIC RECORDING AND/OR REPRODUCING OF SIGNALS RECEIVED BY ONE OR MORE SIGNAL RECEIVING DEVICES

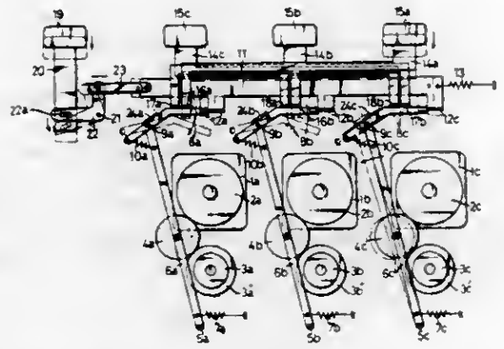
Hiroyuki Kimura, Atsugi, and Takahiko Saito, Kamakura, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Aug. 11, 1975, Ser. No. 603,537

Claims priority, application Japan, Aug. 14, 1974, 49-97102

Int. Cl.² G11B *31/00*

U.S. Cl. 179—100.11 **14 Claims**



1. An apparatus comprising a recording device, at least one original receiving device including tunable signal selecting means operable to tune said receiving device to any one of plural signal channels so as to select the signal received by said signal receiving device, control means selectively operable for applying the signal received by said signal receiving device to said recording device for recording by the latter, and means responsive to the operation of said control means for maintaining the tuning condition of said signal selecting means at the one signal channel to receive said signal and for preventing said signal selecting means from being tuned to a different signal channel so as to avoid changing of the signal selected for reception by said signal receiving device during recording of said signal.

4,031,335

STEREO PICK-UP WITH CASING SERVING AS COMMON POLE PIECE

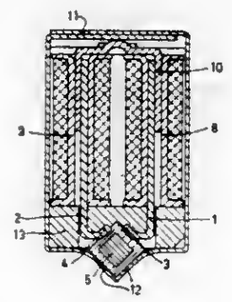
Elzo Smit, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 19, 1975, Ser. No. 559,736

Claims priority, application Netherlands, Apr. 1, 1974, 7404359

Int. Cl.² H04R *11/12*

U.S. Cl. 179—100.41 K **11 Claims**



1. A track groove transducer of the type having a stylus holder and two polepieces arranged for magnetic sensing of stylus holder oscillatory pivoting in each of two mutually perpendicular directions, and a third polepiece cooperating magnetically with said two polepieces, wherein said transducer comprises a magnetically shielding casing made of soft magnetic material, a portion of said casing forming said third polepiece.

4,031,336

ELECTROMAGNETIC PICKUP WITH MAGNETIC GAP DISPLACEMENT GENERATOR

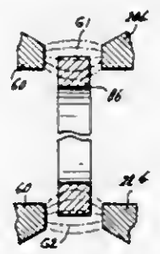
Joseph F. Grado, 4614 Seventh Ave., Brooklyn, N.Y. 11220

Filed Feb. 10, 1975, Ser. No. 548,698

The portion of the term of this patent subsequent to Apr. 29, 1992, has been disclaimed.

Int. Cl.² H04R *11/12*

U.S. Cl. 179—100.41 K **11 Claims**



1. A replaceable module for an electro-magnetic cartridge comprising a carrier, first and second magnetic members mounted in opposing relationship on said carrier and cooperatively positioned to define first and second operating gaps, a stylus lever operatively mounted on said carrier and extending generally parallel to the length dimension of said operating gaps, a generator operatively mounted on said stylus lever and extending at least partially into said operating gaps between said first and second magnetic members, said generator mounted for movement substantially perpendicular to said operating gaps in response to movement of said stylus lever.

4,031,337

LOUDSPEAKER

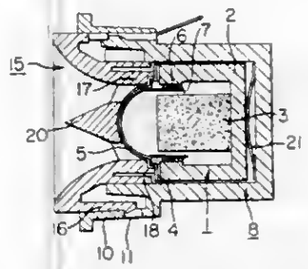
Yasushi Okamura; Kiichiro Tanaka, and Takashi Takeda, all of Fukuoka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Dec. 3, 1975, Ser. No. 637,282

Claims priority, application Japan, Dec. 16, 1974, 49-152999; Dec. 16, 1974, 49-153001

Int. Cl.² H04R *9/00;* **G10K** *13/00*

U.S. Cl. 179—115.5 H **5 Claims**



1. A loudspeaker comprising:
- a cup-shaped enclosure unit having a closed end and a cylindrical side wall, a portion of said side wall remote from said end having a plurality of circumferential slots therein;
- a magnetic structure disposed in said enclosure unit and secured thereto, said structure comprising magnetic material and have (i) an annular end surface and (ii) a cylindrical air gap coaxial with the side wall of said enclosure unit;
- a flexible diaphragm having a circular outer ring adjacent the annular end surface of said magnetic structure;
- a voice coil secured to said diaphragm and disposed within said air gap;
- a horn unit having an outer cylindrical portion, a cylindrical alignment portion, and an inner cylindrical diaphragm retaining portion;
- said outer portion of said horn unit having a corresponding plurality of flexible pawl parts in interlocking engagement with the slots of said enclosure unit;
- the alignment portion of said horn unit having an outer diameter slightly less than the inner diameter of the wall portion of said enclosure unit, said alignment portion being disposed adjacent said wall portion;
- the inner portion of said horn unit having an annular end part adjacent the circular outer ring of said diaphragm, so that said diaphragm is retained in position with the circular outer ring thereof disposed between the annular end surface of said magnetic structure and the annular end part of said inner portion of said horn unit.

4,031,338

ECHO SUPPRESSOR USING FREQUENCY-SELECTIVE CENTER CLIPPING

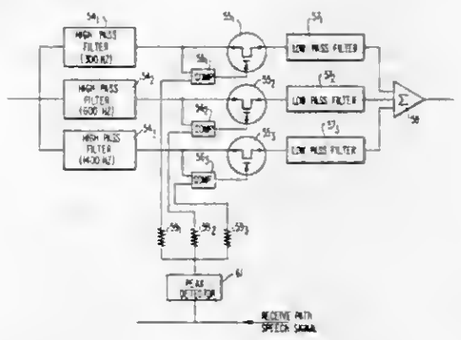
Samuel Joseph Campanella, Gaithersburg, Md.; Hans Dodel, Alexandria, Va., and Henri George Suyderhoud, Potomac, Md., assignors to Communications Satellite Corporation (COMSAT), Washington, D.C.

Filed Feb. 10, 1976, Ser. No. 656,903

Int. Cl.² H04B *3/20*

U.S. Cl. 179—170.8 **8 Claims**

1. An echo suppressor for use in long distance telephone speech communication systems having a send path and a receive path, comprising:
- a first plurality of filter networks connected in said send path for dividing a band width of the send path into a like plurality of contiguous frequency bands;
- a plurality of center-clipping networks connected to the outputs of said first plurality of filter networks on a one-to-one basis, said center-clipper networks being operative to reduce to zero a signal applied thereto whenever the signal's instantaneous absolute level is at or below a threshold level;
- summing means connected to receive the outputs of all of said center-clipper networks and providing a combined output signal; and
- threshold control means connected to receive a signal in said receive path to detect the overall peak signal level of said signal, said thresbold control means producing



plurality of threshold control signals in response to the detected overall peak signal level of a signal in said receive path which control signals are applied to respective ones of said center-clipper networks, the ratios of said threshold control signals produced by said control means being determined by the ratios of the predetermined average energy of the telephone speech in said plurality of frequency bands.

4,031,339

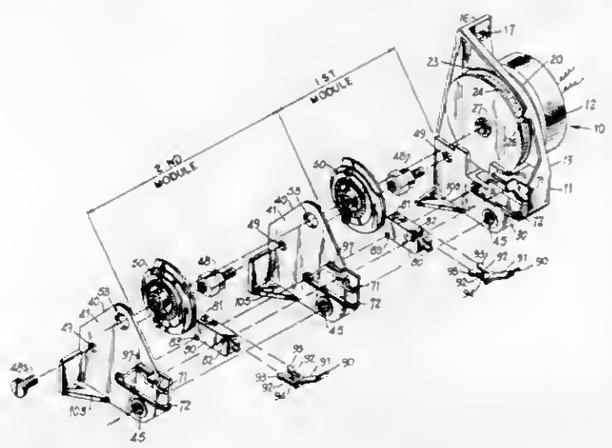
MODULAR TIME SEQUENCE CONTROLLER

Claude V. Koch, Two Rivers, Wis., assignor to AMF Incorporated, White Plains, N.Y.

Filed Dec. 15, 1975, Ser. No. 640,990

Int. Cl.² H01H *43/10, 9/02*

U.S. Cl. 200—38 BA **8 Claims**



1. In a modular time sequence controller the combination comprising
- a first rotatable switch actuator means including an axle having an axle interlock means on at least one end thereof,
- means for rotating said axle,
- a first switch having an actuator,
- means for mounting said switch proximate said first rotatable switch actuator in position to be actuated during rotation of the switch actuator means,
- a pair of support plates,
- bearing means in each support plate for rotatably supporting an axle,
- spacer and fastening means for maintaining said support

plates in spaced parallel relationship with said bearing means in axial alignment,

said first rotatable switch actuator means having its end with the interlock means thereon rotatably supported by the bearing means of the first one of said support plates,

a second rotatable switch actuator means including a second axle which has axle interlock means on each end thereof,

said second rotatable switch actuator means being positioned between the parallel support plates with one end of its axle locked with the axle of the first switch actuator means and its other end rotatably supported by the bearing means of the second support plate,

a second switch having a housing and an actuator extending therefrom,

guide means on at least one of the facing surfaces of the parallel support plates,

said guide means being adapted to slidingly receive said second switch housing and to position the second switch between said support plates with its actuator proximate the second rotatable switch actuator means, whereby the actuator means may actuate the second switch,

detent means on at least one of the facing surfaces of the parallel support plates,

detent engaging means on said second switch housing engageable with said detent means, and

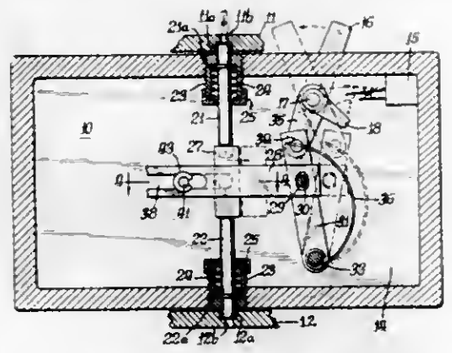
keeper means insertable transversely between said support plates and engageable with said second switch housing for urging said detent engaging means into a retaining engagement with the detent means while the keeper means is in place.

4,031,340

DEFEATER FOR MECHANICAL SAFETY INTERLOCK FOR COVERS OF EXPLOSION-PROOF ELECTRICAL HOUSING

Robert J. Pastorel, Chicago, Ill., assignor to Appleton Electric Company, Chicago, Ill.

Filed Nov. 7, 1975, Ser. No. 629,900
Int. Cl.² H01H 9/20, 33/46
U.S. Cl. 200—50 A **4 Claims**



1. In an explosion-proof electrical enclosure apparatus comprising a housing having a body with an access opening and threads therearound and a cap threaded onto said threads and covering said opening, an electrical switch within said housing and operable between a switch-open position and a switch-closed position, said switch having a member within said housing for moving the switch between said positions which member is operable from outside said housing, a locking device interengaging said cap and said body and movable between a first position at which said cap is locked at a desired location against rotation and a second position at which said cap is free to be rotated to unthread the cap for removal to expose said opening, and interlocking means operatively interconnecting the switch operating member and said cap locking device and including a locking part movable along a path between two positions respectively corresponding to said two positions of said member for retaining said locking device in said first position thereof so long as the member is in the switch-closed position while freeing the locking device for movement to the second position so long as the member is in the switch-open position, the improvement comprising:

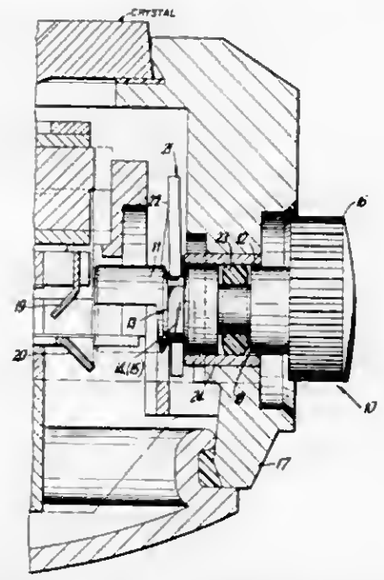
defeater means operatively engaging said interlocking means for moving said locking part along a second path between its position at the switch-closed position and a third position thereof at which it frees the locking device for movement to the second position, said defeater means includes an operating component unmanifestly located at the exterior of said body for moving said locking part along said second path.

4,031,341

DUAL FUNCTION PUSHER AND ROTATE SWITCH FOR SOLID STATE DIGITAL WATCHES HAVING DETENT SPRING

Paul Wuthrich, Watertown, and Frank P. Mascia, Bristol, both of Conn., assignors to Timex Corporation, Waterbury, Conn.

Filed Jan. 14, 1976, Ser. No. 649,115
Int. Cl.² G04C 9/00; G04B 27/00; H01H 13/52
U.S. Cl. 200—52 R **9 Claims**



1. A dual function rotate and pusher device and switch assembly for an electronic watch having a case with an opening for access to the interior thereof which comprises:

a shaft mountable in said opening for axial and rotational movement and having an eccentric tab at the interior end thereof, and a detent retainer section, and an actuating end portion;

a plurality of switch blade means mounted for selective engagement with the eccentric tab; and

biasing means engaging the detent retainer section and the shaft for providing longitudinal and detented rotational movement of the shaft to enable engagement with a selected switch blade by the eccentric tab with longitudinal and/or rotational movement of the shaft.

4,031,342

MATERIAL SENSING SWITCH

Reuben E. Peterson, 402 E. Washington Ave., Fergus Falls, Minn. 56537

Filed Feb. 11, 1976, Ser. No. 657,285
Int. Cl.² H01H 35/00
U.S. Cl. 200—61.21 **3 Claims**

1. A material sensing switch assembly comprising, a hollow body means having open opposite ends,

connection means for securing said body means to a support means,

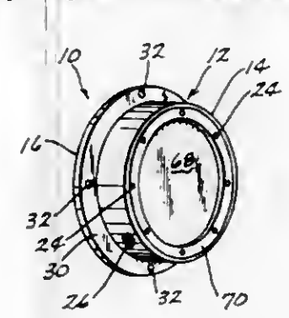
a substantially flat, circular backing plate means removably closing one of said opposite ends,

a substantially flat, circular switch support plate means removably mounted in said body means adjacent the other of said opposite ends, said switch support plate having inner end outer sides,

said switch support plate means having a centrally disposed opening formed therein,

a switch means mounted at the inner side of said switch support plate means,

switch actuator means comprising an elongated switch arm secured at one end to said inner side of said switch support plate means outwardly of the center thereof and extending towards said centrally disposed opening in a spaced relationship to said inner side, said switch arm having an end portion which extends through said centrally disposed opening and which has an actuator portion



positioned outwardly of said outer face of said switch support plate means,

a pressure plate means removably mounted adjacent the outer side of said switch support plate means for engagement with said actuator portion of said switch arm when said pressure plate means is moved towards said switch support plate means,

said switch arm being positioned outwardly of said switch means and being adapted to actuate said switch means when said pressure plate means moves said actuator portion of said switch arm inwardly with respect to said switch support plate means,

a flexible member operatively removably secured to said body means and covering said pressure plate means for sealing said other end of said body means,

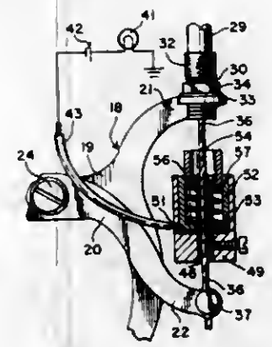
and means securing said flexible member to said body means.

4,031,343

BICYCLE BRAKE LIGHT SWITCH AND STOP LIGHT SYSTEM BEING ACTIVATED BY HAND BRAKE LEVER AND CABLE

Roy Sopko, 21 Huckleberry Lane, Holbrook, N.Y. 11741

Filed Sept. 2, 1975, Ser. No. 609,301
Int. Cl.² B60Q 1/44; B62J 5/00; H01H 3/16, 17/08
U.S. Cl. 200—61.12 **5 Claims**



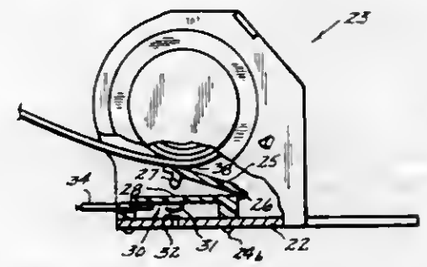
4. In combination with a bicycle having a hand operated caliper brake including a pair of relatively rockable caliper levers having first and second proximal ends remote from the lever braking ends and swingable between contracted braking and spread release positions and a sheathed control cable member having a sheath anchored to said first proximal end and a flexible cable extending through said sheath and anchored to said second proximal end, a stop light mechanism comprising an electric bulb, a source of current and normally open switching means connected in series with said bulb across said current source, and including a switch component mounted on said flexible cable between said first and second proximal ends and engageable by said first proximal end incident to the contraction of said caliper levers to transfer said switching means to a closed condition, siad first proximal end being provided with a contact member defining portion which is grounded to said bicycle frame and said swithc component comprises an insulator sleeve secured to said flexible cable, a cylinder secured to said sleeve and having an open end confronting said contact member and an opposite end wall and a peripheral wall with a radial bore proximate said cylinder end wall, a metal piston movable in and out of said cylinder, a metal sleeve coaxial with and slidably sandwiched between said piston and cylinder and having a centrally apertured inner end wall and a compressor spring entrapped between said inner end wall and said piston to bias said piston and metal sleeve outwardly and inwardly respectively, and a cable conductor passing through said radial bore and clamped between the confronting walls of said cylinder and metal sleeve, said cable conductor being connected in series with said current source and bulb to said bicycle frame.

4,031,344

INTEGRAL HINGE SENSING SWITCH

Regis Victor Pilarski, Utica, and Robert John Rumpf, Grosse Pointe, both of Mich., assignors to The Firestone Tire & Rubber Company, Akron, Ohio

Filed Mar. 15, 1976, Ser. No. 667,263
Int. Cl.² H01H 3.16
U.S. Cl. 200—61.58 B **6 Claims**



1. In an integral hinge sensing switch assembly for use in sensing a seat belt spool condition in a seat belt retractor assembly and the like comprising:

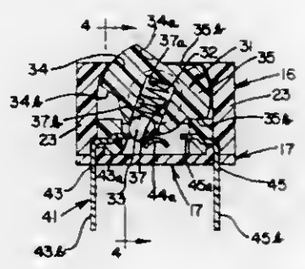
a switch housing having an integrally biased push arm follower plate integrally hinged thereto, said push arm follower plate positioned in biased pivotal follower contact with the outer surface of a seat belt rolled on the spool of a seat belt retractor assembly in register therewith, said push arm follower plate provided with an actuator pin adapted for movement into said housing when said push arm follower plate is pivotally moved in response to a selected spool condition, said switch housing provided with an actuator pin access opening in the upper surface thereof in register with said actuator pin; and

switch means provided in said housing in actuating register with said actuator pin opening, said switch means selectively actuated by selective movement of said actuator pin there against.

4,031,345
MINIATURE ELECTRICAL SWITCH

Ricardo L. Garcia, Justice, Ill., assignor to Grayhill, Inc., LaGrange, Ill.

Continuation-in-part of Ser. No. 533,882, Dec. 18, 1974, Pat. No. 3,958,090. This application Nov. 26, 1975, Ser. No. 635,652
Int. Cl.² H01H 13/28
U.S. Cl. 200—67 AA 21 Claims

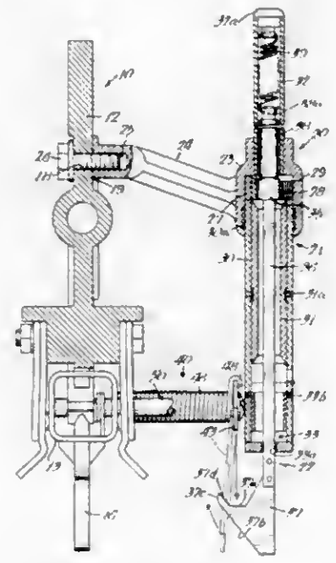


1. A miniature electrical switch for controlling the operation of circuit means comprising,
a housing of electrical insulating material,
said housing including a cover and a base plate,
said cover being generally rectangular in shape and having a top wall, opposed side and end walls and defining an opening opposite the top wall,
and switching means within the housing which includes a contact assembly, a switch actuator, a biasing means and an electrically conductive ball contactor, wherein said switch actuator, biasing means and ball contactor move together between first and second switch positions relative said contact assembly,
said base plate being sized to close the opening opposite the top wall and retain said switching means within the housing,
said cover having bearing means for pivotally mounting said actuator therein and an opening in one wall through which a part of the actuator protrudes for access to operate same,
said actuator having a recess for receiving said biasing means and said ball contactor, said recess having an end wall, whereby said biasing means seats at one end on the recess end wall and the ball contactor engages the other end thereof,
said contact assembly including a terminal support member of electrical insulating material and a set of firsts, second and third electrically conductive members, each conductive member having a contact portion and a conductor connection portion, said contact portions being spaced apart along a line transverse the pivot axis of the actuator and in alignment with the path of movement of the ball contactor for engagement therewith, and said conductor connection portions extending through holes in said base plate to the exterior of the housing,
and said biasing means urging said actuator into seated position in the bearing means and said contactor into engagement with said contact portions, said contact portions being arranged to cause positive positioning of the contactor with said first and second contact portions or said second and third contact portions thereby causing positive positioning of said actuator and electrical connection between said first and second contact portions or said second and third contact portions.

4,031,346
ELECTRICAL INTERRUPTER SWITCH

Ronald P. Bridges, 9 South 681 Brookeridge Road, Downers Grove, Ill. 60515

Filed Oct. 20, 1975, Ser. No. 623,792
Int. Cl.² H01H 33/12
U.S. Cl. 200—146 R 28 Claims



1. An electrical disconnect switch and circuit interrupter comprising, in combination:
a switch body including a fixed electrical contact structure;
a movable electrical contact structure pivoted on said switch body for movement in a path between a closed position engaging the fixed contact structure, and an open position spaced from said fixed contact structure;
an elongate, tubular circuit interrupter assembly housing which has a lining of arc-extinguishing material;
a fixed electrical interrupter contact in said housing;
a movable electrical interrupter contact in said housing which occupies a normal position abutting said fixed interrupter contact and has an integral electrically conductive actuating rod projecting out an end of the housing;
a bracket supporting said housing on the fixed contact structure and providing an electrically conductive path between the fixed interrupter contact and the fixed contact structure;
a fixed catch on the exterior of the housing which is electrically connected to the actuating rod;
an actuating catch on the outer end of the actuating rod adjacent said fixed catch;
and an electrically conductive interrupter operating arm on the movable contact structure, said operating arm being positioned to move in a path in which it sequentially engages the fixed catch and the actuating catch during movement of the movable contact structure from closed position, and serving to separate the movable interrupter contact from the fixed interrupter contact after the movable contact structure is sufficiently spaced from the fixed contact structure to avoid arcing between said structures.

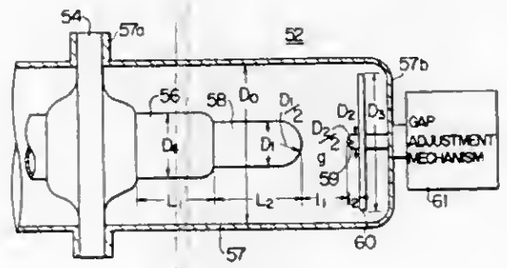
4,031,347
PROTECTIVE GAS CAP FOR ELECTRIC POWER APPARATUSES

Tosio Isikawa; Jun Ozawa, and Takehiro Kikuchi, all of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed Oct. 29, 1975, Ser. No. 626,992
Claims priority, application Japan, Nov. 11, 1974, 49-128999
Int. Cl.² H02H 33/22, 1/00
U.S. Cl. 200—148 B 9 Claims

1. A protective gas gap for electric power apparatus having

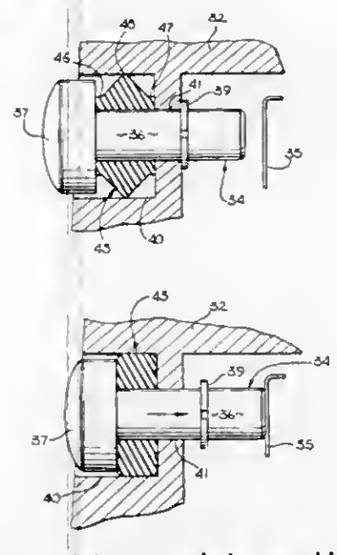
a cylindrical vessel electrically grounded and filled with an electronegative gas and a pair of electrodes oppositely disposed to each other with a predetermined gap therebetween in said cylindrical vessel substantially in alignment with the center-line of said vessel, one of said pair of electrodes being connected with a high tension charged conductor which is in turn connected to a transmission line while the other being electrically grounded; in which each of the confronting portions of said pair of electrodes is formed to have a substantially semispheric smooth surface; in which the maximum diameter of the end portion of said grounded electrode is smaller than that of the end portion of said high tension side electrode; and in which a plate-like back electrode having a diameter which is substantially equal to the inner diameter of said cylindrical vessel is closely disposed at the back of said grounded electrode.



4,031,348
PUSH-BUTTON ASSEMBLY SWITCH FOR WATCHES

Noel H. Eberhardt, Cupertino, Calif., assignor to Microma Incorporated, Cupertino, Calif.

Continuation-in-part of Ser. No. 633,853, Nov. 20, 1975, abandoned. This application Oct. 7, 1976, Ser. No. 730,527
Int. Cl.² H01H 3/12
U.S. Cl. 200—159 R 4 Claims

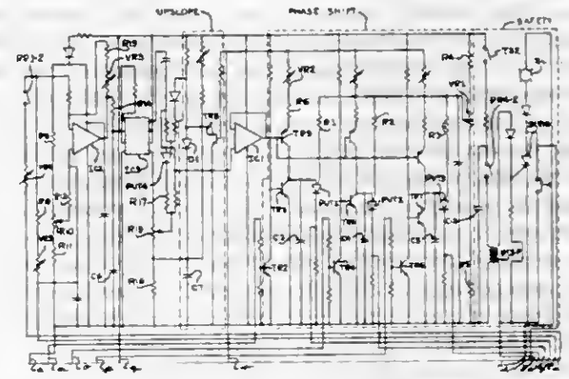


1. A low voltage push-button switch assembly for a watch for engaging a bore disposed through a watch case, said bore including a counter bore on the exterior surface of said watch case, comprising:
an electrical contact member disposed within said watch case;
a push-button member including a button and a shaft, said shaft slidingly engaging said bore for axial movement within said bore such that said shaft may be urged in contact with said electrical contact member;
a compressible, resilient, generally cylindrical integral sealing member engaging said shaft and disposed within said counter bore, the ends of said sealing member defining sleeves for engaging said shaft, the center portion of said sealing member having sloping surfaces that converge at the wall of said counter bore, said sealing member being symmetrical about a plane transverse to its axis; and
retaining means for retaining said push-button member within said bore;
whereby when said button is depressed said shaft contacts said watch case within said bore and contacts said contact member thereby completing an electrical path between said contact member and watch case and whereby said sealing member acts as a spring means and sealing means for said push-button assembly.

4,031,349
STUD WELDING CONTROL

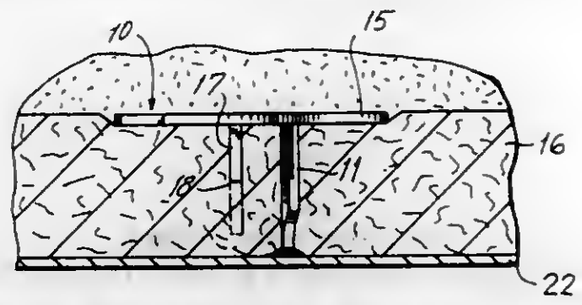
Paul A. Glorioso, Amherst, Ohio, assignor to TRW Inc., Cleveland, Ohio

Filed Sept. 19, 1975, Ser. No. 614,841
Int. Cl.² B23K 9/20
U.S. Cl. 219—98 8 Claims



1. Apparatus for welding a stud to a workpiece comprising a multi-phase power supply, electrical means for withdrawing the stud from the workpiece when said means is energized, spring means for plunging the stud toward the workpiece when said electrical means is deenergized, means connected with said power supply, the stud, and the workpiece for supplying rectified power from said supply to the stud and the workpiece to establish a pilot arc therebetween, additional means connected with said power supply, the stud, and the workpiece for supplying rectified power to the stud and the workpiece for establishing a main welding arc therebetween, said additional means including a semi-conductor controlled rectifier for each phase of the power supply, phase control means for sequentially causing said semi-conductor controlled rectifiers to conduct at predetermined times relative to the cycles of the multi-phase power supply, said phase control means including independent means for firing each of said semi-conductor controlled rectifiers, and means for energizing said firing means including a shunt in a welding circuit for the welding current, means for receiving a signal from said shunt, and hand-manipulatable means for modulating said signal and for changing the times in the cycles of the power supply at which said firing means are energized, a timing circuit connected to said electrical means to deenergize said electrical means and to enable said spring means to plunge the stud toward the workpiece, hand-manipulatable means for controlling the actuation of said timing circuit to control the time in the welding cycle at which the electrical means is deenergized and the stud is plunged toward the workpiece, said firing means comprising capacitor means effective to cause said semi-conductor controlled rectifiers to conduct when a charge on said capacitor means reaches a given value, circuit means for controlling the charging rate of said capacitor means, and up-slope circuit means for supplying power to said circuit means.

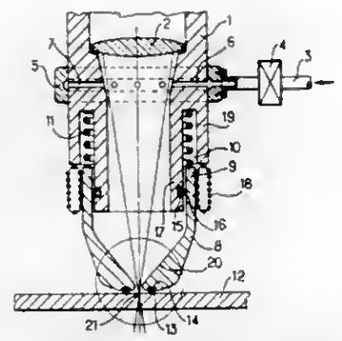
4,031,350
METHOD OF RESISTANCE WELDING
Milton Hindes, Massapequa, and Charles Giannone, North Babylon, both of N.Y., assignors to Duro-Dyne Corporation, Farmingdale, N.Y.
Filed Sept. 5, 1975, Ser. No. 610,640
Int. Cl.² B23K 11/04
U.S. Cl. 219—99 1 Claim



1. The method of attaching insulation to a sheet metal duct or the like utilizing a resistance welding pin, said welding pin being comprised of an integrally formed sheet metal blank including a head and a shank, said shank being bent at right angles to said head and including a sharpened tip disposed to one side of the plane of said head, a depending tongue portion formed from said blank, said tongue portion being disposed in parallel spaced relation to said shank and terminating in an end portion located to the same side of said plane as said shank, the spacing of said tip from said plane being greater than the spacing of said end of said tongue portion from said plane by a predetermined distance, comprising the steps of passing said shank of said pin through said insulation until said tip engages against said duct, connecting said head to one electrode of a welding transformer and said duct to the other electrode thereof, causing a welding current to flow through said shank while urging said shank toward said duct progressively to melt said tip and portions of said shank adjacent said tip to effect a welded connection between said shank and said duct, and interrupting the flow of said welding current through said shank at a point not later than when said tongue portion engages said duct, said tongue portion providing a limit stop and an alternate current path for said welding current, whereby only a limited length of said shank portion may be melted.

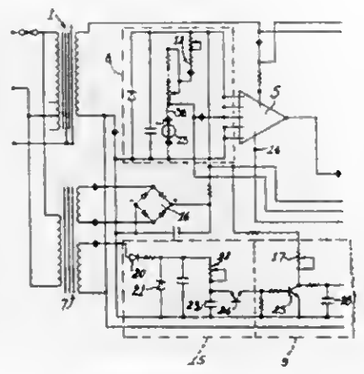
4,031,351
HIGH ENERGY LASER BEAM CUTTING METHOD AND APPARATUS
Jean Martin, Chatillon, France, assignor to Groupement Atomique Alsacienne Atlantique, Le Plessis-Robinson, France
Continuation of Ser. No. 408,910, Oct. 23, 1973, abandoned. This application July 28, 1975, Ser. No. 599,437
Claims priority, application France, Oct. 25, 1972, 72.37880
Int. Cl.² B23K 26/00
U.S. Cl. 219—121 L 4 Claims

1. In a device for cutting a work piece comprising:
a cylindrical sleeve,
a laser beam source, including a frontal lens mounted within said sleeve for directing a laser beam axially through said sleeve,
a plurality of peripheral gas inlet openings within said sleeve downstream of said lens,
a source of gas under pressure coupled to said openings, the improvement comprising:
valve means for adjusting the pressure of the gas entering said cylindrical sleeve interior through said gas inlet openings,
said cylindrical sleeve terminating on the end facing said work piece and opposite said laser beam source in an axially slidable nozzle sealably carried by said cylindrical sleeve and means for spring biasing said sleeve towards extended position,
a seal ring mounted on the end of said nozzle and contacting said work piece under said spring bias, said nozzle terminating adjacent said work piece interiorly of said



seal ring in a convergent upstream portion and a divergent downstream portion for gas discharge at the outlet of the nozzle at supersonic speed confined hy the seal ring contacting the work piece;
thereby, increasing the cutting speed of the laser beam cutting device.

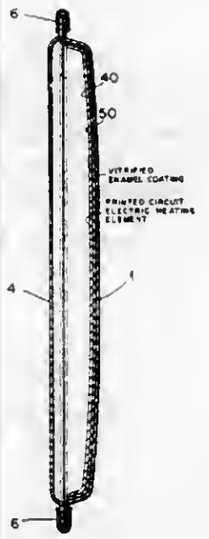
4,031,352
ELECTRIC BLANKET
Cedric Siegfried Oosterberg, Cape Town, South Africa, assignor to C. S. Oosterberg (Proprietary) Limited, Cape Town, South Africa
Filed Oct. 16, 1975, Ser. No. 623,105
Claims priority, application South Africa, Oct. 18, 1974, 74/6635
Int. Cl.² H05B 1/00
U.S. Cl. 219—212 14 Claims



1. An electric blanket assembly including a blanket having elements adapted to be heated from an electric supply source and a control circuit assembly adapted to control current through the elements to regulate the heating of the blanket and further adapted to disconnect the supply source from the heating elements under conditions of malfunction of the blanket, characterised in that the control circuit assembly includes temperature sensitive elements suitably located in the blanket and arranged to generate a control voltage, timing means adapted to generate a reference voltage and regulating means

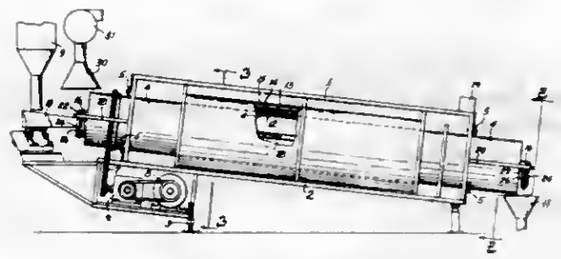
to compare the control voltage and the reference voltage and to trigger a solid state switching device which is adapted to control the current through the blanket heating elements.

4,031,353
ELECTRIC RADIANT HEATER
Eduardo Rueda Segura, Madrid, Spain, assignor to Empresa De Representaciones Unidas, S.A. (Erusa), Madrid, Spain
Filed Apr. 9, 1975, Ser. No. 566,326
Claims priority, application Germany, Apr. 11, 1974, 2417960; Apr. 11, 1974, 2417961; Apr. 11, 1974, 7412971[U]; Apr. 11, 1974, 7412972[U]
Int. Cl.² H05B 3/22; F24D 13/02; F24H 9/04; H01C 1/012
U.S. Cl. 219—345 7 Claims



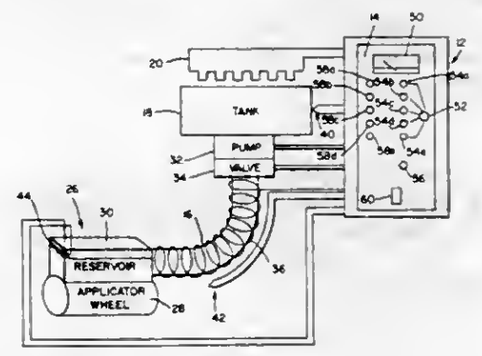
1. An electric heater comprising:
metal heating plate having at least one curved bulged portion, each of said curved bulged portions being surrounded by a flat transversely extending peripheral flange, each of said curved bulged portions having a completely concave curved inner surface and a completely convex curved outer heat radiating surface, at least said concave curved inner surface having thereon a coating of dielectric vitrified enamel covering the whole of said concave curved inner surface and a printed circuit electrical resistance heating element deposited on said enamel coating;
a thermal reflector plate having a bulged portion surrounded by a transversely extending flange;
said heating plate and said thermal reflector plate being joined with the concavities of said heating plate and said thermal reflector plate facing each other, the thus joined heating plate and thermal reflector plate forming a heating assembly;
means for energizing said heating element for heating said heating plate to radiate heat from said convex outer surface;
means for supporting said heating assembly with said convex outer surface being exposed to a zone to be heated;
said heating plate undergoing deformation of a thermal origin upon operation of said resistance heating element; and
a peripheral transition area, adjacent the intersection of each of said bulged portions and its surrounding flange of said heating plate, said transition area being so shaped as to comprise means for imparting a stress, upon deformation of said heating plate, always compressing said enamel coating covering said concave inner surface.

4,031,354
ROTARY HEATING APPARATUS FOR PUFFING BORAX
Godfrey B. D'Souza, Etobicoke, Canada, assignor to Canada Packers Limited, Toronto, Canada
Division of Ser. No. 470,295, May 15, 1974, Pat. No. 3,944,651. This application Oct. 9, 1975, Ser. No. 621,114
Int. Cl.² F27B 7/00
U.S. Cl. 219—389 8 Claims



1. A borax puffing apparatus of the rotary drum type which comprises a rotary, inclined tube and a supporting frame; means for mounting said tube on said frame for rotary motion of the tube around its axis; drive means for rotating said tube around its axis; electrical heating means extending along the exterior of said tube for a major portion of its length for heating the tube to an interior temperature of from about 220° F to 450° F; a thermal insulating jacket fixed to said frame and surrounding said heating means and tube; said heating means being fixed to the interior of said jacket and being spaced from the exterior wall of said tube; an internal scraper having means bearing against an internal surface of said tube; air suction means positioned at the upper end of said tube to draw air through the tube counter current to the direction of feedstock material; feed means at the upper end of the tube and discharge means at the lower end of the tube.

4,031,355
MULTI-CHANNEL TEMPERATURE RESPONSIVE PROCESS CONTROL SYSTEM
Stephen A. Leonik, Jr., 160 Sunrise Drive, Woodside, Calif. 94062
Filed Mar. 31, 1975, Ser. No. 563,911
Int. Cl.² H05B 1/02
U.S. Cl. 219—502 24 Claims



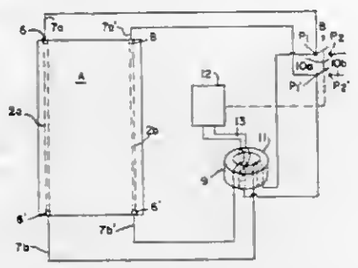
1. A control system comprising:
a sensor producing electrical signals representing a controllable physical condition;
a circuit including a first integrated circuit feedback amplifier having an input connected to said sensor for amplifying said sensor signals and a second like integrated circuit feedback amplifier having an input potentiometer connected across a power supply for adjusting the input thereto for producing set condition signals;
a meter selectively connected to receive and display said amplified sensor signals and said set condition signals in terms of the condition to be controlled;

a comparator comprising a third integrated circuit feedback amplifier connected to receive said amplified sensor signals and said set condition signals and producing a difference signal therefrom;
a switch connecting a power supply and an operator for affecting the condition to be controlled; and
an optical coupler applying said difference signal to control means of said switch for operating the switch to control said condition.

4,031,356
HEAT PANEL SAFETY SYSTEM

Akitosbi Nilbe, No. 4 Nishikubo, Sakuragawa, Shiba Minato,, Tokyo, Japan

Filed Nov. 20, 1975, Ser. No. 633,653
Int. Cl.² H05B 1/02
U.S. Cl. 219—509 **4 Claims**

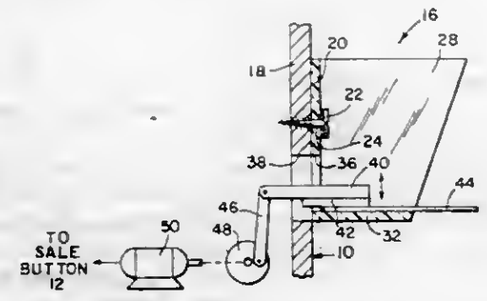


1. Safety heating panels apparatus comprising a sheet dielectric first and second electrodes connected to the sheet in spaced relationship between the electrodes, each electrode having spaced terminals connected to the electrode, electrical conductive heating layer on said dielectric sheet and connected between the electrodes, a first wire having ends connected to terminals on the first electrode and at least one turn in the first wire between its ends, a second wire having ends connected to terminals of the second electrode, and having a turn in the second wire, core means adjacent the turns, a relay having power terminals, and a relay wire connected to the power terminals and having a turn adjacent the core means, circuit breakers connected to the relay, whereby the relay operates the circuit breakers upon energization of the relay wire, the circuit breaker having first and second pairs of contacts and separate means to complete circuits between contacts in the first and second pairs, a contact in the first pair being connected to the first wire and a second contact in the first pair being connected to a power source, a contact in the second pair being connected to the second wire, and a second contact in the second contact in the second pair being connected to a power source.

4,031,357
SAFETY CHECK BILL RECEPTACLE

Wayne R. Brand, 21 Buena Vista, Corte Madera, Calif. 94925

Filed Feb. 20, 1976, Ser. No. 659,719
Int. Cl.² G07G 1/00
U.S. Cl. 235—12 **3 Claims**

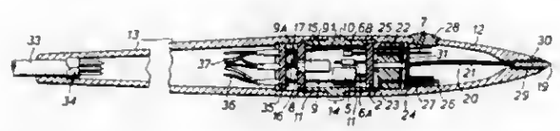


1. A receptacle for cash register comprising a rear wall adapted to be mounted on the exterior of the front plate of said register, and a bottom shelf secured to said rear wall, said rear wall including a slot along said bottom shelf, said slot being adapted to receive a paper money bill, said front plate of said register including a matching slot, said rear wall slot being aligned with said matching slot, said register including means for holding a paper money bill on said bottom shelf and for drawing said bill into said register, said means for holding and drawing said bill including an arm extending through said slots and adapted to contact a bill on said shelf, a motor and linkage connected to said arm to draw said arm and bill into said register, and a button on said register for actuating said motor upon completion of a sales transaction, said receptacle including two side walls at opposite ends of said rear wall and bottom shelf, a central partition and a front wall between said partition and one side wall, said slot being positioned between said partition and the other side wall, the portion of said receptacle with said front wall providing a tray for holding articles.

4,031,358
OPTICAL CODE READERS

Brian Robert Thornlley, Wimborne Minster, England, assignor to Plessey Handel und Investments A.G., Zug, Switzerland

Filed July 1, 1975, Ser. No. 592,264
Claims priority, application United Kingdom, July 3, 1974, 29423/74
Int. Cl.² G01N 21/30; G06K 7/10
U.S. Cl. 235—61.11 E **3 Claims**



1. A probe for scanning optically encoded data comprising a generally tubular housing including a light source, a reading head fitting slidably within the tubular housing, a plurality of optical fibres forming a light guide means wherein the optical fibres are positioned and arranged to bias by reason of their natural springiness the said reading head so that its tip is constrained normally to project from the said housing, and an optical detector arranged within the tubular housing, said light source and said optical detector being optically coupled via said optical fibres to said tip of said reading head so that light is transmitted from said light source via said fibres to illuminate data scanned and so that light reflected from data thus illuminated is returned from said tip of said reading head along another of said fibres to be received at said optical detector.

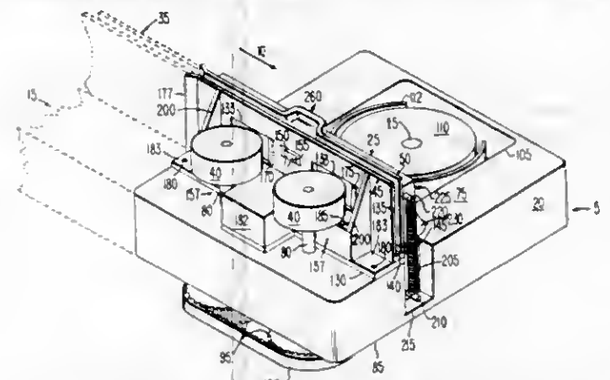
4,031,359
STRAIGHT LINE READ SYSTEM

Kyriakos Christou, Livonia; Karlis Kruklitis, Plymouth, and William R. Burger, Livonia, all of Mich., assignors to Burroughs Corporation, Detroit, Mich.

Filed Dec. 18, 1975, Ser. No. 642,061
Int. Cl.² G06K 13/07; G11B 25/04
U.S. Cl. 235—61.11 D **42 Claims**

1. A document read system disposed on a base member and having a write and read MICR head for writing and reading characters on a document comprising:
a. means defining a linear path through which the documents may be throughputted, and for operatively mounting therein the write and read MICR heads to face the documents in said linear path defining means;
b. first wall means fixably disposed on the base member for establishing one side of the document flow in said linear path defining means;
c. second wall means pivotally disposed on the base member for establishing the other side of the document flow in said linear path defining means and for providing spring-

loaded release and return for easy tactile access to documents in said linear path defining means;
d. means disposed on the base member for driving the documents to be throughputted in said linear path defining means at a relatively constant speed;
e. means disposed on said linear path defining means for maintaining good registration on the documents relative

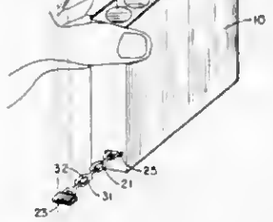


to said linear path defining means for minimizing relatively vertical spatial translations of documents of varying widths; and
f. means disposed on the base member for enabling the document in said linear path defining means as it is throughputted by said driving means to be in close proximity to the write and read MICR heads for positive communative contact therewith.

4,031,360
ELECTRONIC READ OUT TAPE MEASURE

Gustave H. Soule, Jr., Franklin, La., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Nov. 17, 1975, Ser. No. 632,529
Int. Cl.² G06M 3/14; G01B 3/12
U.S. Cl. 235—92 DN **1 Claim**

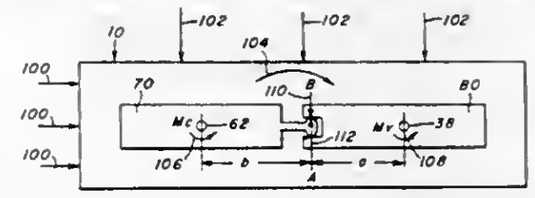


1. A tape measure device incorporating a flexible tape mounted on a spring-biased rotatable reel in a housing, said housing enclosing an electric calculator connected to an electronic digital display unit, with said calculator connected to means to sense the length of tape extended out of said housing in terms of a total of discrete units, and with said calculator incorporating means to cause the electronic digital display unit to display the said total of discrete units,
said tape fabricated of joined individual links, with each link perforated by a through hole of a size to fit over a tooth of a sprocket wheel rotatably mounted in said housing, with the links of said tape engaged about the sprocket wheel so as to cause the sprocket wheel to rotate in direct proportion to the travel of said tape into or out of said housing,
said sprocket wheel rotatably linked to switching means which transmit pulses of electrical current to said calculator in response to the rotation of said sprocket wheels, the number of said pulses being directly proportional to the degree of rotation of the sprocket wheel and the polarity of said pulses being responsive to the direction of rotation of said sprocket wheel,
such that the calculator controls the elctronic digital display unit to display a numeral representing a length of tape extended out of the housing, said numeral being the sum of pulses of a first polarity minus the sum of pulses of the reverse polarity.

4,031,361
ELECTROMECHANICAL COUNTER

Eberhard Moll, Magstadt, Germany, and Lee M. Walch, Jr., Pittsburgh, Pa., assignors to Rockwell International Corporation, Pittsburgh, Pa.

Filed Jan. 14, 1976, Ser. No. 648,855
Int. Cl.² G06M 1/06, 3/12
U.S. Cl. 235—92 C **5 Claims**

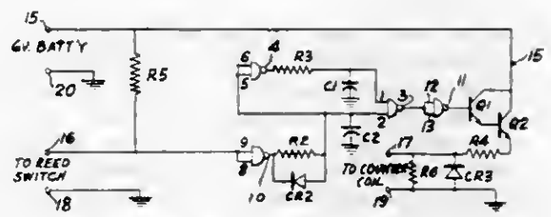


1. An electrically operated counting mechanism comprising a counter, a clapper mounted for pivotal movement about a first axis, means to induce pivotal movement of said clapper about said first axis in response to an electric signal, a verge mounted for pivotal movement about a second axis parallel to and spaced from said first axis, means drive connecting said verge to said counter to operate said counter in response to pivotal movement of said verge about said second axis, means interconnecting said clapper and said verge at a point intermediate said first and second axes whereby pivotal movement of said clapper in one direction will cause pivotal movement of said verge in the opposite direction, the centers of gravity of said clapper and said verge being in substantially the same plane as the plane containing said first and second axes.

4,031,362
ELECTRONIC REMOTE READING SYSTEM FOR A METER

Richard D. Brugger, and Joseph A. Barna, both of Erie, Pa., assignors to Zurn Industries, Inc., Erie, Pa.

Filed Sept. 17, 1975, Ser. No. 614,192
Int. Cl.² G06M 3/12
U.S. Cl. 235—92 FL **14 Claims**



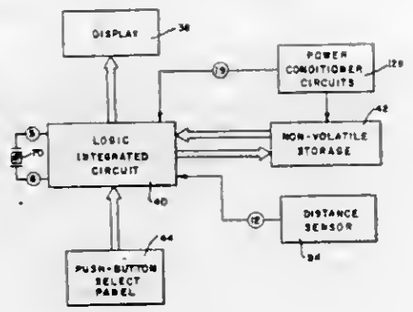
1. A remote reading system for measuring the flow of a product comprising,
an instrument having shaft means moveable in proportion to the flow of said product, contact means,
actuating means on said shaft means adapted to close and open said contact means in response to movement of said shaft,
an electrical circuit connected to said contact means and connected to a counter means for counting the number of times said contact is closed,

said electrical circuit having a power source connected thereto,
said circuit having means comprising an electronic valve connecting said power source to said counter means,
a control element on said electronic valve,
and electronic pulse forming means connected to said control element causing said contact means and to said control element causing said electronic vaive to respond to said closing of said contact and put out a pulse of relatively short duration to said counter when said contact goes from open to closed position and put out no pulse when said contact moves from closed to open position, whereby energy flows from said power source through said electronic valve into said counter during the time of said pulse only.

4,031,363
DISPLAY APPARATUS FOR AUTOMOTIVE VEHICLES

John D. Freeman, Westport, Conn.; Ralph C. Robinson, and Kenneth D. Swonger, both of Charlotte, N.C., assignors to General Time Corporation, Thomaston, Conn.

Filed May 17, 1976, Ser. No. 686,826
Int. Cl.² G06F *15/20*
U.S. Cl. 235—150.2 23 Claims

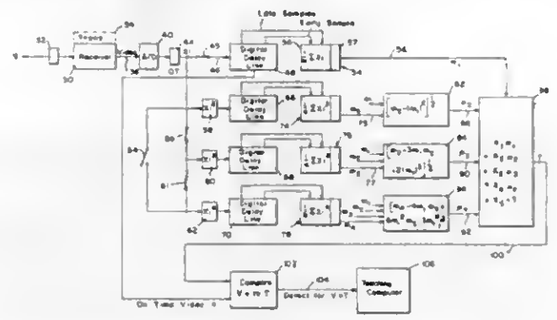


1. A system for automotive vehicles adapted both for providing automatically at least a display representing a time function in minutes and hours and upon manual activation a different display to advise the operator of said automotive vehicle of the state of a selected one of a plurality of other functions which periodically are changing, said system comprising:
a. circuit means including
1. a source of a first input frequency,
2. first divider means connected to said source providing an output which is of a frequency comprising a division of said first input frequency,
3. second divider means having an output of a frequency comprising a further division of said first input frequency,
4. means connecting said first and second divider means whereby said output of said first divider means comprises the input of said second divider means, and
5. a time register also connected to said output of said first divider means, said time register being continuously updated during operation of said system;
b. storage means comprising at least a first storage network, said first storage network connected to said second divider means thereby both to receive said output of said second divider means and store information so that said first storage network continually represents the then present condition of one of said plurality of other functions;
c. a display adapted normally to display said time function and upon command to discontinue said normal display and to display said selected one of said plurality of other functions;
d. means connecting each of said storage means and time register to said display, said connecting means including
1. control means included between said display and storage means for gating said selected one of said plurality of other functions to said display and isolating all other functions from said display;
e. means for activating said control means; and
f. power means for energizing each of said circuit means, storage means and display.

4,031,364
MULTIPLE MOMENT VIDEO DETECTOR

Richard D. Wilmot, Buena Park, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Nov. 10, 1975, Ser. No. 630,592
Int. Cl.² G06F *7/38*; G01S *9/02*
U.S. Cl. 235—151.3 18 Claims



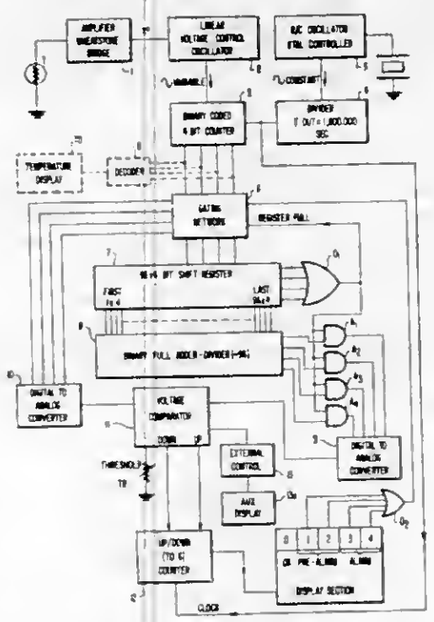
1. A detector system responsive to a source of signals of a statistically varying frequency of occurrence distribution comprising:
first means responsive to said source of signals for generating in parallel a plurality of r moments of said varying distribution; and
second means coupled to said first means for multiplying each moment by a selected constant and combining said moments to develop a threshold signal.

4,031,365
TEMPERATURE MONITORING AND DISPLAY SYSTEM

Guglielmo Raggiotti, and Domenico Colonnelli, both of Perugia, Italy, assignors to Itus Patent Holding (IPH) N.V., Willemstad, Netherlands Antilles

Filed Oct. 14, 1975, Ser. No. 621,915
Claims priority, application Italy, Aug. 21, 1975, 51020/75
Int. Cl.² G01V *1/28*; G01K *7/00*
U.S. Cl. 235—151.3 12 Claims

1. A monitoring system for monitoring the temperature levels of the body of a patient for extended periods, said system comprising:
transducer means for sensing the temperature of the body of the patient under observation and for producing an output voltage in accordance therewith,
a voltage controlled oscillator for producing an output whose frequency varies in accordance with the output voltage of said transducer means,
an n-bit binary coded counter connected to said voltage controlled oscillator for producing an n-bit binary coded output representative of the temperature sensed,
gating means,
a shift register controlled by said gating means for storing the n-bit binary coded output of said counter over N cycles, said N cycles being repeated and said counter producing an N + 1 output following the Nth output thereof,
an adder-divider circuit connected to the outputs of said register for summing N outputs stored thereby and for dividing the resultant sum by N to produce a digital signal representative of the arithmetic average of said N outputs,
comparator means for comparing the output of said adder-divider circuit with the N + 1 output of said counter and for producing a first "normal" output when the difference between said outputs is less than a positive threshold level

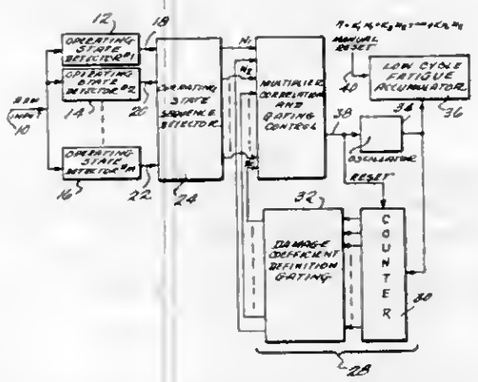


and for producing a second "abnormal" output when said difference exceeds said threshold level, and
display means connected to the output of said comparator means.

4,031,366
LOW CYCLE FATIGUE DAMAGE COUNTER

Robert L. Hartung, Fort Worth, Tex., assignor to Howell Instruments, Inc., Fort Worth, Tex.

Filed Oct. 30, 1975, Ser. No. 627,458
Int. Cl.² G01V *1/28*; G01M *7/00*
U.S. Cl. 235—151.3 16 Claims

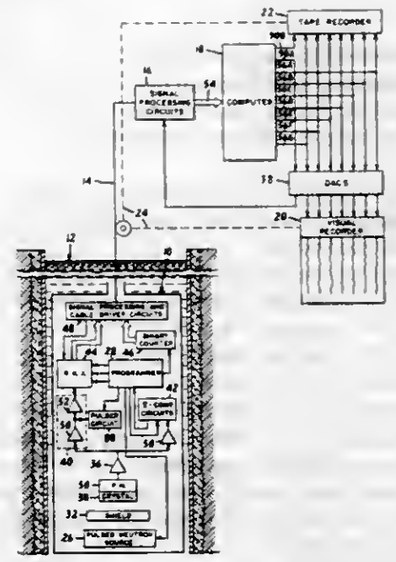


1. Apparatus for detecting and indicating cumulative low cycle fatigue damage done to a rotating member due to the sequential passage of said member through different operating states, said apparatus comprising:
input means for providing an electrical input signal representative of the existing operating state of said rotating member.
classification means connected to receive said input signal for detecting which of a plurality of predetermined operating states is then in occurrence and for producing a respectively corresponding output in response to detection of each different operating state,
sequence detection means for receiving the output from said classification means and for detecting which of a plurality of predetermined sequences of operating states have occurred and for producing a respectively corresponding output in response to detection of each different predetermined sequence of operating states,
damage coefficient determining and correlation means operatively connected to receive the output from said sequence detection means for defining a predetermined constant number of each said predetermined plurality of sequences and for respectively associating each of said constant numbers and said sequences, and
acccumulator means connected to the output of the damage coefficient determining and correlation means for receiving therefrom electrical signals representing the constant number corresponding to the detected predetermined sequence of operating states and to cumulatively add and totalize such constant numbers thereby providing an indication of cumulative low cycle fatigue damage done to the rotating member.

4,031,367
METHODS AND APPARATUS FOR PULSE HEIGHT ANALYZER OFFSET CONTROL

Richard D. Murphy, Ridgefield, Conn., assignor to Schlumberger Technology Corporation, New York, N.Y.

Filed Mar. 31, 1975, Ser. No. 563,510
Int. Cl.² G01V *5/00*
U.S. Cl. 235—151.3 23 Claims



1. Apparatus for generating test pulses useful in controlling offsets in the analog input/digital output relationship of a pulse height analyzer over a certain temperature range, comprising:
switching circuit means responsive to a command signal for generating a first pulse;
means coupled to the switching circuit means for attenuating the first pulse by a predetermined factor which is substantially constant over said temperature range to produce a second pulse;
means coupled to the switching circuit means and to the pulse attenuating means for passing the first and second pulses in a predetermined sequence; and
impedance buffer means, having substantially stable temperature offset characteristics over said certain temperature range, for converting the first and second pulses passed by the pulse passing means into first and second test pulses of a predetermined shape for application to a pulse height analyzer, whereby the amplitude ratio of the first and second test pulses produced by the buffer means is substantially stable over said temperature range.

4,031,368

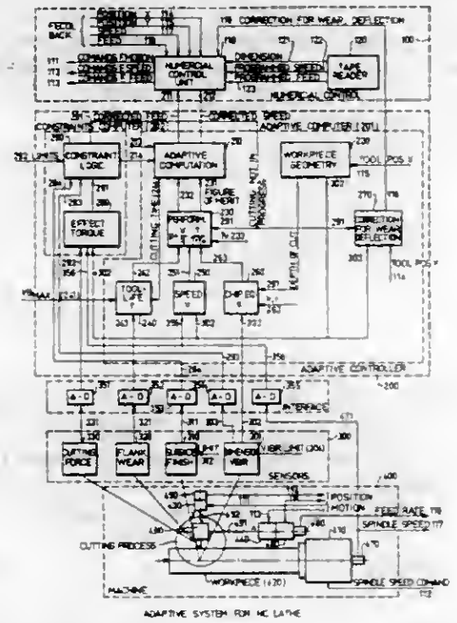
ADAPTIVE CONTROL OF CUTTING MACHINING OPERATIONS

Bertil Coldiog, Stockholm; Arne Novak, Vallingby; Unto Sandstrom, and Goran Jakobsson, both of Stockholm, all of Sweden, assignors to Verkstadsteknik AB, Stockholm, Sweden

Continuation-in-part of Ser. No. 244,607, April 17, 1972, abandoned. This application Feb. 11, 1974, Ser. No. 441,709

Int. Cl.² B23Q *15/00*; **G05B** *13/02*; **G06F** *15/46*

U.S. Cl. 235—151.11 **28 Claims**



1. A method of adaptive control of cutting machine operations to optimize the productivity of cutting machine means including at least one cutting tool and having controllable cutting parameters affecting its cutting tool comprising the steps of:

a. selecting a first set of cutting parameters,

b. performing a machining operation using said first set of cutting parameters,

c. during said machining operation measuring a plurality of times the magnitude of at least one wear-related parameter of the cutting tool,

d. comparing the successive measurements of said at least one wear parameter,

e. calculating the tool life by projecting, based on said comparison step, when said wear parameter will reach a predetermined limiting value,

f. calculating productivity based on said first set of cutting prameters and the tool life calculated in said tool life calculating step,

g. optimizing productivity by selecting further sets of said cutting parameters, and calculating for each set the corresponding tool life, and the productivity resulting from said further sets of cutting parameters and said corresponding tool life,

h. selecting from the optimized productivity value the desired set of cutting parameters.

4,031,369

INTERPOLATION AND CONTROL APPARATUS AND METHOD FOR A NUMERICAL CONTROL SYSTEM

James Patrick Heaman, Westland, Mich., and James Anthony Michaud, Bellbrook, Ohio, assignors to The Bendix Corporation, Southfield, Mich.

Filed Aug. 12, 1975, Ser. No. 603,986

Int. Cl.² G05B *19/30*; **G06F** *15/46*

U.S. Cl. 235—151.11 **7 Claims**

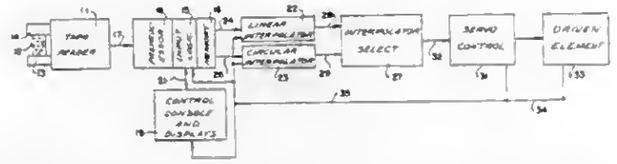
1. A numerical control system for controllably moving an element along a motion path of arbitrary configuration; said system including means for receiving data numerically defining said motion path from a storage medium, system logic for preprocessing and interpolating said data, and means for receiving said data from said system logic and moving said element along said path, said system logic including:

preprocessor means for receiving said data and providing linear interpolating data and circular interpolating data;

said linear interpolating data defining the movement of said element as a straight line segment lying between a start point and an end point at an arbitrary angle with respect to at least two mutually perpendicular axes;

said preprocessor means including means for generating a plurality of sample intervals for each of said segments, the number and length of said sample intervals varying for different segments so that each segment includes an integral number of said sample intervals and said end point for each segment is accurately forced;

said circular interpolating data defining the movement of said element as the rotation of the end of a radius through a total angular excursion from a first position to a final position;



said preprocessor means including means for generating a plurality of subangular excursions for each of said angular excursions, the number and extent of said subangular excursions varying for different angular excursions so that each angular excursion includes an integral number of said subangular excursions and said final position for each angular excursion is accurately forced;

linear interpolating means receiving said linear interpolating data for generating linear interpolated data indicative of the end points for each liner sample interval and apply said linear interpolated data to said means for receiving and moving;

circular interpolting means receiving said circular interpolating data for generating circular interpolated data indicative of the end points for each subangular excursion and applying said circular interpolated data to said means for receiving and moving.

4,031,370

GENERATION OF MATHEMATICAL FUNCTIONS

Reginald Catherall, Woking, England, assignor to Bell & Howell Limited, Basingstoke, United Kingdom

Filed Feb. 17, 1976, Ser. No. 658,349

Claims priority, application United Kingdom, Feb. 26, 1975, 8134/75

Int. Cl.² G06F *7/38, 1/02*

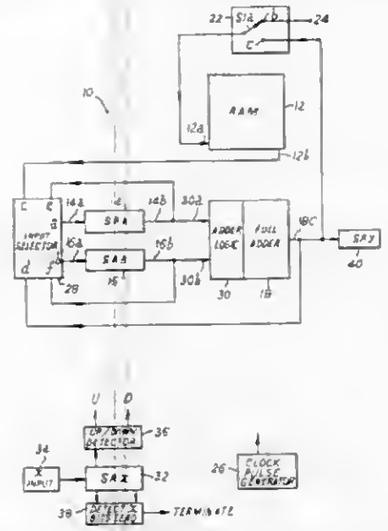
U.S. Cl. 235—152 **29 Claims**

1. A method of interpolating a value of the dependent variable y corresponding to a given value of an independent variable x, wherein y is a function of x and is described by a linear polynomial series of the $2n$th order wherein each term of the series comprises the product of a linear polynomial of x and a coefficient, and the terms of the linear polynomial series containing the $(n+1)$th to the $2n$th polynomials are in the form of an expression which is a product of a common nth order polynomial of x, and the sum of the zero'th to the nth order polynomial each multiplied by its appropriate coefficient, using an nth order polynomial interpolation method to obtain up to a $2n$th order interpolation in 2 iterations of the nth order interpolation method, the method comprising the steps of:

determining the coefficients for each of the terms of the linear polynomial series;

using the determined appropriate coefficients relevant to the $(n+1)$th to the $2n$th polynomials to perform an nth order interpolation to obtain a specific coefficient for the common nth order polynomial at a given value of the independent variable x;

modifying, as required the coefficients relevant to the nth and lower order polynomials of the series to consolidate the term which comprises the common nth order polynomial multiplied by its specific coefficient to provide modified coefficients;



and performing a second nth order interpolation using the modified coefficients at the given value of the independent variable x;

whereby the result of the second interpolation is the value of the dependent variable y for the given value of the independent variable x which would have been obtained by using a higher order interpolation method up to the 2nth order.

4,031,372

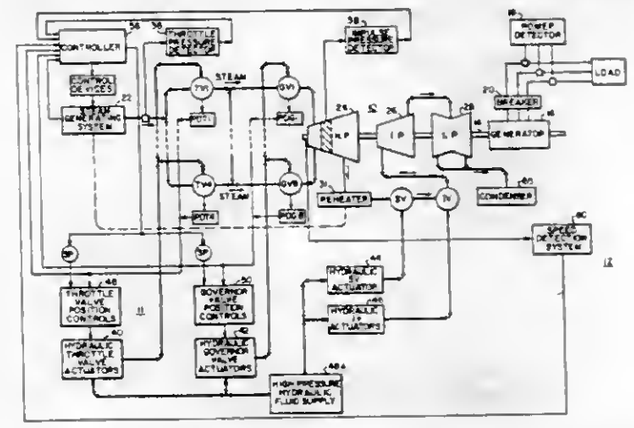
SYSTEM FOR MANUALLY OR AUTOMATICALLY TRANSFERRING CONTROL BETWEEN COMPUTERS WITHOUT POWER GENERATION DISTURBANCE IN AN ELECTRIC POWER PLANT OR STEAM TURBINE OPERATED BY A MULTIPLE COMPUTER CONTROL SYSTEM

Guy E. Davis, Martinez, Calif., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 6, 1973, Ser. No. 413,278

Int. Cl.² F01D *17/02*; **G05B** *15/00*; **G06F** *15/06*

U.S. Cl. 235—151.21 **84 Claims**



1. A control system for an electric power plant having at least one steam turbine and a steam generator, said control system comprising multiple digital computers including at least a first digital computer and a second digital computer, means for generating input signals representing predetermined process variables associated with said steam generator, means for generating input signals representing predetermined process variables associated with said steam turbine, means for coupling the input signals to both of said computers, each of said computers having means for controlling its sequential programmed operation and including substantially identical control elements which generate control outputs as a function of input signals in various control loops to operate controllable elements of said steam generator and throttle and governor valves of said steam turbine, means for sensing predetermined control system malfunctions, means for coupling the outputs of one of said computers to operate the steam generator controllable elements and turbine valves, means for substantially conforming the structure of the other computer to the structure of said one computer in real time, said conforming means including means for responding to predetermined process input signals to control the operation of at least some of said computer control elements in a tracking mode and generate corresponding control outputs in said other computer substantially equal to those from said one computer, and means for executing a transfer in the control of the steam generator and the turbine from said one computer to said other computer substantially without disturbing the power generation when said sensing means detects a control system malfunction.

4,031,371

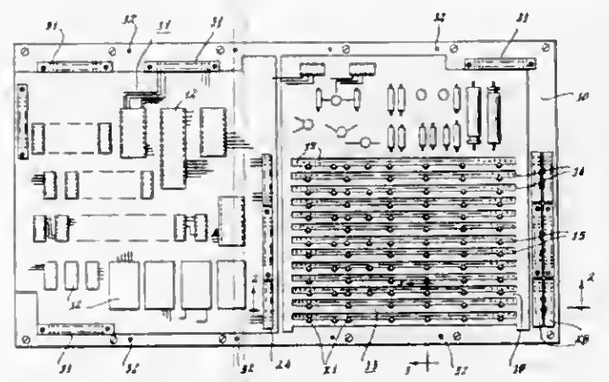
MICROCOMPUTER BOARD HAVING WIRE-WRAP TERMINALS

Hubert G. DeVries, Littleton, Colo., assignor to Monolithic Systems Corporation, Englewood, Colo.

Filed Mar. 8, 1976, Ser. No. 664,815

Int. Cl.² H05K *7/08*

U.S. Cl. 235—152 **11 Claims**



1. A microcomputer board comprising an insulating mounting board, first microcomputer components fixedly mounted to said insulating mounting board in a first area thereof, first and second pluralities of connector means having wire-wrap pins and fixedly mounted to said insulating mounting board, at least a pair of parallel rows of holes in said board in a second area thereof, individual connectors having wire-wrap pins mounted in said holes, and printed circuit means on said insulating mounting board interconnecting said microcomputer components and said first plurality of connector means and not extending directly to said individual connectors and said second connector means.

4,031,373

VELOCITY COMPUTING CHRONOGRAPH

Robert Beckwith, R.R. 1, Box 1058, Marathon, Fla. 33050

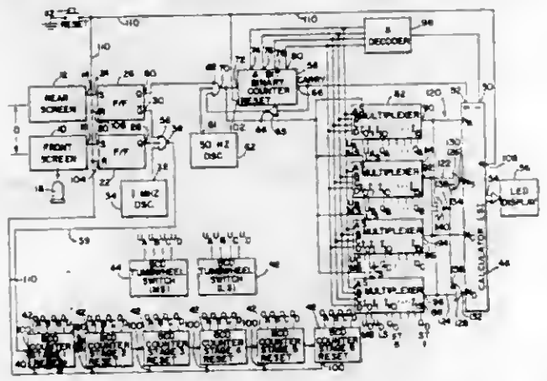
Filed June 1, 1976, Ser. No. 691,327

Int. Cl.² G01N *23/10*; **G06M** *3/06*

U.S. Cl. 235—151.32 **1 Claim**

1. A projectile velocity measuring and computing system having front and rear projectile sensing screens having outputs indicative of the passage of a projectile therethrough the apparatus comprising: a first oscillator; a chain of BCD counter stages; means responsive to the outputs of said screens for coupling said oscillator for clocking said chain of

counters only during the time of flight of said projectile from the front to the rear screen means; a group of BCD coded numerical switches for manual entry of the distance between said pair of screens; an electronic digital display; a digital calculator integrated circuit having data input terminal means for serially receiving BCD digit signals, a divide command input terminal, an equals command input terminal and output means for driving said electronic digital display with the result of computation in said calculator means; means responsive to the output of said rear screen including a second oscillator and a binary counter for deriving a series of binary coded sequential numerical control signals after the flight of said projectile between said front and rear screen means; multiplexer means fed by BCD digit output signals from said BCD counter stages



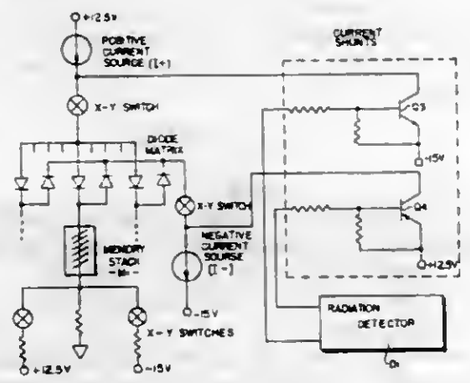
and numerical switches and feeding said data input terminal means of said calculator means for selectively applying different ones of said BCD digit output signals to said data input terminal means in response to the digital state of said numerical control signals, said multiplexer means being organized for serially applying first said BCD digit signals from said numerical switches and then from said BCD counter stages in response to the sequential numerical control signals, there being at east one predetermined numerical control signal state between the application of said BCD digit signals from said BCD coded numerical switches and from said BCD counter stages; means responsive to said predetermined control signal state for driving said divide command input terminal; and means responsive to the occurrence of a last of said numerical control signals for driving said equals command input terminal.

4,031,374

ERROR CORRECTION SYSTEM FOR RANDOM ACCESS MEMORY

Alan I. Grondan, Harrington Park; George F. Schroeder, and H. Lee Treffinger, both of Wayne, all of N.J., assignors to The Singer Company, Little Falls, N.J.

Filed Dec. 24, 1974, Ser. No. 536,142
Int. Cl.² G11C 29/00; G06F 11/10
U.S. Cl. 235—153 AM **16 Claims**



1. A protective system to prevent data word losses in a random access memory in the presence of a radiation pulse from a nuclear radiation event, or the like, which memory includes a multiplicity of individual memory elements and associated selective and read/write circuitry; the combination of:

circumvent circuitry coupled to the selective and read/write circuitry for protecting all unaddressed memory elements in the memory in the event of a radiation pulse;

accessing means coupled to the memory for selectively accessing the data words in the memory at the different memory locations therein; and

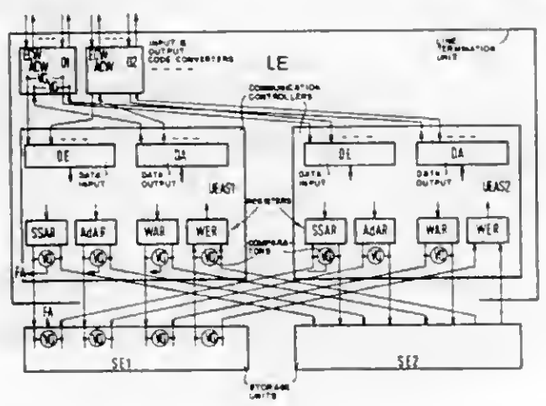
error correction and word recovery logic circuit means coupled to the accessing means for reconstituting the data word being accessed during the radiation pulse so as to replace such data word in the memory with a reconstituted date word.

4,031,375

ARRANGEMENT FOR FAULT DIAGNOSIS IN THE COMMUNICATION CONTROLLER OF A PROGRAM CONTROLLED DATA SWITCHING SYSTEM

Gerhard Jaskulke, Dachau; Alois Schwarz, Munich, and Armin Rutter, Unterpfaffenhofen, all of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Continuation of Ser. No. 501,463, Aug. 28, 1974, abandoned. This application Mar. 15, 1976, Ser. No. 666,583
Claims priority, application Germany, Aug. 29, 1973, 2343586
Int. Cl.² G06F 11/04
U.S. Cl. 235—153 AK **7 Claims**



1. Apparatus for monitoring fault diagnosis operations in a communications controller of a line termination unit in a program controlled data switching center, wherein each said line termination unit includes data input and output devices connecting said line termination unit to transmission lines, word input and output registers for transferring data to and receiving data from a central storage and error detecting means in communication with said central storage for transmitting, responsive to a fault in said communications controller, an error signal to said central storage thereby initiating the operation of a safeguarding routine, comprising:

fault collection means for receiving error signals, registering a fault word describing the error which has occurred and generating first fault signals for communication to said communications controller and second fault signals for communication to said central storage,

diagnostic routine means in said communication controller and including a first decoding means coupled to a said word input register for receiving diagnosis commands issued responsive to said safeguarding routine and for generating, responsive thereto, first control signals and including second decoding means for operating responsive to said first control signal for decoding said diagnosis commands and producing corresponding second control signals,

intermediate buffer storage means in said communication controller,

first means for connecting, responsive to said first control signals, to said input word register, said fault word register and said intermediate buffer storage means to said word output register, and

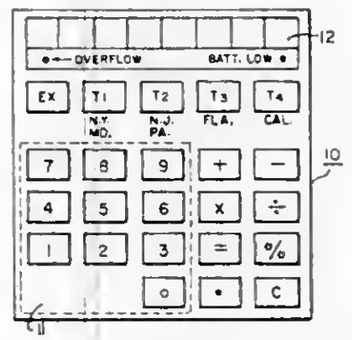
second means for connecting, responsive to said second control signals, components of said communication controller individually to a said word input register for accepting further instructions and to a said word output register for transferring information to said central storage.

4,031,376

CALCULATING METHOD AND APPARATUS FOR HANDICAPPING THOROUGHBRED RACES AND THE LIKE

Samuel Corkin, Jr., 339 Davis Ave., Kearny, N.J. 07032

Filed June 30, 1975, Ser. No. 579,942
Int. Cl.² G06F 7/38
U.S. Cl. 235—156 **14 Claims**



1. A calculator of the digital type particularly adapted for indicating a rating of an entry in a racing contest by operating on the past performance of said entry as regarding past wins (W), past seconds (S) and past thirds (T) and total monies earned by said entry in said past performances, comprising:

a. a keyboard for keying in a code having a given number of digits of a predetermined length indicative of past wins (W), past seconds (S) and past thirds (T),

b. means responsive to said code for multiplying said keyed digits associated with said wins W, said seconds S and said thirds T each by a separate corresponding factor, to provide a separate product for W. S. and T,

c. means responsive to said products for adding the same to provide a total sum,

d. means responsive to said total sum for dividing the same into unity to produce at an output, a class factor,

e. means responsive to said class factor for multiplying the same by said total monies earned to obtain a rating number, and

f. means for displaying said rating number.

4,031,377

FAST MULTIPLIER CIRCUIT EMPLOYING SHIFT CIRCUITRY RESPONSIVE TO TWO BINARY NUMBERS THE SUM OF WHICH APPROXIMATELY EQUALS THE MANTISSA OF THE MULTIPLIER

Ralph Deutsch, Sherman Oaks, and Glen R. Griffith, Westminster, both of Calif., assignors to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

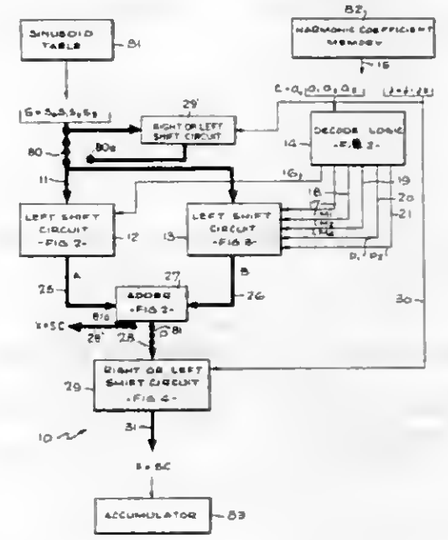
Filed Aug. 25, 1975, Ser. No. 607,141
Int. Cl.² G06F 7/54
U.S. Cl. 235—164 **11 Claims**

1. A multiplier circuit for multiplying a binary fixed point multiplicand by a binary floating point multiplier, comprising:

decode logic means, connected to receive the mantissa of said floating point multiplier, for providing control signals indicative of two binary numbers the sum of which is approximately equal to the value of said mantissa, each of said two numbers being a power of two,

a first left shift circuit means connected to said decode logic means and responsive to one of the control signals therefrom, for left shifting said multiplicand by a number of places corresponding to the first of said two numbers,

a second left shift circuit connected to said decode logic means and responsive to other of the control signals therefrom, for left shifting said multiplicand by a number of places corresponding to the second of said two numbers,



an adder, connected to both said first and second left shift circuits, for adding together the shift products thereof, and

another shift circuit for shifting a binary number by a number of places corresponding to the power of said floating point multiplier, said shifting being to the right for a negative power and to the left for a positive power, said other shift circuit being connected to said adder for shifting the sum received from said adder, the shifted output of said other shift circuit being the multiplication product.

4,031,378

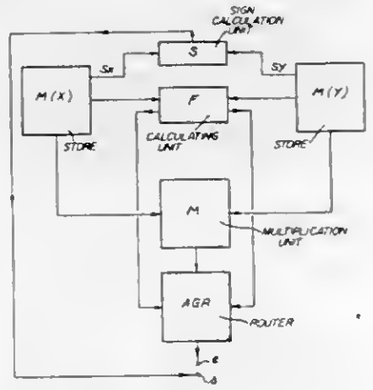
METHOD AND APPARATUS FOR FAST MULTIPLICATION INCLUDING CONVERSION OF OPERAND FORMAT

Michel L. Le Comte, Longjumeau, France, assignor to Jeumont-Schneider, Puteaux, France

Filed June 26, 1975, Ser. No. 590,509
Claims priority, application France, June 28, 1974, 74.22575
Int. Cl.² G06F 7/52
U.S. Cl. 235—164 **22 Claims**

1. A fast-multiplication digital system comprising at least one multiplier for multiplying two binary numbers each number comprised of a plurality of digits having differing significance and weights, each multiplier comprising means for converting each of the two binary numbers into a first amplitude number having a sign, each of said first amplitude numbers comprising the most significant digits of said binary number, the first digit being the most significant non-zero digit of said binary number, and into a second shift number having an amplitude indicative of a weight shift of the binary number before and after conversion to a predetermined format and a sign indicative of a direction of said weight shift, the system further comprising means for multiplying the first amplitude numbers of the two binary numbers and for producing a first resultant number corresponding to the multiplication of said first amplitude numbers, means for algebraically adding the second shift numbers of the two binary numbers and for pro-

ducing a second resultant number corresponding to the addition of said second shift numbers, and means for shifting said



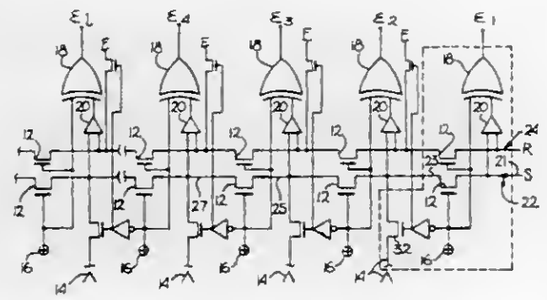
first resultant number in response to said second resultant number.

4,031,379

PROPAGATION LINE ADDER AND METHOD FOR BINARY ADDITION

Samuel Schwartz, Saratoga, Calif., assignor to Intel Corporation, Santa Clara, Calif.

Filed Feb. 23, 1976, Ser. No. 660,693
Int. Cl.² G06F 7/50
U.S. Cl. 235—175 21 Claims



1. A binary adder for adding at least two multiple bit binary numbers comprising:

a conductive reference propagation path having a plurality of segments;

a conductive sense propagation path having a plurality of segments;

a plurality of gating means in series with said reference and sense propagation paths, said gating means for selectively coupling said segments of said reference propagation path together and for selectively coupling said segments of said sense propagation path together;

a plurality of product circuit means corresponding to a plurality of orders of bits of said multiple bit binary numbers, each product circuit means for generating a product signal of a corresponding order of bits of said multiple bit binary numbers and for coupling said product signal to that segment of said sense propagation path corresponding to the next higher order of bits;

a plurality of summing circuit means corresponding to a plurality of orders of bits of said multiple bit binary numbers, each summing circuit means for generating a sum signal of a corresponding order of bits of said multiple bit binary numbers and for coupling said summing signal to selected ones of said plurality of gating means; and

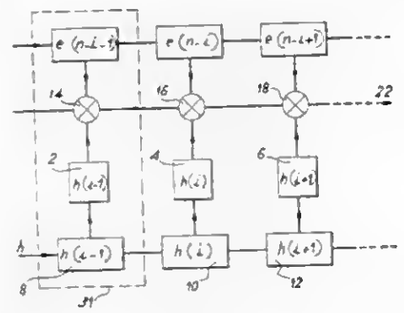
a plurality of output circuit means, each output circuit means coupled to one of said summing circuit means and coupled with selected segments of said sense propagation path, each of said output circuit means for generating an output signal in response to said sum signal and charged state of a corresponding segment of sense propagation path.

4,031,380

METHOD AND DEVICE FOR THE INTEGRATION OF ANALOG SIGNALS

Luc Audaire, St.-Nizier-du-Moucherotte; Joseph Borel, Echirolles; Vincent Le Goascoz, Claix, and Robert Poujois, Grenoble, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Division of Ser. No. 464,879, April 29, 1974, Pat. No. 3,956,624. This application Sept. 15, 1975, Ser. No. 613,373
Claims priority, application France, May 4, 1973, 73.16246
Int. Cl.² G06G 7/18
U.S. Cl. 235—183 3 Claims



1. A method of integration of an analog signal in integrated circuit memory elements, wherein the memory elements are constituted by field-effect transistors having a number of layers of different dielectrics between the gate and the doped semiconductor substrate of the transistor, comprising the steps of performing a discrete sampling of the analog signal at N points, storing the N amplitudes corresponding to the N points in the form of threshold voltages in N of said transistors, then storing the amplitudes corresponding to N points of successive sampling of the analog signal in one transistor by successively adding those amplitudes to the threshold voltage of said one transistor, and reading the resultant threshold voltage of said one transistor as the result of the integration.

4,031,381

ILLUMINATABLE UMBRELLA

Phyllis Carver, 1815 Allison Road, Vancouver 8, British Columbia, Canada

Filed Mar. 8, 1976, Ser. No. 664,932
Int. Cl.² F21V 33/00
U.S. Cl. 240—6.42 4 Claims

1. An illuminatable umbrella comprising:

a hollow tubular shaft;

a hub slidably mounted on said shaft and having electrical conductor means on an inner portion thereof, said hub pivotably carrying a plurality of rib elements which support an umbrella hood;

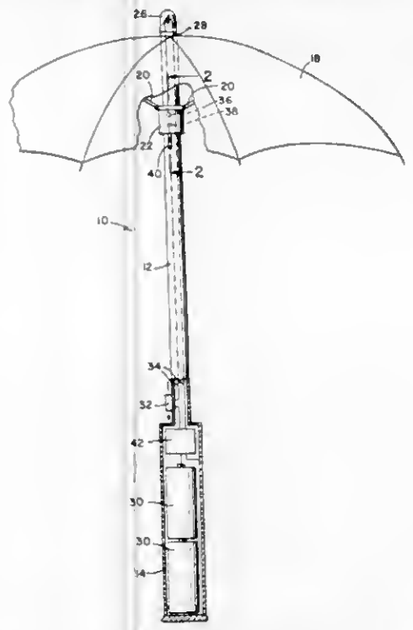
means for mounting an electric bulb at one end of said shaft;

at least one battery mounted within said hollow shaft;

a manually operable electric switch carried by said shaft;

electrical conductor elements positioned within said shaft connecting said switch, batteries and bulb in a series circuit;

and a pair of electrical contacts interposed in said series circuit adjacent the external surface of said shaft cooperable with said electrical conductor means on said hub, whereby upon engagement of said contacts by said elec-



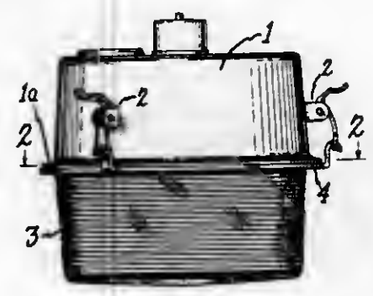
trical conductor means said switch can be manipulated to selectively energize said bulb.

4,031,382

LUMINAIRE ASSEMBLY

Clifford M. Laughter, Hendersonville, N.C., assignor to General Electric Company, New York, N.Y.

Filed June 24, 1976, Ser. No. 699,737
Int. Cl.² F21S 1/10, 3/10, 13/10
U.S. Cl. 240—25 9 Claims



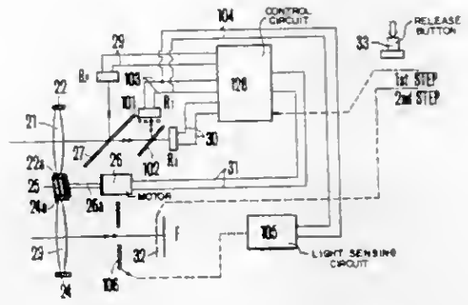
1. A luminaire comprising, in combination, a housing having an open bottom, a plurality of circumferentially spaced latches secured to said housing, a globe having an open top arranged closing the open bottom of said housing, said globe having an outwardly projecting rim extending around its open top, a ring member extending around said globe engaging the underside of said rim, said ring member having a plurality of circumferentially spaced hooks respectively detachably engaged by said latches, and means associated with one of said hooks for retaining the latch in engagement with said one hook whereby the latter hook with associated latch captively hingedly secures said globe to said housing.

4,031,383

METHOD FOR DETECTING VISIBILITY OF IMAGE OF AN OBJECT AND A DEVICE THEREFOR

Kazuya Hosoe; Hiroshi Aizawa, both of Machida; Seiichi Matsumoto, Yokohama, and Hideo Yokota, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 15, 1974, Ser. No. 515,015
Claims priority, application Japan, Oct. 19, 1973, 48-117552; Oct. 19, 1973, 48-117553; Oct. 19, 1973, 48-117554; Oct. 19, 1973, 48-117555; Oct. 23, 1973, 48-119280; Oct. 26, 1973, 48-120553; Oct. 26, 1973, 48-120554
Int. Cl.² G01J 1/20; G03B 7/08
U.S. Cl. 250—201 32 Claims



1. A system for detecting the sharpness of an object image, comprising:

an image forming optical system forming an image of an object;

first photoelectric transducing means which receives the object image formed by said optical system and presents an electrical output which corresponds to the sharpness of the image, said first transducing means placed at a position capable of receiving the object image formed by said optical image and having:

a first photosensitive element of a slender strip shape, and

a first pair of electrodes connected to short sides of said element;

second photoelectric transducing means which receives the object image formed by said optical system and presents an electrical output which corresponds to the sharpness of the image, said second transducing means being placed at a position capable of receiving the object image formed by said optical system and having:

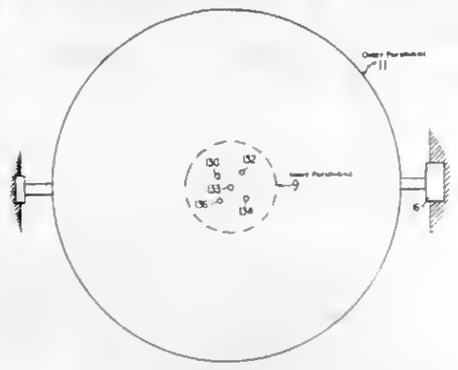
a second photosensitive element of a slender strip shape, and

a second pair of electrodes connected to long sides of said second element;

electrical circuit means to electrically process the output of said first and second transducing means and output image sharpness information based on the output of said first and second transducing means; and

correcting means to eliminate from said circuit means noise outputs of said first and second transducing means having no relationship with image sharpness, said correcting means being electrically coupled to said circuit means to supply an electrical signal thereto based on the brightness of the object, thereby the noise output of said first and second transducing means having no relationship with image sharpness is eliminated and detection of image sharpness may be performed while eliminating noise signals having no relationship with image sharpness.

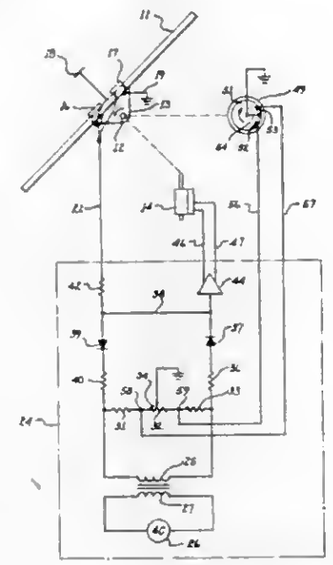
4,031,384
CATOPTRIC SYSTEM FOR SIMULTANEOUS CONCENTRATION OF LIGHT, LASER, AND OTHER TYPE PARAXIAL RAYS INTO BEAMS
Benjamin F. Sherman, Jr., 6329 Mori St., McLean, Va. 22101
Division of Ser. No. 352,466, April 18, 1973, Pat. No. 3,892,476. This application Jan. 24, 1975, Ser. No. 543,925
Int. Cl.² G02B 5/10; G01J 1/20
U.S. Cl. 250—203 R **15 Claims**



1. A concentrator of a wide spectrum of reflectable emissions including limiting rays, such as of light rays, laser rays, infra-red rays, ultra-violet rays, sound waves, electrons and other types of radiant energy emissions from a remote source spaced rearwardly therefrom including a source moving relative thereto, such as planetary bodies, artificial wave sources, a light house, a ship, a signal-transmitting station and a communication sender, comprising:
at least portions of two symmetrically warped truncated shells;
an outer concave shell, provided with at least one inner reflecting surface and
an inner convex shell of a diameter, smaller than that of said outer shell provided at least at its vertex with at least one outer reflecting surface;
means to mount said shells on their central axis, the extremities of said shells being aligned on a conical surface and being defined by an imaginary cone whose surface is traversed by the limiting rays and whose vertex is at the common focal point of the said shells, and whose axis coincides with the central axis,
the reflecting surfaces of the shells being mounted spaced from each other and substantially facing each other at angles and at distances providing at least two successive reflections from each surface for said rays impinging upon them;
at least one of said surfaces including at least one paraboloidal reflector surface, and
means moving at least one of said warped surfaces in response to the changeable location of the said source relative to the said concentrator.

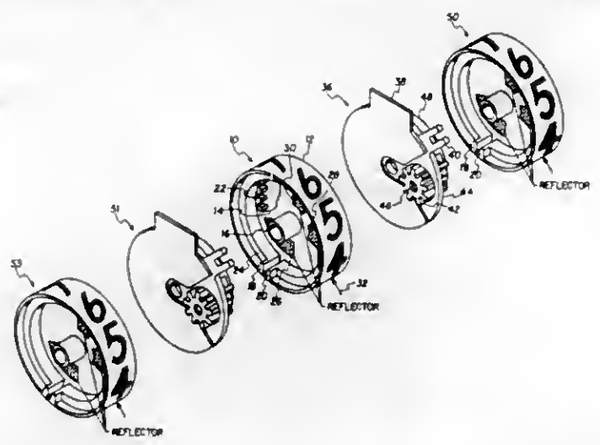
4,031,385
SOLAR TRACKING DEVICE
Gene A. Zerlaut, Phoenix, and Robert F. Heiskell, Glendale, both of Ariz., assignors to Desert Sunshine Exposure Tests, Inc., Phoenix, Ariz.
Filed Apr. 5, 1976, Ser. No. 673,484
Int. Cl.² G01J 1/20
U.S. Cl. 250—203 R **6 Claims**

2. Apparatus for controlling the orientation of a device to track the changing location of the sun in the sky, said apparatus comprising, in combination:
a. means for producing electrical signals corresponding to the position of the device relative to the brightest spot in the sky;
b. orientation means for positioning the device in response to the electrical signals to orient the device perpendicular to the brightest spot in the sky;
c. means for overriding said orientation means whenever the position of the brightest spot in the sky deviates more than a predetermined amount from the position of the sun in the sky;



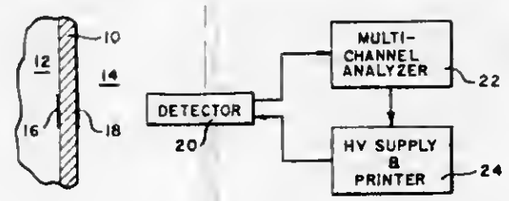
d. means for generating clock responsive signals representing the approximate position of the sun in the sky; and
e. means for locating the device in response to the clock responsive signals whenever said orientation means are overridden, thereby orienting the device approximately perpendicular to the position of the sun in the sky.

4,031,386
OPTICAL TRANSDUCER ENCODING APPARATUS
Gary B. Recker, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.
Filed June 15, 1976, Ser. No. 696,240
Int. Cl.² G01D 5/36; G06K 7/10
U.S. Cl. 250—230 **5 Claims**



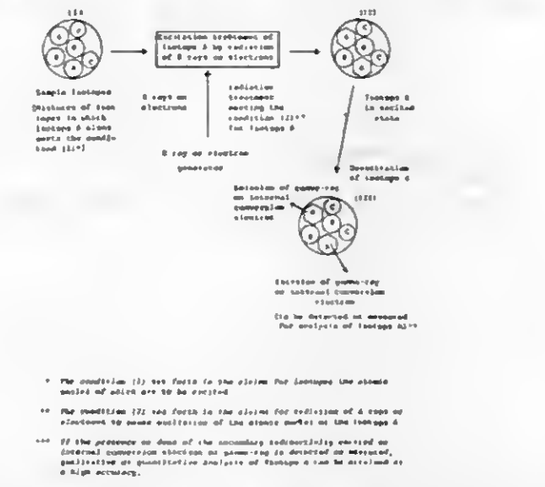
1. Conversion apparatus for providing a visual and binary coded electrical output indication of the number of revolutions of a geared mechanical input wherein an indicating section includes:
a plurality of wheels each having a hub, a connecting web and a felly with indicia on an outer surface, a continuous set of gear teeth on an inner surface on one side of the web and a partial set of gear teeth on the inner surface on the other side of the web to drive further conversion sections, and
a plurality of stationary members, one for each wheel and mounted intermediate said wheels, cooperating with said wheel to provide a bearing surface for a gear operable to mesh with the partial set of gear teeth of the present section and the continuous set of gear teeth of an adjacent further section, the improvement comprising:
a plurality of reflective surfaces situated on said web, each of said surfaces being located at the same radial distance, and
a plurality of optical transducers, including light sources, in said stationary member for detecting and outputting encoded binary digital signals indicate of individual ones of several possible rotational positions of said wheel relative to said stationary member.

4,031,387
METHOD OF DETERMINING WHETHER RADIOACTIVE CONTAMINANTS ARE INSIDE OR OUTSIDE A STRUCTURE
Kenneth R. Lattin, Richland, Wash., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.
Filed Aug. 5, 1976, Ser. No. 711,926
Int. Cl.² G01D 18/00; G01N 23/00
U.S. Cl. 250—252 **4 Claims**



1. A method of determining the amount of radioactive material inside a test structure compared to the amount outside the structure comprising the steps of:
a. disposing a first quantity of the radioactive material inside a dummy structure having the same shape and made of the same material as the test structure;
b. obtaining an inside spectrum of radiation from the first quantity of material inside the dummy structure by detecting radiation outside the dummy structure over a test range of energies that includes a Compton window where Compton scattering is caused by the material and that also includes a region of the spectrum where Compton scattering is negligible;
c. removing the first quantity;
d. disposing a second quantity of the radioactive material outside the dummy structure;
e. obtaining an outside spectrum of radiation from the second quantity by detecting radiation outside the dummy structure over the test range of energies;
f. obtaining a test spectrum from the test structure by detecting radiation outside the test structure over the test range of energies;
g. obtaining from the inside spectrum and outside spectrum ratios of counts of radioactive disintegrations per unit time in the Compton window to counts of radioactive disintegrations per unit time in the region where Compton scattering is negligible;
h. obtaining from the test spectrum a test ratio of counts of radioactive disintegrations per unit time in the Compton window to counts of radioactive disintegrations per unit time in the region where Compton scattering is negligible;
i. comparing the test ratio linearly with the ratio from the inside spectrum and the ratio from the outside spectrum to obtain a proportional measure,
which proportional measure is a measure of the amount of the radioactive material inside the test structure compared to the amount outside.

4,031,388
METHOD FOR THE ANALYSIS OF ISOTOPES
Masato Morita; Reiko Morita, both of Seita, and Kiyoteru Otozai, Toyonaka, all of Japan, assignors to International Nuclear Fuel Co., Ltd., Toyonaka, Japan
Filed Sept. 6, 1974, Ser. No. 503,693
Claims priority, application Japan, Sept. 8, 1973, 48-101488
Int. Cl.² G01N 23/20
U.S. Cl. 250—272 **4 Claims**

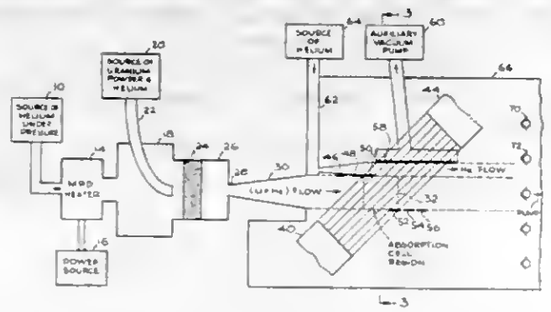


1. A method for the analysis of isotopes which comprises bombarding a substance with X-rays or electrons of a previously determined dose and energy for analyzing an isotope in the substance, to produce an excited state of the atomic nuclei of the isotope and thereafter detecting the gamma rays or internal conversion electrons emitted from the substance when the atomic nuclei is deactivated from the excited state to the ground state, wherein the bombardment of the substance with X-rays or electrons is carried out under such conditions that (1) in the atoms selected to be produced in the excited state of their nuclei, (a) the difference between the nuclear excitation energy and the difference between the binding energies of adequatly selected two electron orbits is small enough to introduce the nuclear excitation by electron transition, and (b) the system of the nucleus and the electrons in the case of ionizing an orbital electron in said atoms should satisfy the spin and parity conservation laws, and (12) the energy of the bombarding X-rays or electrons should be larger than the binding of one of the said two electron orbits which is located at a shorter distance from the atomic nucleus.

4,031,389
ISOTOPE SEPARATION USING METALLIC VAPOR LASERS
Gary R. Russell; Che Jen Chen, both of Sierra Madre, and Kenneth G. Harstad, Pasadena, all of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.
Filed June 26, 1974, Ser. No. 483,301
Int. Cl.² H01J 39/34
U.S. Cl. 250—283 **16 Claims**

1. A method of separating a first isotope from a mixture of a first and second isotope comprising
heating a mixture of said first and second isotopes to a temperature at which they are vaporized and some free electrons are produced,
passing said vaporized isotopes with free electrons therein at a supersonic speed through an expansion nozzle to expand into a supersaturated vapor,
applying laser light having a predetermining frequency to

said supersaturated vapor to selectively elevate the energy level of said first isotope to an energy level at which



said first isotope atoms are ionized by said free electrons, and

directing said ionized atoms to a collection plate.

4,031,390

METHOD OF OPERATING A PARTICLE-BEAM APPARATUS

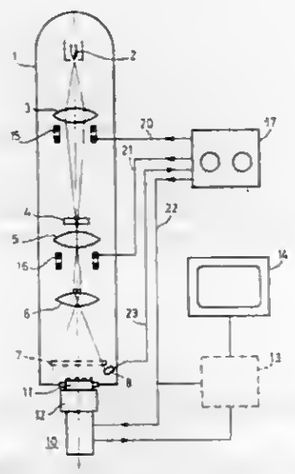
Karl-Heinz Müller; Volker Rindfleisch; Moriz V. Rauch, and Dieter Wilasch, all of Berlin, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Aug. 29, 1973, Ser. No. 392,526

Claims priority, application Germany, Sept. 7, 1972, 2344441

Int. Cl.² G01N *23/04*

U.S. Cl. 250—307 **4 Claims**



1. A method of operating a particle-beam apparatus such as an electron microscope equipped with a controlled deflection system arranged at the beam path, the method comprising adjusting the excitation of the deflection system to direct the particle-beam for a selectable time period onto a location of an object whereat the object is to be investigated; and, again adjusting the excitation of the deflection system to direct the particle-beam in the remaining time to another location of the object whereat the particle-beam passes through the object, the last-mentioned location being disposed laterally of the first mentioned location, said particle-beam apparatus being equipped with a second deflection system, the method comprising the ancillary step of adjusting the excitation of the second deflection system so as to cause the particle-beam to image the region of the object irradiated by the same.

4,031,391

ELECTRON MICROSCOPE INCLUDING IMPROVED MEANS FOR DETERMINING AND CORRECTING IMAGE DRIFT

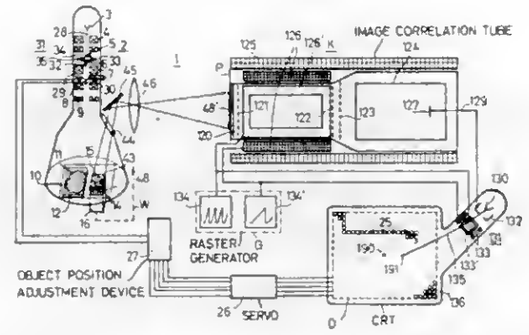
Walter Hoppe, Martinsried near Munich, Germany, assignor to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V., Gottingen, Germany

Filed June 21, 1976, Ser. No. 698,082

Claims priority, application Germany, July 1, 1975, 2529735

Int. Cl.² H01J *37/26*

U.S. Cl. 250—311 **15 Claims**



1. In a corpuscular beam microscope including means for adjusting the position of the object image in the microscope and means, coupled to said adjusting means, for determining and correcting drift of the object image by means of a control signal which controls said adjusting means and is derived from a convolution of an actual object image with a stored reference object image, the improvement comprising said means for determining and correcting including means for deriving said convolution by imaging said actual object image directly on said reference object image.

4,031,392

METHOD AND DEVICES FOR COUNTING EVENTS, PARTICULARLY RADIOACTIVE DISINTEGRATION EVENTS

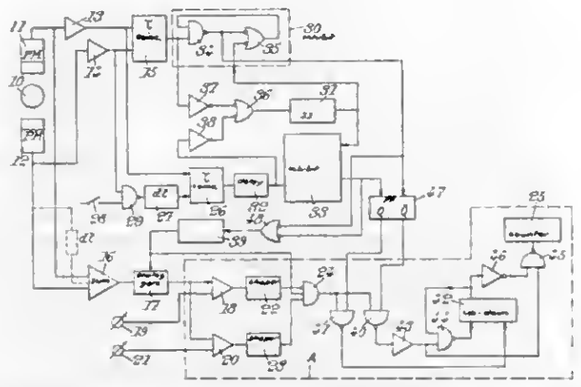
Pierre Giraud, Paris; Conrad Palais, Parly II Le Chesnay, both of France, and Edward Rapkin, Short Hills, N.J., assignors to Intertechnique S.A., Plaisir, France

Filed Mar. 31, 1976, Ser. No. 672,287

Claims priority, application France, Nov. 17, 1975, 75.35085

Int. Cl.² G01T *1/20*

U.S. Cl. 250—328 **8 Claims**



1. A device for counting specific events of a predetermined nature occuring in a sample in the presence of background noise due to events of another nature in said sample, comprising:

a first detector and a second detector operatively associated with a sample receiving location for the first detector and

the second detector to deliver respective signal pulses in time coincidence responsive to each said specific event, while one of said detectors at most delivers a signal pulse responsive to each said event of another nature,

first circuit means connected to receive said signal pulses from said first and second detectors and to deliver a first output signal responsive to each prompt coincidence between the signals received from the first and second detectors,

time delay circuit means connected to receive the signal pulses delivered by the first detector and in response thereto deliver a signal pulse delayed by a predetermined time duration *dt*,

second circuit means connected to receive the signal pulses delivered by the second detector and by the time delay circuit and to deliver a second output signal responsiveto each time coincidence,

and counting means controlled by said first and second circuit means for counting in real time the excess of the coincidences detected by the first circuit means over the coincidences detected by the second circuit means.

4,031,393

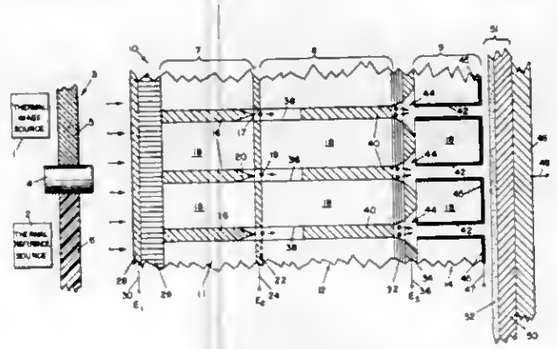
THERMAL IMAGE CAMERA

Charles M. Redman, Las Cruces, N. Mex., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 18, 1976, Ser. No. 667,936

Int. Cl.² H01J *31/49*

U.S. Cl. 250—332 **10 Claims**



1. A thermal image camera comprising:

pyroelectric means for detecting a thermal image;

cathode means connected to the pyroelectric means for converting the thermal image to an electron image;

vacuum means communicating with the cathode means for guiding the passage of the electron image in a preselected location;

emitting means communicating with the vacuum means, in spaced relation with the cathode means, for storing and integrating the electron image;

means communicating with the emitting means for amplifying the density and kinetic energy of the electron image delivered from the emitting means; and

recording means positioned adjacent the outward end of the amplifying means for receiving an amplified electron image thereagainst.

4,031,394

CAMERA DEVICE WITH RESISTIVE TARGET

Pierre Felix; Philippe Gamot; Guy Moiroud, and Serge Veron, all of Paris, France, assignors to Thomson-CSF, Paris Cedex, France

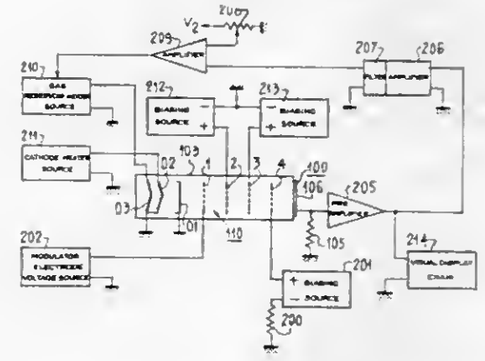
Filed June 21, 1976, Ser. No. 697,750

Claims priority, application France, June 27, 1975, 75.20397

Int. Cl.² H01J *31/49*

U.S. Cl. 250—333 **8 Claims**

1. A camera device with a resistive target comprising a camera tube having a target which in operation receives the energy emanating from the subject on one of its surfaces and which has the property of showing at each point between its two surfaces a dielectric polarisation governed by the energy absorbed by that point, means for generating inside said tube a beam of electrons issuing from a cathode and scanning point by point the other surface of said target so as to bring these points to the potential of said cathode and associated means for reading the signal current of flow of electrons desposited at each point of the target by said beam to obtain this potential, said tube comprising in its interior a first grid arranged in the vicinity of said cathode controlling the intensity of said beam,



a heated ionisable gas reservoir made of a material of which the absorption capacity for said gas and hence the pressure of said gas in the tube is governed by its temperature, ions being generated in said tube by collision between the electrons of said beam and the molecules of said gas, and another grid arranged in the vicinity of said target and brought to a positive d.c. potential which is fixed in relation thereto, said camera device being characterised in that it comprises means for controlling the generation of said ions in the tube in dependence upon the average value of the target currents over a given period.

4,031,395

RADIOGRAPHY

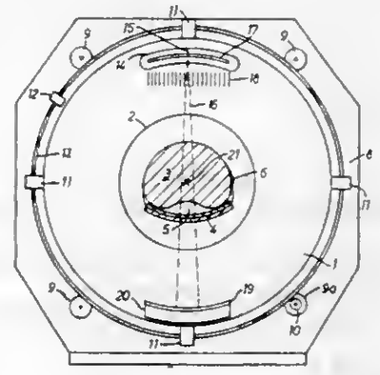
Christopher Archibald Gordon LeMay, Osterley, England, assignor to EMI Limited, Middlesex, England

Filed Mar. 19, 1976, Ser. No. 668,518

Claims priority, application United Kingdom, Mar. 20, 1975, 7366/75; June 21, 1975, 26485/75; Mar. 20, 1975, 11553/75

Int. Cl.² A61B *6/02*; G01N *23/08*; H05G *1/30*

U.S. Cl. 250—360 **10 Claims**



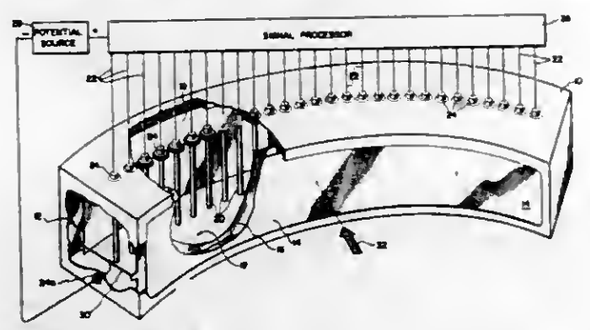
1. An apparatus for examining a body by means of penetrating radiation including a source means arranged to irradate the body with a planar spread of said radiation, detector means arranged to detect the radiation to provide output signals, relating to absorption of the radiation by the body, for processing to provide a representation of the distribution of absorption in a substantially planar section of the body and

means adapted to scan the planar spread of radiation in relation to the body so as to irradiate said section along a plurality of beam paths passing through the body from a plurality of direction, wherein said detector means comprises a plurality of detector devices of which a predetermined number are irradiated by said spread at any time and wherein the scanning means is arranged to traverse the spread of X-rays along the detector devices so as to change the irradiated devices progressively.

4,031,396
X-RAY DETECTOR

Nathan Rey Whetten, Burnt Hills, and John M. Houston, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 554,171, Feb. 28, 1975, abandoned. This application Sept. 26, 1975, Ser. No. 616,930
Int. Cl.² G01T *1/18*
U.S. Cl. 250—385 **19 Claims**



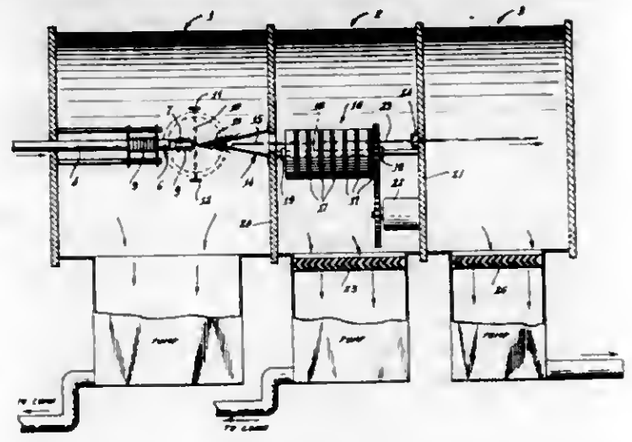
1. An x-ray detector comprising:
a gaseous medium of the type characterized as being substantially opaque to electromagnetic radiation at x-ray frequencies;
a plurality of substantially planar sheet anodes, comprising material which is characterized as being substantially opaque to electromagnetic radiation at x-ray frequencies, disposed in said gaseous medium;
a plurality of substantially planar sheet cathodes, comprising material which is characterized as being substantially opaque to electromagnetic radiation at x-ray frequencies, disposed in said gaseous medium, each of said cathodes lying approximately equi-distant between two of said anodes;
means for applying direct current electric potential between said cathodes and said anodes;
means for separately measuring the electric current flow from each of said anodes connected in series between said anodes and means for applying said potential; and
a beam of x-ray photons disposed and directed to impinge on said gaseous medium in directions substantially parallel to the planes of adjacent said anode sheets and said cathode sheets.

4,031,397
METHOD AND APPARATUS FOR SEPARATING ISOTOPES

Mark J. Cardillo, Somerset, N.J., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Aug. 25, 1975, Ser. No. 607,393
Int. Cl.² H01J *39/34*
U.S. Cl. 250—423 P **8 Claims**

1. A process for separating isotopes from a gaseous mixture thereof which comprises expanding said mixture to form a molecular beam of the mixture in a carrier gas, the molecules of the carrier gas having a mass either less than or greater than the mass of all the molecules containing the isotopes, exposing the gaseous mixture to a laser light having a radiation frequency that causes excitation of the rotational energy of the isotope molecules having the lowest mass without exciting the rotational energy of the other isotope molecules in said mixture, passing said molecular beam through a means for separating the mixture of isotopes on the basis of differences in velocity profiles of each of the isotopes, controlling the time period between the initial expansion of the gas and subsequent

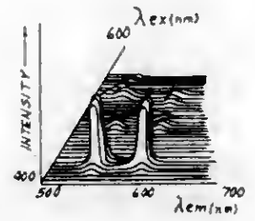


separation of the molecular beam to permit conversion of at least a portion of laser-induced rotational energy to translational energy by secondary collision of the excited isotope molecules with molecules of said carrier gas but without substantially complete conversion of said induced rotational energy to translational energy.

4,031,398
VIDEO FLUOROMETER

James B. Callis, and Ernest R. Davidson, both of Seattle, Wash., assignors to Research Corporation, New York, N.Y.

Filed Mar. 23, 1976, Ser. No. 669,493
Int. Cl.² F21K *2/02*; G01T *1/00*
U.S. Cl. 250—458 **19 Claims**



1. Apparatus for fluorescence spectroscopy comprising:
a. means for holding a sample of fluorescent material;
b. means for simultaneously directing a spatially distributed spectrum of exciting energies onto said sample distributed along its length; and
c. means for simultaneously analyzing the set of fluorescence emissions given off by said sample along its length by producing a fluorescence intensity matrix of the excitation and emission spectra.

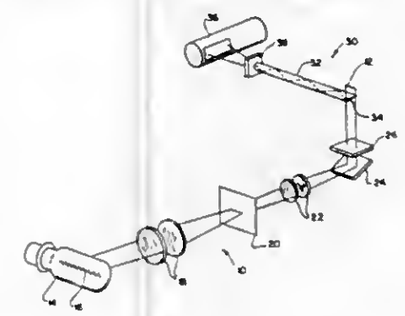
4,031,399
FLUOROMETER

Gerald Lee Klein, Orange, and Richard C. Meyer, La Habra, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed Feb. 24, 1975, Ser. No. 552,653
Int. Cl.² G01M *21/38*
U.S. Cl. 250—461 B **4 Claims**

1. A fluorometer comprising:
means for generating a small area of light of a first bandwidth in a plane of a sample to be analyzed, said sample emitting radiation of a second bandwidth in response to said light striking said sample;

transfer means on a side of said plane receiving said light and immediately adjacent said sample for collecting radiation emitted from said sample and for transmitting said radiation to the exclusion of said light to a detector remote from said sample for analysis, said transfer means comprising an opaque light shield including a port immediately adjacent said sample and including a longitudinal axis defining an acute angle with said plane and being

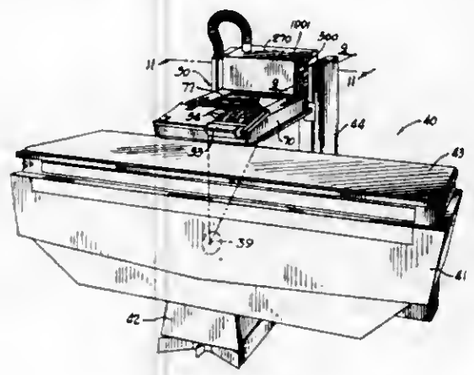


dimensioned to receive and collect a sector of the radiation emitted from said sample, and a light pipe mounted in said shield with an acutely angled end in said port to intersect said longitudinal axis and an opposite end remote from said sample and facing said detector; and
a radiation filter for only passing radiation of said second bandwidth, said filter being located at said opposite end of said light pipe and adjacent said detector.

4,031,400
X-RAY SOFT FILMER

Robert P. Hunt, Chesterland, and Robert J. Steffek, Wickliffe, both of Ohio, assignors to Picker Corporation, Cleveland, Ohio

Filed Oct. 7, 1974, Ser. No. 512,998
Int. Cl.² B65H *5/22*; G11B *1/00*
U.S. Cl. 250—468 **43 Claims**

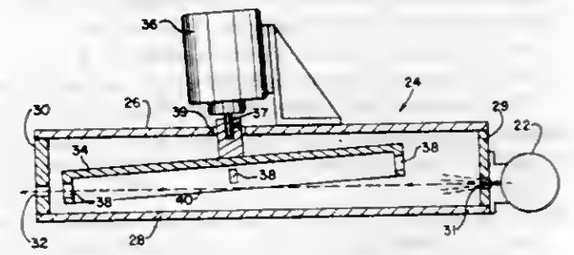


17. An X-ray spot filmer, comprising:
a. a housing structure defining a chamber and having an opening formed therethrough communicating with said chamber;
b. a film positioning assembly movably supported within said chamber for movement between a loading position and an exposure station;
c. drive means carried within said chamber for moving said film positioning assembly between said loading position and said exposure station;
d. film feed means for feeding a sheet of film along a feed path into said assembly and for feeding a sheet of film out of said assembly when said assembly is in said loading position; and,
e. support means supporting said film feed means for movement as a unit through said opening for insertion into and withdrawal from said housing structure.

4,031,401
RADIANT ENERGY IMAGING SCANNING

Daniel Jacob, Allston, Mass., assignor to American Science & Engineering, Inc., Cambridge, Mass.

Filed Mar. 14, 1975, Ser. No. 558,426
Int. Cl.² G01J *1/00*
U.S. Cl. 250—503 **5 Claims**

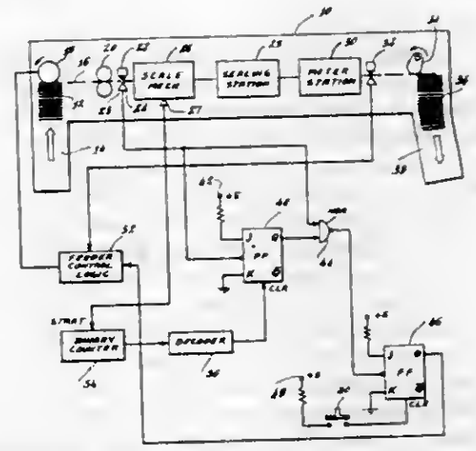


1. Radiant energy image scanning apparatus comprising,
a source of radiant energy that may not be focused by conventional lenses in accordance with the principles of geometric optics,
first means opaque to said radiant energy formed with an exit slit for providing therefrom a pencil beam of radiant energy that scans along the length of said slit.
second means opaque to said radiant energy in the form of an annular rim formed with at least one slit that is generally parallel to the rim axis and generally perpendicular to the length of said exit slit.
and means for rotatably supporting said second means for rotation about said axis with the projection of the at least one slit therein traversing said exit slit as said annular rim rotates oriented so that one surface of said annular rim intercepts said radiant energy while the portion of the annular rim diametrically opposite the intercepting portion is offset from a line joining said source and said exit slit whereby said slit in said second means transmits said radiant energy to said exit slit as said second means is angularly displaced about its axis to coact with said exit slit to provide said scanning pencil beam,
said source of radiant energy being outside said annular rim and spaced from said exit slit by a distance greater than the diameter of said annular rim.

4,031,402
STREAM FEED DETECTOR FOR DETECTING DOCUMENT SPACING

Daniel F. Dlugos, Huntington, and Flavio M. Manduley, Seymour, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed Mar. 23, 1976, Ser. No. 669,530
Int. Cl.² G06K *7/015*, *15/00*
U.S. Cl. 250—557 **8 Claims**



1. For use in a object handling device wherein objects are

fed in seriatim along a predetermined path, a stream feed detector for detecting inadequate separation of successive objects, said stream feed detector including:

an object detecting means located on the path at a predetermined point for generating a first level of signal when an object is present and a second level of signal when no object is present;

a bistable device connected to said object detecting means, said bistable device being driven to one state upon a change from the second level to the first level of signal;

counting means for clearing said bistable device to a second state at the end of a predetermined period of time;

means for initiating operation of said timing means when an object is at a second predetermined point on the path; and

logic means having inputs from said object detecting means and said bistable device for generating an inadequate separation signal if the output of said object detecting means returns to the first level before said bistable device is cleared to the second state.

4,031,403

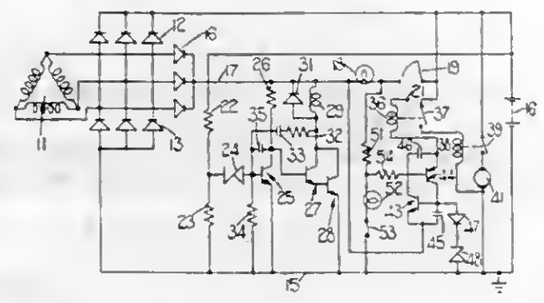
ROAD VEHICLE ELECTRICAL SYSTEMS

William Frank Hill, Stafford, England, assignor to The Lucas Electrical Company Limited, Birmingham, England

Continuation of Ser. No. 385,561, Aug. 3, 1973. This application Sept. 22, 1975, Ser. No. 615,806

Int. Cl.² F02N *11/00*

U.S. Cl. 290—38 R **8 Claims**



1. A road vehicle electrical system comprising an alternator, first and second supply lines, a rectifier connecting the alternator to the first and second supply lines, a vehicle battery connected between the first and second supply lines, at least one additional diode connecting the alternator to a third supply line which when the alternator is operating will reach substantially the same potential as the first line, a warning lamp connected in series with the vehicle ignition switch between the the third and first supply lines, a voltage regulator connected between the third and second supply lines, a starter motor, a control device for the starter motor which when energised energises the starter motor, circuit means connecting said control device between the first and third supply lines so that the control device is energised by way of the voltage regulator, but is de-energised when the alternator energises the third supply line, and switching means operated by the engine of the vehicle independently of the alternator for preventing the control device from being re-energised while the engine is running.

4,031,404

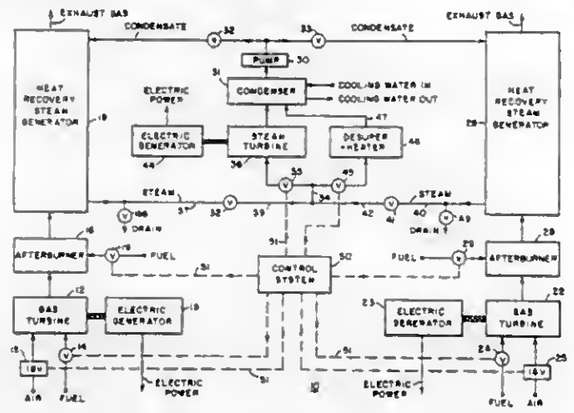
COMBINED CYCLE ELECTRIC POWER PLANT AND A HEAT RECOVERY STEAM GENERATOR HAVING IMPROVED TEMPERATURE CONTROL OF THE STEAM GENERATED

Lyle F. Martz, Verona, Pa., and Richard J. Plotnick, Cherry Hill, N.J., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 8, 1974, Ser. No. 495,723

Int. Cl.² F01K *23/00*

U.S. Cl. 290—40 R **32 Claims**



1. A combined cycle electric power plant comprising:

a. at least one gas turbine including an exit through which heated exhaust gases pass;

b. means for generating steam coupled to said gas turbine exit for transferring heat from the exhaust gases to a fluid passing through said steam generating means;

c. a steam turbine coupled to said steam generating means and driven by the steam supplied thereby;

d. means for generating electric power by the driving power of said turbines;

e. an afterburner for supplying additional heat to the exhaust gases passing from said gas turbine to said steam generating means;

f. valve means for controlling the flow of fuel to said afterburner;

g. condenser means for receiving and converting the spent system from said steam turbine into condensate;

h. temperature measuring means disposed to measure the temperature of the exhaust gases heated by said afterburner, for providing an output indicative thereof; and

i. means for controlling the operation of said turbines and said steam generating means, comprising steam temperature control means responsive to the output of said temperature measuring means for regulating the opening of said afterburner valve means, whereby the temperature of the superheated steam supplied to said steam turbine is controlled.

4,031,405

WINDMILL WITH SHROUD ADJUSTING MEANS

Paul Asperger, 4225 Cheryl Drive, Flint, Mich. 48506

Filed Aug. 4, 1975, Ser. No. 601,464

Int. Cl.² F03D *9/02*

U.S. Cl. 290—55 **6 Claims**

1. A windmill comprising:

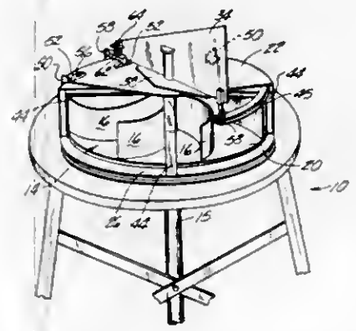
a vane assembly and means rotatably mounting said vane assembly about a vertical axis;

a shroud disposed over a portion of said vane assembly and means mounting said shroud to be rotatable with respect to said vane assembly whereby said shroud can be rotated to cover different portions of said vane assembly;

a directional vane movable by the wind to face the direction of the wind and means rotatably mounting said directional vane independently of said assembly;

means selectively attaching said directional vane to said shroud at different positions on said shroud whereby said shroud is moved by said directional vane to a position with respect to said vane assembly depending upon the position at which said directional vane is attached to said shroud;

said vane assembly mounting means comprising a first shaft and said directional vane mounting means comprising a second shaft, said first shaft and said second shaft being independent of each other, said first shaft being mounted



in a fixed position and said second shaft being fixed to said vane to be rotatable therewith;

said shroud mounting means including means rotatably mounting said shroud to said first shaft;

said attaching means comprising a plurality of stop members disposed on said shroud and spaced within an arc of substantially 90° with respect to the axis of rotation of said shroud and means carried by said directional vane for selective attachment to said stop means.

4,031,406

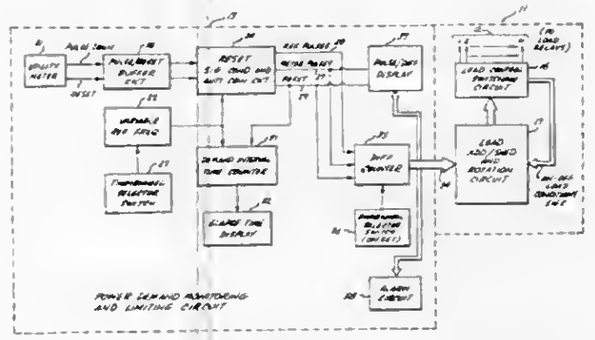
METHOD AND APPARATUS FOR CONTROLLING ELECTRICAL LOADS

Warren L. Leyde, Seattle, and Delbert E. Marker, Issaquah, both of Wash., assignors to Pacific Technology, Inc., Renton, Wash.

Filed June 16, 1975, Ser. No. 587,150

Int. Cl.² H02J *13/00*

U.S. Cl. 307—41 **13 Claims**



1. In an electrical system including a load controller having a plurality of load controlling outputs each capable of assuming either a load-on condition or a load-off condition, said outputs being adapted for individually controlling the connections of a corresponding plurality of electrical loads to a power source, and a load regulating means connected to said controller for regulating the collective status of said load-on and load-off conditions at said outputs, said regulating means assuming an add mode when the number of said outputs that are in said load-on condition is to be increased and assuming a shed mode when the number of said outputs that are in said load-on condition is to be decreased, the improvement in said controller comprising:

switching means connected to said outputs and having input means responsive to said regulating means for successively switching said outputs from said load-off conditions to said load-on conditions when the regulating means is in the add mode and for successively switching said outputs from said load-on conditions to said load-off conditions when said regulating means is in the shed mode, said switching means including means for establishing a plurality of different orders of succession in which said outputs are successively switched;

rotation circuit means for changing said switching means from one of said orders of succession to another of said orders of succession; and,

means for sensing a predetermined collective status of said conditions at said outputs, said rotation circuit means being operative in response to said means for sensing so as to change said switching means from one of said orders of succession to another of said orders of succession when said conditions at said outputs assume said predetermined collective status.

4,031,407

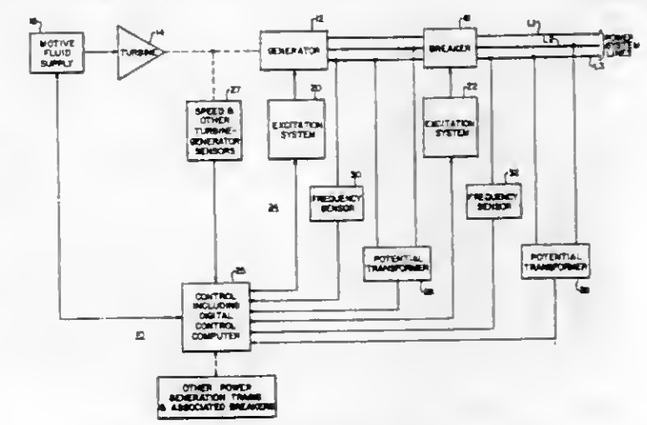
SYSTEM AND METHOD EMPLOYING A DIGITAL COMPUTER WITH IMPROVED PROGRAMMED OPERATION FOR AUTOMATICALLY SYNCHRONIZING A GAS TURBINE OR OTHER ELECTRIC POWER PLANT GENERATOR WITH A POWER SYSTEM

Terry J. Reed, Latrobe, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 99,493, Dec. 18, 1970, abandoned. This application July 31, 1972, Ser. No. 276,343

Int. Cl.² H01J *3/00*

U.S. Cl. 307—87 **32 Claims**



1. A system for operating an electric power plant comprising an electric generator, a prime mover for driving said generator, a circuit breaker for connecting the electric output of said generator to an external power system, a plant control system including means for controlling prime mover motive fluid flow, said control system including a digital control computer, means for detecting the generator speed and the external system frequency, means for determining a computer representation of the magnitude and rate of change of generator output and external system phase difference as a function of time, means for generating a first electric signal representative of the phase difference between the generator and system waveforms, the last named determining means finely determining said phase difference representation in accordance with a computer representation of said phase difference signal after the slip frequency is reduced below a predetermined value, the last named determining means roughly determining said phase difference representation in accordance with representations of the generator speed and external system frequency until the slip frequency is reduced below said predetermined value, said control system providing a loop for controlling prime mover speed in response to a speed reference means for operating said computer within said speed control loop at least to generate said speed reference representation at least during startup operations, means for operating said computer to modify said speed reference representation as a func-

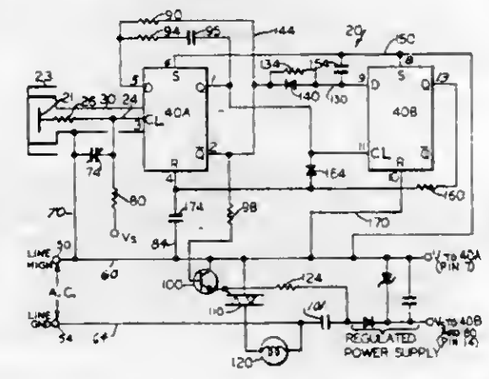
tion of said phase difference representation, means for operating said computer to generate a breaker closure command when said phase difference representation reaches a predetermined condition, and means for operating said breaker in response to said closure command.

4,031,408

PROXIMITY SWITCHING SYSTEM

George Ernest Holz, 97 Grandview Ave., N. Plainfield, N.J. 07060

Filed Oct. 3, 1975, Ser. No. 619,306
Int. Cl.² H05B *37/00*
U.S. Cl. 307—116 16 Claims



1. A control system for operating a utilization device comprising

an A.C. power line including a high side and a ground side connected to ground,

a circuit adapted to produce an output signal when it receives an input signal and having input terminal means and output terminal means,

said utilization device being coupled to the output terminal means of said circuit, and

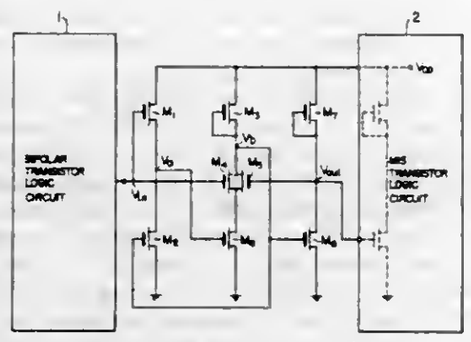
capacitive input signal means coupled by a lead to said input terminal means and comprising a sensor electrode and a conductive shield surrounding said sensor electrode and said lead to shield said sensor from spurious signals, the high side of said A.C. power line being connected to said shield, said sensor electrode being accessible for capacitive coupling to a human body positioned adjacent thereto for generating input signals for said circuit.

4,031,409

SIGNAL CONVERTER CIRCUIT

Shunji Shimada, Kodaira, and Harumi Wakimoto, Hino, both of Japan, assignors to Hitachi, Ltd., Japan

Filed May 26, 1976, Ser. No. 689,966
Claims priority, application Japan, May 28, 1975, 50-62897
Int. Cl.² H03K *3/353*, *19/08*
U.S. Cl. 307—208 3 Claims



1. A signal converter circuit comprising:

a first stage including a source follower circuit having a MIS FET and a first load connected to the source of the MIS FET, the gate of said MIS FET being arranged for reception of an input to the signal converter cicuit;

a second stage including a pair of MIS FETs having their drains connected to each other and their sources connected to each other, a switching MIS FET having its drain connected to the sources of said pair of MIS FETs and its gate connected to the output of said source follower circuit, and a second load connected to the drains of said pair of MIS FETs; and

a third stage including an inverter circuit having a MIS FET and a third load connected to the drain of the MIS FET, the gate of the MIS FET in said third stage being connected to the drains of said pair of MIS FETs in said second stage;

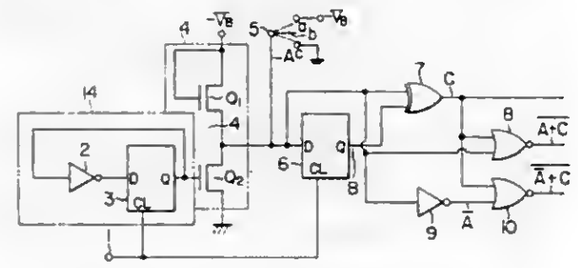
the gate of one of said pair of MIS FETs in said second stage being connected to the gate of the MIS FET in said first stage while the gate of the other of said pair of MIS FETs being connected to the drain of the MIS FET in said third stage.

4,031,410

THREE-STATE DISCERNMENT CIRCUIT

Tadao Kikuchi, Tokyo, Japan, assignor to Hitachi, Ltd., Japan

Filed June 22, 1976, Ser. No. 698,788
Claims priority, application Japan, June 23, 1975, 50-75566
Int. Cl.² H03K *19/08*, *17/02*
U.S. Cl. 307—209 2 Claims



1. A three-state discernment circuit comprising:

first signal generating means for generating a binary signal including logic 0 and 1 levels, said logic 0 and 1 levels being alternately generated in synchronism with a clock signal;

means for applying said binary signal from said first signal generating means to one predetermined terminal through circuit means having a high output impedance, said predetermined terminal being adapted to be selectively connected to power source and ground potentials and opened therefrom;

second signal generating means for receiving a first signal from said predetermined terminal to generate a second signal synchronous with said clock signal but delayed by one bit relative to said first signal;

first logic means for receiving said first and second signals to produce a first logic output representative of an EXCLUSIVE OR combination thereof;

second logic means for receiving said first logic output and one of said first and second signals to produce a second logic output representative of a NOR combination thereof; and

third logic means for receiving said first logic output and an inversion of one of said first and second signals to produce a third logic output representative of a NOR combination thereof;

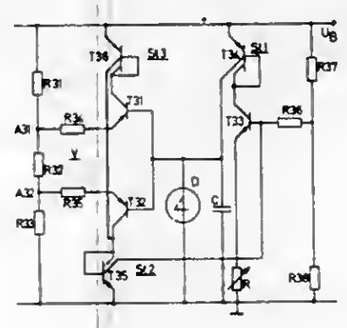
whereby a desired signal is obtained from one of said first, second and third logic means in accordance with one of the condition that said predetermined terminal is connected to the power source potential, the condition that the predetermined terminal is connected to the ground potential and the condition that the predetermined terminal is opened from the power source and ground potentials.

4,031,411

MONOLITHIC INTEGRATED CIRCUIT FOR THE DISTORTION OF A SAW-TOOTH SIGNAL

Hermannus Schat, Freiburg, and Laurin Clemens Freyberger, Endingen, both of Germany, assignors to ITT Industries, Inc., New York, N.Y.

Filed Aug. 4, 1975, Ser. No. 601,759
Claims priority, application Germany, Aug. 16, 1974, 2439343
Int. Cl.² H03K *17/00*
U.S. Cl. 307—228 6 Claims



1. A monolithic integrated circuit for distorting a linear saw-tooth signal without using RC-networks, preferably for the tangent correction of the saw-tooth shaped vertical deflecting current of television picture tubes, which saw-tooth is generated by the charging of a capacitor, comprising:

a regulating circuit which influences the charging current of said capacitor in dependence upon the amplitude of the saw-tooth generator output signal, said regulating circuit comprising:

a voltage comparator (V) having applied thereto the capacitor voltage;

a coupling transistor (T33) having a base electrode coupled to the output of said voltage comparator; an emitter electrode coupled to a reference and

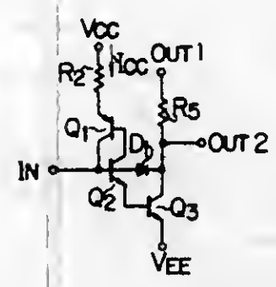
a first current transformer (St1), the collector current of said coupling transistor being coupled to the charging current of said capacitor via said first current transformer.

4,031,412

MEMORY CIRCUIT

Ichiro Ohhinata, Yokohama, and Shinzi Okuhara, Fujisawa, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Dec. 23, 1975, Ser. No. 643,757
Claims priority, application Japan, Dec. 27, 1974, 50-148637
Int. Cl.² H03K *17/00*; G11C *11/40*
U.S. Cl. 307—238 10 Claims



1. A memory circuit comprising:

a semiconductor element circuit having equivalently a PNPN four-layer structure including a P-type emitter, an N-type base, a P-type base and an N-type emitter; and

at least an NPN transistor and a diode; and wherein

said N-type emitter of said semiconductor element circuit is connected to the base of said NPN transistor, said P-type base of said semiconductor element circuit is connected to the anode of said diode, the cathode of said diode being connected to the collector of said NPN transistor, said collector being used for a current absorbing terminal,

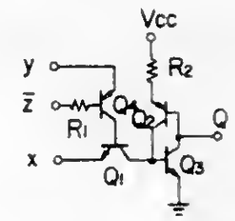
whereby the NPN transistor is adapted to be set to a controlled saturation state by feeding current externally to the collector of said NPN transistor to thereby maintain the memory circuit in the ON state.

4,031,413

MEMORY CIRCUIT

Ichiro Ohhinata, Yokohama; Shinzi Okuhara, Fujisawa, and Tetsuo Takeshita, Yokohama, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 2, 1976, Ser. No. 646,045
Claims priority, application Japan, Jan. 10, 1975, 50-4938; May 14, 1975, 50-56072
Int. Cl.² G11C *15/04*, *11/40*
U.S. Cl. 307—238 6 Claims



1. A memory circuit under the logical control of three inputs, comprising a semiconductor element circuit corresponding to a four layer PNPN structure and having a control gate; at least a PNP transistor and an NPN transistor, the PNP transistor being connected at its collector to the base of the NPN transistor, the NPN transistor being connected at its collector to the control gate of the semiconductor element circuit, whereby the emitter and base of the PNP transistor and the emitter of the NPN transistor function as logical input terminals, respectively.

4,031,414

CIRCUIT ARRANGEMENT FOR PRODUCING HIGH CURRENT PULSES

Thomas Clyde Giles, Downers Grove; Otto James Kobout, Addison, and Gerald Michael Rinaldi, Mundelein, all of Ill., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed June 10, 1976, Ser. No. 694,751
Int. Cl.² H03K *17/00*
U.S. Cl. 307—270 8 Claims

1. A pulse generating circuit for supplying high current pulses to a load comprising:

a first selectively controlled constant current source;

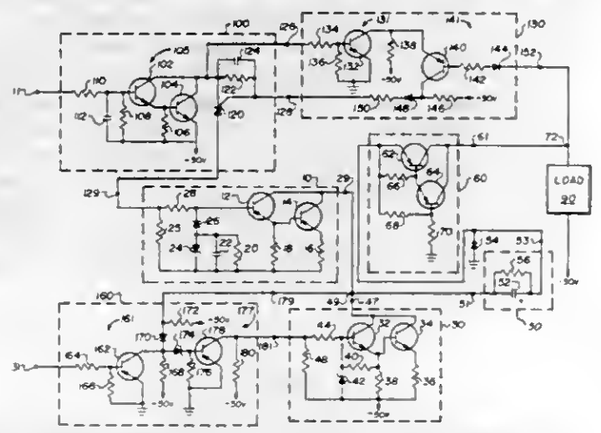
capacitor means connected to said first constant current source;

a second selectively controlled constant current source connected to said capacitor means for charging said capacitor means to a first predetermined voltage level;

first means for establishing a first electrical path for charging said capacitor means when said second constant current source is operated;

second means for limiting the voltage at the output of said first constant current source to a first predetermined value when said first constant current source is operated; and

third means for isolating said load from said capacitor



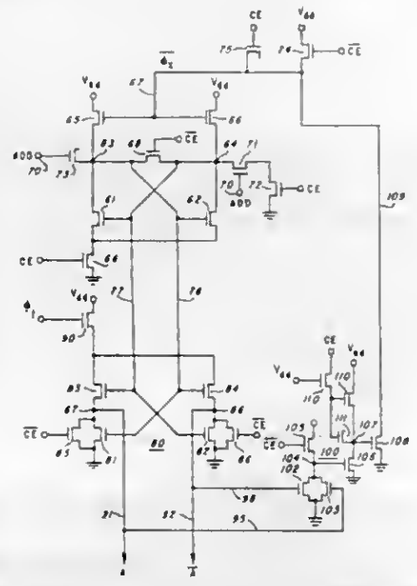
means when said second constant current source is operated.

4,031,415

ADDRESS BUFFER CIRCUIT FOR SEMICONDUCTOR MEMORY

Donald J. Redwine, and Norishisa Kitagawa, both of Houston, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 22, 1975, Ser. No. 624,813
Int. Cl.² H03K *3/286, 3/353;* **G11C** *11/40;* **H03K** *5/20*
U.S. Cl. 307—279 **21 Claims**



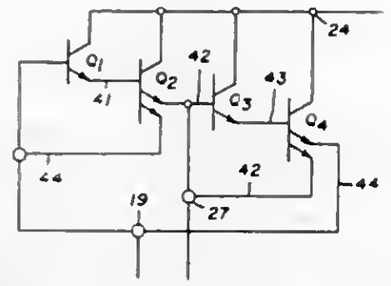
1. An input buffer circuit for an address input of a semiconductor memory device, comprising:
a pair of driver transistors substantially unbalanced in size and characteristic, each driver transistor having a control electrode and two output electrodes, the driver transistors being cross coupled by connection of the control electrode of each to an output electrode of the other,
a pair of load transistors, one for each of the driver transistors, the load transistors being substantially balanced in size and characteristic, each of the load transistors being connected in series with one of the driver transistors and a supply voltage,
means connected to turn on the pair of load transistors at a given time and to turn off the load transistors after a preselected period;
means to short output electrodes of the pair of cross coupled driver transistors together to equalize the voltages on such output electrodes prior to said given time;
means connected to one of the output electrodes of one of said pair of cross-coupled driver transistors to couple said one of the output electrodes to a reference potential when said address input is present during said preselected period; and
a pair of address signal output circuits, each of which has an input connected to an output electrode of a different one of the pair of cross-coupled driver transistors and responsive to the voltage level thereof during said preselected period but delayed by a specified period after said given time, one of the pair of address signal output circuits producing an address signal and the other producing the complement of the address signal during a period of time beginning after said specified period.

4,031,416

SEMICONDUCTOR AMPLIFICATION MEANS COMBINING TWO CASCADED TRANSISTOR AMPLIFIERS OF HIGH INVERSE IMPEDANCES

William Pell, North Syracuse, N.Y., assignor to General Electric Company, Syracuse, N.Y.

Filed Mar. 8, 1976, Ser. No. 664,509
Int. Cl.² H03K *3/26*
U.S. Cl. 307—299 A **6 Claims**



1. Semiconductor amplification means comprising:
a. four transistors of like conductivity type wherein
1. the emitter of the first transistor (Q1) is coupled to the base of the second transistor (Q2),
2. the transistor Q2 has a first and a second emitter, said first emitter of Q2 being coupled to the base of the third transistor (Q3), and the second emitter of Q2 being coupled to the base of Q1 to insure turn off of Q2 when Q1 is turned off,
3. the emitter of Q3 is coupled to the base of the fourth transistor (Q4),
4. the transistor Q4 has a first and a second emitter, said first emitter of Q4 being coupled to the base of Q1, and said second emitter of Q3 being coupled to the base of Q3 to insure turn off of Q4 when Q3 is turned off, and
b. a first terminal for connection to a d.c. source coupled to the collectors of Q1, Q2, Q3, Q4.

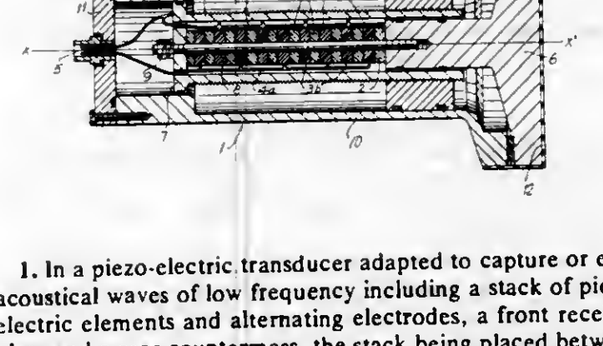
4,031,417

APPARATUS FOR COUPLING A DIGITAL DATA GENERATOR TO A DIGITAL DATA READOUT DEVICE WITH ELECTRICAL ISOLATION THEREBETWEEN

Charles R. Wesner, Crozet, Va., assignor to Sperry Rand Corporation, New York, N.Y.

Filed May 10, 1976, Ser. No. 684,991
Int. Cl.² H03K *17/60, 03/42*
U.S. Cl. 307—311 **6 Claims**

1. An apparatus for coupling a digital data generator to a digital data readout device and for providing electrical isolation therebetween, said apparatus comprising:
means for providing a control signal in response to a data signal coupled from said digital data generator;
means coupled to said control means for switching from a first state to a second state when said control signal achieves a first predetermined level and from said second state to said first state when said control signal achieves a second predetermined level, said switching means including
a first transistor having its collector coupled to said control means and its base coupled to said control means;
a second transistor having its collector coupled to said base of said first transistor, its base coupled to the emitter of said first transistor and the emitter coupled to ground; and
a third transistor having its base coupled to ground and to said collector of said first transistor and its emitter coupled to ground and to said base of said transistor; and



means for providing electrical isolation between said switch means and said digital data readout device and for coupling a signal, in response to said state of said switch means, to said digital data readout device, said coupled signal being representative of said data signal generated by said digital data generator, said isolation means having a first input terminal coupled to the base of said first transistor of said switch means and a second input terminal coupled to the collector of said third transistor of said switch means and having first and second output terminals coupled to said digital data readout device.

4,031,418

LOW FREQUENCY ACOUSTICAL PIEZO-ELECTRIC TRANSDUCER

Philippe Cluzel; Michel Quivy, both of Six-les-Fours-les Plages, and Bernard Tocquet, Sanary, Mer, all of France, assignors to Etat Francais, Paris, France

Filed Sept. 3, 1975, Ser. No. 610,076
Claims priority, application France, Sept. 9, 1974, 74.30415
Int. Cl.² H01L *41/04*
U.S. Cl. 310—8.2 **8 Claims**

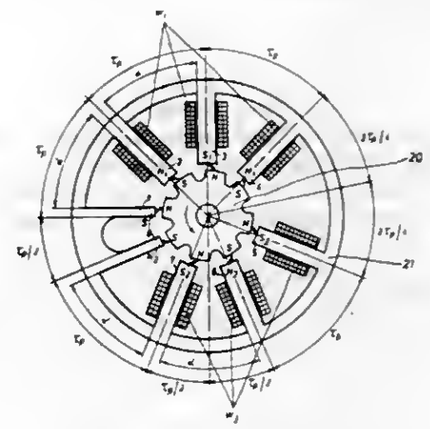
1. In a piezo-electric transducer adapted to capture or emit acoustical waves of low frequency including a stack of piezo-electric elements and alternating electrodes, a front receiver plate and a rear countermass, the stack being placed between the front plate and the rear countermass, an improvement wherein said counter mass is placed at least in part at the front of the rear extremity of the stack and therearound, and comprises a rigid annular block mounted around the stack, a rear plate at the rear extremity of the stack, and elastic connection means between said block and said rear plate, said elastic connection means including a tube, the stack being in the interior of said tube.

4,031,419

SELF-STARTING SYNCHRONOUS AND STEPPING MOTOR HAVING A PERMANENT MAGNET ROTOR

August Spiesberger, Lahr, and Claus Schäffer, Heiligenzell, both of Germany, assignors to Gerhard Berger, Fabrik Elektrischer Messgerate, Lahr, Germany

Filed July 28, 1975, Ser. No. 599,765
Claims priority, application Germany, July 31, 1974, 2436886
Int. Cl.² H02K *37/00*
U.S. Cl. 310—49 R **10 Claims**



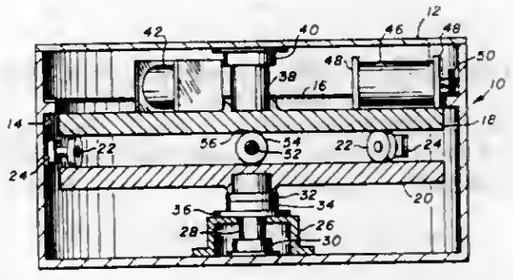
1. In a self-starting synchronous motor of the type having $m \geq$ two phases, a permanent magnet-type rotor with a plurality of alternately polarized poles, a stator including individually excited and inwardly facing main stator poles, both said stator and rotor having an interpole center-to-center angular distance of τ_p, said stator poles being combined in u groups of alternate polarity per phase which groups are spatially displaced from each other by an angle $\tau_p/m = \delta = 180°/m \cdot p$, where p is the number of pole pairs of the rotor, the improvement comprising that at least one windingless auxiliary stator pole of approximately one-half of the width of the main stator poles is provided per group and per phase in addition to the main stator poles, the total number of stator poles being at least equal to the number of rotor poles.

4,031,420

FLYWHEEL DRIVE SYSTEM

Eugene P. Carini, 800 28th Ave., Vero Beach, Fla. 32960

Filed Apr. 22, 1976, Ser. No. 679,193
Int. Cl.² H02K *7/02*
U.S. Cl. 310—74 **12 Claims**



1. Rotary motion producing apparatus comprising:
a housing;
first flywheel means, said first flywheel means including a

first flywheel supported in said housing for rotation about an axis;

second flywheel means, said second flywheel means including a second flywheel supported in said housing for rotation about said axis;

drive means for causing said first flywheel to rotate about said axis, said drive means including at least a first electric motor;

means drivingly coupling said first flywheel to said second flywheel whereby said first and second flywheels rotate about said axis in opposite directions;

power take-off means, said power take-off means including a rotatable output shaft oriented transversely to said axis; and

means coupling said first and second flywheel means to said power take-off means whereby the motion of said flywheels is transmitted to said power take-off means output shaft.

4,031,421

ELECTRIC GENERATOR

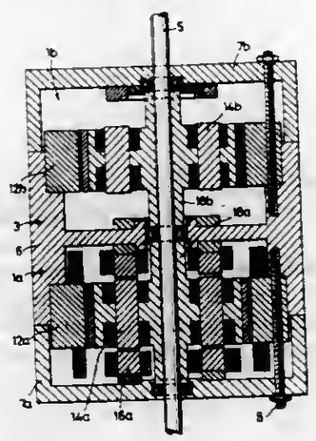
Otto Geiger, Schwabach, Germany, assignor to GeSig Energietechnik GmbH, Schwabach, Germany

Filed Sept. 24, 1975, Ser. No. 616,349

Claims priority, application Germany, Sept. 25, 1974, 2445765

Int. Cl.² H02K *19/34*

U.S. Cl. 310—112 **12 Claims**



1. An electric generator comprising, in combination, a rotor with a shaft, a stator, both carrying respective, peripherally successive poles with a substantially uniform angular distance therebetween, and at least one pair of electrically identical but separate axially aligned generator sections, the latter including pole cores that occupy substantially the same sectors as gaps therebetween, and wheren the angular position of said shaft, in which position said rotor poles overlap between the rotor and the stator of the same generator section, is offset from both generator sections by half the angular distance between said rotor poles.

4,031,422

GAS COOLED FLUX SHIELD FOR DYNAMOELECTRIC MACHINE

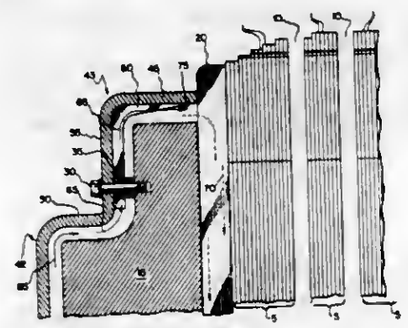
Aathony F. Armor; Madabushi V. K. Chari; Henry W. Kudlacik, all of Schenectady, N.Y., and Paul Reece, Pittsfield, Mass., assignors to General Electric Company, Schenectady, N.Y.

Filed Sept. 2, 1975, Ser. No. 609,390

Int. Cl.² H02K *1/12*

U.S. Cl. 310—256 **6 Claims**

1. A dynamoelectric machine of the type including a gas cooled stator core comprising a plurality of laminations held in assembled relationship by end flanges applying a compressive loading thereto and an annular flux shield for reducing the eddy current losses in the end flanges and the stator cores, the flux shield including an inner rim disposed adjacent to and spaced from a respective end flange for providing a passage for the flow of cooling gas therebetween and including the improvement comprising:



means for circulating cooling gas radially through the passage between said flux shield and said end flange, and

means disposed adjacent the inner rim of said flux shield for increasing the amount of heat transfer surface area between said flux shield and said cooling gas.

4,031,423

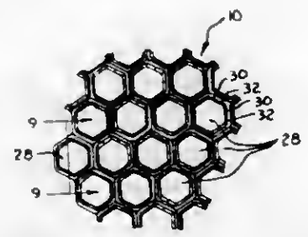
CHANNEL STRUCTURE FOR MULTI-CHANNEL ELECTRON MULTIPLIERS AND METHOD OF MAKING SAME

Walter P. Siegmund, Woodstock, Conn., assignor to American Optical Corporation, Southbridge, Mass.

Filed Apr. 30, 1969, Ser. No. 823,245

Int. Cl.² H01J *43/00*

U.S. Cl. 313—105 CM **4 Claims**



1. An electron multiplier component comprising a glass plate having a multiplicity of juxtapositioned channels extending from one face through the plate to an opposite face thereof, the inner wall of each channel being formed of a plurality of contiguous strips of glass extending along substantially the full length of the channel, said strips being alternately one of a glass having high electrical conductivity and another of a glass having high electron emissive properties and a matrix glass surrounding said strips.

4,031,424

ELECTRODE TYPE GLOW DISCHARGE APPARATUS

Alan S. Penfold, Playa del Rey, and John A. Thornton, Los Angeles, both of Calif., assignors to Telic Corporation, Santa Monica, Calif.

Division of Ser. No. 178,240, Sept. 7, 1971, Pat. No. 3,484,239. This application Mar. 3, 1975, Ser. No. 554,485

Int. Cl.² H01J *1/02, 1/44, 1/52, 21/22*

U.S. Cl. 313—146 **3 Claims**

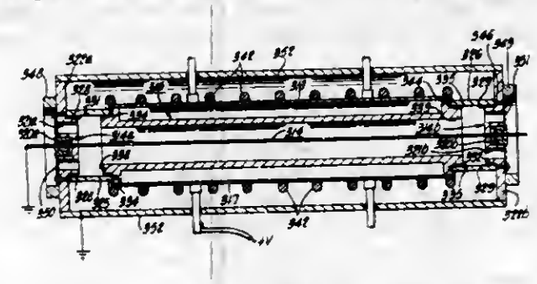
1. Electrode-type glow discharge apparatus comprising:

a low pressure gaseous environment;

anode means and cathode means within said low pressure gaseous environment and adapted to be coupled to a power supply;

said cathode means including a central cathode and a pair of electrically conductive end flanges physically and electrically coupled with said cathode,

said cathode comprising an elongated member and said flanges comprising outwardly extending flanges electrically coupled with said elongated member, said elongated member being movable from outside said gaseous environment into said gaseous environment through and with respect to said flanges along the longitudinal axis of said flanges.



4,031,425

DISPENSER CATHODE FOR A GRID-CONTROLLED ELECTRON TUBE AND METHOD OF MANUFACTURING SAME

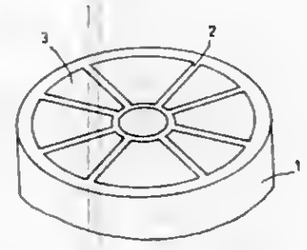
Reinhard Ziegler, and Horst Seifert, both of Hamburg, Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 2, 1975, Ser. No. 619,061

Claims priority, application Germany, Oct. 19, 1974, 2449796

Int. Cl.² H01J *1/14, 19/06*; H01K *1/04*

U.S. Cl. 313—346 R **8 Claims**



1. A sintered dispenser cathode for a grid-controlled electron tube in which the emission of regions of the emissive surface of the cathode immediately opposite to the control grid is reduced, said cathode having projections above the emissive surface of fused pore-closed portions of reduced emission which have a focusing effect.

4,031,426

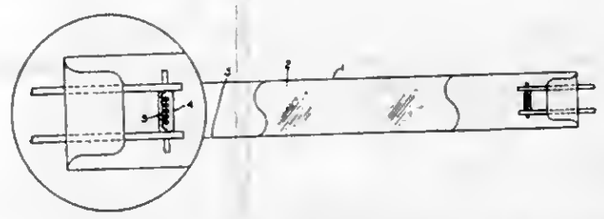
EMISSIVE COATING FOR ELECTRODES

Edmund R. Kern, Hampton, N.H., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Division of Ser. No. 487,409, July 10, 1974, Pat. No. 3,953,376. This application Dec. 15, 1975, Ser. No. 641,192

Int. Cl.² H01J *1/14*; D02G *3/00*

U.S. Cl. 313—346 R **2 Claims**



1. A cathode for electrical gas discharge devices comprising a tungsten coil and an electron emissive coating thereon said coil, said coating comprising barium tantalate having the composition five parts BaO to one part Ta_2O_5.

4,031,427

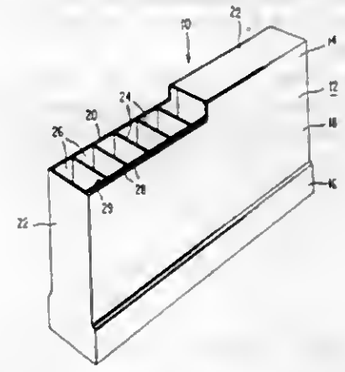
FLAT CATHODE RAY TUBE

Thomas Osborne Stanley, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Aug. 25, 1975, Ser. No. 607,492

Int. Cl.² H01J *29/08, 31/00*

U.S. Cl. 313—422 **9 Claims**



1. An electron beam addressed device comprising:

an evacuated envelope having mutually spaced, substantially parallel, front and back walls,

a target adjacent to and substantially co-extensive with the front wall,

means for generating and directing electrons along at least one path extending between said front and back walls and substantially parallel to said target,

guide means disposed along the entire length of said path for creating electrostatic forces which confine the electrons in a beam which is spaced from the walls of the envelope,

means for deflecting said beam toward said target at selected points along said path, and

openings in said guide means through which the beam can pass when it is deflected toward said target.

4,031,428

DISCHARGE TUBE HAVING MULTIPLE ELECTRODES ARRANGED IN TANDEM

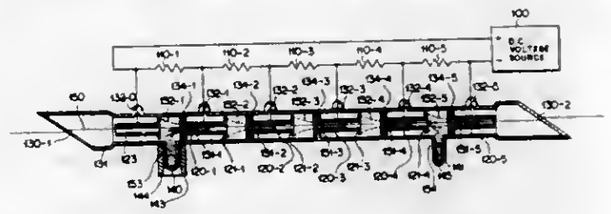
Katsumi Tokudome, Iruma, and Shuzo Hattori, Nagoya, both of Japan, assignors to Kimmon Electric Co., Ltd., Tokyo, Japan

Filed Mar. 15, 1976, Ser. No. 666,907

Claims priority, application Japan, Mar. 13, 1975, 50-30331

Int. Cl.² H01S *3/22*

U.S. Cl. 315—111 **7 Claims**



1. A discharge tube comprising:

a vessel containing rare gas;

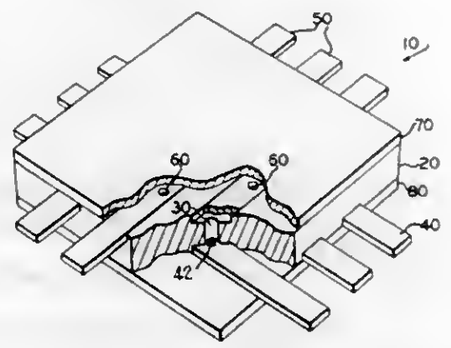
a plurality of electrodes having a cathodic part and anodic part therein and so arranged tandem in said vessel that a glow discharge is kept in a discharge gap between each said cathodic part and said anodic part of the preceding electrode, and that an optical path is provided to let

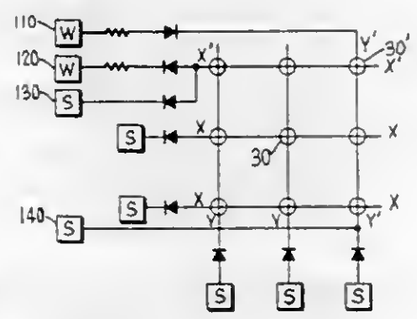
through each negative glow part of said glow discharge adjacent to said cathodic part;
means to apply a dc voltage across every said discharge gap in series; and
means to supply metal vapor to one of said glow discharge at the most low potential end of said means to apply dc voltage, whereby metal ions formed in said one of said glow discharge are carried down throughout said vessel.

4,031,429
INFORMATION DISPLAY AND METHOD OF OPERATING WITH STORAGE

George E. Holz, North Plainfield, and James A. Ogle, Neshanic Station, both of N.J., assignors to Burroughs Corporation, Detroit, Mich.

Continuation of Ser. No. 83,200, Oct. 22, 1970, abandoned, which is a continuation of Ser. No. 780,099, Nov. 29, 1968, abandoned. This application May 12, 1976, Ser. No. 685,550
Int. Cl.² H05B 41/16
U.S. Cl. 315—169 TV 44 Claims



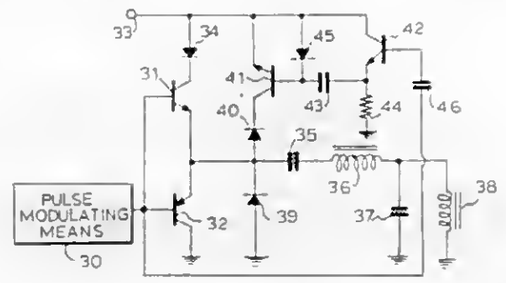


1. An information display system including
a glow discharge device comprising an envelope containing a gaseous atmosphere at a pressure capable of sustaining a glow discharge;
at least one anode electrode and one cathode electrode in operative relation with the gas disposed in said envelope,
the combination of said gas and said anode electrode and cathode electrode having a characteristic firing voltage;
means for applying a write voltage between said electrodes to produce a glow discharge in the gas between said electrodes, said write voltage having an amplitude greater than that of said characteristic firing voltage and permissibly as much as about twice the amplitude of said firing voltage, said glow discharge generating excited particles in said gaseous atmosphere; and
means for applying short duration sustaining pulses between said electrodes starting after the termination of said write voltage and continuing at spaced intervals thereafter but while excited particles still present;
said sustaining pulses being of shorter duration than said write voltage but of sufficient duration to sustain said glow discharge while excited particles are still present; said sustaining pulses having an amplitude greater than that of said firing voltage and a duration and repetition rate sufficient to sustain said glow discharge at a favorable level of light output, current flow, and power dissipation but insufficient to cause arcing; the amplitude, duration, and repetition rate of said sustaining pulses being insufficient to produce said glow discharge if said write voltage has not been applied and excited particles are not present.

4,031,430
VERTICAL DEFLECTION CIRCUIT

Shigeru Enomoto, Kyoto, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Nov. 12, 1975, Ser. No. 631,460
Claims priority, application Japan, Nov. 13, 1974, 49-131489; Dec. 5, 1974, 49-140277; Feb. 13, 1975, 50-18520
Int. Cl.² H01J 29/70, 29/76
U.S. Cl. 315—403 5 Claims



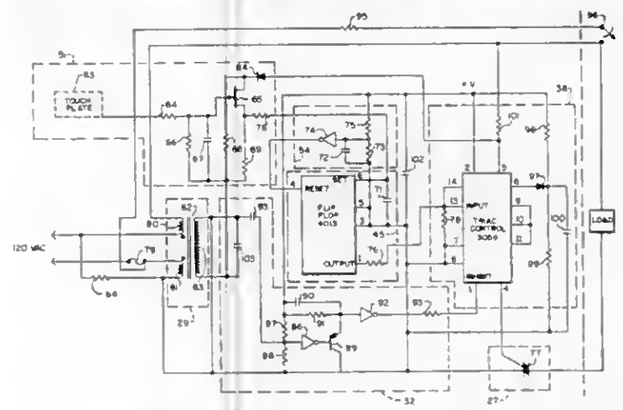
1. A vertical deflection circuit employing a class D amplifier comprising:
modulating means for converting a sawtooth waveform signal having a field frequency to a width modulated pulse train;
a pulse amplifier coupled to said modulating means for amplifying said width modulated pulse train, said pulse amplifier comprising an output circuit having a pair of switching devices which are connected in series and also connected for making one of them conductive while the other is nonconductive, two damping diodes each being connected in parallel with a corresponding switching device and reversely with respect to current flow through the switching devices, switching means connected in series with one of said damping diodes and which is nonconductive during a retrace period in said field frequency, and a forwardly biased diode coupled between one of said switching devices and a voltage supply source;
demodulating means for demodulating said width modulated pulse train to said sawtooth waveform, said demodulating means being composed of a filtering choke, a decoupling capacitor, one end of said choke being coupled to the connection between said switching devices through said decoupling capacitor, and a further capacitor coupled between the other end of the filtering choke and ground; and
a deflection yoke winding coupled between the connecting point between the filtering choke and said further capacitor, and ground.

4,031,431
GROUND FAULT CIRCUIT INTERRUPTER

Thomas A. O. Gross, Lincoln, Mass., assignor to The Gillette Company, Boston, Mass.

Filed Oct. 1, 1975, Ser. No. 618,567
Int. Cl.² H02H 3/28
U.S. Cl. 307—326 18 Claims

1. In a circuit for protecting the operator of a portable apparatus having an electrical load from an alternating current source having line and neutral conductor sides, circuit means capable of being electrically coupled between the alternating current source and the electrical load for sensing a current imbalance in the line and neutral conductor sides and developing an output signal in response to the current imbalance, switching means for interrupting the current in the line conductor side in response to said output signal, the improvement comprising:
polarity sensing means for indicating if said switching means

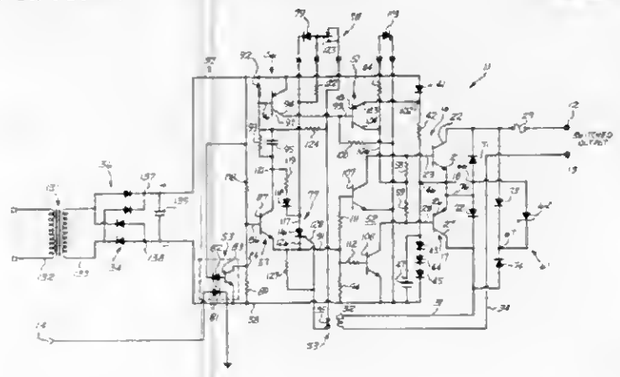


is electrically connected in series in the line conductor side when said circuit means is electrically connected to the alternating current source and means for permanently connecting the electrical load in series in a completed circuit with the switching means wherein the switching means is a solid state switch adapted to self-destruct prior to a lethal voltage developing across said permanently connected electrical load.

4,031,432
SOLID STATE SWITCHING CIRCUIT AND METHOD FOR SIMULATING A RELAY

Daryl F. Proctor, Redmond, Wash., assignor to Proctor and Associates Company, Redmond, Wash.

Filed Nov. 5, 1975, Ser. No. 629,127
Int. Cl.² H02H 7/20
U.S. Cl. 361—7 16 Claims

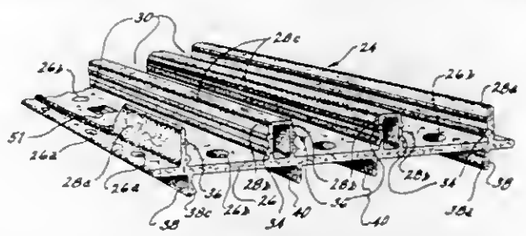


1. A solid state switch comprising:
a pair of output terminals adapted to be connected in a circuit path which is to be switched between closed and open conditions;
a pair of like polarity transistors having their emitters connected in common and having their collectors individually connected to a separate one of said output terminals;
switching signal source means having an output producing a switching signal at selected, non-periodic times; and
drive circuit means jointly connected to said emitters and to the bases of said pair of transistors, and said drive circuit means being connected and responsive to said output of said switching signal source means to drive the base emitter junctions of said pair of transistors between a forward biased condition in which said pair of output terminals connected to said collectors assume a relatively low impedance closed switch condition and a reverse biased condition in which said output terminals connected to said collectors assume a relatively high impedance open switch condition.

4,031,433
INSULATIVE MODULAR MOUNTING PANELS FOR ELECTRICAL SWITCHBOARDS

William Francis Olashaw, Plainville, Conn., assignor to General Electric Company, New York, N.Y.

Continuation of Ser. No. 474,761, May 30, 1974. This application Oct. 3, 1975, Ser. No. 619,241
Int. Cl.² H02B 1/20
U.S. Cl. 361—338 1 Claim

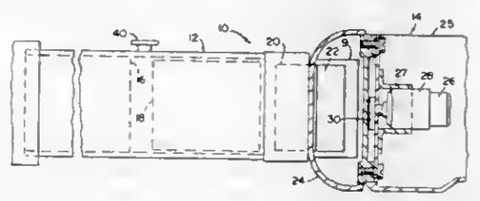


1. For use in an electrical switchboard having vertical busbars for distributing electrical power to a load via an electrical device accommodated in a switchboard compartment, a modular insulative mounting panel comprising:
A. a base plate having opposed marginal side portions for mounting attachment to the switchboard;
B. a plurality of spaced parallel ribs outstanding from one side of said base plate to define three open, longitudinally elongated, parallel channel sections, said rib plurality including two pairs of contiguous inboard ribs separating adjacent channel sections said contiguous inboard ribs of each pair interconnected adjacent their free edges by an integrally formed, coextensive bridging segment spanning the space between adjacent channel sections, said contiguous rib pairs and bridging segments serving to increase the oversurface clearance between adjacent channel sections;
C. busbar mounting means formed in said channel sections;
D. means forming two longitudinally spaced sets of transversely aligned apertures in said base plate, the apertures of at least one set individually located in each said channel section; and
E. coextensive spacer ridges integrally formed on the surfaces of those of said ribs constituting sidewalls for adjacent channel sections.

4,031,434
KEYHOLE-LESS ELECTRONIC LOCK

Robert Richard Perron, Beverly, and John E. Trombly, Winchester, both of Mass., assignors to The Eastern Company, Naugatuck, Conn.

Filed Dec. 29, 1975, Ser. No. 644,947
Int. Cl.² E05B 47/00
U.S. Cl. 361—172 6 Claims



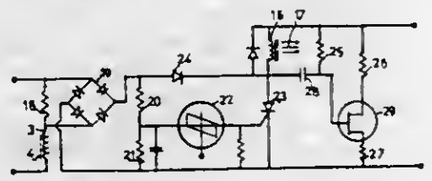
1. An electronic lock system comprising, in combination: key means including generating means for generating a plurality of binary frequency modulated carrier waves, first inductor means electrically connected to said generating means; lock means including lock inductor means positioned to induc-

tively couple with said key inductor means when said key means is in predetermined spatial relation to said lock means, signal distinguishing means electrically connected in circuit of said lock means and disposed to receive signals from said generating means whereby a predetermined sequence of binary signals is compared with the sequence of binary signals contained within the carrier from said generating means, motor means electrically connected in driven relation to said signal distinguishing means so that upon a corresponding comparison of said signal distinguishing means said motor means is activated, lock lug means connected in movable, driven relation to said motor means, whereby activation of said motor means causes movement of said lock lug means between a locked and unlocked position.

4,031,435
SWITCHING DEVICE

Dov Zioni, and Levi Y. Halperin, both of Jerusalem, Israel, assignors to Shaare Zedek Hospital, Jerusalem, Israel

Filed Apr. 8, 1976, Ser. No. 674,863
Int. Cl.² H01H 47/32
U.S. Cl. 361—186 **9 Claims**



1. An indirectly activated electrical switching device comprising an inductor adapted to be periodically pulse-energized, an armature movable mounted with respect to said inductor so as to assume a first and a second position relative to said inductor thereby causing a distinct variation of current flow in said inductor when energized by said periodically applied pulse, a manipulative armature positioning means and an associated electrical circuit responsive to current flowing in said inductor and adapted to selectively actuate and external system only when said armature assumes one of said positions and a periodic energizing pulse has reached the inductor.

4,031,436
ELECTROLYTE CAPACITORS

Robert S. Alwitt, Longmeadow, Mass., assignor to United Chemi-Con, Inc., Syracuse, N.Y.

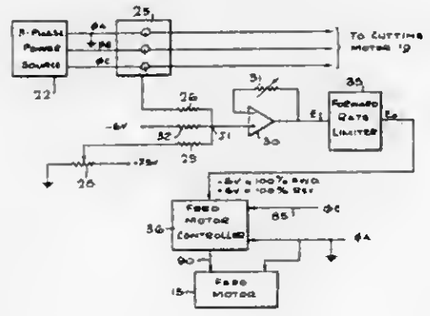
Filed May 9, 1975, Ser. No. 576,089
Int. Cl.³ H01G 9/02
U.S. Cl. 361—301 **9 Claims**

1. A capacitor comprising aluminum anode and cathode members separated by an insulating spacer impregnated with an electrolyte consisting essentially of a solute of a salt of a heteropoly acid of the class consisting of silicotungstic acid and silicomolybdic acid in a polar organic solvent, said salt being selected from the group consisting of alkali metal, ammonium, quaternary ammonium and amine salts, and said electrolyte having a pH of about 5 to about 7.2, said acid containing 1 silicon atom per 12 atoms of tungsten or molybdenum.

4,031,437
WORK AND FEED CONTROL SYSTEM FOR CUTTING MACHINES

Edward Justin Dempsey, Huntington Beach, and David Earl Kent, La Mirada, both of Calif., assignors to Concrete Cutting Equipment Inc., Hawthorne, Calif.

Filed July 10, 1975, Ser. No. 594,584
Int. Cl.² G05B 19/24
U.S. Cl. 318—39 **16 Claims**



1. In a machine for cutting material an arrangement comprising;

a cutting tool;

a cutting motor to which said cutting tool is coupled for producing a cutting motion of said tool at a rate proportional to the level of current supplies to said cutting motor, which level is in turn proportional to the load level of said cutting motor which is related to the load of said cutting tool;

a bidirectional variable speed feed motor for producing relative motion in a forward direction between said cutting tool and material to be cut, thereby feeding material to said cutting tool, and for producing relative motion in a reverse direction, which is opposite said forward direction, between said cutting tool and said material;

first means for continuously detecting said level of current to said cutting motor for providing a first signal proportional to the cutting motor load level;

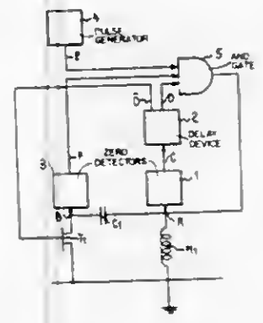
second means responsive to said first signal and to a selected second signal or providing a load level signal which is indicative of the cutting motor load level with respect to a desired cutting load level; and

third means responsive to said load level signal for controlling said feed motor to produce relative motion in the forward direction at a controlled rate of increase when the cutting motor load level is less than said desired cutting load level, for controlling said feed motor to maintian the relative motion in the forward direction at a substantially constant level when the cutting motor load level is substantially equal to said desired load level, for controlling said feed motor to decrease the relative motion in the forward direction at a rate substantially equal to the rate of increase of the cutting motor load level from said desired level toward a threshold load level, for controlling said feed motor to produce relative motion in the reverse direction at rates related to the rates of change of the cutting motor load level when the latter exceeds said threshold load level, and for controlling said feed motor to produce relative motion in the forward direction, when said cutting motor load level decreases below said threshold load level, at an increasing rate which is substantially equal to either the rate of decrease of the cutting motor load level below said threshold load level or at a controlled rate of increase, whichever rate is smaller.

4,031,438
CONTROL DEVICE FOR THE ROTARY MOTOR OF A WATCH

Jean-Claude Berney, Lausanne, Switzerland, assignor to Ebauches S.A., Neuchatel, Switzerland

Filed Jan. 20, 1976, Ser. No. 650,737
Claims priority, application Switzerland, Feb. 11, 1975, 1631/75
Int. Cl.² G05B 5/00
U.S. Cl. 318—331 **2 Claims**

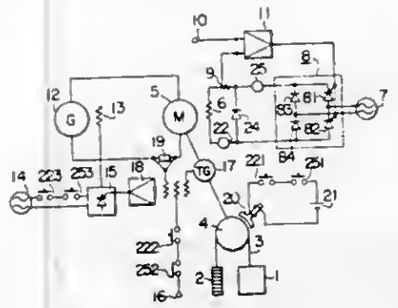


1. A control device for the rotary motor of a watch, comprising: a first zero detector, an input of which is connected to a coil of the motor and the output of which is connected to a delay device; a second zero detector, the input of which is connected to the coil of the motor via a capacitor, which may be short-circuited by a switch controlled by the output of the delay device; and a logic circuit, delivering driving pulses to the coil during the time in which the second detector and the delay device simultaneously deliver an output signal.

4,031,439
OVER-SPEED PREVENTING APPARATUS FOR DC MOTOR

Yoshio Sakai, and Toshiaki Kurosawa, both of Katsuta, Japan, assignors to Hitachi, Ltd., Japan

Filed July 11, 1975, Ser. No. 595,365
Claims priority, application Japan, July 19, 1974, 49-82215
Int. Cl.² H02P 7/06
U.S. Cl. 318—338 **8 Claims**

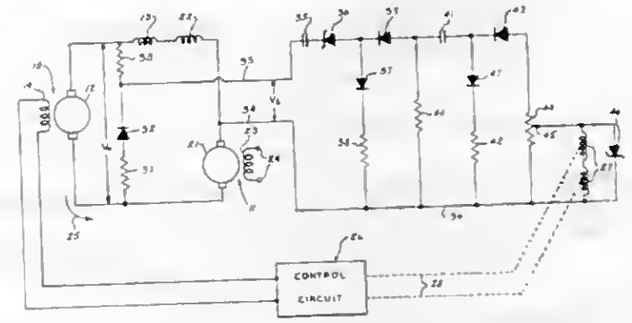


1. An over-speed preventing apparatus for a DC motor comprising a DC motor having a field winding and rectifier means including a rectifier circuit for supplying power to separately excite the field winding of said DC motor; said apparatus further comprising a unidirectional current conducting element connected in parallel to said field winding, current reduction detecting means connected in series between said parallel circuit, formed by said unidirectional current conducting element and said field winding, and said rectifier circuit for detecting reduction of the current therethrough to below a prescribed level, and protecting means responsive to said current reduction detecting means for preventing over-speed operation of said DC motor.

4,031,440
TRANSIENT LOAD DAMPING CIRCUIT FOR EXCAVATOR

Edward H. Christian, Brookfield; Donald M. Mains, Greendale, and James H. Treiber, Milwaukee, all of Wis., assignors to Bucyrus-Erie Company, South Milwaukee, Wis.

Filed May 20, 1976, Ser. No. 688,488
Int. Cl.² H02P 7/00
U.S. Cl. 318—432 **14 Claims**



5. In an excavator drive system the combination comprising:

a drive motor having an armature, and a field winding connected in series with the armature;

a generator having an armature connected to said motor armature to form a loop which includes said motor and generator armatures and said motor field winding;

a voltage divider connected across said generator armature and including a pair of series connected resistors;

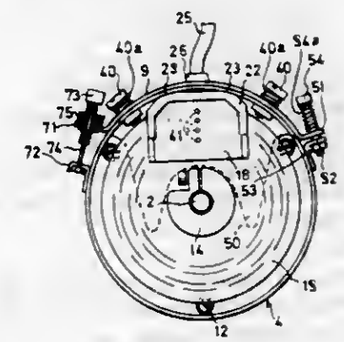
a feedback circuit having one input lead connected to the juncture of said voltage divider resistors and a second input lead connected to the juncture of said motor armature and its associated field winding, said feedback circuit including means for generating a feeback signal proportional to the second derivative of the signal applied to said input leads; and

a control circuit connected to effect the operation of said generator and connected to receive said feedback signal, said control circuit being responsive to said feedback signal to alter the operation of the generator.

4,031,441
OPTICAL ENCODER

David Aubrey Garrett, Sutton, England, assignor to Vactric Control Equipment Limited, England

Filed June 6, 1975, Ser. No. 584,385
Claims priority, application United Kingdom, June 7, 1974, 25445/74
Int. Cl.² G01D 5/36
U.S. Cl. 318—480 **9 Claims**



1. An optical encoder comprising

a housing capable of being secured to the end wall of a motor or rotating component about its shaft, said housing having a peripheral aperture and also an opening for receiving an end portion of said shaft;

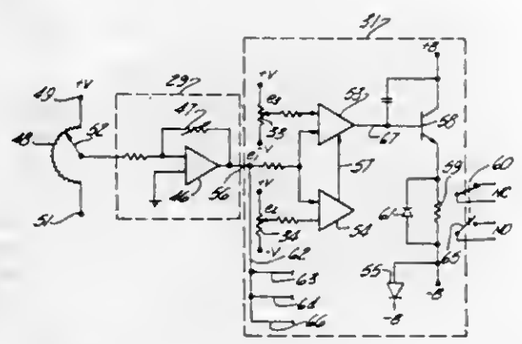
a fixture for mounting an optical encoding disc rigidly on said shaft end portion,
a removable closure for said peripheral aperture of said housing,
a caliper assembly supported by said closure within said housing, said caliper assembly having opposite arms overlying opposite sides of said encoding disc, said arms carrying light-generating and light-sensitive elements, respectively, so that an electrical signal provided by said light-sensitive element is a function of the rotational movement of said disc, and
means for adjusting said caliper assembly through limited arcuate movement about the shaft axis.

4,031,442

ELECTRONIC POSITION AND VELOCITY CONTROL SYSTEM

Joseph C. Poppelreiter, II, Sterling Heights, Mich., assignor to Kubik Hydradrives, Inc., Troy, Mich.

Continuation of Ser. No. 423,805, Dec. 11, 1973, abandoned. This application May 12, 1975, Ser. No. 576,743
Int. Cl.² G05B *13/00*
U.S. Cl. 318—561 **1 Claim**



1. A system for controlling the extent of movement of a movable member with respect to a fixed member and for effecting velocity changes at arbitrarily selected locations along the path of movement comprising:
means for providing a variable voltage, said variable voltage varying in direct relationship with the position of said movable member;
first means for providing a first reference voltage, said first reference voltage providing a level representative of a first arbitrarily selected location along said path of movement where a first change in velocity occurs, said first arbitraily selected location being readily changeable over a widely variable range by changing said first reference voltage;
first voltage comparison means receiving said variable voltage and said first referene voltage and generating a comparison signal when said variable voltage and said first reference voltage are substantially equal;
second means for providing a second reference voltage, said second reference voltage providing a level representative of a second arbitrarily selected location along said path of movement where a second change in velocity occurs, said second arbitrarily selected location being readily changeable over a widely variable range by changing said second reference voltage;
second voltage comparison means receiving said variable voltage and said second reference voltage, said second voltage means being responsive to said comparison signal to provide an actuation signal, said second comparison means ceasing the provision of said actuation signal when said variable voltage substantially equals said second reference voltage;
utilization means responsive to said actuation signal, said utilization means changing the velocity of movement of said movable member when said first comparison means yields said comparison signal and stopping said movement when said second comparison means ceases provision of said actuation signal;
said motion being reciprocal between preselected start and stop points and wherein said second reference voltage means establishes the stop point for motion in one direction and the start point for motion in the order direction and further including:
third means for providing a third reference voltage having a level indicative of an arbitrarily selected third position for a velocity change during motion in the opposite direction;
third voltage comparison means receiving said variable voltage and said third reference signal and generating a second comparison signal when said variable voltage and said third reference voltage are equal;
fourth means for providing a fourth reference voltage for establishing a second change in velocity at a fourth arbitrarily selected position during motion in the opposite direction;
fourth voltage comparison means receiving said variable voltage and said fourth reference voltage, said fourth voltage means being responsive to said second comparison signal to provide a second actuation signal, said fourth comparison means ceasing the provision of said second actuation signal when said variable voltage substantially equals said fourth reference voltage; and

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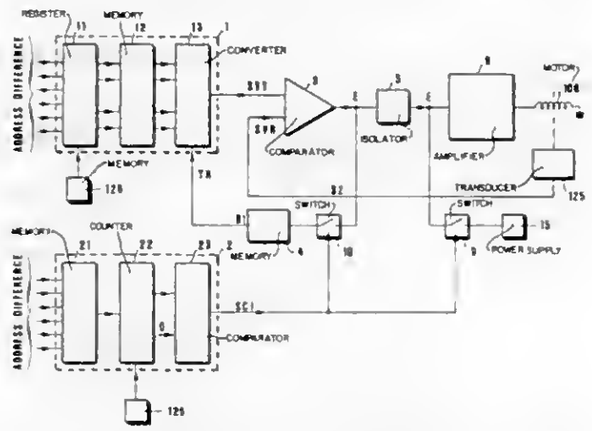
4,031,443

APPARATUS FOR POSITIONALLY CONTROLLING A MOVABLE HEAD ASSEMBLY

Jacques Pierre Léon Droux, Paris, and René Jean Rodier, Bobigny, both of France, assignors to Compagnie Honeywell Bull (Societe Anonyme), Paris, France

Filed May 22, 1975, Ser. No. 579,862
Int. Cl.² G05B *13/00*; G11B *21/08*
U.S. Cl. 318—561 **7 Claims**



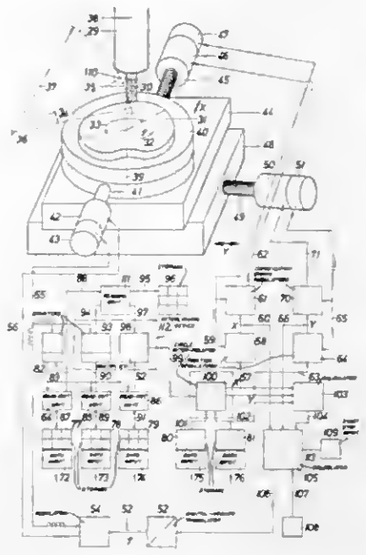
1. An apparatus for positionally controlling a movable head assembly, said apparatus having an acceleration and deceleration state, comprising, in combination:
a motor drivingly connected to said movable head assembly;
transducer means for producing a velocity signal representing the speed of said movable head assembly;
a first and second switch;
an isolator
a power supply connected to said motor through said first switch;
first memory means for setting a series of theoretical velocities for said movable head assembly, said first memory means producing a series of theoretical velocity signals representing said theoretical velocities, said first memory means defining a series of arbitrary velocity signals;
means for comparing said theoretical velocity signals and said velocity signal to produce an error signal, said comparing means including a pair of inputs connected to said first memory means and said transducer means, respectively, and an output connected to said motor through said isolator;
second memory means for producing a reference signal in response to said error signal, said second memory means being connected to said output of said comparing means through said second switch, said first memory means being connected to said second memory means for receipt of said reference signal, said theoretical velocity signals being the product of said arbitrary velocity signals and said reference signal; and
means for controlling inversion between said acceleration and deceleration states, said first and second switches being connected and responsive to said controlling means, said controlling means closing said first and second switches is said acceleration state, whereby said second memory means continually receives said error signal, said motor is connected to said power supply to drive said movable head assembly under substantially free conditions, and said isolator isolates said comparing means from said power supply, said controlling means opening said first and second switches in said deceleration state, whereby said second memory means stores said error signal at inversion, said reference signal becomes constant, and said motor is connected to said output of said comparing means to drive said movable head assembly in response to said error signal, whereby said velocity signal tracks said theoretical velocity signals.

4,031,445

CONTROL ARRANGEMENT FOR A CAM PRODUCTION MACHINE

Alfred Schmermund, 62, Kornerstrasse, 5820 Gevelsberg, Germany

Filed Aug. 21, 1975, Ser. No. 606,827
Claims priority, application Germany, Aug. 26, 1974, 2440775
Int. Cl.² G05B *19/42*
U.S. Cl. 318—568 **7 Claims**



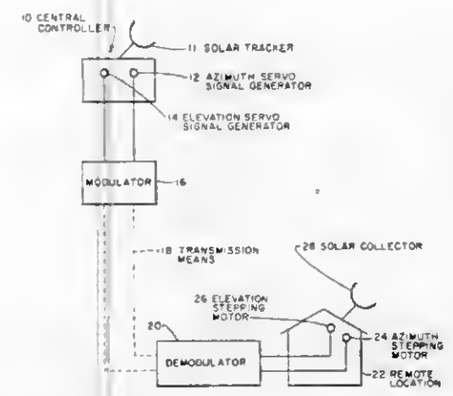
1. An automatic milling or grinding machine comprising in combination:
a frame;
tool support means supported on said frame;
workpiece support means mounted on said frame to be rotationally and rectilinearly displaceable relative thereto;
rotational drive means to rotate said workpiece support means;
first drive means to rectilinearly displace said workpiece support means in a first co-ordinate direction in a plane perpendicular to the axis of rotation of said workpiece support means;
second drive means to rectilinearly displace said workpiece support means in a second co-ordinate direction in said plane and perpendicular to said first co-ordinate direction;
first storage means to store information relating to a law of a camming surface to be formed on said workpiece by said machine;
second storage means to store information relating to workpiece-dependent parameters for determining dimensional characteristics of given portions of said camming surface;
co-ordinator means to operatively associate with one another related items of information derived from each of said first and second storage means thereby to generate a succession of angle information signals, said succession defining a circular arc corresponding to one on which the axis of rotation of a roller follower of given dimensions would move on following said camming surface; and
command signal generator means connected to said co-ordinator means and responsive to said angle information signals to apply respective command signals to each of said first and second rectilinear drive means thereby to cause said workpiece to be displaced relative to said tool along said circular arc.

4,031,444

SOLAR COLLECTOR CONTROL SYSTEM

Earl J. Beck, Jr., Ventura, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 20, 1975, Ser. No. 624,148
Int. Cl.² G05B *11/32*
U.S. Cl. 318—562 **7 Claims**



1. A solar collector control system comprising:
a. means for tracking the sun as it traverses in an arc across the sky;
b. servo means for producing two sets of intermittent stepping signals representative of azimuth and elevation of said means for tracking;
c. means for multiplexing said signals for transmission to remote locations;
d. means for demultiplexing said signals at said remote locations; and
e. stepping means for controlling the azimuth and elevation of solar collectors at said remote location in response to said signals.

4,031,446

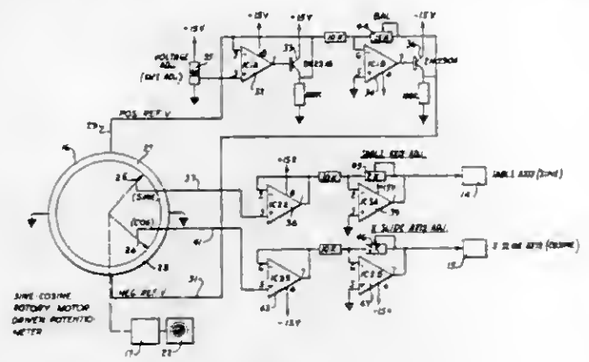
MACHINE TOOL

Arthur Francis St. André, Marlboro; Joseph David LeBlanc, Holden, and Edward George Robillard, Cherry Valley, all of Mass., assignors to Cincinnati Milacron-Heald Corporation, Worcester, Mass.

Continuation of Ser. No. 395,917, Sept. 10, 1973, abandoned. This application July 31, 1975, Ser. No. 600,903

Int. Cl.² G05B *1/06*

U.S. Cl. 318—665 **5 Claims**



1. A machine tool, comprising

a. a base,

b. a workhead mounted on the base,

c. a toolhead mounted on the base,

d. a first means for producing relative movement in a first direction between the workhead and the toolhead, said first means including a constant-torque motor,

e. a second means for producing relative movement between the workhead and the toolhead in a second direction perpendicular to the first direction, said second means including a constant-torque motor, the first means and the second means each including an electrical servo motor receiving a signal from one of the said portions and operating through a ball-screw mechanism to produce the said respective relative movement between the workhead and the toolhead,

f. a first and second potentiometer portion, at least one portion having non-linear resistance and a contactor associated with each portion, the portions of the potentiometer being circular and concentric with a shaft for driving the contactors, the electrical signal developed by one portion of the potentiometer varying as the sine of the angle of the shaft, while the electrical signal developed by the other portion varies as the cosine of the angle, and

g. a motor driving the contactors together at the same constant and predetermined speed, thus causing the potentiometers to develop two separate and continuous electrical signals, each signal varying in accordance with the nature of its respective portion, one signal controlling the speed of one motor and the other signal controlling the speed of the other motor, each motor bringing about the said relative movement at a velocity proportional to the voltage developed by its portion of the potentiometer.

4,031,447

IMPROVED CONTROL SYSTEM FOR ENERGIZING A STEPPING MOTOR

Masaaki Togo, Kawasaki; Masao Shima, Shinagawa, and Kiyoshi Mochizuki, Kamakura, all of Japan, assignors to Yamatake-Honeywell Company Limited, Tokyo, Japan

Filed June 27, 1975, Ser. No. 591,117

Claims priority, application Japan, July 2, 1974, 49-75004

Int. Cl.² H02K *37/00*

U.S. Cl. 318—685 **7 Claims**

1. A control system for energizing a stepping motor for bidirectional rotational comprising in combination:

a comparactor circuit with two input means and and output means;

an input signal and a feedback signal;

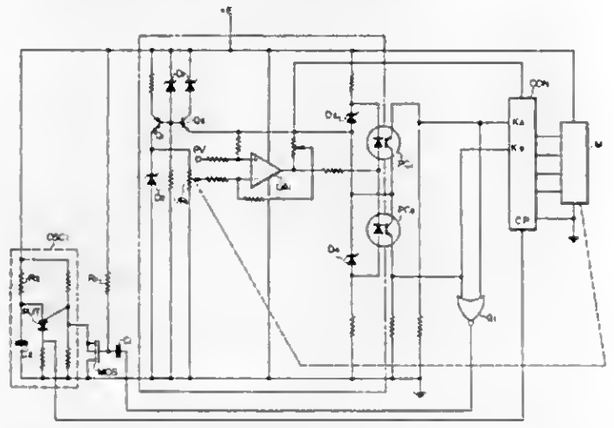
means for coupling the input signal to said one of said input means and the feedback signal to the other of said input means;

a stepping motor;

means for energizing said stepping motor;

means responsive to an output of said comparator for periodically coupling said energizing means to said stepping motor;

said responsive coupling means including a clock pulse generator, the pulse width of which determines the energy coupled to said motor is stepping;



said coupling means coupling said energizing means to said motor to cause rotation in one direction in response to an output of said comparator at one level;

said coupling means coupling said energizing means to said motor to cause rotation in the opposite direction in response to an output of said comparator at another level;

said coupling means for decoupling said energizing means from said motor in response to an output of said comparator which is between said levels; and

means for increasing the width of said clock pulses for a predetermined period in response to the output of said comparator initially reaching said one level.

4,031,448

MOTOR DRIVING SYSTEM AND CIRCUIT THEREFOR

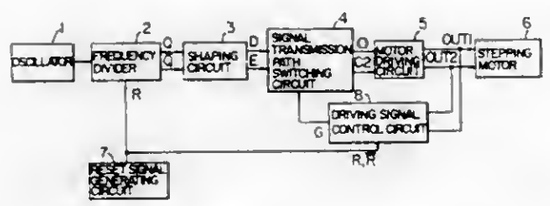
Yoshio Adachi, Kodaira, Japan, assignor to Hitachi, Ltd., Japan

Filed Feb. 11, 1976, Ser. No. 657,235

Claims priority, application Japan, Sept. 26, 1975, 50-115633

Int. Cl.² G05B *19/40*

U.S. Cl. 318—696 **17 Claims**



1. A motor driving system comprising:

a reference signal generating circuit for generating a pair of reference signals of different phase from each other;

a motor driving circuit responsive to said pair of reference signals for producing a pair of motor driving signals for causing drive currents of opposite polarity to each other to be alternately fed to a motor;

a signal transmission path switching circuit connected between said reference signal generating circuit and said motor driving circuit for switching the paths which transmit said reference signals to said motor driving circuit;

a control circuit for receiving said motor driving signals at an input thereof and supplying an output thereof as a control signal to said signal transmission path switching circuit, and

a reset circuit connected to said reference signal generating circuit and said control circuit for generating a reset signal which deactuates said reference signal generating circuit and causes said control circuit to produce and maintain an output signal corresponding to the status of the motor driving signals,

whereby the signal transmission path corresponding to the status of the motor driving signal at the time of the reset is selected and the reference signal is transmitted to the motor driving circuit through the selected signal transmission path at the release of the reset.

4,031,449

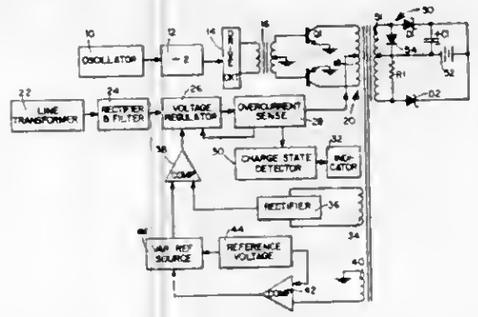
ELECTROMAGNETICALLY COUPLED BATTERY CHARGER

John E. Trombly, Winchester, Mass., assignor to Arthur D. Little, Inc., Cambridge, Mass.

Filed Nov. 20, 1975, Ser. No. 633,987

Int. Cl.² H02J *7/04*

U.S. Cl. 320—2 **14 Claims**



1. A battery charger comprising:

a first electromagnetic assembly having a drive winding and a sense winding;

a charging circuit operative to energize said drive winding to provide a predetermined alternating field;

a control circuit connected to said sense winding and to said charging circuit and operative in response to a signal from said sense winding to control the charging level of said charging circuit;

an electromagnetic receiver assembly connectable to a battery to be charged and adapted for electromagnetic coupling to said assembly; and

means operative in response to the presence of said receiver assembly in coupling relationship with said first assembly to enable full power operation of said charging circuitry, including:

a proximity winding operative to provide a signal upon coupling of said receiver assembly and said first assembly; and

means operative in response to said proximity winding signal to provide an enabling signal to cause full power operation of said charging circuit.

4,031,450

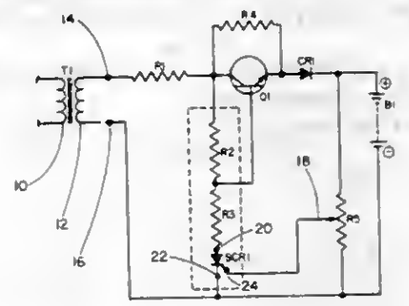
TWO STEP SOLID STATE BATTERY CHARGER

Ronald O. Hammel, Denver; Charles N. Kuykendall, Boulder, and William A. Fischer, Denver, all of Colo., assignors to The Gates Rubber Company, Denver, Colo.

Filed Mar. 26, 1971, Ser. No. 128,430

Int. Cl.² H02J *7/10*

U.S. Cl. 320—23 **17 Claims**



1. Charging means for delivering current to a battery comprising:

a. a power source connected to first and second charging terminals;

b. a charging path including a semiconductor switching means connected between said first charging terminal and one side of said battery, said switching means having a control terminal;

c. a shunt path between said first and second charging terminals including a resistor in series with a controlled rectifier having a gate electrode, a cathode connected to said second charging terminal, and an anode connected to said resistor and forming a juncture therebetween, said juncture connected to said control terminal of said switching means;

d. a voltage divider connected across said battery, said gate electrode connected to said voltage divider at a preselected dividing point;

e. said second charging terminal connected to the other side of said battery;

f. whereupon charging, current is supplied to the battery through the charging path, and when the battery reaches its pre-selected end of the charge voltage, sufficient potential is impressed across the gate-cathode junction to the controlled rectifier to render it conductive and thereby shunt current away from the battery;

g. said controlled rectifier provided with means other than or in addition to self-heating for increasing its temperature during conduction to lower the gate-cathode potential required to render the controlled rectifier conductive, and thereby latching said switching means into non-conduction and reducing the battery voltage to a safe limit to prevent overcharging.

15. In a method of charging a battery of one or more electrochemical cells utilizing circuitry comprising a power source provided with input terminals, a semiconductor switching means connected between the power source and battery, a shunt path connected across said power source and including a resistive element and controlled rectifier having a control terminal, and a voltage divider connected across said battery and having a juncture point connected to said control terminal, the improvement comprising:

substantially freely heating said controlled rectifier below its destruction point, commencing heating only when the battery has attained a nearly fully charged state corresponding to a given end of charge voltage exhibited by the battery, said heating of the controlled rectifier being provided by placing said resistive element in thermal conductive relationship with said controlled rectifier;

reducing the battery voltage below said end of charge voltage; and thereafter

continuously maintaining the battery voltage level below

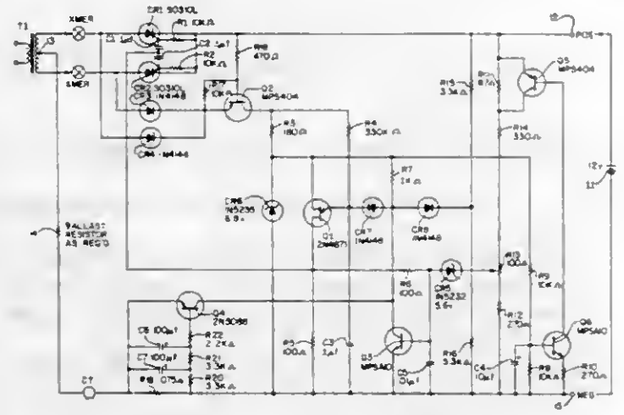
said end of charge voltage to prevent overcharging the battery while simultaneously tapering charging current to safety bring the battery to its fully charged state.

4,031,451

CHARGING CIRCUIT WITH SCR'S TRIGGERED BY PEDESTAL AND COSINE MODIFIED RAMP UNIJUNCTION CIRCUIT HAVING MEANS FOR CURRENT LIMITING BY CONTROLLING PEDESTAL LEVEL

Peter H. Gordon, Framingham, Mass., assignor to Alkon Laboratories, Inc., Newton, Mass.

Filed Feb. 23, 1976, Ser. No. 660,764
Int. Cl.² H02J *7/10*
U.S. Cl. 320—23 **9 Claims**



1. Electrical battery charging apparatus comprising,
input terminal means for receiving A.C. energy,
output terminal means for receiving a potential from a battery to be charged,
gated rectifier means intercoupling said input and output terminal means for converting said A.C. energy into D.C. energy for charging said battery,
a pedestal and cosine modified ramp unijunction trigger circuit having a unijunction transistor with an emitter connected to an emitter capacitor and means for charging said capacitor to a predetermined pedestal level for controlling the time when said unijunction trigger circuit provides trigger pulses, and circuit means for controlling said pedestal voltage
said circuit means including means responsive to the charging current delivered by said output terminal means for limiting said charging current to less than a predetermined value,
wherein said circuit means for controlling said pedestal voltage furthur includes means responsive to a discharged condition of a battery connected to said output terminal means and/or a high voltage upon said input terminal means for establishing said pedestal voltage at a level which prevents triggering of said gated rectifier means until the potential then on said input terminal means is decreasing from its peak value during that cycle to a value low enough so that the peak current through said gated rectifier means is always less than a predetermined value.

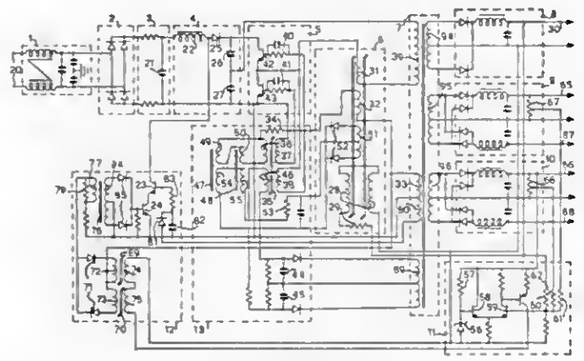
4,031,452

STABILIZED POWER SUPPLY

Pier Luigi Longa, Pavone Canavese (Turin), and Piero Gamba, Banchette (Turin) both of Italy, assigoors to Ing. C. Ollvetti & C., S.p.A., Ivrea (Turin), Italy

Filed Oct. 6, 1975, Ser. No. 620,129
Claims priority, application Italy, Oct. 29, 1974, 70201/74
Int. Cl.² H02M *7/04*
U.S. Cl. 321—2 **4 Claims**

1. A switching power supply coupled to AC mains for supplying a stabilized DC output voltage to an electronic apparatus, comprising:
a rectifying circuit having an input connected directly to said AC mains;
a voltage stabilizing circuit including a storage inductor, and an arrangement of a diode and a capacitor in series with said inductor for generating a DC stabilizing voltage;
said rectifying circuit having an output connected to said inductor;
a frequency generating means for generating a frequency higher than the AC mains frequency;
an interrupter circuit, having a switching cycle of constant repetition rate controlled by said frequency generating means, connected in parallel with said diode and said capacitor whereby said inductor is caused to store mag-



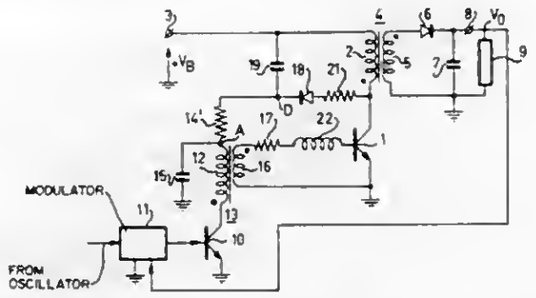
netic energy during a charging interval of said switching cycle corresponding to closing of said interrupter circuit, and whereby the magnetic energy stored in said inductor is transferred to said capacitor through said diode during a discharging interval of said switching cycle corresponding to opening of the said interrupter circuit;
means responsive to the deviation of said stabilized DC output voltage with respect to a reference voltage for conditioning said interrupter circuit to alter a time ratio of charging and discharging of said inductor within said switching cycle; and
a limiting circuit, having an overload detecting means for detecting an overload of said power supply, connected to the output of said stabilizing circuit to shorten the repetition cycle of said stabilizing circuit to limit dissipation of power in the power supply during said overload.

4,031,453

TRIGGERED TRANSISTOR SWITCHING REGULATOR

Dirk Johan Adriaan Teuling, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 13, 1975, Ser. No. 631,736
Claims priority, application Netherlands, Dec. 2, 1974, 7415666
Int. Cl.² H02P *13/22*
U.S. Cl. 321—2 **10 Claims**



1. A switched-mode power supply circuit for converting an input voltage to a substantially constant output d.c. voltage

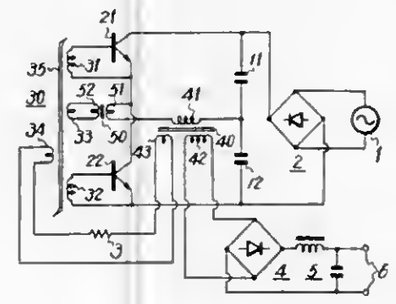
comprising, a switching device, a driver stage for supplying a periodic pulse-shaped control signal to a control electrode of said switching device to render it conducting during a first part of the control signal period and to block it during a remaining second part of the period, means for controlling the duration of said parts of the period, means connecting an output electrode of an switching device to a terminal of the input voltage source through a self-inductance, a rectifier, a smoothing capacitor, means coupling one electrode of said rectifier to said self-inductance, means connecting the other electrode of the rectifier to said smoothing capacitor and to a supply resistor for the driver stage so that the direct current power supply voltage for the driver stage is supplied thereto from said terminal of the input voltage source via said supply resistor.

4,031,454

TRANSISTOR INVERTER

Tadao Suzuki; Tadao Yoshida, and Shigeaki Wachi, all of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed June 1, 1976, Ser. No. 691,827
Claims priority, application Japan, June 6, 1975, 50-68708
Int. Cl.² H02M *3/335*
U.S. Cl. 321—2 **8 Claims**



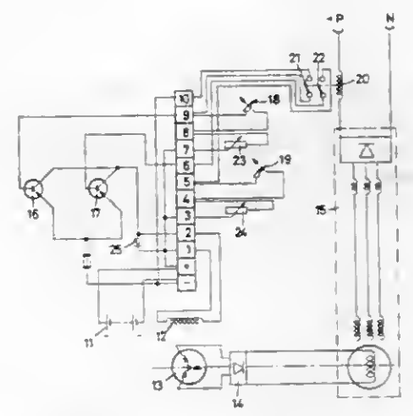
1. A transistor inverter comprising:
a. a DC voltage source having first, second and third terminals;
b. an output transformer having primary and secondary windings;
c. a pair of first and second transistors each having base, emitter and collector electrodes, each of the collector and emitter electrodes of said first and second transistors being connected between the first and second terminals of said DC voltage source and between the second and third terminals of said DC voltage source through the primary winding of said output transformer, respectively;
d. an input transformer having a voltage feedback winding, a pair of voltage control windings and a saturable core;
e. circuit means for coupling the voltage across said primary winding of said output transformer to said voltage feedback winding and connecting each of the voltage control windings of said input transformer between the base and emitter electrodes of said first and second transistors, respectively;
f. DC voltage output means connected to the secondary winding of said output transformer, and
g. means for feeding back one part of the primary current flowing through the primary winding of said output transformer to said input transformer, the last mentioned means further including means for producing a predetermined desired amount of said current feedback.

4,031,455

EXCITATION CIRCUIT FOR BRUSHLESS SYNCHRONOUS WELDING GENERATORS

Dieter Beck, Etzenrod, Germany, assignor to Firma A. van Kaick "AvK" Generatoren- und Motorenwerke, Neu-Isenburg, Germany

Filed Nov. 25, 1975, Ser. No. 635,096
Claims priority, application Germany, Nov. 25, 1974, 2455643
Int. Cl.² H02P *9/10, 9/38*
U.S. Cl. 322—27 **5 Claims**



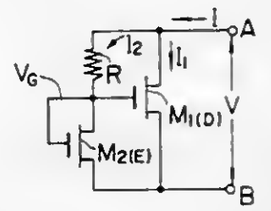
1. In a brushless synchronous welding generator having a three-phase exterior-pole exciter machine including a stator-mounted excitation winding supplied from a separate d. c. voltage source and a three-phase rotor winding connected to a rectifier, an excitation control circuit comprising:
two power transistors arranged in parallel between said voltage source and the excitation winding, one being operative in the idling mode, the other in the welding mode of the machine;
switching means for alternatingly activating one transistor and blocking the other in response to the flow or absence of flow of welding current in the welding generator in the welding and idling modes, respectively; and
means for independently adjusting the base potential of each transistor.

4,031,456

CONSTANT-CURRENT CIRCUIT

Shunji Shimada, Kodaira; Yoshikazu Hatsukano, Hachioji, and Osamu Yamashiro, Kodaira, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Aug. 28, 1975, Ser. No. 608,731
Claims priority, application Japan, Sept. 4, 1974, 49-100916
Int. Cl.² G05F *3/08*
U.S. Cl. 323—4 **4 Claims**



1. A constant-current circuit wherein a depletion type FET M_1, and a series circuit consisting of impedance means and an enhancement type FET M_2 are connected between two terminals A and B and wherein gate electrodes of the respective FET's M_1 and M_2 are connected to a juncture between said impedance means and said FET M_2, characterized in that a current I_1 which flows through said FET M_1 is set to be suffi-

ciently large in comparison with a current I_2 which flows through said series circuit, and that a voltage across said FET M_2 is made substantially equal to a threshold voltage of this FET M_2.

4,031,457

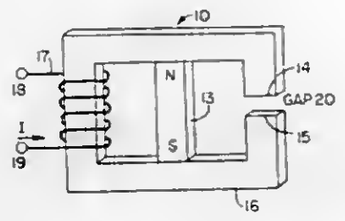
SATURABLE REACTOR CURRENT LIMITER

George A. Oberbeck, Belmont, Mass., assignor to The Charles Stark Draper Laboratory, Inc., Cambridge, Mass.

Continuation-in-part of Ser. No. 614,773, Sept. 19, 1975, abandoned. This application Nov. 28, 1975, Ser. No. 635,895

Int. Cl.² G05F 1/32, 1/70

U.S. Cl. 323—92 21 Claims



1. A device for limiting current in an electric circuit comprising:

A. at least three magnetic circuit branch elements extending between two nodes:

i. the first of said branch elements being characterized by a permeance P_1,

ii. the second of said branch elements being characterized by a non-linear permeance P_2 and having saturated and non-saturated states, wherein P_2 is greater when said second element is in said non-saturated state than when in said saturated state, and wherein the magnetic flux density of said second element is equal to a saturation flux density which is relatively invariant with respect to magneto-motive force applied across said second element when in said saturated state, and said magnetic flux density is less than said saturated flux density otherwise,

iii. the third of said branch elements is characterized by a permeance P_3 and includes a magneto-motive force (mmf) bias means for establishing a substantially constant magnetic flux density in said third element,

B. an input coil including means for electrically coupling said device to said electric circuit so that said current passes therethrough, said coil having a plurality of windings extending about said second element so that magnetic flux is induced in said second element in response to said current,

wherein said elements are magnetically coupled at said nodes, and P_1 is relatively high with respect to the medium external to said device, P_2 is greater than P_1 and is relatively high with respect to the medium external to said device when said second element is non-saturated, and P_3 is relatively low with respect to P_1 and P_2 when said second element is non-saturated, and

wherein further the net magnetic flux density in said second element is equal to the saturation flux density for said second element when said current is below a predetermined threshold, and said net flux density is below said saturation flux density when said current is in a predetermined range above and extending from said threshold.

4,031,458

A.C. VOLTAGE REGULATOR EMPLOYING THYRISTOR

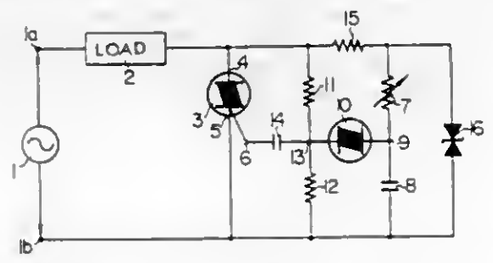
Kazuo Ichikawa, Minowa, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Mar. 12, 1976, Ser. No. 666,335

Claims priority, application Japan, Mar. 20, 1975, 50-33725

Int. Cl.³ G05F 1/44

U.S. Cl. 323—36 2 Claims



1. A phase controlled a.c. voltage regulator for regulating the voltage applied to a load connected in series with an a.c. source, said voltage regulator comprising:

a bilateral thyristor having first and second anodes and a gate, said first and second anodes being connected to first and second terminals across which a load and an a.c. source may be connected;

a voltage divider comprising first and second resistive elements connected in series across said first and second terminals;

a timing circuit including a thrid resistive element, a variable resistor, and a capacitor connected in series across said first and second terminals and a bilateral constant voltage diode connected across said variable resistor and said capacitor to insure that the rate of charge of said capacitor is not affected by minor fluctuations in the magnitude of the voltage generated by said a.c. source;

a bilateral diode connected between the junction between said capacitor and said variable resistor and the junction between said first and second resistive elements;

a capacitor coupled between the junction between said first and second resistive elements and said gate whereby the conductive period of said thyristor increases or decreases as an inverse function of an increasing or decreasing power supply voltage so as to apply a substantially constant effective voltage to said load.

4,031,459

INDUCTIVE VOLTAGE TRANSFORMER FOR A HIGH-VOLTAGE METAL-CLAD SWITCH-GEAR INSTALLATION

Jurgen Moeller, Memmelsdorf; Werner Mitrach, Bamberg; Helmut Krauss, Geisfeld, and Hubert Schulte, Bischberg, all of Germany, assignors to Messwandler-Bau GmbH, Germany

Filed Oct. 30, 1975, Ser. No. 627,272

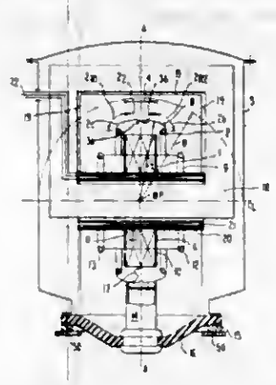
Claims priority, application Germany, Nov. 2, 1974, 2452056

Int. Cl.³ H01F 15/04

U.S. Cl. 323—60 45 Claims

1. An inductive voltage transformer insulated by an insulating gas and including a pressure vessel means and a high-voltage winding means which is surrounded by a high-voltage electrode means, the insulating gas within the pressure vessel means forming the high-voltage insulation, characterized in that the high-voltage electrode means is axially drawn over the winding end faces of at least a part of the high-voltage winding means, said high-voltage electrode means including a central portion surrounding the winding cross section of the high-voltage winding means as well as edge portions axially projecting over the high-voltage winding means, said central portion and said edge portions being so curved that the outer surfaces

thereof together with adjacent wall portions of the pressure vessel means form at least approximately a Rogowski-profile projected on a cylinder area, said central portion of said high-voltage electrode means and the adjacent wall portions of the



pressure vessel means representing in cross section concentric partial circles having at least approximately a common center point of curvature with said edge portions of said high-voltage electrode means having smaller radii of curvature than said central portion so as to form a Rogowski-profile.

4,031,460

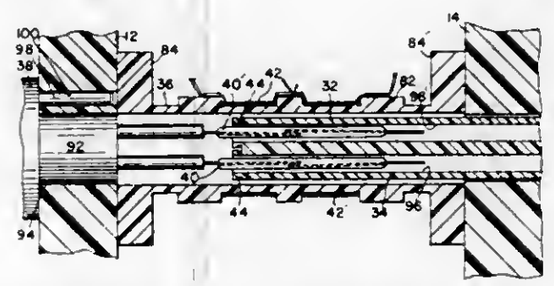
DEVICE FOR MEASURING THE MAGNETIC FLUX DISTRIBUTION ALONG THE LENGTH OF ELONGATED MAGNETIZED ELEMENT

Khaja M. Jameel, Glen Ellyn; Von W. Mueller, Elk Grove Village, and Ronald A. Foerster, Carol Stream, all of Ill., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Oct. 31, 1975, Ser. No. 627,634

Int. Cl.² G01R 33/12

U.S. Cl. 324—34 R 14 Claims



1. An apparatus for use in the measuring magnetic flux distribution along a magnetic member which is in the form of an elongate rod of relatively small cross sectional diameter, said apparatus comprising a support frame having a plurality of upstanding post forming support members spaced along a linear path, an elongate rod member constituting a thrust arm supported by said post members for reciprocating movement along said linear path between extended and retracted positions, drive means for reciprocating said thrust arm, said thrust arm having a hollow end portion of a length and cross section which will accommodate in telescoped relation therein said magnetic rod member, means for supporting said magnetic rod member in axial alignment with said hollow end portion of said thrust arm so as to be telescoped within said hollow end portion when said thrust arm is extended, bobbin forming means having a hollow tubular core portion of a cross section which will receive in telescoped relation said hollow end portion of said thrust arm and mounted in telescoping relation to said magnetic member, said bobbin forming means adapted to have wound thereon an energizing coil for said magnetic member, a search coil having an axial dimension only a small fraction of the length of the magnetic member, mounted on the hollow end portion of said thrust arm so as to sweep along the length of said magnetic member upon retractive member of said thrust arm, and means associated with said search coil and said thrust arm for sensing and recording magnetic flux values at discrete points along the length of the magnetic member and the position of said search coil along said magnetic member as said thrust arm is reciprocated and correlating the two measurements.

4,031,461

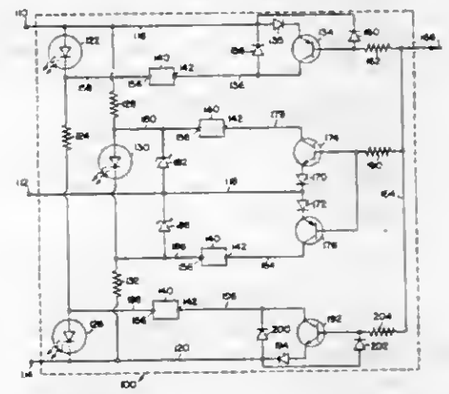
SOURCE RELATED POTENTIAL INDICATING CONTINUITY TESTER

Carl Casper Reiner, Moline, Ill., assignor to Deere & Company, Moline, Ill.

Filed Jan. 23, 1976, Ser. No. 651,808

Int. Cl.² G01R 31/02

U.S. Cl. 324—51 48 Claims



1. A detector for determining continuity in an electrical circuit between a selected point in the circuit and an electrical source in the circuit, said source having first and second source potentials, comprising: probe means adapted to be placed in contact with the selected point; first and second connector means adapted to be connected respectively to the first and second source potentials; first indicator means connected to the probe and first connector means responsive to the potentials thereat to provide a first digital, off-on indication when the potentials are approximately equal thereby indicating continuity in the circuit between the point and first source potential; and second indicator means connected to the probe and second connector means responsive to the potentials thereat to provide a second digital, off-on indication when the potentials are approximately equal thereby indicating continuity in the circuit between the point and second source potential.

4,031,462

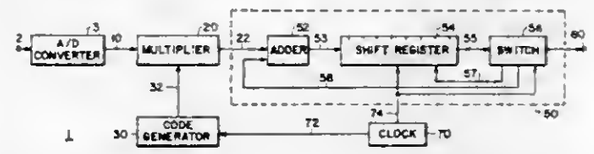
FREQUENCY SPECTRUM ANALYZER

David William Bouvier; William Geary Green, both of Tempe, and Randolph Gaylon Moore, Phoenix, all of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed July 7, 1975, Ser. No. 593,830

Int. Cl.² G01R 23/16

U.S. Cl. 324—77 B 18 Claims

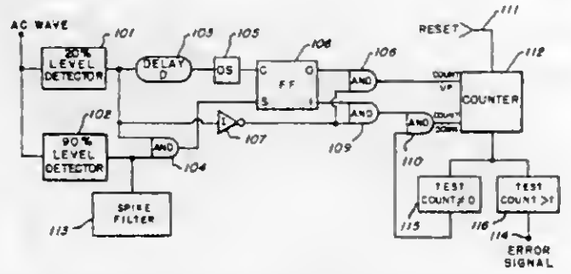


1. An apparatus for analyzing in real time the frequency spectrum of an incoming signal of unknown frequency characteristics which has been separated into two quadrature components, comprising:

means for receiving and limiting the amplitude of each quadrature component;

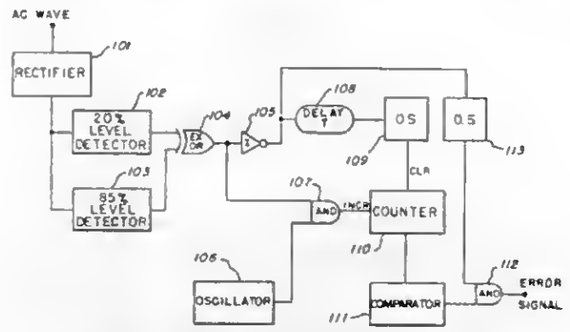
means for generating a timing signal;
means responsive to the timing signal for generating first and second trains of sampling pulses in repetitive frames, wherein each frame of said first and said second trains of sampling pulses represents a series of cross-correlation functions in terms of a predetermined number of sampling intervals and a predetermined number of harmonics;
first means for multiplying said first train of sampling pulses with said first quadrature signal component to generate a first train of discrete sampled outputs;
second means for multiplying said second train of sampling pulses with said second quadrature signal component to generate a second train of discrete sampled outputs;
means for separating said first and said second train of discrete sampled outputs into two completely separated upper and lower channel sampled output signals;
first means responsive to the timing signal for accumulating said upper channel sampled outputs and generating an upper sideband frequency domain output signal for each frame of sampling pulses; and
second means responsive to the timing signal for accumulating said lower channel sampled outputs and generating a lower sideband frequency domain output signal for each frame of sampling pulses.

4,031,463
POWER BROWN-OUT DETECTOR
Gayle Russell Norberg, Columbia Heights, Minn., assignor to Control Data Corporation, Minneapolis, Minn.
Filed Mar. 1, 1976, Ser. No. 662,315
Int. Cl.² G01R *23/16*
U.S. Cl. 324—77 A **11 Claims**



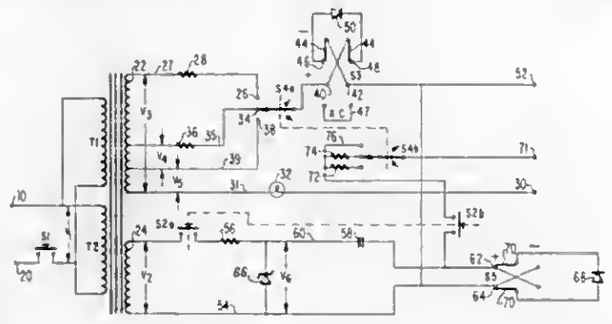
1. Apparatus for providing a brownout signal indicating low power in an AC wave having a nominal peak voltage, and comprising
a. voltage detecting means receiving the AC wave, for providing a low half-cycle signal each time the maximum AC wave excursion from 0 falls between a first predetermined voltage level and a second predetermined voltage level greater in magnitude than the first, and a normal half-cycle signal each time the maximum AC wave excursion is at least as great in magnitude as the second predetermined voltage level; and
b. an accumulator receiving the low and normal half-cycle signals, comprising
i. means responsive to an externally supplied reset signal, for setting the accumulator contents to a first preselected value,
ii. means responsive to each low half-cycle signal, for changing the accumulator contents to decrease the difference between the accumulator contents and a second preselected value by a third preselected value,
iii. means responsive to each normal half-cycle signal, for changing the accumulator contents to increase the difference between the accumulator contents and the second preselected value by a fourth preselected value whenever the accumulator contents are exclusively between the first and second preselected values, and
iv. means for issuing the brownout signal whenever the difference between the second and first preselected values is exceeded by the difference between the accumulator contents and the first preselected value.

4,031,464
LINE POWER DISTORTION DETECTOR
Gayle Russell Norberg, Columbia Heights, Minn., assigoor to Control Data Corporation, Minneapolis, Minn.
Filed Mar. 1, 1976, Ser. No. 662,318
Int. Cl.² G01R *23/02*
U.S. Cl. 324—78 Z **7 Claims**



1. Apparatus for detecting distortion in a phase of an AC power wave of predetermined nominal frequency and peak amplitude, comprising
a. voltage detecting means receiving the AC wave for providing a first signal when the AC wave reaches a preselected first percentage of nominal peak amplitude and a second signal when the AC wave reaches a preselected second percentage of nominal peak amplitude, said second percentage being greater than the first;
b. timing means receiving the voltage detecting means' first and second signals and providing a timing signal encoding the time between the start of adjacent first and second signals in a preselected half cycle of the AC wave; and
c. comparison means for comparing the difference between the time encoded in the timing signal and the time elapsed between adjacent first and second peak amplitude percentages of a sine wave of the same predetermined nominal frequency and amplitude as the AC wave, and supplying an error signal if different by more than a predetermined amount.

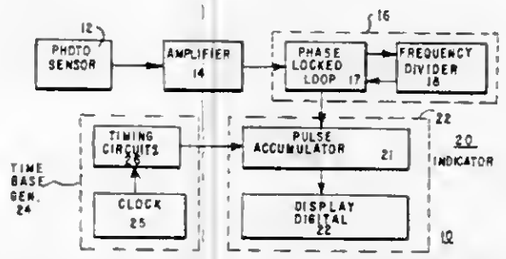
4,031,465
SCR, DIODE, DIAC, AND TRIAC TESTER
John Franklin Sterner, Piscataway, N.J., assignor to RCA Corporation, New York, N.Y.
Filed Dec. 23, 1974, Ser. No. 535,812
Int. Cl.² G01R *31/22*
U.S. Cl. 324—158 SC **7 Claims**



1. A tester for thyristor semiconductor devices having two main electrodes and a control electrode, comprising,
first, second, third terminals adapted to be connected respectively to said main electrodes and said control electrode,
a power source,

means including first switch means connected between said source and one of said first and second terminals for selectively providing direct current or alternating current and for setting the voltage value of electrical energy provided from said source to said first and second terminals, conductor means connecting the power source to the other of said first and second terminals,
pulse source means,
second switch means connecting said pulse source means to said third terminal for selectively (i) setting the pulse current direction and (ii) generating a trigger pulse of electrical energy to said third terminal, said selectively generated trigger pulse having a substantially instantaneous rise time and an exponential fall time based on time constant τ such that $\tau << T$, where T is the pulse period, and
indicating means connected in the path of the power source to indicate the presence of current flow between said first and second terminals according to the acceptable operating parameters of the particular device under test.

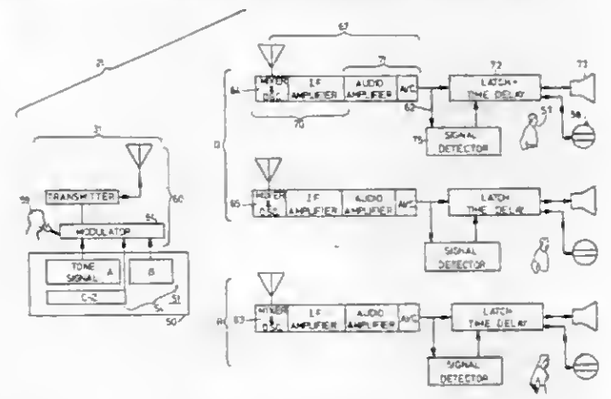
4,031,466
DIGITAL PHOTO-OPTICAL TACHOMETER
Ernest Harry Krause, Addison; Wesley Arthur Seaman, River Grove, and Peter Gregory Angelopoulos, Elmhurst, all of Ill., assignors to The Pioneer Electric and Research Corporation, Forest Park, Ill.
Filed May 5, 1975, Ser. No. 574,252
Int. Cl.² G01P *3/36*; **G01R** *25/00*
U.S. Cl. 324—175 **15 Claims**



1. In a tachometer for measuring the rotational or reciprocating speed of a moving object, the combination comprising sensing means for deriving an input signal related in frequency to the speed of the object, frequency detecting means including phase comparator means for comparing said input signal with a reference signal of a predetermined frequency and for providing a series of output pulses having a frequency which is an integral multiple of the frequency of the input signal, timing means, and output means controlled by said timing means to be responsive to the number of output pulses provided within a predetermined time duration to provide an indication of the speed of said object.

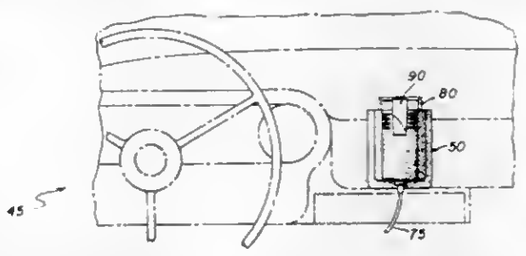
4,031,467
ALERTING PROCESS AND SYSTEM OF APPARATUS THEREFOR
Lewis Singleton, Jr., 422 Ramada, Amarillo, Tex. 79108, and James M. Whitney, 3403 Paramount, Amarillo, Tex. 79109
Filed Sept. 19, 1975, Ser. No. 614,918
Int. Cl.² H04J *3/00*
U.S. Cl. 325—54 **12 Claims**

8. A localized area warning process comprising, in a large geographic area, continuously operating a radio frequency transmitter at and broadcasting a fixed radio frequency signal characteristic with audio modulation and a plurality of distinct emergency modulating audio signals each of fixed frequency in range of 20 to 3,000 Hz, carried by said radio frequency signals for a predetermined time and, in one of several separate smaller geographic area portions within said one large area, at each of a plurality of radio frequency receiving circuits tuned to said fixed radio frequency signal and comprising a audio detector circuit and a loudspeaker circuit not operatively connected to said detector circuit, continuously actuating said audio detector circuit by said modulated frequency signals and an electrical power source and, in an emergency situation, selectively actuating a selective audio signal frequency receiving circuit by one of said distinct emergency modulating audio signals carried by said radio frequency signal and characteristic of that one smaller geographic area portion only, and timing said period of actuation and



after a predetermined period of time of such actuation operatively connecting said audio detector to a loudspeaker and then maintaining operative connection therebetween for only a predetermined period of time while
an audio frequency signal is passed from said radio frequency transmitter to said loudspeakers and an audible verbal message produced by said loudspeaker.

4,031,468
RECEIVER MOUNT
Donald O. Ziebell, and James M. Longly, both of Lexington, Nebr., assignors to Reach Electronics, Inc., Lexington, Nebr.
Filed May 4, 1976, Ser. No. 682,843
Int. Cl.² H04B *1/08*
U.S. Cl. 325—312 **13 Claims**



1. A mount for a portable RF receiver, said receiver having a current conducting clip constituting the receiver input for RF signals, said clip adapted to be connected to an antenna, said mount comprising a holder for said receiver, a terminal on said holder for connection to an antenna, and means on said holder electrically coupled to said terminal and placed into electrical contact with said clip when said receiver is positioned in said holder.

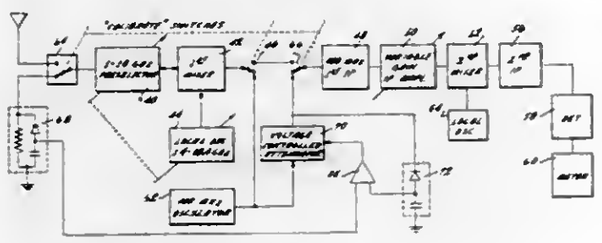
4,031,469
RECEIVER GAIN CALIBRATION
Edgar A. Johnson, Tujunga, Calif., assignor to The Singer Company, New York, N.Y.
Continuation of Ser. No. 612,057, Sept. 10, 1975, abandoned.
This application May 26, 1976, Ser. No. 690,345
Int. Cl.² H04B *17/00*
U.S. Cl. 325—363 **6 Claims**

1. A method for gain calibrating superheterodyne receivers having a bilateral RF and converter portion at the input

thereof, and IF portion, and a detector portion near the output thereof; said method compriaing the steps of:

injecting into the output of said RF and converter portion a calibration signal of known amplitude and at the RF and converter portion a calibration signal of known amplitude and at the IF frequency of said receiver;

measuring the level of said calibration signal appearing at the RF input of said receiver to determine the gain of said bilateral RF and converter portion;



injecting said known calibration signal into the portion of said receiver following said bilateral RF and converter portion;

measuring the level of the signal produced at the output of said receiver to determine the gain of said receiver portion following said RF and converter portion; and

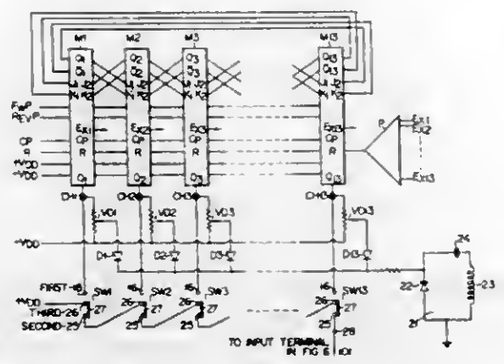
algebraically adding said RF and converter gain with said gain of said receiver portion following said RF and converter portion to obtain the overall gain of the receiver at the frequency to which it is tuned.

4,031,470

OPERATION PROGRAM-PRESETTING SYSTEM

Naoyuki Kukado, Tokyo, and Shinichi Makino, Fujisawa, both of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Tokyo, Japan

Filed Apr. 15, 1975, Ser. No. 568,204
Claims priority, application Japan, Apr. 19, 1974, 49-43465
Int. Cl.² H04B 1/16; H01H 43/00
U.S. Cl. 325—396 8 Claims



1. An operation program-presetting system comprising:

a. input means including a plurality of switches each providing both time and control data;

b. means for generating coded signals corresponding to the operation of each of said switches;

c. means responsive to the order in which said coded signals are generated for allotting said coded signals into sets of information, each set comprising both time data and control data;

d. means for storing said sets of information;

e. means for generating a time signal;

f. means for generating a coincident signal when said time signal coincides with any one of said time data in a stored set of information; and

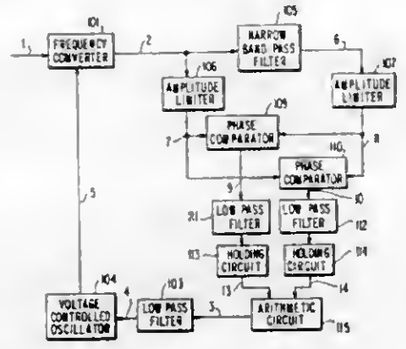
g. means for controlling at least one external appliance responsive to both said coincident signal and said control data included in said one set of information having time data in coincidence with said time signal.

4,031,471

AUTOMATIC FREQUENCY CONTROL CIRCUIT

Toshitake Noguchi, Tokyo, Japan, assignor to Nippon Electric Co., Ltd., Tokyo, Japan

Filed Dec. 17, 1975, Ser. No. 641,709
Claims priority, application Japan, Dec. 18, 1974, 49-145156
Int. Cl.² H04B 1/16
U.S. Cl. 325—423 6 Claims



1. An automatic frequency control circuit for use in a time-division multiplex communication system including a frequency converter for receiving an input signal and a local oscillator signal and producing an output signal which is the sum or difference of said input and local oscillator signals, and a voltage-controlled oscillator for generating said local oscillator signal in response to a control voltage, said automatic frequency control circuit comprising:

a band-pass filter connected to the output of said frequency converter,

first and second phase comparator means each having a first input connected to the output of said frequency converter and a second input connected to the output of said band-pass filter for comparing the phases of the input and output signals of said band-pass filter, said first and second phase comparator means having different output characteristics,

first and second holding circuits for holding the maximum voltages of output signals of said first and second phase comparators, respectively, and

an arithmetic circuit for calculating the average value of the output signals of said first and second holding circuits to develop said control voltage.

4,031,472

MIXER CIRCUIT

Keiro Shinkawa; Chiukhi Sodeyama, both of Yokohama; Yoichi Kaneko, Tokorozawa, and Katsuhiro Kimura, Tokyo, all of Japan, assignors to Hitachi, Ltd., Japan

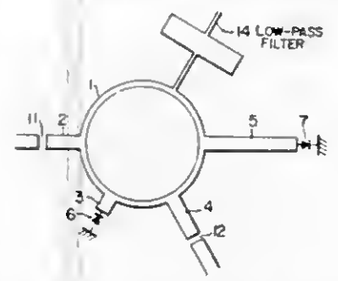
Filed Sept. 3, 1975, Ser. No. 609,920
Claims priority, application Japan, Sept. 6, 1974, 49-102671
Int. Cl.² H04B 1/26
U.S. Cl. 325—446 8 Claims

1. A mixer circuit for converting a high frequency signal into an intermediate frequency signal comprising:

a rat-race including a first transmission line forming a circular closed loop having an overall circumferential length corresponding to three halves the wavelength of the high frequency signal, a second transmission line connected to said first transmission line and having an impedance which is $1/\sqrt{2}$ times the impedance of said first transmission line, and a third, a fourth and a fifth transmission line connected to said first transmission line in such a relationship that they are successively spaced apart from

the connection point of said second transmission in the above order along said first transmission line by an arcuate distance corresponding to one quarter the wavelength of the high frequency signal, said third, fourth and fifth transmission lines having an impedance equal to that of said second transmission line;

means for supplying said high frequency signal to be subject to the frequency conversion to one of said second and fourth transmission lines in said rat-race and supplying a local oscillation signal to the other of said second and fourth transmission lines connected to said rat-race;



a pair of diodes grounded at one terminal thereof and connected at the other terminal thereof to the other end of said third and fifth transmission lines respectively; and

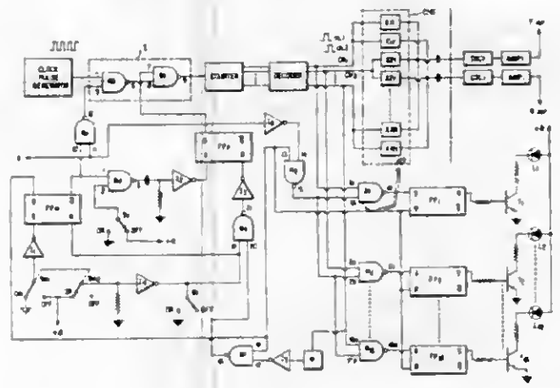
output means connected to said first transmission line at a position forming a straight line passing through the connection of one of said third and fourth transmission lines to said first transmission line relative to the center of said circular closed loop formed by said first transmission line in said rat-race being on said straight line, for delivering an output signal having a frequency component representing the frequency difference between said high frequency signal and said local oscillation signal.

4,031,473

STATION SELECTING DEVICE HAVING IMPROVED MONITOR

Kaoru Mitarai, Tokyo, Japan, assignor to Trio Electronics Incorporated, Tokyo, Japan

Filed Nov. 14, 1974, Ser. No. 523,860
Claims priority, application Japan, Apr. 3, 1974, 49-37642
Int. Cl.² H04B 1/06
U.S. Cl. 325—455 5 Claims



1. A station selecting device for use in a multi-channel communication system, said device comprising

information signal receiving means for receiving information signals over at least one of a plurality of channels;

means for generating a train of clock pulses of predetermined width and period;

sensing signal generating means responsive to said information signals for generating a sensing signal for each of said channels whenever an information signal corresponding to one of said channels is present;

scanning signal generating means responsive to said clock pulses for sequentially generating a plurlity of scanning signals respectively corresponding to the sensing signals of said plurality of channels of said information signal receiving means;

a plurality of display means respectively corresponding to said channels; and

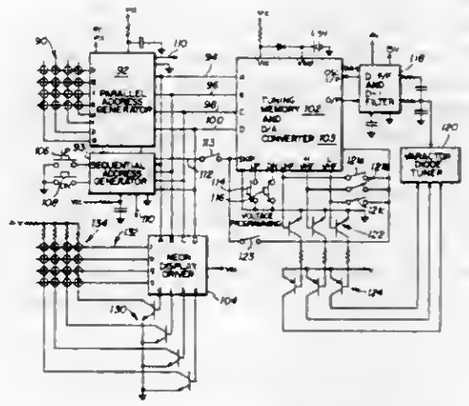
control means responsive to said scanning signal generating means and said sensing signals for actuating those display means corresponding to the channels for which sensing signals are generated so that said last mentioned channels can be readily determined from the actuated display means, said control means including means for maintaining the generation of said scanning signals by said scanning signal generating means even though an information signal is sensed in one of said channels by said sensing means until a predetermined number of said scanning signals have been generated so that all channels having sensing signals can be displayed by said display means.

4,031,474

SOLID STATE TELEVISION CHANNEL SELECTION SYSTEM

George John Ehni, III, and Horst Leuschner, both of Dallas, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 508,969, Sept. 25, 1974, abandoned. This application Apr. 7, 1976, Ser. No. 674,458
Int. Cl.² H04B 1/26
U.S. Cl. 325—455 27 Claims



1. A television channel tuning system comprising:

switch means operable to produce a signal indicative of a desired television channel,

an address generator responsive to said signal produced by said switch means for generating a unique binary address corresponding to the desired channel,

memory means for storing a plurality of digital tuning words each representative of a different television channel and selectively outputting one of said tuning words upon reception of one of said unique binary addresses,

converter means for receiving and converting said tuning words into analog tuning levels,

manually controllable means operable to selectively change any of the digital tuning words stored in said memory means,

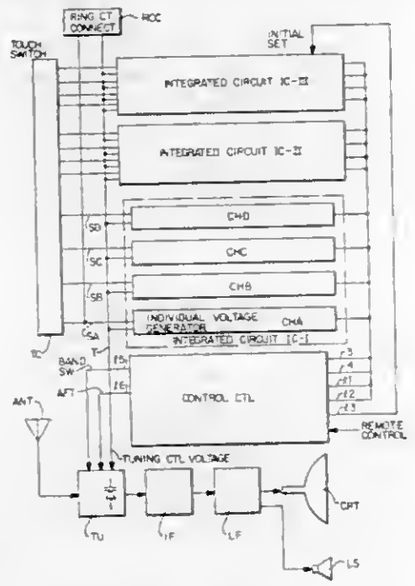
means operable in connection with said switch means to produce sequential access tuning of said system by causing said address generator to produce progressively changing binary addresses, and

skip means in said memory means for causing selective ones of the digital tuning words stored in said memory means to be skipped during sequential access tuning of said system.

4,031,475
ELECTRONIC CHANNEL SELECTING APPARATUS

Takeshi Arai, Higashiosaka, Japan, assignor to Sanyo Electric Co., Ltd., Japan

Filed Apr. 5, 1976, Ser. No. 673,941
Claims priority, application Japan, Apr. 3, 1975, 50-41029
Int. Cl.² H04B 1/26
U.S. Cl. 325—455 **16 Claims**

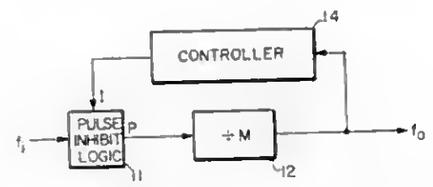


1. An electronic channel selecting apparatus, comprising:
means for selectively providing a plurality of individual channel selecting signals for selecting the corresponding one of a plurality of broadcasting channels,
tuning means comprising tuning circuit means including a voltage controlled variable reactance device the reactance of which is variable as a function of a tuning control voltage applied thereto, said variable reactance device determining a tuning frequency of said tuning means,
a plurality of tuning control voltage providing means, each responsive to the corresponding one of said individual channel selecting signals for providing a different tuning control voltage to said voltage controlled variable reactance device of said tuning means for selecting the corresponding one of said plurality of broadcasting channels,
each said tuning control voltage providing means comprising
gate means responsive to a gating signal for allowing the corresponding individual channel selecting signal to pass therethrough,
store means responsive to said corresponding individual channel selecting signal, as gated by said gate means, for assuming an active state and responsive to a disabling signal for assuming an inactive state,
preset voltage providing means for providing a predetermined voltage for selecting the corresponding one of said plurality of broadcasting channels when said predetermined voltage is applied to said variable reactance device, and
switching means responsive to the active state output from said store means for allowing said predetermined voltage to pass therethrough to said voltage controlled variable reactance device of said tuning means, said apparatus further comprising
means responsive to any one of said plurality of store means being in an active state and an individual channel selecting signal being received in any one of said plurality of tuning control voltage providing means for providing said gating and disabling signals to said gate means and store means, respectively for causing said one store means to assume an inactive state and for causing the store means of said one tuning control voltage providing means to assume an active state, whereby the broadcasting channel corresponding to said one tuning control voltage providing means is selected.

4,031,476
NON-INTEGER FREQUENCY DIVIDER HAVING CONTROLLABLE ERROR

Edwin Allen Goldberg, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed May 12, 1976, Ser. No. 685,549
Int. Cl.² H03K 27/00, 23/00
U.S. Cl. 328—39 **4 Claims**

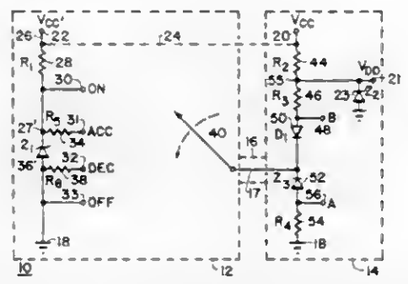


1. A circuit, producing from a signal at a first frequency a signal at a second frequency, said first and second frequencies being related by a non-integral ratio, comprising the combination of:
gating means receptive of said first frequency signal for producing pulses in response thereto when enabled by an enabling signal;
divider means responsive to said pulses for producing said second frequency signal; and
control means responsive to said second frequency signal for enabling said gating means said control means comprising:
means for accumulating a known error value associated with said second frequency signal; and
means responsive to said means for accumulating for producing said enabling signal and supplying it to said gating means while the accumulated error value is less than a predetermined value.

4,031,477
SYSTEM FOR TRANSFERRING FOUR COMMANDS OVER A SINGLE CONDUCTOR UTILIZING DUAL THRESHOLD LOGIC GATES

Mark Layne Shaw, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 26, 1976, Ser. No. 679,964
Int. Cl.² H03K 3/02
U.S. Cl. 328—70 **9 Claims**



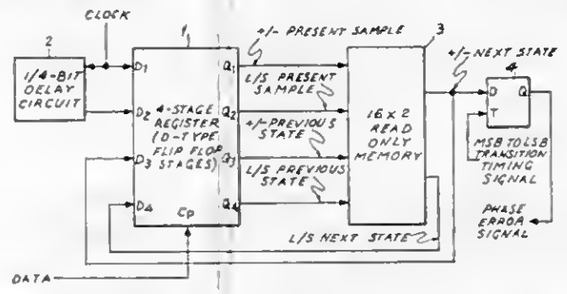
1. A system for transmitting a selected one of a plurality of commands along a conductor comprising:
selection means for selecting one of said plurality of commands;
transmitting means coupled to said conductor and said selection means for generating a signal on said conductor representative of said selected command;
receiving means coupled to said conductor for receiving said signal and generating a pair of ternary signals which represent said selected command;

digital means coupled to said receiving means and to a plurality of output conductors for generating a binary output signal representative of said selected command at one of said plurality of output conductors.

4,031,478
DIGITAL PHASE/FREQUENCY COMPARATOR

James Monroe Clark, Cedar Grove, N.J., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed June 29, 1976, Ser. No. 700,931
Int. Cl.² H03B 3/04
U.S. Cl. 328—134 **10 Claims**

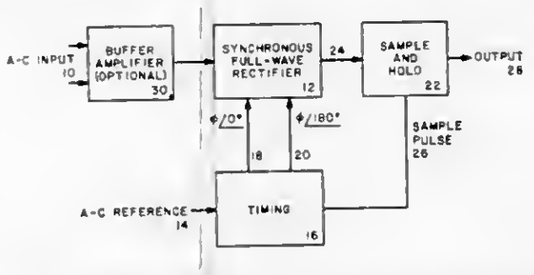


1. A digital phase/frequency comparator comprising:
a first source of clock;
a second source of digital data;
first means coupled to said first and second sources to produce a first signal indicating a plus/minus phase error of a present sample of said data and a second signal indicating a large/small phase error of said present sample of said data;
second means to provide a third signal indicating a plus/minus phase error of a previous state of said data and a fourth signal indicating a large/small phase error of said previous state of said data; and
third means coupled to said first and second means responsive to said first, second, third and fourth signals following a given set of rules determined by a predetermined logic to produce a phase error signal,
said first, second and third means cooperating to provide negative frequency errors for a clockwise change of phase states of said data and positive frequency errors for counter-clockwise changes of phase states of said data.

4,031,479
PEAK DETECTING DEMODULATOR

Virgil E. Thomas, Jr., China Lake, and Donald G. Quist, Ridgecrest, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 23, 1976, Ser. No. 660,585
Int. Cl.² G05B 21/02; H03D 1/00
U.S. Cl. 329—50 **5 Claims**

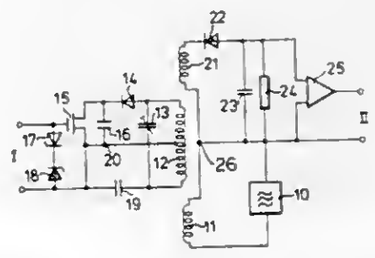


1. A demodulator for converting varying amplitude alternating current (a.c.) signals into direct current (d.c.) format representative of the information contained therein, comprising:
first and second a.c. signals of identical frequency, wherein said first signal is the input of said demodulator containing said information and said second signal is a reference signal;
rectifying means for full-wave rectifying said input and providing an output of either all positive value pulses or all negative value pulses;
gated means for sampling and holding the value of said pulses when said gated means is gated; and
timing means coupled to said reference signal for gating said gated means at only the peak values of said pulses,
such that the value held by said gated means is the demodulator's output, which is a d.c. format representative of at least part of the information contained in said a.c. signal.

4,031,480
CIRCUIT ARRANGEMENT FOR THE UNGROUNDED TRANSMISSION OF SIGNALS THROUGH TESTING POINTS IN COMMUNICATION SYSTEMS

Josef Huellwegen, Altenbeken, Germany, assignor to Nixdorf Computer AG, Paderborn, Germany

Filed Feb. 3, 1976, Ser. No. 654,759
Claims priority, application Germany, Feb. 5, 1975, 2504785
Int. Cl.² H03F 3/38
U.S. Cl. 330—10 **8 Claims**



1. In a circuit arrangement for the ungrounded transmission of signals through testing points in communication systems with the aid of high-frequency oscillations which are signal controlled on one side of a testing point and rectified on the other side of the testing point and utilized to reproduce the signals, said circuit arrangement having input terminal means and output terminal means, the improvement comprising a resonant circuit, a high-frequency generator powered independently of said circuit arrangement, first inductive coupling means for inductively coupling the output from said high-frequency generator to said resonant circuit, said resonant circuit being tuned to the high-frequency oscillations of said high-frequency generator, a modulation circuit connected between and to said input terminal means and said resonant circuit, a demodulaton circuit and second inductive coupling means for inductively coupling the input to said demodulation circuit to said resonant circuit, the output to said demodulation circuit being connected to said output terminal means.

4,031,481
TRANSISTOR AMPLIFIER

Tadao Yoshida, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

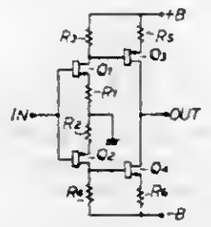
Filed May 16, 1975, Ser. No. 578,195
Claims priority, application Japan, May 23, 1974, 49-59292[U]
Int. Cl.² H03F 3/16
U.S. Cl. 330—35 **6 Claims**

1. A transistor amplifier comprising:
power supply means having a pair of terminals for providing operating potentials;
first and second field effect transistors each having triode-type dynamic characteristics, the gate electrodes of said first and second field effect transistors being supplied with an input signal to be amplified and the source and drain electrodes of said first and second field effect tran-

sistors being connected in a series circuit between said pair of terminals, the source electrodes of said field effect transistors being connected to each other, and said first and second field effect transistors operating as a common source class-A amplifier;

a first connection point connected to one of said source and drain electrodes of said first transistor;

a second connection point connected to one of said source and drain electrodes of said second transistor and having a different DC voltage level than said first connection point; and



third and fourth field effect transistors each having triode-type dynamic characteristics, the gate electrode of said third field effect transistor being directly connected to the drain of said first field effect transistor, and the gate electrode of said fourth field effect transistor being directly connected to the drain of said second field effect transistor, said third and fourth field effect transistors being connected in push-pull amplifier configuration, and the drains of said third and fourth field effect transistors being connected to an output terminal and having their source electrodes connected to said pair of terminals.

4,031,482

BIAS CIRCUIT FOR FET

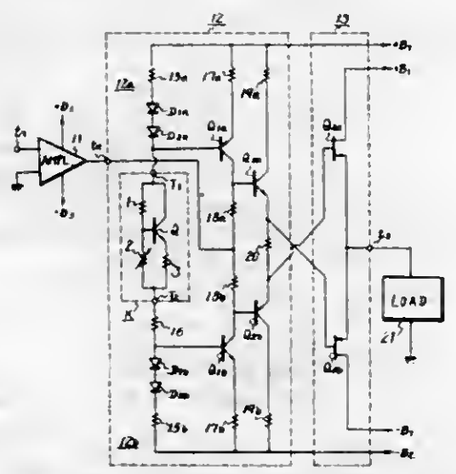
Katsuaki Tsurushima, Kawasaki, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Nov. 10, 1975, Ser. No. 630,331

Claims priority, application Japan, Nov. 14, 1974, 49-131276; Nov. 12, 1974, 49-130125

Int. Cl.² H03F *3/16*

U.S. Cl. 330—35 **12 Claims**



1. A bias circuit for use with a field effect transistor comprising: means for supplying an operating voltage susceptible to voltage fluctuations; a field effect transistor having triode-type dynamic characteristics and including gate, source and drain electrodes; means for applying said operating voltage across said drain and source electrodes through a load; input circuit means for applying an input signal to said gate electrode; bias voltage generating means for generating a bias voltage and applying same to said gate electrode of said field effect transistor, said bias voltage generating means including compensating means coupled to said operating voltage supply means and responsive to voltage fluctuations in said operating voltage to correspondingly vary said bias voltage applied to said gate electrode so as to stabilize the DC drain bias current of said field effect transistor in spite of the voltage fluctuations in the operating voltage; and voltage-controlled impedance means having a pair of terminals at least one of which being coupled to said compensating means and supplied with said operating voltage, said impedance means including biased semiconductor means connected to said pair of terminals having an impedance thereacross which varies with said operating voltage fluctuations in a hyperbolic relation that is substantially the same as the relationship between the amplification constant (μ) and the pinch off voltage (Vp) characteristics of said field effect transistor so as to adjust the DC gate bias voltage applied to said field effect transistor even though the pinch-off voltage (Vp) and the amplification constant (μ) may deviate from one field effect transistor to another.

4,031,483

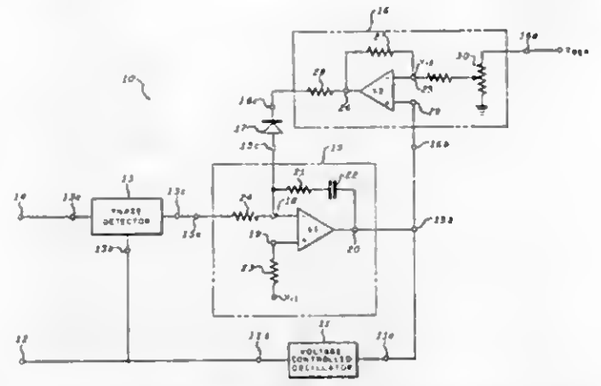
LIMITER CIRCUIT FOR SERVOSYSTEMS

Richard B. Formeister, Phoenix, Ariz., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Jan. 15, 1976, Ser. No. 649,307

Int. Cl.² G05B *11/06, 23/02*; H03B *3/04*

U.S. Cl. 331—17 **11 Claims**



1. In a servomechanism of the type including a feedback loop having an error detecting means with first and second input terminals and an output terminal, for detecting and providing at said output terminal, an crror signal consistent with a signal coupled to said first input terminal from an output terminal of said servomechanism and a signal coupled to said second input terminal; means, having an input terminal coupled to said output terminal of said error detecting means and an output terminal and containing means for storing electrical energy, for providing a filtered error signal at said output terminal; and means, coupled between said second input terminal of said error detecting means and said output terminal of said filter means for providing a signal representative of said filtered error signal, the combination with said filter means of means, coupled to said filter means, for limiting said error signal at said output terminal of said filter means to a predetermined signal level, in the absence of a signal at said input terminal to said servomechanism, that is within predetermined upper and lower bounds, said limiting to said predetermined signal level achieved in a manner that substantially maintains energy stored in said energy storage means, contained in said filter means, at a level that said storage means would have attained for a signal at said output terminal of said filter means equal to said predetermined signal level without said limiting.

9. A method for observing the transient response of a servosystem containing a filter means which comprises:

coupling a limiter circuit containing a variable reference source to said filter means;

adjusting said reference source to establish a reference signal at said limiter circuit, said reference signal establishing a level to which the output signal of said filter means is servoed, in the absence of an input signal within a predetermined frequency range to said servosystem, such that energy storage devices contained within said filter means exhibit an energy storage that is consistent with said output signal of said filter means;

applying an input signal to said servosystem; and

observing the output signal of said servosystem from the time said input signal is applied to the time marking the completion of said transient.

10. A limiter, in combination with a filter means having an input and an output terminal and containing a storage element therein, comprising:

means for receiving a reference signal;

a differential operational amplifier having a first input terminal coupled to said reference signal receiver means, a second input terminal coupled to said output terminal of said filter means and an output terminal;

a first resistor coupled between said first input terminal and said output terminal of said differential operational amplifier; and

a second resistor having a first terminal coupled to said output terminal of said operational amplifier and a second terminal;

a unidirectional current conductive device coupled between said second terminal of said second resistor and said filter means and poled to be operative when a signal at said input terminal of said filter means exceeds a specified value so that a signal at said output terminal of said operational amplifier servoes to a predetermined level thereby accomplishing said limiting in a manner that maintains a charge on said storage element at a value consistent with said predetermined signal level.

4,031,484

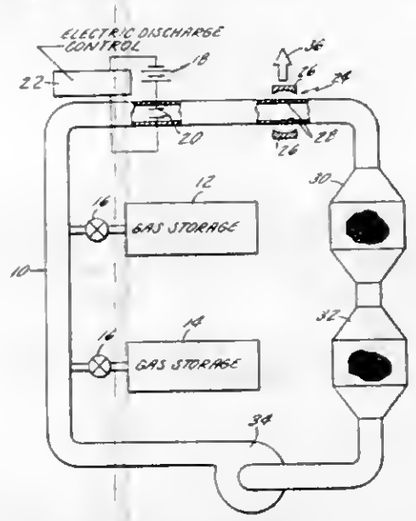
PORTABLE CHEMICAL LASER WITH GAS RECIRCULATION

Robert J. Freiberg, South Windsor; David W. Fradin, Manchester; Peter P. Cheausky, West Hartford, and Frank R. Biancardi, South Windsor, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Nov. 11, 1975, Ser. No. 630,828

Int. Cl.² H01S *3/00*

U.S. Cl. 331—94.5 G **14 Claims**



1. A portable laser system comprising:

a closed loop circuit through which a gaseous medium may be repeatedly circulated;

a vessel for the containment of a first gas and a second gas, said vessel being connected to the conduit in a manner which allows these gases to be controllably admitted into the conduit;

means for causing dissociation of the first gas in the conduit to form a species of atomic gas, such means being downstream of the position at which the first and second gases are admitted into the conduit;

a reaction region in which the atomic gas and the second gas combine chemically to form an excited species from which laser radiation can be extracted;

optical means adjacent to the reaction region for extracting laser radiation from the active species;

scrubber means for removing undesired constituents in the gaseous working medium passed therethrough, the scrubber being positioned in the conduit downstream of the optical means; and

recirculation means for continuously pumping the working medium around the fluid circuit described by the conduit.

4,031,485

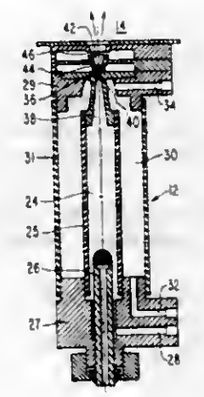
METHOD FOR ACHIEVING GAS DYNAMIC LASING

Robert Anthony Crane, Beaconsfield, and Asoke Kumar Ghosh, Dollard des Ormeaux, both of Canada, assignors to RCA Corporation, New York, N.Y.

Filed Jan. 7, 1976, Ser. No. 647,005

Int. Cl.² H01S *3/095, 3/22*

U.S. Cl. 331—94.5 P **10 Claims**



1. A method for achieving dynamic laser emission comprising:

dissociating molecules of a multi-atomic molecular first gas into atoms;

recombining the dissociated atoms into molecules in a metastable energy state;

mixing a second gas with the recombined molecules to form an active laser gas mixture having a population inversion; and

injecting the gas mixture into an optical laser cavity.

4,031,486

MEDIUM Q HIGH POWER DUAL CAVITY OSCILLATOR

Richard Calvin Havens, Scottsdale, Ariz., assignor to Motorola, Inc., Schaumberg, Ill.

Filed May 26, 1976, Ser. No. 690,215

Int. Cl.² H03B *9/12*

U.S. Cl. 331—96 **4 Claims**

1. A microwave oscillator comprising:

a first resonator:

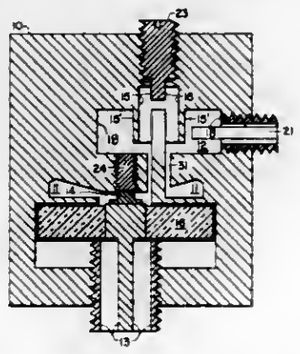
a second resonator electromagnetically coupled to the first resonator;

negative resistance means electromagnetically coupled to the first resonator;

means for supplying energy to said negative resistance means to provide RF energy;

means for coupling the output of the second resonator electromagnetically to a load wherein said first and said second resonators form a circuit with the characteristics of a parallel resonant circuit at a first frequency and wherein said negative resistance means and said first and

second resonators form a circuit with the characteristics of a series resonant circuit when the oscillator is operated



at a second frequency which is within 20% below said first frequency.

4,031,487

RECIPROCAL MICROWAVE JUNCTION DEVICE

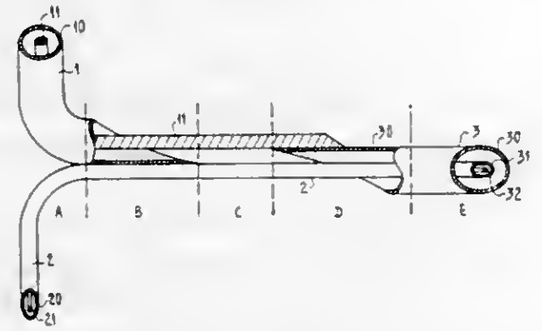
Jean Rannou, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Jan. 28, 1976, Ser. No. 653,022

Claims priority, application France, Jan. 31, 1975, 75.03101

Int. Cl.² H01P *5/00, 3/06*

U.S. Cl. 333—1 **4 Claims**



1. A reciprocal microwave junction device between a system of concentric coaxial lines having an external conductor and an internal coaxial line, and a first and a second independent coaxial line each having an internal conductor and an external conductor, said junction device comprising:

a section of two parallel wires transmission line having a first wire formed of a common section of the first independent coaxial line and the internal coaxial line of the concentric coaxial line system, and a second wire formed of an extension of the internal conductor of the second independent coaxial line,

said first and second coaxial line being located adjoining and parallel to one another at one end of said device, the external conductor of said second independent coaxial line terminating at said end and making electrical contact with said first line external conductor,

said concentric coaxial line system being located at the other end of said device in prolongation of the first coaxial line, the external conductor of said concentric coaxial line system terminating at said other end and making electrical contact with said second line internal conductor.

4,031,488

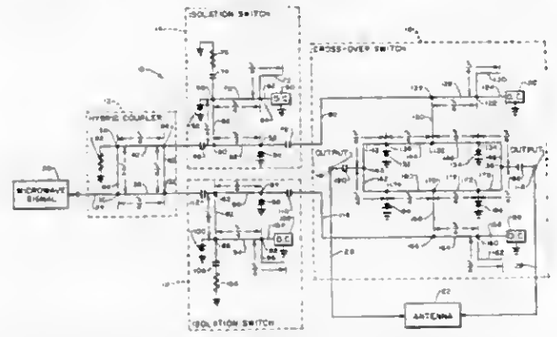
MULTIPLE POLARIZATION SWITCH

Lawrence A. Beno, Camarillo, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 5, 1976, Ser. No. 673,557

Int. Cl.² H01P *1/16, 1/15, 1/18*

U.S. Cl. 333—21 A **45 Claims**



1. A multiple polarization switch for providing horizontal, vertical, right-hand circular and left-hand circular polarization from a single microwave source comprising:

a. a hybrid coupler having an input coupled to receive a microwave signal from a microwave source and a first and second output having first and second respective signals appearing thereon, said first signal being substantially 90° out of phase with said second signal;

b. a first isolation switch connected to receive said first signal from said hybrid coupler first output at an input port, said first switch passing said first signal to an output port when on and terminating the passage of said first signal to said output port when off;

c. a second isolation switch connected to receive said second signal from said hybrid coupler second output, said second switch passing said second signal to an output when on and terminating the passage of said second signal to said output port when off;

d. a cross-over switch having first and second input ports connected, respectively, to receive said first

and second signals from said first isolation switch output and said second isolation switch output, said cross-over switch having a first and second mode, when in said first mode said cross-over switch connecting said first input to a first output and said second input to a second output, when in said second mode said cross-over switch connecting said first input to said second output and said second input to said first output.

4,031,489

VHF HIGH-POWER BROADBAND ISOLATORS

Nicolle Bernard, and Gerard Forterre, both of Paris, France, assignors to Societe Ligoes Telegraphiques et Telephoniques, Paris, France

Filed June 29, 1976, Ser. No. 700,916

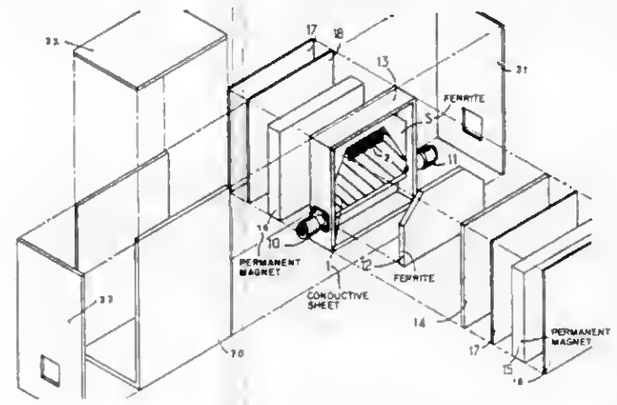
Claims priority, application France, July 15, 1975, 75.22036

Int. Cl.² H01P *1/36*

U.S. Cl. 333—24.2 **6 Claims**

1. A broadband high level VHF isolator having two terminals operating in a wide temperature range comprising two gyromagnetic material slabs on both sides of a substantially trapezoidal metal sheet connected respectively to the two terminals, radiating slots defining teeth cut from said sheet along at least one edge parallel to the propagation direction, the distance between the bottom of said teeth and the nearest edge of gyromagnetic slabs material equal to a quarter wavelength within the gyromagnetic material at a frequency in the operating frequency band, means to encase said slab, means to establish a non uniform d.c. magnetic field within said slabs reaching the gyromagnetic valve in the vicinity of said teeth

and of lower value elsewhere, means to compensate for the variations of permeability of the gyromagnetic material and



the d.c. establishing means with temperature, and means to close the d.c. magnetic field.

4,031,490

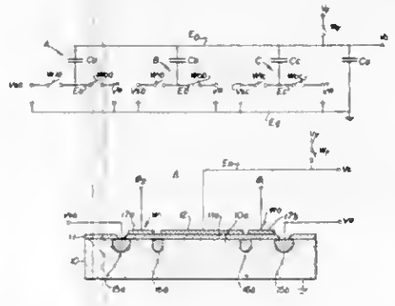
ANALOG SIGNAL PROCESSOR

Miles Alexander Copeland, Ottawa, Canada, assignor to Northern Electric Company Limited, Montreal, Canada

Filed Jan. 29, 1976, Ser. No. 653,293

Int. Cl.² H03H *7/28;* **G06G** *7/19;* **H01L** *29/78, 29/50*

U.S. Cl. 333—70 T **3 Claims**



1. A signal processor comprising:

a plurality of charge storage elements each having an input signal electrode and an output sensing electrode, the input signal electrodes being separated from each other and the output sensing electrodes being connected to each other;

a common electrode;

a control means for initially coupling the input signal electrodes to a first reference potential source and the output sensing electrodes to a second reference potential source to set the electrodes to a fixed potential with respect to the common electrode;

the control means thereafter disconnects the second reference potential source from the output sensing electrodes, selectively disconnects the first reference potential source from preselected input signal electrodes, and connects sampled analog signal potential sources to said preselected input signal electrodes to alter the voltage on the storage elements so as to derive an output signal voltage on the output sensing electrodes which is a function of the magnitude of the sampled analog signal potentials and of the preselected connections of the sources to the input signal electrodes.

4,031,491

TUNING APPARATUS USING A VOLTAGE-DEPENDENT REACTANCE ELEMENT

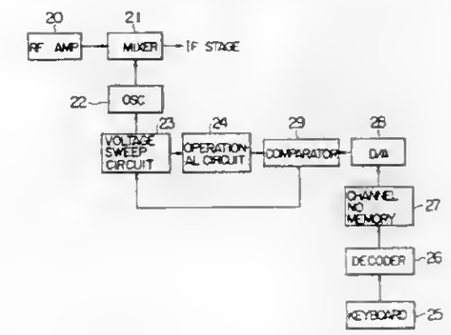
Yoichi Sakamoto, Takatsuki, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Feb. 20, 1975, Ser. No. 551,383

Claims priority, application Japan, Feb. 25, 1974, 49-22636; Feb. 25, 1974, 49-22637; Mar. 4, 1974, 49-25448

Int. Cl.² H03H *5/12;* **H03J** *3/06, 5/04*

U.S. Cl. 334—15 **9 Claims**



1. A tuning apparatus comprising:

a tuning circuit including means for generating tuning frequencies having a voltage dependent reactance element as a tuning element;

a voltage sweep circuit coupled to said tuning circuit for producing a D.C. sweep tuning voltage, said D.C. sweep tuning voltage being applied to said voltage dependent reactance element to control the generation of said tuning frequencies;

an operational circuit including a logarithm converter circuit coupled to said voltage sweep circuit for converting said D.C, tuning voltage to a D.C. reference voltage which varies in linear proportion to said tuning frequencies;

a standard voltage generating circuit for selectively producing a D.C. standard voltage;

voltage comparator means coupled to said operational circuit for comparing said D.C. reference voltage with said D.C. standard voltage; and

means coupling said comparator means to said voltage sweep circuit for controlling the sweep of said voltage sweep circuit in response to the output of said comparator means to produce a predetermined tuning frequency in said tuning circuit.

4,031,492

TRIPLE BREAK CURRENT LIMITER

John A. Wafer, Monroeville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 22, 1975, Ser. No. 607,005

Int. Cl.² H01H *77/10*

U.S. Cl. 335—16 **8 Claims**

1. A current limiting circuit interrupter comprising:

a first stationary contact;

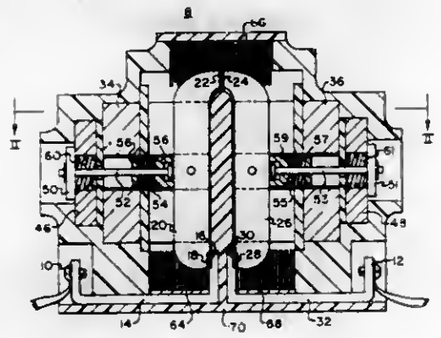
a second stationary contact;

a first elongated bridging member having a first movable contact and a second movable contact disposed in a spaced apart relationship thereon;

a second elongated bridging member having a third movable contact and a fourth movable contact disposed in a spaced apart relationship thereon; and,

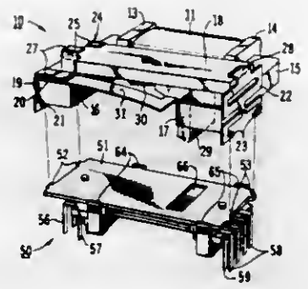
operating means associated with said first elongated bridging member and said second elongated bridging member for moving said first elongated bridging member and said second elongated bridging member in opposite directions from a closed position wherein said first movable contact engages said first stationary contact, said second movable contact engages said third movable contact and said

fourth movable contact engages said second stationary contact to an open position wherein said first movable contact is spaced apart from said first stationary contact,



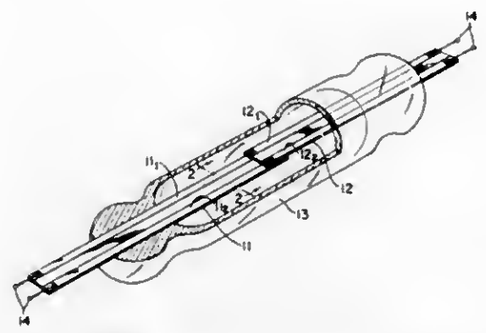
said second movable contact is spaced apart from said third movable contact and said fourth movable contact is spaced apart from said second stationary contact.

4,031,493
MINIATURE LOW PROFILE RELAY
Michael Principe Van Der Wielen, Reynoldsburg, Ohio, assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed Dec. 12, 1975, Ser. No. 640,019
Int. Cl.² H01H 67/02
U.S. Cl. 335—128 **12 Claims**



1. A low profile relay having a magnetic circuit subassembly and a distinct contact spring subassembly, said magnetic circuit subassembly comprising a substantially U-shaped core to present a base and a pair of legs, said core having a winding at said base, a flat armature member hinged at one end thereof to one surface of one of the legs of said core, an actuating insulated member mounted on said armature member adjacent the other leg of said core, and a flat return spring member held at one between said one leg of said core and said one end of said armature member and having its other end bearing against said actuating insulating member; said contact spring subassembly comprising a flat nonmagnetic support plate having a slot therein and a plurality of contact springs mounted on one side thereof, the other side of said support plate being affixed to the other surfaces of said legs of said core in a manner to permit said insulating member to extend through said slot.

4,031,494
MULTIPLE PATH SEALED SPRING SWITCH
Wendel Edward Archer, Gabanna, Ohio, assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed Oct. 21, 1975, Ser. No. 624,333
Int. Cl.² H01H 1/02, 51/06
U.S. Cl. 335—154 **4 Claims**



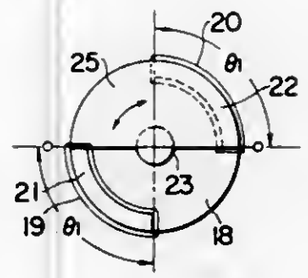
1. An electrical switch structure comprising a pair of magnetically responsive flat spring members arranged to present opposing faces and each being further arranged to present an overlap portion to the other at one end, said members being supported at the other ends, and a plurality of conducting paths comprising a plurality of electrically isolated conductive coatings on each of said spring members at least on said opposing faces, said spring members being flexible responsive to the presence of a magnetic field for controlling the electrical contact of respective ones of said conducting paths at said overlap portions.

4,031,495
Patent Not Issued For This Number

4,031,496
VARIABLE INDUCTOR
Hideo Fujiwara, Tachikawa; Yukio Ichinose, Kokubunji; Satoshi Taniguchi, Tokorozawa; Tsutomu Kobayashi; Kazuo Ichino, both of Tokyo; Michiyasu Itoh, Kodaira; Yasutaro Uesaka, Hachioji; Fumiyuki Inose, Kokubonji, and Sadayasu Ueno, Katsuta, all of Japan, assignors to Hitachi, Ltd., Japan
Filed July 3, 1974, Ser. No. 485,626
Claims priority, application Japan, July 6, 1973, 48-76808; July 6, 1973, 48-76809; July 6, 1973, 48-76811
Int. Cl.² H01F 21/06
U.S. Cl. 336—135 **11 Claims**

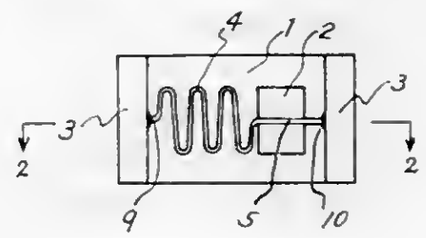
1. A variable inductor comprising
movable magnetic core means;
first fixed magnetic core means forming with said movable magnetic core means a first closed magnetic path;

second fixed magnetic core means forming with said movable magnetic core means a second closed magnetic path;
first coil means wound around a portion of said first closed magnetic path;
second coil means wound around a portion of said second closed magnetic path;
whereby the inductance of said first coil means varies in a complementary manner with the inductance of said second coil means such that the sum of said inductance of said first coil means and said inductance of said second coil means remains constant when said movable magnetic core means is removed relative to said first and second fixed magnetic core means, and
magnetic core member means for joining said first fixed magnetic core means with said second fixed magnetic core means, said magnetic core member means having center columnar means projecting between said first and second fixed magnetic core means and providing a common magnetic path portion of said first and second closed magnetic paths,
said movable magnetic core means being rotatably supported relative to said first and second fixed magnetic core means joined by said magnetic core member means



about the longitudinal axis of said columnar means opposite parallel surfaces of said first and second fixed magnetic core means, and said movable magnetic core means being supported with respective constant gap portions from said opposite parallel surfaces of said first and second fixed magnetic core means,
wherein as said movable magnetic core means is rotated about said longitudinal axis of said columnar means, the sum of the areas of the surfaces of said first and second fixed magnetic core means which face said movable magnetic core means remains constant and wherein said movable magnetic core means is magnetically coupled more closely at said center columnar means than at said gap portions;
wherein said magnetic core member means is disc-shaped, said first and second fixed magnetic core means are of arcuate shape and project axially of said magnetic core member means at respective edge portions thereof toward said movable magnetic core means and said movable magnetic core means is rotatably mounted parallel to said magnetic core member means; and
wherein said movable magnetic core means comprises
a substantially semi-circular shaped disc piece parallel to said magnetic core member means,
wherein the longitudinal axes of said magnetic core member means and said columnar means coincide with the axis of rotation of said movable magnetic core means.

4,031,497
FUSIBLE RESISTOR
Juichiro Ozawa, c/o Susumu Industrial Co., Ltd. No. 14, Umamawashi-cho, Kamitoba, Minami, Kyoto, Japan
Filed Jan. 13, 1976, Ser. No. 648,804
Claims priority, application Japan, Sept. 23, 1975, 50-115411
Int. Cl.² H01C 7/00
U.S. Cl. 338—308 **2 Claims**

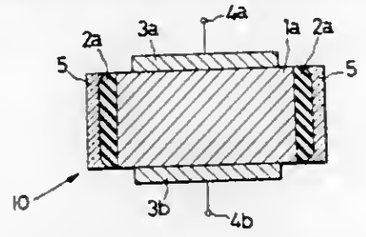


1. A fusible resistor device comprising a base plate of a heat resistant material, a thin layer of an organic material which is caused to decay when heated and over at least a part of said base plate, and an elongated film of a fusible resistor material extending across said base plate, at least a part of said film lying on said layer of organic material, whereby when the resistor film is connected in a circuit and an excessive current flows through said film of resistor material in the case of a somewhat excess current the heat generated thereby melts the organic film and the resistor film is no longer supported and ruptures, thereby opening the circuit in which the resistor film is connected.

4,031,498
NON-LINEAR VOLTAGE-DEPENDENT RESISTOR
Masahiro Hayashi; Masanori Haba; Misuzu Watanabe, and Shinji Hirano, all of Tokyo, Japan, assignors to Kabushiki Kaisha Meidensha, Tokyo, Japan
Filed Oct. 24, 1975, Ser. No. 625,515
Claims priority, application Japan, Oct. 26, 1974, 49-123730; Oct. 16, 1975, 50-124603
Int. Cl.² H01C 7/10
U.S. Cl. 338—21 **23 Claims**

1. A non-linear voltage-dependent resistor comprising a non-linear resistance element having a good non-linearity and a high dielectric constant, and an inorganic electrically insulating coating formed on said resistance element, obtained by firing together at a temperature of from 1,000° to 1,400° C a formed element including zinc oxide (ZnO) and a coating

material applied on the formed element, said coating material including a mixture of zinc oxide (ZnO), silicon dioxide



(SiO_2), bismuth trioxide (Bi_2O_3) and antimony trioxide (Sb_2O_3).

4,031,499

THERMISTOR DEVICE

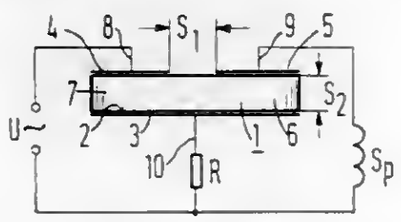
Wolfgang Brueckner, Deutschlandsberg, Austria, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed June 30, 1975, Ser. No. 591,890

Claims priority, application Germany, July 9, 1974, 2433000

Int. Cl.² H01C 7/00, 7/02

U.S. Cl. 338—23 **7 Claims**



1. A thermistor device comprising:

a PTC thermistor body having first and second surfaces and a given body thickness therebetween,

a continuous conductive layer on said first surface of said thermistor body,

two conductive layers on the said second surface of said thermistor body and spaced from said continuous layer by said given thickness,

each of said two conductive layers being spaced apart on said second surface by a predetermined interval,

said predetermined interval being substantially the same as said given body thickness, and

said thermistor having three terminals, one for each of said conductive layers.

4,031,500

POSITION MEASURING DEVICE

Guy Parent, Le Plessis-Robinson, France, assignor to Compagnie Industrielle des Telecommunications Cit-Alcatel SA, Paris, France

Filed Feb. 11, 1976, Ser. No. 657,330

Claims priority, application France, Feb. 27, 1975, 75.06083

Int. Cl.² G01S 5/18

U.S. Cl. 340—6 R **11 Claims**

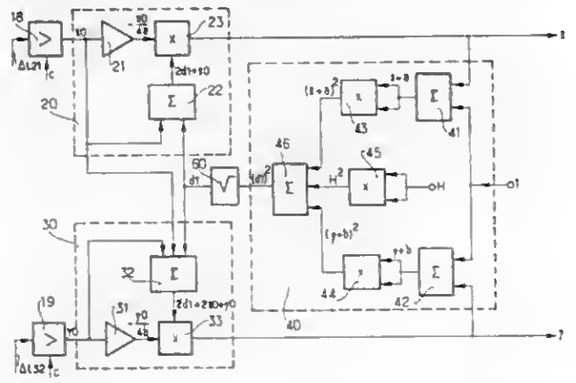
1. In a position measuring device, making it possible to calculate the position of a vessel which can move on water in relation to a fixed point O situated on the sea bed from which are emitted sound waves, and comprising: at least three detectors D1, D2, D3 fixed to the bottom of the vessel and arranged at the apexes of a right-angled triangle, the distance between the detectors D1, D2 being $2a$, the distance between the detectors D2, D3 being $2b$, the distance between the point O and the detector D1 being d_1, the distance between the point O and the detector D2 being d_2, the distance between the point O and the detector D3 being d_3;

Means for calculating the depth H of the water below the vessel;

Means for calculating the difference in travel time Δt_{21} of the sound waves between O and D2 on the one hand and O and D1 on the other hand;

Means for calculating the difference in travel time Δt_{32} of the sound waves between O and D3 on the one hand and O and D2 on the other hand; the improvement comprising:

First means (**18, 19**) supplying, from the difference in travel time Δt_{21}, by multiplication by a coefficient depending on the propagation speed c of sound waves in water, a signal xo equal to the difference between d_2 and d_1 and, from the



difference in travel, by multiplication by a coefficient depending on c, a signal yo equal to the difference between d_3 and d_2;

Second means (**20, 20'**) supplying, by algebraic multiplications and additions of signals xo and d_1, a signal equal to kx, x being the distance of the point O in relation to the mid plane of D1 D2;

Third means (**30, 30'**) supplying, by algebraic multiplications and additions of signals xo, yo and d_1, a signal ky, y being equal to the distance of O in relation to the mid plane of D2 D3;

Fourth means (**40, 40'**) supplying, by algebraic multiplications and additions of signals kx, ky and H, a signal equal to $k^2d_1^2$ which, after application to a square root extractor (**60, 60'**), is applied to the second and third means (**20, 20'**) (**30, 30'**).

4,031,501

APPARATUS FOR ELECTRONICALLY LOCATING ANALOG SIGNALS

Frank Caruso, W. Long Branch, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Continuation-in-part of Ser. No. 546,957, Feb. 4, 1975, abandoned. This application Apr. 5, 1976, Ser. No. 673,321

Int. Cl.² G01S 3/80

U.S. Cl. 340—6 R **7 Claims**

1. Apparatus for electronically locating the source of an acoustic or seismic planar wave comprising:

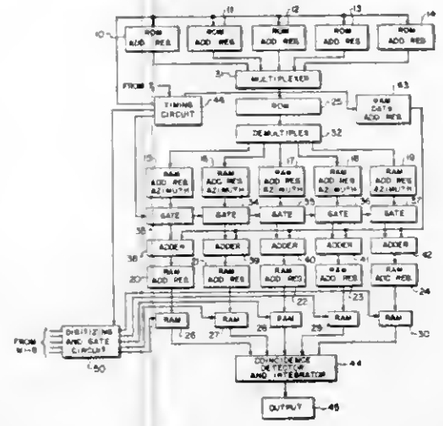
a plurality of signal transducers physically positioned in a predetermined array for detecting an analog acoustic or seismic planar wave and producing an analog electrical signal indicative of said wave;

transducer sampling means electrically coupled to each signal transducer for sampling the detected analog signal at a first sampling rate consistent with the dimensions of the array and the frequency characteristic of the analog signal;

digitizing means, electrically coupled to the output of the transducer sampling means for digitizing each analog electrical signal;

a first plurality of memory means electrically coupled to said digitizing means for storing the digitized signals associated with each transducer in real time;

programmed sampling means electrically coupled to the first plurality of memory means for repeatedly, selectively sampling the partial contents of each of the first plurality of memory means at a second sampling rate in predetermined patterns, each sample pattern corresponding to the expected positions of the digitized signals in the plurality



of memory means for a known azimuth position of the source of said planar wave; detection and summation means electrically coupled to the output of the first plurality of memory means for detecting the sampled contents of each of the first plurality of memory means and selectively summing the sampled contents so as to discount the effects of random noise;

output means coupled to the output of the detection and summation means for displaying the summations.

4,031,502

HYDROPHONE WITH ACOUSTIC REFLECTOR

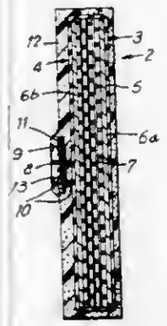
Francnis L. M. Lefaudeux, Le Relecq-Kerhaun, and Michel Georges Quivy, Six Fnurs Les Plages, both nf France, assignors to Etat Francais, Paris, France

Filed Apr. 7, 1976, Ser. No. 674,605

Claims priority, application France, Apr. 11, 1975, 75.11305

Int. Cl.² H04B 13/00

U.S. Cl. 340—10 **6 Claims**



1. A hydrophone comprising an acoustical reflector, at least one transducer disposed adjacent said reflector, and a common envelope for said transducer and reflector;

said reflector comprising a flexible sealed container, two rigid parallel plates disposed in said container and sheets of interlaced filaments disposed between said plates,

said transducer being a piezoelectric transducer comprising a thin flexible blade in the form of a disc, at least one piezoelectric disc fixed to a surface of said blade, and a rigid annular ring to which said blade is fixed at the periphery thereof,

said reflector and transducer being entirely embedded in said common envelope with said flexible blade in immediate proximity to said reflector.

4,031,503

ANTI-CORROSION ULTRASONIC TRANSDUCER

Hiroshi Minami, Kawasaki, Japan, assignor to Hokushin Electric Works, Ltd., Tokyo, Japan

Filed Aug. 19, 1975, Ser. No. 605,808

Claims priority, application Japan, Aug. 30, 1974, 49-105078

Int. Cl.² G01V 1/00

U.S. Cl. 340—11 **4 Claims**

1. An ultrasonic transducer comprising:

A. a cylindrical case provided at one end with an opening;

B. an ultrasonic unit disposed within said case, said unit consisting essentially of a disc-shaped electrostriction element having an inherent resonance frequency, and a relatively thick rigid body affixed thereto which reduces the natural frequency of the element to a degree axially shifting the vibratory nodal point thereof into said body, means suspending said unit from said nodal point to occupy a position within said case in which it is spaced from the inner surface of the case and from said opening;

C. an electrically non-conductive elastomeric material filling the free-space within said case and embedding the unit therein to permit ultrasonic energy to be emitted by said unit or received thereby through said opening, said energy being conveyed by said filling material which otherwise serves to isolate said unit from the environment in which the transducer is installed.

4,031,504

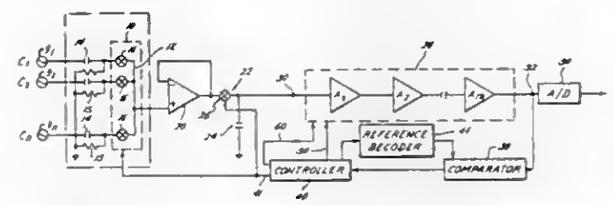
GAIN RANGING AMPLIFIER SYSTEM

George T. Mioduski, Houston, Tex., assignor to Western Geophysical Company of America, Houston, Tex.

Filed Mar. 8, 1976, Ser. No. 664,616

Int. Cl.² G01V 1/24

U.S. Cl. 340—15.5 GC **13 Claims**



12. A gain ranging amplifier system having input and output terminals comprising:

a plurality of amplifiers having inputs and outputs connected in cascade between said terminals, each said amplifier having at least two different gain states, one gain state being unity, the amplification ratio between said gain states being unique to each said amplifier;

controller means for defining the gain states of said amplifiers;

voltage reference means for selectively providing discrete reference voltages corresponding to the amplification ratios unique to each said amplifier, the amplifier having the highest amplification ratio being associated with the lowest reference voltage;

means for comparing the signal voltage at the output of said system with said first reference voltage; and

means for transmitting the result of the comparison to the controller.

4,031,505
SEISMIC SYSTEM WITH SIGNAL-TO-NOISE DETERMINATION

Gary D. Owens, Bellaire, Tex., assignor to Texaco Inc., New York, N.Y.

Filed Mar. 24, 1976, Ser. No. 669,774
Int. Cl.² G01V 1/28
U.S. Cl. 340—15.5 DP 10 Claims

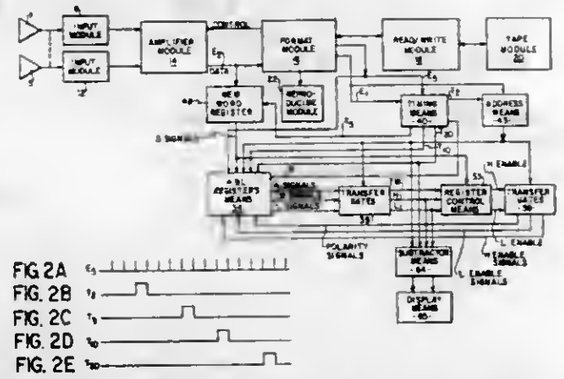


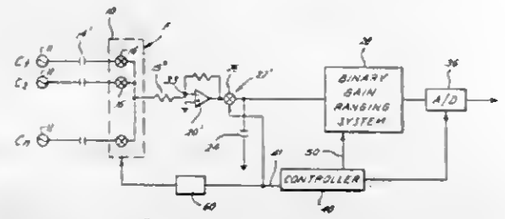
FIG. 2A
FIG. 2B
FIG. 2C
FIG. 2D
FIG. 2E

1. An improvement to a seismic system, which provides a data word having digital signals corresponding to sensed vibrations in an earth formation or to noise occurring in the seismic system, for determining the signal-to-noise ratio of the seismic system when the digital signals correspond to the noise, the data word digital signals including a sign bit corresponding to a positive or a negative polarity of the data word while the remaining data word digital signals correspond to the absolute value of the sensed vibrations or the noise, said improvement comprising sampling means connected to the seismic system for periodically sampling the data word provided by the seismic system to provide a new word for each sampling; means connected to the sampling means for storing the most positive new word, with respect to the new words provided by the sampling means, as an H word, and the most negative new word, with respect to the new words provided by the sampling means, as an L word; and means connected to the storing means for providing a digital output corresponding to the absolute difference between the H word and the L word.

4,031,506
MULTIPLEXER COMMUTATED HIGH PASS FILTER

Lee E. Siems, Houston, Tex., assignor to Western Geophysical Company of America, Houston, Tex.

Filed Mar. 8, 1976, Ser. No. 664,614
Int. Cl.² G01V 1/22; H03K 17/56; H04Q 11/04
U.S. Cl. 340—15.5 GC 7 Claims

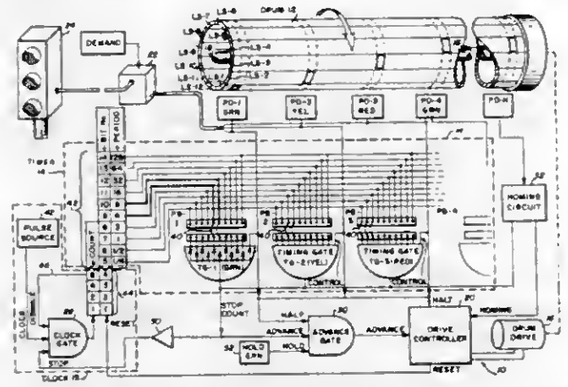


1. A multiplexer commutated high pass filter having a plurality of analog input terminals and an output terminal comprising:
- a multiplexer having a plurality of input terminals and a common output bus;
- a capacitor connected between each analog input terminal to the filter and the corresponding input terminals of the multiplexer;
- a resistor connected to said common output bus;
- seismic sensor units connected respectively to said input terminals; and
- control means connected to said multiplexer for sequentially connecting each capacitor to said resistor, said control means including means for varying the ratio of the dwell with respect to the channel-off time of said multiplexer to vary the cut-off frequency, where the dwell is the time period during which one of said seismic sensor units is connected to said resistor and the remainder of the time required to complete a scan cycle is the channel-off time.

4,031,507
TRAFFIC CONTROLLER, ELECTROMECHANICAL SEQUENCER FOR A TRAFFIC CONTROLLER

Ronald P. Johnson, San Jose, and Reynold W. Bell, Santa Clara, both of Calif., assignors to The Singer Company, Binghamton, N.Y.

Continuation of Ser. No. 485,074, July 2, 1974, abandoned.
This application Aug. 2, 1976, Ser. No. 711,013
Int. Cl.² G08G 1/00
U.S. Cl. 340—41 R 15 Claims

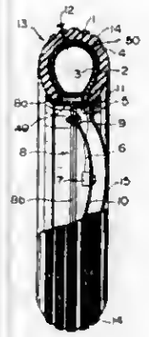


1. A traffic controller sequencer for establishing the order and duration of traffic light events in a traffic light cycle, the sequencer comprising:
- a sequence means having prepositioned structures thereon corresponding to the traffic light events;
- reading means responsive to the prepositioned structures;
- drive means for providing relative motion and periods of nonmotion between the sequence means and the reading means,, permitting the reading means to sequentially read the prepositioned structures on the sequence means for establishing the sequence of traffic light events;
- binary counter means having a sequential series of stages, each of which is periodically activated on a time base which doubles in duration with each subsequent stage causing each stage of the series to have a time base which is a power of two multiple of the first stage of the series;
- a plurality of separately adjustable timer means, one associated with each traffic light event for independently establishing the length of the period of nonmotion for that traffic light event, each timer means having a series of inputs corresponding to at least some stages in sequence in the series of sequential stages, selected stages of the series of sequential stages being electrically connected to the corresponding input in the series of timer inputs for each timer means for establishing the period of nonmotion for that timer means which is equal to the sum of the time bases of the selected stages; and
- drive controller means responsive to the plurality of timer means for initiating the relative motion, and responsive to the reading means for terminating the relative motion when a prepositioned structure is read.

4,031,508
PUNCTURE ALARM DEVICE FOR A TIRE

Seita Omori, 1109-6 Oaza Sho, Tadotsu-cho, Nakatado, Kagawa, Japan

Filed Dec. 15, 1975, Ser. No. 640,436
Int. Cl.² B60C 23/00
U.S. Cl. 340—58 8 Claims

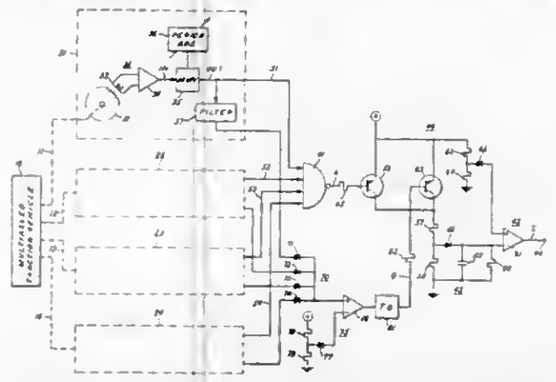


1. In a puncture alarm for a tire, including sensor means disposed within said tire, said sensor means for providing a change in electrical characteristic in response to the puncturing of said tire by a conductive object, and including an alarm and detection circuit means for producing an output signal in response to said sensor means to activate said alarm, said detection circuit means coupled to said sensor means and alarm, and comprising:
- a power supply;
- gate means coupled to said alarm for producing said output signal; and
- compensation means coupled to said power supply, sensor means and gate means for biasing said gate means such that said output signal is produced only when said electrical caracteristic assumes a value outside of a preselected range, said compensation means for allowing a predetermined magnitude of degradation of said electrical characteristic without causing a false alarm.

4,031,509
LOCKED AXLE DETECTOR FOR A MULTI-AXLED TRACTION VEHICLE

E. S. Matulevich, Erie, Pa., assignor to General Electric Company, Erie, Pa.

Filed June 27, 1975, Ser. No. 590,982
Int. Cl.² G08B 21/00; B60T 8/04
U.S. Cl. 340—62 6 Claims



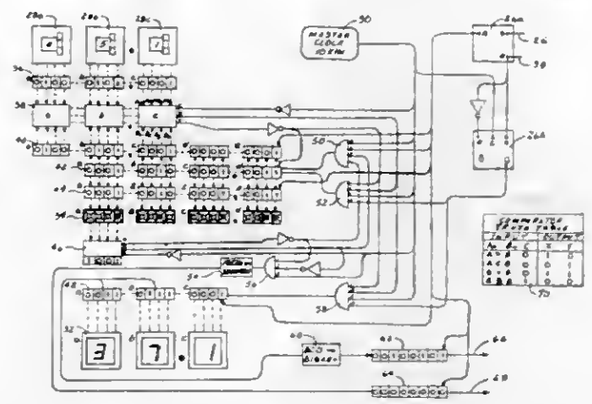
1. For detecting a predetermined speed differential among a plurality of axles of a traction vehicle equipped with speed detectors that provide a corresponding plurality of input signals indicative of the speeds at which the respective axles are rotating, the improvement comprising:
- a. a corresponding plurality of signal conditioning means adapted to receive said input signals from said speed detectors, each of said signal conditioning means being operative to generate a train of discrete output pulses having an average value representative of the axle speed indicated by the associated input signal as that speed varies between nearly zero and a predetermined magnitude, and each of said signal conditioning means also including an electric filter energized in accordance with the corresponding output pulse train whose average value determines the magnitude of an analog output signal of said electric filter;
- b. control means coupled to said signal conditioning means and supplied with the output pulse trains respectively generated thereby, said control means being operative to produce a predetermined control signal in response to any one of said pulse trains having an average value indicating that the rotational speed of the associated axle is lower than a predetermined first threshold level, and
- c. disabling means comprising:
  - i. an OR logic circuit coupled to the said signal conditioning means for receiving the respective analog output signals therefrom, and
  - ii. level detecting means connected between said control means and said OR logic circuit for preventing the production of said control signal except when at least one of said analog signals exceeds a magnitude corresponding to a predetermined second threshold level of rotational speed of the associated axle, said second threshold level being higher than said first threshold level,

whereby the production of said control signal indicates that the speed of at least one axle is lower than said first threshold level while the speed of another axle is higher than said second threshold level, said predetermined magnitude of axle speed being at least as high as said second threshold level.

4,031,510
SPEED DETECTION SYSTEM FOR AUTOMOBILES AND OTHER MOTOR-DRIVEN OBJECTS

Frederick N. King, 5068 Franklin Ave., Los Angeles, Calif. 90027

Filed Dec. 19, 1975, Ser. No. 642,332
Int. Cl.² B60Q 1/54
U.S. Cl. 340—62 11 Claims



1. An adjustable speed detection system for accurately recording the speed of moving objects between a pair of detection locations comprising:
- start timing sensor at the first detection location of said two locations responsive to an object for commencing a time interval;
- stop timing sensor at the second detection location of said two locations responsive to said object for terminating said time interval;
- speed calculation means coupled to said sensors and responsive to said time interval to determine speed of said object;
- compensation means included in said speed calculation means to adjust said uncompensated calculated object

speed for inaccuracies due to reaction time of said sensors; and

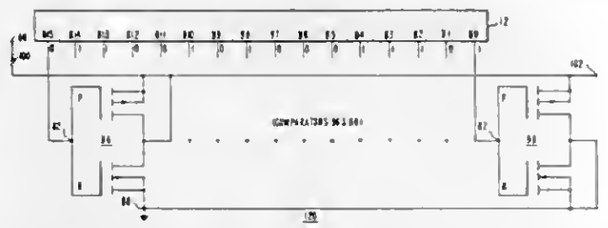
a decimal display matrix coupled to said speed calculation means for visually indicating said object speed.

4,031,511

CMOS COMPARATOR

James S. Britton, Raleigh, N.C., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 27, 1976, Ser. No. 680,655
Int. Cl.² G06F *7/04;* **H03K** *5/20*
U.S. Cl. 340—146.2 **14 Claims**



1. A single bit comparator for comparing a variable word with a fixed word, comprising:

a pair of complementary MOS devices including a p-channel MOS and an n-channel MOS having their gates connected in common and their drains connected in common,

said drains being connected to the source of a selected one of the MOS devices, with the selected MOS device being responsive to the logic level of the fixed word,

a power supply having first and second terminals,

a load resistor,

the source of said p-channel MOS being connected to the first terminal of said power supply via said load resistor,

the source of said n-channel device being connected to the second terminal of said power supply,

an input terminal for receiving the variable word, said input terminal being connected to said gates, and

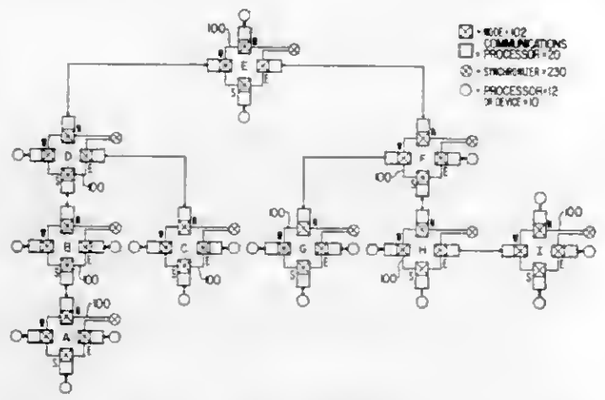
an output terminal for indicating when the variable word is equal to the fixed word, said output terminal being connected to the source of said p-channel MOS device.

4,031,512

COMMUNICATIONS NETWORK FOR GENERAL PURPOSE DATA COMMUNICATIONS IN A HETEROGENEOUS ENVIRONMENT

Ulbe Faber, Honeybrook, Pa., assignor to Burroughs Corporation, Detroit, Mich.

Filed May 29, 1975, Ser. No. 581,938
Int. Cl.² H04Q *9/00*
U.S. Cl. 340—147 R **16 Claims**



1. A method of communicating data between a plurality of information handling units arranged in a series loop configuration comprising the steps of:

generating a plurality of undedicated information limited slots for carrying signals;

organizing said plurality of undedicated information limited slots into a continuous sequence of undedicated information carrying slots;

conveying said organized continuous sequence of undedicated information carrying slots onto said series loop configuration;

dedicating on demand at each of said plurality of information handling units the first available undedicated information carrying slot for receiving information signals to be communicated from said respective information handling unit; and

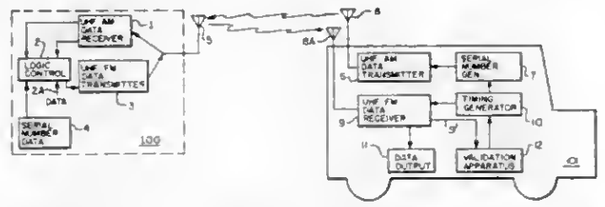
undedicating on demand at each of said designated ones of said information handling units said dedicated information carrying slots when delivering said received information signals.

4,031,513

RF DATA EXCHANGE SYSTEM

Walter Simclak, Longwood, Fla., assignor to Northern Illinois Gas Company, Aurora, Ill.

Filed Nov. 8, 1974, Ser. No. 522,019
Int. Cl.² H04Q *9/00*
U.S. Cl. 340—152 T **12 Claims**



1. In a remote meter reading system having an individual transponder for each of a plurality of remotely located meters and interrogate means for energizing, requesting and receiving information from a selected one of said transponders, said interrogate means including interrogate transmitter means for transmitting electromagnetic signals over a UHF AM radio channel to initiate the readout of the information from said selected one of said plurality of remotely located meters, each of said transponders including data receiver means for receiving the UHF AM signals and data transmitter means responsive to said data receiver means for retransmitting UHF FM radio signals comprised of a carrier signal modulated by signals of predetermined frequencies for representing the information requested by said interrogate transmitter means, said interrogate means further including interrogate receiver means for receiving the UHF FM radio signals and validation means responsive to said interrogate receiver means to provide a control output for enabling said interrogate transmitter means to continue the readout of information from the selected meter whenever the UHF FM radio signals received by said interrogate receiver means are modulated at said predetermined frequencies.

4,031,514

ADDRESSING SYSTEM IN AN INFORMATION PROCESSOR

Toshimasa Kihara, Kunitachi, Japan, assignor to Hitachi, Ltd., Japan

Filed Sept. 2, 1975, Ser. No. 609,605
Claims priority, application Japan, Sept. 4, 1974, 49-100924
Int. Cl.² G06F *9/20*
U.S. Cl. 364—200 **4 Claims**

1. An addressing system for an information processor comprising:

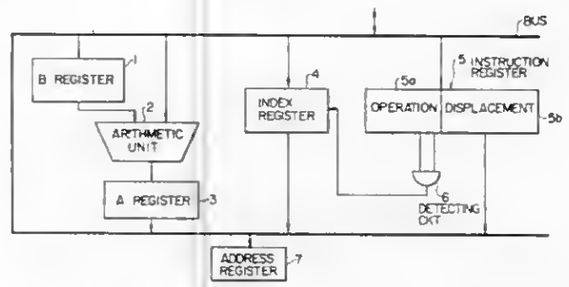
a data bus by way of which data is transmitted within the system;

an index register having an input and an output coupled to said data bus;

an address register having an input coupled to said data bus;

an instruction register, including an operation part and an address part and havng an input coupled to said data bus, said address part having an output coupled to said data bus;

an adder, having a first input coupled to receive the contents of said index register and a second input coupled to



rceive the contents of the address part of said instruction register, for adding said respective contents to each other to provide a summation output;

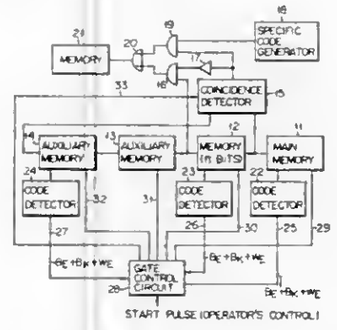
detection means, responsive to the state of selected bits of the operation part of said instruction register, for causing the summation output of said adder to be supplied to said index register and stored in said address register upon the state of said selected bits being a preselected state, and for otherwise preventing the summation output of said adder from being supplied to said index register.

4,031,515

APPARATUS FOR TRANSMITTING CHANGEABLE LENGTH RECORDS HAVING VARIABLE LENGTH WORDS WITH INTERSPERSED RECORD AND WORD POSITIONING CODES

Toshio Kashio, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Apr. 29, 1975, Ser. No. 572,871
Claims priority, application Japan, May 1, 1974, 49-48289; May 2, 1974, 49-49494
Int. Cl.² G06F *5/02, 7/34*
U.S. Cl. 364—200 **13 Claims**



1. A system for transmitting data to an output means, comprising:

a source of a plurality of records serially arranged with record positioning codes interposed therebetween, said records including a plurality of words serially arranged with word positioning codes interposed therebetween;

main memory means coupled to said source for temporarily storing said serially arranged records and record positioning codes;

auxiliary memory means coupled to said main memory means for temporarily storing a record including words of different lengths read out from said main memory means based on said record and word positioning codes;

comparator means coupled to said main and auxiliary memory means for comparing any one of the words of a record read out from said auxiliary memory means with the corresponding word of said record read out from said main memory means immediately after said record which was read out from said auxiliary memory means; and

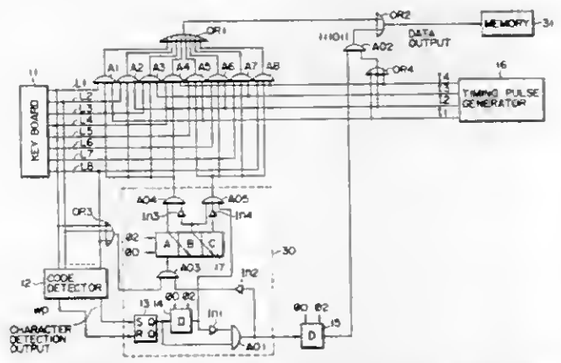
control circuit means coupled to said main memory means and to said comparator means for transmitting to the output means the record read out from the main memory means immediately after said record which was read out from said auxiliary memory means, in the original form, whenthe corresponding words are detected by said comparator means not to be identical and for transmitting the record to the output means with the corresponding word omitted when the corresponding words are detected by said comparator means to be identical.

4,031,516

TRANSMISSION DATA PROCESSING DEVICE

Toshio Kashio, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed June 4, 1975, Ser. No. 583,845
Claims priority, application Japan, June 7, 1974, 49-63932
Int. Cl.² G06F *13/00*
U.S. Cl. 364—200 **12 Claims**



1. A transmission data processing device for serially transmitting records each constituted by data word of variable length which have word positioning codes (*wp*) interposed among them and each of which includes a spontaneous number of binary-coded characters, said device comprising:

a memory means (**31**) for storing as a series transmission data a record comprised of predominantly numeric data characters coded in *n* bits, of data characters including at least one characeter and coded in *m* bits and of specific function codes (α) of *n* bits and inserted immediately before at least said data characters and contained in each data word, where *n* is smaller than *m;*

means (**AO 6**) coupled to said memory means (**31**) for detecting said function codes (α) read out from said memory means (**31**);

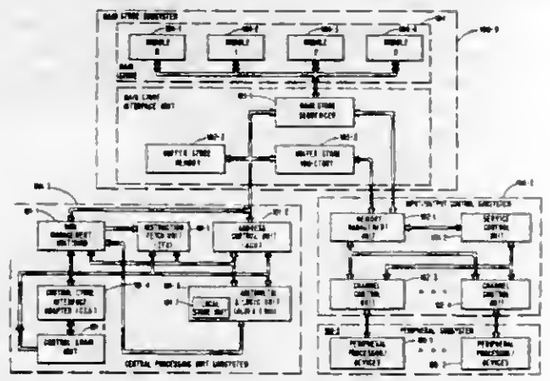
bit configuration designating means (**OR 5,** delay **23 AND AO 8**) having an input coupled to said detecting means (**AO 6**) for reading in *m*-bit configuration the data characters from said memory means (**31**) after said detection means produces a detection output; and

means (**AO 5,** 1*n* **9**) coupled to said memory means (**31**) and to said designating means (**OR 5,** delay **23,** AND **AO 8**) for releasing the *m*-bit configuration designating mode of said designating means upon detection of an *n* bit word positioning code.

4,031,517
EMULATION OF TARGET SYSTEM INTERRUPTS THROUGH THE USE OF COUNTERS

Allen C. Hirtle, Needham, Mass., assignor to Honeywell Information Systems, Inc., Waltham, Mass.

Filed Apr. 24, 1974, Ser. No. 463,700
Int. Cl.² G06F 9/18
U.S. Cl. 364—200 26 Claims



1. A data processing system for handling interrupts received from a peripheral subsystem coupled to said data processing system during the execution of a target system program from a plurality of target system peripheral control means which in the target system being emulated couple to a plurality of peripheral devices, and connect in common to share the common interrupt hardware facilities of said target system said data processing system including:

a main store having a plurality of storage locations;

a first group of said storage locations coded to store instructions of said target system program, said instructions including at least one input/output instruction involving the processing of interrupts generated during execution of said target system program by any one of said peripheral control means connected in common to share the common interruption facilities of said target system;

a second group of said storage locations, each location coded to store signals representative of said interrupts received from said peripheral subsystem and corresponding to the interrupt status indications for a different one of said plurality of peripheral control means of said target system being emulated;

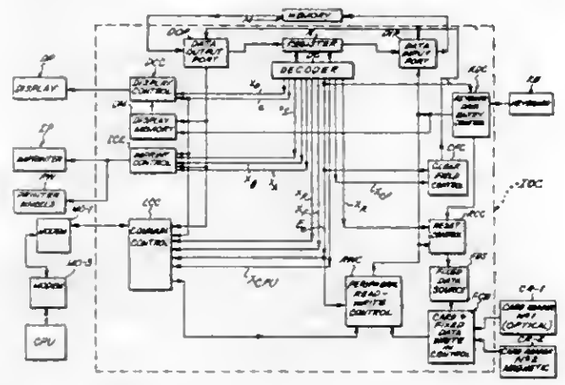
a third group of said storage locations coded for indicating the interrupt status of said emulated target system, at least one of said locations storing an interrupt count representing the number of said peripheral control means of said emulated target system having interrupt conditions; and,

microprogram control means for storing sequences of microinstructions for conditioning said system for processing instructions in at least first and second modes, said control means including branch means, said branch means when said control means is operated in a first mode during the execution of a target system input/output instruction coded to specify the altering of the interrupt status signals of a specified one of said plurality of target systems peripheral control means is caused by said instructions to reference a predetermined one of said sequences, said microprogram control means further including decode means, said decode means being conditioned by microinstructions of said one sequence to generate signals for conditioning said data processing system to switch one of said second group of said locations storing signals corresponding to interrupt status indicators of said specified peripheral control means to a predetermined state and generate signals for modifying the interrupt count contents of said one location of said third group for indicating said interrupt status of all of said plurality of peripheral control means.

4,031,518
DATA CAPTURE TERMINAL

Thomas Patrick Holloran, Aurora; Arthur Buell Braden, Mentor; Jerrold Stokes Foley, Stow; James Lucian Maynard, Northfield; John Patrick Klosky, Mentor; Gerald Anthony Dissauer, South Euclid; Terreoce Miller Adams, Kirtland, and Allan Alfred Lorenz, Mentor, all of Ohio, assignors to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed June 26, 1973, Ser. No. 373,884
Int. Cl.² G06F 3/00, 13/02
U.S. Cl. 364—200 16 Claims



1. A data capture terminal for use in a data communication system, wherein data including output peripheral commands and associated messages are received from a remote device, comprising:

memory means for receiving data for storage therein;

means for entering all output peripheral data from a remote device, including output peripheral commands having associated messages, into said memory means for storage thereby;

communication means, including for receiving data from said remote device and supplying said output peripheral data to said data entering means for entry into said memory means;

means for periodically and non-destructively outputting said data from said memory means;

a plurality of output peripheral means;

a corresponding plurality of actuatable output peripheral control means, each coupled to said outputting means and exposed to all said data outputted therefrom, and each being associated with a different one of said output peripheral means; and

a corresponding plurality of actuating means, each similarly associated with a different one of said output peripheral control means and coupled to said outputting means, for actuating its associated peripheral control means whenever the outputted data includes a command intended for its associated output peripheral means, so that thereby all communication from said remote device to a particular output peripheral means is conducted only through said memory means;

wherein each of said actuable output peripheral control means, when actuated by its corresponding actuating means, commands the associated peripheral means to perform a function in accordance with said associated output peripheral command upon the particular message associated therewith.

4,031,519
PRINTER

Gerald I. Findley, Morgan Hill, Calif., assignor to IBM Corporation, Armonk, N.Y.

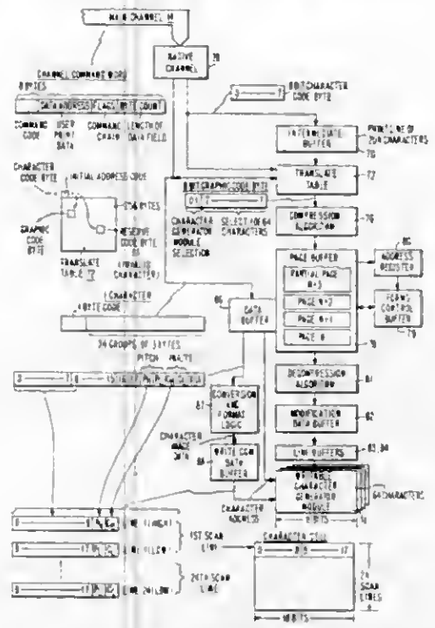
Filed Nov. 11, 1974, Ser. No. 522,998
Int. Cl.² G06F 3/12, 7/34, 13/00; G06K 15/02
U.S. Cl. 364—900 36 Claims

1. A system for printing characters in response to coded data comprising:

means for storing a plurality of different sets of graphical data, each set of graphical data being identified by a particular address and defining the portions of a grid pattern which a particular character comprises;

means responsive to receipt of the coded data by the system for assembling the data into a group representing a plurality of characters to be printed;

means responsive to assembly of the coded data into a group for translating each portion of the coded data representing a character into a corresponding address, the means for translating including means for storing



addresses in a plurality of different storage locations and means responsive to the value of each portion of the coded data representing a character for selecting a storage location to provide the address stored therein;

means responsive to each address from the means for translating for selecting the corresponding set of graphical data from the means for storing sets of graphical data corresponding to the address;

grid pattern scanning print means; and

means responsive to each selected set of graphical data for modulating the scanning print means in accordance with the graphical data to print a character.

4,031,520
MULTISTAGE SORTER HAVING PUSHDOWN STACKS WITH CONCURRENT ACCESS TO INTERSTAGE BUFFER MEMORIES FOR ARRANGING AN INPUT LIST INTO NUMERICAL ORDER

Michel Alexandre Rohner, San Jose, Calif., assignor to The Singer Company, Binghamton, N.Y.

Filed Dec. 22, 1975, Ser. No. 642,849
Int. Cl.² G06F 7/24
U.S. Cl. 364—200 15 Claims

1. An M stage sorter for arranging input members into a numerical order, comprising:

means for grouping the input numbers into groups;

a first stage for ordering the input numbers within each of the groups, and formed by:

first stage input means for sequentially receiving all of the input numbers within each of the groups;

first stage means for comparing each currently received input number to the previously received numbers from the same group; and

first stage storage means for inserting each currently received input number into proper numerical order among the numbers previously received from the same group;

M-1 subsequent sequential stages for progressively forming fewer groups of more numbers each, the last stage of which provides all of the input numbers in numerical order, each stage formed by:

interstage storage means for storing the ordered groups from the preceding stage;

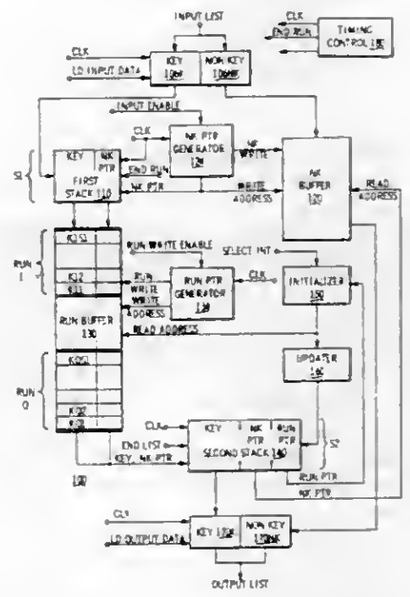
stack input means for sequentially receiving each of the numbers stored in the interstage storage means;

stack comparing means for comparing each currrently received number to the previously received numbers currently in the sorting stack;

stack pushdown storage means for inserting each currently received number into proper numerical order among the previously inserted numbers, which pushdown stormeans progressively fills up from a first-filled position to a last-filled position as each currently received number is inserted;

interstage output means for advancing the current number in the last filled position to the next stage;

replacement means for holding a replacement number from the interstage storage means for insertion into the stack pushdown storage means via the stack input means and stack comparing means as each current output number is advanced from the last filled position of the pushdown storage means to the interstage output means;



candidate pointer means for providing a candidate pointer for a next replacement number candidate for each replacement number from the interstage storage means prior to entering the replacement means for identifying candidates for the next replacement number;

first access means for permitting the candidate pointer for the current replacement number in the replacement means to access a first candidate for the next replacement number from the interstage storage means;

second access means for permitting the candidate pointer for the current number in the last filled position of the pushdown storage means to access a second candidate for the next replacement number from the interstage storage means; and

a candidate comparing means for selecting the next replacement number from the two candidates for entry into the replacement means as the current replacement number is inserted into the stack pushdown storage means; and

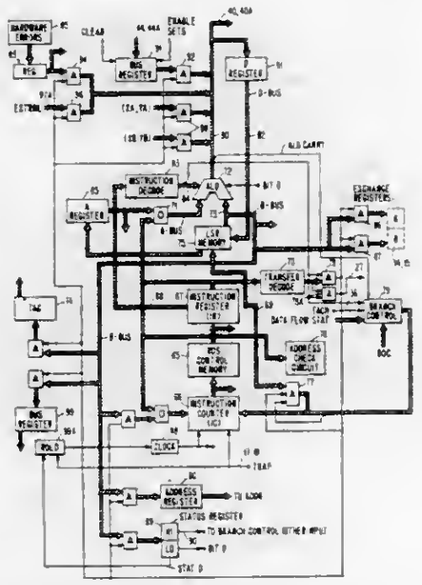
output means for receiving the numbers in numerical order from the last of the M sequential stages.

4,031,521

MULTIMODE PROGRAMMABLE MACHINES

Phil H. Hall, and John W. Irwin, both of Longmont, Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 15, 1971, Ser. No. 189,576
Int. Cl.² G06F 9/16
U.S. Cl. 364—200 8 Claims



1. A multimode programmable machine,
a microprocessing portion having a plurality of program step means,
a multimode cyclable program loop including a predetermined number of control program step means,
means establishing first and second modes of operation in said machine,
means having first sequences of machine operation cooperating with a first group of said control program step means being branch-on-condition steps and which first sequences are operative during said first mode to interrupt said cyclable program loop to selectively execute said first sequences upon certain events occurring in the machine,
means having second sequences of machine operation cooperating with said first group of said step means and operative during said second mode to supply first timed control signals of momentary duration in accordance with a continuous recycling of said program loop for indicating elapsed time, and
said machine having circuit means responsive to said control signals to perform predetermined machine functions in accordance therewith.

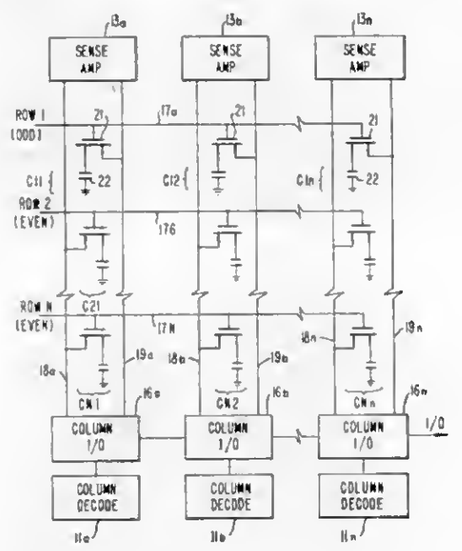
4,031,522

ULTRA HIGH SENSITIVITY SENSE AMPLIFIER FOR MEMORIES EMPLOYING SINGLE TRANSISTOR CELLS

John Anthony Reed, Los Altos, and Joel Allen Karp, Palo Alto, both of Calif., assignors to Burroughs Corporation, Detroit, Mich.

Filed July 10, 1975, Ser. No. 594,579
Int. Cl.² G11C 11/40
U.S. Cl. 340—173 R 10 Claims

1. A differential sense amplifier and restore circuitry comprising:
a pair of sense conductors;
a pair of transistors cross-coupled to form a latch to sense a difference in voltage potential between said sense conductors, said latch having a pair of output leads and a pair of input leads;
a pair of source followers, each coupled between one of said sense conductors and one of said input leads to receive an input signal from one or the other of said sense conductors; and



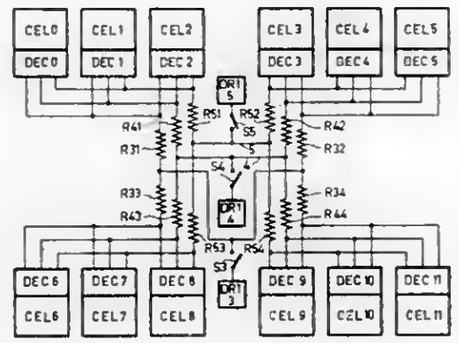
a pair of write-back transistors, each coupled between one of said output leads and one of said sense conductors to supply a restore signal to the sense conductor from which an input signal was received.

4,031,523

INTEGRATED STORAGE SYSTEM WITH PARALLEL CONNECTION LINES CONTAINING A RESISTOR

Johannes Bernardus Horsten, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 500,951, Aug. 27, 1974, abandoned.
This application Oct. 7, 1975, Ser. No. 620,301
Claims priority, application Netherlands, Sept. 11, 1973, 7312487
Int. Cl.² G11C 5/06, 7/00
U.S. Cl. 340—173 R 6 Claims



6. A memory system comprising
a plurality of bit-organized storage cells, each cell storing a plurality of bits;
a first network of first connecting lines connecting said storage cells, each one of said lines including a first junction point with at least another one of said lines, and a resistor connected in series with said one line;
a plurality of drive units for supplying signals to said storage cells; and
a second network of second connecting lines for connecting each of said drive units with at least one second junction point, said at least one second point being connected with said resistor of each respective one of said first connecting lines connected to said at least one second junction point; and
a plurality of capacitors connected between each respective one of said first connection line and ground; whereby said

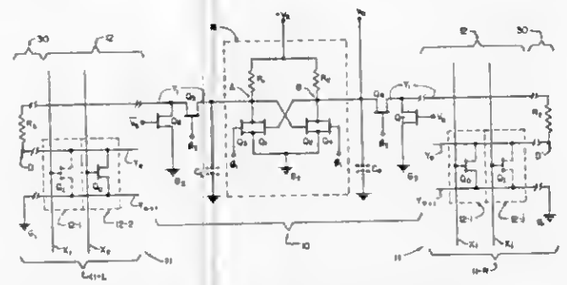
first network forms an integrating RC network with a minimal integration time for each first connection line.

4,031,524

READ-ONLV MEMORIES, AND READOUT CIRCUITS THEREFOR

Richard H. Heeren, Palatine, Ill., assignor to Teletype Corporation, Skokie, Ill.

Filed Oct. 17, 1975, Ser. No. 623,870
Int. Cl.² G11C 11/40, 17/00
U.S. Cl. 340—173 R 26 Claims



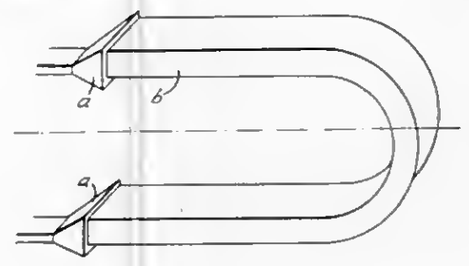
1. An improved readout circuit for a read-only memory bank of the type having an array of memory cells and means for accessing each individual cell, each cell including a memory device programmed to have either a high impedance or a low impedance, representing stored data, the improved readout circuit being characterized by:
a. a sense amplifier having a pair of input nodes;
b. means for connecting the memory bank, including the selected cell impedance, between a first one of the amplifier nodes and a circuit reference node, the total impedance of the memory bank, including that of the selected cell, having a first, "ON" value if the memory device in the selected cell is in the low-impedance state, and a second, "OFF" value if the memory device is in the high-impedance state; and
c. means for connecting a reference impedance between the other amplifier node and the reference node, the reference impedance having a value between the ON bank impedance and the OFF bank impedance;
d. the sense amplifier including means for sensing a difference in the impedance connected to the two amplifier nodes and for generating a binary output signal in response to the sensed difference, representing the data stored in the selected memory cell.

4,031,525

PROCESS FOR RECORDING AND REPRODUCTION OF INFORMATION IN ELECTROMAGNETIC FORM

Horst Volz; Reinhard Straubel, and Arnulf Hager, all of Berlin, Germany, assignors to VEB Kabelwerk Oberspree (KWO), Berlin-Oberschoeneweide, Germany

Filed Apr. 8, 1974, Ser. No. 458,933
Int. Cl.² G11C 13/00
U.S. Cl. 340—174 MS 23 Claims



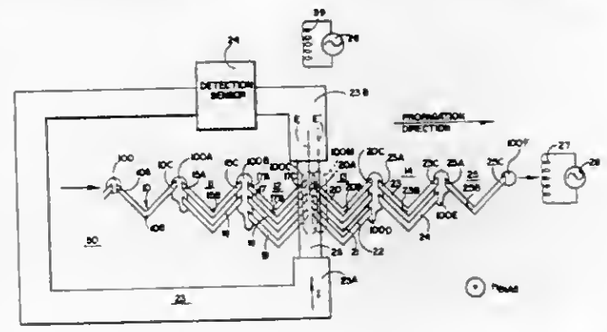
1. A process for the storage and readout of information in electromagnetic form which comprises:
a. modulating an information carrier with an information signal, within the range of the reversible permeability or reversible dielectric constant of said information carrier, wherein the information carrier is comprised of a material selected from a group consisting of ferromagnetic, ferrimagnetic, antiferrimagnetic, ferroelectric and antiferroelectric, metamagnetic, materials, said modulating comprising propagating said signal along a conductor,
b. forming an image of said information signal along the propagation path of the information carrier in the form of values of residual magnetism and/or residual dielectric polarization by short term high frequency pre-magnetization and/or short term high frequency dielectric pre-polarization of said information carrier, comprising applying an alternating electromagnetic field to said carrier, and
c. reading out the stored information by a short term magnetization step and/or short term dielectric polarization step comprising applying an alternating electromagnetic field to said carrier.

4,031,526

MAGNETIC BUBBLE DOMAIN DETECTION DEVICE

John L. Archer, Orange; Leonard R. Tocci, Laguna Niguel, and Jeffrey L. Williams, Corona, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Continuation of Ser. No. 290,607, Sept. 20, 1972, abandoned.
This application May 24, 1976, Ser. No. 689,435
Int. Cl.² G11C 19/08
U.S. Cl. 340—174 TF 6 Claims

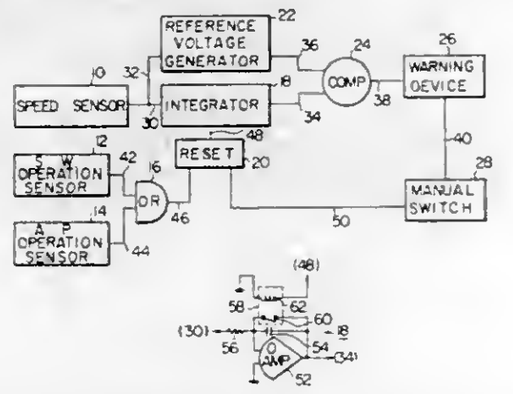


1. A magnetic device comprising,
a magnetic film capable of maintaining isolated domains therein wherein said domains have different magnetic polarization than said film,
a plurality of magnetizable areas on said magnetic film for controlling the position of said isolated domains in said film,
at least some of said plurality of magnetizable areas arranged adjacent to each other for expanding said isolated domains in a direction different from the direction of motion of said domains through said magnetic film, and
detector means adjacent to said magnetizable areas for detecting the presence of an expanded isolated domain at said magnetizable areas,
said detector means including a single magnetoresistive element the resistance of which varies as a function of the proximity of said expanded isolated domain,
said magnetizable areas disposed on said magnetic film under said detector means.

4,031,527
ELECTRONIC ALERTING SYSTEM FOR A VEHICLE DRIVER

Takayuki Yanagishima, and Naohiko Inoue, both of Yokohama, Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed July 3, 1975, Ser. No. 592,983
Claims priority, application Japan, July 8, 1974, 49-77315
Int. Cl.² G08B *21/00*; B60K *28/00*; B60T *7/19*
U.S. Cl. 340—279 **3 Claims**

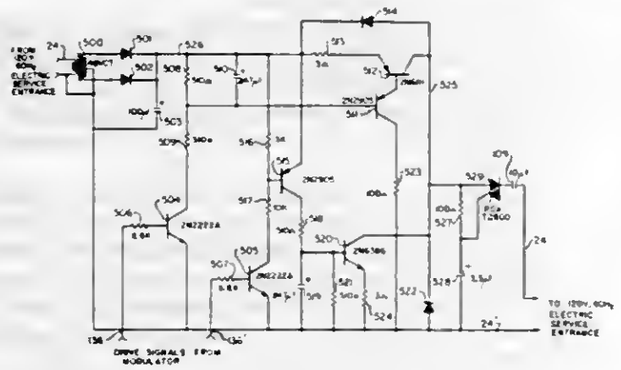


1. A safety system for alerting a driver when said driver becomes drowsy while operating a motor vehicle, comprising a steering wheel operation sensor for producing a first signal when a steering wheel of said motor vehicle rotates through an angle larger than a predetermined angle; an accelerator operation sensor for producing a second signal when an accelerator pedal of said motor vehicle is displaced through a distance larger than a predetermined distance; signal generating means including a speed sensor for producing a third signal representing the speed of said motor vehicle, and an integrator for integrating said third signal into a voltage signal representing the distance travelled by said vehicle until it is reset, into its initial state, by at least one of said first and second signals; a reference voltage generator for producing a reference voltage, the magnitude of which is variable in accordance with said third signal; a comparator for producing a fourth signal when the magnitude of said voltage signal exceeds said reference voltage; and a warning device for giving a warning to said driver when it receives said fourth signal.

4,031,528
TRANSMITTING OVER POWER LINES

David C. Harrison, Arlington, Mass., assignor to General Public Utilities Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 551,356, Feb. 20, 1975, abandoned. This application July 26, 1976, Ser. No. 708,394
Int. Cl.² H04M *11/04*
U.S. Cl. 340—310 R **7 Claims**

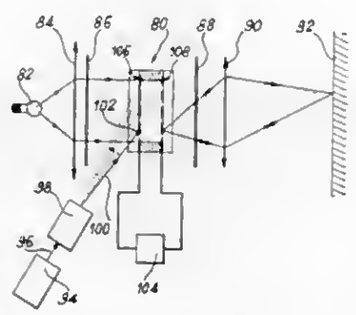


1. Apparatus for transmitting over power lines comprising,
a source of a unipolar potential derived from electrical power on said power lines,
a source of a modulating signal of carrier frequency for interrupting said unipolar potential at a rate corresponding to said carrier frequency,
and means for coupling the interrupted unipolar potential to said power lines to provide a carrier signal of said carrier frequency on said power lines,
said means for coupling comprising gated semiconductor switching means having gate electrode means and input and output electrode means in series with one of said power lines,
gate resistive means connected between said input and gate electrode means,
gate capacitive means connected between said gate electrode means and the other of said power lines,
output transistor switching means connected to said input electrode means for selectively exchanging current with said gate capacitive means through said gate resistive means,
input capacitive means coupled to said output transistor switching means for carrying a potential for slowly switching the latter amplifying means on,
first and second input switching means responsive to said modulating signal coupled to said input capacitive means and rendered conductive during alternating contiguous time intervals at said carrier signal frequency for alternately charging and discharging said input capacitive means and thereby slowly switching on said switching off said transistor switching means whereby said gated semiconductor switching means delivers to said power line a slowly rising and falling current provided by said transistor switching means.

4,031,529
THERMAL METHOD FOR CONTROLLING THE OPTICAL PROPERTIES OF A LIQUID CRYSTAL AND DEVICES FOR THE APPLICATION OF SAID METHOD

Joseph Borel, Echirolles, and Jacques Robert, St-Egreve, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Dec. 22, 1975, Ser. No. 643,144
Claims priority, application France, Dec. 24, 1974, 74.42766
Int. Cl.² G02F *1/13*
U.S. Cl. 340—324 R **17 Claims**

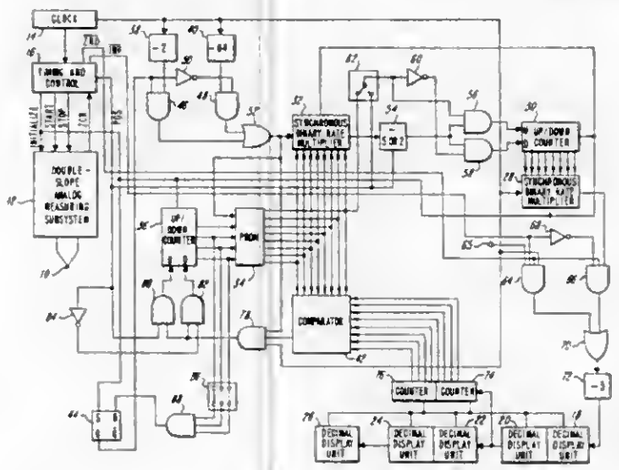


1. A method for controlling the optical properties of a liquid crystal film in which the value of dielectric anisotropy of the liquid crystal molecules is modified in order to control the optical state of said crystal, wherein:
there is chosen a liquid crystal in which said anisotropy depends on the temperature within a range in which the liquid crystal retains the same phase,
an electric field of predetermined frequency is applied to the liquid crystal film,
the temperature of the liquid crystal film is brought to a value located within said range, the dielectric anisotropy then assumes a predetermined value in respect of the value of said frequency and the liquid crystal film then assumes a predetermined optical state.

4,031,530
DIGITAL SECOND-ORDER CLOCK LINEARIZER

Nicholas E. Aneshansley, Centerville, Ohio, assignor to Instrulab Incorporated, Dayton, Ohio

Filed Oct. 22, 1975, Ser. No. 624,598
Int. Cl.² H03K *13/02, 13/20*
U.S. Cl. 340—347 NT **13 Claims**

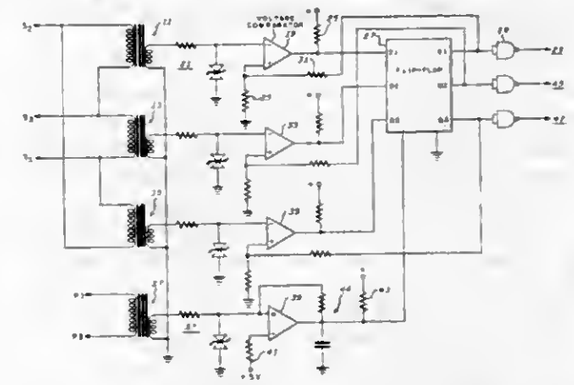


1. A linearizer for processing a non-linear signal comprising:
A. a first source of timing pulses;
B. a first synchronous binary rate multiplier, said first binary rate multiplier having a signal input terminal, a signal output terminal, and a plurality of rate control input terminals;
C. means coupling timing pulses from said first source to said signal input terminal of said first synchronous binary rate multiplier;
D. a second source of timing pulses, the pulses from said second source occurring at a lower frequency than the pulses from said first source;
E. a second synchronous binary rate multiplier, said second binary rate multiplier having a signal input terminal, a signal output terminal, and a plurality of rate control input terminals;
F. means coupling timing pulses from said second source to said signal input terminal of said second synchronous binary rate multiplier;
G. a first counter, said first counter having an increment input terminal and a plurality of output terminals which issue output signals representative of the instantaneous count held therein;
H. means coupling said signal output terminal of said second synchronous binary rate multiplier to said increment input terminal;
I. means individually coupling said output terminals from said first counter to said rate control input terminals of said first binary rate multiplier;
J. means for developing a binary representation of the second order of the correction factor instantaneously required to effect linearization of the non-linear signal; and
K. means coupling the binary representation to said control input terminals of said second binary rate multiplier whereby the binary representation of the second order of the correction factor controls the fractional multiplication which said second binary rate multiplier applies to the timing pulses from said second source, and the resultant pulses applied to said increment input to said first counter alter the count therein, thereby correspondingly altering the rate multiplication applied to the timing pulses from said first source by said first binary rate multiplier, the linearized pulses issuing from said output terminal of said first binary rate multiplier therefore being linearized in accordance with the instantaneously desired correction factor.

4,031,531
SYNCHRO-TO-DIGITAL CONVERTER

Jeffrey C. Rice, McLean, and Terry A. Tucker, Charlottesville, both of Va., assignors to Sperry Rand Corporation, New York, N.Y.

Filed Jan. 12, 1976, Ser. No. 648,073
Int. Cl.² H03K *13/02*
U.S. Cl. 340—347 SV **3 Claims**



1. A synchro-to-digital converter comprising individual transformer means to receive the three stator output voltages and a sample of the rotor excitation voltage from an external synchro, individual channels coupled to said transformer means for processing each stator voltage, and means to produce a clock pulse at a predetermined point in each cycle of the rotor excitation voltage; each of said channels including voltage comparator means having a first input terminal coupled to receive a stator output voltage from the associated transformer means and a second input terminal for applying a threshold potential to the comparator so that the comparator produces a switching signal when and only when the associated stator output voltage exceeds the threshold potential, bistable switching means coupled to receive switching signals from the comparator in the same channel, said bistable means being constructed and arranged to switch to first or second bistable states in response to a clock pulse occurring in the presence or absence, respectively, of a switching signal, said second input terminal being coupled to ground potential through a resistance element and to the output of said bistable switching means through a feedback loop so that said threshold potential is at ground level in the absence of a switching signal but is depressed to a lower level at the inception of a switching pulse, output means on each switching means for producing steady output signals indicative of the bistable state of the switching means in the corresponding channel, the output means in the three channels being arranged to provide simultaneous binary-valued output signals in a known digital code format.

4,031,532
VOLTAGE TO FREQUENCY CONVERTER

David J. First, c/o D. J. Instruments Inc., 11 Esquire Road, North Billerica, Mass. 01862

Filed Dec. 29, 1975, Ser. No. 644,879
Int. Cl.² H03K *13/02*
U.S. Cl. 340—347 NT **6 Claims**

1. A voltage to frequency converter comprising:
A. integrating means having an input connected to receive an input signal and an output;
B. level detecting means responsive to the output of said integrating means for producing an output at a first level responsive to the integrating means output being greater than a predetermined level and an output at a second level responsive to the integrating means output being less than said predetermined level;
C. clock means for generating a clock signal including periodic clock pulses;
D. logic means having an input connected to receive the output of said level detecting means, an input connected

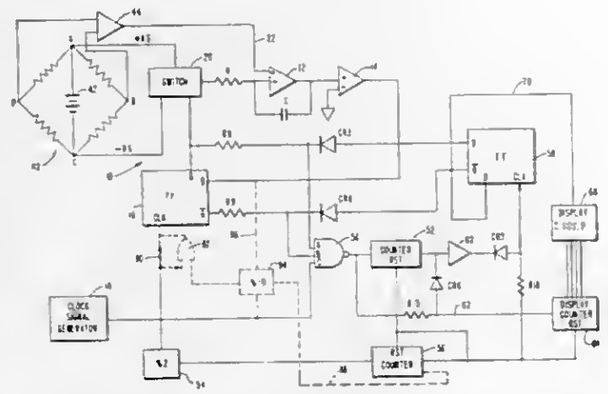
to receive the clock pulses from said clock means and an output for producing an output at a first level responsive to the receipt of a clock pulse and the output of said level detecting means being at the first level and for producing an output at a second level responsive to the receipt of a clock pulse and the output of said level detecting means being at the second level;

E. reference signal source means for producing first and second reference signals of equal magnitude but opposite polarity;

F. switch means having an input connected to receive the output of said logic means, an input connected to receive the first and second reference signals from said reference signal source means, and an output connected to the input of said integrating means for applying the first reference signal to said integrating means when

G. output means for coupling the output of said logic means as a pulsed output signal of said converter, said output signal having a pulse frequency corresponding to the voltage of the input signal and a pulse duty cycle corresponding to the polarity of the input signal;

H. gating means selectively passing the clock pulses from said clock means to its output during the time period in which the output of said logic means is at one of the first or second levels; and



I. counting means connected to the output of said gating means for establishing a digital count corresponding to the voltage of the input signal,

said counting means comprising

1. a first counter connected to receive the output of said gating means:
2. dividing means having an input for receiving clock pulses from said clock means for producing an output having a frequency equal to one half the frequency of the clock pulses from said clock means;
3. a second counter connected to receive the output of said dividing means;
4. a third counter coupled to the output of said gating means;
5. means responsive to said first counter attaining a selected count for passing the clock pulses passed by said gating means to said third counter; and
6. means responsive to said second counter attaining said selected count for resetting said first and second counters, the count into said third counter corresponding to the net voltage of the input signal over the time period required for said second counter to attain said selected count.

4,031,533

DIFFERENTIAL FLOATING DUAL SLOPE CONVERTER

Leopold Neumann, Lexington, Mass., assignor to Analogic Corporation, Wakefield, Mass.

Filed Oct. 2, 1975, Ser. No. 618,783
Int. Cl.² H03K *13/00*
U.S. Cl. 340—347 NT **13 Claims**

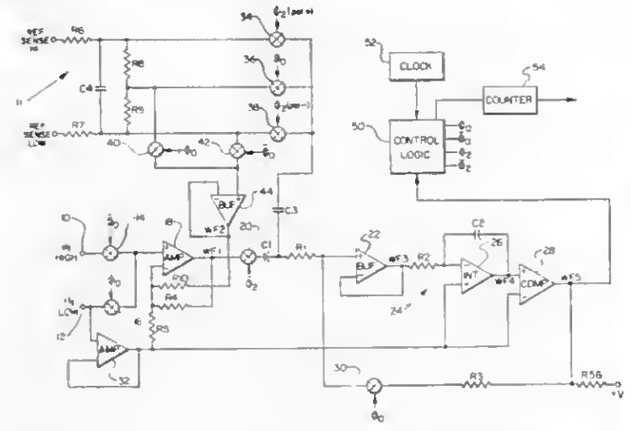
1. For use with a transducer providing a low level differential analog signal representative of a sensed condition, said signal providing a first, lower voltage level and a second, higher voltage level relative to each other, a ratiometric analog-to-digital converter comprising:

an autozeroed dual slope analog-to-digital converter circuit operative to provide a digital representation of said differential analog signal;

the dual slope analog-to-digital converter being of the type which performs an autozero calibration during a first interval, integrates at a rate determined by an input signal during a second interval, and integrates at a rate determined by a reference signal during a third interval;

a differential preamplifier;

differential input switch means for coupling the first and



second levels of said differential analog signal respectively during the first and second intervals to one input of said preamplifier;

first means for selectively capacitively coupling the output of said preamplifier to the input of said converter circuit during said first and second intervals;

reference means operative to differentially sense the excitation of said transducer and provide reference and offset signals to said converter circuit; and

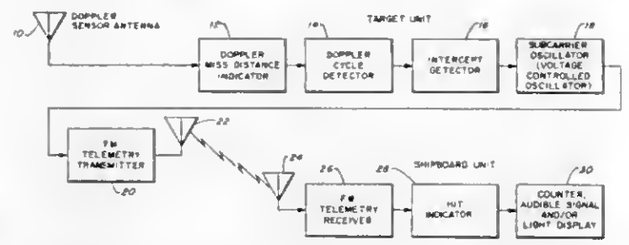
second means for selectively coupling during said first interval said reference means to the input of said converter circuit for analyzing said offset signal thereto, and for coupling during said third interval a reference signal to the input of said converter circuit which reference signal is integrated by said converter circuit.

4,031,534

NOISE RESISTANT ZONE PENETRATION DETECTION SYSTEM

George T. Kallmann, Pacific Palisades, and Theodore P. Waddell, Port Hueneme, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 1, 1976, Ser. No. 691,924
Int. Cl.² G01S *9/04*
U.S. Cl. 343—12 MD **12 Claims**



1. A system for detecting the existence of a projectile within a penetration zone of a target and providing a score indication for each projectile comprising:

a. doppler miss distance indication means for producing a beat frequency signal whenever said projectile is moving within said penetration zone;

b. means for producing a target detection pulse having a predetermined pulse width in response to detection of said beat frequency signal within a predetermined frequency range;

c. means for transmitting from said penetration zone a first FM subcarrier signal having a first predetermined frequency and a second FM subcarrier signal having a second predetermined frequency in response to said target detection pulse;

d. receiving means for detecting said first and second subcarrier signal; and

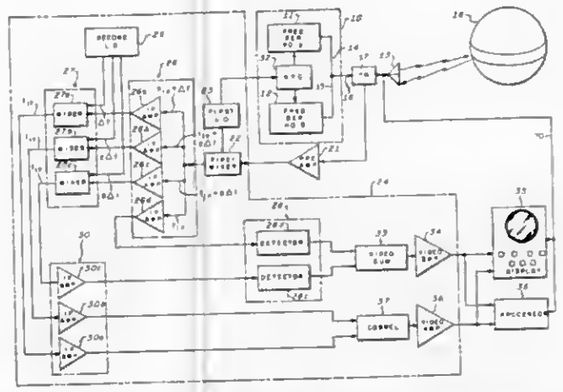
e. display means for providing a score indication for each projectile in response to detection of said second subcarrier signal by said receiving means.

4,031,535

MULTIPLE FREQUENCY NAVIGATION RADAR SYSTEM

Eric J. Isbister, Greenlawn, N.Y., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Nov. 10, 1975, Ser. No. 630,553
Int. Cl.² G01S *9/56;* **H01Q** *15/14*
U.S. Cl. 343—6.5 R **11 Claims**



I. A detection and identification system comprising

transmitter means for producing a multiplicity of signals each having a different frequency with a known frequency separation therebetween;

means coupled to said transmitter means for radiating said multiplicity of signals;

signal generating means for receiving said multiplicity of signals and for producing signals at frequencies that are linear combinations of the frequencies of said multiplicity of signals including signals at frequencies of said multiplicity of radiated signals and re-radiating said produced signals; and

means for receiving said re-radiated signals and producing output signals in response to said re-radiated signals whereby said signal generating means may be identified.

4,031,536

STACKED ARRAYS FOR BROADCASTING ELLIPTICALLY POLARIZED WAVES

Andrew Alford, 120 Cross St., Winchester, Mass. 01890

Filed Nov. 3, 1975, Ser. No. 628,247
Int. Cl.² H01Q *21/24*
U.S. Cl. 343—796 **10 Claims**

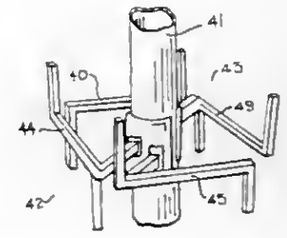
1. A radiating element comprising:

a. Two substantially similar metal conductors each having a central portion and two end portions with the end of the central portion of one conductor located close to the end of the central portion of the other conductor,

b. Said central portions arranged at an angle with each other in substantially the same plane,

c. The end portions of each conductor pointing in opposite directions from the plane containing the central portions,

d. The end portions of the two conductors at the proximate ends of the central portions pointing in opposite directions,



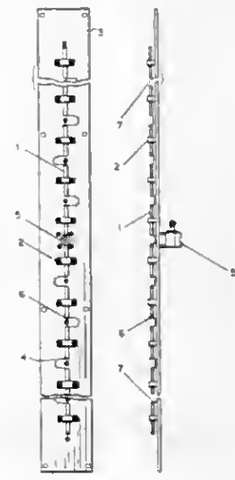
e. Means for energizing the proximate ends of the central portions of the conductors at their proximate ends by radio frequency in opposite phases.

4,031,537

COLLINEAR DIPOLE ARRAY WITH REFLECTOR

Andrew Alford, 120 Cross St., Winchester, Mass. 01890

Filed Oct. 23, 1974, Ser. No. 513,587
Int. Cl.² H01Q *1/02, 9/20*
U.S. Cl. 343—704 **5 Claims**



1. An antenna array comprising a collinear chain of dipoles, a reflecting plate, phasing loops connected between consecutive dipoles and located on the same side of the reflecting plate as the dipoles "said phasing loops having major portions substantially parallel to said reflecting plate", means for spacing the dipoles from the reflecting plate less than a quarter wavelength at the operating frequency, means for spacing the phasing loops at a smaller distance from the plate than the dipoles and means for energizing said chain of dipoles from one end.

4,031,538

ANTENNA WITH ECHO CANCELLING ELEMENTS

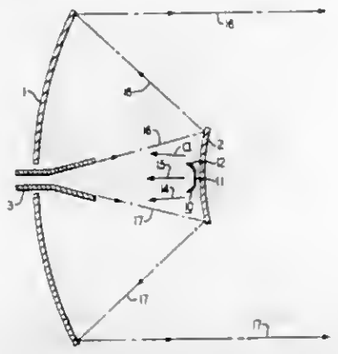
Carl William Lundgren, Jr., Colts Neck, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed July 21, 1975, Ser. No. 597,367
Int. Cl.² H01Q *19/14*
U.S. Cl. 343—781 CA **10 Claims**

1. An antenna having a main reflector, a smaller subreflector, and feeding means so arranged that radiation from said feeding means is reflected successively from said subreflector and said main reflector,

wherein the improvement comprises a reflective band located near said subreflector between said subreflector and said feeding means, said band having a significant width aspect and having an inner surface flaring outward toward said feeding means,

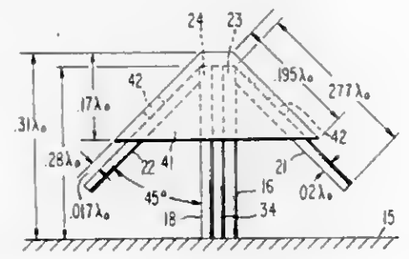
whereby radiation from said feeding means reflected back to said feeding means by said subreflector is substantially cancelled in both a lower and a higher frequency range.



4,031,539
BROADBAND TURNSTILE ANTENNA

Oakley McDonald Woodward, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Dec. 11, 1975, Ser. No. 639,761
Int. Cl.² H01Q 21/26
U.S. Cl. 343—797 **7 Claims**



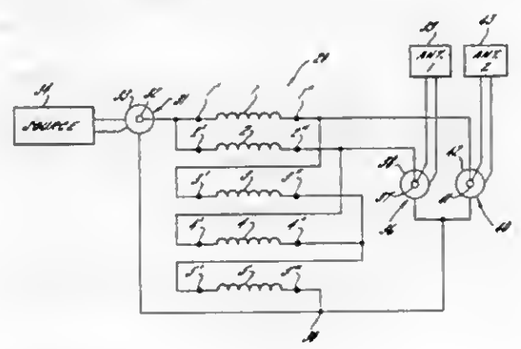
1. A broadband turnstile antenna comprising:
a pair of crossed dipoles mounted forward of a reflective surface,
said dipoles being center fed with the legs of the dipoles fed with equal power in the relative phase rotation of 0°, 90°, 180° and 270°, and
a single member of conductive material closely spaced forward of said dipole legs and separated therefrom with said member overlapping the feed point of said dipoles and a substantial portion of said dipole legs.

4,031,540
IMPEDANCE MATCHING DEVICE

Emil G. Borys, Jr., Rockford, Ill., assignor to Hydrometals, Inc., Chicago, Ill.

Filed Feb. 17, 1976, Ser. No. 658,288
Int. Cl.² H01Q 1/50
U.S. Cl. 343—860 **6 Claims**

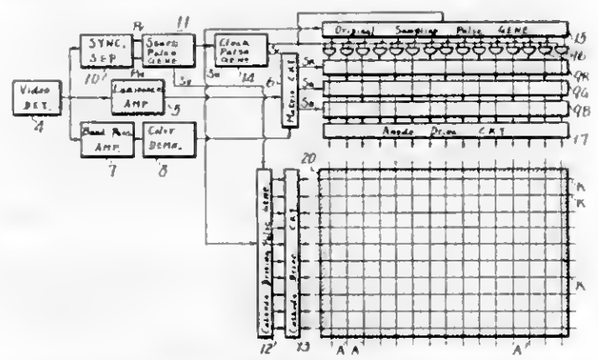
1. An impedance matching device for matching the impedances of a pair of antennas to a single source, said device comprising a bifilar transformer having a toroidal core and five mutually coupled windings thereon, first and second of said windings being connected in series in a first branch, third and fourth of said windings being connected in series in a second branch, said first and second branches being connected in parallel, said fifth winding being connected between said parallel combination and a common connection, means providing a connecting point for a first antenna from the junction between said first and second windings and said common point, means providing a connecting point for said second antenna from the junction between said third and fourth windings and said common point, and means providing a connecting point for said source across said series parallel combination whereby the impedances of said antennas are matched to the impedance of said source.



4,031,541
COLOR VIDEO DISPLAY SYSTEM

Kuniyoshi Arisawa, Higashikurume, and Yoshifumi Amano, Zushi, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed May 7, 1975, Ser. No. 575,244
Claims priority, application Japan, May 13, 1974, 49-54090[U]; May 13, 1974, 49-54091[U]
Int. Cl.² H04N 9/12
U.S. Cl. 358—56 **9 Claims**

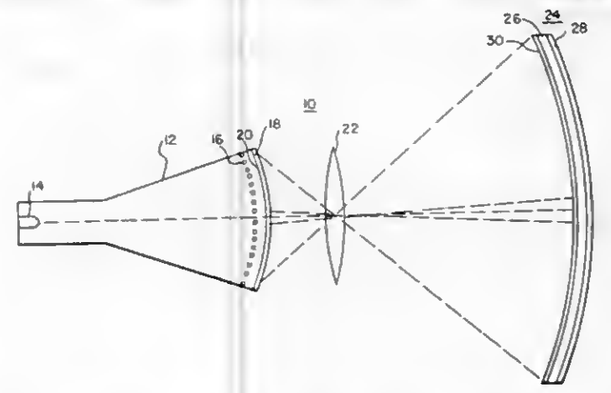


1. A color video display system comprising: a color display panel having a plurality of component color generating means arranged in rows and in columns substantially perpendicular to said rows and arranged to generate a repeating pattern of component colors along selected ones of said rows in a predetermined sequence; means responsive to an input video signal for generating a plurality of component color signals and a synchronizing signal; signal sampling means responsive to said synchonizing signal for sampling said component color signals so that different component color signals are sampled sequentially; means applying the sampled component signals to respective ones of said component color generating means for generating said repeating pattern of component colors along selected ones of said rows; and row selecting means responsive to said synchronizing signal to energize said rows in said predetermined sequence, whereby color pictures are reproduced on said color display panel.

4,031,542
PROJECTION COLOR TELEVISION SYSTEM

Arthur E. Anderson, Murrysville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 8, 1976, Ser. No. 665,132
Int. Cl.² H04N 9/31
U.S. Cl. 358—60 **12 Claims**



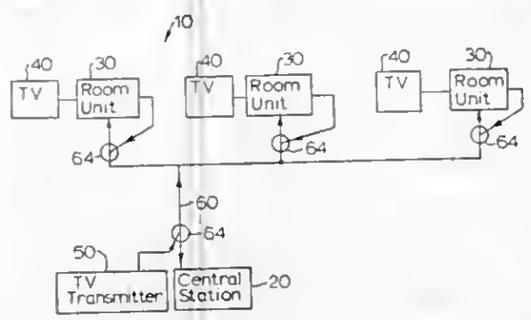
1. A projection color television system comprising:
a. cathode ray tube means for converting electronic color television signals to an optical radiation pattern on a uniform single cathodoluminescent layer phosphor screen of the tube, which optical radiation pattern. is primary color coded;
b. projection optics for coupling the optical radiation pattern produced by the tube to projection screen display means;
c. projection screen display means comprising a support substrate having a plurality of at least one primary color emissive organic phosphor areas disposed thereon, with the primary color emissive organic phosphor areas being opitcally registered via the projection optics to the corresponding primary color coded portion of the optical radiation pattern.

9. A projection color television display screen comprising a support substrate and a plurality of at least two primary color emissive organic phosphor areas, which are absorptive of and excitable by optical radiation, disposed in a regular repeated pattern on the substrate.

4,031,543
COMMUNICATION SYSTEM

George E. Holz, North Plainfield, N.J., assignor to Berkeley Varitronics Systems, Edison, N.J.

Filed Mar. 11, 1974, Ser. No. 450,048
Int. Cl.² H04N 7/16
U.S. Cl. 358—86 **34 Claims**

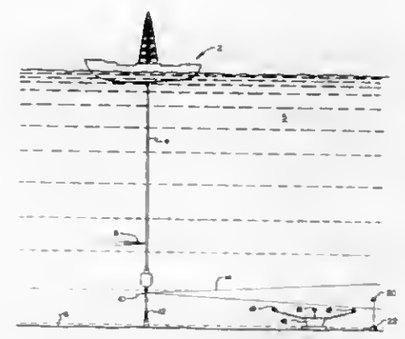


1. A communiction system comprising
a central station and a plurality of remote stations,
a program transmitter at said central station for transmitting program signals representing said programs to all of said remote stations,
second means at each of said remote stations for transmitting information signals to said central station at generally regular but random intervals whereby a relatively large number of remote stations can communicate with a central station without said information signals interfering with each other, said second means including a signal transmitter, switch means for turning on said transmitter at generally regular but slightly random intervals, and a summing amplifier coupled to said switch means,
said summing amplifier being adapted to be charged to a predetermined voltage level at which it operates and switch means, and
a plurality of signal-generating means coupled to said summing amplifier including means for selecting portions of said program signals, a ramp voltage generator, and a random signal generator.

4,031,544
SONAR/TELEVISION SYSTEM FOR USE IN UNDERWATER EXPLORATION

Robert Anthony Lapetina, Salt Lake City, Utah, assignor to Edo Western Corporation, Salt Lake City, Utah

Filed Aug. 11, 1975, Ser. No. 603,696
Int. Cl.² H04N 7/18
U.S. Cl. 358—99 **14 Claims**

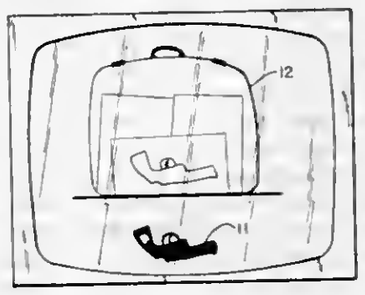


1. A sonar/television system for use with a hollow underwater conductor in locating underwater objects comprising
a first housing having exterior dimensions which enable insertion thereof into the hollow of the underwater conductor,
a television camera disposed within said housing so that the camera is directed downwardly of the housing to record scenes appearing therebelow, and
transducer means carried by said housing for transmitting acoustical signals downwardly of the housing and also generally laterally of the housing through an angle of substantially 360° about the housing and for receiving reflected acoustical signals.

4,031,545
RADIANT ENERGY ALARM SYSTEM

Jay A. Stein, Framingham, and Martin Annis, Newton, both of Mass., assignors to American Science & Engineering, Inc., Cambridge, Mass.

Filed Sept. 8, 1975, Ser. No. 611,230
Int. Cl.² H04N 7/18
U.S. Cl. 358—108 **8 Claims**



1. In a radiant energy imaging system having a scanning

beam of radiant energy that scans a radiant energy detector to provide video signals representative of the opacity of objects intercepting the radiant energy beam alerting apparatus comprising,

a source of a signal of reference level corresponding to a predetermined reference opacity,

means for comparing said video signal with said reference signal to provide a threshold signal when the video signal bears a predetermined relationship to the reference signal,

means for indicating an alarm condition when said threshold signal occurs for a predetermined time interval,

wherein said source of a reference signal comprises a predetermined portion of said video signal produced when said beam is scanning a predetermined reference object of known opacity between said detector and the source of said radiant energy beam.

4,031,546

DISC PLAYER AND STYLUS THEREFOR

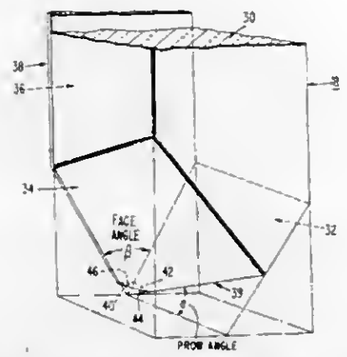
Marvin Allan Leedom, South Brunswick Township, Middlesex County, N.J., assignor to RCA Corporation, New York, N.Y.

Filed June 30, 1975, Ser. No. 591,953

Claims priority, application United Kingdom, Nov. 18, 1974, 49926/74

Int. Cl.² H04N *5/76*

U.S. Cl. 358—128 **7 Claims**



1. In a disc playback system including a turntable for rotating a spiral grooved disc record of the type which contains an information track in the groove thereof, the combination comprising:

1. an elongated stylus tapering to a tip at one end thereof, said tip having:

a. a substantially flat rear face, with a pair of edges converging at said one end and terminating at the ends of a base edge of a generally right triangular shaped bottom surface;

b. a first side disposed orthogonally relative to said rear face and extending from a first edge of said rear face, said first side terminating at said one end at an altitude edge of said triangular shaped bottom surface; a second side disposed at an acute angle to the rear face extending from a second edge of said rear face, said second side terminating at a said one end at a hypotenuse edge of said triangular shaped bottom surface; and

c. an electrode disposed on said rear face; and

2. means for mounting said stylus in a manner permitting stylus reception in a record groove during record playback with an orientation of said stylus tip bottom such that said stylus tip side terminating at said altitude edge of said bottom faces the center of rotation of said turntable, and the direction of movement of said turntable beneath the point of stylus reception extends from said apex toward said base edge.

4,031,547

NOISE REDUCING CIRCUIT FOR VIDEO SIGNALS

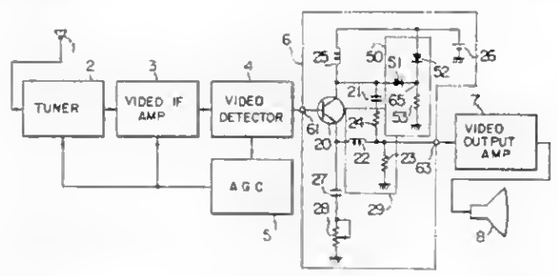
Yukimi Saiki; Masanori Ogino, both of Yokohama, and Shutoku Watanabe, Ashiya, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Nov. 18, 1975, Ser. No. 633,114

Claims priority, application Japan, Nov. 21, 1974, 49-134960

Int. Cl.² H04N *5/14*; **H03K** *5/20*

U.S. Cl. 358—167 **7 Claims**



1. A noise reducing circuit for video signals comprising:

an input circuit including an active element having first, second and third electrodes, said first electrode being for receiving a video signal including high and low frequency components accompanied with noise;

a high-pass filter connected with said second electrode of said active element for deriving the high frequency components of said video signal and a low-pass filter connected with said third electrode of said active element for deriving the low frequency components of said video signal, said high-pass filter and low-pass filter serving as first and second loads on said active element with respect to said high and low frequency components of the received video signal on said first electrode of said active element respectively;

a noise eleminating means including a voltage source and a switching circuit connected between said voltage source and said high-pass filter, the junction point between said switching circuit and said high-pass filter being connected with said second electrode of said active element, whereby said switching circuit is rendered conductive to make the potential on said second electrode substantially constant when the output of said high-pass filter, derivable on said second electrode of said active element, has an amplitude smaller than a predetermined value and is rendered non-conductive when said output derivable on said second electrode has an amplitude not smaller than said predetermined value; and

means for adding the output of said low-pass filter to the output of said high-pass filter under control of said noise eliminating means, thereby reproducing a noise-suppressed video signal.

4,031,548

PLURAL RECEIVING AND RECORDING TELEVISION SYSTEM

Yoshiro Kato, Fujisawa, and Choichi Fujita, Machida, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Sept. 25, 1975, Ser. No. 616,667

Claims priority, application Japan, Sept. 30, 1974, 49-112534

Int. Cl.² H04N *5/44*, *5/76*

U.S. Cl. 358—188 **2 Claims**

1. A television system comprising the combination of:

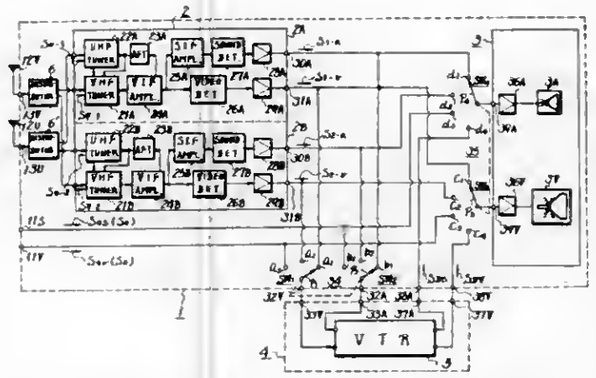
A. signal recording and/or reproducing apparatus having input and output terinals; and

B. a television receiver comprising:

1. a pair of signal selecting and receiving circuitries, each including at least a separately tunable tuner, a video intermediate frequency amplifier, a video detector, and a sound detector,

2. a display stage including sound and video reproducing circuits,

3. first switching means for selectively connecting one of said pair of signal selecting and receiving circuitries to the input terminal of said recording and/or reproducing apparatus, and



4. second switching means for selectively connecting one of said pair of signal selecting and receiving circuitries and the output terminal of said recording and/or reproducing apparatus to said display stage.

4,031,549

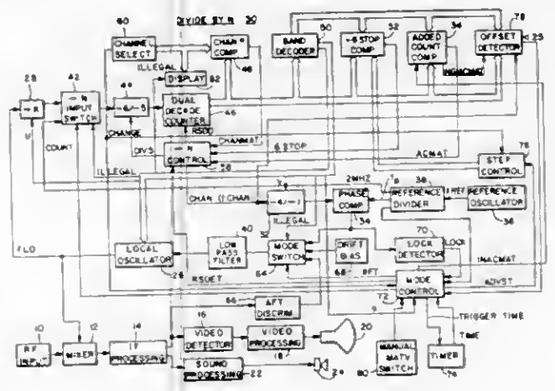
TELEVISION TUNING SYSTEM WITH PROVISIONS FOR RECEIVING RF CARRIER AT NONSTANDARD FREQUENCY

Robert Morgan Rast, Mercerville; Charles Martin Wine, and John Goodchilde Norie Henderson, both of Princeton, all of N.J., assignors to RCA Corporation, New York, N.Y.

Filed May 21, 1976, Ser. No. 688,521

Int. Cl.² H04N *5/50*; **H04B** *1/26*

U.S. Cl. 358—193 **14 Claims**



1. Apparatus for tuning a receiver to a selected channel, comprising:

input means for receiving an information bearing radio frequency carrier;

local oscillator means for generating a local oscillator signal;

mixer means for combining said radio frequency carrier and said local oscillator signal to derive an intermediate frequency information bearing carrier;

first means for tuning the frequency of said local oscillator signal to the nominal local oscillator frequency allocated to said selected channel;

second means for tuning said local oscillator signal to minimize a deviation between the frequency of said intermediate frequency carrier and a nominal intermediate frequency carrier;

control means for selectively coupling either said first means or said second means to said local oscillator, said control means initially coupling said first means to said local oscillator means when said selected channel is selected;

lock detection means for generating a lock signal when said means has substantially tuned the frequency of said local oscillator signal to said nominal local oscillator frequency, said control means coupling said second means to said local oscillator means in response to said lock signal;

offset detection means for generating an offset signal when the frequency of said local oscillator signal is more than a predetermined offset from the frequency of said local oscillator signal generated when said first means was coupled to said local oscillator, said control means coupling said first means to said local oscillator means in response to said offset signal; and

means coupled to said first means for generating a step signal in response to said offset signal, said first means tuning the frequency of said local oscillator signal to a frequency differing by an incremental amount from the frequency of said local oscillator signal during the initial interval in which said local oscillator means is under the control of said first means.

4,031,550

FILM SCANNER

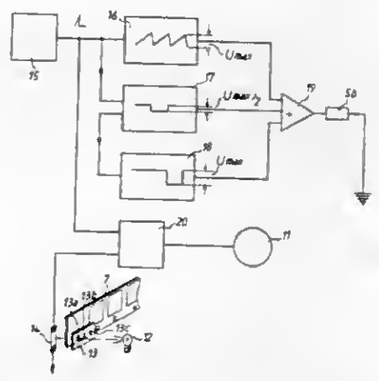
Richard Wick, Munich; Friedrich Bestenreiner, Grunwald; Reinhold Deml, and Josef Helmberger, both of Munich, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Continuation of Ser. No. 384,396, Aug. 1, 1973, which is a continuation of Ser. No. 162,373, July 14, 1971, abandoned. This application Feb. 25, 1976, Ser. No. 661,333

Claims priority, application Germany, July 18, 1970, 2035820

Int. Cl.² H04N *3/36*

U.S. Cl. 358—216 **4 Claims**



1. Arrangement for reproducing images recorded on motion picture film at a predetermined frame rate in frames having a predetermined height in the lengthwise direction of said motion picture film, on television receiver means having a vertical scanning rate approximately equal to an integral multiple of said predetermined frame rate, comprising, in combination, moving means for moving said motion picture film continuously along a predetermined path across a predetermined scanning region; scanning means for scanning each of said frames of said film a first, second and third time over said scanning region during said movement of said frames along said predetermined path, thereby furnishing scanning signals constituting a first, second and third scan, said scanning means including a cathode ray tube for furnishing a light beam and a screen, said scanning means further comprising lens means for focussing said screen onto said frames, and photoreceiver means positioned behind said film in the direction of propagation of said light, the height of said screen exceeding the

height of said image of said screen on said frames by one-third; and scan control means connected to said scanning means for deflecting said light over a region corresponding to half of said screen height for each of said scans and for changing the position of said scanning region by one-third of said image height along said predetermined path following completion of said first scan and following completion of said second scan, said scan control means comprising multivibrator means and sawtooth voltage generator means for furnishing voltages deflecting said light from an initial position to a maximum deflection in a first direction during said first scan, deflecting said light to a position corresponding to one-half the maximum deflection in the opposite direction at the start of said second scan, deflecting said light to a position corresponding to one-half of said maximum deflection in said first direction during said second scan, deflecting said light to a value corresponding to said maximum deflection in said opposite direction at the beginning of said third scan and back to said initial position at the end of said third scan; wherein said motion picture film has perforations having a predetermined spatial relationship to each of said frames; further comprising photosensitive means for furnishing location signals in response to light passing through said perforations during movement of said film along said predetermined path; and synchronizing means for furnishing synchronizing signals for synchronizing said scan control means to said moving means at least in part in dependence upon said location signals.

4,031,551

IMAGE PICKUP DEVICE

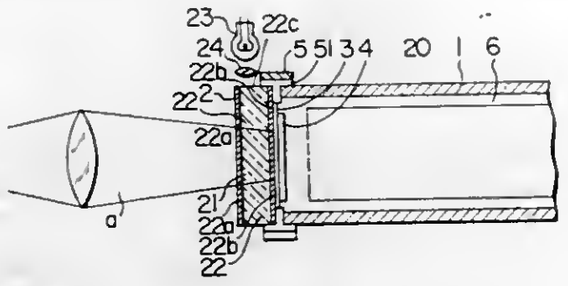
Saburo Nobutoki, Mobara; Chihaya Ogusu, and Masao Sugimoto, both of Tokyo, all of Japan, assignors to Hitachi, Ltd. and Nippon Hoso Kyokai, both of, Japan

Filed Mar. 19, 1976, Ser. No. 668,401

Claims priority, application Japan, Mar. 22, 1975, 50-33541

Int. Cl.² H04N *5/21*

U.S. Cl. 358—223 **10 Claims**



1. An image pickup device having a photoconductive type image pickup tube comprising:

a. a face plate disposed at one end of an envelope and consisting of an effective image pickup region at the central portion thereof and an ineffective image pickup region at the peripheral portion thereof including the edge of the face plate, at least a portion of said ineffective image pickup region being light-dispersive; and

b. means including at least one light source for introducing light solely into said light-dispersive portion of said ineffective image pickup region, said introduced light being dispersed by said portion and projected as bias light into said effective image pickup region.

4,031,552

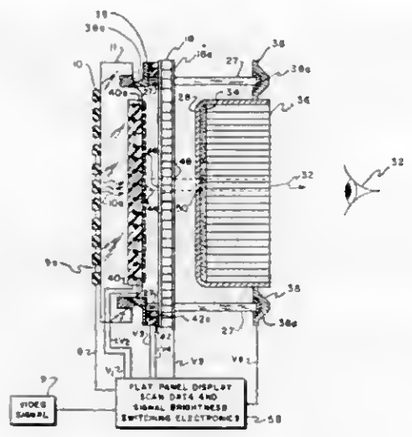
MINIATURE FLAT PANEL PHOTOCATHODE AND MICROCHANNEL PLATE PICTURE ELEMENT ARRAY IMAGE INTENSIFIER TUBE

David A. Bosserman, Alexandria, and Charles F. Freeman, Springfield, both of Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 5, 1976, Ser. No. 664,325

Int. Cl.² H04N *5/70, 5/66*

U.S. Cl. 358—241 **4 Claims**



1. A miniature flat panel picture element array image intensifier tube comprising:

a video picture signal generator for providing a video signal;

a radiation source, said radiation source being modulated by said video signal for creating a generally uniform flow of photons therefrom with said radiation source mounted on the front of a transparent input faceplate;

a plurality of electrically isolated parallel photocathode array stripes mounted on the inside of said input faceplate;

a microchannel plate electron multiplier having an array of electrically isolated parallel input electrode metallic stripes that are positioned adjacent said photocathode array stripes and are orthogonal thereto, said microchannel plate having a continuous metallic output electrode;

an array switching electronic means for switching bias voltages in some selected scan mode over individual stripes of said photocathode array and over said array of microchannel plate input electrode metallic stripes for selectively providing proximity focus areas between cross-over stripes that have on bias voltages applied thereto and wherein repressive voltages exist on all other cross-over stripes that have off bias voltages applied thereto wherein photoelectrons emitted from said photocathode array stripes conform to a charge pattern swept through the proximity focus areas according to said scan mode; and

a metallized phosphor screen mounted on the inside of a transparent output faceplate wherein said metallized phosphor screen is adjacent said microchannel plate output electrode for converting electrons from said microchannel plate into visible energy on said metallized phosphor screen for producing a visible image of said video signal according to said scan mode.

4,031,553

IMPLOSION-RESISTANT CATHODE RAY TUBE WITH PROTECTIVE ASSEMBLY FOR ITS FACE PLATE

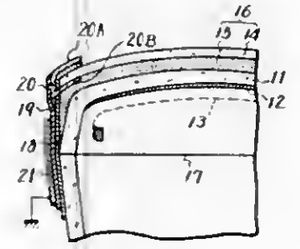
Hiroji Sumiyoshi, Sagamihara, and Tomosuke Chiba, Matsudo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Nov. 25, 1975, Ser. No. 635,240

Claims priority, application Japan, Dec. 17, 1974, 49-152750[U]

Int. Cl.² H04N *5/65*

U.S. Cl. 358—247 **6 Claims**



1. A cathode ray tube comprising an envelope having a face plate, a conductive reinforcing band girdling said envelope adjacent said face plate, a transparent protective panel covering the outer surface of said face plate and being spaced from the latter, a transparent conductive adhesive resin filling the space between said face plate and said panel to cooperate with the latter in protecting said face plate and adhesively joining said panel to said face plate, and at least one conductive connecting element providing an electrically conductive connection between said conductive material and said band.

4,031,554

MAGNETIC RECORDING AND REPRODUCING APPARATUS

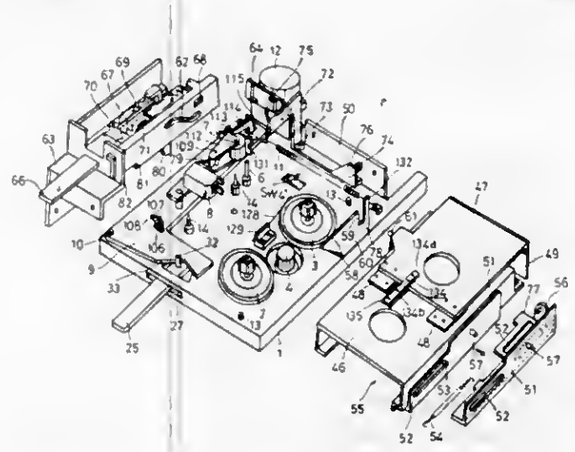
Tomoyoshi Umeda, and Yoshimasa Haraguchi, both of Tokyo, Japan, assignors to Beltek Corporation, Tokyo, Japan

Filed Aug. 19, 1975, Ser. No. 605,924

Claims priority, application Japan, Sept. 13, 1974, 49-105563

Int. Cl.² G11B *5/54, 15/46, 19/24*

U.S. Cl. 360—73 **7 Claims**



1. A magnetic recording and reproducing apparatus comprising:

a substrate;

a tape pack inserting container having a space therein for receiving a tape deck and being supported over said substrate in a manner to be movable between a lower recording or playback position and an upper recording or playback stand-by position;

container actuating mechanism means for moving said container vertically between said upper and lower positions in relation with loading and ejection of said tape pack;

container supporting means for stably supporting both opposite lateral sides of said container in both said lower position and said upper position thereof as well as during movement thereof between said positions;

a head plate supported to be movable between a recording or playback position and a recording or playback stand-by position;

spring member means for constantly biasing said head plate toward said recording or playback position;

head plate actuating means for moving said head plate to said recording or playback position by utilizing the force of said spring member means or to said recording or playback stand-by position against the force of said spring member means, as a function of said container actuating mechanism means and in response to movement of said container to said recording or playback position or said recording or playback stand-by position thereof;

a track scanning head supported by said head plate;

a pair of rotatable reel rest means for taking up a magnetic tape of said tape deck in the forward or reverse directions thereof;

an assembly including a single capstan and a single pinch roller for causing said magnetic tape to travel in both said forward or reverse directions thereof, depending on the direction of rotation of said single capstan and single pinch roller;

a single idler located approximately midway between said pair of reel rest means;

movable support plate means, rotatably and slidably supporting thereon said single idler, for moving said single idler into contact with a selected either one of said reel rest means to transfer the driving force of said single idler to said one reel rest means;

a puller maintained in pressing contact with said single idler to provide said single idler with normal or reverse rotative force around the axis thereof and around said pulley;

a single motor;

means for transferring rotation of said single motor to said single capstan and to said single idler through said pulley; and

a control circuit system comprising a motor constant-speed control circuit for controlling constant-speed drive of said magnetic tape, a motor normal-reverse control circuit for controlling the normal or reverse rotation of said motor, a single switching mechanism for, during constant-speed travel of the magnetic tape, supplying operation signals to said motor constant-speed control circuit to achieve constant-speed travel of said magnetic tape, and for, during fast feed and rewinding of said magnetic tape, actuating said motor normal-reverse control circuit to achieve rapid drive of said motor, and directly controlling the driving of motor through said motor normal-reverse control circuit, thereby causing normal or reverse drive of said motor, and thus enabling fast feed or rewinding operation of magnetic tape.

4,031,555

REEL-TO-REEL TAPE TO TAPE CARTRIDGE ADAPTER

Theodore R. Hughes, 28 S. Kingstoo, Tulsa, Okla. 74112, and Glenn L. McCarty, 6319 S. 45 W. Ave., Tulsa, Okla. 74132

Filed Oct. 20, 1975, Ser. No. 623,820

Int. Cl.² G11B *5/78, 15/66, 23/04*

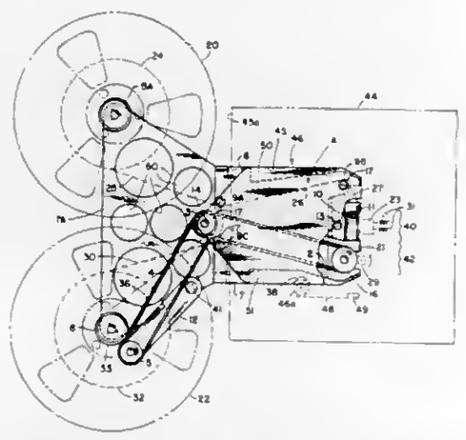
U.S. Cl. 360—94 **4 Claims**

1. In combination with a conventional magnetic tape player adapted to receive and play a tape cartridge carrying magnetic tape, said cartridge having selected physical and geometric characteristics, said player including:

an aperture for receiving said tape cartridge;

means in said player for driving a transport means for said tape in said tape cartridge;

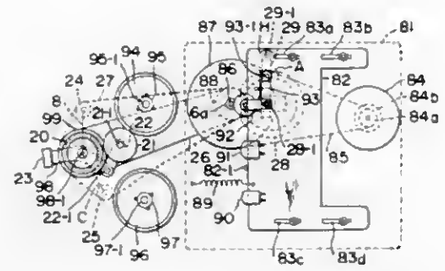
magnetic head means for contacting and interacting with the magnetized surface of said tape in said cartridge;
amplifier and speaker means for utilizing the electrical signals generated in said magnetic head means;
the improvement in apparatus for adapting said player for playing a non-cartridge type reel-to-reel tape of the type wherein the reels are completely independent elements, comprising:
a. frame means having two principal parts;
1. a first frame means having substantially the same exterior characteristics as said tape cartridge; and adapted to be received in said aperture like said tape cartridge;
2. second frame means for indepently supporting a take up reel and a storage reel, said storage reel carrying



a tape to be played in said player, said second frame means adapted to be disposed on the outsideof said player when said first frame means is inserted into said player whereby both of said reels are accessible;
b. means for driving said take up reel, which when said first frame is inserted into said player, is responsive to said means for driving in said player;
c. means in said first frame means for guiding said tape from said storage reel through said first frame means and past a first aperture in the front end of said first frame means similar to the path of the tape and the aperture in said tape cartridge; and then to said take up reel;
whereby when said first frame is inserted into said player, said tape will be in operating relation to said magnetic head means.

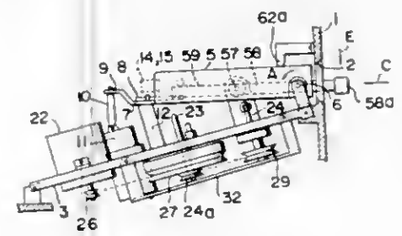
4,031,556
MODE CHANGEOVER APPARATUS FOR RECORDER/PLAYER
Itsuki Ban, 829, Higashioizumi, Nerima, Tokyo, and Kazunori Mochizuki, 6673 Oazahodaka, Hodaka-cho, Minamiazumi, Nagano, both of Japan
Filed Apr. 14, 1976, Ser. No. 676,892
Claims priority, application Japan, Apr. 14, 1975, 50-44270; May 2, 1975, 50-52520; June 26, 1975, 50-78640
Int. Cl.² G11B *15/10, 15/24, 15/44, 23/04*
U.S. Cl. 360—96 **28 Claims**

1. An improvement in a mode changeover apparatus for a magnetic recorder/player of the type which includes means for moving, along a surface of a deck provided in the main body of the recorder/player, a support carrying a magnetic head and the like toward and away from a magnetic tape set in the recorder/player, a spring for elastically biasing said suppot in one direction, reproduction push-botton means for effecting reproducing mode, push-button means for effecting respective modes of stop, fast-feed and rewind, an alternative-selection mechanism for alternatively locking some of said push-button means in position and releaving others of said push-button means from locking engagement when one of said modes is effected, reel driving means for driving, through depression of said fast-feed push-button, a take-up reel-shaft at a high speed, and driving, through depression of said rewind push-button, a supply reel-shaft at a high speed in a reverse direction, and means for shutting off, through depression of said stop push-button, power supply to a motor for capstan power means, the improvement comprising:
a. restraining means for restraining against the elastic force of said spring said support to a reproduction position when said support has been moved near to the magnetic tape;
b. locking means for locking against the elastic force of said spring said support at a non-reproduction position where said support has been moved remotely from the magnetic tape;
c. an eccentric idler rotatably supported by a movable member provided to said deck;
d. spring means for elastically biasing said movable member in a manner that said idler may be rotated by said capstan power means;
e. engaging means for making, in accordance with the movement of said movable member, engagement with said support to move said support to the non-reproduction position;
f. locking member for locking said movable member at a point where a portion of the periphery of said idler having substantially smallest radius with respect to the rotating axis of said idler confronts said capstan power means;



g. means for temporarily relieving, through depression one of said push-buttons for stop, fast-feed and rewind, the locking action of said locking member;
h. means for releasing, through depression of said reproduction push-button, said support from locking engagement with said locking means made at the non-reproduction position;
i. said support, along with taking up of the magnetic tape by the take-up reel-shaft driven through depression of said reproduction push-button, advancing toward the magnetic tape and then being held there by said restraining means;
j. means for holding, upon said advance of said support toward the magnetic tape, said idler apart from said capstan power means with a small gap left between said substantially smallest radius portion of the periphery of said idler and said capstan power means; and
k. whereby said idler, through depression of any one of said push-bottons for stop, fast-feed and rewind, rotating and then being locked by said locking means in a manner that a portion of the periphery of said idler having substantially largest radius with respect to its rotating axis confronts said capstan power means, and the take-up reel-shaft, through depression of said fast-feed push-button, being rotated at a high speed, and the supply reel-shaft, through depression of said rewind push-button, being rotated at a high speed in reverse direction.

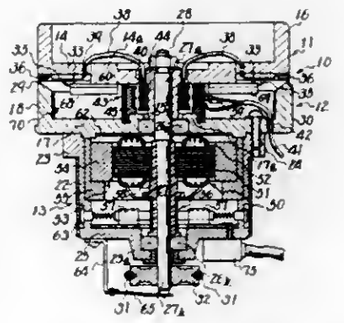
4,031,557
CASETTE LOADING DEVICE FOR USE IN MAGNETIC SOUND RECORDING AND PLAYING BACK APPARATUS
Itsuki Ban, 829, Higashi, Ohizumi, Nerima, Tokyo, and Kazunori Mochizuki, 6673, Ohaza Hodaka, Hodakamachi, Minamiazumi, Nagano, both of Japan
Filed Aug. 4, 1975, Ser. No. 601,437
Claims priority, application Japan, Aug. 2, 1974, 49-87996; Aug. 2, 1974, 49-87995
Int. Cl.² G11B *15/00, 5/54*
U.S. Cl. 360—96 **6 Claims**



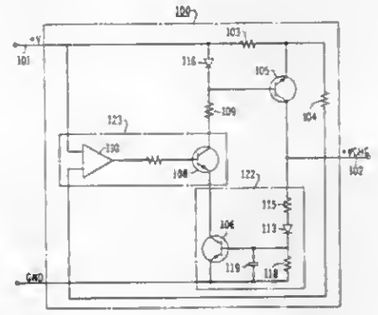
1. A cassette loading device for use in magnetic sound recording and playing back apparatus comprising a chassis mounted on the inner side of the front panel of the holder of the apparatus, said chassis inclining downwardly; a capstan for driving a magnetic tape and reel supporting platforms mounted on said chassis; a cassette holder having a bottom plate and being mounted on said chassis to be rotatable about an axis perpendicular to the direction of insertion of a cassette containing said magnetic tape into said cassette holder, said cassette holder being provided with a cassette insertion opening confronting the cassette insertion opening provided for said front panel; spring means for biasing said cassette holder to rotate downwardly; a cassette detection lever mounted near the inner end of said cassette holder so as to be rotated a predetermined angle by said cassette when it is inserted completely; a stop member mounted on said chassis, the upper surface of said stop member cooperating with said cassette detection lever before completion of the insertion of said cassette thereby maintaining said cassette holder in the horizontal position against the biasing force of said spring means; and an operating lever mounted on the bottom plate of said cassette holder to be slidable in the direction of insertion of said cassette, said operating lever including a portion extending in parallel with the inner edge of said cassette holder, a magnetic head and a pinch roller mounted on said portion, and spring means for biasing said operating lever to pull said portion toward said cassette holder.

4,031,558
HEAD DRUM ASSEMBLY WITH ELECTRICAL NOISE SHIELD
Satoru Kusaka, Kawasaki, Japan, assignor to Sony Corporation, Tokyo, Japan
Filed Aug. 11, 1975, Ser. No. 603,538
Claims priority, application Japan, Aug. 27, 1974, 49-98105
Int. Cl.² G11B *15/60, 5/52, 21/04*
U.S. Cl. 360—130 **11 Claims**

1. A head drum assembly for a video tape transport apparatus, a grounded stationary drum member; a rotary drum member coaxial with said stationary drum member and cooperating with the latter to define a peripheral guide surface for a magnetic tape with a circumferential gap in said guide surface between said stationary and rotary drum members; at least one magnetic head fixed to said rotary drum member and extending into said gap for transducing video signals on a magnetic tape guided by said peripheral guide surface; a D.C. motor disposed coaxially in respect to said stationary and rotary drum members and having a rotary shaft directly coupled to said rotary drum member for effecting rotation of the latter; signal transformer means including nested annular outer stationary and inner rotary cores which are fixed to, and coaxial with said stationary and rotary drum members, respectively, and adjacent stationary and rotary windings mounted on said stationary and rotary cores, respectively; means connecting said magnetic head to said rotary winding; signal conducting means connected to said stationary winding; and shielding means comprising a material of high magnetic permeability extending around said outer surface of said stationary core and having a layer of good electrical conductivity superimposed on said high permeability material and electrically connected to said grounded stationary drum member for shielding said signal transformer means from electrical signals noise generated by said D.C. motor.



4,031,559
FILTER CAPACITOR CHARGING CIRCUIT
Daniel Vern Peters, Naperville, Ill., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed Dec. 10, 1975, Ser. No. 639,396
Int. Cl.² H02H *9/04*
U.S. Cl. 361—52 **6 Claims**



1. A circuit for charging an input filter capacitance from a source of potential having a battery terminal and a ground terminal comprising:
an input connected to the battery terminal, and an output for connection to the capacitance;
a first charging circuit comprising two resistors connected in series between said input and said output;
a threshold detecting circuit comprising first semiconductor switching means connected to said ground terminal and having an output terminal and a control terminal, and diode means connected between said output and said control terminal of said first semiconductor switching means;
a second charging circuit comprising second semiconductor switching means connected between the junction of said two resistors and said output and having a control terminal, and diode means interconnecting said battery terminal and said control terminal of said second semiconductor switching means; and
means for coupling said output terminal to said control terminal of said second semiconductor switching means.

4,031,560

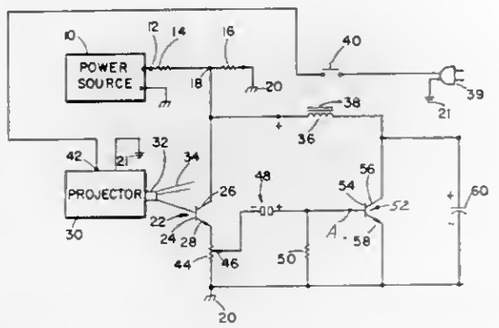
CHOPPED LIGHT RELAY KEYER

Richard L. Maresh, R.R. No. 2, Syracuse, Ind. 46567

Filed Nov. 19, 1975, Ser. No. 633,294

Int. Cl.² H01H *47/24*

U.S. Cl. 361—175 **10 Claims**



9. A protective circuit for a projector having a sequentially framed light energy output comprising a phototransistor having a base, collector, and emitter; said base being subject to the output of the projector and being biased thereby to cause conduction between said emitter and said collector at a rate corresponding to said sequential frame occurence; a transistor having a base, collector, and emitter; a transistor emitter-collector circuit; a relay coil being coupled in said transistor emitter collector circuit; a capacitor being coupled across said transistor emitter and collector; a power source being coupled across said relay and capacitor whereby said power source will charge said capacitor through said relay when said transistor is non-conductive; a differentiating circuit being coupled between said phototransistor emitter and said transistor base whereby a spike signal will be generated and applied to said transistor base when said phototransistor conducts; a power circuit for applying power to the projector; a relay contact switch in said power circuit responsive to current flow in said relay coil to close said power circuit to said projector and responsive to attenuated current flow in said relay coil to open the power circuit to power projector.

4,031,561

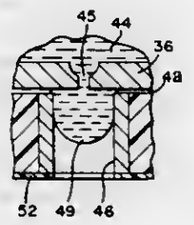
STARTUP APPARATUS AND METHOD FOR JET DROP RECORDING WITH RELATIVELY MOVABLE CHARGE PLATE AND ORIFICE PLATE

Suresh C. Paranjpe, Xenia, Ohio, assignor to The Mead Corporation, Dayton, Ohio

Filed May 3, 1976, Ser. No. 682,363

Int. Cl.² G01D *15/18*

U.S. Cl. 346—1 **22 Claims**



15. In a jet drop recording head having a jet forming nozzle and a circular charging electrode spaced apart from said nozzle, the method of starting a flow of recording liquid through said nozzle comprising the steps of:

placing said electrode in liquid resisting proximity to said nozzle,

after aforesaid placement introducing a flushing liquid into said recording head and forcing it through said nozzle and electrode to form a liquid jet,

introducing recording liquid into said recording head to replace said flushing liquid in said jet, and

retracting said electrode to an operating position spaced apart from said nozzle and surrounding said jet.

4,031,562

DEVICE FOR CREATING A DISPLAY OF A VARIABLE, THE VALUE OF WHICH IS DIGITALLY ENCODED

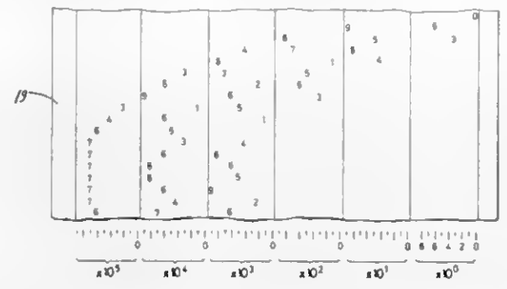
Horst Holzbrecher, Jülich-Bourheim, Germany, assignor to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung, Julich, Germany

Filed Nov. 12, 1975, Ser. No. 631,380

Claims priority, application Germany, Nov. 13, 1974, 2453752

Int. Cl.² G01D *9/06*

U.S. Cl. 346—35 **3 Claims**



1. An apparatus for developing a printed display of a variable transformed into a digital voltage or current signal while a digital signal is so coded in a code adapted to a predetermined numerical system and consists of digital individual signals which correspond to groups of a predetermined numerical system which comprises in combination: means for measuring instantaneous values of the variable and for encoding the signals thus developed in a binary code in which individual signals correspond to differently valued groups of a numerical system, and a type printing mechanism including means establishing operative connection with said means for measuring instantaneous values of the variable and for encoding the signals thus developed in the binary code to receive the encoded signals in conformity with the respective group, said mechanism being operable to register and display the values corresponding to the respective groups in adjacent relation in a sequence corresponding to the value of the groups and also corresponding to the values within each group, said printing mechanism comprising a plurality of printing heads, each having numerals thereon distributed circumferentially of the respective head, each head being rotatable individually, and means for rotating the heads in conformity with the value to be printed thereby.

4,031,563

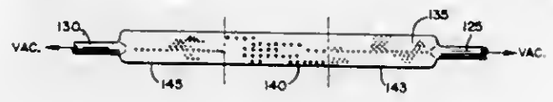
JET DROP RECORDING HEAD HAVING AN IMPROVED POROUS DEFLECTION RIBBON

Suresh C. Paranjpe, Xenia, and Daniel W. Moore, Dayton, both of Ohio, assignors to The Mead Corporation, Dayton, Ohio

Filed Jan. 29, 1976, Ser. No. 653,597

Int. Cl.² G01D *15/16*

U.S. Cl. 346—75 **5 Claims**



1. A self-cleaning deflection ribbon assembly for use in a jet drop recording head having means for generating a plurality of drop streams, each stream consisting of a series of liquid recording drops, means for selectively charging said drops, and a source of drop deflecting potential, comprising:

a porous deflection ribbon having an electrically conductive surface defining a plurality of liquid ingesting pores, the total cross-sectional area of said pores per unit area of said ribbon varying progressively from a smaller value at a point adjacent a first end of said ribbon to larger values at points further removed therefrom,

means for connecting the source of drop deflecting potential to said electrically conductive surface, and

means for applying an evacuating suction of said first end of said ribbon, wherein variations in drop ingesting effectiveness due to variations in evacuating suction along the extent of the ribbon are minimized.

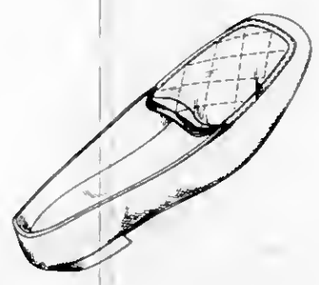
DESIGN PATENTS

GRANTED JUNE 21, 1977

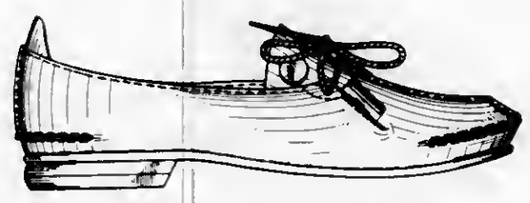
ERRATA

For CLASS	See PATENT NO.
010–038	244,761
010–075	244,762
010–098	244,763
010–113	244,764
011–040	244,765
011–089	244,766
011–137	244,767
011–149	244,768
012–062	244,769
012–142	244,770
012–193	244,771
012–215	244,772
014–099	244,778
014–012	244,779
012–012	244,780
014–039	244,781
014–075	244,799
014–005	244,800
014–082	244,801
024–002	244,805

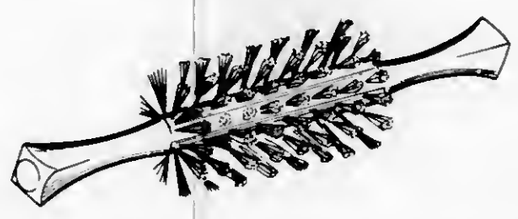
244,726
POCKET-TOP SHOE
Marcella M. Katz, 10573 Le Conte Ane., Los Angeles, Calif., 90024
Filed Dec. 31, 1975, Ser. No. 645,542
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—265



244,727
SHOE
Ambrogio Borri, Piazza della Repubblica 21, Milan, Italy
Filed Apr. 16, 1975, Ser. No. 568,512
Claims priority, application Italy, Oct. 16, 1974, 22161/74
Term of patent 3½ years
Int. Cl. D2—*04*
U.S. Cl. D2—287

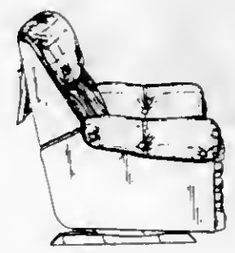


244,728
DUAL HANDLED HAIR BRUSH
Diane I. Kael, 16300 N. Park Drive, Apt. 805, Southfield, Mich. 48075
Filed Apr. 19, 1976, Ser. No. 677,903
Term of patent 14 years
Int. Cl. D4—*02*
U.S. Cl. D4—31

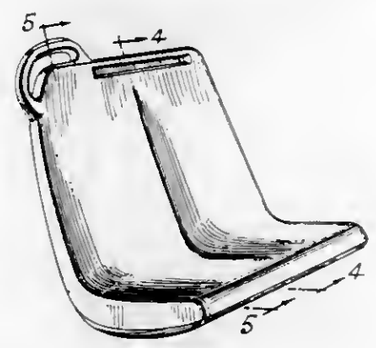


244,729
SWIVEL CHAIR
Randall P. Buhk, Wyoming, Mich., assignor to Steelcase, Inc., Grand Rapids, Mich.
Filed Sept. 5, 1975, Ser. No. 610,834
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—31

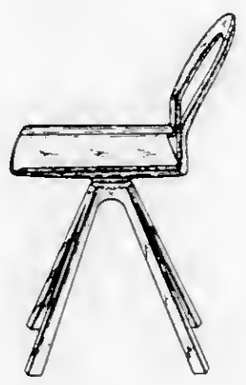
244,730
CHAIR
Stapleton Long, Morristown, Tenn., assignor to The Berkline Corporation, Morristown, Tenn.
Division of Ser. No. 630,321, Nov. 10, 1975, Pat. No. Des.241,695. This application June 10, 1976, Ser. No. 694,777
Term of patent 7 years
Int. Cl. D6—*01*
U.S. Cl. D6—37



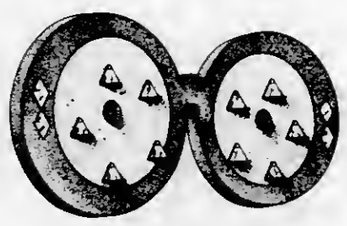
244,731
BUS SEAT
Norman J. James, Bonita; Larry G. Hickey, Chula Vista, and Fred Powers, San Diego, all of Calif., assignors to Rohr Industries, Inc., Chula Vista, Calif.
Filed Mar. 19, 1976, Ser. No. 668,483
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—48



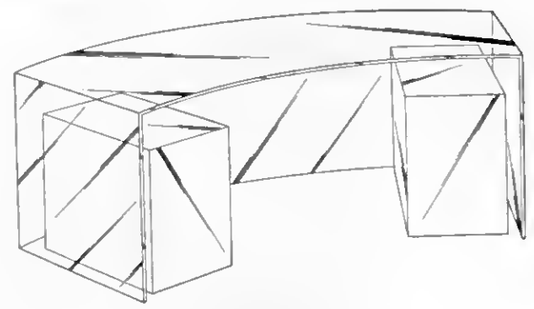
244,732
CHAIR
Vittorio Introini, Gallarate, Italy, assignor to Fratelli Saporiti, Besnate (Varese), Italy
Filed Mar. 18, 1975, Ser. No. 559,447
Claims priority, application Italy, Sept. 20, 1974, 60922/74
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—76



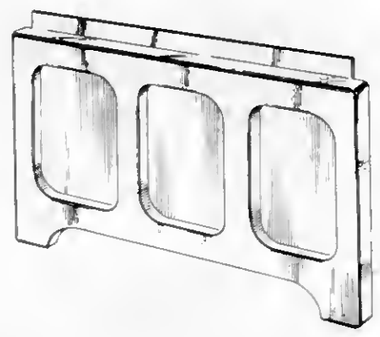
244,733
EYEGLASS DISPLAY RACK INCLUDING ROTARY DISKS
Italo Tammera, 7 Cliff St., West Orange, N.J. 07052
Filed Feb. 20, 1976, Ser. No. 659,593
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—136



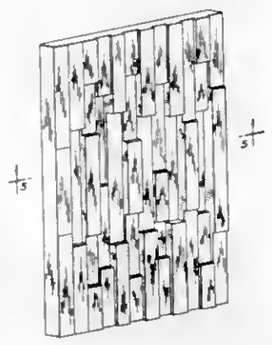
244,734
DESK
Eric Laroye, Koningstraat 14 -Bus 2-, 8400 Oostende, Belgium
Filed June 12, 1975, Ser. No. 586,337
Claims priority, application Belgium, Dec. 20, 1974, 60081
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—175



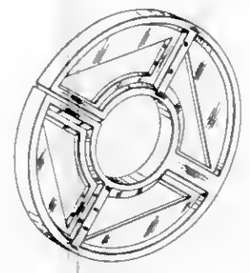
244,735
PANEL FOR USE WITH A MODULAR COUNTER UNIT
Robert J. Kennedy, Jr., and Kendall S. Smith, II, both of West Lafayette, Ind., assignors to Lincoln Manufacturing Company, Inc.
Filed Sept. 17, 1975, Ser. No. 614,337
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—193



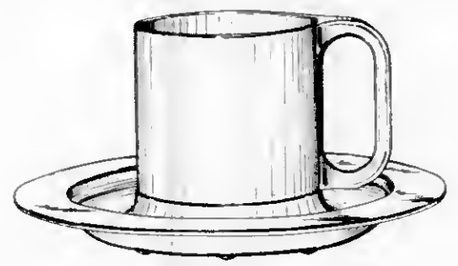
244,736
CABINET DOOR PANEL
James J. Palka, Arlington Heights, Ill., assignor to General Bathroom Products Corporation, Elk Grove Village, Ill.
Filed Mar. 15, 1976, Ser. No. 666,749
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—193



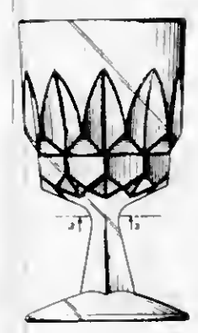
244,737
WARDROBE SYSTEMIZER DEVICE
Franklin H. Henry, 1431 Prentice Drive, Healdsburg, Calif. 95448
Filed Dec. 22, 1975, Ser. No. 642,726
Term of patent 14 years
Int. Cl. D6—*08*
U.S. Cl. D6—257



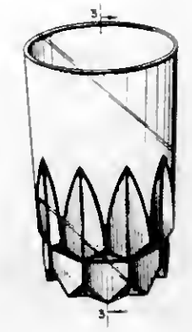
244,738
CUP AND SAUCER COMBINATION
Sven-Eric Juhlin, Ingaro, Sweden, assignor to Aktiebolaget Gustavsbergs Fabriker, Gustavsberg, Sweden
Filed Mar. 9, 1976, Ser. No. 665,303
Claims priority, application Sweden, Sept. 24, 1975, 751871
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—3



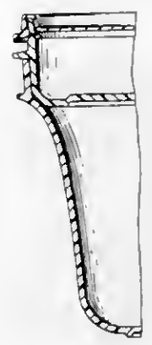
244,739
WINE GLASS OR SIMILAR ARTICLE
Philippe J. Durand, 62510 Arques, LaGarenne, France
Filed Dec. 30, 1975, Ser. No. 645,460
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—13



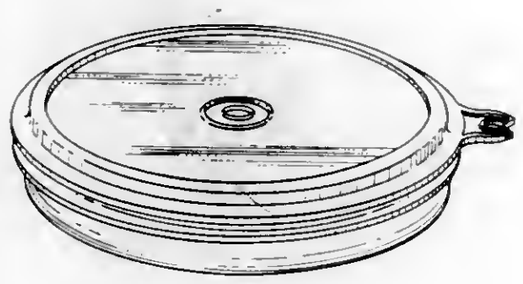
244,740
TUMBLER OR SIMILAR ARTICLE
Phllippe J. Durand, 62510 Arques, LaGarenne, France
Filed Dec. 30, 1975, Ser. No. 645,459
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—14

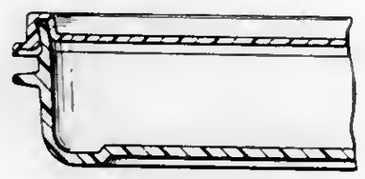


244,741
COVERED COMPARTMENTED BOWL
Robert H. C. M. Daenen, Aalst, Belgium, assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Sept. 10, 1975, Ser. No. 612,154
The portion of the term of this patent subsequent to May 24, 1991, has been disclaimed.
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—17



244,742
COVERED SERVING BOWL OR THE LIKE
Robert H. C. M. Daenen, Aalst, Belgium, assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Jan. 23, 1976, Ser. No. 651,863
The portion of the term of this patent subsequent to Apr. 19, 1991, has been disclaimed.
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—17





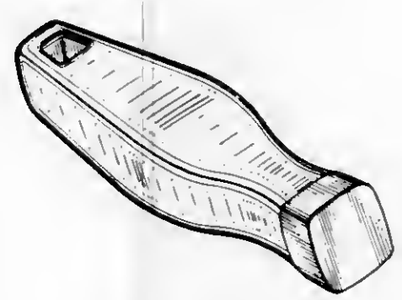
244,743
CANISTER LID
Wendy P. Turner, 3901 E. Garden Lane, Littleton, Colo. 80121
Filed June 4, 1975, Ser. No. 583,840
Term of patent 3½ years
Int. Cl. D7—*01*
U.S. Cl. D7—131

244,744
DETACHABLE GRASS SHEAR HEAD FOR CORDLESS TOOL
Roderick Francis Bunyea, Cockeysville, Md., assignor to The Black and Decker Manufacturing Company
Filed Aug. 19, 1975, Ser. No. 605,859
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—8

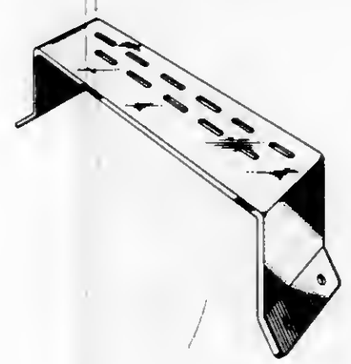
244,745
TORQUE WRENCH
Hiroshi Tsuji, Tokyo, Japan, assignor to Tohnichi Manufacturing Co. Ltd., Japan
Filed Dec. 19, 1975, Ser. No. 642,392
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—24

244,746
JIG FOR CUTTING TILE
Leonard C. Stabb, 10137 Catalina Drive, Indianapolis, Ind. 46236
Filed Mar. 3, 1976, Ser. No. 663,241
Term of patent 14 years
Int. Cl. D8—*99*
U.S. Cl. D8—71

244,747
HANDLE FOR TOOLS
Johannes Josef Solf, Sindelfingen-Eichholz, Germany, assignor to Friedr. Dick G.m.b.H., Esslingen, Germany
Filed Dec. 31, 1975, Ser. No. 645,654
Claims priority, application Germany, July 18, 1975, 831221
Term of patent 14 years
Int. Cl. D8—*04*
U.S. Cl. D8—107

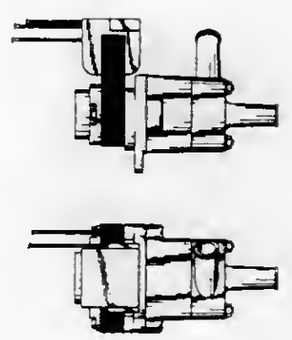


244,748
BRACKET FOR MOUNTING ACCESSORIES OVER THE TRANSMISSION HUMP OF A VEHICLE
Robert W. Canterbury, Addison, Tex., assignor to Holly Enterprises, Addison, Tex.
Filed Feb. 19, 1976, Ser. No. 659,491
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—380

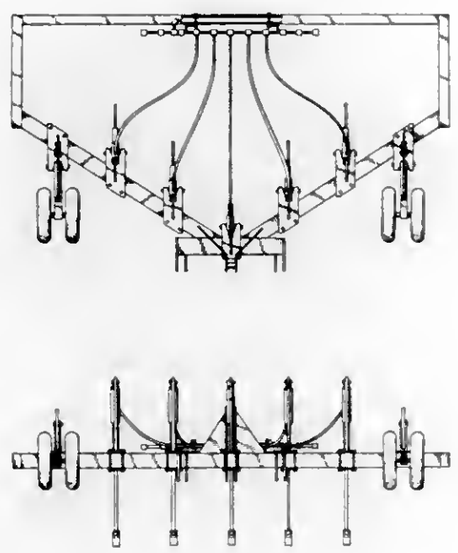


244,749
RIBBON CONTAINER
Dale R. Hodges, 4103 Inwood Road, Dallas, Tex. 75209
Filed July 28, 1975, Ser. No. 599,475
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—238

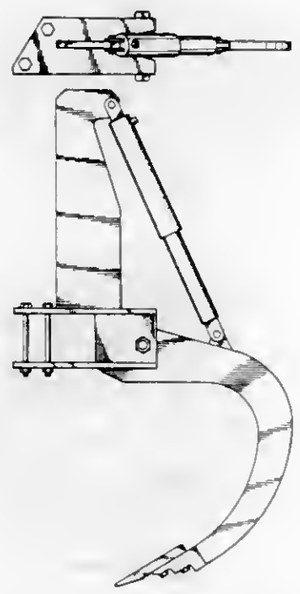
244,750
PUMP
Leo L. Roberts, Moore; Lee W. Davis, Del City, and Jim S. Hollingsworth, Oklahoma City, all of Okla., assignors to Little Giant Corporation, Oklahoma City, Okla.
Filed Oct. 8, 1975, Ser. No. 620,888
Term of patent 14 years
Int. Cl. D15—*02*
U.S. Cl. D15—7



244,751
HYDRAULIC RESET GROUND RIPPER IMPLEMENT
Glen A. Watts, Rte. 1, Box 258, McMinnville, Oreg. 97128
Filed Mar. 8, 1976, Ser. No. 664,491
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—11

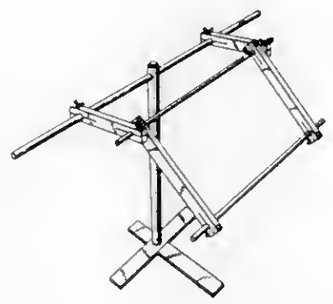


244,752
COMBINED GROUND RIPPER TOOTH AND HYDRAULIC RESET ASSEMBLY
Glen A. Watts, Rte. 1, Box 258, McMinnville, Oreg. 97128
Filed Mar. 8, 1976, Ser. No. 664,492
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—29

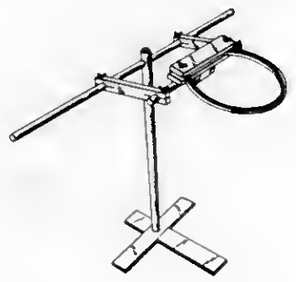


244,753
GROUND RIPPER TOOTH
Glen A. Watts, Rte. 1, Box 258, McMinnville, Oreg. 97128
Filed Mar. 8, 1976, Ser. No. 664,493
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—29

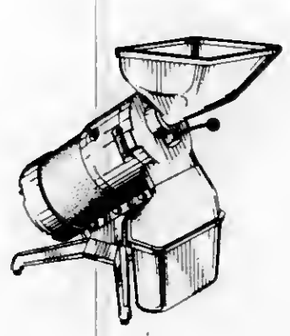
244,754
PORTABLE ADJUSTABLE STAND FOR A NEEDLEWORK FRAME
Donald I. Bard, 7901 College Lane, Annandale, Va. 22003
Filed Mar. 26, 1976, Ser. No. 670,812
Term of patent 14 years
Int. Cl. D15—*06*
U.S. Cl. D15—66



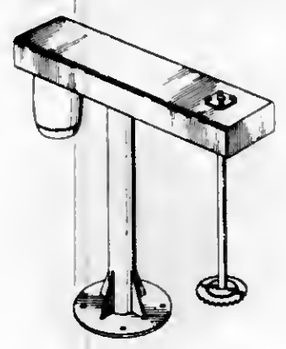
244,755
PORTABLE ADJUSTABLE STAND FOR SUPPORTING AN EMBROIDERY HOOP
Donald I. Bard, 7901 College Lane, Annandale, Va. 22003
Filed Mar. 26, 1976, Ser. No. 670,813
Term of patent 14 years
Int. Cl. D15—*06*
U.S. Cl. D15—66



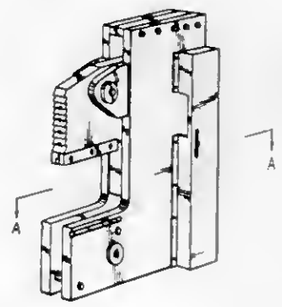
244,756
GRAIN MILL
Clarence E. Granzow, 2516 E. Jackson St., Phoenix, Ariz. 85034
Filed June 28, 1976, Ser. No. 700,592
Term of patent 14 years
Int. Cl. D15—*08*
U.S. Cl. D15—98



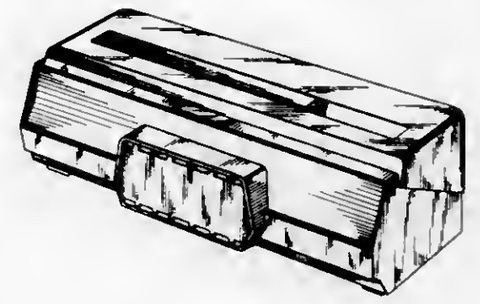
244,757
DISPERSING APPARATUS
Donald M. Schnear, Corona del Mar, Calif., assignor to Morehouse Industries, Inc., Fullerton, Calif.
Division of Ser. No. 515,203, Oct. 16, 1974, Pat. No. Des. 241,675. This application Nov. 17, 1975, Ser. No. 632606
Term of patent 14 years
Int. Cl. D15—*09*
U.S. Cl. D15—122



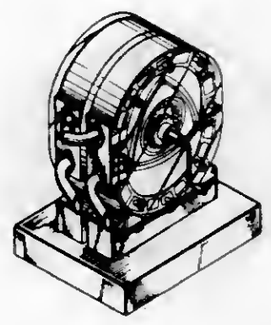
244,758
METAL FORMING PRESS
Dugmore Dennis Slattery, 177 Kestell Street, Potgietersrus, Transvaal Province, South Africa
Filed Mar. 3, 1976, Ser. No. 663,379
Claims priority, application South Africa, Sept. 8, 1975, 75/1298
Term of patent 14 years
Int. Cl. D15—*09*
U.S. Cl. D15—123



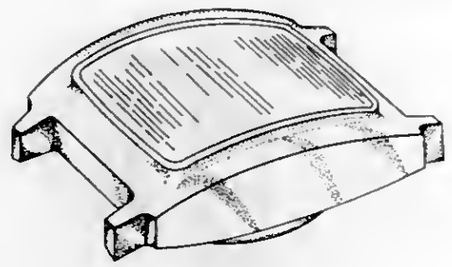
244,759
APPLIANCE FOR CUTTING, SEALING AND MAKING PLASTIC BAGS
William B. Kludred, Allen Park, Mich., assignor to Weigl Co., Inc., New York, N.Y.
Filed July 12, 1976, Ser. No. 704,370
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D15—146



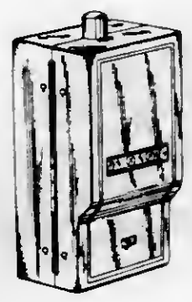
244,760
ROTARY ENGINE MODEL
Ronald L. Phillips, 4633 Dow Ridge, Orchard Lake, Mich. 48033
Filed Mar. 24, 1975, Ser. No. 561,109
Term of patent 14 years
Int. Cl. D19—*07*
U.S. Cl. D19—62



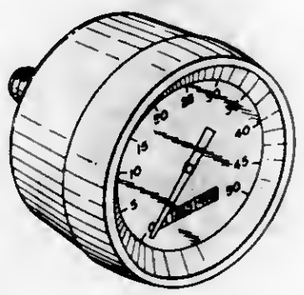
244,761
DIGITAL WRIST WATCH
Eugene Joseph Solek, 3725 Buckboard, Plano, Tex. 75074
Filed Sept. 11, 1975, Ser. No. 612,616
Term of patent 14 years
Int. Cl. D10—*02*
U.S. Cl. D10—38



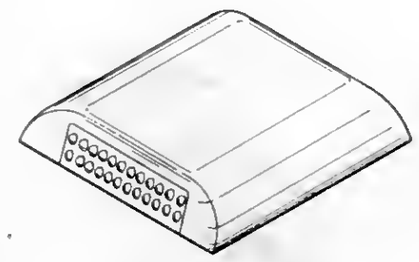
244,762
ELECTRICAL LEAKAGE ANALYZER
Roger K. F. Wasmer, 410 Ridgewood Drive N., Bellevue, Nebr. 68005; David W. McCord, 4811 Florence Blvd., Omaha, Nebr. 68110, and Anthony J. Graziano, 2110 Georgia Ave., Bellevue, Nebr. 68005
Filed June 9, 1975, Ser. No. 584,695
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—75



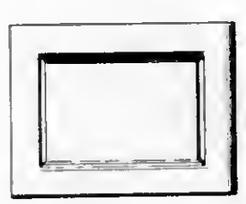
244,763
SPEEDOMETER
Philip S. Stefaniak, Evanston, Ill., assignor to Stewart-Warner Corporation, Chicago, Ill.
Filed Dec. 18, 1975, Ser. No. 641,985
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—98



244,764
ROAD-TRAFFIC STUD
Emil Grubauer, Wattens, Austria, assignor to D. Swarovski & Co., Wattens, Austria
Filed Sept. 12, 1975, Ser. No. 612,672
Claims priority, application Austria, Mar. 18, 1975, 11495/75
Term of patent 14 years
Int. Cl. D10—*06*
U.S. Cl. D10—113

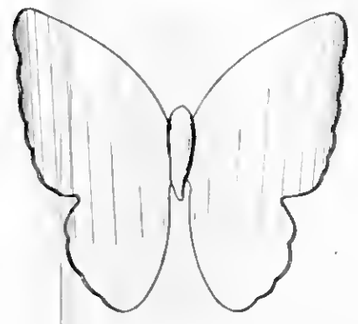


244,765
JEWELRY PIN FOR DISPLAY OF PHOTOGRAPHIC NEGATIVE CONTACT PRINTS
Krystin L. Grenon, 1837 S. Halsted, Chicago, Ill. 60608
Filed Dec. 1, 1975, Ser. No. 636,414
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—40

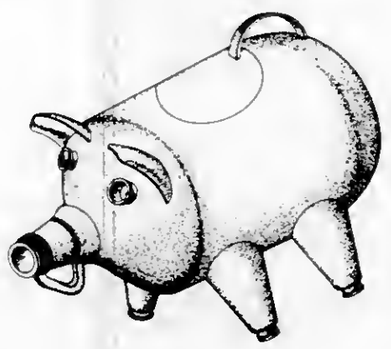


244,766
CROWN FOR A RING
Roy R. Powell, R.D. 1, W. Main Road, North East, Pa. 16428
Filed Dec. 15, 1975, Ser. No. 640,625
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—89

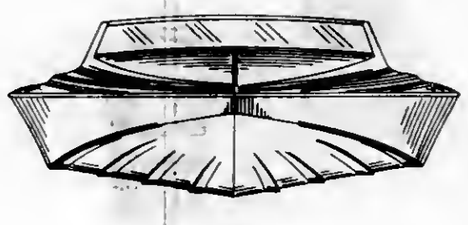
244,767
BUTTERFLY ORNAMENT
Donald R. Ditto, 3129 Maple Leaf Lane, Dallas, Tex. 75233
Filed Jan. 31, 1975, Ser. No. 545,864
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—137



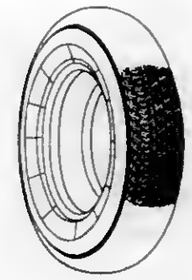
244,768
PLANTER AND A LID THEREFOR
Arthur J. Lacativo, 236 Canyon Drive, Oroville, Calif. 95965
Filed Feb. 27, 1976, Ser. No. 662,188
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—149



244,769
POWER BOAT
Bruce E. Nescher, 1861 Kashlon, LaHabra Heights, Calif. 90631
Filed June 3, 1975, Ser. No. 583,276
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—62



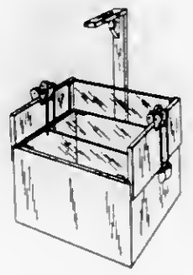
244,770
VEHICLE TIRE
Hiroshi Kojima, Hino; Toshio Hayakawa, Kodaira, and Masafumi Yoshihara, Higashi-Murayama, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan
Filed Feb. 4, 1976, Ser. No. 655,261
Claims priority, application Japan, Aug. 8, 1975, 50-32395
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—142



244,771
LICENSE PLATE HOLDER
John A. Bott, 931 Lakeshore Drive, Grosse Pointe Shores, Mich. 48236
Filed Jan. 5, 1976, Ser. No. 646,547
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—193

244,772
DECOY ANCHOR
Floyd E. Zongker, Tulsa, Okla., assignor to Zongker Lead Casting, Inc., (Entire), Tulsa, Okla.
Filed May 20, 1976, Ser. No. 688,485
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—215

244,773
RAT TRAP
Frank S. Curtis, 1009 N. Jenison, Lansing, Mich. 48915
Filed Nov. 17, 1975, Ser. No. 632,266
Term of patent 14 years
Int. Cl. D22—*19*
U.S. Cl. D22—18

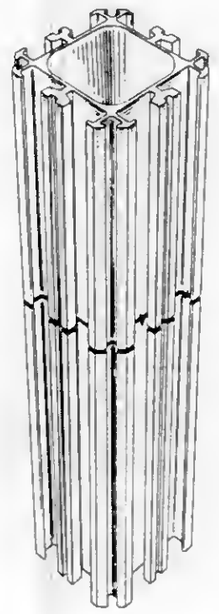


244,774
ANTI-WATER SPLASH SHIELD FOR BATHTUBS
John H. Dose, 4006 Chinaberry Road; River Isles Box 106, Bradenton, Fla. 33505
Filed Nov. 6, 1975, Ser. No. 629,642
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—69

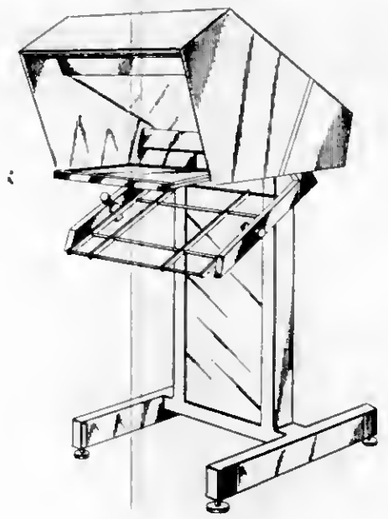
244,775
AIR FRESHENER CONTAINER
Norman E. Wilson, Moscow Mills, Mo., assignor to The Puro Co., Inc.
Filed Dec. 19, 1975, Ser. No. 642,464
Term of patent 14 years
Int. Cl. D23—*99*
U.S. Cl. D23—150

244,776
INFANT NURSING BOTTLE
Paul K. Meeker, 412 Park St., Kent, Ohio 44240
Filed Aug. 16, 1976, Ser. No. 714,529
Term of patent 14 years
Int. Cl. D7—*01*; D9—*01*
U.S. Cl. D24—47

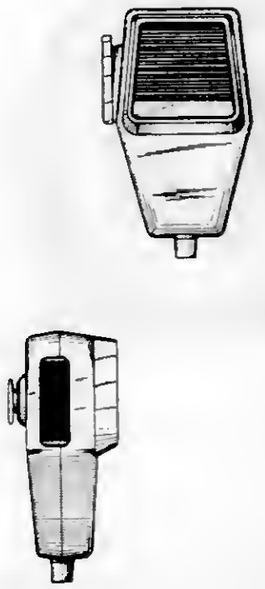
244,777
TUBULAR POST
Bertalan Tamas Bobrovniczky, Don Mills, Canada, assignor to Beautiline Systems Limited
Filed Jan. 7, 1976, Ser. No. 647,165
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—75



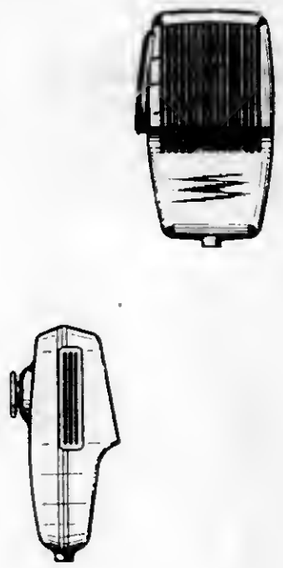
244,778
COMPONENT LOCATER FOR ELECTRONIC PRODUCT ASSEMBLY OPERATIONS
Lewis A. Latanzi, Bethel, Conn., assignor to Contact Systems, Inc., Danbury, Conn.
Filed Oct. 28, 1975, Ser. No. 625,939
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—99



244,779
MICROPHONE
Yoshiaki Kobayasbi, Tokyo, Japan, assignor to Nihon Atsudenki Kabushiki Kaisha, Mitaka, Japan
Filed Aug. 19, 1975, Ser. No. 605,804
Claims priority, application Japan, Feb. 20, 1975, 50-006757
Term of patent 7 years
Int. Cl. D14—*01*
U.S. Cl. D14—12



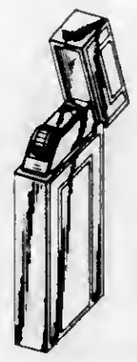
244,780
MICROPHONE
Yoshiaki Kohayashi, Tokyo, Japan, assignor to Nihon Atsudenki Kabushiki Kaisha, Mitaka, Japan
Filed Aug. 19, 1975, Ser. No. 605,801
Claims priority, application Japan, Feb. 25, 1975, 50-7508
Term of patent 7 years
Int. Cl. D14—*01*
U.S. Cl. D14—12



244,781
SPEAKER GRILL
Jack R. Saidel, 1618 Heather-Hill Crescent, Flossmoor, Ill. 60422
Filed Oct. 22, 1976, Ser. No. 734,715
Term of patent 7 years
Int. Cl. D14—*01*, *99*
U.S. Cl. D14—39

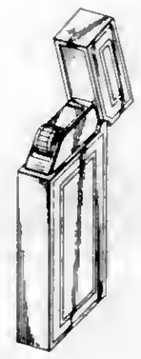
244,782
CIGARETTE LIGHTER
Kenjiro Goto, 4-17-3, Naka-cho, Urawa, Saitama, Japan
Filed Mar. 21, 1975, Ser. No. 560,777
Term of patent 7 years
Int. Cl. D27—*05*
U.S. Cl. D27—36

244,783
CIGARETTE LIGHTER
George O'Brien, New York, N.Y., assignor to Tiffany & Company, New York, N.Y.
Filed July 19, 1976, Ser. No. 706,731
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—36

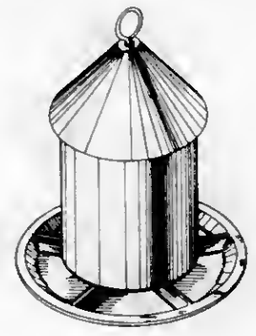


244,784
CIGARETTE LIGHTER
George O'Brien, New York, N.Y., assignor to Tiffany & Company, New York, N.Y.
Filed July 19, 1976, Ser. No. 706,732
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—36

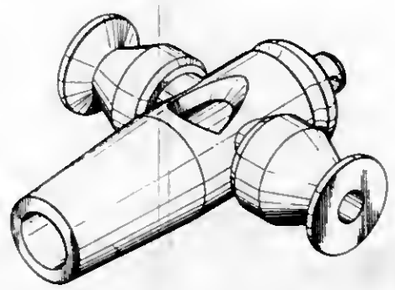
244,785
CIGARETTE LIGHTER
George O'Brien, New York, N.Y., assignor to Tiffany & Company, New York, N.Y.
Filed July 19, 1976, Ser. No. 706,733
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—36



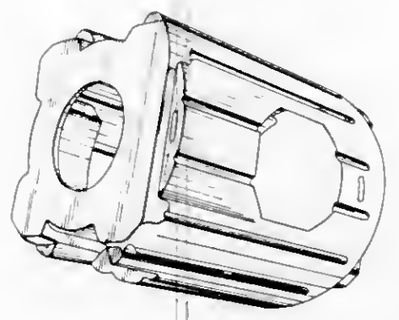
244,786
BIRD FEEDER
Littleton P. Dryden, Westminster, Colo., assignor to Premier Manufacturing Co., Arvada, Colo.
Filed Jan. 12, 1976, Ser. No. 648,330
Term of patent 14 years
Int. Cl. D30—*03*
U.S. Cl. D30—15



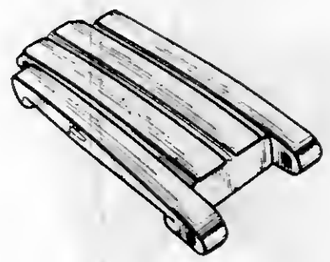
244,787
MUSICAL WHISTLE
Martin B. Cohen, Hillsdale, N.J., assignor to Latin Percussion, Inc.
Filed Aug. 4, 1975, Ser. No. 601,763
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 C



244,788
POD MODULE FOR USE AS PLAY EQUIPMENT
Kenneth Peter Burgess, Kew Surrey, and Timothy Sefton Elsdale, London, both of England, assignors to WCB Containers Limited, Stalybridge, England
Filed Aug. 19, 1975, Ser. No. 605,895
Claims priority, application United Kingdom, Feb. 19, 1975, 969950/75
Term of patent 14 years
Int. Cl. D21—*03*
U.S. Cl. D34—5 H



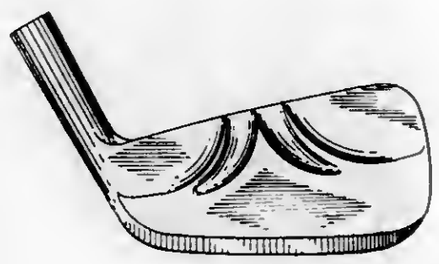
244,789
SLAB MODULE FOR USE AS PLAY EQUIPMENT
Kenneth Peter Burgess, Kew Surrey, and Timothy Sefton Elsdale, London, both of England, assignors to WCB Containers Limited, Stalybridge, England
Filed Aug. 19, 1975, Ser. No. 605,896
Term of patent 14 years
Int. Cl. D21—*03*
U.S. Cl. D34—5 H



244,790
FIELD HOCKEY STICK
Phillip Howard Carlson, Minneapolis, and Lawrence E. Ericksoo, Edina, both of Minn., assignors to International Telephone and Telegraph Corporation, New York, N.Y.
Filed Sept. 16, 1975, Ser. No. 613,968
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 BC

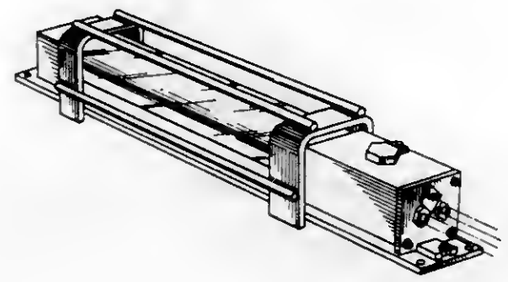
244,791
GOLF STANCE AND SWING PRACTICE DEVICE OR THE LIKE
Edward F. Sullivan, Jr., 6944 Gallardia Road South, Jacksonville, Fla. 32211
Filed Sept. 24, 1975, Ser. No. 616,309
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 CB

244,792
DRIVING IRON HEAD
Paul B. Gelinas, 66 Prospect St., Manchester, N.H. 03104
Filed May 12, 1976, Ser. No. 685,807
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH



244,793
LIGHTING FIXTURE
Alan J. Ruud, West Allis, Wis., assignor to Donald L. Goulet and Alan J. Ruud
Filed July 31, 1975, Ser. No. 600,643
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20 A

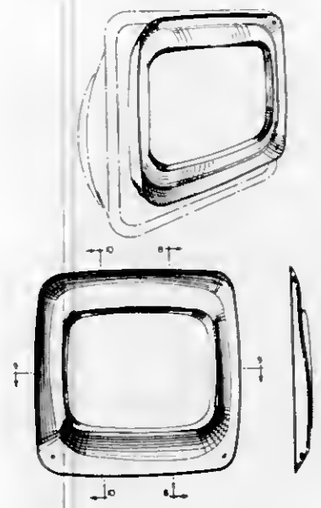
244,794
EXPLOSION PROOF FLUORESCENT LAMP FOR MINES OR THE LIKE
Perfecto Dacal, Beckley, W. Va., assignor to Control Products Inc., Beckley, W. Va.
Filed May 24, 1976, Ser. No. 689,596
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20 E



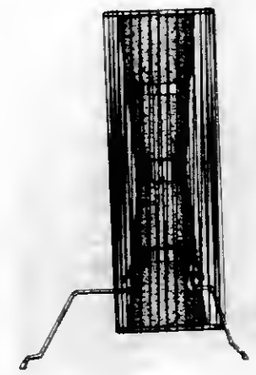
244,795
LIGHTING FIXTURE
Robert M. O'Hara, 1873 Berkley Ave., St. Paul, Minn. 55105
Filed Apr. 11, 1975, Ser. No. 567,398
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—23 R

244,796
PENLIGHT
David E. Staub, Clearwater, Fla., assignor to Concept, Inc., Clearwater, Fla.
Filed Nov. 13, 1975, Ser. No. 631,621
Term of patent 14 years
Int. Cl. D26—*02*
U.S. Cl. D48—24 A

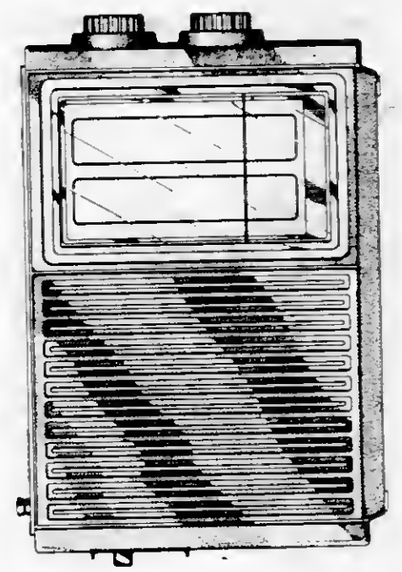
244,797
VEHICLE HEADLAMP BEZEL
William F. Leahy, 624 Edwards, West Dundee, Ill. 60118
Filed Feb. 26, 1976, Ser. No. 661,423
Term of patent 7 years
Int. Cl. D26—*06*
U.S. Cl. D48—32 C



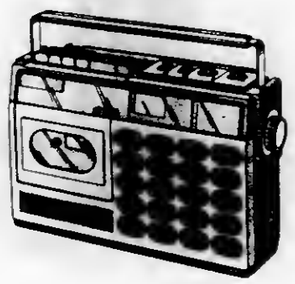
244,798
DRUM
Fred Fleck, 3719 Central Park Circle, Las Vegas, Nev. 89109
Filed Feb. 20, 1975, Ser. No. 551,251
Term of patent 14 years
Int. Cl. D17—*04*
U.S. Cl. D56—1 E



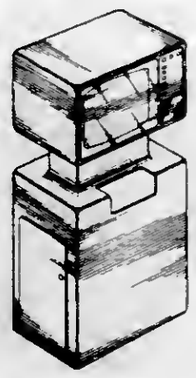
244,799
PORTABLE RADIO
John S. Kolwaite, Dewitt, N.Y., assignor to General Electric Company
Filed June 16, 1975, Ser. No. 587,503
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—75



244,800
COMBINED TAPE RECORDER AND RADIO RECEIVER
Katsutoshi Kido, Toyonaka, and Susumu Yamamoto, Moriguchi, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan
Filed Oct. 21, 1975, Ser. No. 624,635
Claims priority, application Japan, Apr. 23, 1975, 50-16299
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—5

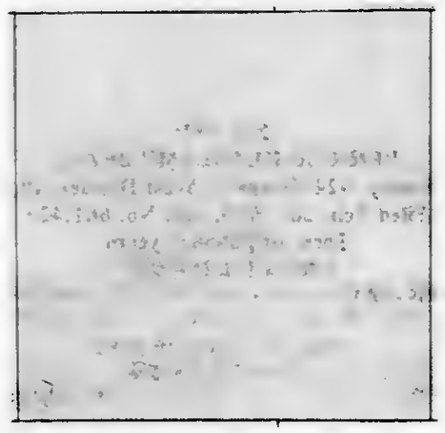


244,801
VIDEO PROGRAM SELECTION AND DISPLAY SYSTEM
George R. DeLand, Yorba Linda, Calif., assignor to Odetics, Inc., Anaheim, Calif.
Filed Dec. 15, 1975, Ser. No. 640,838
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—82



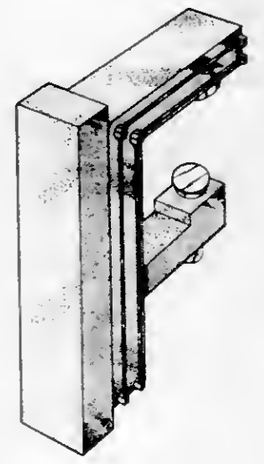
244,802
EMBOSSED PLASTIC SHEET MATERIAL
Jared R. Kies, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio
Filed Apr. 21, 1975, Ser. No. 569,901
Term of patent 14 years
Int. Cl. D5—*06*
U.S. Cl. D87—3 G

244,803
EMBOSSED PLASTIC SHEET MATERIAL
Jared R. Kies, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio
Filed Apr. 21, 1975, Ser. No. 570,282
Term of patent 14 years
Int. Cl. D5—*06*
U.S. Cl. D87—3 G



244,804
EMBOSSED PLASTIC SHEET MATERIAL
Jared R. Kies, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio
Filed Apr. 21, 1975, Ser. No. 570,290
Term of patent 14 years
Int. Cl. D5—*06*
U.S. Cl. D87—3 G

244,805
X-RAY UNIT STAND
Carl-Eric Ohlson, Solna, Sweden, assignor to AO:s Metall & Mek. Verkstad AB, Stockholm, Sweden
Filed May 23, 1975, Ser. No. 580,360
Claims priority, application Sweden, Nov. 25, 1974, 741966
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D24—2



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 21ST DAY OF JUNE, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

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A P Products Incorporated: *See*—
Venaleck, John T., 4,030,799.

A-T-O Inc.: *See*—
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Abernathy, Frank W. Garbage recycling apparatus. 4,030,670, Cl. 241-14.000.

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ACF Industries, Incorporated: *See*—
Garner, Gerald D.; Hammonds, James C.; Holt, Jan D.; and Melcher, Conway H., 4,030,424.

Ackeret, Peter, to IDN Inventions and Development of Novelties AG. Holders for tape cassettes. 4,030,601, Cl. 206-387.000.

Ackerman, James H., to Sterling Drug Inc. Iodinated anilic acids. 4,031,088, Cl. 260-247.20A.

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Muller, Gunter; and Kluge, Reimund, 4,030,602.
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Ahrens, Hanns; Biere, Helmut; Rufer, Clemens; Schmiechen, Ralph; Schroeder, Eberhard; Loge, Olaf; Losert, Wolfgang; and Schillinger, Ekkehard, to Schering Aktiengesellschaft. Novel thiophene derivatives and their preparation. 4,031,236, Cl. 424-275.000.

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Northeved, Allan; Fabrin, Knud Christian Claus; and Solfjeld, Poul, 4,030,344.

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Akimoto, Hidetoshi; Kaji, Ryuichi; Kikuchi, Hideo; Hishinuma, Yukio; and Arikawa, Yoshijiro, to Hitachi, Ltd.; and Babcock-Hitachi K.K. Process for making nitrogen oxides contained in flue gas harmless. 4,031,185, Cl. 423-239.000.

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Alexander, Robert L., to Hunt Manufacturing Co. Hanging file frame with resilient corner members. 4,030,610, Cl. 211-182.000.

Alexandrov, Vladimir Ilich; Osiko, Vyacheslav Vasilievich; Muraviev, Ernest Nikolaevich; Spiridonov, Eduard Georgievich; Tatarintsev, Vladimir Mikhailovich; and Gordon, Vladimir Grigorlevich. Sintered cermet containing ground monocrystals. 4,030,891, Cl. 75-234.000.

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Alford, Andrew. Collinear dipole array with reflector. 4,031,537, Cl. 343-704.000.

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Allenspach, Walter. Multi-function metal-working machine. 4,030,335, Cl. 72-389.000.

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Aronoff, Elihu J.; and Dhemi, Kewal Singh, to International Telephone and Telegraph Corporation. Crosslinking fluorocarbon compositions using polyallylic esters of polycarboxylic acids. 4,031,167, Cl. 260-884.000.

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Board, Kenneth B., 4,030,770.

Atlantic Research Corporation: *See—*
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Atlantic Richfield Company: *See—*
Edison, Robert Raynold; and Dresser, Thorpe, 4,031,154.
Leonard, John J., 4,031,196.
Simpson, Terry Lee, 4,030,752.
Wilson, Leland Earl, 4,030,305.

Atmore, Milton Graham Montgomery; and Macpherson, Roy Duncan, to Anglonor S. A. Electrowinning process. 4,030,989, Cl. 204-104.000.

Atwood, Feliz M., to Square D Company. Safety guard for press brakes. 4,030,364, Cl. 72-389.000.

Audaire, Luc; Borel, Joseph; Le Goascoz, Vincent; and Poujois, Robert, to Commissariat a l'Energie Atomique. Method and device for the integration of analog signals. 4,031,380, Cl. 235-183.000.

Auer, Eberhard: *See—*
Vogt, Wilhelm; Auer, Eberhard; Lenx, Gunter; Merkenich, Karl; Henning, Klaus; and Kandler, Joachim, 4,031,022.

Augat, Inc.: *See—*
Hanlon, Richard J.; Damon, Neil F.; and Yeo, Herbert G., 4,030,793.

Auge, Wolfgang: *See—*
Thiem, Karl-Werner; Auge, Wolfgang; and Neeff, Rutger, 4,031,116.

Auriol, Alain; and Tritten, Paul, to Compagnie Generale d'Electroceramique. Process for the manufacture of articles of translucent alumina. 4,031,177, Cl. 264-65.000.

Austel, Volkhard: *See—*
Kutter, Eberhard; Austel, Volkhard; Eberlein, Wolfgang; Heider, Joachim; Kobinger, Walter; Lillie, Christian; and Kadatz, Rudolf, 4,031,219.

Automobiles Peugeot: *See—*
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Automotive Products Limited: *See—*
Young, Alastair John, 4,030,771.

Avedisian, Armen O. Impermeable ecological barrier and process of making same from reconstituted shale. 4,030,307, Cl. 61-35.000.

Azadian, Jacques; and Arsenault, Albert J. Clog sole. 4,030,155, Cl. 12-146.00B.

B. F. Goodrich Company, The: *See—*
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B-5 Associates of Stamford, Connecticut: *See—*
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Baardman, Frank: *See—*
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Babcock-Hitachi K.K.: *See—*
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Babcock & Wilcox Company, The: *See—*
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Bach, Hans: *See—*
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Bach, Nicholas J.; Hall, David A.; and Kornfeld, Edmund C., to Eli Lilly and Company. Descarboxylysergic acid. 4,031,097, Cl. 260-285.500.

Badalich, Frank C., to Bell & Howell Company. Rear screen projector with remote projection capability. 4,030,821, Cl. 353-71.000.

Badische Anilin- & Soda-Fabrik Aktiengesellschaft: *See—*
Bronstert, Klaus; Fabrbach, Gerhard; Krahe, Eduard; Ladenberger, Volker; Kastning, Ernst-Guenther; Mittnacht, Hans; Willersinn, Herbert; and Trieschmann, Hans-Georg, 4,031,166.

Bahna, Jarolim: *See—*
Sommer, Karel; Zdrazil, Jiri; Kubinek, Milan; Bahna, Jarolim; Kyselica, Stanislav; Habrovec, Frantisek; and Skarek, Jiri, 4,030,944.

Bailey, Alfred J.; and Dean, Malcolm, to Massey-Ferguson Services N.V. Implements for delivering particulate material to the ground. 4,030,641, Cl. 222-317.000.

Bake, Earl A.; and Schoeneweis, E. Frederick, to Rockwell International Corporation. Valve positioning handle. 4,030,696, Cl. 251-288.000.

Baker, Don R., to Stauffer Chemical Company. Certain bromoacetoxy acetylenes as slime control agents. 4,031,241, Cl. 424-311.000.

Baker, Don R.: *See—*
Arneklev, Duane R.; and Baker, Don R., 4,030,911.

Baker, Irwin Gerald: *See—*
Brogan, Joseph; and Baker, Irwin Gerald, 4,030,787.

Bakerdrill, Inc.: *See—*
Kammerer, Archer W., Jr.; and Curington, Alfred R., 4,030,554.

Bakgaard, Knud Erik, to Bang & Olufsen A/S. Loudspeaker systems. 4,031,321, Cl. 179-1.00D.

Belasty, Darrell S. Triangular holder and instrument. 4,030,841, Cl. 401-6.000.

Ban, Itsuki; and Mochizuki, Kazunori. Mode changeover apparatus for recorder/player. 4,031,556, Cl. 360-96.000.

Ban, Itsuki; and Mochizuki, Kazunori. Casette loading device for use in magnetic sound recording and playing back apparatus. 4,031,557, Cl. 360-96.000.

Bang & Olufsen A/S: *See—*
Bakgaard, Knud Erik, 4,031,321.

Bannister, Brian, to Upjohn Company, The. Process for preparing lincomycin derivatives. 4,031,304, Cl. 536-11.000.

Barba, Diego; Germana, Antonino; Liuzzo, Giuseppe; and Tagliaferri, Giovanni, to Societa' Italiana Resine S.I.R. S.p.A. Apparatus for desalting saline water. 4,030,985, Cl. 202-174.000.

Barba, Diego; Battistoni, Fabrizio; D'Agostini, Candido; and Macchi, Giorgio, to Societa' Italiana Resine S.I.R. S.p.A. Process for the production of nitric acid. 4,031,187, Cl. 423-392.000.

Barber, William R., Jr., to Esco Corporation. Method of casting beneficiation. 4,030,253, Cl. 51-321.000.

Barbieri, Siegfried, to Durst AG Fabrik Fototechnischer Apparate Bozer. Color filter determining apparatus. 4,030,833, Cl. 356-175.000.

Bardaley, James G. Portable bolder for roll of perforated paper towel. 4,030,676, Cl. 242-55.540.

Barna, Joseph A.: *See—*
Brugger, Richard D.; and Barna, Joseph A., 4,031,362.

Barnes, Tracy W., to Laidlaw Corporation. Method of flocking metal articles. 4,031,270, Cl. 427-27.000.

Barrault, Michel Raymond, to Imperial Chemical Industries Limited. Anode adjustment. 4,030,998, Cl. 204-219.000.

Barth, Wayne E., to Pfizer Inc. Antibacterial 3-phosphono penams. 4,031,077, Cl. 260-239.100.

Bartoli, Francesco: *See—*
Lostia, Onofrio; and Bartoli, Francesco, 4,031,201.

BASF Aktiengesellschaft: *See—*
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Engelbach, Heinz; Krabetz, Richard; Duembgen, Gerd; Willersinn, Carl-Heinz; Lebert, Ulrich; and Thiessen, Fritz, 4,031,135.
Fischer, Adolf, deceased, 4,030,909.
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Oppenlaender, Knut; Uhl, Guenter; Helfert, Herbert; Scharpenberg, Hans-Georg; and Stork, Karl, 4,031,112.
Rapp, Guenther; Fuchs, Hugo; and Thomas, Erwin, 4,031,139.
Tatzel, Hermann; Koegel, Wolfram; Beck, Gilbert; Zuern, Ludwig; and Caesar, Arodt Christian, 4,031,179.

Bassler, Gerd; and Altpeter, Arno, to Robert Bosch G.m.b.H. Corrosion-resistant sheet steel weld. 4,030,525, Cl. 428-586.000.

Basta, Tom: *See—*
Linck, Donald W., II; and Kaprelian, George, 4,030,197.

Bastian, Jean-Michel; and Berthold, Richard, to Sandoz Ltd. 4H-Benzo[4,5]cyclobepta[1,2-b]thiopbenes. 4,031,225, Cl. 424-267.000.

Battelle Memorial Institute: *See—*
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Battistoni, Fabrizio: *See—*
Barba, Diego; Battistoni, Fabrizio; D'Agostini, Candido; and Macchi, Giorgio, 4,031,187.

Battye, Christopher John; and Dorey, Roger John, to United Glass,

Ltd. Surface coating of glass containers while annealing. 4,030,904, Cl. 65-60.00A.

Baudoin, Jean-Claude; and Oger, Robert, to Commissariat a l'Energie Atomique. Device for applying tension to belts or cables for a remote manipulation. 4,030,376, Cl. 74-242.11C.

Bauer, Klaus; Frommer, Werner; Kaufmann, Wilfried; Metzger, Georg; Scheer, Martin; Schmidt, Delf; Schroder, Theo; and Schafer, Dietmar, to Bayer Aktiengesellschaft. Antibiotic. 4,031,207, Cl. 424-118.000.

Bauer, Klaus; Frommer, Werner; Kaufmann, Wilfried; Metzger, Karl Georg; Scheer, Martin; Schmidt, Delf; Schroder, Theo; and Schafer, Dietmar, to Bayer Aktiengesellschaft. Antibiotic. 4,031,208, Cl. 424-119.000.

Bauer, Martin L.; Johnson, Wayne F.; and Lakomy, Dale G., to United States of America, Energy Research and Development Administratioo. Dynamic multistatioo photometer. 4,030,834, Cl. 356-197.000.

Baumann, Karl-Heinz: *See*—
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Dhein, Rolf; Schoeps, Jochen; and Kuchenmeister, Rolf, 4,031,052.
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Konig, Hans-Bodo; Metzger, Karl Georg; and Schrock, Wilfried, 4,031,229.
Sundermann, Rudolf; Rottloff, Gunther; and Grigat, Ernst, 4,031,067.
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Bayerische Motoren Werke Aktiengesellschaft: *See*—
Schild, Ekkehard, 4,030,467.

Baylor, John Merlin, to J. I. Case Company. Crawler tractor track chain drive assembly. 4,030,782, Cl. 305-57.000.

Bayly, Russell James; Chambers, Virginia Edith May; and Monks, Reginald, to Rediochemical Centre Limited, The. Saturation analysis. 4,030,886, Cl. 23-230.600.

Beard, Colin C., to Syntex (U.S.A.) Inc. 5(6)-Benzene ring substituted benzimidazole-2-cerbamate derivatives having anti-protozoal activity. 4,031,228, Cl. 424-270.000.

Beard, Colin C.; Edwards, John A.; and Fried, John H., to Syntex (U.S.A.) Inc. 1,5(6)-Disubstituted benzimidazole-2-carbamate derivatives beving anthelmintic activity. 4,031,234, Cl. 424-273.000.

Beatrice Foods Co.: *See*—
Kasik, Robert L.; and Peterson, Marvin A., 4,031,254.

Beaucaire, Victor D.: *See*—
Marlin, Louis Allen; and Beaucaire, Victor D., 4,030,894.

Beaver, Emil Routzong, Jr. Solar energy collectors. 4,030,478, Cl. 126-271.000.

Becher, Wilfried; and Massonne, Joachim, to Kali-Chemie Aktiengesellschaft. Process for preparing calcium fluoride from hexafluoro silicic acid. 4,031,193, Cl. 423-490.000.

Becht, Carl T.: *See*—
Rothfuss, Robert G.; and Becht, Carl T., 4,030,655.

Beck, Dieter, to A. van Kaick "AvK" Generatoren- und Motorenwerke, Firma. Excitation circuit for brushless synchronous welding generators. 4,031,455, Cl. 322-27.000.

Beck, Earl J., Jr., to United States of America, Navy. Solar collector control system. 4,031,444, Cl. 318-562.000.

Beck, Gilbert: *See*—
Tetzel, Hermann; Koegel, Wolfram; Beck, Gilbert; Zuern, Ludwig; and Caesar, Arndt Christian, 4,031,179.

Beck, Kurt Gunther; Rohde, Wolfgang; Habermehl, Diethard; and Siebert, Werner, to Bergwerksverhand GmbH; and Didier Engineering GmbH. Method of restricting dust development when feeding coal into coke ovens. 4,030,983, Cl. 201-23.000.

Beckford, Orville A.; and Dauzickas, Helen F. B., to Corning Glass Works. Apparatus and method for identification of selected clinical yeast. 4,030,980, Cl. 195-139.000.

Beckman Instruments, Inc.: *See*—
Blanke, John David; and Brunell, Norman Eliot, 4,030,349.
Cono, Thomas E.; and Grilli, Victor J., 4,030,663.
Klein, Gerald Lee; and Meyer, Richard C., 4,031,399.

Beckwith, Robert. Velocity computing chronograph. 4,031,373, Cl. 235-151.320.

Becton, Dickinson and Company: *See*—
Abramson, Irwin J., 4,030,978.
Rao, Pemmaraju Narasimha, 4,031,117.

Beddow, Frank Howard: *See*—
Elloy, Martin Arthur; and Beddow, Frank Howard, 4,030,143.

Beecham Group Limited: *See*—
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Beer, Wolfgang: *See*—
Dhein, Rolf; Zabrocki, Karl; Beer, Wolfgang; and Kuchenmeister, Rolf, 4,031,047.

Beierle, Carl; and Irik, Harry. Wire or cable reel support. 4,030,704, Cl. 254-139.100.

Beinglass, Israel: *See*—
Schieber, Michael M.; Beinglass, Israel; and Dishon, Giora, 4,030,964.

Belke, William H.; and Hafele, Joseph C., to Caterpillar Tractor Co. Variable focus right angle mirror for laser beam manipulation. 4,030,816, Cl. 350-294.000.

Bell, Edward W., to United States of America, Agriculture. Alcohol esters of fatty acids as useful metalworking lubricants. 4,031,019, Cl. 252-56.00S.

Bell & Howell Company: *See*—
Badalich, Frank C., 4,030,821.

Bell & Howell Limited: *See*—
Catherall, Reginald, 4,031,370.

Bell, Reynold W.: *See*—
Johnson, Ronald P.; and Bell, Reynold W., 4,031,507.

Bell Telephone Laboratories, Incorporated: *See*—
Archer, Wendel Edward, 4,031,494.
Dudonis, Ronald Michael, 4,031,324.
Dudonis, Ronald Michael; Morrison, Charles Glenn; Potter, Robert Lawrence; and Streisand, Kenneth, 4,031,325.
Kaiser, Peter, 4,030,901.
Khanna, Satya Pal, 4,031,272.
Lundgren, Carl William, Jr., 4,031,538.
Peters, Daniel Vern, 4,031,559.
Van Der Wielen, Michael Principe, 4,031,493.

Belleli Industrie Meccaniche S.p.A: *See*—
Roma, Carlo, 4,030,540.

Bellmenn, Manfred; and Goldberg, Hennes, to Mannesmann Aktiengesellschaft. Method and means for separating successive rolling lots. 4,030,333, Cl. 72-227.000.

Beloit Corporation: *See*—
Justus, Edgar J., 4,030,971.

Belous, Viktor Mikhailovich: *See*—
Ponomarev, Alexei Ivanovich; Sokolov, Sergei Vasilievich; Larionova, Julia Alexeevna; Klebansky, Alexandr Leibovich; Berenblit, Vsevolod Volfovich; Dolnakov, Jury Pavlovich; Yagupolsky, Lev Moiseevich; Malovik, Vladlen Vasilievich; Lozinsky, Miron Onufrievich; Belous, Viktor Mikhailovich; Gruz, Boris Efimovich; Alexeeva, Ljubov Antonovna; Ankudinov, Anatoly Kirillovich; and Ryazanova, Rufina Mikhailovna, 4,031,119.

Beltek Corporation: *See*—
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Bencini, Roberto. Cinematic equipment shutter selector mechanism. 4,030,819, Cl. 352-79.000.

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Bendix Corporation, The: *See*—
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Kiwior, Alexander Michael, 4,030,668.

Bengtsson, Bo Gunnar, to Trascandica AG. Ship's dock. 4,030,437, Cl. 114-46.000.

Bennett, Frank William, to Fisons Limited. Process of prilling molten materials. 4,031,174, Cl. 264-14.000.

Beno, Lawrence A., to United States of America, Navy. Multiple polarization switch. 4,031,488, Cl. 333-21.00A.

Benson, John Terry: *See*—
White, Peter Charles; Benson, John Terry; and Leoncavallo, Richard Anthony, 4,030,239.

Benzie, Thomas P.: *See*—
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Berenblit, Vsevolod Volfovich: *See*—
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Berg, Jeffrey H.: *See*—
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Berger, Abe. Polyimide containing silicones as protective coating on semiconductor device. 4,030,948, Cl. 148-33.300.

Berger, Hans; De Lind Van Wijngaarden, Gerhard; and Breuker, Jacobus H., to Shell Oil Company. Base oil compositions having improved light stability. 4,031,016, Cl. 252-50.000.

Bergmann, Rolf: *See*—
Gottschlich, Rudolf; Rogalski, Werner; Bergmann, Rolf; Steinigeweg, Rosmarie; and Wahlig, Helmut, 4,031,230.

Bergwerksverband GmbH: *See*—
Beck, Kurt Gunther; Rohde, Wolfgang; Habermehl, Diethard; and Siebert, Werner, 4,030,983.

Berkeley Varitronics Systems: *See*—
Holz, George E., 4,031,543.

Berkovitz, Harry, to Westinghouse Electric Corporation. Traction elevator system having cable groove in drive sheave formed by spaced, elastically deflectable metallic ring members. 4,030,569, Cl. 187-20.000.

Berkowitz, Sidney; and D'Angelo, John, to FMC Corporation. Process for purifying crude cyanuric acid. 4,031,091, Cl. 260-248.00A.

Bernal G., Enrique; Koepke, Barry G.; and Maciolek, Ralph B., to Honeywell Inc. High strength halide alloys. 4,031,190, Cl. 423-466.000.

Bernard, Nicolle; and Forterre, Gerard, to Societe Lignes Telegraphiques et Telephoniques. VHF high-power broadband isolators. 4,031,489, Cl. 333-24.200.

Bernardi, Luigi: *See*—
Patelli, Bianca; Bernardi, Luigi; Arcamone, Federico; and di Marco, Aurelio, 4,031,211.

Berney, Jean-Claude, to Ebauches S.A. Control device for the rotary motor of a watch. 4,031,438, Cl. 318-331.000.

Berry, Martin F.; Reesman, Stanley H.; Smith, Marvin L.; and Middlesworth, Peter Van, to General Foods Corporation. Expanded protein product and method of making same. 4,031,267, Cl. 426-656.000.

Bertetto, Donald W.: *See*—
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Berthold, Richard: *See*—
Bastian, Jean-Michel; and Berthold, Richard, 4,031,225.

Besancenot, Serge. Mechanism for controlling the advance of a magazine in a transparency projector. 4,030,822, Cl. 353-103.000.

Bessen, Irwin I., to General Electric Company. Method for coating cavities with metal. 4,031,274, Cl. 427-229.000.

Bestenreiner, Friedrich: *See*—
Wick, Richard; Bestenreiner, Friedrich; Deml, Reinhold; and Helmberger, Josef, 4,031,550.

Betters, Paul D. Safety pin. 4,030,166, Cl. 24-156.00R.

Betts, E. Douglas, to Outboard Marine Corporation. Lined engine block member including a threaded opening and method for providing same. 4,030,470, Cl. 123-193.00C.

Bevles Co., Inc.: *See*—
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Bhakuni, Roop S.; and Rye, Grover W., to Goodyear Tire & Ruhber Company, The. Bonding tire cord to rubber. 4,031,288, Cl. 428-395.000.

Biancardi, Frank R.: *See*—
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Bichsel, Daniel, to Societe Suisse pour l'Industrie Horlogere Management Services S.A. Pickup for measuring the rate of an electronic timepiece. 4,030,337, Cl. 73-6.000.

Biebuyck, Lawrence F.: *See*—
Sukolics, Ronald D.; and Biebuyck, Lawrence F., 4,030,260.

Biedermenn, Horst H., to NCR Corporation. Document feeding mechanism. 4,030,726, Cl. 271-246.000.

Bier, Manfred, to Porsche AG. Apparatus for simulating variable air pressures. 4,030,350, Cl. 73-117.100.

Biere, Helmut: *See*—
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Bigelow-Sanford, Inc.: *See*—
Weller, John V. C.; Strydio, George C.; and Vits, Helmuth, 4,031,280.

Binard, William J.; Ciarico, Anthony J.; Anglada, Leonard R.; and Patel, Bhupendra C., to Kendall Company, The. Syringe assembly. 4,030,497, Cl. 128-215.000.

Bingham and Taylor: *See*—
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Birum, Gail H., to Monsanto Company. Phosphorus compounds. 4,031,170, Cl. 260-932.000.

Bissell, Henry M. Simple machine. 4,030,703, Cl. 254-135.00R.

Bittermann, Hans, to Siemens Aktiengesellschaft. Arrangement for connecting information transducers in program controlled processing systems. 4,031,314, Cl. 178-3.000.

BJ-Hughes Inc.: *See*—
Langowski, Faustyn Cornell, 4,030,746.

Black Clawson Company, The: *See*—
Couture, Joseph Walter, 4,030,671.

Blackwell, Samuel E., to Eastman Kodak Company. Solvent dyeing compositions and a method of dyeing polyester fibers therewith. 4,030,882, Cl. 8-39.00R.

Blair, Michael A.; and Hoffman, Robert M., to Advance Design Laboratories, Inc. Hair brush. 4,030,158, Cl. 15-159.00A.

Blanke, John David; and Brunell, Norman Eliot, to Beckman Instruments, Inc. Engine analysis apparatus. 4,030,349, Cl. 73-116.000.

Bleeker, Raymond A., to Westinghouse Electric Corporation. Non-exposed drawer lock. 4,030,788, Cl. 312-333.000.

Bly, Herbert Arthur. Method of forming captive can closure. 4,030,433, Cl. 113-121.00C.

Board, Kenneth B., to Atel Products Limited. Rear wheel jacking system. 4,030,770, Cl. 280-43.230.

Bobka, George R., to Raymond Lee Organization, Inc., The. Portable trailer dump bed. 4,030,751, Cl. 298-1.00A.

Bode, Herbert, to Claudius Peters AG. Thrust grate such as a heat exchange grate. 4,030,206, Cl. 34-164.000.

Boden, Heinrich; and Knipp, Ulrich, to Bayer Aktiengesellschaft. Apparatus for dosing and mixing fluid reactants. 4,030,637, Cl. 222-137.000.

Boehringer Ingelheim GmbH: *See*—
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Kutter, Eberhard; Austel, Volkhard; Eberlein, Wolfgang; Heider, Joachim; Kobioger, Walter; Lillie, Christian; and Kadetz, Rudolf, 4,031,219.
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Boehringer Mannheim G.m.b.H.: *See*—
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Cacciola, Michael John; and Mjolsnes, Leonard Olaf, 4,030,578.
Hapke, Donald William, 4,030,687.
Stachowiak, Claude R., 4,030,290.

Boettcher, William A. Brush accessory for floor sanders. 4,030,251, Cl. 51-177.000.

Boetto, Charles; Orkwiszewski, Wayne L.; and Connor, Donald E., to International Harvester Company. Folding flex toolbar. 4,030,551, Cl. 172-126.000.

Boffa, Gioacchino: *See*—
Pieri, Giampiero; Carlini, Filippo Maria; Paffoni, Camillo; and Boffa, Gioacchino, 4,031,096.

Bogue, John C.: *See*—
Sarbacher, Robert I.; and Bogue, John C., 4,031,296.

Bohanon, Hoy R., to Acme Eng. & Mfg. Corporation. Cooling pad system. 4,031,180, Cl. 261-106.000.

Boie, Immo: *See*—
Renner, Gunter; Boie, Immo; and Scheben, Quirin, 4,031,130.

Boll, Jurgen: *See*—
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Bolles, Theodore F.: *See*—
Jackson, Richard A.; and Bolles, Theodore F., 4,031,198.

Bond, Walter L.; Cutler, Cassius C.; and Lemons, Ross A., to Leland Stanford Junior University, The Board of Trustees of. Acoustic microscope for scanning an object stereo-optically and with dark field imaging. 4,030,342, Cl. 73-67.50R.

Bondarenko, Oleg Alexandrovich: *See*—
Ponomarenko, Nikolai Borisovich; Kononenko, Vadim Grigorievich; Stelmakh, Viktor Alexeevich; Kotelnikov, Vladimir Ivanovich; Valenye, Ivan Jurievich; Sarancha, Vladimir Nikolaevich; Petrenko, Anatoly Avramovich; Bozhko, Valery Pavlovich; Yatsenko, Sergei Vasilievich; Komnatny, Igor Pavlovich; Akhnazariants, Levon Khachaturovich; Strizhenko, Vitaly Evgenievich; Kolokolov, Boris Alexeevich; Maznichenko, Stanislav Anisimovich; Bozhko, Viktor Vasilievich; Bondarenko, Oleg Alexandrovich; and Zakirov, Robert Sharafutdinovich, 4,030,389.

Bonner, John J.: *See*—
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Bontrager, Jacob. Vehicle supported motor lift. 4,030,705, Cl. 254-139.100.

Borel, Joseph; and Robert, Jacques, to Commissariat a l'Energie Atomique. Thermal method for controlling the optical properties of a liquid crystal and devices for the application of said method. 4,031,529, Cl. 340-324.00R.

Borel, Joseph: *See*—
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Borg-Warner Corporation: *See*—
Harnish, James R., 4,030,315.
Robinson, Elmer D.; and Struttmann, Hilarius S., 4,030,785.

Borgqvist, Lennart Rickard, to Kamas Industri Aktiebolag. Process and an apparatus for producing fluffed fiber materials. 4,030,672, Cl. 241-18.000.

Borys, Emil G., Jr., to Hydrometals, Inc. Impedance matcbing device. 4,031,540, Cl. 343-860.000.

Bosa, Primo, to Hooker Chemicals & Plastics Corporation. Electrolytic cell for the production of alkali metal hydroxides having removable orifices for metering fluids to the anode and cathode compartments. 4,031,001, Cl. 204-257.000.

Boser, Ronald J.; and Siegel, Walter P., to Special Sewing Systems, Inc. Sewing machine attachment. 4,030,429, Cl. 112-104.000.

Bossart, Clayton J.: *See*—
Poli, Albert A.; Bossart, Clayton J.; and Benzie, Thomas P., 4,030,887.

Bosserman, David A.; and Freeman, Charles F., to United States of America, Army. Miniature flat panel photocathode and microchannel plate picture element array image intensifier tube. 4,031,552, Cl. 358-241.000.

Bossert, Friedrich; Meyer, Horst; and Vater, Wulf, to Bayer Aktiengesellschaft. 1,4-Dihydropyridine carboxylic acid esters. 4,031,104, Cl. 260-295.50R.

Bouchal, Karel: *See*—
Kalal, Jaroslav; Coupek, Jiri; Pokorny, Svatopluk; Svec, Frantisek; and Bouchal, Karel, 4,031,037.

Bouck, Larry S., to Cities Service Company. Recovery of geothermal energy. 4,030,549, Cl. 166-280.000.

Bourgeois, Jean-Luc: *See*—
Bouy, Pierre; Juillard, Michel; and Bourgeois, Jean-Luc, 4,031,041.

Bourgery, Guy R.: *See*—
Fauran, Claude P.; Bourgery, Guy R.; Raynaud, Guy M.; and Dorme, Nicole A. M., 4,031,089.

Bouvier, David William; Green, William Geary; and Moore, Randolph Gaylon, to Motorola, Inc. Frequency spectrum analyzer. 4,031,462, Cl. 324-77.00B.

Bouy, Pierre; Juillard, Michel; and Bourgeois, Jean-Luc, to Rhone-

Poulenc Industries. Cloth comprising asbestos fibers and method of producing said cloth. 4,031,041, Cl. 260-2.50M.

Bower, Lewis Robert: *See—*
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Bowers, David L., to General Electric Company. Standby heart pacer. 4,030,510, Cl. 128-419.0PG.

Boyce, John G.; and Boyce, Richard G. Wiggle table electronic ball game device. 4,030,555, Cl. 273-110.000.

Boyce, Richard G.: *See—*
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Boyd, Violet; Fishwick, Brian Ribbons; and Glover, Brian, to Imperial Chemical Industries Limited. Coloration process. 4,030,881, Cl. 8-39.00C.

Bozhko, Valery Pavlovich: *See—*
Ponomarenko, Nikolai Borisovich; Kononenko, Vadim Grigorievich; Stelmakh, Viktor Alexeevich; Kotelnikov, Vladimir Ivanovich; Valenya, Ivan Jurievich; Sarancha, Vladimir Nikolaevich; Petrenko, Anatoly Avramovich; Bozhko, Valery Pavlovich; Yatsenko, Sergei Vasilievich; Komnatny, Igor Pavlovich; Akhnazariants, Levon Khachaturovich; Strizhenko, Vitaly Evgenievich; Kolokolov, Boris Alexeevich; Maznichenko, Stanislav Anisimovich; Bozhko, Viktor Vasilievich; Bondarenko, Oleg Alexandrovich; and Zakirov, Robert Sharafutdinovich, 4,030,389.

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Brand, Bridget A.; and Brand, Joseph. Sound producing device. 4,031,320, Cl. 179-1.0AA.

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Brand, Bridget A.; and Brand, Joseph, 4,031,320.

Brand, Wayne R. Safety check hill receptacle. 4,031,357, Cl. 235-12.000.

Brandenstein, Manfred: *See—*
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Brax, Harri J.; Porinchak, Joseph F.; and Weinberg, Alan S., to W. R. Grace & Co. Polymer film with narrow molecular weight distribution and saran and laminates thereof. 4,031,162, Cl. 260-837.0PV.

Breuker, Jacobus H.: *See—*
Berger, Hans; De Lind Van Wijngaarden, Gerhard; and Breuker, Jacobus H., 4,031,016.

Bricknell, William H.; and Sunderlage, Gerald N., to Clark Equipment Company. Fairlead and implement hitch and method of implement retrieval. 4,030,776, Cl. 280-477.000.

Bridges, Alvin C. Adjustable mounting for pivotal wheel support. 4,030,737, Cl. 280-661.000.

Bridges, Ronald P. Electrical interrupter switch. 4,031,346, Cl. 200-146.00R.

Bridwell, John W.; Hopkins, Donald L.; and Lohbeuer, Kenneth R., to Caterpillar Tractor Co. Hydraulic circuitry for an excavator. 4,030,623, Cl. 214-138.00R.

Briney, Douglas W., to General Dynamics Corporation. Optical scanning system with canted and tilted reflectors. 4,030,807, Cl. 350-7.000.

Brinza, Joseph E.: *See—*
Stock, Arthur J.; Christofer, Donald E.; and Brinza, Joseph E., 4,030,708.

Bristol-Myers Company: *See—*
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British Aircraft Corporation Limited: *See—*
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Britton, James S., to Westinghouse Electric Corporation. CMOS comparator. 4,031,511, Cl. 340-146.200.

Brock, Helmut E. Sun shade apparatus. 4,030,748, Cl. 297-184.000.

Brogan, Joseph; and Baker, Irwin Gerald, to Boeing Company, The. Turntable bearing. 4,030,787, Cl. 308-227.000.

Bromels, Marilyn H.: *See—*
Pedersen, Charles John; and Bromels, Marilyn H., 4,031,111.

Bronstert, Klaus; Fahrbach, Gerhard; Krahe, Eduard; Ladenberger, Volker; Kastning, Ernst-Guenther; Mittnacht, Hans; Willersinn, Herbert; and Trieschmann, Hans-Georg, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Impact-resistant polystyrene, α-olefin, block copolymer blends. 4,031,166, Cl. 260-876.00B.

Brooks, Norman B.; and Gimstead, Michael M., to Pass-Port Systems, Inc. Wafer transport system. 4,030,622, Cl. 214-17.00B.

Brown, Charles: *See—*
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Brown, Harold Ben. Air treating dispenser. 4,030,474, Cl. 126-113.000.

Brown, John William. Storage device for shared game pieces. 4,030,765, Cl. 273-148.00R.

Brown Oil Tools, Inc.: *See—*
Rogers, Jerry L.; and Cochran, Chudleigh B., 4,030,546.

Brown, Omar L., to Fraze, Ermal C. Easy-open ecology end. 4,030,631, Cl. 220-269.000.

Brown, Paul L., to Dow Corning Corporation. Organobromosilicone fluids. 4,031,121, Cl. 260-448.80R.

Brown, Paul L., to Dow Corning Corporation. Arylorganobromosilicone compounds. 4,031,122, Cl. 260-448.80R.

Brown, Robert Saul; Eschenbach, Paul W.; and King, Herbert Ray, to Milliken Research Corporation. Quick disconnect coupling. 4,030,582, Cl. 192-67.00P.

Brown & Root, Inc.: *See—*
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Brozenick, Nicholas J.: *See—*
Kniss, Edward L., Jr.; Hixenbaugh, Dennis L.; Maudlin, Jerry A.; and Brozenick, Nicholas J., 4,030,740.

Brueckner, Wolfgang, to Siemens Aktiengesellschaft. Thermistor device. 4,031,499, Cl. 338-23.000.

Brugger, Richard D.; and Lovercheck, Charles L. Copying machine. 4,030,823, Cl. 355-8.000.

Brugger, Richard D.; and Barna, Joseph A., to Zurn Industries, Inc. Electronic remote reading system for a meter. 4,031,362, Cl. 235-92.0FL.

Brunell, Norman Eliot: *See—*
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Bruni, Rudolph C. Spade bit holder. 4,030,599, Cl. 206-379.000.

Brunswick Corporation: *See—*
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Bucalo, Louis. Method and apparatus for providing living beings with absorbable implants. 4,030,499, Cl. 128-260.000.

Buchman, William W., to Hughes Aircraft Company. Position determining systems. 4,030,686, Cl. 244-3.130.

Buckle, Derek Richard; Cantello, Barrie Christian Charles; and Smith, Harry, to Beecham Group Limited. 4-Hydroxy-3-nitro-5,6,7,8 tetrahydro-carbostyrils. 4,031,099, Cl. 260-289.00K.

Buckley, Donald J.: *See—*
Thaler, Warren A.; Buckley, Donald J.; and Kennedy, Joseph P., 4,031,300.

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Bucyrus-Erie Company: *See—*
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Budevski, Evgueni Bogdanov; Iliev, Iliya Dimitrov; Kaisheva, Anastasiya Rostislavova; Gamburtzev, Sergei Sergeev; and Vakanova, Elena Borisova, to ZLEHIT pri BAN. Method for producing powdered wetproofed material useful in making gas-diffusion electrodes. 4,031,033, Cl. 252-511.000.

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Buildex Incorporated: *See—*
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Bukowick, Peter Anthony, to Hercules Incorporated. Certain oximinyl allophanates and their use as herbicides. 4,030,912, Cl. 71-120.000.

Bulman, David Nicholas; and Maunder, Leonard, to National Research Development Corporation. Gyroscopic apparatus. 4,030,371, Cl. 74-5.00F.

Bultez, Alain E.: *See—*
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Bunce, Donald A., to Kelvinator, Inc. Refrigerator construction and the manufacture of panels therefor. 4,030,870, Cl. 425-383.000.

Bunkley, Rex L.; and Powanda, Thomas M., to Celanese Corporation. Protective colloids from alcoholysis products of polyalcohols and polyacrylate esters. 4,031,053, Cl. 260-29.6RW.

Bunnell, Edward Dennman, to AMP Incorporated. Electrical connector junction for carpeted floor. 4,030,801, Cl. 339-121.000.

Burger, William R.: *See—*
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Burrus, Harry Otto, to Du Pont de Nemours, E. I., and Company. Process for producing hydrogen fluoride. 4,031,191, Cl. 423-485.000.

Burt, Terry L. Hard safety hat. 4,030,140, Cl. 2-410.000.

Burton, Clyde L.: *See—*
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Bush, Richard Wayne, to W. R. Grace & Co. Alkali-resistant radiation curable ene-thiol compositions. 4,031,271, Cl. 427-43.000.

Butin, Henri; and Deman, Pierre, to Thomson-CSF. Telephone set and system utilizing frequency division multiplexing. 4,031,327, Cl. 179-15.0FD.

Buttner, Karl; Boll, Jurgen; and Wolfel, Kurt, to Kabel-und Metallwerke Gutehoffnungshutte Aktiengesellschaft. Installation for preparing cable lengths for plug extrusion. 4,030,174, Cl. 29-33.00M.

Buzzi, Leo; Buzzi, Valentin; Opietnik, Walter; Liebl, Helmut; and Malobabic, Peter, to U.S. Philips Corporation. Apparatus driven by an electric motor. 4,030,573, Cl. 188-1.00B.

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Buzzi, Leo; Buzzi, Valentin; Opietnik, Walter; Liebl, Helmut; and Malobabic, Peter, 4,030,573.

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C. S. Oosterberg (Proprietary) Limited: *See—*
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Cacciola, Michael John; and Mjolsnes, Leonard Olaf, to Boeing Company, The. Torque limiter. 4,030,578, Cl. 188-134.000.

Caesar, Arndt Christian: *See—*
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Calculus Instruments Ltd.: *See—*
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Callis, James B.; and Davidson, Ernest R., to Research Corporation. Video fluorometer. 4,031,398, Cl. 250-458.000.

Cambridge Filter Corporation: *See—*
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Campanella, Samuel Joseph; Dodel, Hans; and Suyderhoud, Henri George, to Communications Satellite Corporation (COMSAT). Echo suppressor using frequency-selective center clipping. 4,031,338, Cl. 179-170.800.

Campbell, Alfred, to Perkin, Davis & Company. Tetrapeptides. 4,031,072, Cl. 260-112.5LH.

Canada Packers Limited: *See—*
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Canon Kabushiki Kaisha: *See—*
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Cantor, Stephen E., to Uniroyal Inc. Non-migratory sulfonyl azide antioxidants. 4,031,068, Cl. 260-79.30R.

Caputo, William R., to Westinghouse Electric Corporation. Elevator system. 4,030,570, Cl. 187-29.00R.

Carbonnel, Henri, to Groupement pour les Activities Atomiques et Advancees "GAAA" S.A. Device for adjusting the quantity of molten metal used in pressure casting. 4,030,538, Cl. 164-312.000.

Cardillo, Mark J., to Massachusetts Institute of Technology. Method and apparatus for separating isotopes. 4,031,397, Cl. 250-423.00P.

Carini, Eugene P. Flywheel drive system. 4,031,420, Cl. 310-74.000.

Carl Zeiss-Stiftung, Carl Zeiss: *See—*
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Carlini, Filippo Maria: *See—*
Pieri, Giampiero; Carlini, Filippo Maria; Paffoni, Camillo; and Boffa, Gioacchino, 4,031,096.

Carmien, Joseph Allen, to Nupla Corporation. Adapter for fiberglass tool handles and other fiberglass connections. 4,030,847, Cl. 403-263.000.

Carpenter, John F.: *See—*
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Carpenter Technology Corporation: *See—*
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Caruso, Frank, to United States of America, Army. Apparatus for electronically locating analog signals. 4,031,501, Cl. 340-6.00R.

Carver, Fred F.; and Hoyt, Carl E., to Singer Company, The. Seat vibration system for simulating aircraft buffeting. 4,030,208, Cl. 35-12.00F.

Carver, Phyllis. Illuminatable umbrella. 4,031,381, Cl. 240-6.420.

Casagrande, Fulvio: *See—*
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Castellucci, Nicholas T. Table tennis game apparatus having multi-rebound surfaces. 4,030,734, Cl. 273-30.000.

Castle, Henry H.: *See—*
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Caterpillar Tractor Co.: *See—*
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Keske, Frank E., 4,030,377.

Maguire, Roy L., 4,030,730.

Moring, Rodger L.; and Frauenhoff, Richard E., 4,030,575.

Catherall, Reginald, to Bell & Howell Limited. Generation of mathematical functions. 4,031,370, Cl. 235-152.000.

Caughey, Robert A. Apparatus for producing combustible gases from carbonaceous materials. 4,030,895, Cl. 48-111.000.

Celanese Corporation: *See—*
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Collins, George L.; and Costanza, John R., 4,030,444.
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DeMartino, Ronald N.; and Conciatori, Anthony B., 4,031,307.
Reader, Arthur M., 4,031,035.

Cella, Richard Joseph, Jr., to Du Pont de Nemours, E. I., and Company. Hot melt sealants. 4,031,058, Cl. 260-33.8UA.

Celmer, Walter D.; Cullen, Walter P.; Moppett, Charles E.; Routien, John B.; Shibakawa, Riichiro; and Tone, Junauke, to Pfizer Inc. Antibiotics produced by species of pseudonocardia. 4,031,206, Cl. 424-117.000.

Centoducati, Nicholas J. Windshield wiper blade liner. 4,030,159, Cl. 15-250.420.

Central Glass Co., Ltd.: *See—*
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Ceskoslovenske akademie ved: *See—*
Sommer, Karel; Zdrazil, Jiri; Kubinek, Milan; Bahna, Jarolim; Kyselica, Stanislav; Habrovec, Frantisek; and Skarek, Jiri, 4,030,944.

Chachin, Viktor Nikolaevich; Zhuravsky, Alexandr Julyanovich; Zdor, Gennady Nikolaevich; Shaduya, Vladimir Leontievich; and Golovkina, Elena Yakovlevna. Device for electrical discharge forming. 4,030,329, Cl. 72-56.000.

Chambers, Ren W., to Deco Industries. Scrap-tire feeding and coking process. 4,030,984, Cl. 201-25.000.

Chambers, Virginia Edith May: *See—*
Bayly, Russell James; Chambers, Virginia Edith May; and Monks, Reginald, 4,030,886.

Champion Spark Plug Company: *See—*
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Chang, Shih-Chia, to General Monitors, Inc. Hydrogen gas detector. 4,030,340, Cl. 73-23.000.

Chapman, Derek David, to Eastman Kodak Company. Silver halide sensitized with dyes containing an isoindole nucleus. 4,030,932, Cl. 96-127.000.

Chaput, Reynald. Collapsible aswhorse package. 4,030,565, Cl. 182-151.000.

Chari, Madabushi V. K.: *See—*
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Chazan, Jean-Bernard; and Gasc, Jean-Claude, to Roussel-UCLAF. Antibiotic aminoglycosides, processes of preparation and pharmaceutical compositions. 4,031,210, Cl. 424-180.000.

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Chicago Pneumatic Tool Company: *See—*
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Chierici, Osvaldo F., to Holland Company. Uncoupling lever arrangement for railroad cars with standard draft gear cushioning. 4,030,613, Cl. 213-166.000.

Chimeno, Jose-Alfonso Canicio, to Laboratorios Hermes, S.A. 3-(N-2', 6'xylyl)-carboxamide pyridone-2. 4,031,105, Cl. 260-295.50A.

Chitil, Manfred; and Hubetsch, Gotthard, to Klockner-Werke AG. Arrangement for producing steel. 4,031,309, Cl. 13-10.000.

Chou, Te-Sen, to Eli Lilly and Company. Process for preparing 3-acyclorymethyl-2-cephem compounds. 4,031,082, Cl. 260-243.00C.

Christensen, Donald L.: *See—*
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Christian, Edward H.; Maios, Donald M.; and Treiber, James H., to Bucyrus-Erie Company. Transient load damping circuit for excavator. 4,031,440, Cl. 318-432.000.
Christofer, Donald E.: *See—*
Stock, Artbur J.; Christofer, Donald E.; and Brinza, Joseph E., 4,030,708.
Christopherson, Herman P., to Toro Company, The. Mower rear shield structure. 4,030,277, Cl. 56-320.100.
Christou, Kyriakos; Kruklitis, Karlis; and Burger, William R., to Burroughs Corporation. Straight line read system. 4,031,359, Cl. 235-61.11D.
Chu, Joseph Y. C.; and Gunther, W. H. H., to Xerox Corporation. Process for preparation of solid phase dispersion of photoconductive materials. 4,030,991, Cl. 204-158.00R.
Chu, Joseph Y. C.; and Gunther, W. H. H., to Xerox Corporation. Process for preparation of a solid phase dispersion of photoconductive materials. 4,030,992, Cl. 204-158.00R.
Chu, Joseph Y. C.; and Gunther, W. H. H., to Xerox Corporation. Process for preparation of solid phase dispersion of photoconductive materials. 4,030,993, Cl. 204-158.00R.
Chugal, Alexei Dmitrievich: *See—*
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Churchill, Steven T., to Letot, Incorporated. Telephone operated signalling system. 4,031,322, Cl. 179-2.00A.
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Citrin, Paul S.; and Gurski, Frank, to Indicon Inc. Method and apparatus for dispensing viscous materials. 4,030,640, Cl. 222-207.000.
Clark Equipment Company: *See—*
Bricknell, William H.; and Sunderlage, Gerald N., 4,030,776.
Clark, James Monroe, to International Telephone and Telegraph Corporation. Digital phase/frequency comparator. 4,031,478, Cl. 328-134.000.
Clark, William T., III. Embolectomy catheter. 4,030,503, Cl. 128-304.000.
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Clifton, Howard J.; and Clifton, Doris V., 4,030,814.
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Cluzel, Philippe; Quivy, Michel; and Tocquet, Bernard, to Etat Francais. Low frequency acoustical piezo-electric transducer. 4,031,418, Cl. 310-8.200.
Cobb, Delwin E.; Jackson, George J.; Livesay, Richard E.; and Stemler, Orrin A., to Caterpillar Tractor Co. Hydraulic system for rock breaker. 4,030,566, Cl. 184-6.200.
Cobb, John Farley, to Whirlpool Corporation. Mold apparatus. 4,030,871, Cl. 425-388.000.
Cochran, Chudleigh B.: *See—*
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Cody, David L., to Symons Corporation. Invertable, multi-purpose structural clamp. 4,030,266, Cl. 403-405.000.
Colding, Bertil; Novak, Arne; Sandstrom, Unto; and Jakobsson, Goran, to Verkstadsteknik AB. Adaptive control of cutting machining operations. 4,031,368, Cl. 235-151.110.
Cole, Edward L.: *See—*
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Cole, Paul Morrison, to Du Pont de Nemours, E. I., and Company. Method and apparatus for traversing a strand to form a restrained web. 4,030,168, Cl. 28-101.000.
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Coleman, Bob G., to Babcock & Wilcox Company, The. Ceramic cap for insulation anchor. 4,030,261, Cl. 52-511.000.
Coles, Otis C., Jr. Multi-stage rabbit. 4,030,858, Cl. 417-56.000.
Colinet, Andre, to Regie Nationale des Usines Renault; and Automobiles Peugeot. Lever operated control device. 4,030,379, Cl. 74-522.000.
Collins, Charles P.; and Lampietti, Bernard P., to Torin Corporation. Spring coiling machine with improved drive means. 4,030,327, Cl. 72-23.000.
Collins, George L.; and Costanza, John R., to Celanese Corporation. Continuous silk screen with direct roll coater. 4,030,444, Cl. 118-257.000.
Collins, Joseph C.; and Diana, Guy D., to Sterling Drug Inc. Aryloxyalkyl diketones. 4,031,246, Cl. 424-331.000.
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Colorguard Corporation: *See—*
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Colter, John Cecil; James, Dean B.; Keith, Walter Gill; and Akbari-Kenari, Reza, to General Electric Company. Process for producing uranium oxide rich compositions from uranium hexafluoride using fluid injection into the reaction zone. 4,031,029, Cl. 252-301.10R.
Combustion Engineering, Inc.: *See—*
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Compagnie Generale d'Electroceramique: *See—*
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Compagnie Honeywell Bull (Societe Anonyme): *See—*
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Conciatori, Anthony B.; and Stackman, Robert W., to Celanese Corporation. Phosphorus and halogen containing polymers of bis-hydroxyethyl terephthalate as flame retardant additives. 4,030,933, Cl. 106-15.0FP.
Conciatori, Anthony B.; and Stackman, Robert W., to Celanese Corporation. Polyester resin compositions. 4,031,063, Cl. 260-860.000.
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Connor, Donald E.: *See—*
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Consolidated-Bathurst Limited: *See—*
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Copeland, Miles Alexander, to Northern Electric Company Limited. Analog signal processor. 4,031,490, Cl. 333-70.00T.
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Cordes, Claus; and Sterzel, Hans-Josef, to BASF Aktiengesellschaft. Manufacture of thermoplastic polyester molding compositions of high viscosity. 4,031,065, Cl. 260-75.00R.
Corkin, Samuel, Jr. Calculating method and apparatus for bandicapping thoroughbred races and the like. 4,031,376, Cl. 235-156.000.
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Couture, Joseph Walter, to Black Clawson Company, The. Apparatus for pulping waste paper materials. 4,030,671, Cl. 241-15.000.
Cram, Robert E.; Gill, Walter; and Loumdegin, James A., to United States of America, Navy. Digital flow control system. 4,030,523, Cl. 137-599.000.
Crane, Robert Anthony; and Ghosh, Asoke Kumar, to RCA Corporation. Method for achieving gas dynamic lasing. 4,031,485, Cl. 331-94.50P.
Creighton, John Joseph. Non-return safety valve assembly and pressure pack incorporating same. 4,030,644, Cl. 222-396.000.
Cremer, George D.; and Long, John V., to International Harvester Company. Composite construction of metallic strips disposed in side-by-side relationship. 4,031,279, Cl. 428-44.000.
Crossley, Roger: *See—*
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Crowle, Brian, to RCA Corporation. Differential amplifier. 4,031,495, Cl. 330-30.00D.
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Curington, Alfred R.: *See—*
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Curtis Dyna Products Corporation: *See—*
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Curtis, Russell R., to Curtis Dyna Products Corporation. Pulse fog generator. 4,030,695, Cl. 251-113.000.
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Cutler, Cassius C.: *See—*
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Cyrus, Richard; and Raschack, Manfred, to Knoll A.G. Chemische Fabriken. 3-(3,4-Dialkoxy-benzyl)-3-methyl-piperazines. 4,031,216, Cl. 424-250.000.
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Meixner, Rudolf; and Kling, Gunter, 4,030,773.
Schwuchow, Norbert; and Hutai, Hubert, 4,030,744.
Stute, Manfred; and Tank, Eggert, 4,030,539.
Daley, Thomas G. Method of making an object support member. 4,030,187, Cl. 29-458.000.
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Davis, Eldon, to Norden Laboratories, Inc. Feline viral rhinotracheitis vaccine and combination feline viral rhinotracheitis-calicivirus vaccine prepared therefrom. 4,031,204, Cl. 424-90.000.
Davis, Guy E., to Westinghouse Electric Corporation. System for manually or automatically transferring control between computers without power generation disturbance in an electric power plant or steam turbine operated by a multiple computer control system. 4,031,372, Cl. 235-151.210.
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Deboffles, Regis Pierre. Loading apparatus. 4,030,593, Cl. 198-308.000.
Deckert, Dennis D. Toothbrush with self-contained dentifrice and dispostable bandle. 4,030,845, Cl. 401-268.000.
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Del Castillo, Juan M. Chord playing attachment for a stringed instrument. 4,030,400, Cl. 84-317.000.
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DelPesco, Thomas Wayne, to Du Pont de Nemours, E. I., and Company. Synthesis of aromatic amines by reaction of aromatic compounds with ammonia. 4,031,106, Cl. 260-296.00R.
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Dhein, Rolf; Schoeps, Jochen; and Kuchenmeister, Rolf, to Bayer Aktiengesellschaft. Aqueous stoving lacquer containing e-caprolactam as a reactive diluent. 4,031,052, Cl. 260-29.40R.

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Di Bella, Eugene P., to Tenneco Chemicals, Inc. Process for the production of 3,4-dichlorotoluene. 4,031,145, Cl. 260-650.00R.

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Doobenen, William; and Hennessy, Robert Thomas. Gun lock using manual pressure. 4,030,221, Cl. 42-1.00Y.

Dorey, Roger John: *See—*
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Dorgathen, Friedrich, to Montanus Industrieanlagen GmbH. Magnetic filter apparatus. 4,031,011, Cl. 210-222.000.

Dorme, Nicole A. M.: *See—*
Fauran, Claude P.; Bourgery, Guy R.; Raynaud, Guy M.; and Dorme, Nicole A. M., 4,031,089.

Dorph, Thor, to Lie, Bjorn; and Lie, Gina. Line guide for a fishing rod. 4,030,224, Cl. 43-24.000.

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Dover Corporation: *See—*
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Griffin, Thomas J., Jr., 4,031,014.
Grinstead, Robert R.; and Nasutavicus, Wilmonte A., 4,031,038.
Johnston, Howard, 4,030,910.

Dow Corning Corporation: *See—*
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Dowbenko, Rostyslaw; and Marchetti, Joseph R., to PPG Industries, Inc. Hydrolyzed reaction product of a polyepoxide with a phenolic compound having a group hydrolyzable to a carboxyl and curing agent therefor. 4,031,051, Cl. 260-29.2TN.

Dowbenko, Rostyslaw: *See—*
Anderson, Carl Clement; and Dowbenko, Rostyslaw, 4,031,290.

Doyle, Donald M. Nasal hemostat and method of construction of nasal hemostat. 4,030,504, Cl. 128-325.000.

Drabert Sohne: *See—*
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Draftex Development AG: *See—*
Yeomans, Frederick G., 4,030,245.

Dragerwerk Aktiengesellschaft: *See—*
Simbruner, Georg, 4,030,492.

Drancourt, Claude, to Societe Presstub. Tube squeezing device. 4,030,636, Cl. 222-102.000.

Dreiding, Andre. Molecular models. 4,030,209, Cl. 35-18.00A.

Dresser, Thorpe: *See—*
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Droll Yankees, Inc.: *See—*
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Droux, Jacques Pierre Leon; and Rodier, Rene Jean, to Compagnie Honeywell Bull (Societe Anonyme). Apparatus for positionally controlling a movable head assembly. 4,031,443, Cl. 318-561.000.

Drucker, Howard. Push toy. 4,030,243, Cl. 46-241.000.

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Arolski, Angel Tomov; Usheva, Velichka Borissova; Gruev, Peter Vassilev; Richev, Georgi Trendafilov; and Doncheva, Zvetana Semkova, 4,031,264.

D'Souza, Godfrey B., to Canada Packers Limited. Rotary heating apparatus for puffing borax. 4,031,354, Cl. 219-389.000.

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Ducellier & Cie: *See—*
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Dudley, Philip; Bower, Lewis Robert; and Wake, Malcolm, to Fletcher Sutcliffe Wild Limited. Mine roof supports. 4,030,308, Cl. 61-45.00D.

Dudonis, Ronald Michael, to Bell Telephone Laboratories, Incorporated. Automated coin arrangement providing interference free coin deposit detection during announcements. 4,031,324, Cl. 179-6.30R.

Dudonis, Ronald Michael; Morrison, Charles Glenn; Potter, Robert Lawrence; and Streisand, Kenneth, to Bell Telephone Laboratories, Incorporated. Called party fraud prevention in an automated coin system. 4,031,325, Cl. 179-6.30R.

Duembgen, Gerd: *See—*
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Duennenberger, Max: *See—*
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Kochemidov, Atanas Dimitrov; Makedonski, Boris Georgiev; Dumanov, Ivan Minkov; Payakov, Stefan Georgiev; Galabov, Peter Konstantinov; and Atanassov, Haralampi Aangelov, 4,030,249.

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Dunham-Bush, Inc.: *See—*
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Dupont, John A.; Kooch, Walter; and Scott, Joseph D., to Rohm and Haas Company. Metal compound stabilized coating compositions. 4,031,055, Cl. 260-29.6MM.

Duran, Hector Oscar. Pneumatic shock absorber for suspension of cars and/or similar vehicles. 4,030,715, Cl. 267-64.00R.

Durham, Harvey. Clamp for scoop loader. 4,030,626, Cl. 214-767.000.

Durling, Harold, to Midland-Ross Corporation. Tractor-mounted cargo-trailer brake control system. 4,030,757, Cl. 303-28.000.

Duro-Dyne Corporation: *See—*
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Durst AG Fabrik Fototechnischer Apparate Bozer: *See—*
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Durst, Jack R., to Pillsbury Company, The. Preparation of fat-containing beverages. 4,031,261, Cl. 426-565.000.

Dushku, Victor A. Manually operated log breaking device. 4,030,700, Cl. 254-113.000.

Dussartre, Roger, to Jaeger. Device for correcting the law of deflection of an aneroid capsule. 4,030,367, Cl. 73-410.000.

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Earley, Kenneth W. Detachable connector for securing a member to a fishing lure. 4,030,225, Cl. 43-42.090.

Earth Sciences, Inc.: *See—*
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Easterbrook, Michael George, to Burroughs Wellcome Co. Sulphonamide and 2,4-diaminopyrimidine injectable suspension. 4,031,214, Cl. 424-229.000.

Eastern Company, The: *See—*
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Eastman Kodak Company: *See—*
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Chapman, Derek David, 4,030,932.
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Portmann, Hubert, 4,030,284.

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Echterhoff, Heinz: *See—*
Gemmeke, Wilfried; Werner, Heinrich; Echterhoff, Heinz; and Raulf, Erich, 4,031,189.

Eckhardt, Hellmuth, to Torrington GmbH. Felting needle. 4,030,170, Cl. 28-115.000.

Eckholt, Heinrich, to Hamel GmbH Zwirnmaschinen. Thread brake for double thread twister. 4,030,683, Cl. 242-149.000.

Eden, Edward Joseph, to Tekonsha Engineering Company. Magnetic dampened inertial sensor for brake and sway controls. 4,030,756, Cl. 303-24.00A.

Eden, Jamal S., to B. F. Goodrich Company, The. Low temperature catalytic combustion of chlorohydrocarbons. 4,031,149, Cl. 260-654.00A.

Edison, Robert Raynold; and Dresser, Thorpe, to Atlantic Richfield Company. Benzene by hydrogenative dealkylation. 4,031,154, Cl. 260-672.00R.

Edmond, Tibor O.; and Dahl, H. Douglas, to Continental Oil Company. Borehole pressure cell. 4,030,345, Cl. 73-88.00E.

Edo Western Corporation: *See—*
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Edwards, Colin: *See—*
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Edwards, John A.: *See—*
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Edwards, Robert A. Remote indicating solid state magnetic sensor. 4,030,204, Cl. 33-361.000.

Edwards, William Joseph: *See—*
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Ehni, George John, III; and Leuschner, Horst, to Texas Instruments Incorporated. Solid state television channel selection system. 4,031,474, Cl. 325-455.000.

Ehrat, Kurt, to KESO AG. Lock. 4,030,325, Cl. 70-383.000.

Eidelberg, Jonah; and Mooney, Thomas, to I-T-E Imperial Corporation. Fitting for conduit and electrical cable. 4,030,742, Cl. 285-343.000.

Einstabland, Tomas Berge; and Opedal, Torlak, to Ingenior F. Selmer A/S. Apparatus for making inclined hollow concrete columns using sliding formwork. 4,030,864, Cl. 425-65.000.

Eisai Co., Ltd.: *See—*
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Eisfeldt, Werner. Apparatus for film and tape winding. 4,030,675, Cl. 242-55.180.

El-Antably, Samir M., to Mallinckrodt, Inc. 7-(2,3-Dihydroxypropyl-1,3-di-n-propylxanthine and a pharmaceutical composition containing same useful as a bronchial muscle relaxant. 4,031,218, Cl. 424-253.000.

Electrical Conductors, Inc.: *See—*
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Elloy, Martin Arthur; and Beddow, Frank Howard, to National Research Development Corporation. Endoprosthetic bone joint devices. 4,030,143, Cl. 3-1.910.

Elser, Dieter, to Zahnradfabrik Friedrichshafen AG. Power steering with accumulator operation. 4,030,403, Cl. 91-448.000.

Elston, Lewis W., to Georgia Tech Research Institute. Regenerative method removal of sulfur dioxide from stack gases. 4,031,195, Cl. 423-554.000.

EMI Limited: *See—*
LeMay, Christopher Archibald Gordon, 4,031,395.

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Engelbach, Heinz; Krabetz, Richard; Duembgen, Gerd; Willersinn, Carl-Heinz; Lebert, Ulrich; and Thiessen, Fritz, to BASF Aktiengesellschaft. Manufacture of acrylic acid by oxidation of propylene with oxygen-containing gases in two separate catalyst stages. 4,031,135, Cl. 260-530.00N.

Enneking, Heinrich; Schubert, Gunter; and Baumann, Karl-Heinz, to Industriewerke Karlsruhe Augsburg Aktiengesellschaft. Method and apparatus for treating yarn. 4,030,169, Cl. 28-220.000.

Enomoto, Masahiro, to AMP Incorporated. Electrical terminal. 4,030,804, Cl. 339-258.00S.

Enomoto, Shigeru, to Matsushita Electric Industrial Co., Ltd. Vertical deflection circuit. 4,031,430, Cl. 315-403.000.

Ernst, Horst M.; Olschewski, Armin; and Brandenstein, Manfred, to SKF Industrial Trading and Development Company, B.V. Device for linearly guiding a machine element. 4,030,191, Cl. 308-6.00C.

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Eskeli, Michael. Rotor with jet nozzles. 4,030,856, Cl. 415-80.000.

Espino, Ramon L.; and Pletzke, Thomas S., to Chem Systems Inc.

Methanol production in a paraffinic medium. 4,031,123, Cl. 260-449.500.
Esser-Werke GmbH vorm. Westmontan-Werke: *See—*
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Esteve-Subirana, Antonio, to Laboratorios del Dr. Esteve S.A. 2,5-Dihydroxy benzene sulfonic acid mono- and diesters. 4,031,240, Cl. 424-308.000.
Etablissement Ani, chez Me Beck, avocat: *See—*
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Lefaudeux, Francois L. M.; and Quivy, Michel Georges, 4,031,502.
Etes, Elmer G. Plural coin responsive mechanism for a dispensing machine. 4,030,586, Cl. 194-59.000.
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Nelson, Gunner E., 4,031,143.
Eutectic Corporation: *See—*
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Euverard, Maynard R.; and Heide, Henry A., to Velten & Pulver, Inc. Apparatus and method for loading containers. 4,030,620, Cl. 214-6.00P.
Evans, David Arthur, to Strachan & Hensbew Limited. Rail wheel grippers. 4,030,574, Cl. 188-62.000.
Everman, Don D., to Lawrence Peska Associates, Inc. Apparatus for forming a bar of soap from leftover pieces. 4,030,867, Cl. 425-144.000.
Evers, William J.; Heinsohn, Howard H., Jr.; and Mayers, Bernard J., to International Flavors & Fragrances Inc. Foodstuff flavor compositions comprising 3-furyl alkyl sulfides and processes. 4,031,256, Cl. 426-535.000.
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Shulta, Mikhail Mikbailovich; Parfenov, Anatoly Ivanovich; Shnypikov, Alexandr Dmitrievich; Krunchak, Vladimir Georgievich; Evnina, Sarra Borisovna; Dolidze, Vladimir Alexandrovich; and Terasova, Valentina Mikhailovna, 4,030,935.
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Healy, Frank J.; and Geissler, Paul R., 4,031,155.
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Fabrin, Knud Christian Claus: *See—*
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Northeved, Allan; Fabrin, Knud Christien Claus; and Solfjeld, Poul, 4,030,344.
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Fadl, Mohemed F. A.; and Olasz, Joseph S., to Federal Products Corporation. Bore gage. 4,030,202, Cl. 33-178.00E.
Fagao, Joseph P., to Du Pont de Nemours, E. I., and Company. Polytetrafluoroethylene felt. 4,031,283, Cl. 428-280.000.
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Keifert, Hibbard G.; and Waters, Frank J., deceased, 4,030,849.
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Straeten, Franz-Josef; Pelzer, Rudolf; Feiten, Karl-Josef; and Stevens, Wilhelm-Josef, 4,030,961.
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Fiat-Allis Construction Machinery, Inc.: *See—*
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Fick, Henry A. Retention device for filleting fish. 4,030,164, Cl. 17-70.000.
Fidrych, Alfred Walter, to Harvey Hubbell, Incorporated. Cord grips. 4,030,741, Cl. 285-161.000.
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Fischer, Adolf, deceased (by Fischer, Caecilia Emma, heiress-at-law), to BASF Aktiengesellschaft. Herbicidal compositions. 4,030,909, Cl. 71-91.000.
Fischer, Caecilia Emma, heiress-at-law: *See—*
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Fischer, William A.: *See—*
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Fish, Leonard A.; and Moore, Robert L. Portable weighing scale. 4,030,559, Cl. 177-159.000.
Fisher, Glen W., to Technovators, Inc. System for controlling segregation within a bin during material withdrawal. 4,030,633, Cl. 222-1.000.
Fisher, Lloyd R., to Page, Joe W., Jr. Combination hand tool. 4,030,150, Cl. 7-15.000.
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Florica, Mihai: *See—*
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Flototto, Reinhard-Heinrich. Furniture frame joint. 4,030,846, Cl. 403-231.000.
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Shepard, E. Dwayne; and Scherbel, Gordon H., 4,030,709.
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Folk, Craig L.; and Kotter, James I., to United States of America, Agriculture. Fiber blending, subdividing, and distributing system. 4,030,280, Cl. 57-58.950.
Foller, Werner, to Gestra-KSB Vertriebsgesellschaft mbH & Co. Bremen. Float controllable valve. 4,030,516, Cl. 137-192.000.
Fonseca, Anthony G., to Continental Oil Company. Hydrometallurgical processing of metal sulfides. 4,030,917, Cl. 75-103.000.
Ford Motor Company: *See—*
Kantz, Don B.; and Lezotte, Tim F., 4,030,297.
Formeister, Richard B., to Sperry Rand Corporation. Limiter circuit for servosystems. 4,031,483, Cl. 331-17.000.
Formica Corporation: *See—*
Keeling, Ronald James, 4,031,281.
Forsyth, Bruce Adam; Pryor, David Ernest; McGarry, Errol James; and Harney, Donald William Gerald, to ICI Australia Limited. Compositions containing certain 2,4-halo-6-nitrophenols or derivatives thereof and methods for using same to eradicate internal parasites in warm-blooded animals. 4,031,249, Cl. 424-347.000.
Forterre, Gerard: *See—*
Bernard, Nicolle; and Forterre, Gerard, 4,031,489.
Fortune, Jeffrey L. Shower water temperature measuring instrument. 4,030,360, Cl. 73-349.000.
Fortune, Jeffrey L. Floating bath water temperature measuring instrument. 4,030,361, Cl. 73-353.000.
Foster, Edwin E. Pedal actuated bicycle brake with coordinating supporting stand. 4,030,774, Cl. 280-261.000.
Fouratt, George Thomas, to International Telephone and Telegraph Corporation. Circuit to indicate the simultaneous off-hook condition of at least two of a plurality of telephone subsets on the same telephone line. 4,031,333, Cl. 179-81.00R.
Fox Valley Tool & Die, Inc.: *See—*
Heiting, Richard H., 4,030,390.
Fosboro Company, The: *See—*
Shinskey, Francis G., 4,030,986.
Fradin, David W.: *See—*
Freiberg, Robert J.; Fradin, David W.; Chenausky, Peter P.; and Biancardi, Frank R., 4,031,484.
Francis, Jane S. Portable sewing aligning table system. 4,030,200, Cl. 33-76.00R.
Frank, Freidhelm: *See—*
Jacob, Friedrich; Voigt, Gerhard; and Frank, Freidhelm, 4,030,735.
Franken, Adrianus Jacobus Jozef: *See—*
Khoe, Giok Djan; Kuyt, Gerard; and Franken, Adrianus Jacobus Jozef, 4,030,811.
Franz, Arnold; Huthwelker, Dirk; and Jacob, Lothar, to Dynamit Nobel Aktiengesellschaft. Printed circuits with arc-retardance. 4,031,313, Cl. 174-68.500.
Franz, William F.: *See—*
Hess, Howard V.; Franz, William F.; and Cole, Edward L., 4,030,981.
Frauenhoff, Richard E.: *See—*
Moring, Rodger L.; and Frauenhoff, Richard E., 4,030,575.
Fraze, Ermal C.: *See—*
Brown, Omar L., 4,030,631.
Fredrickson, Bengt; and Stenkvist, Sven-Einar, to ASEA Aktiebolag. Direct current arc furnace heartb connection installation. 4,031,308, Cl. 13-9.00R.
Freeman, Charles F.: *See—*
Bosserman, David A.; and Freeman, Charles F., 4,031,552.
Freeman, John D.; Robinson, Ralpb C.; and Swonger, Kenneth D., to General Time Corporation. Display apparatus for automotive vehicles. 4,031,363, Cl. 235-150.200.
Freiberg, Robert J.; Fradin, David W.; Chenausky, Peter P.; and Biancardi, Frank R., to United Technologies Corporation. Portable chemical laser with gas recirculation. 4,031,484, Cl. 331-94.50G.
Freitag, Dieter: *See—*
Idel, Karsten-Josef; Saleck, Wilhelm; Wolff, Erich; and Freitag, Dieter, 4,030,929.
Freitag, Herbert, to Stabilus GmbH. Pneumatic suspension element. 4,030,716, Cl. 267-64.00R.
French, James Clark: *See—*
Nicolaides, Ernest D.; Tinney, Francis John; and French, James Clark, 4,031,069.
Frey, Jurgen; Weber, Andreas; and Triffterer, Adolf, to Daimler-Benz Aktiengesellschaft. Internal combustion engine with return line for eshaust gases. 4,030,463, Cl. 123-119.00A.
Freyberger, Laurin Clemens: *See—*
Schat, Hermannus; and Freyberger, Laurin Clemens, 4,031,411.
Fried, John H.: *See—*
Beard, Colin C.; Edwards, John A.; and Fried, John H., 4,031,234.
Fried. Krupp Gesellschaft mit beschrankter Haftung: *See—*
Hoffmeister, Bernhard; and Dose, Gerhard, 4,030,973.
Fromantin, Andre Paul Edouard. Machine for preforming shoe uppers. 4,030,154, Cl. 12-54.100.
Frommer, Werner: *See—*
Bauer, Klaus; Frommer, Werner; Kaufmann, Wilfried; Metzger, Georg; Scheer, Martin; Schmidt, Delf; Schroder, Theo; and Schafer, Dietmar, 4,031,207.
Bauer, Klaus; Frommer, Werner; Kaufmann, Wilfried; Metzger, Karl Georg; Scheer, Martin; Schmidt, Delf; Schroder, Theo; and Schafer, Dietmar, 4,031,208.
Fuchs, Hugo: *See—*
Rapp, Guenther; Fuchs, Hugo; and Thomas, Erwin, 4,031,139.
Fuerst, Charles Floyd, to Fabri-Tek Incorporated. Tuning fork connector. 4,030,792, Cl. 339-17.0LC.
Fuji Photo Film Co., Ltd.: *See—*
Honjo, Satoru; and Matsumoto, Seiji, 4,030,922.
Kondo, Toshihiro, 4,030,567.
Noguchi, Yasuhiro; Ukai, Toshinao; Sashihara, Kenji; and Masuda, Takao, 4,030,931.
Sashihara, Kenji; Masuda, Takao; Noguchi, Yasubiro; Sekikawa, Nobuyoshi; and Shishido, Tadao, 4,030,930.
Suzuki, Osamu; Akashi, Goro; Kasuga, Akira; and Sega, Kenji, 4,030,685.
Takahashi, Isoji, 4,031,269.
Tani, Tadaaki, 4,030,927.
Fuji Photo Optical Co., Ltd.: *See—*
Nishizawa, Tetsuo, 4,030,820.
Fuji Sangyo Kabushiki Kaisha: *See—*
Isbizawa, Toushichi, 4,030,951.
Fujii, Setsuro; Kajita, Yasumichi; Hiraku, Seizi; Kira, Heizo; Aishita, Hideki; Muryobayashi, Keiko; Terashima, Hiroshi; Akimoto, Akira; Taniguchi, Ken; and Wada, Minoru, to Ono Pharmaceutical Co., Ltd. Method for purification of physiologically active substance using enzyme-enzyme inhibitor system. 4,030,977, Cl. 195-66.00R.
Fujimoto, Keimei; Ohno, Nobuo; Okuno, Yoshitoshi; Mizutani, Toshio; Ohno, Isao; Hirano, Masachika; Itaya, Nobushige; and Matsuo, Takashi, to Sumitomo Chemical Company, Limited. Insecticidal substituted acetate compounds. 4,031,235, Cl. 424-274.000.
Fujimoto, Masanori: *See—*
Shirayama, Kenzo; Kita, Shinichiro; and Fujimoto, Masanori, 4,031,062.
Fujisou, Tokuo: *See—*
Sugiura, Kensuke; Kagaya, Mineo; Fujisou, Tokuo; Aoki, Hiroyuki; Takehara, Takeichiro; and Kurata, Shigenori, 4,031,020.
Fujita, Choichi: *See—*
Kato, Yoshiro; and Fujita, Choichi, 4,031,548.
Fujita, Shigeru; Murayama, Koichi; and Kaneda, Toyohito, to Kabushiki Kaisha Japan Metal Finishing Company. Zinc plating method. 4,030,987, Cl. 204-55.00R.
Fujiwara, Hideo; Ichinose, Yukio; Taniguchi, Satoshi; Kobayashi, Tsutomu; Ichino, Kazuo; Itoh, Michiyasu; Uesaka, Yasutaro; Inose, Fumiyuki; and Ueno, Sadayasu, to Hitachi, Ltd. Variable inductor. 4,031,496, Cl. 336-135.000.
Fukui, Kiyoshige; Tamamura, Akira; and Nishimoto, Minoru, to Rank Xerox Ltd. Paper tray for copying machines. 4,030,725, Cl. 271-164.000.
Fukutome, Shuji. Device for capturing animals. 4,030,231, Cl. 43-85.000.
Fullenwider, Malcolm A., to Fullenwider, Malcolm A.; and Ament, Richard L., II. Hydrogen-oxidizing catalyst, and fuel cell electrode using same. 4,031,291, Cl. 429-40.000.
Funskoshi, Sozo: *See—*
Nagata, Toshio; Kawasaki, Kunijiro; Takahama, Ryuichiro; Miyatani, Yoshifusa; and Funakoshi, Sozo, 4,030,441.
Furane Plastics, Inc.: *See—*
Hirosawa, Frank N.; and Lee, Ming H., 4,031,049.
Furukawa Battery Co., Ltd., The: *See—*
Sano, Ichiro, 4,031,294.
Furukawa, Yoshitaka: *See—*
Horikoshi, Yoshiji; and Furukawa, Yoshitaka, 4,030,949.
Gabbert, James D.: *See—*
Hedrick, Ross Melvin; and Gabbert, James D., 4,031,164.
Gabriele, Joseph Michael: *See—*
Gabriele, William Joseph; and Gabriele, Joseph Michael, 4,030,719.
Gabriele, William Joseph; and Gabriele, Joseph Michael, to Contour Fabricators, Inc. Child immobilizing device for X-rays. 4,030,719, Cl. 269-328.000.
Gaetani, Quintino: *See—*
Papantoniou, Christos; and Gaetani, Quintino, 4,030,512.
Gagliardo, John P., to Feecon Corporation. Fire fighting nozzle. 4,030,666, Cl. 239-526.000.
Gahler, Siegfried; Junge, Karl-Wilhelm; Fischer, Gunther; Scheithauer, Steffen; and Viola, Horst, to VEB Filmfabrik Wolfen-Fotochemisches Kombinat. Process of sensitizing silver halide emulsion with a dithioester, 4,030,928, Cl. 96-107.000.
Galabov, Peter Konstantinov: *See—*
Kochemidov, Atanas Dimitrov; Makedonski, Boris Georgiev; Dumanov, Ivan Minkov; Payakov, Stefan Georgiev; Galabov, Peter Konstantinov; and Atanassov, Haralampi Aangelov, 4,030,249.
Galashina, Malvina Leontievna: *See—*
Chuiko, Alexei Alexeevich; Tertykh, Valentin Anatolievich; Sobolev, Vilyam-Alexandrovich; Maschenko, Valery Mikhailovich;

Pavlov, Vyacheslav Valentinovich; Chugai, Alexei Dmitrievich; Khaber, Nikolai Vasilievich; Kondratenko, Anatoly Borisovich; Vetamenjuk, Vasily Ivanovich; Khoma, Mikhail Ivanovich; Kutin, Alexandr Nikolaevich; Shaposhnikov, Jury Davydovich; and Galashine, Melvina Leontievna, 4,030,940.

Gallagher, H. Dan. Multiple pitch animal call. 4,030,241, Cl. 46-180.000.

Gamba, Piero: *See*—
Longa, Pier Luigi; and Gamba, Piero, 4,031,452.

Gamburtzav, Sergei Sergeev; *See*—
Budevski, Evgueni Bogdanov; Iliev, Iliya Dimitrov; Keisheva, Anastasiya Rootislevova; Gamburtzev, Sergei Sergeev; and Vakanova, Elena Borisova, 4,031,033.

Gamot, Philippe: *See*—
Felix, Pierre; Gamot, Philippe; Moiroud, Guy; and Veron, Serge, 4,031,394.

Garcia, Ricardo L., to Grayhill, Inc. Miniature electrical switch. 4,031,345, Cl. 200-67.0AA.

Gardner, Jeffrey M., to Container Corporation of America. Partition arrangement. 4,030,659, Cl. 229-42.000.

Gardner, Jeffrey M.: *See*—
Rade, Joseph J.; and Gardner, Jeffrey M., 4,030,660.

Gardner, Joseph G.: *See*—
Adhikari, Manoj C.; and Gardner, Joseph G., 4,030,409.

Garner, Gerald D.; Hammonds, James C.; Holt, Jan D.; and Melcher, Conway H., to ACF Industries, Incorporated. Rigid railway car truck. 4,030,424, Cl. 105-182.00R.

Garrett, Devid Aubrey, to Vactric Control Equipment Limited. Optical encoder. 4,031,441, Cl. 318-480.000.

Gasc, Jean-Claude: *See*—
Chazan, Jean-Bernard; and Gasc, Jean-Claude, 4,031,210.

Gates Rubber Company, The: *See*—
Hammel, Ronald O.; Kuykendall, Charles N.; and Fischer, William A., 4,031,450.
Stecklein, Alfred L., 4,030,276.

Gayo, Nenesio: *See*—
Aparicio, Luis; Gayo, Nenesio; M° ; Martin, Jose Luis; and Ron, Armando, 4,031,243.

Geiger, Otto, to GeSig Energietechnik GmbH. Electric generator. 4,031,421, Cl. 310-112.000.

Geissler, Paul R.; and Healy, Frank J., to Exxon Research and Engineering Company. Seperation and recovery of ethylbenzene by dual desorbent composition and temperature separation processes. 4,031,156, Cl. 260-674.0SA.

Geissler, Paul R.: *See*—
Heely, Frank J.; and Geissler, Paul R., 4,031,151.
Healy, Frank J.; and Geissler, Paul R., 4,031,155.

Geisslinger, Wolfgang; and Ungnadner, Peter, to AGFA-Gevaert, A.G. Motion picture sound camera. 4,030,818, Cl. 352-72.000.

Gelperine, Eleonora Grigorievna: *See*—
Khcheyan, Khachik Egorovich; Revenko, Olge Mikhailovna; Shetelove, Alla Nikolaevna; Gelperine, Eleonora Grigorievna; Agrinskaya, Lidia Ivanovna; and Muradian, Georgy Avanesovich, 4,031,128.

Gemmeke, Wilfried; Werner, Heinrich; Echterhoff, Heinz; and Raulf, Erich, to Verkeufsgesellschaft fur Teererzeugniase (VfT). Process for prepering composition coataining carbon and low sulfur, nitrogen and ash content. 4,031,189, Cl. 423-449.000.

Gemmellaro, Carmelo; Maggioni, Virginio; and Moretti, Renzo, to Fiat Societa per Azioni. Pneumatic anti-skid brake system having proportionel pressure control means. 4,030,759, Cl. 303-119.000.

General Cable Corporation: *See*—
Jachimowicz, Ludwik, 4,031,310.

General Converters & Assemblers, Inc.: *See*—
Danowski, Edwin K., 4,030,760.

General Dynamics Corporation: *See*—
Briney, Douglas W., 4,030,807.
Schaefer, William H.; and Bender, Richard E., 4,031,181.

General Electric Company: *See*—
Armor, Anthony F.; Chari, Madahushi V. K.; Kudlacik, Henry W.; and Reece, Paul, 4,031,422.
Bessen, Irwin I., 4,031,274.
Bowers, David L., 4,030,510.
Colter, John Cecil; James, Dean B.; Keith, Walter Gill; and Akbari-Kesseri, Reza, 4,031,029.
Dombrowski, Frank R.; and Larson, Reymond L., 4,030,184.
Grondahl, Clayton M.; and Gerbold, Bruce W., 4,030,875.
Johnson, Curtis A.; and Prochazke, Svante, 4,031,178.
Laughter, Clifford M., 4,031,382.
Lennon, David C.; and Wandler, Richerd A., 4,030,802.
Matulevich, E. S., 4,031,509.
Michoski, Ronald E., 4,030,176.
Olashaw, William Francis, 4,031,433.
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Whetten, Nathan Rey; and Houston, John M., 4,031,396.

General Foods Corporation: *See*—
Berry, Martin F.; Reesman, Stanley H.; Smith, Marvin L.; and Middlesworth, Peter Van, 4,031,267.
Haas, Gerhard J.; and Berg, Jaffrey H., 4,031,258.
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General Monitors, Inc.: *See*—
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General Motors Corporation: *See*—
King, Donald J.; Lura, Loren E.; and Maurushat, Ewalt, 4,030,784.

General Pattern Co., Inc.: *See*—
Reiland, Dennis J., 4,030,188.

General Public Utilities Corporation: *See*—
Harrison, Devid C., 4,031,528.

General Time Corporation: *See*—
Freeman, John D.; Robinson, Ralph C.; and Swonger, Kenneth D., 4,031,363.
Rigazio, Anthony W., 4,031,295.

General Tire & Rubber Company, The: *See*—
Hein, Richard D., 4,030,852.
Molbert, Robert A., 4,031,176.

Gentili, Bruno: *See*—
Guadagni, Dante G.; Horowitz, Robert M.; Gentili, Bruno; and Maier, Vincent P., 4,031,265.

Gentry, Elvin O. Crankshaft-forming apparatus and method. 4,030,172, Cl. 29-6.000.

Georgia Tech Research Institute: *See*—
Elston, Lewis W., 4,031,195.

Gerber, Evalyn: *See*—
Gerber, Warren E., 4,030,198.

Gerber, Warren E., to Gerber, Evalyn. Tooth enamel-stripping apparatus. 4,030,198, Cl. 32-58.000.

Gerhard Berger, Fabrik Elektrischer Messgerate: *See*—
Spiesberger, August; and Schaffer, Claus, 4,031,419.

Gerhold, Bruce W.: *See*—
Grondahl, Clayton M.; and Gerhold, Bruce W., 4,030,875.

Germana, Antonino: *See*—
Barba, Diego; Germana, Antonino; Liuzzo, Giuseppe; and Tagliaferri, Giovanni, 4,030,985.

Gervase, Nicholas J., to Lord Corporation. Isocyanatosilane adducts. 4,031,120, Cl. 260-448.80R.

GeSig Energietechnik GmbH: *See*—
Geiger, Otto, 4,031,421.

Gess, Larry C. Package and method and apparatus for producing same. 4,030,662, Cl. 229-87.00R.

Geatra-KSB Vertriebsgesellschaft mbH & Co. Bremen: *See*—
Foller, Werner, 4,030,516.

Ghosh, Asoke Kumar: *See*—
Crane, Robert Anthony; and Ghosh, Asoke Kumar, 4,031,485.

Ghougesian, John N. Variable size and angularly adjustable projection. 4,030,825, Cl. 355-71.000.

Giacobbe, Thomas J., to Dow Chemical Company, The. Process for making 2,6-difluoropyridine. 4,031,100, Cl. 260-290.0HL.

Giannone, Charles: *See*—
Hinden, Milton; and Giannone, Charles, 4,031,350.

Gibilaro, Frank. Link drive chain repair tool. 4,030,286, Cl. 59-7.000.

Gibson, Edwin D.; and Verhoeven, John D., to United States of America, Energy Research and Development Administration. Arc-melting preparation of single crystal LaB_6 cathodes. 4,030,963, Cl. 156-602.000.

Gics, Paul W., to Gics Pharmaceuticals, Inc. Separatory apparatus. 4,031,012, Cl. 210-321.00A.

Gics Pharmaceuticals, Inc.: *See*—
Gics, Paul W., 4,031,012.

Giles, Thomas Clyde; Kohout, Otto James; and Rinaldi, Gerald Michael, to GTE Automatic Electric Laboratories Incorporated. Circuit arrangement for producing high current pulses. 4,031,414, Cl. 307-270.000.

Gill, Walter: *See*—
Cram, Robert E.; Gill, Walter; and Loundagin, James A., 4,030,523.

Gillette Company, The: *See*—
Gross, Thomas A. O., 4,031,431.
Pentney, Harry, 4,030,598.

Gilmore, Bennett J. Board game with diagonal paths. 4,030,762, Cl. 273-134.0AD.

Ginkel, Frank. Opposed piston engine. 4,030,471, Cl. 123-197.00R.

Giometti, Paul F., to Facet Enterprises, Inc. Electromagnetic roller clutch. 4,030,581, Cl. 192-16.000.

Giraud, Pierre; Palais, Conrad; and Rapkin, Edward, to Intertechnique S.A. Method and devices for counting events, particularly radioactive disintegration events. 4,031,392, Cl. 250-328.000.

Giudicelli, Don Pierre Rene Lucien; and Nejer, Henry, to Synthelabo. N-meta-trifluoromethylpiperazines. 4,031,094, Cl. 260-268.0PH.

Givaudan Corporation: *See*—
Neegeli, Peter, 4,031,132.

Glaze, Stanley George, to Lucas Industries Limited. Damping device for a vehicle suspension. 4,030,580, Cl. 188-299.000.

Gloeckler, Alfred, to Superba S.A. Domestic knitting machine. 4,030,319, Cl. 66-75.200.

Glorioso, Paul A., to TRW Inc. Stud welding control. 4,031,349, Cl. 219-98.000.

Gloucester Engineering Co. Inc.: *See*—
Schott, Charles M., Jr., 4,030,681.

Glover, Brian: *See*—
Boyd, Violet; Fishwick, Brian Ribbons; and Glover, Brian, 4,030,881.

Goel, Krishan N.; and Welker, Osman J., to Consolidated-Bathurst Limited. Disposal of paper pulp mill sludge. 4,030,968, Cl. 162-16.000.

Goldberg, Edwin Allen, to RCA Corporation. Non-integer frequency divider having controllable error. 4,031,476, Cl. 328-39.000.

Goldberg, Hannes: *See*—
Bellmann, Manfred; and Goldberg, Hannes, 4,030,333.

Golden M Enterprises, Inc.: *See*—
McDonald, David, 4,030,506.

Goldstein, David, to United States of America, Navy. Armor plate. 4,030,427, Cl. 109-82.000.

Goldstein, David; Kibbel, William Henry, Jr.; and Hollenbach, Roger C., to FMC Corporation. Stabilized isocyanurate. 4,031,090, Cl. 260-248.00C.

Goldwell GmbH: *See*—
Koyama, Masaya, 4,030,665.

Golovkina, Elena Yakovlevna: *See*—
Chachin, Viktor Nikolaevich; Zhurevsky, Alexandr Julyanovich; Zdor, Gennady Nikolaevich; Sheduya, Vladimir Leontievich; and Golovkina, Elena Yakovlevna, 4,030,329.

Goodwin, Eber Lyle, to Addressograph Multigraph Corporation. High operator efficiency duplicating system. 4,030,724, Cl. 271-64.000.

Goodyear Tire & Rubber Company, The: *See*—
Bhakuni, Roop S.; and Rye, Grover W., 4,031,288.
Curtiss, Walter W., Jr., 4,030,530.
Kahaner, Joel M., 4,030,653.
Smith, Edwin Studley, 4,031,297.

Gordon, Peter H., to Alkon Laboratories, Inc. Charging circuit with SCR's triggered by pedestal and cosine modified ramp unijunction circuit having means for current limiting by controlling pedestal level. 4,031,451, Cl. 320-23.000.

Gordon, Stanley H., to Acme Staple Company, Inc. Stapler. 4,030,656, Cl. 227-131.000.

Gordon, Vladimir Grigorievich: *See*—
Alexandrov, Vladimir Ilich; Osiko, Vyacheslav Vasilievich; Muraviev, Ernest Nikolaevich; Spiridonov, Eduard Georgievich; Tatarintsev, Vladimir Mikhailovich; and Gordon, Vladimir Grigorievich, 4,030,891.

Gorin, Everett; Jasulaitis, William A.; Theodore, Frank W.; and Wasson, George E., to Consolidation Coal Company. Process of making formcoke from non-caking or weakly caking coals. 4,030,982, Cl. 201-6.000.

Gorog, Istvan: *See*—
Firester, Arthur Herbert; and Gorog, Istvan, 4,030,835.

Goshima, Takeshi; and Mochizuki, Noritaka, to Canon Kabushiki Kaisha. Scanning optical system. 4,030,806, Cl. 350-7.000.

Goswami, Jagadish Chandra, to Stauffer Chemical Company. Foamable PVC resin formulation, process for foaming, and product thereof. 4,031,045, Cl. 260-2.50R.

Gottschlich, Rudolf; Rogalski, Werner; Bergmann, Rolf; Steinigeweg, Rosmerie; and Wehlig, Helmut, to Merck Patent Gesellschaft mit beschrankter Haftung. Novel penicillins and their preparation. 4,031,230, Cl. 424-271.000.

Gougeon, Thomas William: *See*—
Laughlin, Robert Gene; and Gougeon, Thomas William, 4,031,202.

Gough, Stanley T.; Tohias, Michael A.; and Napier, Roger P., to Mobil Oil Corporation. Carbamate insecticides from 5,8-dihydro-5,8-methano-1-naphthol and its derivatives. 4,031,237, Cl. 424-278.000.

Gowrinathan, Sankaran, to United States of America, Navy. Phase detector for optical figure sensing. 4,030,831, Cl. 356-109.000.

Grado, Joseph F. Electromagnetic pickup with magnetic gap displacement generator. 4,031,336, Cl. 179-100.41K.

Graham, John C., to Hooker Chemicals & Plastics Corporation. Process for the directed chlorination of alkylbenzenes. 4,031,142, Cl. 260-650.00R.

Graham, John C., to Hooker Chemicals & Plastics Corporation. Process for directed chlorination of alkylbenzenes. 4,031,147, Cl. 260-650.00R.

Granges Essem Aktiebolag: *See*—
Wallin, Jan-Olof, 4,030,682.

Grannis, Roland K., to Pacific Utilities Supply Co. Utility pole drill guide. 4,030,854, Cl. 408-115.00B.

Graupe, Daniel, to United States of America, Veterans Administration. Multi-function control system for an artificial upper-extremity prosthesis for above-elbow amputees. 4,030,141, Cl. 3-1.100.

Gray, Robert. Pallet racks. 4,030,612, Cl. 211-192.000.

Graybeal, Walter C. Manhole closure including a two-way pressure relief valve. 4,030,851, Cl. 404-25.000.

Grayhill, Inc.: *See*—
Garcia, Ricardo L., 4,031,345.

Grechinsky, Dmitry Alexeevich: *See*—
Yakshin, Alexandr Sergeevich; Novikov, Oleg Nikolaevich; Grechinsky, Dmitry Alexeevich; Klochko, Viktor Alexandrovich; and Rygalin, Viktor Georgievich, 4,030,339.

Green, William Geary: *See*—
Bouvier, David William; Green, William Geary; and Moore, Randolph Gaylon, 4,031,462.

Griffin, Thomas J., Jr., to Dow Chemical Company, The. Method of reducing friction loss. 4,031,014, Cl. 252-8.55R.

Griffith, Glen R.: *See*—
Deutsch, Ralph; and Griffith, Glen R., 4,031,377.

Griffiths, Clifford H.; and Keezer, Richard C., to Xerox Corporation. Method for the preparation of X-form metal phthalocyanine and X-form metal free compounds. 4,031,109, Cl. 260-314.500.

Grigat, Ernst: *See*—
Sundermann, Rudolf; Rottloff, Gunther; and Grigat, Ernst, 4,031,067.

Grigorenko, Anatoly Sergeevich; Moroz, Jury Antonovich; and Landyshev, Vladimir Vladislavovich. Hydraulic protection device for presses. 4,030,336, Cl. 72-432.000.

Grilli, Victor J.: *See*—
Conn, Thomas E.; and Grilli, Victor J., 4,030,663.

Grinberg, Jan: *See*—
Miller, Leroy J.; and Grinberg, Jan, 4,030,997.

Grinsteed, Robert R.; and Nasutavicus, Wilmonte A., to Dow Chemical Company, The. Water insoluble chelate exchange resins having a crosslinked polymer matrix and pendant thereto a plurality of methyleneaminopyridine groups. 4,031,038, Cl. 260-2.20R.

Grondahl, Clayton M.; and Gerhold, Bruce W., to General Electric Company. Integreted ceramic-metal combustor. 4,030,875, Cl. 431-352.000.

Gross, Erwin; and Vowinkel, Hans, to Hoechst Aktiengesellschaft. Multi-element type radiator of plastic material. 4,030,541, Cl. 165-175.000.

Gross, Thomas A. O., to Gillette Company, The. Ground fault circuit interrupter. 4,031,431, Cl. 307-326.000.

Grot, Walther Gustav, to Du Pont de Nemours, E. I., and Company. Process for producing halogen and metal hydroxides with cation exchange membranes of improved permselectivity. 4,030,988, Cl. 204-98.000.

Grottola, Oresto P. Closed peg box on stringed instrument. 4,030,399, Cl. 84-304.000.

Groudan, Alan I.; Schroeder, George F.; and Treffinger, H. Lee, to Singer Company, The. Error correction system for random access memory. 4,031,374, Cl. 235-153.0AM.

Groupement Atomique Alsacienne Atlantique: *See*—
Martin, Jean, 4,031,351.

Groupement pour les Activities Atomiques et Advancees "GAAA" S.A.: *See*—
Carbonnel, Henri, 4,030,538.

Grous, Philip P.: *See*—
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Groves, Malcolm Duane, to Combustion Engineering, Inc. Fluidly driven control rod. 4,030,972, Cl. 176-36.00R.

Gruev, Peter Vassilev: *See*—
Aroiski, Angel Tomov; Usheva, Velichka Borissova; Gruev, Peter Vassilev; Richev, Georgi Trendafilov; and Doncheva, Zvetana Semkova, 4,031,264.

Grund, Peter; Schmidt, Jurgen; and Hesse, Jurgen, to Messer Griesheim GmbH. Device for removing hurrs from workpieces. 4,030,247, Cl. 51-419.000.

Gruz, Boris Efimovich: *See*—
Ponomarev, Alexei Ivanovich; Sokolov, Sergei Vasilievich; Larionova, Julia Alexeevna; Klebansky, Alexandr Leibovich; Berenblit, Vsevolod Volfovich; Dolnakov, Jury Pavlovich; Yagupolsky, Lev Moiseevich; Malovik, Vladlen Vasilievich; Lozinsky, Miron Onufrievich; Belous, Viktor Mikhailovich; Gruz, Boris Efimovich; Alexeeva, Ljubov Antonovna; Ankudinov, Anatoly Kirillovich; and Ryazanova, Rufina Mikhailovna, 4,031,119.

GTE Automatic Electric Laboratories Incorporated: *See*—
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GTE New Ventures Corporation: *See*—
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GTE Sylvania Incorporated: *See*—
Williams, G. Norman; and Schultz, Thomas W., 4,030,790.

Guadagni, Dante G.; Horowitz, Robert M.; Gentili, Bruno; and Maier, Vincent P., to United States of America, Agriculture. Method of reducing bitterness in citrus juices. 4,031,265, Cl. 426-599.000.

Gubbels, Christoph. Garment clasp. 4,030,167, Cl. 24-210.000.

Guggi, Diether Josef; and Klein, Rolf, to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung. Manipulator for movement of articles in a controlled envirooment chamber, especially a high vacuum chamber. 4,030,615, Cl. 214-1.0BB.

Gulf & Western Manufacturing Company (Hastings): *See*—
Miller, Stanley J.; and Heniser, Richerd J., 4,030,432.

Gundersen, Marius, to Vefi A/S. Means on packing machine. 4,030,272, Cl. 53-376.000.

Gunnell, Thomas J., to Phillips Petroleum Company. Carbon black reactor with adjustable flame length. 4,030,889, Cl. 23-259.500.

Gunther, W. H. H.: *See*—
Chu, Joseph Y. C.; and Gunther, W. H. H., 4,030,991.
Chu, Joseph Y. C.; and Gunther, W. H. H., 4,030,992.
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Gurski, Frank: *See*—
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Gushima, Hideki: *See*—
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Gutman, Abraham: *See*—
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Haas, Gerherd J.; and Berg, Jeffrey H., to General Foods Corporation. Inorganic salts of dipeptide sweeteners. 4,031,258, Cl. 426-548.000.

Haas, Gerhard Julius; Herman, Edwin Bernard; and Lugay, Joaquin Castro, to General Foods Corporation. Method for imparting red color to animal food. 4,031,250, Cl. 426-18.000.

Haba, Masanori: *See*—
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Habermehl, Diethard: *See—*
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Hablutzel, Kurt; and Lamparter, Hansruedi, to Rieter Machine Works, Ltd. Method and apparatus for producing a continuous even strand of fibers. 4,030,635, Cl. 222-55.000.
Hebrovec, Frantisek: *See—*
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Hackert, Raymond Leo, to Du Pont de Nemours, E. I., and Company. Process of pigmenting polyamides. 4,031,060, Cl. 260-37.00N.
Hafele, Joseph C.: *See—*
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Hafeli, Robert J., to Von Roll AG. Method of hygienic disposal of chlorine-containing plastic material. 4,031,192, Cl. 423-488.000.
Hager, Arnulf: *See—*
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Hagiwara, Hisami: *See—*
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Hahm, Heinz Gunter; and Pocci, Nedo Igor, to ITT Industries, Incorporated. Method of manufacturing a brake pad assembly for a spot-type disc brake. 4,030,185, Cl. 29-413.000.
Hahn, Frank J.; and Santer, James O., to Monsanto Company. Liquid aminoplast polyfunctional resin compositions. 4,031,057, Cl. 260-32.60R.
Hale, Raymond P.: *See—*
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Hall, Phil H.; and Irwin, John W., to International Business Machines Corporation. Multimode programmable machines. 4,031,521, Cl. 364-200.000.
Hall, Wilbur S.; and Steinbrecher, Lester, to Amchem Products, Inc. Rinsing coated metallic surfaces. 4,030,945, Cl. 148-6.200.
Halleck, Michael E., to Electromedics, Inc. Electronic thermometer. 4,030,363, Cl. 73-362.0AR.
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Hammel, Ronald O.; Kuykendall, Charles N.; and Fischer, William A., to Gates Rubber Company, The. Two step solid state battery charger. 4,031,450, Cl. 320-23.000.
Hammond, David A.; and Swinehart, Carl F., to Harshaw Chemical Company, The. Crystal growth procedure. 4,030,965, Cl. 156-616.00R.
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Hanauer, Burton C.; and Patton, Charles Richard, to Hanauer Machine Works Incorporated. Medical equipment device for controlling dispositions of intravenous bottles. 4,030,690, Cl. 248-311.300.
Hanauer Machine Works Incorporated: *See—*
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Hanlon, Richard J.; Damon, Neil F.; and Yeo, Herbert G., to Augat, Inc. Electronic programing jumper pins and dual-in-line assembly thereof. 4,030,793, Cl. 339-19.000.
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Hansen, John H. Releasable gripper assembly for a jacking mechanism. 4,030,698, Cl. 254-106.000.
Hanson, Alden B.; Hanson, Chris A.; and Bertetto, Donald W., to Hanson Industries Inc. Adjustable flexure means for ski boot. 4,030,214, Cl. 36-105.000.
Hanson, Chris A.: *See—*
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Hanson Industries Inc.: *See—*
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Hapke, Donald William, to Boeing Company, The. Articulated nozzle for upper surface blown aircraft. 4,030,687, Cl. 244-12.500.
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Harnish, James R., to Borg-Warner Corporation. Reverse cycle heat pump. 4,030,315, Cl. 62-324.000.
Harp, Fredrick Eugene. Triple corner boring bar. 4,030,843, Cl. 408-197.000.
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Hartung, Robert L., to Howell Instruments, Inc. Low cycle fatigue damage counter. 4,031,366, Cl. 235-151.300.
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Hashimoto, Michiyoshi; and Shako, Hisahumi, to Honda Giken Kogyo Kabushiki Kaisha. Safety kickstarter for motorcycles. 4,030,561, Cl. 180-33.00R.
Haskell, Donald M., to Phillips Petroleum Company. Separation of styrene from xylenes. 4,031,153, Cl. 260-669.00A.
Hasty, James H., to Kendall Company, The. Intermittent compression device. 4,030,488, Cl. 128-24.00R.
Hata, Yoshitaka, to Nissan Motor Co., Ltd. Multi-cylinder internal combustion engine. 4,030,293, Cl. 60-285.000.
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Hawryluk, Peter, to Raymond Lee Organization, Inc., The, a part interest. Vapor carburetor. 4,030,457, Cl. 123-34.00A.
Hayashi, Masahiro; Haba, Masanori; Watanabe, Misuzu; and Hirano, Shinji, to Kabushiki Kaisha Meidensha. Non-linear voltage-dependent resistor. 4,031,498, Cl. 338-21.000.
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Hayashida, Yoshihiro, to Tokico Ltd. Dual system hydraulic braking apparatus for vehicle. 4,030,758, Cl. 303-84.00A.
Healy, Frank J.; and Geissler, Paul R., to Exxon Research and Engineering Company. Separation of hydrocarbons. 4,031,151, Cl. 260-666.00A.
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Heimke, Wolfram, to Union Industrielle et d'Entreprise. Method and apparatus for fluidifying powderous substances. 4,030,755, Cl. 302-29.000.
Hein, Richard D., to General Tire & Rubber Company, The. Compression seal for variably spaced joints. 4,030,852, Cl. 404-66.000.
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Hill, Lucius D. Manometric pressure sensing and liquid evacuating device for intraoperative hiatal hernia repair. 4,030,481, Cl. 128-2.00S.
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Hofman, Emiel Alexander, to AGFA-GEVAERT N.V. Method of producing photographic images. 4,030,924, Cl. 96-61.00R.

Hokushin Electric Works, Ltd.: *See—*
Minami, Hiroshi, 4,031,503.

Hold, Peter, to USM Corporation. Controlled deflection roll. 4,030,177, Cl. 29-116.0AD.

Holfeld, Winfried Thomas; and Strohmaier, Alfred John, to Du Pont de Nemours, E. I., and Company. Process for improving dyeability. 4,030,880, Cl. 8-15.000.

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Chierici, Osvaldo F., 4,030,613.

Hollenbach, Roger C.: *See—*
Goldstein, David; Kibbel, William Henry, Jr.; and Hollenbach, Roger C., 4,031,090.

Holloran, Thomas Patrick; Braden, Arthur Buell; Foley, Jerrold Stokes; Maynard, James Lucian; Klosky, John Patrick; Dissauer, Gerald Anthony; Adams, Terrence Miller; and Lorenz, Allan Alfred, to Addressograph Multigraph Corporation. Data capture terminal. 4,031,518, Cl. 364-200.000.

Holly, Sandor, to Atlantic Research Corporation. Process and apparatus for sensing defects on a smooth surface. 4,030,830, Cl. 356-109.000.

Holmen, Reynold E.; and Olander, Stanley J., to Minnesota Mining and Manufacturing Company. Paint composition for marking paved surfaces. 4,031,048, Cl. 260-22.0CQ.

Holt, Jan D.: *See—*
Garner, Gerald D.; Hammonds, James C.; Holt, Jan D.; and Melcher, Conway H., 4,030,424.

Holz, George E.; and Ogle, James A., to Burroughs Corporation. Information display and method of operating with storage. 4,031,429, Cl. 315-169.0TV.

Holz, George E., to Berkeley Varitronics Systems. Communication system. 4,031,543, Cl. 358-86.000.

Holz, George Ernest. Proximity switching system. 4,031,408, Cl. 307-116.000.

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Holzl, Ludwig: *See—*
Reisinger, Konrad; and Holzl, Ludwig, 4,031,316.

Honda Giken Kogyo Kabushiki Kaisha: *See—*
Hashimoto, Michiyoshi; and Shako, Hisahumi, 4,030,561.
Tanaka, Minoru; and Otake, Syoichi, 4,030,460.

Honeywell Inc.: *See—*
Bernal G., Enrique; Koepke, Barry G.; and Macklock, Ralph B., 4,031,190.

Honeywell Information Systems, Inc.: *See—*
Hirtle, Allen C., 4,031,517.

Honjo, Satoru; and Matsumoto, Seiji, to Fuji Photo Film Co., Ltd. Image recording method. 4,030,922, Cl. 96-1.00R.

Hood, Frederick E.; Mitchell, Donald K.; and Uhring, Gary S., to Hood Sailmakers, Inc. Boom gooseneck fitting providing mainsail roller-furling. 4,030,439, Cl. 114-106.000.

Hood, Henry Alexander, to Well Industries, Inc. Faired article. 4,030,401, Cl. 87-6.000.

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Hood, Frederick E.; Mitchell, Donald K.; and Uhring, Gary S., 4,030,439.

Hooker Chemicals & Plastics Corporation: *See—*
Bosa, Primo, 4,031,001.
Graham, John C., 4,031,142.
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Hooper, Gerald E., to Varian Associates. Keying waveform generator for spectrophotometer. 4,030,829, Cl. 356-97.000.

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Bridwell, John W.; Hopkins, Donald L.; and Lohbauer, Kenneth R., 4,030,623.

Hoppe, Walter, to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V. Electron microscope including improved means for determining and correcting image drift. 4,031,391, Cl. 250-311.000.

Hori, Kenji; and Nakamura, Shigeo, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Multicylinder engine. 4,030,459, Cl. 123-52.00M.

Horie, Noboru, to Hitachi, Ltd. Method of manufacturing a semiconductor integrated circuit device. 4,030,954, Cl. 156-628.000.

Horikoshi, Yoshiji; and Furukawa, Yoshitaka, to Nippon Telegraph and Telephone Public Corporation. Method of effecting liquid phase epitaxial growth of group III-V semiconductors. 4,030,949, Cl. 148-171.000.

Hornig, Carl F.; Kroupa, Kenneth M.; and Simpson, Earle E., to Western Electric Company, Inc. Method of hydrothermally growing quartz. 4,030,966, Cl. 156-623.00Q.

Horning, Bent, to F. L. Smidth & Co. Magazine for bags such as sacks. 4,030,528, Cl. 141-1.000.

Hornschu, Joachim; and Jung, Arthur, to Carl Zeiss-Stiftung, Carl Zeiss. Binocular telescope. 4,030,808, Cl. 350-36.000.

Horowitz, Robert M.: *See—*
Guadagni, Dante G.; Horowitz, Robert M.; Gentili, Bruno; and Maier, Vincent P., 4,031,265.

Horsten, Johannes Bernardus, to U.S. Philips Corporation. Integrated storage system with parallel connection lines containing a resistor. 4,031,523, Cl. 340-173.00R.

Hosoe, Kazuya; Aizawa, Hiroshi; Matsumoto, Seiichi; and Yokota, Hideo, to Canon Kabushiki Kaisha. Method for detecting visibility of image of an object and a device therefor. 4,031,383, Cl. 250-201.000.

Hoult, David P., to American Fish Company. Fish raising. 4,030,450, Cl. 119-3.000.

Houston, John M.: *See—*
Whetten, Nathan Rey; and Houston, John M., 4,031,396.

Howard, Fred, to Wix Corporation. Article display stand. 4,030,608, Cl. 211-131.000.

Howard, Harold P. Headrest. 4,030,781, Cl. 297-397.000.

Howell Instruments, Inc.: *See—*
Hartung, Robert L., 4,031,366.

Hoyt, Carl E.: *See—*
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HPM Corporation: *See—*
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Hubatsch, Gotthard: *See—*
Chitil, Manfred; and Hubatsch, Gotthard, 4,031,309.

Hubbard, James L. Food processing apparatus. 4,030,162, Cl. 17-1.00R.

Huellwegen, Josef, to Nixdorf Computer AG. Circuit arrangement for the ungrounded transmission of signals through testing points in communication systems. 4,031,480, Cl. 330-10.000.

Hughes Aircraft Company: *See—*
Buchman, William W., 4,030,686.
Lee, Don H.; Weller, Kenneth P.; and Thrower, William F., 4,030,943.
Miller, Leroy J.; and Grinberg, Jan, 4,030,997.
Wilmot, Richard D., 4,031,364.

Hughes, Theodore R.; and McCarty, Glenn L. Reel-to-reel tape to tape cartridge adapter. 4,031,555, Cl. 360-94.000.

Hunt, Gary: *See—*
Linck, Donald W., II; and Kaprelian, George, 4,030,197.

Hunt Manufacturing Co.: *See—*
Alexander, Robert L., 4,030,610.

Hunt, Robert P.; and Steffek, Robert J., to Picker Corporation. X-ray soft filmer. 4,031,400, Cl. 250-468.000.

Husky, Glover A. Field to gin cotton handling and storge systems. 4,031,003, Cl. 209-3.000.

Hutai, Hubert: *See—*
Schwuchow, Norbert; and Hutai, Hubert, 4,030,744.

Hutchinson, John Jefferson: *See—*
Anthony, Andrew James; and Hutchinson, John Jefferson, 4,030,975.

Huthwelker, Dirk: *See—*
Franz, Arnold; Huthwelker, Dirk; and Jacob, Lothar, 4,031,313.

Hyde, George S., to United States of America, Army. Interlocked joint. 4,030,850, Cl. 403-288.000.

Hydril Company: *See—*
Mott, James D., 4,030,550.

Hydrometals, Inc.: *See—*
Borys, Emil G., Jr., 4,031,540.

I-T-E Imperial Corporation: *See—*
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I-T-E Imperial Corporation EFCOR Division: *See—*
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Ibbotson, Arthur, to Imperial Chemical Industries Limited. Diphenylmethane diisocyanate compositions. 4,031,026, Cl. 252-182.000.

Ichikawa, Kazuo, to Olympus Optical Co., Ltd. A.C. voltage regulator employing thyristor. 4,031,458, Cl. 323-36.000.

Ichino, Kazuo: *See—*
Fujiwara, Hideo; Ichinose, Yukio; Taniguchi, Satoshi; Kobayashi, Tsutomu; Ichino, Kazuo; Itoh, Michiyasu; Uesaka, Yasutaro; Inose, Fumiyuki; and Ueno, Sadayasu, 4,031,496.

Ichinose, Yukio: *See—*
Fujiwara, Hideo; Ichinose, Yukio; Taniguchi, Satoshi; Kobayashi, Tsutomu; Ichino, Kazuo; Itoh, Michiyasu; Uesaka, Yasutaro; Inose, Fumiyuki; and Ueno, Sadayasu, 4,031,496.

ICI Australia Limited: *See—*
Forsyth, Bruce Adam; Pryor, David Ernest; McGarry, Errol James; and Harney, Donald William Gerald, 4,031,249.

Idel, Karsten-Josef; Saleck, Wilhelm; Wolff, Erich; and Freitag, Dieter, to AGFA-Gevaert, A.G. Photographic silver halide emulsion. 4,030,929, Cl. 96-114.000.

IDN Inventions and Development of Novelties AG: *See—*
Ackeret, Peter, 4,030,601.

Iglesias, Jose Juan. Anti-arcing resectoscope. 4,030,502, Cl. 128-303.150.

Iljima, Zenshiro, to Kawamura Seichu Kogyo Kabushiki Kaisha. Coloring composition for line- or pattern- drawing elements. 4,030,934, Cl. 106-23.000.

Iliev, Iliya Dimitrov: *See—*
Budevski, Evgueni Bogdanov; Iliev, Iliya Dimitrov; Kaisheva, Anastasiya Rostislavova; Gamburtzev, Sergei Sergeev; and Vakanova, Elena Borisova, 4,031,033.

Imperial Chemical Industries Limited: *See—*
Barrault, Michel Raymond, 4,030,998.
Boyd, Violet; Fishwick, Brian Ribbons; and Glover, Brian, 4,030,881.
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Inazaki, Tsunenori: *See—*
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Indicon Inc.: *See—*
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Ing. Alfred Schmidt GmbH: *See—*
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Ing. C. Olivetti & C., S.p.A.: *See—*
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Ing. Polin & C di Polin Ing. Antonio & C. S.a.s.: *See—*
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Ingenior F. Selmer A/S: *See—*
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Ingersoll-Rand Company: *See—*
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Ingraham, Glen E., to Colorguard Corporation. Insulated and grounded fence fabric. 4,031,284, Cl. 428-222.000.

Ingram, Arthur: *See—*
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Ingrey, Sidney Ivor Joseph; Nentwich, Heinz Josef; and Poulsen, Robert Gordon, to Northern Telecom Limited. Gaseous plasma etching of aluminum and aluminum oxide. 4,030,967, Cl. 156-643.000.

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Inose, Fumiyuki: *See—*
Fujiwara, Hideo; Ichinose, Yukio; Taniguchi, Satoshi; Kobayashi, Tsutomu; Ichino, Kazuo; Itoh, Michiyasu; Uesaka, Yasutaro; Inose, Fumiyuki; and Ueno, Sadayasu, 4,031,496.

Inoue, Naohiko: *See—*
Yanagishima, Takayuki; and Inoue, Naohiko, 4,031,527.

Insolio, Thomas A., to Fletcher-Terry Company, The. Scoring device with edge guide. 4,030,195, Cl. 30-164.900.

Institut National de la Sante et de la Recherche Medicale (Inserm): *See—*
Delhaye, Michel; Moschetto, Yves J. M.; and Dhamelincourt, Paul, 4,030,827.

Institutul de Cercetare Proiectare si Documentare Pentru Industria Materialelor de Constructii: *See—*
Stanasila, Virgil Corneliu; Florica, Mihai; and Lungu, Onut Antoniu, 4,030,879.

Instrulab Incorporated: *See—*
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Intel Corporation: *See—*
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Interlake, Inc.: *See—*
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InterMed, Inc.: *See—*
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International Business Machines Corporation: *See—*
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Hall, Phil H.; and Irwin, John W., 4,031,521.
Keenan, William Andrew; and Kroll, Charles Thomas, 4,030,942.
Krause, Donald Lester; and Presley, Kenneth Dale, 4,030,923.
Martin, Blair Robertson; Meier, Johann Hans; and Raider, Jerry Wesley, 4,030,591.
Varker, Kenneth James, 4,030,190.

International Environmental Dynamics: *See—*
Labie, Allan S.; Thornton, Charles; Lew, Irwin Paul; and Gutman, Abraham, 4,030,257.

International Flavors & Fragrances Inc.: *See—*
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Sanders, James Milton; Taylor, William I.; Hill, Ira D.; and Kryschuk, John J., 4,031,161.
Schreiber, William Lewis; Mosciano, Gerard Joseph; Pittet, Alan O.; Vock, Manfred; and Shuster, Edward Joseph, 4,031,140.
Wilson, Richard A.; Pascale, John V.; and Vock, Manfred Hugo, 4,031,257.
Wilson, Richard Arnold; Katz, Ira; Vock, Manfred H.; and Shuster, Edward J., 4,031,034.

International Harvester Company: *See—*
Boetto, Charles; Orkwiszewski, Wayne L.; and Connor, Donald E., 4,030,551.
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International Nuclear Fuel Co., Ltd.: *See—*
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International Telephone and Telegraph Corporation: *See—*
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Inverness Corporation: *See—*
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Ironside's Machine & Welding Ltd.: *See—*
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Irvine, Robert; and Luperti, Harry E., to Pitney-Bowes, Inc. Sheet-material separator and feeder system. 4,030,722, Cl. 271-10.000.

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Irwin, John W.: *See—*
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Isa, Hiroshi; Ukigai, Toshiyuki; Tominaga, Anri; Taniyasu, Ryozo; and Nagayama, Masuzo, to Lion Fat & Oil Co., Ltd. Method for preparation of polyolefin oil. 4,031,158, Cl. 260-683.15B.

Isbister, Eric J., to Sperry Rand Corporation. Multiple frequency navigation radar system. 4,031,535, Cl. 343-6.50R.

Ishida, Teisuke, to Japan Patent Center Inc. Compressed air generating device for forklift trucks. 4,030,294, Cl. 60-407.000.

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Ogawa, Yutaka; and Hirai, Hiroshi, 4,030,577.

Ishizawa, Seiya: *See—*
Ishizawa, Toushichi, 4,030,951.

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Isikawa, Tosio; Ozawa, Jun; and Kikuchi, Takehiro, to Hitachi, Ltd. Protective gas cap for electric power apparatuses. 4,031,347, Cl. 200-148.00B.

Isobe, Mitsuhide, to Shimano Industrial Company, Limited. Front derailleur for bicycle. 4,030,374, Cl. 74-217.00B.

Isooo, Tomoyuki: *See—*
Suda, Kazuyoshi; Isono, Tomoyuki; Uchida, Takashi; and Tsuda, Kiyoshi, 4,030,607.

Itagaki, Tadasi, to Pioneer Electronic Corporation; and Tokorozawa Electrooic Corporation. Loud speaker with stable damping. 4,030,564, Cl. 181-166.000.

Itaya, Nobushige: *See—*
Fujimoto, Keimei; Ohno, Nobuo; Okuno, Yoshitoshi; Mizutani, Toshio; Ohno, Isao; Hirano, Masachika; Itaya, Nobushige; and Matsuo, Takashi, 4,031,235.

Ito, Kakutaro, to Ito, Kakutaro; and Katoh, Yuzoh. One-piece sandal made from a flat sheet. 4,030,212, Cl. 36-11.500.

Ito, Susumu: *See—*
Asao, Makoto; Ito, Susumu; and Umehara, Hidetoshi, 4,031,171.

Ito, Yasuo; and Suzuki, Yoshitake, to Nippon Steel Corporation. Apparatus for continuous casting using linear magnetic field for core agitation. 4,030,534, Cl. 164-147.000.

Itoh, Hirotaka: *See—*
Nagata, Yasunori; Itoh, Hirotaka; Yazaki, Susumu; Hamamura, Takeyuki; and Yoshiya, Shigeo, 4,030,884.

Itoh, Michiyasu: *See—*
Fujiwara, Hideo; Ichinose, Yukio; Taniguchi, Satoshi; Kobayashi, Tsutomu; Ichino, Kazuo; Itoh, Michiyasu; Uesaka, Yasutaro; Inose, Fumiyuki; and Ueno, Sadayasu, 4,031,496.

Itoh, Yasuo; Suzuki, Yoshitake; Shibutami, Hirohiko; Hirano, Koichi; and Tagami, Muneo, to Nippon Steel Corporation; and Kabushiki Kaisha Yaskawa Denki Seizakusho. Continuous casting system. 4,030,533, Cl. 164-147.000.

ITT Industries, Incorporated: *See—*
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Schat, Hermannus; and Freyberger, Laurin Clemens, 4,031,411.

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J. I. Case Company: *See—*
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Parquet, Donald J.; and Pedersen, Carl O., 4,030,560.

J. M. Huber Corporation: *See—*
Kunkle, Albert C.; and Kollmar, Carl E., Jr., 4,030,941.

Jablecki, Elizabeth S. Liquid phase separator with valved outlet means. 4,031,032, Cl. 210-474.000.

Jachimowicz, Ludwik, to General Cable Corporation. Shrinkable electrical cable core for cryogenic cable. 4,031,310, Cl. 174-15.00C.

Jackson, Edgar D., to Steel Web Corporation. Wood rivet and method of installation in a truss. 4,030,264, Cl. 52-693.000.

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Cobb, Delwin E.; Jackson, George J.; Livesay, Richard E.; and Stemler, Orrin A., 4,030,566.

Jackson, Richard A.; and Bolles, Theodore F., to Minnesota Mining and Manufacturing Company. Technetium-labeled complexes, production and use thereof. 4,031,198, Cl. 424-1.000.

Jackson, Thomas E., to Sandoz, Inc. Substituted 2H,3H-2,1-benzisothiazole-S-oxides, method of use and pharmaceutical compositions thereof. 4,031,227, Cl. 424-270.000.

Jacob, Daniel, to American Science & Engineering, Inc. Radiant energy imaging scanning. 4,031,401, Cl. 250-503.000.

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Jacob, Friedrich; and Morsch, Dieter, to Volkswagenwerk Aktiengesellschaft. Frame. 4,030,772, Cl. 280-106.00R.

Jacob, Lothar: *See—*
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Jagenberg-Werke AG: *See—*
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Jakobsson, Goran: *See—*
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James, Dean B.: *See—*
Colter, John Cecil; James, Dean B.; Keith, Walter Gill; and Akbari-Kenari, Reza, 4,031,029.

Jan Lelous, Arnoldus Willem, to Wavin B.V. Method of manufacturing plastic bags in a continuous way. 4,030,956, Cl. 156-290.000.

Janssen, Paul Adriaan Jao: *See—*
Soudijn, Willem; van Wijngaarden, Ineke; and Janssen, Paul Adriaan Jan, 4,031,226.

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Japan Patent Center Inc.: *See—*
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Jaquith, Burton Kent, to Technical Industries, Inc. Continuous weighing mechanism for fluids. 4,030,356, Cl. 73-195.000.

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Jefferson, Eva Imogene: *See—*
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Jerabek, Robert D., to PPG Industries, Inc. Cationic electrodepositable compositions of blocked NCO and acid salt of adduct of amine and polyeposide. 4,031,050, Cl. 260-29.2TN.

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Jeumont-Schneider: *See—*
Le Comte, Michel L., 4,031,378.

Jewett, Harold A. Pool diver safety and research apparatus. 4,030,147, Cl. 4-172.000.

Jin, Jung Il, to Stauffer Chemical Company. Flame-retardant binder comprising vinylidene halide-bis(hydrocarbyl)vinyl phosphonate polymer latices blended with antimony oxide and chloroparaffin. 4,031,054, Cl. 260-29.60T.

John Wyeth & Brother Limited: *See—*
Curran, Adrian Charles Ward; Crossley, Roger; and Hill, David George, 4,031,102.

Johnson, Curtis A.; and Prochazka, Svante, to General Electric Company. Strength improvement in machined SiC bodies. 4,031,178, Cl. 264-65.000.

Johnson, David W. Inflatable streamlining structure for vehicles. 4,030,779, Cl. 296-1.00S.

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Ramirez, Ernest R.; and Johnson, Dennis L., 4,031,006.

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Sung, Pei; and Schweder, Frederic James, 4,030,918.

Johnson, Melvin Kermit; and Pilarski, Regis Victor, to Firestone Tire & Rubber Company, The. Carrier support apparatus. 4,030,648, Cl. 224-31.000.

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Johnson, Wayne F.: *See—*
Bauer, Martin L.; Johnson, Wayne F.; and Lakomy, Dale G., 4,030,834.

Johnson, Wayne O., to Rohm and Haas Company. Process for preparing phenoxybenzoic acids. 4,031,131, Cl. 260-473.00G.

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Reber, Erwin; and Schollhorn, Fritz, 4,030,274.

Joslyn, Wallace G., to Dow Corning Corporation. Polyether based, high resilient polyurethane foam. 4,031,044, Cl. 260-2.5AH.

Juby, Peter Frederick; and Partyka, Richard Anthony, to Bristol-Myers Company. 1,6-Dihydro-6-oxo-2-(ortho-substituted phenyl)pyrimidine-5-carboxylic acid derivatives. 4,031,093, Cl. 260-251.00R.

Juillard, Michel: *See—*
Bouy, Pierre; Juillard, Michel; and Bourgeois, Jean-Luc, 4,031,041.

Jung, Arthur: *See—*
Hornschu, Joachim; and Jung, Arthur, 4,030,808.

Junge, Karl-Wilhelm: *See—*
Gahler, Siegfried; Juoge, Karl-Wilhelm; Fischer, Gunther; Scheithauer, Steffen; and Viola, Horst, 4,030,928.

Jurischka, Hans-Dieter: *See—*
Heinroth, Karl-August; Dietrich, Theo; Bach, Hans; and Jurischka, Hans-Dieter, 4,030,278.

Juste, S.A. Quimico-Farmaceutica: *See—*
Aparicio, Luis; Gayo, Nenesio; M° ; Martin, Jose Luis; and Ron, Armando, 4,031,243.

Justus, Edgar J., to Beloit Corporation. System compensating for pressure fluctuations in a paper machine headbox. 4,030,971, Cl. 162-216.000.

Juusela, Jyrki Tapani: *See—*
Aaltonen, Olavi August; Andersson, Bengt Torsten; Juusela, Jyrki Tapani; Palperi, Matti Johannes; and Tuominen, Tapio Kalevi, 4,030,915.

Kabel-und Metallwerke Gutehoffnungshutte Aktiengesellschaft: *See—*
Buttner, Karl; Boll, Jurgen; and Wolfel, Kurt, 4,030,174.

Kabushiki Kaisha Japan Metal Finishing Company: *See—*
Fujita, Shigeru; Murayama, Koichi; and Kaneda, Toyohito, 4,030,987.

Kabushiki Kaisha Kawai Oakki Seisakusho: *See—*
Kugisawa, Toshio, 4,030,395.

Kabushiki Kaisha Meidensha: *See—*
Hayashi, Masahiro; Haba, Masanori; Watanabe, Misuzu; and Hirano, Shinji, 4,031,498.

Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See—*
Miyamoto, Noriaki, 4,030,372.

Kabushiki Kaisha Yaskawa Denki Seisakusho: *See—*
Itoh, Yasuo; Suzuki, Yosbitake; Shibutami, Hirohiko; Hirano, Koichi; and Tagami, Muneo, 4,030,533.

Kadatz, Rudolf: *See—*
Kutter, Eberhard; Austel, Volkhard; Eberlein, Wolfgang; Heider, Joachim; Kobinger, Walter; Lillie, Christian; and Kadatz, Rudolf, 4,031,219.

Kadin, Saul B.; and Moore, Peter F., to Pfizer Inc. 1-Oxo-1H-6-substituted-pyrimido(1,2-a)-quinoline-2-carboxylic acids and esters useful as antiulcer agents. 4,031,217, Cl. 424-251.000.

Kadowaki, Hidejiro: *See—*
Takahashi, Toru; Nakahata, Kimio; and Kadowaki, Hidejiro, 4,030,447.

Kagaya, Mineo: *See—*
Sugiura, Kensuke; Kagaya, Mineo; Fujisou, Tokuo; Aoki, Hiroyuki; Takehara, Takeichiro; and Kurata, Shigenori, 4,031,020.

Kahan, Frederick M., to Merck & Co., Inc. Antibacterial composition comprising 3-fluoro-D-alanine or deutero analog in combination with auto-antagonist inhibitor. 4,031,231, Cl. 424-272.000.

Kahaner, Joel M., to Goodyear Tire & Rubber Company, The. Method and apparatus for splicing tire cord fabric. 4,030,653, Cl. 227-25.000.

Kaiser, Peter, to Bell Telephone Laboratories, Incorporated. Method for drawing fibers. 4,030,901, Cl. 65-2.000.

Kaisheva, Anastasiya Rostislavova: *See—*
Budevski, Evgueni Bogdanov; Iliev, Iliya Dimitrov; Kaisheva, Anastasiya Rostislavova; Gamburtzev, Sergei Sergeev; and Vakanova, Elena Borisova, 4,031,033.

Kaji, Ryuichi: *See—*
Akimoto, Hidetoshi; Kaji, Ryulchi; Kikuchi, Hideo; Hishinuma, Yukio; and Arikawa, Yoshijiro, 4,031,185.

Kajita, Yasumichi: *See—*
Fujii, Setsuro; Kajita, Yasumichi; Hiraku, Seizi; Kira, Heizo; Aishita, Hideki; Muryobayashi, Keiko; Terashima, Hiroshi; Akimoto, Akira; Taniguchi, Ken; and Wada, Minoru, 4,030,977.

Kaken Chemical Co., Ltd.: *See—*
Sasaki, Kazuya; Naito, Takanobu; Momoki, Yoshio; Sega, Toshio; and Satomi, Toshiyuki, 4,031,215.

Kalal, Jaroslav; Coupek, Jiri; Pokorny, Svatopluk; Svec, Frantisek; and Bouchal, Karel. Three-dimensional polymeric gel materials containing phosphoric acid residues capable of dissociation and a method for their preparation. 4,031,037, Cl. 260-2.20R.

Kali-Chemie Aktiengesellschaft: *See—*
Becher, Wilfried; and Massonne, Joachim, 4,031,193.

Kallmann, George T.; and Waddell, Theodore P., to United States of America, Navy. Noise resistant zone penetration detection system. 4,031,534, Cl. 343-12.0MD.

Kalopissis, Gregoire; and Bugaut, Andree, to Societe Anonyme dite: L'Oreal. 2-Amino-4-hydroxy-5-chloro toluene and the hydrochloride thereof. 4,031,160, Cl. 260-575.000.

Kalopissis, Gregoire; and Vanlerberghe, Guy, to Societe Anonyme dite: L'Oreal. Manufacture of food powders. 4,031,263, Cl. 426-588.000.

Kamas Industri Aktiebolag: *See—*
Borgqvist, Lennart Rickard, 4,030,672.

Kammerer, Archer W., Jr.; and Curington, Alfred R., to Bakerdrill, Inc. Bore hole airhammer and anvil bit. 4,030,554, Cl. 173-17.000.

Kampe, Robert F., to Chandler Evans Inc. Thrust augmentation technique and apparatus. 4,030,289, Cl. 60-204.000.

Kamyr Aktiebolag: *See—*
Skretting, Arne, 4,031,013.

Kandler, Joachim: *See—*
Vogt, Wilhelm; Auer, Eberhard; Lenz, Gunter; Merkenich, Karl; Henning, Klaus; and Kandler, Joachim, 4,031,022.

Kanebo, Ltd.: *See—*
Nagata, Yasunori; Itoh, Hirotaka; Yazaki, Susumu; Hamamura, Takayuki; and Yoshiya, Shigeo, 4,030,884.

Kaneda, Toyohito: *See—*
Fujita, Shigeru; Murayama, Koichi; and Kaneda, Toyohito, 4,030,987.

Kanegafuchi Chemical Industries Co., Ltd.: *See—*
Suzuki, Kazuo; Hayashi, Yoshiaki; and Nagamine, Seiichi, 4,031,287.

Kaneko, Takashi; Yuminaka, Takeo; Iwasaka, Tatsuo; and Kinoshita, Hiroshi, to Hitachi, Ltd. Elevator control system. 4,030,571, Cl. 187-29.00R.

Kaneko, Takashi; Iwasaka, Tatsuo; and Yuminaka, Takeo, to Hitachi, Ltd. Elevator control apparatus. 4,030,572, Cl. 187-29.00R.

Kaneko, Yoichi: *See—*
Shinkawa, Keiro; Sodeyama, Chiuichi; Kaneko, Yoichi; and Kimura, Katsuhiro, 4,031,472.

Kanner, Bernard: *See—*
Prokai, Bela; and Kanner, Bernard, 4,031,042.

Kantz, Don B.; and Lezotte, Tim F., to Ford Motor Company. Hydrogen compression system for Stirling engine power control. 4,030,297, Cl. 60-521.000.

Kapl, Ladislav: *See—*
Rambousek, Miroslav; Kapl, Ladislav; and Mladek, Milos, 4,030,279.

Kaprelian, George: *See—*
Linck, Donald W., II; and Kaprelian, George, 4,030,197.

Karady, Sandor; and Amato, Joseph S., to Merck & Co., Inc. Process for cleavage of 7-amino-adipoylamino side chain in cephalosporins. 4,031,086, Cl. 260-243.00C.

Karlsson, Tom Orvar Bjorn, to Nordnero AB. Method for liquid level control. 4,030,521, Cl. 137-566.000.

Karp, Joel Allen: *See—*
Reed, John Anthony; and Karp, Joel Allen, 4,031,522.

Karr, Allan V., to Electrostatic Equipment Corporation. Directed flow ionization chamber in electrostatic coating. 4,030,446, Cl. 118-654.000.

Kashio, Toshio, to Casio Computer Co., Ltd. Apparatus for transmitting changeable length records having variable length words with interspersed record and word positioning codes. 4,031,515, Cl. 364-200.000.

Kashio, Toshio, to Casio Computer Co., Ltd. Transmission data processing device. 4,031,516, Cl. 364-200.000.

Kasik, Robert L.; and Peterson, Marvin A., to Beatrice Foods Co. Instant cheese, cheese sauces and related compositions. 4,031,254, Cl. 426-573.000.

Kastning, Ernst-Guenther: *See—*
Bronstert, Klaus; Fahrbach, Gerhard; Krahe, Eduard; Ladenberger, Volker; Kastning, Ernst-Guenther; Mittnacht, Hans; Willersinn, Herbert; and Trieschmann, Hans-Georg, 4,031,166.

Kasuga, Akira: *See—*
Suzuki, Osamu; Akashi, Goro; Kasuga, Akira; and Sega, Kenji, 4,030,685.

Kathawala, Faizulla G., to Sandoz, Inc. Phenoxyphenyl imidazolyl methanols and ketone derivatives thereof. 4,031,233, Cl. 424-273.000.

Kato, Iwao: *See—*
Sonobe, Shigeru; Watanabe, Makoto; Kato, Iwao; and Sato, Tomoyoshi, 4,030,828.

Kato, Mikio, to Nippon Felt Co., Ltd. Bed for the invalid. 4,030,149, Cl. 5-90.000.

Kato, Yoshiro; and Fujita, Choichi, to Sony Corporation. Plural receiving and recording television system. 4,031,548, Cl. 358-188.000.

Katoh, Yuzoh: *See—*
Ito, Kakutaro, 4,030,212.

Katz, Ira: *See—*
Wilson, Richard Arnold; Katz, Ira; Vock, Manfred H.; and Shuster, Edward J., 4,031,034.

Kaufmann, Wilfried: *See—*
Bauer, Klaus; Frommer, Werner; Kaufmann, Wilfried; Metzger, Georg; Scheer, Martin; Schmidt, Delf; Schroder, Theo; and Schafer, Dietmar, 4,031,207.
Bauer, Klaus; Frommer, Werner; Kaufmann, Wilfried; Metzger, Karl Georg; Scheer, Martin; Schmidt, Delf; Schroder, Theo; and Schafer, Dietmar, 4,031,208.

Kaut, William, Jr. Leakproof coupling means for garden hoses and the like. 4,030,778, Cl. 285-174.000.

Kawakami, Katsuhiko: *See—*
Yamaguchi, Kineo; Kawakami, Katsuhiko; and Nakamoto, Yukimasa, 4,031,031.

Kawamura Seichu Kogyo Kabushiki Kaisha: *See—*
Iljima, Zenshiro, 4,030,934.

Kawasaki, Kunijiro: *See—*
Nagatu, Toshio; Kawasaki, Kunijiro; Takahama, Ryuichiro; Miyatani, Yoshifusa; and Funakoshi, Sozo, 4,030,441.

Kawneer Company, Inc.: *See—*
Sukolics, Ronald D.; and Biebuyck, Lawrence F., 4,030,260.

Kazahaya, Masahiro; and Bonner, John J., to Fischer & Porter Co. Pressure transmitter. 4,030,366, Cl. 73-406.000.

Keasling, David E. Knurling tool. 4,030,331, Cl. 72-110.000.

Keedy, David Edward: *See—*
Davis, Warren Wiley; and Keedy, David Edward, 4,030,288.

Keeling, Ronald James, to Formica Corporation. Flocked metallic laminated wallcoverings. 4,031,281, Cl. 428-90.000.

Keen, Everett M.; and Siciliano, Anthony J., to Diamond International Corporation. Feed dispensing hopper. 4,030,452, Cl. 119-52.00B.

Keenan, William Andrew; and Kroll, Charles Thomas, to International Business Machines Corporation. Semiconductor masking for device fabrication utilizing ion implantation and other methods. 4,030,942, Cl. 148-1.500.

Keezer, Richard C.: *See—*
Griffiths, Clifford H.; and Keezer, Richard C., 4,031,109.

Kefauver, Bernard C.; and Little, Norman, to United States of America, Health, Education and Welfare. Apparatus for capping and uncapping containers. 4,030,271, Cl. 53-305.000.

Keifert, Hibbard G.; and Waters, Frank J., deceased (by Waters, Ethel M., administratrix), to Fansteel Inc. Lined equipment with dual base metal inserts. 4,030,848, Cl. 403-272.000.

Keifert, Hibbard G.; and Waters, Frank J., deceased (by Waters, Ethel M., administratrix), to Fansteel Inc. Lined equipment and method of fabrication. 4,030,849, Cl. 403-272.000.

Keith, Thomas R., Jr., to Continental Oil Company. Transducer positioner for testing tubes from inside diameter. 4,030,370, Cl. 73-67.80S.

Keith, Walter Gill: *See—*
Colter, John Cecil; James, Dean B.; Keith, Walter Gill; and Akbari-Kenari, Reza, 4,031,029.

Keller Corporation, The: *See—*
Keller, Leonard J., 4,030,893.

Keller & Knappich Augsburg Zweigneiderlassung der Industrie-Werke Karlsruhe Augsburg Aktienegesellschaft: *See—*
Richter, Hans, 4,030,617.

Keller, Leonard J., to Keller Corporation, The. Method of preparing low-sulfur, low-ash fuel. 4,030,893, Cl. 44-1.00B.

Kelley, Norman S.; and Pearne, Florentin J., to Aircraft Mechanics, Inc. Semi-automatic palletizer. 4,030,618, Cl. 214-6.00P.

Kelvinator, Inc.: *See—*
Bunce, Donald A., 4,030,870.

Kemper, Eugene L. Heating treatment method and system of utilizing same. 4,030,947, Cl. 148-12.900.

Kendall Company, The: *See—*
Binard, William J.; Ciarico, Anthony J.; Anglada, Leonard R.; and Patel, Bhupendra C., 4,030,497.
Hasty, James H., 4,030,488.

Kennedy, Joseph P.: *See—*
Thaler, Warren A.; Buckley, Donald J.; and Kennedy, Joseph P., 4,031,300.

Kenny, Garry R.: *See—*
Sommer, Edward J., Jr.; Kenny, Garry R.; Knoll, Frank S.; and Mitchell, David W., 4,031,004.

Kent, David Earl: *See—*
Dempsey, Edward Justin; and Kent, David Earl, 4,031,437.

Kenyon, David L. Padlock with protected slide bolt and locking means. 4,030,321, Cl. 70-34.000.

Kern, Edmund R., to International Telephone and Telegraph Corporation. Emissive coating for electrodes. 4,031,426, Cl. 313-346.00R.

Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung: *See—*
Guggi, Diether Josef; and Klein, Rolf, 4,030,615.
Holzbrecher, Horst, 4,031,562.
Neef, Hanns-Joachim, 4,030,974.

Kersten, Gunter: *See—*
Aldinger, Ulrich; and Kersten, Gunter, 4,030,405.

Keske, Frank E., to Caterpillar Tractor Co. Rotary drive assembly. 4,030,377, Cl. 74-412.00R.

KESO AG: *See—*
Ehrat, Kurt, 4,030,325.

Kessler, Clarence W., to NCR Corporation. Data processing machine. 4,030,589, Cl. 197-1.00R.

Kessler, Saul, to Aidlin, Joseph W. Chemical surface coating bath. 4,031,027, Cl. 252-186.000.

Khaber, Nikolai Vasilievich: *See—*
Chuiko, Alexei Alexeevich; Tertykh, Valentin Anatolievich; Sobolev, Vilyam Alexandrovich; Maschenko, Valery Mikhailovich; Pavlov, Vyacheslav Valentinovich; Chugai, Alexei Dmitrievich; Khaber, Nikolai Vasilievich; Kondratenko, Anatoly Borisovich; Vatamanjuk, Vasily Ivanovich; Khoma, Mikhail Ivanovich; Kutin, Alexandr Nikolaevich; Shaposhnikov, Jury Davydovich; and Galashina, Malvina Leontievna, 4,030,940.

Khanna, Satya Pal, to Bell Telephone Laboratories, Incorporated. Hybrid integrated circuit including thick film resistors and thin film conductors and technique for fabrication thereof. 4,031,272, Cl. 427-96.000.

Khatti, Ramkishan; and Lourigan, Patrick M., to J. I. Case Company. Control valve for tractor-implement hydraulic system. 4,030,295, Cl. 60-445.000.

Khcheyan, Khachik Egorovich; Revenko, Olga Mikhailovna; Shatalova, Alla Nikolaevna; Gelperina, Eleonora Grigorievna; Agrinskaya, Lidia Ivanovna; and Muradian, Georgy Avanesovich. Method of preparing acrylonitrile. 4,031,128, Cl. 260-465.900.

Khoe, Giok Djan, to U.S. Philips Corporation. Method of coupling light conductors. 4,030,810, Cl. 350-96.00C.

Khoe, Giok Djan; Kuyt, Gerard; and Franken, Adrianus Jacobus Jozef, to U.S. Philips Corporation. Device for coupling a light source to an optical fiber. 4,030,811, Cl. 350-96.00C.

Khoma, Mikhail Ivanovich: *See—*
Chuiko, Alexei Alexeevich; Tertykh, Valentin Anatolievich; Sobolev, Vilyam Alexandrovich; Maschenko, Valery Mikhailovich, Pavlov, Vyacheslav Valentinovich; Chugai, Alexei Dmitrievich; Khaber, Nikolai Vasilievich; Kondratenko, Anatoly Borisovich; Vatamanjuk, Vasily Ivanovich; Khoma, Mikhail Ivanovich; Kutin, Alexandr Nikolaevich; Shaposhnikov, Jury Davydovich; and Galashina, Malvina Leontievna, 4,030,940.

Kibbel, William Henry, Jr.: *See—*
Goldstein, David; Kibbel, William Henry, Jr.; and Hollenbach, Roger C., 4,031,090.

Kidratschky, Hermann: *See—*
Wagner, Alfred; and Kidratschky, Hermann, 4,030,328.
Wagner, Alfred; and Kidratschky, Hermann, 4,030,334.

Kiener, Christian, to Tex International, S.A. Multiple loom. 4,030,526, Cl. 139-18.000.

Kieserling & Albrecht: *See—*
Koch, Rolf Eckart; and Fangmeier, Ralf, 4,030,332.

Kihara, Toshimasa, to Hitachi, Ltd. Addressing system in an information processor. 4,031,514, Cl. 364-200.000.

Kikuchi, Hideo: *See—*
Akimoto, Hidetoshi; Kaji, Ryuichi; Kikuchi, Hideo; Hishinuma, Yukio; and Arikawa, Yoshijiro, 4,031,185.

Kikuchi, Tadao, to Hitachi, Ltd. Three-state discernment circuit. 4,031,410, Cl. 307-209.000.

Kikuchi, Takehiro: *See—*
Isikawa, Tosio; Ozawa, Jun; and Kikuchi, Takehiro, 4,031,347.

Kim, Young Sul. Methampicillin lysinate and its method of manufacturing. 4,031,076, Cl. 260-239.100.

Kimberly-Clark Corporation: *See—*
Melnikov, Igor V., 4,030,629.

Kimmon Electric Co., Ltd.: *See—*
Tokudome, Katsumi; and Hattori, Shuzo, 4,031,428.

Kimura, Hiroyuki; and Saito, Takahiko, to Sony Corporation. Apparatus for magnetic recording and/or reproducing of signals received by one or more signal receiving devices. 4,031,334, Cl. 179-100.110.

Kimura, Katsuhiro: *See—*
Shinkawa, Keiro; Sodeyama, Chiuichi; Kaneko, Yoichi; and Kimura, Katsuhiro, 4,031,472.

King, Donald J.; Lura, Loren E.; and Maurushat, Ewalt, to General Motors Corporation. Gas bearing roll shell assembly with selective drive means. 4,030,784, Cl. 308-107.000.

King, Frederick N. Speed detection system for automobiles and other motor-driven objects. 4,031,510, Cl. 340-62.000.

King, Herbert Ray: *See—*
Brown, Robert Saul; Eschenbach, Paul W.; and King, Herbert Ray, 4,030,582.

Kinnucan, Walter Frederick, Jr. Longitudinal joint assembly in combination with a paving form. 4,030,693, Cl. 249-9.000.

Kinoshita, Hiroshi: *See—*
Kaneko, Takashi; Yuminaka, Takeo; Iwasaka, Tatsuo; and Kinoshita, Hiroshi, 4,030,571.

Kipping, Joachim: *See—*
Schmitt, Ludwig; and Kipping, Joachim, 4,030,165.

Kira, Heizo: *See—*
Fujii, Setsuro; Kajita, Yasumichi; Hiraku, Seizi; Kira, Heizo; Aishita, Hideki; Muryobayashi, Keiko; Terashima, Hiroshi; Akimoto, Akira; Taniguchi, Ken; and Wada, Minoru, 4,030,977.

Kirose, Yutaka: *See—*
Yamamoto, Kenichi; Kirose, Yutaka; and Maeda, Tooru, 4,030,454.

Kise, Masahiro: *See—*
Murai, Hiromu; Kitaguchi, Koji; Suminokura, Tatsuo; Sano, Akira; Kise, Masahiro; Kitano, Masahiko; and Tomita, Toshio, 4,031,303.

Kistner, Hermann; and Lehmann, Gunthart, to Maschinenbau Oppenweiler GmbH. Device for cutting through a pile of sheets with a revolving blade. 4,030,394, Cl. 83-409.000.

Kita, Shinichiro: *See—*
Shirayama, Kenzo; Kita, Shinichiro; and Fujimoto, Masanori, 4,031,062.

Kitada, Masaya: *See—*
Akae, Kiyoshi; Kitada, Masaya; and Uno, Yoshiyuki, 4,030,876.

Kitagawa, Norishisa: *See—*
Redwine, Donald J.; and Kitagawa, Norishisa, 4,031,415.

Kitaguchi, Koji: *See—*
Murai, Hiromu; Kitaguchi, Koji; Suminokura, Tatsuo; Sano, Akira; Kise, Masahiro; Kitano, Masahiko; and Tomita, Toshio, 4,031,303.

Kitano, Masahiko: *See—*
Murai, Hiromu; Kitaguchi, Koji; Suminokura, Tatsuo; Sano, Akira; Kise, Masahiro; Kitano, Masahiko; and Tomita, Toshio, 4,031,303.

Kiwior, Alexander Michael, to Bendix Corporation, The. Electromagnetically operated fuel injection valve. 4,030,668, Cl. 239-585.000.

Kiyota, Yuhiko: *See—*
Nakagami, Tatsuro; and Kiyota, Yuhiko, 4,030,465.

Klebansky, Alexandr Leibovich: *See—*
Ponomarev, Alexei Ivanovich; Sokolov, Sergei Vasilievich; Larionova, Julia Alexeevna; Klebansky, Alexandr Leibovich; Berenblit, Vsevolod Volfovich; Dolnakov, Jury Pavlovich; Yagupolsky, Lev Moiseevich; Malovik, Vladlen Vasilievich; Lozinsky, Miron Onufrievich; Belous, Viktor Mikhailovich; Gruz, Boris Efimovich; Alexeeva, Ljubov Antonovna; Ankudinov, Anatoly Kirillovich; and Ryazanova, Rufina Mikhailovna, 4,031,119.

Klein, Gerald Lee; and Meyer, Richard C., to Beckman Instruments, Inc. Fluorometer. 4,031,399, Cl. 250-461.00B.

Klein, Rolf: *See—*
Guggi, Diether Josef; and Klein, Rolf, 4,030,615.

Klelnschmit, Einhard; Tattermusch, Peter; and Haverbeck, Gunther, to Daimler-Benz Aktiengesellschaft. Connecting element for wheel suspensions of motor vehicles. 4,030,714, Cl. 267-21.00A.

Kling, Gunter: *See—*
Meisner, Rudolf; and Kling, Gunter, 4,030,773.

Klink, Otto W.: *See—*
Snyder, Robert O.; and Klink, Otto W., 4,030,596.

Klochko, Viktor Alexandrovich: *See—*
Yakshin, Alexandr Sergeevich; Novikov, Oleg Nikolaevich; Grechinsky, Dmitry Alexeevich; Klochko, Viktor Alexandrovich; and Rygalin, Viktor Georgievich, 4,030,339.

Klockner-Humboldt-Deutz Aktiengesellschaft: *See—*
Kunath, Paul, 4,030,878.

Klockner-Werke AG: *See—*
Chitil, Manfred; and Hubatsch, Gotthard, 4,031,309.

Klosky, John Patrick: *See—*
Holloran, Thomas Patrick; Braden, Arthur Buell; Foley, Jerrold Stokes; Maynard, James Lucian; Klosky, John Patrick; Dissauer, Gerald Anthony; Adams, Terrence Miller; and Lorenz, Allan Alfred, 4,031,518.

Kluge, Reimund: *See—*
Muller, Gunter; and Kluge, Reimund, 4,030,602.

Knipp, Ulrich: *See—*
Boden, Heinrich; and Knipp, Ulrich, 4,030,637.

Kniss, Edward L., Jr.; Hixenbaugh, Dennis L.; Maudlin, Jerry A.; and Brozenick, Nicholas J., to American Air Filter Company, Inc. Expansion joint. 4,030,740, Cl. 285-16.000.

Knoll A.G. Chemische Fabriken: *See—*
Cyrus, Richard; and Raschack, Manfred, 4,031,216.

Knoll, Frank S.: *See—*
Sommer, Edward J., Jr.; Kenny, Garry R.; Knoll, Frank S.; and Mitchell, David W., 4,031,004.

Kobayashi, Tadashi. Apparatus for simultaneous defiberization of waste paper stock and uniform dispersion and accumulation of the defiberized fine fiber stock for dry web formation. 4,030,865, Cl. 425-82.000.

Kobayashi, Takashi: *See—*
Taneda, Yukinori; and Kobayashi, Takashi, 4,030,614.

Kobayashi, Tsutomu: *See—*
Fujiwara, Hideo; Ichinose, Yukio; Taniguchi, Satoshi; Kobayashi, Tsutomu; Ichino, Kazuo; Itoh, Michiyasu; Uesaka, Yasutaro; Inose, Fumiyuki; and Ueno, Sadayasu, 4,031,496.

Kobinger, Walter: *See—*
Kutter, Eberhard; Austel, Volkhard; Eberlein, Wolfgang; Heider, Joachim; Kobinger, Walter; Lillie, Christian; and Kadatz, Rudolf, 4,031,219.

Kobzina, John W., to Chevron Research Company. Herbicidal N-haloacetyl-1,2-dihydro-4H-3,1-benzoxazine. 4,030,906, Cl. 71-66.000.

Koch, Claude V., to AMF Incorporated. Modular time sequence controller. 4,031,339, Cl. 200-38.0BA.

Koch, Frederick William: *See—*
Musser, Jerry Lee; and Koch, Frederick William, 4,031,023.

Koch, Rolf Eckart; and Fangmeier, Ralf, to Kieserling & Albrecht. Machine for straightening elongated workpieces. 4,030,332, Cl. 72-164.000.

Kochemidov, Atanas Dimitrov; Makedonski, Boris Georgiev; Dumanov, Ivan Minkov; Payakov, Stefan Georgiev; Galabov, Peter Konstantinov; and Atanassov, Haralampi Aangelov, to Zniitmash. Automatic machine for magnetic abrasive polishing of internal rotational surfaces. 4,030,249, Cl. 51-105.00R.

Koegel, Wolfram: *See—*
Tatzel, Hermann; Koegel, Wolfram; Beck, Gilbert; Zuern, Ludwig; and Caesar, Arndt Christian, 4,031,179.

Koehler, Peggy Joe: *See—*
York, Alvin, 4,030,654.

Koehnen, Edward L. Loader attachment for handling logs, bales and the like. 4,030,625, Cl. 214-147.00G.

Koepke, Barry G.: *See—*
Bernal G., Enrique; Koepke, Barry G.; and Maciolek, Ralph B., 4,031,190.

Kohan Sendan Kikai Kabushiki Kaisha: *See—*
Nagata, Toshio; Kawasaki, Kunijiro; Takahama, Ryuichiro; Miyatani, Yoshifusa; and Funakoshi, Sozo, 4,030,441.

Kohashi, Tadao; and Kurosawa, Toshiharu, to Matsushita Electric Industrial Co., Ltd. Control element having liquid layer attainable to geometrically uneven state in response to electrical signal. 4,030,813, Cl. 350-161.00S.

Kohler, Gunter A., to Minnesota Mining and Manufacturing Company. Process for forming carbonaceous fibers. 4,031,188, Cl. 423-447.600.

Kohout, Otto James: *See—*
Giles, Thomas Clyde; Kohout, Otto James; and Rinaldi, Gerald Michael, 4,031,414.

Koiwa, Seki; and Hasegawa, Hajime. Hair cutter. 4,030,196, Cl. 30-133.000.

Kojima, Kojiro; Sakurai, Yoshihisa; Sugai, Tetuya; and Motegi, Masayoshi, to Nippon Steel Corporation. Method and apparatus for automatically measuring distribution of reflectance of coals. 4,030,837, Cl. 356-209.000.

Kokado, Naoyuki; and Makino, Shinichi, to Tokyo Shibaura Electric Co., Ltd. Operation program-presetting system. 4,031,470, Cl. 325-396.000.

Kokubu, Yoshikazu: *See—*
Nakamura, Tadashi; Hagiwara, Hisami; and Kokubu, Yoshikazu, 4,031,000.

Kollmar, Carl E., Jr.: *See—*
Kunkle, Albert C.; and Kollmar, Carl E., Jr., 4,030,941.

Kollonitsch, Janos, to Merck & Co., Inc. Substitutive fluorination of organic compounds. 4,030,994, Cl. 204-159.110.

Kolokolov, Boris Alexeevich: *See—*
Ponomarenko, Nikolai Borisovich; Kononenko, Vadim Grigorievich; Stelmakh, Viktor Alexeevich; Kotelnikov, Vladimir Ivanovich; Valenya, Ivan Jurievich; Sarancha, Vladimir Nikolaevich; Petrenko, Anatoly Avramovich; Bozhko, Valery Pavlovich; Yatsenko, Sergei Vasilievich; Komnatny, Igor Pavlovich; Akhnazariants, Levon Khachaturovich; Strizhenko, Vitaly Evgenievich; Kolokolov, Boris Alexeevich; Maznichenko, Stanislav Anisimovich; Bozhko, Viktor Vasilievich; Bondarenko, Oleg Alexandrovich; and Zakirov, Robert Sharafutdinovich, 4,030,389.

Komnatny, Igor Pavlovich: *See—*
Ponomarenko, Nikolai Borisovich; Kononenko, Vadim Grigorievich; Stelmakh, Viktor Alexeevich; Kotelnikov, Vladimir Ivanovich; Valenya, Ivan Jurievich; Sarancha, Vladimir Nikolaevich; Petrenko, Anatoly Avramovich; Bozhko, Valery Pavlovich; Yatsenko, Sergei Vasilievich; Komnatny, Igor Pavlovich; Akhnazariants, Levon Khachaturovich; Strizhenko, Vitaly Evgenievich; Kolokolov, Boris Alexeevich; Maznichenko, Stanislav Anisimovich; Bozhko, Viktor Vasilievich; Bondarenko, Oleg Alexandrovich; and Zakirov, Robert Sharafutdinovich, 4,030,389.

Kondo, Toshihiro, to Kondo, Toshihiro; and Fuji Photo Film Co., Ltd. Spring drum. 4,030,567, Cl. 185-37.000.

Kondratenko, Anatoly Borisovich: *See—*
Chuiko, Alexei Alexeevich; Tertykh, Valentin Anatolievich; Sobolev, Vilyam Alexandrovich; Maschenko, Valery Mikhailovich; Pavlov, Vyacheslav Valentinovich; Chugai, Alexei Dmitrievich; Khaber, Nikolai Vasilievich; Kondratenko, Anatoly Borisovich; Vatamanjuk, Vasily Ivanovich; Khoma, Mikhail Ivanovich; Kutin, Alexandr Nikolaevich; Shaposhnikov, Jury Davydovich; and Galashina, Malvina Leontievna, 4,030,940.

Konig, Hans-Bodo; Metzger, Karl Georg; and Schrock, Wilfried, to Bayer Aktiengesellschaft. Penicillins and processes for their preparation and use. 4,031,229, Cl. 424-271.000.

Konishi, Toji, to Eisai Co., Ltd. Method for treating nervous bladder. 4,031,205, Cl. 424-94.000.

Konishiroku Photo Industry Co., Ltd.: *See—*
Akira, Kato; Akira, Itoh; Tohru, Uchida; and Masao, Ishihara, 4,030,921.

Konomi, Toshiaki: *See—*
Yamaguchi, Shunzo; Ozaki, Tadashi; and Konomi, Toshiaki, 4,030,464.

Kononenko, Vadim Grigorievich: *See—*
Ponomarenko, Nikolai Borisovich; Kononenko, Vadim Grigorievich; Stelmakh, Viktor Alexeevich; Kotelnikov, Vladimir Ivanovich; Valenya, Ivan Jurievich; Sarancha, Vladimir Nikolaevich; Petrenko, Anatoly Avramovich; Bozhko, Valery Pavlovich; Yatsenko, Sergei Vasilievich; Komnatny, Igor Pavlovich; Akhnazariants, Levon Khachaturovich; Strizhenko, Vitaly Evgenievich; Kolokolov, Boris Alexeevich; Maznichenko, Stanislav Anisimovich; Bozhko, Viktor Vasilievich; Bondarenko, Oleg Alexandrovich; and Zakirov, Robert Sharafutdinovich, 4,030,389.

Konstance, Richard P.: *See—*
Sullivan, John F.; Konstance, Richard P.; and Heiland, Wolfgang K., 4,031,252.

Konstant, Anthony N., to Speedrack Inc. Adjustable storage racks. 4,030,611, Cl. 211-191.000.

Kooch, Walter: *See—*
Dupont, John A.; Kooch, Walter; and Scott, Joseph D., 4,031,055.

Koppe, Herbert; Zeile, Karl; Kummer, Werner; Stahle, Helmut; and Danneberg, Peter, to Boehringer Ingelheim GmbH. Pharmaceutical compositions containing a 1-(2,6-dimethyl-phenoxy)-2-aminoalkane and method of use. 4,031,244, Cl. 424-330.000.

Kornfeld, Edmund C.: *See—*
Bach, Nicholas J.; Hall, David A.; and Kornfeld, Edmund C., 4,031,097.

Kortenbach & Rauh Kommanditgesellschaft: *See—*
Schultes, Tilmann, 4,030,514.

Koshar, Robert J., to Minnesota Mining and Manufacturing Company. Use of bis(fluoroaliphaticsulfonyl) imides in cationic polymerization. 4,031,036, Cl. 260-2.00N.

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Kotelnikov, Vladimir Ivanovich: *See—*
Ponomarenko, Nikolai Borisovich; Kononenko, Vadim Grigorievich; Stelmakh, Viktor Alexeevich; Kotelnikov, Vladimir Ivanovich; Valenya, Ivan Jurievich; Sarancha, Vladimir Nikolaevich; Petrenko, Anatoly Avramovich; Bozhko, Valery Pavlovich; Yatsenko, Sergei Vasilievich; Komnatny, Igor Pavlovich; Akhnazariants, Levon Khachaturovich; Strizhenko, Vitaly Evgenievich; Kolokolov, Boris Alexeevich; Maznichenko, Stanislav Anisimovich; Bozhko, Viktor Vasilievich; Bondarenko, Oleg Alexandrovich; and Zakirov, Robert Sharafutdinovich, 4,030,389.

Kotter, James I.: *See—*
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Kouda, Michihiro: *See—*
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Kouwenhoven, Adriaan P.: *See—*
Lukas, Joachim H.; Baardman, Frank; and Kouwenhoven, Adriaan P., 4,031,152.

Koyama, Masaya, to Goldwell GmbH. Apparatus for foaming liquid cosmetic substances. 4,030,665, Cl. 239-373.000.

Kozlowski, Matthew A.: *See—*
Pines, Seemon H.; and Kozlowski, Matthew A., 4,031,085.

Krabetz, Richard: *See—*
Engelbach, Heinz; Krabetz, Richard; Duembgen, Gerd; Willersinn, Carl-Heinz; Lebert, Ulrich; and Thiessen, Fritz, 4,031,135

Krafft, Werner: *See—*
Stahlke, Kurt-Rainer; Krafft, Werner; Meyer, Rudolf; and Rosenkranz, Hans Jurgen, 4,030,926.

Krahe, Eduard: *See—*
Bronstert, Klaus; Fahrbach, Gerhard; Krahe, Eduard, Ladenberger, Volker; Kastning, Ernst-Guenther; Mittnacht, Hans; Willersinn, Herbert; and Trieschmann, Hans-Georg, 4,031,166.

Krammer, Robert, to Standard Conveyor Company. Material handling system. 4,030,423, Cl. 104-172.00S.

Kraus, Edmund J.: *See—*
Kraus, Robert A.; and Kraus, Edmund J., 4,030,303.

Kraus, Robert A.; and Kraus, Edmund J. Waste heat regenerating system. 4,030,303, Cl. 60-688.000.

Krause, Donald Lester; and Presley, Kenneth Dale, to International Business Machines Corporation. Mixture of binder materials for use in connection with a charge transport layer in a photoconductor. 4,030,923, Cl. 96-1.500.

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Krauss, Helmut: *See—*
Moeller, Jurgen; Mitrach, Werner; Krauss, Helmut; and Schulte, Hubert, 4,031,459.

Kress, Dieter, to Mapal Dr. Kress KG. Reaming tool. 4,030,855, Cl 408-226.000.

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Keenan, William Andrew; and Kroll, Charles Thomas, 4,030,942.

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Kroupa, Kenneth M.: *See—*
Hornig, Carl F.; Kroupa, Kenneth M.; and Simpson, Earle E., 4,030,966.

Kruklitis, Karlis: *See—*
Christou, Kyriakos; Kruklitis, Karlis; and Burger, William R., 4,031,359.

Krunchak, Vladimir Georgievich: *See—*
Shults, Mikhail Mikhailovich; Parfenov, Anatoly Ivanovich; Shnypikov, Alexandr Dmitrievich; Krunchak, Vladimir Georgievich; Evnina, Sarra Borisovna; Dolidze, Vladimir Alexandrovich; and Tarasova, Valentina Mikhailovna, 4,030,935.

Kryschuk, John J.: *See—*
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Kubik Hydradrives, Inc.: *See—*
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Kubinek, Milan: *See—*
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Kuchenmeister, Rolf: *See—*
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Dhein, Rolf; Schoeps, Jochen; and Kuchenmeister, Rolf, 4,031,052.

Kudelka, Herbert: *See—*
Piret, Norbert L.; Rabben, Hans Joachim; Kudelka, Herbert; and Schmidt, Siegbert, 4,030,990.

Kudlacik, Henry W.: *See—*
Armor, Anthony F.; Chari, Madabushi V. K.; Kudlacik, Henry W.; and Reece, Paul, 4,031,422.

Kugisawa, Toshio, to Kabushiki Kaisha Kawai Gakki Seisakusho. Musical-tone signal forming apparatus for an electronic musical instrument. 4,030,395, Cl. 84-1.030.

Kuh, Arthur David; and Condit, Paul Brainard, to Eastman Kodak Company. Processing compositions containing glycols for color transfer processes comprising direct positive silver halide development. 4,030,920, Cl. 96-29.00D.

Kuhn, Rolf; Hardebeck, Klaus; and Heinemann, Helmut, to Boehringer Mannheim G.m.b.H. Pharmaceutical composition and method for the treatment of hydropic conditions. 4,031,213, Cl. 424-229.000.

Kukolja, Stjepan; and Spry, Douglas O., to Eli Lilly and Company. Process for cephalosporin antibiotic intermediates. 4,031,084, Cl. 260-243.00C.

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Koppe, Herbert; Zeile, Karl; Kummer, Werner; Stahle, Helmut; and Danneberg, Peter, 4,031,244.

Kuna, Wayne A.: *See—*
Terzian, Rouben T.; Schoenfield, Palmer J.; Dunn, Kathy A.; and Kuna, Wayne A., 4,030,235.

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tion. Method for reducing the viscosity and for refining kaolin clays. 4,030,941, Cl. 106-309.000.

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Sugiura, Kensuke; Kagaya, Mineo; Fujisou, Tokuo; Aoki, Hiroyuki; Takehara, Takeichiro; and Kurata, Shigenori, 4,031,020.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See—*
Nakamura, Tadashi; Hagiwara, Hisami; and Kokubu, Yoshikazu, 4,031,000.

Kurkov, Victor P., to Chevron Research Company. Alpha, beta-butenolide preparation. 4,031,114, Cl. 260-343.600.

Kurkov, Victor P., to Chevron Research Company. 4-Pentenoic acid conversion. 4,031,115, Cl. 260-343.600.

Kurosaki, Takefumi, to Rank Xerox Ltd. Automatic manuscript discharging device for copying machines. 4,030,721, Cl. 271-3.000.

Kurosawa, Toshiaki: *See—*
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Kurosawa, Toshiharu: *See—*
Kohashi, Tadao; and Kurosawa, Toshiharu, 4,030,813.

Kusaka, Satoru, to Sony Corporation. Head drum assembly with electrical noise shield. 4,031,558, Cl. 360-130.000.

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Chuiko, Alexei Alexeevich; Tertykh, Valentin Anatolievich; Sobolev, Vilyam Alexandrovich; Maschenko, Valery Mikhailovich; Pavlov, Vyacheslav Valentinovich; Chugai, Alexei Dmitrievich; Khaber, Nikolai Vasilievich; Kondratenko, Anatoly Borisovich; Vatamanjuk, Vasily Ivanovich; Khoma, Mikhail Ivanovich; Kutin, Alexandr Nikolaevich; Shaposhnikov, Jury Davydovich; and Galashina, Malvina Leontievna, 4,030,940.

Kutter, Eberhard; Austel, Volkhard; Eberlein, Wolfgang; Heider, Joachim; Kobinger, Walter; Lillie, Christian; and Kadatz, Rudolf, to Boehringer Ingelheim GmbH. Bis-homophthalimides and salts thereof. 4,031,219, Cl. 424-258.000.

Kuykendall, Charles N.: *See—*
Hammel, Ronald O.; Kuykendall, Charles N.; and Fischer, William A., 4,031,450.

Kuyt, Gerard: *See—*
Khoe, Giok Djan; Kuyt, Gerard; and Franken, Adrianus Jacobus Jozef, 4,030,811.

Kuzel, Frank J.: *See—*
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Kyncl, Jaroslav: *See—*
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Kyselica, Stanislav: *See—*
Sommer, Karel; Zdrazil, Jiri; Kubinek, Milan; Bahna, Jarolim; Kyselica, Stanislav; Habrovec, Frantisek; and Skarek, Jiri, 4,030,944.

Labie, Allan S.; Thornton, Charles; Lew, Irwin Paul; and Gutman, Abraham, to International Environmental Dynamics. Folded slab floor construction and method. 4,030,257, Cl. 52-126.000.

Laboratoires Jacques Logeais: *See—*
Maillard, Jacques Georges, 4,031,133.

Laboratorios del Dr. Esteve S.A.: *See—*
Esteve-Subirana, Antonio, 4,031,240.

Laboratorios Hermes, S.A.: *See—*
Chimeno, Jose-Alfonso Canicio, 4,031,105.

Lace, Melvin Arthur, to Motorola, Inc. Synchronous rotor indexing mechanism. 4,030,466, Cl. 123-146.50A.

Lacombe, Gaetan Y., to D.C. Glass Ltd. Protective capping channel for glass sealed unit. 4,030,263, Cl. 52-616.000.

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Bronstert, Klaus; Fahrbach, Gerhard; Krahe, Eduard; Ladenberger, Volker; Kastning, Ernst-Guenther; Mittnacht, Hans; Willersinn, Herbert; and Trieschmann, Hans-Georg, 4,031,166.

Laidlaw Corporation: *See—*
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Lake Aid Inc.: *See—*
Henegar, Dale L., 4,030,859.

Lake St. Louis Research Products, Inc.: *See—*
Navato, Jose Miguel Antonio Rosario, 4,030,482.

Lakin, Willis M. Rotating toys, particularly flying toys. 4,030,238, Cl. 46-86.00R.

Lakomy, Dale G.: *See—*
Bauer, Martin L.; Johnson, Wayne F.; and Lakomy, Dale G., 4,030,834.

Lalin, Andre; and Piret, Jean, to Regie Nationale des Usines Renault. Hydraulic control device for automatic change-speed transmissions. 4,030,381, Cl. 74-867.000.

Lambertz, Martin R.; and Fiorelli, Maria, to Stanley Works, The. Corner bracket and roller assembly for sliding doors. 4,030,160, Cl. 16-105.000.

Lamm, August Uno. Rotary piston engine. 4,030,458, Cl. 123-44.00D.

Lamparter, Hansruedi: *See—*
Hablutzel, Kurt; and Lamparter, Hansruedi, 4,030,635.

Lampietti, Bernard P.: *See—*
Collins, Charles P.; and Lampietti, Bernard P., 4,030,327.

Lampman, Duncan L., to Diagraph-Bradley Industries, Inc. Stencil cutting apparatus. 4,030,592, Cl. 197-6.400.

Lance, Richard T.: *See—*
Papafingos, Pandelis N.; and Lance, Richard T., 4,030,914.

Landis Tool Company: *See—*
Price, Ralph E., 4,030,252.

Landyshev, Vladimir Vladislavovich: *See—*
Grigorenko, Anatoly Sergeevich; Moroz, Jury Antonovich; and Landyshev, Vladimir Vladislavovich, 4,030,336.

Langenbach, Jack E., to International Telephone and Telegraph Corporation. Electrical contact and retention means therefor. 4,030,803, Cl. 339-217.00S.

Langer, Alois A.: *See—*
Heilman, Marlin S.; Langer, Alois A.; Mirowski, Mieczyslaw; Mower, Morton M.; and Reilly, David M., 4,030,509.

Langowski, Faustyn Cornell, to BJ-Hughes Inc. Pipe handling head 4,030,746, Cl. 294-88.000.

Lanno, Joseph P. Fluid dispenser system. 4,030,638, Cl. 222-180.000.

Lapetina, Robert Anthony, to Edo Western Corporation. Sonar/television system for use in underwater exploration. 4,031,544, Cl. 358-99.000.

Larionova, Julia Alexeevna: *See—*
Ponomarev, Alexei Ivanovich; Sokolov, Sergei Vasilievich; Larionova, Julia Alexeevna; Klebansky, Alexandr Leibovich; Berenblit, Vsevolod Volfovich; Dolnakov, Jury Pavlovich; Yagupolsky, Lev Moiseevich; Malovik, Vladlen Vasilievich; Lozinsky, Miron Onufrievich; Belous, Viktor Mikhailovich; Gruz, Boris Efimovich; Alexeeva, Ljuhov Antonovna; Ankudinov, Anatoly Kirillovich; and Ryazanova, Rufina Mikhailovna, 4,031,119.

Lark S.p.A.: *See—*
Palladino, Gaetano, 4,031,080.

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Dombrowski, Frank R.; and Larson, Raymond L., 4,030,184.

Larsson, Erik. Helical gear pump and method of manufacturing the same. 4,030,862, Cl. 418-48.000.

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Lawrence Peska Associates, Inc.: *See—*
Everman, Don D., 4,030,867.

Lawton, Robert A.; and Andrews, James R., to United States of America, Air Force. Waveform sampler. 4,030,840, Cl. 356-256.000.

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Engelbach, Heinz; Krabetz, Richard; Duembgen, Gerd; Willersinn, Carl-Heinz; Lebert, Ulrich; and Thiessen, Fritz, 4,031,135.

LeBlanc, Joseph David: *See—*
St. Andre, Arthur Francis; LeBlanc, Joseph David; and Robillard, Edward George, 4,031,446.

Le Comte, Michel L., to Jeumont-Schneider. Method and apparatus for fast multiplication including conversion of operand format. 4,031,378, Cl. 235-164.000.

Lee, Don H.; Weller, Kenneth P.; and Thrower, William F., to Hughes Aircraft Company. Planar process for making high frequency ion implanted passivated semiconductor devices and microwave integrated circuits. 4,030,943, Cl. 148-1.500.

Lee, Ming H.: *See—*
Hirosawa, Frank N.; and Lee, Ming H., 4,031,049.

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Lefaudeux, Francois L. M.; and Quivy, Michel Georges, to Etat Francais. Hydrophone with acoustic reflector. 4,031,502, Cl. 340-10.000.

Le Goascoz, Vincent: *See—*
Audaire, Luc; Borel, Joseph; Le Goascoz, Vincent; and Poujois, Robert, 4,031,380.

Le Guillou, Felix Francois, to Establissements Valois S.A. Push-button having a calibrated outlet for a container under pressure. 4,030,667, Cl. 239-573.000.

Lehmann, Gunthart: *See—*
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Leighton, Peter Watson; and Davidson, Charles Patrick Duncan, to Lucas Industries Limited. Motor and pedal propeller cycle. 4,030,562, Cl. 180-34.000.

Leland Stanford Junior University, The Board of Trustees of: *See—*
Bond, Walter L.; Cutler, Cassius C.; and Lemons, Ross A., 4,030,342.

LeMay, Christopher Archibald Gordon, to EMI Limited. Radiography. 4,031,395, Cl. 250-360.000.

Lemons, Ross A.: *See—*
Bond, Walter L.; Cutler, Cassius C.; and Lemons, Ross A., 4,030,342.

Lench, Jack; and Ferrari, Luigi M., to Del Laboratories, Inc. Roll-on dispenser bottle assembly. 4,030,844, Cl. 401-213.000.

Lennon, David C.; and Wandler, Richard A., to General Electric Company. Terminal block assembly and multiple connector assembly therefor. 4,030,802, Cl. 339-192.00R.

Lentz, William P. TV bulb funnel construction. 4,030,627, Cl. 220-2.10A.

Lenz, Gunter: *See—*
Vogt, Wilhelm; Auer, Eberhard; Lenz, Gunter; Merkenich, Karl; Henning, Klaus; and Kandler, Joachim, 4,031,022.

Leonard, Hamlin, to B-5 Associates of Stamford, Connecticut. Variable speed drive for a bicycle. 4,030,373, Cl. 74-230.190.

Leonard, John J., to Atlantic Richfield Company. Preparing aqueous alkaline slurry of thallic oxide. 4,031,196, Cl. 423-624.000.

Leoncavallo, Richard Anthony: *See—*
White, Peter Charles; Benson, John Terry; and Leoncavallo, Richard Anthony, 4,030,239.

Leone, Ronald E.; Weber, Wayne W., II; and Wrathall, Donald P., to Eastman Kodak Company. Photographic compositions and elements including internal latent image silver halide grains and acylhydrazinophenylthiourea nucleating agents therefor. 4,030,925, Cl. 96-73.000.

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Leonik, Stephen A., Jr. Multi-channel temperature responsive process control system. 4,031,355, Cl. 219-502.000.

Letot, Incorporated: *See—*
Churchill, Steven T., 4,031,322.

Leuschner, Horst: *See—*
Ehni, George John, III; and Leuschner, Horst, 4,031,474.

Levin, Nathan. Yarn tensioning device. 4,030,684, Cl. 242-152.100.

Lew, Irwin Paul: *See—*
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Lewis, Nathanial H. Spinning balloon novelty. 4,030,237, Cl. 46-53.000.

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Lezotte, Tim F.: *See—*
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Lie, Bjorn: *See—*
Dorph, Thor, 4,030,224.

Lie, Gina: *See—*
Dorph, Thor, 4,030,224.

Liebetrau, Richard E.; and Miller, Larry J., to Swiss Aluminium Ltd. Storage and display apparatus employing cantilevered roller track. 4,030,609, Cl. 211-162.000.

Liehl, Helmut: *See—*
Buzzi, Leo; Buzzi, Valentin; Opietnik, Walter; Liebl, Helmut; and Malohahic, Peter, 4,030,573.

Lillie, Christian: *See—*
Kutter, Eberhard; Austel, Volkhard; Eberlein, Wolfgang; Heider, Joachim; Kobinger, Walter; Lillie, Christian; and Kadatz, Rudolf, 4,031,219.

Linck, Donald W., II; and Kaprelian, George, to Linck, Donald W., II; Kaprelian, George; Basta, Tom; Corbett, Maury; Danzig, William; Hunt, Gary; Ingram, Arthur; McNeill, Charles; Preiner, Gerald; and Roth, Ronald. Base plates for dental articulators. 4,030,197, Cl. 32-32.000.

Linde Aktiengesellschaft: *See—*
Wimber, Hans; Rohde, Wilhelm; and Reyhing, Jorg, 4,030,896.

Linder, Jean: *See—*
Schopper, Alf; and Linder, Jean, 4,030,281.

Lingaraju, Bhartoor: *See—*
Vidoni, John; Lingaraju, Bhartoor; and Timmins, John C., 4,030,800.

Liniger, Andreas M.: *See—*
Liniger, Max, 4,030,916.

Liniger, Max, to Liniger, Andreas M. Process for recovering lead from the active material of used batteries. 4,030,916, Cl. 75-77.000.

Lion Fat & Oil Co., Ltd.: *See—*
Isa, Hiroshi; Ukigai, Toshiyuki; Tominaga, Anri; Taniyasu, Ryozo; and Nagayama, Masuzo, 4,031,158.
Mandai, Hiroshi; Ukigai, Toshiyuki; Tominaga, Anri; and Sato, Michito, 4,031,159.

Lipovac, Stanislava N., to Westvaco Corporation. Universal fountain solution for lithographic offset printing. 4,030,417, Cl. 101-451.000.

Lisiecke, Hieronim L.: *See—*
Scholin, Harold W.; and Lisiecke, Hieronim L., 4,030,385.

Litman, Alan, to Smith & Wesson Chemical Company, Inc. Dual purpose projectile and weapon combination. 4,030,421, Cl. 102-92.300.

Litre Meter Limited: *See—*
Wemyss, William Alexander, 4,030,357.

Little, Norman: *See—*
Kefauver, Bernard C.; and Little, Norman, 4,030,271.

Litton Business Systems, Inc.: *See—*
Antonio, Christo; and Uhl, Wyman F., 4,030,955.

Liu, Richard Tien-Szu: *See—*
Margolis, Geoffrey; Rushmore, Dean Frederick; and Liu, Richard Tien-Szu, 4,031,251.

Liuzzo, Giuseppe: *See—*
Barba, Diego; Germana, Antonino; Liuzzo, Giuseppe; and Tagliaferri, Giovanni, 4,030,985.

Livesay, Richard E.: *See—*
Cobb, Delwin E.; Jackson, George J.; Livesay, Richard E.; and Stemler, Orrin A., 4,030,566.

Loch, Emil P., to Westinghouse Electric Corporation. Insert for explosively expanding a tube into engagement with a tube sheet. 4,030,419, Cl. 102-24.00R.

Loesch, Claude E.: *See—*
Loesch, Leo J.; and Loesch, Claude E., 4,030,223.

Loesch, Leo J.; and Loesch, Claude E. Fish line control apparatus with magnetic release. 4,030,223, Cl. 43-15.000.

Loest, Kent W., to Southwire Company; National Steel Corporation; and Earth Sciences, Inc., part interest to each. Recovery of aluminum from alunite ore using acid leach to purify the residue for bayer leach. 4,031,182, Cl. 423-127.000.

Logan, Robert Thomas: *See—*
Woods, Gilbert Frederick; Logan, Robert Thomas; McGarry, George; and Roy, Robert Gibson, 4,031,075.

Loge, Olaf: *See—*
Ahrens, Hanns; Biere, Helmut; Rufer, Clemens; Schmiechen, Ralph; Schroeder, Eberhard; Loge, Olaf; Losert, Wolfgang; and Schillinger, Ekkehard, 4,031,236.

Lohbauer, Kenneth R.: *See—*
Bridwell, John W.; Hopkins, Donald L.; and Lohbauer, Kenneth R., 4,030,623.

Loikitz, Frank F., to Buildex Incorporated. Self-closing spring hinges. 4,030,161, Cl. 16-186.000.

Long, John V.: *See—*
Cremer, George D.; and Long, John V., 4,031,279.

Longa, Pier Luigi; and Gamba, Piero, to Ing. C. Olivetti & C., S.p.A. Stabilized power supply. 4,031,452, Cl. 321-2.000.

Longly, James M.: *See—*
Ziebell, Donald O.; and Longly, James M., 4,031,468.

Lord Corporation: *See—*
Gervase, Nicholas J., 4,031,120.

Lorenz, Allan Alfred: *See—*
Holloran, Thomas Patrick; Braden, Arthur Buell; Foley, Jerrold Stokes; Maynard, James Lucian; Klosky, John Patrick; Dissauer, Gerald Anthony; Adams, Terrence Miller; and Lorenz, Allan Alfred, 4,031,518.

Losel, Walter; Traunecker, Werner; and Hoefke, Wolfgang, to Boehringer Ingelheim GmbH. 3β-(4-Oxo-α-L-rhamnosyl)-β-hydroxy-bufa-4,20,22-trienolide. 4,031,212, Cl. 424-182.000.

Losert, Wolfgang: *See—*
Ahrens, Hanns; Biere, Helmut; Rufer, Clemens; Schmiechen, Ralph; Schroeder, Eberhard; Loge, Olaf; Losert, Wolfgang; and Schillinger, Ekkehard, 4,031,236.

Lostia, Onofrio; and Bartoli, Francesco, to Snam Progetti S.p.A. Fibres incorporating antibodies, antigens and antisera, method for their preparation and their use. 4,031,201, Cl. 424-27.000.

Loundagin, James A.: *See—*
Cram, Robert E.; Gill, Walter; and Loundagin, James A., 4,030,523.

Lourigan, Patrick M.: *See—*
Khatti, Ramkishan; and Lourigan, Patrick M., 4,030,295.

Lovercheck, Charles L.: *See—*
Brugger, Richard D.; and Lovercheck, Charles L., 4,030,823.

Lowery, Robert D.; and Mehrbrodt, Alphonso W., to Marquette Metal Products Company. Normally disengaged electro-magnetic spring clutch capable of field adjustment of the wrap angle. 4,030,584, Cl. 192-84.00T.

Lozinsky, Miron Onufrievich: *See—*
Ponomarev, Alexei Ivanovich; Sokolov, Sergei Vasilievich; Larionova, Julia Alexeevna; Klebansky, Alexandr Leibovich; Berenblit, Vsevolod Volfovich; Dolnakov, Jury Pavlovich; Yagupolsky, Lev Moiseevich; Malovik, Vladlen Vasilievich; Lozinsky, Miron Onufrievich; Belous, Viktor Mikhailovich; Gruz, Boris Efimovich; Alexeeva, Ljubov Antonovna; Ankudinov, Anatoly Kirillovich; and Ryazanova, Rufina Mikhailovna, 4,031,119.

Lubrizol Corporation, The: *See—*
Miller, Clark Ober, 4,031,015.
Miller, Clark Ober, 4,031,118.
Musser, Jerry Lee; and Koch, Frederick William, 4,031,023.

Lucas Electrical Company Limited, The: *See—*
Hill, William Frank, 4,031,403.

Lucas Industries Limited: *See—*
Glaze, Stanley George, 4,030,580.
Leighton, Peter Watson; and Davidson, Charles Patrick Duncan, 4,030,562.

Luce, Robert L.; Perry, Joseph P.; and Sansburry, James D., to Fairchild Camera and Instrument Corporation. Method of MOS circuit fabrication. 4,030,952, Cl. 148-187.000.

Lucia, Emmanuel A.: *See—*
Vinansky, George, Jr.; and Lucia, Emmanuel A., 4,031,301.

Luebkemann, Leroy, to Fiat-Allis Construction Machinery, Inc. Method of manufacturing track roller with open cell plastic foam in lubrication cavity. 4,030,178, Cl. 29-149.5NM.

Lugash, Max J. Steerable wheeled garment bag. 4,030,768, Cl. 280-47.170.

Lugay, Joaquin Castro; and Feldman, Jacob Richard, to General Foods Corporation. Process of preparing nutritive sweetening compositions. 4,031,259, Cl. 426-548.000.

Lugay, Joaquin Castro: *See—*
Haas, Gerhard Julius; Herman, Edwin Bernard; and Lugay, Joaquin Castro, 4,031,250.

Lukas, Joachim H.; Baardman, Frank; and Kouwenhoven, Adriaan P.,

to Shell Oil Company. Preparation of derivatives of cyclobutane and cyclobutene. 4,031,152, Cl. 260-666.00A.

Lund, Svend Aage; Northeved, Allan; Solfjeld, Poul; and Fahrin, Knud Christian Claus, to Akademiet for de tekniske Videnskaber, Svejsecentralen. Apparatus for providing an ultrasonic sectional view stating the proportion of meat and lard in biological material. 4,030,343, Cl. 73-67.80S.

Lundgren, Carl William, Jr., to Bell Telephone Laboratories, Incorporated. Antenna with echo cancelling elements. 4,031,538, Cl. 343-781.0CA.

Lungu, Onut Antoniu: *See—*
Stanasila, Virgil Corneliu; Florica, Mihai; and Lungu, Onut Antoniu, 4,030,879.

Luperti, Harry E.: *See—*
Irvine, Rubert; and Luperti, Harry E., 4,030,722.
Irvine, Robert; and Luperti, Harry E., 4,030,723.

Lura, Loren E.: *See—*
King, Donald J.; Lura, Loren E.; and Maurushat, Ewalt, 4,030,784.

Lurie, Michael Jay: *See—*
Andrevski, Zygmunt M.; and Lurie, Michael Jay, 4,030,815.

Luzzi, John J.: *See—*
Ramey, Chester E.; and Luzzi, John J., 4,031,095.

Lyle Development, Inc.: *See—*
Oberlolier, John W., 4,030,650.

Lyons, Joseph. Trav-L-safe. 4,030,426, Cl. 109-51.000.

M.A. Buckley (Engraving) Limited: *See—*
Fellows, Stanley, 4,030,415.

M & W Gear Company: *See—*
Meiners, Elmo R., 4,030,753.

M° : *See—*
Aparicio, Luis; Gayo, Nenesio; M° ; Martin, Jose Luis; and Ron, Armando, 4,031,243.

Maass, Jurgen: *See—*
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Macchi, Giorgio: *See—*
Barba, Diego; Battistoni, Fabrizio; D'Agostini, Candido; and Macchi, Giorgio, 4,031,187.

Maciolek, Ralph B.: *See—*
Bernal G., Enrique; Koepke, Barry G.; and Maciolek, Ralph B., 4,031,190.

Mackey, James R.: *See—*
Meisner, Merlin M.; Matulis, Raymond M.; and Mackey, James R., 4,030,959.

Macklin, Bernard: *See—*
Coleman, Allan; and Macklin, Bernard, 4,031,312.

MacMillan, Kenneth T. Venting retainer for curing tube. 4,030,863, Cl. 425-17.000.

Macpherson, Roy Duncan: *See—*
Atmore, Milton Graham Montgomery; and Macpherson, Roy Duncan, 4,030,989.

Madej, Edward A., to Robroy Industries. Molding apparatus. 4,030,866, Cl. 425-116.000.

Maeda, Tooru: *See—*
Yamamoto, Kenichi; Kirose, Yutaka; and Maeda, Tooru, 4,030,454.

Magee, Philip S., to Chevron Research Company. Fungicidal vinyl 2-substituted-thiovinyl sulfones. 4,031,247, Cl. 424-337.000.

Magerlein, Barney J., to Upjohn Company, The. Bicyclic intermediates for preparing 16-alkylated prostaglandin analogs. 4,031,081, Cl. 260-240.00R.

Maggioni, Virginio: *See—*
Gemmellaro, Carmelo; Maggioni, Virginio; and Moretti, Renzo, 4,030,759.

Magnin, Roland. Articulated bracelet. 4,030,287, Cl. 59-85.000.

Maguire, Roy L., to Caterpillar Tractor Co. Symmetrical seal assembly for a hinge joint. 4,030,730, Cl. 277-92.000.

Maier, Vincent P.: *See—*
Guadagni, Dante G.; Horowitz, Robert M.; Gentili, Bruno; and Maier, Vincent P., 4,031,265.

Maillard, Jacques Georges, to Laboratoires Jacques Logeais. Phenylacetic acids. 4,031,133, Cl. 260-520.00R.

Maillefer S.A.: *See—*
Veyrassat, Louis, 4,030,673.

Mains, Donald M.: *See—*
Christian, Edward H.; Mains, Donald M.; and Treiber, James H., 4,031,440.

Mais, James W.; and Myers, L. Paul, to A-T-O Inc. Filling head detection device. 4,030,269, Cl. 53-61.000.

Makedonski, Boris Georgiev: *See—*
Kochemidov, Atanas Dimitrov; Makedonski, Boris Georgiev; Dumanov, Ivan Minkov; Payakov, Stefan Georgiev; Galabov, Peter Konstantinov; and Atanassov, Haralampi Aangelov, 4,030,249.

Makino, Shinichi: *See—*
Kokado, Naoyuki; and Makino, Shinichi, 4,031,470.

Malagari, Frank A., Jr.: *See—*
Shilling, Jack W.; Datta, Amitava; and Malagari, Frank A., Jr., 4,030,950.

Malizia, Peter Donato; and Mitchell, William Alexander, to General Foods Corporation. Fixing acetaldehyde in sucrose. 4,031,255, Cl. 426-534.000.

Malkki, Yrjo: *See—*
Suortti, Mikko Tapani; Malkki, Yrjo; and Nikkila, Olavi Elis, 4,031,253.

Mallinckrodt, Inc.: *See—*
El-Antably, Samir M., 4,031,218.

Mallow, William A., to Southwest Research Institute. Cement composition. 4,030,939, Cl. 106-74.000.

Malobabic, Peter: *See—*
Buzzi, Leo; Buzzi, Valentin; Opietnik, Walter; Liebl, Helmut; and Malobabic, Peter, 4,030,573.

Malovik, Vladlen Vasilievich: *See—*
Ponomarev, Alexei Ivanovich; Sokolov, Sergei Vasilievich; Larionova, Julia Alexeevna; Klebansky, Alexandr Leibovich; Berenblit, Vsevolod Volfovich; Dolnakov, Jury Pavlovich; Yagupolsky, Lev Moiseevich; Malovik, Vladlen Vasilievich; Lozinsky, Miron Onufrievich; Belous, Viktor Mikhailovich; Gruz, Boris Efimovich; Alexeeva, Ljubov Antonovna; Ankudinov, Anatoly Kirillovich; and Ryazanova, Rufina Mikhailovna, 4,031,119.

Mandai, Hiroshi; Ukigai, Toshiyuki; Tominaga, Anri; and Sato, Michito, to Lion Fat & Oil Co., Ltd. Method for preparation of polyolefin oil. 4,031,159, Cl. 260-683.15B.

Mandilaras, Stephen Emmanuel. Haircutting machine. 4,030,193, Cl. 30-30.000.

Mandras, Christian Maurice; and Stanik, Carol, to Societe Metallurgique de Revigny. Automatic device for seizing the end of a drawn product for a drum of a drawing bench. 4,030,680, Cl. 242-78.300.

Manduley, Flavio M.: *See—*
Dlugos, Daniel F.; and Manduley, Flavio M., 4,031,402.

Mankouski, Peter. Steam power plant. 4,030,302, Cl. 60-667.000.

Mann, Samuel, to Inverness Corporation. Sterile earlobe-piercing assembly. 4,030,507, Cl. 128-330.000.

Manner, James A., to PPG Industries, Inc. Drying of dialkyl peroxydicarbonates. 4,031,126, Cl. 260-463.000.

Mannesmann Aktiengesellschaft: *See—*
Bellmann, Manfred; and Goldberg, Hannes, 4,030,333.
Wunnenberg, Klaus; and Dubendorff, Joachim, 4,030,531.

Mapal Dr. Kress KG: *See—*
Kress, Dieter, 4,030,855.

Marcantonio, Livio F., to Chicago Pneumatic Tool Company. Sanding shoe with removable clamping jaw. 4,030,254, Cl. 51-386.000.

Marchetti, Joseph R.: *See—*
Dowbenko, Rostyslaw; and Marchetti, Joseph R., 4,031,051.

Maresh, Richard L. Chopped light relay keyer. 4,031,560, Cl. 361-175.000.

Margolis, Geoffrey; Rushmore, Dean Frederick; and Liu, Richard Tien-Szu, to Societe d'Assistance Technique pour Produits Nestle S.A. Decaffeination of vegetable material. 4,031,251, Cl. 426-387.000.

Mariner, Ralph E. Acoustic pickups. 4,030,396, Cl. 84-1.160.

Marinkovich, Vincent A., to GTE New Ventures Corporation. In vitro method for determining allergic hypersensitivity. 4,031,197, Cl. 424-1.000.

Marker, Delbert E.: *See—*
Leyde, Warren L.; and Marker, Delbert E., 4,031,406.

Marlin, Louis Allen; and Beaucaire, Victor D., to Interlake, Inc. Stabilized fuel slurry. 4,030,894, Cl. 44-51.000.

Marquette Metal Products Company: *See—*
Lowery, Robert D.; and Mehrbrodt, Alphonso W., 4,030,584.

Martin, Adolph; and Edwards, William Joseph, to Singer Company, The. Sewing machine take-up thread shield. 4,030,431, Cl. 112-241.000.

Martin, Blair Robertson; Meier, Johann Hans; and Raider, Jerry Wesley, to International Business Machines Corporation. Controls for a movable disk printer. 4,030,591, Cl. 197-53.000.

Martin, Jean, to Groupement Atomique Alsacienne Atlantique. High energy laser beam cutting method and apparatus. 4,031,351, Cl. 219-121.00L.

Martin, Jose Luis: *See—*
Aparicio, Luis; Gayo, Nenesio; M° ; Martin, Jose Luis; and Ron, Armando, 4,031,243.

Martin, Lawrence Leo; and Duffy, Brian J., to American Hoechst Corporation. 1,3-Dihydro-heteroarylspiro (isobenzofuran)s. 4,031,224, Cl. 424-267.000.

Martin Marietta Corporation: *See—*
Strauss, Eric L., 4,031,059.

Martz, Lyle F.; and Plotnick, Richard J., to Westinghouse Electric Corporation. Combined cycle electric power plant and a heat recovery steam generator having improved temperature control of the steam generated. 4,031,404, Cl. 290-40.00R.

Marvin Glass & Associates: *See—*
Allen, Robert K.; Schoenfield, Palmer J.; and Morrison, Howard J., 4,030,234.
Terzian, Rouben T.; Schoenfield, Palmer J.; Dunn, Kathy A.; and Kuna, Wayne A., 4,030,235.

Masaki, Kenji; and Minami, Hidehiro. Method and apparatus of controlling an air fuel mixture for a multi-cylinder internal combustion engine. 4,030,292, Cl. 60-274.000.

Masao, Ishihara: *See—*
Akira, Kato; Akira, Itoh; Tohru, Uchida; and Masao, Ishihara, 4,030,921.

Maschenko, Valery Mikhailovich: *See—*
Chuiko, Alexei Alexeevich; Tertykh, Valentin Anatolievich; Sobolev, Vilyam Alexandrovich; Maschenko, Valery Mikhailovich; Pavlov, Vyacheslav Valentinovich; Chugai, Alexei Dmitrievich; Khaber, Nikolai Vasilievich; Kondratenko, Anatoly Borisovich; Vatamanjuk, Vasily Ivanovich; Khoma, Mikhail Ivanovich; Kutin, Alexandr Nikolaevich; Shaposhnikov, Jury Davydovich, and Galashina, Malvina Leontievna, 4,030,940.

Maschinenbau Oppenweiler GmbH: *See—*
Kistner, Hermann; and Lehmann, Gunthart, 4,030,394.

Maschinenfabrik Fahr Aktiengesellschaft: *See—*
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Mascia, Frank P.: *See—*
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Masco Corporation: *See—*
Rasor, William A.; Van Dine, Walter S.; and Whitney, Frank A., 4,030,647.

Mason, Burton Hoster. Work arm system for submergible chamber. 4,030,309, Cl. 61-69.00R.

Massachusetts Institute of Technology: *See—*
Cardillo, Mark J., 4,031,397.

Massey-Ferguson Services N.V.: *See—*
Bailey, Alfred J.; and Dean, Malcolm, 4,030,641.
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Massonne, Joachim: *See—*
Becher, Wilfried; and Massonne, Joachim, 4,031,193.

Masuda, Takao: *See—*
Noguchi, Yasuhiro; Ukai, Toshinao; Sashihara, Kenji; and Masuda, Takao, 4,030,931.
Sashihara, Kenji; Masuda, Takao; Noguchi, Yasuhiro; Sekikawa, Nohuyoshi; and Shishido, Tadao, 4,030,930.

Matsumoto, Seiichi: *See—*
Hosoe, Kazuya; Aizawa, Hiroshi; Matsumoto, Seiichi; and Yokota, Hideo, 4,031,383.

Matsumoto, Seiji: *See—*
Honjo, Satoru; and Matsumoto, Seiji, 4,030,922.

Matsuo, Takashi: *See—*
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Matsuoka, Sadao: *See—*
Onishi, Makoto; Nagano, Katsuyuki; Tanaka, Toshikl P.; Matsuoka, Sadao; and Tanaka, Mitsuo, 4,030,809.

Matsushita Electric Industrial Co., Ltd.: *See—*
Enomoto, Shigeru, 4,031,430.
Kohashi, Tadao; and Kurosawa, Toshiharu, 4,030,813.
Okamura, Yasushi; Tanaka, Kiichiro; and Takeda, Takashi, 4,031,337.
Sakamoto, Yoichi, 4,031,491.

Mattel, Inc.: *See—*
White, Peter Charles; Benson, John Terry; and Leoncavallo, Richard Anthony, 4,030,239.

Matthews, Harry, to Massey-Ferguson Services N.V. Loader vehicles, 4,030,624, Cl. 214-145.00A.

Mattila, Alvin. Nasal filter. 4,030,491, Cl. 128-140.00N.

Mattos, Albert V. Bridge bidding indicator. 4,030,764, Cl. 273-148.00A.

Matulevich, E. S., to General Electric Company. Locked axle detector for a multi-axled traction vehicle. 4,031,509, Cl. 340-62.000.

Matulis, Raymond M.: *See—*
Meisner, Merlin M.; Matulis, Raymond M.; and Mackey, James R., 4,030,959.

Maudlin, Jerry A.: *See—*
Kniss, Edward L., Jr.; Hixenbaugh, Dennis L.; Maudlin, Jerry A.; and Brozenick, Nicholas J., 4,030,740.

Maunder, Leonard: *See—*
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Maurushat, Ewalt: *See—*
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Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V.: *See—*
Hoppe, Walter, 4,031,391.

Mayers, Bernard J.: *See—*
Evers, William J.; Heinsohn, Howard H., Jr.; and Mayers, Bernard J., 4,031,256.

Maynard, James Lucian: *See—*
Holloran, Thomas Patrick; Braden, Arthur Buell; Foley, Jerrold Stokes; Maynard, James Lucian; Klosky, John Patrick; Dissauer, Gerald Anthony; Adams, Terrence Miller; and Lorenz, Allan Alfred, 4,031,518.

Mayrl, Jose A.: *See—*
Miller, Charles H.; and Mayrl, Jose A., 4,031,285.

Mazanek, Alfonso J., to Westinghouse Electric Corporation. Electrical bushing. 4,031,311, Cl. 174-31.00R.

Maze, Robert Craig, to Motorola, Inc. Nematic liquid crystal composition. 4,031,028, Cl. 252-299.000.

Maznichenko, Stanislav Anisimovich: *See—*
Ponomarenko, Nikolai Borisovich; Kononenko, Vadim Grigorievich; Stelmakh, Viktor Alexeevich; Kotelnikov, Vladimir Ivanovich; Valenya, Ivan Jurievich; Sarancha, Vladimir Nikolaevich; Petrenko, Anatoly Avramovich; Bozhko, Valery Pavlovich; Yatsenko, Sergei Vasilievich; Komnatny, Igor Pavlovich; Akhnazariants, Levon Khachaturovich; Strizhenko, Vitaly Evgenievich; Kolokolov, Boris Alexeevich; Maznichenko, Stanislav Anisimovich; Bozhko, Viktor Vasilievich; Bondarenko, Oleg Alexandrovich; and Zakirov, Robert Sharafutdinovich, 4,030,389.

McCarthy, Joseph J. Holder and dispenser for removable jewelry inserts. 4,030,605, Cl. 206-525.000.

McCarthy, Peter A. Coin container. 4,030,597, Cl. 206-.830.

McCarty, Glenn L.: *See—*
Hughes, Theodore R.; and McCarty, Glenn L., 4,031,555.

McClain, Herbert D.; Parikh, Bipin D.; and Burkey, John K., to NCR Corporation. Data communications system with improved digital phase-locked loop retiming circuit. 4,031,317, Cl. 178-69.100.

McClinton, John L., to Burns & Russell Company, The. Simulated traditional sand-finished masonry. 4,031,282, Cl. 428-141.000.

McCloskey, Albert R., to Heim Universal Corporation. Self-adjusting spherical bearing. 4,030,783, Cl. 308-72.000.

McCombie, Alan Keith, to Molins Machine Company, Limited. Laterally flexible conveyor construction. 4,030,595, Cl. 198-778.000.

McCord, Andrew T., to Christensen, Donald L., a part interest. Process for reclaiming cement kiln dust and recovering chemical values therefrom. 4,031,184, Cl. 423-197.000.

McDonald, David, to Golden M Enterprises, Inc. Earlobe piercing device. 4,030,506, Cl. 128-330.000.

McEachran, Dennis B., to Quadrelax Corporation. Foldable vibration massage device. 4,030,487, Cl. 128-24.100.

McGarry, Errol James: *See—*
Forsyth, Bruce Adam; Pryor, David Ernest; McGarry, Errol James; and Harney, Donald William Gerald, 4,031,249.

McGarry, George: *See—*
Woods, Gilbert Frederick; Logan, Robert Thomas; McGarry, George; and Roy, Robert Gibson, 4,031,075.

McGinley, Edward J. Instructional system for teaching and testing word pronunciation and spelling. 4,030,211, Cl. 35-35.00H.

McGinn, Ferdinand M., to Production Specialties, Inc. Well tubing mandrel with combination guard, guide and latch arrangement. 4,030,543, Cl. 166-117.500.

McGowan, Edward J., Jr.: *See—*
Kuska, Walter J.; and McGowan, Edward J., Jr., 4,030,484.

McGuire, James T. Wall decorating paint applying device. 4,030,414, Cl. 101-379.000.

McKay, Dwight L., to Phillips Petroleum Company. Passivating metals on cracking catalysts with antimony compounds. 4,031,002, Cl. 208-113.000.

McKeen, Edwin E., Jr. Tow strap for pneumatic inner tube. 4,030,151, Cl. 9-1.700.

McKenzie, Wray V., to Bahson Bros. Co. Tank washer. 4,030,513, Cl. 134-167.00R.

McMath, Jack Alan; Wilder, Paul R.; and Alderson, Larry Lee, to Dover Corporation. Coupler. 4,030,524, Cl. 137-614.060.

McNall, Lester Ray, to Thompson-Hayward Chemical Co. Copper algaecide of increased stability and method of producing the same. 4,030,907, Cl. 71-67.000.

McNeil Corporation: *See—*
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Nakanishi, Susumu, to Pfizer Inc. 2-Hydroaymethyl-3-benzyloxypyridine-6-eposyethane. 4,031,108, Cl. 260-297.00R.

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Nakayama, Sadao: *See—*
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Nakayama, Setuko: *See—*
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Napier, Roger P.: *See—*
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Nashua Corporation: *See—*
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Nasutavicus, Wilmonte A.: *See—*
Grinstead, Robert R.; and Nasutavicus, Wilmonte A., 4,031,038.

Nathaniel, Elmer O. Ice skating surface. 4,030,729, Cl. 272-3.000.

National Patent Development Corporation: *See—*
Stockel, Richard Frederick; and Valenti, Peter Carl, 4,031,110.

National Research Development Corporation: *See—*
Bulman, David Nicholas; and Maunder, Leonard, 4,030,371.
Elloy, Martin Arthur; and Beddow, Frank Howard, 4,030,143.

National Semiconductor Corporation: *See—*
Allen, Robert M., 4,030,999.

National Steel Corporation: *See—*
Loeat, Kent W., 4,031,182.

Navato, Jose Miguel Antonio Rosario, to Lake St. Louis Research Products, Inc. Contact fever thermometer. 4,030,482, Cl. 128-2.00H.

Naylor, Donald B. Sliding barn door. 4,030,246, Cl. 49-501.000.

NCR Corporation: *See—*
Biedermann, Horst H., 4,030,726.
Kesaler, Clarence W., 4,030,589.
McClain, Herbert D.; Parikh, Bipin D.; and Burkey, John K., 4,031,317.
Wojdyla, Gary A., 4,030,590.
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Neef, Hanns-Joachim, to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung. Core reactor. 4,030,974, Cl. 176-58.0PB.

Neeff, Rutger: *See—*
Thiem, Karl-Werner; Auge, Wolfgang; and Neeff, Rutger, 4,031,116.

Nelson, Gunner E., to Ethyl Corporation. Reduction using $NaAlEt_2H_2$. 4,031,143, Cl. 260-632.00D.

Nelson, Welter E. Electrically amplified musical instrument control apparatus. 4,030,397, Cl. 84-1.220.

Nentwich, Heinz Josef: *See—*
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Mendelsohn, Lewis Isaac; and Nesbitt, Ethan Allen, 4,030,892.

Neumann, Leopold, to Analogic Corporation. Differential floating dual slope converter. 4,031,533, Cl. 340-347.0NT.

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Weiss, William Robert; Cooksey, James Judson; Stables, Wilbur Leon; and Newell, Herry Lee, Jr., 4,030,651.

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Alvis, Robert L.; and Newsom, Melvin M., 4,030,557.

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Wittle, Eugene Leroy; and Nicolaides, Ernest D., 4,031,071.

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Niemann, John A. Locking device for electrical plugs. 4,030,795, Cl. 339-37.000.

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Niibe, Akitoshi. Heat panel safety system. 4,031,356, Cl. 219-509.000.

Nijenhuis, Anne Te: *See—*
Otter, Marinus J.A.M. Den; Nijenhuis, Anne Te; and Van Geenen, Albert A., 4,031,040.

Nikkila, Olavi Elis: *See—*
Suortti, Mikko Tapani; Malkki, Yrjo; and Nikkila, Olavi Elis, 4,031,253.

Nilsson, Sven A.; and Melin, Christian, to C O Oberg & Co AB. Sharpening device for steel ski edge strips. 4,030,382, Cl. 76-83.000.

Nippon Electric Co., Ltd.: *See—*
Nakai, Tomotoshi; Utsumi, Kazuaki; and Ohno, Tomeji, 4,030,937.
Noguchi, Toshitake, 4,031,471.
Suda, Kazuyoshi; Isono, Tomoyuki; Uchida, Takashi; and Tsuda, Kiyoshi, 4,030,607.

Nippon Felt Co., Ltd.: *See—*
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Nippon Gakki Seizo Kabushiki Kaisha: *See—*
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Nippon Hoso Kyokai: *See—*
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Nippon Mining Co., Ltd.: *See—*
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Nippon Oil Company, Ltd.: *See—*
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Nippon Piston Ring Co., Ltd.: *See—*
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Nippon Shinyaku Co., Ltd.: *See—*
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Nippon Soda Company Limited: *See—*
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Nippon Soken, Inc.: *See—*
Yamaguchi, Shunzo; Ozaki, Tadashi; and Konomi, Toshiaki, 4,030,464.

Nippon Steel Corporation: *See—*
Ito, Yasuo; and Suzuki, Yoshitake, 4,030,534.
Itoh, Yasuo; Suzuki, Yoshitake; Shibutami, Hirohiko; Hirano, Koichi; and Tagami, Muneo, 4,030,533.
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Nippon Telegraph and Telephone Public Corporation: *See—*
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Nishi Nippon Harbor Service Kabushiki Kaisha: *See—*
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Nishimiya, Torazo: *See—*
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Nishimoto, Minoru: *See—*
Fukui, Kiyoshige; Tamamura, Akira; and Nishimoto, Minoru, 4,030,725.

Nishizawa, Tetsuo, to Fuji Photo Optical Co., Ltd. Automatic fading device for motion picture camera. 4,030,820, Cl. 352-91.00C.

Nissan Chemical Industries, Ltd.: *See—*
Ogawa, Yoshihisa; Inazaki, Tsunenori; and Kouda, Michihiro, 4,031,194.

Nissan Motor Co., Ltd.: *See—*
Hata, Yoshitaka, 4,030,293.
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Yanagishima, Takayuki; and Inoue, Naohiko, 4,031,527.

Niva, Russell N. Collapsible crustacean trap. 4,030,232, Cl. 43-105.000.

Nixdorf Computer AG: *See—*
Huellwegen, Josef, 4,031,480.

Nobutoki, Saburo; Ogusu, Chihaya; and Sugimoto, Masao, to Hitachi, Ltd.; and Nippon Hoso Kyokai. Image pickup device. 4,031,551, Cl. 358-223.000.

Noguchi, Toshitake, to Nippon Electric Co., Ltd. Automatic frequency control circuit. 4,031,471, Cl. 325-423.000.

Noguchi, Yasuhiro; Ukai, Toshinao; Sashihara, Kenji; and Masuda, Takao, to Fuji Photo Film Co., Ltd. Heat developable light-sensitive material. 4,030,931, Cl. 96-114.100.

Noguchi, Yasuhiro: *See—*
Sashihara, Kenji; Masuda, Takao; Noguchi, Yasuhiro; Sekikawa, Nobuyoshi; and Shishido, Tadao, 4,030,930.

Noll, Robert W., to Cambridge Filter Corporation. Portable air velocity measuring unit. 4,030,358, Cl. 73-212.000.

Nor-Am Resources Technology Inc.: *See—*
Willums, Jan-Olaf, 4,030,216.

Norberg, Gayle Russell, to Control Data Corporation. Power brownout detector. 4,031,463, Cl. 324-77.00A.

Norberg, Gayle Russell, to Control Data Corporation. Line power distortion detector. 4,031,464, Cl. 324-78.00Z.

Norden Laboratories, Inc.: *See—*
Davis, Eldon, 4,031,204.

Nordnero AB: *See—*
Karlsson, Tom Orvar Bjorn, 4,030,521.

Norris, Elwood B.; and Yeakley, Lester M., to Electrical Power Research Institute. Biaxial capacitance strain transducer. 4,030,347, Cl. 73-88.50R.

Northern Electric Company Limited: *See—*
Copeland, Miles Alexander, 4,031,490.
Sencer, Mevhibe Gulay, 4,031,331.

Northern Illinois Gas Company: *See—*
Simciak, Walter, 4,031,513.

Northern Telecom Limited: *See—*
Ingrey, Sidney Ivor Joseph; Nentwich, Heinz Josef; and Poulsen, Robert Gordon, 4,030,967.

Northeved, Allan; Fabrin, Knud Christian Claus; and Solfjeld, Poul, to Akademiet for de tekniske Videnskaber, Svejsecentralen. Apparatus for recording an ultrasonic sectional view. 4,030,344, Cl. 73-67.80S.

Northeved, Allan: *See—*
Lund, Svend Aage; Northeved, Allan; Solfjeld, Poul; and Fabrin, Knud Christian Claus, 4,030,343.

Nose, Yukihiko, to Takeda Chemical Industries, Ltd. Combined dialyzer and adsorber unit. 4,031,010, Cl. 210-202.000.

Nottke, James E., to Du Pont de Nemours, E. I., and Company. Cyanoperfluoroether acid fluorides and their preparation. 4,031,124, Cl. 260-465.400.

Novak, Arne: *See—*
Colding, Bertil; Novak, Arne; Sandstrom, Unto; and Jakobsson, Goran, 4,031,368.

Novikov, Oleg Nikolaevich: *See—*
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Nupla Corporation: *See—*
Carmien, Joseph Allen, 4,030,847.

Nutrilite Products, Inc.: *See—*
Westall, Edward B.; and Messing, Alan W., 4,031,260.

Nuttall, Judi. Cat litter dispensing container. 4,030,448, Cl. 119-1.000.

Nyquist, Stephen E.: *See—*
Swanson, James P.; and Nyquist, Stephen E., 4,030,391.

Nyssen, Adrianus Marinus; and Rauch, Gerhard Josef, to Ironside's Machine & Welding Ltd. Multiple roll recorrugator. 4,030,330, Cl. 72-105.000.

Oberbeck, George A., to Charles Stark Draper Laboratory, Inc., The. Saturable reactor current limiter. 4,031,457, Cl. 323-92.000.

Oberloier, John W., to Lyle Development, Inc. Tail flash removal apparatus. 4,030,650, Cl. 225-100.000.

O'Doherty, George O. P., to Eli Lilly and Company. Method for introducing amino groups into benzimidazole or imidazopyridine compounds. 4,031,107, Cl. 260-296.00H.

Oftedahl, Everett J. Bait bucket. 4,030,227, Cl. 43-56.000.

Ogawa, Yoshihisa; Inezeki, Tsunenori; and Kouda, Michihiro, to Nissan Chemical Industries, Ltd. Continuous process for preparing bromine. 4,031,194, Cl. 423-500.000.

Ogawa, Yutaka; and Hirai, Hiroshi, to Akebono Brake Industry Co., Ltd.; and Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Negative disc brake with a clearance-takeup mechanism. 4,030,577, Cl. 188-71.900.

Oger, Robert: *See—*
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Ogino, Masanori: *See—*
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Ogle, James A.: *See—*
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Ogusu, Chihaya: *See—*
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Ohhinata, Ichiro; and Okuhara, Shinzi, to Hitachi, Ltd. Memory circuit. 4,031,412, Cl. 307-238.000.

Ohhinata, Ichiro; Okuhara, Shinzi; and Takeshita, Tetsuo, to Hitachi, Ltd. Memory circuit. 4,031,413, Cl. 307-238.000.

Ohno, Isao: *See—*
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Ohno, Nobuo: *See—*
Fujimoto, Keimei; Ohno, Nobuo; Okuno, Yoshitoshi; Mizutani, Toshio; Ohno, Isao; Hirano, Masachika; Itaya, Nobushige; and Matsuo, Takashi, 4,031,235.

Ohno, Tomeji: *See—*
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Okamura, Akira: *See—*
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Okamura, Yasushi; Tanaka, Kiichiro; and Takeda, Takashi, to Matsushita Electric Industrial Co., Ltd. Loudspeaker. 4,031,337, Cl. 179-115.50H.

Okuhara, Shinzi: *See—*
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Okuno, Yoshitoshi: *See—*
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Olashaw, William Francis, to General Electric Company. Insulative modular mounting panels for electrical switchboards. 4,031,433, Cl. 361-338.000.

Olasz, Joseph S.: *See—*
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Ollman, Melvin L. Building construction. 4,030,256, Cl. 52-90.000.

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Olschewski, Armin: *See—*
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Olympus Optical Co., Ltd.: *See—*
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Omori, Seita. Puncture alarm device for a tire. 4,031,508, Cl. 340-58.000.

Onishi, Makoto; Nagano, Katsuyuki; Tanaka, Toshiki P.; Matsuoka, Sadao; and Tanaka, Mitsuo, to Hitachi, Ltd. Optical connector. 4,030,809, Cl. 350-96.00C.

Ono Pharmaceutical Co., Ltd.: *See—*
Fujii, Setsuro; Kajita, Yasumichi; Hiraku, Seizi; Kira, Heizo; Aishita, Hideki; Muryobayashi, Keiko; Terashima, Hiroshi; Akimoto, Akira; Taoiguchi, Ken; and Wada, Minoru, 4,030,977.

Onsrud, Charles R. Tensioning device for a double drive profile cutter. 4,030,402, Cl. 90-19.000.

Oosterberg, Cedric Siegfried, to C. S. Oosterberg (Proprietary) Limited. Electric blanket. 4,031,352, Cl. 219-212.000.

Opedal, Torlak: *See—*
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Opi Cryochimie S.A.: *See—*
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Oppenlaender, Knut; Uhl, Guenter; Helfert, Herbert; Scharpenberg, Hans-Georg; and Stork, Karl, to BASF Aktiengesellschaft. Cyclic acetals. 4,031,112, Cl. 260-340.700.

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Boetto, Charles; Orkwiszewski, Wayne L.; and Connor, Donald E., 4,030,551.

Osborn, David R. Bottled water transfer device. 4,030,634, Cl. 222-23.000.

Osiko, Vyacheslav Vasilievich: *See—*
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Otter, Marinus J.A.M. Den; Nijenhuis, Anne Te; and Van Geenen, Albert A., to Stamicarbon B.V. Polyurethanes prepared from hydroxymethyl isocyanurates. 4,031,040, Cl. 260-2.5AW.

Ours, Carroll Wayne: *See—*
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Outboard Marine Corporation: *See—*
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Outokumpu Oy: *See—*
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Owens, Gary D., to Texaco Inc. Seismic system with signal-to-noise determination. 4,031,505, Cl. 340-15.5DP.

Owens-Illinois, Inc.: *See—*
Thomas, Ian M., 4,030,938.

Ozaki, Tadashi: *See—*
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Ozawa, Juichiro. Fusible resistor. 4,031,497, Cl. 338-308.000.

Ozawa, Juichiro: *See—*
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Ozawa, Jun: *See—*
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Pacific Utilities Supply Co.: *See—*
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Hildebrand, Larry R.; and Carpenter, John F., 4,030,604.
Paffoni, Camillo: *See—*
Pieri, Giampiero; Carlini, Filippo Maria; Paffoni, Camillo; and Boffa, Gioacchino, 4,031,096.
Page, Joe W., Jr.: *See—*
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Palmer, Dale A., to Monroe Auto Equipment Company. Vehicle suspension device. 4,030,713, Cl. 267-8.00R.
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Paoli, Alfred, to Akzona Incorporated. Electrical connector with means for maintaining a connected condition. 4,030,798, Cl. 339-89.00R.
Papaefingos, Pendelis N.; and Lance, Richard T., to Alumax Mill Products, Inc. Method of treating aluminum drosses, skims and slags. 4,030,914, Cl. 75-68.00R.
Papantoniou, Christos; and Gaetani, Quintino, to Societe Anonyme dite: L'Oreal. Hair lacquer or setting lotion containing bi- or tri-sequenced copolymer. 4,030,512, Cl. 132-7.000.
Paranjpe, Suresh C., to Mead Corporation, The. Startup apparatus and method for jet drop recording with relatively movable charge plate and orifice plate. 4,031,561, Cl. 346-1.000.
Paranjpe, Suresh C.; and Moore, Daniel W., to Mead Corporation, The. Jet drop recording head having an improved porous deflection ribbon. 4,031,563, Cl. 346-75.000.
Parent, Guy, to Compagnie Industrielle des Telecommunications Cit-Alcatel SA. Position measuring device. 4,031,500, Cl. 340-6.00R.
Parfenov, Anatoly Ivanovich: *See—*
Shults, Mikhail Mikhailovich; Parfenov, Anatoly Ivanovich; Shnypikov, Alexandr Dmitrievich; Krunchak, Vladimir Georgievich; Evnina, Sarra Borisovna; Dolidze, Vladimir Alexandrovich; and Tarasova, Valentina Mikhailovna, 4,030,935.
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Parke, Davis & Company: *See—*
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Parmann, Gunnar, to Rieber & Son Plastic-Industri A/S. Combined mould element and sealing ring. 4,030,872, Cl. 425-393.000.
Parquet, Donald J.; and Pedersen, Carl O., to J. I. Case Company. Hydraulic skid steering control system. 4,030,560, Cl. 180-6.480.
Parrish, Thomas D. Friction or inertia welding apparatus. 4,030,658, Cl. 228-2.000.
Partyka, Richard Anthony: *See—*
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Pasquen, Raymond F. Switching system for guided vehicles. 4,030,422, Cl. 104-131.000.
Pass-Port Systems, Inc.: *See—*
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Pastorel, Robert J., to Appleton Electric Company. Defeater for mechanicel safety interlock for covers of explosion-proof electrical housing. 4,031,340, Cl. 200-50.00A.
Patchornik, Abraham: *See—*
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Patel, Bhupendra C.: *See—*
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Patel, Mahesh S., to Eutectic Corporatioo. High hardness flame spray nickel-base alloy coating material. 4,031,278, Cl. 427-423.000.
Patel, Piyush J.; and Miringoff, William, to Tenneco Chemicals, Inc. Process for the removal of vinyl chloride from latexes containing polyvinyl chloride. 4,031,056, Cl. 260-29.6PT.
Patelli, Bianca; Bernardi, Luigi; Arcamone, Federico; and di Marco, Aurelio, to Societa' Farmaceutici Italia S.p.A. Adriamycin esters, their preperation and use. 4,031,211, Cl. 424-180.000.
Patrick, Ernest H. Air conditioner. 4,030,313, Cl. 62-7.000.
Patton, Charles Richard: *See—*
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Patzer, Michael D., to Valleylab, Inc. Electrical connector. 4,030,796, Cl. 339-61.00R.
Paul, Roger, to Etablissement Ani, chez Me Beck, avocat. Process for preparing a product having a biological activity. 4,030,976, Cl. 195-29.000.
Pavlov, Vyacheslav Valentinovich: *See—*
Chuiko, Alexei Alexeevich; Tertykh, Valentin Anatolievich; Sobolev, Vilyam Alexandrovich; Maschenko, Valery Mikhailovich; Pavlov, Vyacheslav Valentinovich; Chugai, Alexei Dmitrievich; Khaher, Nikolai Vasilievich; Kondratenko, Anatoly Borisovich; Vatamanjuk, Vasily Ivanovich; Khoma, Mikhail Ivanovich; Kutin, Alexandr Nikolaevich; Shaposhnikov, Jury Davydovich; and Galashina, Malvina Leontievna, 4,030,940.
Payakov, Stefan Georgiev: *See—*
Kochemidov, Atanas Dimitrov; Makedonski, Boris Georgiev; Dumanov, Ivan Minkov; Payakov, Stefan Georgiev; Galabov, Peter Konstantinov; and Atanassov, Haralampi Aangelov, 4,030,249.
Payne, Richard, to Thurne Engineering Company Limited. Packaging machine. 4,030,268, Cl. 53-55.000.
Pearne, Florentin J.: *See—*
Kelley, Norman S.; and Pearne, Florentin J., 4,030,618.
Pedersen, Carl O.: *See—*
Parquet, Donald J.; and Pedersen, Carl O., 4,030,560.
Pedersen, Charles John; and Bromels, Marilyn H., to Du Pont de Nemours, E. I., and Company. Macrocyclic hetero imine complexing agents. 4,031,111, Cl. 260-340.300.
Pedlar, Roy; Spencer, Alan Roderick; and Edwards, Colin, to British Aircraft Corporation Limited. Vehicles of the submersible type. 4,030,434, Cl. 114-16.00R.
Peil, William, to General Electric Company. Semiconductor amplification means combining two cascaded transistor amplifiers of high inverse impedances. 4,031,416, Cl. 307-299.00A.
Pellarini, Luigi. Aircraft structures. 4,030,688, Cl. 244-13.000.
Pelletier, Herve Joseph. Stand for a roll of floor covering material. 4,030,679, Cl. 242-68.000.
Pelosi, Stanford S., Jr., to Morton-Norwich Products, Inc. 5-[5-(4-Chlorophenyl)-2-furanyl]dihydro-2(3H)-furanone. 4,031,113, Cl. 260-343.600.
Pelzer, Rudolf; and Scholl, Heinz, to Saint-Gobain Industries. Degassing of liquids. 4,030,897, Cl. 55-42.000.
Pelzer, Rudolf: *See—*
Straeten, Franz-Josef; Pelzer, Rudolf; Feiten, Karl-Josef; and Stevens, Wilhelm-Josef, 4,030,961.
Penfold, Alan S.; and Thornton, John A., to Telic Corporation. Electrode type glow discharge method and apparatus. 4,030,996, Cl. 204-192.00R.
Penfold, Alan S.; and Thornton, John A., to Telic Corporation. Electrode type glow discharge apparatus. 4,031,424, Cl. 313-146.000.
Peng, Luke Shih-Cheng; and Yu, Herbert Chia-Chen. Structures for folding baby-carriages, chairs, and the like. 4,030,769, Cl. 280-42.000.
Penland Container, Inc.: *See—*
Yealy, Carl F., 4,030,630.
Pennwalt Corporation: *See—*
Parish, Harold Cheney; Allard, Michael Duane; Pettit, Jack Leland; and Spulgis, Ivars Sigurds, 4,030,639.
Pentney, Harry, to Gillette Company, The. Dispensing container for razor blade units. 4,030,598, Cl. 206-356.000.
Perron, Robert Richard; and Trombly, John E., to Eastern Company, The. Keyhole-less electronic lock. 4,031,434, Cl. 361-172.000.
Perry, Joseph P.: *See—*
Luce, Robert L.; Perry, Joseph P.; and Sanshurry, James D., 4,030,952.
Peters, Daniel Vern, to Bell Telephone Laboratories, Incorporated. Filter capacitor charging circuit. 4,031,559, Cl. 361-52.000.
Peterson, Marvin A.: *See—*
Kasik, Robert L.; and Peterson, Marvin A., 4,031,254.
Peterson, Reuben E. Material sensing switch. 4,031,342, Cl. 200-61.210.
Petrenko, Anatoly Avramovich: *See—*
Ponomarenko, Nikolai Borisovich; Kononenko, Vadim Grigorievich; Stelmakh, Viktor Alexeevich; Kotelnikov, Vladimir Ivanovich; Valenya, Ivan Jurievich; Sarancha, Vladimir Nikolaevich; Petrenko, Anatoly Avramovich; Bozhko, Valery Pavlovich; Yatsenko, Sergei Vasilievich; Komnatny, Igor Pavlovich; Akhnazariants, Levon Khachaturovich; Strizhenko, Vitaly Evgenievich; Kolokolov, Boris Alexeevich; Maznichenko, Stanislav Anisimovich; Bozhko, Viktor Vasilievich; Bondarenko, Oleg Alexandrovich; and Zakirov, Robert Sharafutdinovich, 4,030,389.
Petretti, Raymond H., to Toneray Covers, Inc. Cover assembly. 4,030,780, Cl. 296-100.000.
Petrusek, Victor. Magnetic target throwing game. 4,030,736, Cl. 273-95.00R.
Pettit, Charles E. Locking gas cap system. 4,030,322, Cl. 70-159.000.
Pettit, Jack Leland: *See—*
Parish, Harold Cheney; Allard, Michael Duane; Pettit, Jack Leland; and Spulgis, Ivars Sigurds, 4,030,639.
Pfizer Inc.: *See—*
Barth, Wayne E., 4,031,077.
Celmer, Walter D.; Cullen, Walter P.; Moppett, Charles E.; Routien, John B.; Shibakawa, Riichiro; and Tone, Junsuke, 4,031,206.
Kadin, Saul B.; and Moore, Peter F., 4,031,217.
Nakanishi, Susumu, 4,031,108.

Pfleiderer, Hans-Joerg, to Siemens Aktiengesellschaft. Solid body image sensor having charge coupled semiconductor charge shift elements and method of operation. 4,031,315, Cl. 358-212.000.
Philip, Morris. Dial and cylinder connection. 4,030,318, Cl. 66-28.000.
Philipoff, Alexandros. Universally adjustable vise stop. 4,030,718, Cl. 269-315.000.
Phillips, James W.; and Troyer, Terrance J., to Dwyer Instruments, Inc. Differential pressure gauge. 4,030,365, Cl. 73-393.000.
Phillips, Jodie W., to Corning Glass Works. Pin handling and insertion mechanism. 4,030,173, Cl. 29-25.190.
Phillips, Lawrence W.; and Rodgers, Harris G., Sr., to Corning Glass Works. Pin feeding mechanism. 4,030,181, Cl. 29-809.000.
Phillips Petroleum Company: *See—*
Gunnell, Thomas J., 4,030,889.
Haskell, Donald M., 4,031,153.
McKay, Dwight L., 4,031,002.
Morrison, Charles B., 4,030,642.
Phillips, Raymond J. Miniature impact tool. 4,030,556, Cl. 173-120.000.
Picker Corporation: *See—*
Hunt, Robert P.; and Steffek, Robert J., 4,031,400.
Picker X-Ray Mfg. Limited: *See—*
Sell, Leslie James, 4,030,579.
Pickert, Hansjurgen; Sesselmann, Hans Dieter; and Timmers, Leonardes August, to William Prym-Werke KG. Apparatus for sewing slide fasteners to elastic carriers. 4,030,430, Cl. 112-121.260.
Pieri, Giampiero; Carlini, Filippo Maria; Paffoni, Camillo; and Boffa, Gioacchino, to Montedison S.p.A. Fluorescent azabenzanthronic dyes. 4,031,096, Cl. 260-272.000.
Pierson, Mark V. Longitudinally fed component insertion apparatus. 4,030,180, Cl. 29-741.000.
Piesch, Steffen: *See—*
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Pilarski, Regis Victor; and Rumpf, Robert John, to Firestone Tire & Rubber Company, The. Integral hinge sensing switch. 4,031,344, Cl. 200-61.58B.
Pilarski, Regis Victor: *See—*
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Pilkington P-E Limited: *See—*
Rogers, Philip John, 4,030,805.
Pilkington, Ted S.; and Castle, Henry H. Toilet seat lifting apparatus including a resilient bowed member for preventing the seat from slamming. 4,030,146, Cl. 4-251.000.
Pillsbury Company, The: *See—*
Durst, Jack R., 4,031,261.
Pines, Seemon H.; and Kozlowski, Matthew A., to Merck & Co., Inc. Preparation of 3-hydroxymethyl-7β-aminoadipoyl-7α-methoxy-3-cephem-4-carboxylic acid. 4,031,085, Cl. 260-243.00C.
Pingon, Pierre Joseph. Pneumatic vehicle jack. 4,030,701, Cl. 254-124.000.
Pioneer Electric and Research Corporation, The: *See—*
Krause, Ernest Harry; Seaman, Wesley Arthur; and Angelopoulos, Peter Gregory, 4,031,466.
Pioneer Electronic Corporation: *See—*
Ando, Shizuo; and Okamura, Akira, 4,031,323.
Itagaki, Tadasi, 4,030,564.
Piret, Jean: *See—*
Lalin, Andre; and Piret, Jean, 4,030,381.
Piret, Norbert L.; Rabben, Hans Joachim; Kudelka, Herbert; and Schmidt, Siegbert, to Duisburger Kupferhutte. Process for recovering electrolytic copper of high purity by means of reduction electrolysis. 4,030,990, Cl. 204-108.000.
Pitney-Bowes, Inc.: *See—*
Dlugos, Daniel F.; and Manduley, Flavio M., 4,031,402.
Irvine, Robert; and Luperti, Harry E., 4,030,722.
Irvine, Robert; and Luperti, Harry E., 4,030,723.
Pitre, Lester M., to Innovative Electronics, Inc. High fidelity loudspeaker system. 4,031,318, Cl. 179-1.00D.
Pitroda, Satyan G., to GTE Automatic Electric Laboratories Incorporated. Conferencing arrangement for use in a PCM system. 4,031,328, Cl. 179-18.0BC.
Pittet, Alan O.: *See—*
Schreiber, William Lewis; Mosciano, Gerard Joseph; Pittet, Alan O.; Vock, Manfred; and Shuster, Edward Joseph, 4,031,140.
Plate Bonn Gesellschaft mit beschrankter Haftung: *See—*
Raabe, Fritz; and de Jong, Eduard, 4,030,957.
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Pletzke, Thomas S.: *See—*
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Plotnick, Richard J.: *See—*
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Pocci, Nedo Igor: *See—*
Hahm, Heinz Gunter; and Pocci, Nedo Igor, 4,030,185.
Poe, Curtis Eugene; and Cheers, Ronald Murray, to Ingersoll-Rand Company. Drill string make-up and break-out mechanism. 4,030,542, Cl. 166-77.500.
Poetzsch, Rolf; and Schuster, Hans Gunther, to Albrecht Baumer KG Spezialmaschinenfabrik. Twin-edged foam plastic cleaving machine. 4,030,386, Cl. 83-4.000.
Pohler, Heinz: *See—*
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Pokorny, Svatopluk: *See—*
Kalal, Jaroslav; Coupek, Jiri; Pokorny, Svatopluk; Svec, Frantisek; and Bouchal, Karel, 4,031,037.
Polette, Melvin L. Internal combustion engine device. 4,030,461, Cl. 123-119.00B.
Poli, Albert A.; Bossart, Clayton J.; and Benzie, Thomas P., to Mine Safety Appliances Company. Carbon monoxide detection apparatus and method. 4,030,887, Cl. 23-232.00E.
Polin, Antonio, to Ing. Polin & C di Polin Ing. Antonio & C. S.a.s. Dough transfer apparatus. 4,030,594, Cl. 198-489.000.
Ponomarenko, Nikolai Borisovich; Kononenko, Vadim Grigorievich; Stelmakh, Viktor Alexeevich; Kotelnikov, Vladimir Ivanovich; Valenya, Ivan Jurievich; Sarancha, Vladimir Nikolaevich; Petrenko, Anatoly Avramovich; Bozhko, Valery Pavlovich; Yatsenko, Sergei Vasilievich; Komnatny, Igor Pavlovich; Akhnazariants, Levon Khachaturovich; Strizhenko, Vitaly Evgenievich; Kolokolov, Boris Alexeevich; Maznichenko, Stanislav Anisimovich; Bozhko, Viktor Vasilievich; Bondarenko, Oleg Alexandrovich; and Zakirov, Robert Sharafutdinovich. Machine for high-speed plastic working of materials. 4,030,389, Cl. 83-513.000.
Ponomarev, Alexei Ivanovich; Sokolov, Sergei Vasilievich; Larionova, Julia Alexeevna; Klebansky, Alexandr Leibovich; Berenblit, Vsevolod Volfovich; Dolnakov, Jury Pavlovich; Yagupolsky, Lev Moiseevich; Malovik, Vladlen Vasilievich; Lozinsky, Miron Onufrievich; Belous, Viktor Mikhailovich; Gruz, Boris Efimovich; Alexeeva, Ljubov Antonovna; Ankudinov, Anatoly Kirillovich; and Ryazanova, Rufina Mikhailovna. [Perfluoroalkyl(alkoxy)phenyl]methyldichlorosilanes and method of preparing same. 4,031,119, Cl. 260-448.20B.
Poppelreiter, Joseph C., II, to Kubik Hydradrives, Inc. Electronic position and velocity control system. 4,031,442, Cl. 318-561.000.
Porinchak, Joseph F.: *See—*
Brax, Harri J.; Porinchak, Joseph F.; and Weinberg, Alan S., 4,031,162.
Porsche AG: *See—*
Bier, Manfred, 4,030,350.
Port, Beverly A. Convertible doll with pivoted changeable hands. 4,030,240, Cl. 46-153.000.
Portmann, Hubert, to Ebauches S.A. Control device for an electronic wrist watch. 4,030,284, Cl. 58-23.00R.
Possati, Mario; and Danielli, Franco, to Finike Italiana Marposs-Soc. In Accomandita Semplice di Mario Possati & C. Method and relevant apparatus for detecting the geometrical features of mechanical workpieces, in particular for measuring the eccentricity and out-of-roundness. 4,030,201, Cl. 33-174.00Q.
Potoroka, Victor W. Clothes hanger carrier. 4,030,649, Cl. 224-45.00T.
Potter, Robert Lawrence: *See—*
Dudonis, Ronald Michael; Morrison, Charles Glenn; Potter, Robert Lawrence; and Streisand, Kenneth, 4,031,325.
Poujois, Robert: *See—*
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Poulsen, Robert Gordon: *See—*
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Powanda, Thomas M.: *See—*
Bunkley, Rex L.; and Powanda, Thomas M., 4,031,053.
Powell, James E., to Shell Oil Company. 3,4,7,8-Tetrahydro-9-nitro-7-substituted-2H,6H-pyrimido-(4,3-b)(1,3)thiazines. 4,031,087, Cl. 260-243.00R.
PPG Industries, Inc.: *See—*
Anderson, Carl Clement; and Dowbenko, Rostyslaw, 4,031,290.
Cooper, Joseph E., 4,031,175.
Dowbenko, Rostyslaw; and Marchetti, Joseph R., 4,031,051.
Hawkins, Charles T., 4,030,905.
Jerabek, Robert D., 4,031,050.
Manner, James A., 4,031,126.
Pratt Manufacturing Corporation: *See—*
Pratt, Robert H., 4,030,960.
Pratt, Robert H., to Pratt Manufacturing Corporation. Pneumatic sealing wheel. 4,030,960, Cl. 156-555.000.
Preiner, Gerald: *See—*
Linck, Donald W., II; and Kaprelian, George, 4,030,197.
Presley, Kenneth Dale: *See—*
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Price, Donald C. Sports watercraft. 4,030,443, Cl. 115-70.000.
Price, Ralph E., to Landis Tool Company. Workpiece transporting structure for use with a cylindrical grinder. 4,030,252, Cl. 51-215.00R.
Pringle, William L., to United States Steel Corporation. Disc brake assembly including a self-contained actuator with wear take-up and anti-drag device. 4,030,576, Cl. 188-71.800.
Pro-Tec Industries: *See—*
Hill, John C., 4,030,775.
Prochazka, Svante: *See—*
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Procter & Gamble Company, The: *See—*
Laughlin, Robert Gene; and Gougeon, Thomas William, 4,031,202.
Proctor and Associates Company: *See—*
Proctor, Daryl F., 4,031,432.
Proctor, Daryl F., to Proctor and Associates Company. Solid state switching circuit and method for simulating a relay. 4,031,432, Cl. 361-7.000.
Production Specialties, Inc.: *See—*
McGinn, Ferdinand M., 4,030,543.
Prokai, Bela; and Kanner, Bernard, to Union Carbide Corporation.

Organosilicone polymers and polyester urethane foam produced therewith. 4,031,042, Cl. 260-2.5AH.
Provost, Philip J.; Ittensohn, Oswald L.; and Hilleman, Maurice R., to Merck & Co., Inc. Hepatitis A antigen. 4,031,203, Cl. 424-89.000.
Pryor, David Ercest: *See—*
Forsyth, Bruce Adam; Pryor, David Ernest; McGarry, Errol James; and Harney, Donald William Gerald, 4,031,249.
Pullukat, Thomas J., to Chemplex Company. Polymerization catalyst and method. 4,031,298, Cl. 526-113.000.
Puryear, John W., to Brunswick Corporation. Crossbow trigger. 4,030,473, Cl. 124-35.00R.
Putz, A. Frank. Variable displacement rotary piston espansible chamber device. 4,030,861, Cl. 418-27.000.
Pyle, Kenneth E., to Reef-Baker Corporatioo. Condensate valve assembly. 4,030,517, Cl. 137-203.060.
Quadrelas Corporation: *See—*
McEachran, Dennis B., 4,030,487.
Quigley, Peter James Calvert. Dice game. 4,030,763, Cl. 273-134.00D.
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Quivy, Michel: *See—*
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Swanson, Kermit E.; and Kuzel, Frank J., 4,030,621.
Raabe, Fritz; and de Jong, Eduard, to Plate Bonn Gesellschaft mit beschrankter Haftung. Copolyamides containing caprolactam, laurilactam and hexamethylene diamine adipate. 4,030,957, Cl. 156-331.000.
Rabben, Hans Joachim: *See—*
Piret, Norbert L.; Rabben, Hans Joachim; Kudelka, Herbert; and Schmidt, Siegbert, 4,030,990.
Rabenseifner, Karl, to Volkswagenwerk Aktiengesellschaft. Vehicle suspension system. 4,030,777, Cl. 280-714.000.
Rabenstein, Heinrich: *See—*
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Rada, Joseph J.; and Gardner, Jeffrey M., to Container Corporation of America. Partition arrangemeot. 4,030,660, Cl. 229-42.000.
Radiochemical Centre Limitad, The: *See—*
Bayly, Russell James; Chambers, Virginia Edith May; and Mooks, Reginald, 4,030,886.
Raether, Wolfgang: *See—*
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Rafferty, Aodrew J., to Brown & Root, Inc. Method and apparatus for adjustably supporting a pipeline relative to a lay vessel. 4,030,311, Cl. 61-108.000.
Raggiotti, Guglielmo; and Colonnelli, Domenico, to Itus Patent Holding (IPH) N.V. Temperature monitoring and display system. 4,031,365, Cl. 235-151.300.
Raider, Jerry Wesley: *See—*
Martin, Blair Robertson; Meier, Johann Hans; and Raider, Jerry Wesley, 4,030,591.
Rambousek, Miroslav; Kapl, Ladislav; and Mladek, Milos, to Elites, Zavody testilniho strojirenstvi, generalni reditalstvi. High-speed spindle holder suspension for open-end spinning machines. 4,030,279, Cl. 57-58.890.
Ramey, Chester E.; and Luzzi, John J., to Ciba-Geigy Corporation. Hindered piperidine carboxylic acids, metals salts thereof and stabilized compositions. 4,031,095, Cl. 260-270.00C.
Ramirez, Ernest R.; and Johnson, Dennis L., to Swift and Company Limited. Vortex coagulation means and method for wastewater clarificatioo. 4,031,006, Cl. 210-44.000.
Ramsey, Harold Eugene, to Du Pont de Nemours, E. I., and Company. Film severing method and apparatus. 4,030,388, Cl. 83-49.000.
Rando, Joseph F.; Sobel, Arthur; and Davidson, Richard W., to Spectra-Physics, Inc. Automatic grade rod and method of operation. 4,030,832, Cl. 356-152.000.
Rank Xerox Ltd.: *See—*
Fukui, Kiyoshige; Tamamura, Akira; and Nishimoto, Minoru, 4,030,725.
Kurosaki, Takefumi, 4,030,721.
Rannou, Jean, to Thomson-CSF. Reciprocal microwave junction device, 4,031,487, Cl. 333-1.000.
Rao, Pemmaraju Narasimha, to Becton, Dickinson and Company. Testosterone derivatives. 4,031,117, Cl. 260-397.100.
Rapkin, Edward: *See—*
Giraud, Pierre; Palais, Conrad; and Rapkin, Edward, 4,031,392.
Repp, Gueother; Fuchs, Hugo; and Thomas, Erwin, to BASF Aktiengesellschaft. Manufacture of cyclohexanone oxime. 4,031,139, Cl. 260-566.00A.
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Rasor, William A.; Van Dine, Walter S.; and Whitney, Frank A., to Masco Corporation. Vehicle accessory rack. 4,030,647, Cl. 224-29.00R.
Rast, Robert Morgan; Wine, Charles Martin; and Henderson, John Goodchilde Norie, to RCA Corporation. Television tuning system with provisions for receiving RF carrier at nonstandard frequency. 4,031,549, Cl. 358-193.000.
Rauch, Gerhard Josef: *See—*
Nyssen, Adrianus Marinus; and Rauch, Gerhard Josef, 4,030,330.
Rauch, Moriz V.: *See—*
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Hawryluk, Peter, 4,030,457.
Soule, Gustave H., Jr., 4,031,360.
Stanislawczyk, John P., 4,030,323.
Raymond, Paul J., to A. J. Harris & Sons, Inc. Bridge expansion joint. 4,030,156, Cl. 14-16.500.
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Aronson, Albert Irving, 4,030,316.
Crane, Robert Anthony; and Ghosh, Asoke Kumar, 4,031,485.
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Goldberg, Edwin Allen, 4,031,476.
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Rast, Robert Morgan; Wine, Charles Martin; and Henderson, John Goodchilde Norie, 4,031,549.
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Woodward, Oakley McDonald, 4,031,539.
Reach Electronics, Inc.: *See—*
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Reader, Arthur M., to Celanese Corporation. Polyurethane-amide resins based upon isocyanate terminated prepolymers of bis-(2-hydroxyethyl)terephthalate. 4,031,035, Cl. 260-2.5AM.
Reber, Erwin; and Schollhorn, Fritz, to Josef Bautz GmbH. Agricultural machine. 4,030,274, Cl. 56-13.500.
Recker, Gary B., to Rockwell International Corporation. Optical transducer encoding apparatus. 4,031,386, Cl. 250-230.000.
Redman, Charles M., to United States of America, Army. Thermal image camera. 4,031,393, Cl. 250-332.000.
Redwine, Donald J.; and Kitagawa, Norishisa, to Texas Instruments Incorporated. Address buffer circuit for semiconductor memory. 4,031,415, Cl. 307-279.000.
Reece, Paul: *See—*
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Reed, John Anthony; and Karp, Joel Allen, to Burroughs Corporation. Ultra high sensitivity sense amplifier for memories employing single transistor cells. 4,031,522, Cl. 340-173.00R.
Reed, Terry J., to Westinghouse Electric Corporation. System and method employing a digital computer with improved programmed operation for automatically synchronizing a gas turbine or other electric power plant generator with a power system. 4,031,407, Cl. 307-87.000.
Reef-Baker Corporation: *See—*
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Lalin, Andre; and Piret, Jean, 4,030,381.
Reichsteio, Erik Laurits, to Arenco AB. Cutter for removing a tough surface layer from pieces of material. 4,030,163, Cl. 17-50.000.
Reid, Joanne; de la Teja, Elpidio Leoncio; and Farrell, Francis, to Thomas J. Lipton, Inc. Process for preparing instant beverage cubes. 4,031,238, Cl. 426-285.000.
Reif, Robert Bruce, to Hoffmann-La Roche Inc. Manufacture of pharmaceutical unit dosage forms. 4,031,200, Cl. 424-27.000.
Reiland, Dennis J., to General Pattern Co., Inc. Method of making shaker plates. 4,030,188, Cl. 29-527.100.
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Heilman, Marlin S.; Langer, Alois A.; Mirowski, Mieczyslaw; Mower, Morton M.; and Reilly, David M., 4,030,509.
Reiner, Carl Casper, to Deere & Company. Source related potential indicating continuity tester. 4,031,461, Cl. 324-51.000.
Reinert, Gerhard; Fallows, Jack; and Dussy, Paul, to Ciba-Geigy Corporation. Continuous process for optical brightening. 4,031,273, Cl. 427-158.000.
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Asplund, Arne Johan Arthur; Reinhall, Rolf Bertil; and Ahrel, Per Johan Ingemar, 4,030,969.
Reisioger, Konrad; and Holzl, Ludwig, to Siemens Aktiengesellschaft. Apparatus for the time division multiplex transmission of binary signals. 4,031,316, Cl. 178-50.000.
Remy, David C., to Merck & Co., Inc. Trifluoromethylthio (and sulfonyl) derivatives of cyproheptadine analogs. 4,031,222, Cl. 424-267.000.
Remy, David C., to Merck & Co., Inc. Trifluoromethylthio derivatives of cyproheptadine. 4,031,223, Cl. 424-267.000.
Renner, Gunter; Boie, Immo; and Scheben, Quirin, to AGFA-Gevaert, A.G. Aliphatic β-keto esters. 4,031,130, Cl. 260-468.00K.
Rescalli, Carlo; and Pacifico, Antonio, to Snam Progetti S.p.A. Method for removing acetylenic compounds from saturated, olefinic and

dienic hydrocarbons or mixtures thereof. 4,031,157, Cl. 260-676.00R.
Research Corporation: *See—*
Callis, James B.; and Davidson, Ernest R., 4,031,398.
Reuschel, Donald L.; and Hendry, James W., to Ex-Cell-O Corporation. intensified cylinder assembly. 4,030,299, Cl. 60-560.000.
Revenko, Olga Mikhailovna: *See—*
Khcheyan, Khachik Egorovich; Revenko, Olga Mikhailovna; Shatalova, Alla Nikolaevna; Gelperina, Eleonora Grigorievna; Agrinskaya, Lidia Ivanovna; and Muradian, Georgy Avanesovich, 4,031,128.
Reyhing, Jorg: *See—*
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Bouy, Pierre; Juillard, Michel; and Bourgeois, Jean-Luc, 4,031,041.
Helgorsky, Jacques, 4,031,148.
Rice, Jeffrey C.; and Tucker, Terry A., to Sperry Rand Corporation. Synchro-to-digital converter. 4,031,531, Cl. 340-347.0SY.
Richards, William Henry George, to Burroughs Wellcome Co. Method for the treatment of malaria. 4,031,220, Cl. 424-258.000.
Richardson, Edwin A.; and Scheuerman, Ronald F., to Shell Oil Company. Economically dissolving barium sulfate scale with a chelating agent. 4,030,548, Cl. 166-279.000.
Richev, Georgi Trendafilov: *See—*
Arolski, Angel Tomov; Usheva, Velichka Borissova; Gruev, Peter Vassilev; Richev, Georgi Trendafilov; and Doncheva, Zvetana Semkova, 4,031,264.
Richter, Hans, to Keller & Knappich Augsburg Zweigneiderlassung der Industrie-Werke Karlsruhe Augsburg Aktienegesellschaft. Robot device. 4,030,617, Cl. 214-1.0CM.
Rickert, Glenn Edward. Frequency selective reflex sight. 4,030,839, Cl. 356-251.000.
Rickmann, Bernard C.: *See—*
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Rieber & Son Plastic-Industri A/S: *See—*
Parmann, Gunnar, 4,030,872.
Riedel, Dieter, to Drabert Sohne. Decatizing of fabrics. 4,030,320, Cl. 68-5.00R.
Rieter Machine Works, Ltd.: *See—*
Hablutzel, Kurt; and Lamparter, Hansruedi, 4,030,635.
Rigazio, Anthony W., to General Time Corporation. Combination housing with compartment and ejector mechanism for ejecting a battery therefrom. 4,031,295, Cl. 429-100.000.
Rinaldi, Gerald Michael: *See—*
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Rindfleisch, Volker: *See—*
Muller, Karl-Heinz; Rindfleisch, Volker; Rauch, Moriz V.; and Willasch, Dieter, 4,031,390.
Rittler, Hermann L., to Corning Glass Works. Exuded transition metal films on glass-ceramic articles. 4,030,903, Cl. 65-32.000.
Rizio, Leo A. Lock hardware for outboard motor. 4,030,324, Cl. 70-232.000.
Robert Bosch G.m.b.H.: *See—*
Aldinger, Ulrich; and Kersten, Gunter, 4,030,405.
Bassler, Gerd; and Altpeter, Arno, 4,030,525.
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Robert, Jacques: *See—*
Borel, Joseph; and Robert, Jacques, 4,031,529.
Robertson, Joseph D.; and Ward, Dean L. Drying system for particles. 4,030,205, Cl. 34-12.000.
Robillard, Edward George: *See—*
St. Andrc, Arthur Francis; LeBlanc, Joseph David; and Robillard, Edward George, 4,031,446.
Robinson, Christopher Thomas. Vehicle jacks. 4,030,697, Cl. 254-8.00R.
Robinson, Elmer D.; and Struttmann, Hilarius S., to Borg-Warner Corporation. Bearing cartridge. 4,030,785, Cl. 308-187.000.
Robinson, Philip W. Furnace waste gas heat recovery device and method of using same. 4,030,877, Cl. 432-29.000.
Robinson, Ralph C.: *See—*
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Robroy Industries: *See—*
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Roch, Jacques L., to Xynetics, Inc. Automatic cable forming system. 4,030,527, Cl. 140-92.100.
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Bake, Earl A.; and Schoeneweis, E. Frederick, 4,030,696.
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Recker, Gary B., 4,031,386.
Rockwell, Thomas H. Percussion tool with noise reducing characteristics and method of making. 4,030,553, Cl. 173-1.000.
Rodenchuk, William Simon; and Eccles, Anthony Garth, to Alcan Research and Development Limited. Apparatus for continuous casting of metals. 4,030,536, Cl. 164-274.000.
Rodgers, Harris G., Sr.: *See—*
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Rodriguez, Jose E. Canopy release activating device for parachutes. 4,030,689, Cl. 244-151.00B.
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Rogell, Paul S. Simulated gemstone. 4,030,317, Cl. 63-32.000.
Rogers, Jerry L.; and Cochran, Chudleigh B., to Brown Oil Tools, Inc. Swivel assembly. 4,030,546, Cl. 166-208.000.
Rogers, Paul. Efficiency and utilization of cooling towers. 4,031,173, Cl. 261-24.000.
Rogers, Philip John, to Pilkington P-E Limited. Infra-red lenses. 4,030,805, Cl. 350-2.000.
Rogers, Ronald D., to Alco Standard Corporation. Method and apparatus for circulating a heat treating gas. 4,030,712, Cl. 266-252.000.
Rohde, Wilhelm: *See—*
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Rohde, Wolfgang: *See—*
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Dupont, John A.; Kooch, Walter; and Scott, Joseph D., 4,031,055.
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Rohner, Michel Alexandre, to Singer Company, The. Multistage sorter having pushdown stacks with concurrent access to interstage buffer memories for arranging an input list into numerical order. 4,031,520, Cl. 364-200.000.
Roma, Carlo, to Belleli Industrie Meccaniche S.p.A. Tube nest for heat exchangers, and modular elements for said nest consisting of thermoplastic tubes, and process for manufacturing the modular elements and the tube nests. 4,030,540, Cl. 165-172.000.
Ron, Armando: *See—*
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Ronnquist, Hadar Yngve. Fecal matter collector. 4,030,500, Cl. 128-283.000.
Rooney, Clarence Stanley: *See—*
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Rosenberg, Jeffrey. Swimming pool surface cleaning device. 4,030,148, Cl. 4-172.000.
Rosenkranz, Hans Jurgen: *See—*
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Ross, Sigmund L., to Shuffman, Rose, Executrix. Apparatus for cryothermal fracturing of rock formations. 4,030,547, Cl. 166-212.000.
Roth, Ronald: *See—*
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Rothfuss, Robert G.; and Becht, Carl T., to Senco Products, Inc. Improved fastener applying device. 4,030,655, Cl. 227-130.000.
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Rowan, Frank E., to Aluminum Plumbing Fixture Corporation. Combination plumbing fixture having single floor waste outlet. 4,030,145, Cl. 4-10.000.
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Rozenboom, Gustave; and Rickmann, Bernard C., to Square D Company. Bus bar and switchboard assemblage. 4,030,794, Cl. 339-22.00B.
Ruddick, Marie T.: *See—*
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Ruddick, Roy M.; and Ruddick, Marie T. Pet litter deodorizing apparatus. 4,030,449, Cl. 119-1.000.
Rudiger, Gunther: *See—*
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Rudolph, Paul, to Metallgesellschaft Aktiengesellschaft. Process for treating raw gas produced by the pressure gasification of coal. 4,031,030, Cl. 252-373.000.
Rueda Segura, Eduardo, to Empresa De Representaciones Unidas, S.A. (Erusa). Electric radiant heater. 4,031,353, Cl. 219-345.000.
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Runge, Hans-Jurgen, to Warner Lewis Jr. Industrie- Filter GmbH. Spring-loaded differential pressure gage. 4,030,368, Cl. 73-419.000.
Ruprecht, Hermann, to Maschinenfabrik Fahr Aktiengesellschaft. Rotary mower. 4,030,275, Cl. 56-192.000.
Rushmore, Dean Frederick: *See—*
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Organosilicone polymers and polyester urethane foam produced therewith. 4,031,042, Cl. 260-2.5AH.

Provost, Philip J.; Ittensohn, Oswald L.; and Hilleman, Maurice R., to Merck & Co., Inc. Hepatitis A antigen. 4,031,203, Cl. 424-89.000.

Pryor, David Ernest: *See—*
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Pullukat, Thomas J., to Chemplex Company. Polymerization catalyst and method. 4,031,298, Cl. 526-113.000.

Puryear, John W., to Brueswick Corporation. Crossbow trigger. 4,030,473, Cl. 124-35.00R.

Putz, A. Frank. Variable displacement rotary piston expansible chamber device. 4,030,861, Cl. 418-27.000.

Pyle, Kenneth E., to Reef-Baker Corporation. Condensate valve assembly. 4,030,517, Cl. 137-203.000.

Quadrelax Corporation: *See—*
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Quigley, Peter James Calvert. Dice game. 4,030,763, Cl. 273-134.00D.

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Raabe, Fritz; and de Jong, Eduard, to Plate Bonn Gesellschaft mit beschrenkter Heftung. Copolyamides containing caprolactam, lauriclactam and bexamethylene diamine adipate. 4,030,957, Cl. 156-331.000.

Rabben, Hans Joachim: *See—*
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Rabenseifner, Karl, to Volkswagenwerk Aktiengesellschaft. Vehicle suspension system. 4,030,777, Cl. 280-714.000.

Rabenstein, Heinrich: *See—*
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Radiochemical Centre Limited, The: *See—*
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Raether, Wolfgang: *See—*
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Rafferty, Andrew J., to Brown & Root, Inc. Method and apparatus for adjustably supporting a pipeline relative to a lay vessel. 4,030,311, Cl. 61-108.000.

Raggiotti, Guglielmo; and Colonnelli, Domenico, to Itus Patent Holding (IPH) N.V. Temperature monitoring and display system. 4,031,365, Cl. 235-151.300.

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Rambousek, Miroslav; Kapl, Ladislav; and Mladek, Milos, to Elitex, Zavody textilniho strojirenstvi, generalni reditalstvi. High-speed spindle bolder suspension for open-end spinning machines. 4,030,279, Cl. 57-58.890.

Ramey, Chester E.; and Luzzi, John J., to Ciba-Geigy Corporation. Hindered piperidine carbosylic acids, metals salts thereof and stabilized compositions. 4,031,095, Cl. 260-270.00C.

Ramirez, Ernest R.; and Johnson, Dennis L., to Swift and Company Limited. Vortex coagulation means and method for wastewater clarification. 4,031,006, Cl. 210-44.000.

Ramsey, Harold Eugene, to Du Pont de Nemours, E. I., and Company. Film severing method and apparatus. 4,030,388, Cl. 83-49.000.

Rando, Joseph F.; Sobel, Arthur; and Davidson, Richard W., to Spectra-Physics, Inc. Automatic grade rod and method of operation. 4,030,832, Cl. 356-152.000.

Rank Xerox Ltd.: *See—*
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Rannou, Jean, to Thomson-CSF. Reciprocal microwave junction device. 4,031,487, Cl. 333-1.000.

Rao, Pemmaraju Narasimha, to Becton, Dickinson and Company. Testosterone derivatives. 4,031,117, Cl. 260-397.100.

Rapkin, Edward: *See—*
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Rapp, Guenther; Fuchs, Hugo; and Thomas, Erwin, to BASF Aktiengesellschaft. Manufacture of cyclohexanone oxime. 4,031,139, Cl. 260-566.00A.

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Rasor, William A.; Van Dine, Walter S.; and Whitney, Frank A., to Masco Corporation. Vehicle accessory rack. 4,030,647, Cl. 224-29.00R.

Rast, Robert Morgan; Wine, Charles Martin; and Henderson, John Goodchilde Norie, to RCA Corporation. Television tuning system with provisions for receiving RF carrier at nonstandard frequency. 4,031,549, Cl. 358-193.000.

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Firester, Arthur Herbert; and Gorog, Istvan, 4,030,835.
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Reader, Arthur M., to Celanese Corporation. Polyurethane-amide resins based upon isocyanate terminated prepolymers of bis-(2-hydroxyethyl)terephthalate. 4,031,035, Cl. 260-2.5AM.

Reber, Erwin; and Schollhorn, Fritz, to Josef Bautz GmbH. Agricultural machine. 4,030,274, Cl. 56-13.500.

Recker, Gary B., to Rockwell International Corporation. Optical transducer encoding apparatus. 4,031,386, Cl. 250-230.000.

Redman, Charles M., to United States of America, Army. Thermal image camera. 4,031,393, Cl. 250-332.000.

Redwine, Donald J.; and Kitagawa, Norishisa, to Texas Instruments Incorporated. Address buffer circuit for semiconductor memory. 4,031,415, Cl. 307-279.000.

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Reed, John Anthony; and Karp, Joel Allen, to Burroughs Corporation. Ultra high sensitivity sense amplifier for memories employing single transistor cells. 4,031,522, Cl. 340-173.00R.

Reed, Terry J., to Westinghouse Electric Corporation. System and method employing a digital computer with improved programmed operation for automatically synchronizing a gas turbine or other electric power plant generator with a power system. 4,031,407, Cl. 307-87.000.

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Reichstein, Erik Laurits, to Arenco AB. Cutter for removing a tough surface layer from pieces of material. 4,030,163, Cl. 17-50.000.

Reid, Joanne; de la Teja, Elpidio Leoncio; and Farrell, Francis, to Thomas J. Lipton, Inc. Process for preparing instant beverage cubes. 4,031,238, Cl. 426-285.000.

Reif, Robert Bruce, to Hoffmann-La Roche Inc. Manufacture of pharmaceutical unit dosage forms. 4,031,200, Cl. 424-27.000.

Reiland, Dennis J., to General Pattern Co., Inc. Method of making shaker plates. 4,030,188, Cl. 29-527.100.

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Reiner, Carl Casper, to Deere & Company. Source related potential indicating continuity tester. 4,031,461, Cl. 324-51.000.

Reinert, Gerhard; Fallows, Jack; and Dussy, Paul, to Ciba-Geigy Corporation. Continuous process for optical brightening. 4,031,273, Cl. 427-158.000.

Reinhall, Rolf Bertil: *See—*
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Reisinger, Konrad; and Holzl, Ludwig, to Siemens Aktiengesellschaft. Apparatus for the time division multiplex transmission of binary signals. 4,031,316, Cl. 178-50.000.

Remy, David C., to Merck & Co., Inc. Trifluoromethylthio (and sulfonyl) derivatives of cyproheptadine analogs. 4,031,222, Cl. 424-267.000.

Remy, David C., to Merck & Co., Inc. Trifluoromethylthio derivatives of cyproheptadine. 4,031,223, Cl. 424-267.000.

Renner, Gunter; Boie, Immo; and Scheben, Quirin, to AGFA-Gevaert, A.G. Aliphatic β-keto esters. 4,031,130, Cl. 260-468.00K.

Rescalli, Carlo; and Pacifico, Antonio, to Snam Progetti S.p.A. Method for removing acetylenic compounds from saturated, olefinic and

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Research Corporation: *See—*
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Rice, Jeffrey C.; and Tucker, Terry A., to Sperry Rand Corporation. Synchro-to-digital converter. 4,031,531, Cl. 340-347.0SY.

Richards, William Henry George, to Burroughs Wellcome Co. Method for the treatment of malaria. 4,031,220, Cl. 424-258.000.

Richardson, Edwin A.; and Scheuerman, Ronald F., to Shell Oil Company. Economically dissolving barium sulfate scale with a chelating agent. 4,030,548, Cl. 166-279.000.

Richev, Georgi Trendafilov: *See—*
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Richter, Hans, to Keller & Knappich Augsburg Zweigneiderlassung der Industrie-Werke Karlsruhe Augsburg Aktienegesellschaft. Robot device. 4,030,617, Cl. 214-1.0CM.

Rickert, Glenn Edward. Frequency selective reflex sight. 4,030,839, Cl. 356-251.000.

Rickmann, Bernard C.: *See—*
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Rieber & Son Plastic-Industri A/S: *See—*
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Rieter Machine Works, Ltd.: *See—*
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Rigazio, Anthony W., to General Time Corporation. Combination housing with compartment and ejector mechanism for ejecting a battery therefrom. 4,031,295, Cl. 429-100.000.

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Rittler, Hermann L., to Corning Glass Works. Exuded transition metal films on glass-ceramic articles. 4,030,903, Cl. 65-32.000.

Rizio, Leo A. Lock hardware for outboard motor. 4,030,324, Cl. 70-232.000.

Robert Bosch G.m.b.H.: *See—*
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Robert, Jacques: *See—*
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Robertson, Joseph D.; and Ward, Dean L. Drying system for particles. 4,030,205, Cl. 34-12.000.

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Robinson, Christopher Thomas. Vehicle jacks. 4,030,697, Cl. 254-8.00R.

Robinson, Elmer D.; and Struttmann, Hilarius S., to Borg-Warner Corporation. Bearing cartridge. 4,030,785, Cl. 308-187.000.

Robinson, Philip W. Furnace waste gas heat recovery device and method of using same. 4,030,877, Cl. 432-29.000.

Robinson, Ralph C.: *See—*
Freeman, John D.; Robinson, Ralph C.; and Swonger, Kenneth D., 4,031,363.

Robroy Industries: *See—*
Madej, Edward A., 4,030,866.

Roch, Jacques L., to Xynetics, Inc. Automatic cable forming system. 4,030,527, Cl. 140-92.100.

Rockwell International Corporation: *See—*
Archer, John L.; Tocci, Leonard R.; and Williams, Jeffrey L., 4,031,526.
Bake, Earl A.; and Schoeneweis, E. Frederick, 4,030,696.
Moll, Eberhard; and Walch, Leo M., Jr., 4,031,361.
Recker, Gary B., 4,031,386.

Rockwell, Thomas H. Percussion tool with noise reducing characteristics and method of making. 4,030,553, Cl. 173-1.000.

Rodenchuk, William Simon; and Eccles, Anthony Garth, to Alcan Research and Development Limited. Apparatus for continuous casting of metals. 4,030,536, Cl. 164-274.000.

Rodgers, Harris G., Sr.: *See—*
Phillips, Lawrence W.; and Rodgers, Harris G., Sr., 4,030,181.

Rodier, Rene Jean: *See—*
Droux, Jacques Pierre Leon; and Rodier, Rene Jean, 4,031,443.

Rodriguez, Jose E. Canopy release activating device for parachutes. 4,030,689, Cl. 244-151.00B.

Rogalski, Werner: *See—*
Gottschlich, Rudolf; Rogalski, Werner; Bergmann, Rolf; Steinigeweg, Rosmarie; and Wahlig, Helmut, 4,031,230.

Rogell, Paul S. Simulated gemstone. 4,030,317, Cl. 63-32.000.

Rogers, Jerry L.; and Cochran, Chudleigh B., to Brown Oil Tools, Inc. Swivel assembly. 4,030,546, Cl. 166-208.000.

Rogers, Paul. Efficiency and utilization of cooling towers. 4,031,173, Cl. 261-24.000.

Rogers, Philip John, to Pilkington P-E Limited. Infra-red lenses. 4,030,805, Cl. 350-2.000.

Rogers, Ronald D., to Alco Standard Corporation. Method and apparatus for circulating a heat treating gas. 4,030,712, Cl. 266-252.000.

Rohde, Wilhelm: *See—*
Wimber, Hans; Rohde, Wilhelm; and Reyhing, Jorg, 4,030,896.

Rohde, Wolfgang: *See—*
Beck, Kurt Gunther; Rohde, Wolfgang; Habermehl, Diethard; and Siebert, Werner, 4,030,983.

Rohm and Haas Company: *See—*
deBenneville, Peter, 4,031,186.
Dupont, John A.; Kooch, Walter; and Scott, Joseph D., 4,031,055.
Johnson, Wayne O., 4,031,131.

Rohner, Michel Alexandre, to Singer Company, The. Multistage sorter having pushdown stacks with concurrent access to interstage buffer memories for arranging an input list into numerical order. 4,031,520, Cl. 364-200.000.

Roma, Carlo, to Belleli Industrie Meccaniche S.p.A. Tube nest for heat exchangers, and modular elements for said nest consisting of thermoplastic tubes, and process for manufacturing the modular elements and the tube nests. 4,030,540, Cl. 165-172.000.

Ron, Armando: *See—*
Aparicio, Luis; Gayo, Nenesio; M° ; Martin, Jose Luis; and Ron, Armando, 4,031,243.

Ronnquist, Hadar Yngve. Fecal matter collector. 4,030,500, Cl. 128-283.000.

Rooney, Clarence Stanley: *See—*
Williams, Haydn Windsor Richard; and Rooney, Clarence Stanley, 4,031,103.

Rosenberg, Jeffrey. Swimming pool surface cleaning device. 4,030,148, Cl. 4-172.000.

Rosenkranz, Hans Jurgen: *See—*
Stahlke, Kurt-Rainer; Krafft, Werner; Meyer, Rudolf; and Rosenkranz, Hans Jurgen, 4,030,926.

Ross, Alan Leslie: *See—*
Morse, Charles Richard; and Ross, Alan Leslie, 4,030,747.

Ross, Sigmund L., to Shuffman, Rose, Executrix. Apparatus for cryothermal fracturing of rock formations. 4,030,547, Cl. 166-212.000.

Roth, Ronald: *See—*
Linck, Donald W., II; and Kaprelian, George, 4,030,197.

Rothfuss, Robert G.; and Becht, Carl T., to Senco Products, Inc. Improved fastener applying device. 4,030,655, Cl. 227-130.000.

Rottloff, Gunther: *See—*
Sundermann, Rudolf; Rottloff, Gunther; and Grigat, Ernst, 4,031,067.

Rourke, Terence Arthur. Process for calcining limestone. 4,031,183, Cl. 423-175.000.

Roussel-UCLAF: *See—*
Chazan, Jean-Bernard; and Gasc, Jean-Claude, 4,031,210.

Routien, John B.: *See—*
Celmer, Walter D.; Cullen, Walter P.; Moppett, Charles E.; Routien, John B.; Shibakawa, Riichiro; and Tone, Junsuke, 4,031,206.

Rowan, Frank E., to Aluminum Plumbing Fixture Corporation. Combination plumbing fisture having single floor waste outlet. 4,030,145, Cl. 4-10.000.

Roy, Robert Gibson: *See—*
Woods, Gilbert Frederick; Logan, Robert Thomas; McGarry, George; and Roy, Robert Gibson, 4,031,075.

Rozenboom, Gustave; and Rickmann, Bernard C., to Square D Company. Bus bar and switchboard assemblage. 4,030,794, Cl. 339-22.00B.

Ruddick, Marie T.: *See—*
Ruddick, Roy M.; and Ruddick, Marie T., 4,030,449.

Ruddick, Roy M.; and Ruddick, Marie T. Pet litter deodorizing apparatus. 4,030,449, Cl. 119-1.000.

Rudiger, Gunther: *See—*
Nieschulz, Otto; Rudiger, Gunther; and Maass, Jurgen, 4,031,199.

Rudolph, Paul, to Metallgesellschaft Aktiengesellschaft. Process for treating raw gas produced by the pressure gasification of coal. 4,031,030, Cl. 252-373.000.

Rueda Segura, Eduardo, to Empresa De Representaciones Unidas, S.A. (Erusa). Electric radiant heater. 4,031,353, Cl. 219-345.000.

Rufer, Clemens: *See—*
Ahrens, Hanns; Biere, Helmut; Rufer, Clemens; Schmiechen, Ralph; Schroeder, Eberhard; Loge, Olaf; Losert, Wolfgang; and Schillinger, Ekkehard, 4,031,236.

Rumpf, Robert John: *See—*
Pilarski, Regis Victor; and Rumpf, Robert John, 4,031,344.

Runge, Hans-Jurgen, to Warner Lewis Jr. Industrie- Filter GmbH. Spring-loaded differential pressure gage. 4,030,368, Cl. 73-419.000.

Ruprecht, Hermann, to Maschinenfabrik Fahr Aktiengesellschaft. Rotary mower. 4,030,275, Cl. 56-192.000.

Rushmore, Dean Frederick: *See—*
Margolia, Geoffrey; Rushmore, Dean Frederick; and Liu, Richard Tien-Szu, 4,031,251.

Russell, Gary R.; Chen, Che Jen; and Harstad, Kenneth G., to United States of America, National Aeronautics and Space Administration. Isotope separation using metallic vapor lasers. 4,031,389, Cl. 250-283.000.

Russell Harrington Cutlery, Inc.: *See*—
Umholtz, Franklyn G., 4,030,192.

Russell, John R., to E-Z Floss. Handle for disposable appliance. 4,030,199, Cl. 32-40.00R.

Rutschow, Joseph Fredrick; and Zucconi, Bruno, to Scala Radio Corporation; and Millifect. Method of molding fiberglass reflecting antenna. 4,030,953, Cl. 156-79.000.

Rutter, Armin: *See*—
Jaskulke, Gerhard; Schwarz, Alois; and Rutter, Armin, 4,031,375.

Ryazanova, Rufina Mikhailovna: *See*—
Ponomarev, Alexei Ivanovich; Sokolov, Sergei Vasilievich; Larionova, Julia Alexeevna; Klebansky, Alexandr Leibovich; Berenblit, Vsevolod Volfovich; Dolnakov, Jury Pavlovich; Yagupolsky, Lev Moiseevich; Malovik, Vladlen Vasilievich; Lozinsky, Miron Onufrievich; Belous, Viktor Mikhailovich; Gruz, Borix Efimovich; Alexeeva, Ljubov Antonovna; Ankudinov, Anatoly Kirillovich; and Ryazanova, Rufina Mikhailovna, 4,031,119.

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Rygalin, Viktor Georgievich: *See*—
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Sabol, Albert R., to Standard Oil Company (Indiana). Phosphosulfurized hydrocarbon modified N-(hydroxy and alkyl-substituted benzyl) alkylene polyamine. 4,031,017, Cl. 252-46.700.

Saeki, Yukio: *See*—
Nakamura, Nobutaka; and Saeki, Yukio, 4,031,276.

Saiki, Noritsugu; Takeuchi, Yoshihiko; and Sakai, Hiroshi, to Teijin Limited. Process for preparing polyester elastomers. 4,031,165, Cl. 260-860.000.

Saiki, Yukimi; Ogino, Masanori; and Watanabe, Shutoku, to Hitachi, Ltd. Noise reducing circuit for video signals. 4,031,547, Cl. 358-167.000.

St. Andre, Arthur Francis; LeBlanc, Joseph David; and Robillard, Edward George, to Cincinnati Milacron-Heald Corporation. Machine tool. 4,031,446, Cl. 318-665.000.

Saint-Gobain Industries: *See*—
Pelzer, Rudolf; and Scholl, Heinz, 4,030,897.
Straeten, Franz-Josef; Pelzer, Rudolf; Feiten, Karl-Josef; and Stevens, Wilhelm-Josef, 4,030,961.

Saito, Takahiko: *See*—
Kimura, Hiroyuki; and Saito, Takahiko, 4,031,334.

Saka, Yoshimi, to Hitachi Metals, Ltd. Molding system. 4,030,535, Cl. 164-207.000.

Sakai, Hiroshi: *See*—
Saiki, Noritsugu; Takeuchi, Yoshihiko; and Sakai, Hiroshi, 4,031,165.

Sakai, Yoshio; and Kurosawa, Toshiaki, to Hitachi, Ltd. Over-speed preventing apparatus for DC motor. 4,031,439, Cl. 318-338.000.

Sakamoto, Yoichi, to Matsushita Electric Industrial Co., Ltd. Tuning apparatus using a voltage-dependent reactance element. 4,031,491, Cl. 334-15.000.

Sakanaka, Yasuhiro: *See*—
Shimizu, Akihiko; and Sakanaka, Yasuhiro, 4,031,302.

Sakurai, Yoshihisa: *See*—
Kojima, Kojiro; Sakurai, Yoshihisa; Sugai, Tetuya; and Motegi, Masayoshi, 4,030,837.

Sale, Morris D. Bird trap. 4,030,229, Cl. 43-69.000.

Saleck, Wilhelm: *See*—
Idel, Karsten-Josef; Saleck, Wilhelm; Wolff, Erich; and Freitag, Dieter, 4,030,929.

Sanders, James Milton; Taylor, William I.; Hill, Ira D.; and Kryschuk, John J., to International Flavors & Fragrances Inc. Process for producing mixture containing 4-(4'-methyl-4'-hydroxyamyl)-Δ^3-cyclohexene carboxaldehyde. 4,031,161, Cl. 260-598.000.

Sandoval, Dante J. Thermal motor. 4,030,298, Cl. 60-527.000.

Sandoz, Inc.: *See*—
Jackson, Thomas E., 4,031,227.
Kathawala, Faizulla G., 4,031,233.

Sandoz Ltd.: *See*—
Bastian, Jean-Michel; and Berthold, Richard, 4,031,225.

Sands, Asa D. Ball-type safety valve. 4,030,520, Cl. 137-513.500.

Sandstrom, Unto: *See*—
Colding, Bertil; Novak, Arne; Sandstrom, Unto; and Jakobsson, Goran, 4,031,368.

Sangster, Arlon G. Exposure station for a contact printing device. 4,030,826, Cl. 355-104.000.

Sankyo Electric Company, Limited: *See*—
Harashima, Ikuo, 4,030,632.

Sano, Akira: *See*—
Murai, Hiromu; Kitaguchi, Koji; Suminokura, Tatsuo; Sano, Akira; Kise, Masahiro; Kitano, Masahiko; and Tomita, Toshio, 4,031,303.

Sano, Ichiro, to Furukawa Battery Co., Ltd., The. Splash-proof device for use in a storage battery. 4,031,294, Cl. 429-82.000.

Sansburry, James D.: *See*—
Luce, Robert L.; Perry, Joseph P.; and Sansburry, James D., 4,030,952.

Sant'Andrea Novara Officine Meccaniche e Fonderie S.p.A.: *See*—
Vedani, Augusto, 4,030,674.

Santer, James O.: *See*—
Hahn, Frank J.; and Santer, James O., 4,031,057.

Sanyo Chemical Industries, Ltd.: *See*—
Tominaga, Yoichi; and Shibahara, Yasuo, 4,030,970.

Sanyo Electric Co., Ltd.: *See*—
Arai, Takeshi, 4,031,475.

Sarancha, Vladimir Nikolaevich: *See*—
Ponomarenko, Nikolai Borisovich; Kononenko, Vadim Grigorievich; Stelmakh, Viktor Alexeevich; Kotelnikov, Vladimir Ivanovich; Valenya, Ivan Jurievich; Sarancha, Vladimir Nikolaevich; Petrenko, Anatoly Avramovich; Bozhko, Valery Pavlovich; Yatsenko, Sergei Vasilievich; Komnatny, Igor Pavlovich; Akhnazariants, Levon Khachaturovich; Strizhenko, Vitaly Evgenievich; Kolokolov, Boris Alexeevich; Maznichenko, Stanislav Anisimovich; Bozhko, Viktor Vasilievich; Bondarenko, Oleg Alexandrovich; and Zakirov, Robert Sharafutdinovich, 4,030,389.

Sarbacher, Robert I.; and Bogue, John C., to Bogue, John C. Electrochemical energy cell. 4,031,296, Cl. 429-116.000.

Sargisson, Donald Farley, to General Electric Company. Thrust reverser for a gas turbofan engine. 4,030,291, Cl. 60-226.00A.

Sasaki, Kazuya; Naito, Takanobu; Momoki, Yoshio; Sega, Toshio; and Satomi, Toshiyuki, to Kaken Chemical Co., Ltd. Streptovaricinone C derivatives as antibiotics. 4,031,215, Cl. 424-244.000.

Sasayama, Takao; and Nishimiya, Torazo, to Hitachi, Ltd. Air-fuel ratio controller for internal-combustion engine. 4,030,462, Cl. 123-119.0EC.

Sasebo Jukogyo Kabushiki Kaisha: *See*—
Nagata, Toshio; Kawasaki, Kunijiro; Takahama, Ryuichiro; Miyatani, Yoshifusa; and Funakoshi, Sozo, 4,030,441.

Sashihara, Kenji; Masuda, Takao; Noguchi, Yasuhiro; Sekikawa, Nobuyoshi; and Shishido, Tadao, to Fuji Photo Film Co., Ltd. Heat-developable light-sensitive material. 4,030,930, Cl. 96-114.100.

Sashihara, Kenji: *See*—
Noguchi, Yasuhiro; Ukai, Toshinao; Sashihara, Kenji; and Masuda, Takao, 4,030,931.

Sato, Michito: *See*—
Mandai, Hiroshi; Ukigai, Toshiyuki; Tominaga, Anri; and Sato, Michito, 4,031,159.

Sato, Tomoyoshi: *See*—
Sonobe, Shigeru; Watanabe, Makoto; Kato, Iwao; and Sato, Tomoyoshi, 4,030,828.

Satomi, Toshiyuki: *See*—
Sasaki, Kazuya; Naito, Takanobu; Momoki, Yoshio; Sega, Toshio; and Satomi, Toshiyuki, 4,031,215.

Satterwhite, Charles R., to Unit Rig & Equipment Co. Two wheel excavating and loading system. 4,030,217, Cl. 37-190.000.

Sauthier, Pierre A.; and Vuilleumier, Cyril, to Societe Suisse Pour l'Industrie Horlogere Management Services S.A. Electrically driven time piece with means for effecting a precise setting of time. 4,030,283, Cl. 58-23.00R.

Saxon, B. Ronald, to International Telephone and Telegraph Corporation. Time limited telephone paging employs a relay switch actuated by dual frequency tone. 4,031,329, Cl. 179-18.0BF.

Scala Radio Corporation: *See*—
Rutschow, Joseph Fredrick; and Zucconi, Bruno, 4,030,953.

Scans Associates, Inc.: *See*—
Smith, Richard L.; and Mosher, Peter J., 4,030,352.
Smith, Richard Lawrence, 4,030,351.

Schaefer, William H.; and Bender, Richard E., to General Dynamics Corporation. Method for molding high strength facing. 4,031,181, Cl. 264-135.000.

Schaefers, Elvin J. Cartridge for fishing flies and leaders. 4,030,228, Cl. 43-57.50R.

Schafer, Dietmar: *See*—
Bauer, Klaus; Frommer, Werner; Kaufmann, Wilfried; Metzger, Georg; Scheer, Martin; Schmidt, Delf; Schroder, Theo; and Schafer, Dietmar, 4,031,207.
Bauer, Klaus; Frommer, Werner; Kaufmann, Wilfried; Metzger, Karl Georg; Scheer, Martin; Schmidt, Delf; Schroder, Theo; and Schafer, Dietmar, 4,031,208.

Schaffer, Claus: *See*—
Spiesberger, August; and Schaffer, Claus, 4,031,419.

Schampers, Paulus Philippus Maria; and De Rijke, Pieter Adrianus, to U.S. Philips Corporation. Method of manufacturing an electric discharge tube. 4,030,789, Cl. 316-19.000.

Schank, Richard L., to Xerox Corporation. Waterless printing masters. 4,030,416, Cl. 101-450.000.

Scharpenberg, Hans-Georg: *See*—
Oppenlaender, Knut; Uhl, Guenter; Helfert, Herbert; Scharpenberg, Hans-Georg; and Stork, Karl, 4,031,112.

Schat, Hermannus; and Freyberger, Laurin Clemens, to ITT Industries, Inc. Monolithic integrated circuit for the distortion of a saw-tooth signal. 4,031,411, Cl. 307-228.000.

Scheben, Quirin: *See*—
Renner, Gunter; Boie, Immo; and Scheben, Quirin, 4,031,130.

Scheer, Martin: *See*—
Bauer, Klaus; Frommer, Werner; Kaufmann, Wilfried; Metzger, Georg; Scheer, Martin; Schmidt, Delf; Schroder, Theo; and Schafer, Dietmar, 4,031,207.
Bauer, Klaus; Frommer, Werner; Kaufmann, Wilfried; Metzger, Karl Georg; Scheer, Martin; Schmidt, Delf; Schroder, Theo; and Schafer, Dietmar, 4,031,208.

Scheffer, Harvey Dow Gibson, to RCA Corporation. Wire lead bonding tool. 4,030,657, Cl. 228-1.00R.

Scheithauer, Steffen: *See*—
Gahler, Siegfried; Junge, Karl-Wilhelm; Fischer, Gunther; Scheithauer, Steffen; and Viola, Horst, 4,030,928.

Schellenbaum, Max; Duennenberger, Max; and Casagrande, Fulvio, to Ciba-Geigy AG. Microbicidal agents containing as active ingredient monohydroxyphenyl carbinols. 4,031,248, Cl. 424-347.000.

Scherbel, Gordon H.: *See*—
Shepard, E. Dwayne; and Scherbel, Gordon H., 4,030,709.

Schering Aktiengesellschaft: *See*—
Ahrens, Hanns; Biere, Helmut; Rufer, Clemens; Schmiechen, Ralph; Schroeder, Eberhard; Loge, Olaf; Losert, Wolfgang; and Schillinger, Ekkehard, 4,031,236.

Scheuerman, Ronald F.: *See*—
Richardson, Edwin A.; and Scheuerman, Ronald F., 4,030,548.

Schieber, Michael M.; Beinglass, Israel; and Dishon, Giora, to United States of America, Energy Research and Development Administration. Temperature cycling vapor deposition HgI_2 crystal growth. 4,030,964, Cl. 156-610.000.

Schild, Ekkehard, to Bayerische Motoren Werke Aktiengesellschaft. Centrifugal adjusting mechanism for ignition interrupters of internal combustion engines. 4,030,467, Cl. 123-146.50A.

Schillinger, Ekkehard: *See*—
Ahrens, Hanns; Biere, Helmut; Rufer, Clemens; Schmiechen, Ralph; Schroeder, Eberhard; Loge, Olaf; Losert, Wolfgang; and Schillinger, Ekkehard, 4,031,236.

Schimmel, Vernon R., to Symons Corporation. Composite concrete wall form unit with a special transition bolt. 4,030,694, Cl. 249-196.000.

Schirtzinger, Joseph F., to Sea-Log Corporation. Monopod drilling platform with directional drilling. 4,030,310, Cl. 61-86.000.

Schlumberger Technology Corporation: *See*—
Murphy, Richard D., 4,031,367.

Schluter, Wilhelm; and Pohler, Heinz, to Hoesch Werke Aktiengesellschaft. Multi-row anti-friction bearing. 4,030,786, Cl. 308-227.000.

Schmermund, Alfred. Control arrangement for a cam production machine. 4,031,445, Cl. 318-568.000.

Schmidt, Delf: *See*—
Bauer, Klaus; Frnmmer, Werner; Kaufmann, Wilfried; Metzger, Georg; Scheer, Martin; Schmidt, Delf; Schroder, Theo; and Schafer, Dietmar, 4,031,207.
Bauer, Klaus; Frommer, Werner; Kaufmann, Wilfried; Metzger, Karl Georg; Scheer, Martin; Schmidt, Delf; Schroder, Theo; and Schafer, Dietmar, 4,031,208.

Schmidt, Jurgen: *See*—
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Schmidt, Siegbert: *See*—
Piret, Norbert L.; Rabben, Hans Joachim; Kudelka, Herbert; and Schmidt, Siegbert, 4,030,990.

Schmiechen, Ralph: *See*—
Ahrens, Hanns; Biere, Helmut; Rufer, Clemens; Schmiechen, Ralph; Schroeder, Eberhard; Loge, Olaf; Losert, Wolfgang; and Schillinger, Ekkehard, 4,031,236.

Schmitt, Joseph Lawrence, Jr.; Walker, Philip Leroy, Jr.; and Castellion, George Augustus, to American Cyanamid Company. Catalysts based on carbon supports ano use in catalytic deoxidation process. 4,031,137, Cl. 260-559.0AT.

Schmitt, Ludwig; and Kipping, Joachim, to Schubert & Salzer Maschinenfabrik Aktiengesellschaft. Device for drafting long staple fibre sliver. 4,030,165, Cl. 19-.200.

Schmitter, Andre; and Seiz, Wolfgang, to Ciba-Geigy Corporation. Process for the manufacture of foams from epoxide resins. 4,031,043, Cl. 260-2.5EP.

Schnabel, Walter. Toy building blocks. 4,030,236, Cl. 46-25.000.

Schnee, Karl; Tichy, Dieter; and Piesch, Steffen, to Cassella Farbwerke Mainkur Aktiengesellschaft. Aminoplast curing agents. 4,031,064, Cl. 260-67.60R.

Schneider, Abraham: *See*—
Suld, George; Schneider, Abraham; and Myers, Harry K., Jr., 4,031,150.

Schoeffler, Romona B.: *See*—
Schoeffler, William N.; and Schoeffler, Romona B., 4,030,745.

Schoeffler, William N.; and Schoeffler, Romona B. Tool retriever for wells. 4,030,745, Cl. 294-86.140.

Schoeneweis, E. Frederiek: *See*—
Bake, Earl A.; and Schoeneweis, E. Frederick, 4,030,696.

Schoenfield, Palmer J.: *See*—
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Terzian, Rouben T.; Schoenfield, Palmer J.; Dunn, Kathy A.; and Kuna, Wayne A., 4,030,235.

Schoeps, Jochen: *See*—
Dhein, Rolf; Schoeps, Jochen; and Kuchenmeister, Rolf, 4,031,052.

Scholin, Harold W.; and Lisiecke, Hieronim L., to Scholin Industries, Inc. Washer cutting machine. 4,030,385, Cl. 82-48.000.

Scholin Industries, Inc.: *See*—
Scholin, Harold W.; and Lisiecke, Hieronim L., 4,030,385.

Scholl, Heinz: *See*—
Pelzer, Rudolf; and Scholl, Heinz, 4,030,897.

Schollhorn, Fritz: *See*—
Reber, Erwin; and Schollhorn, Fritz, 4,030,274.

Schopper, Alf; and Linder, Jean, to Heberlein Hispano S.A. Surveying device. 4,030,281, Cl. 57-87.000.

Schott, Charles M., Jr., to Gloucester Engineering Co. Inc. Roll winder. 4,030,681, Cl. 242-81.000.

Schreiber, William Lewis; Mosciano, Gerard Joseph; Pittet, Alan O.; Vock, Manfred; and Shuster, Edward Joseph, to International Flavors & Fragrances Inc. 4- and 5-Phenyl pentenal acetals. 4,031,140, Cl. 260-611.00A.

Schrider, Michael Stanley, to American Cyanamid Company. Cyclopropanecarboxylates for systemic control of ectoparasites. 4,031,239, Cl. 424-304.000.

Schrock, Wilfried: *See*—
Konig, Hans-Bodo; Metzger, Karl Georg; and Schrock, Wilfried, 4,031,229.

Schroder, Theo: *See*—
Bauer, Klaus; Frommer, Werner; Kaufmann, Wilfried; Metzger, Georg; Scheer, Martin; Schmidt, Delf; Schroder, Theo; and Schafer, Dietmar, 4,031,207.
Bauer, Klaus; Frommer, Werner; Kaufmann, Wilfried; Metzger, Karl Georg; Scheer, Martin; Schmidt, Delf; Schroder, Theo; and Schafer, Dietmar, 4,031,208.

Schroeder, Eberhard: *See*—
Ahrens, Hanns; Biere, Helmut; Rufer, Clemens; Schmiechen, Ralph; Schroeder, Eberhard; Loge, Olaf; Losert, Wolfgang; and Schillinger, Ekkehard, 4,031,236.

Schroeder, George F.: *See*—
Groudan, Alan I.; Schroeder, George F.; and Treffinger, H. Lee, 4,031,374.

Schubert, Gunter: *See*—
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Schubert & Salzer Maschinenfabrik Aktiengesellschaft: *See*—
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Schulte, Hubert: *See*—
Moeller, Jurgen; Mitrach, Werner; Krauss, Helmut; and Schulte, Hubert, 4,031,459.

Schultes, Tilmann, to Kortenbach & Rauh Kommanditgesellschaft. Shortenable umbrella. 4,030,514, Cl. 135-25.00R.

Schultz, Thomas W.: *See*—
Williams, G. Norman; and Schultz, Thomas W., 4,030,790.

Schulze, Ehrhart, to Felix Stiegler Maschinenfabrik. Equalizing device for movements in packing machines, especially machines for making bags and the like. 4,030,652, Cl. 226-114.000.

Schuster, Hans Gunther: *See*—
Poetzsch, Rolf; and Schuster, Hans Gunther, 4,030,386.

Schwartz, Samuel, to Intel Corporation. Propagation line adder and method for binary addition. 4,031,379, Cl. 235-175.000.

Schwarz, Alois: *See*—
Jaskulke, Gerhard; Schwarz, Alois; and Rutter, Armin, 4,031,375.

Schwarz, Leonard H., to Dunham-Bush, Inc. Method of manufacturing low cost non-porous metal connecting rods. 4,030,179, Cl. 29-156.50A.

Schweder, Frederic James: *See*—
Sung, Pei; and Schweder, Frederic James, 4,030,918.

Schwuchow, Norbert; and Hutai, Hubert, to Daimler-Benz Aktiengesellschaft. Motor vehicle bumper. 4,030,744, Cl. 293-71.00R.

Scott, Joseph D.: *See*—
Dupont, John A.; Kooch, Walter; and Scott, Joseph D., 4,031,055.

Scott, Kenneth F. Testing of ram and annular blowout preventers. 4,030,354, Cl. 73-151.000.

Sea-Log Corporation: *See*—
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Sea Solar Power, Inc.: *See*—
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Seaman, Wesley Arthur: *See*—
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Seidel, William C.: *See*—
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Sekikawa, Nobuyoshi: *See*—
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Sell, Leslie James, to Picker X-Ray Mfg. Limited. Lineal lock for X-ray apparatus. 4,030,579, Cl. 188-171.000.

Semperit Aktiengesellschaft: *See*—
Steiner, Anton, 4,030,393.

Sencer, Mevhibe Gulay, to Northern Electric Company Limited. Telephone speech network. 4,031,331, Cl. 179-81.00A.

Senco Products, Inc.: *See*—
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Sensibar, Ezra, to Construction Aggregates Corporation. Hopper valve module for hopper dredge. 4,030,435, Cl. 114-36.000.

Sergovic, John A., to Burns & Russell Company of Baltimore City, The. Stain resistant polyester-coated block. 4,031,289, Cl. 428-451.000.

Serlovsky, Frank V., to D.N.S. Precision Machining. Adjustable printed circuit board pallet. 4,030,717, Cl. 269-118.000.

Sesselmann, Hans Dieter: *See—*
Pickert, Hansjurgen; Sesselmann, Hans Dieter; and Timmers, Leonardes August, 4,030,430.
Seymour, Claude W. Rake device. 4,030,157, Cl. 15-142.000.
Seymus, Herman Ernest, to Du Pont de Nemours, E. I., and Company. Fluorocarbon polymer coating compositions containing mica particles. 4,031,286, Cl. 428-324.000.
Shaare Zedek Hospital: *See—*
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Shaduya, Vladimir Leontievich: *See—*
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Sharkey, William Henry; and Harris, John Ferguson, Jr., to Du Pont de Nemours, E. I., and Company. Copolymers of isobutylene and a vinylbenzene and graft polymers thereof with pivalolactone. 4,031,168, Cl. 260-896.000.
Shatalova, Alla Nikolaevna: *See—*
Khcheyan, Khachik Egorovich; Revenko, Olga Mikhailovna; Shatalova, Alla Nikolaevna; Gelperina, Eleonora Grigorievna; Agrinskaya, Lidia Ivanovna; and Muradian, Georgy Avanesovich, 4,031,128.
Shaw, Mark Layne, to Motorola, Inc. System for transferring four commands over a single conductor utilizing dual threshold logic gates. 4,031,477, Cl. 328-70.000.
Sheesley, Wilmer Lee, to AMP Incorporated. Electrical contact system. 4,030,791, Cl. 339-5.00M.
Shell Oil Company: *See—*
Berger, Hans; De Lind Van Wijngaarden, Gerhard; and Breuker, Jacobus H., 4,031,016.
Lukas, Joachim H.; Baardman, Frank; and Kouwenhoven, Adriaan P., 4,031,152.
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Powell, James E., 4,031,087.
Richardson, Edwin A.; and Scheuerman, Ronald F., 4,030,548.
Shelton, Jack P., Sr.; and Adam, John M. Insect carrier and dispenser apparatus. 4,030,226, Cl. 43-55.000.
Shemtov, Sami, to I-T-E Imperial Corporation EFCOR Division. Attachment for thread cutting apparatus. 4,030,153, Cl. 10-89.0WH.
Shepard, E. Dwayne; and Scherbel, Gordon H., to FMC Corporation. Method of plugging tapholes in phosphorus furnaces. 4,030,709, Cl. 266-45.000.
Sherman, Benjamin F., Jr. Catoptric system for simultaneous concentration of light, laser, and other type paraxial rays into beams. 4,031,384, Cl. 250-203.00R.
Sheth, Harshadrai D. Electronic hour glass clock. 4,030,285, Cl. 58-50.00R.
Shibahara, Yasuo: *See—*
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Shibakawa, Riichiro: *See—*
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Shilling, Jack W.; Datta, Amitava; and Malagari, Frank A., Jr., to Allegheny Ludlum Industries, Inc. Process for cube-on-edge oriented boron-bearing silicon steel including normalizing. 4,030,950, Cl. 148-112.000.
Shima, Masao: *See—*
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Shimada, Shunji; and Wakimoto, Harumi, to Hitachi, Ltd. Signal converter circuit. 4,031,409, Cl. 307-208.000.
Shimada, Shunji; Hatsukano, Yoshikazu; and Yamashiro, Osamu, to Hitachi, Ltd. Coostant-current circuit. 4,031,456, Cl. 323-4.000.
Shimano Industrial Company, Limited: *See—*
Isobe, Mitsuhide, 4,030,374.
Nagano, Masashi, 4,030,375.
Shimizu, Akihiko; and Sakanaka, Yasuhiro, to Toyo Soda Manufacturing Co., Ltd. Process for preparing granular rubber. 4,031,302, Cl. 528-486.000.
Shinkawa, Keiro; Sodeyama, Chiuichi; Kaneko, Yoichi; and Kimura, Katsuhiro, to Hitachi, Ltd. Mixer circuit. 4,031,472, Cl. 325-446.000.
Shinskey, Francis G., to Foxboro Company, The. Control for maximizing capacity and optimizing product cost of distillation column. 4,030,986, Cl. 203-2.000.
Shionogi & Co., Ltd.: *See—*
Sugasawa, Tsutomu, 4,031,098.
Shirayama, Kenzo; Kita, Shinichiro; and Fujimoto, Masanori, to Sumitomo Chemical Company, Limited. Polyolefin composition and process for preparing the same. 4,031,062, Cl. 260-42.450.
Shishido, Tadao: *See—*
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Shuster, Edward J.: *See—*
Wilson, Richard Arnold; Katz, Ira; Vock, Manfred H.; and Shuster, Edward J., 4,031,034.
Shuster, Edward Joseph: *See—*
Schreiber, William Lewis; Mosciano, Gerard Joseph; Pittet, Alan O.; Vock, Manfred; and Shuster, Edward Joseph, 4,031,140.
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Shylo, Paul, to Cook Electric Company. Telephone ringer insolator. 4,031,332, Cl. 179-84.00R.
Siby, Sture: *See—*
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Siegel, Walter P.: *See—*
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Siegmund, Walter P., to American Optical Corporation. Channel structure for multi-channel electron multipliers and method of making same. 4,031,423, Cl. 313-105.0CM.
Siemens Aktiengesellschaft: *See—*
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Brueckner, Wolfgang, 4,031,499.
Jaskulke, Gerhard; Schwarz, Alois; and Rutter, Armin, 4,031,375.
Muller, Karl-Heinz; Rindfleisch, Volker; Rauch, Moriz V.; and Willasch, Dieter, 4,031,390.
Pfleiderer, Hans-Joerg, 4,031,315.
Reisinger, Konrad; and Holzl, Ludwig, 4,031,316.
Siems, Lee E., to Western Geophysical Company of America. Multiplexer commutated high pass filter. 4,031,506, Cl. 340-15.5GC.
Sierra, Austin V., Jr., to Cities Service Company. Slop oil treating system. 4,031,007, Cl. 210-59.000.
Sigma Chemical Company: *See—*
Das, Manik L., 4,030,885.
Starkweather, William H., 4,030,995.
Sih, Charles J., to Wisconsin Alumni Research Foundation. 15-Deoxy-PGE_1 and method for preparing same. 4,031,129, Cl. 260-468.00D.
Siller, Vinzenz, to Esser-Werke GmbH vorm. Westmontan-Werke. Method and apparatus for the surface hardening of the inner surface of tube bends. 4,030,711, Cl. 266-123.000.
Simhruner, Georg, to Dragerwerk Aktiengesellschaft. Device for supporting human breathing and artificial respiration. 4,030,492, Cl. 128-145.800.
Simciak, Walter, to Northern Illinois Gas Company. RF data exchange system. 4,031,513, Cl. 340-152.00T.
Simpson, Earle E.: *See—*
Hornig, Carl F.; Kroupa, Kenneth M.; and Simpson, Earle E., 4,030,966.
Simpson, Ralph E. Tape winding device. 4,030,678, Cl. 242-67.200.
Simpson, Terry Lee, to Atlantic Richfield Company. Longwall mining of thick underground mineral seams. 4,030,752, Cl. 299-11.000.
Singer Company, The: *See—*
Carver, Fred F.; and Hoyt, Carl E., 4,030,208.
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Johnson, Ronald P.; and Bell, Reynold W., 4,031,507.
Kron, Gerald J., 4,030,207.
Martin, Adolph; and Edwards, William Joseph, 4,030,431.
Rohner, Michel Alexandre, 4,031,520.
Singleton, Lewis, Jr.; and Whitney, James M. Alerting process and system of apparatus therefor. 4,031,467, Cl. 325-54.000.
Sintron, Cruz. Hoop and propelled means. 4,030,242, Cl. 46-220.000.
Sirius Corporation: *See—*
Fairhairn, Thomas E., 4,031,268.
Skagerlund, Lars-Erik, to AB Bofors. Device for ground-controlled activation of proximity fuzes. 4,030,420, Cl. 102-70.20P.
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Ernst, Horst M.; Olschewski, Armin; and Brandenstein, Manfred, 4,030,191.

Skretting, Arne, to Kamyr Aktiebolag. Method and apparatus for fiber suspension dewatering. 4,031,013, Cl. 210-326.000.
Smit, Elzo, to U.S. Philips Corporation. Stereo pick-up with casing serving as common pole piece. 4,031,335, Cl. 179-100.41K.
Smith, Edwin Studley, to Goodyear Tire & Rubber Company, The. Polymerization of monomers. 4,031,297, Cl. 526-87.000.
Smith, Gary C., Jr., to Champion Spark Plug Company. Paint pump for airless spray guns. 4,030,857, Cl. 417-46.000.
Smith, Harry: *See—*
Buckle, Derek Richard; Cantello, Barrie Christian Charles; and Smith, Harry, 4,031,099.
Smith, Leward N.; and Morey, Larry L., to Morbark Industries, Inc. Vibrating tubular screen. 4,030,606, Cl. 209-287.000.
Smith, Marvin L.: *See—*
Berry, Martin F.; Reesman, Stanley H.; Smith, Marvin L.; and Middlesworth, Peter Van, 4,031,267.
Smith, Philip D. Solar collector with conical elements. 4,030,477, Cl. 126-270.000.
Smith, Richard L.; and Mosher, Peter J., to Scans Associates, Inc. Apparatus for reproducing operating conditions in induced flow devices. 4,030,352, Cl. 73-118.000.
Smith, Richard Lawrence, to Scans Associates, Inc. Method and apparatus for laboratory testing of carburetors. 4,030,351, Cl. 73-118.000.
Smith, Richard S., to Xerox Corporation. Reproducing apparatus having an improved imaging surface cleaning system. 4,030,824, Cl. 355-15.000.
Smith, Tennyson, to United States of America, Air Force, The. Method for mapping surfaces with respect to ellipsometric parameters. 4,030,836, Cl. 356-118.000.
Smith & Wesson Chemical Company, Inc.: *See—*
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Smola, Raymond L., to Morgan Construction Company. Tool assembly for mounting and removing overhung rolls. 4,030,183, Cl. 29-252.000.
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Rescalli, Carlo; and Pacifico, Antonio, 4,031,157.
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Sobolev, Vilyam Alexandrovich: *See—*
Chuiko, Alexei Alexeevich; Tertykh, Valentin Anatolievich; Sobolev, Vilyam Alexandrovich; Maschenko, Valery Mikhailovich; Pavlov, Vyacheslav Valentinovich; Chugai, Alexei Dmitrievich; Khaber, Nikolai Vasilievich; Kondratenko, Anatoly Borisovich; Vatamanjuk, Vasily Ivanovich; Khoma, Mikhail Ivanovich; Kutin, Alexandr Nikolaevich; Shaposhnikov, Jury Davydovich; and Galashina, Malvina Leontievna, 4,030,940.
Societa' Farmaceutici Italia S.p.A.: *See—*
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Societa' Italiana Resine S.I.R. S.p.A.: *See—*
Barba, Diego; Germana, Antonino; Liuzzo, Giuseppe; and Tagliaferri, Giovanni, 4,030,985.
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Societe d'Assistance Technique pour Produits Nestle S.A.: *See—*
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Societe Francaise des Silicates Speciaux "Sifrance": *See—*
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Societe Lignes Telegraphiques et Telephoniques: *See—*
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Societe Metallurgique de Revigny: *See—*
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Societe Suisse pour l'Industrie Horlogere Management Services S.A.: *See—*
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Northeved, Allan; Fabrin, Knud Christian Claus; and Solfjeld, Poul, 4,030,344.
Sommer, Carl G. Cartridge loading device for revolvers. 4,030,222, Cl. 42-89.000.
Sommer, Edward J., Jr.; Kenny, Garry R.; Knoll, Frank S.; and Mitchell, David W. Feed system for an electromagnetic eddy current materials separator. 4,031,004, Cl. 209-212.000.
Sommer, Karel; Zdrazil, Jiri; Kuhinek, Milan; Bahna, Jarolim; Kyselica, Stanislav; Habrovec, Frantisek; and Skarek, Jiri, to Ceskoslovenska akademie ved. Production of annular products from centrifugally cast steel structures. 4,030,944, Cl. 148-2.000.
Sonntag, Marvin A. Protective apron and method of fabrication. 4,030,139, Cl. 2-51.000.
Sonobe, Shigeru; Watanabe, Makoto; Kato, Iwao; and Sato, Tomoyoshi, to Hitachi, Ltd. Spectrophotometer. 4,030,828, Cl. 356-96.000.
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Tsurushima, Katsuaki, 4,031,482.
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Sopko, Roy. Bicycle brake light switch and stop light system being activated by hand brake lever and cable. 4,031,343, Cl. 200-61.120.
Soudijn, Willem; van Wijngaarden, Ineke; and Janssen, Paul Adriaan Jan, to Janssen Pharmaceutica N.V. N-[1-piperidinyl)alkyl]arylcarboxamide derivatives. 4,031,226, Cl. 424-267.000.
Soule, Gustave H., Jr., to Raymond Lee Organization, Inc., The, a part interest. Electronic read out tape measure. 4,031,360, Cl. 235-92.0DN.
Southwest Research Institute: *See—*
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Souza, Anthony J., to Woodstream Corporation. Automatically adjusting boat seat. 4,030,152, Cl. 9-7.000.
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Special Sewing Systems, Inc.: *See—*
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Spectra-Physics, Inc.: *See—*
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Speedrack Inc.: *See—*
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Rice, Jeffrey C.; and Tucker, Terry A., 4,031,531.
Wesner, Charles R., 4,031,417.
Spies, Alfons, to Dr. Johannes Heidenhain GmbH. Resilient support for spinning-ring or twisting-ring bearing. 4,030,282, Cl. 57-124.000.
Spieaberger, August; and Schaffer, Claus, to Gerhard Berger, Fabrik Elektrischer Messgerate. Self-starting synchronous and stepping motor having a permanent magnet rotor. 4,031,419, Cl. 310-49.00R.
Spiridonov, Eduard Georgievich: *See—*
Alexandrov, Vladimir Ilich; Ozhko, Vyacheslav Vasilievich; Muraviev, Ernest Nikolaevich; Spiridonov, Eduard Georgievich; Tatarintsev, Vladimir Mikhailovich; and Gordon, Vladimir Grigorievich, 4,030,891.
Springer, Edward M., to Heyer Inc. Duplicating machine. 4,030,412, Cl. 101-132.000.
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Stables, Wilbur Leon: *See—*
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Stachowiak, Claude R., to Boeing Company, The. Jet engine thrust reverser. 4,030,290, Cl. 60-226.00A.
Stackman, Robert W.: *See—*
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Conciatori, Anthony B.; and Stackman, Robert W., 4,031,063.
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Stahlke, Kurt-Rainer; Krafft, Werner; Meyer, Rudolf; and Rosenkranz, Hans Jurgen, to AGFA-Gevaert, A.G. Light-sensitive material containing a dye-forming combination of a heterocyclic compound and a cyclic dihalodicarbonyl compound in a polymeric binder. 4,030,926, Cl. 96-90.00R.
Staiger, Donald W.: *See—*
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Stait, Donald Peter; and Zenger, Willi, to Contraves AG. Syringe for injecting liquids into blood vessels of living bodies. 4,030,496, Cl. 128-215.000.

Stamicarbon B.V.: *See—*
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Staoasila, Virgil Corneliu; Florica, Mihai; and Lungu, Onut Antoniu, to Institutul de Cercetare Proiectare si Documentare Pentru Industria Materialelor de Constructii. Apparatus for drying ceramic bodies. 4,030,879, Cl. 432-144.000.

Standard Conveyor Company: *See—*
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Standard Oil Company (Indiana): *See—*
Sabol, Albert R., 4,031,017.

Standlick, Ronald E. Variable proportional metering apparatus. 4,030,860. Cl. 417-63.000.

Stanik, Carol: *See—*
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Stanislawczyk, John P., to Raymond Lee Organization, Inc., The, a part interest. Anti-theft transmission lever lock plate. 4,030,323, Cl. 70-199.000.

Stanley, Thomas Osborne, to RCA Corporation. Flat cathode ray tube. 4,031,427, Cl. 313-422.000.

Stanley Works, The: *See—*
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Stapler, W. Mead. Open stream velocity probe and meter. 4,030,359, Cl. 73-231.00R.

Starkweather, William H., to Sigma Chemical Company. Alkaline phosphatase isoenzyme determination. 4,030,995, Cl. 204-180.00G.

Stauffer Chemical Company: *See—*
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Baker, Don R., 4,031,241.
Goswami, Jagadish Chandra, 4,031,045.
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Stebbins, Robert C.; Allen, Brockenbrough S.; and Brown, Charles. Method of and means for demonstrating evolution including chance determinations. 4,030,210, Cl. 35-20.000.

Stecklein, Alfred L., to Gates Rubber Company, The. Integrally molded belt with working element attached thereto. 4,030,276, Cl. 56-291.000.

Steel Web Corporation: *See—*
Jackson, Edgar D., 4,030,264.

Steffek, Robert J.: *See—*
Hunt, Robert P.; and Steffek, Robert J., 4,031,400.

Stein, Jay A.; and Annis, Martin, to American Science & Engineering, Inc. Radiant energy alarm system. 4,031,545, Cl. 358-108.000.

Steinbrecher, Lester: *See—*
Hall, Wilbur S.; and Steinbrecher, Lester, 4,030,945.

Steiner, Anton, to Semperit Aktiengesellschaft. Apparatus for cutting conveyed materials. 4,030,393, Cl. 83-318.000.

Steinigeweg, Rosmarie: *See—*
Gottschlich, Rudolf; Rogalski, Werner; Bergmann, Rolf; Steinigeweg, Rosmarie; and Wahlig, Helmut, 4,031,230.

Stelmakh, Viktor Alexeevich: *See—*
Ponomarenko, Nikolai Borisovich; Kononenko, Vadim Grigorievich; Stelmakh, Viktor Alexeevich; Koteloikov, Vladimir Ivanovich; Valenya, Ivan Jurievich; Sarancha, Vladimir Nikolaevich; Petrenko, Anatoly Avramovich; Bozhko, Valery Pavlovich; Yatsenko, Sergei Vasilievich; Komnatny, Igor Pavlovich; Akhnazariants, Levon Khachaturovich; Strizhenko, Vitaly Evgenievich; Kolokolov, Boris Alexeevich; Maznichenko, Stanislav Anisimovich; Bozhko, Viktor Vasilievich; Bondarenko, Oleg Alexandrovich; and Zakirov, Robert Sharafutdinovich, 4,030,389.

Stemler, Orrin A.: *See—*
Cobb, Delwin E.; Jackson, George J.; Livesay, Richard E.; and Stemler, Orrin A., 4,030,566.

Stenemann, Heinrich F., to Minnesota Mining and Manufacturing Company. Pavement-striping apparatus. 4,030,958, Cl. 156-350.000.

Stenkvist, Sven-Einar: *See—*
Fredrickson, Bengt; and Stenkvist, Sven-Einar, 4,031,308.

Sterling Drug Inc.: *See—*
Ackerman, James H., 4,031,088.
Collins, Joseph C.; and Dianz, Guy D., 4,031,246.

Sterner, John Franklin, to RCA Corporation. SCR, diode, diac, and triac tester. 4,031,465, Cl. 324-158.0SC.

Sterzel, Hans-Josef: *See—*
Cordes, Claus; and Sterzel, Hans-Josef, 4,031,065.

Stevens, Jack D. Pulse rate monitoring device. 4,030,483, Cl. 128-2.05T.

Stevens, Wilhelm-Josef: *See—*
Streeten, Franz-Josef; Pelzer, Rudolf; Feiten, Karl-Josef; and Stevens, Wilhelm-Josef, 4,030,961.

Stoberl, Helmuth. Foldable outboard seat for sailboats. 4,030,436, Cl. 114-39.000.

Stock, Arthur J.; Christofer, Donald E.; and Brinza, Joseph E., to Stock Equipment Company. Process for introducing particulate material into a container. 4,030,708, Cl. 259-8.000.

Stock Equipment Company: *See—*
Stock, Arthur J.; Christofer, Donald E.; and Brinza, Joseph E., 4,030,708.

Stockel, Richard Frederick; and Valenti, Peter Carl, to National Patent Development Corporation. Method of preparing 3,3-Bis (chloromethyl) oxetane. 4,031,110, Cl. 260-333.000.

Stockwell, Guy N., to United States of America, Army. Segmented map and holder. 4,030,218, Cl. 40-102.000.

Stoelting Company: *See—*
Kuska, Walter J.; and McGowan, Edward J., Jr., 4,030,484.

Stork, Karl: *See—*
Oppenlaender, Knut; Uhl, Guenter; Helfert, Herbert; Scharpenberg, Hans-Georg; and Stork, Karl, 4,031,112.

Strachan & Henshaw Limited: *See—*
Evans, David Arthur, 4,030,574.

Straeten, Franz-Josef; Pelzer, Rudolf; Feiten, Karl-Josef; and Stevens, Wilhelm-Josef, to Saint-Gobain Industries. Device for assembling glass sheets and layers of plastic material. 4,030,961, Cl. 156-580.000.

Strahm, Charles, to Mount Royal Transportation Equipment Ltd. Diesel cab seat assembly. 4,030,749, Cl. 297-345.000.

Straubel, Reinhard: *See—*
Volz, Horst; Straubel, Reinhard; and Hager, Arnulf, 4,031,525.

Strauss, Eric L., to Martin Marietta Corporation. Low density ablator compositions. 4,031,059, Cl. 260-37.0SB.

Strebel, Elwood L., to Minnesota Mining and Manufacturing Company. Lyotropic birefringent films. 4,030,812, Cl. 350-157.000.

Strebel, Elwood L., to Minnesota Mining and Manufacturing Company. 1,3-Bis-(carboxy-phenylamino)-s-triazines. 4,031,092, Cl. 260-249.600.

Strehler, John Frederick; Mikoliczeak, John Joseph; and Strehler, Kirk Robert. Method and apparatus for preserving biological materials. 4,030,314, Cl. 62-65.000.

Strehler, Kirk Robert: *See—*
Strehler, John Frederick; Mikoliczeak, John Joseph; and Strehler, Kirk Robert, 4,030,314.

Streisand, Kenneth: *See—*
Dudonis, Ronald Michael; Morrison, Charles Glenn; Potter, Robert Lawrence; and Streisand, Kenneth, 4,031,325.

Strizhenko, Vitaly Evgenievich: *See—*
Ponomarenko, Nikolai Borisovich; Kononenko, Vadim Grigorievich; Stelmakb, Viktor Alexeevich; Kotelnikov, Vladimir Ivanovich; Valenya, Ivan Jurievich; Sarancha, Vladimir Nikolaevich; Petrenko, Anatoly Avramovich; Bozhko, Valery Pavlovich; Yatsenko, Sergei Vasilievich; Komnatny, Igor Pavlovich; Akhnazariants, Levon Khachaturovich; Strizhenko, Vitaly Evgenievich; Kolokolov, Boris Alexeevich; Maznichenko, Stanislav Anisimovich; Bozhko, Viktor Vasilievich; Bondarenko, Oleg Alexandrovich; and Zakirov, Robert Sharafutdinovich, 4,030,389.

Strohmaier, Alfred John: *See—*
Holfeld, Winfried Thomas; and Strohmaier, Alfred John, 4,030,880.

Strong, Jerry G., to Mobil Oil Corporation. N-[3-(4-Methyl-3-cyclohexenyl)butyl]amines and their use as plant growth regulators. 4,030,908, Cl. 71-78.000.

Strupczewski, Joseph: *See—*
Helsley, Grover C.; and Strupczewski, Joseph, 4,031,221.

Struttmann, Hilarius S.: *See—*
Robinson, Elmer D.; and Struttmann, Hilarius S., 4,030,785.

Strydio, George C.: *See—*
Weller, John V. C.; Strydio, George C.; and Vits, Helmuth, 4,031,280.

Stute, Manfred; and Tank, Eggert, to Daimler-Benz Aktiengesellschaft. Cross-current pipe heat-exchanger for gases. 4,030,539, Cl. 165-134.000.

Suda, Kazuyoshi; Isono, Tomoyuki; Uchida, Takashi; and Tsuda, Kiyoshi, to Nippon Electric Co., Ltd. Flat-article separating apparatus for an automatic mail handling system and the like. 4,030,607, Cl. 209-74.00R.

Suda, Seiji: *See—*
Sugiura, Noboru; Mori, Yasunori; and Suda, Seiji, 4,030,468.

Sugai, Tetuya: *See—*
Kojima, Kojiro; Sakurai, Yoshihisa; Sugai, Tetuya; and Motegi, Masayoshi, 4,030,837.

Sugasawa, Tsutomu, to Shionogi & Co., Ltd. Camptothecin analogues. 4,031,098, Cl. 260-287.00C.

Sugimoto, Masao: *See—*
Nobutoki, Saburo; Ogusu, Chihaya; and Sugimoto, Masao, 4,031,551.

Sugimoto, Takeshige. Method of water admixing to fuel oil for an internal combustion engine and apparatus therefor. 4,030,453, Cl. 123-3.000.

Sugiura, Kensuke; Kagaya, Mineo; Fujisou, Tokuo; Aoki, Hiroyuki; Takehara, Takeichiro; and Kurata, Shigenori, to Nippon Oil Company, Ltd.; and Nissan Motor Co., Ltd. Central system fluid composition. 4,031,020, Cl. 252-56.00R.

Sugiura, Noboru; Mori, Yasunori; and Suda, Seiji, to Hitachi, Ltd. Ignition system for internal combustion engines. 4,030,468, Cl. 123-148.00E.

Sukolics, Ronald D.; and Biebuyck, Lawrence F., to Kawneer Company, Inc. Wall construction. 4,030,260, Cl. 52-397.000.

Suld, George; Schneider, Abraham; and Myers, Harry K., Jr., to Suntech, Inc. Catalytic dimerization of norbornadiene to Binor-S. 4,031,150, Cl. 260-666.0PY.

Sullivan, John F.; Konstance, Richard P.; and Heiland, Wolfgang K., to United States of America, Agriculture. Doctoring and drying method. 4,031,252, Cl. 426-445.000.

Sullivan, Kevin J., to Corning Glass Works. Fluid application device. 4,030,341, Cl. 73-61.10C.

Suminokura, Tatsuo: *See—*
Murai, Hiromu; Kitaguchi, Koji; Suminokura, Tatsuo; Sano, Akira; Kise, Masahiro; Kitano, Masahiko; and Tomita, Toshio, 4,031,303.

Sumitomo Chemical Company, Limited: *See—*
Fujimoto, Keimei; Ohno, Nobuo; Okuno, Yoshitoshi; Mizutani, Toshio; Ohno, Isao; Hirano, Masachika; Itaya, Nobushige; and Matsuo, Takashi, 4,031,235.
Nakamura, Yasushi; Agatsuma, Kunio; Tanaka, Yoshihiro; and Aono, Shunji, 4,031,134.
Shirayama, Kenzo; Kita, Shinichiro; and Fujimoto, Masanori, 4,031,062.

Sumitomo Durez Company, Ltd.: *See—*
Nakamura, Nobutaka; and Saeki, Yukio, 4,031,276.

Sumiyoshi, Hiroji; and Chiba, Tomosuke, to Sony Corporation. Implosion-resistant cathode ray tube with protective assembly for its face plate. 4,031,553, Cl. 358-247.000.

Sun Oil Company of Pennsylvania: *See—*
Etheridge, Jay D., 4,030,369.

Sunderlage, Gerald N.: *See—*
Bricknell, William H.; and Sunderlage, Gerald N., 4,030,776.

Sundermann, Rudolf; Rottloff, Gunther; and Grigat, Ernst, to Bayer Aktiengesellschaft. Polytriazines and a process for their production. 4,031,067, Cl. 260-77.50R.

Sung, Pei; and Schweder, Frederic James, to Johnson & Johnson. Indium containing dental alloy powder. 4,030,918, Cl. 75-134.00B.

Suntech, Inc.: *See—*
Suld, George; Schneider, Abraham; and Myers, Harry K., Jr., 4,031,150.

Suortti, Mikko Tapani; Malkki, Yrjo; and Nikkila, Olavi Elis, to Suortti, Mikko Tapani; and Malkki, Yrjo. Procedure for preserving root crops by deep freezing and their peeling. 4,031,253, Cl. 426-482.000.

Superba S.A.: *See—*
Gloeckler, Alfred, 4,030,319.

Suyderhoud, Henri George: *See—*
Campanella, Samuel Joseph; Dodel, Hans; and Suyderhoud, Henri George, 4,031,338.

Suzuki, Kazuo; Hayashi, Yoshiaki; and Nagamine, Seiichi, to Kanegafuchi Chemical Industries Co., Ltd. Self-bonding insulated wire. 4,031,287, Cl. 428-379.000.

Suzuki, Osamu; Akashi, Goro; Kasuga, Akira; and Sega, Kenji, to Fuji Photo Film Co., Ltd. Magnetic tape magazine. 4,030,685, Cl. 242-199.000.

Suzuki, Tadao; Yoshida, Tadao; and Wachi, Shigeaki, to Sony Corporation. Transistor inverter. 4,031,454, Cl. 321-2.000.

Suzuki, Yoshitake: *See—*
Ito, Yasuo; and Suzuki, Yoshitake, 4,030,534.
Itoh, Yasuo; Suzuki, Yoshitake; Shibutami, Hirohiko; Hirano, Koichi; and Tagami, Muneo, 4,030,533.

Svec, Frantisek: *See—*
Kalal, Jaroslav; Coupek, Jiri; Pokorny, Svatopluk; Svec, Frantisek; and Bouchal, Karel, 4,031,037.

Swanson, James P.; and Nyquist, Stephen E., to W. A. Whitney Corporation. Punch press with hydraulically actuated stripper. 4,030,391, Cl. 83-137.000.

Swanson, Kermit E.; and Kuzel, Frank J., to R. R. Donnelley & Sons Company. Compensating stacker for magazines. 4,030,621, Cl. 214-6.500.

Swift and Company Limited: *See—*
Ramirez, Ernest R.; and Johnson, Dennis L., 4,031,006.

Swinehart, Carl F.: *See—*
Hammond, David A.; and Swinehart, Carl F., 4,030,965.

Swiss Aluminium Ltd.: *See—*
Liebetrau, Richard E.; and Miller, Larry J., 4,030,609.
Wagner, Alfred; and Kidratschky, Hermann, 4,030,334.

Switack, Elva Jane: *See—*
Switack, John; and Switack, Elva Jane, 4,030,646.

Switack, John; and Switack, Elva Jane. Survival belt/bag. 4,030,646, Cl. 224-9.000.

Swonger, Kenneth D.: *See—*
Freeman, John D.; Robinson, Ralph C.; and Swonger, Kenneth D., 4,031,363.

Symons Corporation: *See—*
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Syntex (U.S.A.) Inc.: *See—*
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Beard, Colin C.; Edwards, John A.; and Fried, John H., 4,031,234.

Synthelabo: *See—*
Giudicelli, Don Pierre Rene Lucien; and Najer, Henry, 4,031,094.

Szente, Andre, to Hoffmann-La Roche Inc. Benzodiazepine derivatives. 4,031,078, Cl. 260-239.30D.

Szilagyl, Jane M., to Delbar Products, Inc. Mirror mounting structure. 4,030,692, Cl. 248-487.000.

T.W. Jesty & Partners: *See—*
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Tagami, Muneo: *See—*
Itoh, Yasuo; Suzuki, Yoshitake; Shibutami, Hirohiko; Hirano, Koichi; and Tagami, Muneo, 4,030,533.

Tagliaferri, Giovanni: *See—*
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Takahama, Ryuichiro: *See—*
Nagata, Toshio; Kawasaki, Kunijiro; Takahama, Ryuichiro; Miyatani, Yoshifusa; and Funakoshi, Sozo, 4,030,441.

Takahashi, Isoji, to Fuji Photo Film Co., Ltd. Electrostatic image forming method. 4,031,269, Cl. 427-24.000.

Takahashi, Toru; Nakahata, Kimio; and Kadowaki, Hidejiro, to Canon Kabushiki Kaisha. Developing device. 4,030,447, Cl. 118-658.000.

Takeda Chemical Industries, Ltd.: *See—*
Nose, Yukihiko, 4,031,010.

Takeda, Takashi: *See—*
Okamura, Yasushi; Tanaka, Kiichiro; and Takeda, Takashi, 4,031,337.

Takehara, Takeichiro: *See—*
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Takenaga, Hisayoshi; and Yotsukura, Teruo, to Hitachi, Ltd. Multicolor developing device. 4,030,445, Cl. 118-645.000.

Takeshita, Tetsuo: *See—*
Ohhinata, Ichiro; Okuhara, Shinzi; and Takeshita, Tetsuo, 4,031,413.

Takeuchi, Yoshihiko: *See—*
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Tamamura, Akira: *See—*
Fukui, Kiyoshige; Tamamura, Akira; and Nishimoto, Minoru, 4,030,725.

Tanaka, Kiichiro: *See—*
Okamura, Yasushi; Tanaka, Kiichiro; and Takeda, Takashi, 4,031,337.

Tanaka, Minoru; and Otaka, Syoichi, to Honda Giken Kogyo Kabushiki Kaisha. Ignition timing control apparatus for internal combustion engine. 4,030,460, Cl. 123-117.00A.

Tanaka, Mitsuo: *See—*
Onishi, Makoto; Nagano, Katsuyuki; Tanaka, Toshiki P.; Matsuoka, Sadao; and Tanaka, Mitsuo, 4,030,809.

Tanaka, Toshiki P.: *See—*
Onishi, Makoto; Nagano, Katsuyuki; Tanaka, Toshiki P.; Matsuoka, Sadao; and Tanaka, Mitsuo, 4,030,809.

Tanaka, Yoshihiro: *See—*
Nakamura, Yasushi; Agatsuma, Kunio; Tanaka, Yoshihiro; and Aono, Shunji, 4,031,134.

Taneda, Yukinori; and Kobayashi, Takashi, to Hitachi, Ltd. Reciprocal transfer apparatus. 4,030,614, Cl. 214-1.0BT.

Tani, Tadaaki, to Fuji Photo Film Co., Ltd. Supersensitizing combinations of halogen substituted benzotriazoles and cyanine dyes. 4,030,927, Cl. 96-100.000.

Tanifuji, Shinya: *See—*
Morooka, Yasuo; and Tanifuji, Shinya, 4,030,326.

Taniguchi, Isao, to Nippon Piston Ring Co., Ltd. Chrome insert ring. 4,030,767, Cl. 277-235.00R.

Taniguchi, Ken: *See—*
Fujii, Setsuro; Kajita, Yasumichi; Hiraku, Seizi; Kira, Heizo; Aishita, Hideki; Muryobayashi, Keiko; Terashima, Hiroshi; Akimoto, Akira; Taniguchi, Ken; and Wada, Minoru, 4,030,977.

Taniguchi, Satoshi: *See—*
Fujiwara, Hideo; Ichinose, Yukio; Taniguchi, Satoshi; Kobayashi, Tsutomu; Ichino, Kazuo; Itoh, Michiyasu; Uesaka, Yasutaro; Inose, Fumiyuki; and Ueno, Sadayasu, 4,031,496.

Taniyasu, Ryozo: *See—*
Isa, Hiroshi; Ukigai, Toshiyuki; Tominaga, Anri; Taniyasu, Ryozo; and Nagayama, Masuzo, 4,031,158.

Tank, Eggert: *See—*
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Tarasova, Valentina Mikhailovna: *See—*
Shults, Mikhail Mikhailovich; Parfenov, Anatoly Ivanovich; Shnypikov, Alexandr Dmitrievich; Krunchak, Vladimir Georgievich; Evnina, Sarra Borisovna; Dolidze, Vladimir Alexandrovich; and Tarasova, Valeotina Mikhailovna, 4,030,935.

Tatarintsev, Vladimir Mikhailovich: *See—*
Alexandrov, Vladimir Ilich; Osiko, Vyacheslav Vasilievich; Muraviev, Ernest Nikolaevich; Spiridonov, Eduard Georgievich; Tatarintsev, Vladimir Mikhailovich; and Gordon, Vladimir Grigorievich, 4,030,891.

Tattermusch, Peter: *See—*
Kleinschmit, Einhard; Tattermusch, Peter; and Haverbeck, Gunther, 4,030,714.

Tatzel, Hermann; Koegel, Wolfram; Beck, Gilbert; Zuern, Ludwig; and Caesar, Arndt Christian, to BASF Aktiengesellschaft. Manufacture of shaped articles of formed olefin polymers. 4,031,179, Cl. 264-91.000.

Taylor, William I.: *See—*
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Technical Industries, Inc.: *See—*
Jaquith, Burton Kent, 4,030,356.

Technovators, Inc.: *See—*
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Teijin Limited: *See—*
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Tekonsha Engineering Company: *See—*
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Tektronix, Inc.: *See—*
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Telesco Brophey Limited: *See—*
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Teletype Corporation: *See—*
Heeren, Richard H., 4,031,524.

Telfer, Ian Edmund, to British Petroleum Company Limited, The. Ships for liquid cargoes. 4,030,438, Cl. 114-74.00R.

Telic Corporation: *See—*
Penfold, Alan S.; and Thornton, John A., 4,030,996.
Penfold, Alan S.; and Thornton, John A., 4,031,424.

Templeton, William B.: *See—*
Wallace, Harry L.; and Templeton, William B., 4,030,728.

Tenczar, Francis. Fluid connectors. 4,030,494, Cl. 128-214.00R.

Tenneco Chemicals, Inc.: *See—*
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Di Bella, Eugene P., 4,031,145.
Di Bella, Eugene P., 4,031,146.
Patel, Piyush J.; and Miringoff, William, 4,031,056.

Tennes, Bernard R.; and Burton, Clyde L., to United States of America, Agriculture. Metering and spray apparatus for horticultural applications. 4,030,244, Cl. 47-1.700.

Terashima, Hiroshi: *See—*
Fujii, Setsuro; Kojita, Yasumichi; Hiraku, Seizi; Kira, Heizo; Aishita, Hideki; Muryobayeshi, Keiko; Terashima, Hiroshi; Akimoto, Akira; Taniguchi, Ken; and Wada, Minoru, 4,030,977.

Tertykh, Valentin Anatolievich: *See—*
Chuiko, Alexei Alexeevich; Tertykh, Valentin Anatolievich; Sobolev, Vilyam Alexandrovich; Maschenko, Valery Mikhailovich; Pavlov, Vyacheslav Valentinovich; Chugai, Alexei Dmitrievich; Kheber, Nikolai Vasilievich; Kondratenko, Anatoly Borisovich; Vetamenjuk, Vasily Ivanovich; Khoma, Mikhail Ivanovich; Kutin, Alexandr Nikolaevich; Shaposhnikov, Jury Davydovich; and Galashina, Malvina Leontievna, 4,030,940.

Terzian, Rouben T.; Schoenfield, Palmer J.; Dunn, Kathy A.; and Kuna, Wayne A., to Mervin Glass & Associates. Toy play kit. 4,030,235, Cl. 46-11.000.

Tessler, Arthur N., to Calculus Instruments Ltd. Method and device for disintegrating stones in human ducts. 4,030,505, Cl. 128-328.000.

Teuling, Dirk Johan Adriaan, to U.S. Philips Corporation. Triggered transistor switching regulator. 4,031,453, Cl. 321-2.000.

Tex International, S.A.: *See—*
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Texaco Development Corporation: *See—*
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Texaco Inc.: *See—*
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Texas Instruments Incorporated: *See—*
Ehni, George John, III; and Leuschner, Horst, 4,031,474.
Redwine, Donald J.; and Kitagawa, Norishisa, 4,031,415.

Thalen, Hilbert J. Th., to Vitatron Medical B.V. Low output electrode for cardiac pacing. 4,030,508, Cl. 128-418.000.

Thaler, Warren A.; Buckley, Donald J.; and Kennedy, Joseph P., to Exxon Research and Engineering Company. High molecular weight, high unsaturation isobutylene-cyclopentadiene copolymers. 4,031,300, Cl. 526-308.000.

Theodore, Frank W.: *See—*
Oorin, Everett; Jasulaitis, William A.; Theodore, Frank W.; and Wasson, George E., 4,030,982.

Thiem, Karl-Werner; Auge, Wolfgang; and Neeff, Rutger, to Bayer Aktiengesellschaft. Process for preparing pure 1-nitroanthraquinone. 4,031,116, Cl. 260-369.000.

Thiessen, Fritz: *See—*
Engelbech, Heinz; Krabetz, Richard; Duembgen, Gerd; Willersinn, Carl-Heinz; Lebert, Ulrich; and Thiessen, Fritz, 4,031,135.

Thomas, Erwin: *See—*
Rapp, Guenther; Fuchs, Hugo; and Thomas, Erwin, 4,031,139.

Thomas, Ian M., to Owens-Illinois, Inc. Method for the manufacture of borosilicate glasses. 4,030,938, Cl. 106-73.500.

Thomas Industries of Tennessee, Inc.: *See—*
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Thomas J. Lipton, Inc.: *See—*
Reid, Joanne; de la Teja, Elpidio Leoncio; and Farrell, Francis, 4,031,238.

Thomas, James L., to FMC Corporation. Rigid polyvinyl chloride compositions with high heat-deflection temperatures. 4,031,061, Cl. 260-42.290.

Thomas, Virgil E., Jr.; and Quist, Donald G., to United States of America, Navy. Peak detecting demodulator. 4,031,479, Cl. 329-50.000.

Thompson-Hayward Chemical Co.: *See—*
McNall, Lester Ray, 4,030,907.

Thompson, William C. Power generating system. 4,030,300, Cl. 60-639.000.

Thomson-CSF: *See—*
Butin, Henri; and Deman, Pierre, 4,031,327.
Deman, Pierre, 4,031,326.
Felix, Pierre; Gamot, Philippe; Moiroud, Guy; and Veron, Serge, 4,031,394.
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Thornley, Brian Robert, to Pleasey Handel und Investments A.G. Optical code readers. 4,031,358, Cl. 235-61.11E.

Thornton, Charles: *See—*
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Thornton, John A.: *See—*
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Thrower, William F.: *See—*
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Thurne Engineering Company Limited: *See—*
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Tiberg, Lars, to Fagersta AB. Method for casting steel ingots. 4,030,532, Cl. 164-66.000.

Tichy, Dieter: *See—*
Schnee, Karl; Tichy, Dieter; and Piesch, Steffen, 4,031,064.

TIDO Chemisch-technische Produkte GmbH, Firma: *See—*
Tiaza, Julianna, 4,031,046.

Timex Corporation: *See—*
Wuthrich, Paul; and Mascia, Frank P., 4,031,341.

Timmers, Leonardes August: *See—*
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Timmins, John C.: *See—*
Vidoni, John; Lingaraju, Bhartoor; and Timmins, John C., 4,030,800.

Tinney, Francis John, to Parke, Davis & Company. Tetrapeptides. 4,031,070, Cl. 260-112.5LH.

Tinney, Francis John: *See—*
Nicolaides, Ernest D.; Tinney, Francis John; and French, James Clark, 4,031,069.

Tisbo, Cosmo N.; and Tisbo, Thomas A., to Custom Plastics, Inc. Spraying and watering can. 4,030,664, Cl. 239-289.000.

Tisbo, Thomas A.: *See—*
Tisbo, Cosmo N.; and Tisbo, Thomas A., 4,030,664.

Tisza, Julianna, to TIDO Chemisch-technische Produkte GmbH, Firma. Exothermic lining for metallurgical purposes and method of making the same. 4,031,046, Cl. 260-17.200.

Toa Medical Electronics Co., Ltd.: *See—*
Yamamoto, Hiroshi; and Oka, Masaaki, 4,030,888.

Tobias, Michael A.: *See—*
Gough, Stanley T.; Tobias, Michael A.; and Napier, Roger P., 4,031,237.

Tocci, Leonard R.: *See—*
Archer, John L.; Tocci, Leonard R.; and Williams, Jeffrey L., 4,031,526.

Tocquet, Bernard: *See—*
Cluzel, Philippe; Quivy, Michel; and Tocquet, Bernard, 4,031,418.

Togo, Masaaki; Shima, Masao; and Mochizuki, Kiyoshi, to Yamatake-Honeywell Company Limited. Improved control system for energizing a stepping motor. 4,031,447, Cl. 318-685.000.

Tohru, Uchida: *See—*
Akira, Kato; Akira, Itoh; Tohru, Uchida; and Masao, Ishihara, 4,030,921.

Tojo, Eigo: *See—*
Nakayama, Michio; and Nakayama, Setuko, 4,031,262.

Tokico Ltd.: *See—*
Hayashida, Yoshihiro, 4,030,758.

Tokorozawa Electronic Corporation: *See—*
Itagaki, Tadasi, 4,030,564.

Tokudome, Katsumi; and Hattori, Shuzo, to Kimmon Electric Co., Ltd. Discharge tube having multiple electrodes arranged in tandem. 4,031,428, Cl. 315-111.000.

Tokyo Shibaura Electric Co., Ltd.: *See—*
Anno, Gousuke, 4,031,008.
Kokado, Naoyuki; and Makino, Shinichi, 4,031,470.

Tominaga, Anri: *See—*
Isa, Hiroshi; Ukigai, Toshiyuki; Tominaga, Anri; Taniyasu, Ryozo; and Nagayama, Masuzo, 4,031,158.
Mandai, Hiroshi; Ukigai, Toshiyuki; Tominaga, Anri; and Sato, Michito, 4,031,159.

Tominaga, Yoichi; and Shibahara, Yasuo, to Sanyo Chemical Industries, Ltd. Surface sizing of paper with an acrylic copolymer where scum formation is minimized. 4,030,970, Cl. 162-168.00R.

Tomita, Toshio: *See—*
Murai, Hiromu; Kitaguchi, Koji; Suminokura, Tatsuo; Sano, Akira; Kise, Masahiro; Kitano, Masahiko; and Tomita, Toshio, 4,031,303.

Tompkins, Douglas L., to Baxter Travenol Laboratories, Inc. Syringe. 4,030,498, Cl. 128-218.00P.

Tone, Junsuke: *See—*
Celmer, Walter D.; Cullen, Walter P.; Moppett, Charles E.; Routien, John B.; Shibakawa, Riichiro; and Tone, Junsuke, 4,031,206.

Toneray Covers, Inc.: *See—*
Petretti, Raymond H., 4,030,780.

Torin Corporation: *See—*
Collins, Charles P.; and Lampietti, Bernard P., 4,030,327.

Toro Company, The: *See—*
Christopherson, Herman P., 4,030,277.

Torres, Lorenzo. Can slitting device. 4,030,392, Cl. 83-178.000.

Torrington GmbH: *See—*
Eckhardt, Hellmuth, 4,030,170.

Toyo Kogyo Co., Ltd.: *See—*
Yamamoto, Kenichi; Kirose, Yutaka; and Maeda, Tooru, 4,030,454.

Toyo Soda Manufacturing Co., Ltd.: *See—*
Shimizu, Akihiko; and Sakanaka, Yasuhiro, 4,031,302.

Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Yamaguchi, Shunzo; Ozaki, Tadashi; and Konomi, Toshiaki, 4,030,464.

Trascandica AG: *See—*
Bengtsson, Bo Gunnar, 4,030,437.

Traunecker, Werner: *See—*
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Trautvetter, Werner: *See—*
Vollkommer, Norbert; and Trautvetter, Werner, 4,031,163.

Treffinger, H. Lee: *See—*
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Treiber, James H.: *See—*
Christian, Edward H.; Mains, Donald M.; and Treiber, James H., 4,031,440.

Trieschmann, Hans-Georg: *See—*
Bronstert, Klaus; Fahrbach, Gerhard; Krahe, Eduard; Ladenberger, Volker; Kastning, Ernst-Guenther; Mittnacht, Hans; Willerainn, Herbert; and Trieschmann, Hans-Georg, 4,031,166.

Triffterer, Adolf: *See—*
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Trio Electronics Incorporated: *See—*
Mitarai, Kaoru, 4,031,473.

Tritten, Paul: *See—*
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Trombly, John E., to Arthur D. Little, Inc. Electromagnetically coupled battery charger. 4,031,449, Cl. 320-2.000.

Trombly, John E.: *See—*
Perron, Robert Richard; and Trombly, John E., 4,031,434.

Tronstad, Knut, to Aksjeselskapet Jotul. Fireplace. 4,030,475, Cl. 126-121.000.

Troyer, Terrance J.: *See—*
Phillips, James W.; and Troyer, Terrance J., 4,030,365.

Truax, James R. Native grass seed drill. 4,030,428, Cl. 111-85.000.

TRW Inc.: *See—*
Glorioso, Paul A., 4,031,349.

Tsuda, Kiyoshi: *See—*
Suda, Kazuyoshi; Isono, Tomoyuki; Uchida, Takashi; and Tsuda, Kiyoshi, 4,030,607.

Tsurushima, Katsuaki, to Sony Corporation. Bias circuit for FET. 4,031,482, Cl. 330-35.000.

Tucker, Terry A.: *See—*
Rice, Jeffrey C.; and Tucker, Terry A., 4,031,531.

Tull, Roger J.: *See—*
Weinstock, Leonard M.; Tull, Roger J.; and Mulvey, Dennis M., 4,031,125.

Tuominen, Tapio Kalevi: *See—*
Aaltonen, Olavi August; Andersson, Bengt Torsten; Juusela, Jyrki Tapani; Palperi, Matti Johannes; and Tuominen, Tapio Kalevi, 4,030,915.

Turney, Lorry R., to Victor Equipment Company. Floating tube torch. 4,030,710, Cl. 266-48.000.

Uchida, Takashi: *See—*
Suda, Kazuyoshi; Isono, Tomoyuki; Uchida, Takashi; and Tsuda, Kiyoshi, 4,030,607.

Ueno, Sadayasu: *See—*
Fujiwara, Hideo; Ichinose, Yukio; Taniguchi, Satoshi; Kobayashi, Tsutomu; Ichino, Kazuo; Itoh, Michiyasu; Uesaka, Yasutaro; Inose, Fumiyuki; and Ueno, Sadayasu, 4,031,496.

Uesaka, Yasutaro: *See—*
Fujiwara, Hideo; Ichinose, Yukio; Taniguchi, Satoshi; Kobayashi, Tsutomu; Ichino, Kazuo; Itoh, Michiyasu; Uesaka, Yasutaro; Inose, Fumiyuki; and Ueno, Sadayasu, 4,031,496.

Uhl, Guenter: *See—*
Oppenlaender, Knut; Uhl, Guenter; Helfert, Herbert; Scharpenberg, Hans-Georg; and Stork, Karl, 4,031,112.

Uhl, Wyman F.: *See—*
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Uhring, Gary S.: *See—*
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Ukai, Toshinao: *See—*
Noguchi, Yasuhiro; Ukai, Toshinao; Sashihara, Kenji; and Masuda, Takao, 4,030,931.

Ukigai, Toshiyuki: *See—*
Isa, Hiroshi; Ukigai, Toshiyuki; Tominaga, Anri; Taniyasu, Ryozo; and Nagayama, Masuzo, 4,031,158.
Mandai, Hiroshi; Ukigai, Toshiyuki; Tominaga, Anri; and Sato, Michito, 4,031,159.

Umeda, Tomoyoshi; and Haraguchi, Yoshimasa, to Beltek Corporation. Magnetic recording and reproducing apparatus. 4,031,554, Cl. 360-73.000.

Umehara, Hidetoshi: *See—*
Asao, Makoto; Ito, Susumu; and Umehara, Hidetoshi, 4,031,171.

Umholtz, Franklyn G., to Russell Harrington Cutlery, Inc. Mat cutter for circles. 4,030,192, Cl. 30-310.000.

Ungnadner, Peter: *See—*
Geisslinger, Wolfgang; and Ungnadner, Peter, 4,030,818.

Union Carbide Corporation: *See—*
Prokai, Bela; and Kanner, Bernard, 4,031,042.

Union Industrielle et D'Entreprise: *See—*
Heimke, Wolfram, 4,030,699.
Heimke, Wolfram, 4,030,755.

Uniroyal Inc.: *See—*
Cantor, Stephen E., 4,031,068.
Morris, Harris L., 4,031,169.

Unit Rig & Equipment Co.: *See—*
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United Chemi-Con, Inc.: *See—*
Alwitt, Robert S., 4,031,436.

United Glass, Ltd.: *See—*
Battye, Christopher John; and Dorey, Roger John, 4,030,904.

United States of America
Agriculture: *See—*
Bell, Edward W., 4,031,019.
Folk, Craig L.; and Kotter, James I., 4,030,280.
Guadagni, Dante G.; Horowitz, Robert M.; Gentili, Bruno; and Meier, Vincent P., 4,031,265.
Sullivan, John F.; Konstance, Richard P.; and Heiland, Wolfgang K., 4,031,252.
Tennes, Bernard R.; and Burton, Clyde L., 4,030,244.

Air Force: *See—*
Lawton, Robert A.; and Andrews, James R., 4,030,840.
Smith, Tennyson, 4,030,836.

Army: *See—*
Bosserman, David A.; and Freeman, Charles F., 4,031,552.
Ceruso, Frank, 4,031,501.
Hyde, George S., 4,030,850.
Redman, Charles M., 4,031,393.
Regber, Norman; Dukic, Ferdinando V.; and Diorio, Frank, 4,030,418.
Stockwell, Guy N., 4,030,218.
Vinansky, George, Jr.; and Lucia, Emmanuel A., 4,031,301.
Westell, William E., 4,030,817.
Zeigler, Edward H., 4,031,172.

Energy Research and Development Administration: *See—*
Alvis, Robert L.; and Newsom, Melvin M., 4,030,557.
Bauer, Martin L.; Johnson, Wayne F.; and Lakomy, Dale G., 4,030,834.
Gibson, Edwin D.; and Verhoeven, John D., 4,030,963.
Lattin, Kenneth R., 4,031,387.
Schieber, Michael M.; Beinglass, Israel; and Dishon, Giora, 4,030,964.

Health, Education and Welfare: *See—*
Kefauver, Bernard C.; and Little, Norman, 4,030,271.

National Aeronautics and Space Administration; administrator; with respect to an invention of:
Fitzer, George E. Machine for use in monitoring fatigue life for a plurality of elastomeric specimens. 4,030,348, Cl. 73-91.000.

National Aeronautics and Space Administration: *See—*
Russell, Gary R.; Chen, Che Jen; and Harstad, Kenneth G., 4,031,389.

Navy: *See—*
Beck, Earl J., Jr., 4,031,444.
Beno, Lawrence A., 4,031,488.
Cram, Robert E.; Gill, Walter; and Loundagin, James A., 4,030,523.
Der, James J., 4,031,005.
Goldstein, David, 4,030,427.
Gowrinathan, Sankaran, 4,030,831.
Kallmann, George T.; and Waddell, Theodore P., 4,031,534.
Thomas, Virgil E., Jr.; and Quist, Donald G., 4,031,479.

Veterans Administration: *See—*
Graupe, Daniel, 4,030,141.

U.S. Philips Corporation: *See—*
Buzzi, Leo; Buzzi, Valentin; Opietnik, Walter; Liebl, Helmut; and Malobabic, Peter, 4,030,573.
Horsten, Johannes Bernardus, 4,031,523.
Khoe, Giok Djan, 4,030,810.
Khoe, Giok Djan; Kuyt, Gerard; and Franken, Adrianus Jacobus Jozef, 4,030,811.
Meijer, Roelf Jan, 4,030,404.
Schampers, Paulus Philippus Maria; and De Rijke, Pieter Adrianus, 4,030,789.
Smit, Elzo, 4,031,335.
Teuling, Dirk Johan Adriaan, 4,031,453.
van Leeuwen, Johannes Cornelis, 4,031,330.
Van Litsenburg, Joannes Wilhelmus, 4,030,899.
Van Litsenburg, Joannes Wilhelmus, 4,030,900.
Wegener, Joachim, 4,030,913.
Ziegler, Reinhard; and Seifert, Horst, 4,031,425.

United States Steel Corporation: *See—*
Pringle, William L., 4,030,576.

United Technologies Corporation: *See—*
Freiberg, Robert J.; Fradin, David W.; Chenausky, Peter P.; and Biancardi, Frank R., 4,031,484.
Kroesser, Edward James, 4,030,378.

Unitika Ltd.: *See—*
Akae, Kiyoshi; Kitada, Masaya; and Uno, Yoshiyuki, 4,030,876.

Universal Bleacher Company: *See—*
Hartman, Arlin Philip, 4,030,255.

Uno, Yoshiyuki: *See—*
Akae, Kiyoshi; Kitada, Masaya; and Uno, Yoshiyuki, 4,030,876.

UOP Inc.: *See—*
Hervert, George L., 4,031,292.

Upjohn Company, The: *See—*
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Magerlein, Barney J., 4,031,081.

Usheva, Velichka Borissova: *See—*
Arolski, Angel Tomov; Usheva, Velichka Borissova; Gruev, Peter Vassilev; Richev, Georgi Trendafilov; and Doncheva, Zvetana Semkova, 4,031,264.

USM Corporation: *See—*
Hold, Peter, 4,030,177.

Utsumi, Kazuaki: *See—*
Nakai, Tomotoshi; Utsumi, Kazuaki; and Ohno, Tomeji, 4,030,937.

Vactric Control Equipment Limited: *See—*
Garrett, David Aubrey, 4,031,441.

Vaesken, Maryvonne J.; Bultez, Alain E.; and Dalle, Jean-Paul, to Opi Cryochimie S.A. Process for treating natural polyamide fibres of asymmetric structure, such as wool, with liquid ammonia. 4,030,883, Cl. 8-115.500.

Vakanova, Elena Borisova: *See—*
Budevski, Evgueni Bogdanov; Iliev, Iliya Dimitrov; Kaisheva, Anastasiya Rostislavova; Gamburtzev, Sergei Sergeev; and Vakanova, Elena Borisova, 4,031,033.

Valenti, Peter Carl: *See—*
Stockel, Richard Frederick; and Valenti, Peter Carl, 4,031,110.

Valenya, Ivan Jurievich: *See—*
Ponomarenko, Nikolai Borisovich; Kononenko, Vadim Grigorievich; Stelmakh, Viktor Alexeevich; Kotelnikov, Vladimir Ivanovich; Valenya, Ivan Jurievich; Sarancha, Vladimir Nikolaevich; Petrenko, Anatoly Avramovich; Bozhko, Valery Pavlovich; Yatsenko, Sergei Vasilievich; Komnatny, Igor Pavlovich; Akhnazariants, Levon Khachaturovich; Strizhenko, Vitaly Evgenievich; Kolokolov, Boris Alexeevich; Maznichenko, Stanislav Anisimovich; Bozhko, Viktor Vasilievich; Bondarenko, Oleg Alexandrovich; and Zakirov, Robert Sharafutdinovich, 4,030,389.

Valleylab, Inc.: *See—*
Patzer, Michael D., 4,030,796.

Van Assendelft, Leendert, to Akzo N.V. Method and apparatus for making filament cables. 4,030,248, Cl. 57-9.000.

van Bokhoven, Cornelis Wilhelmus: *See—*
deJongh, Hendrik Paul; and van Bokhoven, Cornelis Wilhelmus, 4,031,074.

Van Der Wielen, Michael Principe, to Bell Telephone Laboratories, Incorporated. Miniature low profile relay. 4,031,493, Cl. 335-128.000.

Van Dine, Walter S.: *See—*
Rasor, William A.; Van Dine, Walter S.; and Whitney, Frank A., 4,030,647.

Van Eeck, Philippe F. Antipollution carburetor device for internal combustion engines. 4,030,455, Cl. 123-25.00E.

Van Geenen, Albert A.: *See—*
Otter, Marinus J.A.M. Den; Nijenhuis, Anne Te; and Van Geenen, Albert A., 4,031,040.

van Leeuwen, Johannes Cornelis, to U.S. Philips Corporation. Digital radio transmission system. 4,031,330, Cl. 179-41.00A.

Vanlerberghe, Guy; and Sebag, Henri, to Societe Anonyme dite: L'Oreal. Chitosan derivative, sequestering agents for heavy metals. 4,031,025, Cl. 252-180.000.

Vanlerberghe, Guy: *See—*
Kalopissis, Gregoire; and Vanlerberghe, Guy, 4,031,263.

Van Litsenburg, Joannes Wilhelmus, to U.S. Philips Corporation. Cooling device. 4,030,899, Cl. 62-514.00R.

Van Litsenburg, Joannes Wilhelmus, to U.S. Philips Corporation. Cooling device. 4,030,900, Cl. 62-514.00R.

van Manen, Dick T., to Voplex Corporation. Contents-conserving plunger for cartridge. 4,030,643, Cl. 222-386.000.

van Wijngaarden, Ineke: *See—*
Soudijn, Willem; van Wijngaarden, Ineke; and Janssen, Paul Adriaan Jan, 4,031,226.

Varian Associates: *See—*
Hooper, Gerald E., 4,030,829.

Varker, Kenneth James, to International Business Machines Corporation. Method for forming a multilayer printed circuit board. 4,030,190, Cl. 29-625.000.

Varta Batterie Aktiengesellschaft: *See—*
Voss, Ernst; and Rabenstein, Heinrich, 4,031,293.

Vatamanjuk, Vasily Ivanovich: *See—*
Chuiko, Alexei Alexeevich; Tertykh, Valentin Anatolievich; Sobolev, Vilyam Alexandrovich; Maschenko, Valery Mikhailovich; Pavlov, Vyacheslav Valeotinovich; Cbugai, Alexei Dmitrievich; Khaber, Nikolai Vasilievich; Kondratenko, Anatoly Borisovich; Vatamanjuk, Vasily Ivanovich; Khoma, Mikhail Ivanovich; Kutin, Alexandr Nikolaevich; Shaposhnikov, Jury Davydovich; and Galashina, Malvina Leontievna, 4,030,940.

Vater, Wulf: *See—*
Bossert, Friedrich; Meyer, Horst; and Vater, Wulf, 4,031,104.

VEB Filmfabrik Wolfen-Fotochemisches Kombinat: *See—*
Gabler, Siegfried; Junge, Karl-Wilhelm; Fischer, Gunther; Scheithauer, Steffen; and Viola, Horst, 4,030,928.

VEB Kabelwerk Oberspree (KWO): *See—*
Volz, Horst; Straubel, Reinhard; and Hager, Arnulf, 4,031,525.

Vedani, Augusto, to Sant'Andrea Novara Officine Meccaniche e Fonderie S.p.A. Device for incorporating an identification marker in a roll of textile substance. 4,030,674, Cl. 242-55.000.

Vefl A/S: *See—*
Gundersen, Marius, 4,030,272.

Velten & Pulver, Inc.: *See—*
Euverard, Maynard R.; and Heide, Henry A., 4,030,620.

Vensleck, John T., to A P Products Incorporated. Jumper connector. 4,030,799, Cl. 339-99.00R.

Verhoeven, John D.: *See—*
Gibson, Edwin D.; and Verboeven, John D., 4,030,963.

Verkaufsgesellschaft fur Teererzeugnisse (VFT): *See—*
Gemmeke, Wilfried; Werner, Heinrich; Echterhoff, Heinz; and Raulf, Erich, 4,031,189.

Verkstadsteknik AB: *See—*
Colding, Bertil; Novak, Arne; Sandstrom, Unto; and Jakobsson, Goran, 4,031,368.

Veron, Serge: *See—*
Felix, Pierre; Gamot, Philippe; Moiroud, Guy; and Veron, Serge, 4,031,394.

Vetco Offsbore Industries, Inc.: *See—*
Ahlstone, Arthur G., 4,030,544.

Vetten, Wilhelm, to Jagenberg-Werke AG. Device for the removal of empty containers from their mandrels. 4,030,616, Cl. 214-1.0BB.

Veyrassat, Louis, to Maillefer S.A. Double wire-winding machine with automatic transfer. 4,030,673, Cl. 242-25.00A.

Victor Equipment Company: *See—*
Turney, Larry R., 4,030,710.

Vidoni, John; Lingaraju, Bhartoor; and Timmins, John C., to Square D Company. Connector cap with cord grip. 4,030,800, Cl. 339-107.000.

Vinansky, George, Jr.; and Lucia, Emmanuel A., to United States of America, Army. Micro particle generation. 4,031,301, Cl. 526-328.000.

Vincent, Max. Harness for the teaching of tennis. 4,030,732, Cl. 273-29.00A.

Viola, Horst: *See—*
Gahler, Siegfried; Junge, Karl-Wilhelm; Fischer, Gunther; Scheithauer, Steffen; and Viola, Horst, 4,030,928.

Virag, Robert Anthony, to Baxter Travenol Laboratories, Inc. Twin check valve pump system having fail-safe characteristic. 4,030,495, Cl. 128-214.200.

Vitatron Medical B.V.: *See—*
Thalen, Hilbert J. Th., 4,030,508.

Vits, Helmuth: *See—*
Weller, John V. C.; Strydio, George C.; and Vits, Helmuth, 4,031,280.

Vock, Manfred: *See—*
Schreiber, William Lewis; Mosciano, Gerard Joseph; Pittet, Alan O.; Vock, Manfred; and Shuster, Edward Joseph, 4,031,140.

Vock, Manfred H.: *See—*
Wilson, Richard Arnold; Katz, Ira; Vock, Manfred H.; and Shuster, Edward J., 4,031,034.

Vock, Manfred Hugo: *See—*
Wilson, Richard A.; Pascale, John V.; and Vock, Manfred Hugo, 4,031,257.

Vogel, George N. Female protective device. 4,030,490, Cl. 128-130.000.

Vogel, Raimund W. Sports shoes made of plastic. 4,030,215, Cl. 36-119.000.

Vogt, Wilhelm; Auer, Eberhard; Lenz, Gunter; Merkenich, Karl; Henning, Klaus; and Kandler, Joachim, to Hoechst Aktiengesellschaft. Builders for detergent and cleaning compositions. 4,031,022, Cl. 252-89.00R.

Voigt, Gerhard: *See—*
Jacob, Friedrich; Voigt, Gerhard; and Frank, Freidhelm, 4,030,735.

Volkswagenwerk Aktiengesellschaft: *See—*
Jacob, Friedrich; Voigt, Gerhard; and Frank, Freidhelm, 4,030,735.
Jacob, Friedrich; and Morsch, Dieter, 4,030,772.
Rabenseifner, Karl, 4,030,777.

Vollerin, Bernard, to Battelle Memorial Institute. Method of and apparatus for controlling combustion. 4,030,874, Cl. 431-9.000.

Vollkommer, Norbert; and Trautvetter, Werner, to Dynamit Nobel Aktiengesellschaft. Hardenable resins based upon allyl compounds. 4,031,163, Cl. 260-837.00R.

Volz, Horst; Straubel, Reinhard; and Hager, Arnulf, to VEB Kabelwerk Oberspree (KWO). Process for recording and reproduction of information in electromagnetic form. 4,031,525, Cl. 340-174.0MS.

Von Roll AG: *See—*
Hafeli, Robert J., 4,031,192.

von Knorring, Folke: *See—*
Dahle, Orvar; von Knorring, Folke; and Siby, Sture, 4,030,346.

Voplex Corporation: *See—*
van Manen, Dick T., 4,030,643.

Voss, Ernst; and Rabenstein, Heinrich, to Varta Batterie Aktiengesellschaft. Maintenance free lead storage battery. 4,031,293, Cl. 429-60.000.

Vowinkel, Hans: *See—*
Gross, Erwin; and Vowinkel, Hans, 4,030,541.

Vrisakis, Georges, to Societe Francaise des Silicates Speciaux "Sifrance". Process for improving the stability and shaping of anhydrous sodium metasilicate, and the compositions containing same, and the resulting products. 4,031,024, Cl. 252-135.000.

Vuilleumier, Cyril: *See—*
Sauthier, Pierre A.; and Vuilleumier, Cyril, 4,030,283.

W. A. Whitney Corporation: *See—*
Swanson, James P.; and Nyquist, Stephen E., 4,030,391.

W. R. Grace & Co.: *See—*
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Bush, Richard Wayne, 4,031,271.

Wachi, Shigeaki: *See—*
Suzuki, Tadao; Yoshida, Tadao; and Wachi, Shigeaki, 4,031,454.

Wada, Minoru: *See—*
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Waddell, Theodore P.: *See—*
Kallmann, George T.; and Waddell, Theodore P., 4,031,534.

Wafer, John A., to Westinghouse Electric Corporation. Triple break current limiter. 4,031,492, Cl. 335-16.000.

Wagner, Alfred; and Kidratschky, Hermann. Device for continuous lubrication of an extrusion die. 4,030,328, Cl. 72-45.000.

Wagner, Alfred; and Kidratschky, Hermann, to Swiss Aluminium Ltd. Process for the manufacture of composite sections and a device for carrying this out. 4,030,334, Cl. 72-258.000.

Wagner, John Bradley. Nose piece for screwguns. 4,030,383, Cl. 81-54.000.

Wahle, Gunter, to Hauni-Werke Korber & Co., KG. Control system for cigarette producing and processing machines or the like. 4,030,511, Cl. 131-21.00R.

Wahlig, Helmut: *See—*
Gottschlich, Rudolf; Rogalski, Werner; Bergmann, Rolf; Steinigeweg, Rosmarie; and Wahlig, Helmut, 4,031,230.

Wake, Malcolm: *See—*
Dudley, Philip; Bower, Lewis Robert; and Wake, Malcolm, 4,030,308.

Wakimoto, Harumi: *See—*
Shimada, Shunji; and Wakimoto, Harumi, 4,031,409.

Walch, Leo M., Jr.: *See—*
Moll, Eberhard; and Walch, Leo M., Jr., 4,031,361.

Walker, Alexander D. R. Computer terminal. 4,030,587, Cl. 197-1.00R.

Walker, Leonard B. Device for accurately sanding objects such as wooden objects and the like. 4,030,250, Cl. 51-128.000.

Walker, Osman J.: *See—*
Goel, Krishan N.; and Walker, Osman J., 4,030,968.

Walker, Philip Leroy, Jr.: *See—*
Schmitt, Joseph Lawrence, Jr.; Walker, Philip Leroy, Jr.; and Castellion, George Augustus, 4,031,137.

Wall Industries, Inc.: *See—*
Hood, Henry Alexander, 4,030,401.

Wallace, Harry L.; and Templeton, William B., to Burroughs Corporation. Document transport apparatus. 4,030,728, Cl. 271-277.000.

Walley, Robert F.: *See—*
Muzyka, Donald R.; and Walley, Robert F., 4,030,946.

Wallin, Jan-Olof, to Granges Essem Aktiebolag. Locking mechanism for vehicle safety belts. 4,030,682, Cl. 242-107.40B.

Wallin, Mark; and Shantzer, Aaron, deceased (by Shantzer, Helen, executrix), to Shantzer-Wallin Corporation. Heat pumps with solar heat source. 4,030,312, Cl. 62-2.000.

Walters, William T.; and Parlette, Marvin D., Jr., to Conceptual Products, Inc. Respiratory mouthpiece. 4,030,493, Cl. 128-147.000.

Wander, Raoul; and Angue, Robert. Apparatus for sterilization. 4,030,406, Cl. 99-461.000.

Wandler, Richard A.: *See—*
Lennon, David C.; and Wandler, Richard A., 4,030,802.

Ward, Dean L.: *See—*
Robertson, Joseph D.; and Ward, Dean L., 4,030,205.

Ward, George C., to Southwire Company. Thin gauge casting wheel band. 4,030,537, Cl. 164-278.000.

Ward, James S., to Ward; James S. Highway guard rail bumper guard. 4,030,706, Cl. 256-1.000.

Ware, William P.; and Wheeler, Robert D., to Thomas Industries of Tennessee, Inc. Apparatus and method for pneumatically rodding multi-passage cable housing conduits. 4,030,702, Cl. 254-134.400.

Warner, Glenfield. Method and apparatus for continuously monitoring systolic blood pressure. 4,030,485, Cl. 128-2.05A.

Warner Lewis Jr. Industrie- Filter GmbH: *See—*
Runge, Hans-Jurgen, 4,030,368.

Warthen, William P., to Milliken Research Corporation. Synthetic yarn device. 4,030,743, Cl. 289-18.000.

Wasson, George E.: *See—*
Gorin, Everett; Jasulaitis, William A.; Theodore, Frank W.; and Wasson, George E., 4,030,982.

Watanabe, Makoto: *See—*
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Watanabe, Misuzu: *See—*
Hayashi, Masahiro; Haba, Masanori; Watanabe, Misuzu; and Hirano, Shinji, 4,031,498.

Watanabe, Shutoku: *See—*
Saiki, Yukimi; Ogino, Masanori; and Watanabe, Shutoku, 4,031,547.

Waters, Ethel M., administratrix: *See—*
Keifert, Hibbard G.; and Waters, Frank J., deceased, 4,030,848.
Keifert, Hibbard G.; and Waters, Frank J., deceased, 4,030,849.

Waters, Frank J., deceased: *See—*
Keifert, Hibbard G.; and Waters, Frank J., deceased, 4,030,848.
Keifert, Hibbard G.; and Waters, Frank J., deceased, 4,030,849.

Watkins, Michael L. Aerial toy and launching stick apparatus. 4,030,472, Cl. 124-5.000.

Watts, Glen Armon. Plow trip. 4,030,552, Cl. 172-663.000.

Wavin B.V.: *See—*
Jan Leloux, Arnoldus Willem, 4,030,956.

Webb, Nolan J., to McNeil Corporation. Solid fuel heater with blowback prevention means. 4,030,479, Cl. 126-287.000.

Weber, Andreas: *See—*
Frey, Jurgen; Weber, Andreas; and Triffterer, Adolf, 4,030,463.

Weber, Heinz, to Telesco Brophey Limited. Telescopic umbrella. 4,030,515, Cl. 135-25.00R.

Weber, Wayne W., II: *See—*
Leone, Ronald E.; Weber, Wayne W., II; and Wrathall, Donald P., 4,030,925.
Leone, Ronald E.; Weber, Wayne W., II; and Wrathall, Donald P., 4,031,127.

Wegener, Joachim, to U.S. Philips Corporation. Method of stabilizing pyrophorous iron powder. 4,030,913, Cl. 75-.50R.

Wei, Chung H., to Stauffer Chemical Company. Process for forming a polyvinyl chloride estender resin by incorporating in the suspension polymerization medium a prehomogenized solution of a polyallyl compound and a low molecular polymer of propylene. 4,031,299, Cl. 526-193.000.

Weinberg, Alan S.: *See—*
Brax, Harri J.; Porinchak, Joseph F.; and Weinberg, Alan S., 4,031,162.

Weinstock, Leonard M.; Tull, Roger J.; and Mulvey, Dennis M., to Merck & Co., Inc. 3-Sulfonate ester of 2,3-dihydroxypropylamine. 4,031,125, Cl. 260-456.00A.

Weiss, William Robert; Cooksey, James Judson; Stables, Wilbur Leon; and Newell, Harry Lee, Jr., to Allied Chemical Corporation. Interfloor tube aspirator muffler. 4,030,651, Cl. 226-97.000.

Weller, John V. C.; Strydio, George C.; and Vits, Helmuth, to Bigelow-Sanford, Inc. Method and apparatus for coloring a pile fabric, and a pile fabric produced thereby. 4,031,280, Cl. 428-88.000.

Weller, Kenneth P.: *See—*
Lee, Don H.; Weller, Kenneth P.; and Thrower, William F., 4,030,943.

Welstead, William John, Jr., to A. H. Robins Company, Incorporated. Alkenyl and alkanylamines for treating depression. 4,031,245, Cl. 424-330.000.

Wemyss, William Alexander, to Litre Meter Limited. Metering of fluid flows. 4,030,357, Cl. 73-202.000.

Werner, Heinrich: *See—*
Gemmeke, Wilfried; Werner, Heinrich; Echterhoff, Heinz; and Raulf, Erich, 4,031,189.

WERSI-electronic GmbH & Co. Kommanditgesellschaft fur elektronische Gerate und elektronische Bauelemente: *See—*
Dittmar, Wilfried, 4,030,398.

Wesner, Charles R., to Sperry Rand Corporation. Apparatus for coupling a digital data generator to a digital data readout device with electrical isolation therebetween. 4,031,417, Cl. 307-311.000.

West, Robert E., to Cascade Industries, Incorporated. Floating boom. 4,030,304, Cl. 61-1.00F.

Westall, Edward B.; and Messing, Alan W., to Nutrilite Products, Inc. Salts of dihydrochalcone derivatives and their use as sweeteners. 4,031,260, Cl. 426-548.000.

Westell, William E., to United States of America, Army. Apodization filter. 4,030,817, Cl. 350-314.000.

Western Electric Company, Inc.: *See—*
Hornig, Carl F.; Kroupa, Kenneth M.; and Simpson, Earle E., 4,030,966.

Western Gear Corporation: *See—*
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Westinghouse Electric Corporation: *See—*
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Westvaco Corporation: *See—*
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Wheeler, Philip T., to Hardy Company, The. Tag applicating device. 4,030,182, Cl. 29-816.000.

Wheeler, Robert D.: *See—*
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Whetten, Nathan Rey; and Houston, John M., to General Electric Company. X-ray detector. 4,031,396, Cl. 250-385.000.

Whirlpool Corporation: *See—*
Cobb, John Farley, 4,030,871.

White, Herbert O. Marine propulsion device. 4,030,442, Cl. 115-14.000.

White, John; and Abbots, David. Combination writing instrument and information storage apparatus. 4,030,842, Cl. 401-195.000.

White, Peter Charles; Benson, John Terry; and Leoncavallo, Richard Anthony, to Mattel, Inc. Multiple face doll. 4,030,239, Cl. 46-135.00R.

Whitney, Frank A.: *See—*
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Whitney, James M.: *See—*
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Wick, Richard; Bestenreiner, Friedrich; Deml, Reinbold; and Helmberger, Josef, to AGFA-Gevaert, A.G. Film scanner. 4,031,550, Cl. 358-216.000.

Wickersham, Floyd David. Boat cleaning machine. 4,030,440, Cl. 114-222.000.

Wilcox, David E., to Flanders Filters, Inc. Air flow control apparatus. 4,030,518, Cl. 137-246.000.
Wilder, Paul R.: *See—*
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Willasch, Dieter: *See—*
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Willetts, Elwood H. Tandem axle vehicle suspension system. 4,030,738, Cl. 280-681.000.
William Prym-Werke KG: *See—*
Pickert, Hansjurgen; Sesselmann, Hans Dieter; and Timmers, Leonardes August, 4,030,430.
Williams, G. Norman; and Schultz, Thomas W., to GTE Sylvania Incorporated. Process for fabricating lenses for manufacturing cathode ray tube screen structures. 4,030,790, Cl. 316-23.000.
Williams, Heydn Windsor Richard; and Rooney, Clarence Stanley, to Merck Sharp & Dohme (I.A.) Corporation. 1,8-Naphthyridine compounds. 4,031,103, Cl. 260-295.00N.
Williams, Jeffrey L.: *See—*
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Williams, Joseph James, to Hoffmann-La Roche Inc. Force measurement and analysis particularly relating to rotary tablet presses. 4,030,868, Cl. 425-149.000.
Willis, Melvin M. Binder for alumina containing refractories. 4,030,936, Cl. 106-65.000.
Willums, Jen-Olaf, to Nor-Am Resources Technology Inc. Method of and apparatus for underwater hydraulic conveying, as for ocean mining and the like, and continued transport of material in controlled floating containers. 4,030,216, Cl. 37-58.000.
Wilmot, Richard D., to Hughes Aircraft Company. Multiple moment video detector. 4,031,364, Cl. 235-151.300.
Wilson, Leland Earl, to Atlantic Richfield Company. Method of moving a floating body into a predetermined float path. 4,030,305, Cl. 61-1.00R.
Wilson, Richard A.; Pascale, John V.; and Vock, Manfred Hugo, to International Flavors & Fragrances Inc. Use in foodstuff flavoring compositions of five or six membered heterocylic oxathio compounds. 4,031,257, Cl. 426-535.000.
Wilson, Richard Arnold; Katz, Ira; Vock, Manfred H.; and Shuster, Edward J., to International Flavors & Fragrances Inc. Altering perfume green notes using trithioacetone. 4,031,034, Cl. 252-522.000.
Wimber, Hans; Rohde, Wilhelm; and Reyhing, Jorg, to Linde Aktiengesellschaft. Regeneration of adsorbents. 4,030,896, Cl. 55-33.000.
Wine, Charles Martin: *See—*
Rast, Robert Morgan; Wine, Charles Martin; and Henderson, John Goodchilde Norie, 4,031,549.
Winkelmann, Erhardt; and Raether, Wolfgang, to Hoechst Aktiengesellschaft. 1-Alkyl-2-(phenoxymethyl)-5-nitro-imidazoles and process for their manufacture. 4,031,232, Cl. 424-273.000.
Wisconsin Alumni Research Foundation: *See—*
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Wittle, Eugene Leroy; and Nicolaides, Ernest D., to Parke, Davis & Company. Tetrapeptides. 4,031,071, Cl. 260-112.5LH.
Wix Corporation: *See—*
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Wojdyla, Gary A., to NCR Corporation. Spacing and connecting a plurality of print heads. 4,030,590, Cl. 197-1.00R.
Wojdyla, Gery A.; and Hanna, Kenneth W., to NCR Corporation. Record media rewind mechanism. 4,030,677, Cl. 242-65.000.
Wolf, Morris A. Clothing display form. 4,030,645, Cl. 223-68.000.
Wolfe, Gerald W., to InterMed, Inc. Occluder for prosthetic heart valve assembly. 4,030,142, Cl. 3-1.500.
Wolfel, Kurt: *See—*
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Woods, Gilbert Frederick; Logan, Robert Thomas; McGarry, George; and Roy, Robert Gibson, to Akzona Incorporated. Alkylated pregnanes and process for obtaining same. 4,031,075, Cl. 260-239.55D.
Woodstream Corporation: *See—*
Souza, Anthony J., 4,030,152.
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Woodward, Oakley McDonald, to RCA Corporation. Broadband turnstile antenna. 4,031,539, Cl. 343-797.000.
Wrathall, Donald P.: *See—*
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Wunnenberg, Klaus; and Dubendorff, Joachim, to Mannesmann Aktiengesellschaft. Method and apparatus for monitoring and obviating deformations of continuous castings. 4,030,531, Cl. 164-4.000.
Wunsche, Anton E. Cockroach trap. 4,030,233, Cl. 43-121.000.
Wuthrich, Paul; and Mascia, Frank P., to Timex Corporation. Dual function pusher and rotate switch for solid state digital watches having detent spring. 4,031,341, Cl. 200-52.00R.
Xerox Corporation: *See—*
Chu, Joseph Y. C.; and Gunther, W. H. H., 4,030,991.
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Yakshin, Alexandr Sergeevich; Novikov, Oleg Nikolaevich; Grechinsky, Dmitry Alexeevich; Klochko, Viktor Alexandrovich; and Rygalin, Viktor Georgievich. Impact impulse measuring device. 4,030,339, Cl. 73-12.000.
Yamaguchi, Kineo; Kawakami, Katsuhiko; and Nakamoto, Yukimasa, to Nippon Mining Co., Ltd. Method for treating catalyst used for catalytic reactions of hydrocarbons at the time of catalyst removal. 4,031,031, Cl. 252-414.000.
Yamaguchi, Shunzo; Ozaki, Tadashi; and Konomi, Toshiaki, to Nippon Soken, Inc.; and Toyota Jidosha Kogyo Kabushiki Kaisha. Fuel-air mixture heating device for use with internal combustion engine. 4,030,464, Cl. 123-122.0AC.
Yamamoto, Hiroshi; and Oka, Masaaki, to Toa Medical Electronics Co., Ltd. Automatic blood analyzer. 4,030,888, Cl. 23-253.00R.
Yamamoto, Kenichi; Kirose, Yutaka; and Maeda, Tooru, to Toyo Kogyo Co., Ltd. Rotary piston engines. 4,030,454, Cl. 123-8.450.
Yamashiro, Osamu: *See—*
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Yamatake-Honeywell Company Limited: *See—*
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Yanagishima, Takayuki; and Inoue, Naohiko, to Nissan Motor Co., Ltd. Electronic alerting system for a vehicle driver. 4,031,527, Cl. 340-279.000.
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Yealy, Carl F., to Penland Container, Inc. All plastic reclosable container closure. 4,030,630, Cl. 220-258.000.
Yeda Research and Development Co., Ltd.: *See—*
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Yeo, Herbert G.: *See—*
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Yeomans, David L. Article support assembly. 4,030,425, Cl. 108-111.000.
Yeomans, Frederick G., to Draftex Development AG. Channel-shaped sealing and finishing strips. 4,030,245, Cl. 49-490.000.
Yokota, Hideo: *See—*
Hosoe, Kazuya; Aizawa, Hiroshi; Matsumoto, Seiichi; and Yokota, Hideo, 4,031,383.
York, Alvin, to Jefferson, Eva Imogene; and Koehler, Peggy Joe, part interest to each. Hammer tool for carpet strip. 4,030,654, Cl. 227-110.000.
Yoshida, Tadao, to Sony Corporation. Transistor amplifier. 4,031,481, Cl. 330-35.000.
Yoshida, Tadao: *See—*
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Young, Alastair John, to Automotive Products Limited. Vehicle braking system. 4,030,771, Cl. 280-88.000.
Young, Robert D. Mechanisms for feeding documents from a stack thereof. 4,030,413, Cl. 101-232.000.
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Zeigler, Edward H., to United States of America, Army. Process for preparing nitrocellulose for use in small arms. 4,031,172, Cl. 264-3.00B.
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Zenger, Willi: *See—*
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Zerlaut, Gene A.; and Heiskell, Robert F., to Desert Sunshine Exposure Tests, Inc. Solar tracking device. 4,031,385, Cl. 250-203.00R.
Zhuravsky, Alexandr Julyanovich: *See—*
Chachin, Viktor Nikolaevich; Zhuravsky, Alexandr Julyanovich; Zdor, Gennady Nikolaevich; Shaduya, Vladimir Leontievich; and Golovkina, Elena Yakovlevna, 4,030,329.
Ziebell, Donald O.; and Longly, James M., to Reach Electronics, Inc. Receiver mount. 4,031,468, Cl. 325-312.000.
Ziegler, Reinhard; and Seifert, Horst, to U.S. Philips Corporation. Dispenser cathode for a grid-controlled electron tube and method of manufacturing same. 4,031,425, Cl. 313-346.00R.
Zimmer, Peter. Dyestuff applicator for screen printer. 4,030,410, Cl. 101-120.000.
Zimmer, Peter. Rotary-screen printing machine. 4,030,411, Cl. 101-126.000.
Zinn, Frank R., to Bingham and Taylor. Valve cover for buried valve, permitting access thereto. 4,030,519, Cl. 137-364.000.
Zinna, Edward F. Speaker system of cubic configuration. 4,030,563, Cl. 181-147.000.
Zioni, Dov; and Halperin, Levi Y., to Shaare Zedek Hospital. Switching device. 4,031,435, Cl. 361-186.000.
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Budevski, Evgueni Bogdanov; Iliev, Iliya Dimitrov; Kaisheva, Anastasiya Rostislavova; Gamburtzev, Sergei Sergeev; and Vakanova, Elena Borisova, 4,031,033.
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Zuber, Walter H., Jr.: *See—*
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Zuber, Walter Henry, to Zuber, Walter H., Jr. Method of detecting hydrogen-producing bacteria. 4,030,979, Cl. 195-103.50M.
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Rutschow, Joseph Fredrick; and Zucconi, Bruno, 4,030,953.
Zuern, Ludwig: *See—*
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53: *See—*
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LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 21ST DAY OF JUNE, 1977

NOTE.—Arranged io accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

American Seating Company: *See—*
Barecki, Chester J., Re. 29,271.

B. F. Goodrich Company, The: *See—*
Kuts, Mathew, Re. 29,268.

Barecki, Chester J., to American Seating Company. Cantilevered seat for motorcoach vehicles or the like. Re. 29,271, Cl. 297-451.000.

Berman, Herbert; and Tenen, Stanley N. Motor control system. Re. 29,275, Cl. 318-227.000.

Braden, Denver, to Illinois Tool Works Inc. Automatic lead straightening of axial leaded components. Re. 29,269, Cl. 140-147.000.

Canon Kabushiki Kaisha: *See—*
Mitani, Taizo; and Shirashaki, Takayuki, Re. 29,276.

Collette, Richard L.; Vojir, Frank S.; and Watts, Roger E., to Guardian Electric Manufacturing Company. Mechanical counter. Re. 29,274, Cl. 235-91.00R.

Coltron Industries, Inc.: *See—*
Leitner, Frank Wilhite; and Griffin, William Thomas, Re. 29,267.

Griffin, William Thomas: *See—*
Leitner, Frank Wilhite; and Griffin, William Thomas, Re. 29,267.

Guardian Electric Manufacturing Company: *See—*
Collette, Richard L.; Vojir, Frank S.; and Watts, Roger E., Re. 29,274.

Hintz, Harold L.; and Webb, Joseph T., to Westvaco Corporation. Water resistant corrugated paperboard. Re. 29,272, Cl. 156-208.000.

Illinois Tool Works Inc.: *See—*
Braden, Denver, Re. 29,269.

Kuts, Mathew, to B. F. Goodrich Company, The. Fabric cutting. Re. 29,268, Cl. 83-488.000.

Leitner, Frank Wilhite; and Griffin, William Thomas, to Coltron Industries, Inc. Apparatus for straightening fabric. Re. 29,267, Cl. 26-51.500.

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1.16 4,030,396
1.22 4,030,397
1.26 4,030,398
304 4,030,399
317 4,030,400

CLASS 87
6 4,030,401

CLASS 90
19 4,030,402

CLASS 91
448 4,030,403

CLASS 92
12.2 4,030,404
58 4,030,405

CLASS 96
1 R 4,030,922
1.5 4,030,921
4,030,923
29 D 4,030,920
61 R 4,030,924
73 4,030,925
90 R 4,030,926
100 4,030,927
107 4,030,928
114 4,030,929
114.1 4,030,930
4,030,931
127 4,030,932

CLASS 99
461 4,030,406

CLASS 100
4 4,030,407

CLASS 101
1 4,030,408
47 4,030,409
120 4,030,410
126 4,030,411
132 4,030,412
232 4,030,413
379 4,030,414
382 R 4,030,415
450 4,030,416
451 4,030,417

CLASS 102
8 4,030,418
24 R 4,030,419
70.2 P 4,030,420
92.3 4,030,421

CLASS 104
131 4,030,422
172 S 4,030,423

CLASS 105
182 R 4,030,424

CLASS 106
15 FP 4,030,933
23 4,030,934
52 4,030,935
65 4,030,936
73.2 4,030,937
73.5 4,030,938
74 4,030,939
308 Q 4,030,940
309 4,030,941

CLASS 108
111 4,030,425

CLASS 109
51 4,030,426
82 4,030,427

CLASS 111
85 4,030,428

CLASS 112
104 4,030,429
121.26 4,030,430
241 4,030,431

CLASS 113
7 R 4,030,432
121 C 4,030,433

CLASS 114
16 R 4,030,434
36 4,030,435
39 4,030,436
46 4,030,437
74 R 4,030,438
106 4,030,439
222 4,030,440
242 4,030,441

CLASS 115
14 4,030,442
70 4,030,443

CLASS 118
257 4,030,444
645 4,030,445
654 4,030,446
658 4,030,447

CLASS 119
1 4,030,448
4,030,449
3 4,030,450
51 R 4,030,451
52 B 4,030,452

CLASS 123
3 4,030,453
8.45 4,030,454
25 B 4,030,456
25 E 4,030,455
34 A 4,030,457
44 D 4,030,458
52 M 4,030,459
117 A 4,030,460
119 A 4,030,463
119 B 4,030,461
119 EC 4,030,462
122 AC 4,030,464
127 4,030,465
146.5 A 4,030,466
4,030,467
148 E 4,030,468
4,030,469
193 C 4,030,470
197 R 4,030,471

CLASS 124
5 4,030,472
35 R 4,030,473

CLASS 126
113 4,030,474
121 4,030,475
246 4,030,476

270 4,030,477
271 4,030,478
287 4,030,479

CLASS 128

1.5 4,030,480
2 H 4,030,482
2 S 4,030,481
2.05 A 4,030,485
2.05 R 4,030,484
2.05 T 4,030,483
2.06 R 4,030,486
24 R 4,030,488
24.1 4,030,487
75 4,030,489
130 4,030,490
140 N 4,030,491
145.8 4,030,492
147 4,030,493
214 R 4,030,494
214.2 4,030,495
215 4,030,496
4,030,497
218 P 4,030,498
260 4,030,499
283 4,030,500
303.14 4,030,501
303.15 4,030,502
304 4,030,503
325 4,030,504
328 4,030,505
330 4,030,506
4,030,507
418 4,030,508
419 D 4,030,509
419 PG 4,030,510

CLASS 131

21 R 4,030,511

CLASS 132

7 4,030,512

CLASS 134

167 R 4,030,513

CLASS 135

25 R 4,030,514
4,030,515

CLASS 137

192 4,030,516
203 4,030,517
246 4,030,518
364 4,030,519
513.5 4,030,520
566 4,030,521
596.13 4,030,522
599 4,030,523
614.06 4,030,524

CLASS 139

18 4,030,526

CLASS 140

92.1 4,030,527
147 Re.29,269

CLASS 141

1 4,030,528
392 4,030,529

CLASS 148

1.5 4,030,942
4,030,943
2 4,030,944
6.2 4,030,945
11.5 P 4,030,946
12.9 4,030,947
33.3 4,030,948
112 4,030,950
147 4,030,951
171 4,030,949
187 4,030,952

CLASS 152

4,030,530

CLASS 156

79 4,030,953
208 Re.29,272
235 4,030,955
290 4,030,956
331 4,030,957
350 4,030,958
457 4,030,959
555 4,030,960
580 4,030,961
583 4,030,962
602 4,030,963
610 4,030,964
616 R 4,030,965
623 Q 4,030,966
628 4,030,954
643 4,030,967

CLASS 162

16 4,030,968
23 4,030,969
168 R 4,030,970
216 4,030,971

CLASS 164

4 4,030,531
66 4,030,532
147 4,030,533
4,030,534
207 4,030,535
274 4,030,536
278 4,030,537
312 4,030,538

CLASS 165

134 4,030,539
172 4,030,540
175 4,030,541

CLASS 166

77.5 4,030,542
117.5 4,030,543
182 4,030,544
191 4,030,545
208 4,030,546
212 4,030,547
279 4,030,548
280 4,030,549
314 4,030,550

CLASS 172

126 4,030,551
663 4,030,552

CLASS 173

1 4,030,553
17 4,030,554
120 4,030,556

CLASS 174

15 C 4,031,310
31 R 4,031,311
52 R 4,031,312
68.5 4,031,313

CLASS 175

4.5 4,030,557
39 4,030,558

CLASS 176

36 R 4,030,972
4,030,973
58 PB 4,030,974
78 4,030,975

CLASS 177

159 4,030,559

CLASS 178

3 4,031,314
50 4,031,316
69.1 4,031,317

CLASS 179

1 A Re.29,273
1 AA 4,031,320
1 D 4,031,318
4,031,319
4,031,321
2 A 4,031,322
6 E 4,031,323
6.3 R 4,031,324
4,031,325
15 FD 4,031,327
15 FS 4,031,326
18 BC 4,031,328
18 BF 4,031,329
41 A 4,031,330
81 A 4,031,331
81 R 4,031,333
84 R 4,031,332
100.11 4,031,334
100.41 K 4,031,335
4,031,336
115.5 H 4,031,337
170.8 4,031,338

CLASS 180

6.48 4,030,560
33 R 4,030,561
34 4,030,562

CLASS 181

147 4,030,563
166 4,030,564

CLASS 182

151 4,030,565

CLASS 184

6.2 4,030,566

CLASS 185

37 4,030,567

CLASS 187

9 E 4,030,568
20 4,030,569
29 R 4,030,570
4,030,571
4,030,572

CLASS 188

1 B 4,030,573
62 4,030,574
71.1 4,030,575
71.8 4,030,576
71.9 4,030,577
134 4,030,578
171 4,030,579
299 4,030,580

CLASS 192

16 4,030,581
67 P 4,030,582
84 C 4,030,583
84 T 4,030,584

CLASS 193

38 4,030,585

CLASS 194

59 4,030,586

CLASS 195

29 4,030,976
66 R 4,030,977
75 4,030,978
103.5 M 4,030,979
139 4,030,980

CLASS 197

1 R 4,030,587
4,030,588
4,030,589
4,030,590
6.4 4,030,592
53 4,030,591

CLASS 198

308 4,030,593
489 4,030,594
778 4,030,595

CLASS 200

38 BA 4,031,339
50 A 4,031,340
52 R 4,031,341
61.12 4,031,343
61.21 4,031,342
61.58 B 4,031,344
67 AA 4,031,345
146 R 4,031,346
148 B 4,031,347
159 R 4,031,348

CLASS 201

2.5 4,030,981
6 4,030,982
23 4,030,983
25 4,030,984

CLASS 202

174 4,030,985

CLASS 203

2 4,030,986

CLASS 204

55 R 4,030,987
98 4,030,988
104 4,030,989
108 4,030,990
158 R 4,030,991
4,030,992
4,030,993
159.11 4,030,994
180 G 4,030,995
192 E 4,030,997
192 R 4,030,996
206 4,030,999
219 4,030,998
252 4,031,000
257 4,031,001

CLASS 206

45.26 4,030,596
.83 4,030,597
356 4,030,598
379 4,030,599
386 4,030,600
387 4,030,601
404 4,030,602
521 4,030,603
4,030,604
525 4,030,605

CLASS 208

113 4,031,002

CLASS 209

3 4,031,003
74 R 4,030,607
212 4,031,004
236 4,031,005
287 4,030,606

CLASS 210

44 4,031,006
59 4,031,007
137 4,031,008
164 4,031,009
202 4,031,010
222 4,031,011
321 A 4,031,012
326 4,031,013
474 4,031,032

CLASS 211

131 4,030,608
162 4,030,609
182 4,030,610
191 4,030,611
192 4,030,612

CLASS 213

166 4,030,613

CLASS 214

1 BB 4,030,615
4,030,616
1 BT 4,030,614
1 CM 4,030,617
6 M 4,030,619
6 P 4,030,618
4,030,620
6.5 4,030,621
17 B 4,030,622
138 R 4,030,623
145 A 4,030,624
147 G 4,030,625
767 4,030,626

CLASS 219

98 4,031,349
99 4,031,350
121 L 4,031,351
212 4,031,352
345 4,031,353
389 4,031,354
502 4,031,355
509 4,031,356

CLASS 220

2.1 A 4,030,627
85 P 4,030,628
211 4,030,629
220 Re.29,270
258 4,030,630
269 4,030,631

CLASS 221

150 A 4,030,632

CLASS 222

1 4,030,633
23 4,030,634
55 4,030,635
102 4,030,636
137 4,030,637
180 4,030,638
189 4,030,639
207 4,030,640
317 4,030,641
368 4,030,642
386 4,030,643
396 4,030,644

CLASS 223

68 4,030,645

CLASS 224

9 4,030,646
29 R 4,030,647
31 4,030,648
45 T 4,030,649

CLASS 225

100 4,030,650

CLASS 226

97 4,030,651
114 4,030,652

CLASS 227

25 4,030,653
110 4,030,654
130 4,030,655
131 4,030,656

CLASS 228

1 R 4,030,657
2 4,030,658

CLASS 229

42 4,030,659
4,030,660
52 B 4,030,661
87 R 4,030,662

CLASS 233

26 4,030,663

CLASS 235

12 4,031,357
61.11 D 4,031,359
61.11 E 4,031,358
91 R Re.29,274
92 C 4,031,361
92 DN 4,031,360
92 FL 4,031,362
150.2 4,031,363
151.11 4,031,368
4,031,369
151.21 4,031,372
151.3 4,031,364
4,031,365
4,031,366
4,031,367
151.32 4,031,373
152 4,031,370
4,031,371
153 AK 4,031,375
153 AM 4,031,374
156 4,031,376
164 4,031,377
4,031,378
175 4,031,379
183 4,031,380

CLASS 239

289 4,030,664
373 4,030,665
526 4,030,666
573 4,030,667
585 4,030,668
590 4,030,669

CLASS 240

6.42 4,031,381
25 4,031,382

CLASS 241

14 4,030,670
15 4,030,671
18 4,030,672

CLASS 242

25 A 4,030,673
55 4,030,674
55.18 4,030,675
55.54 4,030,676
65 4,030,677
67.2 4,030,678
68 4,030,679
78.3 4,030,680
81 4,030,681
107.4 B 4,030,682
149 4,030,683
152.1 4,030,684
199 4,030,685

CLASS 244

3.13 4,030,686
12.5 4,030,687
13 4,030,688
151 B 4,030,689

CLASS 248

225.3 4,030,691
311.3 4,030,690
487 4,030,692

CLASS 249

9 4,030,693
196 4,030,694

CLASS 250

201 4,031,383
203 R 4,031,384
4,031,385
230 4,031,386
252 4,031,387
272 4,031,388
283 4,031,389
307 4,031,390
311 4,031,391
328 4,031,392
332 4,031,393
333 4,031,394
360 4,031,395
385 4,031,396
423 P 4,031,397
458 4,031,398
461 B 4,031,399
468 4,031,400
503 4,031,401
557 4,031,402

CLASS 251

113 4,030,695
288 4,030,696

CLASS 252

8.55 R 4,031,014
46.7 4,031,017
47.5 4,031,018
48.2 4,031,023
50 4,031,015
4,031,016
56 R 4,031,020
56 S 4,031,019
62.1 P 4,031,021
89 R 4,031,022
135 4,031,024
180 4,031,025
182 4,031,026
186 4,031,027
299 4,031,028
301.1 R 4,031,029
373 4,031,030
414 4,031,031
511 4,031,033
522 4,031,034

CLASS 254

8 R 4,030,697
106 4,030,698
108 4,030,699
113 4,030,700
124 4,030,701
134.4 4,030,702
135 R 4,030,703
139.1 4,030,704
4,030,705

CLASS 256

1 4,030,706

CLASS 259

8 4,030,707
4,030,708

CLASS 260

2 N 4,031,036
2.2 R 4,031,037
4,031,038
2.3 4,031,039
2.5 AH 4,031,042
4,031,044
2.5 AM 4,031,035
4,031,049
2.5 AW 4,031,040
2.5 EP 4,031,043
2.5 M 4,031,041
2.5 R 4,031,045
17.2 4,031,046
21 4,031,047
22 CQ 4,031,048
29.2 TN 4,031,050
4,031,051
29.4 R 4,031,052
29.6 MM 4,031,055
29.6 PT 4,031,056
29.6 RW 4,031,053
29.6 T 4,031,054
32.6 R 4,031,057
33.8 UA 4,031,058
37 N 4,031,060
37 SB 4,031,059
42.29 4,031,061
42.45 4,031,062
67.6 R 4,031,064
75 R 4,031,065
77.5 CR 4,031,066
77.5 R 4,031,067
79.3 R 4,031,068
112.5 LH 4,031,069
4,031,070
4,031,071
4,031,072
154 4,031,073
239.1 4,031,076
4,031,077
239.3 D 4,031,078
4,031,079
239.55 C 4,031,074
239.55 D 4,031,075
239.55 R 4,031,080
240 R 4,031,081
243 C 4,031,082
4,031,083
4,031,084
4,031,085
4,031,086
243 R 4,031,087
247.2 A 4,031,088
247.5 DP 4,031,089
248 A 4,031,091
248 C 4,031,090
249.6 4,031,092
251 R 4,031,093
268 PH 4,031,094
270 C 4,031,095
272 4,031,096
285.5 4,031,097
287 C 4,031,098
289 K 4,031,099
290 HL 4,031,100
293.84 4,031,101
294.8 C 4,031,102
295 N 4,031,103
295.5 A 4,031,105
295.5 R 4,031,104
296 H 4,031,107
296 R 4,031,106
297 R 4,031,108
314.5 4,031,109
333 4,031,110
340.3 4,031,111

340.7 4,031,112
343.6 4,031,113
4,031,114
4,031,115
369 4,031,116
397.1 4,031,117
404.5 4,031,118
448.2 B 4,031,119
448.8 R 4,031,120
4,031,121
4,031,122
449.5 4,031,123
456 A 4,031,125
463 4,031,126
465 D 4,031,127
465.4 4,031,124
465.9 4,031,128
468 D 4,031,129
468 K 4,031,130
473 G 4,031,131
514 L 4,031,132
520 C 4,031,134
520 R 4,031,133
530 N 4,031,135
537 N 4,031,136
559 AT 4,031,137
561 N 4,031,138
566 A 4,031,139
575 4,031,160
598 4,031,161
611 A 4,031,140
614 R 4,031,141
632 D 4,031,143
650 R 4,031,142
4,031,144
4,031,145
4,031,146
4,031,147
652 P 4,031,148
654 A 4,031,149
666 A 4,031,151
4,031,152
666 PY 4,031,150
669 A 4,031,153
672 R 4,031,154
674 SA 4,031,155
4,031,156
676 R 4,031,157
683.15 B 4,031,158
4,031,159
837 PV 4,031,162
837 R 4,031,163
857 PG 4,031,164
860 4,031,063
4,031,165
876 B 4,031,166
884 4,031,167
896 4,031,168
897 A 4,031,169
932 4,031,170

CLASS 261

1 4,031,171
24 4,031,173
106 4,031,180

CLASS 264

3 B 4,031,172
14 4,031,174
40.7 4,031,175
45.2 4,031,176
65 4,031,177
4,031,178
91 4,031,179
135 4,031,181

CLASS 266

45 4,030,709
48 4,030,710
123 4,030,711
252 4,030,712

CLASS 267

8 R 4,030,713
21 A 4,030,714
64 R 4,030,715
4,030,716

CLASS 269

118 4,030,717
315 4,030,718
328 4,030,719

CLASS 270

61 F 4,030,720

CLASS 271

3 4,030,721
10 4,030,722
11 4,030,723
64 4,030,724
164 4,030,725
246 4,030,726
276 4,030,727
277 4,030,728

CLASS 272

3 4,030,729

CLASS 273

1 F 4,030,731
29 A 4,030,732
29 BB 4,030,733
30 4,030,734
95 E 4,030,760
95 R 4,030,736
106.5 A 4,030,761
110 4,030,555
134 AD 4,030,762
134 D 4,030,763
148 A 4,030,764
148 R 4,030,765
163 R 4,030,766

CLASS 277

92 4,030,730
235 R 4,030,767

CLASS 280

42 4,030,769
43.23 4,030,770
47.17 4,030,768
88 4,030,771
106 R 4,030,772
153 R 4,030,773
261 4,030,774
408 4,030,171
477 4,030,775
4,030,776
661 4,030,737
681 4,030,738
708 4,030,739
714 4,030,777

CLASS 285

16 4,030,740
161 4,030,741
174 4,030,778
343 4,030,742

CLASS 289

18 4,030,743

CLASS 290

38 R 4,031,403
40 R 4,031,404
55 4,031,405

CLASS 293

71 R 4,030,735
4,030,744

CLASS 294

86.14 4,030,745
88 4,030,746
92 4,030,747

CLASS 296

1 S 4,030,779
100 4,030,780

CLASS 297

184 4,030,748
345 4,030,749
375 4,030,750
397 4,030,781
451 Re.29,271

CLASS 298

1 A 4,030,751

CLASS 299

11 4,030,752

CLASS 301

36 R 4,030,753
98 4,030,754

CLASS 302

29 4,030,755

CLASS 303

24 A 4,030,756
28 4,030,757
84 A 4,030,758
119 4,030,759

CLASS 305

57 4,030,782

CLASS 307

41 4,031,406
87 4,031,407
116 4,031,408
208 4,031,409
209 4,031,410
228 4,031,411
238 4,031,412
4,031,413
270 4,031,414
279 4,031,415
299 A 4,031,416
311 4,031,417
326 4,031,431

CLASS 308

6 C 4,030,191
72 4,030,783
107 4,030,784
187 4,030,785
227 4,030,786
4,030,787

CLASS 310

8.2 4,031,418
49 R 4,031,419
74 4,031,420
112 4,031,421
256 4,031,422

CLASS 312

333 4,030,788

CLASS 313

105 CM 4,031,423
146 4,031,424
346 R 4,031,425
4,031,426
422 4,031,427

CLASS 315

111 4,031,428
169 TV 4,031,429
403 4,031,430

CLASS 316

19 4,030,789
23 4,030,790

CLASS 318

39 4,031,437
227 Re.29,275
331 4,031,438
338 4,031,439
432 4,031,440
480 4,031,441
561 4,031,442
4,031,443
562 4,031,444
568 4,031,445
665 4,031,446
685 4,031,447
696 4,031,448

CLASS 320

2 4,031,449
23 4,031,450
4,031,451

CLASS 321

2 4,031,452
4,031,453
4,031,454

CLASS 322

27 4,031,455

CLASS 323

4 4,031,456
36 4,031,458
60 4,031,459
92 4,031,457

CLASS 324

34 R 4,031,460
51 4,031,461
77 A 4,031,463
77 B 4,031,462
78 Z 4,031,464
158 SC 4,031,465
175 4,031,466

CLASS 325

54 4,031,467
312 4,031,468
363 4,031,469
396 4,031,470
423 4,031,471
446 4,031,472
455 4,031,473
4,031,474
4,031,475

CLASS 328

39 4,031,476
70 4,031,477
134 4,031,478

CLASS 329

50 4,031,479

CLASS 330

10 4,031,480
30 D 4,031,495
35 4,031,481
4,031,482

CLASS 331

17 4,031,483
94.5 G 4,031,484
94.5 P 4,031,485
96 4,031,486

CLASS 333

1 4,031,487
21 A 4,031,488
24.2 4,031,489
70 T 4,031,490

CLASS 334

15 4,031,491

CLASS 335

16 4,031,492
128 4,031,493
154 4,031,494

CLASS 336

135 4,031,496

CLASS 338

21 4,031,498
23 4,031,499
308 4,031,497

CLASS 339

5 M 4,030,791
17 LC 4,030,792
19 4,030,793
22 B 4,030,794
37 4,030,795
61 R 4,030,796
64 M 4,030,797
89 R 4,030,798
99 R 4,030,799
107 4,030,800
121 4,030,801
192 R 4,030,802
217 S 4,030,803
258 S 4,030,804

CLASS 340

6 R 4,031,500
4,031,501
10 4,031,502
11 4,031,503
15.5 DP 4,031,505
15.5 GC 4,031,504
4,031,506
41 R 4,031,507
58 4,031,508
62 4,031,509
4,031,510
146.2 4,031,511
147 R 4,031,512
152 T 4,031,513
173 R 4,031,522
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174 MS 4,031,525
174 TF 4,031,526
279 4,031,527
310 R 4,031,528
324 R 4,031,529
347 NT 4,031,530
4,031,532
4,031,533
347 SY 4,031,531

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6.5 R 4,031,535
12 MD 4,031,534
4,031,537
704 4,031,538
781 CA 4,031,536
796 4,031,539
797 4,031,540
860 4,031,541

CLASS 346

1 4,031,561
35 4,031,562
75 4,031,563

CLASS 350

2 4,030,805
7 4,030,806
4,030,807
36 4,030,808
96 C 4,030,809
4,030,810
4,030,811
157 4,030,812
161 S 4,030,813
238 4,030,814
255 4,030,815
294 4,030,816
314 4,030,817

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79 4,030,819
91 C 4,030,820

CLASS 353

71 4,030,821
103 4,030,822

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8 4,030,823
15 4,030,824
71 4,030,825
104 4,030,826

CLASS 356

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96 4,030,828
97 4,030,829
109 4,030,830
4,030,831
111 4,030,835
118 4,030,836
152 4,030,832
175 4,030,833
197 4,030,834
209 4,030,837
219 4,030,838
251 4,030,839
256 4,030,840

CLASS 358

56 4,031,541
60 4,031,542
86 4,031,543
99 4,031,544
108 4,031,545
128 4,031,546
167 4,031,547
188 4,031,548
193 4,031,549
212 4,031,315
216 4,031,550
223 4,031,551
241 4,031,552
247 4,031,553

CLASS 360

73 4,031,554
94 4,031,555
96 4,031,556
4,031,557
130 4,031,558

CLASS 361

7 4,031,432
52 4,031,559
172 4,031,434
175 4,031,560
186 4,031,435
301 4,031,436
338 4,031,433

CLASS 364

200 4,031,514
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900 4,031,519

CLASS 401

6 4,030,841
195 4,030,842
213 4,030,844
268 4,030,845

CLASS 403

231 4,030,846
263 4,030,847
272 4,030,848
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4,030,850
405 4,030,266

CLASS 404

25 4,030,851
66 4,030,852

CLASS 408

10 4,030,853
115 B 4,030,854
197 4,030,843
226 4,030,855

CLASS 415

80 4,030,856

CLASS 417

46 4,030,857
56 4,030,858
61 4,030,859
63 4,030,860

CLASS 418

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48 4,030,862

CLASS 423

127 4,031,182
175 4,031,183
197 4,031,184
239 4,031,185
392 4,031,187
447.6 4,031,188
449 4,031,189
466 4,031,190
485 4,031,191
488 4,031,192
490 4,031,193
500 4,031,194
554 4,031,195
624 4,031,196

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1 4,031,197
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12 4,031,199
27 4,031,200
4,031,201
28 4,031,202
89 4,031,203
90 4,031,204
94 4,031,205
117 4,031,206
118 4,031,207
119 4,031,208
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317 4,031,243
324 4,031,186
330 4,031,244
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337 4,031,247
347 4,031,248
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17 4,030,863
65 4,030,864
82 4,030,865
116 4,030,866
144 4,030,867
149 4,030,868
247 4,030,869
383 4,030,870
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393 4,030,872
456 4,030,873

CLASS 426

18 4,031,250
285 4,031,238
387 4,031,251
445 4,031,252
482 4,031,253
534 4,031,255
535 4,031,256
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548 4,031,258
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565 4,031,261
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599 4,031,265
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656 4,031,267

CLASS 427

12 4,031,268
24 4,031,269
27 4,031,270
43 4,031,271
96 4,031,272
158 4,031,273
229 4,031,274

248 R	4,031,275	222	4,031,284	586	4,030,525	116	4,031,296	144	4,030,879		CLASS 528
369	4,031,276	226	4,030,892		CLASS 429		CLASS 431		CLASS 526	486	4,031,302
388 R	4,031,277	280	4,031,283	40	4,031,291	9	4,030,874	87	4,031,297		CLASS 536
423	4,031,278	294	4,031,285		4,031,292	352	4,030,875	113	4,031,298	5	4,031,303
	CLASS 428	324	4,031,286	60	4,031,293		CLASS 432	193	4,031,299	11	4,031,304
44	4,031,279	379	4,031,287	82	4,031,294	14	4,030,876	308	4,031,300	114	4,031,305
88	4,031,280	395	4,031,288	100	4,031,295	29	4,030,877	328	4,031,301		4,031,306
90	4,031,281	451	4,031,289			45	4,030,878				4,031,307
141	4,031,282	480	4,031,290								

CLASSIFICATION OF DESIGNS

D2—	265	244,726		14	244,740	D11—	40	244,765		82	244,801	D22—	18	244,773		5 GH	244,792
	287	244,727		17	244,741		89	244,766		99	244,778	D23—	69	244,774		5 H	244,788
D4—	31	244,728			244,742		137	244,767	D15—	7	244,750		150	244,775			244,789
D6—		244,729		131	244,743		149	244,768		11	244,751	D24—	2	244,805		15 C	244,787
	37	244,730	D8—	8	244,744	D12—	62	244,769		29	244,752		47	244,776	D48—	20 A	244,793
	48	244,731		24	244,745		142	244,770			244,753	D25—	75	244,777		20 E	244,794
	76	244,732		71	244,746		193	244,771		66	244,754	D27—	36	244,782		23 R	244,795
	136	244,733		107	244,747		215	244,772			244,755			244,783		24 A	244,796
	175	244,734		380	244,748	D14—	5	244,800		98	244,756			244,784		32 C	244,797
	193	244,735	D9—	238	244,749		12	244,779		122	244,757			244,785	D56—	1 E	244,798
		244,736	D10—	38	244,761			244,780		123	244,758	D30—	15	244,786	D87—	3 G	244,802
	257	244,737		75	244,762		39	244,781		146	244,759	D34—	5 BC	244,790			244,803
D7—	3	244,738		98	244,763		75	244,799	D19—	62	244,760		5 CB	244,791			244,804
	13	244,739		113	244,764												

CLASSIFICATION OF PLANTS

P.—	15	4,063	43	4,064	68	4,062					

GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

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PATENTS

1 :	4,030,225		4,030,476		4,031,038		4,031,371	12 :	4,030,148		4,030,551
2 :	4,030,747		4,030,477		4,031,049		4,031,450		4,030,232		4,030,559
4 :	4,030,194		4,030,491		4,031,087		4,031,521		4,030,356		4,030,566
	4,030,442		4,030,504		4,031,100	9 :	4,030,177		4,030,360		4,030,568
	4,030,483		4,030,506		4,031,114		4,030,179		4,030,361		4,030,575
	4,030,797		4,030,518		4,031,115		4,030,195		4,030,419		4,030,586
	4,031,028		4,030,523		4,031,173		4,030,220		4,030,449		4,030,592
	4,031,385		4,030,527		4,031,181		4,030,289		4,030,585		4,030,611
	4,031,462		4,030,544		4,031,197		4,030,317		4,030,691		4,030,613
	4,031,483		4,030,587		4,031,209		4,030,327		4,030,718		4,030,620
	4,031,486		4,030,603		4,031,228		4,030,373		4,030,751		4,030,621
5 :	4,030,626		4,030,618		4,031,234		4,030,378		4,030,801		4,030,623
	4,030,670		4,030,634		4,031,241		4,030,446		4,030,851		4,030,649
	4,030,843		4,030,645		4,031,247		4,030,556		4,031,373		4,030,659
	4,030,871		4,030,646		4,031,260		4,030,640		4,031,420		4,030,660
6 :	Re.29,269		4,030,651		4,031,265		4,030,706		4,031,513		4,030,664
	4,030,145		4,030,663		4,031,279		4,030,722	13 :	4,030,205		4,030,693
	4,030,146		4,030,676		4,031,285		4,030,723		4,030,226		4,030,694
	4,030,158		4,030,678		4,031,296		4,030,741		4,030,261		4,030,712
	4,030,197		4,030,686		4,031,333		4,030,783		4,030,474		4,030,717
	4,030,198		4,030,703		4,031,348		4,030,813		4,030,537		4,030,724
	4,030,199		4,030,704		4,031,355		4,030,831		4,030,863		4,030,730
	4,030,210		4,030,733		4,031,357		4,030,842		4,030,941		4,030,736
	4,030,213		4,030,737		4,031,364		4,030,972		4,031,195		4,030,753
	4,030,221		4,030,752		4,031,372		4,030,975	16 :	4,030,709		4,030,765
	4,030,224		4,030,768		4,031,377		4,031,021	17 :	Re.29,274		4,030,798
	4,030,229		4,030,775		4,031,379		4,031,068		4,030,172		4,030,802
	4,030,237		4,030,779		4,031,389		4,031,077		4,030,178		4,030,816
	4,030,239		4,030,803		4,031,399		4,031,108		4,030,184		4,030,821
	4,030,262		4,030,807		4,031,424		4,031,137		4,030,219		4,030,841
	4,030,264		4,030,829		4,031,437		4,031,169		4,030,227		4,030,853
	4,030,265		4,030,832		4,031,444		4,031,206		4,030,234		4,030,894
	4,030,285		4,030,836		4,031,469		4,031,217		4,030,235		4,030,919
	4,030,300		4,030,847		4,031,479		4,031,283		4,030,238		4,031,006
	4,030,303		4,030,848		4,031,488		4,031,322		4,030,251		4,031,019
	4,030,310		4,030,849		4,031,507		4,031,341		4,030,255		4,031,154
	4,030,324		4,030,854		4,031,510		4,031,363		4,030,266		4,031,242
	4,030,340		4,030,877		4,031,519		4,031,367		4,030,288		4,031,254
	4,030,342		4,030,906		4,031,520		4,031,402		4,030,307		4,031,270
	4,030,348		4,030,907		4,031,522		4,031,423		4,030,377		4,031,292
	4,030,349		4,030,910		4,031,526		4,031,433		4,030,385		4,031,295
	4,030,353		4,030,914		4,031,534		4,031,484		4,030,391		4,031,298
	4,030,358		4,030,936	8 :	4,030,141	10 :	4,030,168		4,030,412		4,031,312
	4,030,362		4,030,943		4,030,150		4,030,388		4,030,435		4,031,319
	4,030,383		4,030,952		4,030,214		4,030,880		4,030,466		4,031,328
	4,030,392		4,030,953		4,030,276		4,030,912		4,030,470		4,031,332
	4,030,399		4,030,984		4,030,363		4,031,058		4,030,484		4,031,340
	4,030,426		4,030,996		4,030,396		4,031,106		4,030,488		4,031,345
	4,030,438		4,030,997		4,030,796		4,031,111		4,030,494		4,031,346
	4,030,455		4,030,999		4,030,840		4,031,168		4,030,495		4,031,414
	4,030,458		4,031,005		4,030,923		4,031,191		4,030,497		4,031,460
	4,030,471		4,031,012		4,031,059		4,031,299		4,030,498		4,031,461
	4,030,472		4,031,027		4,031,182	11 :	4,030,147		4,030,513		4,031,466

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OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

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PATENT AND TRADEMARK OFFICE NOTICES

Board of Appeals Decisions Rendered in the Month of May 1977

Affirmed	189
Affirmed in Part	28
Reversed	65
Total	282

Proposed Procedures for Recordation of Interviews

The Patent and Trademark Office is considering the adoption of the procedures set forth in the following proposed Commissioner's notice relating to the recordation of interviews in patent application files.

Current Patent and Trademark Office practices relating to the recordation of interviews with the examiner, whether in person or by telephone, are set forth in sections 1.2 and 1.133(b) of Title 37, Code of Federal Regulations and section 713.04 of the Manual of Patent Examining Procedure (MPEP).

Comments are requested on the desirability of issuing such a notice and the content thereof as well as on the desirability of amending 37 CFR 1.133(b) to provide an independent basis for the proposed interview recordation procedure. It should be noted that section 1.133(b) does not in itself support the various interview recordation requirements in effect or as proposed but must be considered in conjunction with the provisions of section 1.2.

Persons wishing to comment on the proposed procedures may do so in writing, by addressing comments to the Commissioner of Patents and Trademarks, Washington, D.C. 20231. Written comments received by August 10, 1977 will be considered before any new procedures are adopted. The contemplated notice would state that:

This notice establishes within the Patent and Trademark Office additional general procedures for the recordation of interviews.

Under present practice it is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability as set forth in section 713.04 of the Manual of Patent Examining Procedure (MPEP). This practice is continued and further amplified as set forth below.

Recent surveys have indicated that the substance of many interviews has not been made of record or the text thereof is incomplete as to substantive matters. In some cases, the substance of an interview may be presented as arguments in a subsequent response filed by the applicant but without any indication that they had been presented at the interview. In order to help insure a better record of examiner-applicant interviews in application files, the following new procedures are adopted to become effective for interviews conducted on and after ————————, 1977. Appropriate changes will be made in the Manual of Patent Examining Procedure (MPEP).

Examiners will complete a two-sheet carbon interleaf Interview Summary Form for each interview held where a matter of substance has been discussed by checking the appropriate boxes and filling in the blanks in neat handwritten form. Discussions regarding only procedural matters, directed solely to restriction requirements (for which interview recordation is otherwise provided for in Section 812.01 of the MPEP), or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below.

The Interview Summary Form shall be given an appropriate paper number, placed in the file, and listed on the "Contents" list on the file wrapper. The docket and serial register cards will not be updated to reflect this interview. In a personal interview, the duplicate copy of the Form will be removed and given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephonic interview, the copy will be mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner before an allowance is not likely or if other circumstances dictate, the Form will be mailed promptly after the telephonic interview rather than with the next official communication. The original of the complete Form will be made of record and placed in the right hand flap of the file.

The Form provides for recordation of the following information:

— Serial Number of the application
— Name of applicant
— Name of examiner
— Date of interview
— Type of interview (personal or telephonic)
— Name of participant(s) (applicant, attorney or agent, etc.)
— An indication whether or not an exhibit was shown or a demonstration conducted
— An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). (Agreements as to allowability are tentative and do not restrict further action by the examiner to the contrary)
— The signature of the examiner who conducted the interview
— Names of any other Patent and Trademark Office personnel present.

The Form also contains a statement reminding the applicant of his responsibility to record the substance of the interview.

It is desirable that the examiner orally remind the applicant of his obligation to record the substance of the interview in *each case* unless both applicant and examiner agree that the examiner will record same. Where the examiner agrees to record the substance of the interview, or when it is adequately recorded on the Form or in an attachment to the Form, the examiner will check a box at the bottom of the Form informing the applicant that he need not supplement the Form by submitting a separate record of the substance of the interview.

It should be noted, however, that the Interview Summary Form will not be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview:

The complete and proper recordation of the substance of any interview should include at least the following applicable items:

1) A brief description of the nature of any exhibit shown or any demonstration conducted,
2) an identification of the claims discussed,
3) an identification of specific prior art discussed,
4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the examiner,
5) a brief identification of the general thrust of the principal arguments presented to the examiner. The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he feels were or might be persuasive to the examiner,
6) an indication of any other pertinent matters discussed, and
7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete or accurate, the examiner will take appropriate action as set forth in MPEP section 713.04. If the record is complete and accurate, the examiner should place the indication "Interview record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

Questions and requests for further information concerning the above-proposed notice and procedure may be directed to Mr. Louis O. Maassel by telephone at (703) 557-3070, or by mail marked to his attention and addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231.

June 2, 1977.

C. MARSHALL DANN,
Commissioner of Patents and Trademarks.

April and May 1977 Classification Orders

The reclassifications covered by the following classification changes became effective during April and May 1977.

	Class	Subclasses
Classification Order 582, effective April 5, 1977:		
Abolished	29	180-199.
	75	94.
	148	34.
Established	75	228-257; 950 and 951.
	428	539.5; 544-687; and 923-941.
Position change	428	2.
Classification Order 583, effective May 12, 1977:		
Abolished	228	141.
Established	228	141.1; 265.
Classification Order 584, effective May 12, 1977:		
Abolished	280	87.
Established	280	771-780.
Classification Order 585, effective May 27, 1977:		
Abolished	70	146-148.
Established	70	467-489.
Classification Order 586, effective May 31, 1977:		
Abolished	51	8-15.
Established	51	410-439.
Classification Order 587, effective May 31, 1977:		
Abolished	112	218; 219; 252.
Established	112	270-302.

ALFRED C. MARMOR,
Administrator for Documentation,
June 2, 1977.

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

2,685,536, Starkey and Ransburg, METHOD FOR ELECTROSTATICALLY COATING ARTICLES; **2,794,417**, same, APPARATUS FOR ELECTROSTATICALLY COATING ARTICLE; **2,893,893**, W. W. Crouse, METHOD AND APPARATUS FOR ELECTROSTATIC COATING; **2,893,894**, E. M. Ransburg, METHOD AND APPARATUS FOR ELECTROSTATICALLY COATING, **filed** Mar. 1, 1973, D.C., E.D. Pa. (Philadelphia) Doc. 73-471, *Ransburg Corporation* v. *R & R Metal Finishing Co., Inc.* Final judgment on consent, said patents valid and enforceable. Patents in above action were infringed upon by defendant. Both parties shall abide by an agreement dated Oct. 1, 1976, entered Oct. 22, 1976.

2,794,417. (See 2,685,536.)

2,891,375, Vandamme and Rouyer, APPARATUS FOR THE PRODUCTION OF HIGH BULK YARN; **3,165,881**, De Moncuit and Crouzet, PRODUCTION OF HIGH BULK YARNS; **3,232,037**, H. Crouzet, FALSE-TWIST SPINDLE; **3,581,450**, same, PROCESS AND DEVICE FOR THE MANUFACTURE OF TEXTURED YARNS, **filed** Feb. 1, 1977, D.C., M.D.N.C. (Greensboro) Doc. C-77-47-G, *Milliken Research Corporation and Chavanoz, S.A.* v. *Collins & Aikman Corporation.*

2,893,893. (See 2,685,536.)

2,893,891. (See 2,685,536.)

2,938,676, G. H. Magrath, TOP DRIVE SPINNING SPINDLE, **filed** Jan. 10, 1977, in the United States Court of Claims (District of Columbia) Doc. 13-77, *George H. Mograth* v. *The United States.*

3,019,441, Pollack and Finsilver, SHOWER CAP; **Reg. No. 910,954** (UMBRELLA), Beautique, **filed** Feb. 8, 1977, D.C., S.D. Fla. (Miami) Doc. 77-267-C-JLK, *Devora Finsilver and Shirley Pollack* v. *Betty Dain Creations, Inc.*

3,081,392, E. L. Warner, HIGH-FREQUENCY OVEN, **filed** Apr. 13, 1976, D.C., N.D. Ohio (Cleveland) Doc. C-76-377, *The Tappan Company* v. *Litton Industries, Inc., Litton Systems, Inc. and Schwede Appliance Village.* Stipulation and order dismissing complaint with prejudice, subject to its being reinstated on application by plaintiff, upon showing that the validity of U.S. Patent No. 3,081,392 has been sustained in *Norris Industries, Inc.* v. *The Tappan Co.*, #72-597, pending in the U.S. District Court for the Central District of California, Feb. 7, 1977.

3,103,661, W. C. Hahn, IMPULSE SYSTEMS, **filed** Feb. 9, 1977, in the United States Court of Claims (District of Columbia) Doc. 320-75, *General Electric Company* v. *The United States.* Ordered that judgment be and the same is entered for the plaintiff, Feb. 14, 1977.

3,165,881. (See 2,891,375.)

3,232,037. (See 2,891,375.)

3,296,636, B. Markwitz, BUOYANCY RING; **3,775,706**, B. Markwitz, INFLATABLE SWIMMING SUPPORTS; **Reg. No. 894,510** (BEMA), Bernhard Markwitz, **filed** Nov. 29, 1974, D.C., S.D. Fla. (Miami) Doc. 74-1557-C-JE, *Bernhard Markwitz* v. *Ronald A. Hirst, individually and doing business as Beach-Marine USA Inc.* Ordered that defendants are permanently enjoined and restrained from infringing said patents, and from further prosecuting a trademark opposition proceeding, seeking registration of the notation "Swim Floogie" or "Floogie." Defendants' counterclaim is dismissed without prejudice, Feb. 10, 1977.

3,411,256, J. S. Best, ROOF CONSTRUCTION AND METHOD THEREOF; **3,763,614**, Hyde, Chalmers and Mackie, ROOF CONSTRUCTION, **filed** Jan. 24, 1977, D.C., M.D. Fla. (Tampa) Doc. 77-0052-C-TH, *The Dow Chemical Company* v. *The Celotex Corporation.*

3,432,451, R. Kales, POLYOLEFIN-MODIFIED POLYURETHANES AND PROCESS OF MAKING SAME, **filed** Feb. 11, 1976, D.C., E.D. Wis. (Milwaukee) Doc. 76-91, *J. M. Myers Tool Company* v. *Blair Industries, Inc., etc.* Order dismissing action without prejudice by reason of the failure of the plaintiff to prosecute action, Nov. 15, 1976.

3,433,487, L. E. Bates, ROCKET PROJECTILE, **filed** Feb. 8, 1977, United States Court of Claims (District of Columbia) Doc. 82-77, *Leonard E. Bates* v. *The United States of America.*

3,445,324, Curler and Lineburg, FLEXIBLE WRAPPING MATERIAL, **filed** Mar. 22, 1976, D.C., E.D. Wis. (Milwaukee) Doc. 76-201, *Milprint, Inc.* v. *Curwood, Inc.* Decision and order granting defendant's motion to dismiss the action, Nov. 30, 1976.

3,463,651, R. Warsager, MULTICOLOR SURFACE DECORATION AND PROCESS FOR PRODUCING SAME, **filed** Apr. 9, 1975, D.C.N.J. (Newark) Doc. 75-578, *Rubin Warsager* v. *Dri-Print Foils, Inc.* Complaint dismissed Nov. 5, 1976; memorandum order dismissing the defendant's counterclaim, Feb. 10, 1977.

3,506,056, Quinones, Shackelton and Williams, BURGLAR PROOF WINDOW GRILLE, **filed** Feb. 15, 1977, D.C., S.D.N.Y., Doc. 77-C-752, *Cecil Shackelton and Carlos M. Quinones et al.* v. *J. Kaufman Iron Works, Inc. and Window Security Systems, Inc.*

3,584,450. (See 2,891,375.)

3,614,051, A. H. Shapiro, TURBO-MOLECULAR AND STATOR PUMP HAVING IMPROVED ROTOR CONSTRUCTION, **filed** June 23, 1976, D.C., N.D. Calif. (San Francisco) Doc. C76-1281 CBR, *Sargent-Welch Scientific Co.* v. *Industrial Vacuum Engineering, H. R. Smith and W. G. Patterson.* Parties agree to a final judgment on consent, dismissing without prejudice, the complaint and counterclaim under the terms and conditions set forth in said final judgment on consent, Feb. 17, 1977.

3,650,766, Y. Smadar, EXTRUDED FOOD PRODUCTS AND METHOD OF PRODUCING SAME, filed Oct. 14, 1976, D.C., N.D. Tex. (Dallas) Doc. CA3-76-1364-C, *DCA Food Industries Inc. v. Rubenstein Foods, Inc.* Order, case dismissed without prejudice. Jan. 26, 1977.

3,679,840, A. R. Maxey, HELICAL SCANNING ASSEMBLY WITH TAPE TO SCANNER REFERENCING APPARATUS, filed Feb. 14, 1977, D.C., N.D. Ill. (Chicago) Doc. 77c516, *Echo Science Corporation v. Robert Bosch GmbH et al.*

3,737,527, D. F. Keller, WAVE DEFLECTING DEVICE FOR A SEA WALL, filed Feb. 7, 1977, D.C., N.D. Ill. (Chicago) Doc. 77c400, *Franklin D. Keller and Dee-Keller Research and Development Corp. v. 1420 Sheridan Rd. Condominium Assoc. et al.*

3,763,614. (See 3,411,256.)

3,775,788. (See 3,296,636.)

3,811,550, F. S. Ajero, APPARATUS FOR ORIENTING TAPERED ARTICLES, filed Dec. 9, 1975, D.C., E.D. Wis. (Milwaukee) Doc. 75-713, *Hughes Company, Inc. v. FMC Corporation.* Stipulation and order for dismissal, Dec. 1, 1976.

3,875,607, R. B. Rosseau, GUTTER BRUSH, filed Nov. 14, 1975, D.C., E.D. Wis. (Milwaukee) Doc. 75-C-669, *FMC Corp. v. Zarnoth Brush Works, Inc.* Case transferred to District of Kansas, Jan. 4, 1977. **Same,** filed May 12, 1976, D.C., E.D. Wis. (Milwaukee) Doc. 76-316, *FMC Corporation v. Zarnoth Brush Works, Inc., Jenkins Equipment Company, Inc. and Sweepstar, Inc.* Case transferred to District of Kansas, Jan. 4, 1977.

3,928,933, T. Iwamoto, HOLDING TOY, filed Feb. 7, 1977, D.C., S.D.N.Y., Doc. 77-C-0583, *ITI Hawaii, Inc. and Takeji Iwamoto v. Philip Stahl, Inc.*

3,995,030, H. Malachowski, COMPOSITION AND METHOD FOR TREATING ARTHRITIS, filed Aug. 2, 1976, D.C. Conn. (New Haven) Doc. B-76-222, *Henry Malachowski v. Robert Daniels & Company, Inc. and Generics Corp. of America.* Case is dismissed with prejudice, Feb. 15, 1977.

Reg. No. 894,510. (See 3,296,636.)

Reg. No. 910,954. (See 3,019,444.)

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,482,906, Re. S.N. 786,837, Filed Apr. 12, 1977, Cl. 351/160, ASPHERIC CORNEAL CONTACT LENS SERIES, David Volk, Owner of Record: *Inventor,* Attorney or Agent: George S. Baldwin, et al., Ex. Gp.: 257

3,521,420, Re. S.N. 790,921, Filed Apr. 26, 1977, Cl. 52/584, BIN PANEL CONSTRUCTION, Wayne H. Oliver, Owner of Record: *Inventor,* Attorney or Agent: John D. Gould, et al., Ex. Gp.: 354

3,763,604, Re. S.N. 787,065, Filed Apr. 13, 1977, Cl. 51/399, COATED ABRASIVE BELT JOINT, John F. Malloy, Owner of Record: *Norton Company, Troy, N.Y.,* Attorney or Agent: Oliver W. Hayes, Ex. Gp.: 323

3,791,346, Re. S.N. 801,877, Filed May 31, 1977, Cl. 119/17, RODENT HABITAT, Allan H. Willinger, et al., Owner of Record: *Metaframe Corporation, Maywood, N.J.,* Attorney or Agent: Stephen L. King, et al., Ex. Gp.: 333

3,798,209, Re. S.N. 782,294, Filed Mar. 28, 1977, Cl. 536/23, 1,2,4-TRIAZOLE NUCLEOSIDES, Joseph T. Witkowski, et al., Owner of Record: *ICN Pharmaceuticals, Inc., Pasadena, Calif.,* Attorney or Agent: Kay H. Boswell, Ex. Gp.: 124

3,803,691, Re. S.N. 790,596, Filed Apr. 25, 1977, Cl. 29/200 R, MEANS FOR MOUNTING A WORK ROLL ON A SHAFT, Karlheinz Geese, et al., Owner of Record: *Morgan Construction Company, Worcester, Mass.,* Attorney or Agent: Maurice E. Gauthier, et al., Ex. Gp.: 321

3,810,219, Re. S.N. 791,597, Filed Apr. 27, 1977, Cl. 356/206, FILM TRANSPORTING MECHANISM FOR STILL CAMERAS, Guenter Fauth, Owner of Record: *AGFA-Gevaert Aktiengesellschaft, Leverkusen, Germany,* Attorney or Agent: Michael J. Striker, et al., Ex. Gp.: 211

3,833,259, Re. S.N. 793,158, Filed May 2, 1977, Cl. 297/452, VEHICLE SEAT COMPRISING THREE FOAM LAYERS, Roscoe L. Pershing, Owner of Record: *Deere & Company, Moline, Ill.,* Attorney or Agent: H. V. Harsha, et al., Ex. Gp.: 355

3,859,961, Re. S.N. 803,321, Filed June 6, 1977, Cl. 119/15, ANIMAL PATH CONNECTING SYSTEM, Allan H. Willinger, et al., Owner of Record: *Metaframe Corporation, East Paterson, N.J.,* Attorney or Agent: Stephen L. King, et al., Ex. Gp.: 333

3,877,626, Re. S.N. 786,803, Filed Apr. 12, 1977, Cl. 225/96.5, APPARATUS FOR CUTTING A CONTINUOUS ELEMENT OF INDETERMINATE LENGTH INTO PREDETERMINED LENGTHS, William Hackemann, et al., Owner of Record: *Hasbro Development Corp., Pawtucket, R.I.,* Attorney or Agent: Harry G. Shapiro, et al., Ex. Gp.: 324

3,908,416, Re. S.N. 794,792, Filed May 9, 1977, Cl. 70/71, LATCHING DEVICE, Henry Heine, et al., Owner of Record: *Presta Lock Co., Division of Walter Kidde & Co., Inc., Elmwood Park, N.J.,* Attorney or Agent: Harry G. Shapiro, et al., Ex. Gp.: 351

3,915,854, Re. S.N. 790,290, Filed Apr. 25, 1977, Cl. 210/17, WASTEWATER TREATMENT, Wilbur N. Torpey, Owner of Record: *Autotrol Corporation, Milwaukee, Wis.,* Attorney or Agent: Thomas W. Ehrmann, et al., Ex. Gp.: 176

3,944,265, Re. S.N. 785,755, Filed Apr. 7, 1977, Cl. 285/419, EXHAUST SYSTEM CONNECTOR SEAL, John R. Hiemstra, et al., Owner of Record: *Donaldson Company, Inc., Minneapalis, Minn.,* Attorney or Agent: John D. Gould, et al., Ex. Gp.: 353

3,947,681, Re. S.N. 795,189, Filed May 9, 1977, Cl. 250/211 J, ELECTRON TUNNELING DEVICE, Ali Javan, Owner of Record: *Massachusetts Institute of Technology, Cambridge, Mass.,* Attorney or Agent: Arthur A. Smith, Jr., et al., Ex. Gp.: 252

3,983,341, Re. S.N. 790,123, Filed Apr. 22, 1977, Cl. 200/16 D, SIMPLIFIED SLIDE SWITCH, Ronald J. Stanish, Owner of Record: *AMF Incorporated, White Plains, N.Y.,* Attorney or Agent: George W. Price, et al., Ex. Gp.: 217

4,007,528, Re. S.N. 791,587, Filed Apr. 27, 1977, Cl. 32/26, HIGH SPEED BONE DRILL, John J. Shea, et al., Owner of Record: *Inventor,* Attorney or Agent: J. Warren Kinney, Jr., Ex. Gp.: 333

PATENT NOTICES

Certificates of Correction for the Week of June 28, 1977

D. 243,359	3,989,849	4,005,883	4,015,429
D. 243,659	3,989,922	4,006,119	4,015,435
3,411,732	3,992,904	4,006,250	4,015,872
3,580,879	3,993,062	4,006,408	4,015,955
3,604,984	3,993,756	4,006,430	4,016,078
3,687,878	3,994,771	4,006,446	4,016,188
3,767,813	3,997,457	4,007,127	4,016,471
3,809,599	3,997,769	4,007,191	4,016,527
3,816,363	3,997,784	4,007,304	4,016,703
3,817,668	3,998,315	4,007,351	4,016,923
3,819,352	3,998,631	4,008,050	4,017,232
3,830,670	3,998,699	4,008,133	4,017,292
3,843,624	3,999,516	4,008,231	4,017,351
3,869,942	3,999,518	4,008,281	4,017,408
3,878,110	3,999,907	4,008,285	4,017,459
3,880,313	4,000,058	4,009,009	4,017,572
3,883,251	4,000,680	4,009,826	4,017,581
3,896,055	4,000,727	4,010,147	4,017,622
3,896,675	4,000,764	4,010,299	4,017,638
3,906,154	4,001,239	4,010,700	4,017,710
3,910,006	4,001,445	4,010,713	4,017,745
3,926,436	4,001,650	4,010,746	4,017,750
3,927,212	4,001,803	4,010,867	4,017,777
3,933,928	4,001,888	4,010,960	4,017,810
3,944,842	4,002,636	4,011,005	4,017,903
3,950,355	4,002,663	4,011,067	4,017,965
3,956,497	4,002,671	4,011,268	4,018,047
3,956,984	4,002,922	4,011,382	4,018,122
3,959,479	4,003,059	4,012,251	4,018,712
3,961,375	4,003,397	4,012,452	3,018,724
3,962,433	4,003,800	4,012,578	4,018,764
3,962,570	4,003,810	4,012,586	4,019,110
3,965,168	4,004,179	4,012,596	4,019,386
3,967,425	4,004,287	4,012,732	4,019,489
3,968,502	4,004,371	4,012,870	4,019,655
3,976,781	4,004,423	4,013,928	4,019,684
3,978,189	4,004,909	4,014,516	4,019,980
3,979,589	4,005,008	4,014,704	4,020,095
3,980,759	4,005,074	4,014,889	4,020,115
3,981,103	4,005,291	4,014,909	4,020,277
3,981,342	4,005,511	4,014,910	
3,987,009	4,005,651	4,015,023	

National Technical Information Service

GOVERNMENT-OWNED INVENTIONS

Availability for Licensing

The inventions listed below are owned by the U.S. Government and are available for U.S. and possibly foreign licensing, in accordance with the policies of the agency sponsors.

Copies of the patents cited are available from the Commissioner of Patents and Trademarks, Washington, D.C. 20231, for $.50 each. Requests for copies of patents must include the patent number.

Copies of the patent applications, either paper copy (PC) or microfiche (MF), can be purchased at the prices cited from the National Technical Information Service (NTIS), Springfield, Va. 22161. Requests for copies of patent applications must include the patent application number. Claims are deleted from patent application copies sold to the public to avoid premature disclosure in the event of an interference before the Patent and Trademark Office. Claims and other technical data will usually be made available to serious prospective licensees by the agency which filed the case.

Requests for licensing information on a particular invention should be directed to the address cited for the agency-sponsor.

DOUGLAS J. CAMPION,
Patent Program Coordinator.

U.S. DEPARTMENT OF THE AIR FORCE
AF/JACP, Washington, D.C. 20314

Patent application 681,018, Two-Dimensional Drawing Board Manikin. Filed Apr. 28, 1976. PC $3.50/MF $3.00.

Patent application 681,084, Digitally Tuned Parametric Amplifier. Filed Apr. 28, 1976. PC $3.50/MF $3.00.

Patent application 681,871, Lubricant Composition. Filed Apr. 30, 1976. PC $3.50/MF $3.00.

Patent application 685,841, Method for the Fabrication of Gallium Arsenide Semiconductor Devices. Filed May 13, 1976. PC $3.50/MF $3.00.

Patent application 687,285, Digital Lock-Loop Frequency Offset Correction and Display Apparatus. Filed May 17, 1976. PC $3.50/MF $3.00.

Patent application 687,581, Self Synchronizing Convolver System. Filed May 18, 1976. P.C. $3.50/MF $3.00.

Patent 3,940,892, Self-Erecting Aircraft Structure. Filed May 23, 1974. Patented Mar. 2, 1976. Not available NTIS.

Patent 3,955,169, High Power Resistor. Filed Nov. 8, 1974. Patented May 4, 1976. Not available NTIS.

Patent 3,957,083, Pressure Sensitive Regulating Valve. Filed Jan. 27, 1975. Patented May 18, 1976. Not available NTIS.

Patent 3,960,814, Poly (Perfluoroalkylene Oxide) Oxadiazoles and Their Synthesis. Filed Feb. 27, 1975. Patented June 1, 1976. Not available NTIS.

Patent 3,963,490, Dye Sensitized Dichromated Gelatin Holographic Material. Filed Sept. 25, 1974. Patented June 15, 1976. Not available NTIS.

Patent 3,965,422, System Channel Distortion Weighting for Predetection Combiners. Filed July 26, 1974. Patented June 22, 1976. Not available NTIS.

U.S. DEPARTMENT OF THE NAVY
Assistant Chief for Patents, Office of Naval Research, Code 302, Arlington, Va. 22217

Patent application 587,475, Target Detection Method and Apparatus for Reducing Range-Smearing Error Caused by Relative Target Motion. Filed June 16, 1975. P.C. $3.50/MF $3.00.

Patent application 680,944, Constant Current Base-Drive Circuit. Filed Apr. 28, 1976. PC $3.50/MF $3.00.

Patent application 681,087, Electrical Conducting Phthalonitrile Polymers. Filed Apr. 28, 1976. PC $3.50/MF $3.00.

Patent application 681,317, Mid-Pulse Detector. Filed Apr. 29, 1976. PC $3.50/MF $3.00.

Patent application 682,693, Bending and Cutting Tool. Filed May 3, 1976. PC $3.50/MF $3.00.

Patent application 684,506, Redundant Oscillator for Clocking Signal Source. Filed May 7, 1976. PC $3.50/MF $3.00.

Patent application 685,877, Material for Magnetic Bubble Devices. Filed May 12, 1976. PC $3.50/MF $3.00.

Patent application 689,417, Low Loss Tuneable Filter. Filed May 24, 1976. PC $3.50/MF $3.00.

Patent 3,916,229, Induction Motor for Superconducting Synchronous/Asynchronous Motor. Filed June 3, 1975. Patented Oct. 28, 1975. Not available NTIS.

Patent 3,924,262, Aural Warning Apparatus. Filed Dec. 2, 1974. Patented Dec. 2, 1975. Not available NTIS.

Patent 3,934,204, AM/AGC Weighted Diversity Combiner/Selector. Filed Oct. 4, 1974. Patented Jan. 20, 1976. Not available NTIS.

Patent 3,937,407, Multiple Strap Shock Absorber. Filed May 24, 1974. Patented Feb. 10, 1976. Not available NTIS.

Patent 3,939,334, Closest Point of Approach Calculator. Filed Jan. 2, 1975. Patented Feb. 17, 1976. Not available NTIS.

Patent 3,940,289, Flash Melting Method for Producing New Impurity Distributions in Solids. Filed Feb. 3, 1975. Patented Feb. 24, 1976. Not available NTIS.

Patent 3,942,511, Sandwiched Structure for Production of Heat and Hydrogen Gas. Filed Sept. 19, 1974. Patented Mar. 9, 1976. Not available NTIS.

Patent 3,943,001, Silver Sulfide Cathode for Liquid Ammonia Batteries and Fuel Cells Containing Sulfur and H_2S in the Electrolyte. Filed July 5, 1973. Patented Mar. 9, 1976. Not available NTIS.

Patent 3,949,378, Computer Memory Addressing Employing Base and Index Registers. Filed Dec. 9, 1974. Patented Apr. 6, 1976. Not available NTIS.

Patent 3,952,186, Apparatus for the Generation of a Two-Dimensional Discrete Fourier Transform. Filed Feb. 10, 1975. Patented Apr. 20, 1976. Not available NTIS.

Patent 3,952,290, Read-Only Optical Memory System. Filed Nov. 11, 1974. Patented Apr. 20, 1976. Not available NTIS.

Patent 3,953,260, Gossypol, an Abundant, Low-Cost Iron Deactivator, Pot-Life Extender, and Processing Aid for HTPB Propellants. Filed May 23, 1975. Patented Apr. 27, 1976. Not available NTIS.

Patent 3,957,340, Electrooptical Amplitude Modulator. Filed Feb. 25, 1975. Patented May 18, 1976. Not available NTIS.

Patent 3,957,840, Preparation of a Ferrocenyl Compound. Filed July 15, 1974. Patented May 18, 1976. Not available NTIS.

Patent 3,958,564, EKG Contact. Filed May 9, 1975. Patented May 25, 1976. Not available NTIS.

Patent 3,963,198, Negative Air Cushion for Airship Ground Handling. Filed Apr. 2, 1975. Patented June 15, 1976. Not available NTIS.

U.S. DEPARTMENT OF THE ARMY
Office of Judge Advocate General, Patent Division,
Room 2C–455, Pentagon, Washington, D.C. 20310

Patent application 647,238. Inflatably Sealed Sterilizer Door. Filed Jan. 7, 1976. PC $3.50/MF $3.00.

Patent 3,940,474. Generation of Hydrogen. Filed Aug. 6, 1974. Patented Feb. 24, 1976. Not available NTIS.

U.S. DEPARTMENT OF THE AIR FORCE
AF/JACP, Washington, D.C. 20314

Patent application 692,720. Method for the Complete Dissolution of Mineral Samples. Filed June 4, 1976. PC $3.50/MF $3.00.

U.S. DEPARTMENT OF AGRICULTURE
Research Agreements and Patent Mgmt. Branch,
General Services Division, Federal Bldg.,
Agricultural Research Service, Hyattsville, Md. 20782

Patent application 705,230. Wood Impingement Dryer. Filed July 14, 1976. PC $3.50/MF $3.00.

U.S. ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
Assistant General Counsel for Patents,
Washington, D.C. 20545

Patent 3,904,273. Apodised Aperture Using Rotation of Plane of Polarization. Filed Mar. 18, 1974. Patented Sept. 9, 1975. Not available NTIS.

Patent 3,904,985. Explosive Laser. Filed Feb. 5, 1974. Patented Sept. 9, 1975. Not available NTIS.

U.S. DEPARTMENT OF THE INTERIOR
Branch of Patents, 18th and C Streets NW.,
Washington, D.C. 20240

Patent application 709,990. Production of Supported Raney-Type Catalysts by Reactive Diffusion. Filed July 30, 1976. PC $3.50/MF $3.00.

Patent application 709,999. Massive Catalytic Inserts. Filed July 30, 1976. PC $3.50/MF $3.00.

Patent 3,969,452. Method for Casting and Handling Ultra Thin Reverse Osmosis Membranes. Filed Aug. 8, 1974. Patented July 13, 1976. Not available NTIS.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Assistant General Counsel for Patent Matters, NASA
Code GP–2, Washington, D.C. 20546

Patent application 706,424. Heat Resistant Polymers of Oxidized Styrylphosphine. Filed July 19, 1976. PC $4/MF $3.00.

Patent application 706,425. Power Factor Control System for AC Induction Motors. Filed July 19, 1976. PC $3.50/MF $3.00.

Patent application 707,125. TV Fatigue Crack Monitoring System. Filed July 20, 1976. PC $3.50/MF $3.00.

Patent application 708,659. Liquid Metal Slip Ring. Filed July 26, 1976. PC $3.50/MF $3.00.

Patent application 708,771. Method of Producing Complex Aluminum Alloy Parts of High Temper, and Products Thereof. Filed July 26, 1976. PC $3.50/MF $3.00.

Patent application 708,795. Pressure Modulating Valve. Filed July 26, 1976. PC $3.50/MF $3.00.

Patent application 708,800. Wrist Joint Assembly. Filed July 26, 1976. PC $3.50/MF $3.00.

Patent application 708,951. Polymeric Foams From Cross-Linkable Poly-N-Arylenebenzimidazoles. Filed July 26, 1976. PC $3.50/MF $3.00.

Patent application 712,419. Flow Separation Detector. Filed Aug. 6, 1976. PC $3.50/MF $3.00.

Patent 3,961,997. Fabrication of Polycrystalline Solar Cells on Low-Cost Substrates. Patented June 8, 1976. Not available NTIS.

Patent 3,971,362. Miniature Ingestible Telemeter Devices To Measure Deep-Body Temperature. Patented July 27, 1976. Not available NTIS.

Patent 3,971,363. Myocardium Wall Thickness Transducer and Measuring Method. Patented July 27, 1976. Not available NTIS.

Patent 3,971,364. Catheter Tip Force Transducer for Cardiovascular Research. Patented July 27, 1976. Not available NTIS.

Patent 3,971,602. Thrust Bearing. Patented July 27, 1976. Not available NTIS.

Patent 3,971,697. Production of I–123. Patented July 27, 1976. Not available NTIS.

Patent 3,971,703. Method of Detecting and Counting Bacteria. Patented July 27, 1976. Not available NTIS.

Patent 3,971,847. Hydrogen Rich Gas Generator. Patented July 27, 1976. Not available NTIS.

Patent 3,971,930. Polarization Compensator for Optical Communications. Patented July 27, 1976. Not available NTIS.

Patent 3,972,008. Method and Apparatus for Generating Coherent Radiation in the Ultraviolet Region and Above by Use of Distributed Feedback. Patented July 27, 1976. Not available NTIS.

Patent 3,972,038. Accelerometer Telemetry System. Patented July 27, 1976. Not available NTIS.

Patent 3,972,651. Solar-Powered Pump. Patented Aug. 3, 1976. Not available NTIS.

Patent 3,972,727. Rechargeable Battery Which Combats Shape Change of the Zinc Anode. Patented Aug. 3, 1976. Not available NTIS.

U.S. DEPARTMENT OF THE ARMY
Office of Judge Advocate General, Patent Division,
Room 2C–455, Pentagon, Washington, D.C. 20310

Patent application 571,175. Discrete Control Correction for Synchronizating Digital Networks. Filed Apr. 24, 1975. PC $4/MF $3.00.

Patent application 650,658. Glass Compositions Having Fluorescence Properties. Filed Jan. 20, 1976. PC $3.50/MF $3.00.

Patent Re. 28,621. Fluid Angular Rate Sensor. Filed July 17, 1969. Reissued Nov. 25, 1975. Not available NTIS.

Patent Re. 28,622. Fluid Angular Rate Sensor. Filed July 17, 1969. Reissued Nov. 25, 1975. Not available NTIS.

Patent 3,931,730. Ramp Current Apparatus and Method of Sensitivity Testing. Filed Dec. 23, 1974. Patented Jan. 13, 1976. Not available NTIS.

Ptaent 3,932,745. Far Field Construction for Optical Fourier Transforms. Filed Sept. 30, 1974. Patented Jan. 13, 1976. Not available NTIS.

Patent 3,933,096. Gyroscopic Rate Switch. Filed Mar. 11, 1974. Patented Jan. 20, 1976. Not available NTIS.

Patent 3,936,902. Automatic Cleaning Apparatus for Fluid Filters. Filed July 11, 1974. Patented Feb. 10, 1976. Not available NTIS.

Patent 3,937,071. Fatigue Test Apparatus. Filed July 11, 1975. Patented Feb. 10, 1976. Not available NTIS.

Patent 3,938,378. Engine Compression Testing. Filed Aug. 26, 1974. Patented Feb. 17, 1976. Not available NTIS.

Patent 3,938,815. Chuck Having Jaw Counterbalance Mechanism. Filed Mar. 31, 1975. Patented Feb. 17, 1976. Not available NTIS.

Patent 3,942,486. Hydraulic Fan Drive System Speed Control. Filed Aug. 21, 1974. Patented Mar. 9, 1976. Not available NTIS.

Patent 3,943,741. Embossing Method. Filed Mar. 25, 1975. Patented Mar. 16, 1976. Not available NTIS.

Patent 3,943,776. Fluidic Acceleration Sensor. Filed Dec. 23, 1974. Patented Mar. 16, 1976. Not available NTIS.

U.S. DEPARTMENT OF THE AIR FORCE
AF/JACP, Washington, D.C. 20314

Patent application 696,341. Dual Pressure Sensing Safing and Arming Mechanism. Filed June 15, 1976. PC $3.50/MF $3.90.

Patent application 696,343. N-Channel Deep Depletion Mode Semiconductor Device. Filed June 15, 1976. PC $3.50/MF $3.00.

Patent application 696,344. Intershaft Balance Weight. Filed June 15, 1976. PC $3.50/MF $3.00.

Patent application 696,345. Turbine Band Cooling System. Filed June 15, 1976. PC $3.50/MF $3.00.

Patent application 696,963. Duct Pressure Actuated Nozzle. Filed June 17, 1976. PC $3.50/MF $3.00.

Patent application 698,984. Low Power Frequency Modulated Hybrid Fiber Optic Data Acquisition System. Filed June 23, 1976. PC $3.50/MF $3.00.

Patent application 699,929. Vortex Generators in Axial Flow Compressor. Filed June 25, 1976. PC $3.50/MF $3.00.

Patent 3,969,907. Cold Cylinder Assembly for Cryogenic Refrigerator. Filed Mar. 25, 1975. Patented July 20, 1976. Not available NTIS.

Patent 3,969,078. Direct Injection Liquid Propellant Gun System. Filed Dec. 20, 1974. Patented July 20, 1976. Not available NTIS.

Patent 3,970,005. Mass Focus Explosive Layered Bomblet. Filed Jan. 25, 1969. Patented July 20, 1976. Not available NTIS.

U.S. ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
Assistant General Counsel for Patents,
Washington, D.C. 20545

Patent 3,904,273. Apodised Aperture Using Rotation of Plane of Polarization. Filed Mar. 18, 1974. Patented Sept. 9, 1975. Not available NTIS.

Patent 3,904,985. Explosive Laser. Filed Feb. 5, 1974. Patented Sept. 9, 1975. Not available NTIS.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Assistant General Counsel for Patent Matters, NASA
Code GP–2, Washington, D.C. 20546

Patent application 712,419. Flow Separation Detector. Filed Aug. 6, 1976. PC $3.50/MF $3.00.

Patent 3,545,262. Method and Apparatus for Nondestructive Testing of Pressure Vessels. Patented Dec. 8, 1970. Not available NTIS.

Patent 3,955,941. Hydrogen Rich Gas Generator. Patented May 11, 1976. Not available NTIS.

Patent 3,971,256. Meteorid Capture Cell Construction. Patented July 27, 1976. Not available NTIS.

Patent 3,971,535. Oblique-Wing Supersonic Aircraft. Patented July 27, 1976. Not available NTIS.

Patent 3,972,008. Method and Apparatus for Generating Coherent Radiation in the Ultraviolet Region and Above by Use of Distributed Feedback. Patented July 27, 1976. Not available NTIS.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner
WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF JUNE 4, 1977

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Cass Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	8-2-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	5-4-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	5-17-76
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	2-9-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	8-2-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	1-19-76
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	5-24-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	6-4-76
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	12-27-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	5-3-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	10-25-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	6-7-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	11-12-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	7-6-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	7-12-76
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	11-3-76

Expiration of patents: The patents within the range of numbers indicated below expire during June 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,939,145 to 2,943,326, inclusive
Plant Patents..... Numbers 1,950 to 1,956, inclusive

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

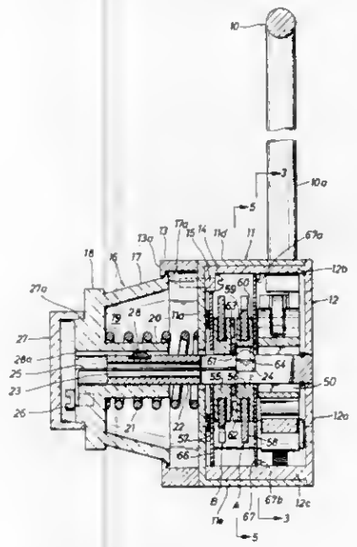
Re. 29,277
COMBINATION LOCK

Richard P. Harrington, and Russell J. Harrington, both of P.O. Box 474, Mountainburg, Ark. 72946

Original No. 3,729,962, dated May 1, 1973, Ser. No. 168,113, Aug. 2, 1971. Application for reissue Apr. 23, 1975, Ser. No. 570,557

Int. Cl.² E05B *37/04*

U.S. Cl. 70—25 **23 Claims**



1. A combination lock comprising

a shackle movable between a locked and an unlocked position;

locking means movable into and out of locking engagement with the shackle;

fence means for moving the locking means out of locking engagement with the shackle;

a plurality of tumbler wheels having peripheral gates to receive the fence means and permit the fence means to move the locking means out of locking engagement with the shackle;

a rotatable dial; and

means rotated by the dial and movable axially between a first position in driving engagement with the tumbler wheels for rotating the tumbler wheels to the desired position for the gates therein to receive the fence means, and a second position out of driving engagement with the tumbler wheels and in driving engagement with the fence means to move the fence means into the gates and move the locking means out of locking engagement with the shackle.

Re. 29,278
WASTE COMPACTING APPARATUS

Rudl Richard Vogel, Kitchener, Canada, assignor to Sargent Industries, Inc., Los Angeles, Calif.

Original No. 3,734,005, dated May 22, 1973, Ser. No. 219,032, Jan. 19, 1972. Application for reissue Apr. 25, 1975, Ser. No. 571,682

Int. Cl.² B30B *15/18, 15/22*

U.S. Cl. 100—52 **25 Claims**

9. Waste compactian apparatus, comprising

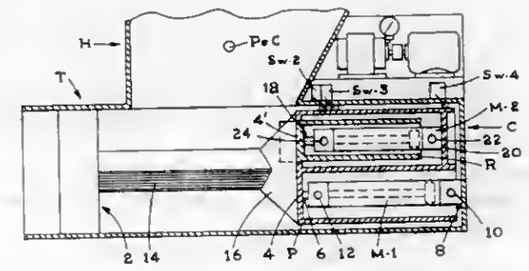
storage means for the waste,

a packer located in the storage means and movable in the storage means in a first direction to advance waste through the storage means and compact such waste during such advance of the waste through the storage means and movable in a direction opposite to the first direction;

a ram forming part of said packer and normally telescoped therein and retractably extendible therefrom in the first direction of movement of said packer, the ram having a leading end which forms a portion of that of the packer as a whole when the ram is telescoped therein;

motor means for reciprocating said packer through successive cycles of operation respectively comprising movement in the first direction for compacting the waste in the storage means and movement in the opposite direction, a standard cycle of operations commencing at a lead-off position with the ram telescoped as aforesaid and with the packer displaced from a position for compacting the waste in the storage means, and

recycling means responsive, upon mechanical stalling of the



packer in the movement of a standard cycle of operations involving compacting the waste in the storage means, to initiate successive cycles of operation for advancing the waste through the storage means, said successive cycles including the termination of said movement of the packer upon the mechanical stalling of the packer; then extension of the ram from the packer in the first direction; then telescopic retraction of the ram into the packer, with the leading end of the ram forming a portion of that of the packer as a whole; upon the completion of the retractible extension of the ram from the packer or upon the exertion of a particular pressure against the ram by the waste in the storage means before the completion of the retractible extension of the ram from the packer; and then movement of the packer, with the ram in the telescoped position in the packer, in the direction for compacting the waste in the storage means.

Re. 29,279
DEVICE FOR LAUNCHING AND DOUSING LIGHT SAILS SUCH AS SPINNAKERS

Jack W. Fretwell, Jr., Millwood, Va. 22646

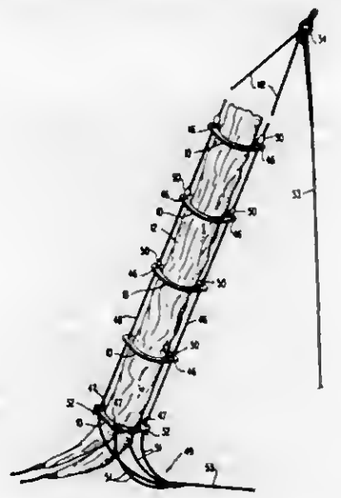
Original No. 3,861,343, dated Jan. 21, 1975, Ser. No. 430,562, Jan. 3, 1974. Application for reissue Nov. 20, 1975, Ser. No. 633,710

Int. Cl.² B63H *9/10*

U.S. Cl. 114—104 **14 Claims**

11. A device for launching a light sail connected to the mast of a sailing vessel comprising at least two rings spaced from each other along the length of said sail and encircling said sail in furled condition, each said ring being of a size which, when positioned on the sail in the furled condition, provides upwardly slideable engagement with the sail, the lowermost ring engaging the lower portions of the sail, the uppermost ring engaging the upper portions of the sail and any intermediate ring or rings engaging intermediate portions of the sail when in the furled condition to retain said sail in the furled condition and means for

raising the lowermost ring into engagement with the next ring above it to raise said next ring and successively to raise all rings



to slide said rings upwardly along said sail to disengage all rings from the sail and thereby launch the sail.

Re. 29,280

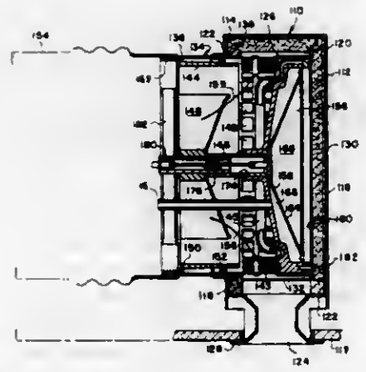
AIR DISTRIBUTION REGULATOR APPARATUS

John C. McNabney, La Crosse, Wis., assignor to The Trane Company, La Crosse, Wis.

Original No. 3,974,859, dated Aug. 17, 1976, Ser. No. 498,826, Aug. 19, 1974. Application for reissue Oct. 15, 1976, Ser. No. 732,938

Int. Cl.² F16K *31/126*

U.S. Cl. 137—625.37 **13 Claims**



1. Air distribution apparatus comprising: an air plenum chamber having front and back sheet metal walls spaced from each other; an air outlet opening from said chamber; a generally circular aperture in said sheet metal front wall, *defining an air inlet opening to said chamber*, that portion of said chamber opposite from said aperture being closed by said back wall; a generally cylindrical sleeve extending axially inward of said inlet opening and having an inner portion disposed inwardly of said inlet opening and an outer portion; retainer means for retaining said sleeve in said inlet opening; an air conveying duct separate from said front wall fastened to the radial outer surface of said outer portion of said sleeve to supply air thereto; means defining at least one first aperture at said inner portion of said sleeve extending radially outwardly communicating the interior of said sleeve with the interior of said plenum chamber; closure means at the end of said inner portion for blocking axial air flow; a generally cylindrically shaped valve disposed radially inwardly of said sleeve; mounting means for mounting said valve for axial movement within said sleeve between a first axial position [at least partially outside of said inlet opening and] substantially noncoextensive with said first aperture thereby opening said first aperture and a second axial position substantially coextensive with said first aperture thereby substantially closing said first aperture; and means for freely communicating the axial ends of said valve through said valve to thereby substantially balance the axial fluid forces exerted on said valve.

Re. 29,281

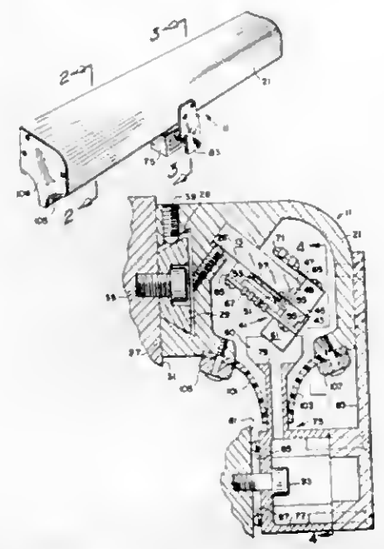
MEASURING APPARATUS USING THE MOIRE FRINGE CONCEPT OF MEASUREMENT

Richard H. Burns, Webster, and Helmut Welker, Jamestown, both of N.Y., assignors to Bausch & Lomb Incorporated, Rochester, N.Y.

Original No. 3,833,303, dated Sept. 3, 1974, Ser. No. 295,777, Oct. 6, 1972. Application for reissue May 19, 1975, Ser. No. 578,594

Int. Cl.² G01B *11/04*

U.S. Cl. 356—169 **11 Claims**



1. Apparatus for measuring displacement between first and second relatively movable members, said apparatus comprising:

a. a scale securable to said first member, said scale including first and second adjacent surfaces, said first scale surface being angled with respect to said second scale surface, one of said first and second scale surfaces having a given line frequency;

b. transducer means including a carriage and an index grating, said carriage including first and second adjacent scale engaging surfaces, said first scale engaging surface being angled with respect to said second scale engaging surface at substantially the same angle that said first scale surface is angled with respect to said second scale surface, said index grating being held by said carriage parallel to and spaced from [said] one of said first and second scale engaging surfaces;

c. support means securable to said second member; and

d. means for continuously maintaining said first scale engaging surface in engagement with said first scale surface and said second scale engaging surface in engagement with said second scale surface, said means for continuously maintaining being secured to one of said transducer means and said support means, said means for continuously maintaining being connected to the other of said transducer means and said support means by means which permit at least limited rotational movement in every direction, said means for continuously maintaining being rigid in a direction parallel to the direction of relative movement between said first and second members and flexible in directions transverse to said direction of movement, whereby in operation when said first member moves relative to said second member the relative spacing and alignment between said index grating and said one of said first and second scale surfaces remains substantially constant.

Re. 29,282

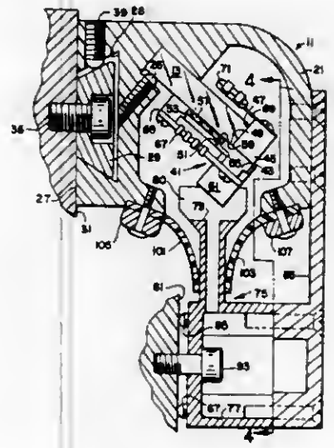
MEASURING APPARATUS USING THE MOIRE FRINGE CONCEPT OF MEASUREMENT

Richard H. Burns, Webster; Donald R. Hosack, and Helmut Welker, both of Jamestown, all of N.Y., assignors to Bausch & Lomb Incorporated, Rochester, N.Y.

Original No. 3,833,303, dated Sept. 3, 1974, Ser. No. 295,777, Oct. 6, 1972. Application for reissue May 19, 1975, Ser. No. 578,595

Int. Cl.² G01B *11/04*

U.S. Cl. 356—169 **1 Claim**



14. *Apparatus for measuring displacement between first and second relatively movable members, said apparatus comprising:*

a. a dovetail mounting member securable to said first member;

b. a spur, said spar being provided with a dovetail mounting means which cooperates with said dovetail mounting member to secure said spar to said first member;

c. a scale secured to said spar, said scale including first and second adjacent surfaces, said first scale surface being angled with respect to said second scale surface, one of said first and second scale surfaces having a given line frequency;

d. transducer means including a carriage and an index grating, said carriage including first and second adjacent scale engaging surfaces, said first scale engaging surface being angled with respect to said second scale engaging surface at substantially the same angle that said first scale surface is angled with respect to said second scale surface, said index grating being held by said carriage parallel to and spaced from one of said first and second scale engaging surfaces;

e. support means securable to said second member; and

f. means for continuously maintaining said first scale engaging surface in engagement with said first scale surface and said second scale engaging surface in engagement with said second scale surface, said means for continuously maintaining being secured to one of said transducer means and said support means, said means for continuously maintaining being connected to the other of said transducer means and said support means by means which permit at least limited rotational movement in every direction, said means for continuously maintaining being rigid in a direction parallel to the direction of relative movement between said first and second members and flexible in directions transverse to said direction of movement, whereby in operation when said first member moves relative to said second member the relative spacing and alignment between said index grating and said one of said first and second scale surfaces remains substantially constant.

Re. 29,283

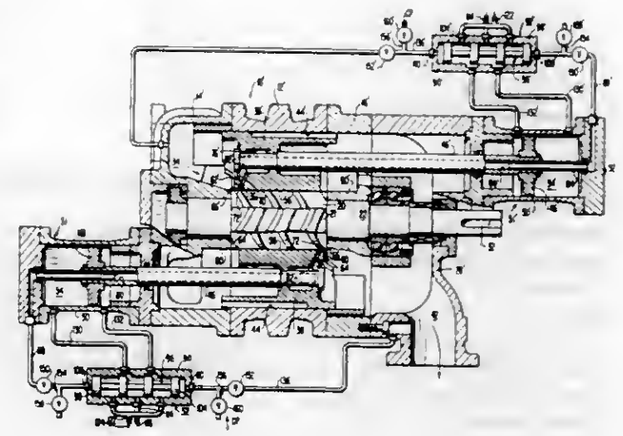
UNDERCOMPRESSION AND OVERCOMPRESSION FREE HELICAL SCREW ROTARY COMPRESSOR

David N. Shaw, Unionville, Conn., assignor to Dunham-Bush, Inc., West Hartford, Conn.

Original No. 3,936,239, dated Feb. 3, 1976, Ser. No. 492,084, July 26, 1974. Application for reissue June 2, 1976, Ser. No. 692,077

Int. Cl.² F04B *49/02*

U.S. Cl. 417—282 **16 Claims**



1. In a positive displacement rotary screw compressor of the type wherein a casing is provided with a barrel portion defined by intersecting bores with coplanar axes located between axially spaced end walls and having low pressure and high pressure ports in communication with said bores at opposite ends of said barrel portion, and helical screw rotors having grooves and lands mounted for rotation within respective bores with the lands and grooves of respective rotors intermeshed, an axially extending recess is provided within the barrel portion of the casing in open communication with the bores, and a slide valve member is axially slidable in the recess with the inner face of the slide valve member being complementary to the envelope of that portion of the bores of the casing structure confronted by the opening of the recess communicating with the bore portion of the casing structure, with the valve member in sealing relation with confronting rotors, the discharge port being located within the barrel portion of the casing structure with the valve member being movable between extreme positions, in one of which, the discharge port is fully open, and the other in which, the discharge port is closed, and wherein the valve member is of sufficient length to cover the entire remaining length of the confronting portion of the rotor structure throughout the range of movement of the valve member between its extreme positions, the improvement comprising:

means for sensing the pressure of the working fluid within a closed thread closely adjacent to the end of the slide valve member closing off the discharge port to the closed thread,

means for sensing the compressor discharge pressure of the working fluid at the discharge port, [and

means for controlling shifting of said slide valve member axially to equalize these pressures]

means for comparing said two pressures, and

means responsive to said pressure comparing means for shifting said slide valve member in a direction tending to equalize said pressures, to prevent undercompression or overcompression of the compressor working fluid within the closed thread, prior to discharge.

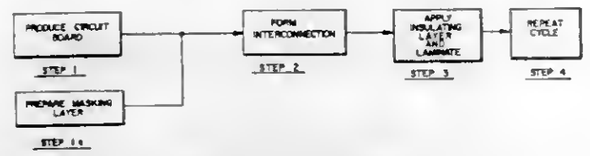
Re. 29,284
PROCESS FOR FORMING INTERCONNECTIONS IN A MULTILAYER CIRCUIT BOARD

Joseph M. Shaheen, La Habra, and Leo J. Quintana, Anaheim, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Original No. 3,464,855, dated Sept. 2, 1969, Ser. No. 577,438, Sept. 6, 1966. Application for reissue Nov. 6, 1970, Ser. No. 87,512

Int. Cl.² C25D *5/02*

U.S. Cl. 204—15 **3 Claims**



3. A method of fabricating an individual layer of a multilayer printed circuit board, comprising the steps of:

farming a printed circuit on an insulator substrate;

coating said printed circuit with a thin conductive layer of material;

conforming an apertured masking material to said conductive layer on said printed circuit on said insulator substrate;

said masking material including apertures therein in the desired pattern of at least one interlayer connector;

electroforming said connector using said conductive layer as an electrical path in the electroforming operation;

removing the masking material and the resultant exposed material of the conductive layer; and

insulating the printed circuit and the interlayer connector, leaving an exposed surface at the end of said interlayer connector.

Re. 29,285
METHOD FOR CONCOMITANT PARTICULATE DIAMOND DEPOSITION IN ELECTROLESS PLATING, AND THE PRODUCT THEREOF

Theodore Peter Christini, Dushore, Pa.; Albert Lawrence Eustice, Lewiston, N.Y., and Arthur Hughes Graham, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Original No. 3,936,577, dated Feb. 3, 1976, Ser. No. 341,529, Mar. 15, 1973. Continuation-in-part of Ser. No. 208,233, Dec. 15, 1971, abandoned. Application for reissue June 7, 1976, Ser. No. 694,047

Int. Cl.² B32B *15/00*; **B05D** *3/10*

U.S. Cl. 428—426 **6 Claims**

1. A coated article formed by electroless plating comprising a co-deposited uniform dispersion of diamond particles secured by substantial nucleation within a metallic matrix comprising one of the group consisting of: (1) an alloy including a metal of the sub-group made up of nickel, cobalt and mixtures thereof with one of the elements phosphorus, boron and mixtures thereof and (2) elemental copper, deposited on a supporting substrate consisting of polymer, metal, ceramic or glass.

Re. 29,286
POWER AMPLIFIER WITH A BOOTSTRAPPED DRIVER STAGE

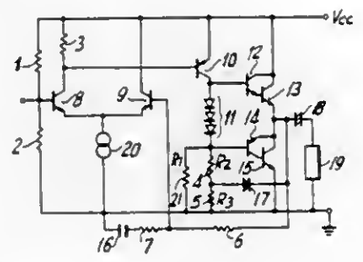
Hirokazu Fukaya, and Naotoshi Higashiyama, both of Tokyo, Japan, assignors to Nippon Electric Company, Limited, Tokyo, Japan

Original No. 3,904,974, dated Sept. 9, 1975, Ser. No. 493,652, July 30, 1974. Application for reissue Oct. 4, 1976, Ser. No. 729,285

Claims priority, application Japan, Aug. 2, 1973, 48-87349

Int. Cl.² H03F *1/38*

U.S. Cl. 330—26 **3 Claims**



1. A power amplifier comprising:

a driver circuit comprising an input terminal, an output terminal, signal amplifying means and a load element formed by two separate resistors, a first end of the first resistor being connected to said signal amplifying means and a second end of said first resistor being connected to said second resistor;

an output circuit comprising at least one input terminal connected directly to the output terminal of said driver circuit, output transistors connected in a single-ended push-pull configuration, and an output terminal;

feedback means for supplying a feedback signal from the output terminal of said output circuit to said second end of said first resistor; and

a third resistor connected directly to and in parallel with said load element.

PLANT PATENTS

GRANTED JUNE 28, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,065
KALANCHOE PLANT

Lawrence T. Irwin, P.O. Box 657, Canyon, Tex. 79015

Filed June 7, 1976, Ser. No. 693,880

Int. Cl.² A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct variety of Kalanchoe Plant, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of tall, upright, vigorous growth; earliness of flower; profusion of flowers carried on a sturdy stem well above the foliage; medium to large size flexible foliage of fern green color; the unique mandarin red color of its blooms together with the adaptability of photoperiod manipulation for year round flowering.

4,066
KALANCHOE PLANT

Lawrence T. Irwin, P.O. Box 657, Canyon, Tex. 79015

Filed June 7, 1976, Ser. No. 693,881

Int. Cl.² A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct variety of Kalanchoe plant, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of its orange red color with a distinctive yellow eye; medium large sized flexible foliage of fern green color; its tall habit of from 16 inches to 20 inches in height; the profusion of flowers carried on sturdy stems 6 inches above the foliage; and its adaptability to year round flowering by photoperiod manipulation.

4,067
KALANCHOE PLANT

Lawrence T. Irwin, P.O. Box 657, Canyon, Tex. 79015

Filed June 7, 1976, Ser. No. 693,882

Int. Cl.² A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct variety of Kalanchoe plant, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of tall, vigorous growth habit of from 16 inches to 20 inches in height; its medium large size flexible foliage of fern green color; the profusion of unique crimson color flowers carried on sturdy stems 6 inches above the foliage; the absence of an eye in the flowers; its vigorous free breaking habit; and its adaptability to year round flowering by photoperiod manipulation producing a large pot plant from a single cutting.

4,068
KALANCHOE PLANT

Lawrence T. Irwin, P. O. Box 657, Canyon, Tex. 79015

Filed June 7, 1976, Ser. No. 693,883

Int. Cl.² A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct variety of Kalanchoe plant, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of a tall, upright, vigorous habit, growing 16 inches to 20 inches in height; the very large flowers of about 2 cm diameter; the unique scarlet color of the flowers with a definite yellow eye (4); profusion of flowers carried on sturdy stems 4 inches to 6 inches above the foliage; the medium large size flexible foliage of fern green color; and the adaptability to year round flowering with photoperiod manipulation.

PATENTS

GRANTED JUNE 28, 1977

ERRATA

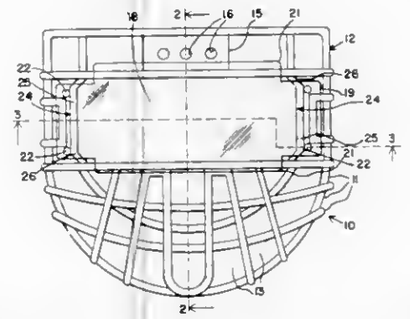
For CLASS	See PATENT NO.
250–237 S	4,031,595
034–235	4,031,631
072–367	4,031,745
084–001.03	4,031,786
116–034 R	4,031,845
239–684	4,031,929
214–767	4,032,015
228–200	4,032,033
303–116	4,032,200
046–202	4,032,295
428–567	4,032,301
075–240	4,032,302
260–635 D	4,032,458
235–078 R	4,032,754
361–398	4,032,819
361–333	4,032,820
361–334	4,032,821
361–205	4,032,822
361–194	4,032,823
363–25	4,032,830
363–002	4,032,831
363–043	4,032,832
363–078	4,032,833
363–128	4,032,834
364–200	4,032,895
364–200	4,032,896
364–900	4,032,897
364–200	4,032,898
364–200	4,032,899
364–200	4,032,900
340–365 R	4,032,931
364–900	4,032,946
323–044 F	4,032,959

PATENTS

GRANTED JUNE 28, 1977

GENERAL AND MECHANICAL

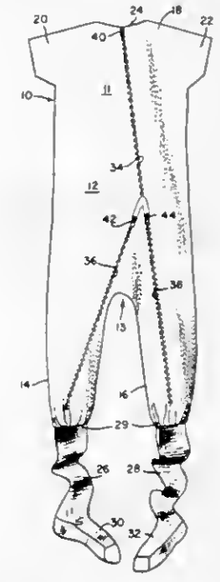
4,031,564
HOCKEY MASK
Theodore W. Wood, 17 Ash St., Sherborn, Mass. 01770
Filed June 24, 1976, Ser. No. 699,268
Int. Cl.² A41D *13/00*
U.S. Cl. 2—9 **11 Claims**



1. A hockey mask comprising:
a grille work for substantially covering the face of a hockey player, said grille work defining a plurality of apertures sufficiently small to prevent passage of a hockey stick and a larger sized, elongated, curved opening positioned to extend adjacently to the player's eyes and to substantially encompass the player's field of vision;
fastening means for securing said grille work to a hockey helmet;
holding means located at each end of said elongated opening;
a curved, flexible, transparent shield with inner surface edge portions bearing against said grille work so as to cover said opening and having ends retained by said holding means, said shield formed from a high impact resistant material and being retained by said holding means in a state of flex corresponding to its normal curvature; and
securing means on said ends of said shield for restraining movement thereof out of said holding means.

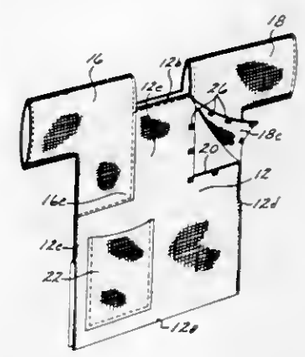
4,031,565
UNITARY BURIAL UNDERGARMENT
John H. Coates, Rte. 3, Box 572, Saluda, S.C. 29138
Filed Feb. 23, 1976, Ser. No. 660,275
Int. Cl.² A41B *9/00*
U.S. Cl. 2—78 R **5 Claims**

1. A unitary burial undergarment comprising upper and lower torso sections, leg sections, and feet sections joined together in an integral garment assembly adapted to cover the full body of the deceased at least below the shoulders, at least said feet sections being knitted, said torso section having a neck opening therein, the back side of said torso section having an upper slit opening therein extending from said neck opening to the waist level of said torso section, the back side of said lower torso section having two lower slit openings diverging from a common termination communicating with the lower end of said upper slit opening in generally inverted Y-shaped fashion across the respective buttocks into at least the upper ends of said leg sections to points at least adjacent



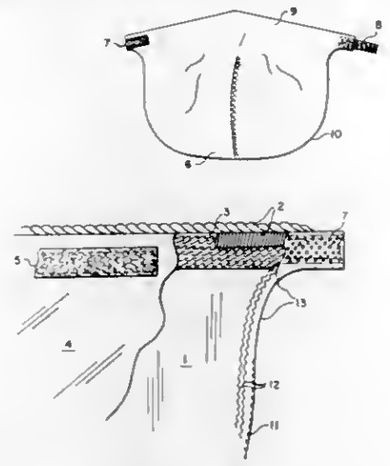
to knitted sections; and closure means to close the respective slit openings.

4,031,566
NURSING GARMENT
Marilyn M. Johnson, 790 Griffith Way, Laguna Beach, Calif. 92651
Filed July 21, 1976, Ser. No. 707,450
Int. Cl.² A41D *1/20*
U.S. Cl. 2—104 **5 Claims**



1. A nursing garment for enabling a mother to nurse a baby comprising in combination,
generally rectangular front and rear garment panels of width approximating the width of the mother's torso, said front panel being formed with a generally right angle cutout in each of two corners providing breast-exposing openings in said front panel,
and a pair of sleeve/shoulder members each of which is connected to and between said front and rear panels and has a generally right angle portion which overlays the corresponding breast-exposing opening in said front panel.

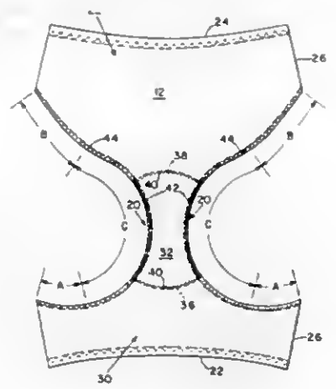
4,031,567
HEADDRESS
Jane S. Planck, 939 26th St. NW., Washington, D.C. 20037
Filed Feb. 26, 1976, Ser. No. 661,680
Int. Cl.² A42B 1/04
U.S. Cl. 2—204 3 Claims



1. A headdress comprising:
A. a head covering fabric, configured as a semi-circle and having:
   i. a leading edge diameter as a headband with fastening portions extending laterally on each side of said semi-circle, said headband at its median portion being positioned over the forehead and adjacent the ears of the wearer with said fastening portions over lapping and being secured to each other behind the head at the nape of the neck; and
   ii. a semi-circular trailing edge defining an arcuate body portion contiguous with said headband and adapted for covering the head and neck of the wearer in which a wedge-like segment is removed from the center of said semi-circle from its trailing edge inwardly and the opposed sides exposed by said wedge are joined by stitching as a dart extending from the nape of the neck towards the dome of the wearer's head;
B. complementary fastening means secured to said fastening portions, so as to secure said portions to each other at a point of overlap adjacent the nape of the wearer's neck; and
C. at least one frictional engagement pad supported on the underside of said headband, so as to engage a side of the wearer's head.

4,031,568
LEGLESS PANTY
Bernice Huff, Hamilton, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio
Filed May 30, 1975, Ser. No. 582,491
Int. Cl.² A41B 9/04
U.S. Cl. 2—406 8 Claims

1. In a legless women's panty having a hip encircling portion for extending completely around a wearer's torso and provided with leg openings with the edges thereof being elasticized and curvilinearly extending along the wearer's groin and generally outwardly over the wearer's hips and completely around the outside of the wearer's thighs, the improvement comprising means for differentially tailoring the elasticity along the leg opening edges, pulling the portion of the leg opening edges adjacent the groin outwardly against the inside of the wearer's legs and pulling the portion of the leg opening edges extending across the outside of the wearer's legs inwardly towards the wearer's groin, said means gathering said leg opening edges generally only along the groin to thereby provide a smooth outside appearance, reduce bunching under the buttocks and riding up thereon together with self adjustable easing of the leg openings outwardly of the groin to accommodate thighs of differing sizes, wherein said means comprises elastic band means extending substantially entirely along each of the leg opening edges secured thereto in a manner to gather said leg opening edges at least along the portions thereof lying along the wearer's groin while leaving

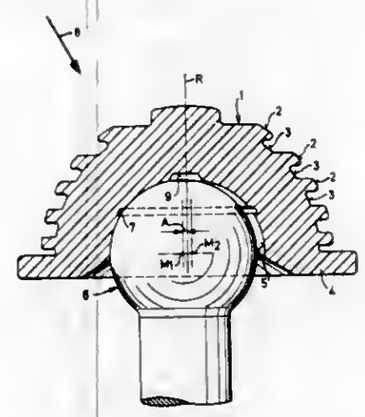


the edge portions which in use overlies the hips and at least the outside of the wearer's legs smooth and ungathered, and elastically providing, during use, a directed pull of the leg opening edges extending about the wearer's legs towards the groin from both the front and the rear directions.

4,031,569
NASAL SEPTUM PLUG
H. John Jacob, 8344 Hendrie, Huntington Woods, Mich. 48070
Filed Mar. 15, 1976, Ser. No. 666,577
Int. Cl.² A61F 1/00, 1/24
U.S. Cl. 3—1 5 Claims

1. In a device for plugging a hole formed through a nasal septum, the improvement comprising:
a. a central portion having opposed ends, the central portion being sized and shaped for disposition within the hole,
b. a disc of greater diameter than the central portion formed on each end of the central portion, and
wherein the device is a unitary, solid member which is formed from a chemically inert, non-toxic, non-irritating flexible material.

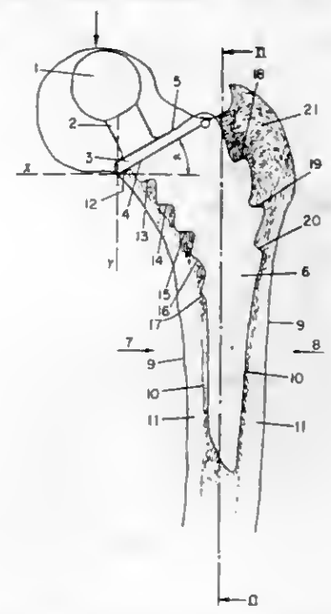
4,031,570
PROSTHETIC ACETABULUM
Otto Frey, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland
Filed May 27, 1976, Ser. No. 690,717
Claims priority, application Switzerland, June 18, 1975, 7898/75
Int. Cl.² A61F 1/24
U.S. Cl. 3—1.912 3 Claims



1. A hip joint endoprosthesis comprising
a joint head with a spherical surface; and
a prosthetic acetabulum having a concave articular surface receiving said joint head and at least one groove within said surface extending peripherally of said surface and said joint head, said articular surface being a surface of rotation having as a generatrix a quadrant arc with a radius corresponding to the radius of said joint head spherical surface but a center of curvature spaced a predetermined distance from the rotational axis around which said quadrant arc is rotated for generating said surface of rotation of said acetabulum.

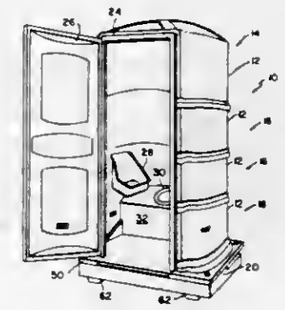
4,031,571
HIP ENDOPROSTHESIS WITH STEPPED LOAD-TRANSFERRING SURFACES
Günther Helmke, Mannheim, and Peter Griss, Plankstadt, both of Germany, assignors to Friedrichsfeld GmbH Steinzeug-und Kunststoffwerke, Postfach, Germany
Filed Dec. 24, 1975, Ser. No. 644,332
Claims priority, application Germany, Dec. 24, 1974, 2461339; Apr. 22, 1975, 2517702
Int. Cl.² A61F 1/24
U.S. Cl. 3—1.913 15 Claims

1. In a thigh portion of a cement-free implant of a hip joint total endoprosthesis, comprising a femur shaft, a head mounted on a neck attached to the upper end of the shaft, and a load supporting contact surface surrounding said neck, said implant having a biologically benign surface, said shaft being provided on its inner and outer sides with a series of outwardly projecting, transverse stepped, load-transferring flat surfaces, each of said surfaces being in a plane perpendicular to the longitudinal direction of orientation of the spicules of the



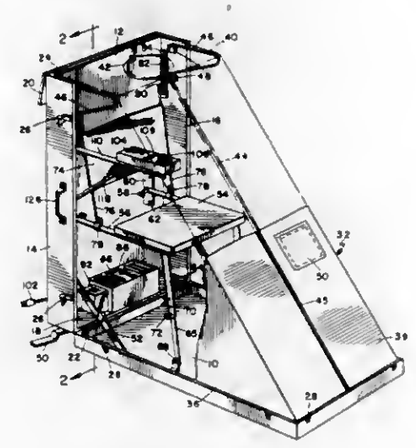
spongy tissue in the femur adapted to be adjacent to each of said surfaces.

4,031,572
CHEMICAL TOILET CABANA SHELL SECTION
George W. Harding, Warren, Mich., assignor to Poly San Corporation, Sarasota, Fla.
Division of Ser. No. 493,256, July 31, 1974, which is a division of Ser. No. 378,316, July 11, 1973, Pat. No. 3,835,480. This application Dec. 8, 1975, Ser. No. 638,815
Int. Cl.² A47K 11/02; A61L 11/00; E04H 14/00
U.S. Cl. 4—111 5 Claims



1. A shell adapted to be used as a top, intermediate, or bottom member of a portable enclosure, and molded of a rigid plastic-like, thermally stable material, comprising:
a dome-like roof;
a side wall extending downwardly from said roof and terminating in a bell-like enlarged lower end; and
a base flange extending outwardly from the enlarged lower end of said side wall;
whereby said dome-like roof may be removed to form a base member of said enclosure, said base flange may be removed to form a top member of said enclosure, and both said dome-like roof and said base flange may be removed to form an intermediate member of said enclosure.

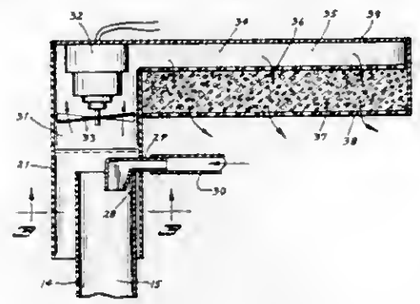
4,031,573
PORTABLE SAUNA
Paul Ira Romanoff, 4602 Collwood Lane, San Diego, Calif. 92115
Filed Sept. 17, 1976, Ser. No. 724,750
Int. Cl.² A61H 33/06
U.S. Cl. 4—164 **10 Claims**



1. A collapsible portable hot air and steam bath apparatus, said apparatus comprising:
a substantially rigid box-like body portion having a deep section and a shallow section hinged together along the bottom, said deep section extending vertically for defining a rigid back wall and a portion of two side walls, said shallow section folding downward for defining a floor;
a flexible cover defined by a pair of generally triangular shaped side panels connected along the base thereof to said floor, a sloping rectangular front panel connected at the lower edge thereof to said floor and extending upward to a horizontally extending rectangular top panel connected to the upper end of the back wall and said side walls so that said cover extends from the edges of said section over the opening thereof for defining an enclosable chamber;
a pair of support arms pivotally mounted on the inside of said deep section and extendable outward for supporting said top portion of said flexible cover outward in a horizontal plane;
a neck receiving opening formed in said top portion of said cover;
an elongated opening formed in said front panel extending from said neck opening downward to said floor;
a foldable seat pivotally connected to said back wall and to said floor and opening to a supporting position upon opening said floor panel to the horizontal position;
heating means mounted in said chamber; and
control means for controlling said heating means pivotally mounted to said deep section for pivotally extending outwardly to a portion above and to one side of said seat for ease of access by an occupant of said chamber.

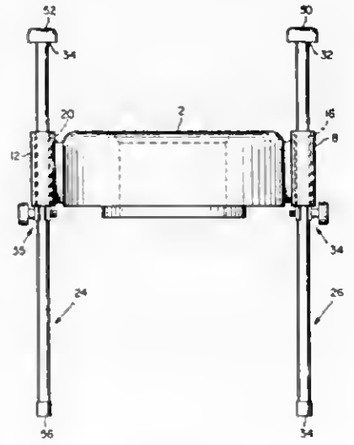
4,031,574
TIMED VENTILATOR FOR TOILETS
Frank D. Werner, Box SR9, Jackson, Wyo. 83001
Filed June 17, 1976, Ser. No. 697,139
Int. Cl.² A47K 3/22; E03D 9/04, 13/00
U.S. Cl. 4—213 **8 Claims**

1. A ventilator for toilets having a water supply tank and an overlap pipe in the tank open to the toilet bowl comprising a housing supported on said overflow pipe on the interior of said tank, said housing including wall means defining a passageway open to said overflow pipe, a filter compartment open to said passageway and having an air discharge side opening to the interior of said tank, fan means in said passageway for causing air flow from the overflow pipe through said passageway and said filter compartment, a power supply and control for said fan mounted on said tank and including a control member on the exterior of said tank for manual operation, said control comprising a manually depressable button completing a circuit to said fan and pneumatic delay means to resist return of said circuit to open position said pneumatic delay means



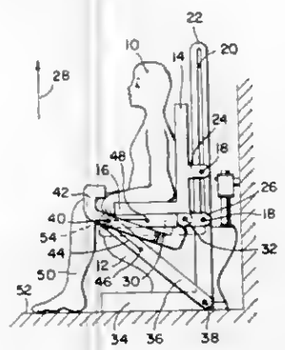
comprising a chamber coupled to said button whereby depressing said button changes the size of said chamber, means tending to return the chamber to its original size, and means to permit air to bleed relative to said chamber at a controlled rate.

4,031,575
ADJUSTABLY MOUNTED SUPERIMPOSABLE TOILET SEAT
Kurt Landsberger, 103 Harrison St., Verona, N.J. 07044
Filed May 24, 1976, Ser. No. 689,130
Int. Cl.² A47K 13/06, 13/28
U.S. Cl. 4—239 **7 Claims**



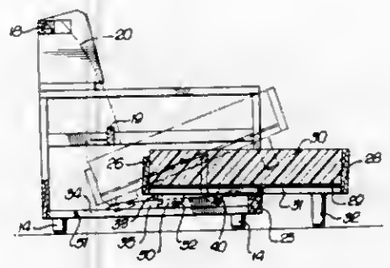
1. An adjustably mounted toilet seat of the type superimposable on a conventional toilet seat, comprising:
a superimposable toilet seat;
a pair of frame members, each of which extends along an opposite side of the superimposable toilet seat;
each of the frame members carrying front and rear corner members;
a pair of vertically disposed rails, each of which has a pair of parallel legs, one of the legs of each of the rails being slidably supported by one of the front and rear corner members of a corresponding frame member and the other leg being slidably supported by the other of the front and rear corner members, the superimposable toilet seat being thereupon longitudinally adjustable along the rails; and
means associated with the rail legs for retaining the superimposable toilet seat in a predetermined longitudinally adjusted position relative to the height of the conventional toilet seat and including a pair of bars, each of which extends between the legs of a corresponding rail for supporting the superimposable seat, a pair of clamps associated with each of the bars, each of the clamps cooperating with a bar end for clamping the end to a corresponding rail leg, means arranged with the clamps and bar ends and loosened for longitudinally displacing the bars along the legs to the adjusted position relative to the height of the conventional toilet seat, and said means tightened for retaining the bars and superimposable toilet seat supported thereby in the adjusted position.

4,031,576
INVALID TOILET AID
Helen Charlotte Epstein, 1193 S. 19th East, Salt Lake City, Utah 84108
Filed May 24, 1976, Ser. No. 689,550
Int. Cl.² A47K 13/10
U.S. Cl. 4—251 **8 Claims**



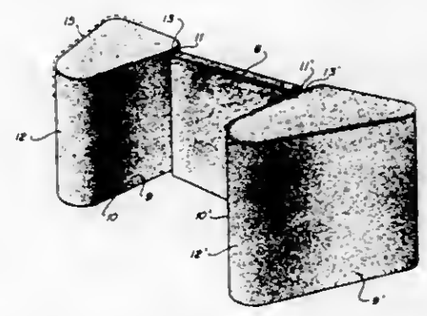
1. An invalid toilet aid comprising a commode seat, a frame, a backrest, at least one arm rest, said at least one arm rest fixedly secured to said backrest, hingeing means for pivotably securing a rear portion of said commode seat to said backrest, spring bias means for urging said at least one arm rest into an uppermost position, said spring bias means for resisting said at least one arm rest being disposed in a lowermost position, said commode seat being disposed in a near vertical position when said at least one arm rest is disposed in said uppermost position, said commode seat being disposed in a horizontal position when said at least one arm rest is disposed in said lowermost position, said frame providing sliding vertical support for said backrest.

4,031,577
CONVERTIBLE SOFA BED
Vincent C. Kanowsky, Newport Beach, and Lloyd A. Blanc, Downey, both of Calif., assignors to Allied Upholstery Mfg. Inc., Lynwood, Calif.
Filed Jan. 5, 1976, Ser. No. 646,625
Int. Cl.² A47C 17/14
U.S. Cl. 5—17 **8 Claims**



1. In a convertible sofa bed, the combination of:
a frame having a base and a back, said base having a front support edge and said back having an overhanging edge;
a seat movable between
a retracted sofa position resting on said frame, with a sloping upper surface positioned partially under said overhanging edge and having front support means adjacent the front edge of said seat and positioned behind said base front support edge thereby concealing said seat front support means behind said base front support edge, and
an extended bed position with said front support means in front of said base front support edge for resting on the floor supporting the seat and having rear support means adjacent the rear edge of said seat,
said base including guide means for said seat rear support means for positioning said seat horizontally; and
a link at each end of said seat pivotally connected to said seat and to said frame.

4,031,578
CONTOURED TRAVEL PILLOW
Doris Sweeney, 512 A Taylor Ave., Warrington, Pa. 18976, and Mary Ellen Lee, 7951 Anita Drive, Philadelphia, Pa. 19111
Filed May 20, 1976, Ser. No. 688,550
Int. Cl.² A47G 9/00; A61G 7/06
U.S. Cl. 5—337 **8 Claims**

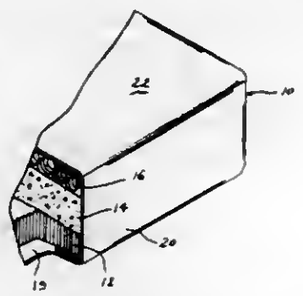


1. A travel pillow comprised of three discrete and resilient sections:
1. a central section which serves as a spacer and supports the back of the user's head and
2. a matching pair of lateral head sections located on opposite sides of said spacer (1) to form a generally H-shaped configuration therewith;
and a snug-fitting cover which accommodates all three sections and maintains them in their generally H-shaped configuration;
both of the head sections (2) being of greater thickness than spacer (1) and possessing a tapered appearance which begins with a flat and generally wide back-wall and a narrower, rounded front portion;
said back-wall being disposed at an angle which slopes toward the central section so that the backward pressure of the user's head on said spacer (1) will cause the said back-walls to form an essentially parallel plane and draw the inner side-walls toward one another, for contact with the user's head.

4,031,579
AIRCRAFT SEAT CUSHION
Thomas A. Larned, Costa Mesa, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.
Filed Dec. 19, 1975, Ser. No. 642,525
Int. Cl.² A47C 27/00
U.S. Cl. 5—355 **2 Claims**

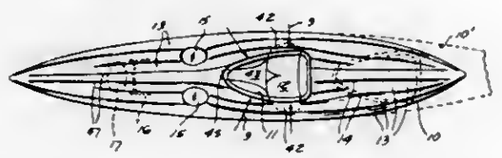
1. A cushion adapted for use in an aircraft seat used by crewmen, comprising: a close cell plastic layer of shock absorbent material; an elastic flow cushioning layer positioned over the shock absorbent layer; a flame resistant cover surrounding

the shock absorbent layer and the cushioning layer; a ventilation layer positioned between the cushioning layer and the



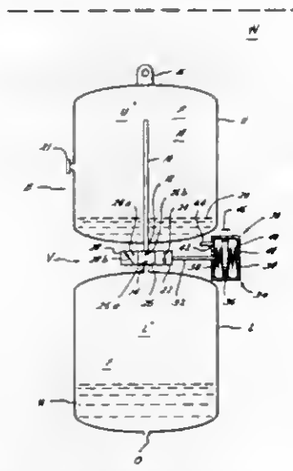
cover; the side of said cover adjacent the ventilation material having high porosity and being mositure absorbent.

4,031,580
INFLATABLE BOAT
Hennlag Neumann, Germering, and Fritz Federer, Turkenfeld, both of Germany, assignors to Metzeler Kautschuk AG, Munich, Germany
Filed Apr. 8, 1976, Ser. No. 675,056
Int. Cl.² B63B *7/08*
U.S. Cl. 9—2 A **34 Claims**



1. In an inflatable boat, a combination comprising an elongated body of elastically yieldable material having a deck portion and a hull portion which together bound an interior of the boat; at least one access opening in said deck portion subdividing the latter into a front section and a rear section as considered in the direction of travel of the boat and communicating the exterior of the boat with said interior; means for giving said body a desired configuration, including a plurality of inflatable tubular elements extending substantially longitudinally of said body, the tubular elements associated with said front section of said deck portion diverging in rearward direction and forming on said front section a plurality of diverging bulges alternating with grooves which are tranversely spaced by a distance which is greatest at said access opening; support means surrounding said access opening, including an elastically yieldable collar-shaped support member connected to said deck portion around said access opening and having an inner and an outer circumferential surface; at least one rigid seat at least partially accommodated in said interior and having a contact portion received in the respective access opening and a marginal portion supported on said support member; sealing means between said inner circumferential surface of said support member and said contact portion of said seat and operative for preventing seepage of water into said interior between the former and the latter; and connecting means for dismountably connecting said seat to said support member, including a ring-shaped element surrounding said support member at said outer circumferential surface thereof, and means for urging said ring-shaped element against said outer circumferential surface to thereby press said sealing means into sealing contact with said contact portion of said seat.

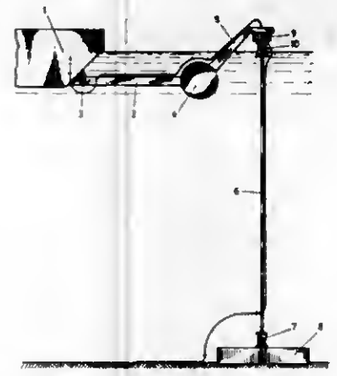
4,031,581
SUB-SEA ADJUSTABLE BUOY
Benton F. Baugh, Houston, TX, assignor to Vetco Offshore Industries, Inc.
Filed Mar. 29, 1976, Ser. No. 671,276
Int. Cl.² B63B *21/52*
U.S. Cl. 9—8 R **3 Claims**



1. A buoy having a controllable buoyancy in water, comprising:
a first chamber member;
a second, buoyant chamber member mounted with said first chamber member;
said first chamber member having a first chamber therein for containing variable amounts of a fluid which is buoyant in water and for containing variable amounts of water;
said first chamber member having an opening formed in its bottom to permit water to pass into and out of said first chamber and fill the portion of said first chamber which is not occupied by buoyant fluid;
control means operably connected to said first chamber for regulating the amount of buoyant fluid in said first chamber so that the buoyancy of the buoy in water is controlled;
said second chamber member has a second chamber therein for containing buoyant fluid under pressure;
said control means is operably connected to said second chamber and said first chamber; and
said control means includes control valve means for controllable movement between a charging position in which buoyant fluid is conveyed from said second chamber to said first chamber, a blocking position in which buoyant fluid is prevented from escaping from said first and second chambers, and a venting position in which buoyant fluid is vented from said first chamber.

4,031,582
FLOATING STRUCTURE
Willem J. Van Heijst, Monte Carlo, Monaco, assignor to N.V. Industrieele Handelscombinatie Holland, Rotterdam, Netherlands
Filed Mar. 9, 1976, Ser. No. 665,333
Claims priority, application Netherlands, Mar. 10, 1975, 74.02829
Int. Cl.² B63B *21/52*
U.S. Cl. 9—8 P **4 Claims**

1. Floating structure comprising a large floating body intersecting the water-level, a small submerged float connected with said body by means of a rigid arm, said arm having a rigid connection with the small float and a pivotal connection about only a horizontal pivot axis with the floating body, said small float further being connected with an anchor by means of a torsion-stiff tube or rod having a hinge with perpendicularly intercrossing or intersecting axes between the lower end of the tube or rod and the anchor as well as between the upper end of the tube or rod and the said small float, said last mentioned

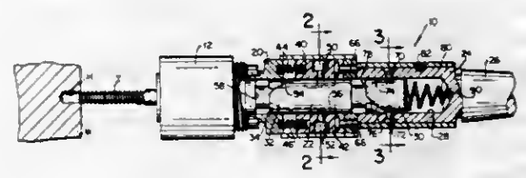


connection further having a vertical axis of rotation between the small float and the upper hinge.

4,031,583
INFLATABLE EMERGENCY EQUIPMENT DEPLOYMENT DEVICE
Ronald Wayne Phillips, II, Akron, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio
Filed Dec. 22, 1975, Ser. No. 643,344
Int. Cl.² B63C *9/22*
U.S. Cl. 9—14 **4 Claims**

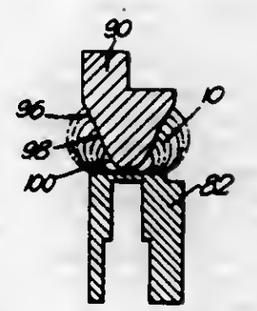
1. An inflatable emergency escape equipment stowage and deployment device comprising:
a. a container having a floor and a back wall;
b. a pivotable panel substantially closing said container, said panel comprising:
1. a front section;
2. a top section;
3. a front hinge pivotally connecting said front section to said floor; and
4. a top hinge pivotally connecting said top section to said front section; and
c. means operable to deploy an emergency evacuation inflatable from said container, said means including an inflation system secured to a deck, an edge of said inflation system being substantially flush with an edge of said deck and wherein said container is removably secured on top, over and flush with said inflation system.

4,031,584
THREADING ATTACHMENT FOR TURNING MACHINES
John Khachiglaa, 78-80 Capitol Ave., Hartford, Conn. 06103
Filed June 8, 1976, Ser. No. 694,032
Int. Cl.² B23G *1/00, 3/00*
U.S. Cl. 10—89 H **10 Claims**



1. An improved threading apparatus for producing threads with a turning machine such as a lathe which rotates a workpiece and threading tool relative to one another comprising:
a tool carrier member connectible in rigid engagement with a thread cutting tool for holding the tool on axis during a thread cutting operation;
a support member located remotely of the tool carrier and the thread cutting tool and connectible in rigid engagement with the turning machine for supporting the tool and tool carrier in the machine during a thread cutting operation;
a sliding spindle member extending between the tool carrier member and the support member in axial alignment with the tool, the spindle member being both axially translatable and rotatable relative to said carrier and support members;
first disengagable torque transmitting means interposed between the carrier member and the spindle member including on one of the two members a first axially extending groove and a first annular groove joined with one end of the axially extending groove, and on the other of the two members a tang engaging the joined grooves;
second disengagable torque transmitting means interposed between the support member and the spindle member and permitting axial translation of the two members relative to one another; and
resilient means extending between the spindle member and one of the other members for urging the tang of the first torque transmitting means into the axially extending groove and away from the annular groove.

4,031,585
BINDING OF PERFORATED SHEETS
Sidney George William Adams, Hersham, England, assignor to James Burn Bindings Limited, Esher, England
Filed Feb. 9, 1976, Ser. No. 656,158
Claims priority, application United Kingdom, Feb. 13, 1975, 6178/75
Int. Cl.² B42C *5/12, 19/00*
U.S. Cl. 11—1 A **7 Claims**



1. A machine used in binding packets of perforated sheets into book form with wire binding elements, each such element being formed from a length of metal wire bent to form a series of curved hairpin-shaped prongs and having a longitudinal slot from one end thereof to the other, and each element being

adapted to receive said sheets in impaled relation prior to closing said element into binding relation with said packet, said machine comprising

a rectifying tool in the form of a wedge-shaped bar adapted to reciprocate into and out of the longitudinal slot in each binding element for conforming the shape and position of said element to a perdetermined standard,

said wedge-shaped bar having a first side comprised of at least two separate discrete surfaces, said first side surfaces being sized and configured to cooperate with two different size binding elements, and

said wedge-shaped bar having a second side comprised of at least two separate discrete surfaces, said second side surfaces also being sized and configured to cooperate with two different size binding elements,

one of said first side surfaces and one of said second side surfaces cooperating to conform the shape and position of a first size binding element, and the other of said first side surfaces and one of said second side surfaces cooperating to conform the shape and position of a second size binding element.

4,031,586

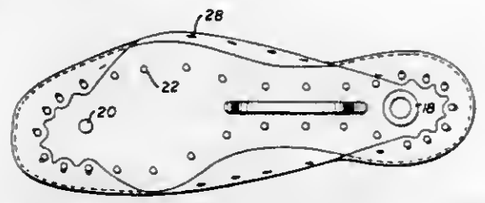
INSOLE FOR FOOTWEAR

Elisabeth von den Benken, and Henry von den Benken, both of 2212 Centre St., West Roxbury, Mass. 02132

Division of Ser. No. 468,223, May 9, 1974, Pat. No. 3,952,427. This application Dec. 8, 1975, Ser. No. 638,827

Int. Cl.² A43D *21/00*

U.S. Cl. 12—145 **1 Claim**



1. A method of assembling footwear which comprises:

a. preparing a shoe upper for lasting by punching a plurality of perforations through the shoe upper along its lasting margin and locating the perforations in such a way that the shoe upper will be properly lasted when tying it to an insole,

b. molding the insole provided with lasting hooks along its edge about ¼ to 1 inch from said edge and giving said lasting hooks a shape which prevents the shoe upper from slipping off once tied to the insole,

c. molding the insole provided with a shank reinforcement rib thus stiffening the insole in the shank area,

d. molding the insole provided with a protrusion which fits a corresponding cavity in an outer sole thereby assuring correct alignment of the outer sole and the insole,

e. molding the insole provided with a contour which fits the bottom contour of a corresponding last,

f. molding the outer sole having corresponding cavities for the lasting hooks, the protrusion and the shank reinforcement rib of the insole,

g. pulling the upper over the last and tying it to the insole by engaging the perforations in the shoe upper with the lasting hooks of the insole and,

h. attaching the molded outer sole to the prior lasted shoe.

4,031,587

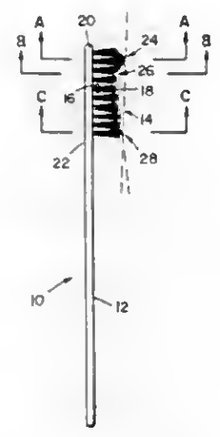
TOOTHBRUSH FOR CANINES

Ursula Dietrich, Hillsborough, Calif., assignor to Deepen Enterprises, Inc., San Mateo, Calif.

Filed July 28, 1975, Ser. No. 599,579

Int. Cl.² A46B *9/04*

U.S. Cl. 15—167 R **2 Claims**



1. A toothbrush for cleaning the teeth of animals which have a long narrow jaw, molars at the rear of the jaw, and secodontal crowned teeth forward of the molars, said toothbrush comprising a handle and a head attached to said handle, said handle having top and bottom ends and an intermediate neck, said head comprising at least three rows of longitudinally extending bristles defining longitudinally a peak adjacent said top end, a heel adjacent said neck, and a substantially linear incline from said heel to the foot of said peak, said incline having a maximum height at said heel substantially corresponding to the maximum height of said peak, and a minimum height at the foot of said peak, said head further defining in cross section along said linear incline from said heel to the foot of said peak, a central longitudinal trough of bristles of uniform diminished height relative to longitudinal outside rows of bristles defining said incline, and at said peak a ridge of bristles of substantially uniform maximum height, the bristles from the top end up to the peaks and down to the foot of said peak being of uniform length in cross-section, the tops of said peak bristles defining surfaces for confronting the tables of the molars at the rear of said jaw, the tops and sides of the outside longitudinal bristle rows of said incline defining surfaces for confronting gums and side faces of secodontal crowned teeth, and the tops and sides of the bristles of said central trough defining surfaces confronting said secodontal crowns, said trough further defining a guideway for tracking the tops of said secodontal crowns along the jaw line upon confrontation between the tops of bristles defining said peak and the tables of the rear molars such that longitudinal translation of said brush head scrubs and massages the gums and the tops and the sides of the teeth.

4,031,588

BROOM

Henri Joseph Marie Adrien Leroy, Le-Pre-Saint-Gervais, and Christian Ludovic Leroy, Perpignan, both of France, assignors to Henri Joseph Marie Andrien Leroy, Le-Pre-Saint-Gervais, France

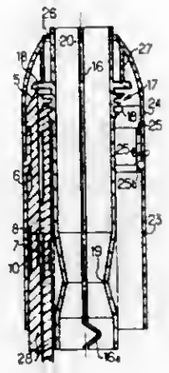
Filed Sept. 15, 1976, Ser. No. 723,469

Claims priority, application France, Oct. 21, 1975, 75.32093

Int. Cl.² A46B *3/18*

U.S. Cl. 15—171 **9 Claims**

1. A broom constituted by a bundle of stems wound around a hollow or tubular bar reserved for the broom handle, the upper portion of the said bundle being fitted into a protective sleeve, the said hollow bar, bundle of stems and protective sleeve constituting with the broom handle on either dismountable or non-dismountable assembly, wherein the winding of the stems is ensured by a separate binding strip of appropriate length of flexible material co-operating with mutually opposite crenels, indentations or notches provided in the thickness of the stems, one of the said crenels serving as a fixing point for the strip and the other crenel serving as a passageway for the spirals or turns of the said strip so as to absorb or compensate for its thickness after the winding.



4,031,589

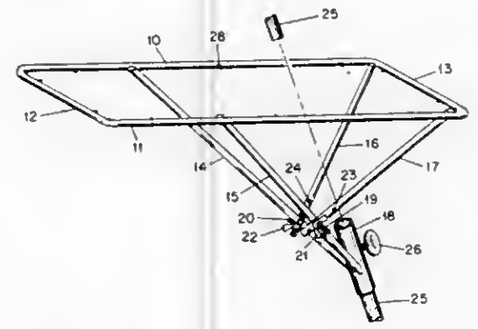
PORTABLE DRIP COLLECTOR

Robert L. Couch, Rte. 3, Box 583, Harriman, Tenn. 37748

Filed Apr. 21, 1976, Ser. No. 678,746

Int. Cl.² B05C *17/02, 21/00*

U.S. Cl. 15—248 R **9 Claims**



1. A portable drip collector for releasible attachment to a handle of a tool for overhead manipulation, which comprises: a rectangular hoop; a collar to receive the handle; a first and second pair of brace arms connecting the hoop to the collar, the first pair of arms each having one end connected to opposite sides of the hoop, the second pair of arms each having one end connected to corners of one end of the hoop; handle engaging means associated with the collar to releasibly engage the handle, and a disposable sheet collector fastened to and spanning the hoop.

4,031,590

PIPE SCRAPER

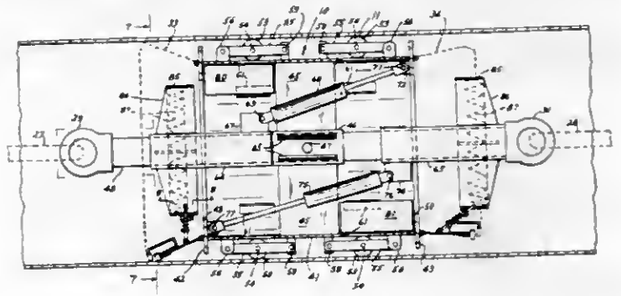
Edward Albert Clavin, Houston, Tex., assignor to Midcon Pipeline Equipmeot Co., Houston, Tex.

Division of Ser. No. 534,823, Dec. 20, 1974, Pat. No. 3,977,331. This application Sept. 9, 1975, Ser. No. 611,696 The portion of the term of this patent subsequent to Aug. 31, 1993, has been disclaimed.

Int. Cl.² B08B *9/02*

U.S. Cl. 15—104.17 **16 Claims**

1. Apparatus for scraping the interior wall of a pipe, comprising carriage means having wheel means for engaging the wall of the pipe whereby said carriage means is movable longitudinally through the pipe, circumferentially segmented scraper means carried at only one end of said carriage means and disposed in a substantially complete circular arrangement around the interior wall of the pipe whereby substantially all of the circumference of the pipe wall will be scraped thereby,



said scraper means being expandable against the pipe wall and retractable therefrom, whereby said apparatus may be employed to scrape the interior wall of a pipe when moved through the pipe in one direction.

4,031,591

STUNNING METHODS AND APPARATUS

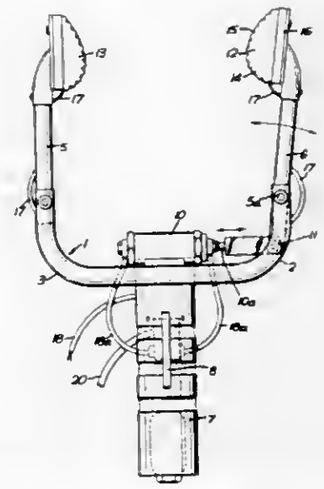
John Joseph Collins, Sudbury, England, assignor to Haverhill Meat Products Limited, Suffolk, England

Continuation-in-part of Ser. No. 514,601, Oct. 15, 1974, abandoned. This application Apr. 21, 1976, Ser. No. 679,047

Claims priority, application United Kingdom, Oct. 23, 1973, 49348/73

Int. Cl.² A22B *3/00*

U.S. Cl. 17—1 E **16 Claims**



1. A stunning tongs for stunning animals prior to slaughter comprising a frame, a handle portion mounted on said frame, a pair of stunning arms mounted on said frame for relative movement of at least one of said arms with respect to said frame, a stunning head on each of said arms, each of said stunning heads comprising a stunning electrode and presenting an area configured for pressure engagement of the head of an animal without penetration, a prime mover operably connected to said at least one arm to effect rapid relative closing movement between said arms to make rapid firm contact on opposite sides of said animal's head disposed between said arms, electronic stunning circuit means including timing means and connected to said electrodes for generating an impulse of predetermined waveform/frequency and voltage/-current; an energizing means operably connected to both said prime mover and said stunning circuit means for energizing said prime mover and said stunning circuit means; manually actuable control means for actuating said energizing means to supply energy simultaneously to said prime mover and said electronic circuit means; said electronic stunning circuit means being operable in timed relation to said prime mover to

energize the electrodes subsequent to activation of said control means but prior to engagement of the electrodes with the animal's head so that instantaneously with the contact of the electrode heads on the animal's head said impulse of predetermined waveform/frequency and voltage/current passes between said stunning heads through said animal's head, for a predetermined period, sufficient to ensure complete stunning until the animal is slaughtered immediately afterwards.

4,031,592

DEVICE FOR CLOSING ELASTIC PACKAGES, PARTICULARLY FLEXIBLE TUBULAR CASINGS

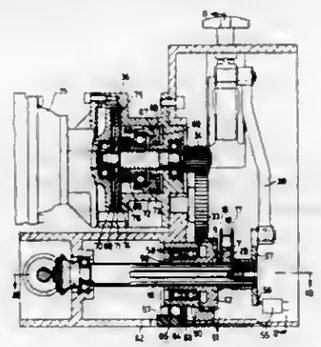
Karl Schnell, Muhlstrasse 28, 7065 Winterbach, Germany

Filed May 20, 1975, Ser. No. 579,140

Claims priority, application Germany, May 22, 1974, 2424979

Int. Cl.[2] A22C 11/00

U.S. Cl. 17—33 12 Claims



1. In a device for closing elastic packages, particularly tubular casings, by means of clamping ties, of the type including a cutting device, feeding means operable to feed a substantially continuous length of clamping tie material intermittently to the cutting device for severing into individual clamping ties, a bending device operable to bend each individual clamping tie into an inverted substantially U-shaped including a pair of spaced legs, a clamping tie closing device operable to wrap each bent clamping tie around the tubular casing to be closed, and means operable to feed bent clamping ties from the bending device to the closing device: the improvement in which said cutting device includes a limit stop for the free end of the clamping tie material fed thereto by said feeding means and further includes a cutting tool spaced from said limit stop by a spacing corresponding to the length of the clamping tie to be cut; said cutting tool and said limit stop being mounted for adjustment and displacement relative to each other.

4,031,593

HOT SHELF SEED COTTON TOWER DRYER APPARATUS AND METHOD

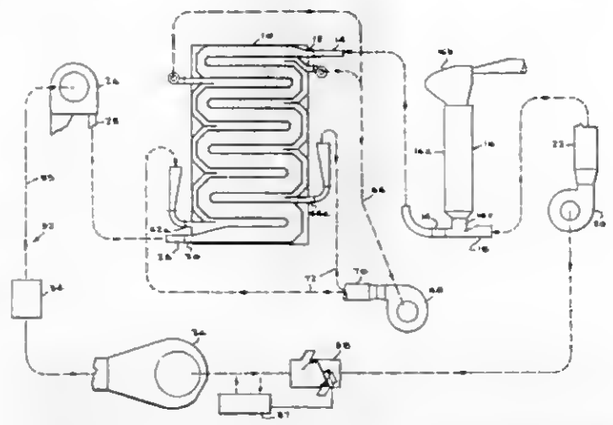
Arvel L. Vandergriff, P.O. Box 457, Corcoran, Calif. 93212

Filed Oct. 7, 1975, Ser. No. 620,495

Int. Cl.[1] D01G 37/00

U.S. Cl. 19—.27 28 Claims

1. Seed cotton dryer apparatus of the parallel flow tower type for conditioning seed cotton for ginning comprising, a vertically elongated drying tower casing having spaced apart vertical lateral walls and front and rear sides and having an inlet adjacent the top for connection to an air duct through which seed cotton is pneumatically conveyed to receive cotton-conveying heated drying air and cotton conveyed by the drying air and having an air and cotton outlet adjacent the bottom means for heating the drying air, a plurality of vertically spaced horizontal metallic shelves fixed in the casing providing flat horizontal upwardly facing shelf surfaces extending in horizontal planes between said lateral walls and spanning the width of the casing, said shelves from the uppermost to the lowermost commencing alternately from opposite front and rear sides of the casing and each terminating short of the side opposite its commencement thereby defining a continuous restricted zig-zag flow path from the upper end to the lower end of the casing communicating respectively with said inlet and said outlet, the heated drying air and cotton conveyed thereby being admitted to the upper end of said flow path at said inlet to be circulated through said flow path for evaporating moisture from the cotton in the dryer while the



drying air impels the cotton along the flow path, and means for supplying heat to said metallic shelves independent of said cotton conveying heated drying air coursing through the drier for heating the surfaces of the shelves substantially throughout their extent to diminish the loss of heat energy from the heated drying air as courses from top to bottom through said flow path and to aid drying of the cotton.

4,031,594

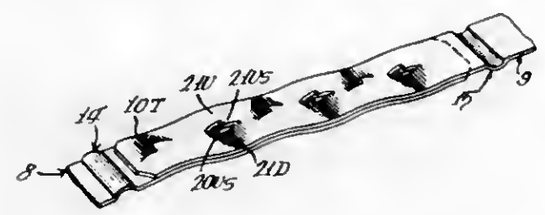
SEALLESS STRAP CONNECTION MEANS

Tallvaldis Cepuritis, Kenilworth, Ill., assignor to Signode Corporation, Glenview, Ill.

Filed Apr. 26, 1976, Ser. No. 680,164

Int. Cl.[2] B65D 63/02

U.S. Cl. 24—20 EE 8 Claims



1. A sealless strap connection between overlapped lengths of strap which comprises an array of longitudinally spaced joints, each joint comprising lengthwise protuberances presenting opposed, overlapping, non-interlocking shoulders each having a transverse face displaced for the respective planes of said overlapped lengths of strap and further comprising lengthwise protuberances presenting opposed interlocking shoulders each having a transverse face displaced from the respective planes of said overlapped lengths of strap, said interlocking shoulders being shaped to interlock with each other, at least one of the protuberances of said array on one of said lengths of strap having, behind the transverse face of one of said interlocking shoulders, an upwardly displaced corner forming a protruding tongue arranged and positioned to irreversibly override the transverse face of an oppositely facing non-interlocking shoulder as the interlocking shoulders are moved into an interlocking position, and to present a stop to the non-interlocking shoulder adjacent to said corner when said interlocking shoulders are interlocked with each other.

4,031,595

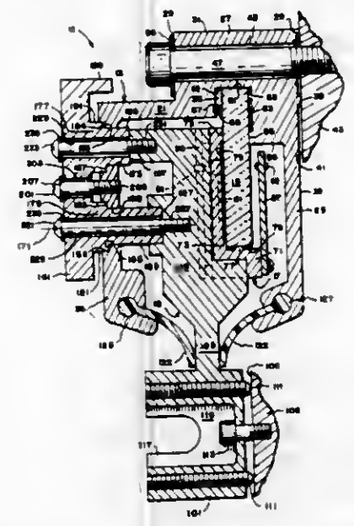
HIGH PRECISION INCREMENTAL DISTANCE MEASURING SYSTEM

Helmut Welker, Jamestown, N.Y., assignor to Bausch & Lomb Incorporated, Rochester, N.Y.

Filed Sept. 2, 1975, Ser. No. 609,863

Int. Cl.[2] H01J 3/14

U.S. Cl. 250—237 G 17 Claims



1. In measuring apparatus securable to first and second relatively movable members for determining the relative displacement therebetween, wherein said first movable member has a substantially flat mounting surface, wherein said apparatus includes a scale, means for supporting said scale, transducer means, transducer support means and means for interconnecting said transducer with said transducer support means, wherein said scale has an edge and a face, and wherein the improvement comprises:

a. a first pair of rails provided on said scale supporting means for engagement with said mounting surface;

b. said scale supporting means including means for positioning means for securing said scale supporting means to said mounting surface, said positioning means locating said securing means between said first rails so as to insure that said first rails engage and conform to said mounting surface when said scale supporting means is secured to said mounting surface; and

c. a second pair of rails provided on said scale supporting means, said second rails cooperating with said scale face to position said scale on said scale supporting means, at least one of said second rails and one of said first rails being approximately aligned and solidly interconnected in a direction substantially perpendicular to the surface defined by said first rails when said scale supporting means is viewed in cross-section.

4,031,596

INTEGRATED FINISHING AND COMPRESSIVE PRESHRINKING OF A HIGH-SHRINKAGE FABRIC

Herman J. Joy, Latham, N.Y., assignor to Cluett, Peabody & Co., Inc., New York, N.Y.

Continuation of Ser. No. 262,579, June 14, 1972, abandoned, which is a continuation-in-part of Ser. No. 224,892, Feb. 9, 1972, abandoned. This application Jan. 7, 1975, Ser. No. 539,216

Int. Cl.[2] D06C 21/00

U.S. Cl. 26—18.6 4 Claims

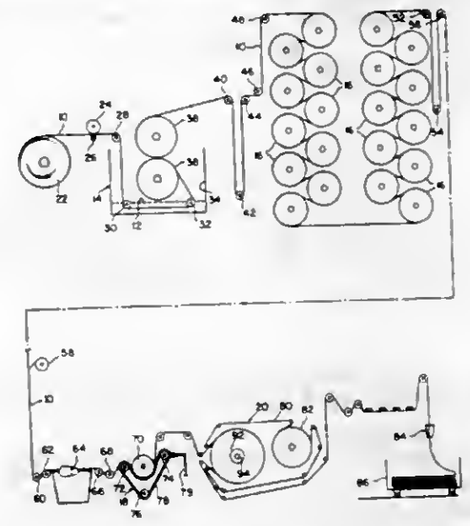
1. A method for continuously manufacturing, finishing and preshrinking fabric, the method comprising the sequential steps of:

creating fabric by using conventional machinery, said fabric being known as greige fabric which has been stretched in said machinery and is susceptible therefor of relatively high shrinkage after washing, taking said greige fabric from said machinery to a padder and impregnating said greige fabric with a finishing liquid therein including starch to a moisture content in excess of 50% by weight, partially drying the fabric, measuring and maintaining a moisture content between 10 and 30% by weight,

compressively preshrinking the fabric, and fully drying the fabric.

4. A method for continuously manufacturing, finishing and preshrinking fabric, the method comprising the sequential steps of:

creating fabric by using conventional machinery, said fabric



being known as greige fabric which has been stretched in said machinery and is susceptible therefor of relatively high shrinkage after washing,

taking said greige fabric from said machinery to a padder and impregnating said greige fabric with a finishing liquid therein including starch to a moisture content in excess of 50% by weight, passing the fabric over a series of hot cans to partially dry the fabric, measuring and maintaining a moisture content in the fabric between 10 and 30% by weight,

compressively preshrinking the fabric in a rubberbelt compressive preshrinking unit, and fully drying the fabric.

4,031,597

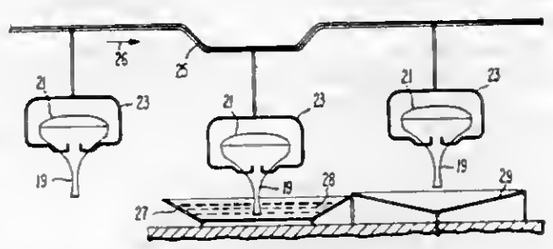
METHOD OF ASSEMBLING A MOUNT ASSEMBLY IN THE NECK OF A CATHODE-RAY TUBE

Jawdat Ibrahim Nubani, Clarks Summit, and Walter Robert Rysz, Moosic, both of Pa., assignors to RCA Corporation, New York, N.Y.

Filed Sept. 22, 1976, Ser. No. 725,583

Int. Cl.[2] H01J 9/18

U.S. Cl. 29—25.16 8 Claims



1. In a method for sealing a mount assembly in the neck of a cathode-ray tube having a faceplate panel and a luminescent screen thereon, the steps in the following order:

a. coating the inner surface of said neck with a film of organic material which is volatilizable when heated in air at temperatures below about 400° C.

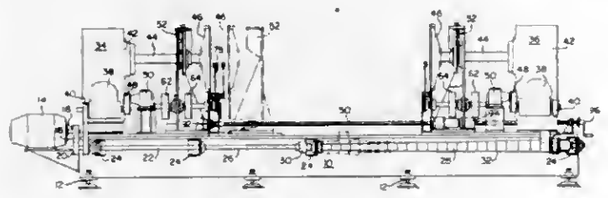
b. sliding said mount assembly into said neck to a perdeter-

mined oriented and spaced position with respect to said screen,
c. sealing said mount assembly into said neck,
d. and volatilizing said film.

4,031,598
END-FORMING MACHINE FOR FLUORESCENT LAMP TUBES

William J. Summers, Mootclair, and William F. Betz, Livingston, both of N.J., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 16, 1976, Ser. No. 723,673
Int. Cl.² H01J *9/46*
U.S. Cl. 29—25.19 **8 Claims**

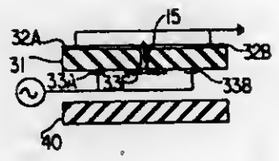


1. An improved end-forming machine for fluorescent lamp tubes, said end-forming machine comprising:
an elongated machine base,
a headstock affixed to said machine base, said headstock including a rotatably indexable lamp tube carrying turret, reciprocating heating and forming tools operable to neck down one end of said lamp tubes and operating means for operating said turret and said heating and forming tools in sequence,
a tailstock including a rotatably indexable lamp tube carrying turret, reciprocating heating and forming tools operable to neck down the other end of said lamp tubes and operating means for operating said turret and said heating and forming tools in sequence, said tailstock being mounted to said machine base for relative movement therewith and selective positioning with respect thereto,
locating drive means associated with said tailstock for selectively positioning said tailstock along the length of said machine base a preselected distance from said headstock whereby lamp tubes of different lengths can be accommodated between the headstock and tailstock,
single drive shaft means extending for substantially the length of said machine base,
drive means for driving said single drive shaft means at a preselected speed, and
means coupling each of said headstock and tailstock operating means to said single drive shaft means.

4,031,599
METHOD OF MAKING STATIC ELECTRICITY SUPPRESSOR WITH PATTERNED COATING

Anthony Q. Testone, Lee, Mass., assignor to Statics Inc., Lee, Mass.

Division of Ser. No. 568,107, April 14, 1975, Pat. No. 3,968,405. This application June 15, 1976, Ser. No. 696,322
Int. Cl.² H01G *4/02*; **H05K** *3/06*
U.S. Cl. 29—25.41 **3 Claims**

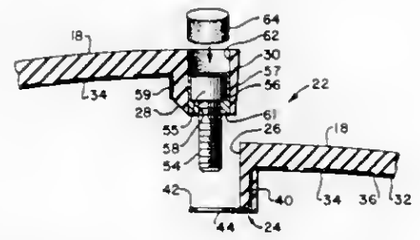


1. A method of making a static electricity suppressor comprising:
a. providing a plate of electrically insulating material,
b. coating said plate on the opposite surfaces thereof with a thin layer of electrically conductive material,
c. removing from a first surface a portion of the layer thereon,
d. removing from the opposite surface a portion of the layer thereon and leaving on said opposite surface an intact portion of the layer thereof which is in alignment with the part of the first surface from which the layer thereon has been removed,
e. passing an emitter wire transversely through said plate,
f. engaging said emitter wire with said intact portion of said second layer only.

4,031,600
ATTACHMENT MEANS FOR A MACHINERY DRUM COVER

Biddle A. Whigham, Lancaster, Pa., assignor to The Fluorocarbon Company, Anaheim, Calif.

Filed Nov. 10, 1975, Ser. No. 630,109
Int. Cl.² B60B *7/00*
U.S. Cl. 29—118 **11 Claims**

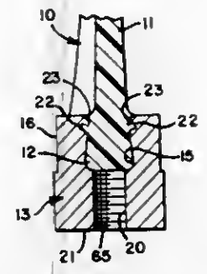


1. A replaceable cover assembly for an anvil roller to provide a contact surface for cutting blades located on an adjacent rotary cutting roller, said anvil roller having a transverse slot generally parallel to the axis of said roller, said cover comprising:
a cover band of an elastomeric material for positioning around said roller and having a first end and a second end;
a backing plate of material more rigid than said elastomeric material securely attached to the interior surface of said cover band;
an inwardly extending backing plate flange integrally connected to said backing plate adjacent said first end of said cover band for insertion in said alot adjacent one edge of the slot, said flange having an offset portion extending beyond said first end for contact with a substantial portion of the bottom of said slot;
a depending inward cover band flange of elastomeric material connected to said second end of said cover band, said depending flange being positioned in said slot above and in contact with said backing plate flange;
a flange of elastomeric material integrally connected to said cover band first end for extending into said slot between said backing plate flange and said cover band flange on said second end;
a flange integrally connected to said backing plate adjacent said cover band second end for extending into said slot adjacent the other edge of the slot, said flanges filling said slot so that the exterior surface of the cover band above said slot is uniform and uninterrupted except for a seam between said cover band ends; and
means for fastening said backing plate flange and said cover band flange to said roller in said slot.

4,031,601
METHOD OF FABRICATING AND MOUNTING A FIBERGLASS FAN BLADE

Norman T. Staub, and Anthony F. Staub, both of Dayton, Ohio, assignors to Dayton Scale Model Company, Dayton, Ohio

Continuation of Ser. No. 549,067, Feb. 11, 1975, abandoned. This application July 30, 1976, Ser. No. 710,175
Int. Cl.² B29D *3/02*; **B29G** *3/00*
U.S. Cl. 29—156.8 B **6 Claims**

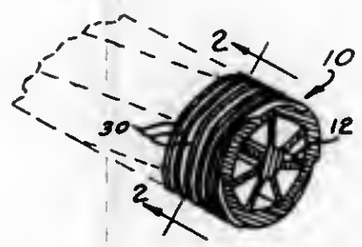


1. A method of fabricating and mounting a fiberglass fan blade in a hub, comprising:
a. producing a metal hub having a dovetail slot in one end thereof and also having a bore extending from the other end thereof into said slot,
b. assembling a plurality of layers of fiberglass sheet material impregnated with heat liquifiable and heat curable resin in superposed relation forming an assembly of predetermined dimensions, each of said layers including a blade portion and a root portion of a width at least equal to the diameter of said hub,
c. interleaving additional pieces of said fiberglass sheet with said root portions of said layers to increase the thickness of the root portion of said assembly to approximately the configuration of said hub slot,
d. inserting said root portion of said assembly into said slot,
e. placing said assembly and hub in a mold which includes cavities for said blank and said hub and a shoulder at the inner end of said hub cavity,
f. heating said mold until said resin substantially liquifies while maintaining said one end of said hub in seated relation with said shoulder,
g. forcing additional substantially liquified resin and fiberglass material through said bore into said slot until said slot and all spaces between adjacent said layers are completely filled,
h. closing said heated mold at a predetermined rate into fully closed relation with said assembly and said hub, and
i. effecting curing of said resin while maintaining said mold closed.

4,031,602
METHOD OF MAKING HEAT TRANSFER TUBE

James L. Cunningham, and Bonnie J. Campbell, both of Decatur, Ala., assignors to UOP Inc., Des Plaines, Ill.

Division of Ser. No. 681,006, April 28, 1976. This application Sept. 14, 1976, Ser. No. 722,922
Int. Cl.² B23P *15/26*
U.S. Cl. 29—157.3 AH **4 Claims**

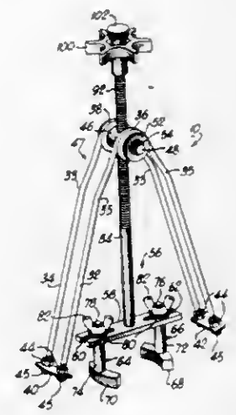


1. A method of making a heat transfer tube having inner and outer fins comprising the steps of inserting a core member having a plurality of radially extending longitudinal fins inside a smooth surfaced cylindrical tube and subjecting at least a portion of the outside surface of the composite assembly to a plurality of finning tools so as to produce external fins on the tube and reduce its internal diameter to a dimension less than the external diameter of the finned core member.

4,031,603
SNAP-IN CLUTCH SPRING

William E. Shultz, 442 W. St. Charles Road, Villa Park, Ill. 60181

Filed July 1, 1976, Ser. No. 701,588
Int. Cl.² B23P *19/02*
U.S. Cl. 29—427 **10 Claims**



1. A method of removing a retaining ring from an automatic transmission, said automatic transmission having a housing including an annular slot, and a spring seat, comprising
connecting a pair of elongated arms to said slot to hold said arms in position relative to said slot;
outwardly biasing said elongated arms to hold said arms within position relative to said slot;
moving a spring seat engaging member relative to said arms to contact said spring seat and thereby compressing said spring seat with said spring seat engaging member;
removing said retainer ring.

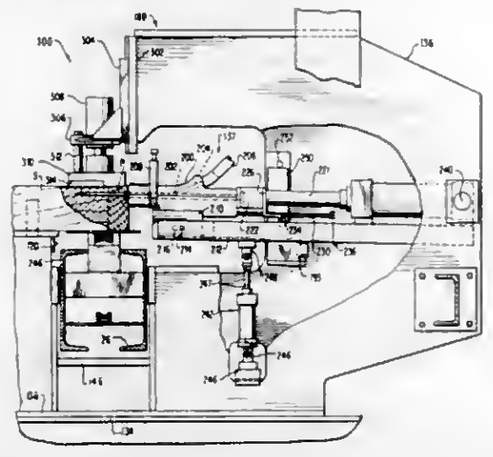
2. An apparatus for disassembling a clutch piston assembly in an automobile automatic transmission, said assembly including a housing having positioned therein a piston, said piston held in said housing by a plurality of springs and a spring seat, said spring seat maintained in said housing by a retaining ring, said housing also including at least one slot fabricated on the peripheral surface of said housing, said apparatus comprising
an elongated stem,
a pair of resilient arms mounted on said stem,
said arms including means for engaging said slot, and said stem including means for engaging said spring seat,
said stem further including means for applying a compressive force to said spring seat when said apparatus is in operative position.

4,031,604

APPARATUS AND METHODS OF FABRICATING WOODEN FRAMES, PANELS AND THE LIKE

John Calvin Jureit, Coral Gables, Fla.; Howell J. Cotten, Keswick, Va.; Adolfo Castillo, and Roy Leutwyler, both of Miami, Fla., assignors to Automated Building Components, Inc., Miami, Fla.

Continuation of Ser. No. 466,176, May 2, 1974, abandoned, which is a division of Ser. No. 328,605, Feb. 1, 1973, Pat. No. 3,848,791. This application Dec. 12, 1975, Ser. No. 640,323
Int. Cl.² B27F 7/00, 7/02
U.S. Cl. 29—429 5 Claims



1. A method of fabricating a wooden panel having a pair of elongated plates and intermediate studs comprising the steps of:

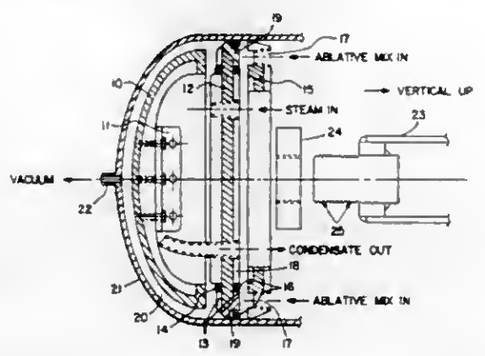
disposing a stud between a pair of plates in substantially horizontal coplanar relation with the plates and stud ends lying on support surfaces between a pair of pivotally mounted nailing assemblies having one end thereof disposed at fixed elevations and other ends thereof disposed at one elevation, clamping the plates and corresponding ends of the studs against the support surface to ensure coplanar relation of the studs and plates, displacing said one end of said nailing assemblies toward said plates to engage the plates and clamp the plates against the stud ends in response to actuation of the nailing assemblies, actuating the nailing assemblies to drive a nail through each plate and into the corresponding end of the stud to secure the plates and the stud one to the other, automatically shifting the elevation of said other ends of said nailing assemblies from said one elevation to another elevation in response to completion of nailing at said one elevation, actuating the nailing assemblies when in said other elevation to drive a second nail through each plate and into the corresponding end of the stud at a like longitudinal location as the first nail thereby forming a partially completed frame, advancing the partially completed frame on an endless conveyor a predetermined distance such that said plates are laterally aligned between the nailing assemblies at the location therealong of a second stud, disposing a second stud between said plates said predetermined distance from said first stud, clamping the plates and corresponding ends of the studs against the support surface to ensure coplanar relation of the studs and plates, displacing said one end of said nailing assemblies toward said plates to engage the plates and clamp the plates against the stud ends in response to actuation of the nailing assemblies, actuating the nailing assemblies to drive a nail through each plate and into the corresponding end of said second stud to secure the plates and said second stud one to the other, automatically shifting the elevation of said other ends of said nailing assemblies from said one elevation to another elevation in response to completion of nailing at said one elevation, actuating the nailing assemblies when in said other elevation to drive a second nail through each plate and into the corresponding end of the second stud at a like longitudinal location as the first nail driven into the second stud.

4,031,605

METHOD OF FABRICATING COMBUSTION CHAMBER LINERS

Harold Thompson Couch, Columbia; Leonard Selwyn Cohen, West Hartford, and Lawrence Joseph Coulter, South Windsor, all of Conn., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 5, 1976, Ser. No. 712,128
Int. Cl.² B29C 5/04; B29D 3/02
U.S. Cl. 29—460 5 Claims



1. In a combustion chamber having a nozzle, an inner surface, an outer surface, and at least one domed region, a method of fabricating a liner on the inner surface of said combustion chamber comprising the steps of:

a. first attaching a wire mesh substrate screen to said inner surface of said combustion chamber so as to cover at least the domed region and the nozzle;

b. forming a cavity between said domed region and a parallel domed surface of a mold fixture assembled inside said combustion chamber;

c. forming a cavity between said nozzle and a mold fixture assembled inside said nozzle to form a surface parallel to said nozzle;

d. injecting a fluid curable polymeric material into said cavity between said domed surface and said domed region and into said cavity between said nozzle and said surface parallel to said nozzle; and

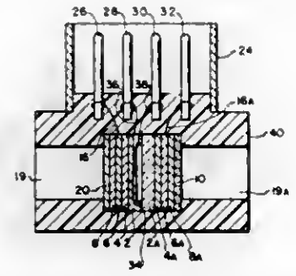
e. curing said fluid polymeric material into a firm solid affixed to said substrate screen.

4,031,606

METHOD OF MAKING A COMBINATION ION RESPONSIVE AND REFERENCE ELECTRODE

Eugene L. Szonntagh, Flourtown, Pa., assignor to Honeywell Inc., Minneapolis, Minn.

Division of Ser. No. 552,284, Feb. 24, 1975, abandoned. This application Feb. 27, 1976, Ser. No. 661,958
Int. Cl.² B01J 17/00
U.S. Cl. 29—570 8 Claims



1. A method of making a combination electrode comprising

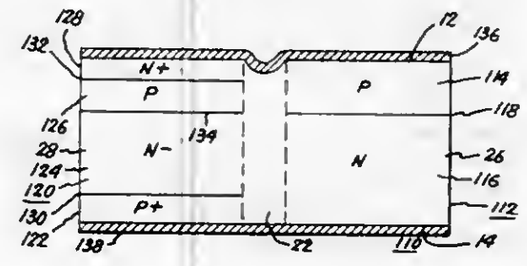
the steps of depositing a first metallic layer on a first surface area of an insulating substrate, depositing a first solid electrolyte layer on said metallic layer and depositing a pH glass layer on said electrolyte layer, depositing a second metallic layer on a second electrically isolated surface area of said insulating substrate, depositing a second solid electrolyte layer on said second metallic layer, depositing a second glass layer on said second electrolyte layer, said second glass layer having a coefficient of thermal expansion mismatched with respect to a coefficient of thermal expansion of said second electrolyte layer to produce differential expansion therebetween causing cracking of said second glass layer during a predetermined temperature cycle and exposing said electrode to said temperature cycle, said second metallic layer, said second electrolyte layer and said second glass layer being electrically isolated from said first metallic layer, said first electrolyte layer and said pH glass layer.

4,031,607

MINORITY CARRIER ISOLATION BARRIERS FOR SEMICONDUCTOR DEVICES

Harvey E. Cline; Thomas R. Anthony, both of Schenectady; Richard A. Kokosa, Skaneateles, and E. Duane Wolley, Auburn, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 474,033, May 28, 1974, Pat. No. 3,988,762. This application Apr. 29, 1976, Ser. No. 681,600
Int. Cl.² B01J 17/00
U.S. Cl. 29—577 57 Claims



1. A process for forming a region of a selected minority carrier lifetime in a body of semiconductor material comprising the steps of:

a. selecting a body of single crystal semiconductor material having two major opposed surfaces comprising, respectively, the top and bottom surfaces thereof, a selected level of resistivity, a selected type conductivity, and a preferred planar crystal structure orientation of at least one of the major opposed surfaces, the planar crystal structure orientation is one selected from the group consisting of (111), (100) and (110);

b. orienting the body so that the vertical axis of the body is substantially aligned with a first axis of the crystal structure which is substantially perpendicular to the at least one major opposed surface having the preferred planar crystal structure orientation;

c. disposing at least one metal wire of selected metal composition comprising at least one material suitable for controlling the minority carrier lifetime in a body of semiconductor material on the surface having a preferred planar orientation, each metal wire having a preferred stable wire direction which is dependent upon the planar orientation of the major surface;

d. heating the body and the at least one metal wire to a temperature sufficient to form a melt of metal-rich semiconductor material on the major surface of the body;

e. establishing a thermal gradient substantially parallel with the vertical axis of the body and the first crystal axis of the material of the body;

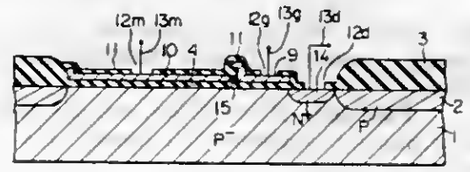
f. thermal migrating each melt into the body a predetermined distance from the one major surface parallel with the first crystal axis in the direction of the higher temperature of the thermal gradient to form a region of recrystallized semiconductor material of the body having solid solubility of the metal of the melt, as determined by the temperature of migration, and a level of minority carrier lifetime which is different from that minority carrier level of the material of the body.

4,031,608

PROCESS FOR PRODUCING SEMICONDUCTOR MEMORY DEVICE UTILIZING SELECTIVE DIFFUSION OF THE POLYCRYSTALLINE SILICON ELECTRODES

Ryoiku Togei; Akira Takei, and Kunihiko Wada, all of Kawasaki, Japan, assignors to Fujitsu Ltd., Japan

Filed Apr. 8, 1976, Ser. No. 675,196
Claims priority, application Japan, Apr. 11, 1975, 50-43388
Int. Cl.² H01L 21/28, 21/22, 29/78
U.S. Cl. 29—578 20 Claims



1. A process for producing a semiconductor memory device, which device comprises:

a semiconductor material substrate having one particular conductivity type and comprising, on the surface thereof, a doped layer with an impurity of conductivity type opposite to said one particular conductivity type, one surface region of the substrate adjoining said doped layer being used as a gate region, and another surface region of said substrate adjoining said one surface region being used as a memory cell region;

a first insulating layer situated on said substrate over said gate region and said memory cell region;

a gate electrode consisting of a doped polycrystalline silicon, said gate electrode being situated on a part of said insulating layer over said gate region;

a memory cell electrode consisting of doped polycrystalline silicon, said memory cell electrode being situated on another part of said insulating layer over said memory cell region;

a resistive layer consisting of non-doped polycrystalline silicon layer, disposed on still another part of said insulating layer, located between and connected to said both electrodes;

wherein an electric charge of said opposite conductivity type is either injected from said doped layer though said gate region into said memory cell region or transferred from said memory cell region through said gate region to said doped layer, depending upon the electric potential level in said substrate, which level is established by an electric field created by each of said electrodes through said insulating layer;

said process comprising the steps of:

forming the first insulating layer on said substrate over at least said memory cell region and said gate region;

forming a first non-doped polycrystalline silicon layer on said first insulating layer;

forming a second insulating layer on said first polycrystalline silicon layer;

removing a part of said second insulating layer and said first polycrystalline silicon layer, thereby selectively placing these layers so as to be used for a masking portion and said memory cell electrode, respectively;

forming a second non-doped polycrystalline silicon layer so as to mask said first insulating layer over said gate region and to mask said masking portion of said second insulating layer;

removing the unmasked parts of both of said first and sec-

ond insulating layers, by an etchant which dissolves these layers, thereby exposing a part of said first and second polycrystalline silicon layers as well as a part of the substrate;

introducing an impurity of said opposite conductivity type into said exposed parts so as to dope the exposed polycrystalline silicon with the impurity and to form on the exposed part of the substrate said opposite conductivity type doped layer, wherein the masking portion of the second insulating layer protects the underlying part of the first non-doped polycrystalline silicon layer from the introduction of impurity so as to form a resistance layer therein

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4,031,609

METHOD FOR THE MANUFACTURE OF A SUPERCONDUCTOR WITH A SUPERCONDUCTIVE INTERMETALLIC COMPOUND CONSISTING OF AT LEAST TWO ELEMENTS

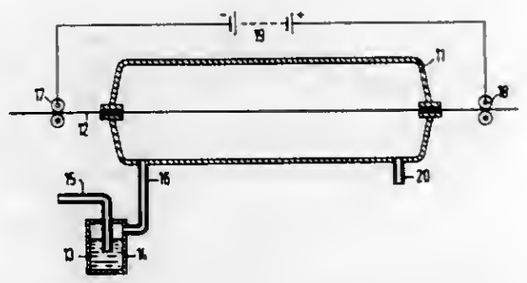
Günther Ziegler, and Sigrun Frohmader, both of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed June 12, 1975, Ser. No. 586,164

Claims priority, application Germany, June 14, 1974, 2428817

Int. Cl.² H01V *11/00*

U.S. Cl. 29—599 **12 Claims**



1. A method for the manufacture of a superconductor with a superconducting intermetallic compound consisting of at least two chemical elements comprising:

a. bringing a ductile structural part made of at least one element of the compound into contact with a second structural part containing a ductile carrier metal for the remaining elements of the compound;

b. subsequently supplying the remaining elements of the compound to the second ductile structural part at elevated temperature;

c. diffusing said remaining elements through said second structural part and reacting said remaining elements with the element in said first structural part to form said compound; and

d. wherein the improvement comprises said step of supplying comprising supplying the remaining elements to the second structural part through decomposition of alkyl compounds of said remaining elements.

4,031,610

METHOD OF ASSEMBLY OF DYNAMOELECTRIC MACHINES

Karnel Singh, North Olmsted; Thomas A. Denny, Lorain; Daniel P. Fritz, Elyria, and Orville C. Rising, LaGrange, all of Ohio, assignors to Airborne Mfg. Co., Elyria, Ohio

Filed Apr. 30, 1974, Ser. No. 465,687

Int. Cl.² H02K *15/14, 15/16*

U.S. Cl. 29—598 **7 Claims**

1. In a method of assembling a dynomoelectric machine including

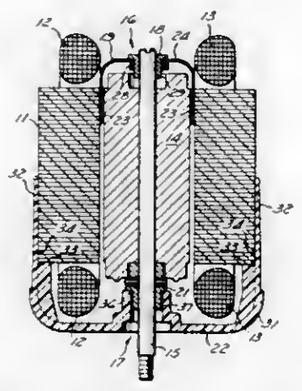
a stator having an axial bore,

a rotor having a shaft,

a rotor shaft bearing,

a bracket having a central opening for receiving said rotor shaft bearing with radially adjustable clearance and having at least two stator locating surfaces for engaging said stator and locating and supporting said bracket in a fixed predetermined positional relationship with respect to said stator and bridging said stator bore with said bore axis extended passing through said opening, the steps comprising

1. positioning and securing said bracket in said predetermined positional relationship with respect to a fixture



having surfaces corresponding to surfaces on said stator related to locating surfaces of said bracket and a bearing locator pin corresponding to said rotor shaft mounted in fixed position on said fixture coaxial with the corresponding location of said bore axis, and

2. positioning said shaft bearing on said bearing locator pin, and

3. positioning said shaft bearing in said bracket opening,

4. securing said bearing to said bracket in its relationship thereto established by said fixture,

the first three steps being performed in any appropriate sequence following by step (4).

4,031,611

METHOD OF MAKING PREINSULATED PIPE ASSEMBLY

Ben C. Johnson, Jr., San Marcos, Tex., assignor to Thermon Manufacturing Company

Division of Ser. No. 497,958, Aug. 16, 1974, Pat. No. 3,971,416. This application Dec. 15, 1975, Ser. No. 640,637

Int. Cl.² H05B *3/00*

U.S. Cl. 29—611 **8 Claims**

1. A method of installing a heating element in a preinsulated pipeline having a pipeline heater housing with a cavity therethrough and terminals for connecting the heating element to an energy source, comprising:

placing an end of the heater element into the heater housing cavity;

connecting a pull line to the heater element;

moving the heating element into the heater housing cavity until the heating element extends through the cavity by exerting a pulling force on the pull line connected to the heating element;

attaching the heater element to terminals for connecting the heater element to an energy source; and

sealing the ends of the heater housing cavity.

6. A method of preparing preinsulated pipe assemblies, and assembling same in the field, comprising the steps of:

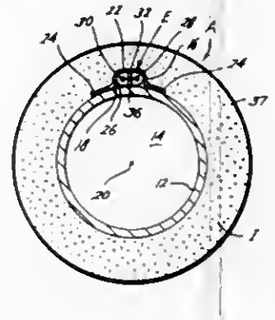
first mounting a heater housing on each of a plurality of sections of pipe at a manufacturing facility remote from the field location where said pipe sections are to be installed;

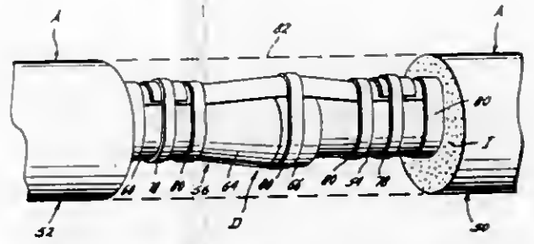
said heater housing for each section of pipe extending for substantially the full length thereof, but terminating short of each end;

applying an insulation layer over each of said pipe sections and heater housings therewith at said manufacturing facility;

said insulation layer on each section of pipe extending for substantially the full length of said heater mounting thereon, but terminating short of each end of said heater;

applying a protective jacket over the insulation on each section of pipe for substantially the full length thereof at a location remote from said field location;





assembling and connecting said sections of pipe at a field location remote from said manufacturing facility;

connecting adjacent ends of said heater housings together to form a continuous heater housing at the field location; and

applying insulation at the areas of the connection of said sections to thereby fully insulate the pipe sections and heater housings therewith.

4,031,612

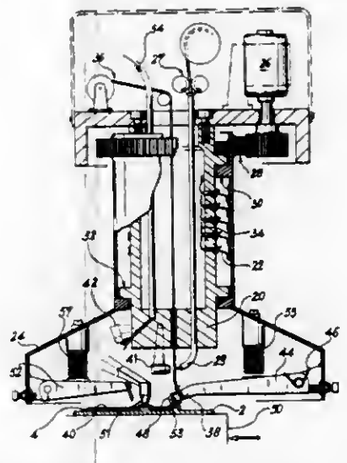
METHOD AND A DEVICE FOR THE INTERCONNECTION OF ELECTRONIC COMPONENTS

Gérard Nicolas, Grenoble, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Mar. 2, 1976, Ser. No. 663,250

Int. Cl.² H05K *3/00*

U.S. Cl. 29—625 **13 Claims**



1. A method for forming an electrical circuit by joining together different conductive zones preformed on an insulating base comprising the steps of

a. soldering an uninsulated end of a length of insulated wire to one of said zones,

b. advancing said wire toward a second zone and stripping insulation off the portion of the wire which will engage the second zone,

c. adhering the unstripped portion of the wire to the base as the wire is being advanced and when it contacts the base,

d. placing the stripped portion of the wire on the second zone,

e. soldering the stripped portion of the wire to the second zone, and

f. cutting the wire to separate the portion thereof extending beyond the second zone.

4,031,613

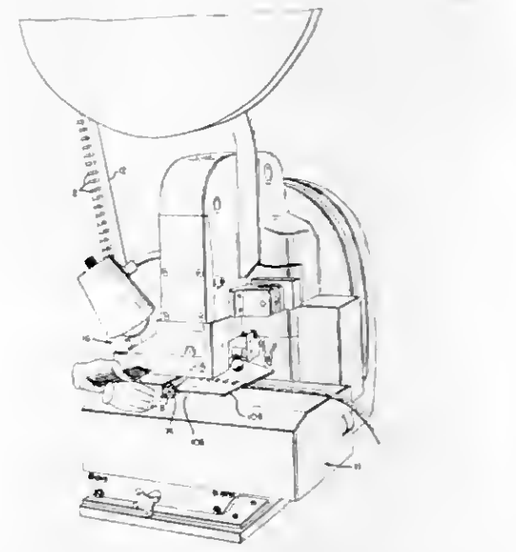
CLOSED BARREL TERMINAL APPLICATOR

Christopher Kingsley Brown, Camp Hill, and Donald Andrew Wion, Harrisburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Mar. 4, 1976, Ser. No. 663,882

Int. Cl.² H01R *43/00*

U.S. Cl. 29—628 **14 Claims**



1. In an apparatus for applying terminals, each having an enclosed cylindrical barrel, to the end of wires including:

a crimping press comprising a crimping anvil and a crimping die movable relatively towards and away from said anvil; a crimping zone formed at the convergence of said anvil and said die; and terminal advance means for sequentially and laterally advancing equally spaced strip mounted individual terminals into said crimping zone from a first side and out of said crimping zone on an opposite second side, the improvement comprising:

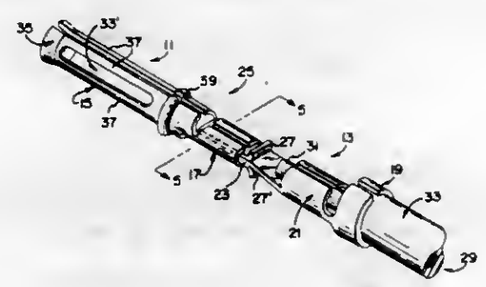
a conical wire positioning funnel located in a first position adjacent to and spaced from said crimping zone with the axis of said funnel in alignment with a terminal barrel located within said crimping zone, said funnel being free to move from said first position to a laterally displaced second position in sequence with the movement of a terminal barrel out of said crimping zone on said second side, said funnel being also free to subseqently return from said second position to said first position, and hinge means allowing said funnel to open when said funnel is in the vicinity of said second position, whereby

one of said wires may be aligned with and inserted into an enclosed cylindrical terminal barrel by use of said funnel whereupon said barrel is crimped onto said wire and said wire is released from said funnel by said hinge means upon relative movement between said funnel and the crimped wire and barrel.

4,031,614
METHOD OF MAKING TWO-PIECE ELECTRICAL CONTACT

Richard Earl Gipe, Warren, Pa., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed Nov. 19, 1975, Ser. No. 633,179
Int. Cl.² H01R 9/00
U.S. Cl. 29—630 A 5 Claims



1. A method for making a two-piece electrical contact adapted for electrically interconnecting a male pin and an electrical wire having an electrically conductive lead portion and at least one layer of an electrically insulative material formed substantially about said lead portion, said method comprising:

forming one of said two pieces from a metallic material of substantially uniform thickness to provide a female receptive member including an elongated reception portion for receiving and electrically engaging said male pin and a wrappable end portion, said elongated reception portion being substantially round in configuration and having an open end through which said male pin may enter said reception portion;

forming a second of said two pieces from a metallic material of substantially uniform thickness to provide a deformable member for positively retaining said electrical wire, said deformable member including a first end portion for positively retaining said insulative coating, an intermediate portion for electrically engaging said electrically conductive lead portion, and a multi-layered second end portion opposing said first end portion; and

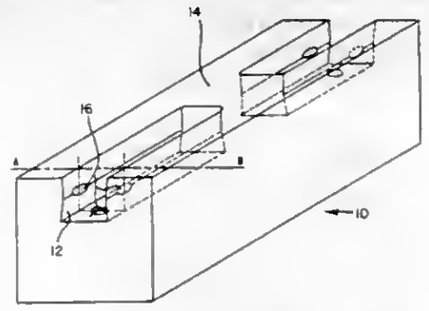
joining said wrappable end portion of said female receptive member to said multi-layered second end portion of said deformable member to provide said two-piece electrical contact, said joining including the steps of wrapping said wrappable end portion substantially about said multi-layered second end portion, followed by welding said multi-layered second end portion to said wrappable end portion after said wrappable end portion has been substantially wrapped about said multi-layered second end portion.

4,031,615
METHOD OF MAKING CATHODES

Daniel Dumas, Saint-Priest, and Gérard Hudault, Saint-Jean-de-Maurienne, both of France, assignors to Societe des Electrodes et Refractaires Savoie, Paris, France

Filed July 7, 1976, Ser. No. 703,265
Claims priority, application France, July 17, 1975, 75.23065
Int. Cl.² H01R 9/02
U.S. Cl. 29—630 R 11 Claims

1. The method of making a cathode element for an electrolytic cell wherein current supplying steel bars are joined to blocks of carbon consisting of the steps of forming an elongated carbon block with means defining a channel extending along at least a major portion of its length, positioning at least one steel bar in spaced relation within and extending substantially the length of said channel and securing the same therewithin for sliding movement along a line generally parallel to the longitudinal axis of said block, anchoring said bar within said channel at at least one anchoring point to preclude transverse displacement of said bar with respect to said channel, and filling selected portions of the space between said channel



and said bar with a cast material while maintaining an expansion zone adjacent a different preselected portion of said bar to permit longitudinal expansion of said bar within said channel in response to variation in a temperature condition.

4,031,616
CARDBOARD CUTTER IMPLEMENT

Clyde A. Hines, 16573 Englewood Ave., Los Gatos, Calif. 95030, and Clyde C. Hines, 1103 N. Kenwood, Burbank, Calif. 91505

Filed Sept. 22, 1975, Ser. No. 615,689
Int. Cl.² B67B 7/30; B26B 3/08
U.S. Cl. 30—2 1 Claim

1. A cardboard cutting implement comprising in combination:

a handle;

a baseplate having a bottom planar surface with an aperture therethrough;

a planar cutter blade having one edge sharpened to form a cutting edge;

blade support means for fixing the blade to the handle with the cutting edge thereof positioned to contact and cut a surface as the handle is grasped and moved along said surface; and

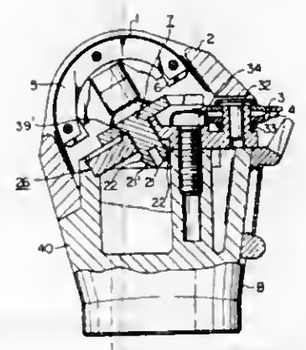
baseplate support means for adjustably attaching said baseplate to said handle such that the blade extends through said baseplate aperture and the baseplate can be pivoted relative to the handle in a direction to change the angle between the plane of the baseplate bottom planar surface and the plane of the planar cutter blade thereby to adjust the angle the blade enters the cardboard surface and vary the angle of the cut made in the cardboard; and

a planar guide in combination with adjustable guide support means fixing the guide to said baseplate in a position to extend beyond the baseplate bottom surface with the plane thereof extending generally parallel to and in the general direction of the plane of the cutter blade with said guide support means being adjustable for varying the angle between the plane of the guide and the plane of the cutter blade.

4,031,617
ELECTRIC SHAVER WITH LONG HAIR TRIMMER

Yosbimasa Tanaka, Hikone; Hirozo Imai, Hirakata; Tadao Tsutsumi, Kadoma, and Takeshi Oda, Hikone, all of Japan, assignors to Matsushita Electric Works Ltd., Osaka, Japan

Filed July 12, 1976, Ser. No. 704,656
Claims priority, application Japan, July 12, 1975, 50-97263[U]
Int. Cl.² B26B 19/10, 19/38
U.S. Cl. 30—34.1 7 Claims

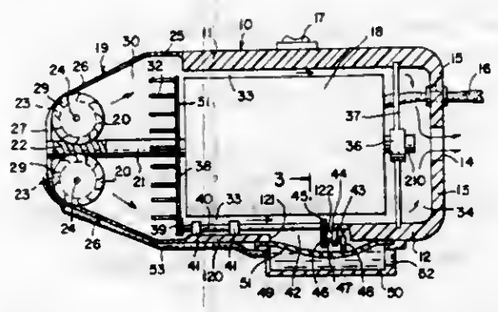


1. An electric shaver comprising an inner blade assembly of a plurality of inner blades supported as spaced on an inner blade supporting frame, a trimmer including a stationary trimming blade and a movable trimming blade slidable along lower surface of said stationary blade, a source of driving power, a reciprocal driving member supporting said inner blade assembly and coupled to said movable trimming blade, means for transmitting said driving power to said reciprocal driving member for reciprocally driving the same, a base member supporting thereon the reciprocal driving member, said stationary trimming blade being fixed to said base member, a shaver body case housing therein respective said elements, and a supporting frame for an outer blade having a plurality of hair introducing holes and cooperating with the inner blade assembly, said outer blade supporting frame being detachably mounted to upper part of said body case.

4,031,618
ELECTRIC SHAVER

Robin Mansfield, 14850 Oka Road No. 31, Los Gatos, Calif. 95030

Filed Jan. 15, 1976, Ser. No. 649,314
Int. Cl.² B26B 19/44
U.S. Cl. 30—41.5 4 Claims



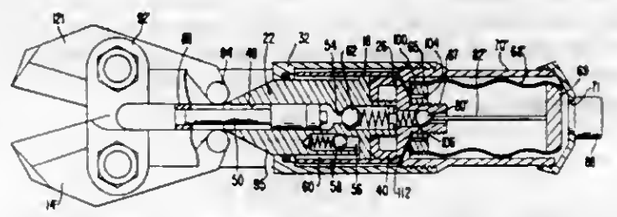
1. An electric dry shaver comprising a casing, a shaving head assembly arranged at the forward end of said casing, said shaving head assembly comprising a slotted cutter guard, a pair of cylindrical reel-type cutters each cylindrical reel-type cutter having an integral worm gear intermediate opposite ends thereof, trunnions at opposite ends, respectively, of each cylindrical cutter arranged to rotatably mount said cylindrical reel-type cutters in over-and-under spaced parallel relationship within said slotted cutter guard with the longitudinal axis of each cylindrical cutter at substantially right angles to the slots in said slotted cutter guard, a vacuum chamber in said shaving head assembly rearwardly of said cylindrical reel-type cutters, a motor mounted within said casing rearwardly of said vacuum chamber, said motor having a drive shaft arranged to extend forwardly into said shaving head assembly, a worm gear integral with the forward end of said drive shaft the said worm gear of said drive shaft arranged in driving engagement with the respective worm gears of said cylindrical reel-type cutters thereby to rotate said cylindrical reel-type cutters, a disc-like vacuum impeller afixed to said drive shaft within said vacuum chamber, a discharge port in the rear end of said casing, internal passage within said casing arranged to connect said vacuum chamber to said discharge port, said drive shaft arranged to rotate said disc-like vacuum impeller to create a vacuum force within said shaving head assembly.

4. An electric dry shaver according to claim 1 wherein said casing is constructed and arranged with lotion dispensing means comprising a chamber having a flexible wall, a conduit arranged to connect the lotion chamber to said shaving head assembly, and rotatable means arranged to be actuated automatically by said disc-like vacuum impeller to engage and deflect the said flexible wall of said lotion chamber thereby to dispense lotion therefrom to said shaving head assembly.

4,031,619
MANUAL, HYDRAULICALLY OPERATED TOOL

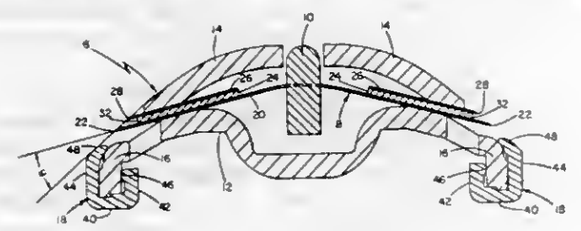
Jack T. Gregory, 390 Redwood Road, San Anselmo, Calif. 94960

Filed Jan. 19, 1976, Ser. No. 650,559
Int. Cl.² B26B 17/00; B25B 7/22
U.S. Cl. 30—180 19 Claims



1. An improved hydraulically operated tool of the type having a cylinder chamber closed at one end, a hydraulic ram within the cylinder chamber, a fluid reservoir, hydraulic pumping means fed by the reservoir for driving the ram out of the cylinder chamber, and work engaging elements operatively connected to the ram and cylinder chamber, wherein the improvement comprises mounting the pumping means in part within the ram, the pumping means including a fluid filled pump chamber within the ram, check valve means mounted in the ram, and wherein the tool further includes means for providing fluid communication between the reservoir and the check valve means and the pumping means further includes means mounted on the ram for pumping fluid from the reservoir through the fluid communication means and the check valve means into the cylinder chamber at the closed end to force the ram to move out of the cylinder chamber thereby operating the work engaging elements.

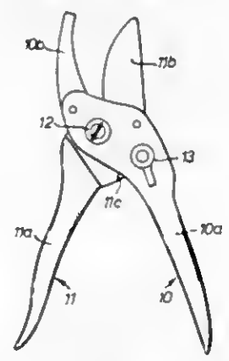
4,031,620
SHAVING SYSTEM
Edward E. Pomfret, Newbury, England, assignor to The Gillette Company, Boston, Mass.
Division of Ser. No. 536,484, Dec. 26, 1974, Pat. No. 3,958,692, which is a division of Ser. No. 381,768, July 23, 1973, abandoned. This application Jan. 28, 1976, Ser. No. 652,995
Claims priority, application United Kingdom, July 25, 1972, 34715/72; July 25, 1972, 34716/72; July 25, 1972, 34717/72
Int. Cl.² B26B 21/54
U.S. Cl. 30—346.57 5 Claims



1. A disposable blade unit comprising a thin, transversely flexible blade which is apertured along its longitudinal center line and has its two longitudinal edges parallel and sharpened to cutting edges, a pair of blade strips each having a length substantially equal to that of the blade and a width less than half that of the blade and each sharpened along one longitudinal edge only, said pair of blade strips lying in a plane parallel to but spaced from that of the blade, and a pair of spacer strips each interposed between the adjacent faces of the blade and a respective one of the blade strips and bonded to both of said faces to secure the two blade strips to the blade with the blade strips disposed symmetrically on opposite sides of the longitudinal center line of the blade with their sharpened edges directed outwardly and extending parallel to the sharpened edges of the blade, said blade having an exposed central portion between the blade strips, the distance between the cutting edge of each blade strip and the longitudinal center line of the blade differing significantly from the distance between each cutting edge of the blade and the said center line, the outer edge of each spacer strip being spaced inwardly from the nearer of the adjacent cutting edges by a distance of at least 0.02 inch, and the cutting edge of each blade strip being spaced from the cutting edge of the blade by a fixed distance of from 0.03 to 0.08 inch, each edge of the blade and the edge of the adjacent blade strip being in a fixed geometrical relation does not change as the blade unit is clamped in a safety razor with said central portion of the blade bent so that the portion of the blade to which one blade strip is secured is exposed at an angle to the portion of the blade to which the other blade strip is secured.

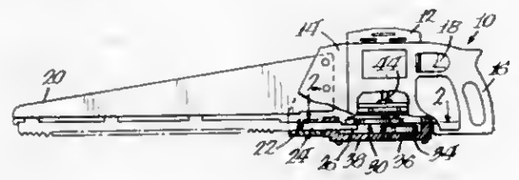
4,031,621
HAND TOOLS
John Arlett, Camberley, England, assignor to Wilkinson Sword Limited, England
Filed July 16, 1976, Ser. No. 706,119
Claims priority, application United Kingdom, July 16, 1975, 29737/75
Int. Cl.² B26B 13/16
U.S. Cl. 30—262 8 Claims

1. A hand tool comprising two members, two handles connected to the respective members and movable to move said members relatively to one another and a manually-operable catch having a shank mounted for rotation in one of said members and including a detent rotatable by the catch into and out of a position in which it prevents or restricts relative movement between the members, the shank being received in an aperture of said one member which is so shaped relative to the shank that over a predetermined range of rotation of the catch away from the position in which the shank was inserted into the aperture, the shank is prevented from withdrawal from the aperture, and said one member is so shaped that it permits the detent to be fitted to or removed from the shank



only when the catch is within said range of rotation and, after fitment of the detent, restricts rotation of the catch to said predetermined range.

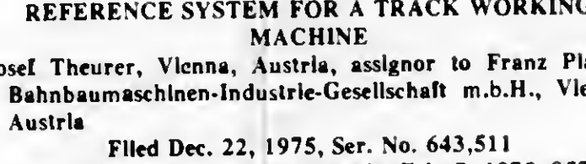
4,031,622
PORTABLE POWER DRIVEN IMPLEMENT
Carl J. Alexander, Moore Park, Mich., assignor to Wells Manufacturing Corporation, Three Rivers, Mich.
Filed Oct. 28, 1975, Ser. No. 626,296
Int. Cl.² B27B 19/04; A01D 46/00
U.S. Cl. 30—392 23 Claims



1. A portable power driven implement comprising:
housing means;
a tool member slidably supported by said housing means for reciprocating motion relative thereto, said tool member having an inner end;
motor means;
drive means adapted to be rotated by said motor means;
the axis of said drive means and the inner end of said tool member defining a plane passing therethrough;
output means rotatably driven by said drive means;
means linking said tool member and said output means for imparting reciprocating motion to said tool member in response to rotation of said output means, said linking means including:
one end portion connected to the inner end of said tool member;
another end portion connected to said output means traversing and intersecting said plane during rotation of said output means; and
an intermediate portion spanning said drive means and configured to remain substantially on one side of said plane.

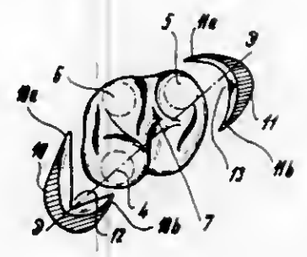
4,031,623
LINGUAL BLADED TOOTH
Bernard Levin, 2077 E. Meadowbrook Road, Altadena, Calif. 91001
Filed June 23, 1975, Ser. No. 589,057
Int. Cl.² A61C 13/00
U.S. Cl. 32—8 11 Claims

1. An insert for use as a lingual cusp of an anatomic artificial tooth, said insert comprising:
means for cutting and shearing food including at least one blade having a convex edge arched outward away from the occlusal surface, said blade being formed of a substance harder than that of the artificial tooth; and
means for securing the insert in the artificial tooth; whereby



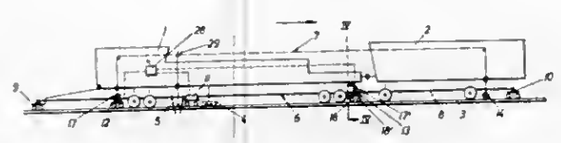
the user is able to chew and shear food with forces substantially less than those required by natural teeth, thereby permitting denture wearers to chew food without distress.

4,031,624
EXTRACTION FORCEPS FOR UPPER MOLARS
Werner Helmann, Warendorfer Strasse 27, 4740 Oelde, Germany
Filed Jan. 15, 1976, Ser. No. 649,466
Int. Cl.² A61C 3/14
U.S. Cl. 32—62 10 Claims



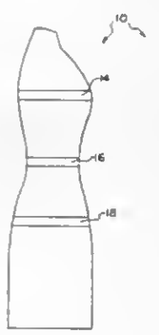
1. Extraction forceps for upper molars, comprising a pair of arms each having an end portion provided with a tooth-engaging jaw formed with claws defining a recess between themselves; and means connecting said arms for relative pivoting movement of said jaws about a pivot axis which extends perpendicularly to planes of closure of said jaws, whereby the forces required for extraction of one of said upper molars are inclined with reference to a skew plane passing through the recesses of said jaws.

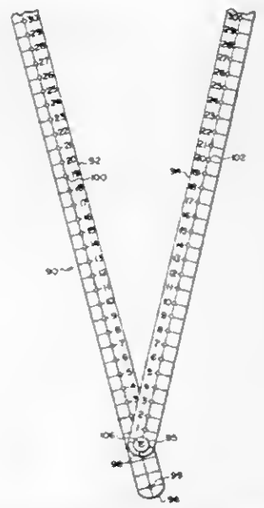
4,031,625
REFERENCE SYSTEM FOR A TRACK WORKING MACHINE
Josef Theurer, Vienna, Austria, assignor to Franz Plasser Bahnbaumaschinen-Industrie-Gesellschaft m.b.H., Vienna, Austria
Filed Dec. 22, 1975, Ser. No. 643,511
Claims priority, application Austria, Feb. 7, 1975, 957/75
Int. Cl.² E01B 33/00
U.S. Cl. 33—1 Q 7 Claims



1. In a reference system for a track working machine mounted for mobility on the rails of a track, which reference system comprises an elongated flexible reference line having two end points and two intermediate measuring points, one of the intermediate measuring points being located in a corrected track section and another one of the intermediate measuring points being located in a track section to be corrected, bogies connected to the machine at each one of the reference line points, the two end point bogies each including means for securing the associated end point of the reference line thereto, and each of the two intermediate bogies including means to sense the position of the associated measuring point of the reference line with respect to the bogie, and drives holding each of the bogies under lateral pressure against a selected one of the track rails: the improvement of two clamping mechanisms associated with the reference line, each clamping mechanism being fixedly connected to a respective one of the intermediate bogies at the intermediate reference line points for selectively reducing and increasing the effective measuring length of the reference line between the end points thereof.

4,031,626
METHOD FOR DRAFTING GARMENT PATTERNS AND MEANS FOR PRACTICING SAME
Marjorie M. Dyal, 1934 S. Kenilworth, Berwyn, Ill. 60402
Filed Feb. 20, 1975, Ser. No. 551,268
Int. Cl.² A41H 3/06
U.S. Cl. 33—17 R 7 Claims





1. A method of making proportionally graded garment pattern component by forming a graphical representation having X and Y axes upon a receptor sheet, said method comprising the steps of: applying a first plurality of equispaced parallel vertical lines and a second plurality of equispaced parallel horizontal intersecting said first plurality and upon said receptor sheet to form the graphical representation, determining the spacing of said first plurality along the X axis by measuring around the figure and dividing the measurement so obtained by a factor of 4 to provide a first spacing factor, measuring the center front length of the figure along a line leading from the base of the neck of the figure to the ground and dividing said last-mentioned measurement by a factor of 4 deriving a tentative factor and adding a predetermined factor of 2 to the tentative factor to provide said second spacing

factor, the spacing between vertical lines being equal to the first factor and the spacing between horizontal lines being equal to the second factor, marking off a pair of rules with quarter-inch spaced graduations representing the first and second factors and carrying indicia correlating the graduation representing said factors to the measurements from which said factors are derived, marking off said distances along the respective X and Y axes and constructing the graphical representation, and thereafter applying universally applicable pattern layout instructions correlated in terms of said graphical graduations to the specific graphical representation whereby when the universal layout instructions are plotted on the graphical representation for any individual figure, patterned components layed out thereon will be properly proportioned for the said individual figure represented by said graphical representation.

4,031,627

LINE HOLDERS FOR BRICK AND CONCRETE BLOCK LAYING

Joseph Dar, 3036 S. Valentia, Denver, Colo. 80231

Filed July 12, 1976, Ser. No. 667,208
Int. Cl.² G01C *15/10*; **B43L** *7/00*; **B44D** *3/00*
U.S. Cl. 33—85 **1 Claim**

1. A pair of mason's line guide holders each of which comprises: a steel wire of a diameter small enough to be inserted into a course of freshly laid morter, the wire being bent to form a generally U-shaped member having two side legs and a base, all of which are generally straight, the side legs being substantially parallel, the connection of each of the side legs to the base comprising a corner formed by a bend in the wire of approximately two hundred seventy degrees so that a loop is formed at each corner, the base extending a distance such that as one of the side legs is pushed into a previously laid course of morter the base spans a plurality of previously laid courses of bricks and the other side leg is spaced a small distance from, and extends over a brick in the course of bricks which is presently being laid, so that the holder can pivot a slight angle about said one leg and the other leg will engage the top surface of said brick and the loop at each corner being formed in a size sufficient to receive said masons line therein.

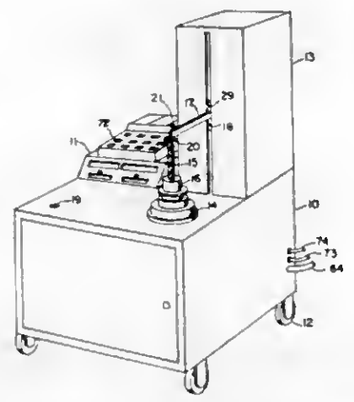
4,031,628

ELECTRONIC TOOL GAGE

Carl W. Kaesemeyer, 2605 Marlington Ave., Cincinnati, Ohio 45208

Filed July 8, 1975, Ser. No. 594,124
Int. Cl.² G01B *5/02*
U.S. Cl. 33—201 **1 Claim**

1. An electronic tool gage device for measuring the length and/or diameter at selected points of tools used in machine tools, the gage device comprising a chassis within a portable cabinet, a column affixed to said chassis, a tool socket affixed to said chassis for receiving tools whose length and/or diameter is to be measured, a slidable carriage adapted to be moved vertically on said column, air bearings mounted on said carriage to give friction free movement between the said carriage and said column, a counter weight to balance said carriage, said carriage supporting a horizontal slidable arm, said carriage having air bearings to give friction free movement between the said arm and said carriage, a first sensing device mounted on said carriage for measuring the length of tools



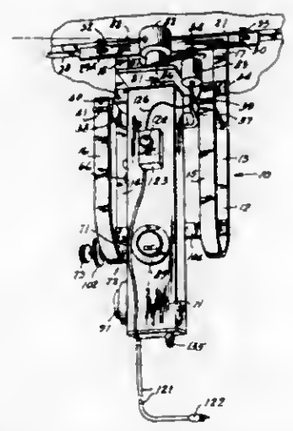
relative to said tool socket, a second sensing device mounted on said arm for measuring the diameter of tools relative to the center line of said tool socket, said sensing devices moving as a single unit, and means for visually displaying the length and/or diameter data.

4,031,629

APPARATUS FOR ESTABLISHING A LEVEL PLANE

George Paluck, 2156 W. Cuyler Ave., Chicago, Ill. 60618

Filed Mar. 30, 1976, Ser. No. 672,035
Int. Cl.² G01C *5/00*; **G01B** *11/26*
U.S. Cl. 33—290 **8 Claims**



1. A laser holding and adjusting bracket for supporting a laser on a wall moulding at a desired orientation and height comprising,

an angle member with one extension of the angle resting on and mating with a horizontal extension of the wall moulding, a pair of clamps releasably clamping said one extension to said horizontal extension, said angle member having its other extension thus held in a vertical orientation,

a main frame member attachable to said other extension.

a C-shaped member pivotally attached to said main frame member and pivotal about a first horizontal axis,

a generally vertical laser supporting frame member pivotally attached to said C-shaped member on a second horizontal axis which is at right angles to said first horizontal axis,

a means for adjusting said supporting frame about said first and second axis,

a laser housing,

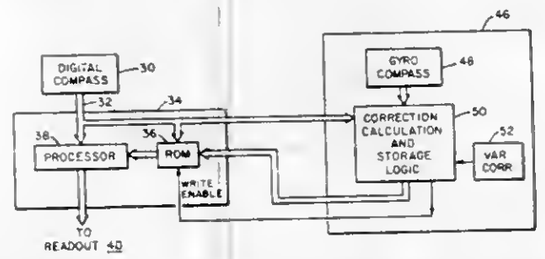
an attachment member conneeted to said laser housing and adjustable attachment means connecting said attachment member to said generally vertical laser supporting frame member for vertical adjustment of said attachment member with respect to said supporting frame member.

4,031,630

CALIBRATION APPARATUS FOR AUTOMATIC MAGNETIC COMPASS CORRECTION

John T. Fowler, Winthrop, Mass., assigoor to The Laitram Corporation, Harahan, La.

Filed June 17, 1976, Ser. No. 697,195
Int. Cl.² G01C *17/38*
U.S. Cl. 33—356 **9 Claims**



1. Apparatus for providing a deviation-correeted output signal representative of an actual compass heading comprising:

a magnetic compass providing an output signal representative of an indicated compass heading;

means for storing deviation-correction signals representative of the deviation of the compass for each of a plurality of different indicated headings;

means for retrieving the stored deviation-correction signal corresponding with the indicated compass heading in response to the output signal from the compass;

means responsive to the retrieved deviation-correction signal and to the compass output signal for producing a deviation-corrected output signal representative of the actual compass heading; and

a calibration eircuit, including

means for providing signals representative of the actual heading of the compass;

means for providing the compass output signal to the calibration eircuit;

means responsive to the signals representative of the actual heading and to the compass output signal for providing signals representative of the difference therebetween; and

means for eausing the difference signals to be stored by the storing means.

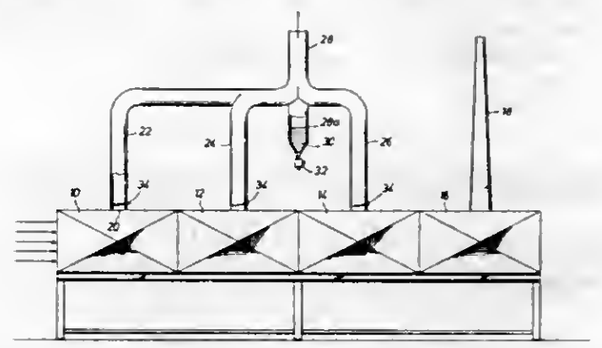
4,031,631

APPARATUS FOR REDUCING THE OPACITY OF THE EMISSIONS FROM WOOD DRYERS

John W. Robinson, Silsbee, Tex., assignor to Kirby Lumber Corporation, Houston, Tex.

Filed Juoe 20, 1975, Ser. No. 588,762
Int. Cl.² F26B *19/00*
U.S. Cl. 34—235 **2 Claims**

1. In a dryer for veneer having a plurality of heated zones through which the veneer moves as it is being dried and an exhaust outlet associated with each zone for venting gases and vapors from the zone, the improvement for reducing the opacity of the vented gases and vapors comprising a common stack, conduit means connecting each stack to the common stack, and means for insulating the conduit means to reduce



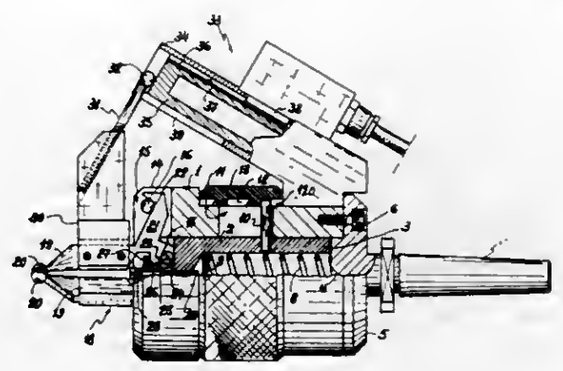
the heat loss of the vented gases and vapors as they travel to the common stack.

4,031,632

CENTERING AND MEASURING HEAD FOR MEASURING MACHINES

Georges Lendi, Crissier; Serge R. Ginggen, Renens, and Gildo Vadi, Cottens, all of Switzerland, assignors to Tesa S.A., Renens, Switzerland

Filed Sept. 29, 1975, Ser. No. 617,384
Claims priority, application Switzerland, Oct. 24, 1974, 14228/74
Int. Cl.² G01B *5/08*, *7/12*
U.S. Cl. 33—178 R **4 Claims**



1. A centering and measuring head for measuring machines, comprising:

a. a tubular body;

b. a piston slidably mounted within said body for longitudinal movement therein;

c. a resilient means biasing said piston towards one end of said tubular body;

d. at least two transverse shafts disposed at said one end of said tubular body, said shafts being tangential with an imaginary circle concentric with the axis of the piston;

e. cylindrical pin means;

f. at least two centering keys disposed at said one end of said tubular body, each said eentering keys formed of a contact arm assembled to a control arm in a substantially L-shape, and each of said control arms comprises two alternate V-shaped parts having ridges which are parallel to each other, and one of said V-shaped parts is oriented in a direction opposite to the piston head and applied against said shaft with its ridge parallel thereto, the other V-shaped part being oriented in the direction of the piston head and engaged on said cylindrical pin means parallel to the ridge thereof and bearing against the piston head;

g. means for connecting said control arms of said centering keys to said piston;

h. means for controlling the displacements of said piston against the bias of said resilient means; and

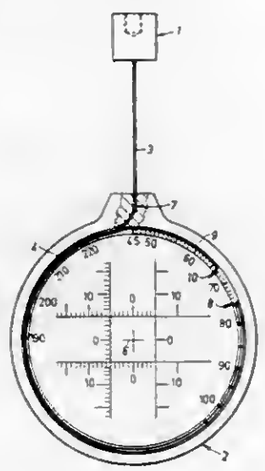
i. bar means connected to each of said control arms and inserted into the ends of said cylindrical pin means, whereby said cylindrical pin means is connected to the V-shaped part with a certain floating play.

4,031,633

SCALE FOR USE IN MEASURING AND STRAIGHTENING DAMAGED VEHICLES IN A SO-CALLED VEHICLE ALIGNMENT APPARATUS

Bengt Anders Bjork, Eskilstuna, Sweden, assignor to Aktiebolaget Nike Hydraulik, Eskilstuna, Sweden

Filed June 28, 1976, Ser. No. 700,261
Int. Cl.² G01B *5/25*; **G01C** *15/08*; **G01B** *11/26*
U.S. Cl. 33—288 **3 Claims**



1. A scale for use in measuring and straightening damaged vehicles in a so-called vehicle alignment apparatus, especially when the measuring is made by using a laser beam, said scale including a fastening means for freely depending fastening of the scale at certain locations on the vehicle, a scale body having a graduated scale, and a line cross that is adjustable to a selected position in relation to the fastening means, the graduated scale indicating the distance of the line cross from a predetermined reference point, characterized in that the scale body and the graduated scale both have a circular shape with the line cross arranged in the center of the scale body, and in that an annular groove is cut in the scale body along the scale, a flexible band extending substantially radially from the scale body and which at its free end is connected to the fastening means and at its other end is provided with an index means said groove receiving said flexible band so that said flexible band so that said index means registers with said scale, the distance of the line cross from the reference point.

4,031,634

TEACHING DEVICE

Edwin Stastny, Santa Ana; Keith Rauch, Los Angeles, and Ronald Young, Simi Valley, all of Calif., assignors to Calfiope International, Inc., Los Angeles, Calif.

Filed Nov. 24, 1975, Ser. No. 634,493
Int. Cl.² G09B *5/04*; **G11B** *5/55*, *25/04*
U.S. Cl. 35—8 A **17 Claims**

1. A teaching device employing cards, each card including printed indicia and a magnetic strip thereon comprising

a chassis;

a card path extending across said chassis;

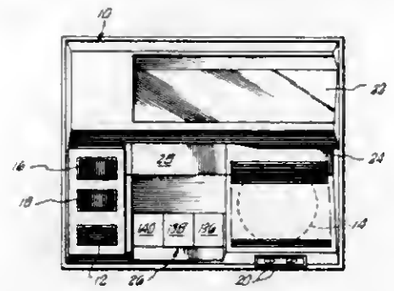
a magnetic recording and reproducing head assembly mounted on said chassis and selectively extending to said card path;

sound recording and reproducing means associated with said head assembly for recording on the magnetic strip and for reproducing that which has been recorded on the magnetic strip, including selector switch means for selecting from recording and reproducing modes;

means for moving the card along said card path for both advancing and retracting the card past said head assembly, said means for moving the card being activated to drive the card forward across said head assembly by insertion of the card in said card path;

track selection means for actuating said head assembly to select a track on the magnetic strip;

main control means for controlling said track selection means and said means for moving the card in said selector switch means, said main control means including first control means for actuating said means for moving the card to return the card to a starting position in said card



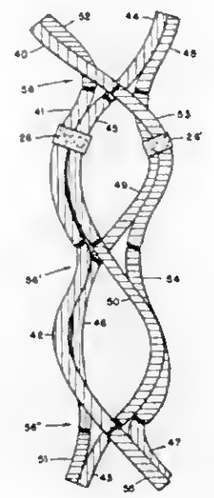
path, for actuating said track selection means to select a first track on the magnetic strip and for actuating said selector switch means to select the reproducing mode, second control means for actuating said means for moving the card to return the card to a starting position in said card path, for actuating said track selection means to select a second track on the magnetic strip and for actuating said selector switch means to select the reproducing mode, and third control means for actuating said means for moving the card to return the card to a starting position in said card path, for actuating said track selection means to select the second track on the magnetic strip and for actuating said selector switch means to select the recording mode.

4,031,635

MANIPULATIVE CHROMOSOMAL MODEL

Edward E. Brandt, and Margaret K. Brandt, both of 208 Doak Drive, Greeneville, Tenn. 37743

Continuation-in-part of Ser. No. 568,024, April 14, 1975, abandoned. This application Aug. 20, 1976, Ser. No. 716,279
Int. Cl.² G09B *23/36*
U.S. Cl. 35—20 **6 Claims**



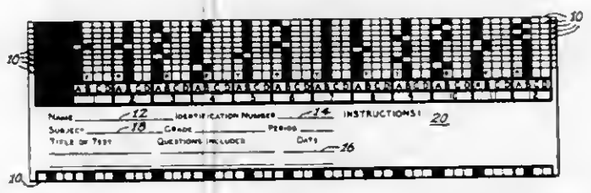
1. A manipulative chromosome model to be placed on a flat surface for the study of chromosomal changes and processes which comprises: from two to four limp generally cylindrical subunits representing chromosome segments, each subunit having a length of about 4 to about 8 inches and a diameter of about ¼ to ⅜ inch; a first half of a contact sensitive reusable fastener affixed to one end of each subunit substantially perpendicular to the length of the subunit; and a second half of the fastener affixed to the second end of each subunit substantially perpendicular to the length of the subunit whereby the subunits may be placed on the flat surface and serially joined to form a simulated chromosome.

4,031,636

CARD GRADING SYSTEM

John M. Hurt, Jr., P.O. Box 126, Smyrna, Tenn. 37167

Filed Nov. 28, 1975, Ser. No. 635,864
Int. Cl.² G09B *3/08*
U.S. Cl. 35—48 A **9 Claims**



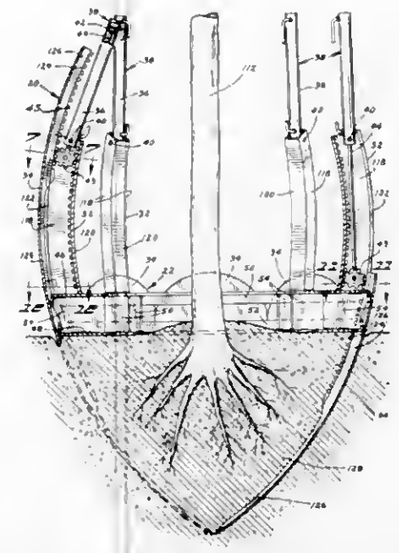
1. An answer card bearing at least one lengthwise column of true-false/multiple-choice answer spaces having lines thereon for marking between to indicate answers to a plurality of questions, said card being adapted to be folded along the length of said answer spaces so as to present, when viewed from above, a top rim edge which will offer a visible mark thereon when folded and compacted together in a stack with a plurality of said cards after said lines have been marked between and a key card at least one end of the stack with lines marked between to indicate correct answers.

4,031,637

TREE TRANSPLANTING MACHINE

Walbert A. Stocker, Jordan, Minn. 55352

Filed July 14, 1976, Ser. No. 705,095
Int. Cl.² A01B *13/00*
U.S. Cl. 37—2 R **11 Claims**



1. A machine for digging trees from the earth, said machine including:

A. a ring stand;

B. means for situating said stand in encircling relation to a tree to be transplanted;

C. a plurality of stanchions extending upwardly from said stand;

D. a plurality of digging spoons, each mounted for guided, sliding movement with respect to one of said stanchions and with respect to said stand between an upper position situated substantially out of the earth in parallel alignment with its stanchion, and a lower position wherein its lowermost portion meets with the lowermost portions of the other spoons when in said lower position;

E. said spoons when all in said lower position together isolating and separating the roots of said tree and the earth encompassing the roots and situated inside said spoons from the rest of the earth thus to define a tree ball;

F. power digging means for selectively moving each spoon between said upper and lower positions;

G. power lifting means for lifting said machine and tree and tree ball from the earth;

H. said power digging means includes a linear digging motor adapted to be anchored to an upper portion of each stanchion and having a powered linearly movable rod extending downwardly therefrom;

I. at least one generally cylindrical actuator rotatably mounted on the downward end of said motor rod; and

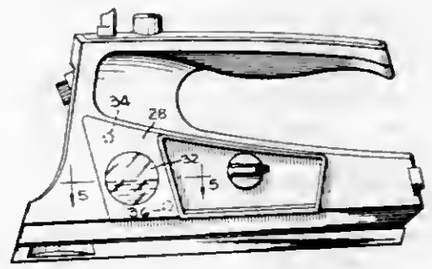
J. means operably assembled with said stanchion, said actuator and its digging spoon for causing said spoon to be moved at least twice the distance of movement of said actuator in response to movement of the actuator in the same direction.

4,031,638

STEAM IRON WATER GAUGE

William D. Ryckman, Jr., and Lester D. Little, both of Asheboro, N.C., assignors to General Electric Company, Bridgeport, Conn.

Filed Aug. 20, 1976, Ser. No. 716,103
Int. Cl.² D06F *75/06*
U.S. Cl. 38—77.2 **9 Claims**



1. An iron comprising:

a soleplate,

exterior wall means positioned above said soleplate in a fixed position relative to said soleplate, a selected wall portion of said exterior wall means having a vertical portion when the iron is positioned both horizontally and vertically,

a water reservoir within said exterior wall means at least partially defined by said selected wall portion, and

cover means secured and peripherally sealed to the outer surface of said selected wall portion and defining therewith a chamber intermediate said cover means and said selected wall portion, at least a portion of said cover means being transparent to permit said chamber to be viewed through said cover means,

said selected wall portion having at least two relatively small spaced-apart openings therein providing direct communication between said chamber and said water reservoir,

each opening being disposed out of view through said transparent portion,

one of said openings communicating with a relatively low portion of said water reservoir and another of said openings communicating with a relatively high portion of said water reservoir

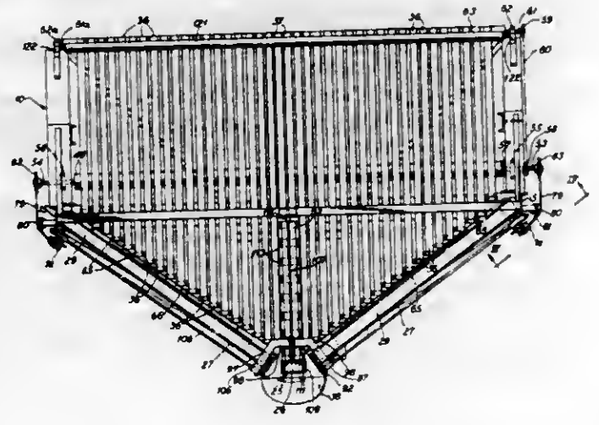
when said soleplate is disposed horizontally or vertically, whereby a range of water levels within said water reservoir may be determined by observing the water level in said chamber through said cover means when the iron is disposed both horizontally and vertically.

4,031,639

SPREADER-FEEDER FOR FLATWORK IRONER

Logan D. McCabe, Rte. 4, Box 8, Lubbock, Tex. 79413, and Stanley G. McCabe, 5302 11th, No. 146, Lubbock, Tex. 79416

Filed Oct. 26, 1976, Ser. No. 735,257
Int. Cl.² D06F 67/04
U.S. Cl. 38—143 29 Claims



1. In an apparatus for spreading and feeding flat laundered articles for ironing and like operations,

a main frame,

a pair of vertically spaced upper and lower power-driven central conveying belts supported on said main frame and extending along the central portion thereof,

means supporting the upper of said belts to establish a pressure nip between said belts,

spreader means mounted on said main frame on opposite sides of said upper and lower central belts and diverging therefrom as extending therealong,

a plurality of equally spaced power-driven carry-out belts extending from said spreader means at opposite sides of said central belts, and extending parallel to said central belts to the discharge end of the apparatus, and providing a substantially continuous article carrying surface for the length of the apparatus,

said spreader means including a pair of vertically spaced power-driven belts on each side of said central belts and extending in angular relation with respect to said central belts at equal angles with respect to said central belts, and

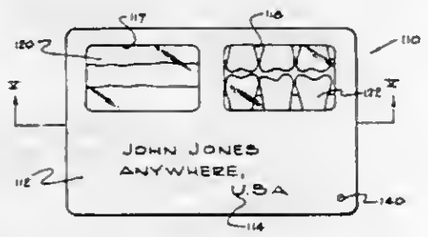
means maintaining pressure nips between said angularly extending belts for spreading and maintaining the laundered articles square with respect to said central belts as carried along the apparatus by said central belts.

4,031,640

IDENTIFICATION SYSTEM

Charles B. Hanna, Jr., 113-B Willow Run, Fayetteville, N.C. 28301, and William W. Coleman, 1646 Colony Road, Rock Hill, S.C. 29730

Filed Dec. 8, 1975, Ser. No. 638,466
Int. Cl.² G09F 3/02
U.S. Cl. 40—2.2 5 Claims



1. An improved identification system comprising:

a. a base of a predetermined thickness, said base having at least one radiograph receiving area therein and a personal data receiving area thereon;

b. at least one dental radiograph received in said at least one radiograph receiving area, said at least one dental radiograph having a thickness approximating that of said base;

c. a first sheet of transparent thermoplastic film disposed on one side of said base and radiograph and extending beyond the edges of same, said film being thermally bonded to said radiograph;

d. a second sheet of transparent thermoplastic film disposed on an opposite side of said base and said radiograph and extending beyond the edges of same, said second sheet of film being thermally bonded to said opposite side of said radiograph and to exposed surfaces of said first sheet of film to totally enclose said base and said radiograph, said thermal bonding between said sheets of film and said sides of said radiograph being sufficient to destroy said radiograph upon delamination of said film; and

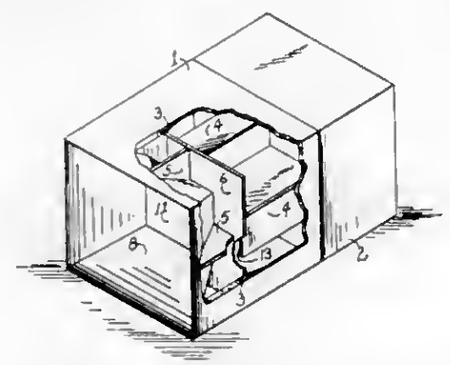
e. tactile orientation means on one of said sheets of film.

4,031,641

COMBINED CONTAINER AND VIEWER PACKAGE FOR FILM TRANSPARENCIES

Jordan Ross Kaiser, Burying Hill Farm, Burrying Hill Road, Greenwich, Conn. 06830

Continuation of Ser. No. 611,175, Sept. 8, 1975, abandoned.
This application July 6, 1976, Ser. No. 703,063
Int. Cl.² G09F 11/30
U.S. Cl. 40—63 A 9 Claims



1. A mailable combined container and view package for film transparencies comprising: a substantially rectangular shaped holder for holding a stack of film transparencies and forming one part of said package; a substantially rectangular shaped viewer part provided with an open back end and having a framed opening behind which a single film transparency is located, and means on said holder part for holding said single film transparency in said framed opening when said holder is inserted through the open back end of said viewer part.

4,031,642

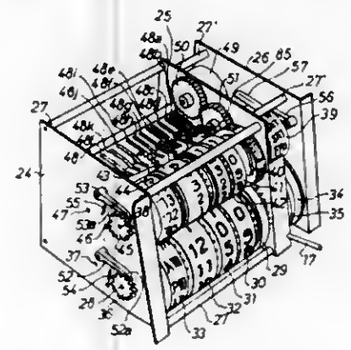
AUTOMATIC CALENDAR

Motomu Aoki, Atsugi, and Akira Isbikawa, Tokyo, both of Japan, assigoors to Motomu Aoki, Japao

Filed Apr. 11, 1974, Ser. No. 460,182
Claims priority, application Japan, Apr. 14, 1973, 48-42438; Dec. 26, 1973, 49-339; Jan. 28, 1974, 49-10963
Int. Cl.² G09D 3/06
U.S. Cl. 40—111 5 Claims

1. A calendar comprising a units display drum having a periphery and displaying a plurality of spaced numerals in the sequence 0,1,1,2,3,4,5,6,7,8, and 9 at equal intervals on the periphery of the units display drum, a tens display drum having a periphery and displaying a plurality of spaced numerals in the sequence 0, 1, 1, 2, 2, and 3 at equal intervals on the periphery of the tens display drum, a calendar main shaft for concentrically supporting the units display drum and the ten's

display drum adjacent each other, support means for supporting said shaft, said support means having index means adjacent said drums for indicating a single numeral on each of said drums, stepping means coupling the units display drum to the tens display drum for advancing the tens display drum relative to the index means once when the numeral of the units display



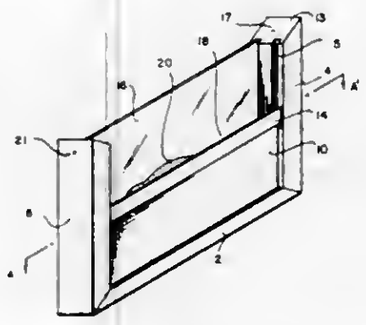
drum appearing at the index means changes from 9 to 0 once when the numeral of the units display drum appearing at the index means changes from 1 to 1, and rotating means for rotating the units display drum to move a numeral past the index means each day so as to display the days of a month in sequence.

4,031,643

SAND PICTURE FRAME

Charles P. Templetoo, 104 Cleveland Road, Rossville, Ga. 30741

Filed May 14, 1976, Ser. No. 686,313
Int. Cl.² G09F 19/00
U.S. Cl. 40—160 8 Claims



1. An Apparatus for creating a sand painting, comprising:

a frame comprised of a horizontally disposed bottom member and two vertically disposed side members connected to said bottom member at opposite ends thereof, said side members each having a first vertical groove;

a first backing plate which is mounted in said first grooves of said side members, having a vertical dimension of approximately one half the magnitude of the vertical dimension of said side members;

a transparent plate which is mounted in a second vertical groove in each of said side members, forward of said first vertical grooves, forming a lower portion of a cavity with said frame and said first backing plate, which is accessible from the top edge of said first backing plate for the introduction of sand therein,

a second backing plate which slidably engages said first grooves of said side members with a lower edge supported by said top edge of said first backing plate, having a vertical dimension of approximately one half that of said side members, for forming an upper portion of said cavity which is accessible from the top edge of said second backing plate for the introduction of said therein;

a horizontally disposed top member having opposite ends connected to the top ends of said vertical side members, and slidably engaging the top edge of said second backing plate and the top edge of said transparent plate, for sealing said sand within said cavity.

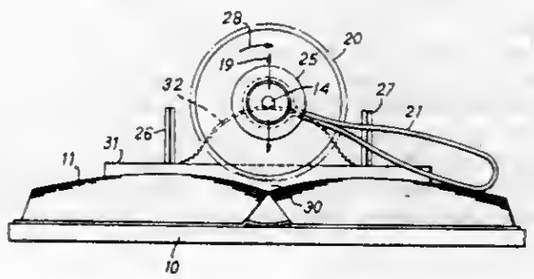
whereby designs may be conveniently formed by said sand in said lower portion of said cavity from the relatively close proximity of said top edge of said first backing plate.

4,031,644

PAGE-TURNERS

Peter Rogers, Addlestone, England, assigoor to Possom Controls Limited, Aylesbury, England

Filed Apr. 12, 1976, Ser. No. 675,758
Claims priority, application United Kingdom, Apr. 18, 1975, 16174/75
Int. Cl.² G09F 11/00
U.S. Cl. 40—104 A 4 Claims



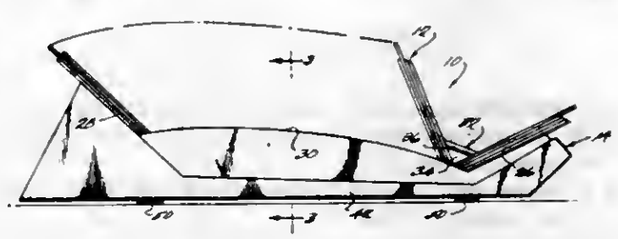
1. Apparatus whereby the pages of a book can be turned by remote control, comprising a mounting board for supporting a book and having a reversible electric motor mounted thereon, the motor having an output shaft extending therefrom over and generally parallel to the mounting board and being pivotally mounted for swinging movement of the output shaft through limited angles across and perpendicular to the mounting board, the output shaft having affixed thereto a friction-wheel for rolling across the pages of a book resting on the mounting board when the wheel is driven by the motor to thereby turn said pages, and a radial finger adjacent the wheel and coupled to the shaft through a slipping clutch whereby when the shaft reaches a limit of swing across a book the wheel can continue its rotation with the finger held against rotation by engagement with the mounting board.

4,031,645

TRAY TYPE CARD FILE

Lloyd E. Rose, North Smithfield, and Joseph P. Maruca, Coventry, both of R.I., assignors to Textron, Inc., Providence, R.I.

Filed Sept. 18, 1973, Ser. No. 398,439
Int. Cl.² G09F 11/06
U.S. Cl. 40—68.6 12 Claims



1. Apparatus for supporting a multiplicity of cards of the type having a pair of parallel T-shaped slots formed along one edge thereof, each of which defines a pair of opposed flexible edge tabs, said apparatus comprising a unitary one piece structure molded of plastic material arranged to be supported on a horizontal surface, said structure including front and rear card supporting walls spaced apart to receive a multiplicity of cards therebetween in row formation, said front wall having rearwardly and upwardly facing surface means for supporting

a forwardmost card of the row along the forward face thereof in a forwardly and upwardly inclined position, said rear wall having forwardly and upwardly facing surface means for supporting a rearwardmost card of the row along the rearward face thereof in a rearwardly and upwardly inclined position, a pair of transversely spaced card supporting walls extending between the lower portions of said front and rear walls, said transversely spaced walls having upwardly facing surfaces disposed in a common plane for supporting the entire row of cards along the portions of the slotted edges thereof extending outwardly from the T-shaped slots therein, a lower rail section extending vertically upwardly along the inner portion of each of said transversely spaced walls between said front and rear walls, an upper rail section formed along the upper portion of each lower rail section and extending transversely outwardly therefrom in both directions, said rail sections having surface means facing in both lateral directions for engaging the slot defining edges of the cards to prevent transverse movement thereof out of the row formation, said upper rail sections having downwardly facing surface means on opposite sides of each lower rail section for engaging corresponding opposed flexible tabs of the cards to normally prevent upward movement of the cards out of the row but permitting such movement through flexure of the tabs, said structure being devoid of material in the space disposed vertically beneath and between the opposed portions of the said upper rail sections extending transversely inwardly of the associated lower rail sections.

4,031,646

SUSPENDIBLE FILING FOLDER

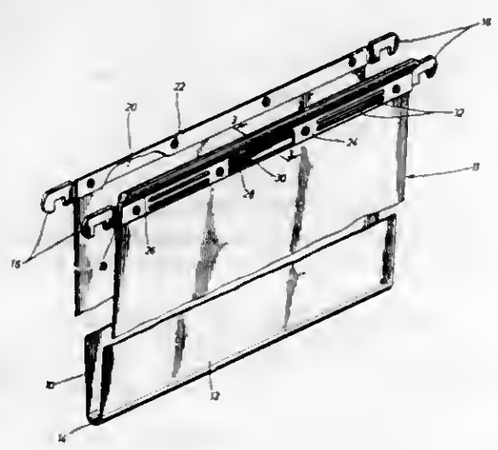
Chantal de Nouël, Paris, France, assignor to Societe d'Exploitation de la S.A. Henri Malsert, Lyon, France

Filed Oct. 21, 1975, Ser. No. 624,395

Claims priority, application France, Oct. 21, 1974, 74.35241

Int. Cl.² B42F *21/00*

U.S. Cl. 40—359 **7 Claims**



1. A vertically suspendable filing folder comprising:
a pair of suspension bars having means at the ends thereof to engage a support;
an envelope with a closed bottom affixed at its upper ends to said suspension bars;
a non-magnetizeable housing attached to one of said suspension bars for mounting a magnetic element thereto;
a permanent magnet disposed within said non-magnetizeable housing and surrounded thereby so as to have a surface thereof facing outwardly from said one of said suspension bars; and,
a region of ferromagnetic material disposed facing outwardly on the other of said suspension bar in opposing position to said magnet for magnetically engaging the magnet of an adjacent folder.

4,031,647

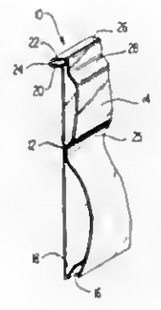
TITLE PROTECTOR

Reta Greenough Thomas, 101 S. Whiting St., No. 407, Alexandria, Va. 22304

Filed Feb. 10, 1976, Ser. No. 656,922

Int. Cl.² B42F *21/00*; **B65D** *27/00*

U.S. Cl. 40—359 **1 Claim**



1. A transparent folder for a document to be filed comprising:
a single sheet of transparent plastic including a front planar portion having an upper edge and a bottom edge,
a back planar portion coextensive and integral with said front planar portion and having an upper edge joined to said first-mentioned upper edge by a fold and both said front and said back planar portions having free bottom edges,
a title display tab extending outwardly from said front panel and formed by sections of said front planar and rear planar portions adjacent to said fold,
said back planar portion having a shallow groove parallel to and spaced from said upper edge a distance equal to the vertical distance the outer edge of said title display tab is spaced from said upper edge.
whereby when two or more of said folders are juxtaposed in front-to-back alignment with each other said groove of the frontmost of said folders will receive said outer edge of said tab of the folder located immediately therebehind,
a return lip formed on the bottom edge of said front planar portion to receive a bottom edge of said document and the bottom edge of said back planar portion, said document comprises a foldable sheet having a title bearing portion thereon, which title bearing portion may be folded and inserted in said title display tab, and
a second groove formed in said back planar portion such that said first and second grooves are in contact with the rear face of said front planar portion.

4,031,648

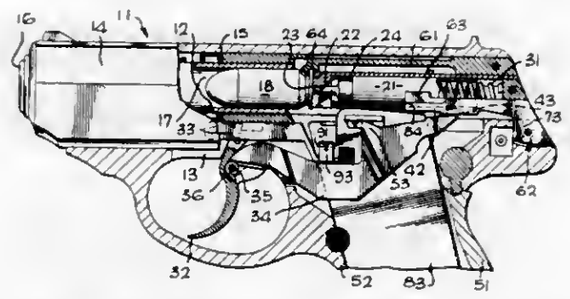
MAGAZINE SAFETY AND EJECTOR

Frank S. Thomas, 835 S. Cajon, West Covina, Calif. 91790

Filed Dec. 29, 1975, Ser. No. 644,437

Int. Cl.² F41C *17/08*

U.S. Cl. 42—70 A **9 Claims**



1. A magazine safety for a semi-automatic double action firearm having a magazine receiver, a cartridge magazine removeably fitted therein, and a cartridge extractor and wherein a firing pin is cocked and released for firing by a trigger bar pivotably connected to a trigger and resiliently urged into releasable engagement with said firing pin, said magazine safety comprising:
camming means comprising an elongated arm pivotably attached at one of its ends to the frame of said firearm and engaging said trigger bar at a point intermediate the ends of said arm for movement of said trigger bar out of engagement with said firing pin;
resilient means operatively connected between said frame and said camming means and rotating said camming means about its axis of rotation thereby holding said trigger normally out of engagement with said firing pin; and
restraining means comprising a lip positioned on said magazine to engage the end of said arm remote from its said attached end and thereby restrain said camming means from disengaging said trigger bar and said firing pin, when said magazine is seated in its operational position in said magazine receiver.

4,031,649

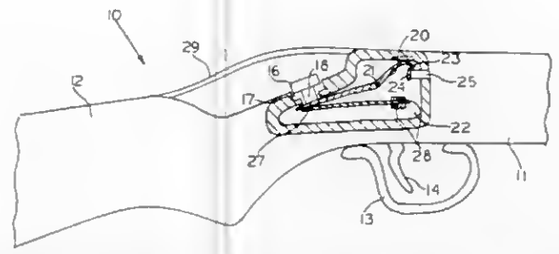
AUTOMATIC SAFETY LOCK FOR FIREARMS

Walter B. Brock, 1101 Titus Towers, Ithaca, N.Y. 14850

Filed July 23, 1976, Ser. No. 707,934

Int. Cl.² F41C *17/04*, *17/02*

U.S. Cl. 42—70 F **2 Claims**



1. In a firearm having a hand grip portion and a gun stock projecting rearwardly therefrom, an automatic safety lock comprising
a button mounted to reciprocate in an opening in said stock adjacent the forward end thereof, and positioned to register with the underside of the thumb on the underside of the thumb on the trigger hand of the operator of the firearm,
an operating member on said firearm movable from an inactive to a firing position to effect the discharge of a projectile from the firearm,
movable locking means interposed between said button and said operating member normally to hold said operating member releasably in its inactive position, and
resilient means urging said button and said locking means into first positions in which said button projects from said opening in said stock and said locking means is engaged with said operating member releasably to hold it in its inactive position,
said button being operative, upon being moved downwardly in said opening by the operator's thumb, to move said locking means to a second position against the resistance of said resilient means, thereby to release said operating member for movement to its firing position,
said locking means being a lever pivoted intermediate its ends for movement by said button from said first position, in which one end of said lever is engaged with said operating member to hold the latter in its inactive position, to a second position in which said one end of the lever is disengaged from said operating member,
said operating member being a reciprocable firing pin, having a circumferential flange forming a rim on one end thereof, and
said lever having a hook on said one end thereof engageable over said rim to hold said pin in its inactive position when said button is in its first position.

4,031,650

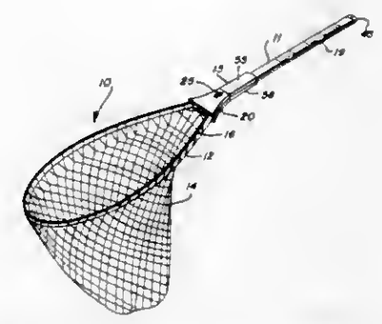
RETRACTABLE NET

Samuel Joseph Popeil, Chicago, Ill., assignor to Popeil Brothers, Inc., Chicago, Ill.

Filed Jan. 9, 1976, Ser. No. 647,805

Int. Cl.² A01K *77/00*

U.S. Cl. 43—12 **16 Claims**



1. A retractable net comprising, in combination,
a handle,
a mesh net at one end of the handle,
a continuous flexible band reversibly flexed thereby forming a net hoop,
said band having ends along the handle,
means at the end of the handle adjacent the net to engage the band and shape the same when passed therethrough,
said net having means for securing the same to the band,
and means for advancing and retracting at least one end of the flexible band,
said means for advancing and retracting at least one end of the flexible band comprising a hollow member proportioned to slide along the handle,
said hollow member comprising separable members,
said band ends being locked in place when said members are secured together,
and means for securing said members together,
whereby a net hoop of increasing and decreasing opening is formed by advancing and retracting the flexible band, and whereby the band may be released to replace the netting by separating the hollow member.

4,031,651

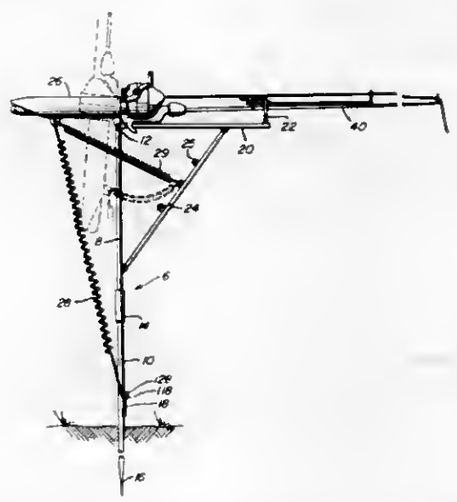
FISHING ROD HOLDER WITH AUTOMATIC HOOK SETTER

Paul O. Titze, R.R. No. 2, Mitchell, S. Dak. 57301

Filed Mar. 30, 1976, Ser. No. 672,001

Int. Cl.² A01K *97/00*

U.S. Cl. 43—15 **5 Claims**



1. A fishing pole holder and hook setter comprising a vertical support post for insertion in the ground, a tubular sleeve

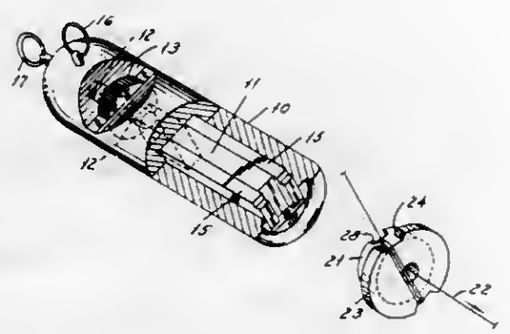
holder for the reception of the butt end of a fishing pole, said holder pivoted to the top of the vertical support post to rotate from a horizontal position to a vertical position, a horizontal linear support rod attached to the top of the vertical post and extending in a direction opposite to said sleeve holder's horizontal position, spring means extending between the free end of the sleeve holder and the support system, a U-shaped support mounted at the free end of the horizontal support rod for the reception of the intermediate portion of the fishing pole and line, a trigger mechanism mounted on said U-shaped support having a positive hook means to engage the fishing line, a brace connecting said vertical support post and said horizontal support rod, the spring means to bias the sleeve holder comprising a main spring connected between the free end of the sleeve holder and the lower post section of the vertical post, and a second lighter spring is connected between the brace and the free end of the sleeve which second spring may be used alone or in conjunction with said main spring.

4,031,652

FISHING LINE RELEASE MECHANISM

C. Evan Johnson, Onekama, Mich., assignor to Hitachi Magnetics Corporation, Edmore, Mich.

Filed Mar. 15, 1976, Ser. No. 667,097
Int. Cl.² A01K 91/00
U.S. Cl. 43—43.12 **5 Claims**



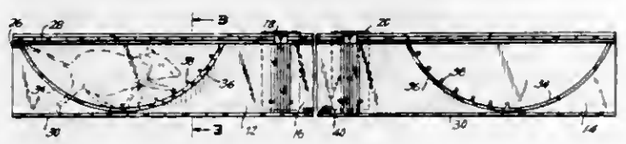
1. A fishing line release mechanism comprising: a housing defining an elongated passageway having an open end; a permanent magnet positioned within said passageway having a pole facing said open end; manually adjustable means whereby the magnet is fixedly positionable in different axial positions within said passageway; and a release plate composed of magnetic material positionable within the open end of said passageway, said release plate being attracted to said magnet when positioned within said passageway, said release plate being threadable on a fishline and being movable to a position free of attraction by said magnet when the pull of said fishline is sufficient to overcome the attraction of said magnet for said release plate.

4,031,653

BAITING ARRANGEMENT FOR RODENTS

Carmel T. Jordan, 1040 Grandview Ave., Union, N.J. 07083

Continuation-in-part of Ser. No. 466,149, May 2, 1974, Pat. No. 3,965,609. This application Apr. 12, 1976, Ser. No. 676,361
Int. Cl.² A01M 23/20
U.S. Cl. 43—61 **10 Claims**



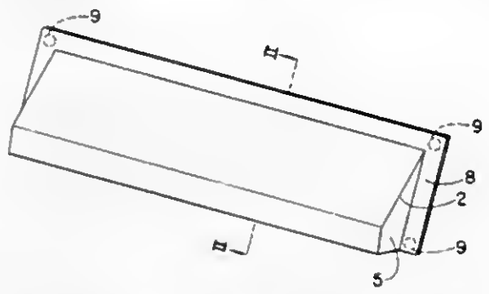
1. A bait feeding arrangement for rodents comprising, in combination, a modular entrance and exit housing with an opening through which a rodent may enter and leave; said housing having side walls with curved grooves formed therein; a curved closure member slidable within said grooves in said side walls; and a modular feeding housing connected to said entrance and exit housing and containing feed for said rodent, said curved closure member being in a first position closing said opening prior to entry into said entrance and exit housing by said rodent, said rodent entering said entrance and exit housing by moving on said curved closure member, said curved closure member sliding in said grooves toward a second position closing said opening when said rodent moves on said curved closure member, said rodent having a free passage into said entrance and exit housing after leaving said curved closure member in said second position, said rodent moving on said curved closure member to leave said entrance and exit housing, said curved closure member sliding in said grooves from said second position to said first position when said rodent leaves the interior of said entrance and exit housing.

4,031,654

INSECT TRAP

James R. Gray, P.O. Box 5094, Little Rock, Ark. 72205

Filed Jan. 26, 1976, Ser. No. 652,383
Int. Cl.² A01M 1/14
U.S. Cl. 43—114 **16 Claims**



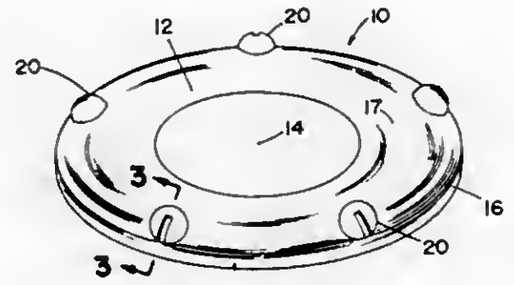
1. A trap for insects or other pests comprising: a panel having an adhesive surface, means supporting an edge of said panel away from a supporting surface so that said panel is disposed over and converges toward the supporting surface, and attractant in proximity to the portions of said panel nearest the supporting surface for means luring insects or pests to move under said panel and toward contact with said adhesive surface.

4,031,655

AERODYNAMIC SOUND-EMITTING AMUSEMENT DEVICE

Jose Ponciano, 1294 Southgate Ave., Daly City, Calif. 94015, and Thomas S. Bautista, 1730 Silliman St., San Francisco, Calif. 94134

Filed Jan. 30, 1976, Ser. No. 653,817
Int. Cl.² A63H 33/18
U.S. Cl. 46—52 **8 Claims**



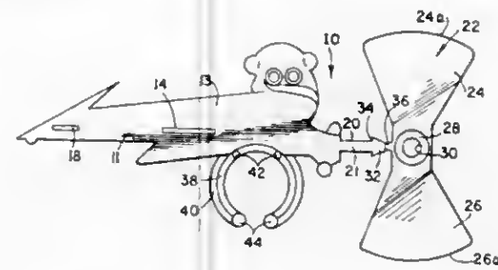
1. An aerodynamic amusement device, comprising:
a circular body provided with an outer surface, a central portion, a central axis, and a rim circumscribing the central portion and curving downward therefrom, said body adapted to be thrown and to sail through the air after being thrown and to spin about the central axis as the body sails through the air; and
a plurality of whistle means for producing a sound symmetrically positioned upon the body a predetermined distance from the central axis, each whistle means having a chamber defined by side walls symmetrically arranged about a chamber axis that is positioned substantially normal to the body surface, a closed end and an opposite end portion forming a single aperture that communicates with the chamber, the aperture being positioned with respect to and above the outer surface of the body to allow air to pass across the aperture as the device sails through the air spinning about its central axis after being thrown.

4,031,656

PLASTIC TOY INTEGRALLY FORMED AND MOLDED WITH A PROPELLER AND MEANS FOR ATTACHING THE TOY TO A SUPPORT MEMBER

Sam Kupperman, Chicago, and Dennis I. Kupperman, Glenview, both of Ill., assignors to R B Toy Development Co., Skokie, Ill.

Filed Apr. 19, 1976, Ser. No. 677,919
Int. Cl.² A63H 33/40
U.S. Cl. 46—53 **10 Claims**



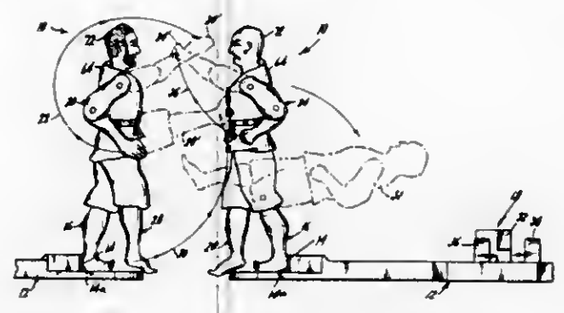
1. A toy integrally molded of a plastic material and comprising a body portion, an extension at one end of said body portion and a propeller all molded as an integral unit, said propeller adapted to be detached from said unit and manually mounted on said extension for rotation on said extension, a ring-like member molded as part of the body portion and extending below said body portion to permit attachment of said toy to a support and the like.

4,031,657

ACTION FIGURE

Dorland L. Crosman, Glen Ridge, N.J., and Charles M. Diker, New York, N.Y., assignors to Aurora Products Corporation, New York, N.Y.

Filed Feb. 5, 1976, Ser. No. 655,564
Int. Cl.² A63H 13/06
U.S. Cl. 46—142 **20 Claims**



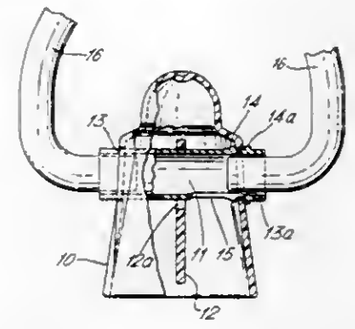
1. In a human-like figure actuable to simulate various movements of the human being; said figure including a head, a body, a pair of arms depending from opposite sides of said body, and a pair of legs depending from opposite sides of said body; at least one means for moving a leg and simultaneously producing movement of the body of said figure comprising:
body mounting means for supporting said body for movement about a first axis;
leg mounting means for moving said leg relative to said body about a second axis; and
motion-transmitting means coupled to said leg mounting means and responsive to an applied force for rotating said leg about the second axis and displacing said leg with respect to said body mounting means, and simultaneously pivoting said body about the first axis to simulate the movement of a human being.

4,031,658

CHILD'S RATTLE

David William Chisnall, Thirlestane, Stadhampton, Oxfordshire, England

Filed June 7, 1976, Ser. No. 693,556
Claims priority, application United Kingdom, June 11, 1975, 25088/75
Int. Cl.² A63H 5/00
U.S. Cl. 46—191 **4 Claims**



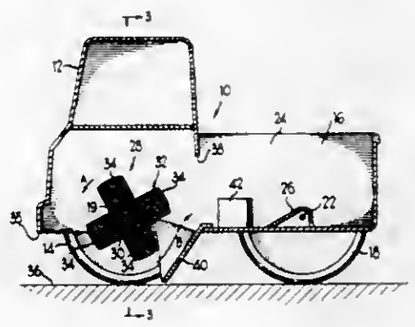
1. A child's rattle comprising a bell-like member, two oppositely disposed apertures through the wall thereof on a common axial line near to its closed end, a tubular shaft passing through said apertures and member, means at an end of said shaft lockingly engaging the member at one aperture, and a clapper having an eye through which said shaft passes within the member.

4,031,659

TOY PICK-UP VEHICLE

Albert G. Keller, Chicago; Donald F. Nix, Hanover Park, and Howard J. Morrison, Deerfield, all of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed Nov. 10, 1975, Ser. No. 630,719
Int. Cl.² A63H 17/00
U.S. Cl. 46—204 **4 Claims**



1. A toy vehicle for picking up playing objects from a supporting surface, comprising:
a vehicle body having a lower object inlet means generally at the front thereof;

front and rear wheel means on the vehicle for supporting the vehicle for movement over the supporting surface;

a paddle wheel rotatably mounted on the vehicle body for conjoint rotation with said front wheel means for engagement with objects on the supporting surface and moving the objects therewith;

a rear receptacle disposed behind said paddle wheel and generally above said rear wheel means; and

conduit means between said paddle wheel and said receptacle including a direct opening in the vehicle body between the paddle wheel and the rear receptacle and a lower deflector member extending beneath said opening in proximity with the surface;

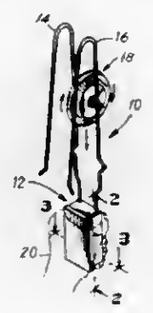
said paddle wheel being fabricated substantially of resilient, soft spongy material to provide friction and yieldability as the paddle wheel rotates to engage the objects for movement upwardly through said opening into said rear receptacle.

4,031,660

ILLUMINATED ACTION TOY

Tommy Chen, 10 Manwan Road 3 A, Kowloon, Hong Kong

Filed Oct. 12, 1976, Ser. No. 731,800
Int. Cl.² A63H *33/26*
U.S. Cl. 46—228 **15 Claims**



1. An illuminated action toy comprising a pair of substantially parallel rails made of magnetic and electrically conductive material, each of said rails having two outwardly flaired sections facing two outwardly flaired sections in the other rail, a moving element having an axle whose ends are magnetized and electrically conductive for rotating and moving along said rails and for reversing direction at the flaired sections thereof, and battery pack means secured to said rails for spacing said rails from each other to accommodate said axle therebetween and for applying a potential difference to said rails, said moving element including bulb means connected between the two ends of said axle whereby said axle controls both attraction of the moving element to the rails and the flow of current from one rail through the bulb to the other rail.

4,031,661

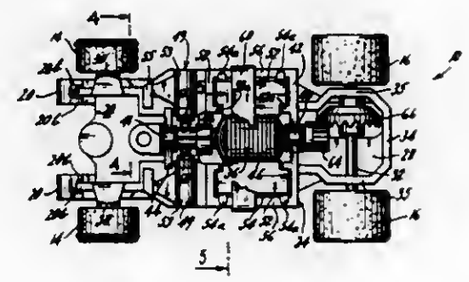
MINIATURE VEHICLE WITH MAGNETIC ENHANCEMENT OF TRACTION

Robert B. Bernhard, Port Washington, N.Y., assignor to Aurora Products Corporation, West Hempstead, N.Y.

Filed Jan. 19, 1976, Ser. No. 650,426
Int. Cl.² A63H *29/12, 18/12*
U.S. Cl. 46—249 **20 Claims**

1. In a miniature vehicle of the type having a supporting chassis, at least one driving wheel mounted to the chassis, and a pair of electrical pick-up shoes, said driving wheel adapted to engage a track including electric power means therein made of a magnetic material engageable with said pick-up shoes, the combination of:

an electric motor mounted in said chassis for powering said at least one driving wheel, including a rotatably mounted drive shaft extending axially along the length of said vehicle and coupled to said at least one driving wheel, an armature coaxially mounted on said drive shaft having a plurality of windings, a pair of magnet assemblies mounted in said chassis on opposite sides of said armature and forming the stationery magnetic component of said motor, each of said magnet assemblies including a magnet mounted in said chassis with no portion of said chassis between the bottom of said magnet assemblies and the electric power means of said track; and



means for coupling said armature to said pick-up shoes for providing electric power to said motor;

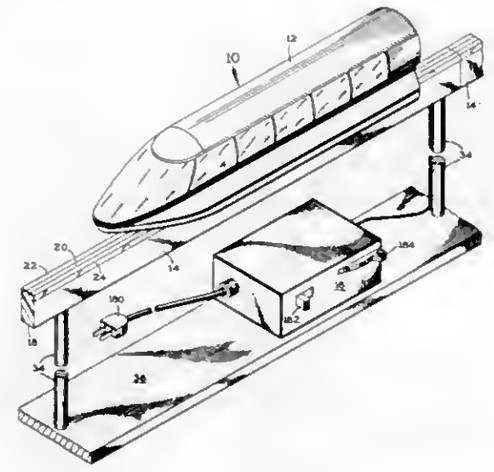
said magnet assemblies and said electric power means cooperating when said miniature vehicle is in said track to provide a magnetic force holding said vehicle to said track, thereby increasing the traction of said at least one driving wheel on said track.

4,031,662

MONORAIL TRAIN AND TRACK

Alan S. Beshany, P.O. Box 15065, Plantation, Fla. 33318

Filed July 21, 1976, Ser. No. 707,272
Int. Cl.² A63H *19/10, 21/04*
U.S. Cl. 46—257 **10 Claims**



1. In a model monorail train including an engine having an electric motor, conductive wheels, a drive train coupled between said motor and said wheels for driving said wheels, electrical connection means connected between said motor and said wheels for supplying current to said motor, and a track for conducting current, the improvement wherein:

said wheels have rims with vertical flanges on one side thereof and are arranged in pairs to straddle said track;

said flanges are positioned on the outsides of said track when said engine is on said track;

said track comprises monorail means for receiving said wheels;

said monorail means has an insulating upper surface and two L-shaped conductor means forming outside corners of said upper surface for engaging both said rims and said flanges of said wheels; and

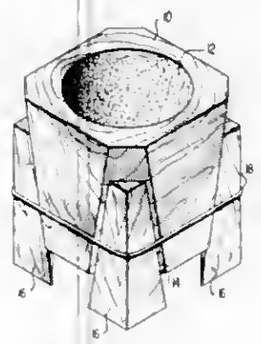
said L-shaped conductor means each have a horizontal leg for engaging the rims of corresponding wheels and a vertical leg for engaging the flanges of corresponding wheels.

4,031,663

WOODEN BLOCK PLANTER WITH SUPPORTING LEGS

Ronald M. Brunk, Rte. 1 Box 192, Greenwood, Va. 22943

Filed May 24, 1976, Ser. No. 689,629
Int. Cl.² A01G *9/02*; **B65D** *1/00*
U.S. Cl. 47—66 **3 Claims**



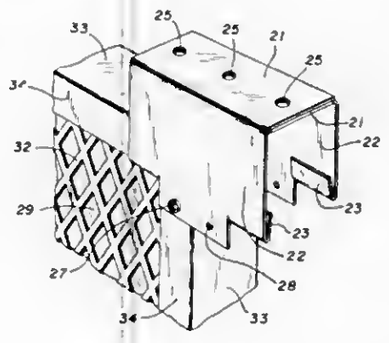
1. A wooden planter comprising initially a substantially solid rectilinear block of wood having a recess in the upper surface thereof for the reception of a plant and leg means formed from said block, said leg means comprising substantially identical wedges having a triangular cross-section which are cut from each corner of said block along a downwardly and inwardly inclined plane extending diagonally across each corner of the block, the cutting forming associated pairs of inclined planar surfaces, each pair of inclined surfaces comprising one inclined surface on each leg and one inclined surface on the associated corner of said block, and means for securing said legs along each associated pair of inclined planar surfaces in downwardly depending offset relationship to said block.

4,031,664

SUSPENSION SYSTEM FOR SOUND ABSORPTION PANELS

Alan C. Wendt, Barrington, Ill., assignor to United States Gypsum Company, Chicago, Ill.

Filed Jan. 20, 1976, Ser. No. 650,632
Int. Cl.² E05D *13/02*
U.S. Cl. 49—409 **13 Claims**



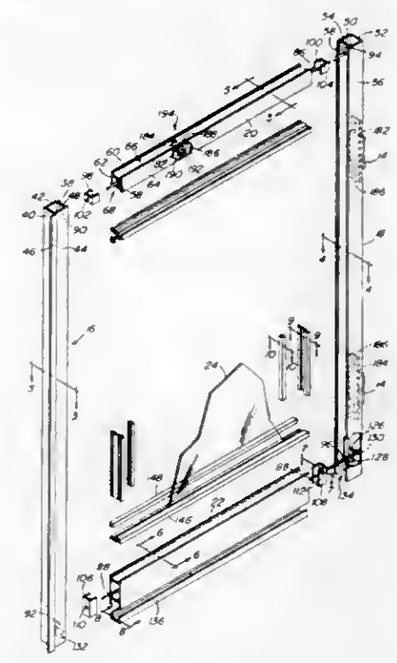
1. A horizontally movable sound absorption wall comprising one or more sound absorption panels supported by a top frame member; a hanger attached to the top frame member; a supported track; guiding means for guiding movement along the track; and connecting means for attaching the hanger and the guiding means to enable the panels to be moved in a path along the track; wherein the panel frame member has one or more depending lip portions; and wherein the hanger has a horizontal portion, one or more vertically depending connection portions depending vertically downward from the horizontal portion with said vertically depending connection portions having one or more support portions comprising inwardly and upwardly formed portions of the connection portion.

4,031,665

ADJUSTABLE ENTRANCE DOOR

Harold B. Abramson, 30 Stearns Road, Brookline, Mass. 02146

Filed Dec. 8, 1975, Ser. No. 638,370
Int. Cl.² E06B *1/04, 3/00*
U.S. Cl. 49—501 **10 Claims**



1. An adjustable entrance door comprising:

a. a plurality of extruded sections including a lead edge stile, a hinge stile, a top rail and a bottom rail;

b. means for interconnecting said sections, said interconnecting means including a pair of tie rods, one of said tie rods connecting said lead edge stile, said hinge stile and said top rail, said other tie rod connecting said lead edge stile, said hinge stile and said bottom rail, said connected sections defining a substantially rectangular open frame;

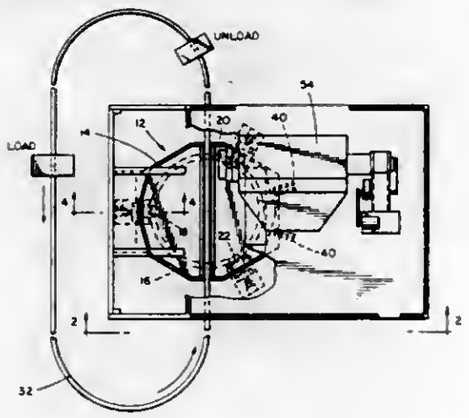
c. a substantially rectangular panel configured to be received within said frame;

d. means for mounting said panel to said frame, said mounting means including a first pair of shims and a second pair of shims, one shim of said first pair disposed between one of said stiles and said panel adjacent a first corner of said frame, the other shim of said first pair disposed between one of said rails and said panel adjacent said first corner, one shim of said second pair disposed between the other of said stiles and said panel adjacent a second corner of said frame, the other shim of said second pair disposed between said other of said rails and said panel adjacent said second corner, said first corner diagonally opposite said second corner, said first and second pairs of shims positioned so that said panel is mounted oblique to the inner faces of said rectangular frame;

e. first adjusting means mounted to said top rail in engagement with a top edge of said glass panel, said first adjusting means operative to cause relative vertical movement between said lead edge stile and said hinge stile; and

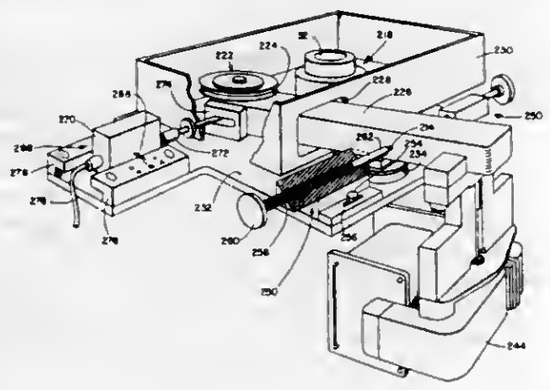
f. second adjusting means mounted to said bottom rail, said second adjusting means constrained against free movement relative to said bottom rail and constrained for forced movement relative to said bottom rail, said second adjusting means operative to vary the height of said door when moved relative to said bottom rail.

4,031,666
ROTARY DOOR BLAST CHAMBER
Curtis C. West, Mishawaka, Ind., assignor to Wheelabrator-Frye, Inc., Mishawaka, Ind.
Filed Aug. 30, 1976, Ser. No. 718,616
Int. Cl.² B24C *3/14*
U.S. Cl. 51—419 **8 Claims**



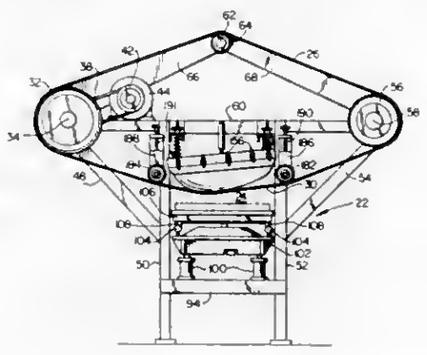
1. A sealable chamber for blast cleaning parts with particulate comprising:
a. an enclosed housing having a pair of aligned openings therethrough to permit entry and exit of said parts;
b. a hollow cylinder disposed within said housing having a pair of openings therethrough corresponding to the openings in said housing;
c. means for supporting and rotating said cylinder between a first position in which said housing and cylinder openings are aligned to permit entry and exit of parts from said chamber and a second position in which said housing and cylinder openings are misaligned to seal the chamber against the escape of said particulate.

4,031,667
APPARATUS FOR CONTOURING EDGE OF SEMICONDUCTOR WAFERS
William H. Sehestedt, Santa Clara, Calif., assignor to Macronetics, Inc., Sunnyvale, Calif.
Filed Mar. 29, 1976, Ser. No. 671,392
Int. Cl.² B24B *9/00*
U.S. Cl. 51—105 R **10 Claims**



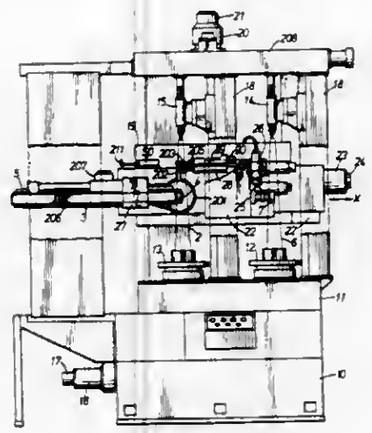
1. Apparatus for contouring the edge of a semiconductor wafer, comprising
rotatable holding means for receiving and releasably holding one side of said wafer while leaving the edge of said wafer free from obstruction, and rotating said wafer generally about its center,
contouring means for removing sharp corners from the edge of said wafer, said contouring means comprising a rotating grinding wheel which is axially parallel to said rotating holding means and is mounted for movement toward and away from said holding means and a wafer held thereupon, said grinding wheel having a generally V-shaped, radially inwardly extending circumferential groove, whereby engagement between the edge of the rotating workpiece and the grinding wheel groove may serve to bevel or round any sharp corners adjacent the edge of the workpiece,
biasing means resiliently urging said contouring means against said wafer edge with a preselected and adjustable force such that said grinding wheel will be maintained in grinding engagement with said wafer edge during the entire rotation of said wafer, said resilient biasing means comprising a pair of coil springs each having one end connected to said contouring means and the other end connected to a mount which is adjustably movable longitudinally of its respective coil spring, said coil springs and mounts opposing one another, whereby said opposed springs and mounts may serve to urge said contouring means to an adjustable predetermined position and to exert an adjustable, predetermined force against displacement of said contouring means either side of said predetermined position.

4,031,668
SANDING MACHINE FOR ANATOMICALLY CONTOURED WOODEN CHAIR SEATS AND THE LIKE
Robert A. Lasko, deceased, late of Winsted, Conn. (by Ruth Lasko, administratrix), and Claud T. Miller, Statesville, N.C., assignors to Hitchcock Chair Company, Riverton, Conn.
Filed Feb. 19, 1974, Ser. No. 659,322
Int. Cl.² B24B *21/06, 21/16*
U.S. Cl. 51—137 **10 Claims**



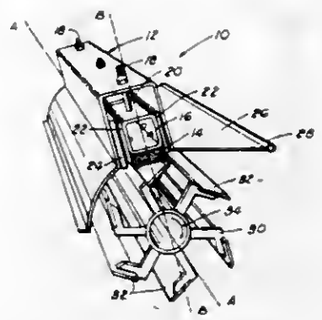
1. In a machine for belt sanding anatomically contoured chair seats and the like having generally concave depressions therein with arcuate surfaces viewed along each of two perpendicular axes, the combination comprising a work station, a sanding belt having at least one abrasive side and which follows a closed loop path with a longitudinal pass adjacent the work station, pulley and associated drive means for supporting the belt at spaced locations internally of the loop and for driving the same through its said path, means for supporting a chair seat with its anatomically contoured surface to be sanded facing toward an abrasive side of the belt at said work station and with one of said axes in substantial alignment with said longitudinal belt pass, said chair seat support means being movable toward and away from and generally perpendicular to the plane of said longitudinal belt pass to cause a chair seat thereon to selectively engage the belt, and said support means also being movable laterally with respect to and generally parallel to the plane of said longitudinal belt pass along the other of said axes whereby the chair seat can be progressively sanded in movement across the belt, a pneumatically inflatable generally pillow-like resilient back-up member having a generally convex pressure surface with both lower side and end edge portions having a rounded configuration, said member being disposed at said work station on a side of said belt opposite said chair seat, a regulable source of air under pressure in communication with the interior of said resilient member and serving to inflate the same, said member when inflated being resilient along each of said axes and serving to slidably engage the belt and urge the same toward the seat thereby causing the belt to conform to and sand said contoured seat along the arcuate surfaces of each of said axes, and at least one guide roller disposed adjacent the sanding belt on the same side as said resilient back-up member but spaced longidutinally from said member, said roller being mounted for adjustment toward and away from the belt whereby to vary the belt angle relative to both the resilient member and a chair seat being sanded and thus to control belt engagement with the seat and sanding thereof in an area adjacent the area of engagement between the resilient member and the belt.

4,031,669
AUTOMATIC PROFILING MACHINE
Sakae Kolde, Tokyo, and Shigeo Aoki, Habikino, both of Japan, assignors to Tahara-Shoyei Engineering Co., Ltd., Osaka, Japan
Filed Nov. 13, 1975, Ser. No. 631,550
Claims priority, application Japan, Nov. 19, 1974, 49-133365
Int. Cl.² B24B *17/00, 19/14, 21/16*
U.S. Cl. 51—142 **14 Claims**



1. An automatic profiling machine comprising means for rotating a model, means for rotating a workpiece in synchronism with the rotation of the model, a stylus capable of relative movement with respect to the model in a direction perpendicular to the axis of rotation of the model and adapted for contact therewith, means for detecting a displacement of the stylus from its neutral point as it contacts the model, means for detecting a distance between the center of the stylus and the center of rotation of the model, means for controlling the rotational speed of the model and the speed of relative movement between the model and the stylus in accordance with the detected values of said displacement and distance so that the point of contact between the stylus and the model moves along the contour of the model with a given speed, a tool for machining the workpiece, the tool being disposed n the same positional relationship as that between the model and the stylus, means for causing a relative movement between the tool and the workpiece in a manner similar to the relative movement between the stylus and the model, means for rotatably holding a contact segment of the stylus against the model so that the segment is in exact conformity to the surface thereof, means for detecting a rotation of the contact segment, and means for causing a skew of the tool in accordance with the detection of the rotation.

4,031,670
ADJUSTABLE SHARPENER FOR SELF-SHARPENING FEED CHOPPING KNIVES
C. J. Murphy, Rte. 1, Abilene, Kans. 67410
Filed Dec. 29, 1975, Ser. No. 644,925
Int. Cl.² B24B *3/36*
U.S. Cl. 51—250 **7 Claims**



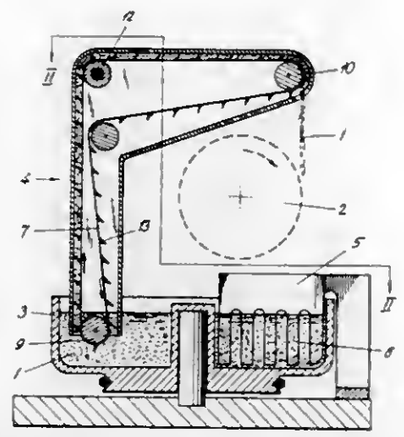
1. An adjustable sharpener for self-sharpening feed chopping knives, the knives mounted on a rotating cutter head, the knives used in cutting crops, forage, ensilage, or the like, the sharpener comprising:
a stone housing disposed adjacent the length of the cutter head;
an elongated sharpening stone mounted in said housing, said stone disposed adjacent the length of the cutting edge of the knives and tangent thereto, said stone laterally secured in said housing to prevent lateral movement of said stone as the cutting edges of the knives rotate thereby;
adjusting means attached to said housing for manually adjusting said stone in a direction toward the axis of the cutter head;
biasing means attached to said housing and disposed against said adjusting means for biasing said adjusting means so that said stone is kept in adjustment; and
an elongated cutter bar mounted in said housing and disposed adjacent said stone, an edge of said cutter bar disposed adjacent the length of the cutting edge of the knives and tangent thereto;
said adjusting means and said biasing means allowing movement of said stone in a direction away from the axis of the cutter head when a foreign object becomes trapped between said stone and the cutting edge of the knives.

4,031,671
APPARATUS FOR DELIVERING FLUID GRINDING MATERIAL
Henryk N. Frosz, 54 Tranumparken, Broendby Strand, Denmark
Filed Feb. 9, 1976, Ser. No. 656,363
Int. Cl.² B24B *57/00*
U.S. Cl. 51—263 **6 Claims**

1. A grinding or polishing apparatus, comprising:
a rotatable grinding or polishing element;
a cup disposed beneath said rotatable element and including a bottom wall and a generally vertical peripheral wall, said cup being mounted for rotation about a generally vertical axis passing centrally therethrough, and being adapted to contain fluid grinding material, and to receive fluid grinding material falling from said rotatable element;
drive motor means connected with said cup for effecting rotation thereof about said axis;
a comb-like member fixedly mounted to extend generally radially across the top of said rotatable cup, said member extending over at least a major portion of the radial distance from said peripheral wall to said axis, and carrying a plurality of spaced, downwardly projecting teeth arranged to effect mixing of fluid grinding material disposed

in said cup during rotation of said cup relative to said member;

shield means mounted to extend generally above and over said rotatable element, and including a discharge point disposed above said element and positioned to correctly



deposit fluid grinding material falling therefrom for the operation of said element; and

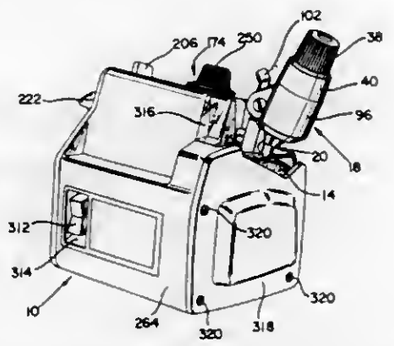
conveyor means of variable capacity mounted with one end thereof in said cup for collecting fluid grinding material therefrom, the other end of said conveyor means leading to said discharge point of said shield means.

4,031,672

SHARPEN TWIST DRILLS OR THE LIKE

Robert Gordon Moores, Jr., Cockeysville, and Richard Eugene Walton, II, Baltimore, both of Md., assignors to The Black and Decker Manufacturing Company, Towson, Md.

Division of Ser. No. 456,946, April 1, 1974, Pat. No. 3,930,342. This application Sept. 12, 1975, Ser. No. 612,912
Int. Cl.² B24B *1/00*
U.S. Cl. 51—288 **5 Claims**



I. A method of grinding the leading end of twist drills or the like having a plurality of flutes, said method comprising the following steps:

A. rotating a grinding wheel about its axis;

B. advancing a twist drill or the like toward a surface of the grinding wheel to dispose the leading end of one of the flutes in a position suitable for grinding; and

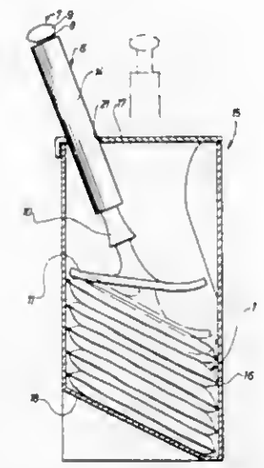
C. spirally rotating the twist drill about an axis transverse to the longitudinal dimension of said twist drill and generally parallel to the grinding surface of the grinding wheel to cause the leading end of one of the flutes of the twist drill to move laterally across the grinding surface of the grinding wheel to be ground thereby whereby a more even wear distribution of the grinding wheel is obtained.

4,031,673

CLEANING DEVICE PREFERABLY FOR WATER CLOSETS

Anders Torvald Sverker Hagelberg, Molnlycke, Sweden, assignor to Bengt Petersson New Products Investment AB, Goteborg, Sweden

Filed Apr. 19, 1976, Ser. No. 678,208
Int. Cl.² B24D *15/04*; **A46B** *17/02*
U.S. Cl. 51—385 **9 Claims**



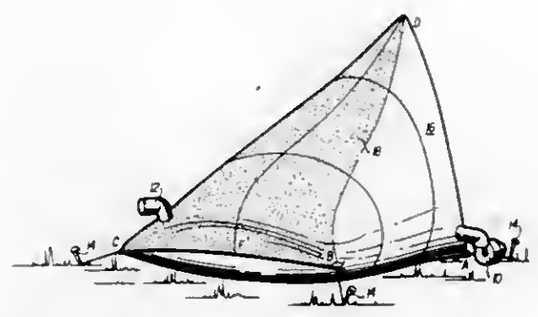
1. A cleaning device particularly for cleaning water closets, comprising: a holder stick device including a handle portion arranged at one end thereof and clamping means arranged at the opposite end thereof, said clamping means being actuated by manual operation of said handle portion between a clamping position for operably clamping therein a cleaning pad, and a release position for releasing said cleaning pad; a receptacle defining a space configured to store therein a plurality of cleaning pads stacked in a vertical pile one upon another; and a plurality of cleaning pads vertically stacked in a pile in said receptacle, said cleaning pads including a cleaning compound, being adapted for disposal thereof after use in a single cleaning operation, and being made of a material which effects disintegration of said pad in water; said receptacle including a supporting part for supporting said holder stick device in said receptacle by engagement with said handle portion and with said clamping means in a position to facilitate clamping therein of the top cleaning pad in said pile of pads stored in said receptacle to enable withdrawal of said holder stick device from said receptacle with a pad operatively engaged therein for use in a cleaning operation.

4,031,674

INFLATABLE TENT

J. Patrick Rand, 2357 Onyx St., Eugene, Oreg. 97403

Filed Jan. 19, 1976, Ser. No. 650,328
Int. Cl.² E04B *1/345*
U.S. Cl. 52—2 **2 Claims**



1. A camping tent comprising a flexible tent membrane and a separate tent support means, said tent membrane having the shape of a non-planar irregular tetrahedron when supported

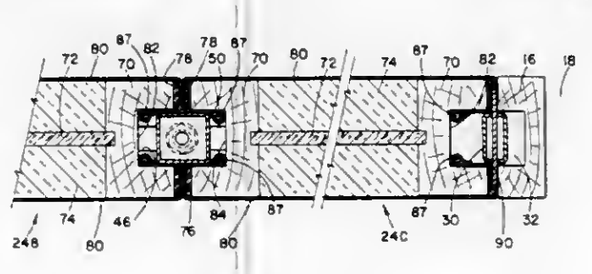
by said support means, said tent being formed from a substantially rectangular sheet, first and second opposed edges of said sheet being joined along a first seam, a third edge of said sheet being joined with itself along a second seam substantially perpendicular to said first seam, and a fourth edge of said sheet being joined with itself along a third seam substantially perpendicular to both said first and second seams, at least one of said second and third seams comprising a zipper, said support means comprising a blower communicating with said tent membrane for blowing air into said tent membrane and a vent, said vent cooperating with said blower to replace air in said inflatable membrane and to regulate internal pressure.

4,031,675

FREE STANDING REDECORATABLE VERTICAL WALL OR DIVIDER

Raymond P. Roberts, 5909 E. 58th Place, and Sven Arthur John Nilson, Jr., 5328 S. Toledo, both of Tulsa, Okla. 74135

Continuation-in-part of Ser. No. 581,740, May 29, 1975, abandoned. This application Feb. 26, 1976, Ser. No. 661,736
Int. Cl.² E04B *2/74*
U.S. Cl. 52—36 **28 Claims**



20. A free-standing vertical divider wall comprising:

a quadrilateral frame of desired thickness having upper and lower horizontal frame members attached to right and left vertical frame members;

first vertical supports each of thickness than the thickness of said frame retained within recesses along each of the inside vertical members of said frame and horizontally movable from said recess to a position inside said frame exposing a frontal width X;

said first supports include a plurality of vertically spaced apertures along their frontal width, keeper means, of length less than the thickness of said frame and insertable into said apertures between said panel and said right and left vertical frame members;

at least one second vertical support of thickness less than the thickness of said frame and of frontal width no greater than 2X, said second support vertically positioned to substantially divide the space horizontally between said first vertical supports, said second support being movable horizontally either side of said division line a distance equal to the width of said second support; and

a plurality of panels to substantially fill each horizontally divided space inside said frame, each of said panels having grooves hidden between front and back sides of said panel along each vertical edge, said grooves of thickness slightly larger than the thickness of said support members and of frontal width no less than the frontal width of said second supports.

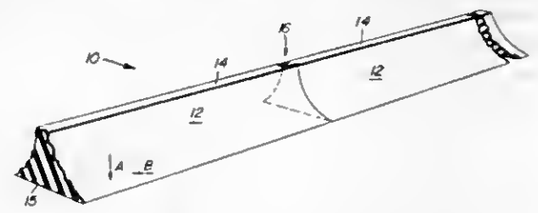
4,031,676

WATER BLOCKING DEVICE

Don A. Daily, P.O. Box 181, Pillager, Minn. 56473

Filed Mar. 29, 1976, Ser. No. 671,361
Int. Cl.² E02D *27/00*
U.S. Cl. 52—102 **8 Claims**

1. A surface water blocking device comprising; a self-supporting longitudinally extending section member having, first means for connection to another such section member in interlocking fashion to present a continuous barrier to the flow of surface water, second means for removably fastening each member to the surface on which they rest in a water-tight semi-permanent fashion, the first means for connecting one



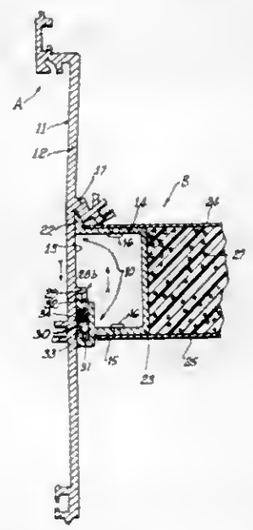
section member to another section member includes a tongue and groove joint, and the second means for removably fastening each section member to the surface includes suction cup type recesses provided in each section member.

4,031,677

FLOOR SLAB TO SIDE WALL JOINT STRUCTURE FOR TRANSIT VEHICLE

Keith W. Tantlinger, Coronado, Calif., assignor to Rhor Industries, Inc., Chula Vista, Calif.

Filed Apr. 21, 1976, Ser. No. 678,732
Int. Cl.² E04C *1/10*; **F16B** *1/00*
U.S. Cl. 52—262 **4 Claims**



1. In a transit vehicle having a floor slab, two side walls, and a roof, floor-to-side wall joint joining each side wall substantially perpendicularly to a side of the floor slab, each joint structure comprising:

an extrusion comprising a lower structural element of each vehicle side wall and having a laterally inwardly exposed joint surface formed therealong,

a pair of vertically spaced, laterally outwardly extending flanges substantially integral with, and extending along each side of the floor slab, the laterally outward edge portions of each pair of said flanges being contact with their respective said side wall joint surface,

means integral with each of said side wall extrusions forming a vertically open, bead-receiving recess extending along each such joint surface,

a locking bead formed integrally with, and extending upwardly along the laterally outward edge portion of one of said side flanges of each pair thereof, each locking bead being shaped and located to fit into the locking bead recess of its respective side wall upon a selected movement of the floor slab relative to such side wall,

a first half of a plastic key interlock joint comprising a laterally outwardly open channel formed along, and comprising the laterally outward edge portion of the other of said side flanges of each pair thereof, an interlock projection extending along each side of each of said channels,

both of the projections of each pair thereof extending in the same direction as the locking bead on said one flange of their respecting pair thereof,

a second half of each plastic interlock joint comprising a pair of recess defining means integral with each side wall, and extending lengthwise along the joint surface thereof in parallel, spaced relation to their respective bead receiving recesses, and to each other, each of the latter recess defining means being shaped and located to define a recess shaped and positioned to receive one of said interlock projections in fitted relation therein upon such selected, relative movement of the floor slab and side wall, one of the latter recess defining means of each pair thereof being located within each of side channels, of a height to extend substantially to the bottom of its respective channel, and of a width for limited movement transversely therein, whereby such selected, relative movement of the floor slab and side wall opens up a key forming passage lengthwise within each joint for the reception of flowable, solidifiable, key forming compound for retaining said beads and said interlock projections in their respective recesses, thereby completing the joint structure.

4,031,678

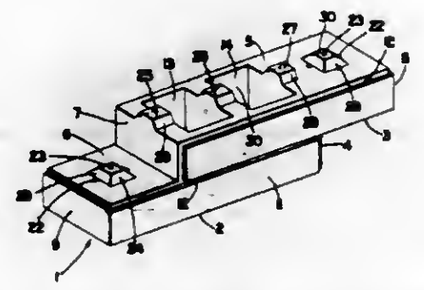
INTERLOCKING BUILDING BLOCK CONSTRUCTION

James A. Schuriag, 352 Saratoga Ave., Canton, Ohio 44708

Filed Nov. 20, 1975, Ser. No. 633,574

Int. Cl.² E04B *1/02*; E04C *1/08*

U.S. Cl. 52—285 **3 Claims**



1. A rectangulsr building structure formed entlrely of a plurality of similar interlocking building blocks, each block including:

a. a longitudinelly extending, rectangular, upper surface terminating at one end in a lower stepped end surface;

b. a longitudinally extending, rectangular, lower surface terminating at one end in an upper stepped end surface;

c. said stepped and surfaces lying in a common horizontal plane and located at opposite ends of the building block;

d. a plurality of generally truncated pyramid-shaped recess means formed in the upper rectangular surface and a corresponding number of complementary generally turncated pyramid-shaped lug means formed on the lower rectangular surface, said lug means being aligned vertically with the recess means;

e. a single recess formed in the center of the lower stepped end surface and a single lug formed on the center of the upper stepped end surface, said lug and recess each having a truncated pyramid configuration complementary to each other;

f. the stepped end surfaces having a square planar configuration with the longitudinal lengths of the stepped end surfaces being equal to each other, and equal to the width of the upper and lower surfaces;

g. a first pair of spaced, parallel, vertically estending smooth end surfaces connecting the stepped end surfaces to their respective longitudinally extending rectangular surfaces;

h. a second pair of spaced, parallel, vertically extending smooth end faces connecting the upper surface with the upper stepped end surface and connecting the lower surface with the lower stepped end surfaces, respectively;

i. a pair of spaced, parallel, vertical, generally smooth side surfaces extending between the upper and lower rectangular surfaces, and between the pairs of spaced end surfaces;

j. the upper stepped end surfaces of the blocks being in abutting, overlapping relationship with lower stepped end surfaces of horizontally adjacent blocks with the single lugs of the upper stepped end surfaces being interlockingly engaged in the single recesses of the overlapped lower stepped end surfaces, with the lower rectangular surfaces being in abutting relationship with the upper rectangular surfaces of lower vertically adjacent blocks with the lug means of the lower surfaces being interlockingly engaged in the complementary recesses of the upper surfaces; and with the side surfaces of said horizontally and vertically adjacent blocks forming smooth continuous longitudinally extending wall surfaces, and with the side surfaces of adjacent blocks placed at right angles to each other forming smooth continuous right-angled corner surfaces;

k. opening means formed in and extending vertically through each block and communicating with the upper and lower rectangular surfaces, with said opening means of vertically adjacent blocks forming vertically extending passages in the building walls for receiving utility supply lines;

l. holes formed in the stepped end surfaces single lugs and recesses and vertically aligned with each other; and

m. pin means mounted in the aligned recess and lug holes and extending between a pair of vertically adjacent blocks mechanically interconnecting said adjacent blocks.

4,031,679

SPHERICAL STORAGE TANK FOR GASES AND LIQUIDS AND SUPPORTING BASE THEREFOR

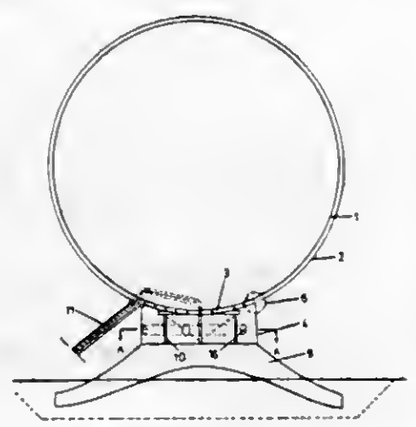
Peter Feuerlein, Prattein, Switzerland, assignor to Buss Aktiengesellschaft, Basel, Switzerland

Filed Oct. 8, 1976, Ser. No. 730,862

Claims priority, application Switzerland, Nov. 5, 1975, 14466/75

Int. Cl.² E02D *27/32*

U.S. Cl. 52—294 **5 Claims**



1. In combination, a spherical tank for gases and liquids, a rigid load-bearing concrete foundation in the region of the vertical axis of said spherical tank, and a mounting interposed between said foundation and the underside of said spherical tank, said mounting having generally elastomeric properties and being solidly bonded to the underside of said spherical tank and to said foundation, said mounting consisting essentially of a plurality of rigid support elements in spaced array within a matris of foamed heat insulation material, the upper and the lower surface of said plurality of said rigid support elements being covered by elastic layers of a material remaining elastic even at very low temperatures, a load bearing steel shell interposed between said concrete foundation and the lower of said elastic layers, and a first adhesive bonding layer between the underside of said spherical tank and the top of the upper of said elastic layers, a second adhesive bonding layer between the bottom of the upper of said elastic layers and the top of said plurality of rigid support elements, a third adhesive bonding layer between the bottom of said plurality of rigid support elements and the top of the lower of said elastic layers, and a fourth adhesive bonding layer between the bottom of the lower of said elastic layers and the top of said steel shell, said mounting assuring orthotropic transmission of the load of said tank to the foundation and insulating the tank from the foundation to prevent heat losses.

4,031,680

STRUCTURAL ASSEMBLIES

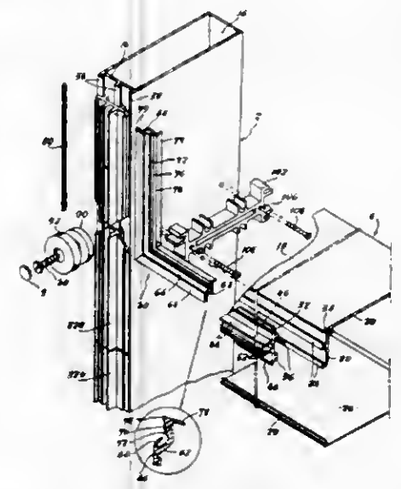
Richard Lewis Stoakes, "Clouds" Northdown Road, Woldingham, Surrey, England

Filed May 20, 1975, Ser. No. 579,214

Claims priority, application United Kingdom, May 29, 1974, 23832/74

Int. Cl.² E04B *1/62*

U.S. Cl. 52—400 **11 Claims**



1. A structural assembly comprising, in combination, as series of interconnected elongate members, a frame structure formed by said interconnected members, at least two contiguous cells or spaces being defined in said structure by said members, panes or panels mounted on or adjacent an outer face of said structure and providing infill members for said cells or spaces, sealing means engaging the infill members both at edges thereof and at portions of inner faces thereof adjacent said edges, said sealing means having a front face substantially coplanar with the outer faces of the infill members, and being contoured, at portions thereof engaging said edges of the infill members, to provide local resilient deformability, securing means engaging outer faces of the infill members adjacent said edges to apply a sealing pressure between the sealing means and said portions of the inner faces, said securing means comprising a series of devices that are disposed at intervals along the edges of the infill members, and means fixing said devices individually in position on the frame structure.

4,031,681

WALL CONSTRUCTION

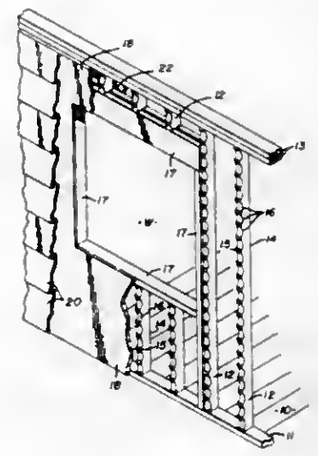
Joseph Charniga, P.O. Box 5037, Poland, Ohio 44514

Filed Feb. 4, 1976, Ser. No. 655,266

Int. Cl.² E04B *2/02*; E04C *2/80*

U.S. Cl. 52—408 **4 Claims**

1. An exterior load bearing wall construction comprising an inner wall portion, studding supporting said inner wall portion in continuous contact therewith, a plurality of closely spaced scallops formed in the outer surfaces of each of said studding so as to form narrow transverse areas therebetween, an outer wall portion positioned against said narrow transverse areas of said studding and secured thereto in limited contact therewith and exterior surfacing material on said outer wall portion, said



inner wall portion comprising dry wall or the like and said outer wall portion comprising insulating board and siding or the like, upper and lower plates positioned on the upper and lower ends of said studding, the outer surfaces of said plates being smooth, said insulating board of said outer wall portion being positioned against said smooth surfaces of said plates in substantially weather-tight relation.

4,031,682

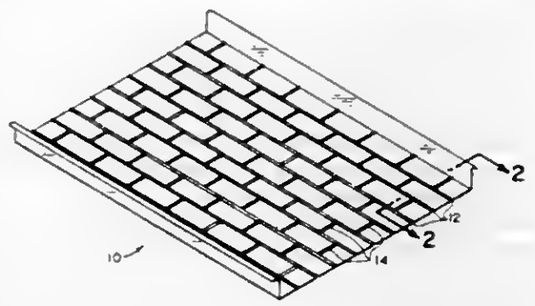
PREFABRICATED BUILDING PANEL AND METHOD OF MAKING

J. Steven Renkert, Canton, Ohio, assignor to Metropolitan Industries, Canton, Ohio

Division of Ser. No. 569,276, April 14, 1975, Pat. No. 3,965,635. This application June 22, 1976, Ser. No. 698,309

Int. Cl.² E04B *2/00*, *1/00*

U.S. Cl. 52—434 **8 Claims**



1. A wall panel including a plurality of ceramic, masonary or the like facing bricks spaced apart but bonded together by a first cementitious mixture deposited and hardened in the spaces separating the bricks, the cementitious mixture covering a rear portion of some of the bricks but none of the front portion,

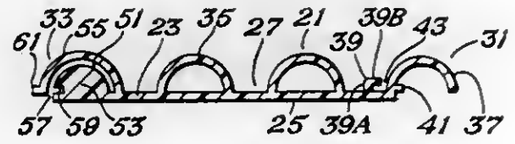
a lattice work of beams and shafts joined to both the back portions of at least some of the bricks by the bond of said cementitious mixture and to each other by welding,

at least some of the beams and shafts being of a cross-sectional shape other than round, thereby providing a more rigid composite panel,

a layer of a second cementitious mixture at least partially covering the exposed surface of the lattice work, bricks and the first cementitious mixture, said layer helping to join the lattice work to the facing bricks,

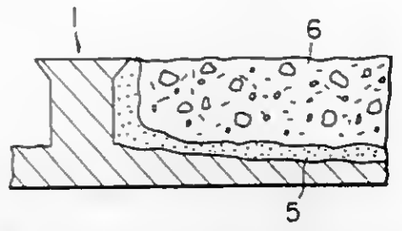
said second cementitious mixture including hydrated cement and glass fibers,
said layer having a thickness not substantially greater than ¼ inch.

4,031,683
PANEL INTERLOCK
Ray R. Walker, 6209 N. Hill Lane, Fort Worth, Tex. 76135
Filed June 18, 1975, Ser. No. 587,997
Int. Cl.² E04D 1/08
U.S. Cl. 52—536 5 Claims



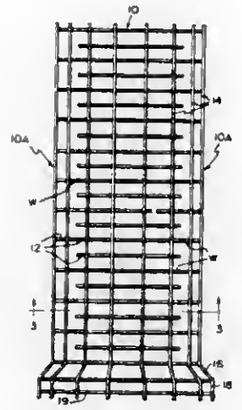
1. A panel for use for construction purposes and having opposite edges to be interlocked with adjacent panels, comprising:
a base portion having an inner side and an outer side,
one of said edges having an arcuate interlock member extending along the length of said one edge,
said arcuate member as seen in a cross-section through the width of said panel extends outward beyond said base portion and away from said other edge and has a free edge spaced from said base portion,
the other edge of said panel having an arcuate slot extending along the length of said other edge,
said arcuate slot as seen in a cross-section through the width of said panel has an opening along said other edge,
said arcuate slot extends from said opening outward beyond said base portion and toward said one edge,
a L-shaped member extending along the length of said panel from the outer edge of said base portion and located at a position near but spaced inward from said arcuate member,
said L-shaped member as seen in a cross-section through the width of said panel comprising a first portion extending outward from said base portion at a position spaced inward from said arcuate member and a second portion extending towards said arcuate member defining an L-shaped slot between said L-shaped member, said arcuate member, and said base portion,
a ridge extending along the length of said panel from the inner side of said arcuate member near the level of said base portion,
said ridge being generally parallel with base portion and extending in a direction away from said other edge of said panel,
said arcuate slot being defined by:
structure extending outward from said base portion and having an arcuate outward facing surface, and
a second arcuate member spaced outward from said structure and following said arcuate outward facing surface of said structure,
said second arcuate member extending from said panel away from said one edge and having a free end defining said opening between said free end and said structure,
said structure defining said arcuate slot having a slot formed therein along its length near said opening and extending generally parallel with said base portion,
said second arcuate member having a ridge formed at its free end along its length and extending generally parallel with said base portion in a direction away from said one edge.

4,031,684
DECORATIVE PRECAST CONCRETE BOARDS AND PROCESS FOR PRODUCING THE SAME
Tokuhito Shibata, 1 Nishi Koike-cho, Toyohashi, Aichi, Japan
Continuation-in-part of Ser. No. 482,303, June 24, 1974, abandoned. This application Nov. 11, 1975, Ser. No. 630,865
Claims priority, application Japan, Mar. 15, 1974, 49-029213
Int. Cl.² E04B 5/04
U.S. Cl. 52—612 6 Claims



1. A decorative precast concrete board comprising at least one surface layer and a core layer, the four edges of which recede or are indented toward the back side, said surface layer being made of an inorganic cement mortar containing non-expanded shirasu at least in an amount that said sand occupies at least 30% by weight of the total amount of the dry ingredients, and said core layer being made from an inorganic concrete mortar containing fine hollow spherical expanded shirasu in an amount that said expanded sand occupies 10 – 70% by weight of the total amount of the dry ingredients.

4,031,685
REINFORCING CAGE CONSTRUCTION
Robert F. Heinz, 3910 Pratt Lake Road, Gladwin, Mich. 48624
Continuation of Ser. No. 517,489, Oct. 24, 1974, abandoned. This application Feb. 13, 1976, Ser. No. 657,992
Int. Cl.² E04H 12/12; E04C 5/03
U.S. Cl. 52—653 11 Claims

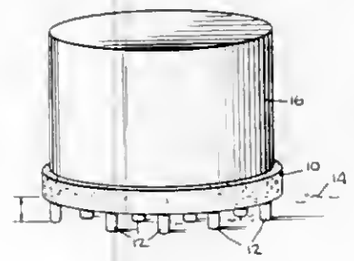


1. A prefabricated cage section for constructing a tubular wire mesh reinforcing cage for concrete pipe or like structures; said section comprising a plurality of arcuate wire members and a plurality of axially extending wire members fixedly secured to said arcuate members at one of the concave and convex sides thereof to define an arcuate grid structure conformed to constitute a full length quadrant segment of less than 120° arcuate extent of a tubular wire reinforcing cage, and stacking elements fixedly mounted at spaced locations on one of the concave and convex sides of said grid structure and projecting radially from said one of said sides by a distance such that a curved surface containing those points of said arcuate grid lying at a minimum radial distance from the axis of arcuateness at the concave side of said grid is congruent with a curved surface containing those points of said arcuate grid lying at a maximum radial distance from said axis at the convex side thereof whereby like sections can be stacked in concave to convex side nested relationship with each section the next adjacent section at at least three peripherally spaced support locations.

4,031,686
COMBINATION WOOD AND METAL TRUSS STRUCTURE
Arthur Carol Sanford, 2308 Bay Drive, Pompano Beach, Fla. 33062
Filed Jan. 13, 1977, Ser. No. 759,072
Int. Cl.² E04C 3/17, 3/292
U.S. Cl. 52—693 8 Claims

1. A combination wood and metal truss structure comprising wood chord members and a series of diagonal compression and tension web members therebetween, said compression members being wood members oppositely inclined to said tension members, toothed metal plates connecting the ends of all said web members to the sides of said chord members, the opposed inner surfaces of said chord members having notches abuttingly receiving the ends of said compression web members, the connector plates for the compression web members overlying said notches on one side of said chord members, and the connector plates for the tension web members overlying said notches on the other side of said chord members, whereby movement of the compression web members laterally of said chord members is prevented.

4,031,687
FORMATION OF ELEVATED STRUCTURES
Howard W. Kuntz, Miami, Fla., assignor to Raymond International Inc., Houston, Tex.
Filed Aug. 2, 1976, Ser. No. 710,470
Int. Cl.² E04B 1/00; E02D 27/00
U.S. Cl. 52—742 16 Claims

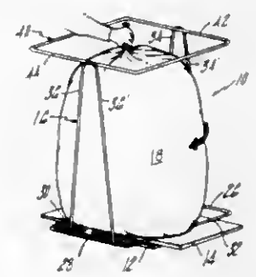


1. A method of constructing an elevated platform, said method comprising the steps of providing a blanket of sand on the earth, installing a plurality of spaced apart support elements to extend from a bearing region in the earth beneath the sand blanket and up to a location near the top of said sand blanket, embedding water jet nozzles in said sand blanket with water conduits extending from outside said sand blanket to said nozzles, forming a mold surrounding said plurality of support elements at their upper end, with the upper surface of said sand blanket forming the bottom of said mold, pouring concrete into said mold and allowing it to solidify in contact with the upper ends of said support elements and to form a platform supported by the support elements, and thereafter washing out the sand from between said support elements under the platform by pumping water through said conduits and causing jets of water to be directed from said nozzles.

4,031,688
TECHNIQUE FOR PRESSURIZING A SEALED ARTICLE
George J. Wasserman, 110 Babcock St., Brookline, Mass. 02146
Filed Sept. 4, 1975, Ser. No. 610,128
Int. Cl.² B65B 31/08
U.S. Cl. 53—7 23 Claims

22. In a method of inflating a tennis ball the step of coring a cylindrical segment from the wall of said ball with said segment having a diameter in the order of one millimeter, removing the core from the wall, introducing air into said ball through the hole formed in the wall and thereafter sealing the hole formed by the removal of said core.

4,031,689
FLEXIBLE BAG SUPPORTING DEVICE
Philip E. Sullivan, c/o Columbia Poly Pak Company, 83 Meadow St., Hartford, Conn. 06114
Filed Sept. 18, 1975, Ser. No. 614,515
Int. Cl.² B65B 7/12, 51/00, 67/12
U.S. Cl. 53—370 2 Claims



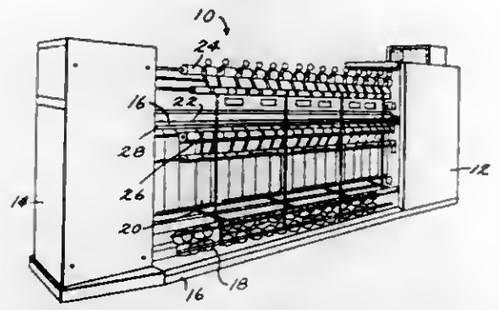
1. For use with a flexible bag having a bottom closed end and an upper open end, a bag supporting device comprising a base, a support platform mounted for rotation on the base for supporting the closed end of the bag, a stand of an open wirelike frame construction having a bag mounting rim, a bottom member and upright legs connecting opposite sides of the bottom member to the bag mounting rim of the stand to locate the bag mounting rim in elevated relation to the platform at a height less than the height of the bag to be supported such that the upper end of the bag may be reversely folded over the rim with the bag open and extended for loading, and mounting means for securing the bottom member of the stand in fixed relation to the support platform, the support platform and the stand being rotatable in unison relative to the base such that upon spinning the bag and stand on the support platform while holding the upper end of the bag fixed, its upper end may be formed into a tightly twisted closure and handle for efficient removal and lifting of the bag, the platform having a face scored with a plurality of slots conforming to the configuration of the open wirelike bottom member of the stand for receiving the same in a stabilized assembly, the mounting means removably securing the bottom member of the stand in the slots of the support platform.

4,031,690

NOISE SUPPRESSION APPARATUS AND METHOD FOR FALSE-TWIST TEXTURING MACHINES

Lorimer Phillip Thomas, and Robert Harold Walker, both of Greensboro, N.C., assignors to Burlington Industries, Inc., Greensboro, N.C.

Filed Oct. 2, 1975, Ser. No. 618,969
Int. Cl.² D02G 1/02; G10K 11/00
U.S. Cl. 57—1 R 11 Claims



1. Noise abatement apparatus for a yarn texturing machine of the type having a frame extending between a gear housing and a motor housing, a plurality of rotatable devices spaced longitudinally along said frame, a plurality of pulley means mounted on said frame and spaced longitudinally therealong, an endless drive belt extending from within said motor housing along said frame and into said gear housing and in driving engagement with a portion of each said pulley means, a plurality of idler pulleys, means for mounting said idler pulleys along said frame in engagement with said endless drive belt, an endless driven belt extending along said pulley means and in engagement with another portion of each said pulley means and in driving engagement with each of said rotatable devices, said texturing machine further including yarn transport means and heater means mounted on said frame, said noise abatement apparatus comprising:

a. means for enclosing a said pulley means located adjacent to said gear housing, said enclosing means including pairs of openings for said endless drive belt and said endless driven belt,

b. means for isolating vibrations of said idler pulleys' mounting means from said frame,

c. means for reducing sound generation from said idler pulleys and simultaneously reducing the rotational velocity of said idler pulleys when said idler pulleys are being rotated by said endless drive belt.

9. A noise abatement method for a yarn texturing machine of the type having a motor housing at one end of the machine, a gear housing at the other end thereof, a frame extending between said housings, a plurality of rotatable spindles spaced along said frame, a plurality of pulleys mounted on said frame and spaced longitudinally therealong, an endless drive belt extending from said motor housing, along said frame and into said gear housing with said drive belt being in driving engagement with a portion of each said pulley means, a plurality of idler pulleys, means for mounting said idler pulleys along said frame in engagement with said endless drive belt, an endless driven belt extending along said pulley means and in engagement with another portion of each said pulley means so as to be driven thereby, said endless driven belt being in driving engagement with said rotatable spindles, said yarn texturing machine further including yarn transport means and heater means mounted on said frame, said method comprising the steps of:

a. enclosing the pulley located adjacent to said gear housing with enclosure walls lined with sound absorbing material,

b. providing, with said enclosure walls, tunnels for said endless drive belt and lining said tunnels with sound absorbing material,

c. providing cushioning means for said mounting means for said idler pulleys, and

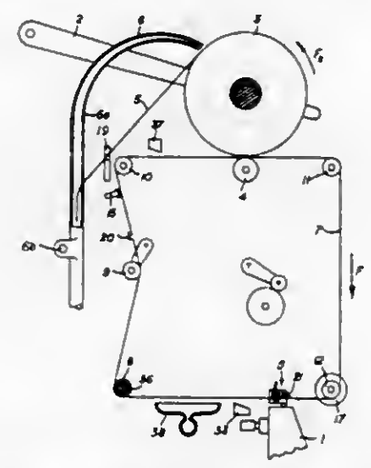
d. providing sound reducing means on the rotatable portion of each idler pulley.

4,031,691

DEVICE FOR REINSERTING THE BROKEN YARN IN AN OPEN END SPINNING UNIT

Christian Roehrich, Chaillevette, France, assignor to Nuova San Giorgio S.p.A., Genoa-Sestri, Italy

Filed Aug. 13, 1976, Ser. No. 714,114
Claims priority, application Switzerland, Aug. 20, 1975, 10807/75; Nov. 28, 1975, 15462/75
Int. Cl.² D01H 15/00, 1/12
U.S. Cl. 57—34 R 17 Claims



1. A device for reinserting the broken yarn in a spinning unit of an open end type of spinning frame, comprising a disengaging or releasing member between the winding up bobbin and associated driving shaft, means for extracting the broken end of yarn from the bobbin yarn, a yarn gripping element, a device for reinserting the yarn in the spinning unit, means for transferring said gripping element from a yarn gripping position to said reinserting device and a thread cutter adjacent said reinserting device, said transfer means comprising an endless belt having said gripping element secured thereto, guide means for said endless belt to form a loop passing in front of said yarn gripping position and said reinserting device, driving means for said belt to move said gripping element from said yarn gripping position to said reinserting device, and means for stopping said belt at least at a determined position of the path of said gripping element.

4,031,692

NOVEL HOSIERY YARN

F. Holmes Simons, and Michael P. Taylor, both of Charlotte, N.C., assignors to Fiber Industries, Inc., Charlotte, N.C.

Continuation of Ser. No. 275,390, July 26, 1972, abandoned, and a continuation-in-part of Ser. No. 166,580, July 27, 1971, abandoned. This application Jan. 7, 1976, Ser. No. 647,235
Int. Cl.² D02G 3/24, 3/26, 1/02
U.S. Cl. 57—140 R 11 Claims

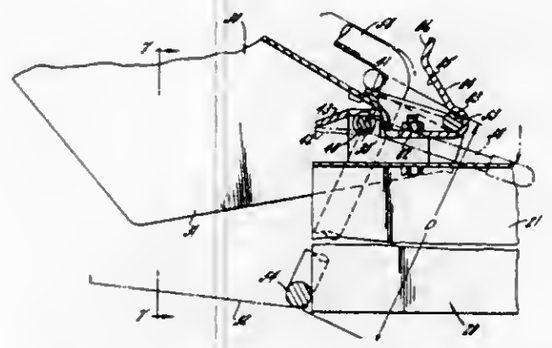
1. Pick resistant hosiery comprising twist lively yarn comprising at least 50% polyester, said polyester being essentially 100% poly(tetramethylene terephthalate), said yarn having an available torque ratio of 1 to 3, a sum of initial twist and developed twist less than 55 t.p.i., a percent developed crimp of at least about 12 percent, and from 1 to 50 filaments.

4,031,693

ELECTRONIC DIGITAL CLOCKS

Albrecht Haag, Dauchingen, and Helmut Stechmann, Schwenningen, both of Germany, assignors to Kienzle Uhrenfabriken GmbH, Schwenningen, Germany

Filed Dec. 23, 1975, Ser. No. 643,878
Claims priority, application Germany, Dec. 27, 1974, 2461563; Feb. 25, 1975, 2508037
Int. Cl.² G04C 13/06
U.S. Cl. 58—33 32 Claims



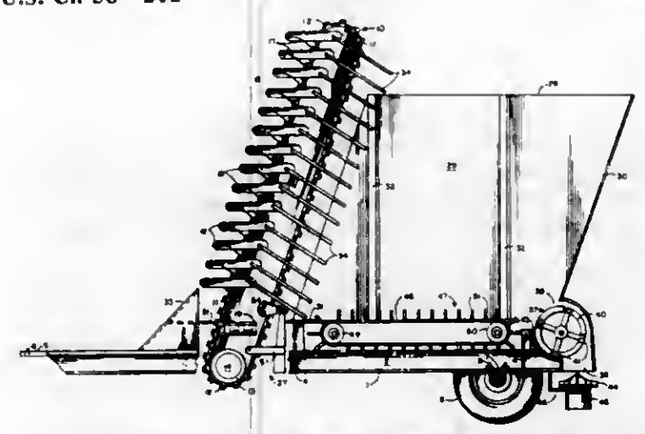
1. An electronic digital clock having at least one time-programmed electrical output for triggering switching functions, the clock comprising a digital electrical time display, a clock circuit for producing and applying to said display coded signals representing time, a multiplexer, at least one coded fixed-value store, a sampling logic circuit and a comparator circuit, wherein coded values stored in the fixed-value store are sampled under the control of the multiplexer by the sampling logic circuit and are compared in the comparator circuit with said coded signals representing time, and wherein the event of coincidence between the sampled values and the coded signals representing time an output signal is produced at said time-programmed electrical output.

4,031,694

MOWER ASSEMBLY WITH CATCHER SECUREMENT

Donald L. Gobin, Savannah, Ga., assignor to Roper Corporation, Kankakee, Ill.

Filed May 17, 1976, Ser. No. 686,888
Int. Cl.² A01D 55/22
U.S. Cl. 56—202 11 Claims



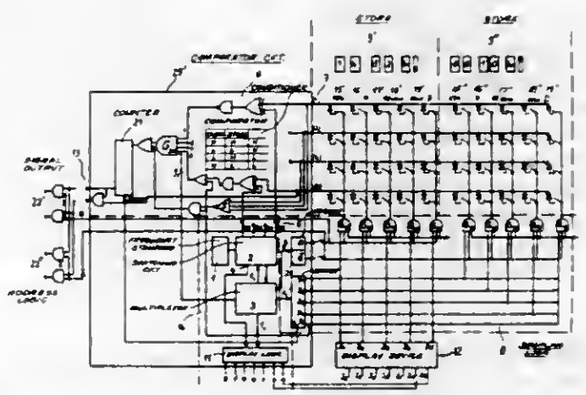
1. A mower assembly with catcher securement comprising, in combination, a rotary mower structure including a housing having a discharge chute of inverted U cross section formed of side walls and a top wall and defining an opening for outward discharge of a stream of clippings, a guard of inverted U cross section having sides and a top wall superimposed on the discharge chute and extending beyond it, means for pivoting the guard to the discharge chute along an axis located at the top wall of the chute adjacent the discharge opening, means for biasing the guard downwardly about its pivot axis, a stop in the path of downward movement of the guard for defining a normal downwardly-angled guarding position for interception of missiles in the stream, the sides of the guard including projections extending inwardly of the pivot axis and having upwardly facing notches at the inner ends thereof defining vertical obstructing edges, means on the top wall of the chute defining a horizontally facing groove spaced inwardly of the pivot axis and parallel thereto and so located as to be in register with the notches when the guard is tilted to a horizontal freely discharging position, a catcher having a frame and a bag supported thereby, the frame defining a throat registering with the end of the chute and enclosing the guard, the frame including a horizontal supporting rod at the upper edge of the throat, an upstanding guide member mounted on the discharge chute adjacent the groove and so angled that when the horizontal supporting rod of the catcher is positioned against the guide member and pressed downwardly against the projections on the guard, the guard is swung upwardly to a position slightly beyond the horizontal position for entry of the supporting rod into the groove followed by slight downward movement of the guard under the force of bias into horizontal position in which the obstructing edges of the notches hold the rod captive in the groove.

4,031,695

TREE HEDGING ARRANGEMENT

Richard E. Diggs, P.O. Box 776 South 12A Road, Carthage, Mo. 64836

Filed Oct. 28, 1975, Ser. No. 626,449
Int. Cl.² A01D 55/24
U.S. Cl. 56—237 14 Claims



1. A hedging apparatus comprising:

a. a wheeled vehicle which rolls over the ground;

b. a powered chain saw on said vehicle, said saw having a chain bar with a rotatively movable cutter chain thereon and being oriented to sever the branches of trees which the vehicle rolls past during a hedging operation; said cutter chain moving about said chain bar in a cutting direction;

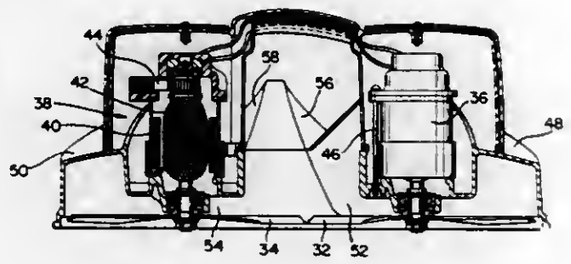
a plurality of guide bars attached to the chain bar and extending forwardly therefrom beyond the cutter chain; the guide bars being spaced apart from each other along the length of the chain bar; and

d. said guide bars each having a first surface thereof engaging selected branches and restraining the same from motion relative to said cutter chain in the cutting direction; said first surface being blunt from a forwardmost point thereof to a point disposed adjacent to said cutter chain for non-cutting abutment with said selected branches, whereby the selected branches are severed by a chopping, non-sharing motion of said cutting chain.

4,031,696
BLADE CONFIGURATION FOR CORDLESS LAWNMOWER

Donald Earl Fleigle, Frostburg, Md., assignor to The Black and Decker Manufacturing Company, Towson, Md.

Filed Aug. 8, 1975, Ser. No. 603,251
Int. Cl.² A01D *55/18*
U.S. Cl. 56—295 **1 Claim**



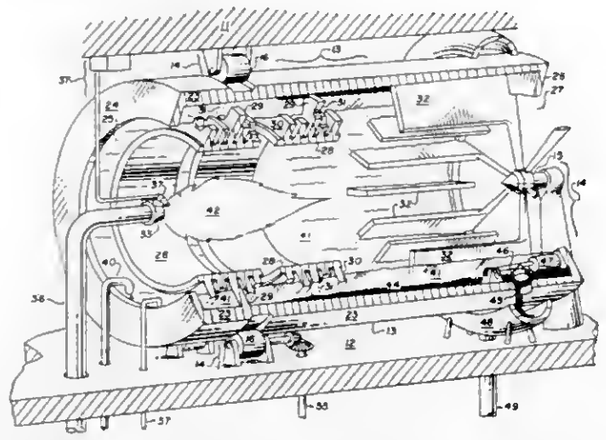
1. In a cordless electric lawnmower of the type comprising a housing, a battery supported on said housing, a handle mounted on said housing, a switch supported on said handle, an electric motor mounted on said housing and connected to be energized from said battery via said switch, a blade adapted to be rotated in a horizontal plane within said housing by said motor, and a helical discharge path defined by said housing for receiving air and grass clippings propelled by said blade without causing substantial recutting of said clippings, the improvement comprising an improved configuration for said blade to provide maximum cutting and air propelling efficiency so that said grass clippings tend to remain entrained from the time of severing the clipping to the point of discharge from the mower housing, said configuration comprising an air foil cross section along the full length of said blade, said cross section comprising a generally flat central width section and two converging end sections, said central width section comprising approximately 60% of the width of said blade; said configuration including two lifting regions wherein said cross sectional shape is disposed at an angle to the cutting plane of said mower and a central length region parallel to said cutting plane, said lifting regions lying below the upper surface of said central length region, said configuration providing a recess between the cutting plane of said mower and the lower surface of said central length region for location of mounting means for said blade therein.

4,031,697
COMBINATION STEAM-GAS GENERATOR ENGINE

Joseph Bryan Adair, 2103 Vanderbilt Lane, Austin, Tex. 78723

Filed Apr. 18, 1976, Ser. No. 675,071
Int. Cl.² F02C *7/00*
U.S. Cl. 60—39.55 **17 Claims**

1. A combination steam-gas generator engine comprising
A. a ground base support structure;
B. an engine bed frame supported by a conventional means at a spaced-apart distance from the ground base support structure with means for rotatably supporting a rotary can burner;
C. an input air compressor;
D. a compressed air transmission duct routed between the compressed air supply end of said input compressor and the input end of a rotary can burner;
E. a generally horizontally positioned rotatably mounted hollow tubular can burner structure having
1. a cylindrical wall,
2. an appropriate fuel injection nozzle with associated means of igniting fuel injected into the burner can,
3. a cylindrical wall of vaporizable liquid fluid forming a liquid liner on the interior wall of the burner can and held against said interior wall of the burner can by centrifugal force resulting from high speed rotation of the burner can,
4. at least one rotatable flame protecting flame gallery liner of a thermally conductive material concentrically mounted to and within the burner can near the fluid input end of the can and supported at a spaced-apart distance from the burner can wall, with the space between the outer portions of the flame gallery liner and the burner can wall being partially occupied by said cylindrical wall of vaporizable liquid fluid,
5. a fluid input means at one end of the burner can, and
6. a fluid output means at the opposite end of the burner can;
F. means of providing rotary drive motion to rotate the burner can;

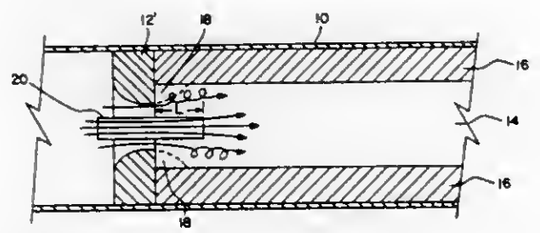


G. an auxiliary power turbine gas inlet duct coupled to the downstream output end of the rotatable burner can;
H. a driven auxiliary power turbine wheel rotatably mounted in such position as to be driven by the gasseous fluid flowing from the rotatable burner can through the auxiliary power turbine gas inlet duct;
I. means of coupling rotative energy developed by the auxiliary power turbine wheel to auxiliary and accessory equipment;
J. a generated gas directive duct; coupled to
K. a useful load device;
L. means for controlling the supply and flow of vaporizable liquid fluid into the burner can;
M. means for controlling the supply and flow of fuel to the fuel injection nozzle in the burner can.

4,031,698
SPLIT FLOW INJECTOR FOR SOLID FUEL RAMJETS

John M. Humphrey, San Jose, and Allen L. Holzman, Palo Alto, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 6, 1976, Ser. No. 712,421
Int. Cl.² F02K *9/04*
U.S. Cl. 60—251 **5 Claims**

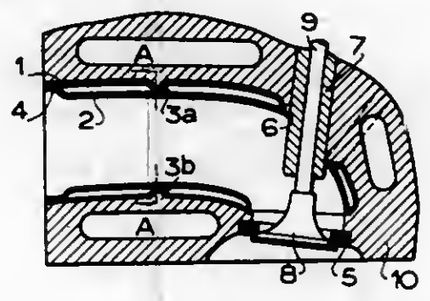


1. In a solid fuel ramjet, having a casing with an injector port and a fuel port with a recirculation region adjacent to and downstream from said injector port, the improvement comprising:
an inner tube situated centrally in said injector port and extending into said fuel port to divide an airflow through said injector port into a primary and secondary airstream, said primary airstream being injected into said recirculation region to stabilize combustion and said secondary airstream being injected into said fuel port downstream from said recirculation region to smooth said airflow.

4,031,699
PORT LINER ASSEMBLY

Yoshiyuki Suga, Tokyo; Tsutomu Kita, Kawasaki, and Ryusuke Harada, Tokyo, all of Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 20, 1975, Ser. No. 606,238
Claims priority, application Japan, Oct. 25, 1974, 49-129185
Int. Cl.² F01N *3/10*
U.S. Cl. 60—282 **6 Claims**



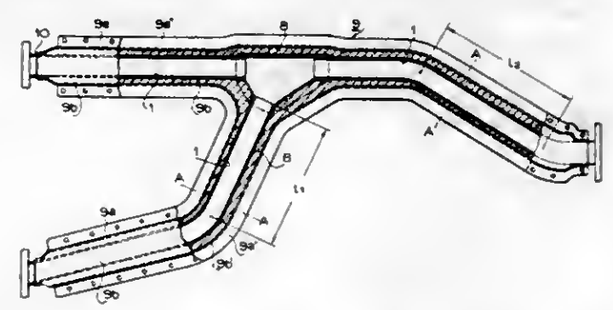
1. A port liner assembly for internal combustion engines having at least one exhaust valve seat, comprising,
a cylinder head block,
an exhaust port having an inner wall provided in said cylinder head block communicating with at least one exhaust valve seat,
a tubular liner provided in said exhaust port comprising an outer tube and an inner tube engaged with each other forming a hollow structure,
said tubular liner having means for sliding an outer end of said inner tube relative to said outer tube, said inner tube constituting a floating tube,
said inner and outer tubes having inner ends adjacent the exhaust valve seat, and
said inner ends being secured together.

4,031,700
HEAT INSULATING APPARATUS FOR EXHAUST PIPE OF AN INTERNAL COMBUSTION ENGINE

Nobuo Yamazaki, Gunma; Takeshi Ito, Ohta; Tetsuro Katsurada, Ohta, and Yasuhiko Habara, Ohta, all of Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 24, 1975, Ser. No. 634,786
Claims priority, application Japan, Nov. 26, 1974, 49-143649[U]; Nov. 26, 1974, 49-143651[U]
Int. Cl.² F01N *7/00*
U.S. Cl. 60—322 **7 Claims**

1. An exhaust pipe system for internal combustion engines comprising
an exhaust pipe comprising first straight portions and bending portions and second straight portions positioned after the bending portions which are alternately arranged and continuously connected with each other,
a heat insulating layer disposed on said exhaust pipe,
a cover covering said heat insulating layer,
said heat insulating layer on the second straight portions positioned after each said bending portion having an eccentric cross-sectional thickness having a stretching side and a diametrically opposite side, in which the thickness of the stretching side thereof is greater than that of the diametrically opposite side and being adapted to absorb a thermal expansion of a preceding said first straight portions, said cover on said second straight portions after each said bending portion being eccentrically

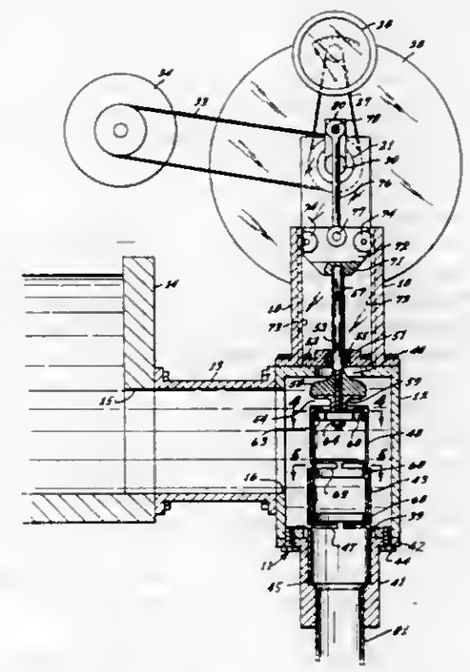


offset relative a longitudinal axis of said second straight portions, and
one end of said cover being secured to said exhaust pipe and the other end of said cover slidably engaging with said exhaust pipe.

4,031,701
WATER MOTOR

Carl H. Upton, 12831 Clark Ave., Downey, Calif. 90242

Filed Mar. 30, 1976, Ser. No. 671,840
Int. Cl.² F15B *1/06*
U.S. Cl. 60—325 **10 Claims**



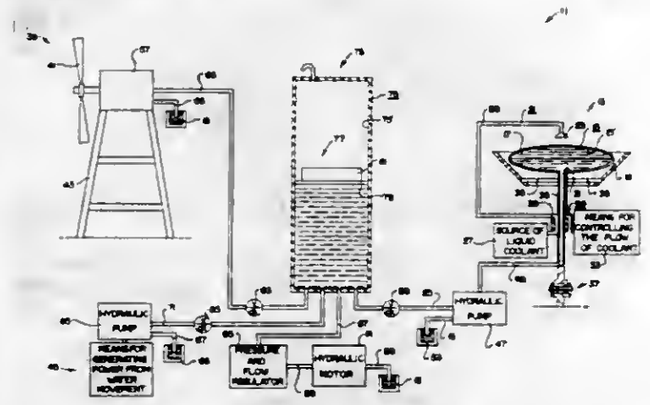
1. A water motor unit comprising:
a cylinder having a port on the sidewall thereof,
an outlet conduit extending from the lower end of said cylinder,
a piston means including a piston rod, said piston means reciprocatingly movable in said cylinder and having a port on the sidewall thereof, and
a container providing a supply of water immersing said cylinder and said piston means,
whereby when said piston means is in its uppermost position relative to said cylinder the ports of said cylinder and said piston means are open to enable water to flow from the container into the cylinder to fill the outlet conduit with a continuous column of flowing water, and
whereby when said piston means moves downwardly into said cylinder the ports in each are closed resulting in the column of water in the outlet conduit exerting a downward pulling action on the piston means until the ports of each mate and provide an opening thereby permitting

water to flow from the container into the cylinder and terminate the pulling action on the piston means.

4,031,702
MEANS FOR ACTIVATING HYDRAULIC MOTORS

James T. Burnett, River Bank Road, Batesville, Ark. 72501, and Arnold P. Hendrix, Rte. 1, Box 775, Atoka, Tenn. 38004

Filed Apr. 14, 1976, Ser. No. 677,018
Int. Cl.² F15B 1/02, 18/00
U.S. Cl. 60—398 2 Claims



1. Means for activating hydraulic motors, said means comprising:

a. at least one power generating means for generating power from sunlight, said power generating means including a solar heat absorbing means having a hollow interior, including a quantity of heat absorbing expandable gas within said hollow interior of said solar heat absorbing means, including reflector means for allowing sunlight to be directed against substantially all portions of said solar heat absorbing means, including coolant spray means for spraying a liquid coolant over said solar heat absorbing means when the temperature of said quantity of heat absorbing expandable gas within said hollow interior of said solar heat absorbing means is above a set amount, including support means for supporting said solar heat absorbing means and said reflector means, and including a thermostat device for sensing the temperature of said quantity of heat absorbing expandable gas within said hollow interior of said solar heat absorbing means and for controlling the flow of liquid coolant through said coolant spray means, said support means including a gimbal-like device for allowing said solar heat absorbing means and said reflector means to be positioned so as to receive the maximum effect of the sun's rays;

b. hydraulic pump means connected to said power generating means for using the power generated by said power generated means to pump hydraulic fluid;

c. tank means connected to said hydraulic pump means for receiving and storing the hydraulic fluid pumped by said hydraulic pump means, said tank means including means for maintaining the hydraulic fluid under a constant pressure; and

d. means for allowing the hydraulic fluid stored within said tank means to selectively pass to a hydraulic motor whereby the hydraulic motor is activated.

4,031,703
SPHERICAL STIRLING ENGINE

Charles G. Redshaw, 15001 SE. 44th Place, Bellevue, Wash. 98006

Continuation-in-part of Ser. No. 602,923, Aug. 7, 1975, Pat. No. 3,984,981. This application June 18, 1976, Ser. No. 697,624
Int. Cl.² F02G 1/04
U.S. Cl. 60—519 10 Claims

1. A spherical Stirling cycle engine having means for internal heat transfer comprising:

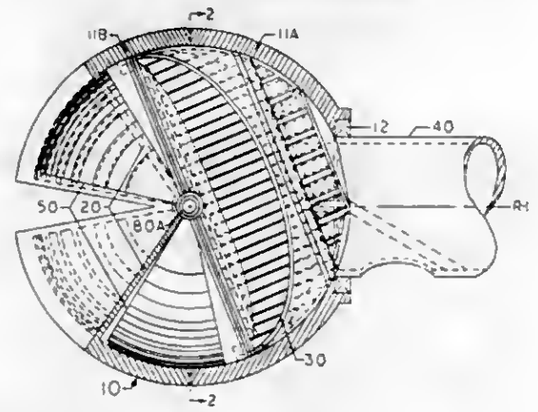
a housing fixed against rotation comprising;

two substantially hemispherical members having means for joining and sealing around their common diametrical plane forming an essentially spherical cavity, said members each having a circular aperture located diametrically opposite each other;

a circular disk located within said cavity and engaged with said housing by sealing means to divide said cavity into two substantially equal first and second sections, said disk having a first axis with a journal segment extending diametrically across the disk in said first section, and a second axis positioned perpendicular to said first axis with a journal segment extending diametrically across the disk in said second section;

substantially similar first and second spherical-sector shaped heat exchangers located in said first and second sections respectively, and pivotally mounted about said first and second axis to form a universal coupling between them, with the wedge apex engaged by seal means to said journal segments and the wedge lune juxtapose and engaged by seal means to said housing, dividing each of said sections into two chambers, said heat exchangers having ports located on the wedge lune in communication with said apertures for the circulation of heat transfer fluids through heat exchanger fin assemblies comprising;

a plurality of hollow sector shaped fins arranged symmetrically to form a spherical-sector shape with openings on common manifolds connected to said ports;



atachment means to prevent movement of said first heat exchanger, located in said first section, relative to said housing;

connective means for drivingly engaging said second heat exchanger for nutative movement, said movement providing an oscillating motion to said second heat exchanger about said second axis varying the effective volume of said chambers in said second section, and an oscillating motion to said disk about said first axis varying the effective volume of said chambers in said first section;

substantially similar spherical-sector shaped heat regenerators located within each said chamber by attachment means to said disk, and connected by passages through said disk between said first and second sections to form two interconnected pair of chambers, said regenerators comprising;

a plurality of sector shaped fins arranged for interspacing with said heat exchanger fin assemblies, and mounted on a common manifold to form a spherical-sector shape, said fins providing fluid passage in heat exchange relationship with a working fluid circulated between said interconnected chambers through said manifolds and passages;

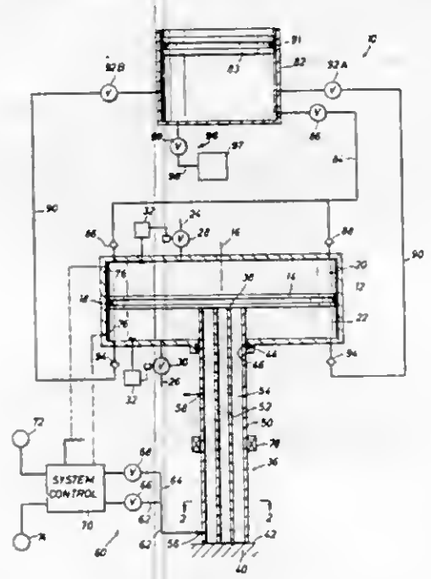
means for supplying heat to said first heat exchanger;

means for removing heat from said second heat exchanger.

4,031,704
THERMAL ENGINE SYSTEM

Marvin L. Moore, 16204 Diana Lane, Apt. 323A, Houston, Tex. 77062, and William M. Moore, 8820 Mountain Path Circle, Austin, Tex. 78750

Filed Aug. 16, 1976, Ser. No. 714,300
Int. Cl.² F03G 7/06
U.S. Cl. 60—325 10 Claims



1. A thermal engine comprising:

a cylinder having a working fluid therein;

a piston reciprocally movable in first and a second direction within said cylinder and dividing said cylinder into a first and second region;

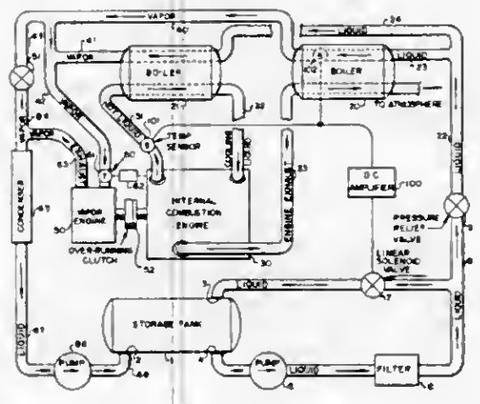
an expansible member operatively associated with said piston and responsive to the temperature of a driving fluid to move said piston reciprocally within said cylinder to alternatively pressurize working fluid in said first and second regions; and,

means for introducing driving fluid of a predetermined temperature into a heat exchange relationship with said expansible member.

4,031,705
AUXILIARY POWER SYSTEM AND APPARATUS

John W. Berg, 1111 Morse Ave., Space No. 35, Sunnyvale, Calif. 94086

Continuation-in-part of Ser. No. 524,262, Nov. 15, 1974, abandoned. This application Nov. 10, 1975, Ser. No. 630,415
Int. Cl.² F01K 23/10
U.S. Cl. 60—615 37 Claims



1. Apparatus for providing mechanical power from normally wasted heat energy, comprising:

primary engine means for generating primary power and heat not used for said primary power.

fluid having a boiling point well below that of water,

heat exchange means connected to said engine for heating said fluid from a liquid state to a vapor by employing heat normally wasted by said primary engine means,

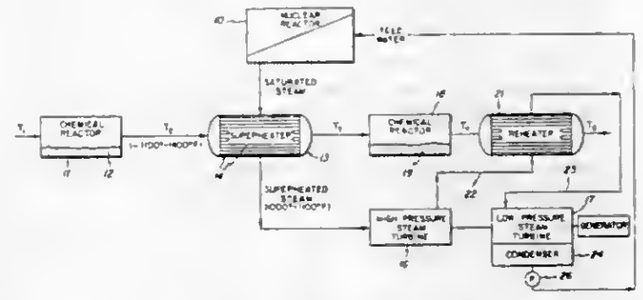
auxiliary vapor-operated engine means for generating power from the energy supplied by said vapor, and

control means for automatically controlling the flow of said fluid to said heat exchange means in accordance with the temperature of said primary engine, including temperature-sensitive means for providing an output signal as a function of temperature, and valve means connected to said temperature-sensitive means for controlling said fluid flow as a function of said output signal.

4,031,706
SUPERHEATING STEAM FROM LIGHT WATER NUCLEAR REACTORS

Himanshu B. Vakil, Schenectady, and Dale H. Brown, Scotia, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 18, 1975, Ser. No. 641,835
Int. Cl.² F01K 21/00
U.S. Cl. 60—644 10 Claims



1. In a process for heating the pressurized steam product stream produced by heat generated in a light water nuclear reactor wherein the steam product stream is brought into heat exchange relationship with a high temperature source in a heat exchange device and the temperature of the steam product stream is increased to at least about 650° F. after which the superheated steam so produced is used to operate a steam turbine-generator set, the improvement comprising using a combustion-less exothermic chemical reaction for the generation of heat utilized for the heating step, said exothermic chemical reaction having a maximum attainable temperature limited by thermodynamic considerations to a value below the design capability of any component of said heat exchange device exposed thereto.

4,031,707
CRYOTHERMAL MANIPULATION OF PETROLEUM SPILLS ON WATER

Sigmund Lance Ross, deceased, late of 1 Cornell St., Scarsdale, N.Y., by Rose Shuffman, executive, Scarsdale, N.Y., and Oscar Shuffman, 2761 Sedgwick Ave., New York, N.Y., assignors to Rose Shuffman, Executrix, Scarsdale, N.Y.

Filed Apr. 24, 1972, Ser. No. 246,960
Int. Cl.² E02B 3/00
U.S. Cl. 61—1 F 8 Claims

1. A method for recovering a body of petroleum constituting an oil spill on a large body of water comprising the steps of:

providing a plurality of elongated booms each comprising material at a cryothermal temperature corresponding to the freezing point of water at sea level or lower, which cryothermal temperature is lower than the temperature of said body of petroleum, each of said elongated booms being disposed in adjacent end-to-end pivotally connected relationship;

floating said elongated booms in the body of water with said material facing and adjacent the periphery of said body of

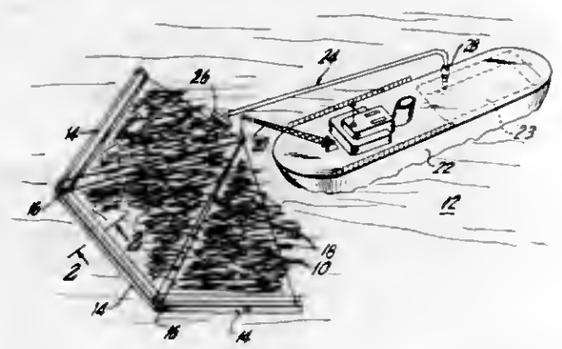
petroleum so as to increase the surface tension of said body of petroleum that is adjacent thereto and cause it to move away therefrom into a more restricted area; and

removing said body of petroleum from the water.

4. Apparatus for recovering a body of petroleum constituting an oil spill on a large body of water comprising:

an oil collection vessel;

a floatable boom assembly including at least two pivotally connected, elongated booms, each boom carrying, at the level of the water, an elongated block of material at a



cryothermal temperature corresponding to the freezing point of water at sea level or lower, which cryothermal temperature is lower than the temperature of said body of petroleum so as to increase the surface tension thereof when said elongated block of material is positioned adjacent said body of petroleum;

a guide wire assembly interconnecting said floatable guide assembly to said oil collection vessel; and

suction apparatus for removing the petroleum from said body of water and conveying same to the vessel for collection.

4,031,708

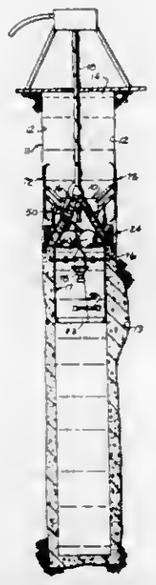
SLIPFORMING METHOD AND APPARATUS FOR IN SITU LINING OF AN UPWARDLY OPEN SHAFT WITH MONOLITHIC CONCRETE

Raymond A. Hanson, c/o R. A. Hanson Co., P.O. Box 7400, Spokane, Wash. 99207

Filed Sept. 20, 1976, Ser. No. 725,007

Int. Cl.² E21D *5/00*

U.S. Cl. 61—41 R **15 Claims**



1. A slipform for forming a monolithic concrete lining in an upwardly open vertical walled shaft filled with a liquid such as drilling mud, comprising:

an outer downwardly open form member having a lower peripheral edge of complementary configuration to the shaft cross section;

an upwardly closed inner core form member mounted to the outer form member and spaced inwardly therefrom;

an upright core wall parallel to and spaced inwardly from the shaft wall for forming the inside wall of the lining;

means for delivering concrete in a plastic state between the outer and inner form members to fill the gap between the shaft wall and core wall;

seal means on the outer form for providing a movable hydraulic seal between the outer form member and shaft wall; and

pump means for pumping liquid within the shaft from above the outer form member to pressurize the area within the shaft below the inner core member and thereby force the form members upwardly within the shaft as concrete is simultaneously received and formed against the shaft wall.

4,031,709

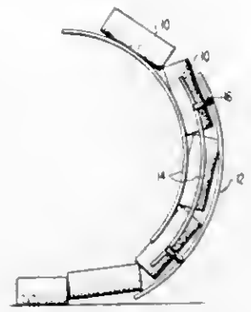
TILE DEGAPPER

John D. Blankemeyer, R.R. No. 3, Ottawa, Ohio 45875

Filed Feb. 19, 1976, Ser. No. 659,195

Int. Cl.² B65G *11/00*; **F16L** *1/00*

U.S. Cl. 61—106 **6 Claims**



1. An apparatus for detecting and correcting misaligned tiles in an automated tile laying system wherein tiles, having a cylindrical shape, open at both ends, are fed into a semicircular distribution chute in the vertical plane such that the tiles progress around and down the chute, the front edge of each tile is lapped over the rear edge of a preceding tile when in proper alignment, and no gaps occur between the tiles being placed on the ground, and when improperly aligned the front edge of a tile is lapped under the rear edge of a preceding tile causing the front edge of the tile to strike the ground a distance away from the rear of the preceding tile causing a gap in the line of tiles, said apparatus comprising:

sensing means for detecting said misaligned tile in the chute;

delaying means responsive to said sensing means for momentarily stopping the misaligned tile from progressing further down the distribution chute; and

readjustment means for positioning the misaligned tile such that when released by said delaying means said tile drops to the preceding tile with its forward edge lapped over the rear edge of the preceding tile as it is deposited on the ground.

4,031,710

EMERGENCY COOLING SYSTEM FOR AIR-CONDITIONED VEHICLES

Marvin Rideout, 8 E. 83rd St., New York, N.Y. 10028

Filed Mar. 10, 1976, Ser. No. 665,580

Int. Cl.² F28D *3/00*; **G01K** *13/00*; **B60H** *3/04*; **F28D** *5/00*

U.S. Cl. 62—171 **3 Claims**

1. Emergency cooling apparatus for a condensor of an air conditioning system of a motor vehicle comprising:

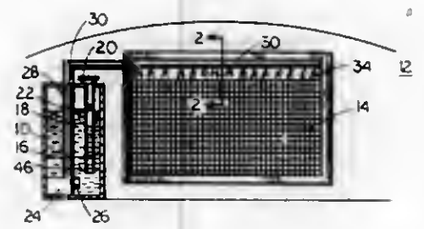
a coolant tank;

manifold means connected to said tank for spraying coolant from said tank on a condensor of an air conditioning system of a motor vehicle;

pump means within said tank for supplying coolant from said tank to said manifold means;

control means within said tank for rendering said pump means inoperative in response to the coolant in said tank being depleted below a predetermined level, and

electric circuit means having a source of electric power and a first switch adapted to be mounted in a motor vehicle



for activating said pump means in electrical series with said power source;

said electric circuit means further including

a second normally closed switch in electrical series with said first switch; and

said control means including a float in said tank; and

said second normally closed switch being mounted in said tank so as to be opened by said float when said float reaches said predetermined level in said tank.

4,031,711

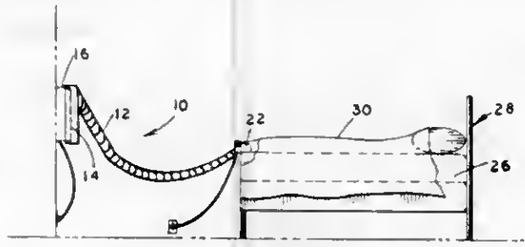
COLD AIR BLAST WAKE-UP APPARATUS

Peter MacNeil, 3680 Mountain St., Montreal, Quebec, Canada

Filed May 24, 1976, Ser. No. 689,562

Int. Cl.² F25D *23/12*; **E06B** *7/02*

U.S. Cl. 62—261 **2 Claims**



1. Wake-up apparatus for use in conjunction with means for air conditioning a room including a cold air outlet into said room, and a mattress located in said room, said apparatus comprising: a flexible elongated duct; coupling means at one end of said duct for attachment to said cold air outlet for enabling cold air to be fed into said duct; outlet means on the other end of said duct configured to rest on said mattress, said outlet means having a horizontally elongated outlet aperture lying in a vertical plane when said outlet means rests on said mattress for directing said cold air in a stream along the top of said mattress; an electrically controlled valve means in series with said duct having open and closed alternative positions for selectively allowing or blocking air flow through said duct, said valve means being normally in said closed position; and electrical timer means coupled to said valve means for placing said valve means in said open position at some preset time.

4,031,712

COMBINED ABSORPTION AND VAPOR-COMPRESSION REFRIGERATION SYSTEM

Frederick Alexander Costello, Herndon, Va., assignor to The University of Delaware, Newark, Del.

Filed Dec. 4, 1975, Ser. No. 637,839

Int. Cl.² F25B *15/00*

U.S. Cl. 62—483 **6 Claims**

1. In a closed cyclic absorption-refrigeration system using in combination

a. means for absorbing a vapor refrigerant in an absorbent

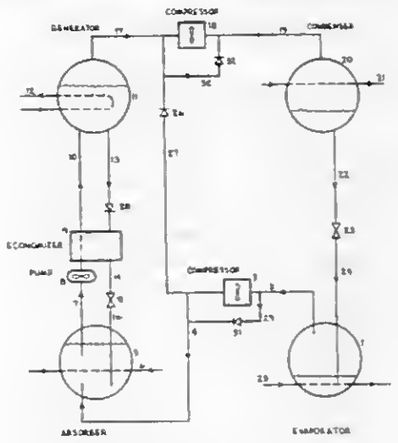
b. means for increasing the pressure on the absorbent containing the refrigerant

c. means for heating the absorbent-refrigerant mixture to drive off the refrigerant as a vapor

d. means for cooling said refrigerant vapor to condense same to a liquid

e. means for reducing the pressure on said liquid to permit same to evaporate

f. heat exchange means for cooling fluids outside the system by the evaporation of the refrigerant and



g. means for recycling the refrigerant vapor to the said absorbing means

the improvement which comprises a compressor for increasing the vapor pressure of the refrigerant vapor after it leaves the heat exchange means and before it is recycled to said absorbing means, and a compressor for increasing the vapor pressure of the refrigerant vapor after it is driven off from the absorbent-refrigerant mixture and before it enters the means for cooling to condense the refrigerant vapor.

4,031,713

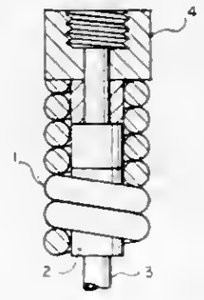
FLEXIBLE DRILL PIPE

W. B. Driver, 19 Sheridan Road, Arnold, Md. 21012

Continuation-in-part of Ser. No. 465,500, April 30, 1974, abandoned. This application Nov. 25, 1975, Ser. No. 635,136

Int. Cl.² F16C *1/02*

U.S. Cl. 64—2 P **2 Claims**



1. A flexible drill pipe for operating around the radius of bend of a curved hole or deflecting tool and the flexible drill pipe comprises, a closed pitch cylindrical spiral coil of wire rod, a female tool joint rigidly secured to one end portion of said rod, a male tool joint rigidly secured to the opposite end portion of said rod, a plurality of tube sections positioned end to end in contact within said coil or wire rod and having complete circumferential contact with said rod, said tube sections extending the full length of said coil of wire rod and contacting said tool joints at each end of said rod, flexible structure formed by said tube sections supports said coil or wire rod under high torsion loads and keeps said coil of wire rod from collapsing, all said tube sections constructed the

same permitting an even distribution of flexing moments over the length of said coil of wire rod, said tube sections each having an axial length not more than twice the diameter of said rod and not less than the diameter of said rod for support and maximum flexibility of said coil of wire rod, ends of said tube sections being blunt so the length around the inside radius of bend of the said structure formed by said tube sections will not be reduced when bent or flexed, a thin wall hose extending through said tube sections and secured to said joints at its opposite ends permit drilling fluids to be pumped through said drill pipe.

4,031,714

FLEXIBLE COUPLING AND TORQUE-TRANSMITTING MEMBER THEREFOR

Werner Faust, Unna-Billmerich, Germany, assignor to Maschinenfabrik Stromag GmbH, Unna, Germany

Filed Feb. 24, 1976, Ser. No. 661,451

Claims priority, application Germany, Mar. 8, 1975, 2510197; Apr. 14, 1975, 2516238

Int. Cl.² F16D 3/58

U.S. Cl. 64—12 22 Claims

1. A flexible coupling including a pair of coaxially arranged coupling members, a plurality of torque-transmitting members of a reinforced elastomer arranged in a circular pattern around the common axis of said pair of coupling members, each of said plurality of torque-transmitting members defining a pair of parallel stud-receiving passageways, a plurality of pairs of studs, each pair of said plurality of pairs of studs projecting through a pair of said stud-receiving passageways of one of said plurality of torque-transmitting members, one of each of said plurality of pairs of studs being supported by one of said pair of coupling members and the other of each of said plurality of pairs of studs being supported by the other of said pair of coupling members, and a woven reinforcement strip substantially spirally wound around said stud-receiving passageway wherein the improvement comprises in that said torque-transmitting members (3) are pre-stressed under compression, so as to preclude any relative movement between each of said plurality of pairs of studs (4,5, 4', 5') and one of said plurality of torque-transmitting members (3', 3') mounted thereon.

4,031,715

FLEXIBLE COUPLING ASSEMBLY

Hiriyur V. Shekar, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Dec. 12, 1975, Ser. No. 639,992

Int. Cl.² F16D 3/52

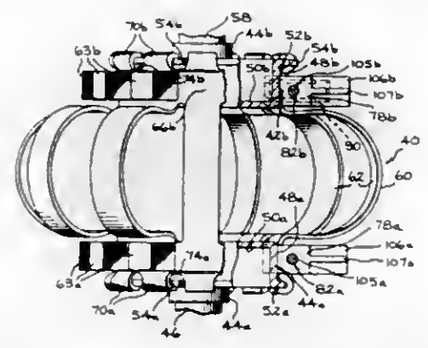
U.S. Cl. 64—15 B 6 Claims

1. A flexible coupling assembly for connecting a driving member to a driven member comprising:

a. a first circular end plate for attachment to the driving member for rotation therewith,

b. a second circular end plate spaced from the first end plate for attachment to the driven member for rotation therewith, said first and second end plates each having a circular flat surface and at least one lug extending beyond the flat surface,

c. a one-piece flexible plastic molded body having (*i*) a collar portion at each end engaging the circular flat surface of the first and second end plates respectively, said collar portions each having two bosses for receiving fastening means to secure the collars to the first and second end plates respectively, (*ii*) a notched area to receive the



respective lugs, and (*iii*) a plurality of spaced outwardly bowed ribs interconnecting the collar portions and spanning the space between the first and second end plates,

d. fastening means holding the two bosses of each collar portion together to thereby secure the molded body to the first and second end plates,

the improvement comprising one of the two bosses on each collar portion having a pocket to receive a reinforcing fastening member.

4,031,716

AUTOMATIC SEQUENTIAL DUAL ACTION SEALING SYSTEM

Clarence John Zabcik, 414 W. Cowan Drive, Houston, Tex. 77007

Division of Ser. No. 554,453, March 3, 1975. This application Dec. 29, 1975, Ser. No. 644,531

Int. Cl.² E21B 17/00

U.S. Cl. 64—23 1 Claim

1. In a shock absorbing subassembly including a body, a mandrel slidably and non-rotatively received in the body, means for providing limited relative longitudinal movement therebetween, dampening means between the mandrel and body for absorbing and dampening vibrations and impact loads applied to the body, upper seal means for providing a fluid tight seal between the body and the mandrel above the dampening means, and floating seal means for providing a flulid tight seal between the body and the mandrel below the dampening means, the improvement comprising

said body having a radial fluid outlet slightly below the floating seal means;

primary annular seal means for providing a fluid tight seal between the body and mandrel below the floating seal means; and

secondary annular seal means positioned between the body and mandrel and the floating seal means and said primary seal means, said secondary seal means comprising

an annular piston slidably positioned between the body and the mandrel and said radial fluid outlet and said primary seal means, said annular piston being slidable between first and second positions proximate and remote from said primary annular seal means,

inner and outer annular seals positioned between said annular piston and the mandrel and the body, respectively,

said annular piston being provided with an orifice to facilitate low fluid flow rates through said piston and said radial fluid outlet without causing said piston to move from said first position to said second position, and

orifice seal means for sealing said orifice when said piston is in said second position.

4,031,717

PATTERNING APPARATUS FOR KNITTING MACHINES, PARTICULARLY FOR MANUFACTURING PATTERNED KNITTED PILE FABRICS ON CROCHETTING MACHINES

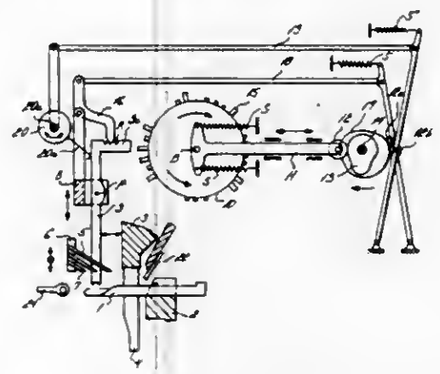
Heinz Lindner, Geyer, Erzg., Germany, assignor to VEB Wirkmaschinenbau, Karl-Marx-Stadt, Germany

Filed Apr. 19, 1976, Ser. No. 678,333

Claims priority, application Germany, May 12, 1975, 0418595

Int. Cl.² D04B 23/06, 23/08, 23/10, 23/12

U.S. Cl. 66—84 R 10 Claims



1. In a pattern-making device for a pile knitting machine for manufacturing patterned knitted pile fabrics, the knitting machine being of the type having a row of needles which move fore and aft and multiple pile thread guides movable between the needles, thread selecting sinkers controlled according to the desired pattern by patterning means, the thread exit openings of said multiple pile thread guide being disposed in a plane substantially parallel to the longitudinal axes of the needles, the improvement comprising means mounting the thread selecting sinkers for vertical movement perpendicular to the longitudinal axes of the needles, said mounting means including means for pivotal movement of the thread selecting sinkers intermediate the ends thereof about axes parallel to the row of needles, varying pattern spacer means positioned adjacent the upper ends of the thread selecting sinkers and constituting means for moving said thread selecting sinkers about their pivotal mounting means and for positioning the lower ends of said thread selecting sinkers adjacent any selected one thread exit opening of the multiple pile thread guide, and means for locking the thread selecting sinkers in a respective selected position relative to the corresponding exit openings of the multiple pile thread guides.

4,031,718

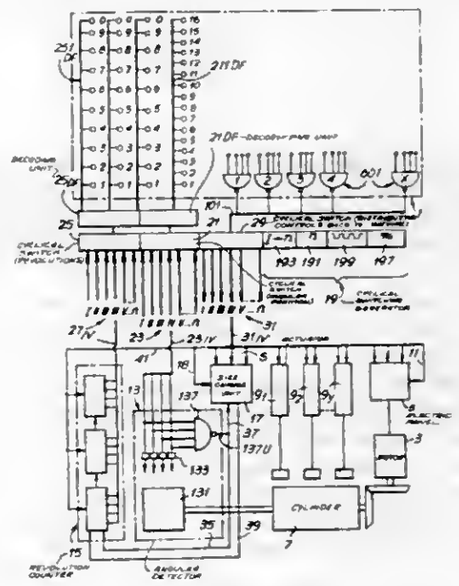
ELECTRONIC SYSTEM FOR CENTRALLY CONTROLLING A PLURALITY OF KNITTING MACHINES

Claus-Peter Luth, Florence, Italy, assignor to Macchine Tessili Circolari MATEC S.p.A. of Roma, Italy

Continuation-in-part of Ser. No. 387,514, Aug. 10, 1973, abandoned. This application June 12, 1975, Ser. No. 586,157

Int. Cl.² D04B 15/66, 15/78

U.S. Cl. 66—154 A 5 Claims



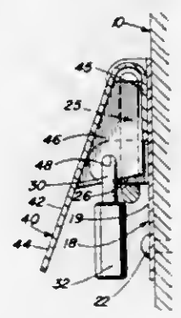
1. Electronic equipment for the control of a plurality of circular hosiery knitting machines of the type having a needle cylinder and a plurality of control members, each machine being designed to operate independently of the others, said equipment including for each machine an angular detector of the respective needle cylinder, a main revolutions counter means to count the revolutions completed by the cylinder and adapted to the zero set at the end of a cycle, a plurality of actuators including signal amplifiers, a central control unit with a signal program common for all the machines and having a input of the angular position information, an input of the revolutions number information and an output for the control information for the actuators, a quick switching assembly to temporarily and cyclically enable the central unit to receive the information from each of the machines successively and to supply the control information to the actuators of each machine in relation to the position wherein it is instantaneously located, and a size-change device for each machine and including means for receiving count pulses from the revolutions counter and the control unit, said size-change device including partial counter actuable by the counting pulses, a decoder means connected to each partial counter, a plurality of swtiches connected to each partial counter forming a plurality of pairs of swtiches, each switch of a pair having an input from one of said partial counters, the output of each corresponding pair of switches forming a coincidence circuit leading to a bistable switch, said bistable switches so connected into the system as to enable the main counter to progressively count and to interrupt the count respectively by means of a polarity inverter upon the reaching of a predetermined count and simultaneously to zero set the partial counters and respectively activate them to count during the interruption of the main counter, said switches determining the count interruption of the main counter and tus the dimensions of a corresponding portion of the hosiery are vaired.

4,031,719

LOCK-PROTECTIVE DEVICE

Lawrence R. Klingler, 124 - 20th St., Huntington Beach, Calif. 92648, and Daniel E. Shook, 2543 Orange St., Costa Mesa, Calif. 92626

Filed Oct. 8, 1976, Ser. No. 730,733
Int. Cl.² E05B 67/38; E05C 5/02
U.S. Cl. 70—56 4 Claims



1. A lock-protective device for garage-door locking units and similar locking units having a mounting plate, a slidable locking bolt, and locking ear, and including the use of various styles of padlocks having a locking arm, wherein the device comprises:

an elongated cover plate having a front cover wall and a rear wall wherein each wall is interconnected along its upper portion;

a support keeper fromed by said rear wall, said keeper being arranged to be received over said sliding bolt, and disposed between said sliding bolt and said mounting plate of said locking unit; and

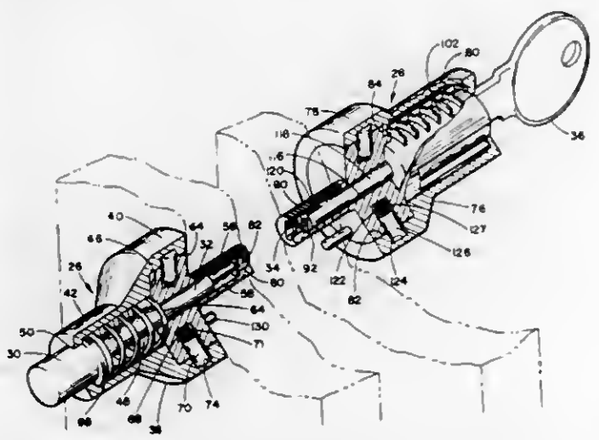
a strut member positioned between said front and rear wall and secured thereto, said strut having an aperture therein to receive said locking arm of said padlock.

4,031,720

LOCKING DEVICE FOR SECURING SKIS

Mauricio V. Avalusini, 1038 S. 317th St., Federal Way, Wash.

Filed Nov. 24, 1975, Ser. No. 634,403
Int. Cl.² E05B 73/00; A63C 11/00
U.S. Cl. 70—58 4 Claims



1. Apparatus for locking a pair of skis together with their lower surfaces in juxtaposition, comprising:

a first attachment mountable onto an upper surface portion of one of said skis, comprising a lock bolt including a head portion having a non-circular cross-sectional configuration and axially inwardly directed lock surface means mounting means supporting said lock bolt for axial movement between a retracted position in which the head portion of said lock bolt is at least substantially flush with the underside of its ski, and an extended position in which the head of said lock bolt is positioned substantially beyond the underside of its ski,

a second attachment mountable onto a corresponding upper surface portion of the second ski, including means defining an orifice having a cross-sectional shape which complements but is slightly larger than the cross-sectional shape of the head portion of the lock bolt, and lock surface means immediately inwardly bounding said orifice,

said first attachment including means for moving said lock bolt axially from its retracted to its extended position, so that when said two attachments are on two skis whose lower surfaces are juxtposed and the head portion of said lock bolt is aligned with said orifice, said head portion can be moved axially through said orifice, and

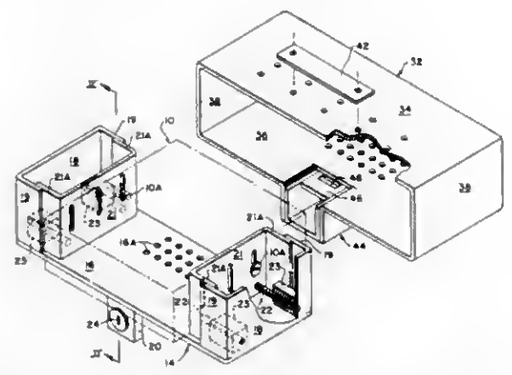
said second attachment including lock bolt rotation means for rotating said lock bolt in position after it has been extended through said orifice, to in that manner move the lock surface means on the head portion of said lock bolt angularly into a position of engagement with the lock surface means which inwardly bounds said orifice, whereby the engagement of the two lock surface means will prevent disengagement of said first and second attachments and in turn will prevent disengagement of the two skis, and for rotation of said lock bolt means back into a position in which its head portion is in pass-through alignment with said orifice, permitting separation of the two attachments and hence separation of the two skis, said lock bolt rotation means including a rotatable shaft having wrench means on an end thereof directed towards said orifice and sized to engage the head portion of said lock bolt, and key-controlled lock means connected to said shaft for controlling rotation of said shaft by operation of a key.

4,031,721

COMBINED ANTI-THEFT AND ADJUSTABLE MOUNTING ASSEMBLY FOR A CB RADIO DEVICE

Lyle V. Anderson, 122 Carriage Drive, Pittsburgh, Pa. 15237

Filed July 12, 1976, Ser. No. 704,525
Int. Cl.² E05B 73/00; F16B 41/00
U.S. Cl. 70—58 14 Claims



1. A combined anti-theft and adjustable mounting assembly for the casing of a CB radio receiver and transmitter of the type adapted for attachment to and opearable within a vehicle such as an automobile or the like, the combination comprising:

a frame including spaced-apart, upstanding side members adapted to support said casing while forming a nested relation between the side members of the frame,

spacer members adapted for attachment to the opposite sides of said casing for extending into an interlocking engagement with said side members at the opposite sides of said frame,

means to position at least one of said spacer members relative to a side member,

a housing forming an open-ended compartment to receive and support said frame together with said casing, said housing including a wall to carry fastening means for support by the vehicle at a desired location,

a lock box having walls secured to said housing, and

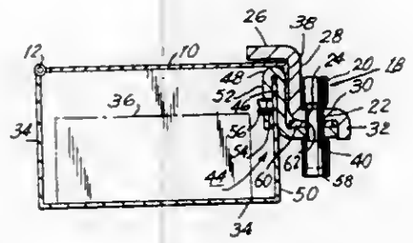
lock means carried by said frame to project into said lock box for interlocking said housing and said frame.

4,031,722

TAMPER-PROOF LOCKING DEVICE

Lionel S. Michelman, Pomona; Samuel M. Michelman; David L. Michelman, both of Queens, and Milton Michelman, Long Beach, all of N.Y., assignors to Michelman Iron Works Corporation, Brooklyn, N.Y.

Filed June 7, 1976, Ser. No. 693,293
Int. Cl.² E05B 65/52
U.S. Cl. 70—63 11 Claims



1. A tamper-proof locking device mountable on a lidded container or the like comprising a first member and a second member, said first member comprising a generally zig-zag strip having three substantially right-angled bends, so that said first member is divided into four sections, with none of said sections being directly opposite to another section, an inner one of said sections being provided with at least one opening, said second member comprising a strip having a generally U-shaped section and a projecting section, said U-shaped section having a first leg and a second leg, said projecting section extending laterally outwards from and substantially perpendicular to the lower end of the first leg of said U-shaped section and being provided with at least one opening, the second leg of said U-shaped section being provided with a threaded bore, and screw means extending through the bore in said second leg, so that the locking device is mountable on a lidded container by placing the U-shaped section of the second member on a wall of a container with said legs straddling said wall and with said second leg and said screw means within the container, turning said screw means until the tip of said screw means contacts and presses against the wall of the container, closing the lid of the container so that the edge of the lid rests on the base of said U-shaped section, and mounting said first member on both the edge of the lid and the projecting section of the second member with one end section of the first member extending over the edge of the lid, one inner section of the first member overlying the first leg of the U-shaped section, the other inner section of the first member overylying the projecting member and the other end section of the first member extending over the tip of the projecting section of the second member, so that said members are attachable to each other by lock means having a shackle extending through the opening in said inner one of said sections of said first member and the opening in said projecting section of said second member.

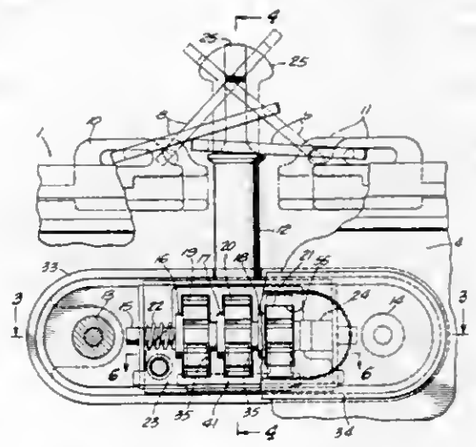
4,031,723

LOCKABLE ZIPPER CLOSURE

Clair A. Samhammer, Dana Point, and James Patrick Sullivan, Tustin, both of Calif., assignors to Samsonite Corporation, Denver, Colo.

Filed Mar. 31, 1976, Ser. No. 672,517
Int. Cl.² E05B 67/38
U.S. Cl. 70—68 13 Claims

1. A lockable zipper closure which comprises at least one slider with slider pulling means having an opening therein, and means for securing said zipper closure in at least partially closed position, said securing means comprising column means comprising a portion that is longer than at least one dimension of the opening in said slider pulling means adapted



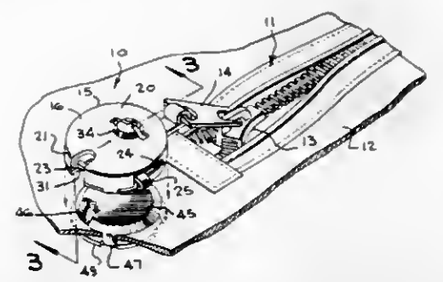
to pass through said opening in said pulling means, said column means being movable to a locking position in which said column means cannot pass completely through said opening, and means for locking said column means in said locking position.

4,031,724

KEY CONTROLLED LOCK MECHANISMS FOR ZIPPER FASTENERS

Wallace E. Atkinson, Petersburg, Va., assignor to Long Manufacturing Co., Inc., Petersburg, Va.

Filed Oct. 20, 1976, Ser. No. 734,119
Int. Cl.² E05B 65/32
U.S. Cl. 70—68 18 Claims



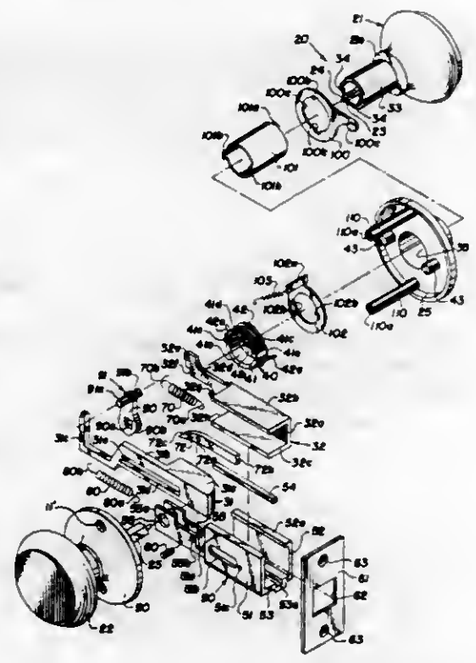
1. A key controlled lock mechanism for locking in closed position the zipper slider of a separable zipper-type fastener, comprising a lock member formed in the shape of a thick circular disc-like lock body of small axial thickness relative to its diameter, the disc-like lock body including a cup shaped casing forming a thin walled casing shell of generally cylindrical configuration having a circular front wall bounded by a rearwardly projecting annular rim flange and including a circular backing plate fastened thereto at the rearmost rear portions of said rim flange to define a cylindrical lock chamber between said backing plate and front wall, a circular latch plate having a diameter approximating the diamter of said chamber supported by sliding peripheral contact with the outwardly surrounding rim flange for rotary angular movement about the center axis of the lock body between latching and release positions and having a radially outwardly projecting finger piece extending beyond the rim flange forming a manually operable shifting tab for movement of the latch plate toward the release position, the circular latch plate having a peripheral cut-out shaped to define a circumferentially extending latch tongue adjacent its periphery and having a shaped intermediate recess near and eccentric of its center shaped to coact with a key-operable locking disc, a locking disc journaled at a fixed station in the casing for rotation in

said recess about an eccentric axis offset from said center axis having a key slot for rotation of the locking disc by a key inserted therein and having a locking surface extending in a generally circular path confronting the boundary surfaces of the intermediate recess to restrain the latch plate against rotation from said latching position and to free the same for rotation to release position at locking and unlocking positions respectively of the locking disc, means defining a keeper formation insertable into the casing for securing the slider in the closing position, and said casing having recesses for accommodating circumferential movement of said finger piece and for admitting the keeper formation into the casing into latched coupling engagement with said latch tongue.

4,031,725
DOOR LOCK

Floyd F. Reid, 603 W. Rochelle, No. 1073, Irving, Tex. 75062

Filed Aug. 11, 1975, Ser. No. 603,618
Int. Cl.² E05B 59/00; E05C 1/12
U.S. Cl. 70—107 7 Claims

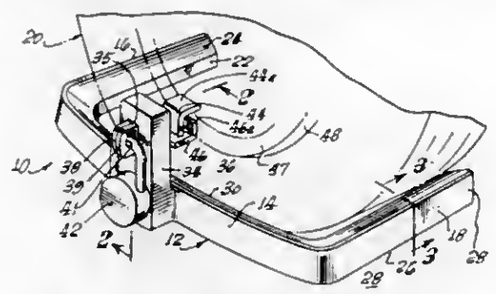


1. A door lock adapted to be mounted on a door and operated by first and second doorknobs mounted on opposite sides of said door comprising: a keyed lock associated with said first and second doorknobs, said first doorknobs being operable to activate said keyed lock by depressing and turning said doorknob and said second doorknob being operable by means of a key; a latch; means for moving said latch between a retracted unlocked position and an extended locked position; a dead bolt sleeve fitting in sliding relationship around said latch for movement between a retracted unlocked position, said latch and said dead bolt sleeve occupying a common recess in a doorjamb adjacent to said door when said latch and said dead bolt sleeve are extended to locked positions; lever means for extending said dead bolt sleeve by rotation of at least said first doorknob, said lever means being mounted on a shaft connected between and rotatable by said first and second doorknobs and being engageable with said latch responsive to rotation of either of said doorknobs in one direction to retract said latch and being engageable with said dead bolt sleeve responsive to rotation of said door knobs in an opposite direction; means for releasably locking said dead bolt sleeve at said extended locked position; means for releasing said dead bolt sleeve for movement from said extended locked position back to said retracted unlocked position by rotation of either of said first and second doorknobs; said lever means including an operator surface engageable with said means for releasing said dead bolt sleeve to release said dead bolt sleeve from said extended locked position by rotation of either of said doorknobs in said direction which retracts said latch; and means for moving said dead bolt sleeve from said first retracted position to said second extended position from the side of said door on which said second doorknob is mounted and independently of said second doorknob.

4,031,726
AIRCRAFT ANTI-THEFT CHOCK DEVICE

Garry De Jager, 6660 Riverside Drive, Chino, Calif. 91710

Filed Mar. 19, 1976, Ser. No. 668,435
Int. Cl.² B60F 3/00; B60T 3/00
U.S. Cl. 70—226 14 Claims

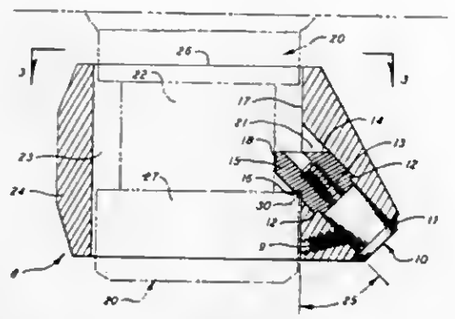


1. An aircraft anti-theft device in combination with an aircraft wheel assembly having a wheel thereon comprising:
- a bifurcated chock means arranged to receive the wheel of the wheel assembly between the bifurcated portion thereof and including a forward main body base member and a pair of spaced apart laterally extending arm members at opposite ends of said base member arranged to be positioned forward and aft of said wheel assembly when arranged therewith;
- securing means having a vertical securing bar formed with said base member of said bifurcated chock means; and
- securing connection means for releasable engagement between said securing bar and said wheel assembly.

4,031,727
KING PIN LOCK

Philip M. De Groat, 823 Pine St., Endicott, N.Y. 13760, and Robert A. Lewis, R.D. No. 1, Box 70, Port Crane, N.Y. 13833

Filed May 12, 1976, Ser. No. 685,643
Int. Cl.² E05B 65/12; B60R 25/00
U.S. Cl. 70—232 7 Claims

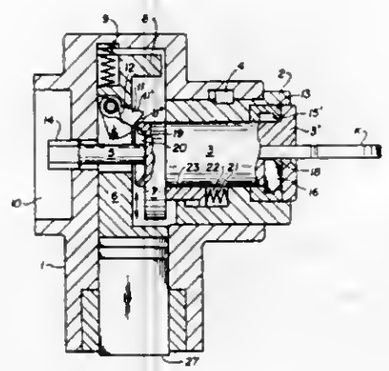


1. A locking mechanism, comprising;
- a housing, for surrounding a device to be protected by said locking mechanism, said housing being freely rotatable about said device whether said locking mechanism is in the locked or unlocked condition;
- a lock bar mounted at an acute angle within said housing;
- said lock bar having a bearing surface said bearing surface being cut at a second angle to prevent removal of said locking mechanism in the locked condition and to allow removal of said locking mechanism in the unlocked condition; and
- a key lock mechanism for rotating said lock bar to the locked or unlocked condition.

4,031,728
STEERING COLUMN AND IGNITION LOCK FOR MOTOR VEHICLE

Rudolf Eichenauer, Hollbergstrasse 1, Frankfurt am Main, Germany (D-6000)

Filed May 17, 1976, Ser. No. 687,009
Claims priority, application Germany, Feb. 25, 1976, 2607609
Int. Cl.² B60R 25/02
U.S. Cl. 70—252 10 Claims

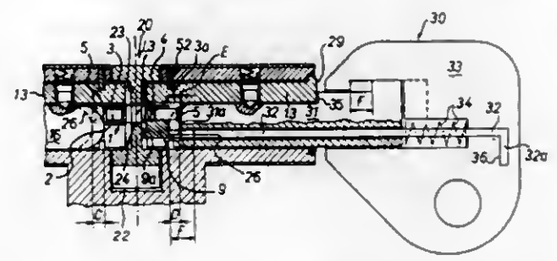


1. A lock arrangement for a motor vehicle having a steering column which comprises
1. a housing defining an axial bore and a cross bore intersecting therewith,
2. a key controlled lock cylinder mounted in the axial bore of the housing for axial displacement between an inwardly and an outwardly displaced position, and for rotation about the axis of the bore in the inwardly displaced position into selected operating positions,
3. a lock bolt mounted in the cross bore for displacement between a retracted position and a locking position, the bolt having a keeper engaging the steering column in the locking position,
4. actuating means arranged to displace the lock bolt between the retracted and locking positions, the bolt actuating means including
   a. an operating spring biassed to displace the lock bolt into the locking position and
   b. a driving member operated by the rotation of the lock cylinder to displace the bolt against the bias of the operating spring into the retracted position to disengage the keeper from the steering column, and
5. latch means mounted on the lock bolt for pivoting in the direction of the keeper, the latch means including
   a. a latch having a wedge face,
   b. a soft spring biasing the latch in a direction opposite to the pivoting direction, and
   c. the lock cylinder having an end rim adjacent the bolt, and the latch being arranged to cause the operating spring to wedge the wedge face thereof firmly against the lock cylinder rim when the bolt is in the retracted position and the lock cylinder is in the inwardly displaced position whereby the bolt is securely maintained in the retracted position, the firm wedge being removed on withdrawal of the key from the lock cylinder and the operating spring displacing the lock bolt and correspondingly driving the wedge face of the latch over the end rim to cause outward displacement of the lock cylinder.

4,031,729
EMERGENCY KEY MECHANISM ON A CYLINDER LOCK WITH A DOUBLE LOCKING CYLINDER

Heinrich Gretler, Hinwil, Switzerland, assignor to Bauer Kaba AG., Wetzikon, Switzerland

Filed Sept. 16, 1975, Ser. No. 613,897
Claims priority, application Switzerland, Sept. 26, 1974, 012999/74
Int. Cl.² E05B 17/04
U.S. Cl. 70—380 10 Claims



1. In a cylinder lock of the type having two coaxial locking cylinders each having a stator portion and a rotor portion with a key slot, a lock bolt, and a lock bolt driver rotatably mounted between the rotor portions to operate the lock bolt when rotated, the lock bolt driver having a transverse web with means defining an opening therethrough, an improved emergency key operatable mechanism comprising
- a locking coupling including
- an axially displaceable coupling spindle having enlarged stop portions at the opposite ends thereof;
- first and second coupling members mounted on said spindle,
- said members being rotatably and axially movable relative to each other and to said spindle,
- each of said members further being operatively associated with one of said rotor portions, each member being rotatable with and axially movable relative to its associated rotor portion,
- each of said members having a protruding portion thereof engageable with said opening in said lock bolt driver when said member and said spindle are axially displaced by insertion of a normal key of predetermined blade length in the key slot of its associated rotor portion; and
- compression spring means mounted on said spindle for urging said coupling members axially outwardly toward said enlarged portions on said spindle; and
- an emergency key insertable into the key slot of one of said rotor portions, said emergency key having
- a blade having a length shorter than said predetermined length of said normal key, and
- an operating pin extendable beyond the distal end of said blade when said emergency key is fully inserted in said slot;
- the one of said coupling members operatively associated with said one of said rotor portions having a radially protruding portion engageable with said pin,
- said pin being operative to axially displace said one of said coupling members into engagement with said driver whereby said rotor and said driver can be rotated by said emergency key to operate the lock without axially displacing said spindle.

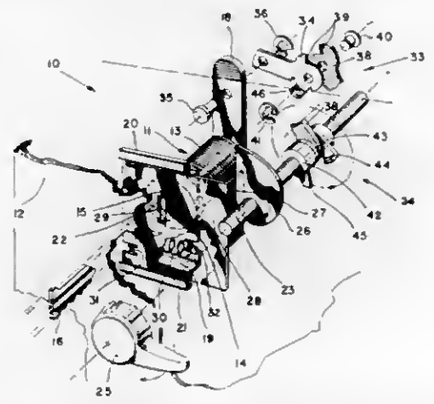
4,031,730
TAMPERPROOF LOCK AND METHOD

Michael F. Kern, 4304 Janwood, Copley, Ohio 44321

Filed Feb. 4, 1976, Ser. No. 655,096
Int. Cl.² E05B 17/14
U.S. Cl. 70—419 12 Claims

1. Apparatus to prevent tampering with a locking mechanism having an accessible keyway therein and normally rotat-

able when a key is in the keyway comprising, means normally holding the locking mechanism to prevent rotation thereof even when the key is in the keyway; blocking plate means having a slot therein normally aligned with the keyway; cam means to move said blocking plate means so that said slot and keyway are misaligned; means to release said means normally



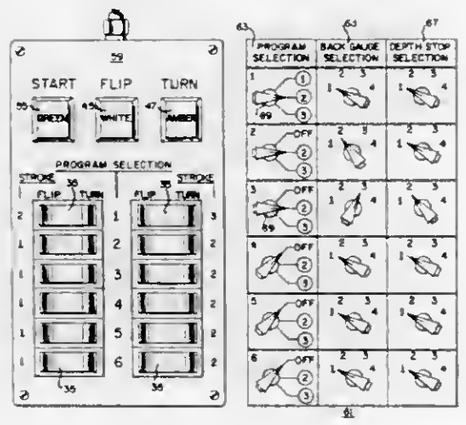
holding the locking mechanism; and movable means carrying said means normally holding the locking mechanism, said cam means, and said means to release so that movement of said movable means sequentially moves said blocking plate means to block access to the keyway, operates said means to release, and rotates said locking mechanism.

4,031,731

ALERT MEANS FOR A PROGRAMMING SYSTEM FOR PRESS BRAKES OR THE LIKE

Rolland A. Richardson, Alameda, Calif., assignor to Canron, Inc., Oakland, Calif.

Filed Mar. 26, 1973, Ser. No. 344,870
Int. Cl.² B21D *5/02*
U.S. Cl. 72—37 **7 Claims**



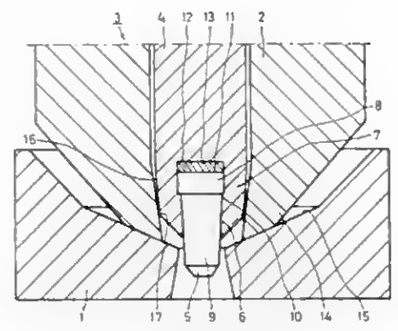
1. For use in combination with a system for programming a press brake or like machines in producing a sequence of operations on work, during which, the work must be flipped or turned in preparation for certain of said operations, means for alerting an operator as to the necessity for flipping or turning the work, and means for coordinating said alerting means with said programming system to function at the proper stages in such sequence of operations to activitate said alerting means.

4,031,732

METHOD FOR HYDROSTATIC EXTRUSION OF TUBES

Hans Larker; Erik Lundblad; Bertil Lundback, and Jan Nilsson, all of Robertsfors, Sweden, assignors to ASEA, Vasteras, Sweden

Filed May 22, 1975, Ser. No. 580,463
Claims priority, application Sweden, June 7, 1974, 7407507
Int. Cl.² B21C *25/04*
U.S. Cl. 72—60 **3 Claims**



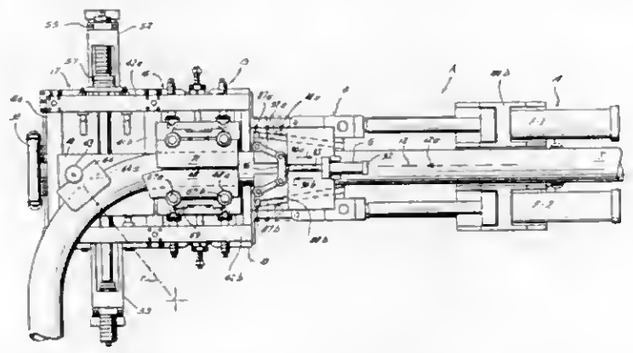
1. Method for hydrostatic extrusion of tubes in a press with a pressure chamber containing a high pressure cylinder, a pressure generating punch insertable into the cylinder, a die arranged in the cylinder and a mandrel axially fixed in relation to the die and composed of a carrier and a separate tip mounted in the carrier, which tip together with an opening in the die forms a gap in which a tubular billet having a hole therein is shaped into a tube when the billet is subjected to an all-sided hydrostatic pressure in a surrounding pressure medium, which comprises, in connection with the insertion of the tubular billet (2), producing the initial sealing between the mandrel (3) and the hole of the tubular billet (2) by contact between the front part (7) of the mandrel carrier (4) and the hollow wall of the tubular billet (2):

4,031,733

APPARATUS FOR BENDING TUBULAR MEMBERS

John L. Coody, 5514 Aldine-Bender, Rte. 16, Houston, Tex. 77032

Filed Oct. 15, 1976, Ser. No. 732,756
Int. Cl.² B21C *7/04, 7/12*
U.S. Cl. 72—166 **22 Claims**



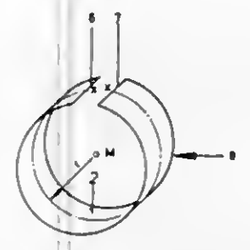
1. Apparatus for bending tubular members such as pipe, comprising:
- a frame;
- gripping means for gripping said tubular member, said gripping means being mounted on said frame for movement between an initial and final position in a longitudinal direction;
- feed means mounted with said frame and attached to said gripping means for moving said gripping means between said initial and final positions;
- bending means for bending said tubular member as said feed means moves said gripping means gripping said tubular member from said initial to said advanced position, said bending means including:
  - a set of bending dies for receiving and bending a tubular member and bending die mount means mounting said bending dies with said frame for adjustable movement in a direction transverse to said longitudinal axis; and
  - a radius setting assembly and radius mount means mounting said radius setting assembly for movement between an initial and a radius applying position in a direction transverse to said longitudinal axis, said radius setting assembly and bending dies cooperating to engage and bend a tubular member to a desired radius with said feed means moving said gripping means from said initial to said final position; and
- power control means controlling movement of said gripping means, feed means, bending dies and radius setting assembly, said power control means including means for synchronizing movement of said radius setting assembly with movement of said gripping means and said feed means.

4,031,734

METHOD FOR THE PRODUCTION OF CONCENTRIC MACHINE ELEMENTS

Helmut Imme, Friedberg, and Werner Moser, Augsburg, both of Germany, assignors to SKF Industrial Trading and Development Company B.V., Nieuwegein, Netherlands

Division of Ser. No. 524,490, Nov. 18, 1974, Pat. No. 3,950,044. This application Sept. 9, 1975, Ser. No. 611,683
Claims priority, application Germany, Dec. 22, 1973, 2364223
Int. Cl.² B21D *53/10*
U.S. Cl. 72—368 **2 Claims**



1. A method for forming a bearing shell comprising forming a flat strip of elastic material to be permanently bent to have an arcuate cross-section, with a longitudinally extending convex surface on one side and a longitudinally extending concave surface on the other side thereof, and then bending the ends of said permanently bent strip around an axis transverse of the longitudinal axis of said strip and spaced from said first side of said strip to form an arcuate casing that retains its arcuate shape.

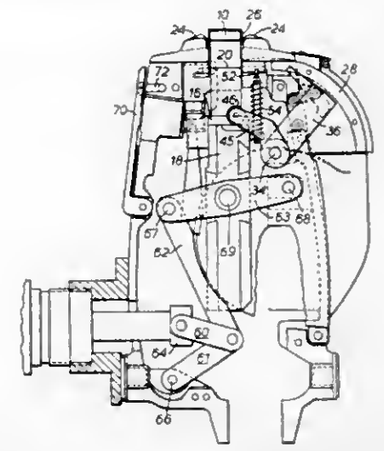
4,031,735

APPARATUS FOR JOINING WIRES

John Patrick Harding, Bushey; David Sydney Butler, Hassocks, and Graham Keith Whitehead, Harefield, Uxbridge, all of England, assignors to The Post Office, London, England

Filed Feb. 24, 1976, Ser. No. 660,979
Claims priority, application United Kingdom, Feb. 27, 1975, 8270/75
Int. Cl.² B21D *7/06*
U.S. Cl. 72—394 **5 Claims**

1. Apparatus for joining together a pair of wires by deforming a crimping clip to grip and thereby join the wires, the apparatus including crimping jaws which are movable into a crimping position to deform the crimping clip; a support member which is adapted to carry the clip and is also movable into a crimping position to co-operate with the jaws in the deformation of the clip, and a toggle linkage for moving the crimping jaws and support member, the toggle linkage being operable to develop an output force which varies with the condition of the toggle and increases as the jaws and support member move towards the crimping position, said toggle linkage comprising a driving link; two linkage members each pivotally



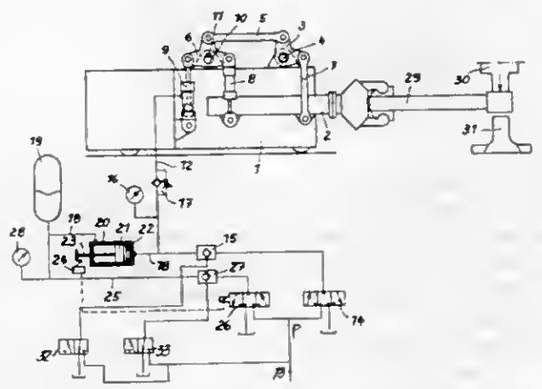
coupled at one end to the driving link, the other end of one of the linkage members being fixed; and an actuating link which is pivotally coupled at one end to the other end of the second linkage member, the actuating link being fixed at its other end and being connected to move the jaws and support member.

4,031,736

WORKPIECE MANIPULATOR FOR USE IN A FORGING PRESS

Heinrich Kutz, Neuss, Germany, assignor to Schloemann-Siemag Aktiengesellschaft, Germany

Filed July 14, 1976, Ser. No. 705,016
Claims priority, application Germany, July 24, 1975, 2533055
Int. Cl.² B21D *43/10*; **B21J** *13/10*
U.S. Cl. 72—422 **3 Claims**



1. A workpiece manipulator for use with a forging press, the manipulator comprising:
- a mobile chassis;
- a pair of tongs for gripping a workpiece;
- a tongs holder to which the tongs are attached;
- a parallel motion linkage connecting the tongs holder to the chassis;
- a hydraulic piston/cylinder actuating unit for actuating the linkage to cause the tongs holder to be moved with a parallel motion;
- a hydraulic circuit connected to said actuating unit;
- a second piston/cylinder unit in said circuit, the piston of which is biassed on one side by hydraulic fluid from said actuating unit; and
- a pressure reservoir in said circuit, which contains hydraulic

fluid which biasses the other side of the piston of said second unit,

whereby an increase in pressure in said actuating unit causes the piston of the second unit to move against the pressure from the pressure reservoir to allow movement of the actuating unit piston to move the tongs holder.

4,031,737

MACHINE TOOL APRON GUIDING SYSTEM

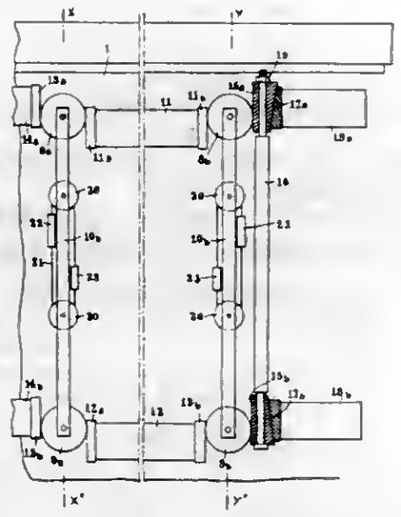
Paul Cailloux, La Varenne Saint Hilaire, France, assignor to Promecam Sisson-Lehmann, Saint-Denis, France

Filed Jan. 14, 1976, Ser. No. 649,098

Claims priority, application France, Jan. 24, 1975, 75.02255

Int. Cl.² B21J *13/04*

U.S. Cl. 72—456 10 Claims



1. In a machine tool such as a press or a shear, comprising a vertical apron movable in the vertical direction in relation to the fixed frame structure of the machine, means for guiding said apron in the longitudinal direction during its vertical movements, said means comprising on each face of said movable apron:

two pairs of vertical races rigid with said fixed frame structure and extending at right angles to the corresponding face of said movable apron, the two races of one of said pairs registering with two races of one of two pairs of races carried by said movable apron to form a first group of races, said other two races carried by said movable apron forming with said two races of said other pair of races rigid with said fixed frame a second group of races;

two pairs of rollers disposed in two spaced vertical planes respectively between the races of said first and second groups which are in part rigid with the movable apron and in part rigid with said fixed frame structure, respectively, and

tightening means adapted to produce a horizontal pressure for clamping at least some of said vertical races against the corresponding rollers, said tightening means being associated with the races formed on one side of one of said pairs of rollers.

4,031,738

PLUG FOR PLUG ROLLING

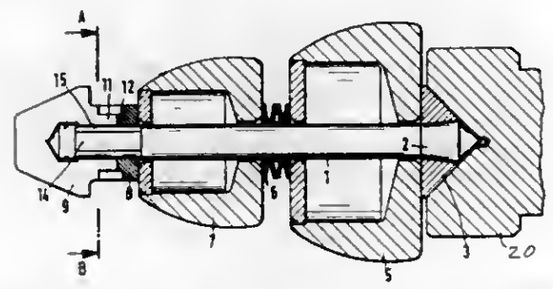
Wolfram Schönfeld, Meerbusch-Osterrath; Armin Phillpps, and Fritz Runkel, both of Dusseldorf, all of Germany, assignors to Mannesmannrohren-Werke AG., Mannesmann-Hochhaus, Germany

Filed Aug. 21, 1975, Ser. No. 606,367

Claims priority, application Germany, Aug. 22, 1974, 286649

Int. Cl.² B21B *25/00*

U.S. Cl. 72—478 3 Claims



1. Plug for plug rolling mills to be connected to a mandrel and having

a first plug element, being the primary working plug in abutment with the mandrel, an intermediate plug element, and a guiding plug element, the improvement comprising:

a tie rod threadedly received with one end by the guiding plug element and having a cone for connection to a mandrel insert on the other end, the first and intermediate plug elements being traversed by the tie rod;

resilient means interpositioned between the first and intermediate plug elements through which the latter urges the former against the mandrel insert;

a spacer interposed and in abutment with the intermediate and the guiding plug elements;

first means for preventing relative angular displacement between the guiding and the intermediate plug elements; and

second means for preventing angular displacement of the guiding plug element relative to the tie rod, so that by operation of the first and second means the guiding element is prevented from unscrewing.

4,031,739

AUTORANGING METHOD AND SYSTEM FOR TESTING THE SPEEDS OF A CAMERA SHUTTER

Barry R. Springer, 35 Northwood Drive, Nashua, N.H. 03060

Filed July 22, 1976, Ser. No. 707,573

Int. Cl.² G03B *43/02*

U.S. Cl. 73—5 14 Claims

1. A method for measuring shutter speed in the camera comprising:

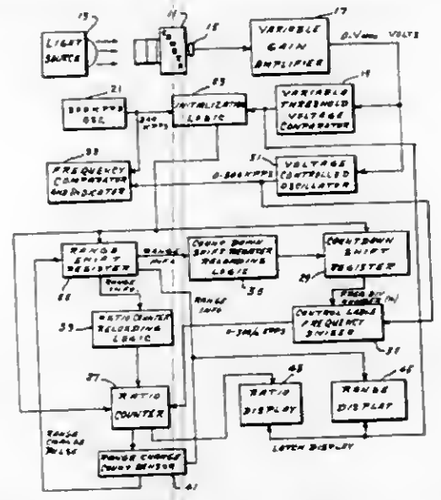
a. positioning the shutter adjacent to a light source;

b. activating the shutter causing a pulse of light to pass therethrough;

c. sensing the intensity and duration of the light pulse;

d. automatically displaying a standard shutter speed which

most accurately represents the effective speed of the tested shutter; and



e. displaying an error ratio relating the effective speed of the shutter tested to the standard speed display.

4,031,740

APPARATUS FOR THERMOANALYTICAL INVESTIGATIONS

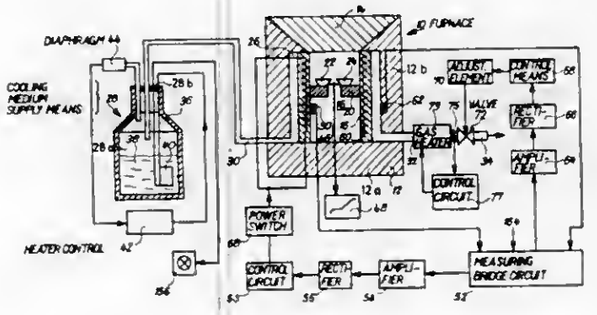
Heinz Achermann, Uster, Switzerland, assignor to Mettler Instrumente AG, Zurich, Switzerland

Filed May 12, 1975, Ser. No. 576,668

Claims priority, application Switzerland, June 25, 1974, 8666/74

Int. Cl.² G01K *17/00*

U.S. Cl. 73—15 B 13 Claims



1. An apparatus for thermoanalytical investigations at low temperatures, comprising:

a. a furnace having a furnace chamber for receiving an article to be investigated;

b. means for ascertaining the temperature of the article or a parameter of the article that characterizes the temperature of the article;

c. means for controlling the temperature in the furnace chamber to a desired value following a predetermined temperature versus time program, said controlling means including

1. means for pre-setting said desired value;

2. means for heating the furnace chamber; and

3. a sensor cooperating with the furnace for measuring the temperature in the furnace chamber;

d. a hollow cooling medium chamber having an inlet and an outlet through which flows a cooling medium, said cooling medium chamber being separated from the furnace chamber but being disposed adjacent thereto and adjacent to said heating means;

e. supply means connected to the cooling medium chamber for supplying cooling medium thereto; and

f. means for controlling the temperature of the cooling medium near said outlet to a desired value following a predetermined temperature versus time program, said controlling means including

1. means for pre-setting said desired value;

2. a sensor cooperating with the cooling medium chamber for measuring the temperature of the cooling medium near said outlet; and

3. means for quantitatively controlling the throughflow of cooling medium through the cooling medium chamber.

4,031,741

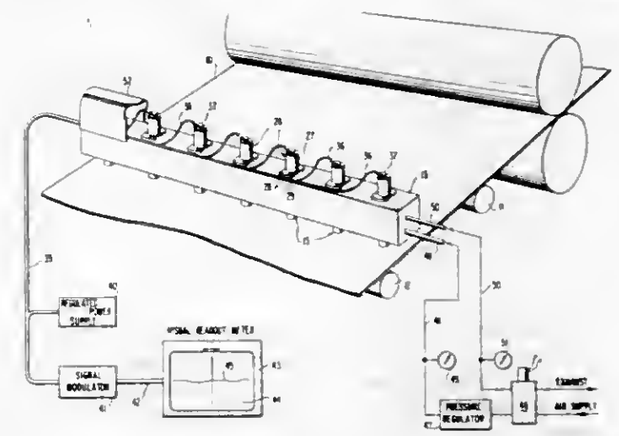
FLATNESS MONITORING SYSTEM FOR STRIP MATERIAL

Edward Schaming, P.O. Box 1070, Butler, Pa. 16001

Filed July 14, 1976, Ser. No. 705,175

Int. Cl.² G01B *13/22*

U.S. Cl. 73—37.7 7 Claims



1. An apparatus for monitoring flatness in a moving strip product comprising a manifold spanning substantially the width of the moving product and mounted in spaced relation to one face thereof, plural spaced pneumatic sensing probes on the manifold having pneumatic discharge passages for directing pneumatic streams against the opposing face of the product without physical contact between the probes and product, the probes floating on the back pressures of said pneumatic streams and maintaining uniform gaps between their tips and said opposing face of the product, coacting electrical signal transmitters connected with the probes and responding to movements thereof and producing signals representative of flatness irregularities in the product, and visual electrical display means connected with said signal transmitters to constantly display a representation of product flatness or lack of flatness, said manifold having a main pneumatic passage in intersecting relationship to said probes, the probes having pneumatic inlet means in communication with said main pneumatic passage and also in communication with said discharge passage of each probe, said manifold additionally having a separate secondary pneumatic passage in intersecting relation to said probes, and a piston means on each probe communicating with said secondary pneumatic passageway whereby pneumatic pressure therein at selected times can cause retraction of the probes into the body of the manifold.

4,031,742

LEAK DETECTOR USING MASS CONCENTRATION GAUGE

Gerald C. Michael, 5946 Linton Lane, Indianapolis, Ind. 46220, and Murvyn M. McDowell, 721 Coleman Ave., Fairmont, W. Va. 26554

Continuation-in-part of Ser. No. 469,966, May 13, 1974, abandoned, which is a continuation of Ser. No. 295,913, Oct. 10, 1972, abandoned. This application Feb. 11, 1975, Ser. No. 549,093

Int. Cl.² G01M *3/04*

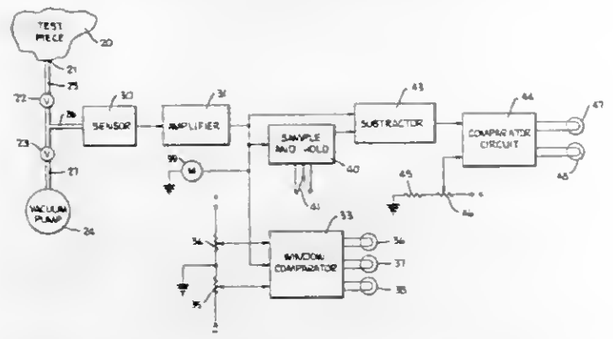
U.S. Cl. 73—40.7 38 Claims

1. A device useful for detecting leaks which comprises:

a. means for measuring the mass concentration of a gas

essentially independently of the temperature of the gas, said means including:

1. a chamber,
2. two electrodes spaced apart from each other, the space between them being within said chamber,
3. a radioactive source placed near said electrodes to ionize any gases which may exist between said electrodes,
4. impedance measuring means for applying a voltage across said two electrodes and for detecting current flowing between said two electrodes when voltage is applied across said two electrodes;



b. a test piece to be tested for leaks, said test piece having an interior and surfaces surrounding the interior;

c. connecting means for providing communication between the interior of said chamber and the interior of said test piece;

d. a valve; and

e. pressure means communicating with said test piece through said valve for creating a pressure differential between the interior and the exterior of said test piece, whereby after closure of the valve a subsequent change of mass concentration within said test piece is indicative of a leak.

4,031,743

ULTRASONIC ECHOGRAM DISPLAY

George Kossoff, Northbridge, and David Errol Robinson, Avalon Beach, both of Australia, assignors to The Commonwealth of Australia, c/o Dept. of Health, Phillip, Australia

Continuation-in-part of Ser. No. 466,791, May 3, 1974, abandoned. This application Jan. 15, 1976, Ser. No. 649,347

Claims priority, application Australia, May 3, 1973, 3195/73

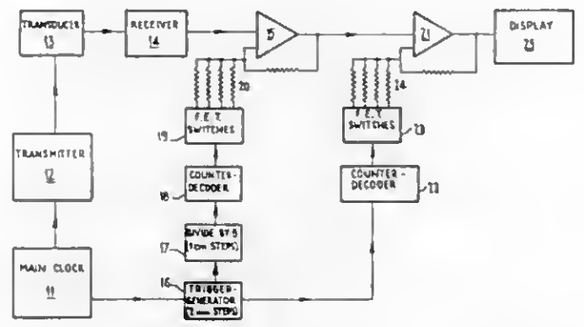
Int. Cl.² G01S 9/66; G01N 29/04

U.S. Cl. 73—67.8 R **6 Claims**

1. In a method of ultrasonic examination of an object comprising the steps of transmitting pulses of ultrasonic energy into the object, and receiving by receiver means echoes of said pulses of ultrasonic energy reflected by acoustic impedance discontinuites within the object, the improvement comprising:

progressively increasing the gain of said receiver means in predetermined steps during the time between transmitter pulses to compensate for attenuation of said echoes within the object; and

cyclically altering the gain of said receiver means during each of said predetermined steps by stepping the receiver



gain through a cycle of discrete steps superimposed upon each of said predetermined steps.

4,031,744

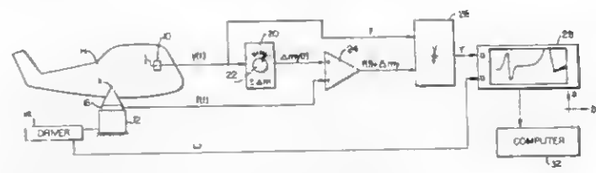
METHOD AND APPARATUS FOR ANALYZING A DAMPED STRUCTURAL SPECIMEN

William G. Flannelly, South Windsor, Conn., assignor to Kaman Aerospace Corporation, Bloomfield, Conn.

Filed Apr. 25, 1975, Ser. No. 571,636

Int. Cl.² G01N 29/00

U.S. Cl. 73—67.2 **34 Claims**



1. A method of determining an undamped physical response characteristic from a damped specimen comprising:

exciting the damped specimen to produce physical responses over a range of forcing frequencies of interest;

producing two signals representing respectively the excitation and the corresponding physical responses produced;

combining with one of the produced signals a signal proportional to the other of the produced signals by a known constant of proportionality to thereby produce a third signal;

dividing the third signal into said other of the signals to obtain a fourth signal representative of a modified response characteristic of the damped specimen over the range of forcing frequencies of interest;

determining the frequencies at which the modified response characteristic indicates a resonant condition; and

determining from the known constant of proportionality an undamped value of the response characteristic at the frequencies indicating the resonant condition.

4,031,745

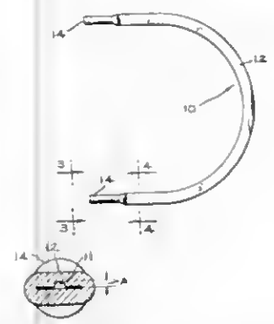
METHOD OF FORMING CONSTRICTION IN TUBING

William J. McCarty, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Feb. 20, 1976, Ser. No. 659,768

Int. Cl.² B21D 31/06

U.S. Cl. 72—367 **3 Claims**



1. The method of forming a capillary tube for connection into a refrigeration system which comprises:

forming at least one longitudinally disposed groove in the internal wall of a length of tubing;

forming said length of tubing longitudinally into a preselected configuration so that the free ends thereof are arranged to connect with said refrigeration system, including at least one portion intermediate said ends being in a single plane;

placing said portion of said tubing intermediate said free ends in a forming means;

connecting at least one of said free ends to a source of constant pressure through a control means having means for measuring said pressure passing through said tubing;

squeezing said portion of the tubing in the forming means at a first speed until the tubing reaches an intermediate predetermined restriction; then

squeezing said portion of tubing at a second slower speed so that substantially all of the medium passing through said tubing travels through said groove, and continuing said slower speed squeezing until the groove restriction causes the medium passing therethrough to reach a final predetermined pressure; and

terminating said second squeezing operation when said measuring means indicates said predetermined pressure.

4,031,746

AUTOMATIC TENSILE TEST APPARATUS

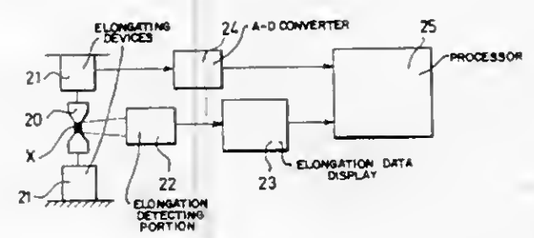
Isao Furuta, Suzuka; Shinsuke Iwamoto, Kyoto; Hironari Kuga, Muko, and Yoshishige Chikatsu, Yokkaichi, all of Japan, assignors to Japan Synthetic Rubber Co., Ltd., Tokyo and Iwamoto Seisakusho Company Limited, Kyoto, both of, Japan

Filed Apr. 29, 1976, Ser. No. 681,758

Claims priority, application Japan, Aug. 26, 1975, 50-103351

Int. Cl.² G01N 3/08

U.S. Cl. 73—95 **10 Claims**



1. Automatic tensile test apparatus comprising a portion for detecting an elongational strain of a test specimen, said portion including sensors which optically detect movements in elongating directions of both boundary marking lines between said specimen and a light reflecting substance applied thereon and a follow-up device which cooperates with said sensors; means to detect a tension exerted on said specimen; means to detect break of said specimen in cooperation with the elongation strain detecting portion; and a data processor which continuously calculates and processes the detected elongation and tension of said specimen.

4,031,747

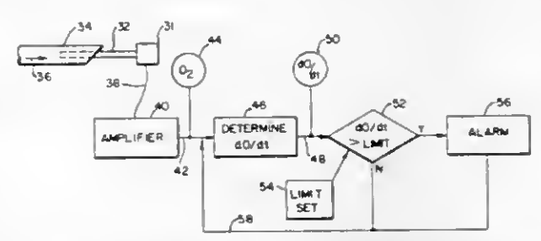
MISFIRE MONITOR FOR ENGINE ANALYSIS HAVING AUTOMATIC RESCALING

John David Blanke, Fullertoo, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Filed Aug. 16, 1976, Ser. No. 714,143

Int. Cl.² G01M 15/00

U.S. Cl. 73—116 **7 Claims**



1. In engine exhaust gas analysis apparatus having:

means for sampling the exhaust gases including means for generating a first signal indicating the amount of a component present in the exhaust gases;

differentiating means connected to said sampling means and including means responsive to said first signal for generating a second signal indicating the rate of change of said first signal with respect to time;

means connected to said differentiating means for comparing said second signal to a limit; and,

means connected to said comparing means for indicating when said second signal exceeds said limit, the improvement comprising:

means for causing the values of said second signal and said limit to be normalized to a standard range before said comparing is done whereby the exceeding of said limit by said second signal will have substantially the same meaning regardless of the engine being analyzed.

4,031,748

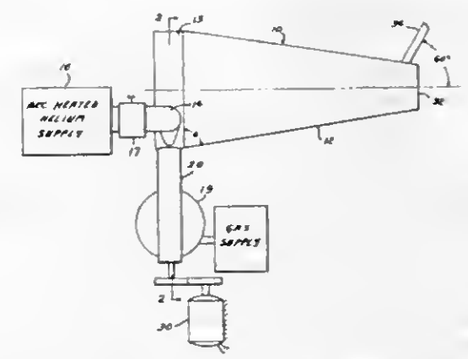
VORTEX FLOW PARTICLE ACCELERATOR

Kenneth R. Cramer, Dayton, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed May 11, 1976, Ser. No. 685,247

Int. Cl.² G01M 9/00

U.S. Cl. 73—147 **4 Claims**



1. A particle accelerator comprising: a substantially frusto

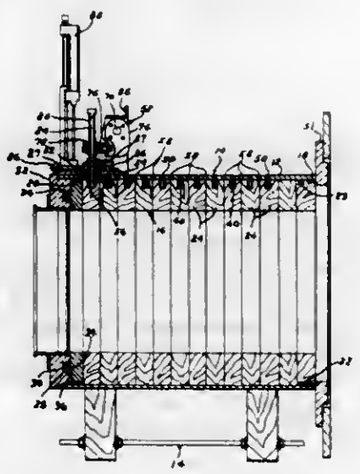
conically shaped flow chamber; said flow chamber having a zero taper entrance portion at the larger end of said flow chamber; an axial exit at the end of said flow chamber remote from said zero taper section; means for supplying a high pressure low molecular weight gas tangentially to the zero taper section of said flow chamber to thereby provide a vortex gas flow within said flow chamber; means for supplying small solid particles into the gas flow within said flow chamber at the zero taper section of said flow chamber and means for removing said particles from said chamber substantially along the maximum flow velocity vector of said particles within said flow chamber.

4,031,749

PROBE SYSTEM FOR WIND TUNNEL TEST SECTION

Buryl L. McFadden, Jr., Green County, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed June 15, 1976, Ser. No. 696,342
Int. Cl.² G01M 9/00
U.S. Cl. 73—147 **3 Claims**



1. A wind tunnel test section, comprising: an outer cylindrical shell member; a cylindrical inner liner positioned within said shell member; a pair of bearing members at opposite ends of said liner member, between the liner member and the outer shell member; a plurality of probe retainer plugs in said liner member, adapted to support a test probe within the test section; a plurality of elongated circumferentially positioned slots in said outer shell member positioned adjacent said probe retainer plugs; means for rotating said inner liner member within said outer shell member, to thereby move said probe retainer plugs along the slots in said outer shell member.

4,031,750

APPARATUS FOR LOGGING INCLINED EARTH BOREHOLES

Arthur H. Youmans, and Heinz D. Lichtenberg, both of Houston, Tex., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed Sept. 2, 1976, Ser. No. 719,749
Int. Cl.² E21B 47/00
U.S. Cl. 73—151 **7 Claims**

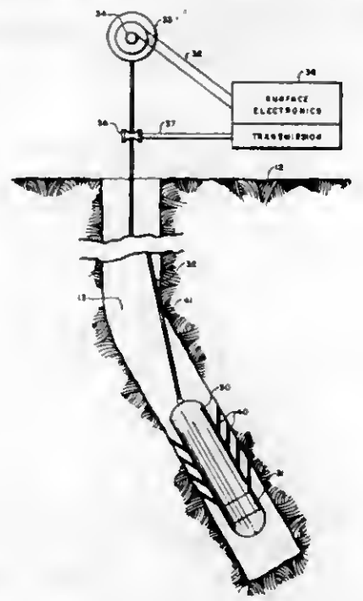
4. Apparatus for traversing an inclined earth borehole, comprising:

an elongated instrument adapted to traverse an earth borehole, said instrument including a longitudinal support mandrel;

a sliding sleeve encircling said support mandrel;

at least one vane attached to said sleeve and having a given angle with respect to said sleeve; and

means to reciprocate said sleeve with respect to said mandrel and thereby impart motion to the instrument in a



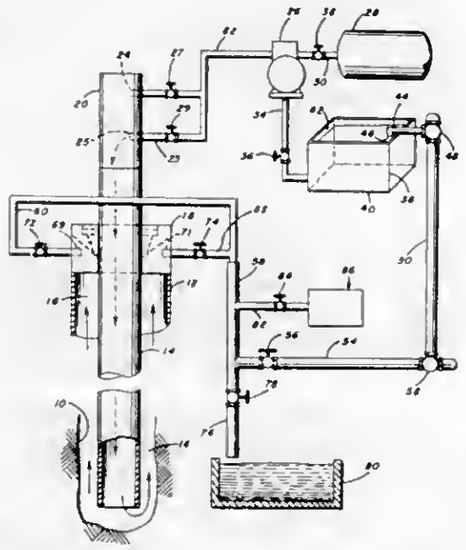
direction away from the angled slant of said at least one vane.

4,031,751

CLOSED SYSTEM FOR TESTING THE CONDITION OF WELL BORE FORMATIONS

Richard Y. Haddad, Pittsburgh, Pa., assignor to Haddad and Brooks, Inc., Upper St. Clair, Pa.

Filed Sept. 22, 1976, Ser. No. 725,635
Int. Cl.² E21B 47/00
U.S. Cl. 73—155 **11 Claims**



1. Method for testing the condition of well bore formations in a closed system for cementing a casing in the well bore comprising,

introducing a testing fluid having a preselected density from a source into the well bore,

circulating said fluid through the well bore,

displacing drilling fluid and other materials from the well bore by the flow of said testing fluid therethrough,

conveying said testing fluid and the drilling fluid and other materials from the well bore, and

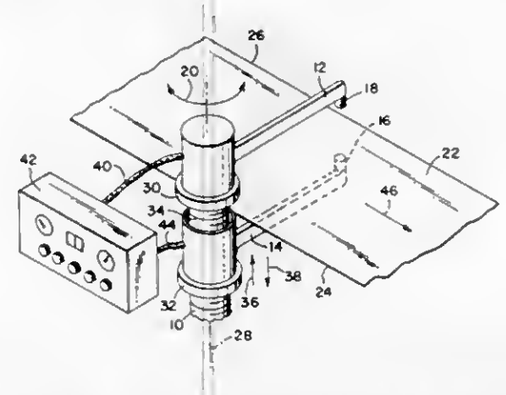
monitoring samples of the flow from the well bore for the presence of gas emitted from formations surrounding the well bore.

4,031,752

WEB PROCESS CONTROL APPARATUS

Art Sanders, 230 Harvie Road, East, R.R. No. 5, Barrie, Ontario, Canada

Filed July 19, 1976, Ser. No. 706,226
Int. Cl.² G01N 33/34
U.S. Cl. 73—159 **4 Claims**



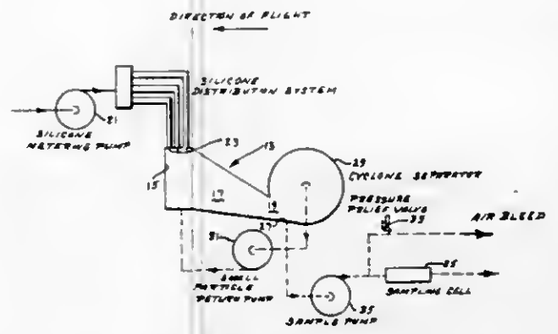
1. A process control and measuring apparatus comprising a pair of parallel arms disposed in spaced apart relationship, a web travelling between said arms, said arms commonly pivotably secured to a shaft, said shaft having the longitudinal axis thereof disposed perpendicular to the surface of said plane, said arms describing substantially a ninety degree arc at the free ends thereof, said arc passing about the surfaces of said web, measuring means fixedly secured to a free end of one of said arms, coupling means for coupling the signal generated by said measuring means to a point remote from said shaft post.

4,031,753

TOTAL WATER CONTENT INSTRUMENT

Richard G. Hooper, La Crescenta, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Aug. 20, 1976, Ser. No. 716,304
Int. Cl.² G01N 1/00
U.S. Cl. 73—170 R **4 Claims**



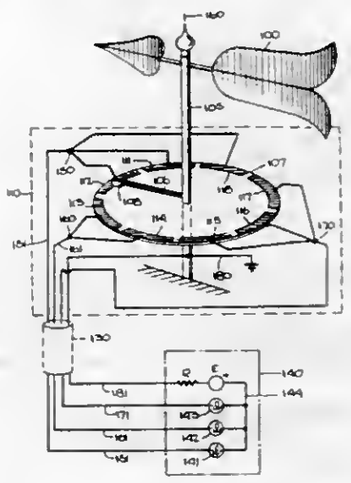
1. An instrument for sampling both solid and liquid water particles in the atmosphere and continuously producing an electrical signal directly equivalent to the total percentage water content of the atmosphere sampled, said instrument comprising an air sampling scoop of substantially funnel shaped configuration, a fixed intake aperture at the forward end of said air scoop, a narrowing area downstream said intake aperture, a throat area downstream said narrowing area, a suction port located in the throat area, a sample pump in operative communication with said suction port for drawing the water particles from the atmosphere sample therefrom, a sampling capacitor in operative communication with said sample pump for receiving the output therefrom and producing an electrical signal proportional to the water content of the atmosphere sample, and means at the throat of said air scoop for spinning out water particles which are swept past said suction port and returning the spun out water particles to the intake aperture of said air scoop.

4,031,754

APPARATUS FOR WEATHER PREDICTION

James Charles Bedard, 22 Foster Lane, Westbury, N.Y. 11590

Filed Jan. 19, 1976, Ser. No. 650,051
Int. Cl.² G01W 1/00
U.S. Cl. 73—188 **7 Claims**



1. Apparatus for predicting weather conditions solely on the basis of present wind direction comprising:

means for producing a physical indication of the present wind direction,

means responsive to said physical indication of the present wind direction for generating a plurality of signals, each of said signals corresponding to a particular wind direction, and

means for converting said signals into visual indications of future weather conditions comprising

means for selectively combining said signals to yield a set of three signals, and

means responsive to each of said three signals for generating visual indications of weather conditions corresponding to fair, changing or unsettled conditions.

4,031,755

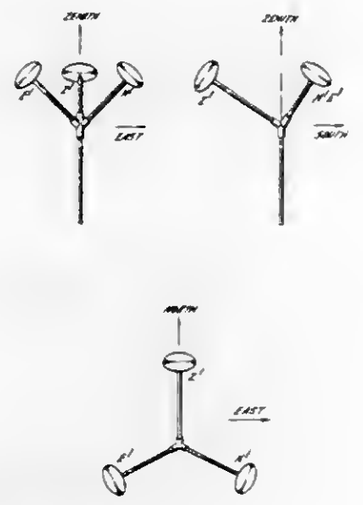
TRI DIMENSIONAL FLUID FLOW SENSING DEVICE

Pierre Ravussin, Lausanne, Switzerland, assignor to Alcyon Electronique et Physique S.A., Renens, Switzerland

Filed June 30, 1976, Ser. No. 701,454
Int. Cl.² G01W 1/02
U.S. Cl. 73—189 **6 Claims**

1. An instrument for sensing the components of a vector repesenting fluid flow comprising a first, a second and a third arm each bearing fluid flow sensing propeller means, said arms

extending from a common origin in directions each of which is at the same angle of inclination from the direction nominally



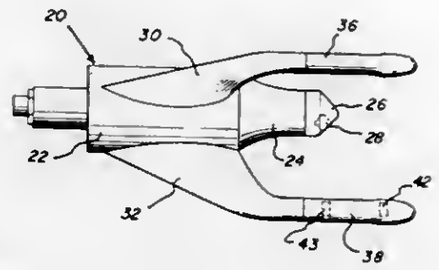
orthogonal to the fluid flow direction and means for measuring said vecotr components.

4,031,756

ULTRASONIC AIR MOVEMENT AND TEMPERATURE MEASURING APPARATUS

Donald Jack Rotier, St. Paul, and Frank J. Ferrin, Wayzata, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Aug. 2, 1976, Ser. No. 710,980
Int. Cl.² G01F *1/66*
U.S. Cl. 73—189 **10 Claims**



6. A gaseous movement and temperature sensing apparatus comprising:

an ultrasonic wave transmitting transducer means comprising a common support element having a conical outer surface with three transmitting transducer elements mounted in the conical surface and displaced relative to each other by approximately 120°, three separte ultrasonic receiver transducer means spatially positioned about said transmitting transducer means and each aligned with one each of said transmitting transducer elements along a line extending perpendicular from said conical surface; and a fourth receiver transducer spatially positioned from one of the transmitting transducers at a position displaced from a lone perpendicular from said conical surface;

an ultrasonic wave energy source connected to said transmitting transducer means to activate said transmitting transducer means to project ultrasonic wave energy from each of said transducer elements toward said receiver transducer means;

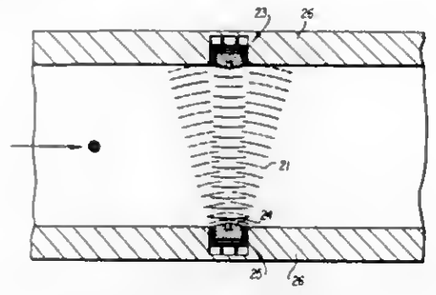
and means connected to said receiver transducer to measure the time difference in the received signals received by said four receiving transducer means and thereby the relative movement and temperature of a gaseous medium passing said sensing apparatus.

4,031,757

SONIC TRANSDUCER SURFACES

Russell F. Colton, Cedar Rapids, Iowa, assignor to J-Tec Associates, Incorporated, Cedar Rapids, Iowa

Filed Dec. 8, 1975, Ser. No. 638,356
Int. Cl.² G01F *1/32*
U.S. Cl. 73—194 VS **5 Claims**



1. In a sonic velocity sensor system of the type comprising a vortex generating strut, a sonic signal transmitting transducer, and a sonic signal receiving transducer, the improvement wherein:

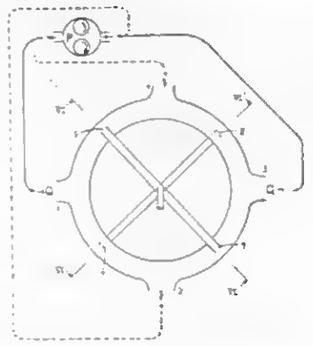
at least one of said sonic signal transducers is formed of a single integral crystal which has a conically-shaped faced surface.

4,031,758

MASS FLOWMETER

Nobuo Doi, Kanan-cho Daigatsuka 60, Minamikawachi, Osaka, Japan (585)

Filed Dec. 29, 1975, Ser. No. 645,231
Int. Cl.² G01F *1/34*
U.S. Cl. 73—205 D **3 Claims**



1. In a mass flowmeter with an endless annular pipe path for passing fluid therein, having four junctions each with a spur pipe path connected thereto, to be designated as first, second, third and fourth junction in circulatory order in any direction along the annulus, defining four pipe path sections therebetween to be designated as first pipe path section between the first and second junction, second pipe path sections between the second and third junctions, third pipe path section between the third and fourth junctions, and fourth pipe path section between the fourth and first junctions; the first junction serving as inlet of the fluid to be measured and the third junction as outlet thereof, while the second junction serving as inlet of the fluid recirculated at constant volumetric flow rate by recirculation means provided outside of said annular path and the fourth junction as outlet of the recirculation flow for returning to the recirculation means; the improvement comprising:

a. a static fluid pressure sensing portion provided in an intermediate portion of each of the pipe path sections;

b. the annular pipe path, including the shape and configuration of the static fluid pressure sensing portions, being constructed in mirror-image symmetry with respect both to a plane including a line connecting center axis of the first junction and center axis of the third junction, and partitioning the second and fourth junctions on either side thereof, and to a plane including a line connecting center axis of the second junction and center axis of the fourth junction, and partitioning the first and third junctions on either side thereof; and

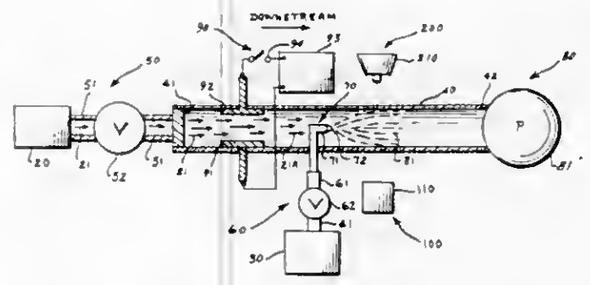
c. transducer means for transducing pressure difference between the average of the static fluid pressure at the sensing portion in the first pipe path section and the static fluid pressure at the sensing portion in the third pipe path section and average of the static fluid pressure at the sensing portion in the second pipe path section and the static fluid pressure at the sensing portion in the fourth pipe path section, into an indication of the mass flow rate of the fluid to be measured.

4,031,759

METHOD OF, AND APPARATUS FOR, MAKING VISIBLE THE FLOW PATTERN OF A GAS

Claude R. Jones, Los Alamos, N. Mex., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Aug. 12, 1976, Ser. No. 713,748
Int. Cl.² G01M *13/00*; **G01F** *15/00*
U.S. Cl. 73—432 R **10 Claims**



1. An apparatus for making visible the geometry of the flow pattern of a second gas introduced into a first gas which is capable of producing metastable molecules and atoms, comprising:

a. a source of said first gas;

b. a source of said second gas;

c. a translucent reservoir capable of containing said first gas and said second gas;

d. means for controlling flow of said first gas, with said flow control means for said first gas interposed between, and connected to, said source of said first gas and said reservoir;

e. means for controlling flow of said second gas, with said flow control means for said second gas interposed between, and connected to, said source of said second gas and said reservoir;

f. means for introducing said second gas into the flow of said first gas, within said reservoir, with said second gas introduction means connected to said reservoir;

g. means for promoting flow of said first gas and of said second gas into and within said reservoir, with said flow promoting means connected to said reservoir;

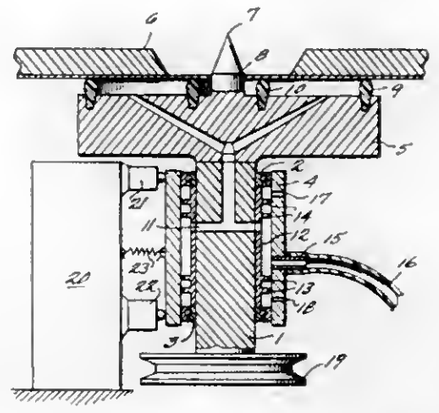
h. and, means for producing metastable molecules and atoms of said first gas, within said reservoir, with said production means connected to said reservoir; whereby, when metastable molecules and atoms of said first gas are produced in said reservoir, they transfer their energy to said second gas, thereby causing said second gas to emit visible light, and thereby making visible the geometry of the flow pattern of said second gas.

4,031,760

APPARATUS FOR BALANCING MACHINES FOR CHUCKING AND CENTERING OF ANAXIAL BODIES OF ROTATION

Richard Muller, Lynchburg, Va., assignor to Gebr. Hofmann KG, Darmstadt, Germany

Filed Apr. 14, 1976, Ser. No. 676,674
Claims priority, application Germany, May 20, 1975, 2522260
Int. Cl.² G01M *1/04*
U.S. Cl. 73—460 **3 Claims**



1. An apparatus for clamping and centering bodies during rotation for balancing comprising:

a body receiving plate having an upper extending surface and a plurality of channels extending therethrough into a chamber,

a spindle coupled to said plate for rotating the same and having a passage extending therethrough between said channels and an enclosed space,

a bearing housing enclosing said spindle,

a plurality of bearings disposed between said housing and said spindle,

a first flexible ring attached to and extending upward from said surface,

a second flexible ring attached to and extending upward from said surface and extending about said first ring to form said chamber which is sealed by a body resting on said rings,

means for producing a vacuum in said chamber by removing air from said chamber via said channels, said passage and said enclosed space to clamp said body to said upper extending surface, and

a centering cone extending upward from said surface within said first ring.

4,031,761

ENGINE POWER TAKE-OFF SYSTEM WITH SINGLE BELT DRIVE

David G. Fisher, and Robert G. Gladden, both of Springfield, Mo., assignors to Dayco Corporation, Dayton, Ohio

Continuation of Ser. No. 551,477, Feb. 20, 1975, Pat. No. 3,951,006, which is a continuation of Ser. No. 390,448, Aug. 22, 1973, abandoned. This application Apr. 16, 1976, Ser. No. 677,860
The portion of the term of this patent subsequent to Apr. 20, 1993, has been disclaimed.
Int. Cl.² F16H *7/02*; **F16G** *5/08, 5/20*
U.S. Cl. 74—15.63 **5 Claims**

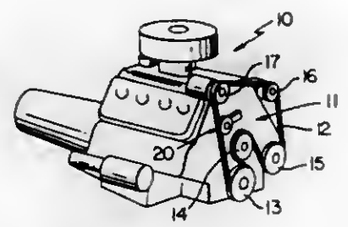
1. An improved automotive belt drive system comprising:

an automotive engine having a driving sheave coupled thereto for rotation;

at least three accessory devices each having a driven sheave coupled thereto, wherein each drive sheave is adapted to supply power to its respective accessory device, said driving sheave and at least two of said driven sheaves

each having a plurality of annular circumferential grooves therein, at least another of said driven sheaves having a cylindrical surface free of said grooves, and all of said driven sheaves being disposed in a common plane with said driving sheave; and,

an endless power transmission belt disposed about said sheaves and defining a serpentine path in said common plane, said belt having a flat driving portion and an oppositely arranged driving portion provided with a plurality of spaced longitudinal projections, said flat driving portion operatively engaging said cylindrical surface of said



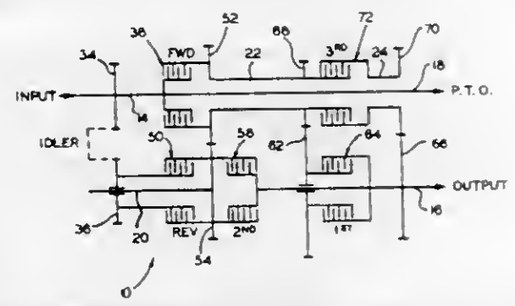
other driven sheave through a substantial arc of at least about 180°, and said projections of said oppositely arranged driving portion being received in said grooves of said grooved sheaves, said belt having a comparatively thin cross section for increasing belt life by reducing hysteresis, for reducing belt weight which reduces centrifugal tension loss, for allowing easy flexing around said sheaves, and for allowing backside bending enabling easy engagement of said flat driving portion against said cylindrical surface through said substantial arc to assure the driven sheave having said cylindrical surface is driven in a non-slipping manner.

4,031,762

MULTI-SPEED POWERSHIFT TRANSMISSIONS

James E. Shellberg, Jackson, Mich., assignor to Clark Equipment Company, Buchanan, Mich.

Filed July 30, 1975, Ser. No. 600,254
Int. Cl.² F16H *3/08, 37/06*
U.S. Cl. 74—15.63 1 Claim



1. In an in-line multi-speed constant-mesh-gear reversible powershift transmission of the type utilizing bidirectionally engageable multiple-disc fluid-pressure-actuated clutches, comprising in combination: an input shaft; a first gear fixed to said input shaft; a first shaft; a second gear journalled for rotation on said first shaft and drivingly connected with said first gear so as to rotate in the same direction therewith; a second shaft axially aligned with said input shaft; first clutch means for connecting said input shaft with said second shaft; second clutch means for connecting said second gear to said first shaft for conjoint rotation therewith; a third gear fixed to said second shaft; a fourth gear fixed to said first shaft and in mesh with said third gear; a third shaft axially aligned with said first shaft; third clutch means for connecting said third shaft with said first shaft; a fifth gear journalled for rotation on said third shaft; fourth clutch means for connecting said fifth gear to said third shaft; a sixth gear fixed to said third shaft, said fifth gear being located intermediate said third clutch means and said sixth gear; an output shaft axially aligned with said input shaft; a seventh gear fixed to said output shaft and in mesh with said sixth gear; an eighth gear fixed to said second shaft and in mesh with said fifth gear and fifth clutch means for connecting said second shaft to said output shaft for conjoint rotation therewith; a method for both modifying said in-line transmission to a transmission having a vertically offset output shaft, with respect to said input shaft, and adding an accessory drive shaft coaxial with said input shaft, said method comprising:

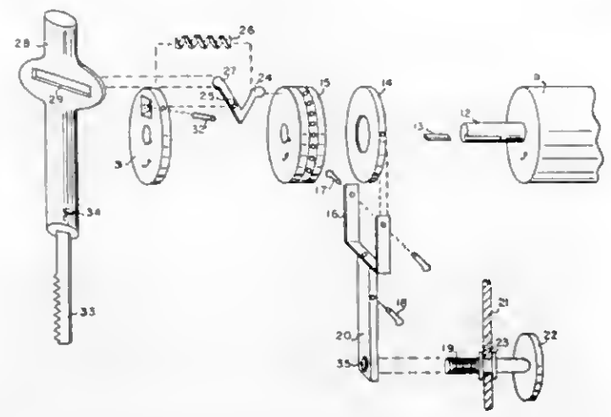
a. exchanging said third shaft for an output shaft that is vertically displaced relative to said input shaft;
b. exchanging said output shaft that is axially aligned with said input shaft for a first sleeve shaft concentric with said input shaft;
c. exchanging said second shaft for a second sleeve shaft, said second sleeve shaft being axially aligned with said first sleeve shaft; and
d. adding an accessory drive shaft, said accessory drive shaft being axially aligned with and operatively connected with said input shaft for conjoint rotation therewith and coaxial with said first and second sleeve shafts, whereby exchanging said third shift, said axially aligned output shaft and said second shaft, as well as adding said accessory drive shaft, produces a transmission having a vertically offset output shaft with respect to said input shaft and permits the coaxial interposition of said accessory drive shaft through said first and second sleeve shafts.

4,031,763

ADJUSTABLE STROKE LENGTH, RECIPROCATING TOOLS

Robert M. Eisenberg, Woodbine, Md., assignor to The Singer Company, Binghamton, N.Y.

Filed Sept. 15, 1975, Ser. No. 613,631
Int. Cl.² F16H *21/18*
U.S. Cl. 74—50 3 Claims



1. In a reciprocating power tool, mechanism for modifying the length of the stroke of the tool, said mechanism comprising:

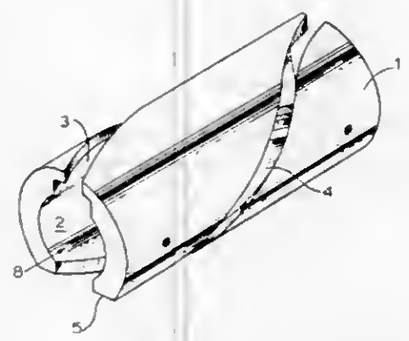
a. a housing;
b. a power source having a rotating shaft, said source being mounted in said housing;
c. means for converting the rotating motion of said shaft to reciprocating motion, said means comprising at least a lever member having an offset from said rotating shaft and a part mounted in said housing for reciprocal movement and driven by said member; and
d. means for changing the distance of said offset from the center line of said shaft, said changing means comprising a first pressure device slidably supported on said shaft and longitudinally movable along said shaft to bear against one end of said lever member whereby the position of the other end of said lever member is modified.

4,031,764

DEVICES FOR ROTATING ARTICLES

Sidney Curtis, Cottingham, England, assignor to Thomas Hill Engineering Co. (Hull) Ltd., Hull, England

Filed Jan. 26, 1976, Ser. No. 652,531
Int. Cl.² F16H *25/12*
U.S. Cl. 74—57 8 Claims



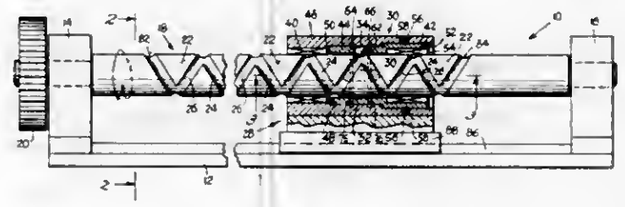
1. A longitudinal device of a predetermined length for rotating a plurality of articles, wherein each of the articles has base and top portions, respectively, said device being formed with two separate half-portions held together by a substantially cylindrical yoke, said device a substantially cylindrical longitudinal passage having an internal surface, two helical paths being defined in said device along said internal surface, said helical paths being located on said internal surface diametrically opposite one another along the entire length of said device, the width of one of said paths being substantially equal to the width of said base portion, and the width of the other of said paths being substantially equal to the width of said top portion.

4,031,765

REVERSING NUT FOR DIAMOND THREAD SCREW

Joseph R. Metz, Georgetown, Conn., assignor to Norco, Inc., Ridgefield, Conn.

Filed Mar. 31, 1975, Ser. No. 563,793
Int. Cl.² F16H *25/12*
U.S. Cl. 74—57 20 Claims



1. A reversing nut for use with a diamond thread screw having threads defining criss-crossed grooves, comprising in combination:

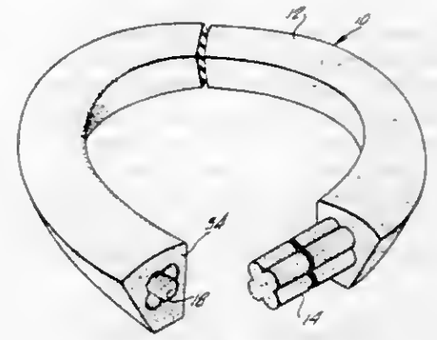
a. a nut body having a through opening to receive the screw,
b. a ball engaging a wall of one groove of the screw,
c. means mounting the ball against lateral movement thereof on the body, said ball extending into the body opening for said groove wall engagement,
d. a laterally movable ball carried by the body, said ball extending into the opening thereof for engagement with a wall of a groove of the screw,
e. means providing a slot in the body in which the movable ball is disposed, for enabling said movable ball to be translationally shifted in directions along the body axis whereby, while guided and directly engaged by the slot walls it can transfer from direct engagement with one groove wall of the screw and simultaneous direct engagement with one slot end, to direct engagement with another groove wall of the screw and simultaneous direct engagement with the other slot end, thereby to effect a change in the axial direction of travel of the nut with respect to the screw, and
f. springs for directly engaging the movable ball to yieldably hold it against either one slot end or else the other slot end.

4,031,766

ADJUSTABLE ENDLESS BELT OF UNITARY CONSTRUCTION

Paul Beck, 1100 N. Alta Loma, Los Angeles, Calif. 90069

Filed Apr. 2, 1976, Ser. No. 673,200
Int. Cl.² F16G *1/00*
U.S. Cl. 74—231 J 11 Claims



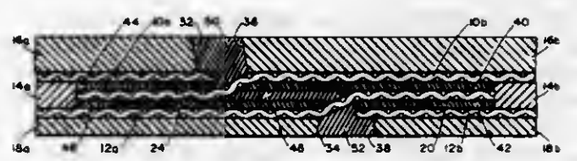
1. A continuously adjustable endless belt of unitary construction for use in power transmission comprising a length of flexible tear-resistant material, one end thereof being of reduced diameter and defining an extended male end portion, the other end of said length having a longitudinal channel therein adapted to receive said male portion, said channel and said male portion being of equal lengths such that upon disposing said male portion within said channel a continuous endless solid belt is defined.

4,031,767

SPLICED BELTING

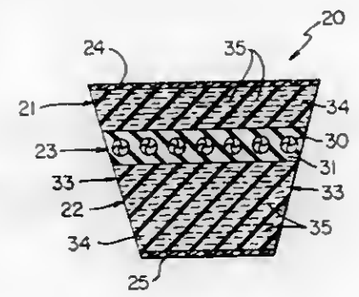
Nathan E. Guyer, Stoneham, Mass., assignor to American Biltrite Inc., Cambridge, Mass.

Filed Jan. 23, 1976, Ser. No. 651,859
Int. Cl.² F16G *1/00, 5/00;* B65G *15/30*
U.S. Cl. 74—231 J 10 Claims



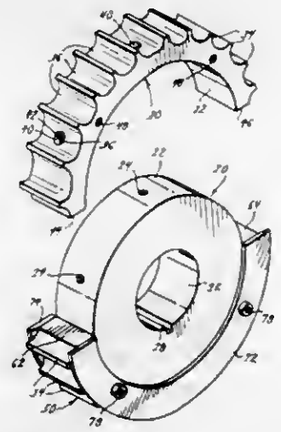
5. In conveyor belting comprising at least two carcass plies, an elastomeric ply intermediate said carcass plies, and outer plies of rubbery compound; a spliced area in which all carcass plies are severed, the severed locations being spaced apart longitudinally of the belting, terminal portions of each carcass ply overlapping each other, overlapping carcass ply surfaces being coated with tie gum.

4,031,768
ENDLESS POWER TRANSMISSION BELT STRUCTURE
Dewey D. Henderson; Jerry W. Rogers, and Gerald C. Hollaway, Jr., all of Springfield, Mo., assignors to Dayco Corporation, Dayton, Ohio
Filed June 18, 1976, Ser. No. 697,801
Int. Cl.² F16G 5/00, 5/16
U.S. Cl. 74—233 7 Claims



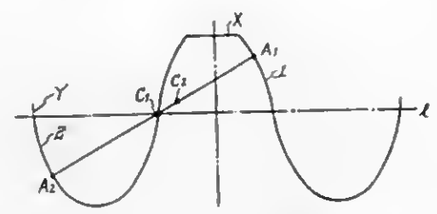
1. An endless substantially trapezoidal power transmission belt structure having reduced coefficient of friction raw-edged non-parallel sides comprising, a tension section, a compression section, and load-carrying means disposed between said sections, each of said sections being made of an elastomeric compound comprising a polymer and graphite, said compound having anti-friction properties which reduce the coefficient of friction of said sides, said graphie comprising 15–90 parts by weight for each 100 parts by weight of said polymer.

4,031,769
SEGMENTED SPROCKET
Milton O. Kassing, St. Louis, Mo., assignor to Semmelmeyer-Corby Co., St. Louis, Mo.
Filed Feb. 6, 1976, Ser. No. 656,193
Int. Cl.² F16H 55/12
U.S. Cl. 74—243 DR 2 Claims



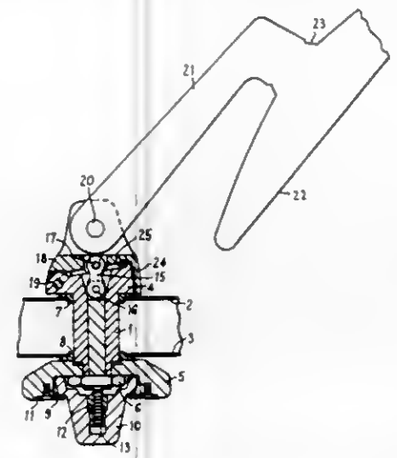
1. A sprocket for tabletop chain which comprises a hub plus a plurality of segments that intimately encircle said hub, said hub having a central opening therethrough to accommodate a shaft and having a wide, machined, convex, outer surface thereon and having a plurality of radially-directed, circumferentially-spaced, threaded sockets therein which are spaced outwardly from said central opening and which open to said outer surface, each of said segments being arcuate in side elevation and having a wide, machined, concave, inner surface thereon and having a plurality of sprocket teeth at the outer periphery thereof and having a plurality of radially-directed, circumferentially-spaced, shouldered passages extending all the way therethrough, said sprocket teeth and the portions of said segments which are intermediate the roots of said sprocket teeth defining spaces between adjacent sprocket teeth, said radially-directed, circumferentially-spaced shouldered passages in said segments being formed so they are permanently in register with some of said spaces between adjacent sprocket teeth, said some of said spaces between adjacent sprocket teeth and said radially-directed, circumferentially-spaced shouldered passages in said segments being disposed in register with said radially-directed, circumferentially-spaced threaded sockets in said hub, the shoulders of said radially-directed, circumferentially-spaced shouldered passages in said segments opening to said some of said spaces between adjacent sprocket teeth, the width of each of said segments and of each sprocket tooth thereon being substantially equal to the width of said outer surface of said hub, the length of each of said some spaces between said adjacent sprocket teeth being greater, in a direction parallel to the geometric axis of said hub, than the diameter of the shoulder of the radially-directed, circumferentially-spaced, shouldered passage which opens to said some space, said shoulders of said radially-directed, circumferentially-spaced shouldered passages in said segments being spaced substantial distances inwardly from the ends of said spaces between adjacent sprocket teeth to assure full strength for those portions of said segments which are intermediate said shoulders of said radially-directed, circumferentially-spaced shouldered passages in said segments and said ends of said some spaces between adjacent sprocket teeth, the width of each of said segments being at least as great as the pitch of said sprocket teeth, and fasteners, which have the heads thereof telescoped into said shoulders of said radially-directed, circumferentially-spaced shouldered passages in said some spaces between said sprocket teeth to be clear of all parts of said tabletop chain and which have the shanks thereof telescoped into said radially-directed, circumferentially-spaced, threaded sockets in said hub.

4,031,770
DUAL TOOTH CONTACT TYPE W-N GEAR
Shoichi Ishikawa, Yokohama, Japan, assignor to Kabushiki Kaisha Hasegawa Haguruma, Tokyo, Japan
Filed Apr. 5, 1976, Ser. No. 673,896
Claims priority, application Japan, Apr. 7, 1975, 50-41200
Int. Cl.² F16H 55/06
U.S. Cl. 74—462 2 Claims



1. A dual tooth contact type W-N gearing including a pair of helical gears of which the basic rack tooth profile, as taken in a transverse or normal-to-teeth reference plane, is composed of addendum convex circular arcs and dedendum concave circular arcs, characterized in that the basic rack tooth profile is so defined that the addendum convex circular arc on one side of a tooth and the dedendum concave circular arc on the same side of another tooth neighboring said tooth on the other side thereof have both a point of meshing contact set on the circular arc so as to have at the respective points of meshing contact lines of radius lying on one and the same straight line.

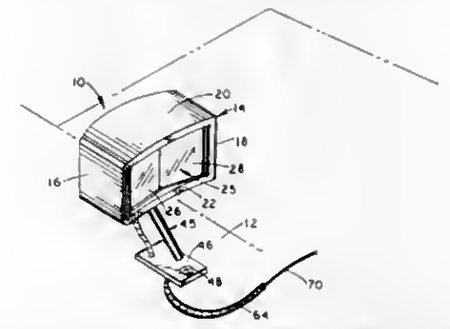
4,031,771
VEHICLE REAR-VIEW MOUNTING ARRANGEMENT
Daniel Daly, Chertsey; Kenneth Paul Davis, Harlington, and Charles Arthur Boughtflower, Bourne End, all of England, assignors to Magnatex Limited, Heathrow, England
Filed Oct. 28, 1975, Ser. No. 626,124
Claims priority, application United Kingdom, Nov. 4, 1974, 47698/74
Int. Cl.² F16D 11/00; A47G 1/24
U.S. Cl. 74—479 6 Claims



1. A mounting arrangement for mounting a vehicle rear-view mirror on the outside of a part of a vehicle body, comprising:
a. a tubular bearing member adapted to be mounted to extend through and be turnable in the body part and having an outer and an inner end and defining a passage extending therethrough,
b. a mirror support member,
c. hinge means having an axis extending transversely to the axis of said bearing member and connecting said mirror support member to the outer end of said bearing member for hinging about the axis of the hinge means,
d. a first rotatable control member connected to the inner end of the bearing member, for turning the bearing member about its axis,
e. a push member axially movable in the passage in said bearing member, said push member comprising a rod which is flexible for at least a part of its length, said rod being screw-threaded at its inner end and having its outer end rigid with the mirror support member,
f. a second rotatable control member,
g. screw-thread means coupling the inner end of said push member to said second control member,
h. means holding said second control member axially captive with the inner end of said bearing member, and
i. means operative in response to axial movement of said push member to cause the mirror support member to hinge about said hinge means.

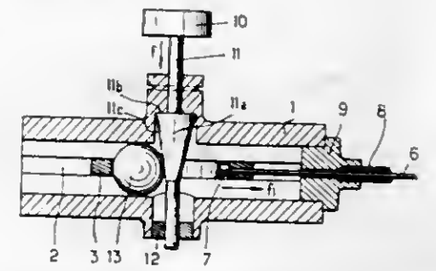
4,031,772
NIGHT/DAY REARSIDE VIEW MIRROR
Glenn DeCastri, 32 Circle Drive, Glen Cove, N.Y. 11542
Filed June 22, 1976, Ser. No. 698,706
Int. Cl.² F16C 1/10
U.S. Cl. 74—501 M 8 Claims

1. A rear vision mirror assembly for use on a vehicle, comprising:
A. a housing open at one end,
B. a vertically disposed mirror including a pair of mirror panels angularly positioned relative to each other and having reflective faces of different values of intensity,
C. means for rotatably supporting said mirror with said mirror panels facing the open end of said housing for rotation about an upright axis between a first position in which one of said mirror panels is brought into reflective position for use to a second position in which the other of said mirror panels is brought into reflective position for use, said supporting means including:
i. a pivot member extending vertically in said housing, and
ii. a first arm secured to said mirror at one end thereof and rotatably mounted relative to said pivot member at the opposite end thereof,
D. stop means mounted within said housing to limit the path of travel of said mirror between the first and second positions,
E. means for mounting said housing in fixed position relative to the vehicle associated therewith, and



F. means for controlling the movement of said mirror between said first and second positions from within the vehicle, said controlling means includes,
i. a bracket extending between said mirror and said pivot member adjacent said arm,
ii. a flexible tubular sheath secured to said bracket at one end thereof and having its opposite end extending within the vehicle, and
iii. a flexible cable positioned within said sheath and secured at one end thereof to said arm between said mirror and said pivot member, and having its opposite end terminating within the vehicle, such that linear movement of said cable within said sheath applies a force to effect angular displacement of said arm for movement between said first and second positions.

4,031,773
DEVICE FOR ACTUATING A SHEATHED CONTROL CABLE
Robert René Marechal, Paris, France, assignor to SICMA Societe Industrielle et Commerciale de Materiel Aeronautique, Issoudun, France
Filed July 14, 1976, Ser. No. 705,108
Claims priority, application France, Feb. 13, 1976, 76.04672
Int. Cl.² F16C 1/22
U.S. Cl. 74—501.5 R 8 Claims



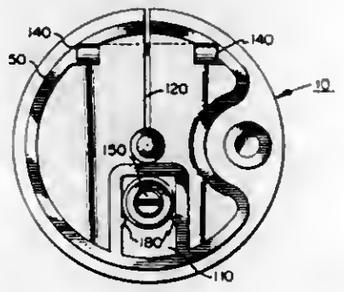
1. A device for actuating a sheathed control cable, said device comprising a casing, push button means actuable to exert a tension on the cable, said push button means being slidable in the casing, means defining an inclined surface rigid with the push button means, a traction member slidably mounted in the casing, the cable being fixed to the traction

member, and ball means interposed between the inclined surface and the traction member.

4,031,774
MOLDED MEMBER FOR USE IN WINDING MECHANISMS

Robert A. Bennett, Easton, Conn., assignor to Waterbury Lock & Specialty Company

Filed Mar. 19, 1976, Ser. No. 668,459
Int. Cl.² G05G 1/00
U.S. Cl. 74—547 **4 Claims**

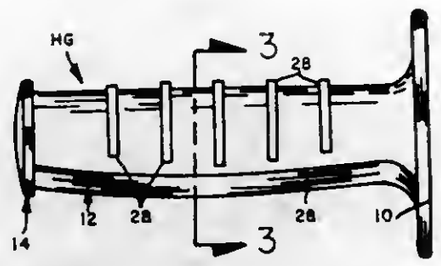


1. A device for use in winding mechanism comprising:
a member with a downwardly extending cylindrical wall and a top with a circular periphery, the top having an elongated channel with a flat bottom extending along one of its diameters and dividing it into two like raised portions, each of these portions having a bore extending from the periphery of the top to the edge of the channel with the axes of the top being horizontally coincident and perpendicular to the axis of the channel and being located above its bottom and near one of its ends, the member further having a central vertical slit extending downwardly through the top and the wall along an imaginary line which begins at a point along the bottom of the wall, then runs vertically upwardly along the wall to a point of intersecion of the end of the channel axis adjacent the bores and the periphery of the top, and then runs along the channel axis between the bores and through the center of the top to terminate at a point between the center of the top and the end of the channel axis remote from the bores.

4,031,775
HAND GRIP

Preston L. Petty, 403 N. Main, Newberg, Oreg. 97132

Filed Feb. 9, 1976, Ser. No. 656,729
Int. Cl.² B62K 21/26
U.S. Cl. 74—551.9 **5 Claims**



1. A hand grip for a handlebar comprising:
a hand-gripping section;
means at each end of said hand-gripping section to maintain an operator's hand in position on said hand-gripping section;
said hand-gripping section having a finger-engaging area and a palm-engaging area, said finger-engaging area defining a plurality of flat surfaces therealong which are disposed substantially parallel with respect to a longitudinal axis of said hand grip and said flat surfaces are joined thereby defining a slightly curved linear ridge the length of said hand gripping section so that said plurality of flat surfaces and ridge define in cross-section at least a V-shape configuration conforming to the jointed formation of finger joints of an operator's hand when engaging said hand-gripping section, said palm-engaging area defining a semi-circular surface having rib means disposed therealong at spaced intervals conforming to the palm area of the operator's hand when engaging said palm-engaging area and being truncated at their ends short of said flat surfaces

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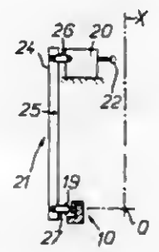
4,031,776
CAMS SUITABLE FOR USE IN MOTION TRANSMITTING MECHANISM AND MOTION TRANSMITTING MECHANISM INCORPORATING SUCH CAMS

William Leone, Gagny, France, assignor to Essilor International Geoerale d'Optique, Joinville-le-Pont, France

Filed Mar. 31, 1975, Ser. No. 563,659
Claims priority, application France, Apr. 11, 1974, 74.12725
Int. Cl.² F16H 53/00
U.S. Cl. 74—567 **8 Claims**



1. A motion transmitting mechanism comprising a cam assembly comprising a fixed base, a rigid one-piece cam member having a generally J-shaped cam surface including a part circular portion and a planar portion tangent to and continuous with said part circular portion, and means adjustably mounting said cam member on said base for angular displacement about the axis of the said part circular portion, a feeler, means for maintaining said feeler in contact with said cam surface, a work block mounted for translatory movement perpendicular to said cam surface, and motion transmitting means connecting said work block to said feeler for transmitting movement, said motion transmitting means transforming movements of said feeler away from said axis of the part-circular cam surface into movements of the work block toward said axis, and vice versa.

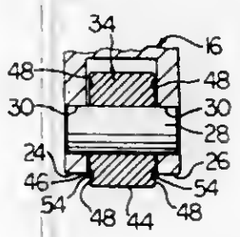
4,031,777
LOW STRESS CAM ROLLER

John H. Parks, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 11, 1976, Ser. No. 657,127
Int. Cl.² F16H 53/06
U.S. Cl. 74—569 **4 Claims**

1. In a cam follower mechanism, a rotary cam having a straight follower lifting cam surface, a reciprocally guided follower, a follower roller rotatably supported by said follower for engagement with same cam surface, said roller being a generally cylindrical member having a peripheral contact surface and a pair of opposite, radially directed sidewalls,

wherein the improvement comprises means on said roller for relieving stress, said means on said roller comprising an annu-

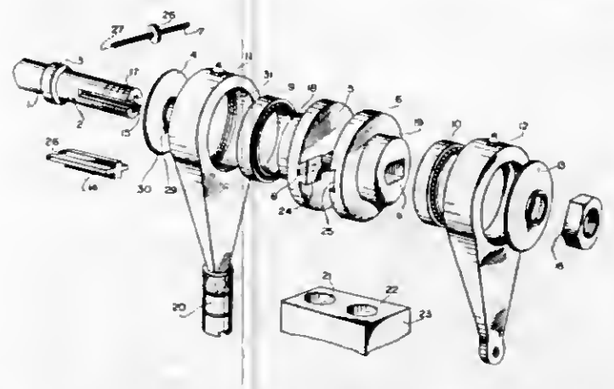


lar groove in each of said radially directed sidewalls, said annular groove being arcuate in cross-section.

4,031,778
DRIVE SYSTEM

David Stephen Fazekas, Oakville, Canada, assignor to The International Nickel Company, Inc., New York, N.Y.

Filed July 11, 1975, Ser. No. 595,300
Claims priority, application Canada, Aug. 28, 1974, 208027
Int. Cl.² G05G 5/04; F15B 15/24
U.S. Cl. 74—571 L **4 Claims**



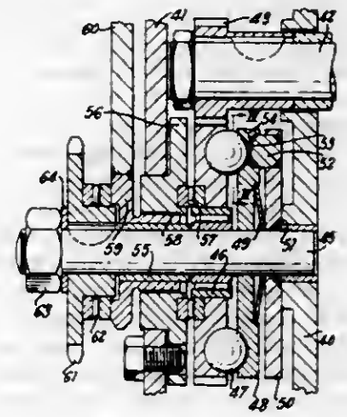
1. A double-eccentric variable drive system comprising a drive shaft, two eccentrics mounted on said drive shaft to be driven thereby, and means for varying the eccentricity of both of said eccentrics simultaneously, said means comprising a spindle having left-hand screw-threads on one end thereof and right-hand screw-threads on the other end thereof, said spindle having an enlarged central portion rotatably mounted in said shaft but radially fixed relative thereto, said eccentrics each having an annular surface carrying a bearing which in turn carries a connecting rod and said eccentrics each having a radial bore therethrough tapped to correspond with and receive the threads of said spindle, said bores being aligned on opposite sides of said shaft, each eccentric having an axial bore larger than the diameter of the shaft at least in a direction parallel to said spindle to allow for sliding movement of the eccentrics with respect to each other radially of the shaft, means for rotating said spindle in one direction to simultaneously increase the eccentricity of both of said eccentrics relative to said shaft and for rotating said spindle in the other direction to simultaneously decrease the eccentricity of both of said eccentrics relative to said shaft.

4,031,779
ROTARY DRIVES

Rudi Helmut Braune, Griffin Hill, Tbrupp, Stroud, Gloucestershire, England

Filed Oct. 16, 1975, Ser. No. 623,093
Int. Cl.² F16H 35/04
U.S. Cl. 74—650 **20 Claims**

1. A mechanical rotary coupling comprising a driving member, a driven member coaxial therewith, a contact member having a bearing surface abutting opposing faces of said driving and driven members, said members being connected together by said contact member, means for applying variable axial thrust between said driving and driven members so as to

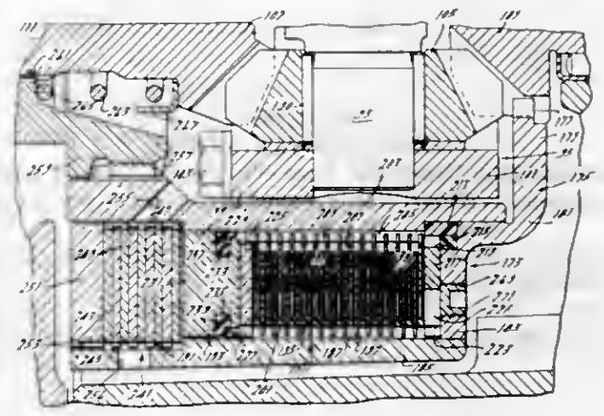


vary the torque transmitted therebetween, and means arranged to vary said axial thrust during operation of the coupling.

4,031,780
COUPLING APPARATUS FOR FULL TIME FOUR WHEEL DRIVE

Courtney F. Dolan, Syracuse, and Thurman O. Ruettinger, Skaneateles, both of, NY, assignors to Chrysler Corporation, Highland Park, Mich.

Filed Nov. 29, 1974, Ser. No. 528,244
Int. Cl.² F16H 1/44; F16D 43/00, 31/00
U.S. Cl. 74—711 **6 Claims**

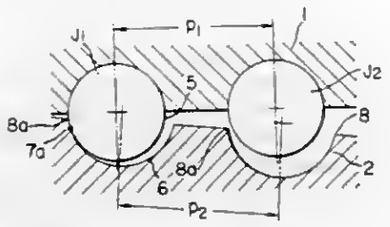


1. Coupling apparatus for power drive systems comprising first and second rotatable elements adapted to be coupled together, a first coupling device comprising a viscous coupling chamber, a first set of viscous coupling members in said chamber drivingly connected to one rotatable element, and a second set of viscous coupling members in said chamber, interleaved with said first set of viscous coupling members and drivingly connected to the other rotatable element, viscous fluid in said chamber adapted to be sheared when said members are rotated relative to one another, said fluid transmitting torque from one set of coupling members to the other and increasing in temperature as a result of shearing action, said fluid expanding as its temperature increases, and a second coupling device adapted to be actuated by the expansion of fluid in said first coupling device, said second coupling device comprising a second chamber closed at one end, a first set of friction coupling members in said second chamber drivingly connected to one rotatable element, a second set of friction coupling members in said second chamber drivingly connected to the other rotatable element, and a piston at the other end of said second chamber and adjacent said viscous coupling chamber, said viscous fluid applying pressure on said piston to move the same toward and apply pressure on said

friction coupling members in response to the expansion of said viscous fluid in said viscous coupling chamber.

4. Coupling apparatus for power drive systems comprising a differential including first and second side gear members, an annular carrier member, pinion shafts connected to said carrier member and extending radially inward, means drivingly connected to said pinion shafts for rotating said carrier member pinions carried on said pinion shafts and meshing with said side gear members, a viscous coupling connected to two of said members for transmitting torque therebetween, said viscous coupling including a viscous fluid adapted to increase the temperature and expand during torque transmission thereby in said viscous coupling, a friction clutch connected to two of said members for transmitting torque therebetween, and means movable in response to the expansion of said viscous fluid for actuating said friction clutch, said viscous coupling and said friction clutch including an inner drum and an outer drum, said inner drum surrounding said carrier member and connected to one of said members, said outer drum surrounding said inner drum and having a diameter greater than the diameter of said inner drum to provide space therebetween, a plurality of first viscous coupling plates drivingly connected to one of said drums and located in said space, a plurality of second viscous coupling plates interleaved with said first viscous coupling plates and drivingly connected to the other drum, said viscous fluid being located between said viscous coupling plates, a first set of friction clutch plates drivingly connected to said one drum and a second set of friction clutch plates interleaved with said first set of friction clutch plates and drivingly connected to said other drum, said means for actuating said friction clutch comprising a piston in said space, said piston being adapted to apply pressure on said friction clutch plates in response to pressure applied thereto by said expanding viscous fluid.

4,031,781
SPEED REDUCTION GEAR
Yoshihisa Iida, Kyoto, and Yozo Oike, Osaka, both of Japan, assignors to Shinpo Kogyo Kabushiki Kaisha, Kyoto, Japan
Filed Dec. 15, 1975, Ser. No. 640,944
Claims priority, application Japan, Dec. 16, 1974, 49-144220; Sept. 9, 1975, 50-109329
Int. Cl.² F16H *1/06, 1/20, 1/28*
U.S. Cl. 74—804 **2 Claims**



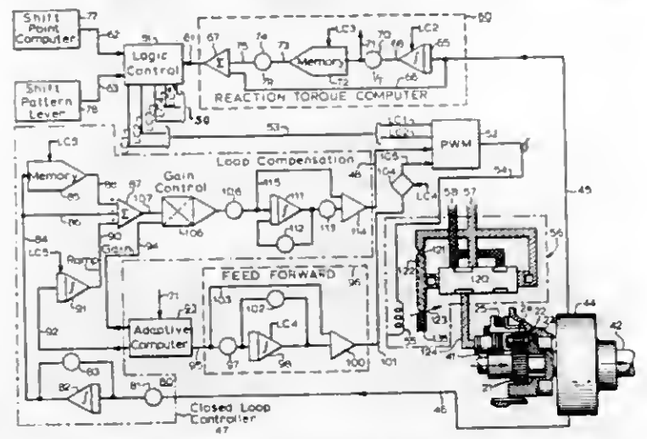
1. A speed reduction gear wherein a stationary internal gear and an external gear meshing with the internal gear are provided, and wherein a differential rotation due to difference in the number of teeth between the above said gears is transmitted to an output shaft characterized in that:

A. the teeth of the internal gear are provided with a circular convex profile, and the teeth of the external gear are provided with a circular concave profile the radius of which is larger than that of the above said circular convex profile, in that:

B. the mesbing of the above said gears moves reciprocally between two points on the concave profile, and in that:

C. the range defined by the above said two points does not include any edge of the concave profile.

4,031,782
METHOD AND APPARATUS FOR A TRANSMISSION CONTROL SYSTEM
Alan Leonard Miller, Mount Prospect, Ill., and John Saxon Ivey, Bloomfield Hills, Mich., assignors to Borg-Warner Corporation, Chicago, Ill.
Filed Feb. 27, 1976, Ser. No. 661,896
Int. Cl.² B60K *41/18;* **G05G** *21/00*
U.S. Cl. 74—866 **18 Claims**



1. A control system for controlling the change of gear ratio in a gear set receiving drive from an engine and having an output drive connection for supplying drive torque to a load, comprising:

a control unit for the gear set to control the change of gear ratio;

sensor means operatively associated with the drive connection for providing an output torque signal which varies as a function of said drive torque; and

means connecting the sensor means and the control unit, whereby the control unit will control the change of gear ratio in response to said drive torque.

17. The method of regulating gear ratio change in a gear set coupled between an automotive engine and an output mechanical drive connection, comprising the steps of:

sensing the output torque provided by the gear set;

providing a feedback signal which varies as a function of the output torque;

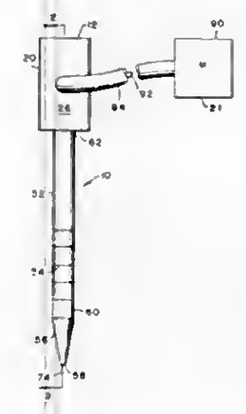
establishing a reference signal;

continually comparing the feedback signal with the reference signal to determine the proper time for effecting the gear ratio change; and

modifying the control of the gear ratio change as a function of changes in the feedback signal indicating the output torque.

4,031,783
TATTOO ETCHING MACHINE
Stanley C. Paul, and Shelby J. Russell, both of 9912 Woodside, Detroit, Mich. 48204
Filed Apr. 7, 1975, Ser. No. 565,342
Int. Cl.² B26F *1/24*
U.S. Cl. 81—9.22 **1 Claim**

1. A tattoo etching machine comprising a U-shaped body member having a top leg portion and a bottom leg portion, each connected at one end to a connecting portion, which body member has a threaded opening in the connecting portion extending in the direction of the leg portions, a non-threaded opening in the bottom leg portion extending transversely of the leg portions and in the direction of the connecting portion, and a threaded opening extending from the free end of the bottom leg portion in the direction of the bottom leg portion into the non-threaded opening therethrough, an externally threaded bearing member positioned within the threaded opening in the connecting portion of the body member having a cylindrical opening extending axially thereof, a drive shaft having a head on one end thereof extending through the opening in the bearing member for rotation therein, means for connecting a drive cable to the one end of the drive shaft exteriorly of the body member, a hollow cylinder having a radially extending threaded opening extending transversely therethrough sleeved over the other end of the drive shaft within the body member between the leg portions thereof for rotation with the drive shaft, a set screw extending through the radial opening in the hollow cylinder rigidly securing the cylinder to the drive shaft, a pin extending axially of the drive shaft from the hollow cylindrical member and offset from the axis of rotation of the hollow cylindrical member and the drive shaft, a hollow cylindrical barrel one end of which extends through the unthreaded opening in the bottom leg portion of the body member transversely of the bottom leg portion and in the direction of the connecting portion of the body member, a barrel tip secured to the other end of the barrel having an opening therethrough extending axially of the barrel, needle means extending through the barrel, one end of which is adapted to extend through the opening in the barrel



tip in one position of the needle means and the other end of which includes an opening therethrough through which the pin on the cylinder secured to the drive shaft passes, whereby on rotation of the drive shaft the needle means is reciprocated into and out of the opening in the barrel tip a controlled distance, a threaded set screw extending through the opening in the bottom leg portion of the body member and into contact with the one end of the barrel for securing the barrel to the body member in axially adjusted positions of the barrel with respect to the body member, and a cover for the body member enclosing the area between the top and bottom leg portions of the body member, which cover is a U-shaped member constructed of resilient material having a connecting portion and a pair of leg portions, which leg portions converge slightly toward each other with the cover not assembled on the body portion, whereby on assembly of the cover with the body portion the leg portions are spread apart and the resiliency of the cover material holds the cover on the body member.

4,031,784
DEVICE FOR UNLOCKING FROZEN VALVES
George H. Cobbe, Jr., 3411 S. Camino Seco No. 46, Tucson, Ariz. 85730
Filed Mar. 8, 1976, Ser. No. 664,899
Int. Cl.² B25B *13/04, 13/50*
U.S. Cl. 81—57.39 **10 Claims**

1. A tool for freeing locked and frozen valves which applies only torque forces about the longitudinal axis of the valve intermediate the valve stem and the valve body, said tool comprising in combination:

a. a first apertured collar for circumscribingly engaging the valve body, said collar including restraining means for inhibiting rotation of said first collar about the longitudinal axis of the valve body;

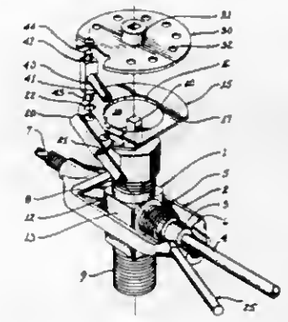
b. a first lever extending generally tangentially from said first collar;

c. an aperture disposed in said first collar in proximity to the point of attachment of said first lever;

d. a second collar for non-rotatably engaging the valve stem,

said second collar including a plurality of apertures spaced about the periphery of said second collar; and

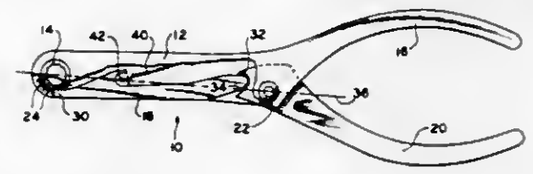
e. a second lever positionable in general vertical alignment with said first lever for inducing relative rotational movement between said first and said second collars, said second lever including a first stud for engaging said aperture within said first collar and a second stud for engaging



one of said plurality of apertures within said second collar;

whereby, on urging angular displacement of said second lever toward said first lever, said first and second studs generate only a torque force acting through said first and second collars upon the valve body and valve stem, respectively, to unlock and unfreeze the valve stem.

4,031,785
SQUEEZE ACTUATED WRENCH
Charles J. Wheeler, 2346 Haines, Madison, Ohio 44057
Filed Sept. 2, 1975, Ser. No. 609,399
Int. Cl.² B25B *13/46*
U.S. Cl. 81—57.39 **13 Claims**



1. A squeeze actuated ratchet wrench comprising a rotatable socket means having an annular toothed outer peripheral surface, a driver member having one end thereof engaging with said toothed peripheral surface of said socket means and defining a first pivot point about which said driver member pivots relative to said socket means upon rotation of said socket means by said driver member and an opposite end, a body for supporting said socket means at one end portion thereof for rotation about an axis of rotation and having a handle portion at the opposite end thereof, an actuating handle having one end thereof adapted to be gripped by the user's hand and the other end thereof engaging with said opposite end of said driver member and defining a second pivot point about which said actuating handle and said driver member rotate relative to each other upon rotation of said socket means, said actuating handle being pivotably connected intermediate said end portions of said actuating handle to said body at a third pivot point for rotation relative to said body, said third pivot point and the axis of rotation of said socket means defining a path through which a longitudinal axis of the wrench passes with said first pivot point being located on one side of said longitudinal axis and said second pivot point being located on the opposite side of said longitudinal axis, said actuating handle and said handle portion of said body being adapted to be simultaneously gripped by the hand of the user and squeezed to rotate said one end of said actuating handle toward said body to rock and move said driver toward said socket means and effect rotation of said socket means and wherein the distance between said third pivot point and said

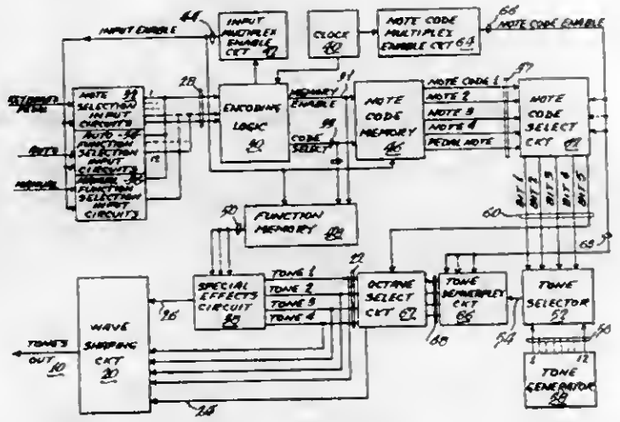
second pivot point decreases upon movement of said one end of said actuating handle toward said body to increase the force transferable between said actuating handle and said driver member by increasing the mechanical advantage of the lever arrangement defined by said actuating handle and said driver member.

4,031,786

TONE SELECTOR CIRCUIT WITH MULTIPLEXED TONE DATA TRANSFER

Howard B. Kaplan, Lynnwood, Wash., assignor to Warwick Electronics Inc., Chicago, Ill.

Filed Aug. 11, 1975, Ser. No. 603,860
Int. Cl.² G10F 1/00
U.S. Cl. 84—1.03 **19 Claims**



1. In a musical instrument having means for generating tone signals and means for providing information representative of a plurality of selected ones of said tone signals, a circuit for producing selected ones of said plurality of tone signals in accordance with said information, comprising:

tone selector means connected with said tone signal generating means and said information providing means for producing a selected one of the tone signals on an output thereof when information representative of a selected tone signal is received on an input thereof;

multiplexing means connected with said information providing means for transferring the information provided thereby to an input of the tone selector means on a time division multiplexing basis, said tone selector selectively producing time division multiplexed tone signals on an output thereof in accordance with said information; and

means connected with the output of the tone selector means for demultiplexing the selected multiplexed tone signals.

4,031,787

PUNCH AND STRIPPER ASSEMBLY

Percy Luther Cady, Darien Center, N.Y., assignor to Houdaille Industries, Inc., Buffalo, N.Y.

Filed July 28, 1976, Ser. No. 709,338
Int. Cl.² B26F 1/14
U.S. Cl. 83—140 **10 Claims**

1. A punch and stripper assembly for use with a die on a workpiece beneath the ram of a punch press, comprising:

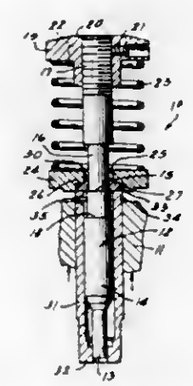
a. a punch having means at one end thereof for coacting with said die, an intermediate body portion, a shoulder facing away from said one end, and a threaded end portion at the opposite end;

b. an enlarged head adjustably carried on said threaded end portion for being engaged by the ram;

c. a compression spring surrounding said opposite end of said punch, and at one end engaging said head;

d. a washer surrounding said punch and engaging the opposite end of said spring;

e. a retainer acting between said punch shoulder and said washer, and held in engagement therewith by said spring; and



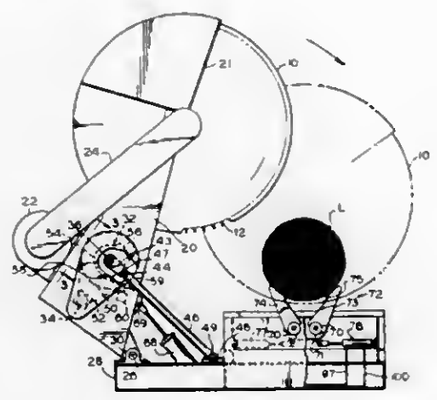
f. a stripper sleeve surrounding said body portion of said punch for transferring a reactive force from the workpiece to said retainer during a power stroke of the punch press to store energy in said spring.

4,031,788

CHOP SAW

Dallas F. Boge, 7145 SW. Sylvan Court, Portland, Oreg. 97225, and Roderick Olsen, Jr., 13500 SW. Hazel, Beaverton, Oreg. 97005

Division of Ser. No. 556,796, March 10, 1975. This application Oct. 1, 1975, Ser. No. 618,699
Int. Cl.² B27B 7/00
U.S. Cl. 83—380 **10 Claims**



1. A chop saw comprising:

a powered saw blade,

a saw carriage means supporting said saw blade and mounted for moving said blade toward and away from a workpiece,

carriage drive means for moving said carriage means to feed said saw blade toward and away from and in a cutting stroke through said workpiece,

and position-responsive speed control means responsive to the position of said carriage means with respect to said workpiece for reducing the feed speed of said carriage means during the cutting stroke of said saw blade,

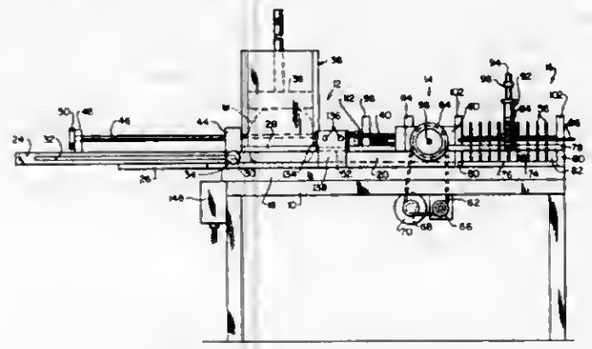
a pair of clamping arm means for gripping opposite sides of a generally cylindrical workpiece during the cutting stroke of said saw blade, a pair of separate and independent hydraulic motors, one for operating each said clamping arm means, each said hydraulic motor being in a separate hydraulic control circuit, each said control circuit including a three-position control valve having a first spring-centered flow-blocking position, a second position for directing flow to said hydraulic motor in a direction to apply said clamp arm means and a third position for directing flow to said hydraulic motor in a direction to release said clamp arm means, and valve-operating means operable sequentially first during movement of said saw blade toward a workpiece to shift said control valve from said first position to said second position to apply said clamping arm means to the workpiece prior to commencement of said cutting stroke, second to shift said control valve from said second position back to said first position to block flow and thereby lock said clamp arm means on the workpiece during said cutting stroke and third to shift said control valve from said first position to said third position to release said workpiece after completion of said cutting stroke.

4,031,789

MEAT CUBING MACHINE

Arnold Soodalter, University Park Apts., Apt. M-1, Eastbampton Road, Holyoke, Mass. 01040

Continuation-in-part of Ser. No. 602,269, Aug. 6, 1975, Pat. No. 3,990,336. This application July 29, 1976, Ser. No. 709,940
Int. Cl.² B26D 3/18
U.S. Cl. 83—404.2 **5 Claims**



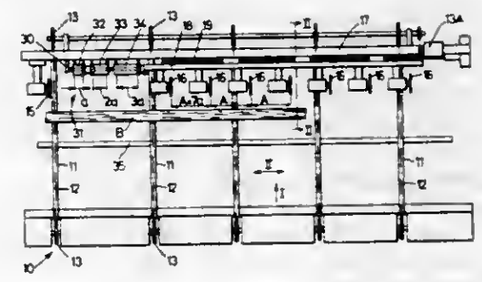
1. Apparatus for cubing frozen meat comprising, first cutting means for cutting a slab from a piece of meat, second cutting means for cutting the slab longitudinally into strips, and third cutting means for cutting the strips transversely into cubes, wherein the first cutting means is a horizontally reciprocable cutting blade having a cutting edge comprised of a plurality of equi-spaced teeth alternately offset upwardly or downwardly relative to the plane of the cutting blade, and wherein the second and third cutting means each comprise a plurality of upright annular rotatable saw tooth cutting blades, the first and second cutting means being disposed in a horizontally disposed first meat channel, and the third cutting means being disposed in a horizontally disposed second meat channel normal to the first meat channel, a first meat ram slidable in the first meat channel, a second meat ram slidable in the second meat channel, a meat hopper linked to and slidable with the first meat ram, and a strip guide having a plurality of partitions in the second meat channel for guiding strips of meat, and handle means for effecting vertical movement of the strip guide for clearing the partitions from the second meat channel, whereby manual inward sliding movement of the first meat ram first causes a slab to be cut from meat within the hopper by the first cutting means with meat dust being reclaimed as the cutting blade of the first cutting means reciprocates, second causes the so-cut slab to be sliced into strips by the second cutting means, with meat dust produced as the so-sliced strips are cut by the second cutting means being reclaimed, and third causes the so-sliced strips to be moved into the second meat channel between the partitions of the strip guide for retaining the strips in alignment, with manual vertical upward movement of the strip guide moving the partitions out of the second meat channel whereby manual inward sliding movement of the second meat ram causes the aligned strips to be moved to the third cutting means for cubing, with meat dust produced as the strips are cubed by the third cutting means being reclaimed.

4,031,790

LUMBER TRIMMER

Bengt Arvidsson, Sibbhult, Sweden, assignor to A & B Constructors AB, Markaryd, Sweden

Filed Mar. 18, 1976, Ser. No. 667,953
Claims priority, application Sweden, Mar. 21, 1975, 7503286
Int. Cl.² B27B 5/02
U.S. Cl. 83—425.4 **4 Claims**



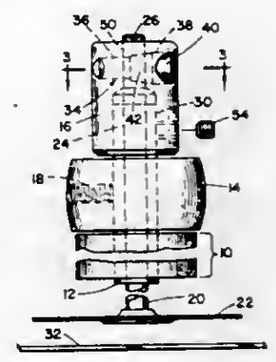
1. Lumber trimmer, comprising a saw table having a lumber conveyor for moving lumber pieces in a first direction across the saw table with the lumber pieces oriented in a second direction perpendicular to the first direction; a first end cutting device on the saw table, including a cutter for cross-cutting one end of the lumber pieces at a first cutting position; a second end cutting device on the saw table, including a common cutter support displaceable in the second direction and a plurality of cutters selectively operable for cross-cutting the other end of the lumber pieces at a selected one of a plurality of second cutting positions spaced-apart in the second direction, the cutters of the second end cutting device being evenly spaced apart in the second direction on said support; and a power operated linear positioner for selectively positioning the cutter support at discrete positions spaced apart in said second direction, said positioner being connected between a stationary holder on said saw table and said cutter support and including first and second double-acting fluid pressure cylinders connected with one another in additive relation, the length of stroke of one of said cylinders being one unit of distance and the length of stroke of the other cylinder being two units of distance, and the spacing of adjacent cutters on said cutter support being a multiple of said unit of distance.

4,031,791

KNIFE MOUNTING UNIT FOR ROLL SLICING MACHINE

Dale S. Lecrone, 4447 Bonnymede, Jackson, Mich. 49201

Filed Sept. 16, 1976, Ser. No. 723,917
Int. Cl.² B26D 3/08, 4/76
U.S. Cl. 83—508.2 **9 Claims**



1. A disc blade mounting and driving unit for a roll slicing machine comprising in combination, a normally vertical driving sleeve supported for rotation about the axis thereof within bearing means, a drive pulley fixed to the upper end of said sleeve, a knife shaft coaxial with said sleeve and extending respectively at the opposite ends thereof beyond the opposite

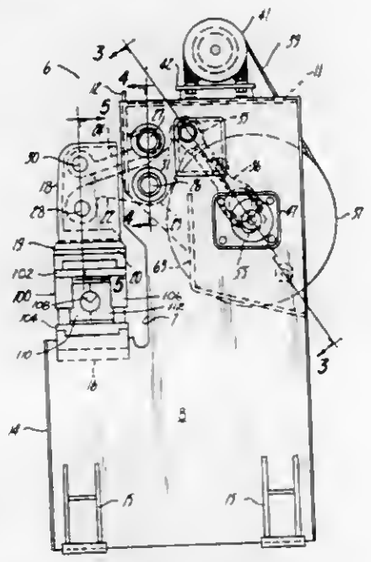
ends of said sleeve and a disc knife fixed to the lower end of said shaft; the improvement comprising a chuck unit comprising a head having a first bore in one end to receive the upper end of said driving sleeve coaxially, means to firmly secure said head to said upper end of said driving sleeve, the opposite end of said head having a second bore coaxial with said first bore and of a diameter complementary to that of said knife shaft and receiving the upper end of said shaft, said shaft having an arcuate notch in one side thereof adjacent the upper end and extending transversely to the axis of said shaft and said notch being wider at one end than the other, said head having a bore extending transversely thereof in the upper end portion thereof substantially coaxial with the axis around which said notch is generated, a latching plug mounted within said transverse bore for axial movement and having a frustoconical section complementary to the surface of said notch and adapted to wedgingly engage said notch when said plug is moved in one direction to secure said shaft to said driving sleeve for rotation of said disc knife thereby, and means operable to move said latching plug into wedging engagement with said notch in said shaft.

4,031,792

HAMMER RAM PRESS

Alexander Borzym, Dearborn, and John J. Borzym, Birmingham, both of Mich., assignors to Alpha Industries, Inc., Detroit, Mich.

Filed July 12, 1976, Ser. No. 704,344
Int. Cl.² B26D *5/14*
U.S. Cl. 83—601 **4 Claims**



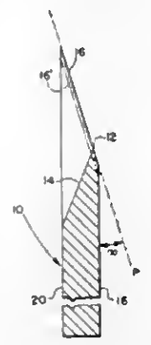
1. A press comprising, in combination, a rigid frame including a portion adapted to support a first member of a die set; a ram adapted to support a second member of the die set and traverse the second member relative to the first member; a parallelogram linkage connecting the ram to the frame including a link and a rocker arm pivotally connected to the frame for rotation about first and second axes and pivotally connected directly to the ram at third and fourth axes, the said four axes being parallel and passing through the vertices of a parallelogram; a power-driven crankshaft rotatably mounted on the frame including a crank throw; and a connecting rod coupling the crank throw to the rocker arm so that the rocker arm and link are oscillated upon rotation of the crankshaft to move the ram and second die member.

4,031,793

BAND KNIFE TOOTH SHAPE

Leonard Miaskoff, Easton, Pa., assignor to Harris Corporation, Cleveland, Ohio

Filed May 3, 1976, Ser. No. 682,624
Int. Cl.² B26D *1/46;* **B23D** *61/12;* **B27B** *33/06*
U.S. Cl. 83—788 **2 Claims**



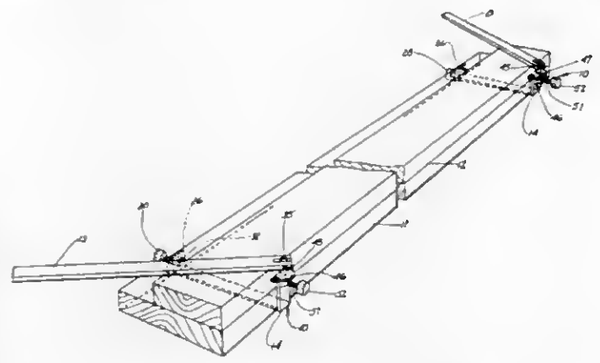
1. Apparatus for cutting sheet material comprising a cutting blade, first means for longitudinally moving said cutting blade across workpiece so as to produce a cutting action, and second means for transversely moving said blade and said workpiece relative to one another so as to sever said workpiece along a cutting plane, and wherein said cutting blade has substantially parallel first and second sides, a back edge and a cuttting edge, said cutting edge being formed along a beveled surface being inclined with respect to said sides so as to join said first side at an obtuse angle and said second side at an acute angle, said beveled surface being generally serrated by scallops disposed at an acute angle to said beveled surface and an obtuse angle to said second side such that the cutting edge formed at the intersection of said beveled surface with said scallops lies entirely within the plane of said beveled surface, said second means for transversely moving said blade and said workpiece relative to one another being adapted to move said blade and said workpiece so that said cutting plane including said serrated cutting edge is substantially coincident with said beveled surface.

4,031,794

PORTABLE JIG FOR RAFTER CUTS AND OTHER ANGLE CUTS

Joseph Q. Leihgeber, Rte. No. 1, Box 164A, Fayetteville, Ohio 45118

Filed June 25, 1976, Ser. No. 699,694
Int. Cl.² B27G *9/04*
U.S. Cl. 83—829 **8 Claims**



1. A portable saw guide for a hand operable saw, said saw guide comprising:

a. a base member including means for clamping said base member to an elongated horizontally disposed work piece supporting surface wherein said base member includes a first portion extending transversely of and underlying said supporting surface and a second portion disposed to one side of said supporting surface, said second portion of said base member comprising a first section extending vertically upward from said first portion adjacent said work piece supporting surface and a second portion extending horizontally from said first section and in a direction away from said work piece supporting surface, said second section including an aperture extending vertically therethrough;

b. a vertically disposed pin mounted in said vertical aperature of said second portion of said base member for rotation about its axis, said vertically disposed pin including a head section overlying said second portion and a shoulder having a cross sectional dimension greater than the cross sectional dimension of said aperture for seating said head section on said base member second section overlying said aperture, said vertically disposed pin having a cylindrical extension depending from said shoulder rotatively through said aperture, said cylindrical extension including an annular depression extending at least partially thereabout;

c. an elongated guide blade pivotally secured at one end to said head section and swingable between a position vertically disposed from said work piece and a substantially horizontal position overlying said work piece, said guide blade being rotatable with said pin so as to overlie said work piece at any selected angle relative thereto; and

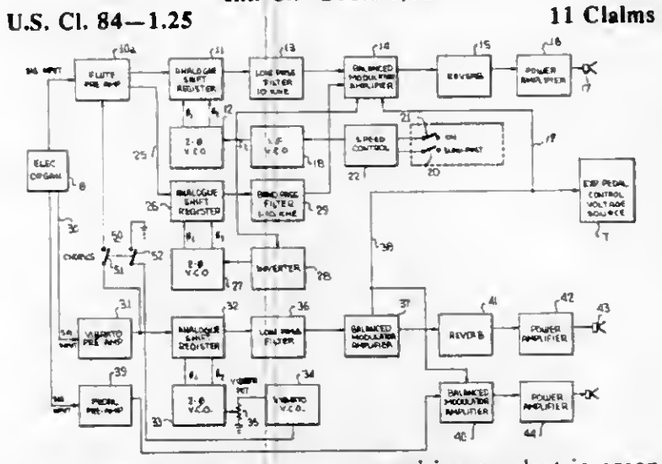
d. means for locking said pin for maintaining said guide blade at said selected angle comprising a brake pad cooperatively associated with said annular depression and means for selectively urging said brake pad into and out of frictional engagement with said annular depression.

4,031,795

TONE SIGNAL MODULATION SYSTEM

David A. Bunger, Cincinnati, Ohio, assignor to D. H. Baldwin Company, Cincinnati, Ohio

Filed June 20, 1975, Ser. No. 588,627
Int. Cl.² G10H *1/02*
U.S. Cl. 84—1.25 **11 Claims**



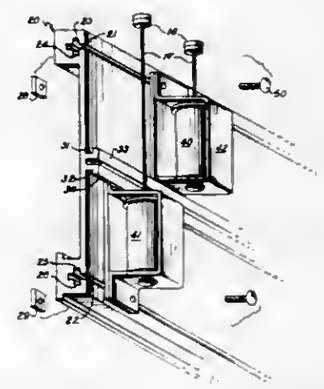
1. An electric organ system, comprising an electric organ having a flute signal output lead and a heterosignal output lead, means including a first analogue shift register means for modulating the frequency of said flute signal, amplitude modulation means in cascade with said analogue shift register, oscillator means providing modulating signal to said analogue first shift register means and to said amplitude modulator means, a first loudspeaker responsive to the output of said amplitude modulator means, means including a further analogue shift register for modulating the frequency of said heterosignal, said heterosignal being exclusive of said flute signal, a second loudspeaker connected in cascade with said further analogue shift register, and switch means operable for transferring signal from said heterosignal output lead to the input of said first analogue shift register means, said first and second loudspeakers being spatially separated sufficiently to represent distinct acoustic sources.

4,031,796

SOLENOID MOUNTING ASSEMBLY FOR MUSICAL KEYBOARD

Thomas Jewel Wilkes, Lewisburg, Tenn., assignor to Teledyne, Inc., Los Angeles, Calif.

Filed Apr. 28, 1976, Ser. No. 681,095
Int. Cl.² G10C *3/20*
U.S. Cl. 84—20 **7 Claims**



1. In a keyboard musical instrument, a solenoid mounting member for a plurality of solenoid operated key actuating assemblies, each key actuating assembly having a mounting bracket which includes a back plate, said solenoid mounting member being constituted by an extruded plate member,

said extruded plate member having at least one elongated channel in a surface thereof, said at least one elongated channel having side walls and means in said side walls for threadably receiving a threaded fastener member passing through an end of said back plate, and

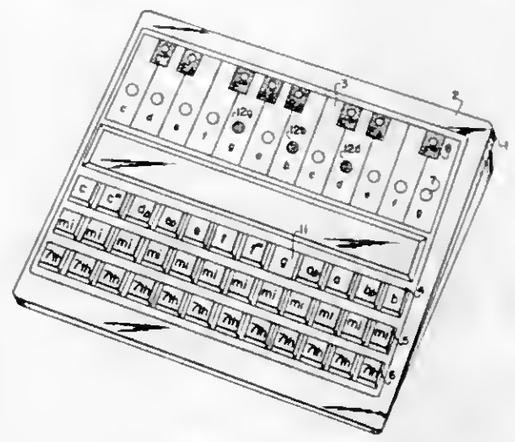
an elongated rib on said plate member and projecting from said plate, said rib having a groove formed in said rib projection and opening in a direction transverse to the direction of said channel, said groove adapted to receive a flange projecting from an end of said back plate.

4,031,797

POCKET-SIZE MUSICAL CHORD STUDY AID

Arthur R. Schmoyer, The Cedars, Rte. 16, Woolford, Md. 21677

Continuation-in-part of Ser. No. 578,032, May 16, 1975, Pat. No. 3,954,040. This application Feb. 20, 1976, Ser. No. 659,978
Int. Cl.² G09B *15/00*
U.S. Cl. 84—470 **9 Claims**



1. A study aid for use in self instruction in the make-up of musical chord triads, said study aid comprising a self-contained unit including a relatively flat casing dimensioned appropriately for carrying in a pocket, said casing having

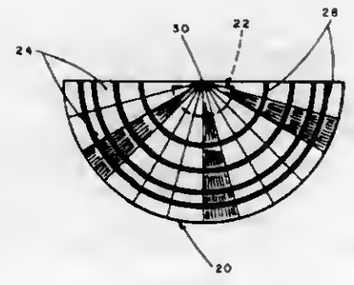
A. a face surface including

A. a display panel in a format representative of keys of a musical instrument keyboard and including
   a. indicia of the respective notes represented by said format of keys,
   b. light indicators respectively associated with said note representations
B. a series of push-buttons representative of notes by which chords are identified,

said study aid further including

C. means responsive to the depression of a selected push-button to provide a signal,
D. means responsive to said signal to activate a certain plurality of said light indicators which correspond to the notes of the chord identified by said depressed push-button, said plurality including one indicator for the note representation which corresponds to said key, and
E. latch means effective to retain said certain plurality of chord note indicators in said activated state.

4,031,798
SOUNDBOARD FOR STRINGED MUSICAL INSTRUMENTS
Arthur E. Snider, 158 North Hazel, St. Paul, Minn. 55133
Filed Oct. 31, 1975, Ser. No. 627,390
Int. Cl.² G10D *3/02*
U.S. Cl. 84—291 **9 Claims**

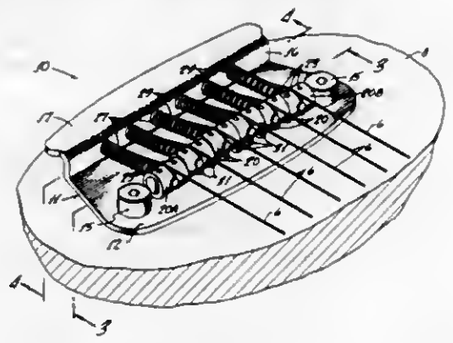


1. A soundboard for stringed musical instruments comprising a solid sheet which is radially/circumferentially anisotropic and which comprises a plurality of longitudinally-grained, wooden sections radiating from the focal point of the sheet and wherein said sheet includes a plurality of curved braces concentric about the focal point of said sheet.

3. A plucked-string musical instrument comprising tensioned strings, a soundboard, and means coupling said strings to said soundboard wherein the improvement comprises a soundboard which is a radially/circumferentially anisotropic sheet comprising stiff fibers in a matrix, said fibers running substantially radially from a focal point of said sheet, said soundboard including a plurality of braces concentric about said focal point and wherein means coupling said strings to said soundboard is a bridge attached near said focal point.

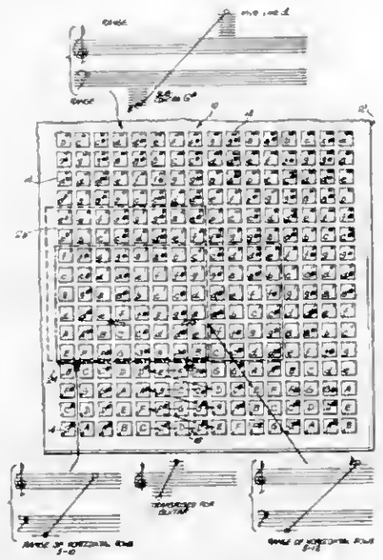
4,031,799
BRIDGE FOR STRINGED INSTRUMENTS
C. Leo Fender, 2851 Rolling Hills Drive Sp. 33, Fullerton, Calif. 92635
Filed Jan. 26, 1976, Ser. No. 652,408
Int. Cl.² G10D *3/04, 3/00*
U.S. Cl. 84—307 **6 Claims**

1. A bridge for a stringed instrument including a body and a neck comprising:
   a base member rigidly connectable to said body of said instrument;
   a plurality of drums;
   means connecting said drums to said base member in end-to-end relationship for independent lateral movement in two orthogonal directions to separately adjust the length of each string and the height of each string relative to said neck;
   a fixed post connected to said base member, adjacent one end of the first one of said drums; and



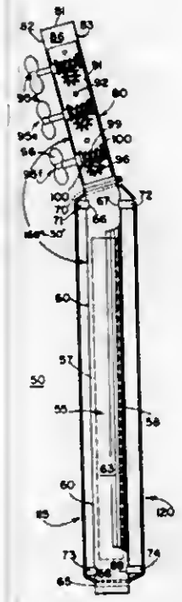
means operatively positioned adjacent said drums for conducting said strings into engagement with said drums connecting means and said drums so as to apply an axial force to each of said drums and to urge all of said drums axially into contact with each other and said first drum into contact with said post.

4,031,800
KEYBOARD FOR A MUSICAL INSTRUMENT
Geary S. Thompson, 700 Schons Place, Wenatchee, Wash. 98801
Filed July 16, 1976, Ser. No. 705,789
Int. Cl.² G10C *3/12*
U.S. Cl. 84—423 **8 Claims**



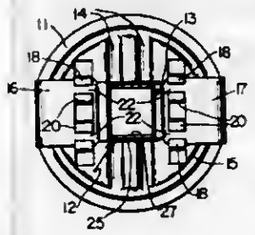
1. A keyboard for a musical instrument of a type which includes means for producing musical tones when the keys are touched, wherein each key of the keyboard represents a particular tone, said keyboard comprising a two-dimensional pattern of at least six horizontal rows of keys and at least six perpendicular vertical rows of keys, wherein the tones represented by the keys are arranged horizontally from left to right in ascending half-steps and are stacked vertically in ascending perfect fourths, and wherein the cener-to-center spacing of the keys, both horizontally and vertically, is no greater than about one inch.

4,031,801
STRINGED MUSICAL INSTRUMENT
Jack Cecchini, 5344 N. Magnolia, Chicago, Ill. 60640
Filed May 17, 1976, Ser. No. 687,145
Int. Cl.² G09B *15/06*
U.S. Cl. 84—465 **10 Claims**



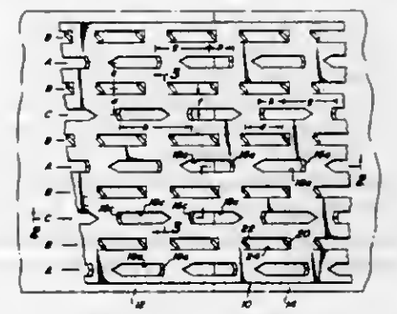
10. A practice device, comprising a longitudinally extending member having dimensions similar to the neck of a stringed instrument, spaced apart frets extending transversely of said member on one surface thereof, means on said member for holding a plurality of longitudinally extending and transversely spaced apart strings over said frets above said one surface and over and above the surface opposed to said one surface, and means for maintaining one set of tensions in strings held by said holding means extending over said one surface and for maintaining another set of tensions in strings held by said holding means extending over said opposed surface, whereby strings held by said holding means extending over said frets and said one surface are useful for practicing fingering of chords and strings held by said holding means and maintained in tension by said tension means extending over said opposed surface are useful for practicing strumming and plucking.

4,031,802
HOLLOW SHEET METAL NAIL
Robert L. Hallock, Boca Raton, Fla., assignor to E. S. Products, New Rochelle, N.Y.
Filed Jun. 12, 1976, Ser. No. 648,211
Int. Cl.² E01B *9/12;* **F16B** *15/04*
U.S. Cl. 85—11 **1 Claim**



1. A one-piece hollow sheet metal nail for attaching a non-woven covering material to a lightweight insulating base material comprising a head, a pair of connecting strips integrally connected to opposite sides of said head and being bent to a position underlying the same, the other ends of said strips being attached to one end of a pair of interfitting generally U-shaped legs, each of said legs including a pair of generally parallel sides connected by a bight portion, the sides of one of said legs being nested within the sides of the other leg and defining a hollow enclosure before being driven, the ends of the sides of one of said legs being bent away from the sides of the other leg adjacent to said head to facilitate the nesting together of said legs, the other end of said legs being of substantially the same dimension as said one end and defining a penetrating portion, the bight portion of at least one of said legs being curved toward the other leg intermediate the ends for deflecting at least one of said legs outwardly when said nail is driven into the base material, the penetrating portion of each of said legs including a cutting edge along said bight portion and an upwardly inclined shearing edge along each of said sides, said upwardly inclined shearing edges being disposed at an angle of at least 20° and not more than 45° from a plane normal to the axis of said legs for cutting a plug from said covering material, a first pair of ears struck downwardly from said head beside each of said connecting strips and bent inwardly toward each other to a position underlying each of said connecting strips, a second pair of ears struck downwardly from said head through openings in each of said connecting strips and bent outwardly away from each other to a position underlying said strips connecting said other ends of said strips to said head, whereby when said nail is driven said cutting and shearing edges sever a plug from said covering material and thereafter said means for deflecting said legs causes said legs to spread apart.

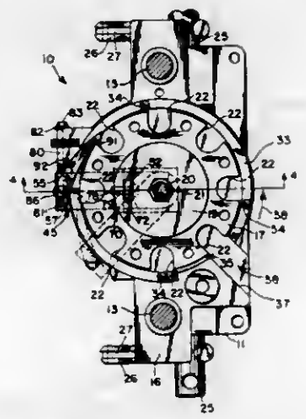
4,031,803
CONNECTOR PLATE
John Calvin Jurelt, Coral Gables, and Benjamin H. Kushner, Miami, both of Fla., assignors to Automated Building Components, Inc., Miami, Fla.
Filed Apr. 30, 1976, Ser. No. 681,839
Int. Cl.² F16B *15/00*
U.S. Cl. 85—13 **2 Claims**



1. A connector plate for joining members in abutting relationship comprising: an elongated plate, a plurality of elongated projecting nail-like teeth struck from said plate thereby leaving a plurality of slots in said plate, said teeth projecting from one side of said plate, said teeth being struck in longitudinally extending generally parallel rows, the teeth in first alternate rows being struck such that the slots left thereby in said plate extend from the teeth in like longitudinal directions, the teeth in second alternate rows being struck such that the slots left thereby in the plate extend from the teeth in opposed direction to said slots formed in said first alternate rows, a row of teeth between each of said first and second alternate rows with the teeth therein being struck to form a plurality of sets of longitudinally spaced pairs of teeth, the teeth in each set being struck such that a continuous slot is left in said plate between said teeth in each set with the portions of the slot left by each tooth of each set extending therefrom toward the opposite tooth of each set, successive teeth in said first alternate rows thereof being spaced longitudinally and relative to said sets of teeth in next adjacent rows such that each successive tooth lies between each successive set of teeth, and successive teeth in said second alternate row thereof being spaced longitudinally and relative to said sets of teeth in next

adjacent rows such that each successive tooth lies between said pairs of teeth forming said set.

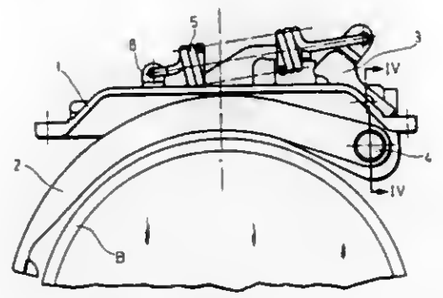
4,031,804
ROTARY SHOT SHELL RELOADER
Richard C. Boschi, Euclid, Ohio, assignor to Pacific Gunsight Company, Grand Island, Nebr.
Filed June 16, 1975, Ser. No. 586,962
Int. Cl.² F42B 33/00
U.S. Cl. 86—23 10 Claims



1. In a shot shell reloader of the type including a base structure, an elevatable carriage supported on the base structure, a positioning mechanism for raising and lowering the carriage relative to the base structure, a plurality of tools supported above the carriage and defining a plurality of operating stations spaced circumferentially about an imaginary circle having a substantially vertical axis, a shotshell support supported by the carriage for rotation about such axis, and a plurality of spaced formations on each support, each of such formations being adapted to receive a separate shot shell and to position such received shot shells simultaneously in different ones of the operating stations, the improvement of a drive mechanism engageable with the shotshell support for rotating the shotshell support to position shot shells received in such support formations sequentially in each of the operating stations, comprising:

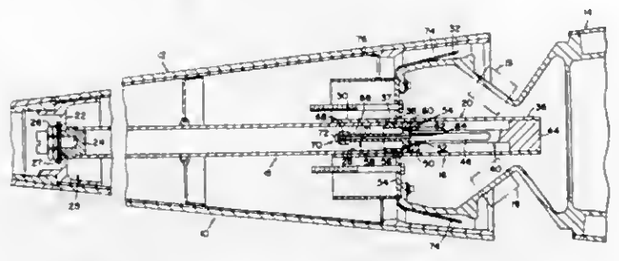
a. first cam means including a curvilinear cam surface;
b. second cam means including a cam follower for engaging said cam surface;
c. an arm supported on the elevatable carriage and being pivotally movable about such axis between first and second positions;
d. one of said cam means being supported on said arm, and the other of said cam means being supported on the base structure;
e. biasing means operably connected to said arm to bias said cam follower and said cam surface relatively toward engagement with each other;
f. said first and second cam means and said biasing means being operable, in response to raising of the carriage by the positioning mechanism to pivot said arm in a forward direction about such axis from said first position to said second position, and in response to lowering of the carriage by the positioning mechanism to pivot said arm in a reverse direction about such axis from said second position to said first position; and
g. pawl means carried by said arm for drivingly engaging the rotatable shotshell support when said arm is pivoted in a selected one of said forward and reverse directions to rotate such support and to move such received shot shells between adjacent operating stations.

4,031,805
APPARATUS FOR EJECTING A TRANSPORT AND LAUNCHING CONTAINER FROM A MISSILE LAUNCHER
Dietmar Puttinger, Munich, and Manfred Fischer, Ottobrunn, both of Germany, assignors to Messerschmitt-Boelkow-Blohm GmbH, Munich, Germany
Filed Nov. 1, 1976, Ser. No. 737,561
Claims priority, application Germany, Nov. 11, 1975, 2550587
Int. Cl.² F41F 5/00
U.S. Cl. 89—1.5 G 6 Claims



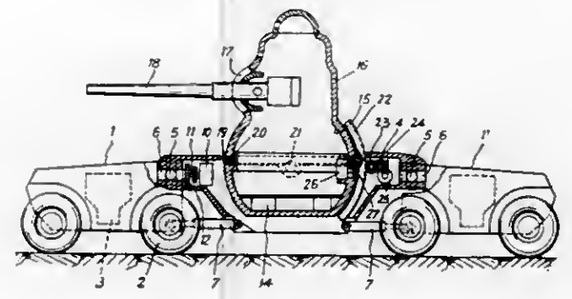
1. In an apparatus for ejecting a missile container from a missile launcher, including a pivoted ejector lever means movable between a first, ready to operate position and a second operated position; the improvement comprising movable anchor means, first spring means coupled between said movable anchor means and said ejector lever means, actuating means comprising means for moving said anchor means to load said first spring means and thereby apply a first torque to said ejector lever means in the direction to move said ejector lever means to said second position thereof for ejecting said container, first catch means coupled to said anchor means for holding said first spring means in a loaded state, second catch means for holding said ejector lever means at said first position thereof, said actuating means further comprising means for releasing said second catch means for movement from said first position to said second position, means responsive to movement of said ejector lever means to said second position for releasing said first catch means, and second spring means coupled to apply a second torque to said ejector lever means in a direction to move said ejector lever means to said first position thereof, said second torque being smaller than said first torque, whereby said second spring means move said ejector lever means to said first position only in response to release of said first catch means.

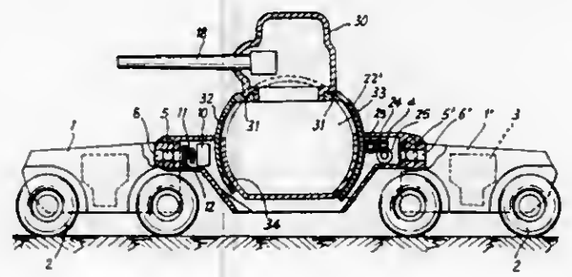
4,031,806
INTERNAL UMBILICAL CONNECTOR FOR MISSILES
Sidney Stark, and Fred T. Sumner, both of Orlando, Fla., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.
Filed Sept. 1, 1976, Ser. No. 719,499
Int. Cl.² F41F 3/04
U.S. Cl. 89—1.811 5 Claims

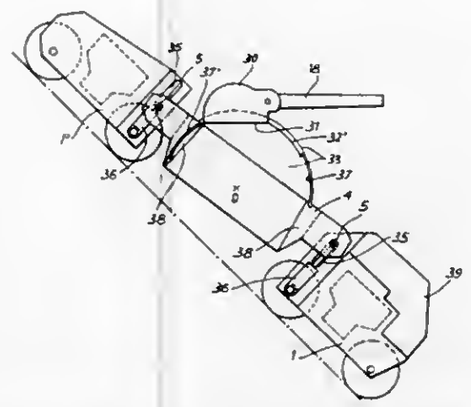


1. A missile having a movable nose cone, a body section, and internal umbilical connectors carried in said body section, means for retention of said nose cone and said body section in spaced relation to give access to said internal umbilical connectors and for controlling the impact velocity of said nose cone and body section during closure thereof responsive to predetermined acceleration forces acting on said nose cone.

4,031,807
ARMOURED ASSAULT CAR
Jean-Jacques Boyer, Montchauvet, France, assignor to Societe Anonyme Secmafer, Buchelay, Mantes, France
Filed Sept. 8, 1975, Ser. No. 611,334
Claims priority, application France, Sept. 20, 1974, 74.31830
Int. Cl.² F41H 7/02
U.S. Cl. 89—36 K 10 Claims

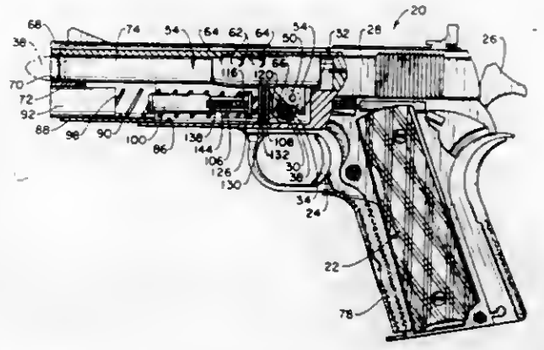






1. An armoured assault car comprising a central chassis articulated at each of its two ends on a bogie chassis by a transverse shaft and a longitudinal shaft, with at least one monitoring device acting between the central chassis and the chassis of one of the bogies for controlling the relative transverse slope of the central chassis relatively to the bogie chassis, in which at least the gun turret of the armoured assault car is mounted on the central chassis whilst being articulated to pivot about an axis which is transverse to the longitudinal axis of the central chassis and fixed relative to the central chassis, with means for monitoring the relative longitudinal slope between the gun turret and the central chassis.

4,031,808
HANDGUN APPARATUS
Clarence A. Raville, P.O. Box 377, Thousand Oaks, Calif. 91360
Division of Ser. No. 343,560, March 21, 1973, Pat. No. 3,901,125. This application Aug. 7, 1975, Ser. No. 602,566
Int. Cl.² F41D 11/06
U.S. Cl. 89—163 6 Claims



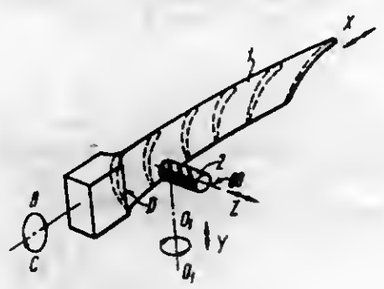
1. In combination with a semi-automatic handgun which has a barrel mounted within a slide, said barrel terminating in a firing chamber at its inner end, a link pivotally connected by a first pivot pin to said barrel at said inner end, said slide mounted for longitudinal movement upon a handgrip housing, said slide being movable between a cartridge firing position and a cartridge ejecting position, with said slide in said cartridge firing position said barrel having a locking lug assembly which cooperates within a locking recess assembly formed within said slide, said link being pivotally connected by a second pivot pin to said handgrip housing, a trigger connected to said handgrip housing, said trigger to be capable of causing firing of a cartridge located within said firing chamber, the improvement comprising:

a protuberance formed upon said link, a means under a constant biasing force being in continuous contact with said protuberance, with said slide in said cartridge firing position the biasing force of said means being transferred through said protuberance so as to apply a torque in respect to said link tending to maintain said locking lug assembly of said barrel into full cooperation with said locking recess assembly formed within said slide, with said slide in said cartridge ejecting position the biasing force of said means being transferred through said protuberance into said link so as to exert a torque about said link tending to maintain said locking lug assembly disassociated from said locking recess assembly.

4,031,809
METHOD OF MACHINING CURVILINEAR SURFACES
Evgenia Isaevna Shralman; Isai Benlaminovich Shralman, both of ulitsa Saltykova-Schedrina, 23, kv. 10; Eduard Iosifovich Tsesevich, Liteiny prospekt, 34, kv. 17; Viktor Leonidovich Dobroslavsky, ulitsa Varshavskaya, 110, kv. 5; Nikolai Ivanovich Ivanov, prospekt Kultury, 15, korpus 2, kv. 64, and Pavel Pavlovich Lebedev, prospekt Morisa Toreza, 80, kv. 99, all of Leningrad, U.S.S.R.
Filed Oct. 10, 1975, Ser. No. 621,616
Claims priority, application U.S.S.R., Oct. 14, 1974, 2079351
Int. Cl.² B23C 3/04
U.S. Cl. 90—11 C 9 Claims

1. A method for machining curvilinear surfaces of workpieces of the type of turbine blades by circular milling comprising: rotating a blank and mill and applying thereto a profile generation displacement with respect to the rotational axis of the blank imparting to the blank and mill a relative displacement along the rotational axis of the blank and the profile generation displacement during rotation of the blank and mill, the direction of said profile generation displacement being at

an angle from substantially 45° to 135° with respect to the rotational axis of the blank, said relative displacement being imparted at an angle substantially smaller than a right angle with respect to the rotational axis of the blank and to the direction of said profile generation displacement; positioning



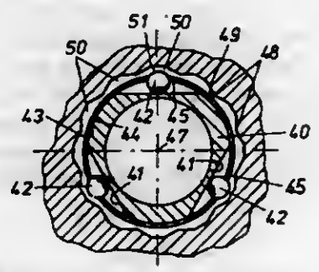
the mill relative to the surface being machined so that an angle between the mill axis and a line normal to each profiled point of the surface is substantially smaller than a right angle; and shaping the curvilinear surface of said blank with the end face of the mill.

4,031,810

ROTATING SPINDLE AND TOOL UNIT

Fritz Nattefort, Leichlingen, Germany, assignor to The Precise Corporation, Racine, Wis.

Filed July 26, 1976, Ser. No. 708,610
Claims priority, application Germany, Oct. 3, 1975, 2544558
Int. Cl.² B23C 5/26
U.S. Cl. 90—11 A 9 Claims



1. In combination:

a spindle rotatable about a longitudinal axis and for use in supporting a tool unit for rotation about said longitudinal axis, said spindle having an end including a cavity therein co-axial with said axis, said cavity including a surface having a plurality of circumferentially spaced recesses; and

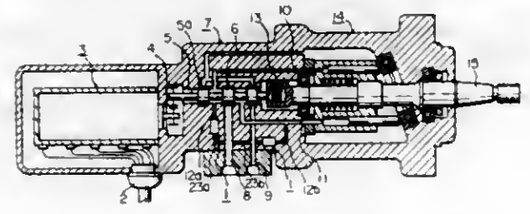
a tool unit for supporting a tool and axially receivable within said cavity for rotation about said longitudinal axis with said spindle, said tool unit including a neck portion having a plurality of radially outwardly projecting balls spaced apart around its circumference, said outwardly projecting balls being radially shiftable and receivable within said recesses when said tool unit is received in said cavity, and for shifting said balls radially outwardly upon initial relative rotational motion between said tool unit and said spindle for preventing further relative rotation of said tool unit and said spindle and providing a rotational driving connection therebetween.

4,031,811

ELECTRO-HYDRAULIC PULSE MOTOR

Seiuemon Inaba; Kanryo Shimizu, both of Kawasaki; Kohei Ito, Fujisawa; Youichi Amemiya, and Gotaro Gamo, both of Tokyo, all of Japan, assignors to Fujitsu Ltd., Japan

Filed Jan. 19, 1972, Ser. No. 219,087
Claims priority, application Japan, Jan. 29, 1971, 46-3337[U]
The portion of the term of this patent subsequent to May 28, 1992, has been disclaimed.
Int. Cl.² F15B 9/10; F01B 3/10
U.S. Cl. 91—39 2 Claims



1. An electro-hydraulic pulse motor comprising

an electric pulse motor,

a rotary pilot valve including a sleeve and a spool, said spool disposed in said sleeve for rotary and slidable movement,

an hydraulic motor having an output shaft,

hydraulic path means including an oil supply path for supplying pressurized oil to said rotary pilot valve, an oil return path for exhausting return oil from said rotary pilot valve,

a pair of hydraulic circuits for leading said pressurized oil from said oil supply path to said hydraulic motor through said rotary pilot valve and for leading said return oil from said hydraulic motor to said oil return path through said rotary pilot valve, the oil pressure in said hydraulic circuits being normally lower than that in said oil supply path,

feedback means coupled between said output shaft and said spool for feeding back an axial displacement of said spool when said displacement is produced by said electric pulse motor by rotation of said output shaft, and

a first and a second safety valve disposed within said sleeve, said first safety valve being connected between a first of said pair of hydraulic circuits and said oil supply path, said second safety valve being connected between a second of said pair of hydraulic circuits and said oil supply path,

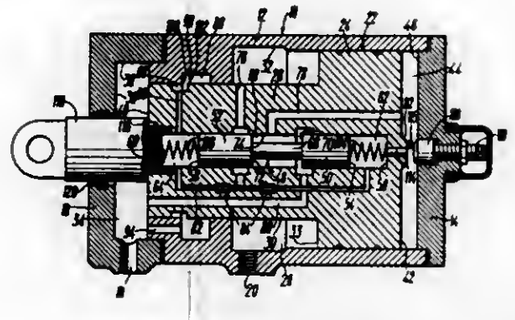
each of said safety valves including a cylinder provided with a cylinder bore having a wall, one end of each said cylinder bore connected to said oil supply path, the other end of each said cylinder bore connected to a respective hydraulic circuit, for each said safety valve an oil-type piston slidably fitted in said cylinder bore and having first and second end surfaces respectively facing said one end and said other end of said cylinder bore whereby said pressurized oil is applied to said first end surface and the normally lower pressure of the oil in a respective hydraulic circuit is applied to said second end surface, a spring disposed in each said cylinder bore for supplying a spring force to said piston first end surface thereby providing a biasing force in addition to the pressure of said pressurized oil for biasing said piston toward said other end of said cylinder bore to a normal initial position, an hydraulic bypass circuit for each cylinder having an inlet and an outlet both formed in said wall of said cylinder bore for fluidly connecting a respective hydraulic circuit to said oil supply path only when said piston is displaced from said initial position by a predetermined rise in the oil pressure in the respective hydraulic circuit.

4,031,812

HYDRAULIC VIBRATOR FOR ACTUATOR DRIVE

Nikolai Vasilievich Koshelev, ulitsa Gagarina, 56, kv. 10, Kulbyshev, U.S.S.R.

Continuation-in-part of Ser. No. 449,281, March 8, 1974, abandoned. This application Apr. 19, 1976, Ser. No. 678,458
Int. Cl.² F01L 21/04; F01B 7/18
U.S. Cl. 91—224 4 Claims



1. A hydraulic vibrator for the drive of actuators in metal-cutting machines, comprising: a casing; a differential piston arranged in said casing and moving reciprocally therein, said differential piston having a first pressure surface and a second pressure surface, the second pressure surface of the piston being larger than the first pressure surface; a spring-balanced slide valve having a plurality of plungers which are arranged coaxially in said differential piston and which move reciprocally therein; said differential piston and said casing being positioned so that they define at least one inlet chamber, one pressurized chamber and one discharge chamber, said inlet chamber being defined at least partially by the first pressure surface of said piston and by said casing, said pressurized chamber being defined by the second pressure surface of said piston and at least partially by said casing, and said discharge chamber being defined at least partially by said casing and by an end of said piston; said spring-balanced slide valve ensuring successive communication of said pressurized chamber with said discharge and inlet chambers; said slide valve defines by its plungers, together with said piston, a plurality of compensating chambers; throttles of constant section providing communication between said inlet chamber and said compensating chambers, said throttles of constant section ensuring a drop in the pressure, as a result of which the pressure in the compensating chambers is less than the pressure in the inlet chamber; and throttles of variable section controlling communication between the compensating chambers and said discharge chamber; whereby said differential piston performs reciprocating displacements smoothly and noiselessly.

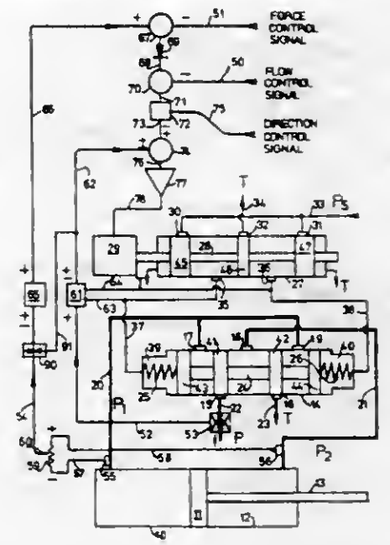
4,031,813

HYDRAULIC ACTUATOR CONTROLS

Ronald Bernard Walters, Wembley; Peter Michael Hamey, Emsworth; John Anthony Gordon Hammond, Guildford, and Thomas Derek Linden, Ashtead, all of England, assignors to Sperry Rand Limited, London, England

Filed Oct. 3, 1974, Ser. No. 511,739
Claims priority, application United Kingdom, Oct. 10, 1973, 47213/73
Int. Cl.² F15B 11/10, 13/043
U.S. Cl. 91—433 25 Claims

1. In combination with hydraulic actuator means, a device for controlling the flow of fluid to said hydraulic actuator means, said device comprising a fluid pressure operated main valve for regulating the fluid flow to the actuator means; via service lines a pilot valve for controlling the main valve, via control lines said pilot valve including electrical operating means; electrical input means for an electrical input signal; flow sensing means for producing an electrical feedback signal dependent on the rate of fluid flow to the actuator means, said flow sensing means including a pivoted movable element displaceable from a closed flow blocking position in accordance with the fluid flow to be sensed and biased into said position by spring means and mechanical/electrical transducer means for converting such displacement into said feedback



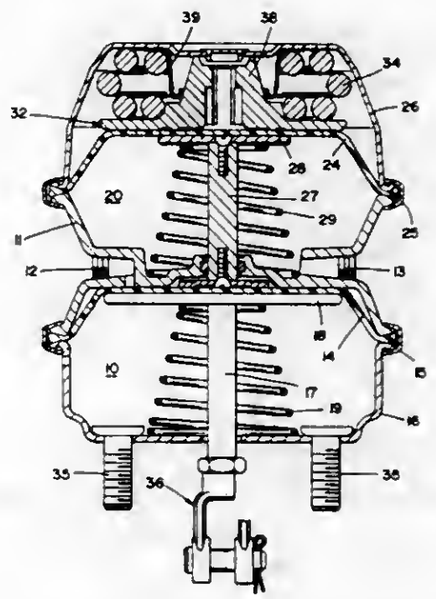
signal; and means for comparing said feedback signal with said input signal to produce an electrical error signal for said electrical operating means to operate said pilot valve in accordance with such comparison.

4,031,814

SELF-CENTERING SPRING ACTUATED AUXILIARY BRAKE MECHANISM

Robert T. Lukens, Plymouth, and Stanley Jaksim, Detroit, both of Mich., assignors to Indian Head Inc., New York, N.Y.

Filed Feb. 2, 1976, Ser. No. 654,033
Int. Cl.² F01B 7/00
U.S. Cl. 92—63 9 Claims



1. A brake actuating mechanism comprising a service brake chamber and a spring actuated auxiliary brake chamber, said spring actuated auxiliary brake chamber comprising:

a. a generally cylindrical cup-like head made of a first metal;

b. an emergency piston made of said first metal received within said head for axial movement therewithin, said piston providing a first flat surface facing the open end of said cup-like head and extending in a plane substantially perpendicular to the axis of said cup-like head and a second surface opposite said first surface providing a boss

of generally circlar cross-section extending along a substantial portion of said axis of said cup-like head and having its minimum external diameter at the free end thereof;

c. a helical compression spring received about said boss and between said second surface of said piston and the bottom of said cup-like head, one end of said helical compression spring bearing on said second surface of said piston and the other end of said helical compression spring bearing on the interior of said bottom of said cup-like head; and

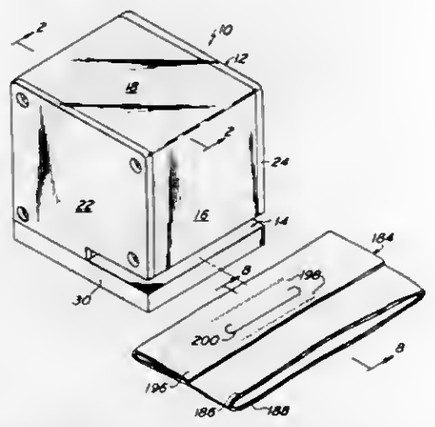
d. a thin-walled guide member made of a metal dissimilar from said first metal having a tubular portion of generally circular cross-section received within said helical compression spring coaxially of said cup-like head, said tubular portion of said guide member having internal dimensions adapted to receive a substantial portion of the length of said boss of said piston, said guide member having one end thereof adapted to abut the interior of said bottom of said cup-like head and extending to an open free end spaced a substantial distance from said bottom of said cup-like member whereby said boss of said piston is received within said guide member when said helical compression spring is compressed, at least one of said cross-section of said boss and said cross-section of said tubular portion of said guide member changing in diameter along the axial length thereof at a greater rate than the cross-section of the other.

4,031,815

HANDLE FORMING APPARATUS

Henry Verbeke, Tannersbrook Road, Chester, N.J. 07930

Filed Apr. 28, 1975, Ser. No. 572,363
Int. Cl.² B31B *1/64*
U.S. Cl. 93—33 H **7 Claims**



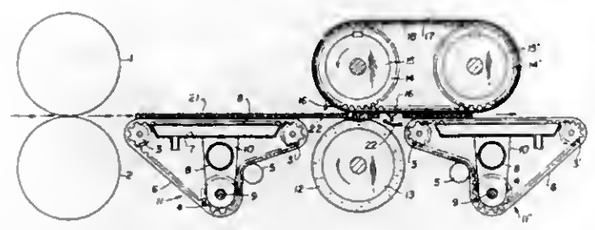
1. An apparatus for forming a handle on a plastic bag comprising a housing, a mouth formed in said housing into which the top of said plastic bag can be inserted, means within said housing for cutting an opening in the top of said plastic bag and heat sealing the walls of said plastic bag together at said cut opening, and means for reciprocating said cutting and heat sealing means, said cutting and heat sealing means comprising a flat wire, with the edge of said wire contacting said plastic bag during reciprocation.

4,031,816

APPARATUS FOR TRIMMING ADHERING SCRAP FROM A PUNCHED CARDBOARD BLANK

Masaharu Matsuo, No. 3-17, 3-Chome, Higashi Komagata, Sumida,Tokyo, Japan

Filed May 19, 1976, Ser. No. 687,687
Claims priority, application Japan, July 14, 1975, 50-85339
Int. Cl.² B26F *3/02*
U.S. Cl. 93—36 A **8 Claims**



1. Apparatus for trimming adhering scrap from a punched cardboard blank comprising:

a. two conveyors having respective driven surface portions defining successive parts of a path of travel for said punched blank and spaced from each other in the direction of said travel;

b. a roller mounted between said conveyors for rotation about an axis and having a resilient surface layer, said path being substantially tangential to said layer;

c. a first pulley separated from said roller by said path;

d. a second pulley offset from said first pulley in said direction along said path, said pulleys being mounted for rotation about respective axes;

e. a carrier trained over said pulleys in a closed loop and bounding said path in a direction transversely away from one of said surface portions;

f. a plurality of ejector members mounted on said carrier projecting therefrom into said path; and

g. drive means operatively connected to said conveyors, said roller, and one of said pulleys for simultaneously moving said surface portions, said surface layer, and said carrier at the same speed in the same direction along said path.

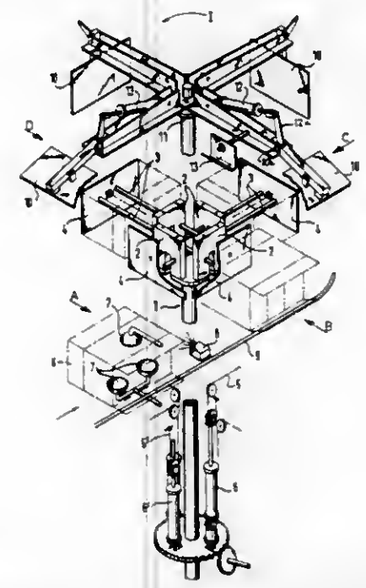
4,031,817

CARTON HANDLING APPARATUS

Josef Raschke, Sommerhausstrasse 11, 8011 Gelting, Germany

Filed July 29, 1975, Ser. No. 600,126
Int. Cl.² B31B *1/32*
U.S. Cl. 93—44.1 R **8 Claims**

1. Apparatus for the unfolding of cartons and closing the flaps of the bottoms or tops thereof, comprising: at least two diametrically opposite holders (4), means for moving said holders continuously together along a circular path, holder control means connected to said two holders comprising at least one control rod common to said holders and means moving said control means towards and away from the axis of said circular path whereby each holder moves alternately into a carton to be folded to fix and carry the carton along said circular path and out of the folded carton while the opposite holder moves synchronously out of and into a carton.

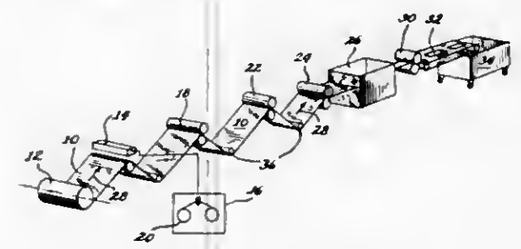


4,031,818

APPARATUS FOR PREPARING SEALED ENVELOPE UNITS WITH MESSAGES

James W. Kehoe, Shelby, Ohio, assignor to GAF Corporation, New York, N.Y.

Division of Ser. No. 515,428, Oct. 16, 1974, abandoned. This application Dec. 4, 1975, Ser. No. 637,694
Int. Cl.² B31B *19/00*
U.S. Cl. 93—63 R **7 Claims**



1. Apparatus for forming pre-printed, cut, and folded message units comprising:

means for receiving and holding a single roll of paper adapted to supply to said apparatus a single-thickness paper web having a grain running parallel to the longitudinal axis of said web;

friction roller advancing means, adapted to advance said single-thickness web off of a roll of paper held by said receiving and holding means;

means for continuously printing predetermined messages on said single web by forming characters of said messages in a direction parallel to the longitudinal axis of said paper web as said web is continuously advanced in a longitudinal direction;

means connected to said printing means for directing said printing means to print individual and different subject matter along various segments of said web as the web is moved through said continuous printing means;

means for applying adhesive to said single web in predetermined locations as said web is advanced;

means for folding said web into a desired message unit configuration, said folding means being positioned to receive said web after the web has passed through said continuous printing means and said adhesive applying means; and

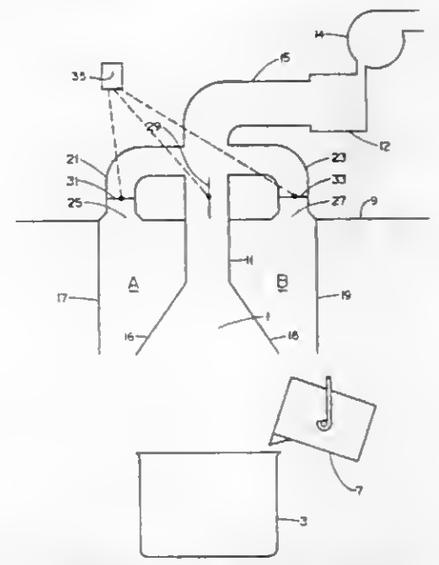
means for cutting said web into individual segments to form individual message units.

4,031,819

APPARATUS FOR COLLECTING AND CONVEYING OF FUMES FROM A FURNACE

Grant D. Applewhite, Louisville, Ky., assignor to Americao Air Filter Company, Inc., Louisville, Ky.

Filed Jan. 7, 1976, Ser. No. 647,059
Int. Cl.² F23J *11/00*
U.S. Cl. 98—115 R **6 Claims**



1. In combination with a furnace having an opening therein, an apparatus for the collecting and conveying of fumes from said furnace comprising: a fume hood spaced from and disposed in communication with the opening in a furnace; a housing spaced from said fume hood, the spacing between said housing and said fume hood defining a fume collecting reservoir; and, exhaust means in flow communication with said fume hood and said fume collecting reservoir with flow control means therein to selectively control the flow of fumes from said fume hood and said fume collecting reservoir, said flow control means including first damper means controlling flow through said fume collecting reservoir; and second damper means controlling flow through said fume hood and, means for moving said first damper means to one position while moving said second damper means to an opposed position whereby said positions determined whether said fume hood is in flow communication with said exhaust means or said fume collecting reservoir is in flow communication with said exhaust means.

4,031,820

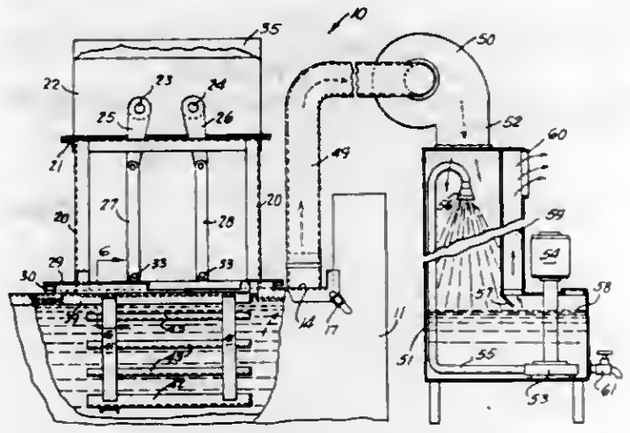
AUTOMATIC LIFTING AND LOWERING MECHANISM FOR DEEP FRYERS

Buckley R. Reed, Jeffersontown, Ky., assignor to Reed & Associates, Inc., Jeffersontown, Ky.

Filed Feb. 13, 1976, Ser. No. 657,846
Int. Cl.² A47J *37/12*
U.S. Cl. 99—336 **6 Claims**

1. An automatic lifting and lowering mechanism for attachment to deep fryers of the type having an open top comprising a detachable cover for the open top of the deep fryer, a generally rectangular central opening formed in said cover, a generally rectangular horizontal frame arranged in upwardly spaced relation to said opening in said cover, a plurality of legs extending upwardly from said cover supporting said frame, a movable cover for closing the opening in said first named cover, a food support suspended below said movable cover, means on said frame for raising and lowering said movable cover and the food support suspended therebeneath vertically

to simultaneously immerse food on said food support in said deep fryer and covering the opening in said first named cover,



and means for automatically raising said movable cover and said food support at the expiration of a predetermined time.

4,031,821

FOOD PROCESSING MACHINERY

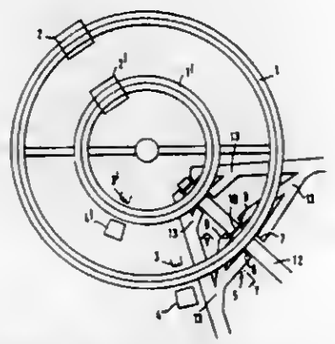
Peter William Loose, and Martyn Ridley Tamkin, both of Chelmsford, England, assignors to Gardenia Limited, St. Peter's Port, Guernsey, Guernsey (Channel Is.)

Filed Apr. 21, 1976, Ser. No. 678,801

Claims priority, application United Kingdom, Apr. 29, 1975, 17819/75

Int. Cl.² A23N *15/02*

U.S. Cl. 99—643 **10 Claims**



1. In a machine for cutting off the heads of carrots which comprises a cutting station, a conveyor for carrying carrots with random head first or tail first orientation to the cutting station and apparatus operative to sense the orientation of each carrot for controlling the cutting station such as to remove the head of the carrot, the improvement wherein said apparatus operative to sense the direction of orientation of each carrot comprises light sensitive means, a light source for projecting an image of the object on the light sensitive means, means for detecting the leading and trailing edge of each carrot, a circuit connected to the light sensitive means for producing an electrical output signal representative of the proportion of the area of the light sensitive means occupied by the image of the object and means for determining the sense of variation in said electrical output signal as the object is moved past the light sensitive means by the conveyor.

4,031,822

PRINTING PRESS

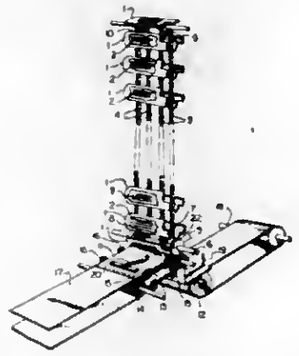
Roy P. Wilson, 84 Cambridge St. North, Lindsay, Ontario, Canada

Filed Mar. 29, 1976, Ser. No. 671,133

Claims priority, application Canada, May 20, 1975, 227318

Int. Cl.² B41L *45/08*

U.S. Cl. 101—53 **5 Claims**



1. A printing press comprising:

a. a multiplicity of drum segments, having similar radii or curvature, for carrying printing type on their convex surfaces,

b. a pressure wheel comprised of two spaced coaxial cylindrical portions, each having a similar radius of curvature as each of the drum segments, at least one cylindrical portion containing a slot which accommodates a sequential count changing and printing apparatus, each of the drum segments containing a gap to accommodate the protrusion of type from said count changing and printing apparatus,

c. a pressure plate located adjacent the pressure wheel,

d. a pair of spaced sprocket wheels having a smaller diameter than the diameter of said pressure wheel portions mounted with their axes coaxial with the axis of the pressure wheel between the cylindrical portions,

e. a pair of chains disposed orthogonal and around the respective sprocket wheels, each having sprocket holes integrated with the respective sprocket wheels, the width across the outside of the chains through a diameter of the sprocket wheels being less than the diameter of the pressure wheel,

f. means mounting the drum segments to both chains, the axes of the drum segments being parallel to the pressure wheel axis, whereby, upon rotation of the sprocket wheels, the chains are progressively drawn around the axis of the pressure wheel in unison, and the drum segments are sequentially drawn around and bear upon part of the pressure wheel between the pressure wheel and the pressure plate to imprint stock passing therethrough, while the sequential count changing and printing apparatus simultaneously imprints and further indexes.

4,031,823

SCREEN PRINTER WITH ADJUSTABLE SCREEN SUPPORT AND MAGNETIC SQUEEGEE MEANS

George S. McGee, 2311 E. 28th St., Chattanooga, Tenn. 37407

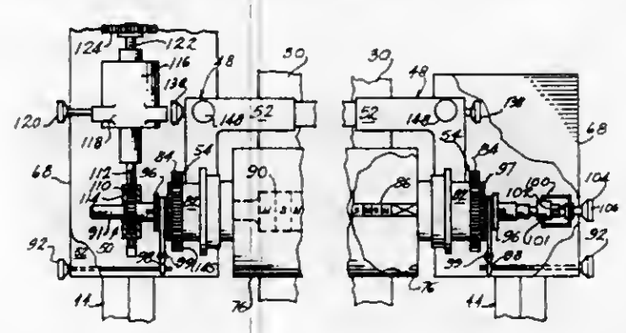
Continuation of Ser. No. 391,980, Aug. 27, 1973, abandoned. This application May 23, 1975, Ser. No. 580,408

Int. Cl.³ B41F *15/44*, *15/38*

U.S. Cl. 101—120 **14 Claims**

1. In a variable pressure device for applying pressure to a continuously moving material: an elongated magnetic roller having both North and South magnetic poles along the length thereof, an elongated magnetic member extending coextensively with said elongated magnetic roller and having both North and South magnetic poles along the length thereof, said North and South poles on the magnetic roller being located in opposed relation with the North and South magnetic poles on the magnetic member and within sufficient distance whereby the magnetic forces on the magnetic roller are affected by the magnetic forces on the magnetic member, said magnetic roller and said magnetic member being selectively relatively movable coextensively along respective longitudinal axes so as to vary magnetic attraction therebetween by selectively placing opposite magnetic poles in closer alignment to increase pressure between said magnetic roller and said magnetic member or to decrease the pressure between said magnetic roller and said magnetic member by placing like magnetic poles in closer alignment, whereby the pressure between said magnetic roller and said magnetic member may be selectively varied by means of relative motion therebetween.

8. A multi-head rotary screen printer for printing on continuously conveyed material a succession of repeated lengths of a composite pattern created by the total of a succession of lengths of individual pattern repeats printed in succession on the material as it advances from one pattern repeat to the next until the composite pattern is achieved and wherein the length of the composite pattern can be changed by changing the distance between the pattern repeats:



an elongated frame having conveyor means thereon for conveying a continuous length of material to receive the composite pattern printed thereon, opposed sides on the top of the elongate frame each comprising an elongated head support on each side of said frame, a plurality of printer head assemblies each having two ends and having screen printing means thereon for screen printing each of said pattern repeats and;

means for changing the length of said composite pattern comprising means for adjustably mounting each of said ends of said assemblies on the respective head support, means for selectively locking each of said printer head assemblies in selected positions on said head supports and means for selectively driving said screen printing means in each of said selected positions, whereby each of said printer head assemblies may be repositioned with respect to the other printer head assemblies longitudinally of the frame either in the direction of or opposite to the direction of movement of the material to adjust the distance between head assemblies and thereby change the composite pattern.

4,031,824

SHEET FEED AND TAKEOFF ASSEMBLY FOR PRINTERS

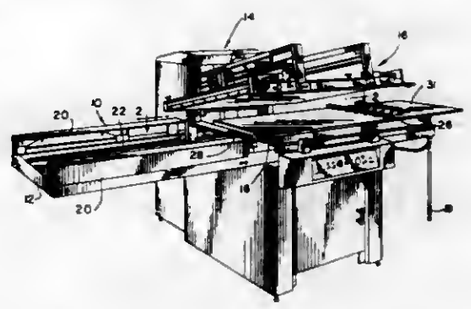
Henry J. Bubley, Deerfield, and John R. Krutsch, Glenview, both of Ill., assignors to American Screen Printing Equipment Company, Chicago, Ill.

Filed Nov. 3, 1975, Ser. No. 628,151

Int. Cl.² B41F *15/20*, *15/22*

U.S. Cl. 101—126 **5 Claims**

1. A feed and take off assembly particularly for use in conjunction with a printing press to automatically transfer sheet stock, from a first position, where said stock may be registered, through a second position under a printing head, where said stock may be printed on, and to a third position, including a frame, a first gripper means for contacting and feeding a single sheet of stock from said first position to said second position while maintaining registration of said sheet of stock, second gripper means for removing and delivering said single sheet of stock from said second position to said third position, said first gripper means and said second gripper means being mounted near opposite ends of a transfer carriage, said transfer carriage having a plurality of rollers mounted thereon which engage said frame to facilitate movement of said transfer carriage therealong, said transfer carriage maintaining said first gripper means and said second gripper means in fixed spaced relationship relative to one another during movement, a motor means for driving said transfer carriage, said transfer carriage being driven by a drive crank assembly having one end thereof connected to said motor means and an opposite end thereof connected to said transfer carriage, said drive crank assembly having means for translating angular motion



produced by said motor means into linear motion of said transfer carriage bearing said first gripper means and said second gripper means, said motor means being in communication with a control means to determine the rate of movement of said transfer carriage relative to said frame, said control means including circuit selecting cams rotatable about a central axis by said motor means, and circuit controlling switches engaged and activated by said circuit selecting cams to select, at a desired time, a predetermined circuit controlling the speed of the motor means to thereby vary the rate of movement of said transfer carriage relative to said frame thereby providing a single, reliable, unitarily moveable unit for feeding and delivering stock during a printing operation.

4,031,825

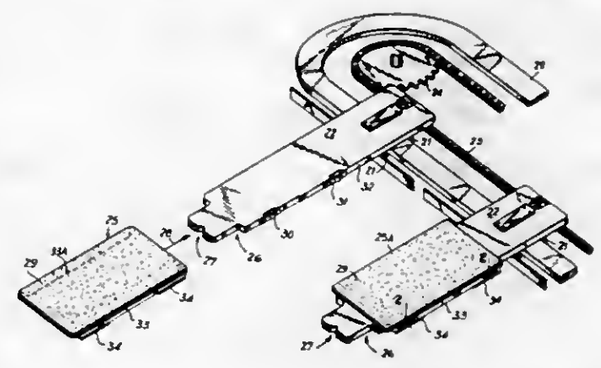
PALLET MOUNTING APPARATUS FOR SCREEN PRINTING MACHINES

David Jaffa, Fairlawn, N.J., assignor to Precision Screen Machines Inc., Hawthorne, N.J.

Filed Feb. 13, 1976, Ser. No. 657,872

Int. Cl.³ B41F *15/26*

U.S. Cl. 101—126 **10 Claims**



1. A pallet locating apparatus comprising a pallet supporting plate,

said pallet support plate being affixed to the indexing mechanism of a screen printing machine,

means for supporting said pallet on said pallet support plate,

said pallet supporting plate having a first marginal edge extending outwardly from said indexing mechanism,

detenting means for releasably engaging said pallet with respect to said pallet supporting plate,

said pallet including a first longitudinally extending side rail, and

locating means for positioning said first side rail in touching engagement with said first marginal edge of said pallet supporting plate.

4,031,826

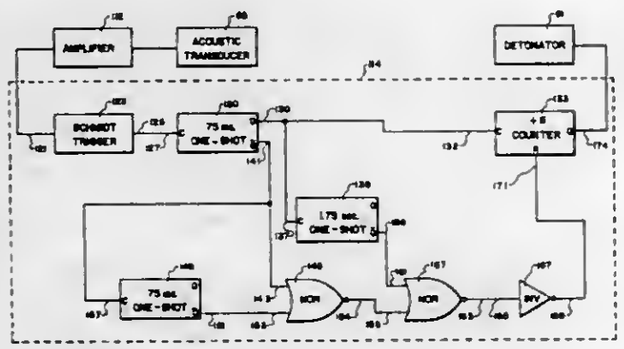
DETONATION SYSTEM AND METHOD

Frank S. Gemmell, and Mark A. Fried, both of Scottsdale, Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Division of Ser. No. 512,651, Oct. 7, 1974, Pat. No. 3,971,317. This application Dec. 22, 1975, Ser. No. 642,879

Int. Cl.² E21B *43/26*

U.S. Cl. 102—20 **9 Claims**



1. A trigger system for actuating a detonator situated at a remote position, comprising:

conduit means being capable of providing acoustic wave propagation;

transmitting means for sending a predetermined coded acoustic wave signal through said conduit means; said transmitter means further comprising:

encoding means for modulating said transmitter means with a predetermined aperiodic coded electrical signal;

transducer means for converting said predetermined aperiodic coded electrical signal into said aperiodic coded acoustic wave signal for propagation through said conduit means;

receiving means including means for converting said aperiodic coded acoustic wave signal into an output electrical signal; and

output means responsive to the output electrical signal for triggering the detonator.

4,031,827

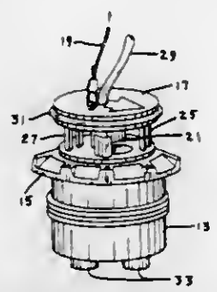
POP-UP COVER FOR SLIPSTREAM GENERATOR

David M. Collier, Santa Barbara, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 4, 1976, Ser. No. 663,639

Int. Cl.² F42C *19/06*

U.S. Cl. 102—70.2 G **3 Claims**



1. In an air-flow operated electric bomb charging device for attachment to a bomb having a bomb fuze and including a main housing with a closure and installation ring attached to the upper part thereof carried on the bomb for generating electrical energy to energize the bomb fuze, the improvement comprising a pop-up cover slidably positioned over said installation ring, a lanyard operating to lift said pop-up cover when pulled, an air scoop positioned under said cover for exposure to air-flow when said cover is lifted upward, a bracket positioned between said cover and said air scoop for upward movement when said lanyard is pulled, said bracket including front and rear guide members, said rear guide member including a switch actuator portion as an integral part thereof, and switching means positioned within the main housing of said charging device for connecting a signal carried by a coaxial cable from a remote position to the bomb fuze in response to specific environmental conditions.

4,031,828

PRESSURIZED CHAFF CANISTER

Laverne J. Larson, Boxfod, Mass., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jan. 28, 1976, Ser. No. 653,056

Int. Cl.² F42B *13/42*

U.S. Cl. 102—89 R **5 Claims**

1. A self pressurized chaff canister comprising: a housing; lining means witin the housing; case means having open ends movably positioned within the lining means; first and second end cap means adapted to cover the ends of said case means, and electric squib means for generating a gas to fill said case means and move said case within the housing.

4,031,829

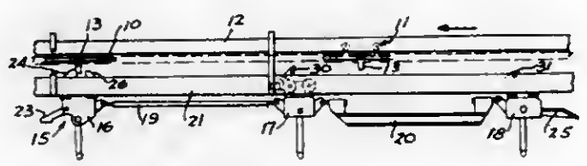
CONVEYOR SYSTEM

Edward L. Bell, St. Clair Shores, and Ivan L. Ross, Birmingham, both of Mich., assignors to American Chain & Cable Company, Inc., Bridgeport, Conn.

Filed June 2, 1975, Ser. No. 582,844

Int. Cl.² B61B *12/02*; B61J *3/00*

U.S. Cl. 104—172 S **5 Claims**



1. A carrier comprising

a plurality of trolleys adapted to move along a track,

means pivotally interconnecting said trolleys,

a first pusher dog mounted on a foremost trolley,

a second dog mounted on a succeeding trolley and movable to and from operative position for engagement by a pusher of a conveyor,

a third dog mounted on a further succeeding trolley and movable to and from operative position for engagement by a pusher of a conveyor,

and a projection on each of said second and third pusher dogs adapted to be engaged by portions of a track to hold said second and third dogs in inoperative position,

the projection on said second pusher dog extending from one side only of said second pusher dog and the projection on said third pusher dog extending from the opposite side only of said third pusher dog such that one of said second and third pusher dogs can be permitted to move upwardly into operative position without permitting the other of said second and third pusher dogs to move upwardly.

4,031,830

SAFETY CLAMPING DEVICE FOR PULL-CABLE IN AERIAL CABLEWAY ARRANGEMENT

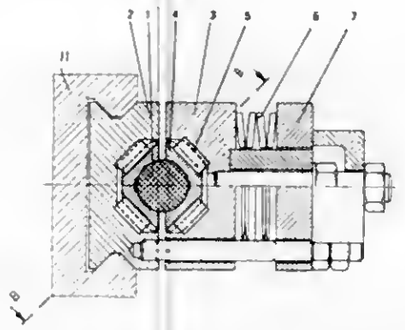
Peter Klaus Hirt, Farchant, and Kurt Switzeny, Cologne, both of Germany, assignors to Pohlig-Heckel-Bleichert Vereinigte Maschinenfabriken Aktiengesellschaft, Cologne-Zollstock, Germany

Filed Jan. 27, 1976, Ser. No. 652,759

Claims priority, application Germany, June 14, 1975, 2526745

Int. Cl.² B61B *12/12*

U.S. Cl. 104—223 **6 Claims**



1. A safety clamping device for a pull-cable in an aerial cableway by which overload protection may be provided between a pull-cable and a trolley of a cableway cabin, said clamping device comprisimg a first cable-clamping jaw and a second cable-clamping jaw, cable-clamping cups disposed between said cable-clamping jaw, a pull-cable extending between said cable clamping jaws and bilaterally embraced thereby, at least one spring storage means urging said cable clamping jaws toward each other, and a number of synthetic-resin strips extending between said cable-clamping cups and said cable-clamping jaws along the circumference and the length of said clamping device, a pressure plate abutting against one end of said spring storage means with said spring storage means operating against said pressure plate in the case of normal operation of said clamping device to provide a frictional coupling between the trolley and the pull-cable and to store energy, while on the other hand, in the case of pull-cable breakage to allow said synthetic-resin strips to be dropped and said pull-cable to be released and said spring storage means to be detensioned to effect reaction pressure developed and stored by said spring means and transmitted to said cable-clamping jaws.

4,031,831

TABLE FURNITURE

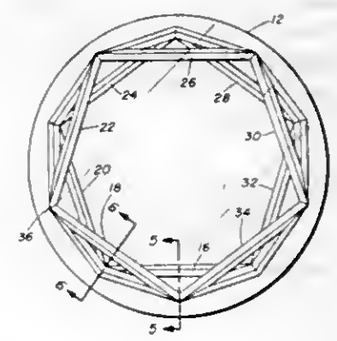
Pauline Dortch Davis, 42 Redwood Road, Severna Park, Md. 21146

Filed Aug. 27, 1975, Ser. No. 608,064

Int. Cl.² A47B *3/06*

U.S. Cl. 108—159 **7 Claims**

1. As an article of manufacture, a furniture structure comprising a base for supporting a horizontally disposed member in spaced relation to a floor, said base consisting only a plurality of triangles of identical size and shape, said triangles alternately extending upwardly and downwardly and being alternately inclined inwardly and outwardly with the locus of the points of said triangles lying on a circle, said triangles having a plurality of sides extending towards and supporting said horizontally disposed member.



4,031,832

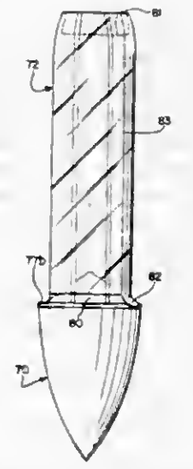
PLANTING SYSTEM

Bryant Edwards, Clarendon Hills, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Continuation-in-part of Ser. No. 538,295, Jan. 2, 1975, abandoned, and a continuation-in-part of Ser. No. 587,561, June 20, 1975, abandoned, and a continuation-in-part of Ser. No. 611,111, Sept. 8, 1975, abandoned. This application Mar. 26, 1976, Ser. No. 670,918

Int. Cl.² A01C *11/02*; A01G *9/10*

U.S. Cl. 111—4 **45 Claims**



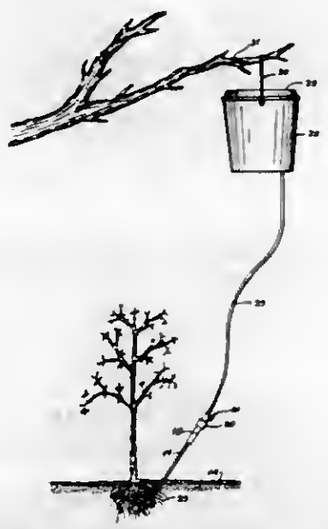
1. A planting method for a plurality of plants such as trees comprising the steps of: providing a plurality of containers each of which comprises a seedling cartridge having a base section with a horizontally extending shoulder and with spaced-apart elongated members extending upwardly from said base and with a thin plastics film disposed about said elongated members, placing a growing medium and plant seed in each of said plurality of containers and growing said plants to a seedling stage therein, thereafter transporting said plurality of seedling cartridges to an open ground planting site, removing the film from one of said seedling cartridges and inserting said seedling cartridge in a planting tool having a tubular section capable of accepting said seedling cartridge with the elongated members longitudinally therein and with the end of said tubular section abutting the upper side of said shoulder and about said base section, pushing said tubular section into the ground until said elongated members are within the ground, and withdrawing said tubular section to leave said seedling cartridge with said seedling growing therein in the ground, and thereafter repeating the foregoing steps from the step of removing the film from one of said seedling cartridges.

4,031,833

INJECTION IRRIGATING PROCESS AND APPARATUS

Cultlahuac Ibanez, Mexico D.F., Mexico, assignor to Tecnicas de Riego y Abono, S.A., Mexico City, Mexico

Filed Sept. 25, 1975, Ser. No. 616,694
Claims priority, application Mexico, Mar. 12, 1975, 157111
Int. Cl.² A01C 23/02
U.S. Cl. 111—7.1 4 Claims



1. An apparatus for injecting liquid into cultivated ground, comprising a container for containing liquid to be injected, said container being supported a short distance above the ground, a flexible tube having first and second ends of which the first is connected to the container for drawing off liquid therefrom, and a unitary rigid tube having first and second ends and having at its first end a pointed head member of larger external diameter than the rigid tube to facilitate insertion of the rigid tube into the ground and also having near the pointed head member a plurality of perforations to enable liquid in the interior of the rigid tube to enter the ground in the region of the pointed head member when the rigid tube is inserted in the ground, and the apparatus also comprising a connection member threadedly securing the second end of the flexible tube to the second end of the rigid tube and being removable from the rigid tube to afford access to the interior thereof, a bag having a rigid perforated cap and a pervious wall and containing fertilizer or conditioner and being adapted to be inserted in the interior of the rigid tube when the connecting member is removed therefrom and to be retained in the rigid tube with the perforated cap under the connecting member when the connecting member is replaced, and regulating means to control flow of liquid from the container to the interior of the rigid tube by way of the flexible tube and the connection member.

4,031,834

GRAIN DRILL WITH DISK BIASING MEANS

Richard J. Klenke, Spearville, Kans., assignor to American Products, Inc., Spearville, Kans.

Filed Sept. 8, 1975, Ser. No. 611,022
Int. Cl.² F23B 1/00
U.S. Cl. 111—85 1 Claim

1. In a grain drill having a frame with a seed hopper mounted thereon, a seed tube suspended from the bottom of the hopper for feeding seed from the hopper into the ground surface, gauge wheels rotatably mounted on the front of the drill frame, press wheels rotatably mounted on the rear of the drill frame, and an elongated horizontally mounted frame bar, attached to the frame, the frame bar positioned transverse to the direction of the movement of the grain drill, the improvement comprising:

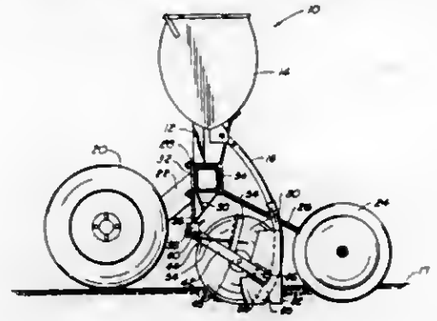
a disk bracket attached to and suspended downwardly from the frame bar;

a disk arm having a first end portion, a second end portion and a center portion, the first end portion of said disk arm pivotally mounted to said disk bracket;

a disk rotatably mounted to the center of said disk arm;

a disk boot attached to the second end portion of said disk arm, said boot having a side portion disposed against the side of said disk, the seed tube disposed between said disk and said disk boot; and

biasing means attached to said disk arm for urging said disk into the ground surface; said biasing means is a coil spring; said coil spring including a first end portion, a second end portion, and a coiled center portion, the first end portion and the coiled center portion mounted on said disk bracket, said improved grain drill further including an adjustable spring tension arm integrally attached to said disk arm, said tension arm receiving the second end portion of said coil spring thereon for adjusting the tension on said disk arm and urging said disk into the ground surface; said disk bracket including



a first end portion bolted to the frame bar, and a second end portion having a U-shaped arm with an arm shaft mounted therebetween, said first end portion of said disk arm having a bushing pivotally mounted on said arm shaft of said disk bracket; the coiled center portion of said coil spring is received around a first end portion of said bushing, the first end portion of said coil spring held against the U-shaped arm of said disk bracket; said improved grain drill further including a second coil spring having a first end portion, a second end portion, and a coiled center portion, the coiled center portion of said second coil spring received around a second end portion of said bushing, the first end portion of said second spring held against the U-shaped arm of said disk bracket, the second end portion of said second coil spring disposed against said adjustable spring tension arm thereby applying additional tension to said disk arm and urging said disk into the ground surface.

4,031,835

DEVICE FOR CLAMPING THE WORKPIECE IN A SEWING MACHINE

Andrew John Gilbride, Swampscott, and John Frederick Martin, South Essex, both of Mass., assignors to USM Corporation, Boston, Mass.

Filed May 7, 1976, Ser. No. 684,161
Int. Cl.² D05B 3/00
U.S. Cl. 112—76 14 Claims

1. In a bar tacker sewing machine having means to secure the workpiece for movement through a predetermined pattern under the stitching instruments of the sewing machine, a workpiece clamp comprising:

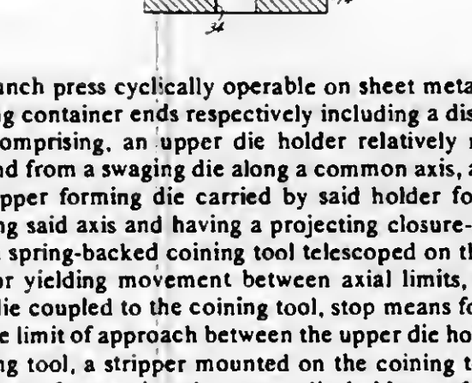
A. a lower clamping element operatively connected to the sewing machine for movement through the predetermined pattern;

B. a support arm fixed to the lower clamping element and extending under the stitching instruments of the sewing machine;

C. an upper clamping element mounted on the support arm for movement into and out of clamping engagement with the lower clamping element;

D. biasing means resiliently forcing the upper clamping element into clamping engagement with the lower clamping element;

E. remotely actuatable means mounted on the support arm and operatively connected to the upper clamping element



to cause movement thereof against the biasing means to release the workpiece; and,

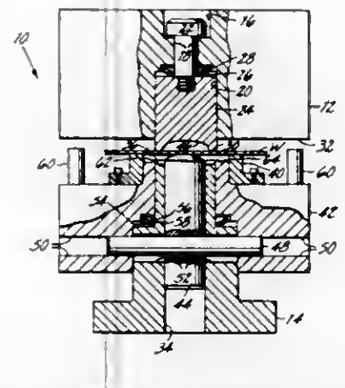
F. electrically operated control means to cause actuation of the workpiece release means.

4,031,836

MACHINE FOR MAKING CAN ENDS HAVING RUPTURABLE CLOSURES

Frederick Gerard Joseph Grise, 87 Main St., Osterville, Mass. 02655, and Walter Carl Lovell, 348 Mountain Road, Wilbraham, Mass. 01095

Filed Apr. 16, 1976, Ser. No. 677,798
Int. Cl.² B21D 51/44
U.S. Cl. 113—1 F 8 Claims



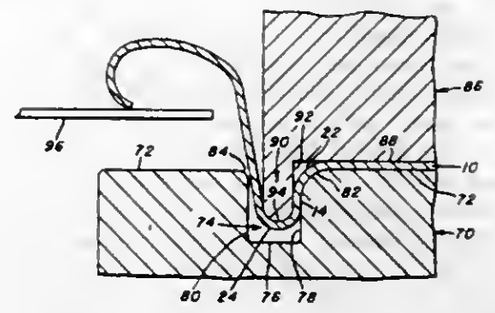
1. A punch press cyclically operable on sheet metal blanks for making container ends respectively including a disruptible closure comprising, an upper die holder relatively movable toward and from a swaging die along a common axis, a spring-backed upper forming die carried by said holder for movement along said axis and having a projecting closure-defining surface, a spring-backed coining tool telescoped on the swaging die for yielding movement between axial limits, a lower forming die coupled to the coining tool, stop means for determining the limit of approach between the upper die holder and the coining tool, a stripper mounted on the coining tool, and power means for causing the upper die holder to force the upper forming die against a blank on the stripper and into cooperative relation with the lower forming die whereby the periphery of the end closure is formed and, as the limit of approach is about to be determined by said stop means, to cause the coining tool to produce a line of weakening along at least a portion of said formed periphery, the springbacking of the upper forming die providing a greater resistance to unit load than the spring-backing of the coining tool so that bottoming of the upper forming die permits the loaded swaging die to cooperate with said projecting surface to radially dilate the closure periphery adjacent to said line of weakening, and thereafter relative retraction of the upper die holder in the operating cycle permits the still loaded coining tool to be de-energized and cooperate with said closure-defining surface of the upper forming die to tend to lock said dilated periphery to the remainder of the blank.

4,031,837

METHOD OF REFORMING A CAN END

Charles L. Jordan, Upper Burrell Township, Westmoreland County, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed May 21, 1976, Ser. No. 688,583
Int. Cl.² B21D 51/44
U.S. Cl. 113—121 C 10 Claims



1. A method for reforming a metallic can end to increase the can end's buckle resistance, comprising the steps of:

providing a sheet metal can end having a substantially planar center wall, an annular groove around said center wall bounded on the inside by an integral inner wall and on the outside by an integral chuckwall, a first curved portion between said center wall and said inner wall, a second curved portion at the bottom of said annular groove between said inner wall and said chuckwall, a peripheral flange extending radially outwardly from said chuckwall for securement of said can end to a container, and exterior and interior surfaces with respect to the exterior and interior of a container when said can end is secured thereon;

supporting said center wall of said can end against the interior surface thereof; and

reforming said can end by moving a drawing means into said groove and against the exterior surface of the second curved portion, while supporting the interior surface of the center wall to deepen said annular groove with respect to said center wall and reduce the radius of curvature of said second curved portion.

4,031,838

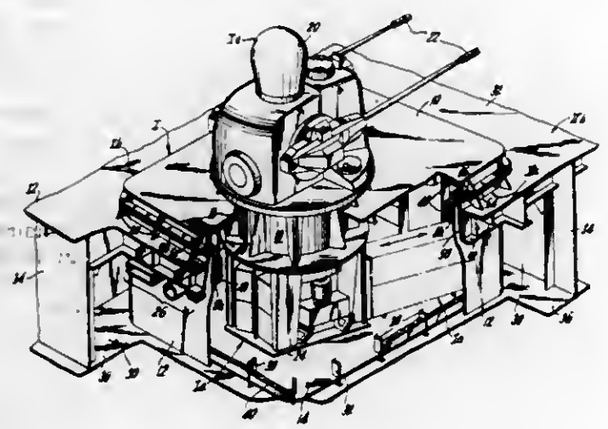
MODULAR INTERCHANGEABLE WEAPONS SUB-ASSEMBLY SYSTEM FOR WARSHIPS

Willy Schmidt, Ellerbek, Kr Pinneberg, and Karl-Otto Sadler, Hamburg, both of Germany, assignors to Blohm & Voss AG, Hamburg, Germany

Continuation-in-part of Ser. No. 521,083, Nov. 5, 1974, abandoned, which is a continuation of Ser. No. 399,245, Sept. 20, 1973, abandoned, which is a continuation of Ser. No. 198,510, Nov. 15, 1971, abandoned. This application Dec. 24, 1975, Ser. No. 644,316
Claims priority, application Germany, Nov. 14, 1970, 2056069
Int. Cl.² B63G 1/00
U.S. Cl. 114—1 7 Claims

1. A containerized modular assembly particularly for interchangeable mounting of operational units on warships by remote prefabrication of said operational units into operational unit sub-assemblies capable of interchangeable mounting upon said warship by standardized uniformly configured mating means, said assembly comprising: an operational unit; container means having said operational unit mounted therein in a manner to enable functioning interconnection of said

operational unit with said warship when mounted thereon; said operational unit and said container means being structurally combined as a unitary prefabricated modular operational unit sub-assembly; means defining on said warship a compartment adapted to receive therein said modular operational unit sub-assembly; adapter means including portions thereof defining adapter mating means formed of a standardized predetermined size and configuration, said adapter means being structurally formed as a part of said warship to define an opening for said compartment; container mating means formed from parts of said container means with a standardized predetermind size and configuration complementary to the size and configuration of said adapter mating means; said adapter mating means and said container mating means being in mounting engagement with each other to operatively mount said operational unit sub-assembly upon said warship within said compartment; adjustment means interposed between said adapter means and said container means for enabling adjustment of the attitude and orientation of said operational unit relative to said warship after said modular sub-assembly has been introduced into said compartment and movably arranged in mounting position by engagement between said adapter mating means and said container mating means; resilient sealing means extending in sealing engagement completely around said container means between said adapter mating



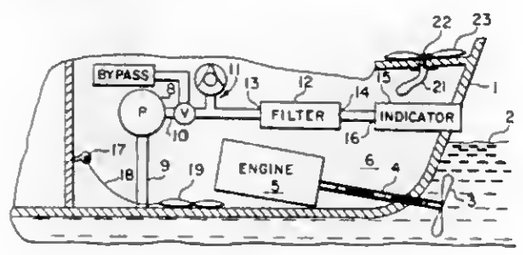
means and said container mating means to form a fluid-tight seal therebetween; and means for enabling application of said sealing means to effect said fluid-tight seal after said operational unit sub-assembly has had its attitude and orientation relative to said warship adjusted by operation of said adjustment means; said assembly further including means for enabling separation of said sealing means from between said adapter means and said container mating means to permit dismounting of said operational unit sub-assembly from said warship and mounting in the place thereof of another prefabricated modular operational unit sub-assembly having container means with substantially identical standardized container mating means, said adapter mating means and said container mating means each including complementary rims forming an annular gap therebetween which extends completely around said container means and which is adapted to receive therein said resilient sealing means, said assembly further including a stopper strip in abutting relationship between said adapter mating means and said container mating means closing off the innermost side of said annular gap, said container mating means having formed therein orifice means spaced around said container means in flow communication with said annular gap on the outermost side thereof to enable pouring therethrough of said sealing means while in liquid form to fill said annular gap. --

4,031,839

REUSABLE OIL ABSORBENT BILGE AND FUEL TANK OPENING PADS

Vito S. Pedone, Box 2733, Arlington, Va. 22202

Filed May 19, 1976, Ser. No. 687,942
Int. Cl.² B63B *35/00*
U.S. Cl. 114—270 15 Claims



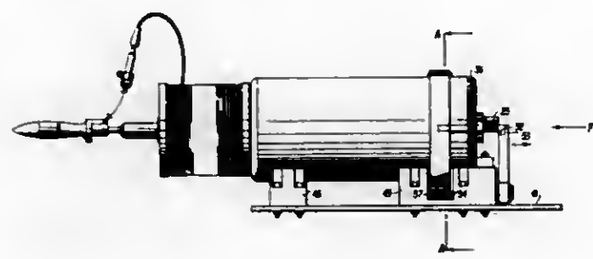
1. A method for removing hydrocarbon oil and its products from the bilge of a boat having an internal combustion engine contaminating the bilge area with the hydrocarbon oil and products to avoid contaminating the environment of the boat with such products, comprising the steps of: containing a particulate mass of expanded open pore oleophilic and hydrophobic synthetic resin within a generally flat envelope of woven oleophilic and hydrophobic synthetic resin fibers having interstices between the fibers substantially smaller than the particules; placing the envelope and contained particle mass within the bilge area of the boat in contact with the oil and bilge water; passing the oil through the envelope with a wicking action and absorbing the oil with the particulate mass within the envelope while generally preventing passage of water through the envelope to its interior; providing a generally centrally arranged passage through the envelope and particulate mass with the side walls of the passage sealed to prevent removal of the particulate mass; aligning the passage concentrically with the fuel tank filler opening of the boat, and thereafter placing a fuel filling nozzle through the passage and into the fuel tank filler opening and passing fuel through the nozzle into the fuel tank so that spilled fuel during filling and withdrawing of the nozzle will be directly engaged by the envelope and absorbed by the particulate mass.

4,031,840

PROCESS AND APPARATUS FOR RECOVERING SUNKEN WRECKS

Gerald Marc Albert Boisrayon, Clamart, and Gilbert Marius Henri Martin, La Seyne, both of France, assignors to Etat Francais, France

Filed Dec. 19, 1975, Ser. No. 642,591
Claims priority, application France, Jan. 24, 1975, 74.02195
Int. Cl.² B63C *7/02*
U.S. Cl. 114—51 10 Claims



1. An apparatus for recovering sunken wrecks from the water, said apparatus comprising:

a. a harpoon fastened to one end of a rope by means of a fastening part connected to the harpoon, said fastening part formed, at one end, as a male tip;

b. a submarine gun provided with a hull and adapted to be connected to a submarine vehicle;

c. a harpoon launching apparatus borne by said submarine gun, which comprises a float rigidly connected with a reel on which the other end of said rope is wound, both being removably fastened to said gun and;

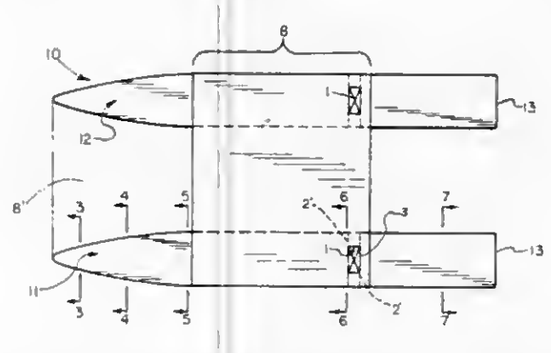
d. a device for the automatic fastening onto said male tip, formed by a hollow body which is threaded over said rope, said device having a pull cable fastened thereto.

4,031,841

CONTROLLED AIR FILM HULL FOR WATERCRAFT

Mainhardt Bredt, New Orleans, La., assignor to Bredt-Kat, Inc., New Orleans, La.

Continuation-in-part of Ser. No. 419,087, Nov. 23, 1973, abandoned, which is a continuation-in-part of Ser. No. 875,430, May 25, 1970, abandoned. This application June 30, 1975, Ser. No. 592,042
Int. Cl.² B63B *1/38*
U.S. Cl. 114—67 A 18 Claims



1. A watercraft of the step-lift planing type comprising:

at least one hull having an intermediate step-lift at its bottom;

an at least generally flat bottom hull portion aft of the step-lift, the underside of which is at least generally parallel to the water level;

air channel means extending through the hull to and communicating with the step-lift area through an opening for producing an air stream vacuum break at the step-lift and a thin, substantially non-propulsive, relatively low pressure and velocity air film along substantially all of the bottom of the aft hull portion, said air channel means being substantially free of any mechanical pressure inducing means;

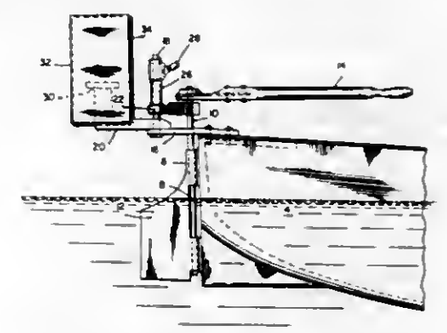
retaining means comprising a pair of elongated, relatively narrow, edge protrusions located along each port and starboard edge of the hull at the bottom thereof and extended aft at least generally parallel to the hull and at least generally parallel each to the other from the step-lift area to the stern, the lower tip of each edge protrusion extending vertically downward beyond the bottom of said flat hull portion a very short distance to contact the surface of the water when the watercraft if underway and on plane, said retaining means and said bottom hull portion forming aft hull air film confining means to retain said thin film of air beneath substantially all the entire area of the hull aft the step-lift, said film of air being confined above by the bottom of said aft hull portion, confined below by the surface of the water, and confined laterally by the said pair of elongated protrusions, but having unimpeded egress at the stern.

4,031,842

BOAT STEERING APPARATUS

Alden H. Simpson, 54 Pine Grove St., Springfield, Mass. 01110

Filed Apr. 26, 1976, Ser. No. 680,148
Int. Cl.² B63H *25/52*
U.S. Cl. 114—144 C 1 Claim



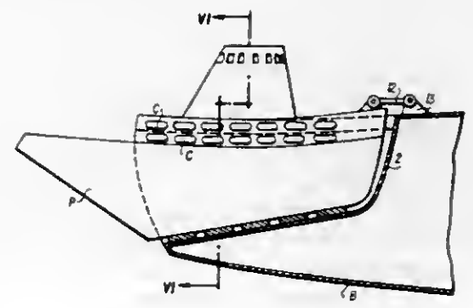
1. A self steering apparatus for a sailing craft and the like comprising a rudder and rudder post, a tiller mounted on said post for guiding said rudder, a stationary support member extending rearwardly and outboard of said craft through which said rudder post extends, a shaft extending through the support member, a beam mounted on said support and said shaft and being pivotal on the shaft, said shaft being in geared connection with said rudder post as an alternative guide for said rudder, and a pair of spaced fins secured to the pivotal beam respectively on opposed sides thereof and being forwardly and inwardly inclined to one another whereby said beam is moved in accordance with the relative wind forces on each side of the fins.

4,031,843

DEVICE FOR CONNECTING A BARGE AND A PUSHER

Jean-Paul Colin, Loire-Atlantique, France, assignor to Ateliers et Chantiers de Bretagne – A.C.B., Loire-Atlantique, France

Continuation-in-part of Ser. No. 385,577, Aug. 3, 1973, abandoned, which is a continuation of Ser. No. 575,234, May 7, 1975. This application Jan. 9, 1975, Ser. No. 539,831
Claims priority, application France, Aug. 9, 1972, 72.28708; Jan. 16, 1974, 74.01415
Int. Cl.² B63B *21/56, 35/70*
U.S. Cl. 114—247 3 Claims



1. In a system for interconnecting a barge and a pusher tug, having the stern of the barge complementary with the bow of the pusher tug, a longitudinal groove in the stern part of the barge, said groove having a section of substantially inverted T form in transverse cross-section to which the bow of said pusher tug conforms with clearance when the tug and the barge are brought together, a rigid thrust transmitting passive member attached at one end to said pusher tug and at the other end to the stern of said barge so as to transmit longitudinal forces and not forces at right angles to the longitudinal axis of the combined barge and pusher tug, expansible hydraulic compression members in the groove for interconnecting said bow and said stern, a pressure accumulator in fluid communi-

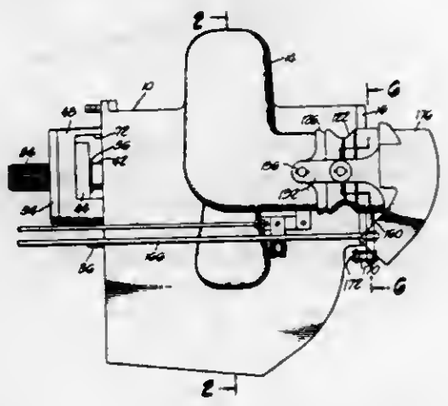
cation with said members, and means for expanding said expansible members after the tug and the barge have been interconnected by said thrust transmitting member.

4,031,844

DUAL JET BOAT PUMP

Hasan F. Onal, Oceanside, and Clarence R. Harmon, Rancho Sante Fe, Calif., assignors to Hydro-Tech Corporation, Denver, Colo.

Continuation of Ser. No. 621,818, Oct. 14, 1975, abandoned, which is a continuation of Ser. No. 447,749, March 4, 1974, abandoned. This application Mar. 11, 1976, Ser. No. 665,908
Int. Cl.² B63H 11/02
U.S. Cl. 115—12 R 5 Claims



1. A pump for propelling a boat, comprising:
a pump housing having a central impeller cavity;
inlet passage means communicating with the said impeller cavity;
a substantially horizontal pump shaft extending centrally through and being rotatably mounted in said housing;
an impeller positioned within said impeller cavity and fixed to rotate with said shaft;
dual discharge volutes communicating with said impeller cavity, said dual volutes extending about said central impeller cavity and terminating laterally at opposite sides and at the level of said shaft;
a pair of elbows associated respectively one with each of said dual volutes and each having a first part formed by an end of a volute, and each one of said elbows including a bend to have a second part extending rearwardly beside said housing with said second parts in spaced parallel relation generally at the level of said shaft; and
a pair of non-rotatable discharge nozzles mounted directly one on each of said second elbow parts adjacent said bends with the discharge ends of said discharge nozzles at generally the same level as said second elbow parts and directed rearwardly in the same direction as said second elbow parts to minimize the length of the fluid confinement thereby reducing friction losses and providing a compact construction.

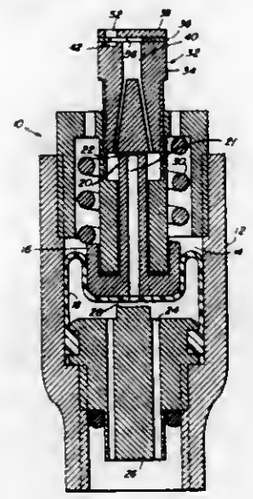
4,031,845

SLIT NOZZLE SOUND SIGNAL GENERATOR

Edward J. Cook, South Hamilton, Mass., assignor to Safety Research & Engineering Corporation, North Reading, Mass.

Filed Apr. 29, 1976, Ser. No. 681,537
Int. Cl.² B60C 23/02; G10K 10/00
U.S. Cl. 116—34 R 12 Claims

1. A sound generator actuated by a flow of gas, comprising
a. a block, a shim and a cover assembled in superimposed relation,
b. said block being formed with a flat face and a passage terminating at said face in a port located inwardly from the edges of said face and adapted to be connected to a source of compressed gas,
c. said block being formed with at least one cavity in said face located inwardly from the edges of said face and spaced from said port,
d. said shim being formed with an elongated opening of a length adapted to extend between said port and said cavity when said shim is in position over said face,
e. said shim being formed with an interaction edge at one end of said shim opening, said interaction edge extending transversely across the mid-portion of said cavity,



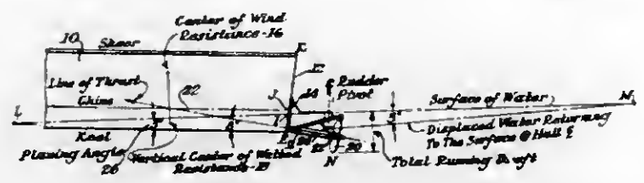
f. said cover being formed with a flat face and at least one opening discharge vent in said face, said cover face adapted to span said shim opening when said cover is in position over said shim with said vent in communication with said cavity through said shim opening,
g. said shim opening defining with the opposing flat faces of said block and cover a slit nozzle between said port and said cavity whereby gas delivered into said passage will flow through said nozzle and against said interaction edge to produce oscilations released through said vent.

4,031,846

ANTI-CAVITATION SHROUD AND RUDDER

John W. Tooe, 2601 Foulk Road, Wilmington, Del. 19810

Filed Oct. 9, 1975, Ser. No. 620,939
Int. Cl.² B63H 5/16
U.S. Cl. 115—39 19 Claims



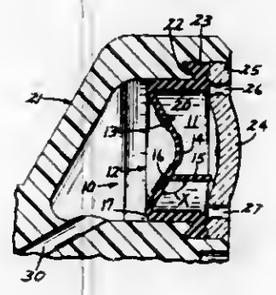
1. A shroud adapted to be mounted at the rear transom of a boat having a propeller, said propeller defining a propeller disc and a plane of revolution, a propeller shaft extending through said transom, a keel, and a hull having a planing center of resistance; said shroud extending rearwardly of said boat and being of expanding arcuate shape encompassing only the upper portion of said propeller disc and extending forwardly of said plane of revolution to said transom and rearwardly of said plane of revolution.

4,031,847

PRESSURE RATIO REVERSAL INDICATOR

Bruce M. Sullivan, Burnsville, Minn., assignor to Donaldson Company, Inc., Minneapolis, Minn.

Filed Apr. 21, 1976, Ser. No. 679,064
Int. Cl.² G08B 5/06
U.S. Cl. 116—65 9 Claims



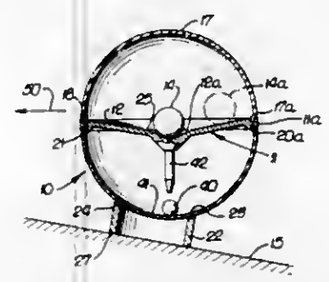
1. A generally cup-shaped indicator element of resilient, air impermeable material comprising:
a tubular wall member
a slack diaphragm closing one end of said member and movable into either an inward or an outward position with respect thereto, said diaphragm having an inner surface which is convex in said inward position of said diaphragm and concave in said outward position of said diaphragm;
a limited central area of augmented visibility on said inner surface of said diaphragm;
and an opaque tongue integral with said diaphragm, wider and longer than said central area, and extending from said inner surface, at an oblique angle with respect thereto, at a location spaced from said tubular member and said central area,
so that in said outward position of said diaphragm said tongue overhangs and conceals said area, while in said inward position of said diaphragm said tongue exposes said area, when viewed looking toward said inner surface.

4,031,848

INERTIAL PERFORMANCE INDICATOR

Robert H. Killen, Pasadena, Calif., assignor to Wayne D. Stelmie, Arcadia, Calif.

Filed Mar. 17, 1976, Ser. No. 667,487
Int. Cl.² G01P 15/02
U.S. Cl. 116—114 AH 8 Claims



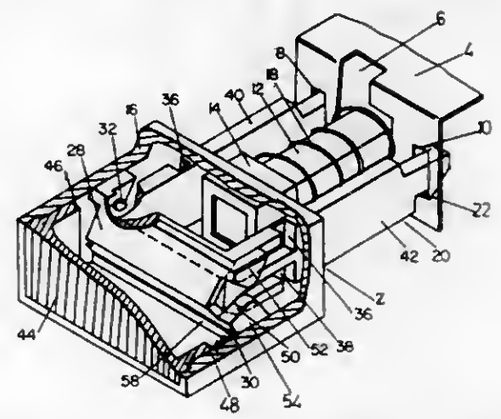
1. An inertial performance indicator, comprising
a. a carrier having a downwardly dished upper surface,
b. a first ball supported on said surface in a rest position, the ball adapted to be bodily displaced out of said rest position in response to predetermined acceleration of the carrier in a generally horizontal direction, and
c. means to adjustably support and level said carrier so that said upper surface is approximately level relative to horizontal, said means including ball and socket joint elements forming a universal joint below the level of the carrier,
e. said means including a leveling ball rollably supported on a downwardly dished interior surface associated with the lower hemisphere, there being a pointer integral with the carrier and projecting downwardly therefrom to point toward the leveling ball.

4,031,849

PUSH BUTTON SWITCH POSITION INDICATOR

Girishkumar Ratilal Mehta, Bombay, India, assignor to Mehta Engineering Enterprise, Maharashtra, India

Filed June 18, 1975, Ser. No. 587,804
Int. Cl.² H01H 9/16
U.S. Cl. 116—124 L 6 Claims



1. A push button switch indicator (2) having a longitudinal axis comprising:
a. a push button head (16) having a window fitted with a transparent cap (44) and a carrier (20) detachably mounted to switch frame means (4), said carrier being mounted in said head for longitudinal movement towards and away from said window while said head is maintained longitudinally by spring means (18) relative to said carrier and said frame means;
b. said carrier having a front end whereon a signal surface (56) is provided and a pair of limbs (40, 42) extending longitudinally towards the rear end of said carrier;
c. at least one shutter means (28, 30);
d. first attaching means (32, 34; 36, 38; 52, 54) provided on said carrier for mounting on the latter said shutter means at said front end of the carrier so that said shutter means is rotatable about bearing means forming an axis perpendicular to the longitudinal axis;
e. first operating cam means (46, 48) provided on said cap and co-acting with said first attaching means for operating the latter so that, on moving said head relative to said carrier, said shutter means pivotally moves into its "on" or first position for providing visual detection of said surface through said window; and
f. second operating cam means (58, 60) provided on said head and co-acting with said first attaching means for operating the latter so that, on moving said head relative to said carrier, said shutter means pivotally moves into its "off" or second position for preventing the detection of said surface through said window.

4,031,850

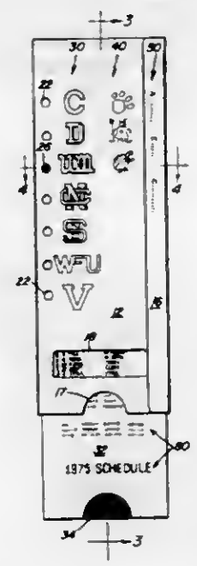
SCHEDULE AND RECORD INDICATOR

Everett E. Gantt, Gadsden, Ala., assignor to Sports Guides, Inc., Gadsden, Ala.

Filed Jan. 27, 1976, Ser. No. 652,813
Int. Cl.² G09F 9/00
U.S. Cl. 116—135 8 Claims

1. A schedule and record indicator for keeping abreast of future scheduled events and also past records of the same opponents comprising; a sleeve member having two rectangular flat sides, said flat sides being integral with each other along the longitudinal edges thereof to form a pocket therebetween, a third flat rectangular member slightly smaller in width than the width of the sleeve member and slidable within

said sleeve member, window means in at least one of the flat sides of the sleeve, and means for frictionally retaining the slidable third member in an adjusted indicating position within the sleeve, and the means for frictionally retaining said third member in proper adjustment within the sleeve including a



number of spaced holes along one edge of one side of said sleeve and an indicator portion along one edge of the third slidable member and in alignment with said spaced holes so that the third member may be properly adjuted by reference to the indicator portion as viewed through the holes.

4,031,851

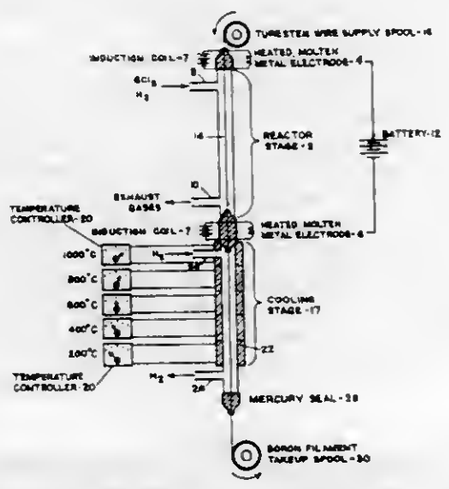
APPARATUS FOR PRODUCING IMPROVED HIGH STRENGTH FILAMENTS

Jose L. Camahort, 10 Fernwood Rd., Acton, Mass. 01720

Continuation-in-part of Ser. No. 386,691, Aug. 8, 1973, abandoned. This application Apr. 18, 1974, Ser. No. 462,073

Int. Cl.² C23C *13/02*

U.S. Cl. 118—49.1 **6 Claims**


TUNGSTEN WIRE SUPPLY SPOOL - 16
INDUCTION COIL - 7
HEATED MOLTEN METAL ELECTRODE - 6
REACTOR STAGE - 8
BATTERY - 12
EXHAUST GASES
TEMPERATURE CONTROLLER - 20
COOLING STAGE - 17
MERCURY SEAL - 28
BORON FILAMENT TAKEUP SPOOL - 30

I. A vapor deposition apparatus for forming composite, high strength filaments having a core material and a sheath material, comprising:

a. a reactor, including:

1. a reaction zone;
2. means for directing said core material through said reaction zone;
3. means to seal said reaction zone at its entrance end;
4. means to seal said reaction zone at its exit end, said means to seal comprising an inert, low-melting, high-boiling metal;
5. means to introduce a gaseous source of sheath material of boron to said reaction zone;
6. means to exhaust reaction gases from said reaction zone;
7. means to selectively heat said core to a temperature at least equal to the temperature at which the sheath material deposits onto the core material.

b. means for controllably cooling said composite material after it exits from the reactor and before it enters the ambient atmosphere to prevent buildup of internal stresses in said composite filament which substantially diminish its strength.

4,031,852

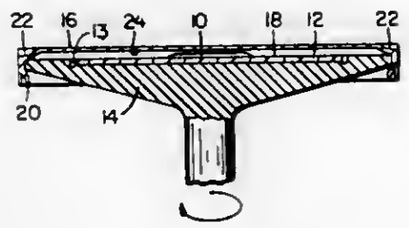
MICROSCOPE SLIDE CENTRIFUGE

Louis W. Clarke, Raleigh, N.C., and Burton H. Sage, Jr., Medfield, Mass., assignors to Corning Glass Works, Corning, N.Y.

Filed Jan. 2, 1976, Ser. No. 645,948

Int. Cl.² B05C *11/08*

U.S. Cl. 118—52 **3 Claims**



1. An apparatus for preparing blood films on a microscope slide comprising

a centrifuge including a platen having at least one surface suitable for accepting a microscope slide for spinning said microscope slide with a flat surface thereof perpendicular to the spin axis of the platen,

an enclosure having a broad flat interior surface closely disposed adjacent said flat microscope slide surface and parallel therewith a distance of up to about 0.3 inches, said enclosure closely surrounding said platen and substantially totally enclosing said microscope slide and said one surface of said platen,

means for firmly attaching said enclosure to said platen, and

means for spinning said platen and said enclosure together as one whereby due to said close disposition of the enclosure with respect to the microscope slide and platen, air flow between the slide and platen combination and the enclosure is minimal.

4,031,853

DEVICE FOR APPLYING INK TO A RIBBON

Raymond L. Conrad, 1598 W. Burrel Ave., Visalia, Calif. 93277

Filed Feb. 17, 1976, Ser. No. 658,585

Int. Cl.² B05C *11/00*

U.S. Cl. 118—264 **1 Claim**

1. A device for applying liquid ink to a ribbon for a typewriter comprising:

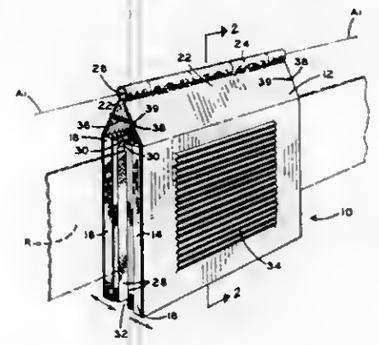
A. a case of a substantially planar configuration including a pair of opposed case halves, each case half being characterized by an endless lip projected from the periphery thereof for defining in said case a pair of pad cavities;

B. a pair of ink absorbent pads each being seated in a pad cavity and characterized by a face of a substantially planar configuration;

C. hinge means interconnecting said case halves for pivotal displacement about a common axis including a linear hinge member extended in spaced relation with adjacent edge portions of said case halves;

D. means for continuously urging the case halves in pivotal displacement for positioning the face of each pad of said pair of pads in an opposed relationship with the face of the other pad of the pair; and

E. stop means for limiting the pivotal displacement of said



case halves about said axis including stop means comprising a linear protuberance projected from one edge surface of the face of each pad of said pair of pads and extended in spaced parallelism with said axis for engaging the protuberance projected from the face of the other pad of the pair as the case halves are pivotally displaced.

4,031,854

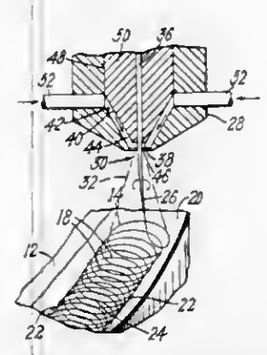
APPARATUS FOR COATING ARTICLES WITH ADHESIVE

Gordon V. Sprague, Jr., Danvers, Mass., assignor to USM Corporation, Boston, Mass.

Division of Ser. No. 417,352, Nov. 19, 1975, Pat. No. 3,911,173, which is a continuation-in-part of Ser. No. 329,362, Feb. 5, 1973, abandoned. This application Oct. 1, 1975, Ser. No. 618,484

Int. Cl.² B05C *5/00*

U.S. Cl. 118—641 **4 Claims**



1. Apparatus for depositing a hot molten thermoplastic resinous adhesive material onto a workpiece surface as a band of overlapping loops comprising an applying nozzle having an extrusion orifice at one end thereof, supply means connected to said nozzle for forcing said material through said orifice to form a thin filament for deposition on said surface, air supply means for directing a stream of air around said filaments, said air supply means being constructed and arranged to impart to said stream of air a component in the direction of said work surface for attenuating said filament and a rotational component for moving said filament in a circular path to generate a substantially conical envelope terminating on said workpiece surface, and means for causing relative movement between said nozzle and said workpiece surface in a predetermined path at substantially right angles to said conical envelope, said nozzle and said workpiece being spaced from one another a direct distance predetermined to deposit said material on said surface as a band of overlapping loops.

4,031,855

ARTIFICIAL INSEMINATION OF SHRIMP

Harvey O. Persyn, Crystal River, Fla., assignor to Ralston Purina Company, St. Louis, Mo.

Filed June 23, 1976, Ser. No. 699,142

Int. Cl.² A01K *61/00*

U.S. Cl. 119—2 **11 Claims**

1. A method of promoting the fertilization of shrimp eggs comprising selecting female shrimp with mature eggs or ovaries and male shrimp with a mature spermatophore, removing the spermatophore from the male shrimp, extracting the sperm mass from the spermatophore, and attaching the sperm mass to the female shrimp with mature eggs or ovaries to effectively fertilize the eggs upon spawning in sea water.

4,031,856

SQUIRREL-PROOF POST

Russell L. Chester, Box 42, Fontana, Wis. 53125

Filed June 4, 1976, Ser. No. 693,045

Int. Cl.² A01K *29/00*

U.S. Cl. 119—51 R **9 Claims**

I. A squirrel-proof post comprising a post adapted to support a bird platform at the top of the post, squirrel carrier means slidably related to the post for up and down movement with respect to the post, said squirrel carrier means being dimensioned to receive a squirrel which climbs onto the carrier means to transfer his weight from the post to the carrier means, and means biasing the carrier means toward the top of the post, the bias of said biasing means being insufficient to sustain the weight of a squirrel which has climbed up the post and onto the carrier means, whereupon the carrier means and squirrel will slide down the post to a position in which the squirrel is out of jumping range to the bird platform.

4,031,857

VOLUMETRIC ACCUMULATING DEVICE

Robert D. Jones, Oskaloosa, Iowa, assignor to Intraco, Inc., Oskaloosa, Iowa

Filed Mar. 15, 1976, Ser. No. 666,696

Int. Cl.² A01K *5/00*

U.S. Cl. 119—56 R **6 Claims**

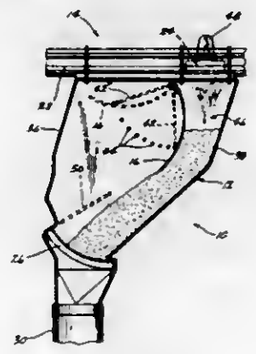
1. A volumetric accumulating device adapted to be connected to a conveyor system for receiving and holding a predetermined amount of granular or powdery material from the conveyor system, said device comprising:

a housing having two side walls and two end walls positioned therebetween, said housing adapted to be connected to the underside of the conveyor system, said housing including an upper portion adjacent to one of said end walls, said one end wall being spaced from the other end wall and including a portion converging downwardly toward the lower end of said housing and towards the other end wall thereby forming a discharge opening adjacent to said lower end and adjacent to said other end

wall, said upper portion including an inlet opening adapted to receive material therethrough;

means for selectively opening and closing said discharge opening;

metering means for selectively controlling the amount of material receivable within said housing, said means including a plate pivotally attached adjacent one end thereof to said housing and positioned transversely with respect to the sidewalls, the edges of said plate being complementary to the shape of the sidewalls whereby the



edges of the plate remain adjacent to the sidewalls during pivotal movement of the plate with respect to the sidewalls, said plate being movable between a vertically oriented position adjacent to said one end wall and a horizontally oriented position; and

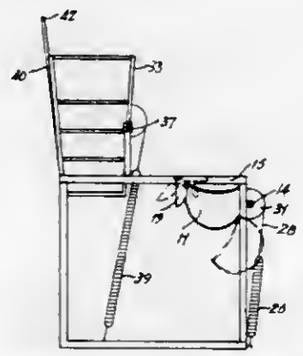
an inlet opening disposed in said upper portion of the housing and adapted to receive material therethrough, said inlet opening being positioned directly above the downwardly inclined end wall and generally between said one end wall and the pivotal axis of said plate.

4,031,858

STOCK HANDLING DEVICE

Brian Mervyn Harrington, P.O. Box 43, Darkan, 6392, Australia

Filed Dec. 23, 1975, Ser. No. 643,942
Int. Cl.² A61D *3/00*
U.S. Cl. 119—103 **10 Claims**



1. A stock handling device comprising:

a. a cradle shaped to receive and support an animal in an inverted position, the cradle being pivotally mounted on a frame for rotation about a first substantially horizontal axis coinciding with one side of the cradle;

b. latching means mounted on the frame for holding the cradle in a horizontal position, the latching means being releasable to permit the cradle to rotate about the first horizontal axis to discharge the animal therefrom; and

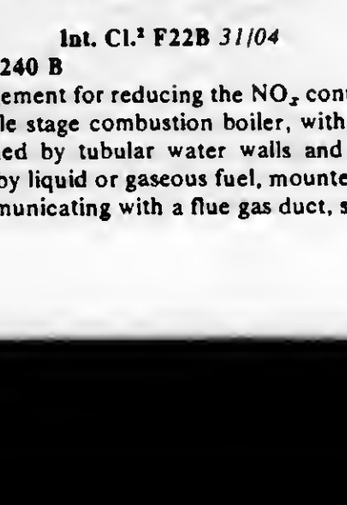
c. animal tipping means rotatable on said frame and having an entry to receive an animal and capable of being rotated about a second substantially horizontal axis to an inverted position to discharge the animal into the cradle in an inverted position, the tipping means having two opposed side walls and a floor, one of said side walls being fixed lying adjacent the cradle, the other of said side walls being remote from the cradle and movable inwardly from an outermost position to clamp an animal within the tipping means against the one of said side walls during the rotation of the animal tipping means to a discharge position, said tipping means also being provided with gate means at the entry thereof and closeable upon an animal entering the tipping means to prevent animals backing therefrom, said gate means being adapted to open upon an animal being tipped from the tipping means.

4,031,859

COLLAR FOR A SMALL ANIMAL

James P. Stewart, 14605 SE. Fairwood Blvd., Renton, Wash. 98055

Filed May 23, 1974, Ser. No. 472,733
Int. Cl.² A01K *27/00*
U.S. Cl. 119—106 **12 Claims**



1. A collar for a small animal, said collar comprising:

a. a tubular housing;

b. said tubular housing having a tubular passageway extending the entire length of said tubular housing;

c. an insert for positioning in said tubular passageway;

d. said tubular housing having a first end and a second end;

e. said tubular housing near said first end having a pair of opposing holes in the walls and which opposing holes connect with said tubular passageway;

f. said tubular housing near said second end having a tongue;

g. said tongue having a first end and a second end with said first end being in said tubular passageway and said tongue being secured to said tubular housing;

h. said tongue on said second end having opposed studs for mating with said opposing holes to form a collar from said tubular material; and,

i. said tubular housing being soft, flexible and resilient.

4,031,860

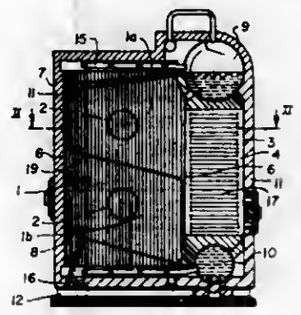
ARRANGEMENT FOR REDUCING THE NOX CONTENT OF FLUID GASES

Heinz Recbt, Oberhausen, Rhld., Germany, assignor to Deutsche Babcock & Wilcox Aktiengesellschaft, Germany

Filed Feb. 2, 1976, Ser. No. 654,345
Claims priority, application Germany, Feb. 3, 1975, 2504418
Int. Cl.² F22B *31/04*
U.S. Cl. 122—240 B **7 Claims**

1. An arrangement for reducing the NO_x content in the flue gases of a single stage combustion boiler, with a combustion chamber defined by tubular water walls and having plural burners, fired by liquid or gaseous fuel, mounted through one wall, and communicating with a flue gas duct, separated from

the combustion chamber by a transition zone, through a combustion gas flow opening, adjacent a wall opposite the burner mounting wall, connecting the combustion chamber to the flue gas duct, said arrangement comprising at least one substantially gas-tight partition, formed of water tubes, extending in the axial direction of the burners completely across said combustion chamber between the water walls thereof and said



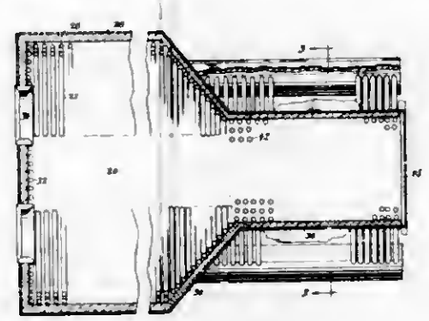
transition zone, and dividing said combustion chamber into sections each respective to a single burner and each communicating individually with said combustion gas flow opening, whereby the combustion gases, flowing through said sections from the respective burners to said combustion gas flow opening are in heat transfer contact with, and surrounded by, both the water walls of said combustion chamber and the water tubes of each said partition.

4,031,861

PULVERIZED COAL FIRED PACKAGE BOILER

William Hunter Pollock, East Granby, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Apr. 5, 1976, Ser. No. 673,498
Int. Cl.² F22B *21/14*
U.S. Cl. 122—327 **4 Claims**



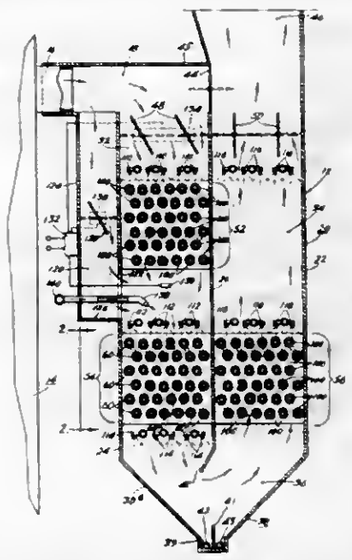
1. A shop assembled boiler comprising an upper drum that extends horizontally to form an elongate ridge along the apex of a boiler, a pair of lower drums positioned under the upper drum and spaced apart to comprise a base for said boiler, a housing with a front and rear portion enclosing the boiler, a plurality of tubular members connecting each lower drum to the upper drum formed to provide an open furnace cavity in the front portion of the housing having a hopper shaped bottom with tubular walls on opposite sides of an elongate throat, a bank of closely spaced tubes in the rear portion of the boiler formed to extend vertically between the lower drums and the upper drum and adapted to intercept hot gases that have traversed the cavity in the front portion of the boiler furnace, and coal burning apparatus penetrating the front portion of the furnace to exhaust hot products of combustion into the furnace cavity.

4,031,862

ECONOMIZER

Frank J. Smith, 7352 Limekiln Pike, Philadelphia, Pa. 19138

Filed Mar. 10, 1976, Ser. No. 665,501
Int. Cl.² F23J *3/02*; **F22D** *1/02*
U.S. Cl. 122—421 **8 Claims**



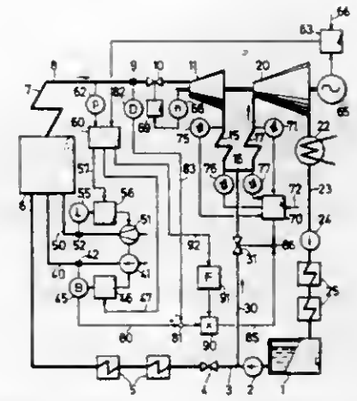
1. An economizer comprising a duct for conducting hot flue gases from a boiler to a stack, a plurality of parallel heat exchange tube assemblies disposed within said duct extending transversely to the flow of said flue gases, said tube assemblies each comprising an outer tube of a first material, an inner tube of a second material coaxially disposed in spaced relation within said outer tube, and an intermediate layer between said inner and outer tubes completely filling the space therebetween, a major portion of the composition of said intermediate layer comprising graphite or carbon, and means for connecting said inner tubes to a source of liquid to provide a flow of liquid through said tube assemblies to transfer heat energy from said flue gases to said liquid.

4,031,863

PROCESS AND A CONTROL SYSTEM FOR CONTROLLING THE EXIT TEMPERATURE OF VAPOR FLOWING THROUGH A CONTACT HEATING SURFACE OF A VAPOR GENERATOR

Fritz Läubli, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Sept. 26, 1975, Ser. No. 617,063
Claims priority, application Switzerland, Sept. 17, 1974, 12628/74
Int. Cl.² F22G *5/12*
U.S. Cl. 122—479 R **14 Claims**



1. A process for controlling the exit temperature of vapor

flowing through a contact heating surface of a vapor generator, said process comprising the steps of

obtaining a first signal corresponding to the amount of an instantaneous flow of heat supplied by a fuel delivered to the vapor generator;

obtaining a second signal corresponding to the quantity of vapor flowing momentarily through the contact heating surface;

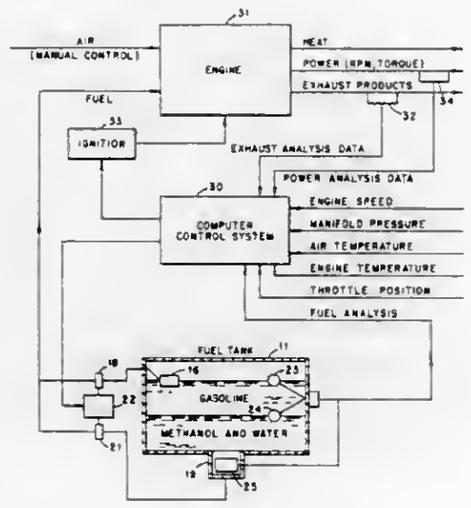
comparing said first and second signals to obtain a comparison signal; and

imposing said comparison signal on a control element acting on the exit temperature of the contact heating surface.

4,031,864
MULTIPLE FUEL SUPPLY SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

William T. Crothers, Sunol, Calif., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Mar. 9, 1976, Ser. No. 665,191
Int. Cl.² F02B *75/12*
U.S. Cl. 123—1 A **14 Claims**



1. A method for supplying a combustion engine with fuel from a multiple liquid fuel supply contained in a single container, said multiple liquid fuel being phase-separable to form a two-phase liquid, the upper phase containing a major proportion of a first component of the multiple fuel and the lower phase containing a major proportion of a second component of the multiple fuel, which comprises:

inducing phase separation of the multiple liquid fuel, thereby establishing the two-phase liquid in the container;

supplying the combustion engine with liquid selected from the group consisting of liquid withdrawn from the upper phase, liquid withdrawn from the lower phase, and liquid withdrawn from both the upper phase and the lower phase.

4,031,865
HYDROGEN-OXYGEN FUEL CELL FOR USE WITH INTERNAL COMBUSTION ENGINES

Patrick Dufour, 14 Hawthorne St., Laconia, N.H. 03246

Filed Oct. 1, 1975, Ser. No. 618,442
Int. Cl.² F02B *43/08*
U.S. Cl. 123—1 A **1 Claim**

1. In combination, an internal combustion engine having an intake manifold,

and a carburetor for supplying a fuel-air mixture to said engine,

a hydrogen and oxygen gas generator for supplying a hydrogen gas fuel supplement to said engine,

said gas generator comprising a cell containing water,

a negative and positive electrode extending into said water,

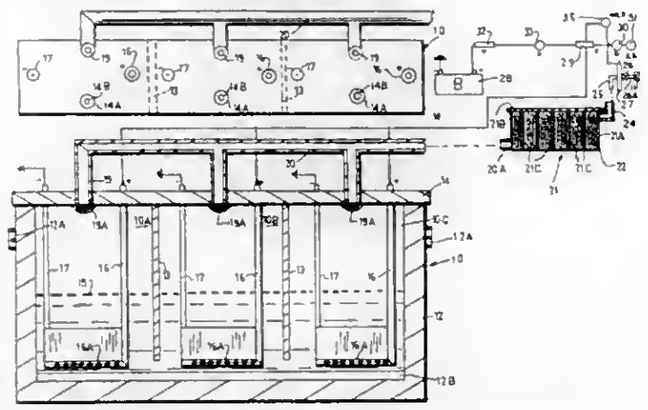
a catalyst of an alkaline base dispersed in said water,

an electrical D.C. power supply connected in circuit with said electrodes whereby hydrogen gas is generated when said electrodes are energized,

a rheostat switch in circuit with said power supply to control the rate of said hydrogen gas generator,

a dryer,

conduit means connecting the gases generated in said cell to said dryer,



means for directing the gases dried in said dryer to said intake manifold,

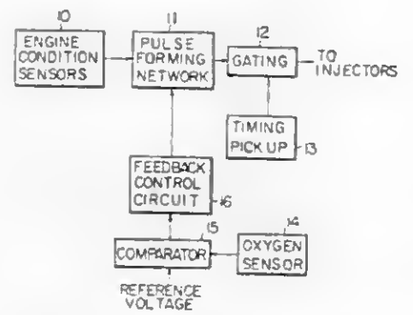
and accelerator means operatively connected to said rheostat switch for controlling the rate of gas generation in accordance to engine demand,

and wherein said positive electrode is perforated to permit the introduction of air into said cell to enhance liberation of the hydrogen gas forming at the negative electrode.

4,031,866
CLOSED LOOP ELECTRONIC FUEL INJECTION CONTROL UNIT

Masaharu Asano, Fujisawa, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed July 23, 1975, Ser. No. 598,280
Claims priority, application Japan, July 24, 1974, 49-84960
Int. Cl.² F02B *3/00*
U.S. Cl. 123—32 EB **7 Claims**



1. An electronic fuel injection control unit for internal combustion engines including a fuel injecting device, comprising:

means including a composition sensor for sensing the concentration of the composition in the emissions from the engine and generating a correction signal at one of first and second discrete values depending upon whether the sensed concentration is above or below a predetermined value;

means for generating a train of clock pulses in step with each engine revolution;

means for counting the clock pulses to generate a first signal when the number of counted clock pulses reaches a predetermined value in the presence of the correction signal at the first discrete value and a second signal when the number of the counted clock pulses reaches the predetermined value in the presence of the correction signal at the second discrete value;

a variable gain operational amplifier responsive to the correction signal to provide a gain-controlled signal and capable of providing different amplification in response to said first or second signal from the counting means;

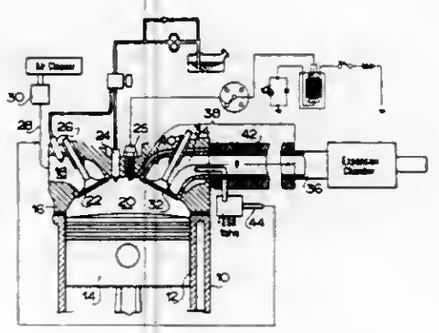
means for generating first and second transient signals in response to the first and second signals, respectively, from said counting means, said transient signals having opposite polarities to the polarity of the gain-controlled signal and being combined therewith; and

a pulse forming network responsive to the combined signals to generate an injection pulse, the duration of which is dependent on the magnitude of the gain-controlled signal, said injection pulse being supplied to said fuel injecting device.

4,031,867
INTERNAL COMBUSTION ENGINE COMBUSTION PROCESS

Hiroki Yasuda, Hachioji; Shuji Sawafuji, Musashino, and Hitoshi Suzuki, Chofu, all of Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 18, 1975, Ser. No. 641,738
Claims priority, application Japan, Dec. 28, 1974, 50-3275
Int. Cl.² F02B *3/00*
U.S. Cl. 123—32 ST **8 Claims**



1. An internal combustion engine having at least one cylinder, comprising

a combustion chamber in each cylinder,

an intake port communicating with a corresponding combustion chamber and provided with an intake valve,

means for feeding air fuel mixture into said combustion chamber through said intake port,

injection nozzle means for supplying fuel into said combustion chamber in the form of droplets in suspension in said mixture,

a spark plug provided in said combustion chamber,

an exhaust valve operatively communicating with said combustion chamber,

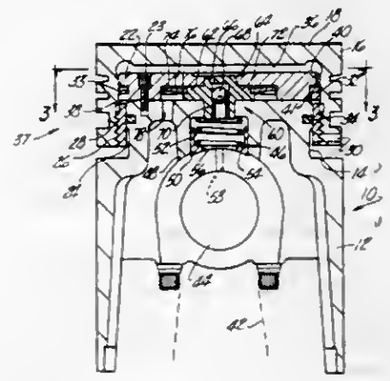
an exhaust gas passage without a gas stagnating portion and communicating with said exhaust valve, and including a predetermined zone defining a volume, the latter extending from immediately adjacent said exhaust valve, said exhaust gas passage having an open end, and

heat insulation means in said predetermined zone immediately adjacent to said exhaust valve for preventing exhaust gas temperature in said predetermined zone from lowering below a predetermined temperature, the latter being a function of the volume of said predetermined zone with respect to engine displacement volume so as to cause sufficient self-reaction oxidation in said predetermined zone in order to have HC concentration below 10 ppm and CO concentration below 0.1 percent.

4,031,868
VARIABLE COMPRESSION RATIO PISTON

Albert M. Karaba, Muskegon; Alexander P. Brouwers, Bloomfield Hills, and Thomas J. Pearsall, Grand Haven, all of Mich., assignors to Teledyne Industries, Inc., Los Angeles, Calif.

Continuation-in-part of Ser. No. 611,863, Sept. 10, 1975. This application Feb. 20, 1976, Ser. No. 659,727
Int. Cl.² F02B *75/04*
U.S. Cl. 123—78 B **10 Claims**

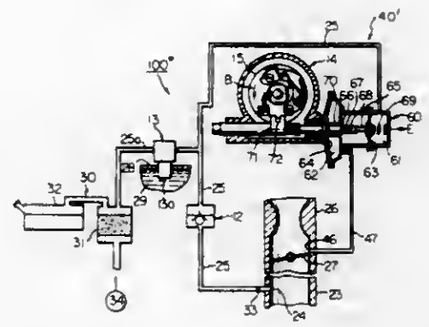


1. In an internal combustion engine, a piston having an inner member and an outer member telescopically received by said inner member, said members being movable in response to reciprocation of the piston with respect to a combustion chamber of the engine, a first fluid chamber and a second fluid chamber varying in volume in response to said relative movement and to variations in the quantity of fluid therein, means supplying fluid to said chambers, said means comprising a first passage in said piston connecting with said first fluid chamber, a one way inlet valve disposed in said first passage and a second passage in said piston connecting said first chamber with said second chamber, the improvement comprising a sealing groove in said inner member and a sealing member carried in said sealing groove, said second passage extending through said sealing groove and said sealing ring acting as a valve means to regulate fluid flow between said first and second chamber.

4,031,869
IGNITION-TIMING ADJUSTING SYSTEM FOR SPARK-IGNITION INTERNAL COMBUSTION ENGINES

Takanori Onishi, and Ken Shiozawa, both of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Jan. 20, 1975, Ser. No. 542,448
Claims priority, application Japan, Feb. 18, 1974, 49-018475
Int. Cl.² F02P *5/04*
U.S. Cl. 123—117 A **8 Claims**

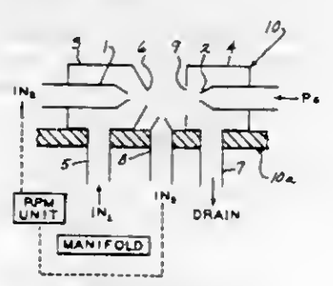


1. An ignition timing control system for an internal combustion engine comprising:

an intake tube for delivering a combustible mixture to an engine and having a vacuum port in the wall of said tube;

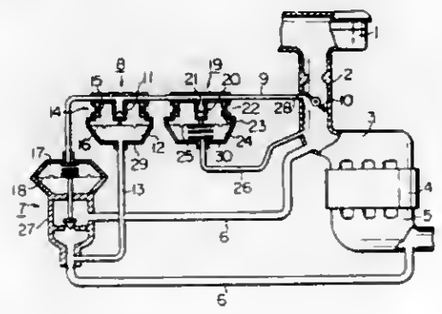
a throttle valve mounted in the intake tube;
an ignition timing means synchronized with the engine;
a vacuum actuator having a vacuum chamber and an actuator means connected to the ignition timing means for advancing the ignition timing of the engine in response to increasing vacuum level in the vacuum chamber;
a vacuum line connecting the vacuum chamber of said actuator to the vacuum port in the intake tube;
an air line between the vacuum chamber and the atmosphere;
first valve means in said vacuum line between the vacuum port of the intake tube and the vacuum chamber of the actuator, said first valve means being responsive to the difference in vacuum levels in the intake tube at the vacuum port and in the vacuum chamber of the actuator to open the vacuum line when the level of vacuum at the vacuum port is greater than the level of vacuum in the vacuum chamber and to close the vacuum line when the vacuum level at the vacuum port is less than the vacuum level in the vacuum chamber; and
second valve means in said air line responsive to engine temperature to close the air line when the engine is colder than a predetermined temperature and to open the air line when the engine is warmer than said predetermined temperature, such that the vacuum chamber of the actuator is exposed to the greatest level of vacuum at the vacuum port under all operating load conditions during cold engine operation and to atmospheric pressure when the engine is warmed up.

4,031,870
FUEL CHARGE INJECTION APPARATUS FOR INTERNAL COMBUSTION ENGINES
Shinji Ozawa, Kanagawa, Japan, assignor to Mikuni Kogyo Co., Ltd., Tokyo, Japan
Filed Mar. 20, 1975, Ser. No. 560,170
Int. Cl.² F02B *33/00*; **F02M** *7/00*; **F02D** *11/08*; **F02M** *17/02*
U.S. Cl. 123—119 R **12 Claims**



1. In a fuel charge injection apparatus wherein an impacting stream charge injection device having a pair of opposing stream forming means to define impacting fuel and air streams and having means to move the impacting stream position therebetween for selective introduction into the engine, and having a signal source means to establish an engine related control signal for controlling at least one of said streams, comprising a stream control chamber means enclosing the discharge end of one of said stream forming means and having an orifice aligned with said stream forming means, and a control signal port connected to said chamber to receive said engine related control signal and to control the strength of the corresponding stream.

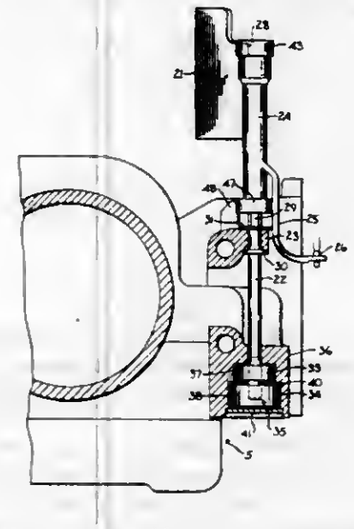
4,031,871
EXHAUST GAS RECIRCULATION SYSTEM OF A MOTOR VEHICLE
Makio Hamaoishi, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan
Filed May 27, 1976, Ser. No. 690,656
Claims priority, application Japan, Mar. 2, 1976, 51-21757
Int. Cl.² F02M *25/06*
U.S. Cl. 123—119 A **4 Claims**



1. In an exhaust gas recirculation system of a motor vehicle which comprises:
a diaphragm type EGR valve mounted on an EGR pipe which connects the exhaust manifold and the intake manifold;
an opening path for air from the atmosphere diverged from a connecting pipe which connects the diaphragm chamber of said EGR valve and the EGR port near the carburetor throttle valve, and;
a diaphragm type vacuum control valve (VCV) arranged at the opening end of said opening path, the diaphragm chamber of said VCV communicating with the inlet of said EGR valve, the improvement comprising another opening path for air from the atmosphere being diverged from the connecting pipe between said diaphragm chamber of said EGR valve and said EGR port, and another VCV, which operates in response to the vacuum pressure in the intake manifold, being arranged at the opening end of said second opening path.

4,031,872
THERMOSTATIC AUTOMATIC CHOKE CONTROL FOR SMALL ENGINES
Robert G. Thompson, Milwaukee, and Heinz K. Gund, Brookfield, both of Wis., assignors to Briggs & Stratton Corporation, Wauwatosa, Wis.
Continuation-in-part of Ser. No. 516,641, Oct. 21, 1974, abandoned, which is a division of Ser. No. 417,402, Nov. 19, 1973, Pat. No. 3,863,614. This application Sept. 19, 1975, Ser. No. 614,891
Int. Cl.² F02B *33/00*
U.S. Cl. 123—119 F **10 Claims**

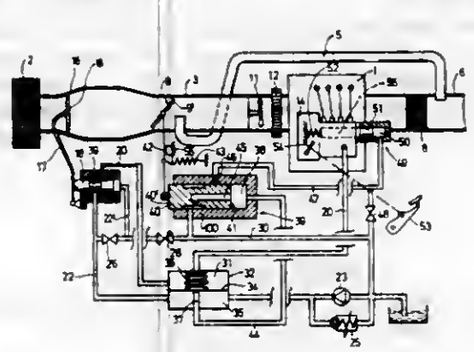
4. A control device wherein an imbalance between opposing forces acting on a movable control element urge the same in one or the other of two opposite directions with respect to a fixed element, depending upon the sense of the imbalance, characterized by:
A. a pair of thermostatic governor means to govern the response of said control element to the opposing forces acting thereon,
said pair of thermostatic governor means having responses of opposite sense to a change in ambient temperature; and
B. means operatively interposing said governor means between said control element and said fixed element in a manner such that each of the two governor means can govern response of said control element to the opposing forces acting thereon independently of the other, whereby the two governor means can coact to govern the response of said control element to the opposing forces



acting thereon, over a wide temperature range without objectionably stressing either one of them.

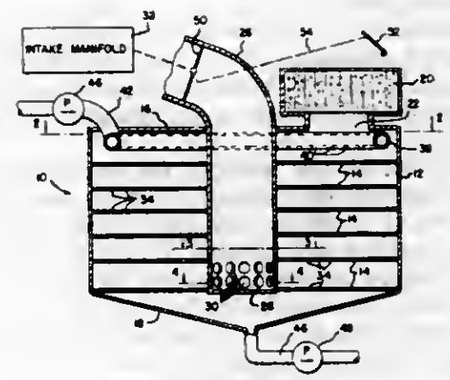
h. means providing a variable restoring force against the displacements of the servomotor piston;
i. a differential pressure valve having an uncontrolled pressure chamber, a controlled outflow opening in a chamber having an essentially constant reference pressure, and means connecting the controlled outflow opening to the working chamber of the servomotor;
j. fuel metering means including a control slide connected to and displaceable by the air metering means, a throttle whose cross-section is varied by the displacements of the control slide, and means for establishing a regulatable, substantially constant return force acting against the displacements of the control slide; and
k. a fuel suction line connected to the fuel injection means, the uncontrolled pressure chamber of the differential pressure valve and, upstream of its connection to the uncontrolled pressure chamber, to the throttle whose cross-section is varied, wherein:
i. the arbitrarily varied fuel quantity serves as a reference parameter for the operation of the servomotor; and
ii. the servomotor piston is displaceable, against the variable restoring force, between two positions, one corresponding to a fully opened position of the throttle valve and closed exhaust gas recycling line, and the other corresponding to a substantially closed throttle valve.

4,031,873
FUEL INJECTION SYSTEM FOR INTERNAL COMBUSTION ENGINES HAVING CONTROLLED EXHAUST GAS RECYCLING
Werner Banzhaf, Sindelfingen; Gerhard Stumpp, Stuttgart-Vaihingen, and Gerhard Schiellnsky, Schwaikheim, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany
Filed June 30, 1976, Ser. No. 701,160
Claims priority, application Germany, July 10, 1975, 2530777
Int. Cl.² F02M *25/06*, *7/00*; **F02B** *31/00*
U.S. Cl. 123—119 A **16 Claims**



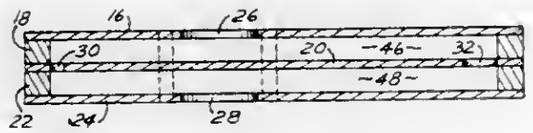
1. A fuel injection system for an internal combustion engine, comprising in combination:
a. a suction tube through which an air flow is established;
b. an exhaust gas line through which an exhaust gas flow is established;
c. an exhaust gas recycling line connected to the exhaust gas line and to the suction tube, the suction tube connection defining therein a discharge outlet of the recycling line;
d. a throttle valve controlling the flow of the exhaust gas in the recycling line, said throttle valve being mounted within the suction tube upstream of and in operative association with the discharge outlet of the recycling line;
e. air metering means mounted to partially extend into said suction tube and be displaceable by the air flow thereon;
f. fuel injection means including means for arbitrarily varying the fuel quantity delivered by the fuel injection means;
g. a servomotor including a displaceably mounted piston, a working chamber and means connecting the piston to the throttle valve for controlling the opening thereof;

4,031,874
CARBURETOR
John E. Alwine, 4341 Willow Brook Ave., Apt. 102, Los Angeles, Calif. 90029
Filed Oct. 8, 1975, Ser. No. 620,843
Int. Cl.² F02M *17/22*
U.S. Cl. 123—134 **6 Claims**



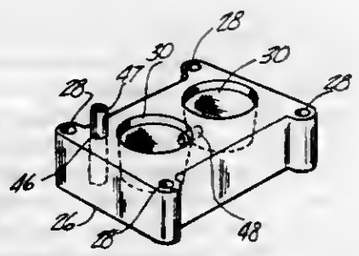
1. A carburetor for supplying a fuel mixture to an internal combustion engine including a closed hollow body, a series of closely perforated baffle plates extending between the side walls of the body and spaced apart between the top and bottom of the body, an air inlet opening in the body above the uppermost baffle plate, a fuel mixture pipe extending into the body through the top of the body, down through a number of baffle plates to an inlet opening located below a number of baffle plates, the portion of the baffle plate immediately above the inlet opening being imperforate adjacent the pipe to prevent excess liquid fuel from being drawn through such plate immediately adjacent the inlet opening, a fuel supply for distributing liquid fuel over the uppermost of said baffle plates so that when the engine is in operation liquid fuel and air are drawn down through the perforations in the baffle plates and the fuel is evaporated to form a gaseous fuel mixture subsequently drawn into the fuel mixture pipe through said inlet openings, the bottom of the body forming a sump for collection of excess liquid fuel and a return fuel system for flowing such liquid fuel away from the carburetor.

4,031,875
FUEL VAPORIZER
Darwin A. Tyler, 26054 East St. U12, Llano, Calif. 93544
Filed Sept. 15, 1975, Ser. No. 613,057
Int. Cl.² F02M *29/00*
U.S. Cl. 123—141 **5 Claims**



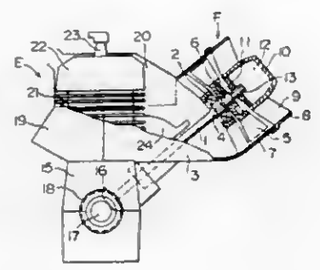
1. Vaporizing means particularly adapted for use in converting wet mixtures of fuel and air from the jets of a carburetor for an internal combustion engine to substantially dry mixtures, said vaporizer means comprising:
a body formed of a thermally conductive material having a relatively flat elongate first internal chamber, a relatively flat, elongate second internal chamber in superposed relationship with the first internal chamber and a relatively thin partition separating the two chambers;
said body having a first opening into said first internal chamber and a second opening into said second internal chamber;
said partition having a first port interconnecting the first and second internal chambers and a second port interconnecting said chambers;
the first and second openings in said body being of equal size and shape and in peripheral and axial alignment, said first port being offset a first distance in one longitudinal direction from the aligned axes of said first and second openings, and said second port being offset a second distance in the opposite longitudinal direction from said axes;
said body being sized and shaped, and its openings and chambers being positioned and otherwise adapted, to permit its interposition between said carburetor and said internal combustion engine in a way to receive air-fuel mixtures from the carburetor jets through said first opening, and discharge said mixtures, after they have passed through at least one of the ports in said partition, into the intake manifold of the engine through said second opening;
whereby the air-fuel mixtures are detoured through said body between the carburetor and intake manifold, when the engine is running, and undergo increases in velocity when passing through one or both of said ports and, additionally, absorb engine heat through the thermally conductive material of the body so that vaporization of fuel droplets in the mixture takes place to render said fuel more completely combustible in said engine.

4,031,876
FUEL ATOMIZER
Robert G. Hoots, 7427 Lawrence St., Grand Blanc, Mich. 49505
Continuation-in-part of Ser. No. 451,949, March 18, 1974. This application July 7, 1975, Ser. No. 593,718
Int. Cl.² F02M *29/00*
U.S. Cl. 123—141 **7 Claims**



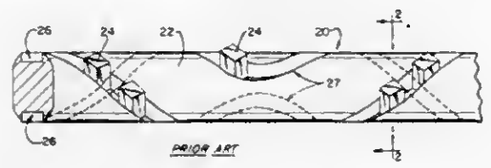
1. A liquid fuel atomizer device for an internal combustion engine, comprising:
a. a base member having at least two throughbores formed therethrough and at least one internal transverse bore extending between the throughbores and in communication therewith,
b. and grids disposed in each of the throughbores comprising a plurality of superposed fine mesh grids comprising alternating layers of copper grids and brass grids, the grids being coated with copper oxide and potassium dichromate, and
wherein the transverse bore is in communication with the throughbores in the region of the grids.

4,031,877
ENGINE LUBRICATING OIL PUMP
Tetsuzo Fujikawa, Kobe, and Kichiji Misawa, Akashi, both of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan
Filed Feb. 19, 1976, Ser. No. 659,231
Claims priority, application Japan, Feb. 26, 1975, 50-27103
Int. Cl.² F02F *7/00*
U.S. Cl. 123—195 A **5 Claims**



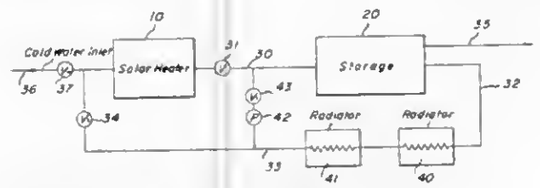
1. Internal combustion engine comprising an engine portion having a power output member, cooling blower means driven by said power output member of the engine portion for producing flow of engine cooling air, said blower means having fairing means at hub portion thereof, lubricating oil pump means disposed in said fairing means of the blower means and driven by said power output member of the engine portion to provide supply of lubricating oil to the engine portion as the engine rotates.

4,031,878
CROWN CUTTING WIRE
George H. Hall, P.O. Box 244, Westford, Mass. 01886
Filed Nov. 12, 1975, Ser. No. 631,083
Int. Cl.² B28D *1/08*
U.S. Cl. 125—21 **9 Claims**



1. A wire saw comprising in combination:
an elongated flexible metallic body having a substantially circular cross section, a curved outer surface and, at least one helical ridge on said curved outer surface along the length of said body,
a plurality of blocks of composite comminuted abrasive in a bonding matrix resiliently mounted on said body along said at least one ridge in spaced-apart relation to one another;
the bottom surfaces of said blocks being shaped to substantially mate with said body outer surface.

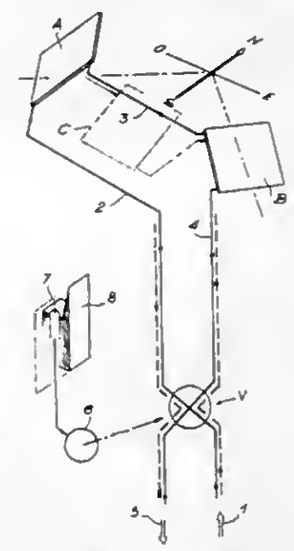
4,031,879
SOLAR ENERGY CONVERSION PLANT
J. P. Parham, R.R. 2, Box 475, Melbourne, Fla. 32901
Filed Oct. 28, 1975, Ser. No. 625,856
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 **7 Claims**



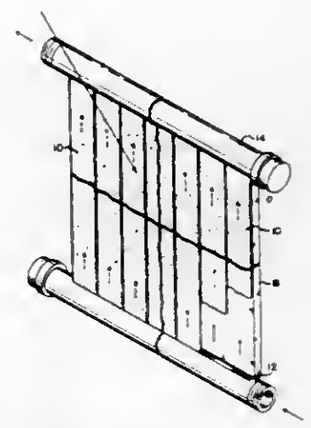
1. A solar energy conversion plant, comprising:
a solar radiation converter system including,
a solid radiation to heat converter, a plurality of heat exchange members thermally connected to said radiation to heat converter and a housing adapted to support said radiation converter and form a container for said heat exchange members wherethrough a heat absorbent fluid is circulated;
a fluid circulating system adapted to inject a heat absorpitive fluid into said solar radiation converter system at a first temperature and extract said fluid from said system at a second temperature wherein said second temperature is greater than said first temperature;
a fluid storage means adapted to receive heated fluid from said solar radiation converter system, said receiving means including a one-way pressure valve adapted to permit fluid transfer from said radiation converter system to said storage means when the differential pressure therebetween exceeds a predetermined value;
heat radiation means adapted to receive heated fluid from said storage means;
means to return said fluid from said radiation means to said solar radiation converter system including a one-way valve;
a solar radiation converter system bypass connected between said radiation means return fluid line and said storage means, said interconnection to said storage means adapted to be downstream of said pressure valve;
a fluid pump in said bypass system; and
a one-way valve between said fluid pump and said storage means.

4,031,880
METHOD AND DEVICE FOR COLLECTING SOLAR ENERGY
Bernard Devin, Gif-sur-Yvette, France, assignor to Commissariat a l'Energie Atomique, Paris, France
Filed Apr. 19, 1976, Ser. No. 678,117
Claims priority, application France, Apr. 21, 1975, 75.12367
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 **9 Claims**

1. A method for collecting solar energy by means of a system of stationary collectors differently oriented with respect to the sun, of the type in which a heat-transporting fluid is circulated; circulating the heat-transporting fluid through said system of collectors connected together in series from the collector which is least exposed to solar radiation to the collector which is the most exposed to solar radiation and reversing the direction of flow of the fluid within the collectors automatically at a moment of the day which is determined beforehand so as to control the quantity of energy delivered by the collectors by flow of the heat transporting fluid from the collector least exposed to solar radiation to the collector most exposed to solar radiation.



4,031,881
SOLAR HEATER
Heinz E. P. Thiel, 468 Willis Drive, Oakville, Ontario, Canada
Filed Oct. 20, 1975, Ser. No. 624,249
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 **2 Claims**



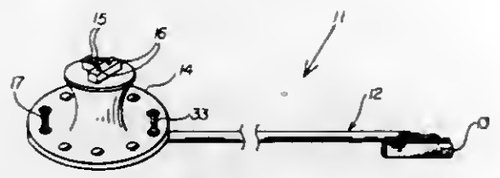
1. A solar heater comprising:
a plurality of liquid conducting metal pipes arranged in an array to receive incident solar radiation from a mean direction on one side of said array,
said metal pipes each being formed from sheet metal having a predetermined reflectivity on both sides bent to form a tube,
means for connecting to said pipes a liquid conduit connected to supply liquid to said pipes to flow therethrough,
means for connecting to said pipes a liquid conduit for carrying away liquid which has flowed through the pipes in said array,
said pipes in said array being provided, with a treated heat absorptive surface on the side thereof designed to approximately face the direction of incident solar radiation,
the pipes in said array being provided with an inner surface having the reflectivity produced by a surface not coarser than that providing a centre-line average of 60μ".

4,031,882

APPARATUS FOR INTERFACING TO ANATOMIC SIGNAL SOURCES

Carlo J. DeLuca, Newton, Mass., assignor to Liberty Mutual Insurance Company, Boston, Mass.

Division of Ser. No. 595,582, July 14, 1975. This application June 28, 1976, Ser. No. 700,195
Int. Cl.² A61B 5/04
U.S. Cl. 128—2.1 R 5 Claims



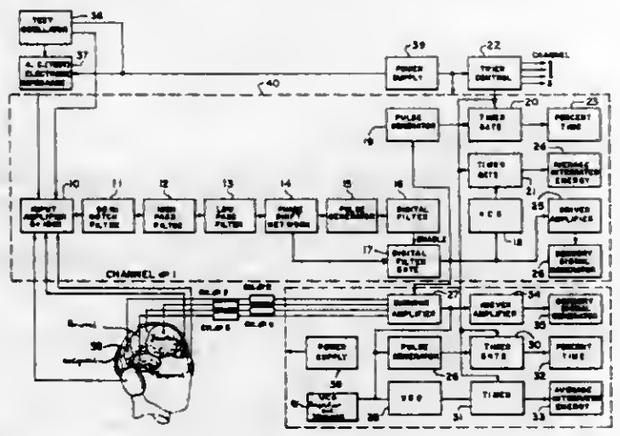
1. An electrical system for interfacing to anatomic signal sources and comprising:
terminal means suitable for anatomic implantation so as to receive primary signals generated physiologically;
coupling means comprising a piece of sheet material secured to said terminal means and being shaped and arranged for juxtaposition to the outer surface of a nerve, said sheet material having interstices of a size for receiving tissue growth after being implanted;
electrical lead means suitable for anatomic implantation and connected to said terminal means so as to receive said primary signals;
output circuit means connected to receive said primary signals from said electrical lead means; and
electrical insulator means suitable for anatomic implantation and enclosing said terminal means so as to shield said terminal means from noise signals generated physiologically, said insulator means comprising an elongated hollow casing closed at one end and enclosing said coupling means and of a size to surround the nerve so as to disrupt external electrical conductive paths to said terminal means.

4,031,883

MULTIPLE CHANNEL PHASE INTEGRATING BIOFEEDBACK COMPUTER

Lester G. Fehmi, Princeton, N.J., and Joseph R. Schneider, Larchmont, N.Y., assignors to Biofeedback Computers, Inc., Rocky Point, N.Y.

Division of Ser. No. 492,954, July 29, 1974, Pat. No. 3,978,847. This application July 21, 1976, Ser. No. 707,480
Int. Cl.² A61B 5/04
U.S. Cl. 128—2.1 B 17 Claims



1. An apparatus for measuring the electroencephalographic activity of at least two lobes of the brain of a human trainee and providing the trainee with a sensory signal in response to a combination of amplitude and the inphase activity of each of the brain lobes comprising:
a plurality of electrical contacts coupled to the head of the trainee, said contacts being disposed adjacent to at least two lobes or areas of the brain, and to a neutral area of the trainee's head for obtaining at least two signals from said contacts which correspond to each of said at least two lobes or areas of the brain;
at least one amplifier for amplifying said at least two signals;
filter means coupled to said at least one amplifier for filtering the signals to obtain output signals each within a defined frequency range;
a summing amplifier coupled to said filter means for summing the in-phase signals of the defined frequency band of the amplified brain wave activity to produce a phase relevant measure of the trainee's brain wave activity;
audio signal means coupled to said summing amplifier for producing an auditory signal and modulating the volume of the auditory signal responsive to the amplitude and phase of the summed brain wave activity, so as to present to the trainee an audible signal which reflects the degree of phase parity and amplitude of the signals recorded from said at least two lobes or areas of the brain.

15. An apparatus for measuring the bioelectrical activity such as muscle activity of at least two regions of the body of a human trainee and providing the trainee with a sensory signal in response to a combination of amplitude and the inphase activity of each of the regions of the body comprising,
a plurality of electrical contacts for coupling to the body of the trainee, said contacts being disposed adjacent to at least two regions of the body, and to a neutral area of the trainee's body so as to obtain at least two signals from said contacts which correspond to each of said at least two regions of the body;
at least one amplifier coupled to said contacts for amplifying said at least two signals;
a summing amplifier coupled to said at least one amplifier for summing the in-phase signals of the amplified signals to produce a phase relevant measure of the trainee's bioelectrical activity;
filter means coupled to said summing amplifier for filtering the summed signals to obtain an output signal within a defined frequency range; and
signal means coupled to said filter means for producing a tactile signal and modulating the magnitude of the tactile signal responsive to the amplitude and phase of the summed bioelectrical activity so as to present to the trainee and tactile signal which reflects the degree of phase parity and amplitude of the signals recorded from said at least two regions of the body.

4,031,884

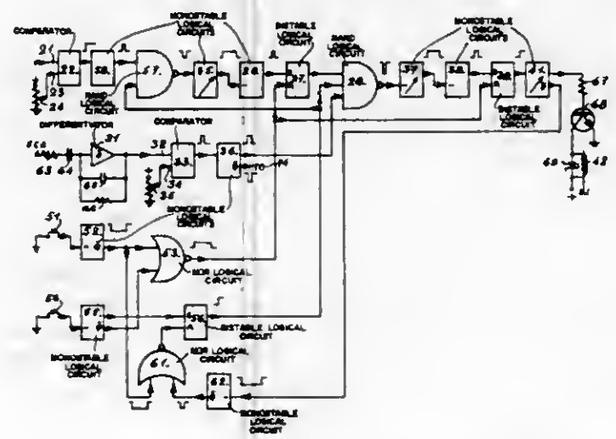
APPARATUS FOR CORRELATING THE RESPIRATORY AND CARDIAC CYCLES

Daniel Georges Christian Henzel, Noisy le Grand, France, assignor to Institut National de la Sante et de la Recherche Medicale, Paris, France

Filed June 2, 1975, Ser. No. 583,184
Claims priority, application France, June 7, 1974, 74.19669
Int. Cl.² A61B 5/02, 5/08
U.S. Cl. 128—2.05 R 9 Claims

1. An apparatus for correlating respiratory and cardiac cycles comprising:
means for defining a chosen period in the progress of the respiratory cycle as the end of a regulatable delay beginning when the ascending front of the inspiratorial pressure reaches a regulatable level,
means for defining a chosen period in the progress of the cardiac cycle as the end of a regulatable delay beginning when the differential dV/dt of the blood pressure reaches a regulatable level,

means for activating an operator upon the coincidence of



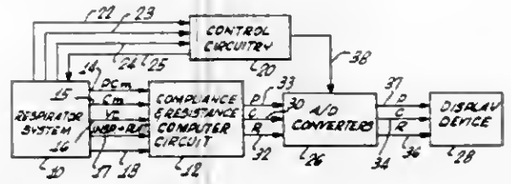
these two periods in time after a regulatable delay and during a regulatable period.

4,031,885

METHOD AND APPARATUS FOR DETERMINING PATIENT LUNG PRESSURE, COMPLIANCE AND RESISTANCE

James E. P. Davis, Santa Monica, and David M. Omelich, Cerritos, both of Calif., assignors to Puritan-Bennett Corporation, Kansas City, Mo.

Filed Oct. 15, 1975, Ser. No. 622,536
Int. Cl.² A61B 5/08
U.S. Cl. 128—2.08 13 Claims



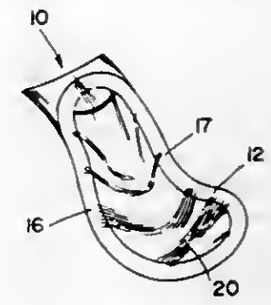
1. For use with a respirator system of the volume-compensated type in which a preselected volume of gas is delivered to a patient during an inspiration phase of the patient breathing cycle, apparatus for the determination of patient compliance and resistance comprising:
control means operable to initiate computation and display of patient compliance and resistance;
means for sampling the system pressure at the end of the inspiration phase;
means included within said control means for ensuring a plateau phase, following the inspiration phase and preceeding an expiration phase, long enough to allow the system pressure to equalize with the patient lung pressure;
means for sampling the system pressure at the end of the plateau phase, to obtain a measure of the lung presure at the end of the inspiration phase;
means for monitoring the actual volume of gas delivered to the patient; and
means for computing and displaying patient compliance, as derived from the monitored volume and the system pressure sampled at the end of the inspiration phase, and patient resistance, as derived from the monitored volume and the two sampled values of the system pressure.

4,031,886

OCCLUSIVE PESSARY

Vera B. Morhenn, 731 De Soto, Palo Alto, Calif. 94303

Continuation of Ser. No. 612,284, Sept. 11, 1975, abandoned. This application Aug. 30, 1976, Ser. No. 718,614
Int. Cl.² A61F 5/24
U.S. Cl. 128—130 13 Claims



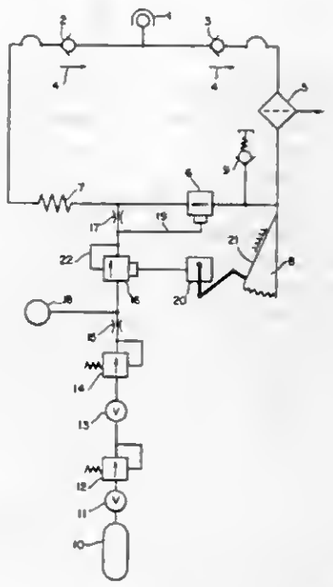
13. In combination, a pessary for the support and stabilization of the human uterus comprising a frame made of an elongated body of generally cross-section formed into a closed figure; and a bag made of thin and flexible material receiving said frame entirely therewithin, whereby said frame is totally enclosed within said bag.

4,031,887

BREATHING APPARATUS PROVIDING PRESSURE COMPENSATION

Imre Botos, Lidingo, and Ivan Aldine Hellquist, Rotebro, both of Sweden, assignors to AGA Aktiebolag, Sweden

Filed Feb. 26, 1976, Ser. No. 661,490
Claims priority, application Sweden, Mar. 14, 1975, 7502855
Int. Cl.² A62B 7/02
U.S. Cl. 128—142 R 8 Claims



1. Breathing apparatus for use under water, in a noxious atmosphere or under like conditions, said apparatus comprising:
a container for breathing gas,
a breathing circuit including connecting means, connected in said breathing circuit, for connection to the breathing organs of a user, carbon dioxide absorbing means connected in said breathing circuit and an expansible gas chamber connected in said breathing circuit,
a conduit for supplying breathing gas from said breathing gas container to said breathing circuit, and
means, including valve means connected in said conduit, for controlling the operation of said breathing circuit to

provide (i) a first operating period wherein said breathing circuit form a closed breathing circuit and a breathing gas is caused to circulate in said breathing circuit until the oxygen concentration of the circulating breathing gas is reduced to a predetermined value and (ii) a second operating period, which alternates with said first operating period, wherein the used breathing gas is released to the ambient environment and fresh gas is supplied to the breathing circuit;

wherein the improvement comprises:

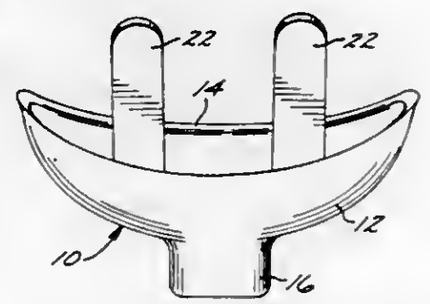
a dosing bottle, and means for, during the first operating period, connecting the bottle to the breathing gas container so as to store in the bottle fresh gas having a pressure exceeding the pressure in the breathing circuit and for, during the second operating period, connecting the bottle to the breathing circuit so as to supply the contents of the bottle to the breathing circuit and thus to the expansible gas chamber until the pressure in the dosing bottle is substantially equal to the pressure in the breathing circuit.

4,031,888

BREATHING MOUTHPIECE FOR UNDERWATER USE

William D. Walters, 2940 Andros St., Costa Mesa, Calif. 92626

Filed Jan. 5, 1976, Ser. No. 646,878
Int. Cl.² A62B 7/00
U.S. Cl. 128—145 A **5 Claims**



1. A breathing mouthpiece for underwater use comprising:

a housing having a flexible edge contoured to surround the wearer's mouth and fit snugly against the face in spaced relation to the wearer's lips to permit free movement of the lips, said housing further having a central port to breath through; and

a pair of elongated, flexible bit members affixed interiorly to said housing on opposite sides of said port and sufficiently laterally spaced apart on opposite sides of said port, and projecting beyond said edge sufficiently, to fit between molar teeth of the wearer, the portion of said housing between said bit members and adjacent said port being open to permit the wearer's lips to come together adjacent said port, said bit members being sufficiently thick to allow them to be gripped by molar teeth of the wearer and sufficiently thin to enable the wearer's lips to come together whereby said mask can be held in position while yet allowing free movement of the lips and limited movement of the front teeth.

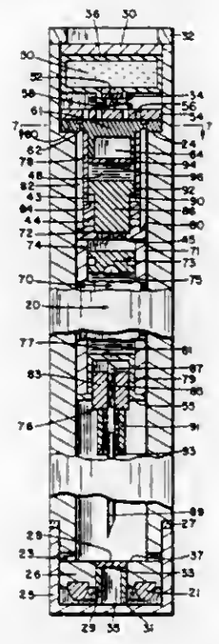
4,031,889

POWER OPERATED ASPIRATING HYPODERMIC SYRINGE

William Floyd Pike, 915 Alamosa, Carlsbad, N. Mex. 88220

Continuation-in-part of Ser. No. 559,961, March 25, 1975, Pat. No. 3,977,401, and a continuation-in-part of Ser. No. 593,771, July 14, 1975, Pat. No. 3,977,402. This application May 19, 1976, Ser. No. 687,893
Int. Cl.² A61M 5/00
U.S. Cl. 128—215 **7 Claims**

1. A disposable gas pressure operated hypodermic syringe for automatically inserting a hypodermic needle into tissue, drawing a vacuum in said needle, and finally injecting medicament into the tissue, comprising: an elongated tubular main housing having a sealed first end, being the triggering end, and a second end, being the needle end; a source of compressed gas housed in a first end portion of the main housing; an elongated unitary tube slidably supported in the main housing and extending from a first end which is proximate the source of compressed gas when the syringe is in the preset condition to a second end which is foreshortened from the second end of the main housing by the length of an extensible portion of the hypodermic needle, substantially; a sliding valve member having a cylindrical head and a cylindrical stem, said cylindrical stem having a diameter less than that of the head, said valve member cylindrical head having a hermetic fit in a reduced cross sectional portion of the elongated unitary tube, and the stem portion having a hermetic fit with a further reduced cross sectional portion of the elongated unitary tube, said sliding valve member being situated in the elongated unitary tube proximate the source of compressed gas; a medicament chamber support in the elongated unitary tube be-



tween the sliding valve member and the second end of said elongated unitary tube; a piston closing the end of the medicament chamber facing the sliding valve member; a hypodermic needle supported in the second end of the elongated unitary tube proximate the medicament chamber, said hypodermic needle having an elongated end portion housed in and facing the second end of the main housing; manual means for releasing the compressed gas into the first end of the main housing to propel the elongated unitary tube to the second end of the main housing and to insert the elongated end portion of the hypodermic needle into tissue; means for admitting gas pressure to the head of the sliding valve member on the side facing the medicament chamber, means for restricting the movement of the sliding valve member to a selected rate of travel, the movement of the stem of said sliding valve producing a vacuum in the medicament chamber thereby effecting the function of aspirating, means controlled by the sliding valve member when it has completed the aspiration stroke, substantially, for admitting gas pressure into the medicament chamber to inject the medicament into tissue.

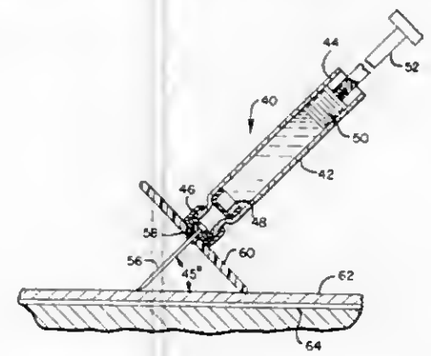
4,031,890

SAFETY I. V. INJECTOR

Gerlof Homan, St. Louis, Mo., assignor to Survival Technology, Inc., Bethesda, Md.

Filed Jan. 14, 1976, Ser. No. 648,972
Int. Cl.³ A61M 5/32
U.S. Cl. 128—215 **3 Claims**

1. An I.V. injector having a cylindrical barrel open at one end and closed at the other end by sealing means, a cannula mounted on the closed end outwardly of the sealing means, a plunger slidably carried in the open end of the barrel, a chamber formed in the barrel between the plunger and the sealing means, said chamber being adapted to receive a high concentrate I.V. medicament, and means at the closed end of the barrel to prevent the presentation of the cannula at an included angle between the cannula and the patient's blood vessel of less than 45°, thus preventing proper intravenous



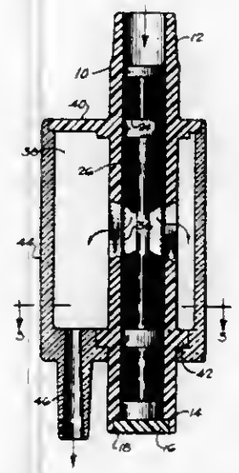
injection of the aforesaid medicament into a patient by causing the user to become aware that the usual intravenous injection procedure cannot be followed thereby inducing the user to check the injector, said means comprising spacer means mounted on the closed end of the barrel and extending perpendicularly outward from the longitudinal axis of the barrel a distance whereby the included angle between the cannula and the patient's blood vessel upon presentation of the cannula for injection will be at least 45° thereby making an intravenous injection impractical due to the steep angle of entry.

4,031,891

AIR ELIMINATING FILTER

Thurman S. Jess, Mundelein, Ill., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Nov. 3, 1975, Ser. No. 628,435
Int. Cl.² A01M 5/16
U.S. Cl. 128—214 R **2 Claims**



1. An air-eliminating filter for intravenous liquids comprising:

an elongated, hollow, tubular filter support member defining inlet means at one end thereof and closed at its other end, a plurality of circumferentially-spaced, longitudinally extending ribs defined along an intermediate portion of said tubular member, and circumferentially spaced window portions defined between said ribs to permit communication between the interior and exterior of said tubular support member;

a tubular, hydrophilic filter element capable of passing aqueous liquid therethrough when wet with said liquid, while simultaneously blocking the flow of air, positioned wthin said tubular member in coaxial relationship thereto, said hydrophilic filter element being carried by a central portion of said ribs to occlude central portions of said window openings;

a pair of tubular, hydrophobic filter elements capable of repelling aqueous liquid and passing air therethrough, each being positioned adjacent an end of said hydrophilic tubular filter element, said hydrophobic filter elements being carried by end portions of said ribs to block flow through end portions of said window openings,

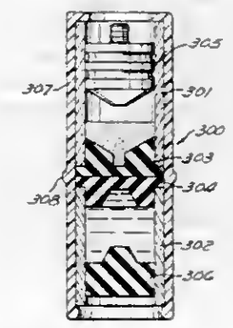
and manifold means mounted on said tubular member to enclose said hydrophilic filter but not to enclose said hydrophobic filters, said manifold means including outlet means to discharge liquid therefrom.

4,031,892

TWO-CHAMBER MIXING SYRINGE

Alfred A. Hurschman, Hudson, Ohio, assignor to Ampoules Corporation, Hudson, Ohio

Division of Ser. No. 489,746, July 18, 1974, Pat. No. 3,946,732, which is a continuation-in-part of Ser. No. 386,594, Aug. 8, 1973, abandoned. This application Feb. 13, 1976, Ser. No. 657,860
Int. Cl.² A61M 5/00
U.S. Cl. 128—218 M **9 Claims**



1. A two-chamber mixing vial comprising:

a. a glass cylinder;

b. closure means closing one end of said cylinder;

c. an end diaphragm closing the other end of said cylinder; and

d. a stationary intermediate diaphragm within said cylinder separating the interior of the cylinder into first and second chambers respectively defined by said closure means and intermediate diaphragm and by said intermediate diaphragm and end diaphragm; said cylinder and intermediate diaphragm having coacting parts that comprise means for locking the intermediate diaphragm against axial movement toward the said plunger during a mixing operation and during a dispensing operation.

4,031,893

HYPODERMIC INJECTION DEVICE HAVING MEANS FOR VARYING THE MEDICAMENT CAPACITY THEREOF

Sheldon Kaplan, Potomac; George B. Calkins; Stanley J. Sarnoff, both of Bethesda, and N. Lawrence Dalling, Wheaton, all of Md., assignors to Survival Technology, Inc., Bethesda, Md.

Filed May 14, 1976, Ser. No. 686,636
Int. Cl.² A61M 5/00
U.S. Cl. 128—218 F **6 Claims**

1. In a hypodermic injection device comprising a gun, a cartridge holder in operative relationship to the gun, a cartridge within the holder, said gun comprising a sleeve open at one end thereof, a plunger positioned within the sleeve, spring power means acting on said plunger tending to move it out the open end of the sleeve, restraining means cooperating with

said plunger to prevent plunger movement, safety means acting on said restraining means to render it inoperative, said cartridge holder comprising a hollow shell acting as a prolongation of the gun sleeve, said cartridge including an ampoule comprising a hollow cylindrical sleeve, a piston slidably positioned in one end thereof and means mounting a cannula extending from and closing off the other end, a medicament chamber formed between the piston and the cannula, the

cartridge fitting within the cartridge holder with the free end of the cannula within the end of the holder remote from the gun, a resilient sheath covering the cannula to maintain the cannula in sterile condition, the improvement comprising:

means positioned between the outer face of the piston and the adjacent end of the plunger to control the position of the piston within the ampoule sleeve thus determining the volume of the medicament chamber and thus the quantity of medicament carried in the syringe.

4,031,894

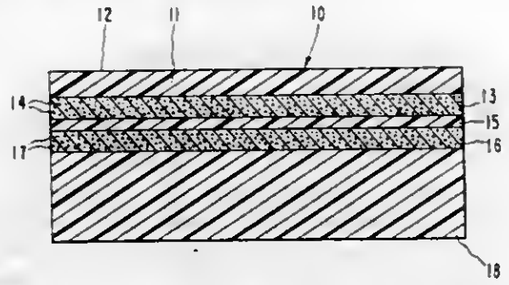
BANDAGE FOR TRANSDERMALLY ADMINISTERING SCOPOLAMINE TO PREVENT NAUSEA

John Urquhart; Santosh Kumar Chandrasekaran, both of Palo Alto, and Jane Elizabeth Shaw, Atherton, all of Calif., assignors to Alza Corporation, Palo Alto, Calif.

Continuation-in-part of Ser. No. 638,947, Dec. 8, 1975, abandoned, which is a continuation-in-part of Ser. No. 547,504, Feb. 6, 1975, abandoned. This application Sept. 7, 1976, Ser. No. 721,602

Int. Cl.² A61F 7/02; A61L 15/06

U.S. Cl. 128—268 **12 Claims**



1. A therapeutic system in the form of a bandage for administering scopolamine base through unbroken skin to inhibit emesis and nausea for a prolonged time period comprising a sandwich-type laminate of:

a. a backing lamina that is substantially impermeable to scopolamine base, one face of which forms the top of the bandage:

b. a scopolamine base reservoir lamina adjacent the opposite face of the backing lamina comprising

i. about 0.2 to about 3 mg scopolamine base dispersed in a gelled mixture of

ii. mineral oil of about 10 to about 100 cp at 25° c, and polyisobutene;

c. a microporous membrane lamina adjacent and below the scopolamine reservoir lamina through which the scopolamine base is released from the reservoir lamina after the bandage is affixed to the skin at a substantially constant rate in the range of about 0.3 to about 15 μg/hr; and

d. a contact adhesive lamina adjacent and below the microporous membrane lamina by which said bandage is affixed to the skin comprising about 10 to about 200 μg scopolamine base per cm^2 effective surface area dispersed in a gelled mixture of said mineral oil and said polyisobutene.

4,031,895

SYRINGE ASSEMBLY PACKAGE

Robert E. Porter, 1734 Machado St., Oceanside, Calif. 92054

Filed Apr. 5, 1976, Ser. No. 674,033

Int. Cl.² A61M 5/18; B65D 81/32

U.S. Cl. 128—272.1 **11 Claims**

1. A prepackaged syringe assembly comprising a support structure, a syringe having a discharge needle and a barrel adapted to be loaded with a first substance and a container adapted to be loaded with a second substance, said syringe and said container being mounted in said structure for relative slidable and rotational displacement, said syringe having its needle tip within said structure and said container mounting within the structure a sealing body wherein the needle tip is imbedded in one relative position of rotation of said syringe and container for isolation of said substances while in the structure and also mounting a puncturable closure element laterally spaced from said sealing body adapted to permit entry of the needle tip into the container in another relative position of rotation of the syringe and container in the package for admixture of said substances and reloading of the syringe with the mixture, said syringe being separable from the remainder of the assembly for immediate use after said reloading.

4,031,896

SURGICAL SUCTION SETS

Per Magnus Lennart Ronnmark, Gislaved, Sweden, assignor to Molnlycke AB, Gothenburg, Sweden

Filed Oct. 17, 1975, Ser. No. 623,500

Claims priority, application Sweden, Oct. 18, 1974, 7413157

Int. Cl.² A61M 1/00

U.S. Cl. 128—276 **10 Claims**

1. A surgical suction device for removing fluid from a wound and adapted to be connected to a suction pump by a hose pipe, said device comprising:

a tubular-shaped handle,

an inner tube extending from one end of said handle and having a suction opening at one end thereof and a tip at the other end thereof,

an outer tube surrounding said inner tube to form an annular space therebetween, said inner and outer tubes being movable relative to each other,

a plurality of openings formed in said channel for quickly removing large quantities of fluid from a wound,

said outer tube including at one end thereof a tapered section having a suction opening at one end and a seat member at its other end, and

the tip of said inner tube being movable into and out of contact with said seat member so that when said tip and said seat member are in contact with each other, a single tube suction function is obtained in that suction is applied only to said tip, and when said tip and said seat member are out of contact with each other, a sump suction function is obtained in that suction is applied to both said plurality of openings and said tip.

4,031,897

COLLECTOR FOR AMNIOTIC FLUID

Adan Graetz, Apartado Postal 374, Cuernavaca, Mor, Mexico

Filed Apr. 21, 1976, Ser. No. 679,060

Int. Cl.² A61F 5/44

U.S. Cl. 128—286 **13 Claims**

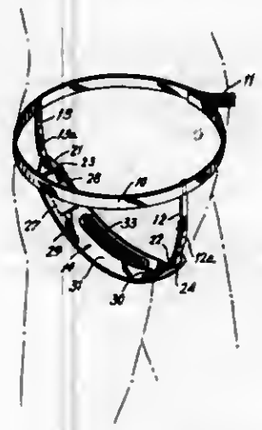
1. An article for collecting and retaining amniotic fluid discharged from an expectant mother, which comprises

a. body encircling support means,

b. a flat, flexible pocket-forming member engaged at forward and rearward ends by said support means,

c. said pocket-forming member having a fluid receiving opening in its upper portion,

d. a fluid receiving receptacle formed of lightweight, flexible, foldable material and having its open upper end secured to and communicating with said openings,



e. a flat pocket formed in said pocket-forming member, below said fluid receiving opening, for the reception and containment of said receptacle in a flat, folded condition,

f. said receptacle being quickly removable from said pocket while said article is being worn by the user, to place said receptacle in fluid receiving condition.

4,031,898

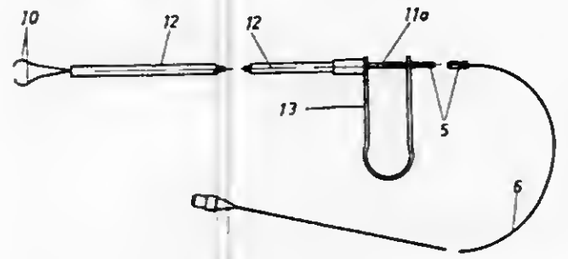
SURGICAL INSTRUMENT FOR COAGULATION PURPOSES

Siegfried Hiltebrandt, Aug.-Lammle-Str. 16, D-7134 Knittlingen, and Helmut Wurster, Mozartstr. 20, D-7519 Oberderdingen, both of Germany

Continuation of Ser. No. 529,042, Dec. 3, 1974, abandoned. This application Sept. 13, 1976, Ser. No. 722,926

Int. Cl.² A61N 3/04; A61B 17/38

U.S. Cl. 128—303.1 **1 Claim**



1. A coagulation probe having a head and having a heating element embodied within the head, the head being adapted to be heated up to a predetermined maximum temperature in a temperature range extending from about 110° C to about 150° C necessary for the coagulation of thermolabile tissue during a predetermined heating period and alternating cooling-off period for the head, the heating element being a part of a circuit energized by electrical current of an electrical voltage source and being adapted to be switched-off initiating and during the cooling-off period such that after this later period a sticking of tissue to the head is prevented, the said circuit having switch means for opening and closing said circuit adapted thereby to energize and deenergize respectively, the heating element, said switch means adapted to be automatically controlled by a settable electronic control means for closing said switch for a predetermined adjustable length of time and opening said switch for a predetermined length of time substantially equivalent to said cooling-off period and for working signal means giving signals at respectively a beginning and an end of said heating period, and giving a different signal for indicating the end of the cooling-off period.

4,031,899

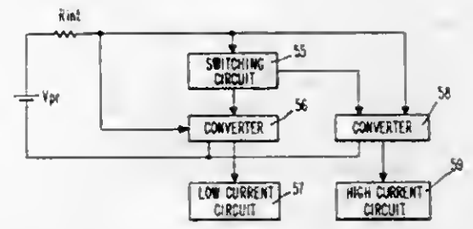
LONG LIFE CARDIAC PACER WITH SWITCHING POWER DELIVERY MEANS AND METHOD OF ALTERNATELY DELIVERING POWER TO RESPECTIVE CIRCUIT PORTIONS OF A STIMULUS DELIVERY SYSTEM

Alexis C. M. Renirie, Dieren, Netherlands, assignor to Vitatron Medical B.V., Dieren, Netherlands

Filed Jan. 22, 1976, Ser. No. 651,549

Int. Cl.² A61N 1/36

U.S. Cl. 128—419 PS **38 Claims**



1. Self contained pacer apparatus for delivering stimulus pulses, comprising:

a. a battery source which provides an output which varies with the loading thereof and having characteristics which vary as a function of its energy depletion;

b. a source sensitive stimulus pulse generating circuit;

c. a stimulus output circuit, driven by the output of said source sensitive circuit, for delivering said stimulus pulses; and

d. connecting means for connecting said source output respectively to said source sensitive circuit and to said stimulus output circuit so that the loading of each of said circuits has no effect upon said source output when connected to the other of said circuits.

4,031,900

BRASSIERE ADJUSTABLE IN HEIGHT, IN PARTICULAR FOR BATHING SUITS

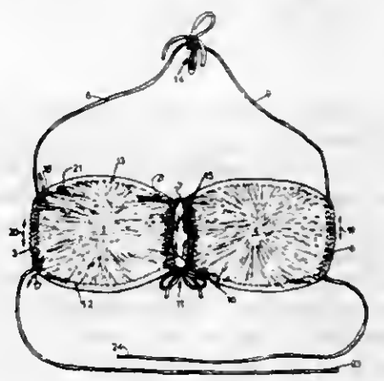
Christian Guidoni, Immeuble "Le Plein Horizon" 62 Chemin du Bois, Rillieux la Pape, Rhone, France

Filed June 14, 1974, Ser. No. 479,536

Claims priority, application France, June 15, 1973, 73.22580

Int. Cl.² A41C 3/00; A41D 7/00

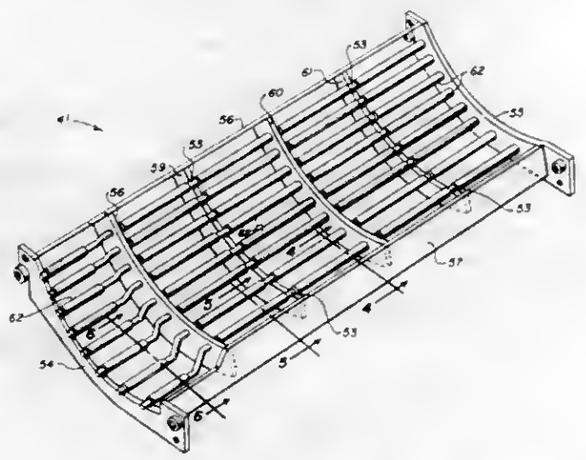
U.S. Cl. 128—493 **9 Claims**



1. A brassiere comprising, in combination:

first and second separate and individually and independently movable and adjustable fabric pieces;
said first fabric piece having tubular hems at opposite edges thereof;
said second fabric piece having tubular hems at opposite edges thereof;
said first and second fabric pieces comprising two surfaces of fabric which constitute pouches each of which has a substantially rectangular shape on which said tubular hems border the vertical sides thereof, and on which the upper horizontal side thereof is provided with a flat seam, and on which the lower horizontal side thereof has a hem inside of which an elastic means is provided;
said elastic means being connected to the fabric near the corners of said rectangular surface;
first means slidably disposed through a tubular hem of said first fabric piece and through a tubular hem of said second fabric piece for independently adjustably and removably interconnecting said first and second fabric pieces at adjacent edge thereof and for providing an adjustable and variable space between said adjacent edges of said first and second separate and individually and independently movable and adjustable fabric pieces;
a first elongated member slidably disposed through the other tubular hem of said first fabric piece;
a second elongated member slidably disposed through the other tubular hem of said second fabric piece; and
the two ends of said first elongated member being removably and adjustably connected to the two ends of said second elongated member for independently adjustably and removably interconnecting said first and second fabric pieces at the remote edges thereof and for facilitating easy removal of said brassiere from the wearer thereof.

4,031,901
CONCAVE FOR AN AXIAL FLOW TYPE COMBINE
Edward W. Rowland-Hill, Lancaster, Pa., assignor to Sperry Rand Corporation, New Holland, Pa.
Filed June 7, 1976, Ser. No. 693,676
Int. Cl.² A01F *12/24*
U.S. Cl. 130—27 T **40 Claims**

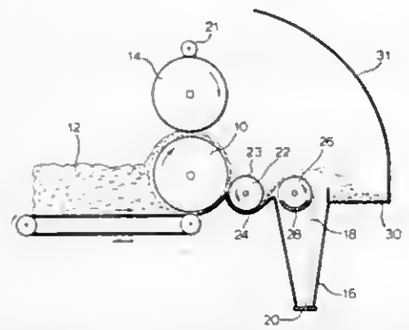


1. In an axial flow combine having a mobile frame adapted to be propelled forwardly over a field of grain bearing crop material, at least one longitudinally extending axial flow threshing and separating unit mounted within the frame, said unit including a generally cylindrical casing and a rotor mounted for rotation with the casing, said casing including an improved lower longitudinally extending concave, the rotor having means mounted on the periphery thereof and being operable upon rotation of said rotor and in cooperation with the improved concave to thresh grain from the unthreshed grain bearing crop material introduced into said unit and advance the crop material through said unit while subjecting the crop material to a threshing and separating action wherein threshed and separated grain material passes through said concave to a grain handling and cleaning means disposed underneath said axial flow unit, said improved concave comprising:
a. a plurality of longitudinally extending rod-like members;
b. at least two spaced apart transversely extending arcuate shaped support members for supporting said rod-like members, said rod-like members being arranged to define an arc about a common axis and aligned generally parallel to each other; and
c. one or more sleeve members rotatably mounted on at least one of said spaced apart rod-like members so as to define openings between adjacent ones of said members and facilitate the passage of threshed and separated crop material therethrough.

4,031,902
AROMATIC COMPOSITIONS
Edouard P. Demole, Geneva, Switzerland, assignor to Firmenich S.A., Geneva, Switzerland
Division of Ser. No. 482,776, June 24, 1974, Pat. No. 3,920,027, which is a division of Ser. No. 219,136, Jan. 19, 1972, Pat. No. 3,840,023. This application June 12, 1975, Ser. No. 586,384
Claims priority, application Switzerland, Jan. 19, 1971, 773/71; June 23, 1971, 9156/71; Jan. 11, 1972, 380/72
The portion of the term of this patent subsequent to Feb. 10, 1993, has been disclaimed.
Int. Cl.² A24B *15/04*
U.S. Cl. 131—17 R **3 Claims**

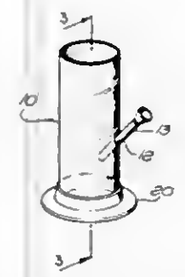
3. A tobacco flavouring composition which comprises octa-3,5-dien-2-one.

4,031,903
WINNOWING OF TOBACCO
Warren A. Brackmann, Cooksville, and Daniel Dilanni, Toronto, both of Canada, assignors to Rothmans of Pall Mall Canada Limited, Toronto, Canada
Filed Aug. 29, 1975, Ser. No. 608,842
Claims priority, application United Kingdom, Sept. 5, 1974, 38921/74
Int. Cl.² A24B *1/02*; **A24C** *1/02*; **A24B** *7/14*
U.S. Cl. 131—109 B **26 Claims**



1. A method for the production from a source of tobacco particles of a relatively wide and thin downwardly-flowing stream of tobacco particles moving at a speed in excess of that achievable by gravitational forces alone, which comprises:
forming from said source a broad stream of tobacco particles of width substantially equal to the width of said downwardly-flowing stream, said tobacco particles in said broad stream flowing at a predetermined speed in substantially separated condition one from another in a flow path intersecting a plane of flow of said downwardly-flowing stream,
rotating adjacent to and beneath said broad stream and at the upper end of said downwardly-flowing stream an air-permeable and tobacco-impermeable foraminous cylindrical surface of length substantially equal to the width of said broad stream about its axis parallel to said plane of flow of said downwardly-flowing stream at a peripheral speed at least equal to said predetermined speed and equal to the speed of particles in said downwardly-flowing stream,
subjecting the tobacco particles in said broad stream to air flow transverse to the direction of movement thereof towards said foraminous surface by suction air flow applied across said foraminous surface, to deflect tobacco particles from said broad stream into engagement with said foraminous surface,
gripping said deflected and engaged particles to said foraminous surface by said suction whereby said gripped particles assume the speed of said foraminous surface and remain in substantially separated condition,
transporting said gripped particles on said foraminous surface until the particles are moving in a substantially vertically-downwardly direction, and
releasing said transported particles from said suction grip when they are moving in said vertically downwardly direction to form said downwardly-flowing stream of tobacco.

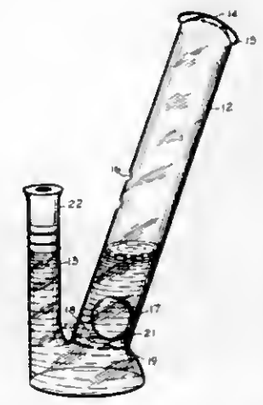
4,031,904
REMOVABLE WATER TIGHT BASE FOR BONG
Eric Karl, Los Angeles, Calif., assignor to Sarah's Family, Inc., Inglewood, Calif.
Filed Sept. 16, 1976, Ser. No. 723,875
Int. Cl.² A24F *1/30*
U.S. Cl. 131—173 **7 Claims**



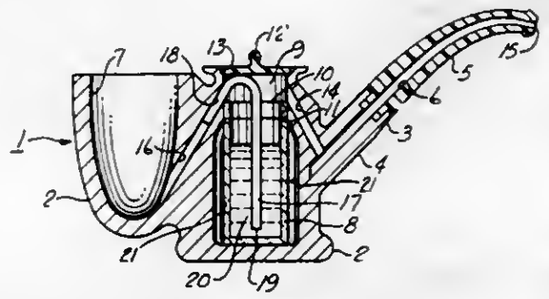
1. A device for filtering tobacco smoke through liquid comprising:
a first hollow tube having first and second open ends and an outer surface for maintaining a volume of filtering liquid and having an opening in the side thereof;
a second smoke conducting tube disposed through the opening in said first tube having one end disposed in the filtering liquid and the other end communicating with the tobacco;
sealing means having a circumferential flange having inner and outer surfaces and a mouth and adapted for detachable mounting to the bottom of said first tube for sealing said first end of said first tube; and
base means having a recess for receiving sealing means for providing additional pressure to said sealing means and for providing a support for the combination of said sealing means and said first tube.

4,031,905
SMOKING TUBE WITH CHECK VALVE
John C. Dunn, 1640 - W. 14th St., Davenport, Iowa 52804
Filed Sept. 11, 1975, Ser. No. 612,265
Int. Cl.² A24F *1/30*
U.S. Cl. 131—173 **2 Claims**

1. A smoking device comprising a hollow base to function as a reservoir for water, a hollow stem extending upwardly from said base, a bowl for holding smoking material, said bowl connected to the upper end of said stem and having a small aperture through the bottom thereof communicating through said stem to the inside of said hollow base, a mouthpiece tube extending upwardly from said hollow base, the cross-section of said mouthpiece tube being substantially greater than that of said stem, a check valve having a valve port and a sealing member, said valve port having an upwardly facing opening communicating between the inside of said mouthpiece tube and the inside of said hollow base, said sealing member being contained within said mouthpiece tube, said sealing member having a specific gravity somewhat greater than unity and being adapted to drop to a position over said opening for substantially restricting flow of water through said port, said mouthpiece tube having a mouthpiece opposite said hollow base, said smoking device to contain a sufficient amount of water to fill said hollow base and the adjacent portions of said stem and said mouthpiece tube to a level above said sealing member, and said sealing member being free to move upwardly above said port in response to inhalation through said mouthpiece to permit water to flow upwardly through said port to raise the level of water in said mouthpiece tube and being free to drop upon cessation of inhalation to prevent rapid reversal of flow of water through said port and upwardly into said stem.



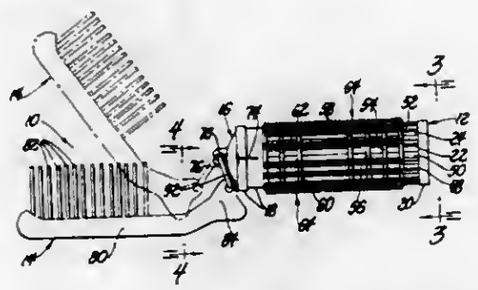
4,031,906
WATER PIPE
Lawrence Robert Knapp, 122 W. Edna St., Munhall, Pa. 15120
Continuation of Ser. No. 528,279, Nov. 29, 1974, abandoned, which is a continuation of Ser. No. 432,908, Jan. 14, 1974, abandoned. This application Mar. 1, 1976, Ser. No. 662,515
Int. Cl.² A24F *1/14*
U.S. Cl. 131—173 **1 Claim**



1. A water pipe comprising a solid one-piece pipe body with an upwardly open pipe bowl integrally formed therein, an upwardly open cylindrical chamber in said solid one-piece body beside said bowl with the cylindrical axis of said chamber also extending upwardly, a pipe stem extending from said body and having a passage therethrough communicating with said chamber, an upwardly open transparent liquid container received within said body and having a cylindrical upwardly open end received within said chamber below the point of communication of said passage with said chamber and in sealed relationship therewith for the full perimeter of said container end, said transparent liquid container having side wall portions thereof exposed through an opening in the walls

of said body to the exterior, tube means communicating the interior of said bowl with the interior of said container, and removable access means independent of said tube means and sealing the upwardly open end of said chamber without obstructing the open communication of said passage with said chamber to provide access to the interior of said chamber and said container.

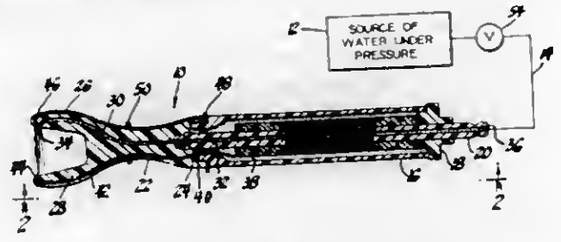
4,031,907
HAIR CURLING APPARATUS
William B. Rogers, Rte. No. 1, East Jordan, Mich. 49727
Filed July 6, 1976, Ser. No. 702,696
Int. Cl.² A45D *2/00*
U.S. Cl. 132—40 1 Claim



1. Hair curling apparatus, comprising generally cylindrical roller means having a plurality of apertures formed therein, and comb means usable to comb a tress of hair and pivotally connected to said roller means for rotation about an axis extending generally normal to the central axis thereof, said comb means comprising an elongated body portion having a plurality of teeth extending at substantially a right angle to said body portion, said comb means having at least two operating positions relative to said roller means, the body portion of said comb means extending away from said roller means in one of said operating positions thereby conditioning said comb means for use in combing selected strands of hair into a tress, said roller means being conditioned to accept and roll said tress of hair thereabout into at least one coil of hair while said comb means is in said one operatng position, said comb means being rotatable about its axis of rotation relative to said roller means to a second operating position, the teeth on said comb means penetrating the trees of hair on said roller means and being received in one of the apertures in said roller means so as to prevent uncoiling of the coiled tress of hair from said roller means, the teeth of said comb means being of thin generally columnar configuration substantially the entire length thereof and of a dimension longitudinally of the elongated body portion of said comb means not greater than the lateral dimension of the teeth thereby to minimize separation and spreading of said tress longitudinally of said roller means upon penetration of the teeth of said comb means into said tress as said comb means moves to said second position within the aperture in said roller means.

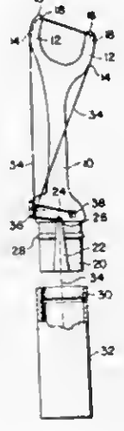
4,031,908
DENTAL APPLIANCE
Wen C. Ting, 31815 Maine, Livonia, Mich. 48150
Filed Sept. 4, 1975, Ser. No. 610,270
Int. Cl.² A61C *15/00*
U.S. Cl. 132—91 3 Claims

1. Mouth cleaning apparatus comrprising:
a source of liquid under pressure;
a hollow body;
a head mounted on the body, said head having a pair of spaced arms suited for supporting a length of dental floss between them, a first of said arms having an opening, and first conduit means connected with said opening for discharging a stream of liquid adjacent said arms;
an elongated tube having one end connected to the head so as to be supported in the body, the tube being connected to the source of liquid under pressure and having longitudinal second conduit means fluidly connected to the first conduit means for cooperating therewith for passing liquid therethrough from said source to the opening in the head;
plug means mounted on the body opposite the head for supporting the tube end opposite the end connected to the head, the plug being removeable from the body to permit removal of the tube therefrom, and to permit access into the body; and



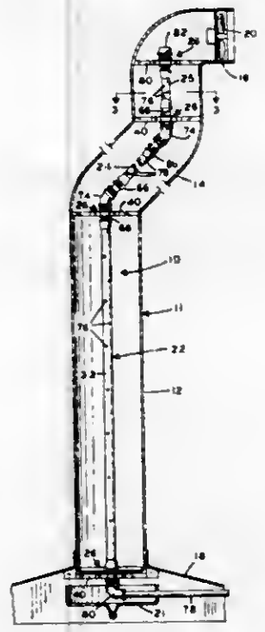
a length of dental floss disposed in the body in a stored position about the tube and the second conduit means, the floss being extended from said stored position in the body so as to be connected between the arms of the head in a position adjacent said head opening, the floss on one side of the arm being clamped betweem the head and the body and the floss on the opposite side of the arms being connected to the head whereby the floss between the arms is supported in a taut position for removing matter from the teeth of the user as a stream of liquid is being discharged adjacent the floss.

4,031,909
DENTAL FLOSS HOLDER AND DISPENSER
John J. Kelley, Harwinton, Conn., assignor to The Raymond Lee Organization, Inc., a part interest
Filed May 25, 1976, Ser. No. 689,731
Int. Cl.² A61C *15/00*
U.S. Cl. 132—91 3 Claims



1. A dental floss holder and dispenser comprising:
a forked member having a shank with two spaced outwardly disposed prongs at one end, said prongs having outer surfaces with longitudinally extending grooves and tips with transversely disposed aligned bores essentially coplanar with the grooves;
a longitudinally disposed sleeve secured at one end to the other end of the shank, said sleeve having a first conically shaped hollow bore extending longitudinally through the sleeve between its ends, the apex of the bore being disposed at one end of the sleeve, said sleeve having a second bore extending transversely from the outside surface to said apex:
a floss cutter secured to said shank adjacent said other end;
a hollow container with floss therein detachably engaging the sleeve, said floss passing through said first and second bores, along said grooves, through the aligned bores of the prongs and terminating at the cutter; and
manually vertically adjustable slidable means secured to said shank intermediate its ends for detachably engaging the floss before it reaches the prongs and after it leaves the prongs to draw taut that portion of the floss which extends between the aligned bores in the prongs.

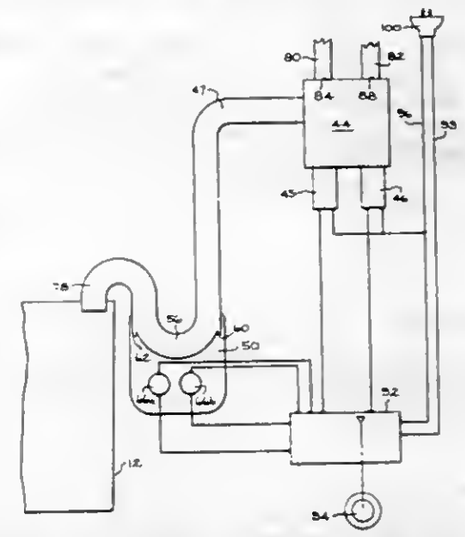
4,031,910
ARTICULATED SPRAY APPLICATOR PARTICULARLY SUITED FOR USE IN CLEANING FLUES AND THE LIKE
Richard L. Lawson, 3272 N. Greenwood Ave., Sanger, Calif. 93657
Filed Jan. 21, 1976, Ser. No. 651,032
Int. Cl.² B08B *3/02, 9/02*
U.S. Cl. 134—167 C 12 Claims



5. A spray applicator for the interior of a flue or the like having a plurality of angularly related successively interconnected segments comprising:
A. Spray conduits individual to the flue segments;
B. means interconnecting the conduits in successive fluid communication and mounting said conduits for independent rotation in their respective flue segments;
C. means for supplying the interconnected conduits with spray fluid under pressure; and
D. means for independently rotating the conduits in their respective flue segments.

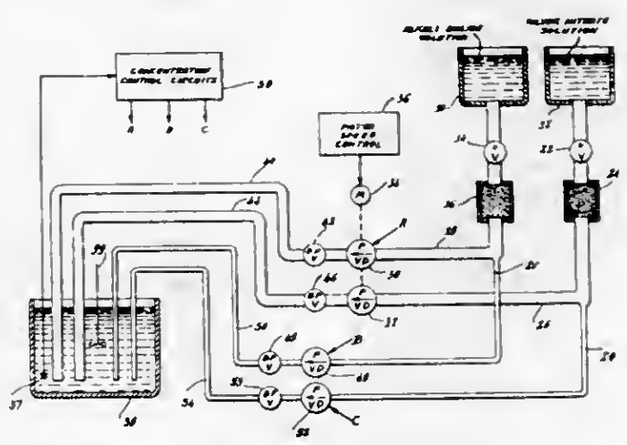
4,031,911
LAUNDRY MACHINE IMPROVED WATER TEMPERATURE CONTROL AND METHOD
Joseph H. Frazar, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.
Filed Apr. 30, 1976, Ser. No. 682,144
Int. Cl.² F16K *11/24*
U.S. Cl. 137—3 11 Claims

1. In an automatic clothes washer having a tub for containing water and a water mixing valve with a hot water inlet and a cold water inlet, control means for opening and closing at least one of said water inlets to regulate the mixed water temperature in the tub including a temperature responsive switch, a water conduit means from the water valve to the tub, the improvement comprising:
a water sampling tank having an inlet opening, an outlet opening, and a water chamber therebetween, said tank being in water flow communication with the conduit means and arranged to divert a small portion of the water passing through the conduit means through the chamber, said temperature responsive switch being in temperature sensing relationship with the water in the chamber and calibrated to actuate at one preselected temperature and



de-actuate at a preselected different temperature to regulate the mixed water temperature in the tub between the two temperatures.

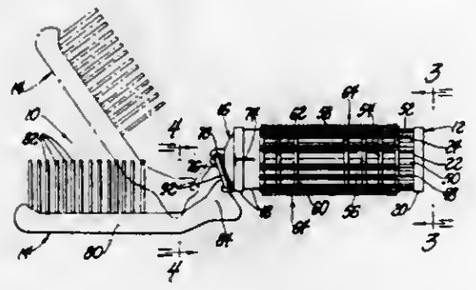
4,031,912
REACTANTS ADDITION AND CONCENTRATION CONTROL SYSTEM
Shau-Zou Lu, Vestal, and Henry Nowicki, Endwell, both of N.Y., assignors to GAF Corporation, New York, N.Y.
Filed June 4, 1976, Ser. No. 692,688
Int. Cl.² G05D *11/08*
U.S. Cl. 137—5 17 Claims



13. A method of controlling the concentration of a constituent of a product prepared by mixing a constituent-deficient component and a constituent-rich component in a vessel comprising the steps of:
establishing a primary addition rate at which each component is continuously delivered to the vessel during the mixing operation;
measuring the concentration of the constituent in the vessel during the mixing operation to determine whether the concentration deviates from a predetermined value;
intermittently supplying to the vessel secondary amounts of the component required to reduce the deviation where the deviation falls within the predetermined range; and
altering the primary addition rate of one of the components as a direct function of the deviation where the deviation falls outside the predetermined range.

of said body to the exterior, tube means communicating the interior of said bowl with the interior of said container, and removable access means independent of said tube means and sealing the upwardly open end of said chamber without obstructing the open communication of said passage with said chamber to provide access to the interior of said chamber and said container.

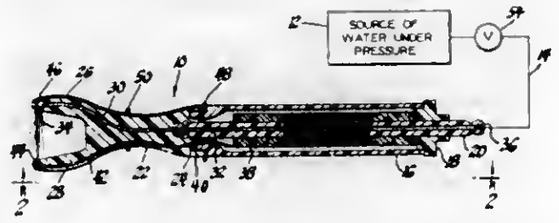
4,031,907
HAIR CURLING APPARATUS
William B. Rogers, Rte. No. 1, East Jordan, Mich. 49727
Filed July 6, 1976, Ser. No. 702,696
Int. Cl.² A45D *2/00*
U.S. Cl. 132—40 **1 Claim**



1. Hair curling apparatus, comprising generally cylindrical roller means having a plurality of apertures formed therein, and comb means usable to comb a tress of hair and pivotally connected to said roller means for rotation about an axis extending generally normal to the central axis thereof, said comb means comprising an elongated body portion having a plurality of teeth extending at substantially a right angle to said body portion, said comb means having at least two operating positions relative to said roller means, the body portion of said comb means extending away from said roller means in one of said operating positions thereby conditioning said comb means for use in combing selected strands of hair into a tress, said roller means being conditioned to accept and roll said tress of hair thereabout into at least one coil of hair while said comb means is in said one operatng position, said comb means being rotatable about its axis of rotation relative to said roller means to a second operating position, the teeth on said comb means penetrating the trees of hair on said roller means and being received in one of the apertures in said roller means so as to prevent uncoiling of the coiled tress of hair from said roller means, the teeth of said comb means being of thin generally columnar configuration substantially the entire length thereof and of a dimension longitudinally of the elongated body portion of said comb means not greater than the lateral dimension of the teeth thereby to minimize separation and spreading of said tress longitudinally of said roller means upon penetration of the teeth of said comb means into said tress as said comb means moves to said second position within the aperture in said roller means.

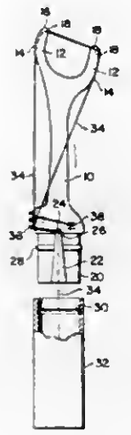
4,031,908
DENTAL APPLIANCE
Wen C. Ting, 31815 Maine, Livonia, Mich. 48150
Filed Sept. 4, 1975, Ser. No. 610,270
Int. Cl.² A61C *15/00*
U.S. Cl. 132—91 **3 Claims**

1. Mouth cleaning apparatus comrprising:
a source of liquid under pressure;
a hollow body;
a head mounted on the body, said head having a pair of spaced arms suited for supporting a length of dental floss between them, a first of said arms having an opening, and first conduit means connected with said opening for discharging a stream of liquid adjacent said arms;
an elongated tube having one end connected to the head so as to be supported in the body, the tube being connected to the source of liquid under pressure and having longitudinal second conduit means fluidly connected to the first conduit means for cooperating therewith for passing liquid therethrough from said source to the opening in the head;
plug means mounted on the body opposite the head for supporting the tube end opposite the end connected to the head, the plug being removeable from the body to permit removal of the tube therefrom, and to permit access into the body; and



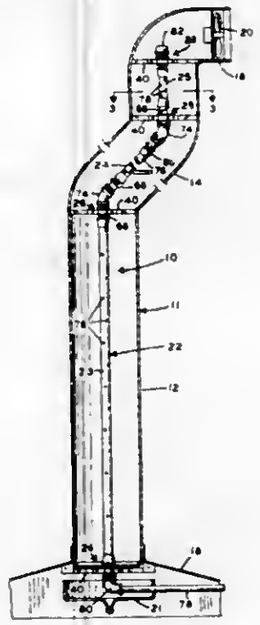
a length of dental floss disposed in the body in a stored position about the tube and the second conduit means, the floss being extended from said stored position in the body so as to be connected between the arms of the head in a position adjacent said head opening, the floss on one side of the arm being clamped betweem the head and the body and the floss on the opposite side of the arms being connected to the head whereby the floss between the arms is supported in a taut position for removing matter from the teeth of the user as a stream of liquid is being discharged adjacent the floss.

4,031,909
DENTAL FLOSS HOLDER AND DISPENSER
John J. Kelley, Harwinton, Conn., assignor to The Raymond Lee Organization, Inc., a part interest
Filed May 25, 1976, Ser. No. 689,731
Int. Cl.² A61C *15/00*
U.S. Cl. 132—91 **3 Claims**



1. A dental floss holder and dispenser comprising:
a forked member having a shank with two spaced outwardly disposed prongs at one end, said prongs having outer surfaces with longitudinally extending grooves and tips with transversely disposed aligned bores essentially coplanar with the grooves;
a longitudinally disposed sleeve secured at one end to the other end of the shank, said sleeve having a first conically shaped hollow bore extending longitudinally through the sleeve between its ends, the apex of the bore being disposed at one end of the sleeve, said sleeve having a second bore extending transversely from the outside surface to said apex;
a floss cutter secured to said shank adjacent said other end;
a hollow container with floss therein detachably engaging the sleeve, said floss passing through said first and second bores, along said grooves, through the aligned bores of the prongs and terminating at the cutter; and
manually vertically adjustable slidable means secured to said shank intermediate its ends for detachably engaging the floss before it reaches the prongs and after it leaves the prongs to draw taut that portion of the floss which extends between the aligned bores in the prongs.

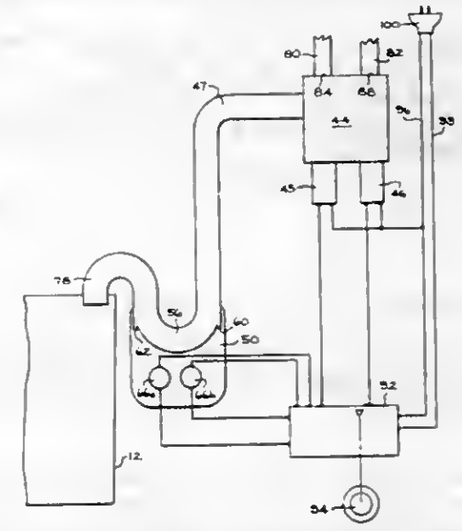
4,031,910
ARTICULATED SPRAY APPLICATOR PARTICULARLY SUITED FOR USE IN CLEANING FLUES AND THE LIKE
Richard L. Lawson, 3272 N. Greenwood Ave., Sanger, Calif. 93657
Filed Jan. 21, 1976, Ser. No. 651,032
Int. Cl.² B08B *3/02, 9/02*
U.S. Cl. 134—167 C **12 Claims**



5. A spray applicator for the interior of a flue or the like having a plurality of angularly related successively interconnected segments comprising:
A. Spray conduits individual to the flue segments;
B. means interconnecting the conduits in successive fluid communication and mounting said conduits for independent rotation in their respective flue segments;
C. means for supplying the interconnected conduits with spray fluid under pressure; and
D. means for independently rotating the conduits in their respective flue segments.

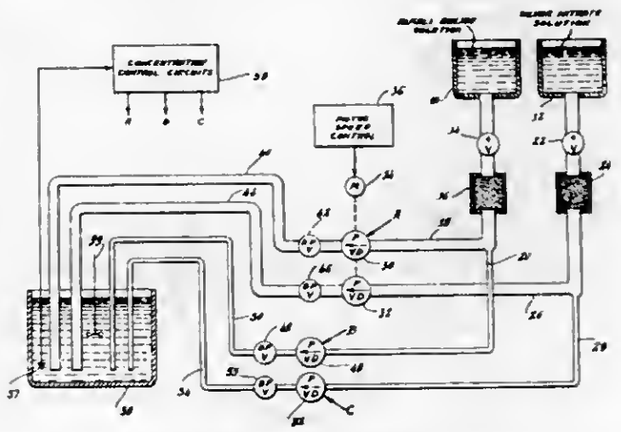
4,031,911
LAUNDRY MACHINE IMPROVED WATER TEMPERATURE CONTROL AND METHOD
Joseph H. Frazar, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.
Filed Apr. 30, 1976, Ser. No. 682,144
Int. Cl.² F16K *11/24*
U.S. Cl. 137—3 **11 Claims**

1. In an automatic clothes washer having a tub for containing water and a water mixing valve with a hot water inlet and a cold water inlet, control means for opening and closing at least one of said water inlets to regulate the mixed water temperature in the tub including a temperature responsive switch, a water conduit means from the water valve to the tub, the improvement comprising:
a water sampling tank having an inlet opening, an outlet opening, and a water chamber therebetween, said tank being in water flow communication with the conduit means and arranged to divert a small portion of the water passing through the conduit means through the chamber, said temperature responsive switch being in temperature sensing relationship with the water in the chamber and calibrated to actuate at one preselected temperature and



de-actuate at a preselected different temperature to regulate the mixed water temperature in the tub between the two temperatures.

4,031,912
REACTANTS ADDITION AND CONCENTRATION CONTROL SYSTEM
Shau-Zou Lu, Vestal, and Henry Nowicki, Endwell, both of N.Y., assignors to GAF Corporation, New York, N.Y.
Filed June 4, 1976, Ser. No. 692,688
Int. Cl.² G05D *11/08*
U.S. Cl. 137—5 **17 Claims**

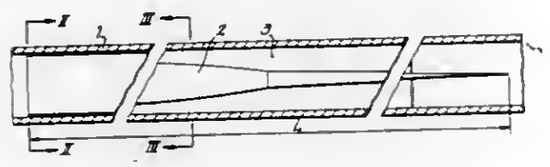


13. A method of controlling the concentration of a constituent of a product prepared by mixing a constituent-deficient component and a constituent-rich component in a vessel comprising the steps of:
establishing a primary addition rate at which each component is continuously delivered to the vessel during the mixing operation;
measuring the concentration of the constituent in the vessel during the mixing operation to determine whether the concentration deviates from a predetermined value;
intermittently supplying to the vessel secondary amounts of the component required to reduce the deviation where the deviation falls within the predetermined range; and
altering the primary addition rate of one of the components as a direct function of the deviation where the deviation falls outside the predetermined range.

4,031,913
FROTH FORMATION LIMITER FOR DRAWINGS-OFF DEVICE OF CARBON DIOXIDE CONTAINING BEVERAGES

Ramon Apellaniz, Lasne-Chapelle-Saint-Lambert, Belgium, assignor to Euracom S.A., Brussels, Belgium

Filed June 3, 1975, Ser. No. 583,459
Claims priority, application Belgium, June 5, 1974, 253663; May 29, 1975, 254366
Int. Cl.² B67D 1/12
U.S. Cl. 137—170.1 9 Claims

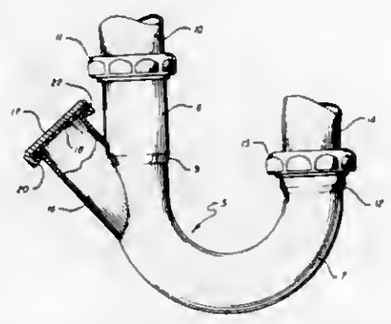


1. A foam formation limiter for drawing-off devices for containers of pressurized carbonated beverages, comprising:
a cylindrical tubular member having a beverage entrance end and defining a flow path for said beverage; and
a foam limiter comprising an elongated member extending centrally within said tubular member and defining with said tubular member and annular flow path for said beverage, said foam limiter being of greatest diameter at said entrance end and tapering to a point in the direction of beverage flow in said tubular member whereby to define, with said tubular member, an annular flow path of increasing sectional area and decreasing boundary surface area, said foam limiter tapering differently in first and second regions of its length said first region tapering convexly and according to a parabolic law and said second region tapering to said point according to a hyperbolic law.

4,031,914
SINK TRAP WITH CLEAN OUT OPENING

John E. Nerl, 4776 Lawndale Road, Syracuse, N.Y. 13215

Filed Dec. 31, 1975, Ser. No. 645,521
Int. Cl.² F16K 9/00
U.S. Cl. 137—247.51 1 Claim

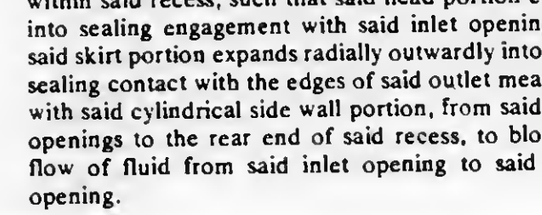


1. In a one piece sink trap, a tubular J-bend having a vertical leg portion terminating at its lower end in an arcuate portion, the arcuate portion bending through substantially 180° from its junction with the leg portion and terminating in an upwardly facing open end, the cross-sectional area of the J-bend being substantially constant from one end to the other, clean out means for the sink trap comprising a unitary tubular branch member that is integrally connected to and communicates with the leg portion of the J-bend adjacent its junction with the arcuate portion, the cross-sectional area of the branch member being substantially the same as that of the J-bend, the branch member extending obliquely upwardly and outwardly from its connection with the J-bend and having an upwardly facing open upper end, the opening at the upper end of the branch member being as large as the cross section of the remainder of the member, a manually removable non-threaded twist-off cap normally forming a closure for the upper end of the branch member, the upper end of the branch member being formed with an outwardly projecting flange having notches therein, the cap having inwardly projecting lugs at its lower edge dimensioned so as to pass through the flange notches whereby twisting the cap brings no lugs into securing engagement with the underside of the branch member flange, and means on the cap that coacts with the branch member upper end to seal the connection therebetween.

4,031,915
IRRIGATION SYSTEM FLUSHING VALVE

Bruce A. McElhoe, Walalua, and Joseph G. Tabrah, Kahuku, both of Hawaii, assignors to Hawaiian Sugar Planters' Association, Honolulu, Hawaii

Division of Ser. No. 522,912, Nov. 11, 1974, Pat. No. 3,921,905. This application June 12, 1975, Ser. No. 586,213
Int. Cl.² F16K 15/14
U.S. Cl. 137—529 3 Claims

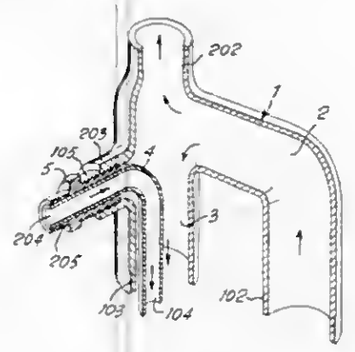


1. A springless valve for controlling the discharge of fluid from a conduit, said valve comprising:
a housing including:
a longitudinally extending, cylindrically shaped chamber having a cylindrical side wall portion and front and rear end wall portions,
an inlet opening associated at said front end wall portion of said chamber and being arranged to conduct pressurized fluid from said conduit to said chamber,
a pilot opening extending though said rear end wall portion of said chamber and being aligned with said inlet opening to conduct pressurized pilot fluid to said chamber, and
an outlet opening arranged in the side wall portion of said chamber and disposed axially rearwardly and radially outwardly of said inlet opening, to conduct pressurized fluid from said chamber,
a valve element slidably disposed in said chamber, said valve element being formed of resiliently deformable material and comprising:
a head portion disposed opposite said inlet opening, and
a cylindrical skirt portion integral with said head portion and defining a recess which opens generally rearwardly toward said pilot opening,
said skirt portion having a cylindrical outer wall free of outward projections and extending from said head portion to the end of the recess and lying generally opposite said cylindrical side wall portion of said housing;
said valve element being rearwardly slidable in response to urgings of pressurized fluid from said inlet opening to allow passage of fluid from said inlet opening to said outlet opening; and
said valve element being forwardly slidable and resiliently expandable, in response soley to sufficient urgings of pilot fluid pressure from said pilot opening acting within said recess, such that said head portion extends into sealing engagement with said inlet opening, and said skirt portion expands radially outwardly into direct sealing contact with the edges of said outlet means and with said cylindrical side wall portion, from said outlet openings to the rear end of said recess, to block the flow of fluid from said inlet opening to said outlet opening.

4,031,916
FITTING FOR A RADIATOR IN A SINGLE DUCT HEATING SYSTEM

Angelo Camerano, Savona, Italy, assignor to Monorapid S.A.S. di Camerano Angelo & C., Sanova, Italy

Filed Mar. 12, 1975, Ser. No. 557,868
Claims priority, application Italy, Mar. 13, 1974, 12530/74
Int. Cl.² F16L 41/02
U.S. Cl. 137—561 A 5 Claims



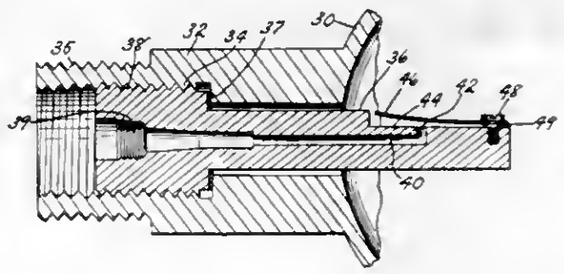
1. In a single duct heating system, of the type in which a single main flow pipe serves for supplying heating water to a radiator and for returning water therefrom, a fitting for joining a radiator to the main flow pipe, said fitting being in the form of a housing comprising:
a. an inflow duct connected to the main flow pipe through a pipe union;
b. an inlet duct for the radiator veering off from the said inflow duct at an upward angle and connected to an inlet pipe for the radiator through a pipe union, said inlet duct defining an inlet axis;
c. an outflow duct connected to the main flow pipe through a pipe union, said outflow duct being a continuation of the inflow duct veering off therefrom in a downward direction and defining an outflow axis coaxial with said inlet axis;
d. a further pipe union for connection to a return conduit from the radiator, said pipe union being arranged with its axis perpendicular to the outflow axis of the outflow duct;
e. a return duct consisting of an open ended pipe section disposed within the housing, said pipe section being tightly fitted by one of its ends into the said further pipe union and by the other of its ends into the outflow duct and having a bend therein of substantially 90° so that the said ends are substantially perpendicular to each other, whereby the return flow from the radiator flows in the same direction as the outflow in the outflow duct.

4,031,917
CONSTANT FLOW GAS REGULATOR

Charles R. De John, 35 Beverly Road, West Caldwell, N.J. 07006, and Edwin L. Heger, 271 Henry St., Paramus, N.J. 07652

Continuation-in-part of Ser. No. 458,520, April 8, 1974, abandoned. This application Sept. 8, 1975, Ser. No. 611,009
Int. Cl.² F16K 15/14, 17/24
U.S. Cl. 137—613 11 Claims

1. A constant-flow gas regulator apparatus adapted to be mounted inside of a vessel containing gas under high pressure comprising an elongated regulator body having at least one flat surface, a conduit through said body with one end thereof terminating in an opening in said flat surface in communication with the interior of the vessel and its other end communicating with the exterior of the vessel, and an elongated, radiused, resilient spring reed having a radius of curvature throughout its entire length and having one end thereof operably secured to said surface with a portion of said spring reed extending over the opening in said surface in spaced relation thereto such that the longitudinal axis of said reed is positioned above said opening, the surface area of said reed being about 15 to 100 times the surface area of said conduit opening, whereby said spring reed is maintained in spaced relation

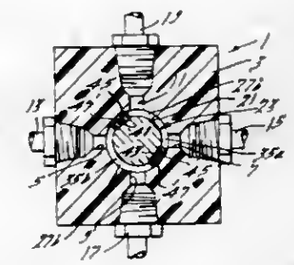


to said opening so as to maintain a substantially constant gas flow rate from the regulator as the internal gas pressure in the vessel decreases or fluctuates over a wide pressure range.

4,031,918
ROTARY SPOOL VALVE

Harlan R. Cagle, Cheboygan, Mich., assignor to Sahlin International, Inc., Birmingham, Mich.

Filed May 24, 1976, Ser. No. 689,007
Int. Cl.² F16K 11/07
U.S. Cl. 137—625.23 17 Claims



1. In a valve having a body with a cylindrical bore and a plurality of ports opening into said bore, a generally cylindrical spool assembly rotatably mounted in said bore to control flow between said ports, said spool assembly comprising a spool member and an elastomeric O-ring member mounted on the spool member, said O-ring member being stretched lengthwise of the spool member and secured thereto so that it extends substantially less than all the way around the circumference of the spool member, said O-ring member sealingly engaging the wall of said bore and being rotatable with the spool assembly to pass across from one side to the other of at least one of said ports and provide means for flow control for said one port.

4,031,919
ARTICULATED RISER

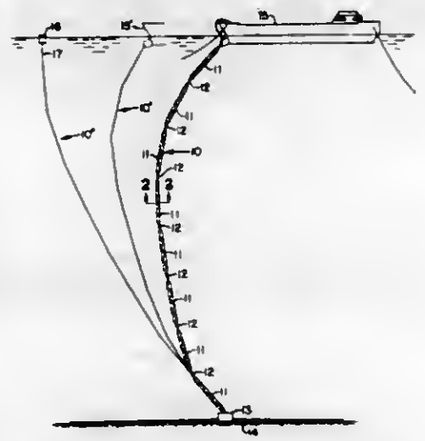
John E. Ortloff; Alfred S. Arcache, and Robert E. Haring, all of Houston, Tex., assignors to Exxon Production Research Company, Houston, Tex.

Continuation of Ser. No. 186,881, Oct. 6, 1971, abandoned. This application Aug. 18, 1975, Ser. No. 605,588
Int. Cl.² F17D 1/08
U.S. Cl. 137—799 9 Claims

1. An articulated marine riser apparatus comprising:
a. at least two elongate structures situated in end-to-end relation and arranged in a substantially vertical orientation, each said structure including at least three rigid, fluid-handling lines that are rigidly affixed thereto and extend the length thereof;
b. a universal joint connecting each adjacent pair of elongate structures, each said joint serving to transfer axial loads between the adjacent structures and including a

pair of transverse flexural axes to permit omnidirectional flexure;

c. at least three flexible fluid-handling lines that interconnect corresponding rigid, fluid-handling lines situated in the adjacent elongate structures;



d. a foundation structure situated on the floor of a body of water; and

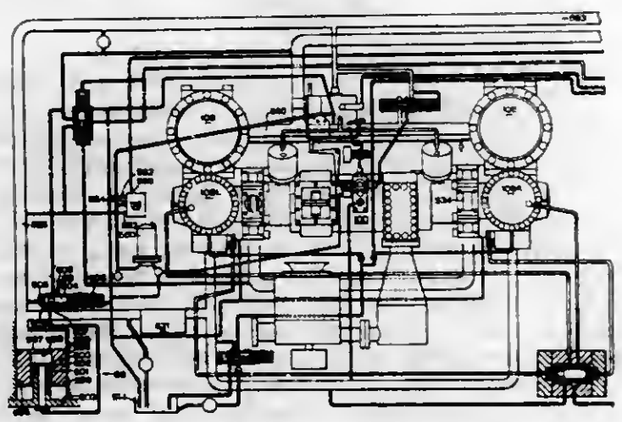
e. a universal joint interconnecting said foundation structure and the lowermost elongate structure.

4,031,920

PRESSURIZED HYDRAULIC SUMP SYSTEM

William Maurice Bard Fitzgerald, R.R. No. 1, Claremont, Ontario, Canada

Division of Ser. No. 305,453, Nov. 10, 1972, Pat. No. 3,841,797. This application Sept. 9, 1974, Ser. No. 504,723
Int. Cl.² F16L 55/04
U.S. Cl. 138—31 4 Claims



1. A pressurized hydraulic sump system comprising means defining a variable volume reservoir,

a sump manifold in fluid communication with said reservoir,

a control valve having a first port communicating with the sump manifold and having a movable valve member therein responsive to sump pressure in said manifold,

said means comprising a piston defining a movable wall of said reservoir which is backed by a fluid space and displaceable to vary the volume of the reservoir in response to differences between hydraulic pressure in said reservoir and hydraulic pressure within said fluid space, a source of fluid pressure,

the control valve being a shuttle valve, an outlet port connected to said fluid space, and a further port connected to said source of fluid pressure

said valve member being spring-biased and displaceable against its spring bias in response to sump pressure at said first port to a first position connecting said outlet port to said first port and a second position connecting said further port to said outlet port,

the piston being displaceable in one or other direction according to whether the sump pressure is greater or less than the value determined by the magnitude of said spring bias.

4,031,921

HYDROGEN-ISOTOPE PERMEATION BARRIER

Victor A. Maroni, Naperville, and Erven H. Van Deventer, Joliet, both of Ill., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Sept. 9, 1975, Ser. No. 611,722
Int. Cl.² B32B 15/18, 15/20
U.S. Cl. 138—140 2 Claims

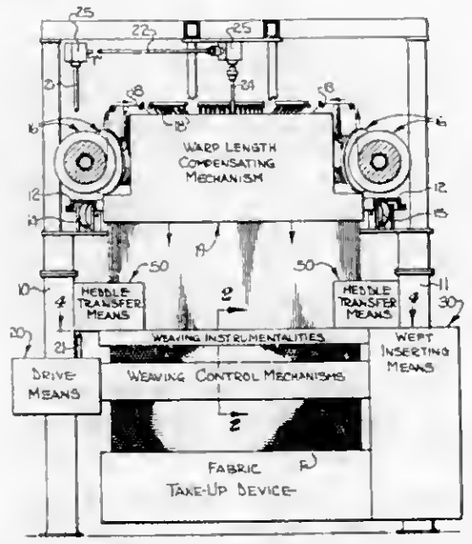
1. A composite tube for use as a hydrogen barrier in a system in which at least one surface contacts a molten salt of lithium containing tritium and an opposite surface contacts a liquid metal stream, said tube comprising an inner tubular layer of austenitic stainless steel, an intermediate, tubular layer of a bronze comprising about 10 weight % A1, 4 weight % Fe and the balance essentially Cu and a outer tubular layer of a refractory metal alloy selected from the group consisting of molybdenum base alloys, niobium base alloys and vanadium base alloys, said outer tubular layer being adapted for contacting said molten base of lithium metal.

4,031,922

VERTICALLY ARRANGED TRIAXIAL WEAVING MACHINE

Wayne C. Trost, Burns Darsie, and Frank P. Trumpio, all of Rockford, Ill., assignors to Barber-Colman Company, Rockford, Ill.

Filed Mar. 25, 1976, Ser. No. 670,341
Int. Cl.² D03D 41/00
U.S. Cl. 139—11 5 Claims



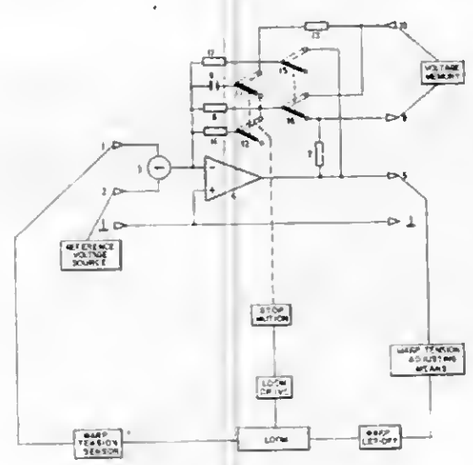
1. A weaving machine for making triaxial fabrics comprising creel means for supplying warp strands and mounted for rotation about a generally vertical axis, a plurality of elongate heddles arranged in weftwise rows spaced vertically from said creel means for guiding warp strands supplied from said creel means, means engaging warp strands intermediate said creel means and said heddles for guiding warp strands into an array of two generally parallel sheets of generally parallel warp yarns, means for moving said heddles longitudinally to form the warp strands into warp sheds and for moving said heddles and the warp strands guided thereby weftwise during weaving in timed relation with rotation of said creel means, and means for transferring said heddles from one end of one weftwise row to an adjacent end of another weftwise row.

4,031,923

WARP TENSION CONTROLLER

Adrianus Henricus van Duynhoven, Deurne, Netherlands, assignor to Rutl-Te Strake B.V., Deurne, Netherlands

Filed Dec. 18, 1975, Ser. No. 641,987
Claims priority, application Netherlands, Feb. 25, 1975, 7502246
Int. Cl.² D03D 49/06
U.S. Cl. 139—97 2 Claims



1. A warp tension controller for a loom, comprising a warp tension sensor for generating a first signal which is a measure of the warp tension, a source of a reference signal, means for comparing said signals and producing an output signal representing deviation of said first signal from said reference signal, an operational amplifier having an inverting input connected to receive said output signal, and having an output connected to means for adjusting the warp tension, and a feedback circuit connected between said input and said output of said amplifier, comprising a resistor in parallel to an integrating capacitor, wherein the improvement comprises a voltage memory having an input connected to the output of said amplifier, for producing a sustained output voltage equal to the voltage applied to its input when the loom is running, and a switch which during slower than normal operation of the loom connects a relatively small resistance between the input and the output of said amplifier, disconnects said capacitor from the output of said amplifier and connects it to the output of said voltage memory, to apply to said capacitor a voltage equal to the voltage which existed at the output of said amplifier when the loom was running at its normal operating speed.

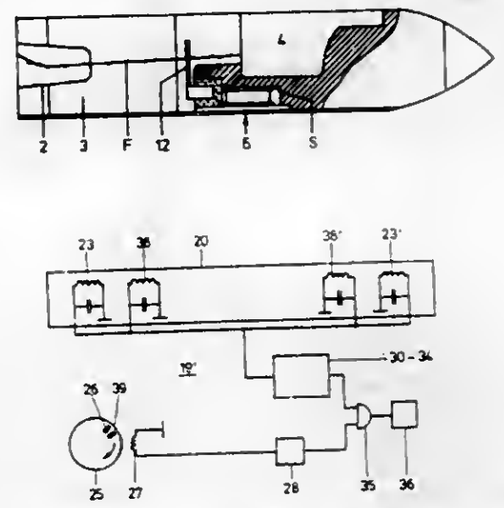
2. A warp tension controller for a loom, comprising a warp tension sensor for generating a first signal which is a measure of the warp tension, a source of a reference signal, means for comparing said signals and producing an output signal representing deviation of said first signal from said reference signal, an operational amplifier having an inverting input connected to receive said output signal, and having an output connected to means for adjusting the warp tension, and a feedback circuit connected between said input and said output of said amplifier, comprising a resistor in parallel to an integrating capacitor, wherein the improvement comprises a voltage memory having an input connected to the output of said amplifier, for producing a sustained output voltage equal to the voltage applied to its input when the loom is running and a switch which, while the loom is stopped, disconnects said capacitor from the output of said amplifier and connects it to the output of said voltage memory, to apply to said capacitor a voltage equal to the voltage which existed at the output of said amplifier when the loom was running.

4,031,924

ELECTRONIC EQUIPMENT FOR MONITORING YARN TRAVEL ON A TEXTILE MACHINE

René Domig, Kusnacht; Ernst Morf, Zurich, and Erich Loepfe, Zollikerberg, all of Switzerland, assignors to Aktiengesellschaft Gebrueder Loepfe, Wetzikon, Switzerland

Filed Apr. 8, 1976, Ser. No. 675,140
Claims priority, application Switzerland, Apr. 23, 1975, 5200/75
Int. Cl.² D03D 51/18, 51/34, 51/40
U.S. Cl. 139—336 12 Claims



1. Equipment for monitoring the yarn travel on a textile machine, comprising piezoelectrical yarn sensing means intended to be arranged at a moving part of the textile machine, and electronic receiving means intended to be mounted outside said moving part of the textile machine; said piezoelectrical yarn sensing means comprising a piezoelectrical transducer element and a yarn sensing member forming a mechanical vibratory system, and an induction coil having a winding electrically connected to the piezoelectrical transducer element; the induction coil winding and piezoelectrical transducer element constituting a first electrical resonant circuit tuned to one of the natural frequencies of said mechanical vibratory system; the electronic receiving means comprising at least one further electrical resonant circuit tuned to said natural frequency.

4,031,925

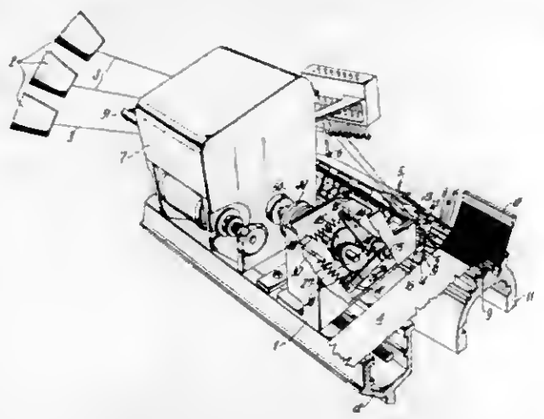
DEVICE FOR CUTTING THE WEFT IN A SHUTTLELESS LOOM HAVING A CONTINUOUS WEFT-SUPPLY MECHANISM

Nicola Santucci, Schio, Italy, assignor to Nuovo Pignone, S.p.A., Florence, Italy

Filed Apr. 29, 1975, Ser. No. 572,652
Claims priority, application Italy, Apr. 30, 1974, 22104/74
Int. Cl.² D03D 47/00, 47/38, 49/70
U.S. Cl. 139—429 5 Claims

1. Weft-cutting apparatus for a shuttleless loom of the type having a drive shaft and a continuous weft supply, in which a selected weft thread coming from a fixed bobbin mounted at a point spaced from the fabric prepared on said loom remains attached to the edge of said fabric during the movement of a picking needle inside rhe shed and until after said weft thread has been beaten into the fabric, comprised of an upper L-shaped lever, an oppositely disposed lower L-shaped lever, a stationary pin upon which said L-shaped levers are fulcrumed at their midpoint so that a gap is provided between said levers along the path of said selected weft thread and said levers are adapted to be pivoted about said fulcrum between open non-cutting position and closed cutting position, a first transverse cutting blade fixed to the inner end of the upper lever, a second transverse cutting blade pivoted to the inner end of the

upper lever and adapted to bear against said first transverse blade when the levers are in closed position, resilient means for urging said second transverse blade to pivot toward the first transverse blade when the levers are in closed position, a stub shaft mounted for rotation with said drive shaft, a first control cam keyed to said stub shaft, a second control cam



keyed to said stub shaft, a first roller mounted on the outer end of the upper lever to ride over the surface of the first cam, a second roller mounted on the outer end of the lower lever to ride over the surface of the second cam, and springs attached to said levers to urge said rollers against their associated cams so that said levers are pivoted from open position to closed position and return during each revolution of said stub shaft.

4,031,926

LOOM WITH MEANS FOR INTRODUCING THE FILLING THREADS BY MEANS OF A FLUID

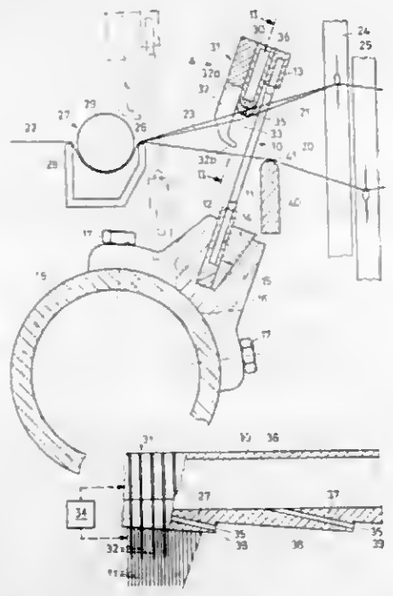
Hans Zollinger, Tann-Rutl, and Rolf Honegger, Durnten, both of Switzerland, assignors to Rutl Machinery Works Ltd., Rutl, Switzerland

Filed Sept. 8, 1975, Ser. No. 611,329

Claims priority, application Switzerland, Sept. 11, 1974, 012338/74

Int. Cl.² D03D *47/30*

U.S. Cl. 139—435 **5 Claims**



1. Loom having a means for inserting filling threads into a shed of warp threads by means of a gaseous fluid and having a reed for beating up the inserted filling threads, a supporting and drive mechanism for the reed, and temples for spreading the cloth in the width-way direction, the means for inserting the filling threads comprising a comb of parallel channel forming blades adapted to move with the reed and form a guide channel for the insertion of the filling threads by said gaseous fluid, the comb of channel forming blades being arranged on the side of the reed facing the fell of the cloth, and being carried by a slat of the reed which is remote from the supporting and drive mechanism for the reed and above the warp threads, said blades extending from the slat downwardly towards the warp threads, said supporting and drive mechanism including a shaft mounting the reed, said shaft having an axis of rotation positioned below the warp threads and forwardly of the fell so that said reed is moved through an arc which positions the channel forming blades within the warp shed during insertion of the weft and above the temples and the plane of the warp during beat-up of the weft.

4,031,927

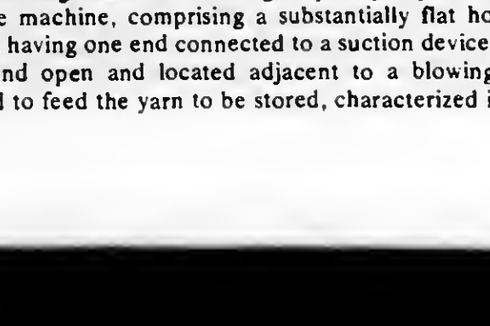
HEALD FRAME DRIVE OF THE SHEDDING MOTION OF WAVE-TYPE SHEDDING LOOMS

Jury Ivanovich Komarov, ulitsa Miklukho-Maklaya, 29, korpus 1, kv. 215; Alexei Nikolaevich Parshin, Nagornaya ulitsa, 34, korpus 1, kv. 53, and Ljubov Yakovlevna Gorbunova, Chertanovskaya ulitsa, 51, korpus 1, kv. 21, all of Moscow, U.S.S.R.

Filed Oct. 7, 1976, Ser. No. 730,462

Int. Cl.² D03D *47/26*

U.S. Cl. 139—436 **1 Claim**



1. A heald frame drive of the shedding motion of a wave-type shedding loom, comprising: guides; actuators accommodated in said guides for reciprocation in a vertical plane; heald frames secured to the top ends of respective actuators and having healds through which warp threads can be drawn; follower means carried by the bottom ends of said actuators; each said actuator having a longitudinal groove made therein; a spring accommodated in this groove; a plurality of cam plates adapted to move in a horizontal plane and be permanently engaged by said followers of respective actuators under the action of respective springs, to effect the reciprocation of said actuators jointly with said heald frames carried thereby, whereby sheds are formed of the warp threads; means for effecting the motion of said cam plates; each said spring being received in the longitudinal groove of a respective actuator so that the axis thereof is offset with respect to the vertical axis of a respective follower in the direction of movement of said cam plates.

4,031,928

STORING MEANS FOR FORMING LOOP-SHAPED YARN LENGTHS IN A TEXTILE MACHINE

Paul Gunneman, Helmond, Netherlands, assignor to Rutl-Te Strake B.V., Deurne, Netherlands

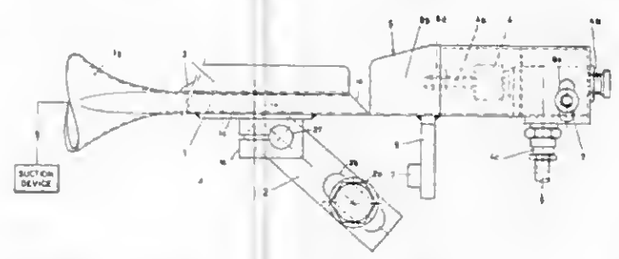
Filed Dec. 24, 1975, Ser. No. 644,185

Claims priority, application Netherlands, Apr. 9, 1975, 7504245

Int. Cl.² D03D *47/36*; B65H *17/32*

U.S. Cl. 139—452 **4 Claims**

1. A storing means for forming loop-shaped yarn lengths in a textile machine, comprising a substantially flat horizontal conduit having one end connected to a suction device and the other end open and located adjacent to a blowing nozzle adapted to feed the yarn to be stored, characterized in that a trough-like yarn-storing means is provided immediately above and substantially coextensive with said conduit, and said blowing nozzle is spaced from and directed toward the end of said



trough-like means, the axis of said nozzle extending just above the level of said conduit and at the level of said trough-like means.

4,031,929

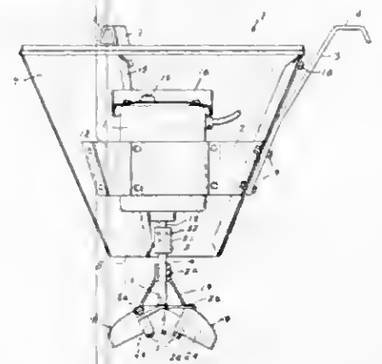
SPREADER FOR A GRANULAR PRODUCT

Wayne E. Cobb, and Edward W. Cobb, both of 358 Harrison St., Valparaiso, Ind. 46383

Filed Feb. 12, 1976, Ser. No. 657,393

Int. Cl.² A01C *19/00*

U.S. Cl. 239—684 **22 Claims**



1. A spreader for spreading a flowable granular product, said spreader comprising a hopper provided with a lower substantially unobstructed outlet, elongated shaft means supported by said hopper vertically through said outlet, said shaft means having an upper extremity disposed in the hopper for connection with means for rotating the shaft means and a lower extremity, a mounting carried by said lower extremity for rotation with said shaft means, a pair of elongated curved blades which are generally curved about the longitudinal axis of said shaft means, said blades having inner ends and outer free ends, and means connecting and securing only said inner ends to said mounting for pivotal adjustment at substantially diametrically disposed locations with respect to said axis of said shaft means, the arrangement being such that when the blades are adjusted to locate their free ends closer to said axis and said shaft means, mounting and blades are rotated as a unit and a product flows through the outlet the blades will direct the product for deposit in a smaller area about said axis then when said free ends are located a greater distance from said axis.

4,031,930

AUTOMATIC SHUT-OFF NOZZLE WITH LOCKABLE VAPOR RELIEF VALVE

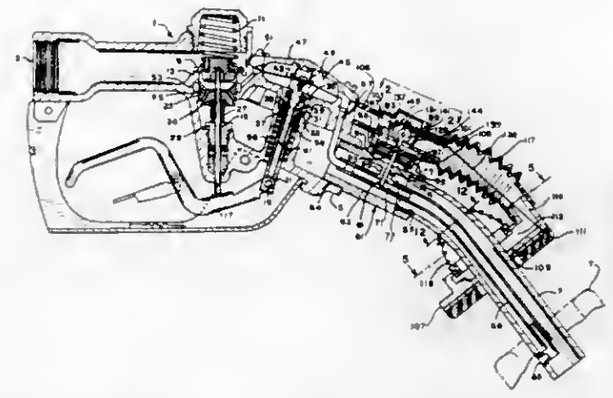
Grenville G. Sutcliffe, Ville Ridge, and Janis Dumpis, St. Aon, both of Mo., assignors to Husky Corporation, Pacific, Mo.

Filed Feb. 9, 1976, Ser. No. 656,433

Int. Cl.² B65B *3/18*, *57/14*

U.S. Cl. 141—207 **15 Claims**

1. In a liquid dispensing nozzle, a body having a inlet, an outlet and liquid passage means therebetween including a main valve controlling the flow of liquid from said inlet to said outlet, a spring biasing said main valve closed, a spout fixedly connected to said outlet and adapted for insertion in the inlet opening of a tank, manually actuated means for opening said main valve in opposition to said spring, Venturi means in said fuel passage means including a vacuum take-off, a vacuum chamber, means connecting said vacuum take-off to said vacuum chamber, means responsive to vacuum within said chamber caused by the flow of liquid through said Venturi means operatively connected to said manually actuated means for releasing the same and thereby permitting said spring to close said main valve, vent passage means communicating with said vacuum chamber to render said vacuum-responsive means inoperative when said vent passage means is open and having a port insertible in the tank with said spout, a normally open vent control valve in said vent passage means between



said port and said vaccum chamber, vapor conduit means adapted for sealed communication with the tank inlet opening, a pressure responsive element exposed directly to pressure in said vapor conduit means and arranged to close said vent control valve when vapor pressure in the tank and said vapor conduit excceds a predetermined value whereby said vacuum-responsive means becomes operable to release said manually operated means and thereby permits said spring to close said main valve, and latch means engaging said pressure-responsive element to hold said vent control valve closed except when said spout is inserted in a tank and releasing the same to open responsive to full insertion of said spout in a tank, whereby to maintain vacuum in said chamber and prevent opening of said main valve except when said spout is inserted in a tank and to break the vacuum in said chamber and thereby permit said main valve to be opened while said spout is inserted in a tank.

4,031,931

MORTISING MACHINE

Barry Vivian Balcombe, Cloverdale, Australia, assignor to Louisa Mary Balcombe, Cloverdale, Australia

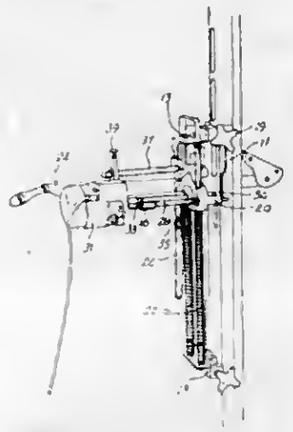
Filed Nov. 12, 1975, Ser. No. 631,392

Int. Cl.² B27F *5/00*

U.S. Cl. 144—83 **7 Claims**

1. A mortising machine comprising: a clamping means whereby the machine may be mounted upon a workpiece; a drive motor mounted such that its drive shaft is substantially perpendicular to the working face of the workpiece; a cutting head mounted to the end of said shaft adjacent the workface; a means to support said shaft between said motor and said head, said support means also providing support for said motor, said shaft and said motor being slidably mounted to said support means, to be movable perpendicular to the workface; feeding means between said support means and said motor such that said shaft can be fed through said support means; and a guide mounted to said clamping means, to which said support means is slidably mounted, such that said support means together with said shaft are capable of movement on said guide perpendicular to that produced by said feeding

means, wherein the latter includes a screw-threaded rod rotatably mounted to said support means and constituting a threaded engagement by a housing of said motor, the end of said rod mounted to said support means having a lugged formation thereon, at least one spring-loaded pawl mounted on one of said clamping means and said guide such that, said said



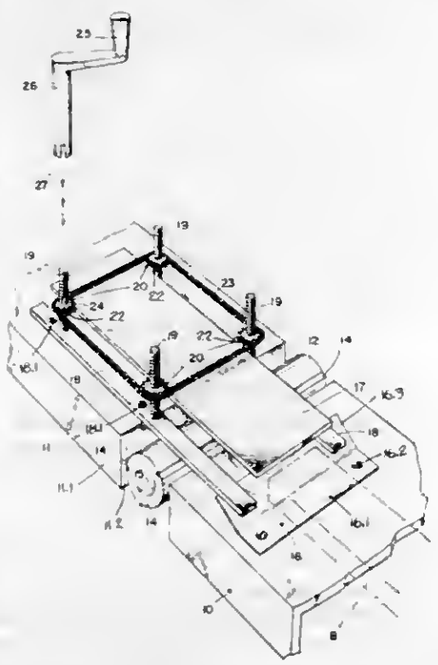
lugged formation is moved past said pawl in one particular direction, said rod is caused to rotate because of the engagement of said pawl with said lugged formation, and when the latter is moved in the opposite direction, there is only resilient engagement of said pawl with said lugged formation, with the absence of rotation of said rod.

4,031,932

PLANING ATTACHMENT FOR JOINTERS

Edgar F. Leasure, 4959 E. Lagoon Road, West Farmington, Ohio 44491

Filed June 28, 1976, Ser. No. 700,143
Int. Cl.² B27C 1/12
U.S. Cl. 144—117 R 10 Claims



1. A board planing attachment for a jointer having a bed with a flat upper surface and a rotary cutter adjacent to one end of said bed, comprising:

a pair of flat bars connected flatwise to said upper surface to extend in spaced side-by-side relation along the normal line of board movement over said flat upper surface,

a pair of screw rods carried by each bar to extend upwardly therefrom with their axes normal to said flat upper surface, said rods being held to said bars against rotation,

four sprocket gears, each having an internally threaded bub threaded on a respective rod,

a bed plate overlying said bed upper flat surface and having an end portion overlying said cutter, said bed plate having a lower flat surface and a slide connection with each sprocket hub, each slide connection being disposed at a respective one of four spaced peripheral portions of said bed plate with two on each side of the latter, so that as said sprockets are rotated said bed plate is moved vertically at each said connection, whereby the lower flat surface of said bed plate may be brought into parallelism with the upper flat surface of said bed by screw adjustment of respective sprockets,

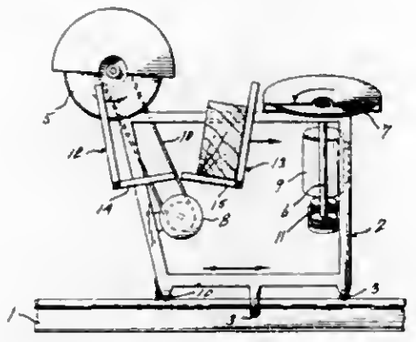
the lower flat surface of said bed plate providing a guide for the upper surface of a board slid along the upper flat surface of said bed to define a predetermined selectable distance between said lower flat surface and said cutter.

4,031,933

TENON CUTTING MACHINE WITH CIRCULAR SAWS

Ernest Piche, 2 Forget St., St. Agathe, Canada

Filed Oct. 21, 1976, Ser. No. 734,737
Int. Cl.² B27F 1/08
U.S. Cl. 144—198 R 5 Claims



1. A tenon cutting machine for cutting skew tenon faces at an end of a piece of timber, comprising a carriage reciprocatively displaccable in a predetermined direction, a timber carrying bench operatively holding a piece of timber in a direction lengthwise orthogonally to said predetermined direction, said bench being laterally slanted in said direction at a predetermined angle of skew transversely of the piece of timber, a first circular saw blade rotatively mounted on said carriage and displaceable therewith in said predetermined direction and extending in a plane orthogonally intersecting said piece of timber at one end thereof and parallel to said predetermined direction, a second circular saw blade rotatively mounted on said carriage and displaceable therewith in said predetermined direction, said second circular saw blade extending in a plane longitudinally inclined relative to the piece of timber and intersecting said one end thereof at the longitudinal tenon angle of the desired skew tenon faces, and drive means connected to said saw blades and operatively rotating the latter for cutting into said one end of the piece of timber upon bodily displacement of said saw blades and carriage in said predetermined direction.

4,031,934

ADJUSTABLE ROUTER BIT

Rigo Stadler, 65 Hillside Ave., New York, N.Y. 10040

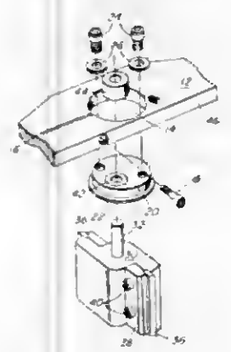
Filed Sept. 1, 1976, Ser. No. 719,622
Int. Cl.² B27C 5/00; B27G 13/12
U.S. Cl. 144—218 1 Claim

1. In a router bit having replaceable cutting blades in a cutter head secured to a rotatable shaft, a device for adjustment of the depth of cut of said cutting blades comprising:

a lengthwise oriented guide plate having a circular opening centrally located along its horizontal axis adapted to receive a circular, rotatable plate and having a tension groove emanating from said circular opening parallel to the lengthwise axis of said guide plate;

a clamp screw threadably inserted in the leading edge of said guide plate and extending through said tension groove to open and close said groove;

a circular plate rotatably mounted in said circular opening in said guide plate, having a lower perimeter edge slightly larger in diameter than said circular opening;



said circular plate being retained in said guide plate by its lower perimeter edge and by retaining screws and washers on its upper surface;

said circular plate being able to rotate when said clamp screw is loosened and being held in a fixed position when said clamp screw is tightened;

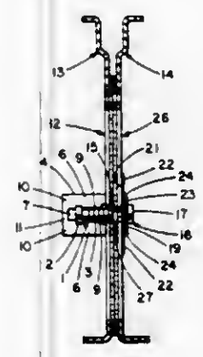
the shaft of said router bit, being eccentrically secured to said rotatable plate such that the depth of cut of said router bit is controlled by the rotation of said circular plate.

4,031,935

CAPTIVE FASTENER ASSEMBLY

Lary D. Jones; Robert H. van Outer, both of Lexington, Ky., and Ernest S. Kettelson, Minooka, Ill., assignors to Square D Company, Park Ridge, Ill.

Division of Ser. No. 597,062, July 18, 1975, Pat. No. 3,986,544. This application Apr. 21, 1976, Ser. No. 678,786
Int. Cl.² F16B 5/02, 39/00
U.S. Cl. 151—41.76 1 Claim



1. A captive fastener assembly comprising a two-piece fastening device, including first and second fastening members, said first and second fastening members being engageable for fastening and separable for unfastening, first and second captivating means, wherein said first fastening member includes a threaded shank extending from a first end and a radially enlarged head formed at the opposite second end, said radially enlarged head includes a pair of radially extending slots opening to diametrically opposite sides of the periphery of said head, said first captivating means includes a pair of spaced apart parallel guide rails defining a passageway therebetween, the respective inner edges of said guide rails facing said passageway being slidably received in respective ones of said pair of slots in said head of said first fastening member, said threaded shank being positioned in said passageway when said guide rails are slidably received in said slots, said threaded shank being then held substantially parallel to said guide rails for reciprocating movement between an fastening and an unfastening position, said second fastening means includes an internally threaded nut, a washer axially aligned with said nut and secured to one side thereof, said threaded shank of said first fastening member being threadably engageable with said internally threaded nut, said second captivating means includes a bracket member having an inner surface to face a work piece when secured thereto, a pair of substantially flat mounting ears projecting laterally from each opposite end of said bracket, an intermediate portion of said bracket spaced outwardly from the plane of the inner surface of said laterally projecting mounting ears, the inner surface of said intermediate portion being spaced from the inner surfaces of said laterally projecting mounting ears a distance slightly greater than the thickness of said washer to permit rotation thereof while restraining substantial reciprocal movement of said washer in an axial direction relative to said bracket when secured to said work piece, an opening through said intermediate portion of said bracket member to receive said nut therethrough when said washer is positioned adjacent said inner surface of said laterally projecting mounting ears, said nut being sufficiently elongated to project outwardly of said bracket member for engagement by external means to rotate said nut, including a first and second work piece to be fastened together, said first captivating means is secured to said first work piece with said first fastening member operably mounted therein, said second captivating means is secured to said second work piece with said second fastening member operably mounted therein, said captivating means being secured to said respective work pieces at locations whereby said first and second fastening members are aligned for fastening engagement when said work pieces are in position for fastening, opening means through said first and second work pieces to permit communication between said first and second fastening members when aligned for fastening engagement, wherein said pair of guide rails of said first captivating means are at least as long as said first fastening member including the combined length of said threaded shank and said head, and fastener dismounting means to enable removal of said first fastening member from said first captivating means and re-installation of said member in said first captivating means, including an integrally formed cross-arm member extending across said passageway and between said pair of guide rails at the end thereof remote from the portion securable to said work piece, said fastener dismounting means comprising a recess in one of said guide rails opening to said passageway adjacent said cross-arm member, the configuration and dimension of said recess conforming to the cross-sectional configuration and dimension of the head of said first fastening member to enable the portion of said head adjacent said recess to rotatably pass through said recess for removal of said member from said captivating means and re-installation therein.

4,031,936

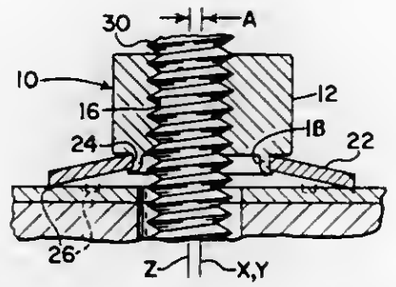
PREASSEMBLED SPRING WASHER FASTENER UNIT

Gary Martin Curtis, Elgin, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Nov. 14, 1975, Ser. No. 632,118
Int. Cl.² F16B 39/24
U.S. Cl. 151—37 1 Claim

1. A preassembled locking fastener unit inlcuding a nut member with a threaded bore formed therein, a compressible, generally conical spring washer with a substantially circular outer periphery and substantially circular, uninterrupted inner periphery formed by an aperture therein, the outer peripbery being concentric with the uninterrupted inner periphery, a generally annular means formed on the clamping surface of the nut with a central axis offset laterally from the central axis of the threaded bore of the nut, the outer periphery of the washer member including locking teeth means to retard free

movement of the washer relative to a work surface when associated therewith, the clamping surface of the nut further including a plurality of teeth integral therewith and spaced circumferentially about the axis of the threaded bore and positioned to overlie the inner marginal surface of the washer member, each tooth including a locking surface extending substantially perpendicular to the clamping surface of the nut and a camming surface, the associated inner marginal surface of the washer including locking recesses including camming surfaces and locking surfaces complementary to the camming



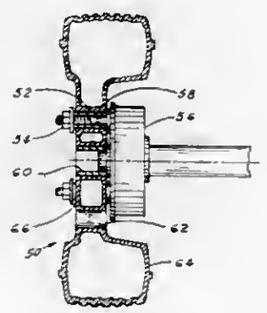
and locking surfaces of the teeth on the clamping surface of the nut wherein the substantially perpendicular surfaces are forward when the nut member is rotated in a tightening direction to urge the washer to rotate therewith in said tightening direction creating visible scribe marks in the workpiece, while the camming surfaces allow relative rotation between the washer and nut when the nut is rotated in an untightening direction but in such a manner that the washer is forced to move laterally across the workpiece thereby resisting unauthorized loosening of the joint formed thereby.

4,031,937

UNITARY TIRE-WHEEL

Edward J. Georgia, Los Altos, Calif.; Russell K. H. Eggers, Baltimore, and Ernest L. Molnar, Timoolum, both of Md., assignors to Zedron, Inc., Baltimore, Md.

Filed June 2, 1975, Ser. No. 582,624
Int. Cl.² B60B 9/22
U.S. Cl. 152—9 **6 Claims**



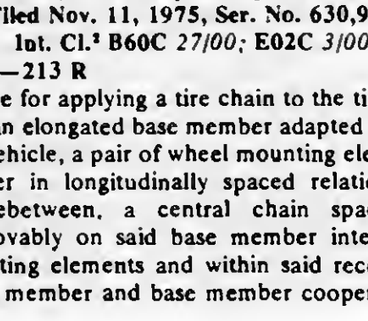
1. A one-piece inflatable tire-wheel having a pneumatic tire portion including a crown portion and a pair of spaced apart sidewalls which cooperatively define a toroidal air chamber coextendant thereabout, a wheel portion including a central hub and a pair of spaced apart sidewalls, each of said sidewalls of said wheel portion being integral with one of said sidewalls of said tire portion and extending therefrom to said central hub and being integral with said central hub, said sidewalls of said wheel portion defining a continuous air chamber therewithin and interconnecting said central hub and said pneumatic tire portion as a unitary one-piece tire-wheel, said air chamber of said tire portion opening into said air chamber of said wheel portion and providing unitary and continuous inflatable air chamber means within said tire-wheel for receiving pneumatic pressurization in maintaining the structural integrity of said tire-wheel to provide a pneumatically sustained tire-wheel, said wheel portion including a plurality of hollow structural reinforcing tie members disposed intermediate said central hub and said pneumatic tire portion, said tie members including wall portions integral with and extending between said sidewalls of said wheel portion in a manner to restrict lateral deformation thereof, and valve means for inflation of said air chamber means of said inflatable tire-wheel to the desired pneumatic pressure.

4,031,938

PNEUMATIC TIRE TREAD

Henri Verdier, Beauregard-l'Eveque, France, assignor to Compagnie Generale des Etablissements Michelin, raison sociale Michelin & Cie, France

Filed Feb. 26, 1976, Ser. No. 661,800
Claims priority, application France, Mar. 4, 1975, 75.06814
Int. Cl.² B60C 11/06
U.S. Cl. 152—209 R **3 Claims**



1. A pneumatic tire with a radial carcass reinforcement which is provided with a tread having circumferential ribs separated by circumferential grooves, said ribs having walls which follow a broken-line outline forming salient and reentrant angles, characterized by the fact that said ribs have:

a. a salient angle recess on each side of and near each said salient angle;

b. two salient angle incisions for each said salient angle wherein each said incision has a length less than half of the width of the rib and being, with respect to each said salient angle, on the outside and near each said salient angle recess;

c. a reentrant angle recess in each said reentrant angle;

d. two reentrant angle incisions for each said reentrant angle wherein each said incision has a length less than half of the width of the rib and being, with respect to each said reentrant angle, on the outside and near each said reentrant angle recess;

and by the fact that

e. the distance measured in the circumferential direction between the two salient angle incisions of each said salient angle is greater than the distance between the two reentrant angle incisions of each said reentrant angle.

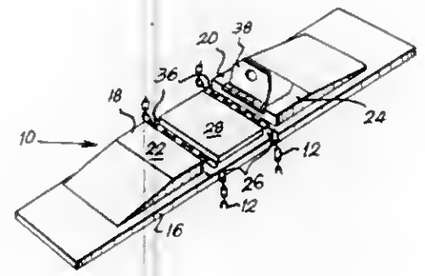
4,031,939

TIRE CHAIN APPLYING DEVICE

Joseph De Martini, 3728 Canyon Way, Martinez, Calif. 94553

Filed Nov. 11, 1975, Ser. No. 630,922
Int. Cl.² B60C 27/00; E02C 3/00
U.S. Cl. 152—213 R **5 Claims**

1. A device for applying a tire chain to the tire of a vehicle comprising an elongated base member adapted to support the wheel of a vehicle, a pair of wheel mounting elements on said base member in longitudinally spaced relation defining a recess therebetween, a central chain spacing member mounted movably on said base member intermediate said wheel mounting elements and within said recess, means on said spacing member and base member cooperable to selectively slide said spacing member longitudinally within said recess and thereby define at least one transverse chain-receiving slot between said spacing member and said wheel mounting elements.

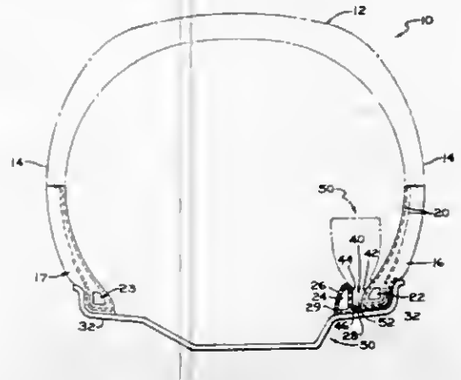


4,031,940

PNEUMATIC TIRE

Donald R. Bartley, Cuyahoga Falls, and Robert F. Jones, Westfield Center, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Filed Feb. 21, 1975, Ser. No. 551,769
Int. Cl.² B60C 15/00
U.S. Cl. 152—362 R **4 Claims**



1. In a pneumatic tire adapted for combination with an emergency use device with an anchoring means therewith for disposing said device internally of the tire, which tire includes a pair of axially spaced annular bead portions, the improvement wherein the tire comprises

A. a pair of axially spaced, inextensible, circular bead members embedded within one of the bead portions, and

B. an arcuate, anchoring channel for mounting the device within the tire, said anchoring channel being

1. formed in the one bead portion,

2. located between the bead members and

3. contoured to receive the anchoring means of the device.

4,031,941

CONCENTRIC CONTRA-ROTATING BEAD DEFLECTOR MECHANISM FOR TIRE MOUNTING APPARATUS

S. W. Malinski, Tamaroa, Ill., and Thomas L. Mueller, St. Louis, Mo., assignors to S. W. Malinski, Tamaroa, Ill.

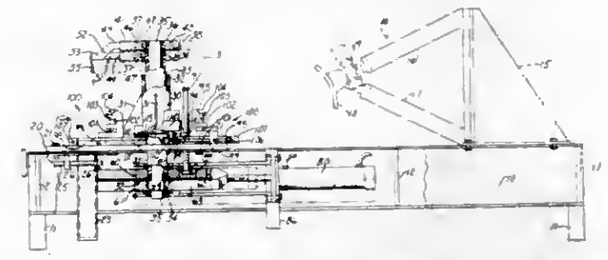
Filed Feb. 17, 1976, Ser. No. 658,600
Int. Cl.² B60C 25/06
U.S. Cl. 157—1.17 **8 Claims**

1. In tire mounting apparatus of the type in which two bead-deflecting arms are rotated simultaneously in opposite senses, the improvement comprising

platform means having a fixed vertical sleeve, an outer tubular shaft therein and projecting thereabove and therebelow, and a central shaft within the outer shaft and projecting above and below it,

a radial arm secured to the upper end of the central shaft, a second radial arm secured therebeneath to the upper end of the outer shaft, and vertical offset means to position their radially outer arm ends in the same plane,

tire bead deflectors secured to said radially outer ends,



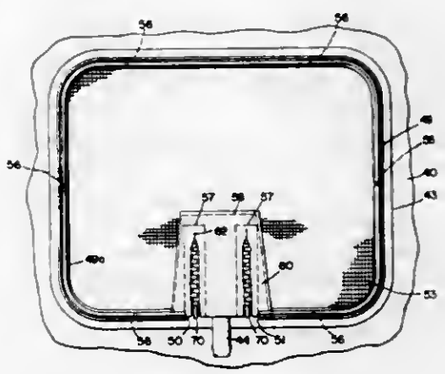
gears secured on the lower end of the outer shaft and therebeneath on the projecting portion of the central shaft, and means meshing with said gears to drive said shafts in opposite senses.

4,031,942

WINDOW SCREENS FOR VANS AND THE LIKE

Warren E. Shelton, Cleveland, Ohio, assignor to Van-Camper Corporation, Cleveland, Ohio

Filed Dec. 15, 1975, Ser. No. 640,708
Int. Cl.² E06B 3/32
U.S. Cl. 160—103 **3 Claims**



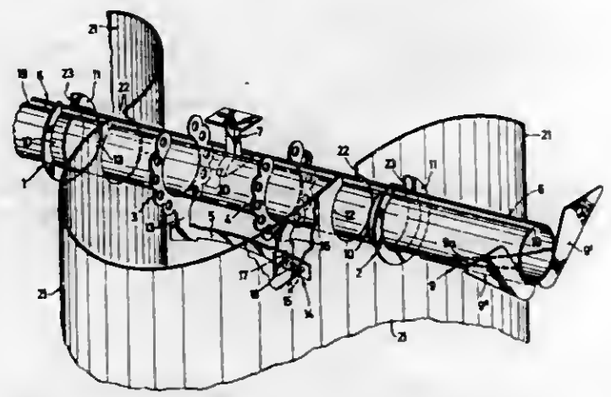
1. A screen for use in combination with an openable window mounted within a window opening in a van or like vehicle and having a window manipulating handle affixed to the window adjacent one edge thereof and projecting inwardly of the opening, said screen comprising a rigid frame conforming to the periphery of the window opening for reception thereabout inward of the window, said frame having a pair of spaced ends aligned with each other for positioning to the opposite sides of the window handle upon a positioning of the screen about the window opening, said screen further including flexible wire screening having a peripheral edge secured to said frame peripherally about the frame and covering the area bounded by the frame, slot means through the edge of the screening between the spaced ends of the frame and alignable with the window handle for access thereto, said slot means extending inwardly from the edge of the screening for only a portion of the width of the screening, at least one piece of flexible material secured to said screening in overlying relationship to said slot means, said flexible material having an outer edge extending between the spaced ends of the frame, said piece of material having spaced slits therein paralleling and overlying said slot means and extending inwardly from the outer edge of the material, and a pair of zipper assemblies mounted on said piece of material with one zipper assembly associated with each slit for a selective opening and closing thereof, the portion of the flexible material between the zipper assemblies, upon an opening of both zipper assemblies, defining an access for the window handle, said flexible material and zipper assemblies, when closed, being inwardly flexible to accommodate the inwardly projecting window handle.

4,031,943

SYSTEM FOR HANGING CURTAINS

Sabino Silvestre, Madrid, Spain

Filed May 3, 1976, Ser. No. 682,786
Int. Cl.² A47H 1/00, 13/14
U.S. Cl. 160—330 7 Claims



1. In a system for hanging gathered curtains: a horizontal tubular suspension rod having a longitudinal slot running the length of the upper side of the tubular rod; means for supporting the tubular rod from a fixed surface including at least one intermediate support member having an enlarged portion housed within the interior of the tubular rod and a narrow portion extending through the slot for fastening to the fixed surface; a curtain having a top portion provided with a plurality of holes through which the rod extends, each of said holes having a portion extending to the upper edge of the curtain to form a slot in said upper edge of a width slightly greater than the thickness of said narrow portion of said support member so that the curtain can slide past the said support member; each pair of adjacent holes in said top portion of the curtain being provided with a pair of curtain-gathering ring assemblies one of which is fastened to the curtain at the location of one of the holes and the other being fastened to the curtain at the location of the other hole of the pair, each of said ring assemblies having a radial slot therethrough and conforming to its respective curtain hole; and linking means of adjustable length connecting one ring assembly with the other of the pair.

4,031,944

DEVICE FOR OPENING AND CLOSING OF CORD OPERATED CLOSURES

Howard J. Morrison, Deerfield, and Derek A. Brand, Naperville, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

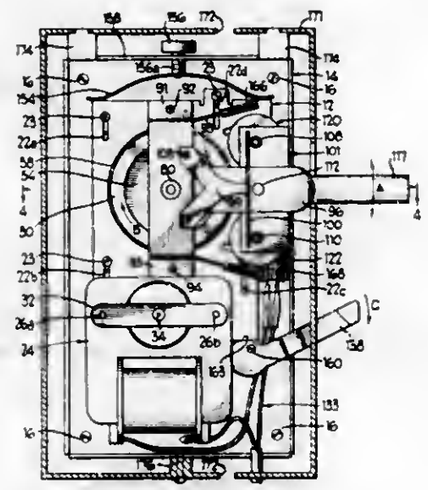
Filed Aug. 11, 1975, Ser. No. 603,342
Int. Cl.² A47H 5/02; B66D 1/76
U.S. Cl. 160—331 20 Claims

1. An opening and closing device for cord operated closures having a pair of cords or a pair of cord runs, one cord or cord run for opening the closure and the other cord or cord run for closing the closure, comprising:

a frame structure;

a unidirectional motor mounted on the frame structure, including drive means for engaging and longitudinally driving either one of said cords; and

direction determining means for selective closing or opening of the closure, said direction determining means being movably mounted on said frame structure for engaging



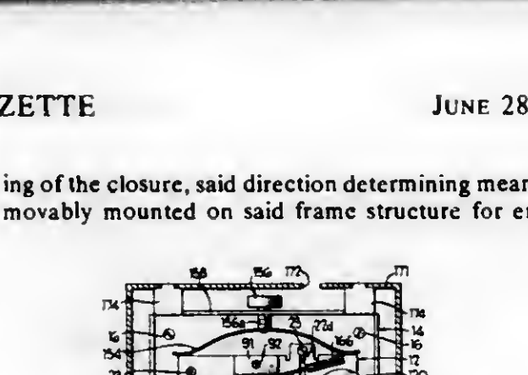
either one of said cords and bringing said cord into driving engagement with said drive means.

4,031,945

PROCESS FOR MAKING CERAMIC MOLDS HAVING A METAL OXIDE BARRIER FOR CASTING AND DIRECTIONAL SOLIDIFICATION OF SUPERALLOYS

Michael F. X. Gigliotti, Jr., Scotia, and Charles D. Greskovich, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Apr. 7, 1976, Ser. No. 674,548
The portion of the term of this patent subsequent to Aug. 3, 1993, has been disclaimed.
Int. Cl.² B22D 21/06
U.S. Cl. 164—72 23 Claims



1. A method for forming a barrier layer at the mold-metal interface in a mold suitable for the casting and directional solidification of superalloys therein including the process steps of:

placing a mold made of a material comprising a first refractory oxide bonded together by silica within a furnace;

introducing a controlled prevailing atmosphere into the furnace;

heating the mold in the controlled prevailing atmosphere at an elevated temperature for a sufficient period of time to dissolve some of the first refractory oxide into the silica;

casting a melt of superalloy metal into a cavity of the mold, and

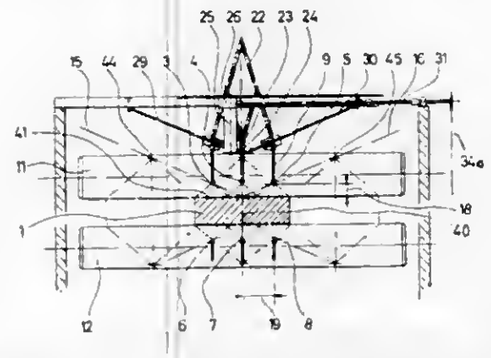
forming a barrier layer comprising a second refractory oxide by the oxidation of at least one constituent of the superalloy within the mold in integral contact with the first refractory oxide material, the barrier layer having a surface defining at least a portion of the interior wall surfaces of the cavity into which the superalloy melt is cast and comes into contact therewith, and having a thickness greater than 1 micron to substantially prevent the molten metal from penetrating into the mold structure and the microstructure of the mold in the vicinity of the cavity exhibiting a substantially porous free structure containing silica bearing phases therein in contact with the barrier layer.

4,031,946

METHOD AND APPARATUS FOR CHANGING THE SECONDARY COOLING DURING CONTINUOUS CASTING OF STEEL

Heinrich Martl, Forch; Andreas Zogg, Zug, and Oskar Hardegger, Hirzel, all of Switzerland, assignors to Concast AG, Zurich, Switzerland

Filed Feb. 20, 1975, Ser. No. 551,103
Claims priority, application Switzerland, Feb. 28, 1974, 2815/74
Int. Cl.² B22D 11/124
U.S. Cl. 164—89 9 Claims



1. A method of cooling a steel strand of substantially rectangular cross-section in the secondary cooling zone of a continuous casting machine, wherein spray nozzles having operating positions are arranged in a group of essentially parallel rows, each row comprising at least two spray nozzles, said rows extending transversely with respect to the direction of travel of the strand, the spray nozzles emitting cooling agent to form substantially adjoining cooling agent patterns on the strand surface, the improvement comprising the steps of: synchronously groupwise altering the distance of said nozzles from said strand surface and at the same time groupwise altering the distance between said nozzles of a row in dependency upon a change in the strand format, the distance of the nozzles of a row from the strand surface and between each other being altered such that the operating positions of each nozzle lie along a substantially straight line which intersects with the strand surface, whereby the cooling agent patterns on the strand surface remain in a substantially adjoining position with respect to each other.

4,031,947

METHOD AND APPARATUS FOR SLUG CASTING

John E. Connolly, Wyoming, Mich., assignor to Walter W. Nichols, Hickory Corners, Mich., a part interest

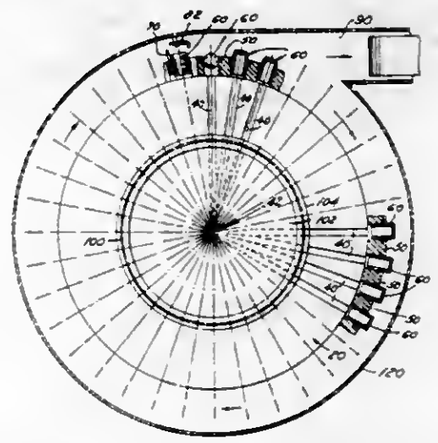
Filed Oct. 8, 1975, Ser. No. 620,766
Int. Cl.² B22D 13/00, 5/02
U.S. Cl. 164—114 8 Claims

1. In a method of continuous casting of individual castings in a system which includes revolving a plurality of radially disposed molds around an axis of revolution and distributing molten metal to said molds from a source on said axis of revolution, that improvement which comprises:

a. mounting said plurality molds circumferentially around said axis of revolution along a transverse axis of each mold wherein each of said plurality of molds can be moved to a fill position and later to a dump position while revolving continuously about the axis of revolution,

b. retaining the molds in a fill position while being filled with molten metal and cooled,

c. causing said molds to move to an inverted position while still revolving about said axis of revolution wherein the chilled casting is dumped, and



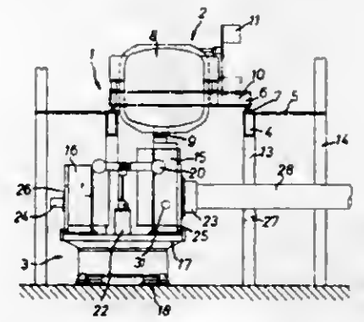
d. utilizing the inertial force of the dumped revolving casting to move it to a conveyance area away from the casting system.

4,031,948

MOLD-EQUIPPED CASTING OVEN UNIT FOR CONTINUOUS ROD CASTINGS

Bernhard Bergmann, Balsthal, Switzerland, assignor to Von Roll AG, Gerlafingen, Switzerland

Filed June 13, 1975, Ser. No. 586,842
Claims priority, application Switzerland, June 15, 1974, 8203/74; Jan. 17, 1975, 545/75
Int. Cl.² B22D 11/10, 11/128
U.S. Cl. 164—281 H 4 Claims



1. In a continuous rod casting equipment line for horizontally forming and pulling one or more rod stems, a mold and oven unit, comprising, in combination:

reservoir oven means (2) for intermittently receiving quantities of casting melt and controllably discharging the casting melt downwardly in molten condition;

mold assembly means composed of at least two individual mold assemblies (15,16), each provided with a continuous-casting chill mold (23,24) and forming therewith an antechamber for the mold, said mold being assembled as part of said mold assembly so as to form a side of said antechamber and to provide for continuous casting in a manner in which the cast material moves horizontally out of the mold, said antechamber formed by said mold assembly being capable of containing a quantity of melt for the mold sufficient for assuring continuity of the casting operation while the mold assembly is supplied with melt from said reservoir oven means (2), and

a positioning turntable (17), having a base (18) providing a rotatable mount therefor and having a plurality of locations at which the respective mold assemblies are fixably mountable on the rotatable part of said turntable (17), said turntable being mounted on its said base so as to be

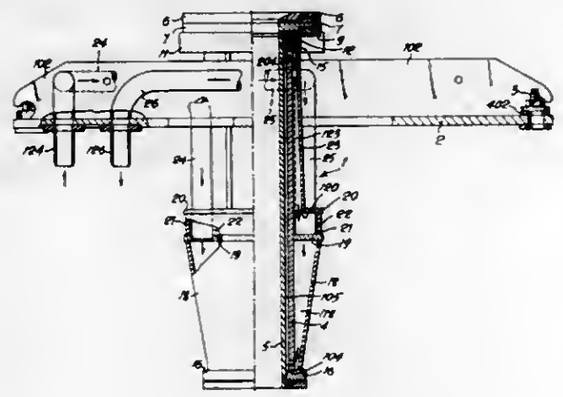
rotatable between a plurality of predetermined orientation positions in each of which one of said mold assemblies mounted on said table is placed in a predetermined operating position, in which it can receive melt discharged from said oven means (2), and another mold assembly thereon is simultaneously placed in a standby position, in which it can be replaced and its replacement mounted, trued up and preheated.

4,031,949

WATER COOLED MOLD FOR THE CONTINUOUS CASTING OF METALS

Piero Colombo, 27, Via Leopardi, Udine, Italy

Filed Apr. 23, 1976, Ser. No. 679,316
Claims priority, application Italy, Apr. 28, 1975, 12587/75
Int. Cl.² B22D *11/02*
U.S. Cl. 164—283 M **1 Claim**



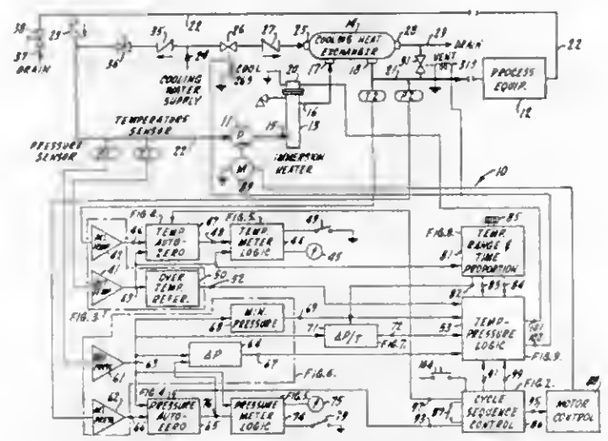
1. A mold for the continuous casting of molten metals comprising an inner tubular mantle, an outer tubular mantle surrounding said inner tubular mantle leaving between them a cooling jacket for the flow of cooling water, an outer, funnel shaped mantle surrounding the said outer mantle of the mold from the lower end of the mold up to substantially one half of its height, defining in cooperation with the outer mantle of the mold a cooling water inlet manifold chamber the cross sectional area of the flow passage of which is progressively decreasing from its upper end to its lower end, communication ports formed in the said outer tubular mantle of the mold placing in communication the lower end of said water inlet manifold chamber with the lower end of said cooling jacket of the mold, cooling water supply pipes communicating with the upper end of said water inlet manifold chamber, a second, funnel shaped mantle surrounding the upper end of the mold, and defining in cooperation with the outer mantle of the mold a a water outlet manifold chamber, the cross sectional area of the flow passage of said water outlet manifold chamber being progressively increasing from its upper end to its lower end, communication ports formed in the said outer tubular mantle of the mold placing in communication the upper end of said water outlet manifold chamber with the upper end of said cooling jacket of the mold, and communication ports formed in the lower end of said water outlet manifold chamber placing in communication said water outlet manifold chamber with a water exbaust chamber communicating with the used cooling water exhaust pipes of the continuous casting plant.

4,031,950

PROCESS FLUID CIRCULATION AND TEMPERATURE CONTROL SYSTEM

Gilbert F. Shultz, Novi, Mich., assignor to Application Engineering Corporation, Elk Grove Village, Ill.

Filed Feb. 17, 1976, Ser. No. 658,350
Int. Cl.² G05D *27/00*
U.S. Cl. 165—31 **21 Claims**



1. A process fluid circulation and temperature control system comprising:

a main heat exchange means, electrically actuatable between an active heat-exchange condition and an inactive condition, for effecting a heat exchange with a process fluid;

a pump for circulating a process fluid through the heat exchange means and through an external process apparatus that utilizes the process fluid to effect a second heat exchange;

a thermal sensor for sensing the temperature of the process fluid at a given point on its circulation path;

temperature control circuit means, coupled to the thermal sensor and to the heat exchange means, for actuating the heat exchange means between its active and inactive operating conditions in response to changes in the temperature of the process fluid;

a delivery pressure sensor for sensing the pressure of the fluid delivered to the process apparatus to develop a delivery pressure signal;

a return pressure sensor for sensing the pressure of the fluid returned to the pump to develop a return pressure signal;

and pressure differential control circuit means, coupled to both pressure sensors and to the temperature control circuit means, for inhibiting actuation of the heat exchange means to its active condition except in the presence of a differential of predetermined sign and amplitude between the delivery pressure signal and the return pressure signal.

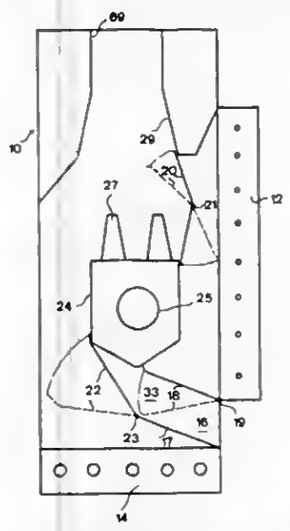
4,031,951

AIR CLIMATIZING DEVICE

Peter Engler, Mosbach, Germany, assignor to Luwa AG, Zurich, Switzerland

Filed Nov. 13, 1974, Ser. No. 523,549
Claims priority, application Switzerland, Nov. 21, 1973, 16447/73
Int. Cl.² G05D *23/00*; **F28F** *27/02*
U.S. Cl. 165—103 **15 Claims**

1. An apparatus for controlling the flow of air in an air climatizing device, comprising a housing having means defining air throughpassages, a plurality of flap members for controlling said air throughpassages, an adjustment motor and transmission means for actuating the flap members in a predetermined sequence, said transmission means comprising a plurality of relatively movable gears which are in continual power transmission-meshing engagement with one another during operation of the apparatus and entrainment elements cooperating with predetermined ones of said gears at predetermined regions thereof, means for drivingly connecting each



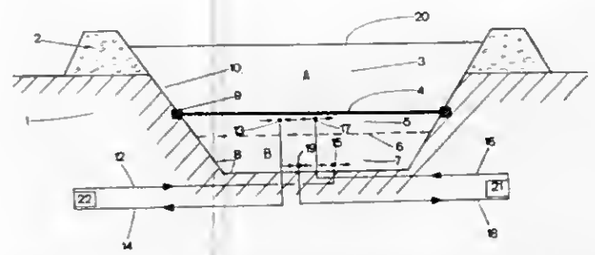
entrainment element with each of its associated flap members in a respective position of each said entrainment element for positively driving each said associated flap member.

4,031,952

HEAT ENERGY ACCUMULATOR

Bernard Contour, Residence "Les Petits Princes" 27, rue Jacques Lemercier, Versailles (Les Yvelines), France

Filed Jan. 13, 1975, Ser. No. 540,729
Claims priority, application France, Jan. 15, 1974, 74.01218; Feb. 12, 1974, 74.04736
Int. Cl.² F01K *1/10*
U.S. Cl. 165—104 S **8 Claims**



1. A system for accumulating and storing heat energy comprising:

means defining a container having bottom and side walls;

a horizontally extending diaphragm disposed above the bottom wall of the container and separating the container into an upper compartment and a lower compartment, said lower compartment being filled with heated water;

the upper compartment being filled with a heavy mass sufficient to apply a uniform pressure to the diaphragm and to the heated water in the lower compartment, said pressure being of a magnitude which is no less than that exerted on the diaphragm by the water in the lower compartment;

first fluid circuit means for communicating the water in the lower compartment with a heat source to circulate water between the lower compartment and the heat source;

second fluid circuit means for communicating the water in the lower compartment with a heat sink to circulate hot water from the lower compartment between it and the heat sink;

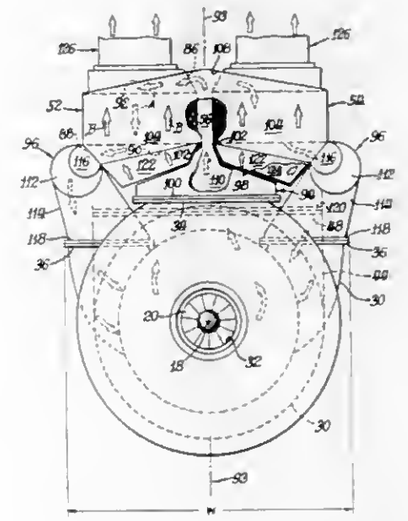
said lower compartment, first fluid circuit and second fluid circuit comprising a closed fluid circuit in which the mass of water is constant.

4,031,953

HEAT EXCHANGER SYSTEM AND DUCTING ARRANGEMENT THEREFOR

Jan C. Kline, Brimfield, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 23, 1974, Ser. No. 535,877
Int. Cl.² F02C *7/10*; **F02G** *1/00*; **F28F** *9/26*, *3/08*
U.S. Cl. 165—166 **2 Claims**



1. A heat exchanger system and ducting arrangement therefor for transferring heat from a first fluid emanating from a first passage to a second fluid emanating from a second passage and circulating therethrough, comprising:

pair of longitudinally oriented and side-by-side heat exchanger units individually having a plurality of first and second primary surface heat exchanging plate assemblies alternately arranged in a generally upright, transversely oriented and longitudinally stacked manner and defining a plurality of first fluid flow paths and a plurality of second fluid flow paths alternately therethrough and so constructed and arranged that an elongated space is defined between said units for substantially the full length thereof:

a bifurcated inlet duct for delivering the first fluid upwardly from said first passage to said heat exchanger units and said first fluid flow paths, and including a pair of longitudinally extending channels individually connected upwardly to said heat exchanger units;

a pair of exhaust conduits for conducting the first fluid upwardly away from said heat exchanger units after heat is extracted therefrom;

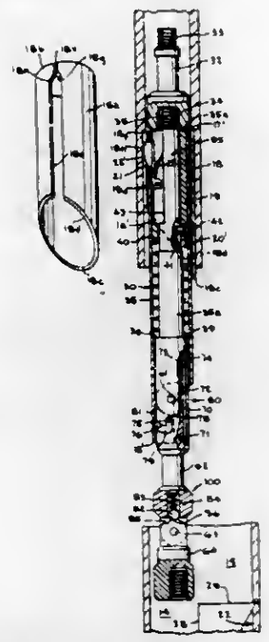
a common inlet plenum including a cover spanning between said heat exchanger units generally above said elongated space, a pair of end walls spanning between the ends of the heat exchanger units, and a centrally disposed duct connected to the heat exchanger units, said centrally disposed duct being longitudinally interposed between said channels and of a construction sufficient for delivering the second fluid oppositely from said second passage upwardly to said elongated space and therefrom in two separate directions symmetrically oppositely outwardly to said heat exchanger units and to said second fluid flow paths; and

a pair of outlet manifolds for conducting the heated second fluid from said heat exchanger units.

4,031,954
FLOW VALVE INSTALLATION AND REMOVAL APPARATUS

Gerald P. Herbert; Ferdinand M. McGinn, and Hugh D. Embree, all of Lafayette, La., assignors to Production Specialties, Inc., Lafayette, La.

Filed Sept. 13, 1976, Ser. No. 722,534
Int. Cl.² E21B *23/00*
U.S. Cl. 166—117.5 **5 Claims**



1. A well installation comprising:
a. a well tubing having a plurality of tubing mandrels each having a main bore therethrough with an orientation sleeve mounted in the main bore and a valve receiving side pocket offset from the main bore, said orientation sleeve including:
1. an elongated hollow tubular body having an upper and lower end;
2. said lower end extending upwardly at an angle relative to the longitudinal axis of said tubular body to form a sloping guide surface which extends upwardly and away from the offset pocket;
3. a first slot extending longitudinally of said tubular body from the highest portion of said guide surface, said first slot terminating in spaced relation to said upper end of said tubular body;
4. a second slot extending from the upper end of said first slot to the upper end of said tubular body; and
5. said second slot being substantially smaller in width than said first slot to form a pair of aligned shoulders at the juncture of said first and second slot which are spaced from each other by said second slot whereby debris may discharge from said first slot through said second slot and into the tubing;
b. guard and guide means above the valve receiving side pocket and including spaced sides facing the main bore and having vertical edge surfaces and an inner upwardly tapered end to guide a valve into the valve receiving side pocket;
c. a support body adapted to be moved through the tubing mandrels;
d. a movable body carried by and longitudinally movable relative to the support body;
e. a longitudinal guide key having an upwardly directed shoulder and an inclined surface facing downwardly, pivotally carried by said movable body for outward movement from said movable body and movable downwardly through said sleeves but an upward movement of said movable body engagable with the lower end of any sleeve immediately thereabove to slide along said first slot means and engage said aligned shoulders;
f. shifting tool means pivotally supported from said support body and adapted to support a valve handling support;
g. cooperating releasing means on said support body and movable plunger initially holding said shifting tool means aligned in the main bore; and
h. cooperating shifting means connected between said shifting tool means and said support body for shifting said shifting tool means into the side pocket when the releasing means is actuated.

4,031,955
DOWN HOLE INHIBITOR INJECTOR

Charles A. Ledet, Houston, Tex., assignor to Baker Oil Tools, Inc., Houston, Tex.

Filed Jan. 20, 1976, Ser. No. 650,741
Int. Cl.² E21B *33/12*
U.S. Cl. 166—183 **14 Claims**

1. Apparatus for use in a subterranean well to inject inhibitor solution within and below the bore of a well packer mechanism and thereafter circulate said solution with produced hydrocarbons through and to the top of said well, comprising: valving means for selective transmission of said inhibitor solution within said well through said apparatus; mandrel means for receipt of said valving means; by-pass means in communication with said valving means for carrying said inhibitor solution therethrough; tubular means having first and second tubing, said first tubing defining a flow path in communication with said by-pass means for carrying said inhibitor solution, and said second tubing defining a flow path for fluid transmission to the top of the well; and well packer means for receipt of said first and second tubing, said packer means defining therein a flow path communicating with the flow path defined within said first tubing whereby said inhibitor solution is exposed to and circulated within the flow path in said packer means and in communication with the flow path defined in said second tubing.

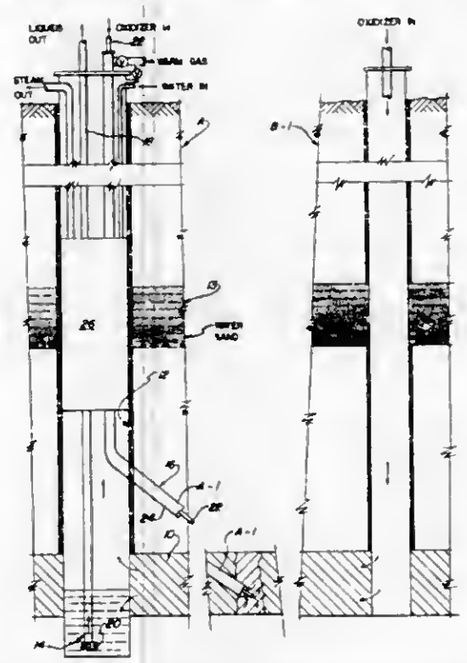
4,031,956
METHOD OF RECOVERING ENERGY FROM SUBSURFACE PETROLEUM RESERVOIRS

Ruel C. Terry, Denver, Colo., assignor to In Situ Technology, Inc., Denver, Colo.

Filed Feb. 12, 1976, Ser. No. 657,550
Int. Cl.² E21B *43/24*
U.S. Cl. 166—261 **6 Claims**

1. A method of extracting heat from a petroleum reservoir in the earth by consuming the petroleum in situ comprising the steps of:

establishing at least two injection passages and a removal passage between a surface location and the petroleum reservoir,
injecting an oxidizer through one of the injection passages into the petroleum reservoir,
igniting the petroleum reservoir through said one passage to create a fire front which progresses toward the other of said injection passages,
injecting an oxidizing agent into said other injection passage while maintaining the injection through said one injection passage,
allowing channels to be formed in the petroleum reservoir by burning petroleum,



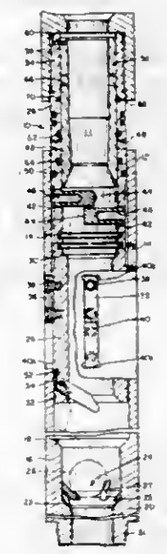
injecting a plugging agent into the most rapidly forming channels,
controlling oxidizer injection so that petroleum is consumed in the fire,
collecting fluids produced by the burning petroleum in the removal passage,
conveying the fluids through the removal passage to the surface location, and
forming an underground burn pattern by injection of a non-flammable fluid into the reservoir at locations where it is desired to discourage further burning.

4,031,957
METHOD AND APPARATUS FOR TESTING AND TREATING WELL FORMATIONS

Lawrence Sanford, 4047 Hollister, Houston, Tex. 77055

Filed July 23, 1976, Ser. No. 708,029
Int. Cl.² E21B *43/00*, *43/27*, *47/00*
U.S. Cl. 166—264 **26 Claims**

1. A single trip method of treating a formation in a well bore comprising:
lowering into said well bore an operating tool string having a packer, a perforated shoe supported below said packer, a first valve means supported above said packer and a second valve means supported above said first valve means;
setting said packer above said formation,
manipulating said first valve means to open a flow passage for circulation downwardly through said string, said first and second valve means, said packer and said shoe to said formation, and upwardly from said formation through said shoe, said packer, said first and second valve means and said string for testing said formation.
manipulating said first vavle means to prevent flow upwardly or downwardly therethrough,
manipulating said second valve means to open a first lateral flow path providing communication from the interior of said tool string to said well bore,
reverse circulating a fluid through said first lateral flow path to remove foreign matter,
manipulating said second valve means to close said first lateral flow path,
manipulating said first valve means to open said flow passage,
introducing a treating fluid into said formation,
manipulating said first valve means to prevent flow upwardly or downwardly therethrough,
manipulating said second valve means by longitudinal movement of said tool string to open a second lateral flow path providing communication from the interior of said tool string to said well bore, and
reverse circulating a fluid through said second flow path to remove foreign matter.



21. Apparatus adapted for attachment to a tool string to be lowered into a well bore for treating a formation in said well bore comprising a packer, a perforated shoe supported below said packer, first conduit means connecting said perforated shoe and said packer, first valve means supported above said packer, second conduit means connecting said first valve means and said packer, second valve means supported above said first valve means, third conduit means connecting said first and second valve means, said first valve means being operative to selectively provide a flow passage for circulation downwardly through said first and second valve means, said packer to said shoe and upwardly from said shoe through said packer and said first and second valve means, said second valve means including means to provide a first lateral flow path from the interior of said second valve means to said well bore and means to provide a second lateral flow path from the interior of said second valve means to said well bore when said first lateral flow path is closed and said tool string is moved longitudinally.

4,031,958
PLUGGING OF WATER-PRODUCING ZONES IN A SUBTERRANEAN FORMATION

Burton B. Sandiford, Placentia, and Robert K. Knight, Fullerton, both of Calif., assignors to Union Oil Company of California, Brea, Calif.

Filed June 13, 1975, Ser. No. 586,731
Int. Cl.² E21B *33/138*
U.S. Cl. 166—270 **25 Claims**

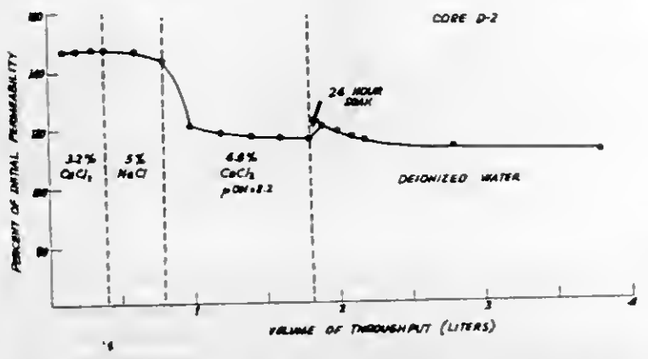
1. A method for selectively plugging the permeable water channels of a subterranean formation of nonuniform permeability penetrated by a well, which comprises:

a. introducing a polymer-thickened aqueous solution of a first reactive chemical into said well communicating with said formation, said solution containing a polymer thickening agent added in an amount sufficient to render the solution substantially more viscous than the subsequently injected liquids;
b. followed by introducing a low viscosity inert aqueous spacer liquid into said well;
c. followed by introducing a low viscosity aqueous solution of a second reactive chemical which, in the formation, contacts and reacts with said first reactive chemical to produce an insoluble precipitate or gel;
d. followed by introducing a second low viscosity inert aqueous spacer liquid; and
e. followed by introducing a second aqueous solution of said first reactive chemical which, in the formation, contacts and reacts with the aqueous solution of a second reactive chemical introduced in step (c) to produce an insoluble precipitate or gel.

4,031,959
METHOD OF MAINTAINING THE PERMEABILITY OF HYDROCARBON RESERVOIR ROCK

James H. Henderson, Dallas, Tex., assignor to Permeator Corporation, Houston, Tex.

Continuation-in-part of Ser. No. 647,769, Jan. 9, 1976, abandoned, which is a continuation of Ser. No. 542,297, Jan. 20, 1975, abandoned. This application July 7, 1976, Ser. No. 703,216
Int. Cl.² E21B *43/04*, *43/26*, *43/27*
U.S. Cl. 166—307 **11 Claims**

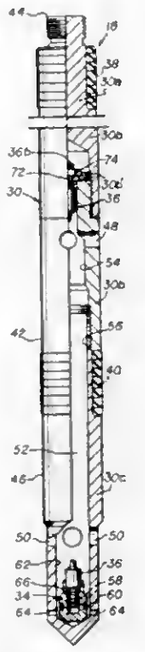


1. A method of maintaining and stabilizing the permeability of subsurface hydrocarbon reservoir rock containing clay particles and, where clay damage has occurred, of improving the permeability of the rock, said method comprising:
a. injecting down a well bore traversing said rock an aqueous solution of alkaline earth metal hydroxide and a salt of an alkaline earth metal the concentration of alkaline earth metal cation in the solution being greater than 10,000 ppm and the pH value of the solution being greater than 10;
b. forcing said solution under pressure out into the reservoir rock formation and away from said well bore;
c. maintaining the pressure to prevent the solution from flowing back into the well bore and to cause the solution to remain within the rock formation for a time period and with a volume which is:
1. insufficient to consolidate sand, but
2. sufficient
i. in respect of expansible clay particles to alter their electrical behavior, thereby causing them, in hydrated form, to occupy a smaller effective volume than prior to the altering, and
ii. in respect of non-expansible clay particles and originally expansible clay particles whose electrical behavior has thus been altered pursuant to (i), chemically to transform them into clay particles which are capable of permanently adhering to rock substrates, thereby to decrease the existing sensitivity of both expansible and non-expansible clay particles to fluids and permanently to change the clay particle structure so as to prevent future sensitivity of fluids
d. thereafter relcasing the well head pressure, thereby enabling solution to flow back into the well bore.

4,031,960
CIRCULATING VALVE

William A. Dudley, Garland, Tex., assignor to Teledyne, Inc., Garland, Tex.

Filed Feb. 25, 1976, Ser. No. 661,249
Int. Cl.² F04F *1/08*; E21B *43/12*
U.S. Cl. 166—317 **33 Claims**



1. A circulating valve for use in a well comprising:
valve housing means;
seal means around said valve housing means;
first circulating port means in said valve housing means on one side of said seal means;
second circulating port means in said valve housing means on the other side of said seal means;
passage means in said valve housing means between said first and second circulating port means;
valve plug means movable between an initial position blocking flow through said passage means and a second position permitting flow through said passage means; and
frangible drawbar means to releasably maintain said valve plug means in said initial position.

4,031,961
OIL AND GASOLINE FIRE EXTINGUISHING COMPOSITION

Alfred R. Globus, Bayside, N.Y., assignor to Guardian Chemical Corporation, Hauppauge, N.Y.

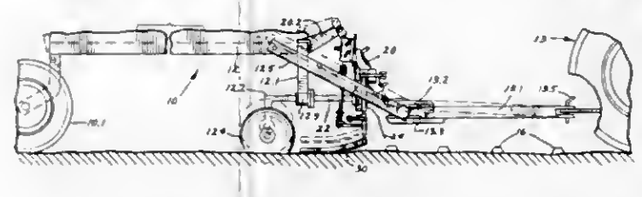
Division of Ser. No. 452,603, March 19, 1974, Pat. No. 3,979,302. This application June 30, 1976, Ser. No. 701,295
Int. Cl.² A62C *1/00*
U.S. Cl. 169—47 **3 Claims**

1. A process for extinguishing hydrocarbon fires comprising contacting said fire with a composition comprising a polymerized (hydrated amide-amine) complex formed from at least one fatty acid having 8 to 18 carbon atoms and at least one dialkanol amine having 1 to 6 carbon atoms per alkanol group.

4,031,962
FARM IMPLEMENT POSITIONER

Earl H. Ellinger, Crookston, Minn., assignor to Dee, Inc., Crookston, Minn.

Filed Oct. 14, 1975, Ser. No. 621,804
Int. Cl.² A01D *33/00*
U.S. Cl. 171—8 **6 Claims**

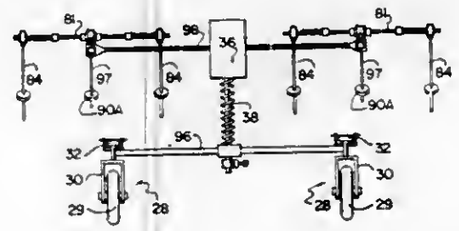


1. A positioner for maintaining the position of an implement such as a sugar beet harvester in correct alignment with the plants of a crop row, and comprising
a harness pivotable about an upright axis and mountable to an implement;
a pair of spaced, elongated sensing shoes for contacting plants in a plant row therebetween;
linkage means pivotally mounting the shoes at their forward ends to the harness for swinging movement of the shoes with respect to the harness, and including means limiting generally horizontal swinging movement of the shoes with respect to the harness to unison movement of the shoes toward and away from each other;
means resiliently urging the shoes to swing toward each other for mutual contact with successive plants of a crop row therebetween, whereby misalignment of the implement with a crop row causes the harness to rotate about its upright axis; and
implement steering means responsive to rotation of the harness about its axis to steer the implement into realignment with the crop row.

4,031,963
DEPTH CONTROL DEVICE FOR GROUND WORKING AGRICULTURAL IMPLEMENTS

Erhard Poggemiller, Box 128, Luseland, Saskatchewan, and Ralph Sweet, Box 3, Forgan, Saskatchewan, both of Canada

Filed Apr. 14, 1975, Ser. No. 567,624
Int. Cl.² A01B *63/114*, *63/12*, *65/06*
U.S. Cl. 172—4 **22 Claims**

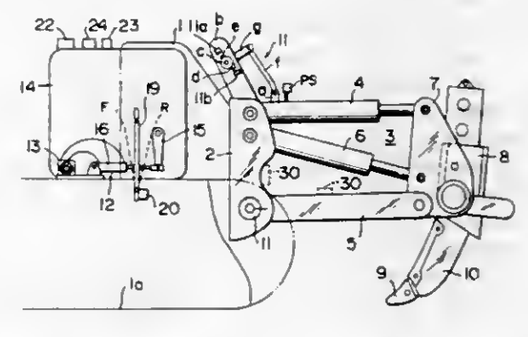


1. A depth control device for earth working agricultural implements such as cultivators, seed drills, discers, underground harvesters and planters and the like which includes supporting framework, ground engaging wheels supporting said framework, earth working components supported from said supporting framework and means to raise and lower and hence adjust the depth of penetration of said earth working components in the ground being worked; said device comprising in combination at least two surface engaging sensing members spaced apart from one another and each operatively secured by one end thereof to said framework and extending in advance of said earth working components, means operatively connected between said surface engaging sensing members to average out the vertical movement required to operate said means to adjust said depth of penetration, said means operatively connected between said surface engaging sensing members including a connecting bar secured by one end thereof to one of said surface engaging sensing members and by the other end thereof to the other of said surface engaging sensing members, and means operatively connected between said connecting bar and said means to adjust the depth of penetration of said earth working components to operate said last mentioned means thereby maintaining said earth working components at a predetermined depth of penetration relative to the surface of the ground.

4,031,964
AUTOMATIC CONTROL SYSTEM CONTROLLING A RIPPER USED ON A CONSTRUCTION EQUIPMENT

Yasuyuki Takahashi, and Tomobaru Sano, both of Hirakata, Japan, assignors to Kabushiki Kaisha Komatsu Seisakusbo, Japan

Filed Jan. 29, 1975, Ser. No. 545,318
Claims priority, application Japan, Feb. 1, 1974, 49-12725
Int. Cl.² A01B *63/112*
U.S. Cl. 172—9 **6 Claims**



1. Automatic control system for a ripper used on a construction equipment comprising:
a ripper mounted on the rear portion of the body of the construction equipment and including a shank, tilt cylinders for tilting the shank, lift cylinders for raising or lowering the shank, links disposed in parallel to the tilt cylinders and a shank holding structure for securely holding the shank;
a load detector mounted on the ripper and capable of detecting overload applied to the shank;
a depth detector for detecting predetermined upper and lower limit positions of the shank; and
a control device actuated by the outputs of the load detector and the depth detector for maintaining penetration depth of the shank at the predetermined lower limit when normal load is applied to the shank and raising the shank when a predetermined overload is applied thereto to reduce the load to a value less than the overload;
whereby penetration depth of the shank is automatically controlled to a value at which no overload is applied to the shank; said control device comprising:
a first relay circuit producing a first control signal when overload is applied to the shank at a shank position which is lower than the upper limit position;
a second relay circuit producing a second control signal when load less than overload is applied to the shank at a shank position which is not the predetermined shank position;
an electromagnetic valve switched to a shank raising position upon receipt of the first control signal, to a shank lowering position upon receipt of the second control signal and to a neutral position when the valve receives neither signal; and
a hydraulic actuation means for actuating the lift cylinders responsive to switching of the electromagnetic valve;
said hydraulic actuation means comprising:
an actuator actuated by the electromagnetic valve;
an operation lever actuated by the rod of the actuator; and

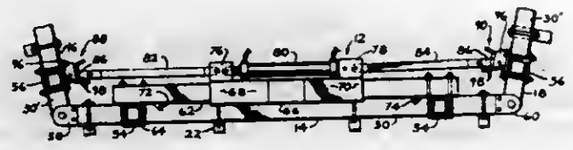
ripper actuation valve interlocked with the operation lever for switching operation and changing direction of fluid from a fluid source to the lift cylinder.

4,031,965

TILLAGE TOOL WING FOLDING KIT

Calvin B. Blair, P.O. Box 97, Barnard, Kans. 67418

Filed Dec. 17, 1975, Ser. No. 641,628
Int. Cl.² A01B *63/00*
U.S. Cl. 172—311 **10 Claims**



1. A wing lifting arrangement having structural characteristics adapting same for use in combination with an earthworking implement having a central carriage with a rigid frame portion and lateral wings hingedly connected to said central carriage, said arrangement comprising:

a. an elongated main frame member adapted for mounting on said frame portion transversely of said carriage;

b. a pair of cylinder mounts slideable along said frame member;

c. an extensible cylinder connected to said mounts and extending therebetween and operable to urge said mounts toward and away from each other;

d. a pair of arms respectively pivotally connected at a first end thereof to said cylinder mounts and extending in generally opposite directions away from said cylinder; and

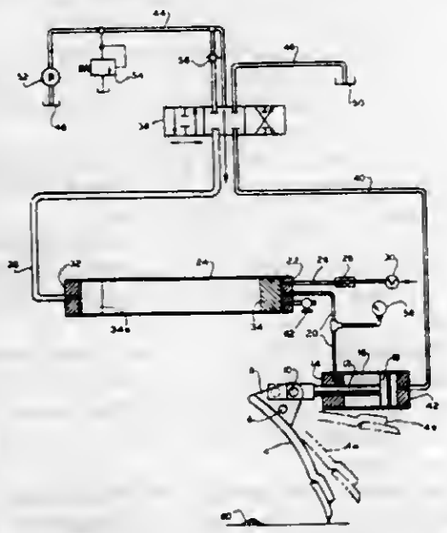
e. a wing connector adapted for mounting on each of said wings, said arms respectively being pivotally connected at a second end thereof to said wing connectors, whereby the contraction of said cylinder produces relative movement of said cylinder mounts toward each other and folding of the wings about said central carriage.

4,031,966

OPERATING AND SHOCK CYLINDER ASSEMBLY FOR VEHICLE UNDERBODY SCRAPERS AND THE LIKE

Eugene A. Farrell, Fishers Landing, N.Y., assignor to Frink Sno-Plows, Clayton, N.Y.

Filed June 21, 1976, Ser. No. 698,037
Int. Cl.² E02F *3/12*
U.S. Cl. 172—794 **9 Claims**



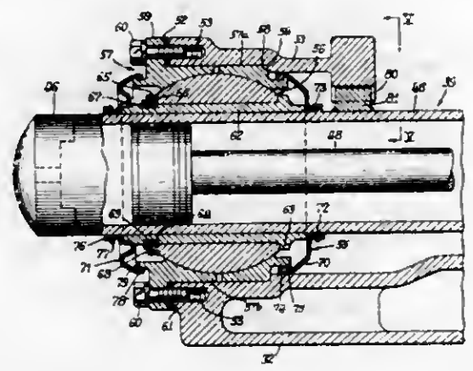
1. An operating and shock cylinder assembly for a vehicle mounted scraper blade that is pivotable between retracted and road engaging positions, a first vehicle mounted cylinder having a free floating piston therein, a second vehicle mounted cylinder having a piston and a rod connected at one end to the piston, the rod passing through an end of the cylinder and being connected at its other end to the pivotable scraper blade, a multi-position control valve, means to deliver hydraulic fluid under pressure to the valve, means connecting the valve to one end of the first cylinder, means connecting the other end of the first cylinder to one end of the second cylinder, means also connecting said other end of the first cylinder to a source of air under pressure, and means to charge the first cylinder with air under pressure, said air charge causing the free floating piston to occupy a position adjacent the end of the cylinder connected to the valve, said air charge also causing the piston in the second cylinder to move to a position whereby the scraper blade is pivoted downwardly into road engaging position, said control valve being movable after the first cylinder has been charged with air to a position whereby hydraulic fluid under pressure is delivered to the first cylinder causing the free floating piston to move toward the end of the cylinder connected to the air source and second cylinder, said piston movement causing the air in the first cylinder to pass into the second cylinder and be further compressed, the compressed air in the second cylinder acting to firmly but yieldably bias the scraper blade into road engaging position.

4,031,967

MOTOR GRADER WITH SPHERICAL BEARING MOUNTING FOR BLADE TILT CYLINDERS

Robert Allan Atherton, Chillicothe, and Carroll Richard Cole, Decatur, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed June 14, 1976, Ser. No. 696,105
Int. Cl.² E02F *3/76*, *3/85*
U.S. Cl. 172—795 **10 Claims**



1. In a motor grader which includes a circle having a pair of integral, depending support arms at its rearward portion, blade carrying means including a pair of bearing housings the lower end portions of which are mounted on transverse pivots in the lower extremities of the support arms so said housings are forward of the arms, a grader blade assembly mounted on said bearing housings, and hydraulic cylinder and piston means mounted on the circle and operatively connected to the bearing housings for tilting the latter about said transverse pivots, an improved cylinder mounting comprising, in combination:

a pair of integral sleeves on the circle which have longitudinal axes aligned with upper portions of the bearing housings;

transverse pivot pins on the bearing housings aligned with said longitudinal axes;

a hydraulic cylinder and piston unit positioned in each of said sleeves and having a piston rod connected to one of said transverse pivot pins;

a bearing collar secured to the cylinder of said unit within the sleeve, said collar having spaced circumferential flanges;

a spherical bearing removably mounted on said collar between said flanges;

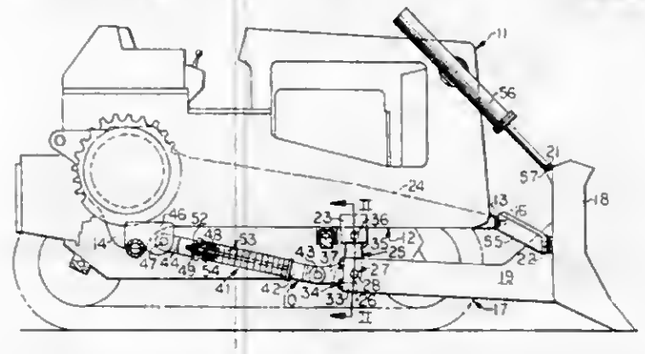
and a socket secured to the interior of the sleeve, said socket mounting the spherical bearing for limited universal movement, said socket having a first annular element toward the rod end of the unit and a second annular element toward the head end, said elements having facing surfaces on opposite sides of the transverse median plane of the spherical bearing, and means maintaining said annular elements in snug engagement with said spherical bearing.

4,031,968

CUSHIONED PUSH DOZER DEVICE

Ronald L. Krolak, Morton, and Duane L. Parker, Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 28, 1975, Ser. No. 626,421
Int. Cl.² E02F *3/76*
U.S. Cl. 172—801 **7 Claims**



1. A resilient push dozer arrangement for a vehicle having a longitudinally extending mounting frame, comprising;

a push dozer transversely disposed at one end of the vehicle;

an elongated push arm rigidly secured to and extended from such dozer in juxaposition below said mounting frame of the vehicle;

means for swingably attaching the push arm to the mouting frame so that the push arm and hence the push dozer is movable in a rearward direction relative to the mounting frame when an impact load is applied in a rearward direction to the push dozer, said means including a rigid supporting link having an end pivotally attached to the mounting frame and pivotally connected to and swingably supporting the distal end of the push arm; and

means for cushioning the rearward movement of the push dozer and push arm so that shock loads applied to the push dozer are cushioned and transmitted in a rearward direction to the mounting frame at a point relatively widely spaced from said attaching means by the cushioning means independent of the attaching means.

4,031,969

METHOD AND APPARATUS FOR EARTH BORING

Roy H. Cullen, and Jimmie R. Aker, both of Houston, Tex., assignors to Roy H. Cullen

Division of Ser. No. 448,975, March 7, 1974, Pat. No. 3,926,269. This application June 27, 1975, Ser. No. 591,125
Int. Cl.² E21B *3/10*
U.S. Cl. 175—65 **8 Claims**

1. A method of deep earth boring in a borehole with a rotating drill bit driven by an electric motor power means and mounted with a drilling string of desired length formed by a plurality of connected tubular pipe joints having communicating bores which enables communication of the drill bit with a supply of drilling fluid, including the steps of:

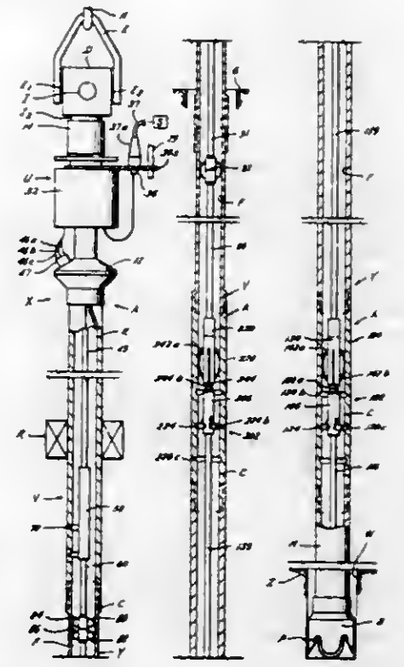
drilling a borehole to a predetermined depth and thereafter removing the drill bit and drill string from the borehole;

assembling a drill bit with an electric motor power means to form a unit to effect earth formation penetrating rotation with the drill bit when the electric motor power means is operated;

lowering the drill bit and electric motor power means therewith in the borehole to the predetermined depth on a drilling string composed of pipe having a bore extending therethrough and a first electrical connector at the lower end thereof;

lowering an electrical power conductor cable means having a length substantially the same as the drilling string in the bore of the drilling string with a second electrical connector at its lower end and connecting the lower end of the second electrical connector with said first electrical connector to establish an electrical connection between said conductor means and said motor power means to supply electrical power to the drill bit and electric motor power means unit;

releasably securing the upper end of the electrical power conductor cable means with the drilling string with a securing means releasable from the drilling string by an upward force applied to the electrical power conductor cable means which effects disconnection of the electrical connectors;



connecting the electrical power conductor cable means with a source of electrical power for supplying electrical power to the drill bit and electric motor power means unit to rotate the drill bit;

supplying electrical power to the drill bit and electric motor power means unit when desired to rotate the drill bit to effect earth formation penetrating rotation of the drill bit wherein earth boring is effected;

flowing drilling fluid through the bore of the drilling string while supplying electrical power to rotate the drill bit;

adding tubular pipe joints to extend the length of the drilling string;

installing additional electrical power conductors in the bore of the added on pipe joints prior to the step of connecting the electrical power conductor means with the source of electrical power;

thereafter removing said additional electrical power conductors from the drilling string; and

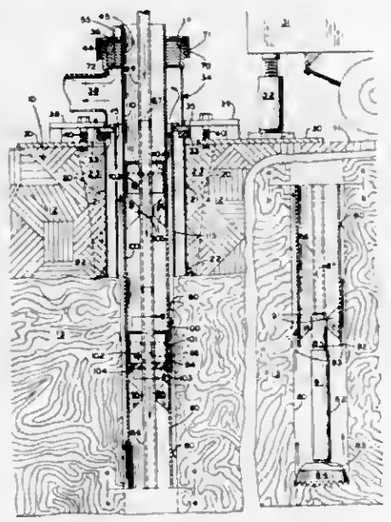
lowering a fishing tool down into the bore of the drilling string to engage and remove said electrical power conductor cable means from the drilling string by applying the upward force thereto with the wireline fishing tool means for thereafter permitting running a tool through the bore substantially to the bottom of the drilling string.

4,031,970

BOREHOLE DRILLING APPARATUS

Billie E. Belknap, P.O. Box 846, Reedley, Calif. 93654

Filed Feb. 9, 1976, Ser. No. 656,362
Int. Cl.² E21B 1/06, 21/00
U.S. Cl. 175—103 12 Claims



1. A well drilling apparatus comprising:

A. a slip discharge conduit,

B. means mounting the slip discharge conduit in a fixed upright position in the ground in substantially air-tight relation therewith,

C. discharge means connected to the slip discharge conduit and laterally extended therefrom above the surface of the ground,

D. an elongated drill pipe extended through the slip discharge conduit for elevational movement relative thereto having an end above the conduit adapted for connection to a source of air under pressure and an end below the conduit,

E. a pneumatically actuated hammer mounted on the lower end of the drill pipe adapted to release compressed air from the drill pipe therethrough having the drill pipe supported thereon for elevational movement therewith,

F. a debris conduit mounted in circumscribing relation on the drill pipe for elevational movement therewith and defining a passage therebetween having an upper end disposed in the slip discharge conduit and an open lower end adjacent to the hammer to receive air released by the hammer and debris generated thereby, and

g. a sliding seal between the slip discharge conduit and the upper end of the debris conduit to force said air and debris up the passage and out the laterally extended discharge means.

4,031,971

JET NOZZLE DRILLING ASSEMBLY

Thomas R. Miller, Waynesburg, Pa., assignor to Continental Oil Company, Ponca City, Okla.

Filed Oct. 8, 1976, Ser. No. 730,883
Int. Cl.² E21B 1/06
U.S. Cl. 175—107 4 Claims

1. In a drilling assembly comprising

a. a fluid supply shaft;

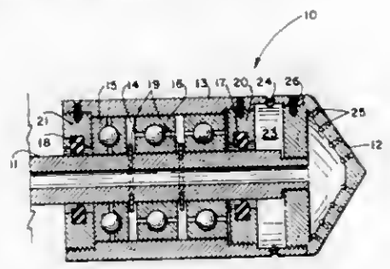
b. a jet nozzle rotatably mounted on an end of said fluid supply shaft and having a plurality of outlet ports adapted to impart rotational force to said nozzle upon passage of fluid through said ports;

c. a housing affixed to said nozzle and extending rearwardly therefrom to encompass a portion of said fluid supply shaft;

d. a bearing section between said fluid supply shaft and said housing, said bearing section including thrust bearing means and radial bearing means; and

e. retaining means connected to said fluid supply shaft and adapted to retain said nozzle, housing and bearing means in position on said fluid supply shaft;

the improvement comprising:



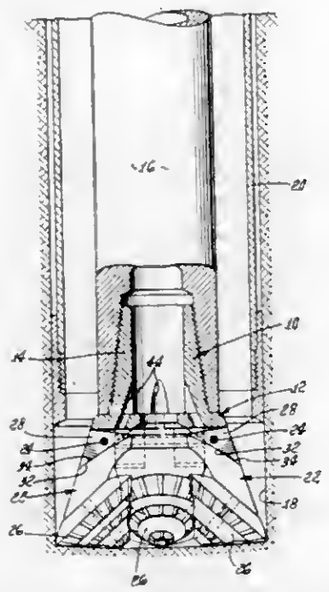
vent means providing an unrestrained fluid passage from the rear of said nozzle to the exterior of said housing whereby pressurized fluid leaking between the fluid supply shaft and the nozzle may pass freely to the exterior of the housing, thereby avoiding fluid contamination of said bearing section.

4,031,972

EXPANDABLE AND CONTRACTIBLE ROTARY WELL DRILLING BIT

Irving X. Burg, 2301 Bayside Drive, Corona del Mar, Calif. 92625

Filed Mar. 8, 1976, Ser. No. 664,960
Int. Cl.² E21B 9/26
U.S. Cl. 175—263 4 Claims



1. In a rotary drill bit which is contractible to fit within a casing to permit withdrawal through the casing, and which is expandable below the casing to drill a well bore of a diameter larger than the outside diameter of the casing so as to permit the casing to follow the bit to prevent collapse of and/or lost circulation from the well bore thereabove, the combination of:

a. a base having an upper end threaded for connection to the lower end of a rotary drill string in the casing for driving the bit;

b. a plurality of cutter arms circumferentially spaced around said base therebelow and respectively having cutters thereon;

c. a plurality of pivot pins respectively pivotally connecting said cutter arms to said base for simple pivotal movement inwardly and outwardly between retracted positions corresponding to the contracted condition of the bit and extended positions corresponding to the expanded condition of the bit, said pivot pins having circular cross sections and being disposed in holes of circular cross section in said base and said cutter arms, respectively;

d. a plurality of interengageable expansion stop means on said base and on said cutter arms, respectively, for preventing outward pivotal movement of said cutter arms beyond their extended positions corresponding to the expanded condition of the bit and for transferring the weight of said base and the drill string to said cutter arms without applying any substantial loads to said pivot pins, each of said interengageable expansion stop means including a first set of interengageable expansion stops on said base and the corresponding cutter arm adjacent one end of the corresponding pivot pin and below and radially outwardly of the corresponding pivot pin, a second set of interengagable expansion stops on said base and the corresponding cutter arm adjacent the other end of the corresponding pivot pin and below and radially outwardly of the corresponding pivot pin, and a third set of interengageable expansion stops on said base and the corresponding cutter arm intermediate the ends of the corresponding pivot pin and above and radially outwardly of the corresponding pivot pin; and

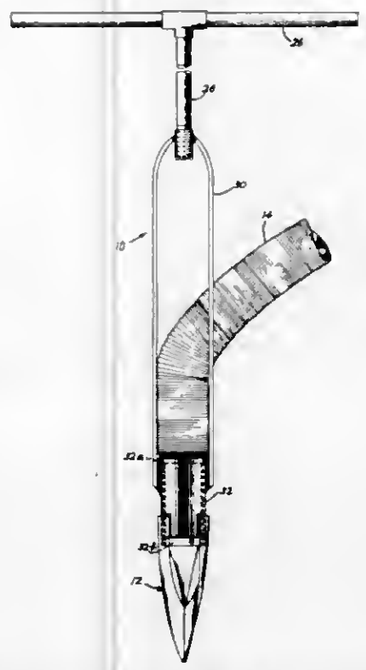
e. a plurality of interengageable contraction stop means on said base and on said cutter arms, respectively, for preventing inward pivotal movement of said cutter arms beyond their retracted positions corresponding to the contracted condition of the bit, said expansion stop means limiting inward pivotal movement of said cutter arms to values such that the weight of said base and the drill string pivots said cutter arms outwardly into their extended positions, to expand the bit, when said cutters rest on the bottom of said well bore.

4,031,973

PLACER MINING TOOL

Robert G. Claye, 420 South St., Yreka, Calif. 96097, and David S. Wilson, P.O. Box 12, Klamath River, Calif. 96050

Filed Nov. 10, 1975, Ser. No. 630,530
Int. Cl.² E21B 49/00
U.S. Cl. 175—320 2 Claims



1. A manually operable ore digging instrumentality for use in placer mining including, in combination,

a. a bit carrying sleeve of substantial diameter,

b. manually operable means for turning the sleeve back and forth and for thrusting it downward continuously or intermittently as required, and

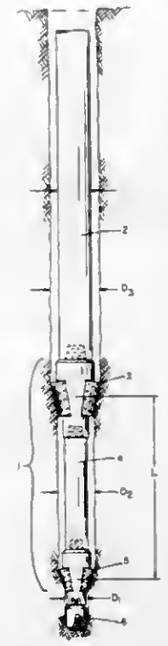
c. bit forming means fixedly attached to said sleeve consisting of three like arcuate earth-boring segments, the segments being generally rectangular in shape but each tapered at a small acute angle along its lower end, and being twisted to bring the beveled edges at their lower ends to a common axis along which they are united to one another, but being spaced from one another at their widest portions by substantially more than their own individual widths, the construction and arrangement being such that material dislodged in pieces or chunks by manual reciprocation of the bit whose maximum dimensions do not exceed the maximum width of a bit segment can be accepted between the bit segments and pass unobstructedly through the sleeve.

4,031,974

BORING APPARATUS CAPABLE OF BORING STRAIGHT HOLES

Carl R. Peterson, Boxford, Mass., assignor to Rapidex, Inc., Gloucester, Mass.

Filed May 27, 1975, Ser. No. 581,379
Int. Cl.² E21B 9/24
U.S. Cl. 175—334 7 Claims



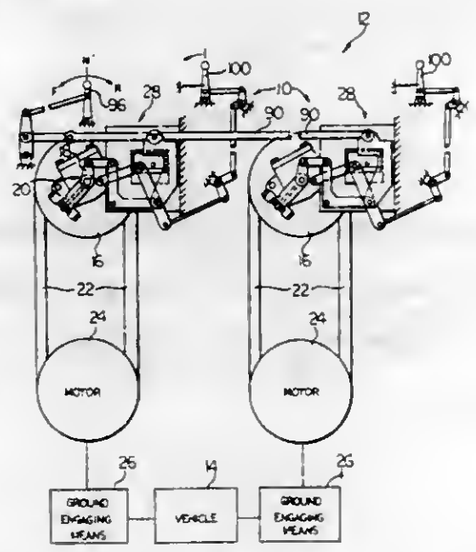
1. A rock boring assembly for producing a straight hole for use in a drill string above a pilot boring bit of predetermined diameter smaller than the desired final hole size, said boring assembly comprising a small conical boring bit and a larger conical boring bit, said conical boring bits mounted of lower and upper ends of an elongated spacer, respectively, the major effective cutting diameter of each of said conical boring bits being at least 10% greater than the minor effective cutting diameter of the respective bit, said spacer having a cross-section resistant to bending under the expected cutting forces, said spacer being rigidly connected to said conical bits to rotate therewith while spacing said conical boring bits apart a distance at least five times the major cutting diameter of said small conical boring bit, thereby spacing the pivot provided by said two conical boring bits to limit bodily angular deflection of said assembly and providing a substantial moment arm to resist lateral forces applied to said assembly by said pilot bit and drill string, and said spacer spacing said conical bits a distance than about 20 times the major cutting diameter of said lower conical boring bit to enable said spacer to act as a bend-resistant beam to resist angular deflection of the axis of either of said conical boring bits relative to the other when it receives uneven lateral force due to non-uniformity of cutting conditions about the circumference of said bit, said spacer spacing said conical bits apart by from 4 to 16 feet.

4,031,975

MECHANICAL MULTIPLIER FOR THE PURPOSE OF SPEED AND STEERING CONTROL FOR HYDROSTATIC SYSTEM

William K. Engel, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Jan. 21, 1976, Ser. No. 650,832
Int. Cl.² B62D 11/04
U.S. Cl. 180—6.48 7 Claims



1. In a control system for a hydrostatic drive of a vehicle comprising a pair of hydrostatic pumps the output of each of which is adjustable by moving an arm attached to a servo valve controlling the displacement of said pumps, each pump powering a respective hydraulic motor which drives a respective ground engaging means of said vehicle, an improved mechanical arrangment for controlling the speed and steering functions of said system, comprising:

A. a pair of pump adjusting means, one communicating with each of said pumps, each adjusting means comprising:

1. a first crank mounted centrally thereof to a frame adjacent said pump, a first end of said first crank drivingly linked to said arm;

2. a second crank mounted centrally thereof to said frame, a first end of said second crank drivingly linked to a second end of said first crank; and

3. a third crank mounted centrally thereof to said frame, a first end of said third crank drivingly linked to said second end of said first crank and a second end of said third rank drivingly linked to independent steering linkage means;

B. a pair of independent operator adjustable steering means, each respective one of said pair of steering means operatively connected to move a respective one of said pair of independent steering linkage means; and

C. tying means drivingly mounted adjacent a second end of each of said second cranks linking their movement.

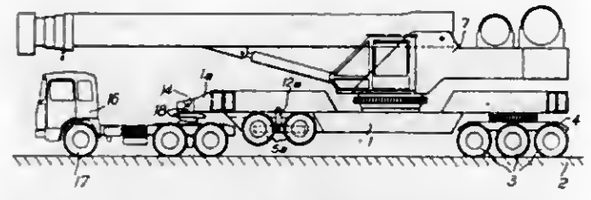
4,031,976

CONSTRUCTION VEHICLE HAVING RETRACTABLE WHEELS FOR TOWING

Bernard Lucien Lambert, Montceau-les-Mines, France, assignor to Potain Poclain Materiel (P.P.M.), Montceau-les-Mines, France

Filed Oct. 7, 1975, Ser. No. 620,466
Claims priority, application France, Oct. 9, 1974, 74.33991
Int. Cl.² B62D 61/12, 53/00
U.S. Cl. 180—14 R 4 Claims

1. A self-propelling construction machine comprising a frame provided with at least two groups of ground engaging members disposed and spaced longitudinally on said frame, one end of the frame being provided with a means for coupling to a towing vehicle, wherein the first group of ground engaging members is disposed near said end provided with the coupling means, said first group comprising means for elevating the ground engaging members with respect to the frame to a position above the ground, and the second group of displacement members being at a constant height relative to the frame and enabling movement of the machine when it is coupled to the towing vehicle, a prime mover on said machine, said first



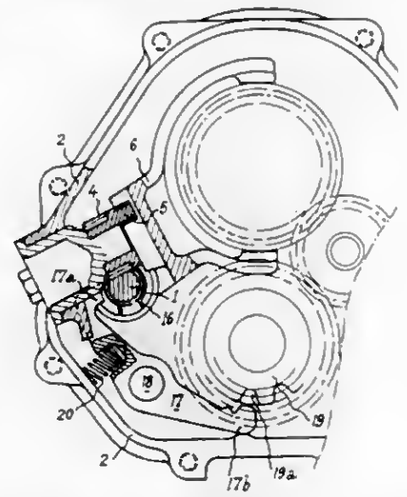
group of ground engaging members comprising drive members, means for transmitting power from said prime mover to said drive members, and said second group of members being mounted for steering movement, whereby said machine may be self-propelled and steered at a construction site, and whereby the machine may be coupled to a towing vehicle and transported over highways with the first group retracted.

4,031,977

TRANSMISSION DEVICES FOR MOTOR VEHICLES

Albert Grosseau, Chaville, France, assignor to Societe Anonyme Automobiles Citroen, France

Filed Jan. 8, 1976, Ser. No. 647,605
Claims priority, application France, Jan. 14, 1975, 75.00999
Int. Cl.² B60T 1/06
U.S. Cl. 180—77 R 13 Claims



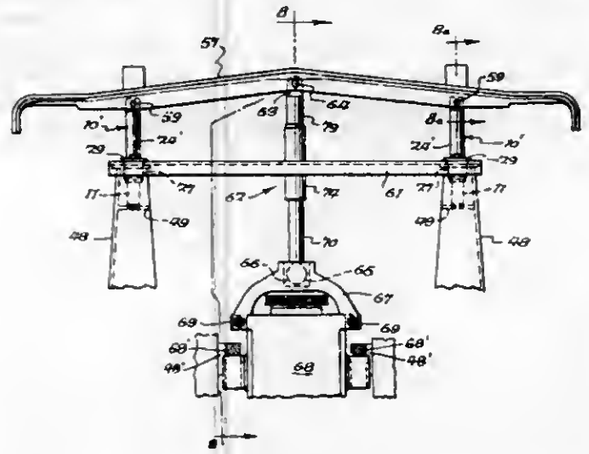
1. In a transmission device for a motor vehicle, means for providing a reverse drive condition of the transmission device, means for immobilizing the vehicle when the vehicle is stationary, first actuating means for actuating the reverse drive means, second actuating means for actuating the immobilizing means, and means for controlling the first and second actuating means, the control means comprising a manually actuated, slidable, selector rod, a rack, and first stop means, the rack and first stop means being movable with the selector rod, the first actuating means comprising a pinion arranged to engage the rack, and the second actuating means comprising a cam and second stop means connected to the cam, the cam being movable in at least one direction by the rod during a part of its displacement, by cooperation between the first and second stop means.

4,031,978

ENERGY ABSORBER UNIT AND ENERGY MANAGEMENT SYSTEM

Paul H. Taylor, Grand Island, N.Y., assignor to Tayco Developments, Inc., North Tonawanda, N.Y.

Filed May 28, 1975, Ser. No. 581,544
Int. Cl.² B60N 21/00
U.S. Cl. 180—91 15 Claims



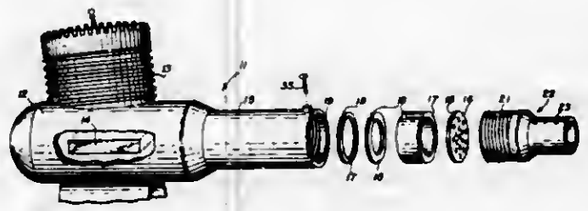
1. An energy management system for a vehicle having a frame, an engine movably mounted on said frame, and a bumper comprising impact energy absorbing unit means having first and second end portions, first means coupling said first end portion of said energy absorbing unit means to said bumper and second means coupling said second end portion of said energy absorbing unit means to said engine to cause impacts received by said bumper to be transmitted to said first end portion of said energy absorbing unit means while the forward momentum of said engine moving forwardly relative to said frame is transmitted to said second end portion of said energy absorbing unit means.

4,031,979

ADJUSTABLE MUFFLER FOR MODEL AIRCRAFT TYPE ENGINES

Roger W. Raleigh, 530 Alsace Lorraine, Half Moon Bay, Calif. 94019

Filed Apr. 24, 1975, Ser. No. 571,374
Int. Cl.² F01N 1/00
U.S. Cl. 181—69 10 Claims



1. In a muffler for muffling the exhaust of a two-cycle combustion engine of the type commonly used to power miniature aircraft, cars, boats and models:

baffle chamber means adapted to be connected in gas communication with and downstream of the exhaust port of the combustion engine for flow therethrough of the exhaust gases as fed into said baffle chamber means from the engine;

a plurality of baffle means adapted to be disposed in said baffle chamber means in spaced apart relation in the direction of the exhaust gas flow therethrough for providing different sonic wave reflections from each of said baffle means for reflecting sonic waves in the exhaust stream back to the engine for muffling the flow of the exhaust flow therethrough; and

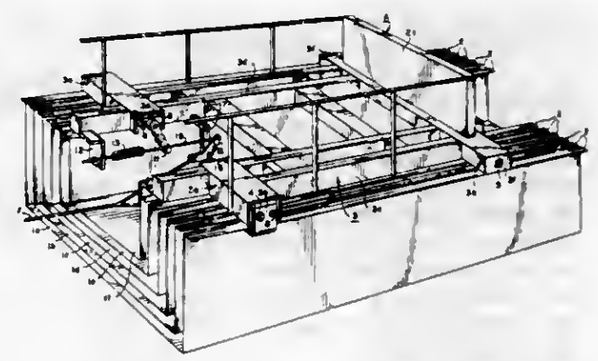
nozzle means having lesser cross-sectional dimensions for the flow of exhaust gas therethrough than those of said baffle chamber means so as to produce a sonic wave reflection in said baffle chamber and adapted to be connected in exhaust gas communication with and downstream of said baffle chamber means for reflecting sonic wave energy without substantially restricting the flow of exhaust gas therethrough for further muffling the flow of exhaust gas.

4,031,980

BRAKING DEVICE FOR LADDER LIFTER

Fusaji Terayama, Osaka, and Tetsuo Kozai, Higashiosaku, both of Japan, assignors to Morita Pump Kabushiki Kaisha, Osaka, Japan

Filed Aug. 14, 1975, Ser. No. 604,761
Int. Cl.² E06C 7/12
U.S. Cl. 182—103 3 Claims

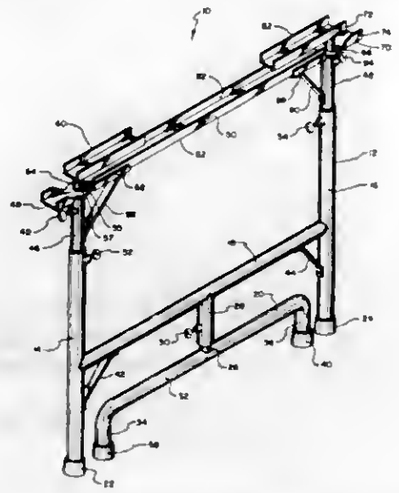


1. In an aerial ladder assembly having at least one pair of laterally spaced, channel-shaped ladder rails forming a ladder unit, a ladder lifter unit having laterally spaced rotatable wheels mounted thereon for rotational movement along each of said pairs of ladder rails of said ladder unit, rope means associated with said ladder lifter unit to raise or lower said lifter unit along the ladder rails of said ladder unit, the improvement of a braking device for stopping the movement of the ladder lifter unit along the ladder unit upon the breaking of the rope means, said braking device comprising elongated plate element means having a serrated upper surface fixed to the upper surface of each ladder rail of the ladder unit along the longitudinal length of each rail, brake cam element means having a bottom serrated surface pivotally mounted adjacent its upper end to said ladder lifter unit above each of said ladder rails, longitudinally tensionable spring means operatively connected intermediate the respective ends thereof to each brake cam element means, lever means pivotally mounted to said ladder lifter unit and connected at one end to one end of said spring means and at the other end to the rope means, bracket means mounted on said lifter means in longitudinally spaced relationship to said lever means and connected to the other end of said spring means whereby when said rope means are under tension, said spring means will be likewise under tension to maintain the brake cam element means in a raised state away from the serrated plate element means on said ladder rails but upon loss of tension in the rope means, the lever means will be pivoted forwardly causing the spring means to effect the pivoting of the brake cam element means towards the ladder rails to cause a meshing of the serrated surface of the cam element means against the serrated surface of each plate element means of each ladder rail to stop the movement of the ladder lifter unit along the ladder unit.

4,031,981
FOLDABLE WORK PLATFORM

Edward Spencer, La Grange, Ill., assignor to Little Giant Industries Inc., American Fork, Utah

Filed June 1, 1976, Ser. No. 691,926
Int. Cl.² E04G 1/32
U.S. Cl. 182—153 6 Claims

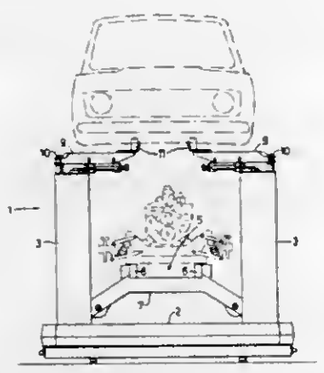


1. A foldable work platform comprising in combination:
a base comprising two upright, hollow legs rigidly interconnected by a cross piece and a support stand rotatably attached to the cross piece for selectively giving stability to the base when in upright position;
a scaffold adjustably cooperating with the base and comprising two downwardly depending hollow members rigidly interconnected by an open cross channel, each member being telescopically received by a leg, and means for securing each leg and hollow member together;
an arm configurated as an open U-shaped channel rotatably and extensibly carried upon the scaffold at at least one end thereof; and
wooden inserts nested within the cross channel and arms, the inserts extending above the sides of the channels.

4,031,982
DEVICE FOR MOUNTING CHASSIS DETAILS ONTO AN AUTOMOBILE BODY

Olov Halvar Lindfors, Goteborg, Sweden, assignor to AB Volvo Penta, Goteborg, Sweden

Filed Mar. 20, 1975, Ser. No. 560,556
Claims priority, application Sweden, Mar. 22, 1974, 7403918
Int. Cl.² B60S 13/00
U.S. Cl. 187—8.59 2 Claims

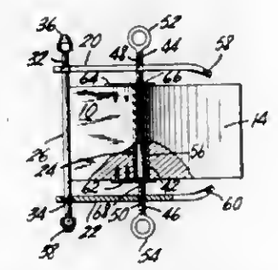


1. Device for mounting chassis details onto an automobile body, said device comprising an elongated rectangular platform, wheels supporting said platform, upright members mounted upon opposite ends of said platform at the corners of said platform, support means for an automobile body mounted on the upper part of each of said upright members, for movement between a first position under the body and a second position at the side of the body, said support means comprising support arms, said mounting means for said support means comprising vertical axles on which said arms are mounted for horizontal swinging movement between said first and second positions, a fixture for chassis details supported by the platform, each of said upright members having a jack connected to said fixture for raising the fixture relative to the platform to a level at which it relieves the weight of the body from said support means when said support means are in said first position and for lowering the fixture relative to the platform to lower the body when the support means are in said second position.

4,031,983
TIRE CHOCK

Peter S. Lentini, 623 Spruce St., Kulpmont, Pa. 17834

Continuation of Ser. No. 552,856, Feb. 25, 1975, abandoned.
This application June 14, 1976, Ser. No. 695,387
Int. Cl.² B60T 3/00
U.S. Cl. 188—32 11 Claims

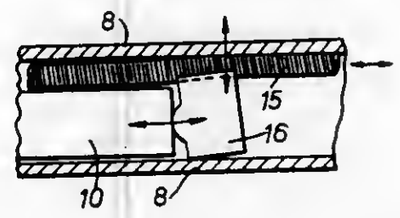


1. A wheel chock for preventing inadvertent movement of a wheel rotatably mounted on an axis comprising:
a. a base member having a wheel-engaging element for engaging the circumferential periphery of said wheel and being of sufficient height to prevent wheel rotation about said axis;
b. a frame mounted on said base member comprising at least two releasable gripping arms, an adjusting rod, means for movably securing said arms to said rod; and gripping arms anchoring means;
said adjusting rod being disposed at a greater distance from said axis than the circumferential periphery of said wheel and being essentially parallel to the axis of said wheel when said wheel engaging element is abutting the outer circumference of said wheel; each of said gripping arms having a proximal end and a distal end; said gripping arms extending radially inwardly of the circumferential periphery of said wheel in unsupported and unconnected embrace of said wheel at opposite sides thereof when said wheel-engaging element is abutting the outer circumference of said wheel; said distal ends extending beyond said wheel-engaging element toward the axis of said wheel when said wheel-engaging element is abutting the outer circumference of said wheel; said rod in cooperation with said securing means being adapted to alter the separation between said distal ends of said arms for the purposes of engaging and disengaging said wheel; and said proximal ends of said gripping arms being axially movable with respect to each other whereby the separation between said proximal ends is variable to permit adjustment of said frame to accommodate different sizes of tire.

4,031,984
BRAKE ACTUATOR AND THRUST RECEIVING STRUCTURE

Anthony William Harrison, Birmingham, England, assignor to Girling Limited, Birmingham, England

Filed June 8, 1976, Ser. No. 693,800
Claims priority, application United Kingdom, June 9, 1975, 24697/75
Int. Cl.² B61H 15/00
U.S. Cl. 188—59 6 Claims

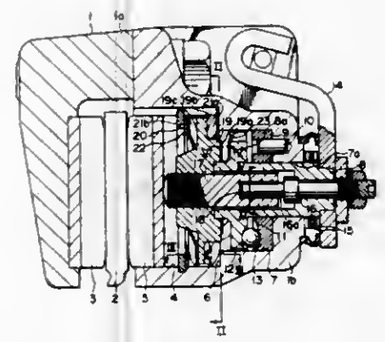


1. A brake for a rotor having a braking surface, said brake comprising a body of friction material having a forward end engageable with said braking surface and a rear end; a support for said body of friction material; adjusting means which moves said body of friction material relative to said support to compensate for wear of the friction material, said adjusting means comprising a screw member extending substantially parallel with the direction of movement of said body of friction material, and a thrust member in screw threaded engagement with said screw member and engaging said body of friction material to transmit braking forces from said screw member to said body of friction material; and means for applying braking forces to said screw member; wherein said thrust member can rock into force-transmitting engagement with said support under the action of the braking and reaction forces, the rotation of said thrust member urging said screw member into engagement with said support, whereby said thrust member and screw member are clamped together in said support and reaction forces are transmitted transversely of said screw member and said thrust member to said support in the region of the engagement between said thrust member and said screw member.

4,031,985
MECHANICAL DISC BRAKE

Hiroshi Ito, Kawasaki, Japan, assignor to Tokico Ltd., Kawasaki, Japan

Filed Oct. 12, 1976, Ser. No. 731,202
Claims priority, application Japan, Oct. 20, 1975, 50-126149
Int. Cl.² F16D 65/56
U.S. Cl. 188—71.9 3 Claims

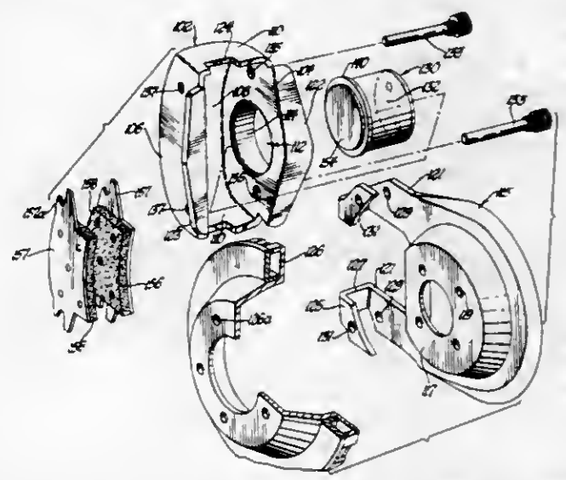


1. A mechanical disc brake comprising an input shaft axially displaceable upon receipt of a rotational movement input, a bolt connected at one end to said input shaft for receiving only said rotational movement of the shaft and abutting at the other end against a friction pad, a nut threaded on said bolt for normally receiving said axial displacement of the input shaft and also for receiving said rotational movement of the input shaft when subjected to clamping force, waved washers disposed on the opposite sides of a radial and outward extension of said nut to normally bias the nut against said input shaft, and a ratchet mechanism disposed between said input shaft and nut to transmit said rotational movement of the input shaft to said nut so as to displace the bolt toward said friction pad in accordance with the rotational amount of the input shaft, characterized in that at least one side of said radial and outward extension of the nut is formed with at least one recess for receiving the projection of one of said waved washers whereby inadvertent rotation of the nut is prevented.

4,031,986
DISK BRAKE CONSTRUCTION HAVING STAMPED SUPPORT

Tom H. Thompson, 540 Grander View Road, Milford, Mich. 48042

Continuation of Ser. No. 454,357, March 25, 1974, abandoned. This application Sept. 18, 1975, Ser. No. 614,583
Int. Cl.² F16D 55/22
U.S. Cl. 188—72.4 15 Claims



1. Disc brake apparatus comprising: an actuator support including an integral body of stamped sheet metal of uniform thickness having a pair of spaced, substantially flat side walls, a top portion extending between the top edges of said side walls, a pair of end portions each extending between the end edges of said spaced pair of side walls at opposite ends of said top portion such that said top portion extends between the upper ends of said end portions, a stiffening flange projecting outwardly from the lower edge of at least one of said side walls, an actuator opening formed in at least one of said side walls, an integral flange struck from said one side wall and projecting from the periphery of and surrounding said opening to define an integral sleeve having an outwadly projecting cylindrical wall for axially receiving a disc brak actuator assembly, a disc brake actuator module received in said actuator opening and sleeve and supported by the cylindrical wall of said sleeve, said module comprising a cylindrical housing having a closed end and an open end with an actuator mounted therein and axially extendable and retractable with respect to said housing in response to fluid pressure changes in said housing, said housing being received in said sleeve with a friction fit and being formed with a retaining flange projecting outwardly from one end of said housing and engaging said side wall to prevent axial movement of said housing in one direction with respect to said side wall.

4,031,987

SPRING APPLIED, ELECTRICALLY RELEASED BRAKE WITH ADJUSTABLE THRUST ELEMENT

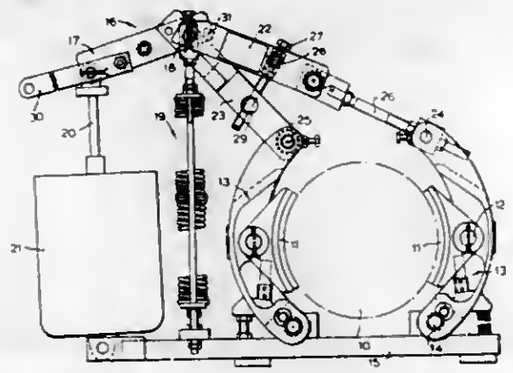
David John Webb, Bridgwater, England, assignor to Elliston, Evans and Jackson Limited, Bridgwater, England

Filed Oct. 24, 1975, Ser. No. 625,303

Claims priority, application United Kingdom, Oct. 26, 1974, 46422/74

Int. Cl.² B60T 13/04

U.S. Cl. 188—75 1 Claim



1. An electrically controlled brake comprising a fixed support, two brake arms each having upper and lower ends and each carrying a respective brake shoe, the lower ends of said brake arms being pivoted to the support, a brake control assembly comprising a brake control member pivotally secured at spaced positions to an electrically controlled thrustor and to a spring biasing means respectively, the thrustor and biasing means tending to move the brake control member in opposed directions and the thrustor being capable, in use, of overcoming the biasing force of said biasing means, first and second levers each having a pair of ends, one end of each lever being pivotally connected to an upper end of a respective one of said brake arms, and the other ends of said levers being pivotally connected together and to said brake control member at a single pivot point, the spring biasing means also being connected to said pivot point, an adjusting device capable of being steplessly lengthened and shortened connecting together said first and second levers at an intermediate position disposed between the ends of said levers, said adjusting device comprising an adjusting screw rotatably mounted in one of said levers but held captive against axial movement, the other of said levers having a transverse pin rotatably mounted therein, and the adjusting screw having screw-threaded engagement within said pin and transversely thereof, whereby rotation of the adjusting screw to adjust the length of the adjusting device varies the angle between said first and second levers only, without varying the length of the levers.

4,031,988

STALL CONTROL AND WEAR BLOCK FOR RECREATIONAL SKATE BOARDS

David John Hill, 1/71 Evans St., Harbord N.S.W. 2096, Australia

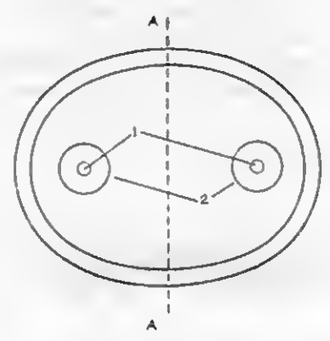
Filed Apr. 28, 1976, Ser. No. 681,056

Claims priority, application Australia, Jan. 7, 1976, 4468/76

Int. Cl.² A63C 17/00

U.S. Cl. 188—250 B 3 Claims

1. A stall control and wear block for skateboards including a platform, comprising a plate-like element formed from moldable material having a plan configuration with major opposing elliptical sides symmetric about a transverse axis, the opposing major elliptical sides containing a central sector of 160° which constitutes a wear edge of which the central 120° is a control edge, no part of the wear and control edges having a radius of less than 15 millimeters or more than 110 millimeters, and at least two countersunk holes formed on the transverse axis of said block adapted to receive connectors for the attachment of the block to the skateboard platform.



4,031,989

DOUBLE EFFECT HYDRAULIC SHOCK ABSORBER

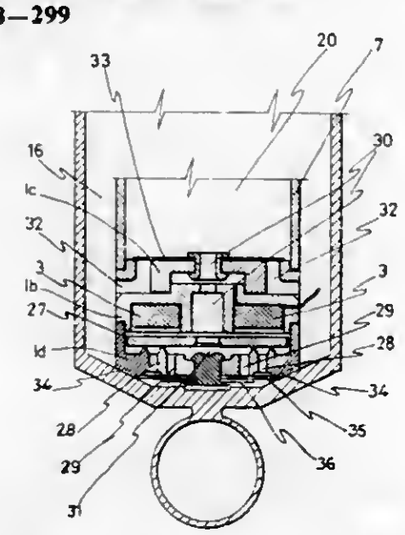
Antonio Giner Blazquez, Lepanto 194 5°-1ª, Barcelona 13, Spain

Filed Feb. 3, 1976, Ser. No. 654,872

Claims priority, application Spain, Feb. 22, 1975, 435006; Dec. 18, 1975, 443663

Int. Cl.² F16F 9/46

U.S. Cl. 188—299 4 Claims



1. A double effect shock absorber comprising:
an inner tube defining an inner chamber having fluid therein;
an outer tube concentric with said inner tube and defining therewith an annular outer chamber;
a piston attached to a rod which extends through one end of said inner tube and movable within said inner chamber;
a body assembly attached to the other end of said inner tube and thereby closing said inner chamber at said other end of said inner tube;
said body assembly including a first body member having therein an annular chamber;
an electromagnet positioned within said annular chamber of said first body member;
said body assembly including a second body member attached to said first body member and defining therewith a collection chamber in permanent communication with said inner chamber;
first and second exhaust duct means extending through said second body member and connecting said outer annuiar chamber with said collection chamber;
first closure valve means for closing said first exhaust duct means;
second closure valve means for closing said second exhaust duct means, said second closure valve means having a stronger resistance to opening than said first closure valve means; and
blocking means positioned within said collection chamber, for blocking said first exhaust duct means when said electromagnet is deactivated, and for opening said first exhaust duct means when said electromagnet is activated;
whereby, when said electromagnet is activated, movement of said piston within said inner chamber toward said body assembly will cause said fluid to pass through said first exhaust duct means and open said first closure valve means to pass to said outer annular chamber, while said second closure valve means closes said second exhaust duct means;
whereby, when said electromagnet is deactivated, movement of said piston within said inner chamber toward said body assembly will cause said fluid to pass through said second exhaust duct means and open said second closure valve means to pass to said outer annular chamber, while said first exhaust duct means remain closed by said blocking means.

4,031,990

SET OF CURRENT COLLECTING ELEMENTS USED FOR A CURRENT COLLECTING ROLLER

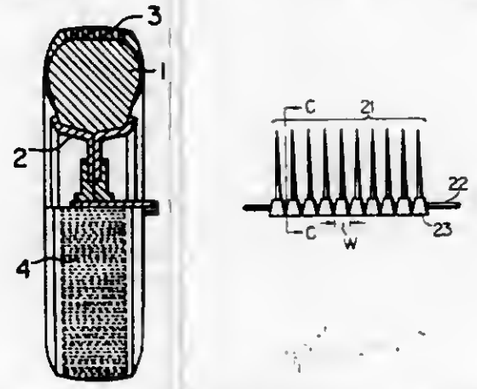
Kazumi Matsui, Tokyo; Takashi Umemori, Musashino; Yutaka Shibata, Takaishi; Kinzo Yamamura, Fujilders; Tamisuke Kimura, Kobe, and Tomokazu Kashiwara, Nishinomiya, all of Japan, assignors to Japanese National Railways, Tokyo; Sumitomo Electric Industries, Ltd., Osaka and Sumitomo Rubber Industry, Ltd., Kobe, all of, Japan

Filed Nov. 14, 1975, Ser. No. 632,164

Claims priority, application Japan, Nov. 26, 1974, 49-136472

Int. Cl.² B60L 5/04

U.S. Cl. 191—63 9 Claims



1. A current collecting apparatus for use in a current collecting member operatively connected to a current collecting roller, said current collecting apparatus comprising:
a plurality of juxtaposed electroconductive elements having truncated lower portions with at least one hole therethrough; and
a lead wire fitted through and secured to said holes in said plurality of electroconductive elements.

4,031,991

COIN OPERATED ELECTRONIC PARKING METER

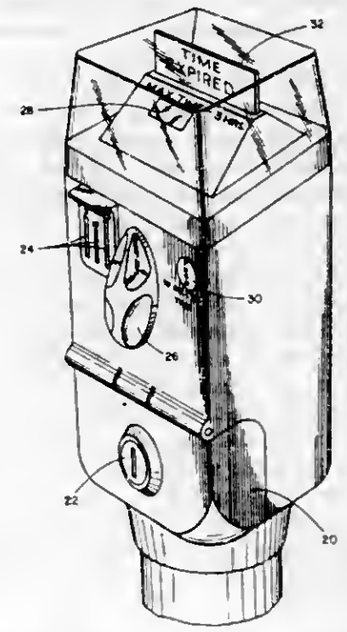
Steve Malott, Schaumburg, Ill., assignor to Qonaar Corporation, Elk Grove Village, Ill.

Filed Dec. 29, 1975, Ser. No. 644,598

Int. Cl.² G06F 9/00

U.S. Cl. 194—1 R 17 Claims

1. A token actuated timing device comprising:
a. means for storing preprogrammed numerical values at a plurality of addressable memory locations;
b. means for detecting the type and number of each type of token inserted into said device and for addressing a selected memory location each time a token is inserted, said location corresponding to the type and number of token of that type inserted;
c. first counter means for down counting from any present number to zero at a rate determined by an applied clock frequency and producing a zero detect signal on reaching zero;
d. means for presetting said first counter means to the value stored at said selected memory location;
e. second counter means for selectively counting up or down at a rate determined by an applied clock frequency;
f. means for producing first and second clock frequencies;
g. control means operative each time a token is detected for



i. applying said first clock frequency to said first counter means to down count said first counter means to zero,
ii. simultaneously up counting said second counter means at said first clock frequency until said zero detect signal is produced by said first counter means,
iii. down counting said second counter means at said second clock frequency after said zero detect signal is produced, and
h. means for displaying the count on said second counter means.

4,031,992

PRINTING DEVICE

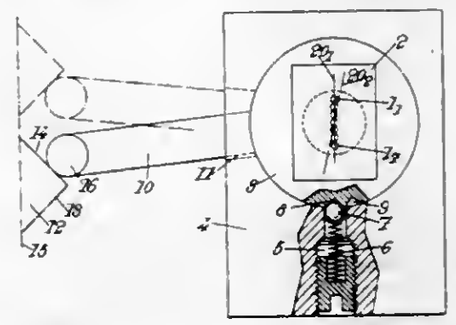
Roger Murat, and Guy Glay, both of Argenteuil, France, assignors to Societe d'Applications Generales d'Electricite et de Mecanique S A G E M, Paris, France

Filed Nov. 11, 1975, Ser. No. 630,923

Claims priority, application France, Nov. 14, 1974, 74.37624

Int. Cl.² B41J 3/04

U.S. Cl. 197—1 R 4 Claims



1. A device for printing data comprising:
at least one printing member of the needle impact type and including a printing head movable in a predetermined direction so as to inscribe the data in lines on a substrate;
a plurality of needles carried by said head for selectively

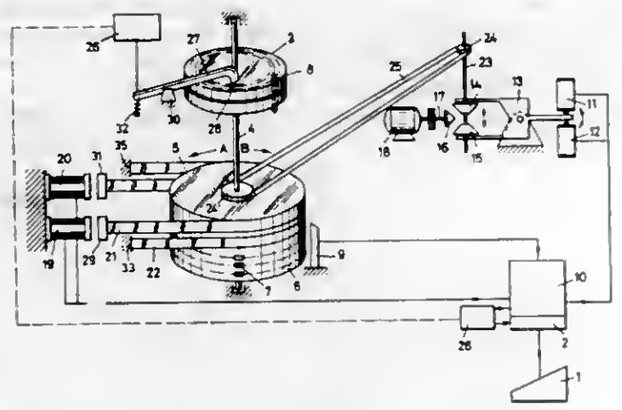
projecting against said substrate at one end, so as to inscribe characters on a predetermined point grid;
synchronizing means for generating pulses in synchronism with the movement of said printing head in said predetermined direction, each of said pulses corresponding to a column of said point grid;
upright character generator means connected to said synchronizing means and producing at an output for each needle, a sequence of pulses for causing projections of said needle against the substrate in order to inscribe a given upright character, said sequence depending on the character to be inscribed and being controlled by the pulses generated by said synchronizing means;
a plurality of OR gate means each comprising a first and a second input, the first input being connected at the output of said upright character generator means;
for each needle, with the exception of one needle in an extreme position, a shift register having a clock input and a serial input for receiving pulses from the corresponding output of said upright character generator means and a serial output, the clock input of said shift register receiving pulses from said synchronizing means, and the serial output of each shift register being connected to the respective second input of a corresponding OR gate means, the number of stages of said shift register depending on the position of said needle and determining the delay between receipt of a pulse from said generator means and appearance of that pulse at the serial output; and
control means for inhibiting the output of the respective shift register when it is desired to inscribe upright characters and preventing the application of a signal to said first input of the OR gate means when it is desired to inscribe an inclined character.

4,031,993

ELECTRONIC EMBOSSING MACHINE

Rainer Eberhard Gürgens, and Helmut August Michael Schottle, both of Berlin, Germany, assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed Sept. 25, 1975, Ser. No. 616,639
Claims priority, application Germany, Oct. 1, 1974, 2446890
Int. Cl.² B41J *1/30*
U.S. Cl. 197—6.6 **3 Claims**



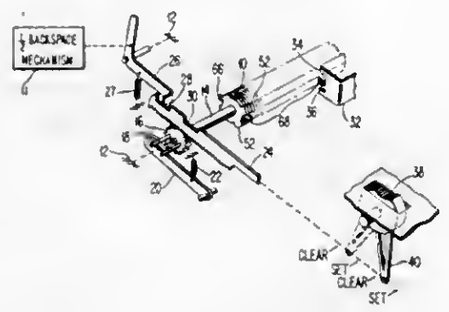
1. An electronic embossing machine comprising:
a keyboard having a plurality of characters,
a memory electronically associated with said keyboard to receive information therefrom and operative for storing such information,
a logic controller associated with said memory for receiving information therefrom, said memory being operative to inform said logic controller as to the character selected by said keyboard,
a drum supported upon a rotatable shaft for rotation therewith, said drum having a plurality of numerically arranged code addresses about the perimeter thereof,
a scanner adjacent to said drum for reading said code addresses as they are conveyed thereacross, sid scanner being operatively connected with said logic controller for supplying information thereto and informing said logic controller as to the code address being read,
a die head bearing a plurality of dies thereon and an opening intermediate adjacent dies, said die head being supported by said shaft for rotation therewith, said dies on said die head having characters thereon corresponding to the characters on said keyboard and to the code addresses on said drum, wherein the embossing position is defined as the posture of the die head when the code address corresponding to the die having the character selected by the keyboard is adjacent said scanner,
brake means associated with said logic controller and operative to brake said shaft upon receipt of a brake signal from said logic controller, said brake means including a pair of brake straps disposed about said drum and a movable pawl disposed adjacent said die head,
electromagnetic means connected to said one end of each brake strap and operative to extend its respective brake strap to engage said drum upon receipt of said brake signal and means for moving said pawl into an opening within said die head upon receipt of said brake signal,
a pair of opposed electromagnets each operatively connected with said logic controller to be alternately energized thereby,
drive means operatively connected to said shaft for rotation thereof in an "A" direction upon one of said electromagnets being energized and in a "B" direction upon the other of said electromagnets being energized, said logic controller upon receiving information from said memory indicating the selected character to be embossed and information from said scanner indicating which die is in the embossing position being operative to determine the required direction of rotation of said shaft for the shortest distance to place the die with the selected character into the embossing position and being operative to send a signal energizing the appropriate one of said electromagnets to drive said shaft until said selected character is placed in the embossing position, at which time said logic controller is operative to terminate the energizing of said electromagnets and actuate said brake means to hold said die head stationary with said selected die in the embossing position.

4,031,994

DOUBLE TAB RACK FOR A TYPEWRITER

John O'Neil Schaefer, Lexington, Ky., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 24, 1975, Ser. No. 644,256
Int. Cl.² B41J *21/04*
U.S. Cl. 197—70 **8 Claims**



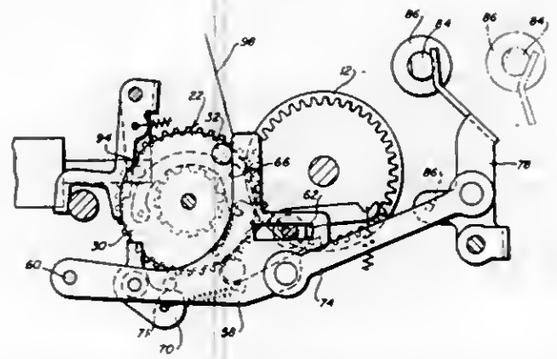
1. A tab rack assembly comprising a tab rack member and a plurality of tab stop members, each tab stop member representing an incremental escapement position of a printing mechanism relative to a record sheet, said tab rack member being movable to present alternatively one side thereof or the opposite side thereof to a tabulator control mechanism;
said tab stop members each having two active control projections extending therefrom for engagement by said tabulator control mechanism;
said control projections being opposite each other with respect to the axis of said tab rack member;
said tab stop member being configured to provide means for retention of each of said control projections in each of two positions respectively;
whereby two discreet and independent sets of tab commands may be set into and retained simultaneously in a tab rack member.

4,031,995

KEYBOARD ACTUATED PAPER INSERTION AND EJECTION MECHANISM

Rudolf Blum, Nurnberg, and Bernd Stiller, Berlin, both of Germany, assignors to Triumph Werke Nurnberg A.G., Nurnberg, Germany

Filed Mar. 17, 1976, Ser. No. 667,554
Claims priority, application Germany, June 13, 1975, 2526445
Int. Cl.² B41J *13/20*
U.S. Cl. 197—138 A **4 Claims**



1. In a typewriter having a rotatable platen and an associated paper hold down bail pivotally mounted for movement between a closed position in rolling contact with said platen and to an open position spaced from said platen,
energizable motor means connected to rotatably index said platen to control movement of a sheet of paper,
a first clutch part rotatably driven by said platen,
a second rotatable clutch part selectively engageable with and driven by said first clutch part and having a camming pin,
a solenoid,
means for coupling over a platen revolution said first and second clutch parts upon energization of said solenoid,
a control lever connected to said paper bail and positioned to be driven by said camming pin to pivot said paper bail to open and closed positions in each clutch cycle, and
operator controlled means for energizing said motor means and for energizing said solenoid.

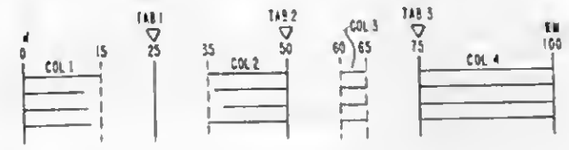
4,031,996

TAB REPOSITIONING SYSTEM

Dennis Gene Busch, Austin, Tex., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 31, 1975, Ser. No. 645,732
Int. Cl.² B41J *25/18*
U.S. Cl. 197—176 **10 Claims**

1. A tab repositioning system comprising:
a. storage means having a number of storage locations for storing tabs set along a text line;
b. means for addressing one of said storage locations in said storage means; and
c. means upon addressing one of said storage locations for



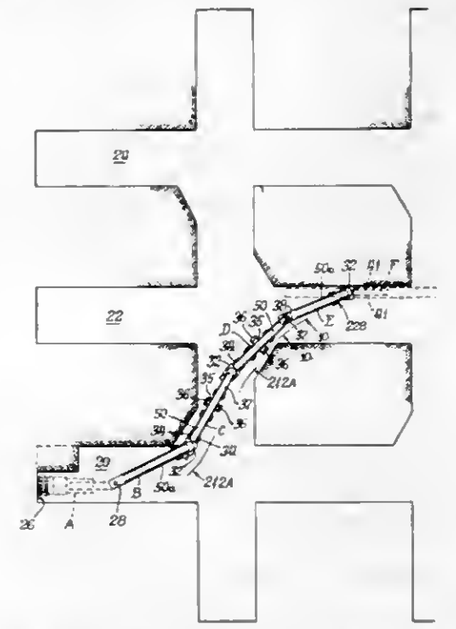
causing set tabs following said addressed location to be repositioned in said storage means.

4,031,997

MOBILE TELESCOPICAL ARTICULATED CASCADE CONVEYOR SYSTEM FOR MINING AND AUTOMATIC SELF-TRAMMING WHEEL-MOUNTED CONVEYOR UNIT THEREFOR

Robert C. Nelson, Bluefield, W. Va., assignor to New River Manufacturing Company, Inc., Glen Lyn, Va.

Filed Dec. 5, 1975, Ser. No. 637,977
Int. Cl.² B65G *21/14*
U.S. Cl. 198—301 **10 Claims**



1. In a mobile conveyor system for mining having a series of elongated mobile conveyor units articulately interconnected in cascade relationship with each of said units positioned to discharge onto a succeeding unit for conveying material from a movable source to a remote stationary floor conveyor, each mobile conveyor unit having a conveyor frame with an endless conveyor element trained for orbital movement between pulleys at opposite ends and driving means for said conveyor element, at least one of said mobile conveyor units intermediate the end units of said series comprising:
tramming frame means intermediate the receiving and discharge ends of the conveyor frame of said one conveyor unit including a pair of separate and independent tramming subframes on opposite sides of said conveyor frame, each subframe being separately guided for independent up and and down movement relative to said conveyor frame and having a single mine-bottom-engaging wheel comprising the sole ground support for said subframe and enabling said one conveyor unit to tilt freely up and down as a unit about said wheels;
the receiving end of said conveyor frame engaging the mine bottom to provide, with said two wheels, a three-point ground-stabilized support for the entire said conveyor frame, the receiving end portion of said conveyor frame having track means located between said receiving end and said wheels;
said conveyor frame comprising with the endless conveyor

element and the pulleys associated therewith, a single integral assembly which is vertically tiltably adjustable, as a unit, independently of the tramming frame means, about the point of engagement of its receiving end with the mine bottom, and is rockably adjustable, as a unit, independently of the tramming frame means, about a longitudinal axis extending along the length of the endless conveyor element;

power-actuated elevating means acting between each of said subframes and the corresponding side of said conveyor frame, either of said elevating means when independently actuated being effective to rockably adjust said conveyor frame about said longitudinal axis and thereby adjust the transversely level condition thereof, both of said elevating means when simultaneously actuated being effective to vertically tiltably adjust the entire said conveyor frame about the said point of engagement of its receiving end with the mine bottom and thereby adjust the height thereof relative to the tramming frame means;

a carriage connected to the adjacent inbye mobile conveyor unit and movable thereby back and forth on said track means along the so-stabilized receiving end portion to provide a connection between said one mobile conveyor unit and said adjacent inbye mobile conveyor unit enabling self-tracking variable telescopic movement therebetween;

the discharge end portion having means for connection with an adjacent outbye mobile conveyor unit;

power tramming means for driving said wheels to self-propel said one mobile conveyor unit; and

automatic control means operable in response to movement of the carriage by the adjacent mobile conveyor unit in one direction along the track means to actuate said power tramming means to move said one conveyor unit in the same direction.

4,031,998

AUTOMATIC SORTING CONVEYOR SYSTEMS

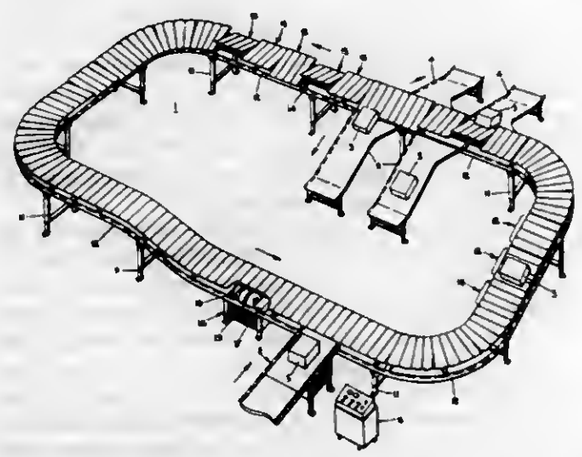
Shin Suzuki, Tokyo; Masami Uesugi, and Michi Sekine, both of Yokohama, all of Japan, assignors to Rapistan, Incorporated, Grand Rapids, Mich.

Filed Mar. 4, 1976, Ser. No. 663,853

Claims priority, application Japan, Mar. 20, 1975, 50-32945

Int. Cl.² B65G *43/00*

U.S. Cl. 198—365 **6 Claims**



1. In an automatic sorting conveyor system including a plurality of support structures to support articles for movement along said conveyor, said support structures being adapted to move in endless fashion along a predetermined path formed by first guide means in said conveyor to thereby receive articles and deposit same at predetermined sorting stations along said path, and driving means for urging said supporting structures along said path, the improvement comprising:

said first guide means being formed centrally along said predetermined path;

each said supporting structure forming an independent article supporting surface including a plurality of slat elements, said slat elements in each said supporting structure being disposed in overlapping relationship;

each said supporting structure including a plurality of carriage means, each said carriage means individually supporting an associated one of said slat elements for movement along said path, said carriage means being supported in said first guide means for movement along said predetermined path;

pivot means on each said carriage means for each of said plurality of slat elements in each said support structure whereby said plurality of overlapping slat elements in each of said support structures can be pivoted about said pivot means and shifted in unison between a level position and a tilted position independently of the position of adjacent upstream and downstream support structures;

actuating means connected to at least one of said carriage means in each of said support structures to cause same to pivot about said pivot means;

second guide means for said actuating means, said second guide means being arranged along said predetermined path on opposite sides of said first guide means and adapted to receive and guide said actuating means to normally maintain said plurality of slats in said level position;

switching means associated with said second guide means, said switching means being disposed proximate said sorting stations along said path, said switching means being adapted for cooperative operation with said actuating means and said second guide means to shift said support structure to said tilted position at said sorting station to thereby deposit articles carried on said support structure at said sorting station.

4,031,999

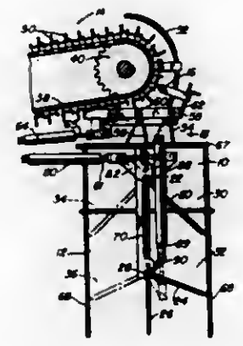
APPARATUS FOR AND METHOD OF ACCUMULATING AND THEREAFTER RELEASING, EN MASSE, A PRE-DETERMINED NUMBER OF INDIVIDUAL, ELONGATED, CYLINDRICAL ARTICLES

Roland W. Wagner, and William K. Switzer, both of Cincinnati, Ohio, assignors to Warrick Equipment Corporation, Cincinnati, Ohio

Filed Jan. 23, 1976, Ser. No. 651,718

Int. Cl.² B65G *47/44*

U.S. Cl. 198—418 **22 Claims**



1. A device for accumulating and thereafter releasing, en masse, a predetermined number of individual, elongate, cylindrical articles, comprising:

a pair of article-receptive chambers, each having upper and lower open ends;

means selectively and sequentially introducing a plurality of individual, elongate articles into the upper end of one or the other of said chambers;

an upper gate disposed intermediate the upper and lower ends of said chambers and movable between alternate closed, article-supporting and opened, article-releasing positions first in one and then in the other chamber, said gate when in closed position defining the bottom of an article-receptive upper compartment in one or the other of the chambers;

a lower gate disposed adjacent the lower ends of said chambers and movable between alternate closed, article-supporting and opened, article-releasing positions first in one and then in the other chamber, said gate when in closed position defining the bottom of an article-receptive lower compartment in one or the other of the chambers;

actuator means for each of said gates to move them from one to the other of their closed and opened positons; and

control means responsive to the number of articles received in the compartments of said chambers to actuate said actuator means.

4,032,000

TRANSPORT DEVICE FOR CYLINDRICAL OBJECTS ROD-SHAPED, SUCH AS CIGARETTES

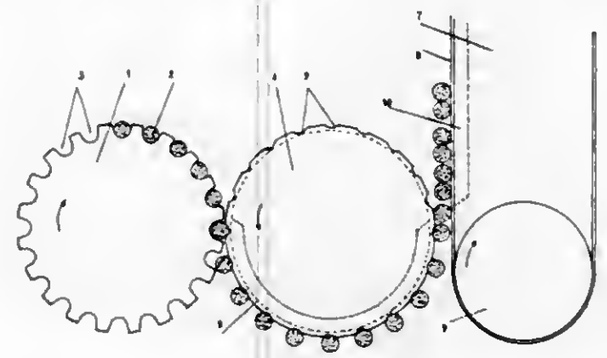
Jean-Francois Leclerc, and Henri Anfossi, both of Orleans, France, assignors to Service d'Exploitation Industrielle des Tabacs et des Allumettes, France

Filed Apr. 2, 1976, Ser. No. 673,081

Claims priority, application France, Apr. 4, 1975, 75.10530

Int. Cl.² B65G *47/57*

U.S. Cl. 198—428 **1 Claim**



1. A device for transporting a plurality of like cylindrical rod-shaped objects such as cigarettes transversely to their longitudinal axis comprising first upstream conveying means and second downstream conveyor means, said first conveying means comprising a cylindrical conveyor having a plurality of like shallow sockets for receiving said objects and said second conveying means comprising a smooth endless belt, said second conveying means being disposed from said first conveying means at a distance such that the length of the shortest perpendicular line from the surface of the second conveying means to the deepest point of the socket is approximately equal to the diameter of the objects, first suction means operable to retain said objects in said sockets over a circumferential portion of said first conveying means which portion terminates approximately in the region of said shortest line, and second suction means operable to retain a pair of said objects contiguously grouped on the ascending portion of said second conveying means which portion begins approximately in the region at which the suction means of said first conveying means terminates.

4,032,001

DETACHABLE CONVEYOR BUCKET APPARATUS

Danny L. Hild, P.O. Box 284, Tribune, Kans. 67879

Filed Sept. 2, 1975, Ser. No. 609,670

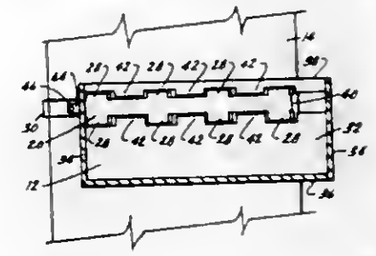
Int. Cl.² B65G *15/00*

U.S. Cl. 198—711 **2 Claims**

1. A detachable conveyor bucket apparatus, the apparatus attached to an endless conveyor belt, the apparatus comprising:

an elongated bracket transversely mounted to the conveyor belt, said bracket having a top and bottom portion with U-shaped bracket flanges extending outwardly therefrom and equally spaced one from the other; and

a bucket having side portions, a front portion, a rear portion and an open top portion, the rear portion having an elongated slot having U-shaped slot flanges, the elongated slot being substantially a mirror image of said elongated bracket, said bracket inserted into the slot and there-



through, said bucket moved laterally along the length of said bracket until the U-shaped slot flanges are positioned behind the U-shaped bracket flanges thereby engaging the rear portion of said bucket between said bracket and the conveyor belt;

a side portion of the U-shaped bracket flanges of said bracket is projected outwardly at an angle to the length of said bracket, the angled side portion used as a guide in sliding the slotted rear portion of said bucket when the rear portion of said bucket is engaged between the conveyor belt and said bracket.

4,032,002

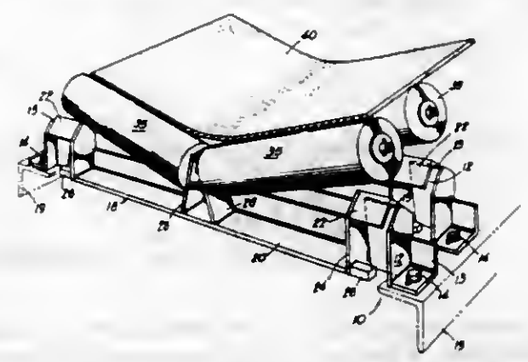
SELF-TRAINING IDLER ASSEMBLY

Allen S. Jackson, Atlanta, Ga., assignor to Clifford G. Hollyfield, Jr., Roswell, Ga., a part interest

Filed Feb. 26, 1976, Ser. No. 661,726

Int. Cl.² B65G *39/16*

U.S. Cl. 198—808 **5 Claims**



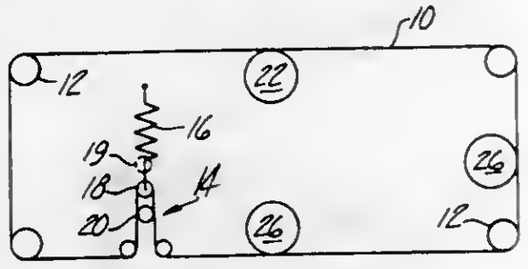
1. Mechanism for automatically training a troughed belt in both of its directions of linear travel comprising a support frame, a series of pendulum cradles on the support frame transversely of and beneath the troughed belt, pairs of transversely inclined divergent axis belt support and training rollers journaled on said pendulum cradles and being swingable bodily with the cradles relative to said support frame, and fulcrum means on said support frame and cradles substantially above the centers of gravity of the cradles from which the cradles and said rollers swing freely and are self-centering under the influence of gravity.

4,032,003

HYDROSTATIC CONVEYOR DRIVE

James S. Hull, Waterford, Mich., assignor to Melvin Corporation, Bay City, Mich.

Filed Apr. 30, 1976, Ser. No. 682,137
Int. Cl.² B65G 23/32
U.S. Cl. 198—855 18 Claims



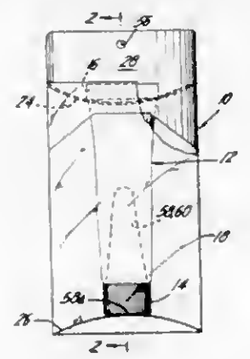
12. A conveyor drive system for maintaining a constant pull on a conveyor independently of load on the conveyor comprising, a closed circuit hydrostatic drive having a variable displacement pump, a fixed displacement motor connected to the conveyor, a supply line for delivering hydraulic fluid from said pump to said motor, a return line for delivering hydraulic fluid from said motor to said pump, control means movable to vary the displacement of said pump, actuating means connected to said control means to move the latter in proportion to the pressure in said supply line to vary the delivery of hydraulic fluid from said pump to said motor to vary the speed of said motor, said actuating means comprising a hydraulic cylinder, means biasing said cylinder in one direction with a constant force, and a fluid conduit communicating said cylinder with said supply line for moving said cylinder in the other direction in response to pressure in said supply line.

4,032,005

DISPLAY CONTAINERS

William J. Vereb, Ringwood, N.J., assignor to J. & P. B. Myers Inc., Moonachie, N.J.

Filed Oct. 22, 1975, Ser. No. 624,594
Int. Cl.² B65D 5/08, 25/54
U.S. Cl. 206—45.14 19 Claims



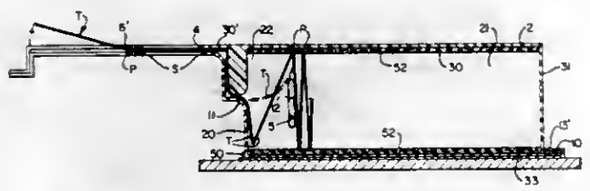
1. An article-display container adapted to be flat when stored and to become expanded for containing an article, including a back wall of dimensionally stable sheet material, a front panel of dimensionally stable transparent material, said back wall and said front panel being of substantially equal width and having lateral margins substantially aligned with each other so that the container can be flat for storage, said front panel having bent-over portions united to said back wall along said lateral margins of the latter, said sheet material including lenticular-shaped flaps defined by outwardly bowed arcs intersecting at said lateral margins, said flaps being joined to other portions of said sheet material by creases extending along respective ones of said arcs, means including said flaps when erected from said other portions of said sheet material end closures of the container and for bowing said back wall and said front panel apart for providing an article-containing space, said sheet material including a display panel having lateral margins aligned with the aforesaid lateral margins, at least part of the display panel being disposed behind said front panel in position to be bowed forward against the front panel by said flap when erected.

4,032,004

TICKET DISPENSING ARRANGEMENT

Francis William Coates, Kings Highway Towers, Apartment A705, Maple-Shade, N.J. 08052

Filed July 9, 1975, Ser. No. 594,246
Int. Cl.² A45C 11/18
U.S. Cl. 206—39.6 45 Claims



1. A dispensing apparatus for dispensing tickets, the apparatus comprising: a base member; a cover member disposed on said base member including a top wall spaced from said base member, a pair of spaced vertical side walls extending from said top wall to said base member, and a rear wall, said top wall, said side walls and said rear wall of said cover member forming the outer walls of the dispensing apparatus and defining therebetween a chamber for housing a plurality of tickets; a dispensing slot provided at one end of said chamber for dispensing tickets therefrom; a first locking means arranged on the top wall of the cover member for retaining a ticket in said dispensing slot; and a second locking means provided on said base member for preventing re-insertion of a withdrawn ticket into said chamber.

4,032,006

SHOCK RESISTANT CONTAINER

Victor F. Cantarella, Monroe, and John G. Smith, Warwick, both of N.Y., assignors to International Paper Company, New York, N.Y.

Filed Oct. 13, 1976, Ser. No. 731,880
Int. Cl.² B65D 5/50
U.S. Cl. 206—45.19 23 Claims

1. A unitary blank for constructing a shock resistant container, said blank comprising:

a front wall-forming section, said front wall-forming section comprising first and second front wall-forming panels, each of said front wall-forming panels having weakened longitudinal score lines, to thereby form, respectively, first and second shadow-forming panels;

top and bottom wall-forming panels hingedly connected along longitudinal score lines to a first pair of opposite edges of said front wall-forming section;

first and second tuck flaps hingedly connected along longitudinal score lines to said top and bottom wall-forming panels respectively, one of said tuck flaps having a transverse slot therein;

a pair of end wall-forming panels hingedly connected along a second pair of opposing outer edges of said front wall-forming section along transverse score lines;

a pair of back wall-forming panels, each hingedly connected along one edge of each of said end wall-forming panels along a score line parallel to said transverse score line, each of said back wall-forming panels being approximately one-half the length of said front wall-forming panels; and

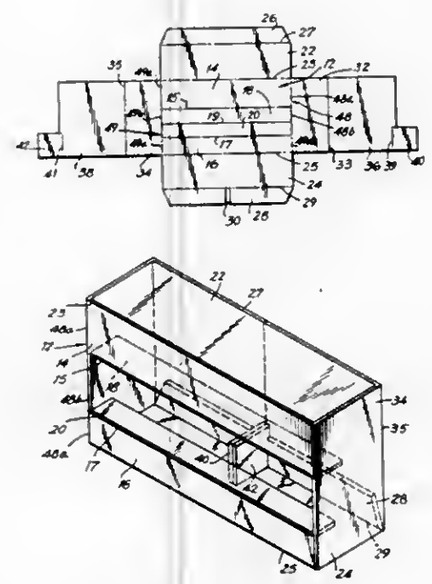
first and second tab means hingedly connected along a transverse score line along a portion of the other edge of each of said back wall-forming panels, said transverse score lines being parallel to the transverse score lines at the opposite edges of said back wall-forming panels.

12. A shock resistant container for holding and displaying a fragile article of merchandise, such as a bottle or a decanter, constructed from a single blank, said container being generally tubular in shape and comprising:

a front wall section consisting of first and second front wall panels;

first and second shadow panels hingedly connected to said first and second front wall panels, respectively, wherein said shadow panels are folded inwardly from the plane of said front wall section to thereby form an aperture in said front wall section;

a pair of oppositely disposed top and bottom wall panels hingedly connected along a first pair of opposing outer edges of said front wall section;



a pair of tuck flaps respectively hingedly connected to said top and bottom wall panels along weakened longitudinal score lines that are parallel to said edges of said front wall section, the tuck flap hinged to said bottom wall panel having a transverse slot therein;

a pair of oppositely disposed end wall panels hingedly connected along a second pair of opposed outer edges of said front wall section;

a pair of back wall panels, each hingedly connected along one edge of each of said end wall panels, said back wall panels overlying said tuck flaps and meeting to thereby form a substantially continuous back wall section for the container; and

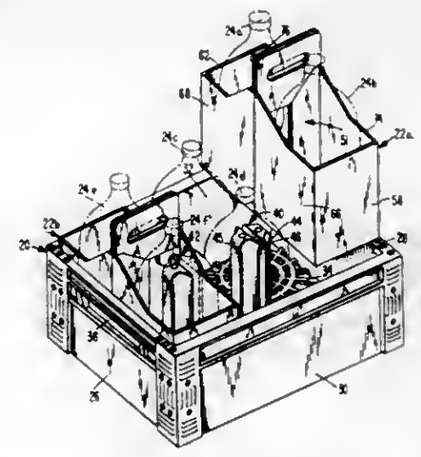
means for simultaneously locking said container in erected position and supporting the article of merchandise contained therewithin, said means comprising first and second tabs which are in face-to-face contact and are hingedly connected to one corner of each of said back wall panels, each of said tab means being folded at a right angle to said back wall section, each of said tab means being inserted into the slot formed in said tuck flap.

4,032,007

TWO-BOTTLE BASKET CARRIER

Earl J. Graser, and Jerry F. Wilson, both of Monroe, La., assignors to Olinkraft, Inc., West Monroe, La.

Filed Oct. 19, 1976, Ser. No. 733,782
Int. Cl.² B65D 75/00
U.S. Cl. 206—173 13 Claims



1. A two-bottle carrier for use with a shipping case which is adapted to contain at least four bottles wherein the shipping case has at least one split divider post for separating the bottles in the case, the carrier comprising

a pair of side walls,

a pair of end walls extending between opposite ends of the pair of side walls,

a bottom,

said bottom having an opening midway between the end walls and adjacent one of the side walls for receiving one half of the split divider post, and

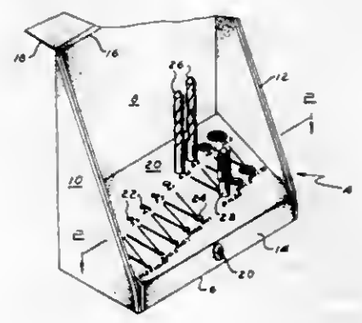
a center partition extending from the other side wall and spaced from the one side wall to accommodate the one half of the split divider post between the one side wall and the center partition.

4,032,008

TOOL HOLDER GUIDE INDICIA FOR TAP AND DRILL SETS

Richard N. Vecchiarelli, 64 Prospect St., Ludlow, Mass. 01056

Filed June 7, 1976, Ser. No. 693,735
Int. Cl.² B65D 85/24
U.S. Cl. 206—379 4 Claims



1. Tool holder for a plurality of taps and a plurality of drills disposed therein comprising means for holding said taps in a predetermined succession according to the diametrical size of said taps, means spaced from the succession of taps for holding said drills in a predetermined succession related to the diameter thereof, each of said tap and drill holding means being adapted to receive and hold a drill and tap of a given size, and indicia which lead from each tap holding means toward a pair of adjacent drill holding means adapted to hold drills of different diametrical size, one of said pair of drills

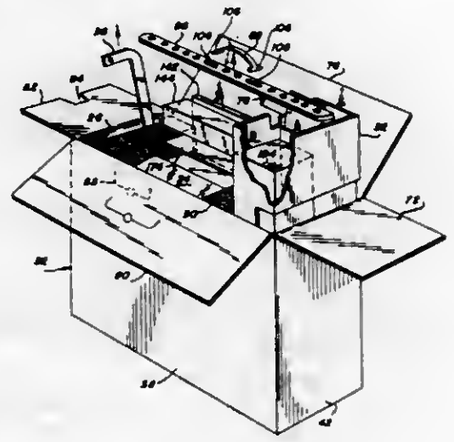
being the tap drill for the tap from which one of said indicia leads and the other of said pair being the clearance drill toward which the other of said indicia leads, said indicia including adjacent pairs thereof which extend toward each of a plurality of said drill holding means in converging relation, each drill holding means toward which said indicia extend in converging relation being adapted to hold one drill of the proper diametrical size to serve as both the clearance drill for one of said taps and the tap drill for the next successive size tap whereby a plurality of said drills are dual functional for use with successive size taps.

4,032,009

CONTAINER SYSTEM FOR GARAGE DOOR OPENER

Robert E. Taylor, Evanston, Ill., assignor to Robert E. Taylor and Aaron M. Schmidt, both of Chicago, Ill.

Filed Feb. 11, 1976, Ser. No. 657,051
Int. Cl.² B65D *81/04*
U.S. Cl. 206—321 **10 Claims**



1. A compact container system for holding components of a remote controlled electric garage door opener, comprising, in combination:

a. a variable capacity container for holding at least one of a transmitter and a receiver;

b. a twin compartment container including a first compartment and a second compartment for holding the variable capacity container; and

c. a corrugated cardboard carton having a plurality of hinged panels defining end walls and sidewalls for snugly holding both a motor unit and the twin compartment container generally in adjacent relationship.

4,032,010

MARKER ASSEMBLY

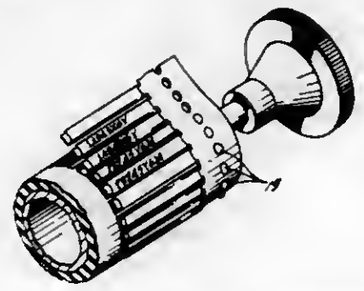
Joseph H. Evans, Palo Alto, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Continuation-in-part of Ser. No. 580,596, May 27, 1975, which is a division of Ser. No. 369,836, June 14, 1973, Pat. No. 3,894,731. This application July 23, 1975, Ser. No. 598,412
The portion of the term of this patent subsequent to July 15, 1992, has been disclaimed.
Int. Cl.² B65D *85/20*
U.S. Cl. 206—345 **5 Claims**

1. An assembly comprising

a carrier, said carrier including a base and projections extending from said base; and

a plurality of tubular sleeves, said sleeves being snugly and slidably disposed over said projections so as to admit of removal of said projections when drawn past the ends thereof, said sleeves being of heat recoverable material and dimensionally unstable on said projections such that



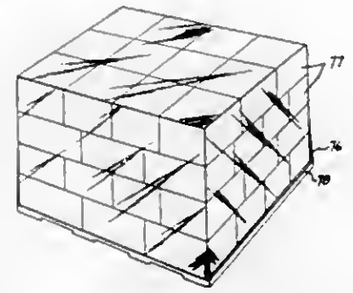
said sleeves are heat recoverable to a lesser transverse dimension when removed from said projection.

4,032,011

PACKAGING ASBESTOS FIBERS

Gerard Lucien Lambert, Asbestos, Canada, assignor to Johns-Manville Corporation, Denver, Colo.

Division of Ser. No. 438,969, Feb. 4, 1974. This application Feb. 26, 1976, Ser. No. 661,576
Int. Cl.² B65D *19/00*
U.S. Cl. 206—386 **2 Claims**



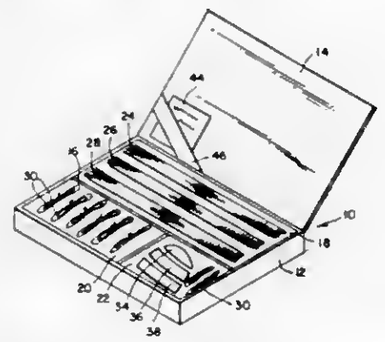
1. An assemblage comprising a plurality of dense packages of asbestos fiber each comprising a compacted mass of asbestos fibers having a density of at least about 90 PCF, arranged on a pulpable pallet and secured thereto.

4,032,012

SCARF AND HAT KIT

Enola Bishop, 5808 N. Winthrop, Chicago, Ill. 60660

Filed Aug. 24, 1976, Ser. No. 717,035
Int. Cl.² B65D *69/00*
U.S. Cl. 206—574 **7 Claims**



1. A sewing kit for forming an article of clothing comprising:

a covered box having

a plurality of upright partitions therein dividing said box into a plurality of compartments,

a plurality of fabric strips in one of said compartments which when sewn together form an article of clothing, and

a plurality of individual yarn lengths having at least one needle permanently attached to an end thereof in another one of said compartments for sewing said fabric strips together to form said article of clothing whereby the needles remain a part of the finished article as decoration therefor.

4,032,013

APPARATUS FOR ARRANGING AND STORING BOBBINS OF YARN OR THREAD

Kimiko Matsumoto, 324-1, Oaza-Shirakibaru, Onojo, Fukuoka, Japan

Continuation of Ser. No. 476,416, June 4, 1974, abandoned. This application Nov. 10, 1975, Ser. No. 630,338
Int. Cl.² A47F *7/00*; B65H *49/02*
U.S. Cl. 211—13 **2 Claims**

1. Apparatus for storing bobbins of yarn or thread comprising, a frame having a plurality of horizontal, vertically spaced, rod-like crosspieces spaced vertically from each other a distance greater than the axial length of a bobbin and used in an upstanding position in use, a plurality of bobbin-holders for storing bobbins with yarn or thread individually depending therefrom on respective ones of said crosspieces, each bobbin-holder having an insert portion insertable axially into an axial bore of a bobbin for removably holding a bobbin depending on said bobbin-holder, hook means on each bobbin-holder for removably freely hanging the bobbin-holders individually on said crosspieces in a condition with a corresponding bobbin suspended on said insert portion, said insert portion comprising a split, hollow cylindrical portion of lesser axial length than a bobbin and insertable into the axial bore of a bobbin in an inwardly compressed state, said bobbin-holder having another hollow cylindrical portion of greater diameter as an upward extension on said insert portion defining therewith an annular shoulder limiting the axial extent of insertion of said insert portion into the corresponding bobbin, said hook means comprising a hook extending outwardly from said another hollow cylindrical portion for removably suspending said bobbin-holder on a crosspiece with a bobbin depending therefrom for removal of the individual bobbin-holder and the corresponding bobbin from the crosspiece jointly and for return to a hanging position jointly on a crosspiece, and said another cylindrical portion having an axial slit for receiving an end of yarn therein from the corresponding bobbin to avoid thereof from said bobbin.

4,032,014

DISPLAY EASEL

Donald P. Weiss, Kinnelon, N.J., assignor to Advertising Displays Corporation, Englewood Cliffs, N.J.

Filed Jan. 30, 1976, Ser. No. 653,663
Int. Cl.² A47F *7/00*
U.S. Cl. 211—49 R **1 Claim**

1. A display rack which can be readily erected between a collapsed and erected position comprising:

a plurality of transversely and longitudinally extending ribs to define a back panel,

support means including a pair of spaced apart leg members hingedly connected to a transversely extending rib, whereby said leg members can be folded between a collapsed and erected position,

complementary base member hingedly connected to a transversely extending rib spaced from said first mentioned transversely extending rib,

said base member being readily folded between an erected and collapsed position,

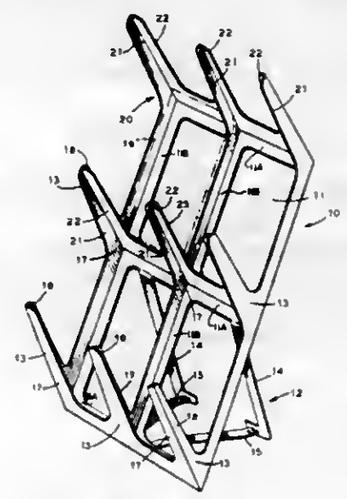
said leg members and base member having complementary interlocking means for locking said members in the erected position,

and a plurality of brackets connected to said longitudinal and transversely extending ribs so as to project normal thereto,

said brackets being disposed at the points of intersection of said longitudinally and transversely extending ribs,

said brackets including angularly disposed side walls, whereby the complementary sides of opposed brackets define a support adapted for holding therebetween a plurality of articles to be displayed,

said brackets including opposed corner brackets having the side walls thereof disposed at substantially right angles,



and intermediate brackets disposed between said corner brackets,

said intermediate brackets having a side wall which is common to the complementary side walls of said corner brackets,

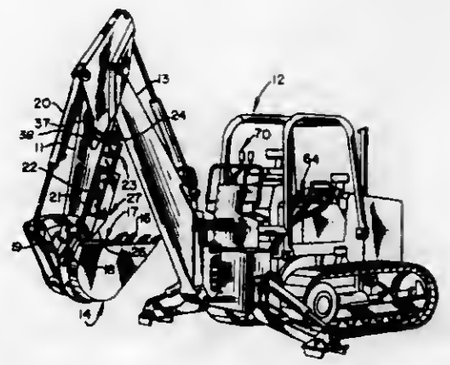
said side walls of the brackets being arranged so that the compartments defined thereby are in open communication with one another.

4,032,015

BUCKET CLEANER AND CONTROL FOR A DIGGING MACHINE

Charles Wayne Hemphill, Duncanville, Tex., assignor to Adco Company, Dallas, Tex.

Filed June 23, 1976, Ser. No. 698,906
Int. Cl.² E02F *3/80*, *3/85*
U.S. Cl. 214—767 **17 Claims**



8. In a backhoe type digging machine having a dipper stick to which there is pivotally mounted a bucket, and having means by which the bucket is moved from an uncurled into a curled configuration;

with the bucket having opposed side walls, and a curved bottom wall connecting the side walls together and forming a rear wall to leave a digging end spaced from the rear wall, the improvement comprising:

a bucket cleaning apparatus comprised of a blade manner; a housing; a guide member; means by which said blade member is affixed to said housing, means slidably captur-

ing said housing to said guide member such that said housing can slidably move in captured relationship respective to said guide member;

means by which said guide member is affixed to a marginal length of said dipper stick in spaced relationship respective to the connection by which the bucket and dipper stick are pivotally joined;

means by which said housing is moved along said guide member towards and away from said bucket such that said blade member can be extended into engagement with the bottom of the bucket with a progressive movement to cause the free end of the blade to contact the bottom of the bucket as the bucket is moved from a curled into an uncurled position; thereby discharging the contents of the bucket.

4,032,016

MOBILE CRANE WITH MEANS FOR EQUALIZING THE AXLE LOAD

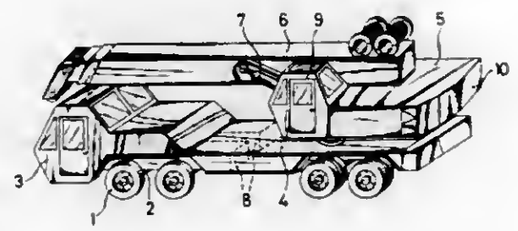
Wilfried Gräf, Dortmund, Germany, assignor to O & K Orenstein & Koppel Aktiengesellschaft, Berlin, Germany

Filed Feb. 23, 1976, Ser. No. 660,359

Claims priority, application Germany, Feb. 21, 1975, 2507476

Int. Cl.² B66C 23/72

U.S. Cl. 212—49 **6 Claims**



4. A mobile crane which includes: a lower carriage having a front section, an upper carriage having a first end portion adapted to support an operator's stand and also having a second end portion opposite said first end portion, first fluid storage container means arranged at said front section of said lower carriage, second fluid storage container means arranged at said second end portion of said upper carriage, conduit means leading from said first to said second fluid storage container means, pump means interposed in said conduit means and operable selectively to pump fluid from said first fluid storage means to said second fluid storage container means thereby permitting liquid which serves for equalizing axle loads of the crane when driving over roads to be pumped to said second fluid storage container means to serve as ballast and counterweight during hoisting operations of said crane, and means pivotally connecting said upper carriage to said lower carriage and being provided with passage means therethrough, said conduit means passing through said passage means.

4,032,017

ADJUSTABLE BRACKET ASSEMBLY FOR A RAIL CAR COUPLER

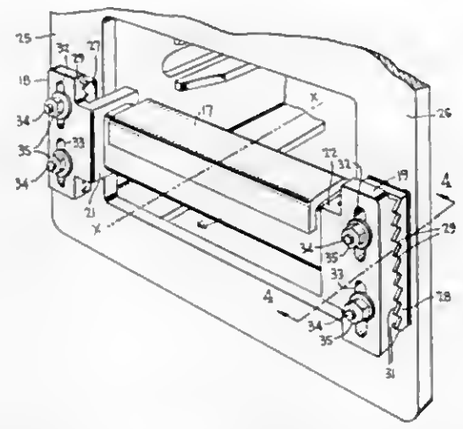
Glen D. Larsen, Upper Marlboro, Md., assignor to Southern Railway Company, Washington, D.C.

Continuation-in-part of Ser. No. 572,861, April 29, 1975, Pat. No. 3,987,907. This application May 13, 1976, Ser. No. 686,098

Int. Cl.² B61G 7/12

U.S. Cl. 213—61 **9 Claims**

6. In a rail car with a coupler having its shank portion resting on a coupler carrier member and bracket members supporting said carrier member at opposite ends thereof, said bracket members and said carrier member comprising a bracket assembly capable of being incrementally adjusted vertically relative to side plates of the rail car, said carrier member having opposing bearing surfaces, said bracket members each having at least one vertically elongated opening therein, each said bracket member having opposing surfaces lying parallel to said side plates, at least one of said surfaces having horizontally extending toothed serrations thereon of a predetermined tooth size, lock means on said side plates, said lock means including toothed serrations of a tooth size equal to said predetermined tooth size, fastener elements on said lock means extending through said elongated openings, one of said bearing surfaces lying in a plane containing a trough between a pair of adjacent teeth of said bracket member serrations, and the other of said bearing surfaces lying in a



second plane containing an apex of one of the teeth of said bracket member serrations, said serrations of said lock means and of said bracket members being intermeshed, and said planes being shiftable relative to said side plates, when said carrier member is in a first position, by an amount equal to at least the size of said one of said teeth, said planes being further shiftable relative to said side plates by an amount equal to at least one-half the size of said teeth, when said carrier member is moved to a second position inverted from said first position as by rotating the bracket assembly 180° about an axis perpendicular to said side plates, and means engaging said fastener elements for retaining said bracket members and said lock means together.

4,032,018

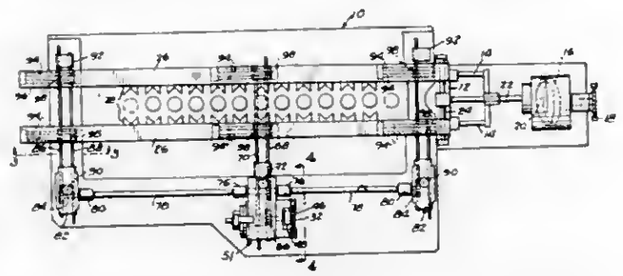
WORKPIECE TRANSFER MECHANISM

Bernard J. Wallis, 25200 Trowbridge Ave., Dearborn, Mich. 48124

Filed Nov. 21, 1975, Ser. No. 634,122

Int. Cl.² B65G 47/90

U.S. Cl. 214—1 BB **13 Claims**



1. In a device for transferring workpieces between successive stations of a die mounted in a stamping press, said transfer device being of the type which comprises a base, a carriage reciprocable on said base in a linear path through a stroke corresponding to the distance between the successive stations in the die and a finger bar mounted for movement with the carriage and for reciprocating movement transversely of the path of travel of the carriage between work engaging and

retracted positions, that improvement which comprises means for actuating the finger bar to said work engaging and retracted positions comprising a cam adapted to be mounted on and reciprocate in a linear path with the ram of the press, said cam having a track thereon extending generally in the direction of said linear path of reciprocation of said ram and having a portion offset transversely of said last-mentioned linear path, a crank rotatably mounted on said base, a cam follower on said crank and adapted to be interengaged by said cam track and to be displaced by said offset portion thereof in response to said reciprocation of the ram to rotate said crank in opposite directions and means operably interconnecting said crank and said finger bar for shifting the finger bar between said work engaging and retracted positions in response to rotation of said crank.

4,032,019

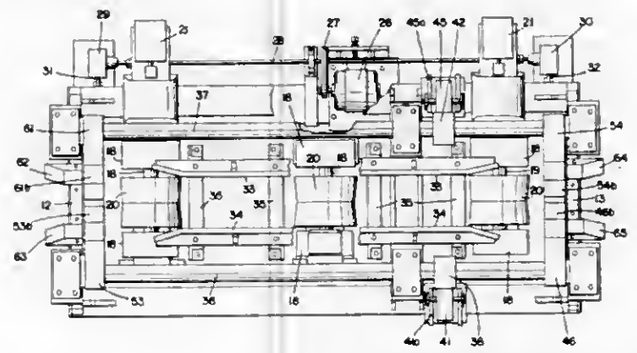
BILLET CONVEYOR AND TURNER

Stanley Darwin Noll, Shaker Heights, and William F. Delfeld, Lyndhurst, both of Ohio, assignors to Production Experts, Inc., Cleveland, Ohio

Filed Aug. 25, 1975, Ser. No. 607,216

Int. Cl.² B65G 7/00

U.S. Cl. 214—1 QG **6 Claims**



1. In a billet turner, billet turner mechanism comprising a pair of spaced parallel shafts, means for selectively imparting oscillatory movement to said shafts about their axes, billet support levers secured to said shafts, each of said levers including a billet support, said billet support of each of said levers being normally disposed in a common horizontal plane, and a flip lever pivotally secured to each of said first-named levers and movable relative to the latter whereby when one of said parallel shafts is rotated about its axis, its billet support lever will cause the billet support to be elevated out of said common plane and its flip lever will cause the billet to be moved along said billet support extension to the end of said extension and to fall by gravity onto the billet support extension of the other lever, and simultaneously turn about the longitudinal axis of the billet.

4,032,020

ARTICLE EXCHANGING APPARATUS

Shozo Kato; Yutaka Takahashi, both of Nagoya; Yorio Miyaji, Osaka; Naomitsu Kondo, Osaka, and Mikio Fukumoto, Osaka, all of Japan, assignors to Sumitomo Chemical Company, Limited and Kabushiki Kaisha Miyazaki Tekkosho, both of Osaka, Japan

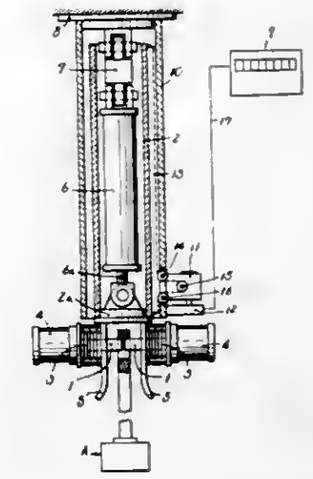
Filed Apr. 7, 1975, Ser. No. 565,714

Claims priority, application Japan, Apr. 5, 1974, 49-39203

Int. Cl.² B66C 13/16

U.S. Cl. 214—1 BB **4 Claims**

1. In an article exchanging apparatus for removing a consumed article from a processing unit and replacing same with a fresh consumable article having base plate means for engagement with transporting apparatus capable of being moved substantially horizontally, lifter means secured at one end to said base plate means in suspended relationship thereto, and article gripping means secured to the opposite end of said lifter means for releasably engaging a fresh or consumed article, the improvement of an article level unit for insuring the proper replacement of a fresh article for a consumed article at the same level at which the consumed article was at the time of its removal, said article level unit comprising load switch means interposed between the base plate means and the lifter means to constitute the connection therebetween, said switch means being actuatable by the weight of the article and the associated parts to which it is connected, means for detecting the vertical displacement of the consumed article operatively associated with the lifter means and the article gripping means, pulse generator means operatively connected to said vertical displacement detecting means for generating a signal corresponding to the upward or downward movement of the article, article level measuring and indicating means operatively connected to said switch means to said pulse generator means, said article level measuring and indicating



means including an indicator unit operable to give a value corresponding to the level of the article whereby said article level measuring and indicating means will be actuated by said switch means upon the raising of a consumed article and which will receive a pulse generator signal to indicate the vertical displacement of the consumed article in terms of a fixed value on said indicator unit, said switch means will be closed upon release of the consumed article and will be reactuated upon engagement by said article gripping means of a fresh replacement article and will give on said indicator unit the vertical displacement of the fresh article in terms of a fixed value and the vertical height of the fresh article will thereafter be adjusted to give a zero value setting corresponding to the final reference value thereby placing the fresh article at a level coinciding with the level of the consumed article at the time it was withdrawn.

4,032,021

DEPALLETIZERS

Michael David Mabey, Bishampton, near Pershore, and James Malcolm Foster, Harrowgate, both of England, assignors to Depallorator Corporation Limited, Ireland

Filed Aug. 22, 1975, Ser. No. 607,064

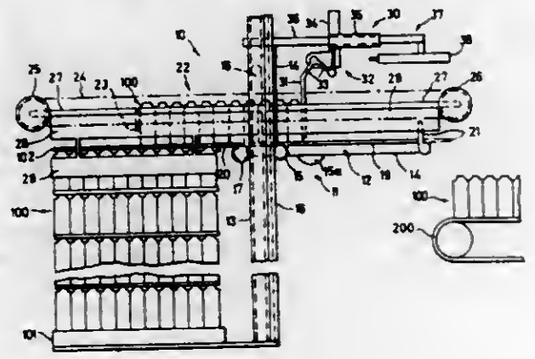
Claims priority, application United Kingdom, Aug. 23, 1974, 37206/74

Int. Cl.² B65G 59/02

U.S. Cl. 214—8.5 F **5 Claims**

1. A depalletiser for unloading tiers of goods from a pallet onto a take-off surface, said pallet having an uppermost tier, said depalletiser comprising vertical support means; a horizontal platform supported by said vertical support means; lift means for displacing said platform vertically up and down the support means so as to sequentially aline the platform with the uppermost tier on the pallet and with the take-off surface and transfer means movable with the platform for displacing tiers of goods from the pallet onto the platform and from the platform onto the take-off surface; and

means movable with the platform for locating about the tier of goods immediately below the uppermost tier on the



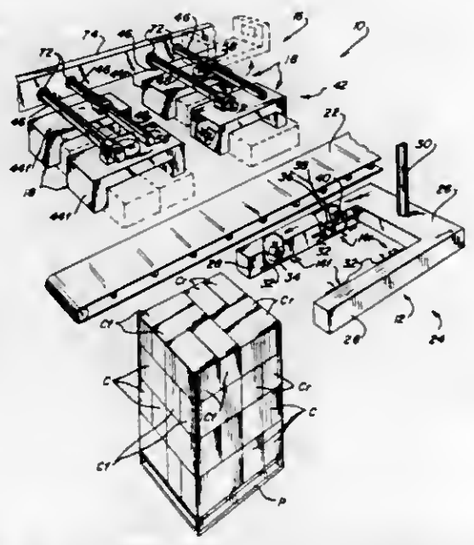
pallet so as to steady the stack of goods on the pallet during transfer of the uppermost tier.

4,032,022

APPARATUS FOR HANDLING CARTONS AND THE LIKE

John S. Smith, 965 11th St., Boulder, Colo. 80302

Filed Nov. 3, 1975, Ser. No. 628,518
Int. Cl.² B65G 59/02
U.S. Cl. 214—8.5 C 9 Claims



1. Apparatus for handling cartons and the like comprising in combination:

first releasable gripping means adapted to releasably grasp a plurality of cartons, said first gripping means including first separating means for separating at least some of the cartons gripped by the first gripping means from other cartons gripped by the first gripping means,

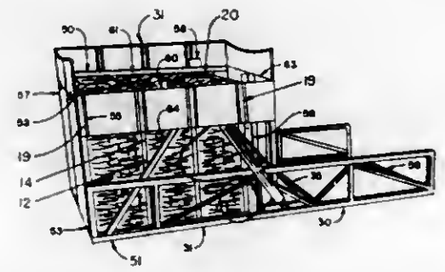
second releasable gripping means for grasping the separated cartons held by the first gripping means and removing the cartons grasped by the second gripping means from the first gripping means when the cartons are released by the first gripping means, said second gripping means being movable relative to said first gripping means and including second separating means adapted to further separate cartons grasped by said second gripping means and deposit the further separated cartons at a pre-selected location.

4,032,023

APPARATUS FOR LOADING TOBACCO IN BARNS

Frank W. Macintosh, Mt. Holly, N.C., assignor to Gas-Fired Products, Inc., Charlotte, N.C.

Filed Mar. 29, 1976, Ser. No. 671,279
Int. Cl.² B65G 47/00
U.S. Cl. 214—16.4 R 5 Claims



1. Apparatus for loading leaf tobacco for curing comprising in combination,

a. an air permeable container for receiving and supporting the tobacco during curing;

b. a loading device including a longitudinal frame stationary in use and a loading fixture pivotally supported in a first loading position at one end of said frame and adapted to receive a container at the lower level of said longitudinal frame in said first loading position, means to lift and rotate the loading fixture and its associated container from said first loading position to a second curing position at the other end of the frame, said means to lift and rotate said loading fixture comprising a pivot located approximately at the lower level of said longitudinal frame, whereby the placement of the container is such that when said loading fixture is rotated the side of said container rests on the upper level of said longitudinal frame and, said loading fixture including a trackway on which the container rests in the loading fixture when in the second or curing position; and

c. a tobacco curing barn adjacent said loading device and including a trackway in alignment and as an extension of said trackway in said loading fixture when in the second or curing position.

4,032,024

APPARATUS FOR DISTRIBUTION OF CHARGE MATERIAL IN SHAFT FURNACES, PARTICULARLY HIGH PRESSURE BLAST FURNACES

Ulrich Genge, Duisburg, and Manfred Eutenereu, Neukirchen-Vluyn, both of Germany, assignors to Demag Aktiengesellschaft, Germany

Filed Nov. 12, 1975, Ser. No. 631,071
Claims priority, application Germany, Nov. 26, 1974, 2455767
Int. Cl.² B66C 17/08
U.S. Cl. 214—35 R 11 Claims

1. Apparatus for evenly distributing charge material to shaft furnaces, comprising

a. a furnace with a stationary hopper disposed in the top of said furnace;

b. an annular support disposed in said furnace adjacent the bottom of said hopper and arranged to pivot on a first horizontal axis extending through said furnace;

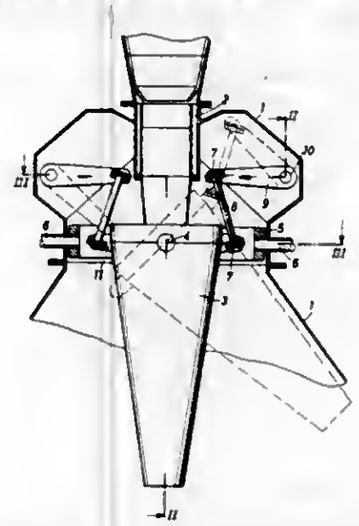
c. a distributor pipe disposed on said support and arranged to pivot in vertical plane on a second horizontal axis on said support;

d. said first and second horizontal axes being perpendicular to each other; characterized by

e. reversible drive means positioned outside the wall of said furnace;

f. first means connecting said drive means to said annular support for the pivoting thereof around said first axis;

g. linkage means connecting the circumferential edge of said distributor pipe to said drive means to pivot said pipe around said second horizontal axis;



h. said linkage means including a non-fixed universal connecting said drive means and said distributor pipe.

4,032,025

BACKHOE BUCKET TILT

Warren N. Ross, Hermiston, Oreg., assignor to Audie B. Tomlinson, Cove, Oreg.

Filed June 20, 1975, Ser. No. 588,702
Int. Cl.² E02F 3/86
U.S. Cl. 214—138 R 4 Claims

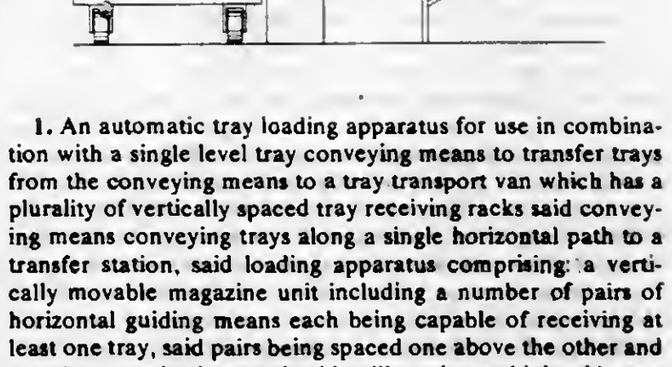
1. In a backhoe, a main boom, a jib boom having an upper end and a lower end, a forked member having an upper end rigidly secured to the lower end of the jib boom and having a lower bifurcated end, a yoke pivotally mounted on the lower bifurcated end of the forked member on a tilt axis and having its arms extending upwardly between said bifurcated end, a bucket pivotally mounted on the lower end of the yoke for pivotal movement on the yoke on a bucket pivot axis transverse to said tilt axis, first manually controlled means for pivoting the bucket about said bucket pivot axis, a double-ended fluid cylinder pivotally mounted between the bifurcated end of the forked member on a third axis above and parallel to said tilt axis locating said cylinder between the arms of the yoke, said fluid cylinder including a housing having a central piston and a rod at each end extending outwardly of said housing parallel to said bucket pivot axis, one rod engaging with one arm of the yoke and the other rod engaging with the other arm of the yoke, the total length of the rods at least equal to the spacing between the arms of the yoke so that the rods always engage both arms, second manually controlled means for said fluid cylinder, the extension of a selected rod resulting in the simultaneous retraction of the other rod and the exertion of a direct force upon a selected arm of the yoke by said selected rod thereby selectively pivoting said yoke and bucket around said tilt axis by said selected rod.

4,032,026

BULK HAULING FREIGHT CAR UNLOADING APPARATUS AND METHOD OF OPERATION

Paul W. McCormick, 200 Lee Drive, Coraopolis, Pa. 15108

Continuation of Ser. No. 387,804, Aug. 13, 1973, now Defensive Publication No. T922,002. This application Feb. 10, 1976, Ser. No. 656,987
Int. Cl.² B65G 67/34
U.S. Cl. 214—152 3 Claims



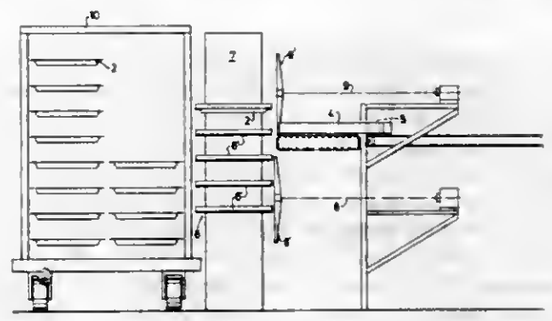
1. The method of unloading a first train of open hopper cars containing bulk material without decoupling the cars comprising pushing the train of cars by a rear engine through a vertically extending helical, 360° loop of track such that the open ends of the cars face the center of the loop; retaining the contents in the car until the car passes through the first quadrant of the loop, connecting an engine to the front car of the train after the latter has passed entirely through the loop and continuing to move the train through the loop through the pushing and pulling forces respectively of the front and rear engines.

4,032,027

AUTOMATIC TRAY LOADING DEVICE

Gunnar V. Lindberg, Vallingbyvagen 212, 162 21 Vallingby, Sweden

Filed Aug. 18, 1975, Ser. No. 605,230
Int. Cl.² B65G 47/00
U.S. Cl. 214—16.6 4 Claims



1. An automatic tray loading apparatus for use in combination with a single level tray conveying means to transfer trays from the conveying means to a tray transport van which has a plurality of vertically spaced tray receiving racks said conveying means conveying trays along a single horizontal path to a transfer station, said loading apparatus comprising: a vertically movable magazine unit including a number of pairs of horizontal guiding means each being capable of receiving at least one tray, said pairs being spaced one above the other and together constituting a unit; side pillars along which said magazine unit is vertically guided; means for moving said magazine unit upwards and downwards in steps, each step being equal to the vertical distance between adjacent pairs of tray guiding means; one side of said magazine unit being a tray

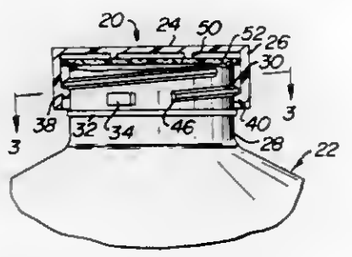
input side between said pillars and said input side being disposed adjacent said transfer station at the side of and parallel with the tray conveying means; a magazine loader at said transfer station disposed adjacent said magazine input side and adapted to laterally reciprocate and engage and shift at least one tray sideways from the conveying means onto an adjacent pair of horizontal guiding means; loading means for horizontally shifting vertically carried trays from said magazine unit to the tray transport van comprising, a first loader device located under the magazine loader and adjacent said magazine input side and a second loader device located above both the first loader device and the magazine loader and adjacent said magazine input side, each loader device being powdered by a step motor means and the two loader devices being alternately operable to shift trays, each loader device having tray shifting structure adapted to simultaneously engage and laterally shift the trays from a plurality number of pairs of said horizontal guiding means.

4,032,028

SAFETY CAP

Oscar Reiss, Great Neck; Leon R. Brynes, Brooklyn, and Frank De Cicco, Hamilton Beach, all of N.Y., assignors to APL Corporation, New York, N.Y.

Filed Sept. 13, 1976, Ser. No. 722,949
Int. Cl.² B65D *85/56, 55/02;* **A61J** *1/00*
U.S. Cl. 215—217 **4 Claims**



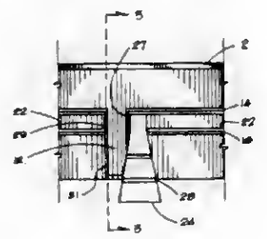
1. A screw-type safety cap for use in combination with a bottle having a threaded neck with a top planar edge, said cap including a top wall and a depending peripheral skirt, said skirt having a thread on the inner surface thereof for rotatably engaging and screwing said cap with the threaded neck of said bottle, said cap having a resilient member disposed under the top of said cap for engaging the top edge of said neck, said threads of said cap and the threads on said bottle being so dimensioned in thickness and space therebetween that the cap is axially slidable with respect to said bottle, said threads on said bottle having at least two interruptions which form at least two recesses in the threads of said bottle, said cap having at least two projections on the inner surface of said skirt, said projections being spaced both axially and radially with respect to each other, as are the two recesses in said bottle thread, the projection on said skirt which is most spaced from the top of said cap being dimensioned so that it is too large to fit in any recess of said bottle other than the recess lowest on the neck of said bottle, said cap being secured to said bottle by rotating said cap until all of said projections are aligned with said recess, said resilient member causing said cap to be urged away from said bottle and the projections to be disposed in said recesses whereby said cap in locked on said bottle and cannot be removed unless the user presses said cap against the bottle to dislodge said projections from said recesses to enable unscrewing said cap.

4,032,029

TAMPER-PROOF BOTTLE CAP AND CONTAINER

Benjamin Arthur Cochrane, 181 Sonora Ave., Danville, Calif. 94526

Filed Apr. 5, 1976, Ser. No. 673,630
Int. Cl.² B65D *41/32*
U.S. Cl. 215—256 **13 Claims**



1. A deformable plastic cap comprising (1) a top disk, (2) a cylindrical thin-walled outer skirt extending substantially perpendicularly from said disk, and (3) a cylindrical inner skirt extending substantially perpendicularly from said disk enclosed within said outer skirt and substantially coaxial therewith;

said outer skirt scored along a circumferential first score line below said disk and scored along a circumferential second score line downwardly spaced from said first score line, said first and said second score lines forming (a) a weakened cylindrical band traversing said outer skirt in an arc from about 250° to about 358° and (b) a narrow strip between the ends of said cylindrical band from the incompleted arc;

a tab attached to one end of and extending outwardly from said cylindrical band;

a first weakened area extending from said first score line to said second score line between said narrow strip and said tab;

a second weakened area extending from said first score line to said second score line between said narrow strip and the opposite end of said cylindrical band from said tab;

a narrow circumferential first bead around the inside of said outer skirt between said first score line and said disk;

a narrow circumferential second bead around the inside of said outer skirt below said first score line; and

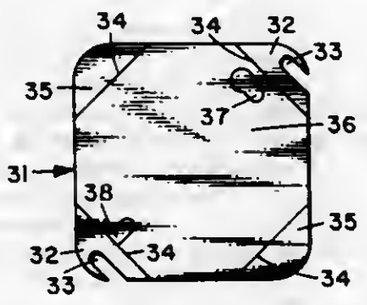
a third score line extending downwardly from said second score line to a lower portion of said outer skirt below said second bead.

4,032,030

MODIFIABLE UTILITY OUTLET BOX COVER ELEMENT

David L. Bass, 2407 Loiurno Road, Chesapeake, Va. 23323, and Kenneth B. Meador, 403 Anndora Road, Portsmouth, Va. 23701

Filed Dec. 23, 1976, Ser. No. 753,851
Int. Cl.² H02G *3/14*
U.S. Cl. 220—3.8 **2 Claims**



1. A modifiable cover element for a utility outlet box comprising a sheet of relatively thin material at least initially having an edge outline corresponding in size and shape to the

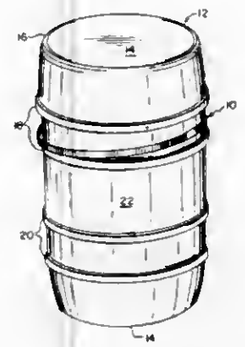
frontal configuration of a first utility outlet box, said cover element having openings or the like formed therein through which screws may be passed into screw receiving means carried by said first utility outlet box when said cover element is congruently frontally positioned against said first utility outlet box for securing said cover element thereto, said cover element having slots cut into one of the surfaces thereof along which removable portions thereof may be readily broken away to leave a remaining portion thereof having an edge outline substantially corresponding in size and shape to the frontal configuration of a second utility outlet box, said remaining portion of said cover element including portions readily removable therefrom to define openings or the like therein through which screws may be passed into screw receiving means carried by said second utility outlet box when said remaining portion of said cover element is substantially congruently frontally positioned against said second utility outlet box for securing said remaining portion of said cover element thereto.

4,032,031

PLASTIC DRUM WITH LIFT RING

Paul Belokin, Jr., Hayward, Wis., assignor to K and M Rubber Company, Elk Grove Village, Ill.

Filed Oct. 12, 1976, Ser. No. 731,621
Int. Cl.² B65D *25/00, 7/42*
U.S. Cl. 220—85 R **4 Claims**



1. In combination with a drum of synthetic material of the type which has relatively unobstructed substantially rimless ends not readily engageable for handling and having at least one pair of annular roll ridges spaced apart on the exterior of and located near one axial end of the drum, means for securing the drum to a hand truck that has a downwardly engaging hook device thereon, said means comprising:

a loose circlet of a diameter greater than the diameter of the drum between said roll ridges and smaller than the outer diameter of said roll ridges, formed of a material having sufficient strength to withstand the tension applied in handling said drum through the engagement of said hand truck hook device with the circlet, between the circlet and the drum surface between said roll ridges.

4,032,032

FLAME GUARD ANTI-ROTATION DEVICE

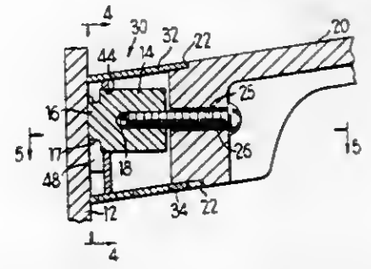
William Michael Carroll, 1111 E. Dean Road, Milwaukee, Wis. 53217, and John Day, Studio House, Shatterford, Warley, Worcestershire, England

Filed May 4, 1976, Ser. No. 682,839
Int. Cl.² B65D *25/28*
U.S. Cl. 220—94 R **11 Claims**

1. In a cooking utensil having a vessel with weld stud mounted thereon and a handle extending from said weld stud, an improved safety interlock between said handle and said vessel, said interlock comprising:

a. a non-circular tubular member having ends interfacing with the vessel and the adjacent end of the handle, and extending over said weld stud;

b. separate interlock means within said tubular member spaced from the adjacent end of said handle and having an aperture extending over and frictionally engaging said weld stud and a periphery engaging said tubular member, said weld stud, interlock means and said tubular member



being non-annular for precluding relative rotation between said vessel and said handle; and

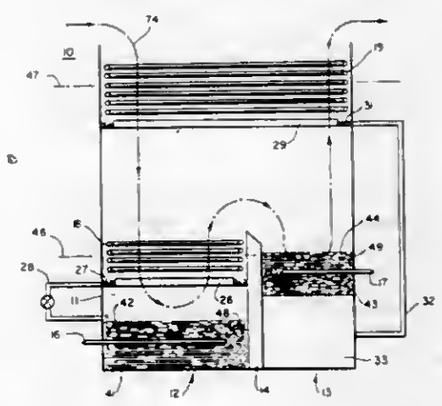
c. bolt means extending through said handle, tubular member and threaded into said weld stud for joining said assembly.

4,032,033

METHODS AND APPARATUS FOR HEATING ARTICLES

Tze Yao Chu; Yogesh Jaluria, both of Lawrence Township, Mercer County; Peter Frederick Lillenthal, II, Princeton, and George Michael Wenger, Franklin Township, Somerset County, all of N.J., assignors to Western Electric Company, Inc., New York, N.Y.

Filed Mar. 18, 1976, Ser. No. 668,012
Int. Cl.² H05K *3/34;* **B23K** *3/04*
U.S. Cl. 228—200 **7 Claims**



1. A method for heating an article to an elevated temperature in a condensation heat transfer facility which is open to the atmosphere, comprising the steps of:

transporting the article into the facility, through a body of secondary vapor, into a body of hot saturated primary vapor;

heating the article to the elevated temperature by condensing the primary vapor thereon to transfer the latent heat of vaporization to the article;

removing the article from the hot saturated primary vapor; and

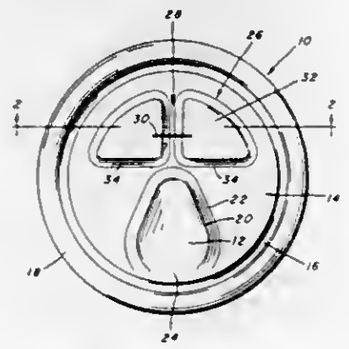
immersing the article in a liquid prior to withdrawal of said article from the facility.

4,032,034

PRESSURE RELEASE DEVICE FOR A CONTAINER

Wilburn Coy Willis, Hagerstown, Ind., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Nov. 18, 1976, Ser. No. 742,893
Int. Cl.² B65D 41/32
U.S. Cl. 220—266 11 Claims



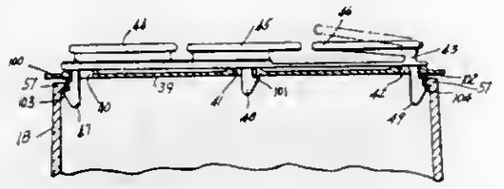
1. In a container having a vent release means comprising a container wall having an inwardly projecting hollow rib and a weakening line across the rib, an improveent comprising walls transverse to the longitudinal axis of said rib and to the general plane of said container adjacent to both ends of said rib, which improvement minimizes effects of changes in internal pressure of said container on the force required to rupture said weakening line.

4,032,035

CHILD-RESISTANT COVER FOR CONTAINERS

Joseph J. Tepas, Jr., Easton, Conn., and Arlon G. Sangster, Sterling, Mass., assignors to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 437,077, Jan. 28, 1974, Pat. No. 3,870,471. This application Mar. 7, 1975, Ser. No. 556,362
Int. Cl.² B65D 45/16
U.S. Cl. 220—318 22 Claims



I. A cover which is adapted to be used for a container having an opening at one end and having a latch lip adjacent to said opening, said cover comprising a plate, a handle secured to said plate having at least two grips, a releasing grip and a non-releasing grip, two latching means for securing said plate to said latch lip, said latching means being responsive to said releasing grip to enable removal of said cover, the appearance of said releasing grip and said non-releasing grip being substantially the same.

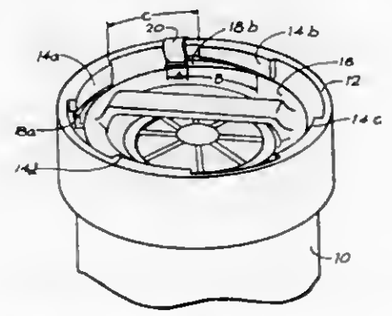
4,032,036

RETAINING CLIP

Junius Sycle, Jr., New Shrewsbury, N.J., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 1, 1976, Ser. No. 737,635
Int. Cl.² B65D 45/16
U.S. Cl. 220—324 12 Claims

1. Sealing means for a tubular casing having a plurality of cammed lugs equally spaced about the interior of a rim formed at the open end thereof, comprising, in combination: a circular cover adapted to be inserted in the rim of the casing for locking therewith, said cover having equally spaced about the periphery thereof a plurality of cammed lugs for rotatably engaging the lugs of the casing when said cover is rotated in one direction; and a U-shaped retaining clip having a pair of legs for compressively engaging the opposing surfaces of the casing rim between succeeding ones of the rim lugs and having a jutting portion on one leg for blocking the rotation of a selected one of said cover lugs in a direction opposite to said one direction thereby to retain said cover in locking engagement with the casing.

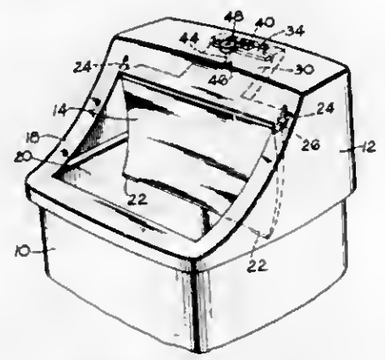


4,032,037

CLOSURE AND FASTENER FOR TRASH BINS

Roy Frederick Dubery, Hanworth, and Ronald Arther Chivrall, London, both of England, assignors to Airfix Plastics Limited, Hanworth, England

Filed Apr. 7, 1976, Ser. No. 674,403
Claims priority, application United Kingdom, Mar. 6, 1976, 09090/76.
Int. Cl.² B65D 43/24
U.S. Cl. 220—335 4 Claims



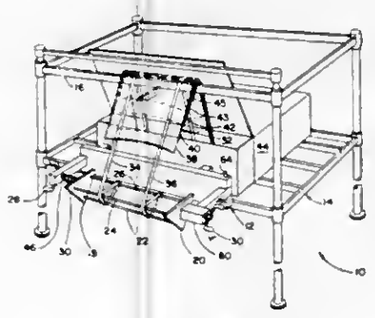
1. A bin comprising an aperture affording access to the bin interior, and a lid hinged to the bin for movement between an open position and a position closing said aperture, the lid being movable by gravity to closed position, wherein the improvement comprises a catch consisting of a magnet mounted on the bin, and a keeper carried in a pocket in the lid in a position to engage said magnet when the lid is in open position, the keeper being free to move in the pocket to a limited extent to enable it to conform to the opposing face of the magnet, and release means for disengaging the keeper from the magnet to allow the lid to close.

4,032,038

DEVICE, APPARATUS AND PROCESS FOR DISPENSING TAPED BAGS

David Allen Hendricks; Milton Albert Howe, Jr., both of Spartanburg; Stephen Royall Luck, Greenville, all of S.C.; Alfred Ray Morris, Cedar Rapids, Iowa, and Dave Leslie Owen, Wellford, S.C., assignors to W. R. Grace & Co., Duncan, S.C.

Filed Jan. 29, 1976, Ser. No. 653,420
Int. Cl.² B65H 19/12
U.S. Cl. 221—71 16 Claims



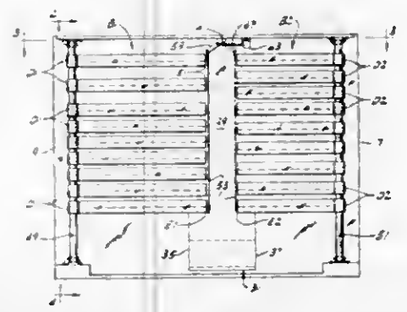
1. A device comprising
a. a first carrier,
b. means for rotatably mounting the carrier to permit rotation of the carrier about an axis of rotation,
c. means defining a surface adapted to rotate in response to rotation of the carrier to wind-up at least one flexible support,
d. means for permitting rotation of the surface in a first rotational direction and for substantially precluding rotation of the surface in a direction opposite to the first direction, and
e. a second carrier spaced from and opposite said first carrier, said surface-defining means extending from one of said carriers to the other of said carriers, and means for permitting relative displacement of at least one of said carriers away from said surface-defining means.

4,032,039

ARTICLE-DISPENSING APPARATUS

James T. Schuller, St. Louis County, Mo., assignor to UMC Industries, Inc., Stamford, Conn.

Filed Nov. 13, 1975, Ser. No. 631,531
Int. Cl.² G07F 11/36
U.S. Cl. 221—75 9 Claims



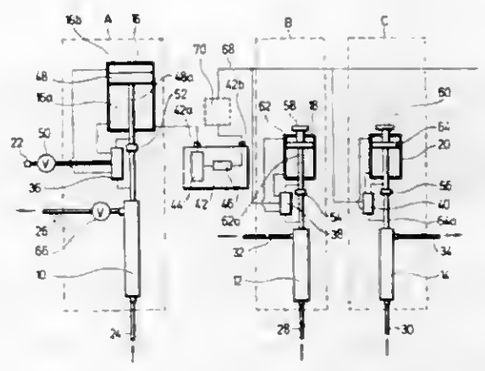
1. Article-dispensing apparatus comprising a cabinet, a first and a second bank of article dispensers in the cabinet, each bank comprising a plurality of dispensers located one above another, each dispenser being adapted to hold a series of articles to be dispensed in a row extending toward one end of the dispenser and having means for feeding the articles toward said one end of the dispenser and discharging the leading article of the series to drop by gravity, the first bank and the second bank of dispensers being arranged in the cabinet with the dispensers of the first bank feeding in one direction and the dispensers of the second bank feeding in the opposite direction and with the discharge ends of the dispensers of the first bank spaced from the discharge ends of the dispensers of the second bank providing a common vertical discharge chute between said banks, said cabinet having a delivery station to which an article delivered from any of the dispensers drops down in said chute, and a closure movable between a first position extending heightwise in said chute at the discharge ends of the dispensers of the first bank for closing off the first bank from the chute and a second position extending heightwise in the chute at the discharge ends of the dispensers of the second bank for closing off the second bank from the chute.

4,032,040

METHOD AND CONTROL SYSTEM FOR BATCHING PLURAL SUBSTANCES AND PUMP SYSTEM

Géza Kecskeméthy; Róbert Tihanyi, and György Virág, all of Budapest, Hungary, assignors to Muanyagipari Kutato Intezet, Budapest, Hungary

Filed Sept. 22, 1975, Ser. No. 615,661
Claims priority, application Hungary, Sept. 23, 1974, MU 529
Int. Cl.² B67D 5/08, 5/52
U.S. Cl. 222—1 8 Claims



1. In a method of batching at least two substances, more particularly synthetic resins and other materials such as catalysts and accelerants in preselected and adjustable amounts and proportions, each substance being delivered by individual batchers, the steps of driving said batchers by means of reciprocating pressure cylinders, selecting a first pressure cylinder for being supplied with a pressure medium from a source of such medium, feeding further pressure cylinders with a pressure medium dependent on the number of strokes per minute of said first pressure cylinder, controlling the total amount of discharge of the batchers by varying the number of strokes per minute of said first pressure cylinder, and controlling the mutual proportions of delivered substances by varying the stroke lengths of said further pressure cylinders.

4,032,041

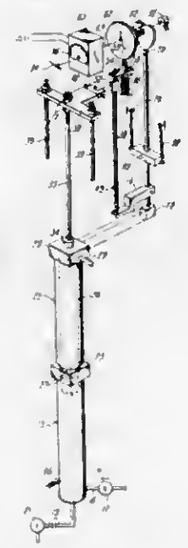
DISPENSING APPARATUS HAVING TEMPERATURE COMPENSATING FLUID METERING

Ralph E. Bruce, Dayton, Ohio, assignor to Production Control Units, Inc., Dayton, Ohio

Filed Aug. 11, 1975, Ser. No. 603,759
Int. Cl.² B67D 5/30
U.S. Cl. 222—14 18 Claims

13. In apparatus for metering and dispensing a fluid and adapted to charge a refrigeration system with a liquid refrigerant, said apparatus including a positive displacement pump having a movable fluid displacement member, means for moving said displacement member to effect dispensing of the fluid, and means for controlling the movement of said displacement member in response to changes in temperature of

the fluid, the improvement wherein said means for controlling the movement of said displacement member comprise a deformable control member having a plurality of elements successively arranged generally in a row, means including an electro-optical unit for counting said elements in response to



movement of said displacement member, means responsive to said counting means for controlling the movement of said displacement member, and means for deforming said control member for changing the spacing between adjacent said elements in response to changes in temperature of the fluid.

4,032,042

APPARATUS FOR COMPUTING AND METERING LIQUID DISCHARGES

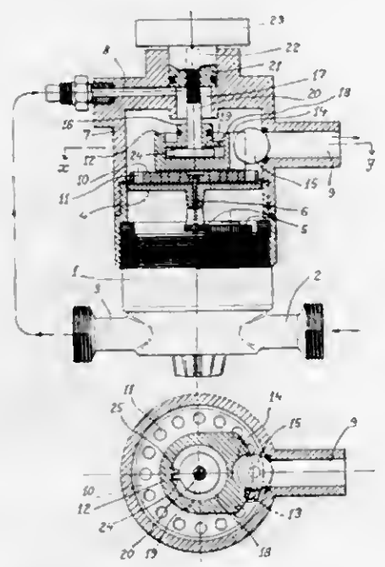
Moise Plat, Residences Clair Horizon, Bat. 1 Bloc A Avenue Joseph Giordan, 06000 Nice, France

Filed May 10, 1976, Ser. No. 684,894

Claims priority, application France, Oct. 2, 1975, 75.30740

Int. Cl.² B67D *5/30*

U.S. Cl. 222—20 **8 Claims**



1. A computing and metering device allowing only predetermined controllable quantities of a liquid to be discharged from a liquid outlet aperture, comprising a turbine flowmeter, metering means driven by said flowmeter and having a rotatable plate which carries a ball located in such a way as to block the arrival of the liquid when the said plate has moved through a given angle of revolution from a position predetermined by a setting component, the flowmeter and the metering means being disposed in separate chambers and being in communication with one another such that the whole of the flow passing through one said chamber then passes into the other chamber via an external duct.

4,032,043

DISPENSING CONTAINER NECK THREAD PROTECTION

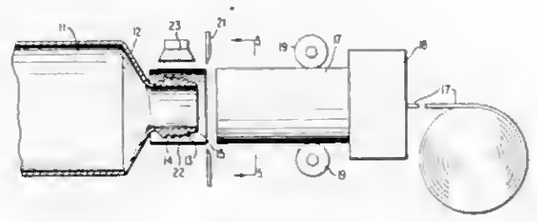
Dusan S. Lajovic, Smithfield, Australia, assignor to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 75,840, Sept. 28, 1970, abandoned. This application Feb. 5, 1973, Ser. No. 329,399

Claims priority, application Australia, Oct. 2, 1969, 61800/69

Int. Cl.² B65D *35/08*

U.S. Cl. 222—92 **12 Claims**



1. A dispensing tube assembly containing a fluent substance containing abrasive material comprising a collapsible metal body formed integrally at one end with a stiff shoulder terminating in a relatively rigid reduced diameter hollow discharge nozzle having an externally threaded section, an internally threaded closure cap for mounting on said nozzle and means for protecting said metal neck threads against abrasion by the substance contained in the body as the cap is repeatedly removed and replaced during successive discharges of portions of said substance in use of the assembly comprising a thin-walled smooth surfaced covering consisting of an integral heat shrunk element of non-metallic synthetic plastic material tightly permanently mounted and anchored against axial displacement on said nozzle in close internal and external contour following conformance with said threaded section, said nozzle being formed intermediate the shoulder and said threaded section with an annular anchor section distinct from the threaded section, the inner end of said element surrounding said annular section in snug internal and external contour following conformance and thereby anchoring said element against axial displacement on said nozzle when said threaded closure cap is rotatably applied upon or removed from said nozzle threads, said covering of plastic material resulting in only an immaterial increase in diameter of said threaded nozzle section thereby not requiring a larger closure cap than did the initial metal threaded section, and said covered threaded section providing a composite threaded region having a smooth abrasion protected thread surface stabilized and directly internally supported by the metal threads of the nozzle.

4,032,044

LIQUID DISPENSING UNIT AND SYSTEM

Jac B. Flynn, Elgin; Jerry C. Janquart, Crystal Lake, and Werner K. Priese, Barrington, all of Ill., assignors to Hills-McCanna Company, Carpentersville, Ill.

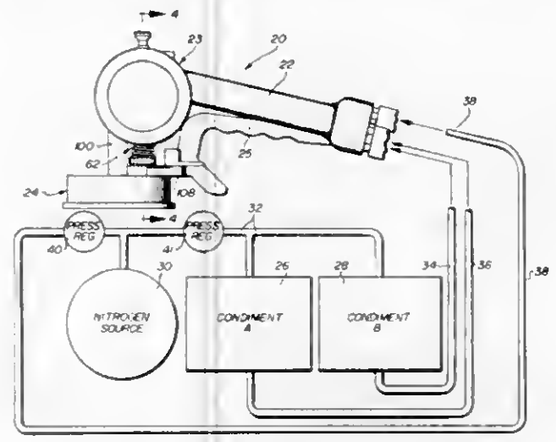
Filed Mar. 8, 1976, Ser. No. 664,556

Int. Cl.² G01F *11/08;* **B67D** *5/52*

U.S. Cl. 222—135 **32 Claims**

1. A dispensing unit for use in the controlled, metered dispensing of a liquid product, said unit adapted for use in a system wherein said product is supplied under pressure, said dispenser comprising: a body assembly, at least one metering chamber and discharge passage means provided in said body assembly, with a flexible diaphragm forming a wall of said

metering chamber, means for establishing a force on the side of said diaphragm opposite said metering chamber, and control means operable to effect supply of pressurized product to said metering chamber to create a pressure differential across said diaphragm in a direction which will overcome any force established on said oppoiste side, thereby permitting complete filling of said metering chamber with pressurized product said



control means also being operable to produce blackage of pressurized product to said metering chamber while establishing communication between said metering chamber and said discharge passage means, such that a pressure differential across said diaphragm will then be created in the opposite direction forcing a predetermined volume of product out of said metering chamber.

4,032,045

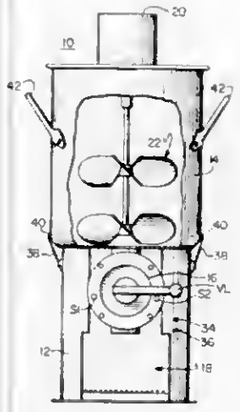
SOUP DISPENSER

Richard R. Epple, Glen Burnie, Md., assignor to Maryland Cup Corporation, Owings Mills, Md.

Filed June 20, 1975, Ser. No. 588,903

Int. Cl.² B67D *5/62;* **G01F** *11/22*

U.S. Cl. 222—146 HE **17 Claims**



1. A dispensing apparatus for hot soup and the like comprising:

a base stand;

heating and control means housed in said base stand for supplying controlled heat;

a reservoir and integral dispensing valve assembly mounted on said base stand with the lower end of said reservoir in immediate proximity to said heating means;

said base stand having a generally cylindrical configuration interrupted by inwardly extending vertical walls defining a vertical dispensing chamber for receiving receptacles to be filled;

said dispensing chamber freely receiving said dispensing valve assembly;

said dispensing valve assembly including a discharge spout positioned in the upper portion of said dispensing chamber;

said reservoir having an open top;

split lid means closing said reservoir and comprising a major section and a minor section; and

motor driven rotary impeller means removably mounted in said major section of said split lid means;

said impeller means extending into close proximity with the bottom of said reservoir and imparting upward thrust to soup and solid particles entrained therein when said reservoir contains soup to be dispensed to preclude settling of solid particles in said reservoir; and

said minor section of said lid means being freely removable independently of said major portion to provide access to said reservoir without removing said impeller means;

wherein said base stand includes an internal shelf positioned adjacent the top thereof and the bottom of said reservoir; and

wherein said heating and control means comprises: at least one heating element mounted on said shelf,

biasing means mounting said heating element on said shelf and constraining said heating element into positive engagement with the bottom of said reservoir, and

thermostat means for controlling said heating element and the temperature of said reservoir mounted adjacent the latter on said shelf and in close proximity to the bottom of said reservoir.

4,032,046

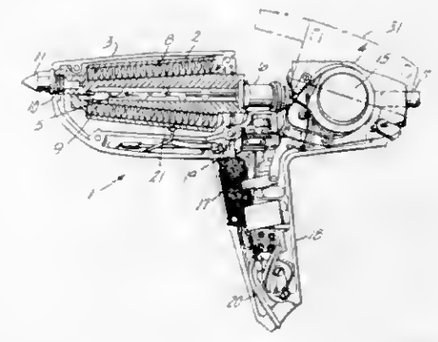
APPARATUS FOR FEEDING GLUE TO A HOT MELT GLUE DISPENSING APPLIANCE

Richard Montgomery Elliott; Albert Eugene Newtoo, both of Beverly, and John Sherburne Kelley, Wenham, all of Mass., assignors to USM Corporation, Boston, Mass.

Filed Nov. 1, 1976, Ser. No. 737,565

Int. Cl.² B67D *5/62*

U.S. Cl. 222—146 HE **7 Claims**



1. In an appliance having a heated melt chamber constructed within the appliance housing, the chamber adapted to receive a flexible rod of thermally activatable glue, to melt the rod of glue, and to intermittently dispense melted glue therefrom; apparatus to feed said flexible rod of glue to the melt chamber comprising:

A. a mounting frame secured within the appliance housing for sliding movement towards and away from the melt chamber, said movement being biased away from the melt chamber;

B. power driven means mounted on the frame to engage the rod of glue and urge it towards the melt chamber;

C. an actuating lever pivotally secured on the appliance housing and operatively connected to the mounting frame to move the frame towards the melt chamber and to feed the rod of glue into the chamber when the lever is operated, said frame and rod of glue being retracted upon release of the actuating lever; and

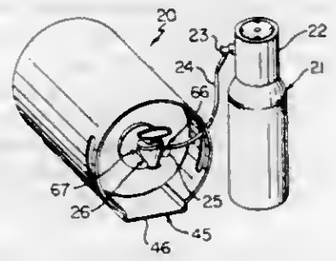
D. a switch operatively connected to the actuating lever and to the engaging means to energize said means upon operation of the actuating lever.

4,032,047

LIQUID DISPENSING CONTAINER CONSTRUCTION

Calvin L. Wilson, Richmond, Va., assignor to Reynolds Metals Company, Richmond, Va.

Continuation of Ser. No. 550,979, Feb. 19, 1975, abandoned.
This application May 5, 1976, Ser. No. 683,411
Int. Cl.² B67D 5/64
U.S. Cl. 222—183 17 Claims



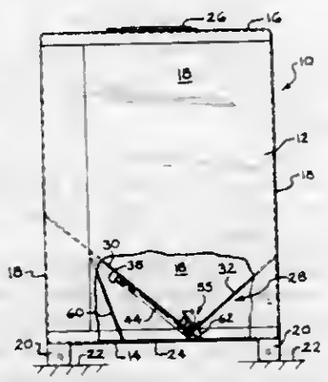
1. A dispensing container construction for a liquid under gaseous pressure comprising, a housing defining a product chamber for said liquid, said housing comprising a cylindrical central portion and a pair of outwardly convex end portions, a spigot device carried by one of said end portions for dispensing said liquid from within said chamber, a closeable filler device for said chamber provided in the other of said end portions, a protective sleeve disposed around said housing and said devices, said sleeve having opposed end edges each arranged outwardly of its associated device and each for supporting said container construction, said end edges defining the axial length of said sleeve therebetween and said sleeve having a uniform single thickness throughout its entire axial length, said sleeve having an identical peripheral outline at each cross section along said length, said sleeve being a tubular single piece sleeve having integral anti-roll means, said anti-roll means being a bottom trough provided as a portion of said single piece sleeve and extending the full length thereof, said trough having a bottom which has a substantially planar bottom supporting surface said trough serving to collect any liquid dripping from said spigot device, said cylindrical central portion of said housing having its entire lower periphery disposed within said trough adjacent said bottom, and means holding said sleeve and housing together.

4,032,048

BIN WITH INTERNAL SLOPING WALLS

Dwight E. Nichols, Beatrice, Nebr., assignor to Hoover Ball and Bearing Company, Saline, Mich.

Filed Dec. 29, 1975, Ser. No. 644,591
Int. Cl.² B67D 5/06
U.S. Cl. 222—185 2 Claims



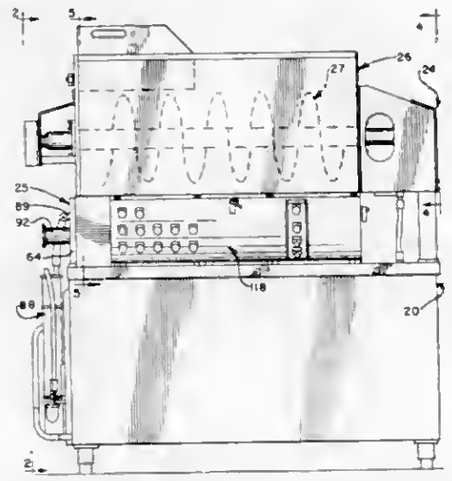
1. A bin for storing and transporting bulk material comprising a bin body having a generally horizontal bottom wall having a discharge opening formed therein, a top wall, side walls extending between said top and bottom walls, and body support legs on said bottom wall, an internal hopper assembly in said body below said top wall consisting of two inclined walls arranged in a generally V-formation for directing all bulk material in said body toward said discharge opening, each of said internal walls having the upper end thereof secured to one of said side walls at a position substantially above said bottom wall and having the lower end thereof located adjacent to and above said bottom wall, means in one of said internal walls forming a feed opening located directly above said discharge opening so that bulk material flowing downwardly in said bin through said feed opening will fall through said discharge opening, a door member pivotally mounted on the underside of said one internal wall for movement between closed and open positions with respect to said feed opening, said door member in the open position thereof extending downwardly through said discharge opening, and coacting releasable latch means on said door member and said one internal wall operable to secure said door in said closed position relative to said feed opening.

4,032,049

FOOD PRODUCT STUFFING PUMP WITH VACUUM LINE

Gary F. Roberts, East Moline, Ill., assignor to The Kartridg Pak Co., Davenport, Iowa

Filed Aug. 18, 1975, Ser. No. 605,609
Int. Cl.² A22C 11/08; G01F 11/20
U.S. Cl. 222—238 14 Claims



1. A stuffing pump for handling a food product comprising a helical gear metering pump having a single outlet passage and dual inlet passages, first means for driving said metering pump at variable speed; vacuum means connected to the metering pump to remove air from the food product, an elongated hopper above the metering pump for receiving food product, a feed conveyer in the bottom of the hopper feeding food product to the inlet passages of the metering pump at a rate faster than the intake capacity of said metering pump, and second means for driving said conveyer at variable speed.

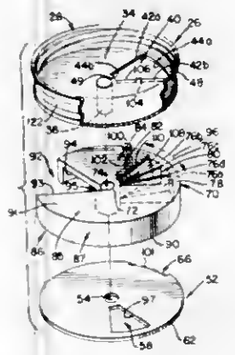
4,032,050

MEASURING CLOSURE FOR CONTAINERS

Richard J. Funk, 344 N. Mulberry, Lancaster, Pa. 17603

Filed Feb. 19, 1976, Ser. No. 659,470
Int. Cl.² G01F 11/06
U.S. Cl. 222—284 1 Claim

1. A measuring and dispensing closure formed of plastic materials for a container or the like, comprising:
a container lid member attachable to the container for readily covering and uncovering the container, said lid having a center post extending outardly therefrom, a dispensing slot defined therein for dispensing material from the container, and screw threads for cooperating with screw threads on the container to selectively attach and detach said lid from the container;
a dispensing wedge rotatably attached to said center post and having a plurality of walls, two of which walls define therebetween a material measuring chamber for receiving material from the container via said lid dispensing slot when said measuring chamber and said lid dispensing slot are aligned, a chamfered portion on one wall of said material measuring chamber adjacent said lid for passing said material thereover into said chamber, and two of which walls have attached thereto a sealing means which is essentially imperforate to seal said lid dispensing slot when said sealing means is oriented to cover said lid dispensing slot when said dispensing slot is not in use to effect an essentially air-tight seal of the container, and further ones of said walls in said measuring chamber dividing that chamber into thirds for dispensing a measured amount of material which is less than that amount



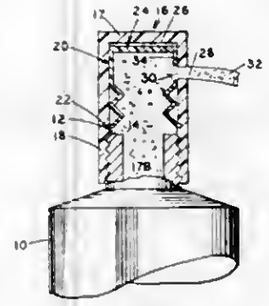
dispensed by a full chamber, and a housing on said dispending wedge having a floor and a skirt attached to said floor, said floor and said skirt contacting said lid, said floor having defined therein a slot and said dispensing wedge being attached to a hub having a cutout portion aligned with said slot for receiving said center post therein; and
an outer top member fixedly secured to said center post and having a measured dispensing slot defined therein and adjustment means thereon for adjusting the amount of material dispensed from said material chamber, said measured material dispensing slot being positioned to cooperate with said dispensing wedge material measuring chamber to dispense material from said chamber for ultimately dispensing a measured amount of material from the container.

4,032,051

SELF SEALING CAP FOR A COLLAPSIBLE TUBE

James V. Testa, 31 Carlton Terrace, Bloomfield, N.J. 07003

Filed Dec. 23, 1975, Ser. No. 643,785
Int. Cl.² B65D 25/40
U.S. Cl. 222—492 2 Claims



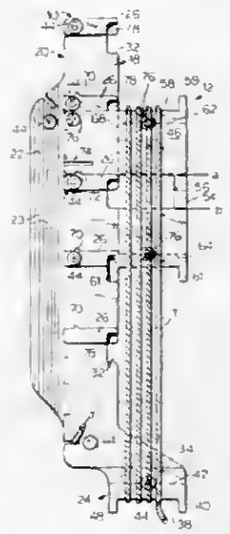
1. A dispensing cap for providing a flow of cream from a delivery opening in the neck of a collapsible tube, comprising:
a cylindrical shell open at a bottom end adapted for connection to said neck, said shell having a dispensing hole therethrough in a sidewall thereof;
a contractible and expandible bellows located wholly within the interior of said shell having an open end connected to the interior of said shell to receive a flow of cream from said bottom and into said open end, said bellows having a feed hole therethrough which is in alignment with said dispensing hole in said shell in response to a pressure being applied to said tube whereby said bellows is expanded and cream flows through said delivery opening, said feed hole and said dispensing hole,
said bellows including an axially movable sealing segment within the interior of said shell which covers said dispensing hole in response to said bellows being contracted upon cessation of pressure being applied to said tube.

4,032,052

FRINGE AND TASSEL MAKER

Hamilton Canfield Bates, Jr., Chester, Conn., assignor to C. J. Bates & Son, Inc., Chester, Conn.

Filed Aug. 9, 1976, Ser. No. 712,486
Int. Cl.² A41H 43/00
U.S. Cl. 223—46 4 Claims



1. A fringe and tassal maker comprising, a base member having a winding and cutting abutment at one end thereof and having a slide member releasably fixed thereto, the slide member having a pair of winding surfaces and a pair of cutting areas thereon, the winding and cutting abutment having a winding surface and a cutting area thereon, and the slide member being selectively positionable along and relative to the base member for providing different lengths of fringes and tassels obtained by winding yarn around selected ones of the winding surfaces and cutting the yarn at selected ones of the cutting areas.

4,032,053

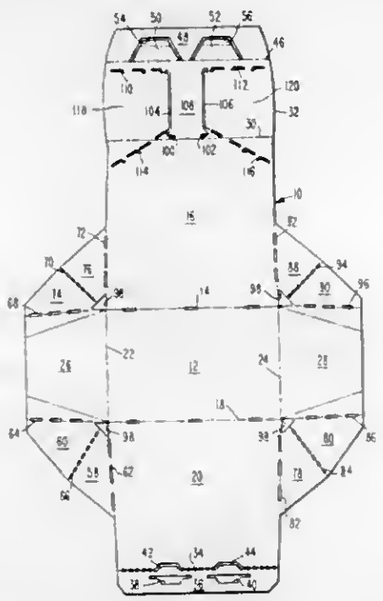
ARTICLE CARRIER WITH HANDLE FEATURE

Jerry F. Wilson, Monroe, La., assignor to Olinkraft, Inc., West Monroe, La.

Filed June 30, 1976, Ser. No. 701,274
Int. Cl.² A45C 11/24
U.S. Cl. 224—45 AB 1 Claim

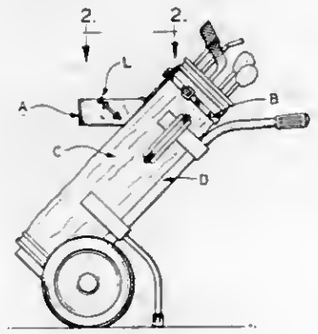
1. An article carrier comprising
a bottom panel with two sides and two ends,
a side panel upstanding from each side of the bottom panel,
end panel means extending across the ends of the carrier for retaining the articles in the carrier,
a top panel extending between the side panels and having two ends, a scoreline connecting the top panel to a first one of the side panels, locking flap means connecting the top panel to a second one of the side panels,
a pair of transverse handle die-cuts formed in the top panel,
a pair of rip guide die-cuts for each handle die-cut extending

from the respective handle die-cut to one of the ends of the carrier, and
a handle portion defined between the handle die-cuts,
a first one of each pair of rip guide die-cuts extending at a



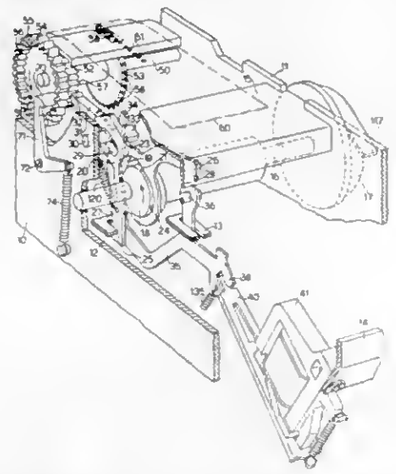
diagonal angle so that it extends onto the first one of the side panels,
a second one of each pair of rip guide die-cuts extending straight from the respective handle die-cut to the end of the top panel.

4,032,054
GOLF ARTICLE CARRIER
Norman E. Duncan, 713 Wesley Drive, Park Ridge, Ill. 60068
Filed Aug. 14, 1975, Ser. No. 604,594
Int. Cl.² B60R *11/00*
U.S. Cl. 224—29 B **7 Claims**



1. In an article carrier adapted to be detachably secured to a golf bag, the combination of:
a. a bottom wall, front and rear end walls, and opposed side walls interconnected to form a tray-like receptacle open at the top;
b. said rear wall sloping rearwardly and upwardly from said bottom wall at an angle of between 90° and 180°, so that when said carrier is attached to a golf bag which is disposed in an inclined position, said bottom wall will be disposed in a substantially horizontal position;
c. said rear wall including an upper portion extending a substantial distance above said side walls and including means for detachably securing said carrier to said golf bag;
d. a sloping transverse wall member extending between said side walls and projecting upwardly and inwardly from said rear end wall in spaced relation with said bottom wall.

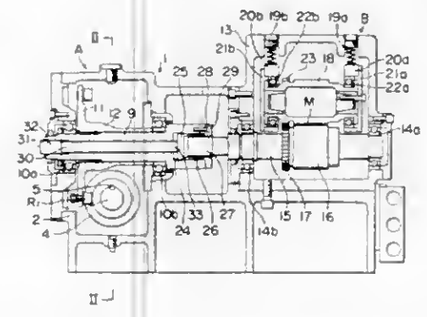
4,032,055
FEED DEVICE FOR TAPE PERFORATORS
Armando Costa, Ivrea (Turin), Italy, assignor to Ing. C. Olivetti & C., S.p.A. and Ufficio Brevetti, both of Turin, Italy
Filed Apr. 9, 1976, Ser. No. 675,368
Claims priority, application Italy, Apr. 18, 1975, 67985/75
Int. Cl.² B65H *17/40*
U.S. Cl. 226—76 **3 Claims**



1. A tape feeding apparatus for perforators or readers of a punched tape, comprising:
a frame;
a supporting shaft rotatably mounted to said frame;
a sprocket pulley mounted on said supporting shaft for rotation therewith for advancing the tape;
a first lever pivotally mounted to the frame and having a first and a second slot and a tab on one end thereof, said second slot disposed between said first slot and said one end;
a guiding element fixed to said frame and in cooperative engagement with said second slot;
a saw toothed pulley integral with said sprocket pulley and coactive with said first lever to be jogged by said tab;
spring means connecting said first lever to said frame, said spring means urging said tab into positive contact with a tooth of said saw toothed pulley; to effect the rotation of said saw toothed pulley; and
a circular cam rotatably mounted inside said first slot and acting positively in only one sense on said first lever in opposition to said spring means, to withdraw said tab from said saw toothed pulley and to impart to said one end movement along a substantially circular path, wherein in a first arc of said circular path said tab is moved away from a contacted tooth, in a second arc of said path, said tab is spaced away from the contacted tooth of said toothed pulley, and in a third arc of said path said tab returns towards the next tooth of said toothed pulley.

4,032,056
ROLL FEEDER DEVICE FOR PRESS WORKS
Sakumatsu Ito, 112 Daijoujijimonyama-cho, Kaga, Ichikawa, Japan
Filed Sept. 23, 1975, Ser. No. 616,014
Int. Cl.² B65H *17/22*
U.S. Cl. 226—154 **4 Claims**

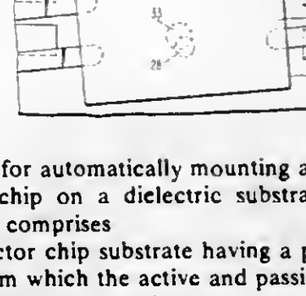
1. A roller-type feed device for press works, comprising:
a roll feed mechanism having
a driving feed roll means,
a driven feed roll means,
gear means drivingly connecting the driving feed roll means to the driven feed roll means,
the driving feed roll means and the driven feed roll means being in spaced relation such that they will frictionally engage a material to be fed between them and feed the same due to rotation of the driving and driven feed roll means;
a motion transmission mechanism having
a main drive shaft associated with and driven by a crank shaft in the press works,
a barrel cam mounted on the main drive shaft for rotation therewith,
an index means mounted for rotation and in driven engagement with the barrel cam,
the barrel cam having at least one groove in the surface thereof a portion of which is a sine-curve groove such that will produce constant velocity rotation of the index means and another portion of which is a rectilinear groove such that will produce no rotational motion of the index means;
the driven feed roll means of the roll feed mechanism being in driven engagement with the index means whereby movement of the index means causes movement of the driving feed roll means so as to feed the material between the driving feed roll means and the driven feed roll means at predetermined intervals;
the driving feed roll means including:
a driving feed roll shaft mounted for axial rotation,



a driving feed roll mounted on the driving feed roll shaft for rotation therewith;
the driven feed roll means includes:
a driven feed roll mounted for axial rotation and for axial translation in a plane containing the axis of the driving feed roll shaft,
spring means biasing the driven feed roll towards the driving feed roll;
the gear means includes:
a driving gear secured to the driving feed roll shaft for rotation therewith,
a driven gear secured to the driven feed roll and in driven engagement with the driving gear;
the main drive shaft is connected to the press works drive shaft through an endless belt means;
the index means includes:
a circular index plate mounted for rotation about the central axis thereof,
a plurality of rollers mounted on one side of the index plate equidistant from the axis of rotation thereof and engageble with the grooves in the barrel cam;
the index plate being connected to the driving feed roll shaft so as to cause rotation thereof when the index plate is rotated by the barrel cam.

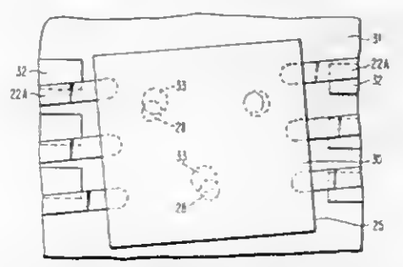
4,032,057
BRAZING CLIP
Phillip S. Linscott, Jr., Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.
Filed Mar. 18, 1976, Ser. No. 667,931
Int. Cl.² B23K *1/04, 35/14*
U.S. Cl. 228—56 **11 Claims**

1. A brazing clip for use in brazing two wires and a spacer element together wherein the brazing clip is maintained in a predetermined position between the wires and with respect to the spacer element during the brazing operation, wherein the brazing clip comprises:
a first leg suitable for inserting between a first wire and the spacer element;
a second leg suitable for insertion between a second wire and the spacer element;
a first retaining portion secured to one end of said first leg and configured to abut a first side of said first wire;



a second retaining portion secured to one end of said second leg and configured to abut a first side of said second wire; and
a connecting crosspiece secured to the other end of said first leg and the other end of said second leg wherein said crosspiece is configured with an end portion abuttable with a second side of said second wire effective to retain the brazing clip in the predetermined position during a brazing operation.

4,032,058
BEAM-LEAD INTEGRATED CIRCUIT STRUCTURE AND METHOD FOR MAKING THE SAME INCLUDING AUTOMATIC REGISTRATION OF BEAM-LEADS WITH CORRESPONDING DIELECTRIC SUBSTRATE LEADS
Jacob Riseman, Poughkeepsie, N.Y., assignor to IBM Corporation, Armonk, N.Y.
Division of Ser. No. 566,570, April 9, 1975, Pat. No. 3,997,963, which is a division of Ser. No. 375,296, June 29, 1973, Pat. No. 3,893,156. This application July 30, 1976, Ser. No. 710,054
Int. Cl.² H01L *21/60*
U.S. Cl. 228—180 A **8 Claims**



1. A method for automatically mounting a beam-lead integrated circuit chip on a dielectric substrate wherein said beam-lead chip comprises
a semiconductor chip substrate having a passivated planar surface from which the active and passive devices in the circuit extend into the substrate,
a plurality of peripheral beam-leads interconnected with the circuit devices extending beyond the periphery of the chip, and
a plurality of solder mounds having a lower melting point than said beam-leads extending from said surface to a plane further from said surface than the plane of said beam-leads, and
said dielectric substrate comprises
a metallic land pattern formed on a surface of said substrate,
a plurality of land leads extending from said conductive

land pattern on said substrate disposed so as to correspond with said plurality of beam-leads, and

a plurality of solder-wettable land pads on said non-wettable dielectric substrate disposed so as to correspond to said plurality of solder mounds,

which method comprises the steps of

placing the chip on the substrate so that said plurality of solder mounds are respectively in registration with said plurality of land pads,

heating the structure to melt the solder mounds whereby said solder mounds selectively wet the corresponding land pads to bring the plurality of beam-leads respectively into registration with said plurality of corresponding land leads, and

cooling the structure to solidify said solder mounds to thereby fix said registration.

4,032,059

METHOD USING A SOLDERING ALLOY FOR CONNECTING PARTS OF WHICH AT LEAST SOME ARE MADE OF ALUMINIUM

Alain Edouard Piegat, Asnieres, France, assignor to Societe Anonyme des Usines Chausson, Asnieres, France

Division of Ser. No. 566,991, April 11, 1975, Pat. No. 3,969,110. This application Mar. 26, 1976, Ser. No. 670,846
Claims priority, application France, Mar. 28, 1975, 75.13565
Int. Cl.² B23K *35/26*
U.S. Cl. 228—183 **4 Claims**

1. A method of soldering parts of which at least one is made of aluminum or aluminum alloy, comprising the steps of:

fluxing the parts to be connected together by means of an organic flux;

covering at least said fluxed portions with a soldering alloy comprising

65–85% lead by weight

12–30% cadmium by weight

1–6% antimony by weight

0.5–1% tin by weight;

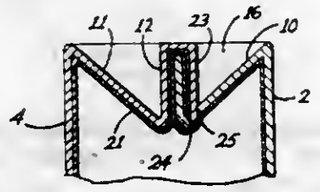
heating said portions up to the liquidus temperature of the soldering alloy while holding said portions together; and cooling down to ambient temperature.

4,032,060

CARTON WITH SELF-SEALING RECLOSABLE END CLOSURE

Frank D. Bergstein, Cincinnati, Ohio, assignor to Bergstein Packaging Trust, Middletown, Ohio

Filed Dec. 24, 1975, Ser. No. 644,303
Int. Cl.² B65D *5/46, 5/56*
U.S. Cl. 229—14 BA **9 Claims**



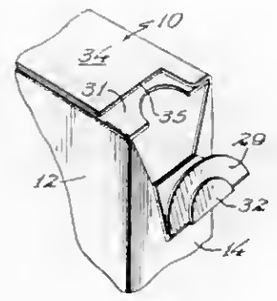
1. In a rectangular carton having opposing side and end walls forming a carton body, a self-sealing reclosable end closure comprising a pair of opposing end closure flaps hingedly connected to the end edges of the carton side walls, said end closure flaps having a width somewhat greater than one-half the width of the carton end walls, a pair of mating sealing flaps hingedly connected to the outermost side edges of said pair of end closure flaps, a flap extension hingedly connected to the outer side edge of one of said sealing flaps, and a tubular liner in said carton body, the mouth of said liner projecting from said carton body to overlie said flap extension, the mouth of said liner having its opposite sides secured to said sealing flaps, said sealing flaps being juxtaposed in face-to-face parallel relation to the carton side walls with portions of the liner mouth sandwiched therebetween, said sealing flaps and the projecting end of the liner being jointly displaceable downwardly to lie within the confines of the carton body and with said opposing pair of closure flaps extending downwardly and inwardly within the carton to bias the sealing flaps and the portions of the liner mouth secured thereto into engagement with each other, said flap extension and the portion of the liner mouth overlying said flap extension being jointly foldable over the upper edge of the other of said sealing flaps, and attachment means for securing said flap extension in its folded position.

4,032,061

POUR SPOUT

Daniel P. Dutcher, Shoreview, and Edwin C. McLaren, Apple Valley, both of Minn., assignors to Hoerner Waldorf Corporation, St. Paul, Minn.

Filed Apr. 12, 1976, Ser. No. 675,769
Int. Cl.² B65D *5/72*
U.S. Cl. 229—17 R **1 Claim**



1. A rectangular, tube like carton having bottom closure flaps and a top closure, said top closure including an improved reclosable pour spout, said closure and spout comprising:

an insertable tab hingedly attached to a first side wall panel of said carton and foldable inwardly along with a minor closure flap on the opposite side wall panel;

a section of said first side wall panel adjacent said insertable tab hingedly connected to said tab and having a pair of laterally spaced-apart frangible score lines connected along their bottom ends by a horizontal fold line to define a spout opening;

a first folded major flap contacting the top surface of said tab;

said first folded major flap having a removable section formed therein and defined by a frangible score line, said section in said flap positioned above and adhered to said tab; and

an outer major flap positioned above said first folded major flap and adhered thereto except in the area adjacent to said tab so that said tab and said removable section are insertable between the edges of said major flaps to reclose said spout opening.

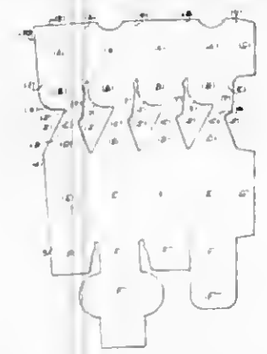
4,032,062

BOX AND METHOD OF MAKING THE SAME

Minoro Kawai, and Kenji Moramatsu, both of Tokyo, Japan

Filed Feb. 9, 1976, Ser. No. 656,737
Int. Cl.² B65D *5/38, 85/10*
U.S. Cl. 229—20 **7 Claims**

1. A polygonal box formed from a sheet of paperboard or the like, comprising a plurality of panels corresponding in number to the number of sides of said box, each of said panels comprising in combination an outer face, an outer cover portion, an inner cover portion, , a connecting piece, , an inner face and a bottom portion, said portions being connected together in the order named, said outer cover portion being provided on a first side with a protruding lobe adapted to cooperate in overlapping relation with similar lobes on other outer cover portions, to form a closure for the top of said box, and on a second side opposite said first side with a tuck piece connecting said outer cover portion with said inner



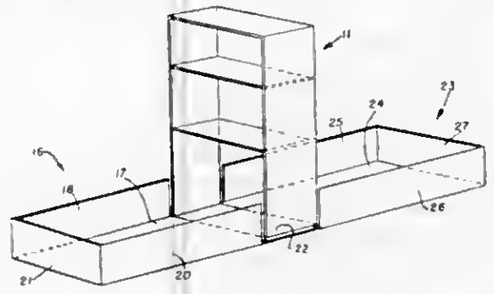
cover portion, said inner cover portion and said connecting piece being shaped to define a notched aperture effective to provide clearance between the edges of said tuck piece on the one hand and the flat surfaces of said inner cover portion and connecting piece on the other hand, during the operations of opening and closing said package.

4,032,063

RETURNABLE SHIPPING BOX FOR FURNITURE

Phillip J. Davis, and M. Vincent Sanderford, both of Morganton, N.C., assignors to Champion International Corporation, Stamford, Conn.

Filed Oct. 2, 1975, Ser. No. 618,919
Int. Cl.² B65D *5/35, 85/00*
U.S. Cl. 229—23 C **4 Claims**



1. A returnable shipping box for furniture comprising:

a. a wooden planar base having a top and bottom surface and a pair of opposed side edges for supporting a piece of furniture on said top surface;

b. a first foldable portion comprising a plurality of base flaps attached to the bottom surface about said side edges of said base, and a front panel for engaging the front portion of a furniture piece, said front panel joined by side and top members which slidably engage the sides and top of the furniture piece when folded to form a closed box;

c. a second foldable portion including a plurality of base flaps attached to the bottom surface about said side edges of said base and a back panel for engaging the back portion of the furniture piece, said back panel joined by side and top members which slidably engage the sides and top of the first foldable portion when folded to form a closed box, the base laps of said first and second foldable portions defining a marginal area around said base when said base flaps are attached to said base, said marginal area including a portion of the base flaps of said first and second foldable portions overlying the opposed side edges of said base whereby said marginal area can be slit with the side edges of said base serving as a backing member for a slitting device so that said first and second portions can be pivoted relative to each other to an open position to expose the furniture piece within said box and can be repivoted to a closed position to reseal said box; and

d. plural tapes holding the first and second foldable portions in their closed positions.

4,032,064

BARRIER BAG ASSEMBLY FOR AEROSOL CONTAINER

Earl D. Giggard, Clarendon Hills, Ill., assignor to The Continental Group, Inc., New York, N.Y.

Filed Jan. 5, 1976, Ser. No. 646,458
Int. Cl.² B65D *33/02*
U.S. Cl. 229—55 **9 Claims**

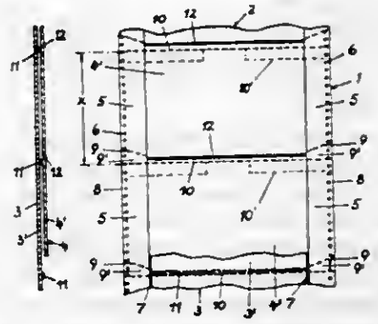
1. A plastic bag for an aerosol container comprising a generally cylindrical collapsible body and top and bottom end members, and means on said bottom member for resisting collapse of the bottom member upon the imposition of pressure on the body and bottom member, said body having portions adapted to fold in radially and the top end member of said bag being generally frusto conical and having an upper neck portion and gradually becoming thinner toward its juncture with the upper end of the body portion and being collapsible therewith inwardly.

4,032,065

FILE FOLDER WEB OF INDETERMINATE LENGTH

Egon Heimann, Falkenberg 61, D-56 Wuppertal-Elberfeld, Germany

Filed Apr. 1, 1975, Ser. No. 564,219
Claims priority, application Germany, Apr. 3, 1974, 2416247; Dec. 18, 1974, 2459741
Int. Cl.² B65D *27/10*
U.S. Cl. 229—69 **19 Claims**

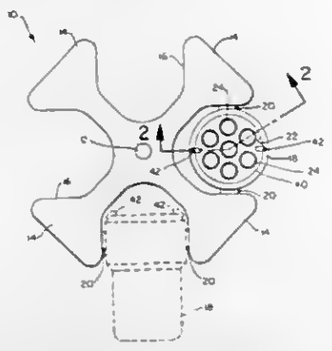


1. A file folder web of indeterminate length formed of a series of interconnected individual file folders each having a length and a width, comprising in combination:

a. upper and lower sheets of indeterminate length arranged face-to-face and constituting, respectively, a front and a rear cover wall of each individual file folder;

b. main weakened lines provided in said sheets and extending along and through the length of each file folder;
c. a strip of adhesive extending between said sheets along the length of each file folder adjacent the main weakened line along one longitudinal edge of each file folder for bonding together said sheets; said strip of adhesive being the sole strip of adhesive in each individual file folder; and
d. a fold line extending in one of said sheets parallel to and adjacent said main weakened lines; said strip of adhesive extending between the main weakened line along said longitudinal edge and said fold line.

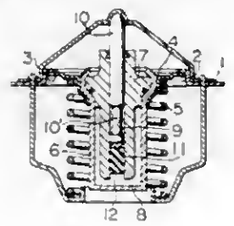
4,032,066
ADAPTERS FOR CENTRIFUGE ROTORS
Herschel Eugene Wright, Santa Clara, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.
Filed Mar. 15, 1976, Ser. No. 666,987
Int. Cl.² B04B 5/02
U.S. Cl. 233—26 **14 Claims**

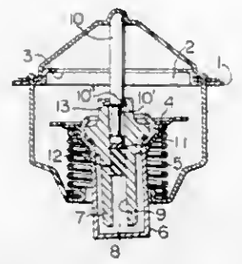


1. An adapter assembly for use within a centrifuge rotor to convert a single cell receptacle within said rotor to a multi-cell receptacle for receipt of a plurality of sample carrying holders, said assembly comprising a plurality of adapter sections positioned adjacent to each other in a stacked relation within said single cell receptacle, each of said adapter sections having at least two holes for alignment with similar holes in adjacent adapter sections to form said multi-cell receptacle, said plurality of adapter sections being variable in number to provide adjustment to the desired depth of said adapter assembly within said rotor to establish substantially the same depth in said adapter assembly as the depth of any of a number of various sized sample carrying holders.

4,032,067
THERMOSTAT VALVE
Masanori Hanaoka, Toyota, and Masao Inagaki, Okazaki, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan
Filed Dec. 11, 1975, Ser. No. 639,973
Claims priority, application Japan, Aug. 4, 1975, 50-107963
Int. Cl.² F01P 7/02
U.S. Cl. 236—34.5 **2 Claims**

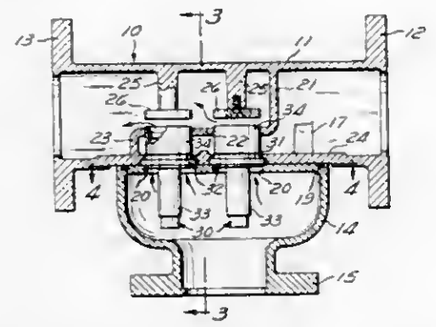
1. A thermostat valve comprising a housing having a valve seat portion which defines a valve port, first and second supporting frame portions provided at opposite sides of said valve seat portion, a valve member adapted to cooperate with said valve seat portion to selectively open and close said valve port, a casing member provided with a centrally disposed cylindrical bore, said casing member containing a thermally expandable material therein, said centrally disposed cylindrical bore communicating with said thermally expandable material and carrying said valve member, a coil spring which elastically and slightly, tiltably supports said casing member against said first supporting frame portion in a manner so that said valve member carried by said casing member is elastically engageable onto said valve seat portion, and a needle member having one end portion thereof disposed in said bore so as to be slideable therealong and adapted to be driven out of said bore by said thermally expandable material in accordance with the thermal expansion thereof, the other end portion of said needle being pivotably supported by said second supporting frame portion in a manner so that said valve member carried by said casing member is adapted to be moved away from said valve seat portion under the reaction applied by said needle member





driven out of said bore due to the thermal expansion of said thermally expandable material, wherein a shoulder portion is formed in a part of said needle member disposed in said bore by reducing a part of said needle member, said shoulder portion being adapted to engage with an outer edge of said bore when said needle has been driven out of said bore beyond a predetermined distance.

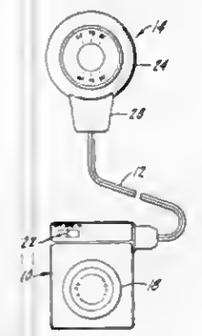
4,032,068
THERMOSTATIC VALVE
Russell O. Luchtenberg, Hebron, and James P. Buchwald, Mount Vernon, both of Ohio, assignors to Thermo Valve Corporation, Mount Vernon, Ohio
Filed Apr. 8, 1975, Ser. No. 566,101
Int. Cl.² F01P 7/02
U.S. Cl. 236—34.5 **10 Claims**



1. In a thermostatic valve utilizing stock temperature-responsive valve element means comprised of a stem, a ring seat carried by the stem, and a skirted hollow head movable by a temperature-responsive element from a closed position on said ring seat to an open position, a main valve body provided with alternate outlet openings, a partition within said main valve body separating a first cavity within said body which leads to one outlet opening from a second cavity which leads to an alternate outlet opening, openings in said valve body and said partition to receive the skirted head of the stock valve

element means, means for removably holding said valve element means in said main body, spaced means to close said skirted head when it is moved axially from the ring seat, and inlet nozzle means for directing fluid to said valve elements, the stem of said valve element being offset from the axis of said inlet nozzle means, whereby fluid entering said inlet means is diverted to the offset stem of said valve element means and said fluid may pass either between said ring seat to one of said body outlets, or through the skirted head to an alternate body outlet, or simultaneously to both outlets, depending upon the position of said skirted head, and means for disconnecting at least a portion of said inlet means from said main valve body to provide access for inspection of said valve element means.

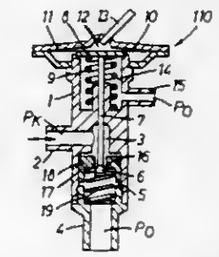
4,032,069
DAY-NIGHT PROGRAMMABLE THERMOSTAT
Joseph L. Cannella, Arlington Heights, Ill., assignor to Candel, Inc., Arlington Heights, Ill.
Continuation of Ser. No. 582,627, June 2, 1975, abandoned.
This application Aug. 18, 1976, Ser. No. 715,440
Int. Cl.² G05D 23/30
U.S. Cl. 236—46 R **1 Claim**



1. The combination with a thermostat having air temperature sensing means, a one-piece replaceable cover member positioned upon the thermostat and including a downwardly extending portion, a resistive heat source attached to and within said downwardly extending portion of the cover and positioned adjacent said temperature sensing means, a timer physically separated from the thermostat, cover and resistive heat source and having a power cord extending therefrom to be electrically connected to said resistive heat source and having a pair of terminals to be connected to a source of electric power, a transformer within said timer and electrically connected between said timer and resistive heat source for reducing the voltage from the source of power applied to said resistive heat source, a switch at said timer for controlling the application of power to said resistive heat source, and a resistor connected in parallel with said resistive heat source and physically located at said timer, said timer controlling the application of power to said resistive heat source which in turn affects the temperature of air immediately adjacent said thermostat temperature sensing means to control operation of said thermostat.

4,032,070
THERMOSTATIC EXPANSION VALVE FOR REFRIGERATION INSTALLATIONS
Leif Nielsen, Nordborg, Denmark, assignor to Danfoss A/S, Nordborg, Denmark
Continuation of Ser. No. 495,384, Aug. 7, 1974, abandoned.
This application Sept. 2, 1975, Ser. No. 609,608
Int. Cl.² F25B 41/04
U.S. Cl. 236—92 B **1 Claim**

1. A thermostatic expansion valve assembly for a refrigeration installation of the type having condenser and evaporator units, comprising, a housing, a condenser inlet port and an evaporator outlet port in said housing, an operating unit having a chamber pressure responsive to the superheat temperature of said evaporator unit, valve means between said ports including a piston and a cylinder with said piston being reciprocally mounted in said cylinder, a central opening in said piston forming a movable valve seat carried by said piston, said operating unit including a centrally disposed rod extending through said piston opening, said valve means including a closure member attached to the lower end of said rod which is cooperable with said valve seat, spring means biasing said



piston in an upstream valve opening direction, said piston pressure biasable by condenser pressure in a downstream valve closing direction, said operating unit being operable to move said rod and closure member thereof in a valve opening direction, said spring means having a characteristic curve relative to a range of values of said condenser pressure to maintain a flow quantity through said valve means over said range of condenser pressure values which corresponds only to said operating unit chamber pressure.

4,032,071
THERMALLY RESPONSIVE VALVE HAVING DUAL OPERATING TEMPERATURES
Kazuo Imoto, Yokohama, Japan, assignor to Texas Instruments Incorporated, Dallas, Tex.
Filed May 10, 1976, Ser. No. 684,805
Claims priority, application Japan, Dec. 29, 1975, 50-159783
Int. Cl.² G05D 23/08
U.S. Cl. 236—101 E **11 Claims**

1. A valve responsive to unidirectional temperature change through two temperature levels for moving, as the valve passes through said respective temperature levels, from a first operating condition to a second operating condition and then from said second operating condition to said first operating condition, said valve comprising valve body means defining an internal operating space, a pair of valve openings, and passages extending from said openings into said operating space providing communication between said openings through said operating space, a first dish-shaped bimetal element disposed in said operating space to be movable with snap-action from an original dished configuration to an inverted dished configuration in response to a change in temperature through a first selected temperature level, a second dish-shaped bimetal element disposed in said operating space to be movable with snap-action from an original dished configuration to an inverted dished configuration in response to a change in temperature through a second relatively higher temperature level, and a pair of valve seat means disposed between the operating space and respective passages to be engaged and disengaged by respective bimetal elements for closing and opening passages when said elements move between said element configurations, said passages being arranged relative to the engagement and disengagement of said elements with said valve seat means to establish a first valve operating condition at a valve

temperature below said first temperature level, to establish a second valve operating condition at a valve temperature between said first and second temperature levels and to establish said first valve operating condition at a valve temperature above said second temperature level.

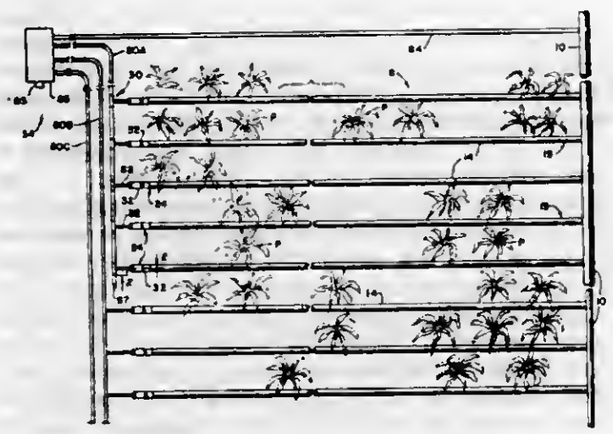
7. A valve responsive to unidirectional temperature change through two temperature levels for moving, as the valve passes through said respective temperature levels, from an open-valve operating condition to a closed-valve operating condition and then from said closed-valve operating condition to an open-valve operating condition, said valve comprising valve body means defining an internal operating space, two openings extending into the body means, a pair of first passages extending from one of said openings into opposite sides of said operating space, and an additional passage extending from the other of said openings into the operating space between said first passages, a pair of valve seat means disposed between said operating space and said respective first passages, a first dish-shaped bimetal element disposed in the operating space in an original dished configuration disengaging one of said valve seat means for permitting communication between said openings over said one valve seat means, said first element being movable with snap-action to an inverted dished configuration when heated through a first temperature level to engage said one valve seat means for preventing communication between said openings over said one valve seat means, and a second dish-shaped bimetal element disposed in the operating space in an original dished configuration disengaging the other of said valve seat means for permitting communication between said openings over said other valve seat means, said second element being movable with snap-action to an inverted dished configuration when heated through a second relatively higher temperature level to engage said other valve seat means for preventing communication between said openings over said other valve seat means.

4,032,072

SOIL IRRIGATION METHODS AND APPARATUS

Bruce A. McElhoe, Walalua, and Joseph G. Tabrah, Kahuku, both of Hawaii, assignors to Hawaiian Sugar Planters' Association, Honolulu, Hawaii

Division of Ser. No. 586,213, June 12, 1975, which is a division of Ser. No. 522,912, Nov. 11, 1974, Pat. No. 3,921,905. This application Sept. 8, 1976, Ser. No. 721,558
Int. Cl.² B05B 17/04
U.S. Cl. 239—11 2 Claims



1. A method of irrigating soil comprising the steps of:

deploying a plurality of drip tubes along plant rows, each drip tube having a flushing valve located on one end thereof, said flushing valve including a primary inlet communicating with said drip tube and a pilot opening;

communicating the other end of each drip tube with a supply of pressurized liquid;

producing a substantially continuous trickle of liquid to the soil through drip orifices contained in said drip tubes by the step of:

diverting a portion of said pressurized liquid simultaneously to said pilot openings of said flushing valves in a manner shifting a valve element in each of said flushing valves to a sealing posture so as to prevent the discharge of liquid from said remote ends of said drip tubes; and

periodically flushing said drip tubes to removed solid material therefrom by the step of:

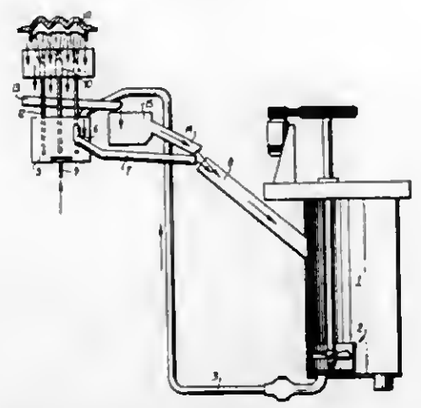
simultaneously relieving the pressure imposed on said valve elements by said diverted liquid to cause said valve element to be shifted to an open posture by pressurized liquid in said drip tubes in a manner allowing said pressurized liquid to be flushed from said remote ends of said drip tubes.

4,032,073

APPARATUS INCLUDING A PUMP MIXER FOR COATING OBJECTS

Ragnar Jakob Aaltonen, Norrgardsgatan 25, Hanko, Finland (10940)

Filed June 10, 1975, Ser. No. 585,651
Claims priority, application Finland, June 13, 1974, 1812/74; June 13, 1974, 1813/74
Int. Cl.² B05B 9/00
U.S. Cl. 239—142 14 Claims



1. Apparatus for coating objects with a coating material, such as lime, comprising a mixing tank for containing the coating material, an intermediate tank connected to said mixing tank, means for feeding the coating material from said mixing tank to said intermediate tank and means for spraying the coating material fed to said intermediate tank on the subject to be coated, said feed means including an impeller positioned in said mixing tank, a tunnel member at least partly encircling said impeller and having upper and lower ends, closure means for partly closing the lower end of said tunnel member and a feed pipe extending from the lower, partly closed end of said tunnel member to said intermediate tank.

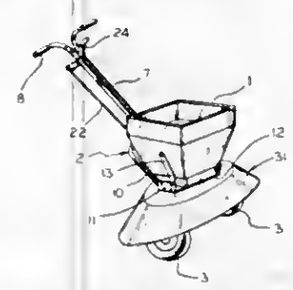
4,032,074

MATERIAL SPREADER

James Dalton Amerine, Marysville, Ohio, assignor to O. M. Scott & Sons Company, Marysville, Ohio

Filed Nov. 24, 1975, Ser. No. 634,906
Int. Cl.² A01C 17/00
U.S. Cl. 239—685 7 Claims

1. In a spreader for particulate material adapted for advance along a given direction having means for discharging said particulate material downwardly from said spreader and means in association with said discharge means for broadcasting said discharged material in a generally radial path surrounding the axis of discharge, the improvement comprising deflection means surrounding said broadcast means tapering downwardly and outwardly, the width of said deflection means along the direction of advance being less than the width along a direction transverse thereto, said deflection means being curved with its radius of curvature being smaller at the transverse end portions thereof, said deflection means aligned to intersect the path of said broadcast material and deflect the material downwardly to form a series of patterns of controlled configuration as the spreader is advanced, the density of said pattern being substantially uniform along the major portion thereof, the density along the transverse edges thereof being less than the major portion.

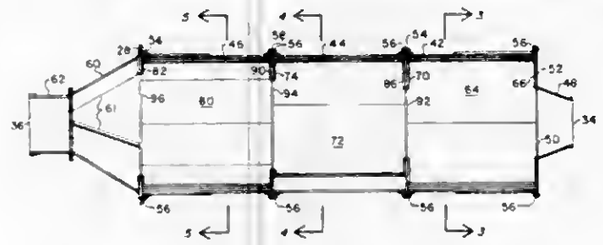


4,032,075

MULTI-CHAMBERED SCRUBBER HAVING POLYGONAL CROSS-SECTION

Clarence C. Tyer, Sr., 6100 Winding Way, Carmichael, Calif. 95608

Filed Aug. 16, 1976, Ser. No. 714,532
Int. Cl.² B02C 17/06
U.S. Cl. 241—45 18 Claims



1. A multi-chambered scrubber apparatus comprising:

a frame;

a drive means; and;

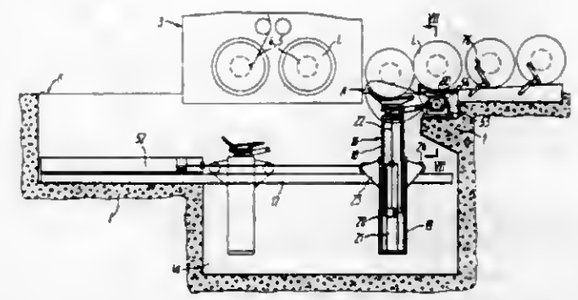
a scrubber drum supported by said frame and adapted to be rotated by said drive means, said scrubber drum having a material input port and an output port and including between said input and output ports at least a first and second scrubber section each having a first and a second interior polygonal scrubber chamber, said first and second polygonal scrubber chambers including a first retainer ring therebetween having an opening therein smaller in area than the cross-sectional area of said first polygonal scrubber chamber.

4,032,076

APPARATUS FOR CONTINUOUS WINDING OF FILAMENT ON SPOOLS

Alzik Markovich Kogos, ulitsa F.Poletaeva, 24, korpus 2, kv. 50, Moscow; Flegont Andreevich Kolchanov, prospekt Lenina, 14, kv. 14, Balashikha-1 Moskovskoi oblasti; Adolf Alexeevich Gnedov, ulitsa Lukhovitskaya, 3, kv. 5, Moscow; Valery Alexandrovich Vinogradov, Ryazansky prospekt, 91, kv. 77, Moscow; Mark Abramovich Labkovsky, Novogireevskoe shosse, 16, kv. 16, Moscow; Sergei Alexandrovich Filatov, Zeleny prospekt, 23/43, kv. 54, Moscow; Vladimir Mikhailovich Kolesov, ulitsa Kirova, 89, kv. 10, Alma-Ata; Oleg Kirillovich Khrapchenkov, ulitsa Butyrskaya, 3, kv. 45, Moscow, and Alexandr Nikolaevich Semes, Kvartal 20, 89, kv. 10, Shelikhov Irkutskoi oblasti, all of U.S.S.R.

Filed June 28, 1976, Ser. No. 700,140
Int. Cl.² B65H 67/04
U.S. Cl. 242—25 A 11 Claims



1. An apparatus for continuous winding of filament on spools comprising: a winder means; pairs of centers each consisting of a movable center and a fixed center for parrallel arrangement of spools, said pairs of centers being incorporated in said winder means; a traversing mechanism of said winder means; a mechanism of said winder means for transferring filament from one spool to another; a device for feeding spools to and removing them from the centers, said device being in a force transmitting connection with said winder means; a carriage of said device for feeding spools to and removing them from the centers, said carriage having a top part and a bottom part; guides, said bottom part of the carriage being mounted in the guides, the guides extending under and normally to the centers; the bottom part of said carriage being made vertically split; the top part of said carriage consisting of three superposed plates of which a first plate is mounted on the bottom part of said carriage, an intermediate plate is articulated with a side thereof to the first plate for rotation in a vertical plane extending parallel with said guides of the carriage and supports guide members extending parallel with the pivot of the articulation for mounting a third plate which is used for accommodating the spools and is in a force transmitting connection with one of the movable centers when the part of the carriage is in the uppermost position; means for locking the position of the third, top plate of the carriage relative to the intermediate plate thereof; a feeding platform for feeding an empty spool to said carriage; a receiving platform for receiving a loaded spool from said carriage.

4,032,077

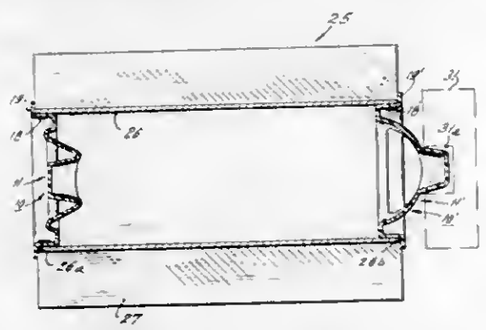
COLLAPSIBLE SPINDLE ASSEMBLY FOR TOILET TISSUE ROLLS AND THE LIKE

Daniel S. Baselice, 639 Redman Ave., Haddonfield, N.J. 08033

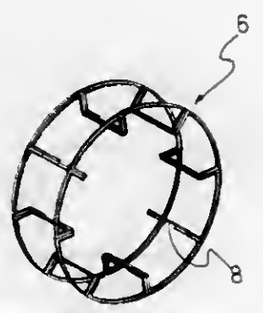
Filed Aug. 20, 1976, Ser. No. 716,083
Int. Cl.² B65H 19/00
U.S. Cl. 242—55.2 8 Claims

1. Mounting means for toilet tissue rolls and the like, said rolls being typically comprised of a hollow cylindrical-shaped core having an elongated toilet tissue sheet of indeterminate length wound therearound, said mounting means being a pair of members each comprised of:

a single thin light-weight one-piece member comprised of a rim portion and a trunion portion;
said rim portion having an outwardly-directed flange integrally joined at one end thereof and having an inwardly-directed continuous flange integrally joined at the opposite end thereof;
said trunion portion being comprised of a hollow truncated conical-shaped shell, the narrow end thereof being remote from said rim portion, and the wider end thereof being closer to said rim portion;
at least first and second spanning ribs, each of said ribs having a first end integrally joined to said inwardly directed flange having opposite ends integrally joined to the wider end of said trunion portion;
said one-piece member being made of a suitable resilient plastic material, the thickness of said spanning ribs being selected so as to enable the spanning ribs to bend in other to permit the trunion portion to collapse towards said rim portion and being further adapted due to the inherent resilience of the material to enable, by virtue of the plastic memory of the material, to assume its natural condition, whereby the trunion portion is moved away from the rim portion as the spanning ribs assume their natural unbent condition.



4,032,078
REEL FOR THE STORAGE OF WIRE OR THE LIKE
Guido Van de Loock, Hemiksem, Belgium, assignor to S. A. Bekaert-Cockerill, N.V., Hemiskem, Belgium
Filed May 13, 1976, Ser. No. 686,007
Claims priority, application United Kingdom, May 20, 1975, 21682/75
Int. Cl.² B65H 75/20
U.S. Cl. 242—77.2 7 Claims

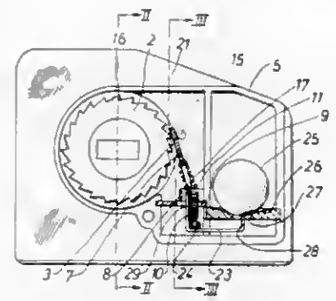


1. A reel for the storage of wire or the like which comprises a number of elements each made of a single piece of metal wire bent to form a segment of the heel and all joined together in a circular array, each of said elements being formed to provide two mutually opposite portions of respective rims of the reel, each of said rim portions having a side member extending radially inwardly from each of its ends, and a transverse member extending between each opposed pair of said side members, at least one of such transverse members constituting a bearing member of a ring of bearing members for the wire to be wound on the reel, the elements being spot-welded together.

4,032,079
FISHTAPE HOLDER
Robert W. Weeks, 12233 Ashworth North, Seattle, Wash. 98133
Filed Aug. 20, 1975, Ser. No. 597,650
Int. Cl.¹ B65H 75/36, 75/40
U.S. Cl. 242—85.1 6 Claims

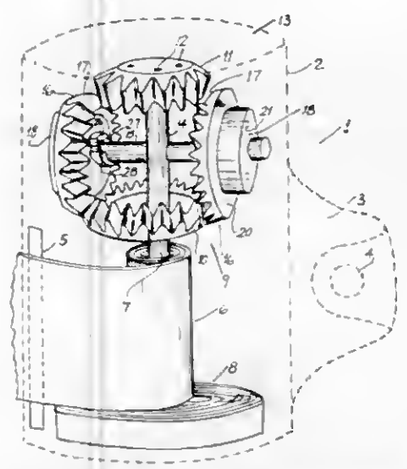
1. A fishtape holder, comprising:
a section of tubing defining a segment of an annular ring, said tubing having a sufficiently large diameter to permit a length of fishtape to be looped therethrough at least several times; and
guide means attached to said section of tubing, said guide means having an opening therethrough for receiving the fishtape, said guide means functioning as a guide for the removal or retrieval of the fishtape relative to said fishtape holder, one end of the fishtape being initially inserted through said guide means, looped through said tubing, and then secured to a point along the length of the fishtape to form a single fishtape coil of selected diameter, said fishtape holder being held stationary in operation so that the single fishtape coil rotates continuously through said section of tubing as the remainder of the fishtape is pulled away from or retrieved onto said fishtape holder.

4,032,080
LOCKING DEVICE FOR A SAFETY BELT OF WINDING-UP TYPE INTENDED FOR VEHICLES
Stig Martin Lindblad, Urbanisation Alblr 1, Cyndad de Elda, Casa 36, Alfas del Pl (Alicante), Spain
Filed July 7, 1975, Ser. No. 593,728
Claims priority, application Sweden, July 8, 1974, 74089327
Int. Cl.² A62B 35/00; B65H 75/48
U.S. Cl. 242—107.4 A 2 Claims



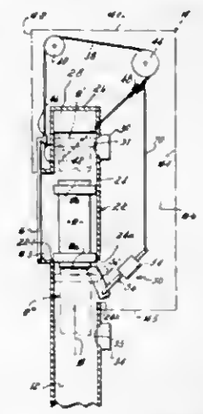
1. Locking device for a safety belt of the winding-up type for vehicles having a rotatable shaft, means for attaching the safety belt to the shaft, and a spring biased said shaft to rotate in one direction, against which bias said belt can be unwound, said device comprising a ratchet wheel connected to said shaft to rotate therewith, pawl means pivotable around a pivoting axis between a releasing position disengaged from the ratchet wheel and a locking position engaging the ratchet wheel in order to impede the rotation thereof, said pawl means including a pivotable member and spring means having one end connected to said pivotable member at a distance from said pivoting axis to bias same, a fixed support, the other end of said spring means carried by said fixed support, a movable element having an actuating portion operably associated with an intermediate portion of said spring means adapted to displace said intermediate portion of said spring means, giving same a different bending condition, and an acceleration sensing inertia body movable between a resting position and an activated position, said activated position being taken under the influence of acceleration forces exceeding a predetemined value, said movable element having a sensing portion sensing the position of said inertia body, said inertia body in one of its positions biasing the movable element via its sensing portion to a first position, said spring means by means of its intermediate portion biasing said movable element via its actuating portion to a second position, and said intermediate portion of the spring means being moved between a first and a second position, corresponding to the two positions of the inertia body, whereby the motion between the two positions of the intermediate portion of said spring means results in that the direction of the spring means bias force acting on said pivotable member of the pawl means passes from one side to the other side of said pivoting axis, thereby changing the direction of the torque acting on said pivotable member, to bias the pawl means to move alternatively into said releasing and into said locking position.

4,032,081
LOCKING DEVICE FOR SAFETY BELT
Thomas Joseph Murnane, 2, Maymount, Friar's Walk, Cork, County Cork, Ireland
Filed June 16, 1976, Ser. No. 696,807
Claims priority, application Ireland, June 16, 1975, 1351/75
Int. Cl.² A62B 35/02; B75H 75/48
U.S. Cl. 242—107.4 B 7 Claims



1. A locking device for a self-coiling vehicle safety belt, of the type having a mounted coil spindle attachable to the vehicle, which device comprises
a. a spindle gear keyed to the coil spindle;
b. a fixed gear on the coil spindle mounting or an extension thereof;
c. at least one planetary gear adapted to mesh with the fixed gear and with the spindle gear;
d. portions of the planetary gear defining a toothless segment thereof, the toothless segment determining a resting rotary attitude of the planetary gear out of engagement with the fixed gear only;
e. means for biasing the planetary gear into the resting rotary attitude against all torques below a predetermined threshold magnitude; and
f. stop means for locking the planetary gear against rotation in excess of a predetermined angle of rotation from the resting rotary attitude thereof, in the direction corresponding to withdrawal of the safety belt.

4,032,082
COMBINED TRANSMIT AND RECEIVE PNEUMATIC CARRIER TERMINAL WITH MECHANICAL CARRIER CATCH
Adam Weissmuller, 27 Dale Ave., Pompton Plains, N.J. 07444
Filed Nov. 3, 1975, Ser. No. 628,111
Int. Cl.² B65G 51/32
U.S. Cl. 243—19 13 Claims



1. A terminal for sending and receiving carriers pneumatically propelled through a combined system send/receive tube, comprising:
a stationary terminal tube section having
a. a lower open end communicating with said combined send/receive tube,
b. an upper end, and
c. a carrier insertion and removal opening intermediate said ends normally closed by a door,
a carrier catch pivotally mounted for movement between
a. an inner position projecting into said terminal tube section for supporting the lower end of a received carrier, and
b. an outer position permitting unobstructed bidirectional passage of a carrier between said combined send-/receive tube and said terminal tube section,
first means interconnected between said catch and door for biasing said catch to said inner position when said door is closed for supporting a received carrier in said terminal tube section while permitting momentary movement of said catch to said outer position during receipt of a carrier in the course of momentary movement thereof past said catch, and second means for biasing said catch to said outer position when said door is open allowing unobstructed insertion of a carrier into said terminal tube section for transmission via said tube, said combined send/receive second means being insufficient to bias said catch to said outer position when said door is open if a carrier is supported by said catch.

4,032,083
AUTOMATIC GAIN CONTROL FOR STABILITY AUGMENTATION SYSTEMS
Joseph R. Maciolek, Newtown, Conn., assignor to United Technologies Corporation, Hartford, Conn.
Filed Apr. 12, 1976, Ser. No. 675,707
Int. Cl.² B64C 11/44
U.S. Cl. 244—17.13 15 Claims

1. A method for varying the operation of a stability augmentation system of an aircraft comprising the steps of:
calculating the position of a first control member as a function of a presumed gross weight and the actual value of a first aircraft dynamic parameter;
calculating the position of a second control member as a function of a preselected center of gravity condition and the actual value of said first aircraft dynamic parameter;
detecting the actual positions of the first and second control members;
comparing the actual and calculated positions of the first control member to determine whether actual gross weight has varied from the presumed value;

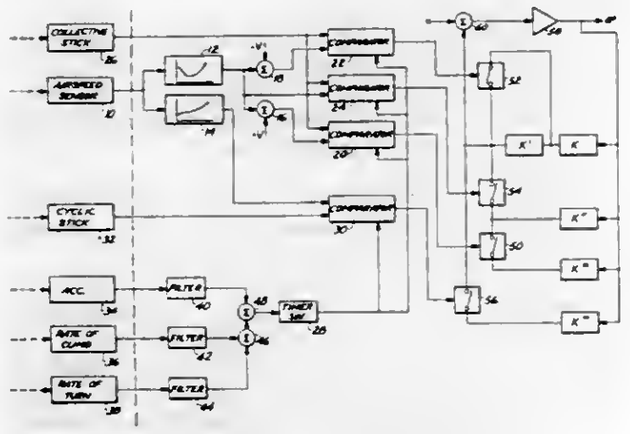
comparing the actual and calculated positions of the second control member to determine whether the actual center of gravity has deviated from the preselected position; and

adjusting the effect of the stability augmentation system on aircraft operation whenever the actual gross weight exceeds the presumed value or the actual center of gravity has deviated from the preselected position.

5. In a stability augmentation system for a rotary wing aircraft, the stability augmentation system including a power amplifier for enhancing control signals delivered thereto, the stability augmentation system receiving input signals commensurate with collective pitch control stick position, cyclic pitch control stick position and airspeed, the improvement comprising:

first function generator means, said first function generator means being responsive to the airspeed signal for generating an output signal commensurate with collective pitch stick position for the existing airpseed and a preselected aircraft gross weight;

second function generator means, said second function generator means being responsive to the airspeed signal for generating an output signal commensurate with cyclic pitch stick position for the existing airspeed and neutral aircraft center of gravity;



first comparator means, said first comparator means receiving the collective pitch stick position signal from said first function generator and the actual collective pitch stick position signal, said first comparator means providing an output signal when the actual collective pitch stick position varies in a first direction from the position corresponding to the output signal of said first function generator, said first comparator means output signal being indicative of actual gross weight exceeding the preselected gross weight;

second comparator means, said second comparator means receiving the cyclic pitch stick position signal from said first function generator means and the actual cyclic pitch stick position signal, said second comparator means providing an output signal when said actual cyclic pitch stick position varies from the cyclic pitch position corresponding to the output signal of said second function generator means, the output signal of said comparator means being indicative of a deviation of aircraft center of gravity from the neutral position; and

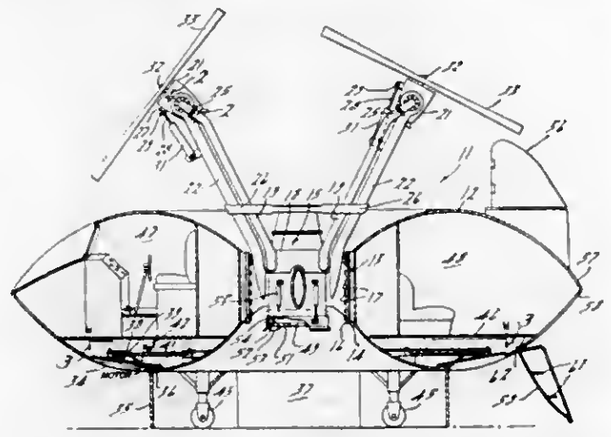
means for varying the gain of the stability augmentation system power amplifier in response to an output signal from either of said first or second comparator means.

4,032,084

HELICOPTER TYPE AIRCRAFT WITH GROUND EFFECT STRUCTURE

John O. Black, 18094 Parkside, Detroit, Mich. 48221

Filed Mar. 11, 1976, Ser. No. 666,080
Int. Cl.² B64C *27/08*
U.S. Cl. 244—17.23 **7 Claims**



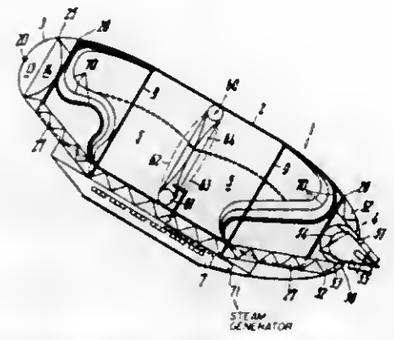
1. In a doughnut-shaped aircraft, an aircraft body, a jet engine extending in a vertical direction supported by the center of said body, said jet engine having a combustion chamber from which gas is expelled downwardly at the exhaust end, conduit means extending upwardly from opposite sides of said chamber, a pair of gas turbines supported by the upper ends of said conduit means in a manner to be driven by the gas from said chamber, a propeller supported and driven by each said turbine, and means for adjusting the position of said turbines for changing the direction of flow of air produced by said propellers.

4,032,085

DIRIGIBLE, ESPECIALLY NON-RIGID DIRIGIBLE

Hermann E. R. Papst, Karl-Maier-Strasse 1, D-7742 St. Georgen, Schwarzwald, Germany

Continuation-in-part of Ser. No. 452,675, March 19, 1974, abandoned. This application Oct. 6, 1975, Ser. No. 620,193
Claims priority, application Germany, Mar. 21, 1973, 2313919
Int. Cl.² B64B *1/58*
U.S. Cl. 244—30 **12 Claims**



1. A non-rigid dirigible comprising:

a non-rigid inflatable body member having a bow section and a stern section;

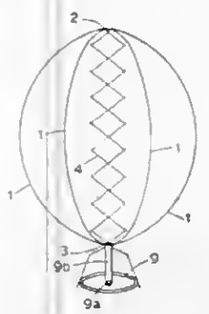
partition means secured to the body member so as to define gas cells in each section which can be pressurized to a higher pressure than the maximum dynamic pressure produced at the bow and the stern sections under flight conditions, the exterior of the body member being inherently subjected under flight conditions to a pressure zone at the bow and the stern portions and to a suction zone intermediate the pressure zones with a pressure transition zone between each pressure zone and the suction zone, the partition means being disposed at each pressure transition zone, at least one of the partition means further comprising an annular tubular ring member engaging the inner wall of the body member and bulkhead means adapted to be loaded by tension and in engagement with the ring member.

4,032,086

AEROSTATS AND AQUASTATS

William Douglas Cooke, The Rowans, Love Lane, Iver, Buckinghamshire, England

Filed Oct. 20, 1975, Ser. No. 624,045
Int. Cl.² B64B *1/58, 1/40*
U.S. Cl. 244—30 **5 Claims**



2. A device for providing buoyancy in a fluid when submerged in the fluid, said device comprising a sealed envelope of flexible material impervious to the passage of gas therethrough, said envelope being evacuated so as to contain at most gas at a predetermined pressure substantially lower than that of the fluid in which the device is buoyant, a frame comprising a plurality of resilient elongated rods each extending along a portion of the envelope, first means connecting said rods together at first ends thereof, second means connecting said rods together at second ends thereof, a lazy-tongs linkage comprising a series of pairs of rigid links, the links in each pair being pivoted together at their centres and the ends of each link in each such pair being pivoted to links respectively in adjacent pairs in said series, a first pair of further links pivoted to said first connecting means and respectively connected to the ends of the links at one end of said series, and a second pair of further links pivoted to said second connecting means and respectively connected to the ends of the links at the other end of said series, diverging extensions on said second pair of further links projecting outside said envelope and controlled mechanical means operative on said extensions to adjust the divergence thereof and consequently the length of said lazy-tongs linkage, whereby opposed forces respectively acting on said first and second means produce simultaneous changes in the curvature of said rods, said rods being operative on said envelope when increasing their curvature to distend said envelope from a condition in which it encloses a comparatively small volume to a condition in which it encloses a comparatively large volume thereby increasing the buoyancy of the device in relation to the fluid.

4,032,087

AIRCRAFT SPOILER SYSTEM

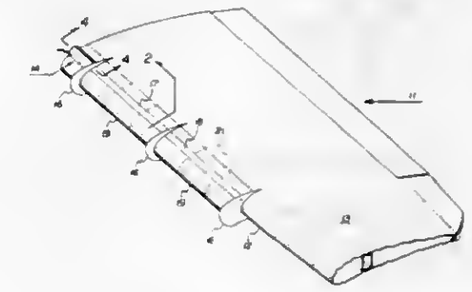
Prentiss B. Cleaves, 4542 Norma Drive, San Diego, Calif. 92115

Continuation of Ser. No. 550,354, Feb. 18, 1975, abandoned. This application June 3, 1976, Ser. No. 692,360
Int. Cl.² B64C *3/58*
U.S. Cl. 244—214 **3 Claims**

3. An aircraft spoiler system comprising:

a retro-fit mounting having a geometry of a predetermined aircraft wing leading edge, said retro-fit mounting being fixedly attached to the leading edge of an aircraft wing providing an extension thereof;

at least one spoiler rod having one substantially flat surface portion, said at least one spoiler rod disposed within said retro-fit mounting and rotatably carried thereby, said



spoiler rod having a geometry for being flush with the surface of said retro-fit mounting in one extreme rotative position; and

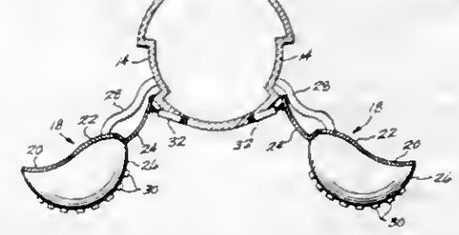
a control system disposed within said retro-fit mounting for controlling the axial rotative position of said at least one spoiler rod.

4,032,088

OUTRIGGER AIR BAG LANDING SYSTEM

John Jerome McAvoy, Seattle, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Apr. 8, 1976, Ser. No. 675,004
Int. Cl.² B64C *25/56*
U.S. Cl. 244—100 A **2 Claims**



1. An air bag landing system for an aircraft having a fuselage comprising:

a. rigid member means having a first, second and third portion mounted to each side of the fuselage, said first, second and third portions being pivotally connected so that said first and second portions are pivotally connected to each other, said second and third portions are pivotally connected to each other, and said third portion is pivotally mounted to the fuselage to allow folding of said portions;

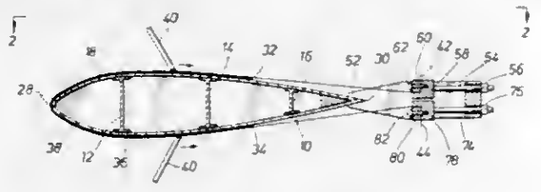
b. inflatable bag means sealably mounted to the underside of said rigid member means;

c. inflating means for inflating said inflatable bag means whereby said inflatable bag means is able to cushion the aircraft at landing;

d. containment means for containing said rigid member means and said inflatable bag means during cruise operation so that said rigid member means forms a portion of the external surface of the fuselage while the inflatable bag means is completely within said containment means; and

e. actuating means connected to the aircraft and to said rigid member means for extending said rigid member means and said inflatable bag means during landing and retracting said rigid member means and said inflatable bag means during cruise operation.

4,032,089
SURFACE FINISHING
Jack A. Kinzler, Seabrook; James T. Heffernan, Friendswood; Leroy G. Fehrenkamp, Houston, and William S. Lee, Friendswood, all of Tex., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.
Filed Apr. 16, 1975, Ser. No. 568,541
Int. Cl.² B64C 1/00; B32B 3/00
U.S. Cl. 244—123 5 Claims



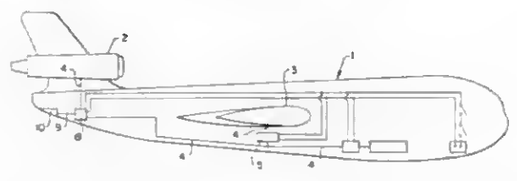
1. A smooth-surfaced airfoil comprising
a. an airfoil structure having a metal skin with surface irregularities,
b. an outer layer of a tensioned sheet of preformed film material of a controlled uniformed thickness in the range of from 0.002 inches to 0.030 inches, said film material being lightweight, flexible, and substantially inelastic, and
c. an adhesive/filler layer disposed between and bonding together said metal skin and said outer layer of film material, said adhesive/filler layer being of a solidhomogeneous material of uniform density and of a varying thickness from an amount just sufficient to act as an adhesive, such amount being less than the thickness of the outer layer, to an amount just sufficient to fill in said surface irregularities.

4,032,090
METHOD FOR DEICING AIRCRAFT
Walter E. Thornton-Trump, 108 Bellvue Drive, Beaver Lake, Plattsmouth, Nebr. 68048
Filed July 21, 1975, Ser. No. 597,490
Int. Cl.² B64D 15/10
U.S. Cl. 244—134 C 6 Claims

3. A method of de-icing aircraft and anti-icing the same to prevent buildup of ice and snow thereon comprising the steps of:
de-icing said aircraft by heating a de-icing solution substantially comprising water when the atmospheric temperature is at or above 20° F, said solution being heated to a temperature within the range of about 160° F to about 190° F and directing the said de-icing solution toward the skin of said aircraft in a concentrated flow to maximize the heat transfer of said heated solution to said skin and to also wash away any snow and ice that is present thereon;
anti-icing said aircraft by spraying a foglike spray to provide said skin with a thin dust coat with an anti-icing solution substantially comprising water and a predetermined low percentage of about 30% glycol in sufficient quantity that run off of said anti-icing is almost eliminated;
the combination of said de-icing and anti-icing steps resulting in virtually no run off of glycol onto the ground.

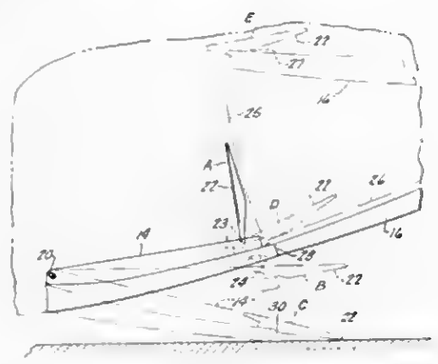
4,032,091
FUEL LINE EVACUATION SYSTEM
Thomas J. Reddy, Mentor, Ohio, assignor to Thomas J. Reddy, Trustee, Mentor, Ohio
Filed Mar. 5, 1976, Ser. No. 664,308
Int. Cl.² B64D 37/32; A62C 1/10
U.S. Cl. 244—135 R 11 Claims

1. A fuel line evacuation system for aircraft including a fluid fuel operable engine, a tank for the fuel, and a fuel line connecting the tank to the engine, said system comprising:
means providing a vent for said fuel line;
a vent control valve means in said fuel line near the engine and normally in a first operative position in which, concurrently, the vent control valve means admits fuel to the engine and prevents the escape; of fuel from the vent, and movable to a second operative position in which, concurrently, the vent control valve means stops the admission of fuel to the engine and vents the fuel line through said vent;
a tank control valve means near the tank and normally in a first operative position in which the tank control valve means connects the tank to said fuel line, and movable to a second operative position in which the tank control valve means blocks the flow of fuel from the tank to said fuel line;
a pressurized source of evacuation fluid;



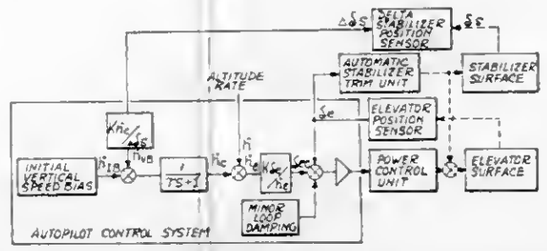
an evacuation control valve in said fuel line in advance, in the normal direction of flow of fuel through said fuel line, of both of said valve means and normally closed for preventing the discharge of evacuation fluid from said source into said fuel line, and movable to an open position in which it admits said evacuation fluid into said fuel line; and
sequence control means connected to both of said valve means and said evacuation valve and operable for causing sequential operation thereof in a sequence such that the tank control valve means is closed not later than at the time said vent control valve means and the evacuation control valve are opened.

4,032,092
RAMP WITH INTEGRAL TOES
John H. Day, Pacific Palisades, Calif., assignor to McDonnell Douglas Corporation, Long Beach, Calif.
Filed Dec. 22, 1975, Ser. No. 643,506
Int. Cl.² B64C 1/14
U.S. Cl. 244—137 R 9 Claims



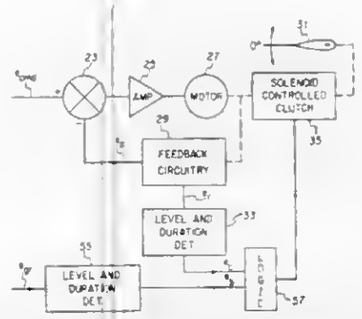
1. In an aircraft including a movable loading ramp with at least one ramp toe having a hinged connection for rotation with respect to said ramp, the improvement comprising:
first abutment means connected to said aircraft;
second abutment means connected to said ramp;
third abutment means connected to said toe positioned to engage said second abutment means and to restrict rotation in a first direction of said toe with respect to said ramp when said toe is in a first predetermined position with respect to said ramp; and
an actuating crank operatively connected to said toe having an end out of alignment with said hinged connection, said end being positioned to engage said first abutment means as said ramp is moved from an open position to a closed position and to disengage said first abutment means as said ramp is moved from a closed position to an open position, whereby said actuating crank rotates said toe when said end is in contact with said first abutment means and said ramp is moving.

4,032,093
ADAPTIVE ENERGY MANAGEMENT FOR VERTICAL SPEED CONTROL OF AN AIRCRAFT
Jimmie Harold Bonne, and Robert D. Simpson, both of Bellevue, Wash., assignors to The Boeing Company, Seattle, Wash.
Filed June 27, 1975, Ser. No. 591,253
Int. Cl.² G05D 1/08
U.S. Cl. 244—180 1 Claim



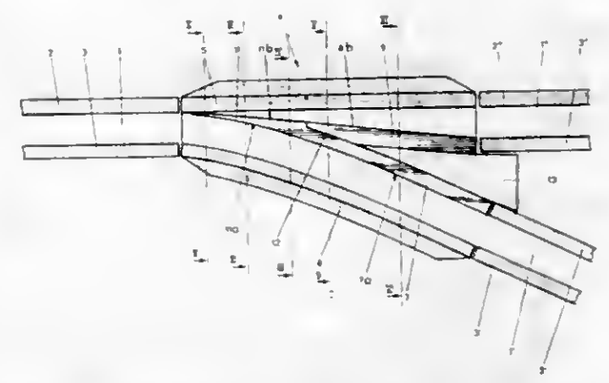
1. In combination in an aircraft flight control system having means for processing signals (h_{VB}) representative of maximum vertical speed bias, the improvement comprising:
feedback circuit means including delta stabilizer position sensing means responsive to a stabilizer position of an aircraft for providing a delta stabilizer position signal $\Delta\delta_s$, said feedback circuit means further having an operand $Kh_c/\Delta\delta_s$ for providing said signals (h_{VB}) representative of maximum vertical speed bias.

4,032,094
CONTROL OF POSITIONING SYSTEM AUTHORITY OVER AIRCRAFT CONTROL SURFACES AS A FUNCTION OF SURFACE MOVEMENT RATE
Charles P. Morgan, Marion, and Jean L. Lamy, Cedar Rapids, both of Iowa, assignors to Rockwell International Corporation, El Segundo, Calif.
Filed May 19, 1976, Ser. No. 687,588
Int. Cl.² G05D 1/00
U.S. Cl. 244—194 8 Claims



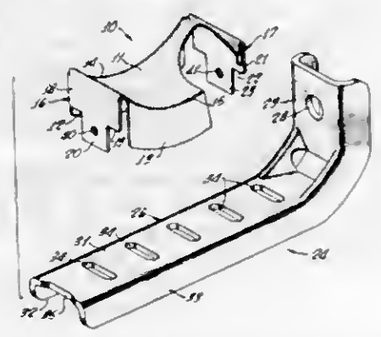
1. A system for controlling the movement of an aircraft flight control surface comprising:
first means for positioning said control surface in accordance with an input command signal, and providing a signal S_a whose amplitude is indicative of the instantaneous rate of control surface movement,
second means comprising level and duration detecting means for providing a signal S_b which indicates when S_a has continuously exceeded a predetermined amplitude A_1 for at least a predetermined time Δ_1, and
third means responsive to S_b for reducing the authority of said first means over said aircraft control surface when S_a has continuously exceeded said predetermined amplitude A_1 for at least said predetermined time Δ_1.
6. A method for controlling the movement of an aircraft flight control surface comprising:
providing means for positioning said control surface in accordance with an input command signal,
providing a signal S_a whose amplitude is indicative of the instantaneous rate of control surface movement,
providing a signal S_b which indicates when S_a has continuously exceeded a predetermined amplitude A_1 for at least a predetermined time Δ_1, and
reducing the authority of said positioning means over said aircraft control surface when S_a has continuously exceeded said predetermined amplitude A_1 for at least said predetermined time Δ_1.

4,032,095
CENTRAL GUIDE SYSTEM FOR VEHICLES
Daniel Ferbeck, Issy les Moulineaux; René Groznykb, Maisons Laffitte, and Patrick de la Ville de Rigne, Sevres, all of France, assignors to Englns Matra and de Dietrich & CIA, both of Paris, France
Filed Apr. 9, 1976, Ser. No. 675,474
Claims priority, application France, Apr. 14, 1975, 75.11586
Int. Cl.² E01B 7/02
U.S. Cl. 246—442 4 Claims



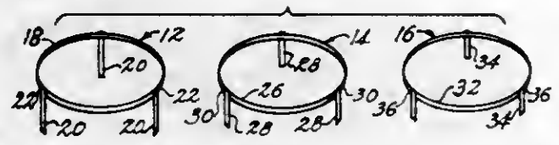
1. A rail points system for a rail turn-out for connecting one track, having two guard rails defining a flange way, selectively to either of two other tracks, each of the other tracks comprising two guard rails defining, respectively, two flange ways, said points system comprising a point and separate matching point respectively having heel ends respectively aligned with a rail of each of the other two tracks, said point and matching point having opposed side portions engaged with one another, said point and matching point being connected for lateral movement in unison between a first position where said one track is connected to one of the other two tracks and a second position where said one track is connected to the second of said other two tracks, and said connecton being such that limited longitudinal sliding movement occurs between the point and matching point during said lateral movement.

4,032,096
CURVED BRACKET ADAPTER
Frederick Perrault, 2644 W. 225th St., Torrance, Calif. 90505, and Raymond E. Perrault, 2404 Colt Road, Rancho Palos Verdes, Calif. 90274
Filed Mar. 3, 1976, Ser. No. 663,629
Int. Cl.² F16L 3/08
U.S. Cl. 248—73 19 Claims



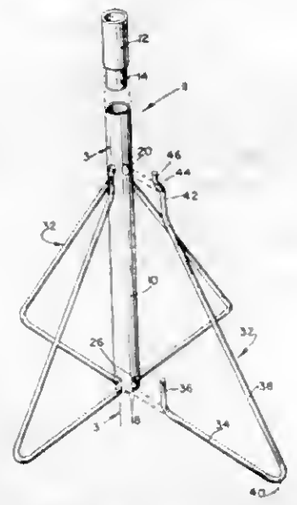
1. An adapter for providing a curved supporting surface on a bracket comprising
a member having
an arcuate wall having side and end edges, a convex surface and a concave surface,
a side flange adjacent either of said side edges and extending outwardly from said convex surface of said arcuate wall,
and an end flange adjacent either of said end edges and extending outwardly from said convex surface of said arcuate wall,
said end flanges having transverse edges intermediate said arcuate wall and the outer edges thereof.

4,032,097
NESTABLE POT STANDS
Thomas H. Dwyer, 3711 Roswell Road, Suite 255, Atlanta, Ga. 30342
Filed July 26, 1976, Ser. No. 708,589
Int. Cl.² A47F 7/00; A47G 29/00
U.S. Cl. 248—146 2 Claims



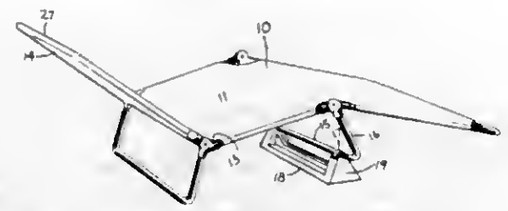
1. In a pot stand arrangement: a plurality of individual pot stands each comprising a circular support ring, and all of said support rings being of substantially the same diameter, each of said pot stands having a plurality of support legs mounted on the outside thereof and the legs of one stand being longer than the legs of any other stand, said pot stands being stackable with the support rings of one stand on top of another and with the stand having the longest legs being the lowermost stand and any other stand having the legs thereof outside of and extending down the outside of the ring of said lowermost stand, the inside surfaces of all legs on a stand being included in a cylindrical plane of larger diameter than the diameter of the rings whereby the legs of one ring fit outside the ring of another stand.

4,032,098
BASE FOR AN UPRIGHT FOR FORMING A STAND OR THE LIKE
Howard J. Marschak, 865 W. North Ave., Chicago, Ill. 60622
Filed Apr. 23, 1976, Ser. No. 679,860
Int. Cl.² F16M 11/32
U.S. Cl. 248—165 2 Claims



1. A base for a tubular upright which has an opening at the bottom thereof, a plurality of spaced openings in said upright positioned above the bottom of said upright, a plurality of leg members detachably secured to said tubular upright to support the upright in a vertical position, each of the leg members formed of wire having a substantially small diameter in cross section and having a base portion and an inclined portion extending upwardly of the base with the upper end of the inclined portion having a hooking end which engages the spaced openings in said tubular upright with said hooking end positioned inside said tubular upright to secure the upper end of said leg member to said upright, said base portion having an upwardly extending inner end substantially at right angles to said base portion, said bottom of said tubular upright having spaced slots, a connector insertable inside said tubular member from the bottom of the tubular upright and positioned above the bottom of the tubular upright, said connector having spaced lugs engaging said spaced slots to retain said connector in said tubular upright, said connector further having central openings to receive the upwardly extending inner ends of said legs, said base portions of said legs entering the spaced slots of said tubular upright below said connecting with the upwardly extending inner ends thereof extending through the central openings of said connector to secure the bottom of said legs to said connector and to said tubular member.

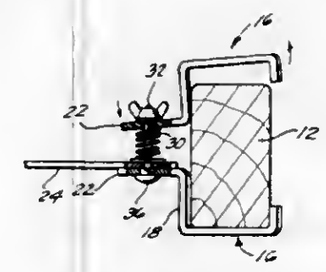
4,032,099
RECLINER PLATFORM
James Walton Maude, 52 Village St., Marblehead, Mass. 01945
Filed Feb. 9, 1976, Ser. No. 656,815
Int. Cl.² A45D 19/04; A47C 1/02
U.S. Cl. 248—188.2 1 Claim



1. A platform for elevating and supporting the front leg portion of a piece of furniture having a seat section, comprising

a base plate, side members rigidly attached at opposite ends of said base plate,
each of said side members having upwardly inclined, converging surface portions rising from said base plate and terminating in a support surface, said support surface being smoothly contoured to fit the shape of said front leg portion,
each of said inclined surface portions having a cavity located therein adjacent its respective support surface, and
each of said members further including a spring tempered retaining clip having off-set tabs received in the cavities of said side members, said support surface and said retaining clip receiving said front leg portion;
whereby said platform will automatically properly position itself under the front leg portion when the piece of furniture is manually raised, said platform being movable to an inactive position wherein the front leg portion is no longer elevated.

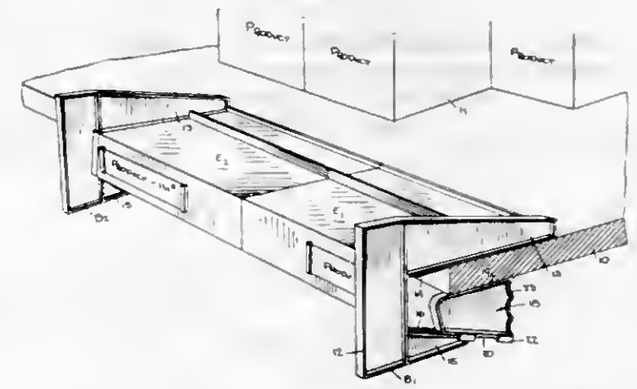
4,032,100
INSTANT SCAFFOLD AND PAINT CAN HOLDER
William J. Kaba, 320 E. 30 St., Paterson, N.J. 07504
Filed Mar. 11, 1976, Ser. No. 666,009
Int. Cl.² E06C 7/14
U.S. Cl. 248—211 12 Claims



1. A support device comprising a pair of opposed bracket members of substantially identical configuration adapted to receive a support post element therebetween, said bracket members each including a flange element extending outwardly therefrom and located in parallel relation to each other; a one piece generally L-shaped support bar having first and second angularly related legs; and means for pivotally securing said bar to said bracket members between said flange elements adjacent the juncture between said angularly related legs; said securing means including a pivot pin comprising a threaded bolt extending through said flange elements and said support bar, and a coil spring surrounding said bolt and having opposite ends respectively engaged between one of said flange elements and said support bar for biasing said flange elements apart and for holding said support bar adjacent the other of said flange elements whereby said bracket elements may be urged apart against the bias of said spring to permit adjustment of the position of the support device on said post; said bolt including a head portion located adjacent one of said flange elements on the side thereof opposite the support bar; and a nut threadably engaged with said bolt adjacent the other of said flange elements for selectively moving said flange elements towards each other against the bias of said spring.

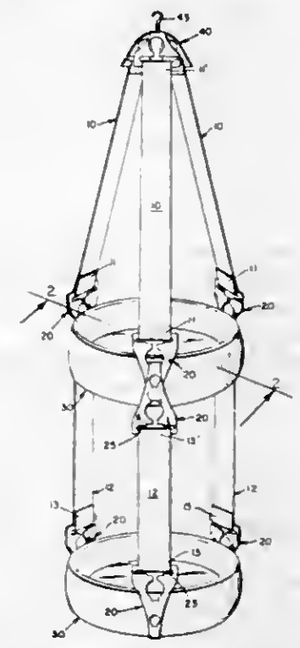
4,032,101
CLAMPING-TYPE BRACKET
Vincent J. Immordino, Flushing, N.Y., assignor to Display Originals, Inc., Flushing, N.Y.
Filed Mar. 31, 1976, Ser. No. 672,063
Int. Cl.² A47J 3/14
U.S. Cl. 248—225.4 5 Claims

1. A clamping-type bracket which is attachable without tools to a shelf or other boardlike member to support extension shelves or other objects, said bracket comprising:
A. a vertical beam whose position relative to the edge of the shelf is settable to a point abutting the edge and to points well spaced from the edge;
B. an upper arm extending laterally from the upper end of said beam, the upper arm being adapted to rest on the top surface of the shelf;
C. a lower arm extending laterally from the lower end of the beam in the same direction as said upper arm, the lower arm having a ramp formation whose sloping surface is treaded, the ramp extending below the undersurface of the shelf to define a free space converging toward the vertical beam; and



D. a wedge-shaped locking piece insertable into said free space to clamp said bracket to said shelf regardless of the set position of the beam relative to the shelf edge, said piece having an upper edge which engages the undersurface of the shelf and a treaded sloping lower edge which complements the sloping surface of the ramp, whereby when said piece is inserted it rides up the ramp until it is wedged into the free space, said ramp tread being provided on either bank with guide tabs to confine the locking piece to said ramp.

4,032,102
TRAY SUSPENSION MEANS
Linda S. Wolf, 44 Loucks Ave., Los Alto, Calif. 94022, and Roussel G. Smith, Jr., 1030 Pine St., Menlo Park, Calif. 94025
Filed May 6, 1976, Ser. No. 683,738
Int. Cl.² B42F 13/00
U.S. Cl. 248—318 13 Claims



1. A suspension structure comprising in combination:
a plurality of suspension members;
a plurality of couplers engaging said members, each of said

couplers has an elongated tapered portion terminating in a curl at the narrowest part thereof and has at least one generally circular aperture in the elongated portion and an elongated open-ended slit in the widest portion thereof in direction orthogonal to the elongated portion;

at least one tray having means integral therewith interlocking with said couplers; and

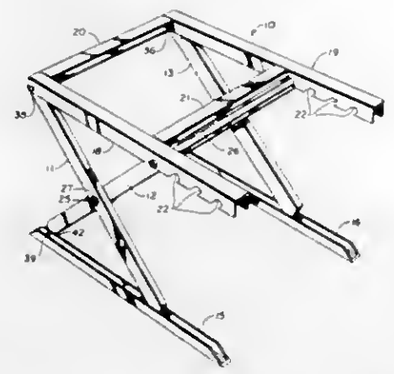
a hangar secured to said members and providing a common junction for at least some of said members.

4,032,103

ADJUSTABLE STAND

Warren A. Ehrichs, Moorhead, Minn., assignor to Ehrichs Manufacturing Company, Fargo, N. Dak.

Filed Mar. 17, 1976, Ser. No. 667,713
Int. Cl.² F16M 13/00
U.S. Cl. 248—421 6 Claims



1. An adjustable stand for supporting heavy loads at various heights, said stand comprising:

a platform comprising four channel shaped beam members rigidly fastened together in a generally rectangular configuration and having upper surfaces all disposed in a common plane to provide a flat supporting surface, two of said beam members being relatively long and extending longitudinally of said platform, the spaced side walls of said longitudinally extending channel shaped beam members extending downwardly and each having longitudinally spaced notches extending inwardly from the lower edges thereof,

two pairs of legs disposed adjacent opposite sides of said platform and formed of beams of generally rectangular cross-section, the legs of each pair being pivotally secured together adjacent the longitudinal midpoints thereof, the upper end of a first leg of each pair extending between the downwardly extending side walls of the adjacent longitudinally extending beam member of said platform and being pivotally secured thereto, the upper ends of the other legs of said pairs being joined by a rod member of a cross-sectional configuration such as to fit within pairs of said spaced notches, the height of said platform being dependent upon the location of the pair of notches in which said rod member is placed,

a pair of longitudinally extending base members of substantially the same length as the longitudinally extending beam members of said platform, said base members being formed of channel shaped members with upturned walls extending upwardly from the supporting surface, said upturned walls being spaced apart a distance at least as great as the width of the first legs of each pair of legs, the bottoms of such first legs being disposed between said upturned walls in slidable engagement with the bottom wall of the channel and the lower ends of the other legs of said pairs being pivotally secured to the side walls of said channels and of a length to engage a supporting surface, and

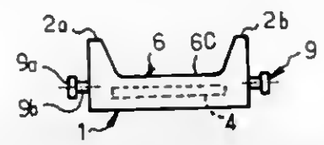
resilient means biasing said legs towards a position in which said platform is at its maximum height to tend to counterbalance the weight of said platform and said legs and hence facilitating the vertical adjustment of said stand.

4,032,104

INGOT CASTING MOULD IN PARTICULAR FOR FERROMANGANESE

Francis Joseph Antoine Pepin, Nancy, France, assignor to Societe Nouvelle des Acieries de Pampey, Neuilly-sur-Seine, France

Filed Feb. 24, 1976, Ser. No. 660,786
Claims priority, application France, Feb. 26, 1975, 75.06041
Int. Cl.² B22D 7/06
U.S. Cl. 249—114 4 Claims



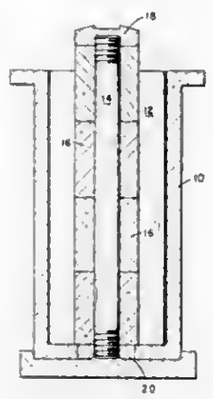
1. Ingot casting mould, consisting of a cast-iron body having a closed upstream end and a closed downstream end and successively comprising, from said upstream end to said downstream end at least one first section, the bottom wall of which is provided with a refractory material layer, a second section, having an inclined bottom rising progressively from the adjacent downstream edge of said layer, and a third section having a flat bottom connected to the downstream edge of the inclined bottom of said second section.

4,032,105

MOLD WITH IMPROVED CORE FOR METAL CASTING OPERATION

Veroe B. Gritzner, and Donald W. Hackett, both of Oak Ridge, Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Apr. 25, 1975, Ser. No. 571,445
Int. Cl.² B29C 1/06, 9/10, 9/24
U.S. Cl. 249—134 2 Claims



1. A mold for use in the process of casting molten metallic material into a hollow article of a desired configuration comprising a housing having a metal receiving receptacle therein and a core disposed within said receptacle for defining therewith an annulus in the desired configuration, said core being separable from the cast article and being characterized by having at least a portion thereof formed of carbon foam with said portion being contactable by the molten metallic material forming the article and possessing both sufficient strength to resist deformation during the introduction of the molten metallic material into said annulus and adequate yieldability to undergo deformation during the solidification and attendant contraction of the molten metallic material for inhibiting deleterious internal stresses leading to cracking or weak areas from occurring in the article during said contraction.

4,032,106

SELF-SEALING VALVE

Warren J. Schieser; John R. Sneeden; R. Alan Feltner, all of Columbus, and Curtis J. Bond, Marion, all of Ohio, assignors to Corco, Inc., Worthington, Ohio

Filed June 4, 1976, Ser. No. 693,220
Int. Cl.² F16K 7/06
U.S. Cl. 251—144 11 Claims

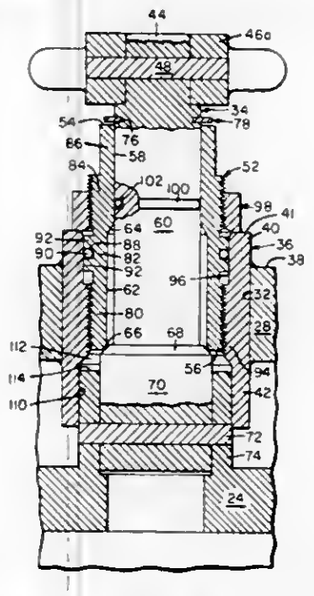
11. A self-sealing valve comprising a housing of annular form having an open inner end and an outer closed end, a flexible normally-convex diaphragm wall closing the outer end, an an inner valve member carried by said flexible wall for axial inward displacement upon applying inward pressure to said wall, said valve member having a convex outer wall complemental to said convex flexible wall and normally seating thereagainst, and an axially inwardly-extending sealing skirt carried by said convex wall of the valve member, said skirt having an outer frusto-conical sealing surface and said housing having an inner complemental frusto-conical sealing surface normally in sealing contact, and an outlet leading from the housing at said sealing surface thereof and normally covered by said skirt.

4,032,107

PLUG VALVE

Jay Robert Kelchner, Montour Falls, N.Y., assignor to The Hilliard Corporation, Elmira, N.Y.

Filed Apr. 29, 1976, Ser. No. 681,547
Int. Cl.² F16K 31/00
U.S. Cl. 251—296 8 Claims



1. in combination with a plug valve of the type including a valve casing having several ports communicating with a valve bore and a cover plate at one end of said valve casing having an opening therethrough, plug means within said valve bore for controlling flow through said ports, an operating stem connected coaxially to an upper end of said plug means and extending through said cover opening, handle means connected to an outer end of said stem for turning said plug to at least two rotational positions in said bore, and means associated with said handle means and said cover for stopping the rotation of said handle at said two rotational positions, the improvement which comprises means for lifting and lowering said plug from and into said bore including:

a sleeve member within said cover plate opening having a threaded inner surface portion and a smooth cylindrical inner surface portion and an upper end projecting above said cover plate;

said stem having a first annular stop means at an upper end portion thereof and a second annular stop means at a lower end portion thereof;

gland means rotatable within said sleeve threaded portion for selectively bearing upwardly against said first stop means to lift said plug means from said bore and thereafter downwardly against said second stop means to force said plug means into said bore;

means at the upper end of the gland for turning said gland;

locknut means rotatable on said gland and against said sleeve upper end for selectively engaging said gland to maintain said gland in said lowered position;

first annular sealing means between said gland and said cylindrical inner surface portion of said sleeve; and,

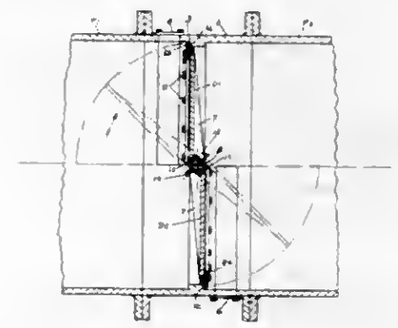
second annular sealing means between said gland and said stem.

4,032,108

BUTTERFLY VALVE ASSEMBLY

Edwin K. Klatner, McNaugher Heights, P.O. Box A-RD No. 4, Johnstown, Pa. 15905

Filed Sept. 17, 1975, Ser. No. 614,312
Int. Cl.² F16K 1/22
U.S. Cl. 251—306 1 Claim



1. In combination with spaced pipe ends of a fluid carrying line, a cylindrical housing bridging said pipe ends and interconnecting them and including metallic seats formed on the sides of a radially inwardly extending collar portion thereof, a butterfly type valve comprising a rotatably shaft, a sleeve surrounding and connected to said shaft, a pair of half disc of slightly smaller diameter than the inner diameter of said collar portion and integrally secured to diametrically opposite sides of said sleeve, said half discs being provided with integral fins disposed in parallel spaced relationship along said sleeve, extending from said sleeve to adjacent the perimeters of said half discs, and sealing half rings of greater diameter than said inner diameter and detachably connected to and projecting beyond the periphery of said half discs so as to form seals with said sides of said collar portion and a pair of arcuate cover plates, one upstream of said collar portion and the other downstream of said collar portion, each cover plate covering an arcuate hole of about 180° in said housing on substantially diametrically opposite sides of said butterfly valve to enable access thereto for replacing said sealing half rings.

4,032,109

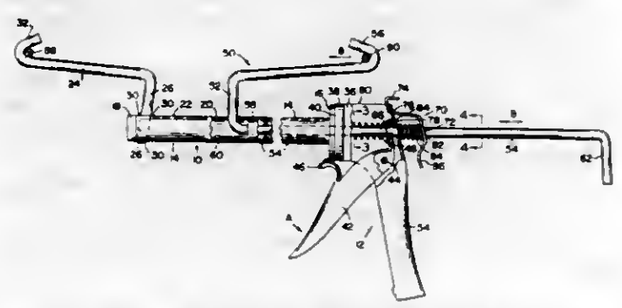
TENSIONING DEVICE

Toney H. Wilson, Rte. 2, Box 302D, Sarasota, Fla. 33577

Filed June 24, 1976, Ser. No. 699,781
Int. Cl.² B66F 1/00
U.S. Cl. 254—69 9 Claims

1. A tensioning device of the type primarily intended for use in stretching fence wire, said device comprising: body means including a hand-gripping portion attached thereto; trigger means movably connected in operative relation to said hand-gripping portion; stationary hook means formed on said body

means; movable tensioning means at least partially disposed within said body means; said body means further comprising a tube portion extending forward of said hand-gripping portion; said tube portion having a keyway formed along its longitudinal dimension so as to permit a predetermined segment of said movable tensioning means to extend therethrough; and prime



mover means disposed within said body means in operative, interconnecting relationship between said trigger means and said movable tensioning means, whereby actuation of said trigger means will cause said prime mover means to advance said movable tensioning means along a predetermined path toward said stationary hook means.

4,032,110

CABLE HAULING DEVICE COMPRISING SELF CLAMPING JAWS

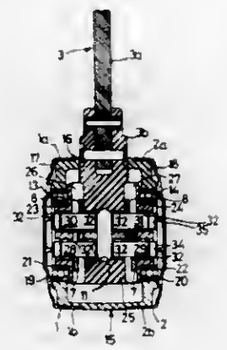
Johannes Augustus Rinio, 5, Promenade Venezia, Grand Siecle, Versailles, France (7800)

Filed July 24, 1975, Ser. No. 598,810

Claims priority, application France, July 25, 1974, 74.25837

Int. Cl.² B66D *1/00*

U.S. Cl. 254—76 **7 Claims**



1. Cable hauling apparatus, comprising:

housing means;

first and second clamping jaw means mounted within said housing in spaced, aligned relationship, and adapted when in an open condition to receive a cable therethrough;

a first pair of spaced, parallel connecting roda connected at the rear ends thereof to said first clamping jaw means;

a second pair of spaced, parallel connecting rods connected at the rear ends thereof to said second clamping jaw means;

backward control lever means connected with said first and second clamping jaw means, and arranged to extend from said housing means;

a head member mounted at the forward end of said housing means, and separate therefrom, said head member including a pair of lateral portions having aligned bores therethrough arranged concentrically about an axis extending transversely of said first and second jaw means, said lateral portions being connected at the forward end thereof, and being open at their rearward end facing said first and second jaw means;

a forward control lever, including a lower body portion receivable between said lateral portions of said head member, said lower body portion having axially aligned trunnions on the opposite sides thereof receivable within said aligned bores in said head member, whereby said forward control lever is mounted for pivotal movement about said transverse axis, said forward control lever further including a handle portion arranged to extend outwardly from said head member and said housing means; and

first and second, transversely extending pivot pin means carried by said lower body portion of said forward control lever, said first and said second pivot pins means being mounted within the outer diameter of said aligned trunnions on opposite sides of and spaced outwardly from said transverse pivot axis;

the forward ends of said first and said second pair of said parallel connecting rods being connected with said first and said second pivot pin means, respectively.

4,032,111

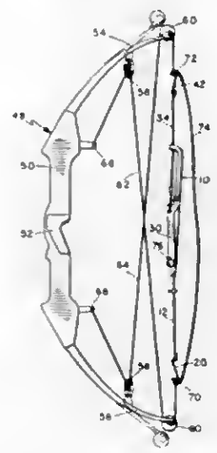
TOGGLE CLAMP FOR STRINGING COMPOUND BOW

Thomas Aubrey Garrett, 4520 Piute Place, San Diego, Calif. 92117

Filed Nov. 5, 1976, Ser. No. 739,289

Int. Cl.² B66F *3/00*

U.S. Cl. 254—77 **8 Claims**



1. An apparatus for stringing archery bows, said apparatus comprising,

an elongated body member having cable guide means on one end,

a lever pivotally connected to said body member intermediate the ends thereof by means defining a fulcrum,

first connecting means on the other end of said elongated body member for releasably connecting said other end of said body member to one end of an archery bow,

second connecting means including an elongated cable connected at one end to said lever at a point spaced from said fulcrum and extending through said guide means to the other end of said bow so that pivotal movement of said lever on said body member in one direction pulls the ends of said bow toward one another for stringing said bow.

4,032,112

CLIMBING JACK

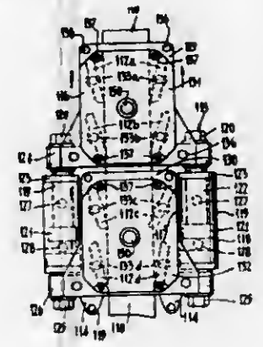
Hans Heinrich Schmidt, Doncaster, Australia, assignor to Enor Nominees Pty Limited, Victoria, Australia

Division of Ser. No. 554,235, Feb. 28, 1975, Pat. No. 4,016,228, which is a division of Ser. No. 448,716, March 6, 1974, abandoned. This application Mar. 16, 1976, Ser. No. 667,451

Claims priority, application Australia, Mar. 7, 1973, 2511/73; Mar. 7, 1973, 2513/73

Int. Cl.² B66F *1/08*

U.S. Cl. 254—108 **18 Claims**



1. A climbing jack comprising jack column means, a plurality of receiving means substantially evenly spaced along said column means, a jack assembly means surrounding said column means and including a first jack section means and a second jack section means, each said jack section means including at least one lever means having an axle which extends substantially transversely of the longitudinal axis of said column means, said lever means having opposite ends selectively adapted by being pivoted about the axle to move either one of the ends into contact with said jack column means and to move the other end out of contact with said jack column means, opposed biasing spring means associated with said lever means for selectively biasing either one of said ends toward said jack column means and the other end away from said jack column means, and wherein an end of at least one lever means in one of the jack section means is in supporting engagement with said receiving means during relative movement of said jack column means and said jack assembly means, and at least one force applying means connecting said first jack section means and said second jack section means for moving one of said jack section means, in turn, relative to the other jack section means, along said column means while the said other jack section means is held in fixed relationship relative to said jack column means by engagement of at least one lever means in said other jack section means with at least one receiving means.

4,032,113

WINCHES FOR HAULING ON BOARD PURSE NETS OR SIMILAR FISHING DEVICES

Kolbjorn Bjorshol, 6560 Langoyneset, Norway

Filed Apr. 17, 1975, Ser. No. 569,012

Claims priority, application Norway, Apr. 26, 1974, 741513

Int. Cl.² A01K *73/06*

U.S. Cl. 254—138 **9 Claims**

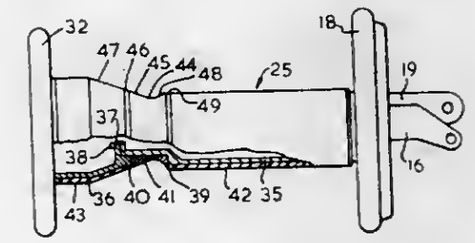
1. In a winch for hauling a purse net on board a fishing vessel comprising at least two rollers rotatable in mutually opposite directions for pulling said net by frictional engagement therewith, a common pivotable end member from which the rollers project freely outwards in spaced apart relation and for adjusting said rollers in various oblique positions relative to a vertical plane, wherein each of said rollers comprises:

an inner rest portion having friction-promoting means on its surface;

an outer rest portion having friction-promoting means on its surface;

said inner rest portion having a diameter smaller than said outer rest portion; and

an annular portion arranged between said inner and outer rest portions thereby constituting a net-slide portion said net-slide portion being formed without friction-promoting means on its surface, the net, when being hauled by said winch, normally rides over said inner rest portion of said rollers, a float-portion of said net being made to



selectively ride over said annular portion and said outer rest portion as regulated by the oblique positioning of said rollers, when riding over said outer rest portion said float-portion moves at increased speed with respect to that portion of the net riding over said inner rest portion, and when riding over said annular portion said float-portion moves at decreased speed with respect to that portion of the net riding over said inner rest portion.

4,032,114

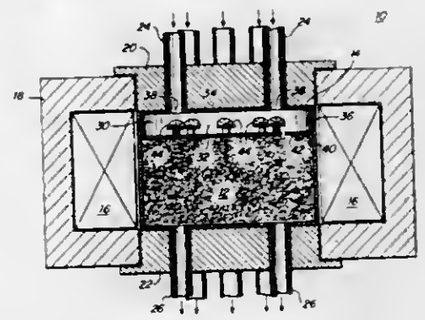
VORTICAL FLOW DISTRIBUTOR

Henry H. Kolm, Wayland, and John A. Oberteuffer, Lexington, both of Mass., assignors to Sala Magnetics, Inc., Cambridge, Mass.

Filed June 30, 1976, Ser. No. 701,426

Int. Cl.² B01F *15/00*

U.S. Cl. 259—4 R **13 Claims**



1. A vortical flow distributor for uniformly, vortically distributing incoming fluid in a plane transverse to the primary flow direction, comprising:

an outlet and at least one smaller inlet;

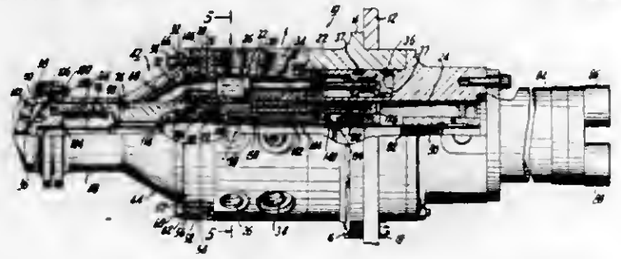
a plenum chamber disposed between said inlet and outlet and having an area corresponding to the area of the outlet and having a length in the primary flow direction which is substantially less than its width; and

a flow diverter aligned with each said inlet for directing the incoming fluid into a plane transverse to the primary flow direction and for establishing a tangential flow with radial components for producing over the plenum chamber area a pattern of distributed vorticity which finally dissipates the flow velocity.

4,032,115
DEVICE FOR MIXING COMPONENTS WHICH FORM A PLASTIC

August Wintels, La Val, and Christopher J. M. Ives, Beaconsfield, both of Canada, assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed June 21, 1976, Ser. No. 697,928
Int. Cl.² B01F 7/00, 7/24
U.S. Cl. 259—7 16 Claims

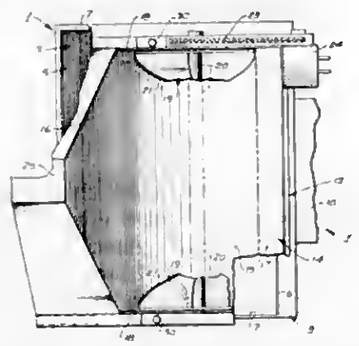


1. In a device for blending flowable components together to form a plastic therefrom, stationary housing means having a front end face and formed with an axial bore extending rearwardly along the interior of said stationary housing means from said front end face thereof, said stationary housing means having an outer surface and being formed outwardly of said axial bore with a plurality of inlet ports each extending from said outer surface of said stationary housing means to said front end face thereof for respectively receiving components to be blended together and for delivering the components to the front end face of said stationary housing means, a cartridge removably connected with said stationary housing means, said cartridge having an elongated tubular cartridge housing means having a rear portion extending into said axial bore of said stationary housing means, an elongated front portion extending forwardly from said stationary housing means, and at a junction between said rear and front portions an annular rearwardly directed surface fluid-tightly engaging said front end face of said stationary housing means, said front portion of said cartridge housing means having a hollow interior defining a mixing chamber and said cartridge housing means being formed with a plurality of component-transmitting ports respectively communicating with said inlet ports of said stationary housing means at said front end face thereof and each extending from said rearwardly directed surface of said cartridge housing means to said mixing chamber where said component-transmitting ports terminate in front outlet ends, so that said component-transmitting ports transmit the components from said inlet ports of said stationary housing means to said mixing chamber, connecting means releasably connecting said cartridge housing means to said stationary housing means with said rearwardly directed surface of said cartridge housing means fluid-tightly engaging said front end face of said stationary housing means, rotary impeller means situated in said mixing chamber of said cartridge housing means closely adjacent to said front outlet ends of said component-transmitting ports for agitating and blending together as well as feeding forwardly the components received in said mixing chamber from said component-transmitting ports of said cartridge housing means, rotary drive shaft means fixed to said impeller means and extending therefrom rearwardly along and through said rear portion of said cartridge housing means and beyond the latter along said axial bore of said stationary housing means, drive means carried by a rear portion of said stationary housing means and releasably connected with said drive shaft means at a portion thereof which extends rearwardly beyond said cartridge housing means for driving said drive shaft means when said cartridge housing means is connected by said connecting means with said stationary housing means, said rotary impeller means having a rear end surface surrounding said drive shaft and situated rearwardly of said front outlet ends of said component-transmitting ports of said cartridge housing means, sealing means carried by said cartridge housing means and having a fluid-tight sealing engagement with said rear end surface of said rotary impeller means for sealing off from said impeller means and mixing chamber the interior of said cartridge housing means which is situated to the rear of said impeller means, and dispensing nozzle means carried by said cartridge housing means at a front end of said front portion thereof for dispensing the blended components from said mixing chamber, whereby said cartridge housing means may be removed from said stationary housing means together with said drive shaft means, said impeller means connected thereto, said dispensing nozzle means, and said sealing means.

4,032,116
MIXER ATTACHMENT FOR MINING VEHICLES

Evan S. Prichard, Newport Beach, Calif., assignor to Challenge-Cook Bros., Incorporated, City of Industry, Calif.

Filed Dec. 31, 1975, Ser. No. 635,707
Int. Cl.² B01F 7/02
U.S. Cl. 259—69 4 Claims



1. In combination a vehicle having a scoop defined by upwardly diverging side walls, a semi-cylindrical bottom wall and essentially parallel end walls, a forwardly directed operator manipulatable lever structure for raising and lowering the scoop, a tilting mechanism and a power supply, and a mixer structure comprising:

a. a mixer shell removably seated in said scoop and having diverging side walls conforming to the side walls of the scoop, a semi-cylindrical bottom wall confronting the bottom wall of the scoop, and end walls received between the end walls of the scoop;

b. a rotatable mixer unit within said mixer shell and overlying the bottom wall of the mixer shell contiguous thereto;

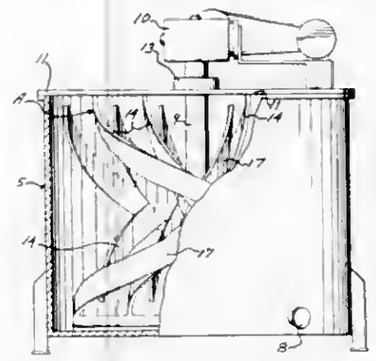
c. and a mixer drive means mounted on the mixer shell and including a motor connectable to the vehicle power supply.

4,032,117
PASTE MIXER

Basil Arthur Burgess, Montreal, Canada, assignor to Bowers Machine Company Limited, Canada

Filed Sept. 15, 1975, Ser. No. 613,406
Claims priority, application Canada, Oct. 25, 1974, 212279
Int. Cl.² B01F 7/24
U.S. Cl. 259—108 5 Claims

1. A mixing apparatus for mixing paste materials comprising a mixing tank having side walls, a bottom wall and a top wall, a drive shaft centrally positioned in the top wall of the mixing tank so that the free end of the drive shaft extends into said tank, means for rotating the said shaft, a series of fixedly mounted baffles, said baffles being mounted with the upper ends thereof at the top on the tank and the lower, free ends thereof extending downwardly from the top of the tank, said baffles being helical and of generally semi-circular form as viewed in transverse cross-section, and being disposed radially in spaced relation about the axis of the drive shaft, a rotor crossbar secured to the free end of the said drive shaft adjacent to said bottom wall of the tank and below the lower free ends of the said baffles, and a series of rotor blades secured at one end to the said crossbar, the said rotor blades being helical and of generally semi-circular form as viewed in transverse cross-section, and being disposed radially in spaced relation about the axis of the said drive shaft, the said baffles and rotor blades intermeshing with each other in radially spaced apart

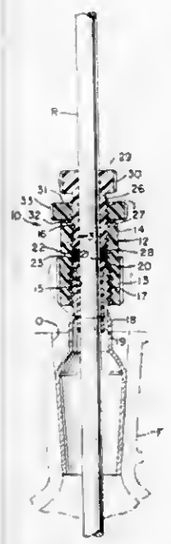


relationship, the said baffles and rotor blades being disposed radially about the axis of the said drive shaft in alternate semi-circular arrangement, the free ends of the baffles extending to within a short distance of the fixed ends of the rotor blades, and the free ends of the rotor blades extending to within a short distance of the fixed ends of the baffles.

4,032,118
SEALING MEANS FOR STIRRING APPARATUS

Edwin D. Phillips, 170 Albert St., N. Plainfield, N.J. 07060

Filed Oct. 21, 1975, Ser. No. 624,398
Int. Cl.² B01F 7/16; F16C 33/72
U.S. Cl. 259—122 10 Claims



1. In combination, a stirring apparatus including an elongate rod having stirrer blade means on one end thereof for disposition in a flask and the like to stir the contents of the flask and power means connected with the other end of the rod to rotate the rod and stirrer blade means, and a seal for effecting a liquid-tight seal between the stirring apparatus and an opening in a laboratory flask and the like, said seal including a generally tubular stopper for fitting in the opening of the flask, said stopper having a bore therethrough and external threads on one end thereof; a sleeve means having internal threads on both ends thereof and threadably engaged at one end thereof with the threads of the stopper and means for forming a positive seal between the threaded members; a bearing sleeve positioned within the bore defined in said stopper one end and having a shoulder thereon resting on the upper surface of said stopper one end; seal ring means positioned within the sleeve means in abutting engagement with the upper surface of said bearing sleeve shoulder; and a generally tubular seal clamping and adjusting means threadably engaged with the other end of the sleeve means and extended into engagement with the seal ring means to urge the seal ring means into secure sealing engagement with said rod extended coaxially through the stopper, sleeve means, seal ring means and seal clamping and adjusting means.

4,032,119
LANCE SEAL FOR CONVERTER VESSEL GAS COLLECTING HOOD

Joseph Ziegler, Apollo, Pa., assignor to Pennsylvania Engineering Corporation, Pittsburgh, Pa.

Filed Mar. 11, 1976, Ser. No. 666,038
Int. Cl.² C21C 5/40
U.S. Cl. 266—158 27 Claims

1. A gas collecting hood disposed above the opening in a metallurgical vessel for collecting gases discharging therefrom,

a port formed in said hood to permit a lance to pass through said hood and into the opening in said vessel,

a seal assembly for said port and having an opening therein to permit said lance to pass therethrough in relatively closely spaced relation,

and resilient means for resiliently mounting said seal assembly for movement in a plane generally normal to the axis of the lance to permit movement of said lance in said opening in reaction to the discharge of gas from the lower end thereof, said resilient means permitting said seal assembly to move with said lance.

4,032,120
APPARATUS FOR DIRECT REDUCTION OF SULFUR-CONTAINING IRON ORE

Donald Beggs, Charlotte, N.C., assignor to Midrex Corporation, Charlotte, N.C.

Filed Nov. 10, 1975, Ser. No. 630,489
Int. Cl.² C21B 1/06
U.S. Cl. 266—159 6 Claims

1. Apparatus for producing a reductant-rich off-gas, a reductant-lean off-gas, and a metallized iron product from particulate impurity-containing iron ore comprising:

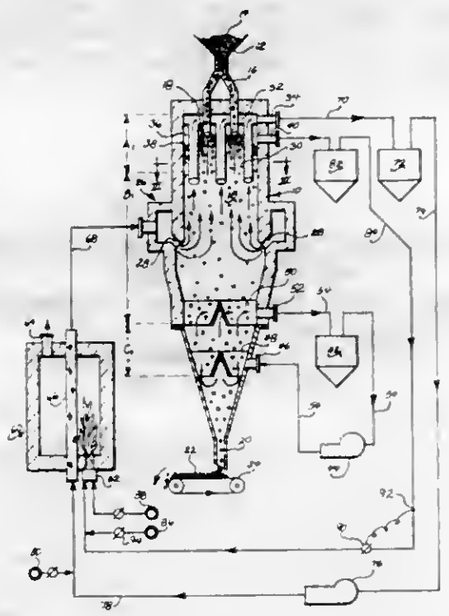
a. a generally vertical shaft furnace having an upper prereducing zone and a lower reducing zone;

b. means for charging particulate iron oxide material to said upper zone, and means for removing metallized iron product from the bottom of said lower zone, whereby a continuous gravitational flow of a packed bed of material can be established through the furnace;

c. a first gas inlet intermediate the ends of the furnace;

d. a first gas outlet consisting of a plurality of gas removal pipes extending downwardly into said furnace and terminating beneath said prereducing zone, the upper ends of

said pipes communicating with a reacted gas offtake system;



e. a reacted gas plenum at the top of said prereducing zone;

f. a second gas outlet communicating with said plenum.

4,032,121

PROCESS FOR THE PRODUCTION OF IRON FROM IRON ORES AND APPARATUS FOR CARRYING OUT SAID PROCESS

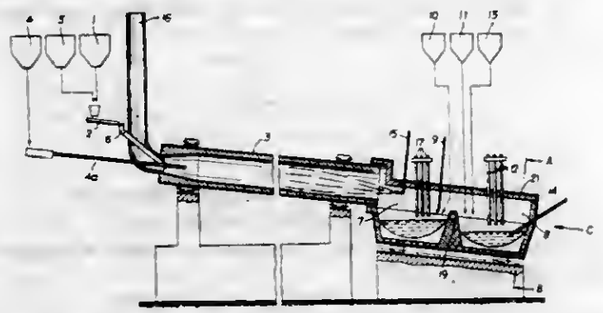
Kurt Stift, and Helwig Vacek, both of Leoben, Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerek-Alpine Montan Aktiengesellschaft, Vienna, Austria

Division of Ser. No. 551,012, Feb. 19, 1975. This application Dec. 15, 1975, Ser. No. 640,567

Claims priority, application Austria, Feb. 22, 1974, 1473/74

Int. Cl.[2] C21B *13/08*

U.S. Cl. 266—163 5 Claims



1. Apparatus for the production of iron from iron ores comprising: a rotary kiln for reducing iron ore with carbon, said kiln having a discharge end for discharging a mixture of iron, slag and unreduced ore; a first hearth furnace for receiving the discharge from the discharge end of the kiln, said furnace having opposed side walls and end walls, one of which comprises a weir, which walls extend between the side walls, said weir having a lower height adjacent one side wall; a second hearth furnace separated from the first furnace by said weir and in communication with the first furnace above said weir; and means mounting said furnaces for tilting movement about a common axis extending through the plane of the wall comprising the weir so that fluid material can be transferred from the first furnace to the second furnace by tilting said furnaces in a direction to lower the position of said weir.

4,032,122

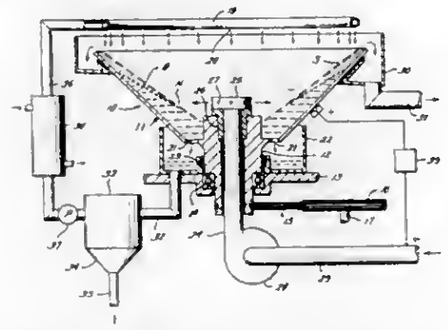
METHOD AND APPARATUS FOR RECOVERING SMALL PARTICLES OF HEAVY PRECIOUS METALS

Edward O. Anders, 1502 Tallulah Court, Houston, Tex. 77077

Division of Ser. No. 643,528, Dec. 22, 1975, Pat. No. 3,998,629. This application Aug. 25, 1976, Ser. No. 717,527

Int. Cl.[2] C22B *11/10*

U.S. Cl. 266—169 11 Claims



1. Apparatus for recovering small particles of heavy precious metals such as gold or platinum from a slurry, comprising a housing having a generally conical, converging inner wall, means for supplying Mercury onto the inner wall of the housing so as to cause a layer thereof to flow downwardly therealong, means for feeding the slurry to the layer of Mercury, means for rotating the housing about the vertical axis of the generally conical inner wall at a speed which induces the particles to settle in or amalgamate with the Mercury and causes the slurry to flow upwardly over the Mercury layer and out of the housing, means for collecting the Mercury layer and particles which flow downwardly therewith over the housing wall, means for separating the particles from the collected Mercury, and means for returning the Mercury from which the particles have been separated to the means for supplying it to the inner wall of the housing in order to maintain a continuous layer of Mercury.

4,032,123

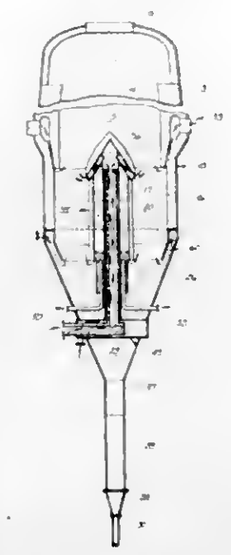
SHAFT FURNACE FOR DIRECT REDUCTION OF ORES

Clyde L. Cruse, Jr., Middletown, Ohio, and Joe H. Brown, Houston, Tex., assignors to Armco Steel Corporation, Middletown, Ohio

Filed Oct. 15, 1976, Ser. No. 732,885

Int. Cl.[2] C21B *11/00*

U.S. Cl. 266—186 9 Claims



1. In a gravity feed shaft-type furnace for the reduction of sized iron ores having a feed zone, a reducing zone, a cooling zone and a discharge zone, the improvement comprising a substantially cylindrical reducing zone communicating directly with a substantially cylindrical cooling zone, an inwardly tapering discharge zone of generally ellipsoidal cross section, an elongated substantially cylindrical member axially disposed within said furnace and extending upwardly from said discharge zone through said cooling zone and terminating in said reducing zone, a conical top secured to said member and configured in such manner as to cause uniform movement of sized ores downwardly in said reducing zone, means for introducing hot reducing gas into the bottom of said cylindrical member for upward flow therein, means for distributing said hot reducing gas into the center of the reducing zone adjacent the lower end thereof, means for introducing cooling gas into said cylindrical member whereby to cool said means for distributing the hot reducing gas, means for distributing said cooling gas into the center of said cooling zone adjacent the lower end thereof, and means in said discharge zone for supporting said cylindrical member.

4,032,124

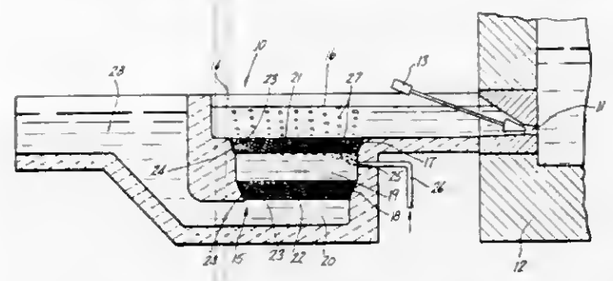
APPARATUS AND METHOD FOR IN-LINE DEGASSING AND FILTRATION OF MOLTEN METAL

John C. Yarwood, Madison, Conn.; James E. Dore, Ballwin, Mo., and Robert K. Preuss, Middletown, Conn., assignors to Swiss Aluminium Ltd., Chippis, Switzerland

Continuation-in-part of Ser. Nos. 563,213, March 28, 1975, Pat. No. 3,962,081, and Ser. No. 597,963, July 21, 1975. This application Feb. 2, 1976, Ser. No. 654,724

Int. Cl.[2] C22B *9/02*, *9/10*

U.S. Cl. 266—218 13 Claims



1. An apparatus for the degassing and filtration of molten metal which comprises a chamber having respective metal inlets and outlets, wall surfaces adapted for the support of at least a first and a second removable filter plate, and a first coarse grade ceramic foam filter plate located upstream in the flow of molten metal through said apparatus, and a second fine grade ceramic foam filter plate located spaced-apart and downsteam from said first filter plate in said molten metal flow, and a conduit providing a fluxing gas inlet port positioned between said first and said second filter plate in such relation to said first filter plate that fluxing gas issuing from said port is capable of percolation in a direction counter-current to said molten metal flow, through molten metal located adjacent thereto and into contact with said first filter plate for passage therethrough.

4,032,125

INSULATOR

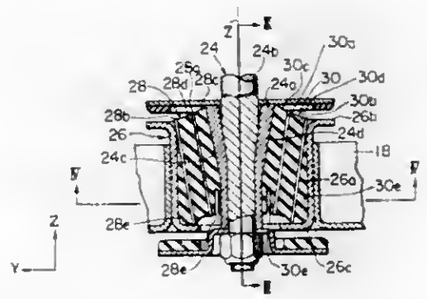
Masaaki Minakawa, Kokubunji, and Toshio Yoshikawa, Ayase, both of Japan, assignors to Nissan Motor Co., Ltd., Japan

Filed Mar. 9, 1976, Ser. No. 665,336

Claims priority, application Japan, Mar. 17, 1975, 50-34656[U]

Int. Cl.[2] B60G *11/24*

U.S. Cl. 267—63 A 3 Claims



1. An insulator comprising:

an inner member with an axis having a wedge, said wedge including two surfaces which are inclined toward each other and disposed symmetrically about said axis;

an outer member around said wedge and spaced therefrom; and

two resilient means, each including alternate layers of rigid plates and elastomeric members, and inner one of said alternate layers of each of said two resilient means being connected to one of said two surfaces of said wedge and an outer one of said alternate layers being connected to said outer member, said rigid plates of each of said two resilient means being disposed in parallel to one of said two surfaces of said wedge;

said inner member having two elastomeric parts on said wedge, each of said two elastomeric parts of said inner member being compressed between said wedge and said outer member to limit movement of said inner member relative to said outer member in a direction which is parallel to said two surfaces of said wedge and perpendicular to said axis,

said outer member having a tubular section having two open ends and said inner member having two axially spaced end members spaced from said two open ends of said tubular section and two elastomeric parts fixed to said end members, respectively, to limit movement of said inner member relative to said outer member in a direction along said axis.

4,032,126

SHOCK ABSORBING APPARATUS

William N. Laughlin, deceased, late of Lafayette, La., and by Thomas L. Hollis, executor, P.O. Box 51422, O.C.S., Lafayette, La. 70501

Filed Mar. 29, 1976, Ser. No. 671,600

Int. Cl.[2] B61G *9/16*; E02B *3/22*

U.S. Cl. 267—116 26 Claims

1. A shock absorbing apparatus comprising:

a casing;

an end wall for closing an end of the casing;

a piston movably disposed within said casing;

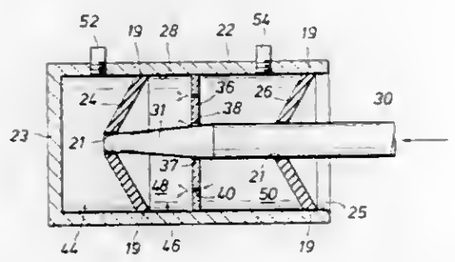
a first resilient seal attached to said piston and to an interior wall of said casing and cooperable with said end wall and a first portion of said casing to define a first closed chamber;

a second resilient seal attached to said piston and to the interior wall of said casing and cooperable with a second portion of said casing and said first resilient means to define a second closed chamber;

a baffle attached to the interior wall of said casing in said second closed chamber and comprising an interior edge defining an aperture through which said piston passes without coming into contact with said baffle, said baffle being operable to generally divide said second chamber into a first zone and a second zone;

a first port for introducing a compressible fluid into said first closed chamber;

a second port for introducing a relatively incompressible fluid into said second closed chamber;



said first resilient seal being operable to affect a compression of said compressible fluid when impact displaces said piston axially towards said first closed chamber;

said first and said second resilient seals being cooperable to affect a displacement of said relatively incompressible fluid from said first zone to said second zone when an impact displaces said piston axially towards said first closed chamber.

4,032,127

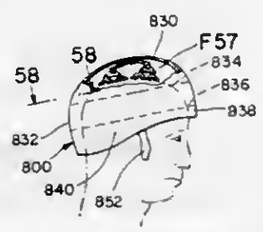
PROTECTIVE HEAD GEAR AND BODY EQUIPMENT

Donald Ernest Lipfert, Woolwich, Maine, assignor to Deres Development Corporation, Greenwich, Conn.

Continuation-in-part of Ser. Nos. 75,373, Sept. 25, 1970, Pat. No. 3,790,150, and Ser. No. 347,069, April 2, 1973. This application Feb. 4, 1974, Ser. No. 439,590

Int. Cl.² F16F 1/16

U.S. Cl. 267—151 14 Claims



1. A cushioning system for a protective head gear, body pad, guard, or the like, comprising a plurality of displaceable bearing means, particular ones of said bearing means being interconnected to others of said bearing means by a first lever type arrangement, so as to define a grouping of bearing means, said first lever type arrangement being operative upon displacement of one of said bearing means in a first direction to apply a force to another of said bearing means in an opposite direction, said bearing means and connected levers being mounted on structure or frame means formed to cover a selected body portion in which selected groupings of interconnected bearing means are further interconnected to other groupings of interconnected bearing means by a second lever type arrangement.

4,032,128

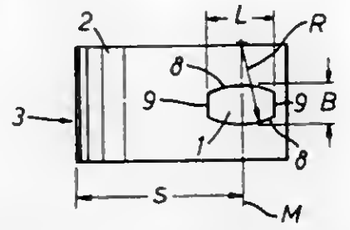
PIVOTAL BEARING FOR AN OMEGA SPRING

Holger Nicolaisen, Nordborg, and Leif Borge Tandrup, Sooderborg, both of Denmark, assignors to Danfoss A/S, Nordborg, Denmark

Filed Oct. 16, 1975, Ser. No. 616,570

Int. Cl.² F16F 1/28

U.S. Cl. 267—159 8 Claims



1. An omega spring assembly comprising a bearing element, a generally U-shaped member having one leg with an elongated aperture therein having two arcuately shaped edges in mutually concave relation to each other, said edges being spaced apart a predetermined distance, said bearing element having a girth dimension larger than said predetermined distance and an adjacent tapered portion engaging said edges in load supporting relation thereto.

4,032,129

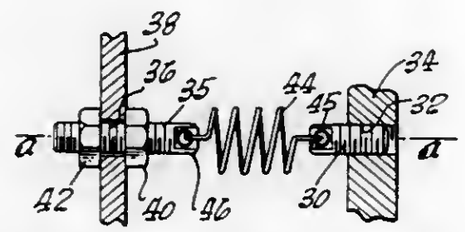
ADJUSTABLE TENSION SPRING ANCHOR

Karl H. Larsson, 433 Granite Ave., Monrovia, Calif. 91016

Filed Apr. 26, 1976, Ser. No. 680,181

Int. Cl.² F16F 1/12

U.S. Cl. 267—179 8 Claims



1. An adjustable tension spring anchor in combination with a tension spring, wherein the anchor is arranged for mounting in both a fixed and a movable structure, said anchor comprising:

an elongated cylindrical body member;

an adjustable securing means disposed along said body member, wherein said adjustable securing means comprises a threaded surface formed throughout the cylindrical body portion thereof, wherein the tension of said spring is adjustable to a predetermined condition;

a mounting head having an aperture disposed therein to receive one end of the tension spring, and formed as an integral part of said cylindrical body member.

4,032,130

DEVICE FOR ASSEMBLING PICTURE FRAMES

James R. Huntley, and William Franklin Southard, both of Monroe, N.C., assignors to Tool Service Engineering Company, Monroe, N.C.

Filed Jan. 14, 1976, Ser. No. 649,016

Int. Cl.² B25B 11/00

U.S. Cl. 269—8 10 Claims

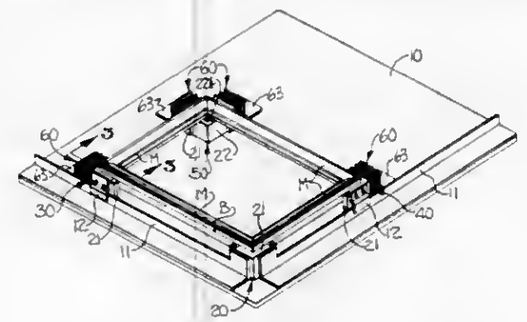
1. Apparatus to facilitate the assembly and gluing of pieces of mitered-end picture frame molding to form a picture frame therefrom, said apparatus comprising

a base member,

a plurality of corner blocks, one for each corner of the picture frame,

each of said corner blocks being carried by said base member and having surface portions thereon adapted for receiving and engaging the abutting end portions of a pair of the pieces of molding forming one corner of the picture frame,

means associated with one of said corner blocks for maintaining the corner block at a predetermined location on



said base member whereby the corner block serves to facilitate assembling the initial corner of the picture frame, and

permanent magnet means cooperating with each of the remaining corner blocks for securing the same to the base member so as to permit adjusting the position of the corner blocks in accordance with the lengths of the pieces of molding to thereby facilitate assembling the remaining corners of the picture frame.

4,032,131

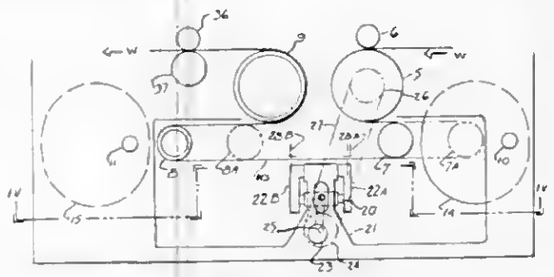
METHOD AND MEANS FOR FABRICATING MAGAZINES

William F. Davis, P.O. Box 179, Hightstown, N.J. 08520

Filed May 15, 1974, Ser. No. 470,141

Int. Cl.² B42B 2/00

U.S. Cl. 270—53 18 Claims



1. A method of processing a plurality of webs to produce multileaf products wherein said method comprises the steps of:

First, continuously driving at least two webs of material from supply sources thereof to a recipient of said web material

Second, collating and registering each of said webs with each other

Third, guiding said webs in an excursion to and thru a processing location intermediate of said supply sources and said recipient of said webs under substantially uniform tension wherein said webs excursion has at least one bight before said processing location and after said collation of all of said webs

Fourth, stopping a portion of said webs at a periodic rate correlated to the driven speed of said webs and maintaining each of said webs in said portion of webs in register with each other at said processing location with places to be processed on said webs in alignment with processing means at said location

Fifth, processing said stopped portion of said webs in at least one place

Sixth, returning said stopped portion of said webs to web driving speed after said processing

Seventh, guiding said processed webs from said processing location to said recipient of said webs thru an excursion having at least one bight after said processing location

Eighth, severing said processed portion of said webs from said webs in predetermined locations with respect to said processed places on said webs thereby producing multileaf products.

4,032,132

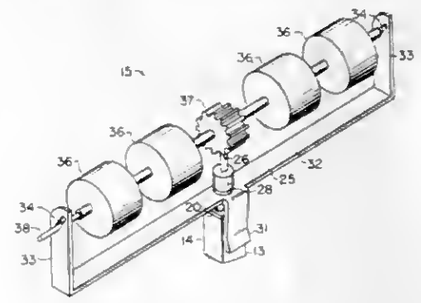
COLLATOR ARM FEED HEAD

Frank J. Mignano, 293 8th St., Brooklyn, N.Y. 11215

Continuation-in-part of Ser. No. 632,511, Nov. 17, 1975, abandoned. This application July 28, 1976, Ser. No. 709,549

Int. Cl.² B65H 39/05

U.S. Cl. 270—58 10 Claims



1. In a collating machine having paper bins with papers therein to be collated, paper ejection arms reciprocating with ejection and return strokes over said bins, feed heads on said arms moving the uppermost sheet in each bin on ejection strokes of said arms, and a system collecting uppermost moved sheets from said bins, the improvement comprising, in combination, a collator feed head on each of said arms, each of said feed heads having a bracket attached to one of said arms, projections of said bracket containing slots extending generally in the direction of the ejection strokes of said arms, a shaft journalled in said slots, rollers mounted on said shaft, a rachet wheel mounted on said shaft, a pawl fixed to said bracket adjacent to said rachet wheel, said pawl being disposed in the direction of return strokes of said arms, said rollers contacting the uppermost sheet of papers in said bin therebelow so that, on ejection strokes of said arms, said shaft moves in said slots engaging said rachet wheel with said pawl locking said rollers to move an uppermost sheet and, on collection of uppermost sheets and on return strokes of said arms, said shaft moves in said slots disengaging said rachet wheel from said pawl enabling said rollers to freely roll on papers thereunder, and electrical contact means associated with said shaft indicating movement of said shaft in said slots and thereby the collection of an uppermost moved sheet of paper from each of said bins.

4,032,133

ROLLER POSITIONING METHOD AND APPARATUS FOR BUCKLE-TYPE PAPER FOLDING MACHINE

Charles J. Steffens, and Scott D. Steffens, both of 1855 Techny Road, Northbrook, Ill. 60062

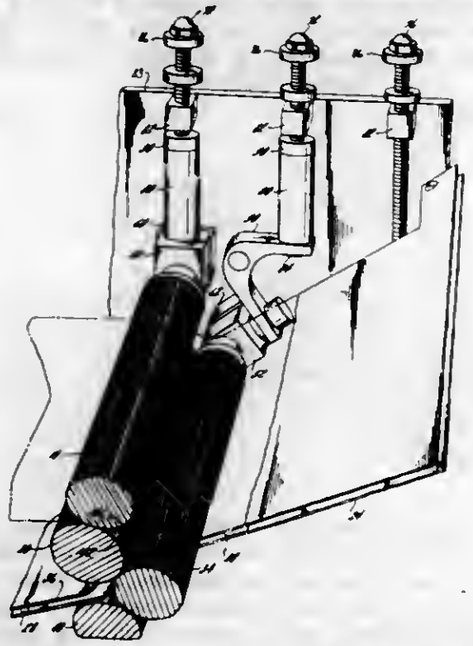
Filed Sept. 11, 1975, Ser. No. 612,489

Int. Cl.² B65H 45/14

U.S. Cl. 270—68 A 2 Claims

1. A buckle-type folding machine for successively folding sheets of paper comprising a frame, first and second elongated rollers disposed in parallel relation defining a nip through which paper sheets can be successsively passed and folded, means for supporting said first roller for rotational movement about its axis, means for rotably driving said rollers, an elongated fold plate having a paper receiving cavity into which

said sheets are directed for buckling said sheets prior to folding, said fold plate having a leading edge in close proximity to said second roller said fold plate being disposed at an acute angle to a line passing through the centers of said rollers, means for supporting said second roller for rotational movement about its axis as well as limited lateral movement relative to said frame In a direction perpendicular to its axis and parallel to said fold plate, said second roller supporting means including a pair of bearing blocks between which the ends of said second roller are rotably journaled, a pair of channels fixed to said frame, said bearing blocks each being slidably disposed within a respective one of said channels, said channels being mounted in a plane parallel to said fold plate so that



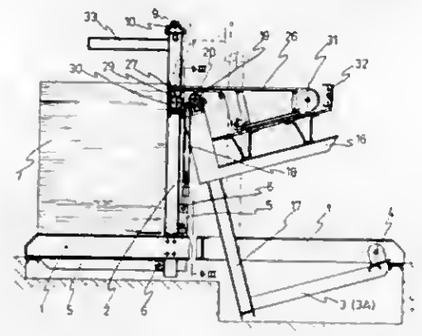
upon passage of a folded sheet through said nip said second roller separates from said first roller through non-radial movement in a direction parallel to the plan of said elongated fold plate to allow passage of said sheets while not substantially changing the spacing between said second roller and said fold plate leading edge, a pair of rockers pivotedly mounted on said frame and having first and second legs, means coupling the first leg of each rocker to one of said bearing blocks so that lateral movement of said bearing blocks within said channel upon passage of said folded sheets through said nip causes rotational movement of said rockers, and bias means acting on the second leg of each said rocker for urging said rockers, bearing blocks, and second roller to their original positions following passage of a folded sheet through said nip.

4,032,134
SHEET TURNING MACHINE

Juan Salvat Dalman, Barcelona, Spain, assignor to Salvat Editores, S.A., Barcelona, Spain

Filed Dec. 10, 1975, Ser. No. 639,609
Claims priority, application Spain, June 12, 1974, 203898
Int. Cl.² B65H *3/10, 29/24*
U.S. Cl. 271—5 **3 Claims**

1. A machine for inverting or turning over material in sheet form, said machine comprising:
a chassis;
first substantially vertical guide means supported by said chassis;
first platform means, guided for movement along said first guide means, for supporting a stack of sheets to be inverted;
a frame pivoted to said chassis, said frame supporting second guide means, said frame being pivotable from a first position whereat said second guide means is inclined to the vertical to a second position whereat said second guide means is substantially vertical;
second platform means, guided for movement along said second guide means, for supporting said stack of sheets after they have been inverted;
means for moving said first platform means in an ascending direction along said first guide means, and for thereby sequentially moving said stack of sheets to a removal position located above said first platform means;
means, located at said removal position, for sequentially removing the topmost sheet from said stack of sheets and transferring the thus removed sheets to an inverting position located above said second platform means;
means, located at said inverting position, for sequentially receiving said removed sheets from said removing and transferring means, for inverting said sheets, and for sequentially depositing the thus inverted sheets onto said second platform means, when said frame is in said first

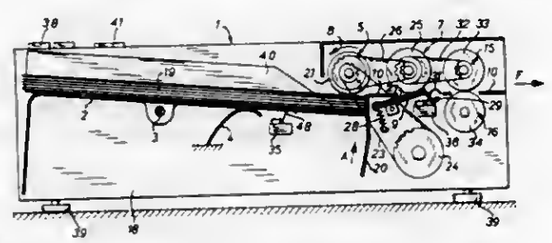


position thereof, said receiving, inverting and depositing means comprising an endless belt having an upper substantially horizontal run for receiving said sheets from said removing and transferring means and a lower run directed substantially perpendicularly to said second guide means when said frame is in said first position thereof, a roller about which said endless belt passes between said upper and lower runs thereof to invert said sheets, and air generator means for directing a jet of air toward a sheet on said endless belt and passing around said roller to thereby maintain said sheet in contact with said endless belt; and
means for moving said second platform in a descending direction along said second guide means, and for thereby sequentially moving said stack of sheets after inversion thereof away from said inverting means.

4,032,135
APPARATUS FOR INDIVIDUALLY REMOVING SHEETS FROM A STACK

Kurt Rüenzi, Kusnachterstrasse 59, 8126 Zumikon, Switzerland

Filed Apr. 8, 1976, Ser. No. 674,918
Claims priority, application Switzerland, Apr. 15, 1975, 4758/75
Int. Cl.² B65H *3/06*
U.S. Cl. 271—116 **14 Claims**



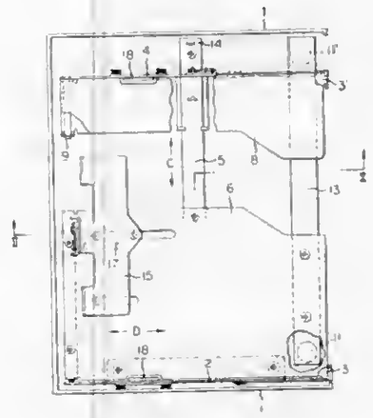
1. An apparatus for removing individual sheets from a stack regardless of sheet thickness, comprising a housing, sheet stack support means having a downstream end, journal means supporting said sheet stack support means in said housing in

see-saw fashion, and sheet separating roller means comprising a first set of sheet separating rollers including a first shaft rotatably supported in said housing, said first set of rollers being drivably secured to said first shaft, said first shaft supporting said first set of rollers above said downstream end of said sheet stack support means, spring means in said housing arranged to urge the downstream end of said sheet stack support means toward said first set of rollers, power drive means for rotating said first set of rollers at a given speed, table means having a surface arranged substantially adjacent to said downstream end of said sheet stack support means, a second set of sheet separating rollers arranged in said housing above said table surface, stop means for a stack on said sheet stack support means, said stop means being located adjacent to said downstream end of said sheet stack support means, said first set of rollers being located so that their lowest sheet contacting surface line extends in a plane substantially corresponding to that of said table surface, at least one cut-out in said table means, a separating gate journalled in said housing a resiliently biassed to extend through said cut-out at an oblique angle relative to said table means, said separating gate being located below said second set of sheet separating rollers with its highest point above said table surface, and friction increasing cover means on said separating gate, said friction increasing cover means facing said second set of sheet separating rollers, said first set of sheet separating rollers comprising free wheeling overtake rollers, said apparatus further comprising means for driving the second set of sheet separating rollers faster than the first set of sheet separating rollers when said first set of sheet separating rollers are driven at said given speed.

4,032,136
FEED CASSETTE

Shiro Komabe, and Yoshitomo Goshima, both of Kawasaki, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 454,843, March 26, 1974, abandoned. This application Sept. 11, 1975, Ser. No. 612,479
Claims priority, application Japan, Apr. 6, 1973, 48-39246
Int. Cl.² B65H *1/12, 3/56*
U.S. Cl. 271—160 **6 Claims**

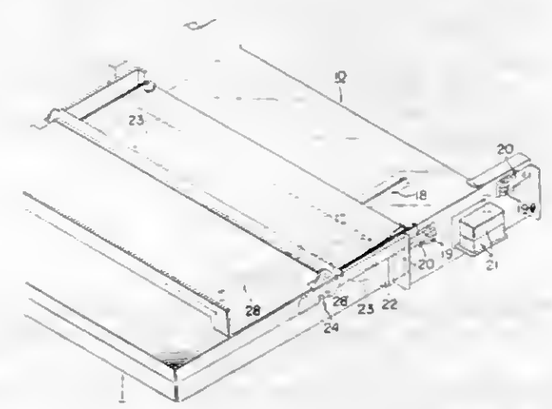


1. A feed cassette for sheets of copy material comprising:
a cassette body having a feeding end past which copy material moves as it is fed from the cassette;
two side plates mounted on said body, at least one of which is movable along said body toward and away from the other side plate to accommodate different sizes of copy material therebetween;
two vertically movable separating pawls for separating the copy material as it is fed, said separating pawls being connected to said side plates for respectively engaging opposite corners of the copy material at the leading edge thereof adjacent to said feeding end of said body;
inner plate means positioned between said side plates for supporting the copy material, said inner plate means including a plurality of inner plates, wherein said inner plates have ends disposed adjacent said feed end of said body, and extend rearwardly to support the copy material;
means connecting one of said inner plates to said movable side plate for movement therewith in the direction of movement of said movable side plate while permitting said one inner plate to move independently with respect to said movable side plate in a vertical direction;
means for mounting the remainder of said plurality of inner plates within said cassette to permit vertical movement of said inner plates;
means mounted within said cassette for urging said ends of said inner plates upwardly, to thereby urge the leading edge of the uppermost sheet of copy material against said separating pawls; and
means for maintaining said ends of said inner plates at substantially the same relative height;
whereby, when said movable side plate is moved to accommodate a different size copy material, the associated separating pawl and inner plate are also moved so that copy material separation is effected uniformly regardless of the size of copy material used.

4,032,137
FEED CASSETTE DEVICE

Hajime Katayama; Hiroshi Nitanda; Tateki Nagaoka, all of Tokyo; Hirotoshi Kishi, Higashi Murayama; Yousaku Takada, Tokyo; Noriyoshi Iida, Ichikawa; Tsuneki Inuzuka, Fuchu, and Yutaka Komiya, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 20, 1975, Ser. No. 624,183
Claims priority, application Japan, Oct. 22, 1974, 49-121823; Dec. 5, 1974, 49-147626[U]; Dec. 5, 1974, 49-147627[U]
Int. Cl.² B65H *1/04*
U.S. Cl. 271—164 **8 Claims**

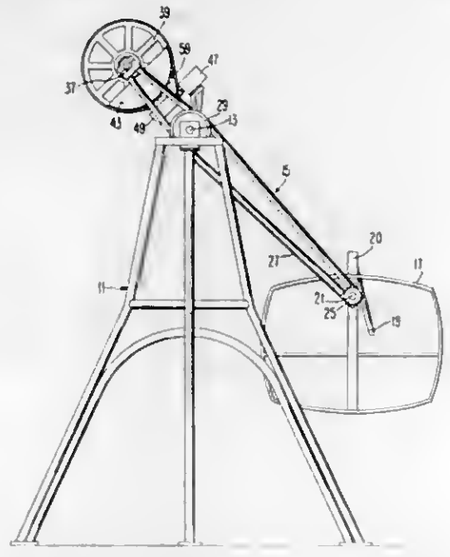


1. A feed cassette device for a copying machine comprising:
a cassette having side plates, and having a bottom plate connecting the side plates, for storing copy mediums therein, said bottom plate having a guide member projecting downwardly therefrom for use in aligning said cassette on said machine;
a cassette table for receiving said cassette thereon, said cassette table having a positioning member and a member for contacting one of said side plates to urge said cassette guide member into engagement with said positioning member to properly align said cassette on said table; and
lock means for locking said cassette in a predetermined position on said cassette table.

4,032,138
ADJUSTABLE POSITION COUNTERWEIGHT ASSEMBLY FOR AMUSEMENT RIDE

David Barry Willis, Palo Alto, Calif., assignor to Arrow Development Co., Inc., Mountain View, Calif.

Filed June 28, 1976, Ser. No. 700,397
Int. Cl.² A63G 1/12
U.S. Cl. 272—33 R 8 Claims



1. In an amusement ride wherein an elongated support arm is pivotably held at an axis intermediate of its ends by a stationary frame, means being attached to the support arm on one side of this axis for carrying one or more passengers and means being attached to the support arm on the other side of the pivot axis for providing a weight to counter that of the passengers and the passenger carrying means, an improved counterweight assembly that is adjustable in position to compensate for varying passenger weight that can be carried by the passenger carrying means, comprising:

a pair of wheels held by said other side of the support arm for independent rotation about a second axis that is parallel to said first axis, each of said wheels being unbalanced in substantially the same manner by having a major portion of its weight concentrated over a small segment of its circular extent, and

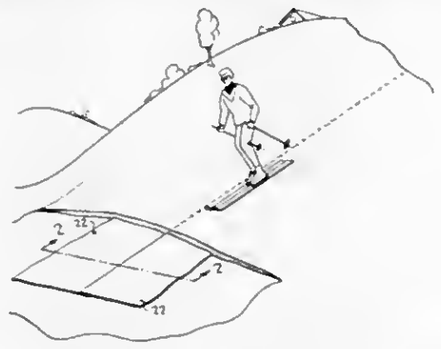
means interconnecting said wheels for rotating the wheels in opposite directions about said second axis, thereby to control the effective counterweight position relative to said first axis.

4,032,139
PROCESS FOR EXTENDING THE SEASONAL USEFUL LIFE OF SKI TRAILS AND SKI TRAILS PRODUCED THEREBY

Yves Gaudard, Lyon, France, assignor to Rhone-Poulenc-Textile, Paris, France

Filed Apr. 26, 1972, Ser. No. 247,638
Claims priority, application France, May 3, 1971, 71.16118
Int. Cl.² A63B 69/18; A63G 21/02
U.S. Cl. 272—56.5 SS 3 Claims

1. A process for extending the period over which fallen natural snow will remain on sloping terrain and during which said sloping terrain can be utilized for skiing comprising the step of covering a sloping terrain with an elongate non-woven fabric support material formed of synthetic continuous filaments wherein said non-woven fabric is a needled, spunbonded fabric of polyethylene terephthalate prior to a snow fall such that a layer of snow collects on the non-woven fabric support material, the length of the non-woven fabric support material running along the sloping direction of the terrain to define a ski trail to thereby extend the period prior to melting of fallen natural snow, and accordingly, extend the seasonal

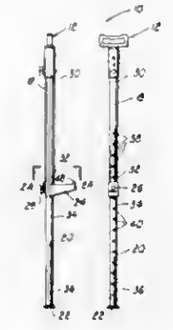


period during which a sloping terrain may be utilized for skiing with natural snow.

4,032,140
ADJUSTABLE STILT

Melvin R. Davis, 810 Toh-n-hah Trail, Wichita, Kans. 67212, and Roy G. Howe, Jr., 310 Champa, Pratt, Kans. 67124

Filed Mar. 29, 1976, Ser. No. 671,134
Int. Cl.² A63B 25/00
U.S. Cl. 272—70.1 7 Claims



1. An adjustable stilt for walking on, the stilt comprising:

a vertical first tube member having an upper end portion and a lower end portion, said first tube member having a plurality of apertures positioned on opposite sides thereof and is spaced relationship along the length of said first tube member;

a vertical second tube member having an upper end portion and a lower end portion, the upper end portion of said second tube member slidably received in the lower end portion of said first tube member, said tube member having a plurality of apertures on opposite sides thereof and in spaced relationship along the length of said second tube member;

a horizontal foot stirrup having a stirrup bolt received in an aperture through the length of said stirrup, the end of said bolt received in selected apertures in said first tube member and said second tube member and therethrough, the end of said bolt attached to a locking nut for securing said tube members to each other and to said foot stirrup; and

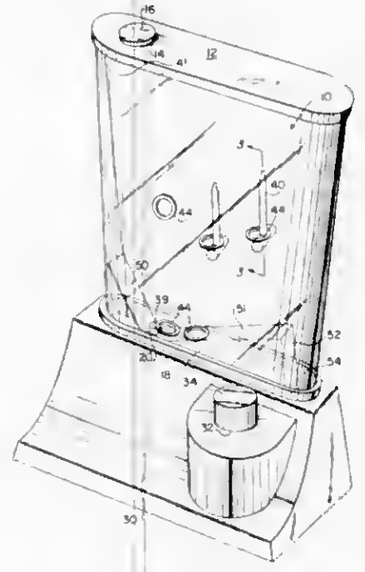
a handle having a hollow collar integrally formed therein, said collar receiving the upper end portion of said first tube member and attached thereto by a handle bolt and a locking nut, said handle having a plurality of apertures on opposite sides of said collar and in a spaced relationship along the length thereof, said handle being adjustable on the upper end portion of said first tube member by indexing the apertures in said collar with the apertures in the upper end portion of said first tube member;

the length of the stilt being adjustable by properly indexing the apertures in said first tube member with the apertures in said second tube members when said first tube member is raised or lowered with respect to said second tube member positioned therein.

4,032,141
AMUSEMENT DEVICE

Tomihiro Tanimura, No. 9-10, Tateisbi, Katsushika, Tokyo, Japan

Filed Mar. 9, 1976, Ser. No. 665,323
Claims priority, application Japan, Oct. 29, 1975, 50-147259[U]
Int. Cl.² A63F 9/00
U.S. Cl. 273—1 L 14 Claims

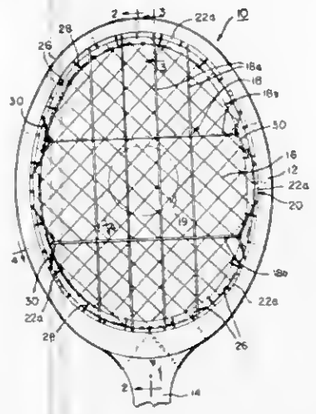


1. An amusement device, comprising a transparent enclosure for containing a liquid, at least one object within said enclosure having a specific gravity greater than the specific gravity of the liquid, target means within said enclosure for holding said object, pump means connected to the interior of said enclosure for transmitting liquid into said enclosure to generate currents within the liquid to cause said object to move within said enclosure sure towards said target means.

4,032,142
PRACTICE TENNIS RACKET

Robert M. Andrews, 3100-80th NE., Bellevue, Wash. 98004

Filed Sept. 12, 1975, Ser. No. 612,934
Int. Cl.² A63B 61/00
U.S. Cl. 273—29 A 13 Claims



1. A practice racket for a game such as tennis, by which a player executes a stroke against a game ball in a manner similar to a stroke executed with a conventional game racket in actual game play, while retaining the ball in the practice racket, said practice racket comprising:

a. a handle adapted to be grasped by the player to execute a stroke,

b. a peripheral frame attached to the handle and defining therewithin the perimeter of an impact area generally in a plane occupied by the frame, said impact area corresponding to an area in the game racket where the ball is normally struck in game play,

c. a flexible net means mounted to the frame and extending across said impact area, said net means being arranged to deflect at least moderately from the plane of the impact area upon engagement with a ball, and

d. retaining string means connected to said frame and extending across said impact area, said string means being sufficiently yielding to permit the ball to pass therethrough and into the net means when the ball is engaged with the practice racket at said impact area, and said string means having sufficient tension to cooperate with the net means to form a retaining pocket to hold the ball in the net means after the ball has passed through the string means.

4,032,143
COMPOSITE BASEBALL BAT

Alvin W. Mueller, St. Louis, Mo.; Robert J. Williams, Chicago, and Robert E. Ansel, Hoffman Estates, both of Ill., assignors to DeSoto, Inc., Des Plaines, Ill.

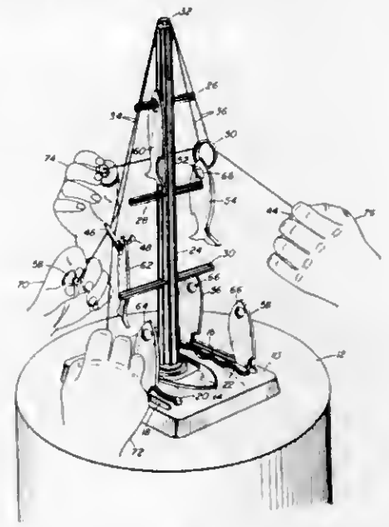
Filed Sept. 29, 1975, Ser. No. 617,439
Int. Cl.² A63B 59/06
U.S. Cl. 273—72 R 12 Claims

1. A baseball bat comprising a tubular, high yield strength aluminum core extending almost the full length of the bat, said core having a diameter of from three-fourths to 1 inch and a wall thickness of from 0.62 to 0.125 inch, said tubular core having adhered to its entire outer surface a foam plastic body having a density of from 30–50 pounds per cubic foot and an integral outer skin, said aluminum having a yield strength of at least 30,000 p.s.i.

4,032,144
FISHING GAME

Matthew A. Moustakas, Mercerville, N.J., assignor to CBS Inc., New York, N.Y.

Filed May 3, 1976, Ser. No. 682,209
Int. Cl.² A63F 9/14
U.S. Cl. 273—86 R 10 Claims



1. Game apparatus comprising, in combination:

a base member adapted to be supported on an underlying

surface and having at least one elongated slot formed in the upper surface thereof,

an elongated member vertically supported on said base member, said vertical member having at least one crossarm extending outwardly therefrom,

a pair of lines each tethered at one end to the upper end of said vertical member and each having a handgrip attached to the other end,

an annular ring member through which both lines of said pair extend, said ring member having a hook secured thereto, and

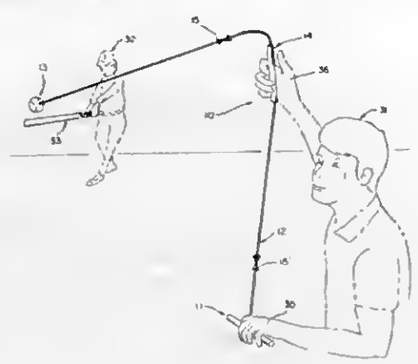
at least one game piece having an aperture therethrough sufficiently large to receive at the same time said hook and said crossarm, said game piece being removably supported in said slot in a position to be engaged by said hook and adapted to be moved with said ring member along said pair of lines by separation and convergence of said lines.

4,032,145

ACTION BATTER UP GAME APPARATUS

Max M. Taml, 1769 Pine St., Napa, Calif. 94558

Filed Sept. 24, 1975, Ser. No. 616,141
Int. Cl.² A63B 67/10
U.S. Cl. 273—90 **1 Claim**



1. An action batter up game apparatus comprising, in combination:

a spherical baseball;

a slide control of a size and configuration to be readily grasped in an individual's hand, the slide control consisting of an axially elongated cylindrically shaped body member having an open top end, an open bottom end, cylindrical sidewalls, and an axially elongated passageway extending longitudinally therethrough completely between the open top and bottom ends;

a handle of a size and configuration to be readily grasped in an individual's hand not holding the slide control, the handle consisting of an axially elongated cylindrically shaped body member manufactured of a flexible plastic material the body member having cylindrical side walls and a pair of opposite parallely disposed ends;

a pair of swivel members each identical to each other with each having opposite ends rotatable relative to each other about their longitudinal axis;

each of said swivel members being of a diameter greater than the diameter of the slide control passageway to prevent passage of the swivel members therethrough;

a first length of elongated flexible cord manufactured of nylon material having one end affixed to the spherical baseball at a point on the surface thereof, the opposite end of the cord being connected to one end of a first one of the swivel members;

a second length of elongated flexible cord manufactured of nylon material having opposite ends and having a diameter less than the diameter of the slide control passageway so as to be freely slidable therethrough;

one end of the second cord being connected to the remaining free end of the first one of the swivel members with the opposite end of the second cord being passed freely through the slide control passageway through its open top end and out of its open bottom end, the opposite end of the second cord then being connected to one end of a second one of the swivel members;

the longitudinal overall length of the first cord being greater than the length of the second cord;

a third length of elongated flexible cord manufactured of nylon material having one end connected to the remaining free end of the second one of the swivel members, the opposite end of the third cord being affixed to the flexible handle at a midpoint thereof in a manner projecting generally radially outwardly therefrom;

the overall length of the third cord being less than the length of the second cord and of the first cord; and

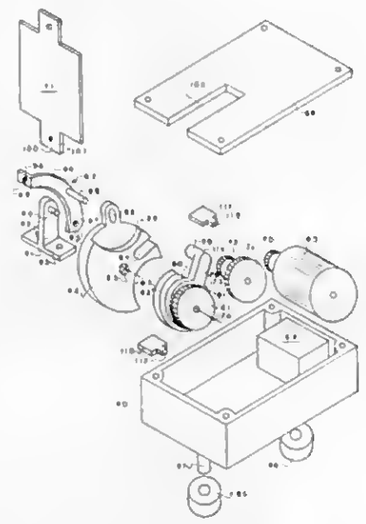
the disposition of the first and second swivel members serving to define the length of the path of travel of the second cord member through the slide control passageway thus limiting the radial inward and outward movement of the baseball relative to the slide control as manipulated by the individual's operation of the handle.

4,032,146

TARGET ASSEMBLY FOR A TARGET PRACTICE RANGE

Raymond W. H. Kim, Cook County, Ill., assignor to Bell & Howell Company, Chicago, Ill.

Filed May 7, 1976, Ser. No. 684,043
Int. Cl.² F41J 9/00
U.S. Cl. 273—105.6 **6 Claims**



1. A target assembly for use in a target practice range comprising:

a carriage base;

a motor mounted in said base including a driven shaft, said motor being capable of driving said driven shaft in first and second angular directions;

a first rotatable member connected in driven relation with said driven shaft including a first axis of rotation and an extension extending parallel to and radially spaced from said first axis, said extension being arcuately displaceable between a first position and a second position about said first axis with rotation of said rotatable member;

a second rotatable member having a second axis of rotation and including a generally radial slot extending from the periphery of said second member towards said second axis and dimensioned for receiving said extension of said first rotatable member, said first rotatable member and said second rotatable member being arranged relative to one another for aligning said slot with said extension; and

a target forming member coupled to said second rotatable member and displaceable by said second rotatable member between a vertical position and a horizontal position as said second rotatable member is rotated under the influence of said extension within said slot.

4,032,147

COMPOSITE DART BODY

Walter M. Sheldon, Jr., Deerfield, Ill., assignor to Fansteel Inc., North Chicago, Ill.

Filed May 17, 1976, Ser. No. 687,168
Int. Cl.² A63B 65/02
U.S. Cl. 273—106.5 R **10 Claims**

1. An improved composite dart body for a hand throwing dart which comprises:

a. a slender, substantially cylindrical, central, metallic body having a density of 18.5 to 19.3 grams per cubic centimeter,

b. a front body bonded to one end of said central body formed of a machinable metal having a recess to receive a dart point, and

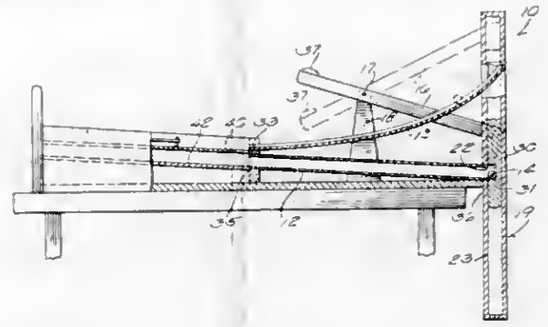
c. a rear body bonded to the other end of said central body formed of a machinable metal having a recess to receive a fletching assembly.

4,032,148

GAME APPARATUS

Richard E. Sanders, B. P. 10, Doba, Chad, Africa

Filed Sept. 18, 1975, Ser. No. 614,563
Int. Cl.² A63D 3/02
U.S. Cl. 273—120 R **6 Claims**



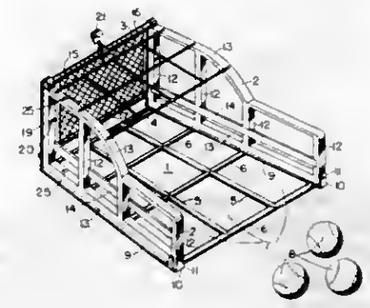
1. In an improved elevator associated with a gameboard, a hollow upright standard having walls sized to contain spherical playing pieces and having upper and lower ends, a rod slideably mounted within said standard, and inlet hole on the lower part of the standard, an outlet hole on the upper part of the standard, said holes communicating between the interior and exterior of the standard, and arranged so that the playing piece leaves the standard through the outlet hole transverse to the direction in which the playing piece enters the standard through the inlet hole, a fixed planar lifting surface formed in the rod, said lifting surface being inclined obliquely to slope both toward the outlet hole and away from the inlet hole, the inclination of the surface being in a direction between the orientation of the inlet hole and the orientation of the outlet hole, said surface cooperating with two of said walls to form a channel to admit a piece from the inlet hole in a first direction and cooperating with another said wall to form a channel to discharge a piece from the outlet hole in a second direction, and means for sliding said rod in said standard from a lower position in which the lifting surface is aligned with the lower edge of the inlet hole to an upper position in which the lifting surface is aligned with the lower edge of the outlet hole.

4,032,149

TARGET GAME FOR ROLLING MISSILE

Delbert B. Lansberry, 211 S. Trask St., Hillsbourgh, Fla. 33609

Filed Oct. 10, 1975, Ser. No. 621,377
Int. Cl.² A63F 7/00
U.S. Cl. 273—123 R **4 Claims**



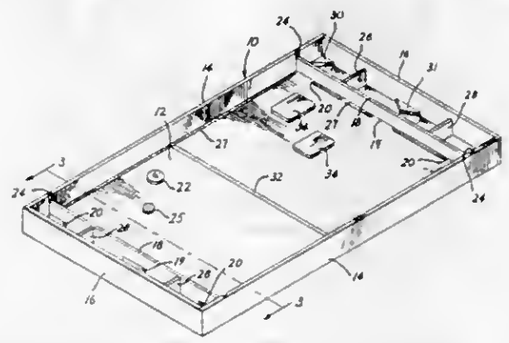
1. In combination, a target game comprising missiles and a partially enclosed target element; said target element having netted rear gate means; upstanding side frame members, each defined by a plurality of vertical posts connected by upper and lower beams and an intermediate bumper bar; a horizontally disposed scoring grid defined by a plurality of longitudinal and latitudinal ribs arranged to form open scoring sectors and integrally affixed to said side frame members; and a top web member attached to a portion of said side frame members, whereby said target element has a forward unobstructed portion for receiving said missiles when launched by a player.

4,032,150

PADDLE AND PUCK GAME EQUIPMENT

David C. Wilson, 35 Manor Loop, Roseburg, Oreg. 97470

Filed May 14, 1975, Ser. No. 577,329
Int. Cl.² A63F 3/00
U.S. Cl. 273—126 R **6 Claims**

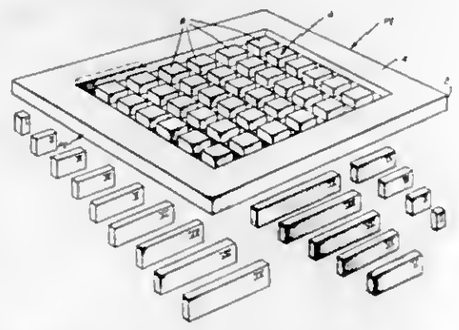


1. Playing equipment for a puck and paddle game comprising, the combinations with a puck and hand held playing paddles of an open tray which includes upstanding side and end wall members, a floor member that provides a playing surface divided into courts by a center line, and goal strips at opposite ends of the tray having scoring slots through any one of which the puck may be driven, said side walls having pairs of transversely aligned vertical slots in which the ends of the respective goal strips may be slidably and removably contained, the lower margins of the side walls and the goal strips being coated with a covering of rubbery material to increase the rebounding liveliness of said members while deadening the sound producing by the playing of the game.

4,032,151
GAME BOARD APPARATUS

Harold F. Morse, 1765 Gilpin St., Denver, Colo. 80218

Filed June 10, 1976, Ser. No. 694,724
Int. Cl.² A63F 3/00
U.S. Cl. 273—131 B 8 Claims

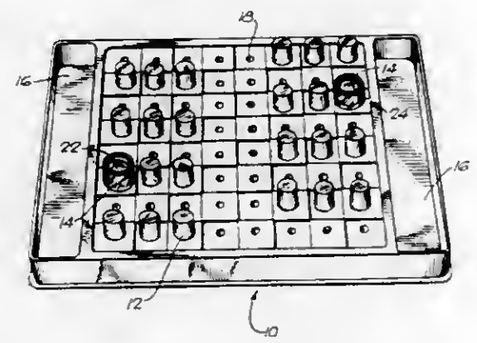


1. A game playable by two opposing players, said game consisting of a playing board having two opposite playing sides and spaced apart intersecting slideways located between said sides, and a set of game pieces for each player engageable in the slideways, said game pieces occurring in uniformly graduated lengths, and game pieces of each graduated set differing in length progressively one from another by a unit dimension corresponding to the width of one of the slideways, differing combinations of pieces for each set being combinable on the board in abutting relationship by a player to extend from one of the playing sides to the other playing side to constitute a game-winning placement of pieces.

4,032,152
BOARD GAME

Edward J. Schiffman, Nashville, Tenn., assignor to Aladdin Industries, Incorporated, Nashville, Tenn.

Filed Jan. 23, 1976, Ser. No. 651,948
Int. Cl.² A63F 3/02
U.S. Cl. 273—131 BA 6 Claims

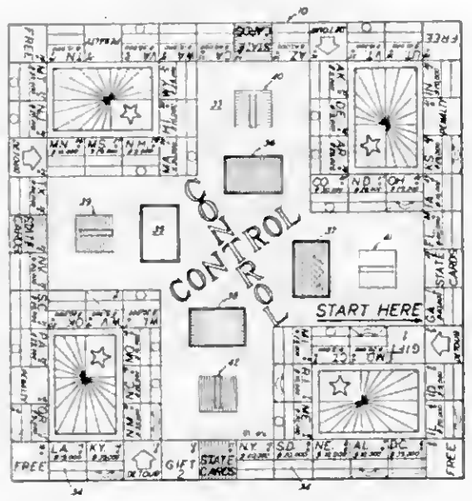


1. A board game for competition between two players comprising
a. a playing surface having an eight by eight array of playing squares including an aperture through the surface provided at the center of each square,
b. two sets of pegs, each set of a different color, each peg including an extension depending downwardly therefrom and dimensioned to be received in said apertures to prevent sliding movement of said pegs on said playing surface.
c. key marker means consisting of a single key marker for each set of pegs, said markers being cylinders having a hollow central portion of a dimension sufficient to be placed over said pegs,
whereby each player attempts to be first to move his key marker one square at a time from one side of the playing surface to the other side, occupying only squares which have pegs located thereon.

4,032,153
BOARD GAME ASSEMBLY

Daniel E. Daum, 977 Columbia Ave., Atlanta, Ga. 30309

Filed July 6, 1976, Ser. No. 702,622
Int. Cl.² A63F 3/00
U.S. Cl. 273—134 AT 10 Claims



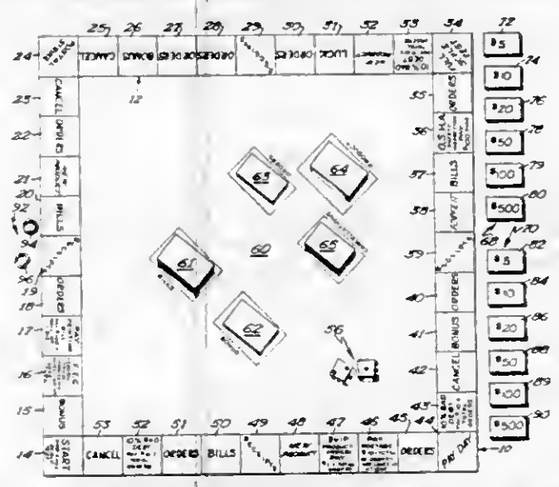
1. A board game assembly for at least two players, comprising:
a. a board having thereon a plurality of juxtaposed sections forming a primary path of play about said board, other of said sections selectively interconnecting said primary path to form alternate playing paths, selected ones of said sections of said primary and alternate paths having means for receiving thereon a removable mark to signify the degree of control of said section by a player;
means for identifying the position of a player along said paths;
c. means for marking on said receiving means;
d. means for registering the number of marks available to a player;
e. artificial money for a player for purchase of said selected sections of compensation to another player as a consequence of placing the identifying means of that other player on one of said selected sections; and
f. chance-controlled means for determining the number of said sections a player may advance his identifying means along said paths during one sequence of play;
g. said selected sections having thereon means for determining the amount of money necessary for obtaining control of said selected sections; and
h. wherein certain of said selected sections have means thereon to indicate that a player controlling a preselected number of said selected sections receives extra compensation when the identifying means of another player is on one of said selected sections.

4,032,154
BOARD GAME APPARATUS

David L. Maglera, Hopkins, Minn., assignor to Wicks & Nemer, P.A., Minneapolis, Minn.

Filed July 8, 1974, Ser. No. 486,607
Int. Cl.² A63F 3/00
U.S. Cl. 273—134 AT 2 Claims

1. Game board apparatus comprising, in combination: first means indicating limits for at least one type of game points, with the game points consisting of orders and cancellations; secon means adding and/or subtracting game points in a random manner; monetary tokens; third means adding or subtracting from the balance of monetary notes in a random manner; a game board having locations arranged thereon forming a path, the locations including reward/penalty locations, major game object locations for directing the player to follow the instructions of the second means adding or subtracting game points, and minor game object locations for directing the player to follow the instructions of the third

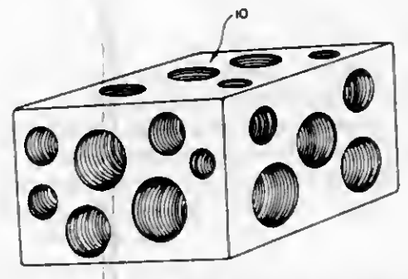


means adding or subtracting from the balance of monetary notes; game markers for movement around the locations on the board; and chance taking apparatus for determining the movement of the game markers around the locations on the board during play, wherein a player tries to meet two separate game objects, where the first game object is determined by the first means and the second game object is to maintain a minimum balance of monetary tokens.

4,032,155
SPLIT BOLT AND BLOCK GAME

Wesley L. Thomas, 109 S. Catalina, Los Angeles, Calif. 90004

Filed Mar. 15, 1976, Ser. No. 666,623
Int. Cl.² A63F 9/08
U.S. Cl. 273—156 4 Claims



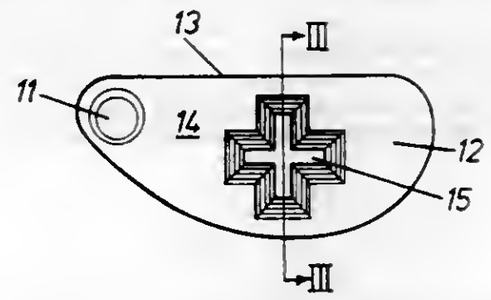
1. A toy or game comprising: a block having a plurality of tapped holes therein; and a plurality of split bolts, each comprising a plurality of parts adapted to be fitted together to provide a bolt of a size to be received in a corresponding one of the holes in the block.

4,032,156
ASSISTING ORIENTATION OF A MEMBER AS IT MOVES IN A LINEAR PATH

Trevor George Clarke, 6 Summercourt Drive, Ravenshead, Nottinghamshire, England

Filed Nov. 3, 1975, Ser. No. 628,316
Claims priority, application United Kingdom, Nov. 1, 1974, 47329/74
Int. Cl.² A63B 53/04
U.S. Cl. 273—164 4 Claims

1. A golf club head having a flat striking face and substantially flat top and bottom faces, the top face having internal walls defining an aperture in the top face and opening at the bottom face, said walls tapering towards each other so that the aperture reduces in lateral dimensions away from the top face, said walls including at least two walls inclined to each other in

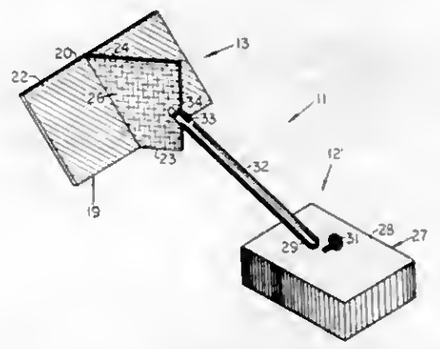


the plane of the top face and also inclined to relatively perpendicular planes.

4,032,157
GOLFER'S TRAINING DEVICE

Walter M. Carpenter, 1825 W. 38th Place, Davenport, Iowa 52806

Filed Feb. 13, 1976, Ser. No. 657,913
Int. Cl.² A63B 69/36
U.S. Cl. 273—183 E 9 Claims



1. A self-instruct golf swing analyzer for use by a golfer, said analyzer comprising:
a base means having a lower ground engageable portion and an upper portion; and
an indicator means for communicating to the golfer the body movement of the golfer during a golf swing, said indicator means being attached to said upper portion and including first and second planar indicator members, said second planar indicator member being affixed normal to said first planar indicator member intermediate the ends of said first planar indicator member, the opposite planar surfaces of said planar members including markings distinctly different from one another and detectable by a golfer from a golfing stance upon improper head and body movement during the execution of a golf club swing the golfer assuming a stance adjacent said base means and fixing his gaze upon said indicator members.

4,032,158
METHOD AND APPARATUS FOR INDICATING ANGULAR DISPLACEMENT

Colin Howard Stanwell-Smith, Cambridge; Dexter Robert Plummer, Ongar; Frederick James Easthope, Cambridge, and Jonathan Humfrey Pope, Fulbourn, all of England, assignors to Strathearn Audio Limited, Belfast, Ireland

Filed Sept. 3, 1975, Ser. No. 610,091
Claims priority, application United Kingdom, Sept. 5, 1974, 38850/74
Int. Cl.² G11B 3/10; G01D 5/30
U.S. Cl. 274—23 A 3 Claims

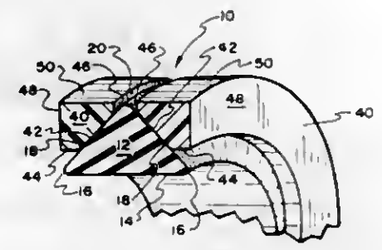
1. In a phonograph having a pivoted pickup arm, apparatus

for use in providing a signal which indicates an angular displacement of the arm in a first plane from a desired axis, while not being influenced by an angular displacement of the arm in a second plane at right angles to the first plane, the apparatus including a mirror mounted on the arm, a reflecting surface of the mirror having a planar cross-section in said first plane and a convex cross-section in said second plane plane, a sensor including a source of electromagnetic radiations and a detector of the radiations said detector having two detecting elements, with one element on either side of said second plane, each producing a signal which varies as a function of the amount of recieved radiation, means for mounting the said detector elements with respect to the mirror and the source that radiations from the source are reflected from the mirror to the detector elements, the relative amounts of radiation received by the respective elements being a function of the displacement of the arm from the desired axis, said first plane whereby the arm can be moved according to the output from the detector elements to correct any angular displacement.

4,032,159
INTERFERENCE COMPRESSION SEAL

Gordon T. Zitting, Sandy, Utah, assignor to Poly Seal, Inc., Salt Lake City, Utah

Filed Oct. 28, 1975, Ser. No. 626,589
Int. Cl.[1] F16J 9/06
U.S. Cl. 277—145 **2 Claims**

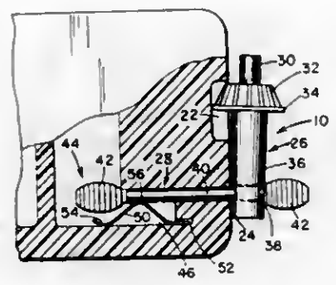


1. An interference compression seal assembly comprising:
first and second relatively displaceable machine parts;
a delta-shaped annular seal of deformable material having memory, said delta-shaped seal comprising three surfaces only, a base surface to engage substantially all of the base of a U-shaped groove in the first machine part and two convergent diagonal side surfaces merging at an apex, said seal further comprising three corners, one corner being disposed at the intersection of each two surfaces, two of the seal corners to be respectively disposed in the base corners and the third seal corner comprising the apex to deformingly engage the second machine part.
two generally triangularly shaped annular anti-extrusion rings having three major surfaces only and comprising hard rigid synthetic resinous material one of each of said ring surfaces being diagonally oriented between the other ring surfaces, the diagonal surface of the two rings respectively contiguously engaging substantially the entire length of the two diagonal surfaces of the delta-shaped seal, one of the other surfaces of each ring respectively engaging the opposed side walls of the groove and, the second of the other surfaces of each ring along their full length respectively engaging a common surface of a second machine part, the anti-extrusion rings being spaced from the base of the grooves and transmitting force to said groove base solely through diagonal side surfaces of the seal, the anti-extrusion rings constricting and compressing the delta-shaped seal inwardly and toward the second machine part when so placed in said groove, each of the two anti-extrusion rings being separate one from the other at said apex seal corner and each presenting at said second other ring surface an annular circumferential wear surface, to engage said common surface of the second machine part which experiences relative motion in respect to said first machine part, the one other surface of each anti-extrusion ring comprising a radial surface, to contact the adjacent side wall of the groove.

4,032,160
CHUCK KEY HOLDER

Alvydas Petras Karasa, Belair, and Stanley Alan Markle, Lutherville, both of Md., assignors to The Black and Decker Manufacturing Company, Towson, Md.

Filed Sept. 20, 1974, Ser. No. 508,009
Int. Cl.[2] B25B 13/44; F16D 1/06
U.S. Cl. 279—1 K **24 Claims**



9. In combination, a chuck key for a portable electric tool including a body having an elongated sliding handle slidable along and rotatable about a longitudinal axis of said handle relative to said body, paddle means at each end of said sliding handle; pocket means formed in a structure for mounting said chuck key on said structure, said pocket means comprising guiding means having an opening having a shape corresponding to the projection of said handle and said paddle means on a plane perpendicular to the axis of said handle; first corner means formed in said pocket means for engaging one of said paddle means when said handle is inserted into said opening and rotated from a first position aligned with said opening to a second position out of alignment with said opening whereby said handle is held in said opening and cannot be withdrawn from said opening while in said second position; second corner means for laterally engaging said one paddle means to prevent said handle from being rotated beyond said second position thereby ensuring that said handle is in said second position when said handle is rotated into said second position; and, cam locking means integral with said body for coacting with said other paddle means for tightly holding said handle between said first corner means and said body when said handle is rotated into said second position whereby said body is held against said structure.

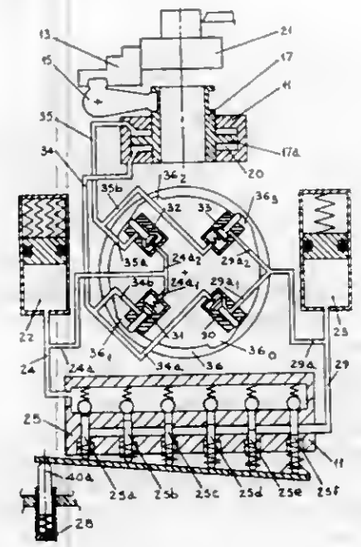
4,032,161
POWER OPERATED CHUCK

John Richard Peden, Liphill Quay, Bere Ferrers, Devon, and Derek Vivian Ivor Santillo, 66 Elm Road, Mannamead, Plymouth PL4 7BB, both of England

Filed Apr. 4, 1975, Ser. No. 565,318
Claims priority, application United Kingdom, Apr. 5, 1974, 15371/74
Int. Cl.[2] B23B 31/30
U.S. Cl. 279—1 H **6 Claims**

1. In a power operated work holding chuck of the type having:
a chuck body,
radially movable jaws on the chuck body,

fluid pressure operated actuator means,
means linking said pressure operated actuator means to said jaws on said chuck body, whereby to transmit movement of said pressure operated actuator means to said jaws,
the improvement wherein:
said chuck body is formed in two parts which are secured together and rotatable with respect to one another, one of said chuck body parts housing said fluid pressure operated actuator means,
means mounting one of said chuck body parts on a spindle of a machine tool,
means defining fluid pressure reservoirs in one of said two chuck body parts,
a power source comprising means within said two chuck body parts for generating, as said two chuck body parts rotate with respect to one another, fluid pressure for driving said fluid pressure operated actuator means, said power source acting to pump fluid from one said reservoir to the other,



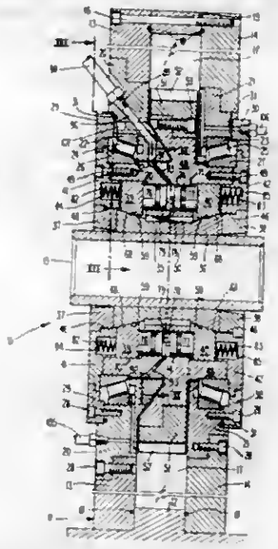
said fluid pressure generating means comprising a plurality of pumps operated by relative rotation of said two relatively rotatable parts of said chuck, said plurality of pumps being mounted in a circle on one of said two chuck body parts and having operating plungers associated therewith extending axially of the chuck bod,
a swash plate carried on the other of said two chuck body parts, said swash plate being pivotally mounted to turn about an axis which lies in a plane defined by the free ends of the plungers of said pumps when they are not depressed, and
resilient biasing means engaging said swash plate and urging it to a position in which it is inclined with respect to the said plane, said resilient biasing means permitting said swash plate to be displaced about said pivot thereof as the pressure delivered by said pumps increases until it lies substantially parallel to said plane defined by said free ends of said plungers.

4,032,162
MACHINE TOOL CHUCK

James D. Flinchbaugh, York, Pa., assignor to Weldon Hydraulics, Inc., York, Pa.

Filed July 26, 1976, Ser. No. 708,488
Int. Cl.[2] B23B 31/19, 31/30
U.S. Cl. 279—4 **16 Claims**

1. A chuck for machine tools for holding two work pieces, including
a. two separate, axially aligned hollow work holding elements, each element having capacity to contract diametrically to work clamping condition and to expand diametrically to work releasing condition,
b. a pair of annular, axially spaced actuators, each actuator being disposed externally of one of the work holding elements in telescopic relation thereto, and each actuator having capacity for axial movement relative to its work holding element,
c. two axially spaced annuli of pistons, each annulus comprising a plurality of angularly spaced pistons disposed adjacent to one of the actuators,
d. an annulus angularly spaced cylinders for containing the pistons, located intermediate the actuators,

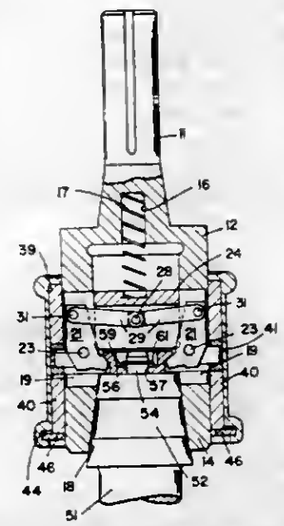


e. actuating means for advancing the pistons of each annulus of pistons into engagement with their adjacent actuator, to advance the actuator to contract its work holding element, and
f. release means associated with the actuators and operative to retract the actuators to permit the work holding elements to expand to work releasing condition.

4,032,163
QUICK CHANGE IN-MOTION TOOL CHUCK

Donald G. Holt, 508 29th Ave., Oakland, Calif. 94601

Filed Jan. 26, 1976, Ser. No. 652,486
Int. Cl.[2] B23B 31/18
U.S. Cl. 279—37 **11 Claims**



1. A tool chuck system for securing and removing a tool in a rotary machine during rotation thereof comprises a spindle adapted to be secured to the rotary machine, a barrel extending axially from said spindle, said barrel including a bore extending axially therein from the distal end thereof; an actuator member disposed about said barrel and slidably translat-

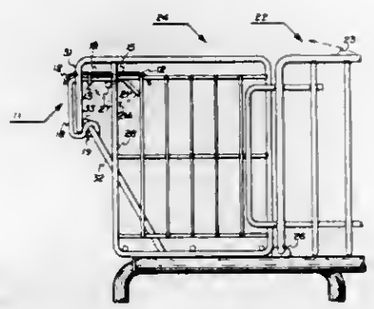
able thereon; a cylindrical member slidably disposed in the inner end of said bore; a first pair of opposed, diametrical slots disposed within said barrel; a pair of toggle members, each of said toggle members pivotally disposed in one of said first pair of slots; a pair of linking members, each of said linking members pivotally joined at one end to said cylindrical member and pivotally joined at the other end to one end of one said toggle members, said linking members being rotatable through a position perpendicular to said axis of said barrel to form a past center linking arrangement with said toggle members, and means for joining said cylindrical member and said actuator member in axially slidable engagement.

4,032,164

SHOPPING CART SHELF ASSEMBLY

Donald H. Frisch, 6759 Mineral Drive, San Diego, Calif. 92119

Filed June 25, 1976, Ser. No. 699,805
Int. Cl.² B62B *5/00*
U.S. Cl. 280—33.99 A **5 Claims**



1. On a shopping cart of the type utilized by customers in retail outlets, in which a substantially horizontally rectangular cross-sectioned marketbasket terminating in its upper back portion in a rigid horizontal crossbar member is mounted on wheels or castered and has a rearwardly protruding handle parallel to and in a lower position in relation to said crossbar member for pushing the cart, the improved shopping cart shelf assembly comprising:

a flat substantially rectangular shelf;

two L-shaped mounting rods respectively extending downwardly from opposite ends of said shelf member, said mounting rods being spaced apart a distance substantially equal to the length of the handle; and means for rotatably coupling said mounting rods through their horizontal section to the lower surface of said shelf member around an axis perpendicular to the length of said shelf member so that the vertical sections of said rods can be folded to a central flat position for shipping purposes, the vertical section of each mounting rod terminating in a hook portion dimensioned for receiving a side of said handle, and the end of the horizontal section bending downward to lock over said crossbar member when said hook portions are coupled to said handle.

4,032,165

DISASSEMBLABLE ARTICLE TRANSPORT, STORAGE AND HANDLING TRUCK

Herman F. Russell, 7350 Brantford Road, Dayton, Ohio 45414

Filed Oct. 9, 1975, Ser. No. 620,958
Int. Cl.² B62B *3/02*
U.S. Cl. 280—79.3 **3 Claims**

1. A disassemblable heavy duty article transport, storage and handling truck adapted to be moved along a floor, said truck comprising

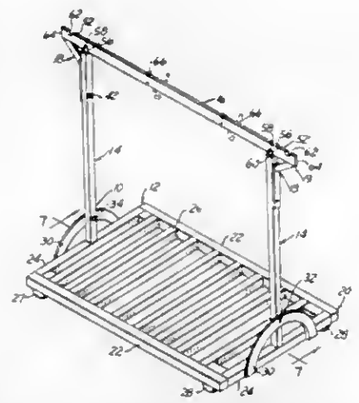
an elongated generally rectangular base structure having laterally- spaced opposite sides and having longitudinally-spaced opposite ends with mid portions thereon,

casters secured to and rollably supporting said base structure in vertically-spaced relationship to the floor whereby to provide space for the insertion of forklift truck forks beneath said base structure,

a pair of upstanding open-centered brace members secured to and extending along a respective opposite end of said base structure in laterally- disposed relationship to said base structure,

each brace member having a central portion disposed above and remote from the mid-portion of a respective end of said base structure,

each brace member having opposite end portions secured to said nearer end of said base structure remote from said mid-portion thereof,



a pair of upright members disposed adjacent said brace members in detachable supported relationship with said base structure,

means separably connecting said brace members to the upright members adjacent thereto,

an elongated article suspension structure detachably secured to the upper end portions of said upright members in spaced parallel relationship to said base structure,

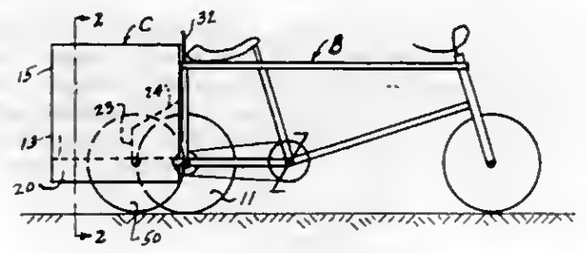
and means separably connecting said article suspension to said upper end portions of said upright members.

4,032,166

BICYCLE PACKAGE TRANSPORT DEVICE

W. Leon Montgomery, 6632 Kingsbury Drive, Dallas, Tex. 75231

Filed Feb. 26, 1976, Ser. No. 661,713
Int. Cl.² B62K *27/06*
U.S. Cl. 280—204 **4 Claims**



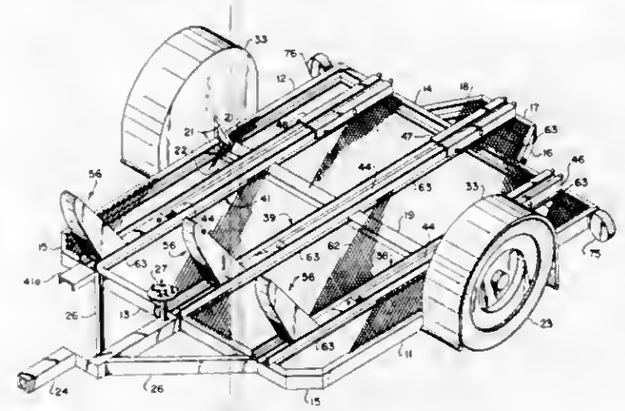
1. A load carrying device for a bicycle having a frame, a seat post, a ground engaging rear wheel, and a front steerable wheel, said device comprising: a container having a wheel well along its forward central portion for accommodating said rear wheel, means for rigidly securing said container to said frame rearwardly of said seat post, a pair of outrigger assemblies, a ground engaging wheel rotationally mounted on each of said outrigger assemblies, and means for mounting each of said outrigger assemblies on opposite sides of said containers, respectively, including hinge means secured between each of said outrigger wheel assemblies and an adjacent side face of said container, roller spacer means between said adjacent side face of said container and said wheel assembly, and elastic snubber means between said container and said outrigger wheel assemblies for biasing said assemblies toward said container against said roller means, said mounting means permitting said outrigger assemblies to move vertically, laterally, and tiltably relative to said container.

4,032,167

TRAILER FOR TRANSPORTING MOTORCYCLES

Wasiliy Chereda, 914 Miller St., Holdrege, Nebr. 68949

Filed Jan. 9, 1976, Ser. No. 647,736
Int. Cl.² B62D *63/06*
U.S. Cl. 280—106 T **10 Claims**



1. A trailer for transporting motorcycles comprising

a. a rigid frame having a horizontal load-supporting bed;

b. a pair of ground-engaging wheels mounted on aligned stub axles which are carried by and project from opposite sides of the frame, the axles being centered at an elevation above that of the bed;

c. at least one elongated, channel-shaped main track supported on the bed and extending forward from the rear margin thereof, the main track serving to receive and closely confine the tires of a motorcycle;

d. a wheel well fixed in place at the forward end of the main track and serving to receive a portion of the front wheel of a motorcycle, the well comprising side panels which extend along the sidewalls of the cycle tire in both the upper and lower front quadrants of the wheel, and a front panel which engages the tire tread in both of those quadrants, whereby turning, forward and vertical motion of the front cycle wheel is prevented;

e. a channel-shaped auxiliary track section pivotally connected with the frame at the rear end of the main track and forming a longitudinal extension of the main track, the auxiliary track section being free to swing about a horizontal axis and having a loading position, in which it engages the ground and forms a ramp for leading a motorcycle onto the main track, and a clamping position, in which it engages the tread of the rear tire of the cycle stored on the main track at a point in the upper rear quandrant of the cycle wheel;

f. deck means fixed to the frame and extending longitudinally along both sides of the main track, and deck means providing secure footing for a driver guiding a cycle onto the trailer under power; and

g. clamping means for interconnecting the frame and the auxiliary ramp section when the latter is in said clamping position and for pressing that track section tightly against the rear tire of a cycle stored on the main track,

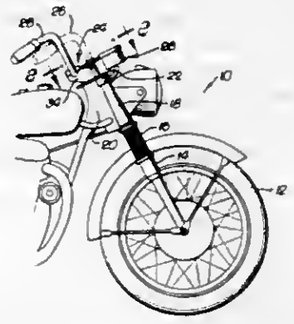
h. whereby the stored cycle is compressed longitudinally between the front panel of the wheel well and the auxiliary track section and is retained in place solely by the action of the clamping means.

4,032,168

HANDLEBAR RISER AND SETBACK WITH DASHBOARD FOR MOTORCYCLES

Donald E. Emerson, Palmdale, Calif., assignor to Space-Age Control, Inc., Paramount, Calif.

Filed Feb. 2, 1976, Ser. No. 654,061
Int. Cl.³ B62K *21/12*
U.S. Cl. 280—279 **7 Claims**



1. In a motorcycle having a handlebar and handlebar supporting means,

the improvement comprising:

mounting means for securing the handlebar on the handlebar supporting means,

said mounting means being adapted to set the handlebar back from and above the handlebar supporting means, and

a dashboard on said mounting means,

said dashboard extending forwardly on said mounting means and being comprised of a plate spaced upwardly from the handlebar supporting means and

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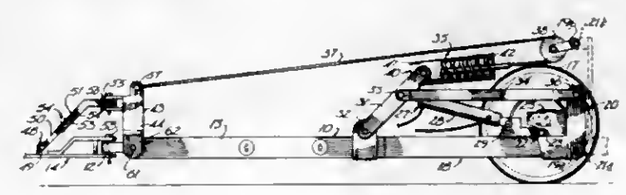
4,032,169

DRAWBAR ASSEMBLY

Alton N. Filan, and A. LaVerne Filan, both of Rte. 1 Box 69, Waitsburg, Wash. 99361

Continuation-in-part of Ser. No. 578,149, May 16, 1975, Pat. No. 3,974,880. This application June 7, 1976, Ser. No. 693,358
Int. Cl.² B60D *1/16;* **A01B** *59/042*
U.S. Cl. 280—405 B **7 Claims**



1. In a drawbar adapter assembly for connecting a three point hitch implement to a towing vehicle, the combination comprising:

a first framework;

a forward connector member on a tongue of said first framework for operative engagement with a complementary hitch member of a towing vehicle;

a secondary framework mounted to said first framework for pivotal movement about a horizontal pivot axis and having three rearwardly facing three point hitch connectors thereon for operative engagement with complementary connectors of a three point hitch implement;

wheel means for movably supporting the first framework and secondary framework above the ground surface;

wherein the three point hitch connectors are adapted to support an attached implement extending rearward of the wheel means;

jack means interconnecting said first and secondary frameworks and operable to pivot said three point connectors

and attached implement relative to said first framework between (a) an operative position wherein the implement is held in an operative ground engaging condition for movement by the draft vehicle and (b) an inoperative position wherein the implement is lifted from the ground and is supported by said adapter assembly;

tongue load relieving means operatively connected between the three point hitch connectors and the towing vehicle for transferring part of the static load of the implement to the towing vehicle when said implement is carried in the inoperative position; and

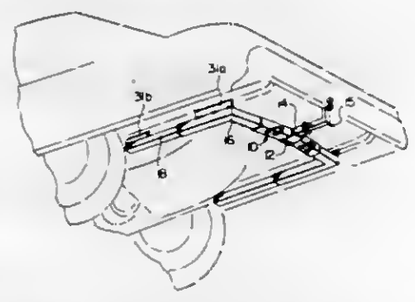
tongue stabilizing means for applying a substantially vertical reaction force at a location rearwardly adjacent the connector member in response to substantially vertical moment of the tongue about the axis of said wheel means.

4,032,170

KIT OF PARTS FOR A WELDED TRAILER HITCH

Leonard A. Wood, P.O. Box 750, North Bay, Ontario, Canada

Filed Oct. 15, 1975, Ser. No. 622,484
Claims priority, application Canada, Oct. 31, 1974, 212800
Int. Cl.² B60D 1/00
U.S. Cl. 280—495 17 Claims



1. A kit of parts for an automobile trailer hitch, comprising a cross member including a central tubular part and two symmetrically arranged tubular arms extending from opposite sides of said tubular part, and two angled side members each having two legs the end portions of which are each sized so as to be insertable selectively into the outer ends of the said tubular arms, said legs being set at such an angle that with one leg inserted into one of said tubular arms the other leg is substantially parallel to the axis of said central tubular part, and said two legs of each angled side member being of differing lengths so that different hitcb configurations are obtained by inserting a longer or shorter leg into the respective tubular arm.

4,032,171

TRAILER HITCH LOCKING DEVICE

Cloy L. Allen, P.O. Box 224, Wingate, Tex. 79566, and Bobby L. Hook, 1207 S. 6, Merkel, Tex. 79536

Filed May 17, 1976, Ser. No. 687,279
Int. Cl.² B60D 1/06
U.S. Cl. 280—507 6 Claims

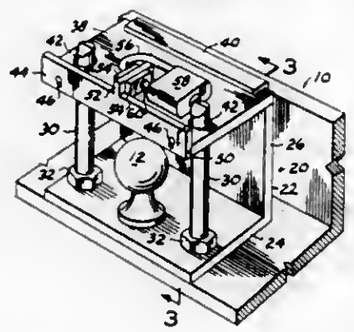
1. In combination with trailer hitch components including a trailer hitch socket secured to a trailer hitch ball having its shank connected with a tow bar transversely secured to the rearward end of a towing vehicle, the improvement comprising:

a base member having a generally flat portion overlying said tow bar and having an aperture in said flat portion surrounding an intermediate portion of the shank of said ball;

a pair of upstanding bolts projecting above the upper limit of said hitch socket and disposed in spaced parallel relation on opposite sides of said ball longitudinally of said tow bar,

said bolts each having a recess in its periphery forming a horizontal shoulder adjacent its upper end,

said base member having a generally upright portion disposed forwardly of said ball;



a top member overlying said base member and pivotally connected with said upright portion for vertical pivoting movement toward and away from said ball; and,

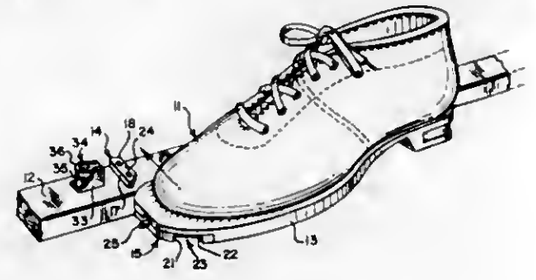
a lockable bar means slidably supported by said top member for entering the recesses in said bolts and preventing movement of said top member relative to said bolts.

4,032,172

TOURING SKI BOOT BINDING

Ewald D. Pyzel, and Harold E. Codding, both of Reno, Nev., assignors to Ski Safe Inc., Carson City, Nev.

Division of Ser. No. 602,976, Aug. 8, 1975, Pat. No. 4,004,823.
This application Apr. 5, 1976, Ser. No. 673,656
Int. Cl.² A63C 9/18
U.S. Cl. 280—615 2 Claims



1. A touring ski binding for releasably securing the toe of a touring ski boot to a touring ski comprising:

a ski binding member secured to the upper surface of a touring ski and a boot binding member secured to the toe of a touring ski boot, each of said binding members having transversely disposed L-shaped binding elements adapted to releasably engage each other; and spring loaded latch means for releasably retaining the binding members in engagement with each other;

the L-shaped binding element of the ski binding member having a vertically disposed transverse lower portion secured to the upper surface of the ski and a horizontally disposed transverse upper portion spaced a predetermined distance above the upper surface of said ski, the horizontally disposed portion of the ski binding member being formed with a latch receiving notch;

the L-shaped binding element of the boot binding member being defined by an L-shaped slot formed in the boot binding member and adapted to receive the L-shaped binding element of the ski binding member, the boot binding member having a horizontally disposed portion that underlies the horizontally disposed portion of the ski binding member when said binding members are in mutual engagement with each other; and

the spring loaded latch means comprising a latch plunger mounted in a longitudinal bore formed in the boot binding member form longitudinal movement to its latched position and to its unlatched position, said latch plunger being formed with a downward facing recess adapted to receive the horizontal portion of the ski binding member when the latch plunger is at its unlatched position and with a latch portion disposed immediately adjacent said recess of said latch plunger, said latch portion being adapted to be received in the latch receiving notch of the ski binding member when the latch plunger is at its latched position, and a latch spring urging said latch plunger to its latch position.

4,032,173

WHEELED CARRIERS

John Dennis Clegg, Old Garden, 205A Banbury Road, Stratford-upon-Avon, Warwick, England

Filed Oct. 3, 1975, Ser. No. 619,363
Claims priority, application United Kingdom, Oct. 4, 1974, 43046/74
Int. Cl.² B62B 1/00
U.S. Cl. 280—650 8 Claims

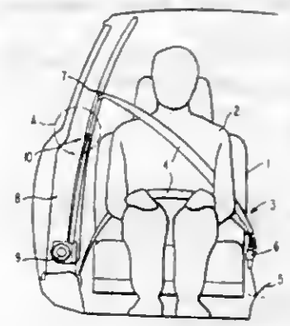
1. In a wheeled carrier of the kind comprising a frame which has a base provided with ground-engaging wheels and a collapsible support which is mounted on the base and is movable between an erected position wherein it extends upwardly from the base and a collapsed position wherein it lies generally flat on the base, a collapsible seat for a child which is supported by a part of the support movable between an erected position to position the seat for use when the support is erected and a collapsed position to collapse the seat when the support is collapsed, and locking means connected between parts of the support for releasably locking the support in the erected position, the improvement wherein the seat-supporting part of the support is operatively connected to the locking means to operate the locking means to lock the support in the erected position on movement of the seat-supporting part towards its erected position and to release the locking means to permit collapsing of the support on movement of the seat-supporting part towards its collapsed position, and the support comprises a first part which is connected to the base for pivoting relative thereto about a first horizontal axis, a second part which is connected to the upper end of the first part for pivoting relative thereto about a second horizontal axis parallel to said first horizontal axis, and a third part which is connected to the base for pivoting relative thereto about a third horizontal axis spaced from and parallel to said first horizontal axis, the second part having a portion which extends downwardly from its pivotal connection to the upper end of the first part and which is connected to the upper end of the third part for pivoting relative thereto about a fourth horizontal axis spaced from and parallel to said second horizontal axis, whereby the three parts of the support are movable between an erected position in which the first and second parts lie generally in a common plane disposed at an inclination to the horizontal and the first and third parts together form a structure of triangular form from which the second part extends upwardly, and a collapsed position in which the three parts are folded generally flat on top of the base.

4,032,174

SAFETY BELT SYSTEM IN A VEHICLE

Rudolf Andres, Sindelfingen, and Heinz W. Knoll, Aidlingen, both of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed Nov. 28, 1975, Ser. No. 635,753
Claims priority, application Germany, Nov. 30, 1974, 2456670
Int. Cl.² B60R 21/10
U.S. Cl. 280—745 32 Claims



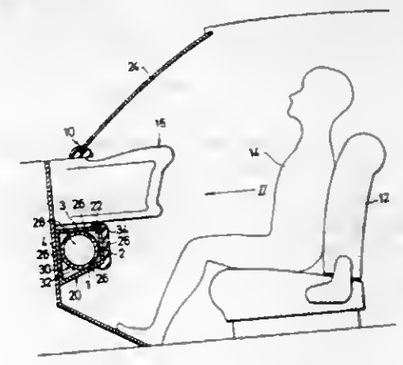
1. A safety belt system for a vehicle, which comprises a belt band means for encompassing a user and a tensioning means for tightening the belt band means against said user with an initial load precluding injury upon reaching a predetermined deceleration value, characterized in that the tensioning means includes a structural part being rotatable and at least partly surrounding the belt band means, said belt band means being freely movable through the structural part during normal operation.

4,032,175

KNEE PROTECTOR IN MOTOR VEHICLE

Tsuyoshi Aibe, Yokohama; Yoshiaki Sugiura, Yokosuka, and Yuzuru Okada, Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed May 2, 1975, Ser. No. 574,032
Claims priority, application Japan, May 9, 1974, 49-52825
Int. Cl.³ B60R 21/04
U.S. Cl. 280—751 18 Claims



1. In a motor vehicle having a seat for a passenger:

a knee protector anchored in a foot space of the passenger, said knee protector comprising an outer hollow body baving a bore and permanently deformable flat support walls defining said bore, and a single permanently deformable inner tube disposed within said bore, said inner tube making a contact with each of said permanently deformable walls.

14. In a motor vehicle having a seat for a passenger:

a knee protector anchored in a foot space of the passenger, said knee protector comprising an outer hollow body baving a bore and permanently deformable flat support walls defining said bore, and a permanently deformable

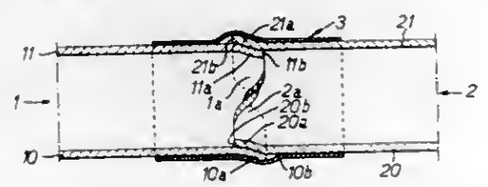
inner rounded wall having two edges, disposed within said bore, said rounded wall having its edges contacting with adjacent corner portions of said permanently deformable support walls and projecting toward a one of all of said permanently deformable support walls which faces the knees of a seated passenger.

4,032,176

METHOD OF ASSEMBLING SEAMLESS FLEXIBLE TUBING AND THE TUBULAR ASSEMBLY OF LENGTHS OF SUCH TUBING

Jean Pierre Tabary, Froissy, France, assignor to Viscora, Paris, France

Filed Feb. 6, 1976, Ser. No. 655,802
Claims priority, application France, Sept. 5, 1975, 75.27312
Int. Cl.² F16L *35/00*
U.S. Cl. 285—18 **7 Claims**



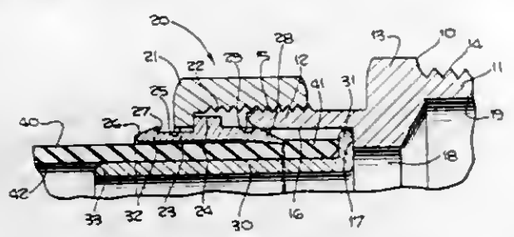
7. A tubular assembly of at least two lengths of seamless flexible tubing, opposed end portions of the lengths of tubing overlapping and contacting each other with the open ends of the tubes extending beyond each other in opposite directions, an adhesive strip wrapped around the overlapping end portions and the adjoining outer surfaces of the lengths of tubing longitudinally therebeyond, said adhesive strip being stuck to the free edge of one of the end portions over half the periphery of the tubular assembly and being stuck to the free edge of the other of the end portions over the other half of the peripheral of the tubular assembly, the stuck free edges of the lengths of tubing being longitudinally offset a distance equal to the longitudinal length of the overlap which is less than one-fourth of the circumference of the tubular assembly; whereby, separating the side walls of one of the tubing lengths at least in the vicinity of the band to give it a substantially cylindrical configuration causes drawing therewith of the corresponding opposed side walls of the other tubing length by the adhesive strip band and thereby intertwining the overlapping end portions and establishing continuous internal communication between the tubing lengths of the tubular assembly.

4,032,177

COMPRESSION FITTING WITH TUBING REINFORCING INSERT

David N. Anderson, 3701 Green Vista, Encino, Calif. 91316

Filed Mar. 18, 1976, Ser. No. 667,889
Int. Cl.² F16L *33/20*
U.S. Cl. 285—24 **2 Claims**



1. A compression type end fitting for non-metal flexible tubing including:

a body having threads and a tubing receiving bore terminating at an internal stop shoulder with a continuing smaller diameter through bore,

a nut sub-assembly of a nut and compression sleeve, the compression sleeve having a tubing receiving through bore and an end portion projecting outwardly of the nut, said nut threaded to said body in untightened relation, and

a tubing reinforcing insert positioned within said body and nut sub-assembly when the latter are preassembled in a relatively untightened relation preparatory to receiving said tubing

retaining means on said insert for loosely retaining said insert within said fitting, said retaining means including a flange located between and being larger than said body and sleeve throughbores, said fitting being free of structure preventing abutting of said flange with said stop shoulder; and

guide means on said insert extending outwardly of said compression sleeve end portion through the throughbore thereof when said insert is loosely retained within said fitting by said retaining means and said insert flange abuts said stop shoulder for guiding a tubing free end over said insert when said nut sub-assembly and body are in said untightened condition,

said flange having an outer diameter smaller than the inner diameter of said body tubing receiving bore so as to be transversely movable therein,

whereby on assembly of tubing to said fitting the tubing can be engaged with said outwardly extending guide means to align said insert relative to said tubing before said tubing is pressed into said fitting and before said nut sub-assembly is tightened onto said body,

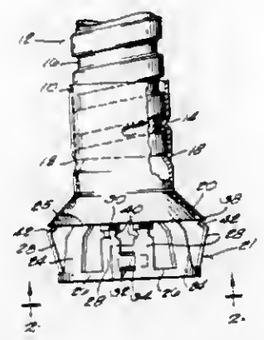
said compression sleeve having an outwardly extending shoulder spaced from one end thereof and engaging a shoulder on said nut, said sleeve having a surface at the other end thereof engaging an end surface of the body and adapted to be deformed inwardly to engage the tubing and to produce a compression type gripping of the tubing for retaining it within the fitting.

4,032,178

ELECTRIC CONDUIT CONNECTOR

Robert J. Neuroth, 101 Kerwin Drive, Ingleside, Ill. 60041

Filed Sept. 4, 1975, Ser. No. 610,200
Int. Cl.² F16L *3/04*; H02G *3/08*
U.S. Cl. 285—162 **13 Claims**



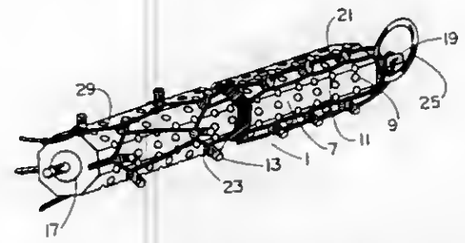
1. An electric conduit connector for connecting one end of an electric conduit to a box having an opening therein for receiving said connector, said connector comprising a unitary one piece metal sleeve adapted at one end to receive an end of said conduit, said sleeve being flared at its other end to a size larger than said opening and having its flared end reduced in diameter to form a reduced end portion which is small enough to enter said opening, said reduced end portion comprising a collar and circumferentially spaced support arms connecting said collar to the flared portion, said collar being split in at least one location and having an expansion joint bridging the split to permit such reduction without buckling of said collar, and means on said reduced end portion for engaging the interior margin of said box about said opening to secure said connector to said box.

4,032,179

MACRAME LOOM

Paul Thieman Goss, 156 S. Pope St., Louisville, Ky. 40206

Filed Aug. 13, 1976, Ser. No. 714,046
Int. Cl.² D03J *3/00*
U.S. Cl. 289—18 **7 Claims**



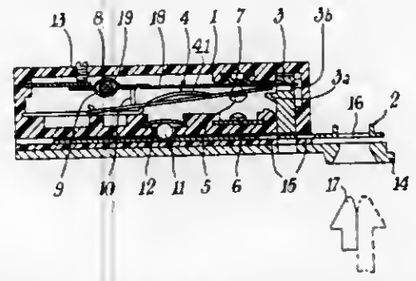
1. A macrame loom comprising: an elongated rod having at least six sides, each side having a face thereon with a row of apertures on each face, said rows of apertures on adjacent faces being parallel with said apertures on adjacent rows; a plurality of cord securing means received by said apertures, said securing means extending outwardly from said rod to receive cords therearound; and, coupling means on each end of said elongated rod whereby a plurality of rods may be coupled.

4,032,180

LOCKING DEVICE FOR WASHING MACHINE DOOR

Walter Pohl, Naples, Italy, assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Aug. 16, 1974, Ser. No. 498,001
Claims priority, application Italy, Aug. 21, 1973, 52111/73
Int. Cl.³ E05B *15/02*; B65H *25/14*
U.S. Cl. 292—341.16 **1 Claim**



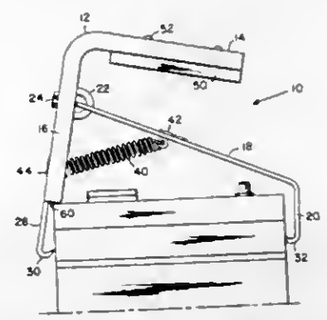
1. A door lock for washing machines and the like comprising body means having a first opening for receiving a door hook and having a second opening, slide means mounted for movement on said body means between an open position and a door book locking position, said slide means having a first opening to be aligned with said first body opening to receive said door hook when said slide means is in said open position and having a second opening to be aligned with said second body opening when said slide means is in said locking position, a ratchet mounted for movement on said body means into said second openings when said second openings are aligned for holding said slide means in said locking position clamping said door hook, a bimetallic element mounted on said body means for movement in response to selected temperature changes to move said ratchet into and out of said second openings in response to said temperature changes when said second openings are aligned, movable contact means, complementary contact means mounted on said body means, an elastic cantilever element movable with snap-action between a first position spaced from said complementary contact means and a second position engaging said complementary contact means, said cantilever element being movable with said bimetallic element to said second position engaging said movable contact means with said complementary contact means to close an electrical power circuit for said washing machine and the like when said ratchet is disposed in said second body and slide openings, resistance means disposed in heat transfer relation to said bimetallic element, and means for connecting said resistance means in an electrical control circuit of said washing machine and the like for heating said bimetallic element when desired, said means connecting said resistance means in said control circuit comprising a diode arranged in series with said resistance means and additional contact means normally engaged with said movable contact means in said first position thereof in shunting relation to said diode when said slide means is in said open position.

4,032,181

BATTERY CARRIER

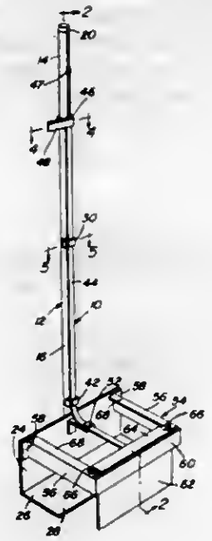
George G. Money, Sr., R.D. No. 2 - Box 245, Smyrna, Del. 19977

Filed Jan. 29, 1976, Ser. No. 653,298
Int. Cl.² B65G *7/12*
U.S. Cl. 294—16 **8 Claims**



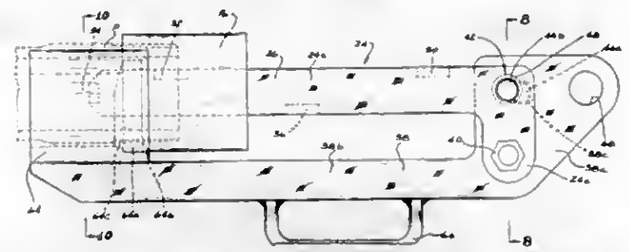
1. A battery carrier adapted to engage the sides of a battery for lifting, tilting or maneuvering the battery into and out of an operating position in a vehicle comprising: an elongated member having a handle portion adapted to extend across the top of a battery to be carried and a leg portion extending at an angle to said handle portion so as to be positioned along the side of a battery to be carried, a hook formed on the end of said leg portion for engaging the side of a battery to be carried, an elongated arm, means for pivotally mounting one end of said arm on said leg portion of said elongated member with said arm extending beneath said handle portion, a hook formed on the other end of said arm for engaging the side of a battery opposite the side engaged by said hook on said leg portion of said member, spring means extending between said arm and said leg portion for biasing said hooks toward engagement with opposite sides of a battery to be carried, said spring means biasing said arm to a normal position in which said hooks are spaced a distance less than the space between opposite sides of a conventional size battery whereby said arm must be moved against the bias of said spring means in order to engage the carrier with a conventional size battery, and a stop formed on said leg portion of said member and spaced from said hook formed thereon for contacting the top of a battery to be carried in the normal battery engaging position of said leg portion along the side of the battery to be carried, said stop having a substantial effective width and including stop surfaces for contacting the top of the battery to be carried at two spaced locations along the top of the side of the battery engaged by said hook on said leg portion, said member is formed of a bent channel of a U-shaped cross-section, the sides of said channel terminating at a location spaced from said book formed thereon to form said stop surfaces, the base of said channel extending beyond said stop surfaces to form said hook.

4,032,182
PET DROPPING PICKUP DEVICE
Philip O. D'Ath, 10455 N. Lynn Circle, "F", Mira Loma, Calif. 91752
Filed Feb. 27, 1976, Ser. No. 661,995
Int. Cl.² A01K 29/00
U.S. Cl. 294—19 R 11 Claims



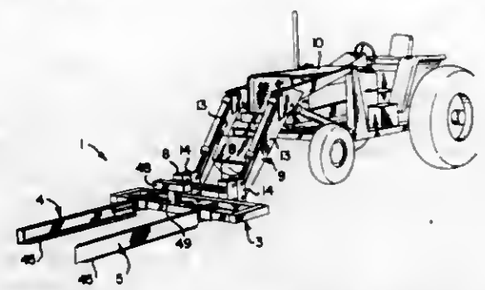
1. A pickup device including an upstanding handle, an L-shaped angle member including a lower horizontal flange and an upstanding flange supported at its lower edge from one marginal edge portion of said horizontal flange, mounting means supporting said upstanding flange from the lower end of said handle, guide means supported from and projecting outwardly of the upstanding flange spaced above said horizontal flange, a depending plate guidingly supported from said guide means for movement therealong toward and away from the upstanding flange over said horizontal flange, said plate being outwardly shiftable along said guide means to a position spaced outwardly of the outer marginal portion of said horizontal flange, control means shiftably supported from an upper portion of said handle, and thrust transfer means operably connected between said control means and said plate operable to shift the latter in response to shifting of said control means, said guide means including a pair of elongated inwardly and downwardly opening parallel angle members including upper horizontal flanges projecting toward each other and depending lower flanges depending from the remote marginal edges of said upper horizontal flanges, said angle members being supported from and projecting outwardly from opposite end portions of the upper marginal portion of said upstanding flange, the upper marginal edge portion of said depending plate including a substantially right angulated horizontal flange projecting toward said upstanding flange, the opposite ends of said right angulated horizontal flange including upwardly struck and offset end tabs, the terminal ends of said right angulated flanges being slidably engaged with said upper horizontal flanges with said end tabs engaged over said upper horizontal flanges and the remainder of each terminal end of said right angulated horizontal flange closely underlying the corresponding upper horizontal flange, the end portions of the upper marginal edge of said depending plate being closely received between the opposing surfaces of said depending lower flanges.

4,032,183
PIPE ELEVATOR
John L. Baugh, and Hollis A. Baugh, both of Houston, Tex., assignors to Brown Oil Tools, Inc., Houston, Tex.
Filed July 28, 1975, Ser. No. 599,839
Int. Cl.² B66C 1/42, 1/62
U.S. Cl. 294—91 6 Claims



1. A device for manipulating tubular members comprising:
a. first arm means partially insertable into the end of said tubular member;
b. second arm means including cradle means;
c. hinge means joining said first arm means and said second arm means so that, when said first arm means is partially inserted into the end of said tubular member, said second arm means may be rotated on said hinge means generally toward said tubular member causing said cradle means to partially encircle said tubular member in a closed position, wherein said first arm means cooperates with said second arm means and said cradle means to grip said tubular member, and so that said second arm means may be rotated on said hinge means withdrawing said cradle means generally away from said tubular member to an open position to permit said first arm means to be withdrawn from within said tubular member; and
d. lock means automatically actuated, whenever said second arm means is rotated on said hinge means, relative to said first arm means, to said closed position, to positively lock said second arm means and said cradle means in said closed position, and selectively disengageable, independently of motion of said second arm means relative to said first arm means, to permit said second arm means and said cradle means to be moved to said open position.

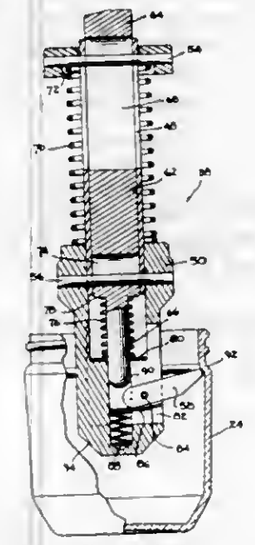
4,032,184
ROUND BALE LOADER
Calvin B. Blair, P.O. Box 97, Barnard, Kans. 67418
Filed Feb. 9, 1976, Ser. No. 656,337
Int. Cl.² B66C 1/28
U.S. Cl. 294—88 8 Claims



1. A device for handling a round hay bale having a substantially cylindrical surface and opposite bases comprising:
a. a frame adapted for manipulation by a tractor loader;
b. a pair of projecting pin members on said frame;
c. means for moving said pin members laterally toward and away from each other;
d. a pair of generally parallel and projecting arms respectively having a bale engaging inner surface and mounted on said projecting pin members, said arms being freely pivotable on said pin members about respective longitudinal axes thereof;

e. said arms being in cross section a greater height than width with said pin member having mounted above the respective center of gravity of said arms whereby said arms hang vertically oriented when not in lifting contact with said bale surface, said arms pivoting so that said inner surfaces conform to said bale surface when in lifting contact therewith and subsequently return to vertical orientation when the bale is released.

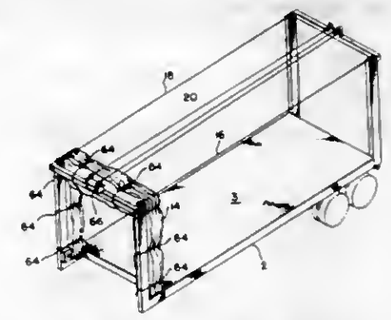
4,032,185
INTERNAL GRIPPER APPARATUS
John J. Peyton, 1644 Payeras, Santa Barbara, Calif. 93109
Filed June 11, 1976, Ser. No. 695,004
Int. Cl.² B66C 1/42
U.S. Cl. 294—97 18 Claims



1. Container gripper apparatus for gripping a container from within upon engagement along a longitudinal axis comprising;
a housing means;
a plurality of gripper members, said gripper members being equally spaced about the periphery of said housing means adjacent the lower end thereof and extending generally radially outward therefrom, each of said gripper members being coupled to said housing means for rotation between extended and retracted positions about axes generally perpendicular to and spaced from said longitudinal axis;
means for yieldably encouraging said gripper members to the extended position; and
an actuator, said actuator being slidably coupled to said housing for relative sliding motion with respect thereto in the direction of said longitudinal axis between extended and depressed positions, said actuator being disposed to engage the inward extending ends of said gripper members when moved to said depressed position.

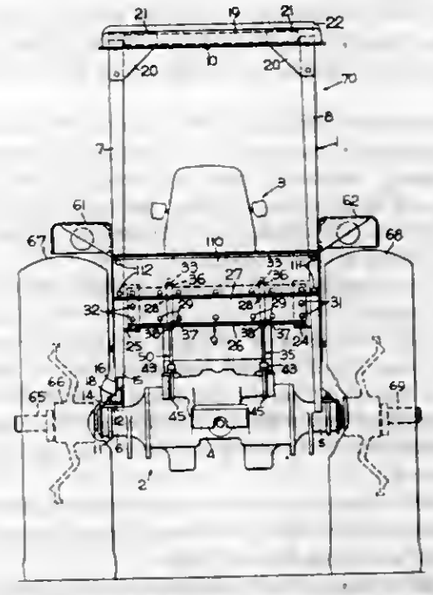
4,032,186
CONVERTIBLE TRUCK COVER
Phillip A. Pickering, 5823-177th Place Southwest, Lynnwood, Wash. 98036, and Harold W. Pickering, 16727 Linden Ave. North, Seattle, Wash. 98133
Continuation-in-part of Ser. No. 440,586, Feb. 2, 1974, abandoned. This application Dec. 17, 1975, Ser. No. 641,507
Int. Cl.² B60P 7/00
U.S. Cl. 296—100 8 Claims

1. A cover means for a trailer or the like having a load supporting platform which flexes during normal use including necessary supporting framework comprising:
a. rigid upright members secured to the framework at opposite ends of the platform leaving the remainder of the platform free from obstruction, said upright members including vertically oriented elements adjacent the corners of the platform and at least one substantially horizontal element extending between the vertical elements substantially parallel to the end of the load supporting platform,
b. flexible removable support means yieldable to the flexing of said platform extending from one upright to the other along each side of the platform said support means providing the sole side support for a cover, means for releasably securing said flexible support means to said uprights,



c. flexible cover means of a size capable of substantially covering the load supporting platform, said cover means resting on top of the flexible support means and extending therebetween over the top of the platform, and
d. means for moving the cover means from a contracted position adjacent one of the upright members, uncovering substantially the entire platform to an expanded position overlying the area between the upright members.

4,032,187
ENERGY ABSORBING JOINT FOR PROTECTIVE FRAME
Ralph R. Atherton, Milwaukee, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.
Filed Dec. 22, 1975, Ser. No. 643,316
Int. Cl.² B62D 25/00
U.S. Cl. 296—102 10 Claims



1. A vehicle having a protective frame extending above an operators station comprising, a vehicle chassis, a protective frame mounted on said vehicle chassis including, a pair of upright columns, a support connected to and extending between said upright columns, at least one strut mounted on said vehicle chassis, an energy absorbing joint connecting said strut to said support, said joint including deformable members of said support mounted in spaced relation and forming an opening in said support, an end portion of said strut extending through said opening, an enlargement on said strut at each end

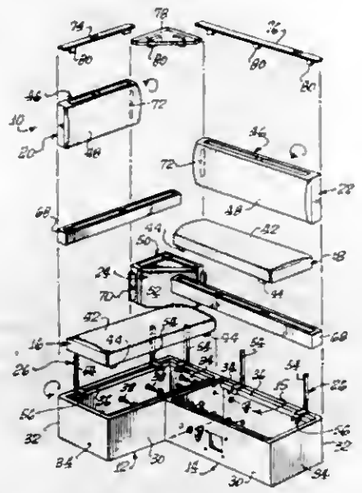
of said opening engaging the opposing sides of said members to brace said support, said enlargements thereby deforming said members and enlarging said opening when said upright columns are deformed due to overturning of the vehicle.

4,032,188

MODULAR BENCH SEAT

Ferris E. Jones, 943 Millbury Ave., La Puente, Calif. 91746

Continuation-in-part of Ser. No. 537,259, Dec. 30, 1974, abandoned. This application Mar. 16, 1976, Ser. No. 667,288
Int. Cl.² A47C *15/00*
U.S. Cl. 297—232 36 Claims



1. A modular bench seat construction comprising:
a rectangular base having front and rear sides and vertically facing sides normal to said front and rear sides,
said base being adapted to be positioned with one of said vertically facing sides uppermost to form the top side of the base and the other vertically facing side lowermost to form the side of the base,
a pair of backrest supporting posts having normally upper and lower ends,
means releasibly attaching the lower ends of said posts to said rear base side at positions spaced along the latter side with the posts upright and rising above the said seat portion,
a backrest portion secured to the upper ends of said posts,
said base having a rear upright wall means at said rear base side having forwardly and rearwardly facing surface means and upper edge means at the top side of the base between and intersecting said forwardly and said rearwardly facing surface means,
said lower post ends seating against said rearwardly facing surface means,
the normally front sides of said post attaching means comprising generally L-shaped brackets fixed to said posts between the ends thereof including normally horizontal legs projecting forwardly over said edge means and vertical flanges depending along said forwardly facing surface means, and
a seat portion removably positioned on the top side of said base with the rear edge of said seat portion resting on said normally horizontal bracket legs.

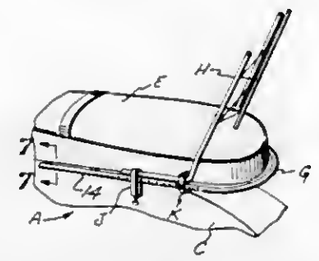
11. A modular bench seat construction comprising:
a pair of rectangular bases each having front and rear sides, ends, and vertically facing sides normal to said front and rear sides and ends,
each base being adapted to be positioned with one vertically facing side uppermost to form the top side of the base and the other vertically facing side lowermost to form the bottom side of the base, whereby each base may occupy either of two upright positions, said bases being arranged in an L-shaped configuration with one end of one base seating against the front wall of the other base and the rear side of said one base coplanar with one end of said other base,
means releasibly joining said bases,
a seat portion removably positioned on the topside of each base,
a pair of backrest supportiing posts for each base having normally upper and lower ends,
means independent of said seat portions releasibly attaching the lower ends of said posts to the rear side of the respective base at positions spaced along the latter side with the posts upright and rising above the corresponding said portion,
a backrest portion for each base having normally horizontal edges and opening means entering one of said edges and removably positioned over the posts on the respective base with the posts entering said opening means to support the backrest portion in an upright position along the rear edge of the corresponding seat portion, and
said posts, seat portions, and backrest portion comprising totally separate elements which may be assembled individually on said bases to form a bench seat.

4,032,189

MOTORCYCLE BACK REST ASSEMBLY

Vicente Cruz Benavente, 1372 Taper St., Long Beach, Calif. 90810, and Jack C. Napper, 3815 Volk St., Long Beach, Calif. 90808

Filed June 21, 1976, Ser. No. 698,044
Int. Cl.² B60N *1/06*; B62J *1/28*
U.S. Cl. 297—352 5 Claims



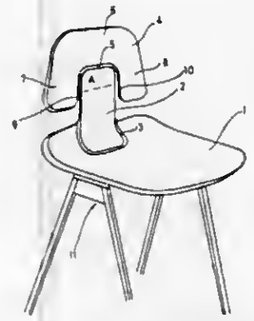
1. In combination with a motorcycle that has a first frame that includes a pair of first parallel legs disposed on opposite sides of a rearwardly disposed fender, an elongate longitudinally extending seat, a second frame secured to said seat, said first and second frames including first and second inturned portions having a plurality of longitudinally spaced sets of first and second bores therein, a plurality of threaded members that engage said sets of first and second apertures and removably lock said seat and second frame to said first frame, a back rest assembly that is longitudinally and pivotally adjustable relative to said seat, said backrest assembly including:
a. a tubular U-shaped support that includes a pair of first, laterally spaced, parallel legs that are disposed outwardly from said first frame, each of said first legs including a pair of longitudinally spaced inturned tabs that are gripped between said first and second inturned portions, each of said tabs having a third bore therein that is aligned with one of said sets of said first and second bores and through which third bore one of said threaded members extends;
b. forward and rearwardly disposed rigid cross pieces that extend between said first legs and are rigidly secured thereto;
c. a back rest that includes a pair of second laterally spaced parallel legs that have first and second ends, said second legs overlying said first pair of legs, with said second legs at said second ends effecting junctions with a pair of elongate extensions that project upwardly and angle rearwardly relative to said second pair of legs, and said back rest having a plurality of rigid cross members extending therebetween to maintain said extensions in fixed lateral spacing;
d. a pair of spring loaded slide means rigidly secured to said pair of said second legs adjacent said first ends thereof, said slide means slidably engaging said first legs for longitudinal movement between said pairs of inturned tabs;
e. a pair of pivot means that pivotally engage said back rest at said junctions, said pivot means slidably engaging said first pair of legs and being longitudinally movable to a plurality of positions between said pairs of tabs;
f. a pair of first manually operable means for selectively holding said pair of pivot means at any one of a plurality of longitudinally spaced positions on said first pair of legs; and
g. a pair of second manually operated means for selectively moving said pair of slide means either up or down relative to said first pair of legs to pivot said back rest to a position where said pair of extension and cross members are disposed at a desired angle relative to said seat.

4,032,190

ERGONOMICALLY DESIGNED CHAIR

Wolfgang Müller-Deisig, Schieder-Schwalenberg, and Egon Brauning, Weil am Rhine, both of Germany, assignors to Fehlbaum, Basel, Switzerland

Filed June 7, 1976, Ser. No. 693,610
Claims priority, application Switzerland, June 13, 1975, 7721/75
Int. Cl.² A47C *3/00*
U.S. Cl. 297—353 6 Claims



1. An ergonomically designed chair comprising a rigidly mounted seat, a back rest integrally joined to the seat and a shoulder rest integrally joined to the upper end of the back rest, the profile of the central region of the back rest substantially matching the curve of the human spine, wherein the back rest is joined to the seat by means of a portion of the back rest which fits into a region at the rear center of the seat and at least said portion of the back rest is provided with stiffening means which impart to the back rest a substantially stiff form up to about the level of the sixth lumbar vertebra of the chair occupant, thus ensuring a continuous transition from the chair seat to the back rest, but allow the back rest an increasingly greater flexibility from said level upwards with the result that the upper part of the back rest bends backwards when the occupant leans back, and wherein the upper end of the back rest is joined to the shoulder rest via a bracing corrugation in order to ensure that the chair profile in the region of the occupant's shoulders is a smooth curve matching that of the occupant's spine.

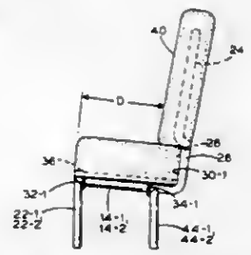
4,032,191

TWO-POSITION SCHOOL BUS SEAT

Joseph T. Fetsch, 26 Concord Road, Port Washington, N.Y. 11050

Filed Feb. 13, 1973, Ser. No. 332,063
Int. Cl.² A47C *5/10*; B60N *1/06*
U.S. Cl. 297—440 1 Claim

1. An adjustable two-position school bus seat, to accommodate adults or children, to provide a seat to have either of two positions, with different depth dimensions, namely, a forward position and a retracted position, said bus seat comprising:
a back rest frame;
a back rest cushion supported on said back rest frame;
a foundation support structure for said back rest frame and seat, generally, said foundation support embodying two rigid structural elements disposed at a predetermined fixed spacing;
a movable seat cushion to rest on said foundation support structure, and movable to be selectively manually disposed with either transverse edge facing to the front to provide a seat immediately in front of said back rest cushion;
connection means between said back rest frame and said foundation to define a space for accommodating a portion of said seat cushion in retracted position;



and self-gripping and self-releasing clamping means secured to said cushion bottom surface, and serving also as positioning means to fit onto the foundation support structure and to wedge against said two rigid structural elements in position to locate the cushion in either selected position, and to hold said seat cushion against undesired movement, and
said clamping means are depending lugs, and include one pair positioned at a short distance from one transverse edge of the seat cushion in a first position, and include a second pair of depending lugs positioned at a long distance from the other transverse edge of the seat cushion, so the forward positioning of either transverse edge will be controlled according to the positioning of the respective pair of lugs relative to said structural elements of the foundation support structure.

4,032,192

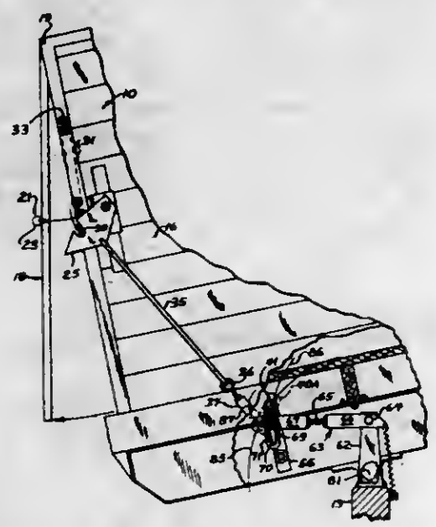
LATCHING MECHANISM FOR REAR GATE OF DUMP VEHICLE WITH AUTOMATIC TILT RELEASE

Robert Eugene Jensen, Tennant, Iowa, assignor to Leonard M. Brannan, Omaha, Nebr., a part interest

Filed Jan. 5, 1976, Ser. No. 646,598
Int. Cl.² B61D *9/02*
U.S. Cl. 298—23 A 7 Claims

1. In combination with a dump vehicle having a box with an openable end gate, said box carried by a wheeled frame, and rearwardly tiltable about a first horizontal axis, the improvement comprising: latch means pivotally mounted to said box for movement between an open position and a latching position, said latch means engaging and coupling to said gate in the latching position; a shaft extending transverse of said box and rotatably mounted thereto at a location rearward of said tilt axis; first link means connected between said shaft and said latch means for moving said latch means between said open and latching positions when said shaft is rotated; second actuator link means having one end connected to said shaft; and means for pivotally mounting the other end of said actuator link means to said frame at a location above said tilt axis; whereby as said box is tilted to the rear said shaft will rotate in a first arc about said tilt axis and said one end of said actuator link means will rotate about a second arc centered at the

pivotal connection of said other end of said actuator link means to rotate said shaft and thereby move said latch means



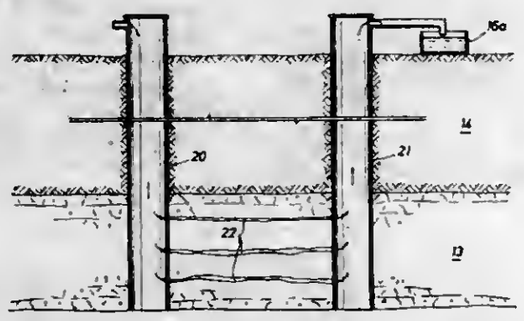
to said open position and release said end gate in quick release motion.

4,032,193

COAL DISAGGREGATION BY BASIC AQUEOUS SOLUTION FOR SLURRY RECOVERY

Gary Driskard; Michael Prats, and Stephen Michael O'Brien, all of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Mar. 28, 1974, Ser. No. 455,695
Int. Cl.² E21C *41/02*
U.S. Cl. 299—4 **11 Claims**



1. A process for removing subterranean coal which comprises contacting said coal in situ with a basic aqueous solution and maintaining said contact for a time sufficient to completely disaggregate at least a portion of said coal, disintegrating said portion to form a slurry, and transporting said slurry to a receiving terminal.

4,032,194

METHOD FOR THE PRODUCTION OF MINERALS

Eddie P. Howell, and Orland J. Gant, Jr., both of Plano, Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Aug. 23, 1976, Ser. No. 716,495
Int. Cl.² E21B *43/28*
U.S. Cl. 299—4 **7 Claims**

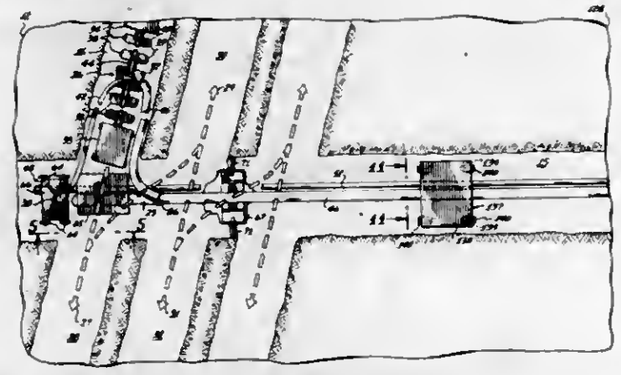
1. An improved method for the solution mining of a mineral from a subterranean formation containing same in which an injection and production well are drilled and completed within said formation, leach solution and an oxidant are injected through said injection well into said formation to dissolve said mineral, and said dissolved mineral is recovered via said production well, wherein the improvement comprises positioning said injection well in the reduced zone and said production well in the oxidized zone of said formation.

4,032,195

PUSH-PULL MINING SYSTEM

Oliver B. Kilroy, 5 Calle Corta, Tucson, Ariz. 85716

Continuation-in-part of Ser. No. 578,312, May 16, 1975, Pat. No. 3,993,354. This application July 19, 1976, Ser. No. 706,916
Int. Cl.² E21C *35/20*, *41/04*
U.S. Cl. 299—19 **16 Claims**



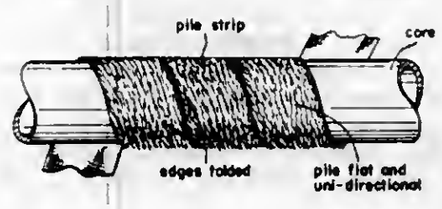
1. In a push-pull mining system
a. a substantially horizontal service tunnel having a floor formed with a central flume extending longitudinally thereof and having a declined portion;
b. a bolding tunnel extending laterally from one side of, and at one end of said service tunnel;
c. a mobile mining unit positioned in said holding tunnel and compriaing:
I. a pair of miming machines located at opposite ends of said unit with each machine including a slurry mix tank,
II. a pump operatively connected with each of said slurry mix tanks.
III. a plurality of wheeled carriers between said mining machines and including a mid-carrier;
IV. a fixed water line extending between said machines, supported by said carriers, and communicating with the slurry mix tanks in said mining machines, and
V. a fixed slurry line extending between said mining machines, being connected to said pumps, and supported by said carriers,
d. a mobile water station connected to a water supply source;
e. a flexible water line extending from said station to said mid-carrier where it is connected to said fixed water line;
f. valve means for establiabing communication between said flexible water line through said fixed water line to one of said slurry mix tanks to the exclusion of the other mix tank;
g. a flexible slurry line extending from said mid-carrier where it is connected to said slurry line, and having a length in excess of one-half the length of said mobile mining unit;
h. valve means for establishing communication between said flexible slurry line through said fixed slurry line to the slurry mix tank of one miming machine to the exclusion of the slurry mix tank of the other mining machine;
i. power driven traction means in said mining unit for moving said unit out of said bolding tunnel, across said service tunnel to form a working tunnel on the side of said service tunnel opposite to said working tunnel, and then back across the service tunnel to form a second working tunnel behind said holding tunnel, making turns as it does so, and so on to form a plurality of working tunnels extending laterally from said service tunnel;
j. a power station removably positioned in said service tunnel in the vicinity of the junction of a working tunnel therewith and including means for drivably engaging said flexible slurry line to exert a push and pull thereon and maintain that portion of the flexible slurry line which is positioned in the service tunnel against lateral displacement whereby it extends into said flume;
k. a main slurry mix tank below said service tunnel, and
l. a slurry tube connected to said main slurry mix tank and extending upwardly to said flume where its upper end portion is deformed to slideably receive the free end of said flexible slurry line.

4,032,196

PROCESS FOR TREATING PILE MATERIALS MADE INTO ELECTROPHOTOGRAPHIC TONER REMOVAL BRUSHES

Thomas G. Kandel, 100 E. Hartsdale Ave., Hartsdale, N.Y. 10530

Filed Oct. 23, 1975, Ser. No. 625,050
Int. Cl.² A46D *19/00*
U.S. Cl. 300—21 **11 Claims**



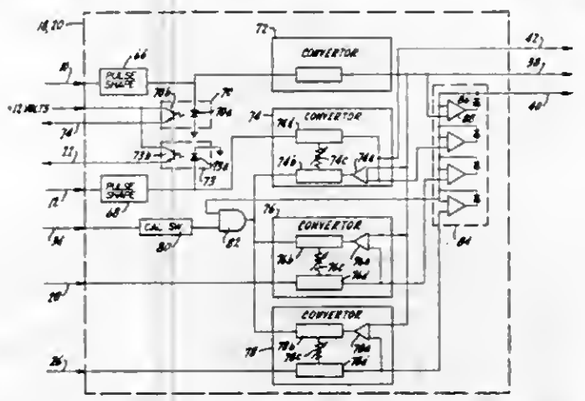
1. A process for making an electrophotographic toner removal brush which comprises subjecting a pile substrate material to an aqueous medium, withdrawing excess moisture therefrom and simultaneously orienting the pile allowing the still wet material to dry, applying the resulting dried pile material to an elongated tubular base core forming an elongated pile-covered tube and subjecting said pile to a further aqueous treatment, and then finally subjecting said pile to a centrifugal force sufficient to hurl the pile fibers to an erect condition forming a brush nap wherein the density of each pile fiber has been increased by rapid centrifugal removal of the water therefrom and allowing the brush to dry.

4,032,197

SLIP/SLIDE DETECTOR CONTROL CIRCUIT

William H. Kohler, Ringwood, N.J., assignor to Abex Corporation, New York, N.Y.

Filed May 4, 1976, Ser. No. 682,916
Int. Cl.² B60T *8/10*
U.S. Cl. 303—96 **13 Claims**



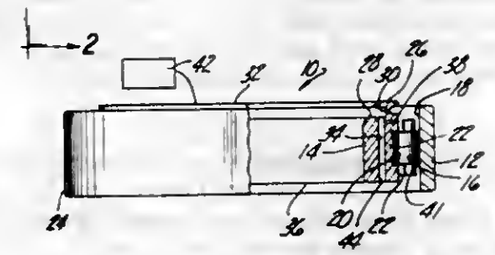
1. In a friction brake control system for a vehicle having two front and two rear axles, means for providing a speed signal for each axle having a variable dependent upon axle angular speed, front axle speed comparison means having direct inputs from said from axle speed signal means and electrically discontinuous and isolated inputs from said rear axle speed signal means and an output representing either the highest or lowest axle speed of the front and rear axles, and means for comparing the front axle speed comparison means output with said front axle speed signals to provide a slip/slide control signal.

4,032,198

BEARING ASSEMBLY WITH LUBRICATION AND COOLING MEANS

Glenn W. Hamburg, Grosse Pointe Park, Mich., assignor to Teledyne Industries, Inc., Los Angeles, Calif.

Filed Jan. 5, 1976, Ser. No. 646,872
Int. Cl.² F16C *1/24*
U.S. Cl. 308—76 **4 Claims**



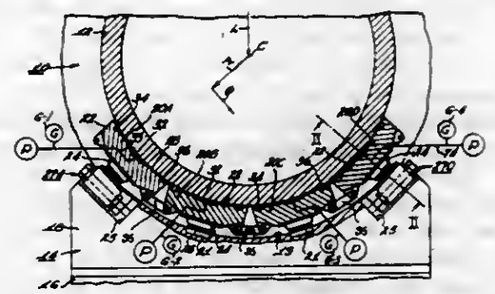
1. A bearing assembly comprising:
a generally cylindrical inner ring, said inner ring rotating during operation of said bearing,
a generally cylindrical outer ring disposed radially outwardly from said inner ring,
bearing members disposed intermediate said inner ring and said outer ring and adapted to permit said inner ring to rotate relative to said outer ring,
said inner ring having an annular groove formed therein adjacent one end, a plurality of axially extending bores formed in said inner ring and having an end communicating with said annular groove, each of said axially extending bores having a radial bore associated therewith, said radial bores being formed in said inner member having one end communicating with said associated axially extending bore and the other end opening to said bearing members whereby lubricant directed into said annular groove operation of said bearing is directed by centrifugal force through said axially extending bores and through said radial bores to said bearing.

4,032,199

APPARATUS FOR EQUALIZING RADIAL LOAD ON PLURALITY OF PIVOTED BEARING PADS

Raymond C. Jeuness, Milwaukee, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Division of Ser. No. 508,983, Sept. 25, 1974, Pat. No. 3,918,770. This application Apr. 30, 1976, Ser. No. 682,075
Int. Cl.² F16C *17/06*
U.S. Cl. 308—73 **10 Claims**



1. In combination, a journal bearing adapted to support a journal for rotation and comprising an even number of bearing pads in excess of two spaced from each other circumferentially of the journal being supported and lying beneath the circumference of the journal and symmetrically positioned about the vertical axis of the bearing, each of said bearing

pads being adapted to pivot on a corresponding support surface lying radially outwardly of the respective bearing pads, two of said bearing pads being located substantially centrally of the circumferential span of the plurality of bearing pads, the support surfaces for said two centrally located bearing pads being substantially radially fixed, means for separately radially adjusting the respective support surfaces for the remaining bearing pads whereby to adjust the relative radial load carried by all of said bearing pads, a separate source of hydraulic pressure corresponding to each of the respective bearing pads and connected to the interface between the respective corresponding bearing pads and said journal, and separate hydraulic pressure gauge means corresponding to each respective bearing pad for indicating the hydraulic pressure at each respective corresponding interface whereby to indicate the relative radial loads assumed by the various bearing pads including the two centrally located bearing pads.

4,032,200

ANTI-SKID HYDRAULIC BRAKING SYSTEMS FOR VEHICLES

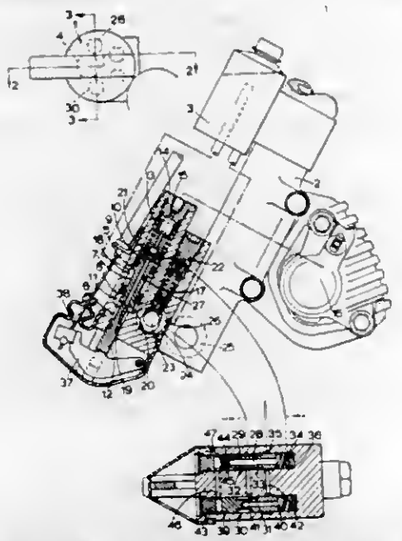
Glyn Phillip Reginald Farr, Leek Wootton, England, assignor to Girling Limited, Birmingham, England

Filed May 4, 1976, Ser. No. 682,980

Claims priority, application United Kingdom, May 10, 1975, 19742/75

Int. Cl.² B60T *8/087*

U.S. Cl. 303—116 **10 Claims**



1. An anti-skid hydraulic braking system comprising a brake applying means, a master cylinder, means connecting said brake applying means to said master cylinder, a reservoir for liquid, a pump having drive means which increases the pump throughput with increased wheel rotational speed, means connecting the pump input to said reservoir, at least on slave cylinder of a wheel brake, means connecting said master cylinder to said slave cylinder for supplying liquid under pressure to said slave cylinder to apply the brake, means connecting the pump output to said master cylinder through a restriction whereby the pressure of liquid in the circuit on the upstream pump side of said restriction is increased to generate a boost pressure which augments the pressure applied to said slave cylinder, a leakage path by-passing the restriction, said leakage path comprising means providing a resistance to liquid flow which decreases automatically with increased wheel rotation speed, sensing means for sensing the deceleration of the wheel, and pressure reducing means operable by said sensing means when the deceleration of the wheel exceeds a predetermined value to reduce said boost pressure whereby the pressure applied to said slave cylinder is reduced, said master cylinder comprising a housing having a bore, an operating piston and a boost piston both working in a said bore, a boost chamber defined in a part of said bore between adjacent ends of said pistons, means connecting said boost chamber to said pumps a pressure space defined in said bore at an end of said boost piston remote from said operating piston, a reservoir return port in said housing located between said boost chamber and said pressure space, means connecting said reservoir return port to said reservoir, an outlet port in said housing in communication with said pressure space, means connecting said outlet port to said slave cylinder, passate means interconnecting said boost chamber, said return port and said outlet port, a boost control valve

between said pistons movable between a normally open inoperative position in which said boost chamber is in communication with said return and outlet ports and an operative closed position when said master cylinder is operated in which said boost chamber is isolated from said return and outlet ports so that pressure is said boost chamber is increased to advance said boost piston in said bore to pressurise liquid in said pressure space, and a recuperation valve controlling comminication between said passage means and said pressure space, said recuperation valve being open when said control valve is open so that said slave cylinder is in communication with said reservoir through said recuperation port, and said recuperation valve being closed to isolate said pressure space from said reservoir when said boost piston is advanced in said bore, additional movement of said boost piston in the same direction pressurising the liquid in said pressure space.

4,032,201

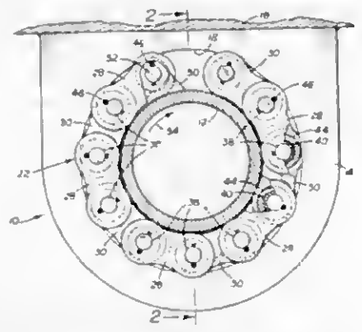
ROLLER BEARING ASSEMBLY

Allen Jacob Jones, Grants Pass, Oreg., assignor to S. J. Agnew, Tenino, Wash.

Filed Dec. 10, 1975, Ser. No. 639,380

Int. Cl.² F16C *13/00*

U.S. Cl. 308—207 R **9 Claims**



1. A roller bearing assembly for reducing rotational friction between a relatively rotatable shaft member and a support member wherein one of said members is held substantially stationary, said assembly comprising

means defining a circular opening in said support member for receiving said shaft, and

an elongate roller chain including a plurality of pivotally interconnected links and a roller rotatably connected in each of said links, said roller chain being shorter than the circumference of said shaft member and being wrapped about said shaft member between said shaft member and the edge margins of said support member defining said opening, with opposite ends of said roller chain being unconnected to each other and the rollers in said chain engaging one of said members to provide rolling support between said members.

4,032,202

VIBRATION CONTROL BUSH ASSEMBLY

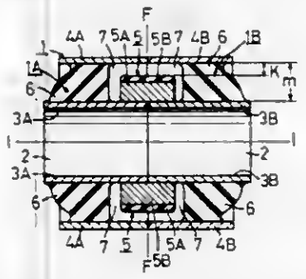
Masaru Ishikawa, Toyota, and Akihiko Kumazawa, Nagoya, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Mar. 16, 1976, Ser. No. 667,285

Claims priority, application Japan, Mar. 19, 1975, 50-38076[U]

Int. Cl.² F16C *27/00*

U.S. Cl. 308—238 **14 Claims**



1. A cylindrical bush assembly for vibration control comprising a pair of cylindrical sections which are joined end to end symmetrically with respect to an interface therebetween, and a cylindrical stop member of elastic material coaxially secured to said cylindrical sections in the vicinity of said interface, each of said cylindrical sections being formed by an inner cylinder, an outer cylinder coaxially encircling said inner cylinder and radially spaced apart from said inner cylinder to define a cylindrical clearance space between said inner and outer cylinders, each of which terminates at one end in said interface, and a generally cylindrical impact absorbing member of elastic material partly filling said clearance space and coaxially encircling said inner cylinder, said elastic material of said stop member being generally greater in hardness than that of said impact absorbing member, said impact absorbing members of said cylindrical sections being both recessed from said interface at one end to define a cylindrical hollow space therebetween in which said stop member coaxially encircles said inner cylinders, said stop member having a wall thickness which is smaller than the radial width of said hollow space.

4,032,203

BEARING ARRANGEMENT FOR THE ARMATURE SHAFT OF AN ELECTRIC MOTOR

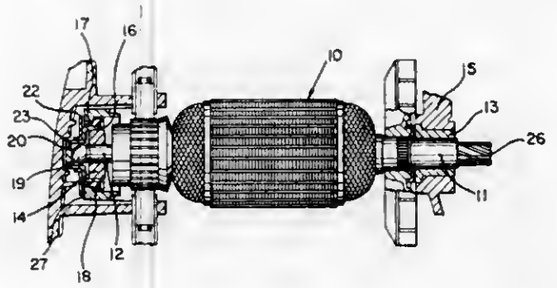
Lorenzo Ercole Alessio, Lecco, Italy, assignor to The Black and Decker Manufacturing Company, Towson, Md.

Filed June 2, 1976, Ser. No. 692,213

Claims priority, application Italy, June 10, 1975, 24222/75

Int. Cl.² F16C *23/00*

U.S. Cl. 308—72 **9 Claims**



1. A bearing arrangement for the shaft of the armature of an electric motor disposed in a support frame and subject to axial thrust comprising:

a bearing housing disposed so as to receive an end portion of the shaft therein and defining a bearing wall for receiving the axial thrust of said shaft, said bearing housing having structure formed thereon for mounting said bearing housing to the support frame;

bearing means at the interface of said bearing wall and said end portion for transmitting the axial thrust of the shaft to said bearing wall;

shaft bearing means for rotatably engaging said end portion;

elastic means interposed between said structure and said support frame for deforming elastically in response to the axial thrust applied to said bearing wall; and,

said structure being located with respect to said shaft axially back of the end of said end portion and said bearing wall being disposed axially beyond said structure and said end portion so that the axial thrust of the shaft against said bearing wall will cause the bearing housing to deform said elastic means to thereby center itself with respect to said axial thrust thereby taking up misalignment of the shaft relative to said shaft bearing means.

4,032,204

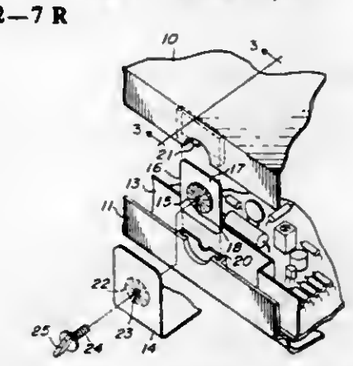
ADJUSTABLE MOUNTING ARRANGEMENT FOR ELECTRONIC APPARATUS

Melvin Stanley Nation, Lombard, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed June 21, 1976, Ser. No. 698,377

Int. Cl.² B60R *11/02*

U.S. Cl. 312—7 R **8 Claims**



1. A mounting arrangement for supporting and positioning an electronic apparatus, the arrangement comprising:

rigid insert means, each having a flange means, a first integral fastener means, and a first positioning means;

resilient plastic housing means comprising two mating portions, each housing portion being adapted to releasably retain a substantial portion of the insert flange means, the insert means being non-releasably and non-rotatably retained within the housing when the housing portions are mated;

a rigid support member including a second positioning means;

a second fastener means adapted for engagement with each first fastener means for attaching the housing means to the support means and for bringing the first positioning means into engagement with the second positioning means for positioning the apparatus housing means.

4,032,205

ADAPTOR FOR A HIGH VOLTAGE CABLE

Hatim H. Taj, Waukesha, Wis., assignor to RTE Corporation, Waukesha, Wis.

Filed Sept. 10, 1976, Ser. No. 722,009

Int. Cl.² H01R *15/00*

U.S. Cl. 339—13 **13 Claims**

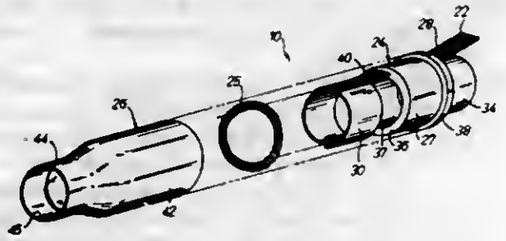
1. A ground contact adaptor for a high voltage cabel having a portion of the metallic tape shield exposed for cable termination, said adaptor comprising:

an elastomeric sleeve,

an electrically conductive band,

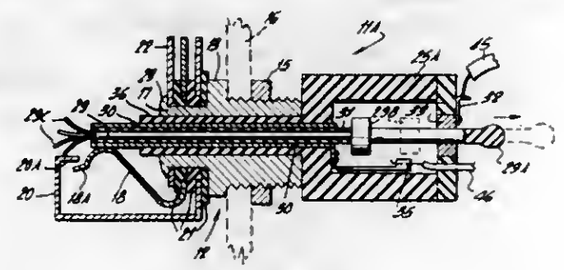
an electrically conductive member secured to said band and embedded in said sleeve and extending outwardly therefrom for providing an external ground contact,

means biasing the conductive band into engagement with



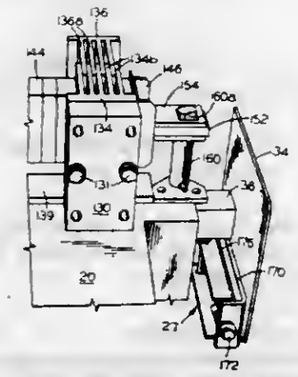
the metallic tape shield and means enclosing said band and said electrically conductive member.

4,032,206
REMOTE VOLUME CONTROL PLUG
Jack Lerner, 337 W. 71st St., New York, N.Y. 10023
Filed Mar. 31, 1976, Ser. No. 672,293
Int. Cl.² H01R *17/18*
U.S. Cl. 339—42 **4 Claims**



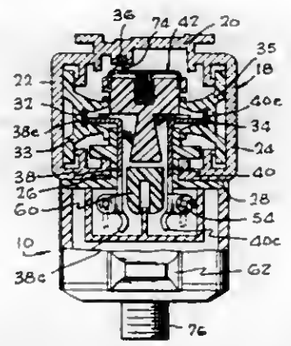
1. A plug for insertion into a standard type current socket connected to the output of a circuit producing voice frequency waves comprising: a fixed and a flexing spring contact in the socket; an axial tubular conductor connected to one terminal of the plug and adapted to make contact with the flexing spring contact; an axial conductive rod within the tubular conductor for connection to a second plug terminal: an insulator tube between the tubular conductor and axial rod; an array of prebent outwardly divergent conductive filaments for electrical connection to the fixed spring contact in the socket secured to and extending from the said rod for connecting the plug terminals in series with the socket contacts, and a variable resistive element connected to said terminals.

4,032,207
HIGH CURRENT ELECTRICAL JOINT APPARATUS
Eric Axel Ericson, Plainville, and Frederick Daniel Kaufhold, Forestville, both of Conn., assignors to General Electric Company, New York, N.Y.
Filed June 21, 1976, Ser. No. 698,280
Int. Cl.² H01R *13/62*
U.S. Cl. 339—75 M **15 Claims**



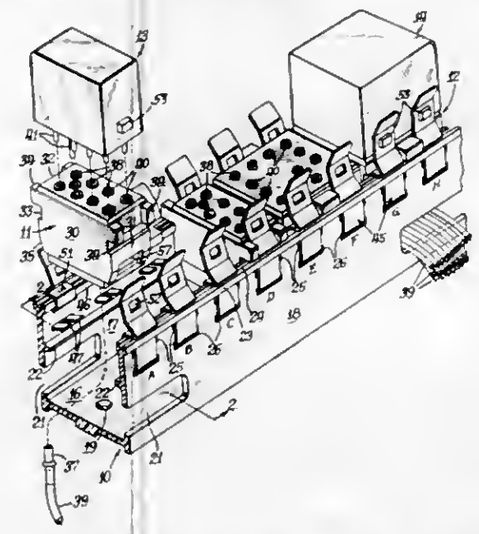
1. Electrical joint apparatus comprising, in combination:
A. an array of spaced first electrical connectors, each having plural contact elements arranged in parallel spaced relation;
B. an array of second electrical connectors, each associated with a different one of said first connectors and having at least one contact element arranged for juxtaposition in lapped relation with said contact elements of its associated one of said first connectors;
C. an elongated clamping rod extending freely through apertures in the contact elements of each said first electrical connector;
D. a first cam follower affixed to one end of said rod;
E. a second cam follower movably supported on said rod adjacent said one end thereof in juxtaposed relation with said first cam follower;
F. first compression spring means interposed between said second cam follower and the first connector at one end of said array;
G. a stop affixed to the other end of said rod;
H. second compression spring means interposed between said stop and the first connector at the other end of said array; and
I. camming means movable between joint clamping and joint unclamping positions, said camming means while in said unclamping position controllably engaging said first and second cam followers to sustain said first and second compression spring means in substantially unloaded conditions to thereby permit said contact elements of said first and second connectors to move into and away from lapped relation, said camming means operable in said clamping position to cam said first and second followers in opposite directions to uniformly load said first and second spring means such as to develop substantially equal and oppositely directed forces effective to clamp said lapped contact elements in secure electrical interconnection.

4,032,208
CONNECTOR FOR TRACK LIGHTING SYSTEM
Hans Peter Berkenhoff, Ludenscheid, Germany, assignor to Lightcraft of California, Los Angeles, Calif.
Filed Mar. 22, 1976, Ser. No. 669,243
Int. Cl.³ H01R *7/32, 13/54*
U.S. Cl. 339—88 R **3 Claims**



3. In a connector for installation in a tube-like track which has a slot and which has a pair of electrical conductors, wherein the connector had a head portion which can enter the track slot at a first orientation of the head portion the head portion having a pair of contact elements for engaging said conductors when the head portion turns to a second orientation, the improvement comprising:
a member moveably mounted on said connector and coupled to said contact elements to retract and extend the elements with respect to the tract conductors as said member moves between first and second positions, said member being positioned so it contacts said track and is maintained by said track at said first position when said head portion lies in said track at its first orientation, but said member is free to move to said second position as said head portion turns to its second orientation; and
spring means for urging said member to said second position.

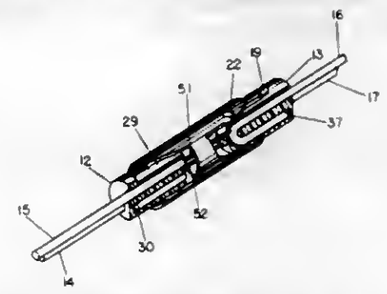
4,032,209
MULTIPLE SOCKET ASSEMBLY FOR ELECTRICAL COMPONENTS
John L. Rutkowski, Mount Prospect, Ill., assignor to Appleton Electric Company, Chicago, Ill.
Filed Jan. 15, 1976, Ser. No. 649,477
Int. Cl.² H01R *13/54*
U.S. Cl. 339—91 R **5 Claims**



1. In an electrical apparatus comprising electrical component means, connector means having wires extending therefrom and a mounting track, said track including a pair of parallel rails defining a space therebetween, said connector means being positioned in said space and supported on said rails, said means having a plurality of mating plugs and sockets for releasably securing the component means to the connector means, the improvement comprising:
a plurality of pairs of spring clip means engaging the track, the two clip means of each pair being mounted opposite each other on respective rails and each pair defining a station, said track having the general shape of a U shaped channel having an open side and including a base between said rails opposite said open side, said rails at each station having members for supporting a connector means at said open side and at a specific location above said base whereby the wires may extend through the part of that space between the connector means and the base, said clip means and said component means having interengaging devices for releasably securing the clip means to the component means, said clip means applying a spring force between the track and the component means urging the component means onto the connector means and holding the combination of a component means and a connector means onto the rail.

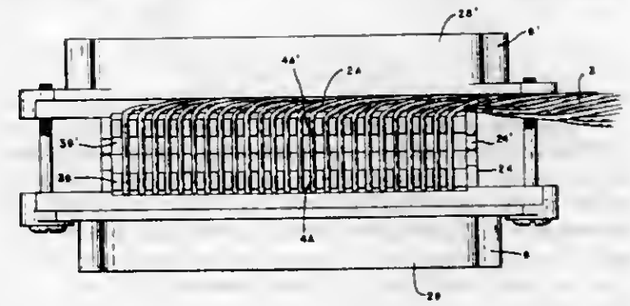
4,032,210
ELECTRICAL SPLICE
Kuno J. Vogt, 5854 Kantor Court, San Diego, Calif. 92122
Filed June 10, 1976, Ser. No. 694,801
Int. Cl.² H01R *13/38*
U.S. Cl. 339—98 **8 Claims**

1. An electrical connector comprising:
a first insulative member;
first and second channels in said first insulative member dimensioned for receiving first and second conductors to be spliced;
first and second recesses in said first insulative member dimensioned for receiving said first and second conductors after passage through said first and second channels;
first and second protuberances disposed on opposite sides of said first insulative member;
a second resilient insulative member, said second insulative member having a recess one one end thereof dimensioned for receiving said first insulative member;



first and second conductive pins carried by said second insulative member and being geometrically disposed for electrical contact with any conductors disposed in said first and second recesses, respectively;
first and second apertures in said second insulative member geometrically disposed for receiving said first and second protuberances, respectively; and
electrical output means coupled to said first and second conductive pins.

4,032,211
MULTI-CONDUCTOR HALF-TAP CONNECTION
John James Tucci, Winston-Salem, N.C., assignor to AMP Incorporated, Harrisburg, Pa.
Division of Ser. No. 649,010, Jan. 14, 1976, Pat. No. 4,007,534. This application Nov. 1, 1976, Ser. No. 737,827
Int. Cl.² H01R *13/38*
U.S. Cl. 339—99 R **10 Claims**



1. an electrical tap connection for a multi-conductor cable, said tap connection comprising:
first and second multi-contact electrical connectors, said connectors each having a mating side and a rearward side,
a plurality of parallel terminal receiving cavities extending from said mating side to said rearward side in each of said connectors,
contact terminals located in said terminal receiving cavities, each of said terminals having a contact portion located on said mating side and a wire-receiving portion located on said rearward side, said first and second connectors being positioned with corresponding terminals being in precise axial alignment,
a plurality of individual wires comprising said cable, said wires extending from one end of said first connector generally perpendicular to said parallel rows of terminal receiving cavities and terminals therein,
said wires extending generally between said wire-receiving portion and said contact portions of said terminals in said first connector,
a right angle bend in one of said wires adjacent to each of said terminals in said first connector, each of said wires

being attached intermediate their ends to said wire-receiving portions in said first connector and being attached relatively nearer their ends to wire-receiving portions of corresponding terminals in said second connector,

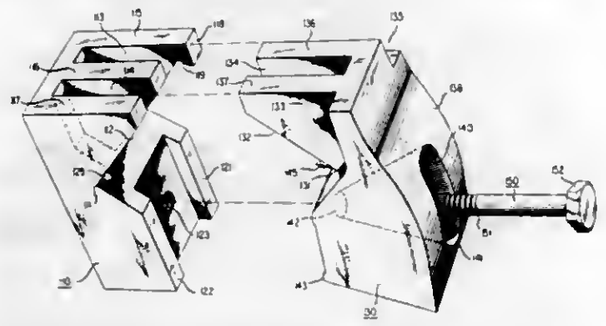
whereby a tap connection for said multi-conductor cable can be formed utilizing two separate multi-contact connectors and in which said wires comprising said cable comprise the interconnection of said connectors.

4,032,212

STRAND ADAPTER FOR AERIAL CLOSURES AND CABLE TERMINALS

Carl Walter Faust, Dover, and Arnold Ray Smith, Chester, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 28, 1975, Ser. No. 635,750
Int. Cl.² H01R 7/08
U.S. Cl. 339—109 5 Claims



1. A strand adapter including first and second mating members for coupling apparatus to a messenger strand, said strand having an outer diameter which is variable within predetermined limits, each of said members having a generally V-shaped groove transversely through a first inner portion, one side of each groove having a plurality of slots therein so as to form a plurality of generally, equally spaced-apart teeth at an end portion of each member, said spaced-apart teeth of said first member aligned to intermesh with said spaced-apart teeth of said second member,

means for securing said first and second members to one another and to said apparatus,

means, integral with said first member, for supporting said first and second members on said messenger strand when said first and second members are loosely coupled to one another in an unmated relationship, said supporting means comprising a hook-like extension integral with an outer one of said spaced-apart teeth of said first member, said extension having an edge face generally perpendicular to said one side of said first member V-shaped groove and generally parallel to another side of said first member V-shaped groove, said supporting means further diminishing rotation of said first member and said apparatus in a direction about an axis of said securing means before said second member is brought into a mated relationship with said first member upon actuation of said securing means, and

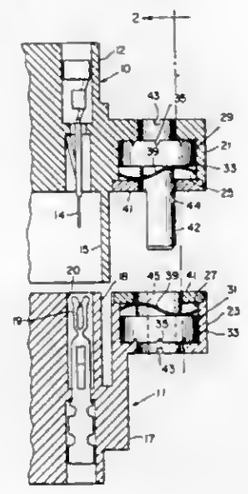
means, integral with said first and second members, for diminishing the rotation of said first and second members and said apparatus circumferentially about an axis of said messenger strand as said securing means is further actuated.

4,032,213

POLARIZING MEANS FOR ELECTRICAL CONNECTORS

Gene Larry Snyder, Bainbridge, and David Thomas Braid, Rochester, both of N.Y., assignors to The Bendix Corporation, Southfield, Mich.

Filed Jan. 29, 1976, Ser. No. 653,557
Int. Cl.² H01R 13/64
U.S. Cl. 339—186 M 8 Claims



1. A pair of mated electrical connectors comprising:

a housing associated with each connector, each housing having a mating face and an external face;

an oriented polarizing element extending from the mating surface of one housing and engaging in a mated relationship a polarizing element extending from the mating surface of the other housing, each polarizing member having an orientation with respect to each housing;

means for changing the orientation of the polarizing elements on the mated electrical connectors to various predetermined positions while the connectors and polarizing elements remain mated, said changing means comprising:

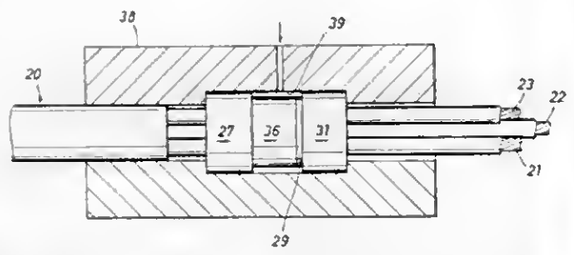
a member carried on at least one of the polarizing elements which extends through the external surface of the housing carrying the polarizing element, and which carries means for reorienting the mated polarizing elements by rotation thereof between said various predetermined positions, whereby the orientation of the polarizing elements on the mated electrical connectors may be changed with respect to each housing without unmating the pair of connectors.

4,032,214

CABLE-TERMINATION ASSEMBLIES AND METHODS FOR MANUFACTURING SUCH ASSEMBLIES

Richard P. McNerney, Houston, Tex., assignor to Schlumberger Technology Corporation, New York, N.Y.

Filed Apr. 21, 1976, Ser. No. 678,814
Int. Cl.² H01R 13/50
U.S. Cl. 339—218 M 68 Claims



1. A method for terminating an electrical cable having miltiple conductors respectively enclosed within thermoplastic sheaths collectively arranged within a cable covering and with laterally-separated end portions protruding therefrom comprising the steps of:

introducing a molten thermoplastic around said separated end portions for integrally fusing a unitary fluid barrier around each of said thermoplastic sheaths to block potential leakage paths through said fluid barrier and exterior of said thermoplastic sheaths;

arranging electrical terminals respectively on each of said end portions; and

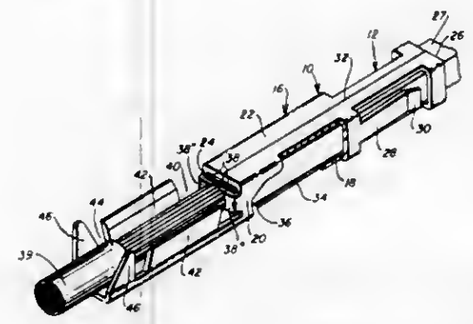
thereafter sealingly bonding a moldable polymer body around each of said electrical terminals respectively and to at least those surfaces on the forward face of said fluid barrier respectively encircling each of said end portions passing therethrough for blocking other potential leakage paths within said polymer body which are ahead of said fluid barrier and would otherwise intercommunicate the interiors of two or more of said thermoplastic sheaths.

4,032,215

ELECTRICAL CONTACT FOR WIRE AND PIN WITH COMMON STOP

Seymour Jarmofsky, deceased, late of Bethel, Conn.; by Doris F. Jarmofsky, legal representative and heir, and by Nancy H. Jarmofsky, heir, both of Bethel, Conn., assignors to Litton Systems, Inc., Beverly Hills, Calif.

Continuation-in-part of Ser. No. 451,738, March 18, 1974, Pat. No. 3,963,302. This application Mar. 10, 1976, Ser. No. 665,711
Int. Cl.² H01R 13/12
U.S. Cl. 339—258 R 6 Claims



1. An electrical contact for joining electrically conductive elements, comprising:

a first conductive element;

a box-like end section for receiving said first conductive element formed from a metal sheet having four side walls;

a second conductive element;

an open barrel crimp section for receiving said second conductive element;

a central box section formed by the extension of said four walls of said box-like end section;

one of said four walls further extended for joining said central box section and said open barrel crimp section;

support means formed by the further extension of two of said four walls perpendicular to said four walls having contiguous facing surfaces for strengthening said contact; and

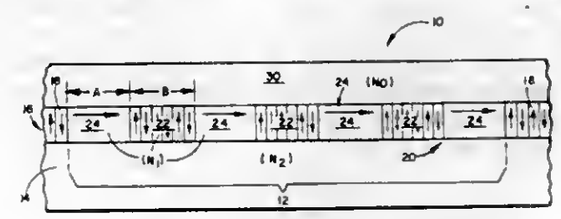
said support means formed by said two perpendicular walls having inner surfaces abutting said first conductive element and outer surfaces abutting said second conductive element to form a stop for said first and second conductive elements whose contiguous surfaces and abutting contact with said first and second conductive elements further strengthens said contact.

4,032,216

THIN FILM MAGNETO-OPTIC MODE CONVERTERS

Rodney D. Henry, Orange, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Mar. 15, 1976, Ser. No. 667,237
Int. Cl.² G02B 5/14
U.S. Cl. 350—96 WG 7 Claims



1. An optical mode converter comprising:

a substrate and;

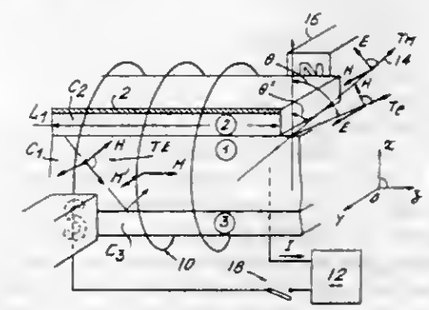
a magneto-optical waveguide supported by said substrate and comprising a periodic structure comprised of alternate first and second areas, said first areas having the magnetization therein in the plane of the waveguide and substantially parallel to the direction of propagation and said second areas having the magnetization therein perpendicular to the direction of propagation.

4,032,217

OPTICAL WAVE GUIDE FOR CARRYING OUT PHASE-TUNING BETWEEN TWO MODES OF LIGHT PROPAGATION

Philippe Coeuré, Grenoble; Jean Pierre Jadot, Meylan, and Jean Claude Peuzin, Eybens, all of France, assignors to Commissariat a l'Energie Atomique, Paris and Agence Nationale de Valorisation de la Recherche, Neuilly-sur-Seine, both of, France

Filed Mar. 24, 1976, Ser. No. 669,883
Claims priority, application France, Apr. 2, 1975, 75.10295
Int. Cl.² G02B 5/14
U.S. Cl. 350—96 WG 11 Claims



1. An optical wave guide for carrying out phase tuning between two modes of light propagation of waves within said guide, wherein said guide comprises first layer C_1 of optical index n_1, a second layer C_2 comprising a dielectric material having an optical index n_2 ($n_2 < n_1$) which is adjacent to said first layer and has a thickness e_2 determined by the equation:

$$2\left[\operatorname{arctg}\left\{\frac{\sqrt{N^2-n_2^2}}{\sqrt{n_1^2-N^2}}\cdot \operatorname{th}\left[\sqrt{N^2-n_1^2}\,e_2\,\frac{2\pi}{\lambda}\right]\right\}+\right.$$

$$\left.\operatorname{Arctg}\left\{\frac{\sqrt{N^2-n_1^2}}{\sqrt{n_1^2-N^2}}\,\frac{n_1^2}{n_2^2}\right\}\right]-2\left[\operatorname{Arctg}\left\{\frac{\sqrt{N^2-n_1^2}}{\sqrt{n_1^2-N^2}}\right.\right.$$

-continued

$$\left.\frac{1}{\text{th}\left(\sqrt{N^2-n_1^2}\;\epsilon_2\frac{2\pi}{\lambda}\right)}\right\}+\text{Arctg}\frac{\sqrt{N^2-n_1^2}}{\sqrt{n_1^2-N^2}}\Bigg]=0$$

with $N=n_1 \sin\theta$, where θ is the angle of refraction of the waves within the layer C_1 and n_2 ($n_2<n_1$) the optical index of the volume below layer C_2; and a coating having optical properties of a metallic type and deposited on the face of the layer C_2, said face being located opposite to the flat face which is common to the layers C_1 and C_2.

4,032,218

DEVICE FOR THE PRODUCTION AND MODULATION OF MONOCHROMATIC LIGHT

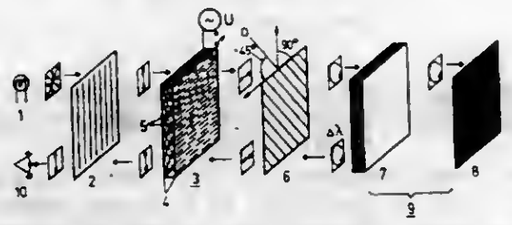
Terry J. Scheffer, Wettingen, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed May 27, 1975, Ser. No. 581,082

Claims priority, application Switzerland, June 7, 1974, 7792/74

Int. Cl.² G02F 1/13

U.S. Cl. 350—160 LC **12 Claims**



1. In a device for the production and modulation of colored light from light emanating from a suitable source by means of a liquid-crystal electro-optical cell coated with electrodes and combined with a polarizing arrangement and a reflector, the liquid crystal exhibiting a helically twisted structure with a twisting angle of at least approximately 90° along the direction normal to the film-like electrodes, the improvement comprising:

a linear polarizer positioned between said light source and said liquid-crystal cell and acting as said polarizing arrangement,

said reflector formed of a substance with a helicoidal structure which reflects colored circularly polarized light of one handedness and transmits colored circularly polarized light of the opposite handedness and a light absorbing material directly adjacent said substance; and,

a circular polarizer formed of a quarter-wave plate positioned between said liquid-crystal cell and said reflector.

said quarter-wave plate directly adjacent to said liquid-crystal cell on the side facing said reflector and, said substance with a helicoidal structure placed directly adjacent to said quarter-wave plate to minimize undesirable effects due to parallax.

4,032,219

LIQUID CRYSTAL DISPLAY DEVICES

Jennifer Constant; Ian Alexander Shanks, and Edward Peter Raynes, all of Worcester, England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britian and Northern Ireland, London, England

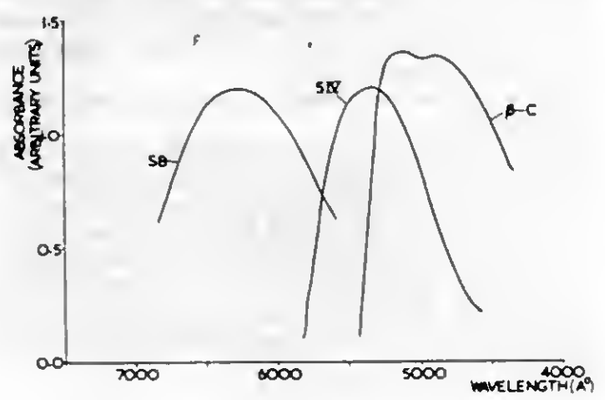
Filed Oct. 17, 1975, Ser. No. 623,506

Claims priority, application United Kingdom, Oct. 21, 1974, 45495/74

Int. Cl.² G02F 1/16; C09K 3/34

U.S. Cl. 350—160 LC **9 Claims**

1. A liquid crystal display device comprising a layer of liquid crystal material, a dye dissolved in said liquid crystal material, and means for applying across said layer an electric field capable of changing the optical transmissivity of a least a part of said layer, wherein the improvement comprises said dye being formed of a mixture of at least three colored dye compounds one of which is blue, one of which is red and one of which has a color between blue and red, said mixture providing an overall gray color in the absence of an applied electric field.



4,032,220

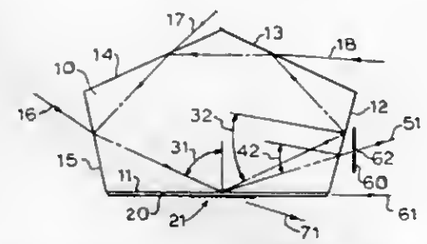
LIGHT OPTIC DATA HANDLING SYSTEM

Joseph T. McNaney, 8548 Boulder Drive, La Mesa, Calif. 92041

Filed Mar. 1, 1976, Ser. No. 662,848

Int. Cl.² G02F 1/34

U.S. Cl. 350—161 W **11 Claims**



1. Light beam distributor and reflection control means, comprising:

a. at least first and second light admitting surfaces:

b. at least first and second sources of light;

c. means for directing light from said first and second sources along corresponding first and second input paths and, respectively, toward said first and second admitting surfaces and thereupon along a primary optical path within said distributor while undergoing a series of light reflections therein so as to establish an availability of light from said first and second sources at a plurality of predetermined light output positions of said distributor for an optically controlled redirecting of light along a selected one of a plurality of secondary paths stemming from said output positions;

d. said means for directing the light along said primary path including an array of light reflecting interfaces of first and second light conducting media presenting, respectively, first and second indices of refraction, each of said interfaces presenting a length dimension and each angularly oriented so as to establish an optical relationship one with respect to the other, with respect to said input paths, and with respect to said secondary paths, said array of interfaces providing a series of 360° primary optical paths for said light, each said 360° path displaced one with respect to the other in a side-by-side relationship in the direction of said length dimension;

e. said output positions extended along said length dimension coincident with a predetermined one of said interfaces of first and second light conducting media of said array of interfaces;

f. light reflection control means positioned along said length dimension for effecting, selectively, a redirecting of light of said first and second sources along a secondary path stemming from a corresponding output position thereof.

4,032,221

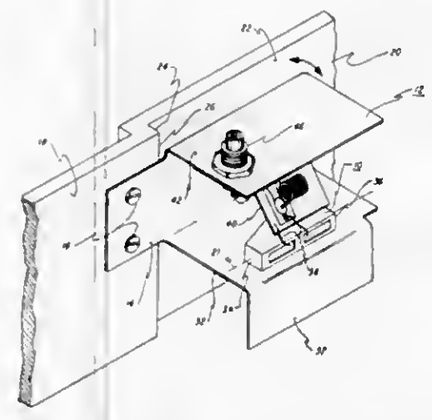
MOUNTING ARRANGEMENT FOR ACOUSTO-OPTIC MODULATORS

John S. Bibb, Indialantic, and Elliot N. Tompkins, Melbourne Beach, both of Fla., assignors to Harris Corporation, Cleveland, Ohio

Filed Mar. 22, 1976, Ser. No. 669,005

Int. Cl.² G02F 1/16

U.S. Cl. 350—161 W **12 Claims**



1. A mounting arrangement for controlling the position of an acousto-optic modulator in a beam of radiation comprising in combination:

a mounting base including a substantially planar portion and an indented portion, wherein said portions are separated by a plurality of bends:

means for directing a beam of radiation along a path that is adjacent to said planar portion;

a generally planar base member;

means for securing said base member, adjacent one end thereof, to said planar surface portion in an abutting coplanar relation, between said planar portion and said beam of radiation, and with a portion of the base member extending beyond said bend;

adjustment means connected to said member adjacent the other end of said base member and engaging said indented portion, said adjustment means being adapted to apply forces to said base member to pivot the portion of said base member extending beyond said bend, and

means for mounting an acousto-optic modulator to said base member so that said acousto-optic modulator extends into said beam and is movable along a plane including said beam in response to said adjustment means.

4,032,222

CONTROLLED REFLECTION READOUT FOR DIGITAL DISPLAYS

James M. Lapeyre, New Orleans, La., assignor to Digicourse Inc., New Orleans, La.

Continuation-in-part of Ser. No. 527,121, Nov. 25, 1974, abandoned. This application Mar. 26, 1976, Ser. No. 670,965

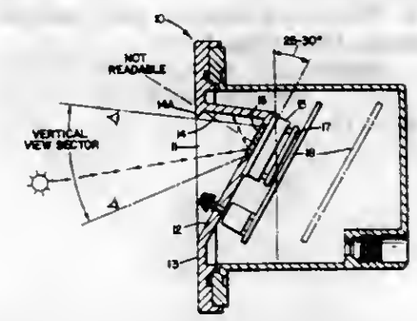
Int. Cl.² G02B 17/00

U.S. Cl. 350—276 R **11 Claims**

1. A self illuminated readout having a glare and reflection control for ambient light comprising:

a. a casement having viewing opening therein for viewing inside a casement front plane,

b. a light emitting display unit positioned inside said casement in view of said opening disposed in a second plane inclined at an angle of the order of 25° to 60° to said front plane, and



c. view limiting shield means carried by said casing and positioned in the light path between the light emitting display and an observer so that the viewing angle is restricted to less than 90° relative to the plane of said display unit thereby to eliminate reflections of external objects from the display unit.

4,032,223

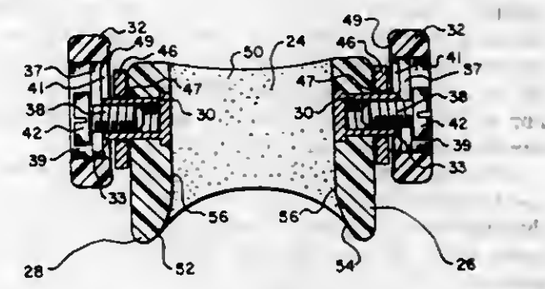
OPHTHALMIC DEVICE

James B. Bradley, Jr., 110 Monteleon Drive, West Monroe, La. 71291

Filed May 2, 1975, Ser. No. 573,907

Int. Cl.² G02C 1/00, 5/02

U.S. Cl. 351—132 **3 Claims**



1. An ophthalmic device comprising

a. a pair of lens mounts, each lens mount having a lug formed thereon, said lugs each having a pair of colinear juxtaposed vertical slots formed therein to allow for vertical adjustment of a nosepiece a wider one of the two slots on each lug being on the interior side thereof;

b. a bridge, spanning said lens mounts and rigidly attached thereto;

c. a pair of temples, hingedly attached to said lens mounts;

d. a removable and replaceable one piece nosepiece positioned between said lens mounts and beneath said bridge;

1. a pair of female receptacles imbedded fixedly in said nosepiece, the female receptacles extending outward from the sides of said nosepiece into the wider of the two slots in said lens mount lugs to retain the nosepiece between the lens mounts;

2. a pair of screws each extending through the other of the two slots in said lens mount lugs and into the female receptacles;

3. a frictional member positioned between said lens mount lugs and said nosepiece for frictionally restraining relative rotational movement between said one piece nosepiece and said lens mounts whenever said screws are tightened in said female receptacles; and

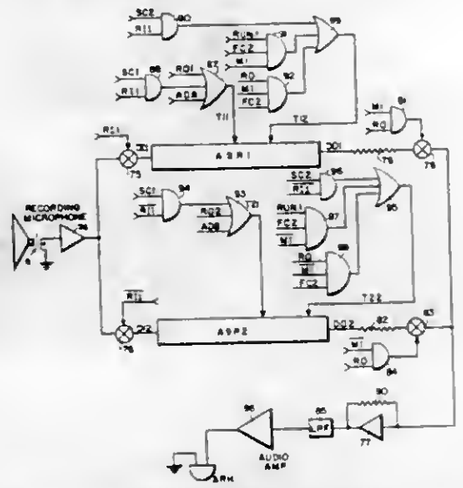
4. said female receptacles also extending through said frictional members.

4,032,224

SOUND RECORDING AND REPRODUCING SYSTEM FOR SOUND MOTION PICTURE PHOTOGRAPHY

William R. Wray, West Roxbury, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Nov. 7, 1974, Ser. No. 521,839
Int. Cl.² G03B 31/02
U.S. Cl. 352—11 6 Claims



1. Means for reproducing a signal recorded at variable speed on a magnetic recording medium while moving the recording medium at variable speed, comprising a transducer, transport means for cyclically moving the recording medium at varying speeds past said transducer and then stopping the recording medium, an amplifier connected to said transducer and having a gain dependent on an applied automatic gain control signal, an optically coded disc, means for moving said disc at a speed synchronized with said transport means, and photoelectric means responsive to the optical coding of said disc to produce an automatic gain control signal to adjust the gain of said amplifier to remove amplitude variations in the recorded signal during reproduction.

2. Photographic apparatus for use with an elongated strip of photographic film having a series of image frame sections disposed therealong and an elongated magnetically recorded sound track section extending lengthwise therealong correlated to each of the image frame sections, said apparatus comprising:

an image porjection station;

means for intermittently imparting motion to progressive intermediate portions of the film strip adjacent said station to sequentially advance the image frame sections into a position at rest in operative relationship to said station;

means for rendering said station operative to perform its intended photographic operation relative to the image frame sections as they are sequentially positioned at rest in operative relationship with respect to said station by said intermittent imparting motion means;

audio information retrieving means for monitoring said elongated sound track and deriving periodic signals of electrical information therefrom during periods of said intermittent motion, said retrieving means including means for storing samples of said intermittently derived signals and for thereafter transcribing said stored samples into continuous audio information in correspondence to the photographic operations performed on respective frame sections subsequent to said periods of intermittent motion, said information retrieving means also including means for providing a first signal indicative of the complete transcription of at least a select portion of the samples stored by said sample storing means,

means for monitoring the motion of said motion imparting means and for providing a second signal representative of a particular point in said intermittent motion, and

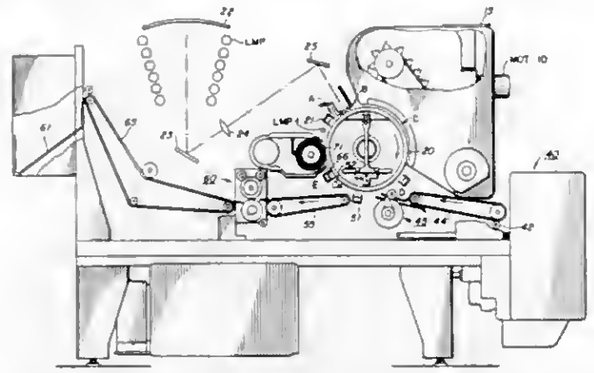
speed control means responsive to said first and second signals for controlling the speed of said motion means so that said particular point in said intermittent motion substantially coincides with the complete transcription of all the samples stored in said select portion of said sample storing means.

4,032,225

COPYING MACHINES

Geoffrey C. Williams, Rochester, N.Y., assignor to Rank Xerox Ltd., London, England

Filed Aug. 25, 1975, Ser. No. 607,644
Claims priority, application United Kingdom, Sept. 24, 1974, 41466/74
Int. Cl.² G03G 15/00
U.S. Cl. 355—3 DD 1 Claim



1. An electrostatic copying machine comprising means for producing an electrostatic latent image, means for developing the latent image, means for transferring the developed image to support material, means for feeding sheets of support material to the transfer means, and means responsive to the feeding means for replenishing developer material in accordance with the number of sheets fed to the transfer means, the replenishing means including:

a. a motor for controlling the flow of developer material from a reservoir;

b. detection means actuatable for a first predetermined period on the feeding of each sheet to the transfer means;

c. first relay means having a normally open first switch in series with the motor;

d. means for actuating the first relay means after the detection means has been actuated a given number of the first predetermined periods to close the first switch for a second predetermined time;

e. a normally closed second switch in series with both the motor and the first switch; and

f. means responsive to the closing of the first switch for opening the second switch after a third predetermined time has elapsed.

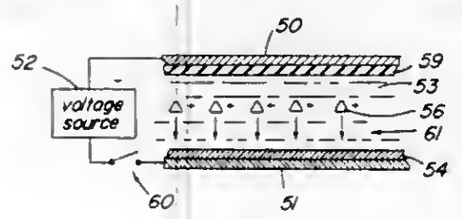
4,032,226

PHOTOIMMOBILIZED ELECTROPHORETIC RECORDING

Carl F. Groner, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 607,650, Aug. 25, 1975, Pat. No. 3,976,485, which is a continuation-in-part of Ser. No. 510,848, Sept. 30, 1974, abandoned, which is a continuation-in-part of Ser. No. 425,044, Dec. 14, 1973, abandoned. This application Mar. 22, 1976, Ser. No. 668,885
Int. Cl.² G03G 15/00
U.S. Cl. 355—3 P 23 Claims

1. In an imaging apparatus for use in a migration imaging process, said apparatus comprising (a) two spaced electrodes adapted to receive electrically photosensitive particles, at least some of which bear a positive polarity electrostatic charge, disposed therebetween, one of said electrodes bearing a blocking layer on a surface thereof adapted to contact said particles, and (b) means for substantially simultaneously creating an electric field between said electrodes and exposing said photosensitive particles to activating radiation, the improvement wherein the electrode opposite said electrode



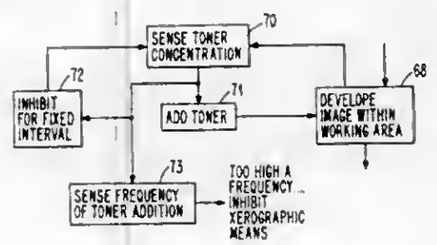
bearing the blocking layer has as an overcoat for a surface thereof adapted to contact said particles a uniform layer comprising an amount of a dark charge exchange material sufficient to provide a net change in the charge polarity of at least a portion of said particles bearing a positive polarity electrostatic charge upon electrical contact therewith in the presence of said field and in the absence of activating radiation.

4,032,227

TONER CONCENTRATION CONTROL APPARATUS

James H. Hubbard, Boulder County, Colo., and George W. Van Cleave, Lexington, Ky., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 15, 1976, Ser. No. 649,390
Int. Cl.² G03G 15/00; B05B 5/02
U.S. Cl. 355—14 25 Claims



17. Toner concentration control apparatus comprising:

a toner concentration sensor providing a cyclic output signal when a need to add toner is sensed;

an integrating counter connected to integrate said cyclic output signal and to provide an add-toner signal upon said integrating counter reaching a preset high-count state;

a periodic signal, of a frequency lower than said cyclic output signal, connected to reset said integrating counter;

inhibit means controlled by said add-toner signal and operable to inhibit operation of said toner concentration sensor for a preset interval; and

a failure-sensing counter incremented by said add-toner signal and operable to provide a failure output when a preset number of said add-toner signals occurs in an interval spanning a number of said periodic signals.

4,032,228

FOREIGN OBJECT DETECTOR/BRUSH CLEANER

Charles A. Whited, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed June 27, 1974, Ser. No. 483,868
Int. Cl.² G03G 21/00
U.S. Cl. 355—15 1 Claim

1. An improved reproduction machine having means defining a support surface on which an image may be formed, means for moving the support surface around a closed path, means for forming a developed image on the support surface, means for transfering the developed image to a transfer member, and means including a housing having an opening and a brush mounted for rotation within the housing and extending through the opening for cleaning the support surface after the developed image has been transferred and before another

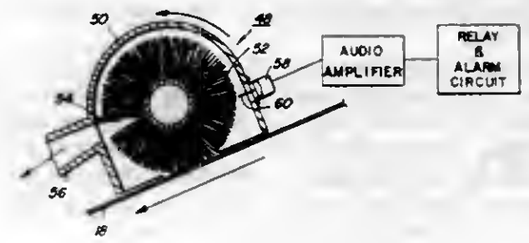


image has been formed on the same portion of the support surface, the improvement comprising:

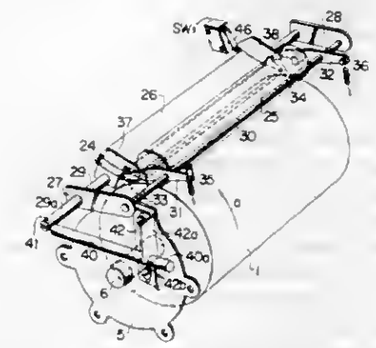
means including a crystal pickup and a probe disposed immediately adjacent to the periphery of the brush for detecting the presence of a transfer member within the housing.

4,032,229

CONSTRUCTION OF ELECTROPHOTOGRAPHIC COPYING MACHINES WITH A CLEANING UNIT FOR PHOTOSENSITIVE SURFACE

Tatsuo Tani, formerly Nishikawa, Tokyo; Susumu Tatsumi, Kawasaki; Mitsuo Tanaka, Sagamihara; Sakae Ota, Tokyo, and Akira Midorikawa, Yokohama, all of Japan, assignors to Ricoh Co., Ltd., Japan

Filed Jan. 9, 1976, Ser. No. 647,813
Claims priority, application Japan, Jan. 14, 1975, 50-6713
Int. Cl.² G03G 21/00
U.S. Cl. 355—15 9 Claims



1. A construction of electrophotographic copying machines comprising:

a. a photosensitive drum,

b. a pair of sidewalls rotatably mounting said drum therebetween, one of said sidewalls having an opening to permit the drum to pass therethrough;

c. a coverplate detachably mounted on said one sidewall to cover said opening,

d. first and second cleaning means, extending across said drum between said sidewalls for movement between respective first positions in engagement with said drum and respective second positions spaced from said drum, said cleaning means in said first positions, engaging said drum at respective contact areas, which are circumferentially spaced from each other,

e. first and second lever means pivotally mounted between said pair of sidewalls on respective shafts extending between said pair of sidewalls, for respectively supporting said first and second cleaning means, one end of one shaft extending through and beyond one sidewall,

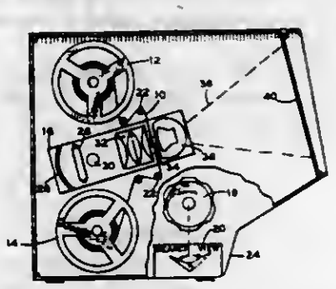
f. means interlocking said first and second lever means for conjoint movement,
g. spring means biasing one of said first and second lever means to move, through said interlocking means, both said first and second cleaning means away from the drum peripheral surface,
h. release lever means connected to said one end of said one shaft, and
i. detent means mounted at a fixed position on said cover plate, and releasably engageable with said release lever means to maintain said one shaft in a preset angular position, against the bias of said spring means, and in which said preset angular position said first and second cleaning means are engaged with the drum peripheral surface, at said respective contact areas.

4,032,230

HIGH SPEED MICROFILM SEARCHING SYSTEM

Matthew Shipman, New York; Richard Hess, Rye; Burton Kaufman, New York, and Bruce H. Schneider, Douglaston, all of N.Y., assignors to General Computing Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 441,049, Feb. 11, 1974, Pat. No. 3,895,865. This application July 21, 1975, Ser. No. 597,766
Int. Cl.² G03B 27/52
U.S. Cl. 355—42 12 Claims



1. A system for recording a marker and an index together with data on each of a plurality of frames of a microfilm, wherein the data is stored as digital signals on a tape, comprising:
a. visual display means for displaying the data on a screen;
b. computer means responsive to the data on the tape for converting the data to human readable characters for display on the screen, and for generating a human readable index for display on the screen, for each of the frames on which data is to be optically recorded;
c. unexposed film source means positioned adjacent the screen of said visual display means for optically recording the data in a plurality of frames;
d. marker recording means; and
e. control means for recording on a given frame, the data, a marker and an index so that the marker is always recorded in a predetermined position on the frame with respect to the index on that frame.

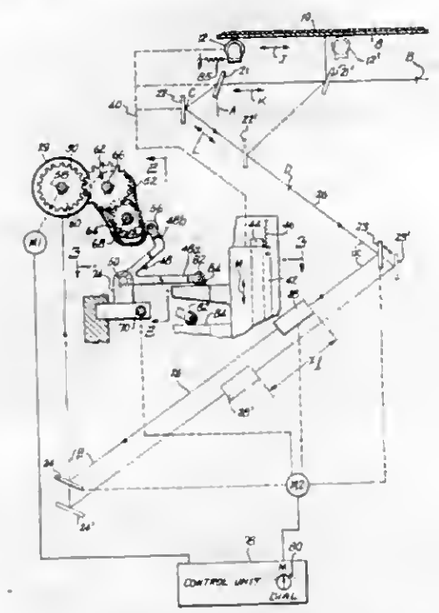
9. A metod of transferring data from magnetic tape to optical film with a marked indicia index for retrieval of said data comprising the steps of exposing a plurality of groups of data frames, each of said groups corresponding to a single film indexing position, generating a series of index indicia, each applicable to one of said groups, applying each of said index indicia to one frame of each of said groups, counting each of said index indicia during application thereof, generating a series of sensing markers, and applying one of said sensing marker to each of said one of said frames containing said index indicia at the same predetermined position relative to said index indicia in each of said one of said frames.

4,032,231

MULTIPLE RANGE VARIABLE MAGNIFICATION REPRODUCTION MACHINE USING THREE-DIMENSIONAL CAM

Edwin Zucker, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 3, 1976, Ser. No. 682,809
Int. Cl.² G03B 27/54
U.S. Cl. 355—60 22 Claims



1. A variable magnification reproduction machine for providing a continuously variable range of document magnifications comprising:
a. a platen for imaging a document,
b. document scanning means for scanning a document at said platen, said document scanning means comprising:
1. an effectively continuous cam surface having an axially extensive portion of different angular surface configurations, said different configurations providing a continuously variable range of document scanning rates, and
2. cam follower means for contacting said cam surface, for controlling the scanning rate and scanning distance of said document scanning means with said cam surface by movement of said cam surface relative to said cam follower means,
c. image receptor means for receiving an image of said document scanned by said document scanning means,
d. imaging means for focusing an image of said document onto said receptor means,
e. means for adjusting said imaging means for selecting between different document magnifications, and
f. means responsive to the selected magnifications for selecting one of said angular surface configurations for said contact by said cam follower means.

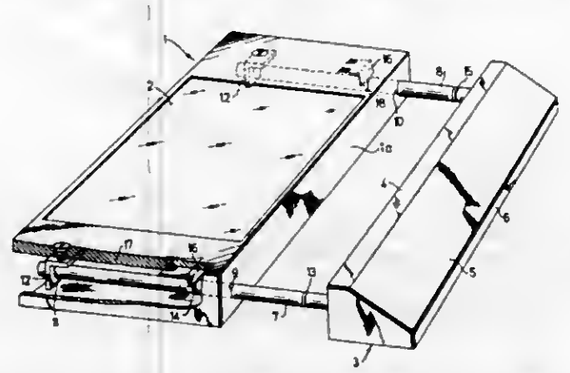
4,032,232

MOVABLE COPY BOARD FOR REPRODUCTION APPARATUS

Horst Perthes, Neuenhain, Taunus, Germany, assignor to Kalle Aktiengesellschaft, Wiesbaden-Biebrich, Germany

Filed Oct. 11, 1973, Ser. No. 405,547
Claims priority, application Germany, Oct. 13, 1972, 7237610[U]
Int. Cl.² G03B 27/62
U.S. Cl. 355—75 3 Claims

1. In a scanning-type photographic duplicating machine having a fixed copying station including a stationary light source and a movable document supporting frame for supporting and transporting an original document to be copied across said copying station, said frame being supported on said machine for reciprocal movement adjacent fixed structure of the machine, and further including an outer, longitudinal side edge portion extending generally parallel to the scanning direction of said frame and a transparent, planar surface for supporting said document; the improvement comprising:
a. an auxiliary, adjustable document support member carried by and movable with said frame, said auxiliary support member comprising an elongated, rigid element having an upper surface extending substantially coplanar with said transparent surface and generally parallel to the outer, longitudinal side edge portion of said frame; and
b. means for rigidly and adjustably securing said auxiliary support member relative to said frame, said auxiliary support member securing means including means for



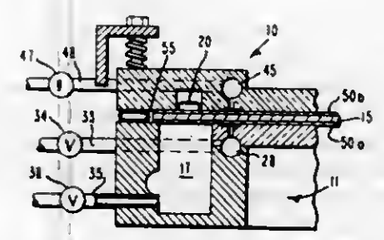
enabling said auxiliary support member to be laterally displaced relative to said side edge portion of said frame, and rigidly secured with respect to said frame at its laterally displaced position; the upper surface of said auxiliary support member being laterally displaced in a coplanar sense with respect to said transparent surface when said auxiliary support member is laterally displaced;
c. whereby a portion of a document to be copied extending lateraly beyond the longitudinal side edge portion of said frame can be rigidly supported from beneath with respect to said frame independently of adjacent fixed structure of the machine to protect the said document portion from damage and to prevent its inadvertent movement due to contact between said document portion and adjacent fixed structure of the machine during scanning movement of said frame.

4,032,233

EXPOSURE REGISTRY APPARATUS

Rolf Arne Oscarsson, Pedricktown, N.J., and Nathaniel Convers Wyeth, Mendenhall, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 3, 1976, Ser. No. 682,721
Int. Cl.² G03B 27/20
U.S. Cl. 355—91 8 Claims



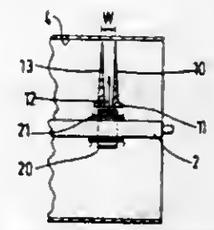
1. Apparatus for subjecting a phtotsensitive material disposed on a sheet-like support to actinic radiation through an image producing transparency comprising, in combination:
first and second sandwich-like frame assemblies each having opposed surfaces adapted to hold said support and transparency therebetween, at least one of said surfaces being radiation transmitting,
perimeter sealing means for providing an air-tight seal between said assemblies when closed,
first vacuum means defining an aperture for subjecting the enclosed region between said closed assemblies and hence the edges of said support and transparency to a vacuum, thereby to force said support and transparency together,
an inner recess formed in the inner face of said one surface within the confines of said perimeter sealing means and interiorly of said aperture, and
second vacuum means for subjecting said recess to a vacuum, thereby to hold said transparency in position while replacing said support.

4,032,234

PHOTOGRAPHIC DUPLICATORS

Harry Arthur Hele Spence-Bate, 1 Cheam Place, Morely, Australia (6062)

Filed July 8, 1975, Ser. No. 594,098
Claims priority, application Australia, July 10, 1974, 8153/74
Int. Cl.² G03B 27/22
U.S. Cl. 355—117 7 Claims



1. A photographic duplicating apparatus comprising a curved holder for holding a master film and copy film in close proximity to a light source mounted at the centre of curvature of the holder, a curved shutter having a centre of curvature coaxial with that of the holder and light source, said shutter comprising an inner tube and an outer tube mounted coaxially one within the other, one of said tubes adapted for rotary motion relative to the other of said tubes, each of said tubes having a wall aperture whereby rotary motion of one of said tubes causes alignment of said apertures to open the shutter and further rotary motion causes nonalignment of said apertures to close the shutter, means for moving the shutter so as to cut off or allow the light from the source to impinge to a master film, and masking means including a plurality of masking elements, said elements comprising fin-like radial members extending from said outer tube to a point in close proximity to the inner surface of said transparent plate thereby limiting the angle of incidence of light from said tubular lamp striking said films to an angle greater than 80°.

4,032,235

APPARATUS FOR BACKGROUND ABSORPTION COMPENSATION IN SPECTROPHOTOMETERS

Hans Walter Kiefer, Nussdorf; Lothar Herbert Riethmüller, Uhldingen-Mühlhofen, and Ernst Günther Robert Spreitzhofer, Nussdorf, all of Germany, assignors to The Perkin-Elmer Corporation, Norwalk, China /Taiwan

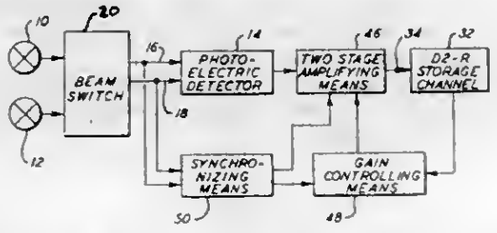
Filed Nov. 24, 1975, Ser. No. 634,928
Claims priority, application Germany, Nov. 30, 1974, 2456713
Int. Cl.² G01J 3/36, 3/42
U.S. Cl. 356—82 10 Claims

1. In a spectrophotometer of the type wherein readouts compensated for background absorption are provided by sequentially directing radiant energy from each of first and

second sources along sample and reference paths to a photoelectric detector, the improvement comprising:

means for amplifying the photoelectric detector output in separate stages at either a fixed gain or a variable gain;

means for controlling said variable gain of said amplifying means in proportion to the intensity variation of the second source from an optimum level; and



means for synchronizing said stages of said amplifying means and said gain controlling means so that the fixed gain stage occurs over a first interval while energy from the first source is directed to the photoelectric detector and the variable gain stage occurs over a second interval while energy from the second source is directed to the photoelectric detector.

4,032,236

OPTICAL MULTIPLE-REFLECTION ARRANGEMENT

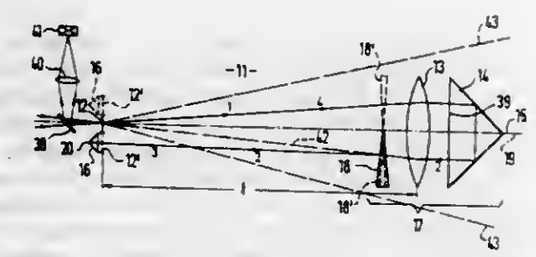
Erwin Sick, Icking, Germany, assignor to Erwin Sick Optik-Elektronik, Waldkirch, Germany

Filed Jan. 28, 1976, Ser. No. 653,152

Claims priority, application Germany, Feb. 28, 1975, 2508860

Int. Cl.² G01N 21/22

U.S. Cl. 356—201 41 Claims



1. An optical multiple-reflection arrangement having first and second reflection devices at respective ends of a measurement path and having a light source at one end of the measurement path, the light source and the reflection devices being so constructed and arranged that a light beam starting from the light source passes at least four times through the measurement path before it passes out of the latter, the first reflection device disposed at the end of the measurement path removed from the light source comprising a lens having a focal length equal to its distance from the light source, behind this lens a first retroreflecting element which reflects an incoming light beam in the same direction but offset laterally, and light beam deflection means which impart to at least one of the incoming and outgoing beams of the retroreflecting element a deflection such that the image made of the light source by the reflection device lies at the side of the light source; the second reflection device being a second retroreflector disposed near, and outside the plane of the image made of the light source by the first reflection device.

4,032,237

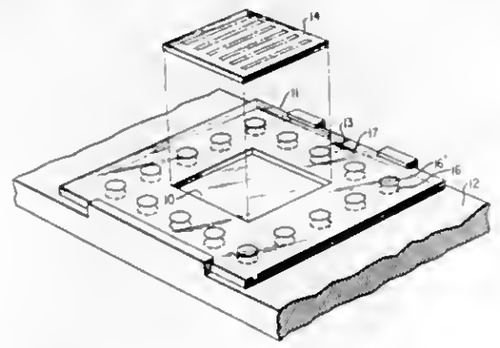
STEREOSCOPIC TECHNIQUE FOR DETECTING DEFECTS IN PERIODIC STRUCTURES

Bela Julesz, Warren, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 12, 1976, Ser. No. 675,779

Int. Cl.² G02B 27/22

U.S. Cl. 356—237 17 Claims



5. A sample holder for use with a stereomicroscope in the inspection of a periodic structure which comprises:

a. a base;

b. means for removably mounting the structure on the base; and

c. at least one random dot stereogram having left and right images mounted on a top major surface of the base within the field of view of the stereomicroscope and having a binocular disparity between left and right images thereof which is an integral multiple of the periodicity of the structure.

4,032,238

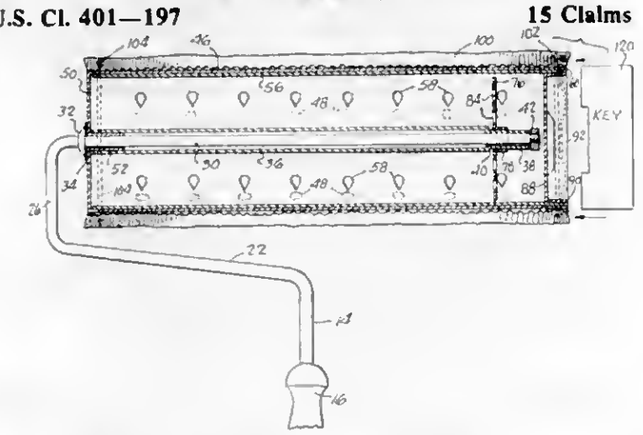
FOUNTAIN PAINT ROLLER

Ragnvald G. Leland, P.O. Box 4174, Palm Springs, Calif. 92262

Filed June 24, 1976, Ser. No. 699,502

Int. Cl.² B44D 3/28

U.S. Cl. 401—197 15 Claims



1. A fountain paint roller, which comprises:

an outer cylinder having a first set of apertures formed therein;

an inner cylinder having a second set of apertures formed therein and being disposed within said outer cylinder so as to be rotatable therewithin between a first position wherein said first and second sets of apertures are not aligned and a second position wherein said sets of apertures are substantially aligned;

guide means for constraining the rotation of said inner cylinder between said first and second positions;

key means for rotating said inner cylinder within said outer cylinder between said first and second positions; and

end closure means for said inner cylinder including means formed therein for receiving said key means so as to be rotatable thereby.

4,032,239

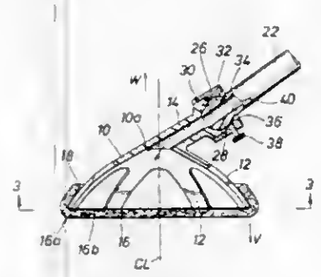
SCRUBBING APPARATUS

Roger A. Maupin, 226 Blue Castle, Houston, Tex. 77015

Filed Sept. 17, 1975, Ser. No. 614,125

Int. Cl.² A47L 1/06

U.S. Cl. 401—203 5 Claims



1. Scrubbing apparatus comprising:

a base;

a plurality of flexible, resilient fingers each having a base end adjoining said base and a free end, each of said fingers extending generally radially away from a finger centerline and also extending generally axially with respect to said centerline in a uniform direction;

and a pad member connected to the free ends of said fingers to be urged by said fingers against an object to be scrubbed and permitting relative distension of said fingers.

4,032,240

TELESCOPIC DEVICE

Horst Reinhardt, Weiskirchen, and Ernst Höger, Grosswelzheim, both of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany

Filed Mar. 5, 1976, Ser. No. 664,401

Claims priority, application Germany, Mar. 7, 1975, 2510062

Int. Cl.² F16B 7/10

U.S. Cl. 403—108 7 Claims

1. Telescopic device comprising a plurality of elongated members disposed one within the other in a fully telescoping retracted condition thereof and including an innermost member, an outermost member and at least one member intermediate thereto, said members being displaceable in longitudinal direction relative to one another in a predetermined sequence, stop means for limiting travel of said members relative to one another, said at least one intermediate member being formed at a wall region located at one end thereof with a recess penetrating therethrough, a locking member disposed in said recess and having a dimension greater than the thickness of said wall region, one of said innermost and outermost members being formed with a depression at the end thereof located, in said fully telescoping retracted position of said members, adjacent the other end of said elongated intermediate members, said locking member, in a extended condition of said intermediate member with respect to said one of said innermost and outermost members, being partly receivable in said depression, a projection extending from the other of said innermost and outermost members, at an end thereof located adjacent to said one end of said intermediate member in said fully telescoping retracted position of said members, said projection at least partly surrounding said locking member, and blocking means located at one side of said projection, and being engageable with said locking member for holding the same in a blocked position located at one side of said wall region of said intermediate member.

4,032,241

CONSTRUCTIONAL ELEMENTS

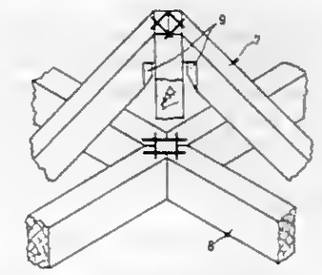
Derek Thomas Martin, 24 Torwood Road, Khandallah, Wellington, New Zealand

Filed July 1, 1975, Ser. No. 592,216

Claims priority, application New Zealand, July 15, 1974, 174863

Int. Cl.³ F16B 12/10

U.S. Cl. 403—173 2 Claims



1. A connector for building constructions and the like comprising in cross-section a four-sided box-shaped central portion having fins in pairs projecting outwardly from each of the corners thereof at right angles to each other and at right angles to the adjacent outer surfaces of the central portion, the said fins forming with the adjacent outer surfaces of the central portion four oppositely disposed substantially right-angular longitudinal channels wherein mitred ends of intersecting structural members may be fitted to the channels to engage with the fins and to project substantially at right angles to one another such that the longitudinal axis of the structural members align diagnally with opposite corners of the said central portion.

4,032,242

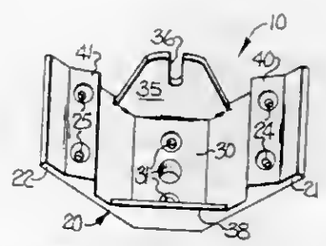
CORNER JOINT BRACE CHARACTERIZED BY A FLEXIBLE CONSTRUCTION

Max O. Morris, 582 E. Sunset Highway, Issaquah, Wash. 98027

Filed Mar. 14, 1975, Ser. No. 558,281

Int. Cl.² F16B 12/46

U.S. Cl. 403—231 3 Claims



1. A corner joint brace for furniture corner joint members and the like and characterized by a flexible construction for use in bracing a variety of angled corner joint members while providing the desired structural strength for the bracing function, said brace comprising an integral, one-piece flexible and resilient molded plastic body construction including:

a pair of rearwardly and longitudinally extending, oppositely inclined, angularly related, side portions having front and rear surfaces and top and bottom edges for

being positioned with said front surfaces adjacent inside surfaces of the angularly related corner joint members to be braced, said side portions comprising flexible, resilient material;

at least one aperture extending through each of said side portions at a longitudinally extending rearward area only thereof from said rear surface to said front surface thereof for receiving fasteners therethrough for securing said brace to the corner joint members; and

reinforcing top and bottom portions extending respectively between said top edges and between said bottom edges of a longitudinally extending forward area only at the apex of said side portions and forwardly of said apertures for providing structural strength and stability to said brace for the bracing function thereof while allowing retention of the resilience and flexibility of the longitudinally extending rearward area of each of said side portions containing said apertures from said top edges to said bottom edges;

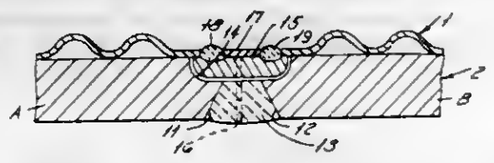
whereby, said brace may be positioned inside the corner joint of furniture and the like having corner joint members of the same or different angular relation for flexing forwardly or rearwardly, if necessary, of the longitudinally extending rearward areas of said side portions containing said fastener apertures for the positioning thereof contiguous with the inside surfaces of the corner joint members when fastened thereto for bracing thereof.

4,032,243

JOINT FABRICATION AND METHOD FOR FORMING THE SAME

Hibbard G. Keifert, Torrance, Calif., and Frank J. Waters, deceased, late of Northridge, Calif. (by Ethel M. Waters, administratrix), assignors to Fansteel Inc., North Chicago, Ill.

Filed Oct. 18, 1976, Ser. No. 733,245
Int. Cl.² F16B 5/18
U.S. Cl. 403—272 **21 Claims**



1. A wall joint for industrial and chemcial process equipment which comprises:

a. a first base structural layer,

b. a second corrosion resistant layer overlying said first layer,

c. a fusion weld joining edges of said first layer in abutting relation,

d. an inset insert of corrosion resistant material fusion welded in abutting relation to opposed edges of said second layer above said first layer, and

e. an inlay insert of corrosion resistant material underlying said inset insert and said opposed edges of said second layer and recessed into said first structural layer over the fusion weld in said first layer.

4,032,244

POLE TOP EXTENSION BRACKET

Jackson C. Quayle, 10225 Darrow Road, Twinsburg, Ohio 44087

Filed Apr. 26, 1976, Ser. No. 680,290
Int. Cl.² B25G 3/00
U.S. Cl. 403—286 **15 Claims**

10. A bracket for connecting a top extension pole member to an existing pole member each having an end portion comprising: a metal plate having parallel planar surfaces and a centrally located shaft member extending perpendicularly outwardly therefrom to be received in at least one corresponding center bore provided in at least one of said pole members; a plurality of reinforcing ribs extending radially outwardly from a central hub of said plate, a plurality of apertures passing through said plate located between said ribs, and fastening

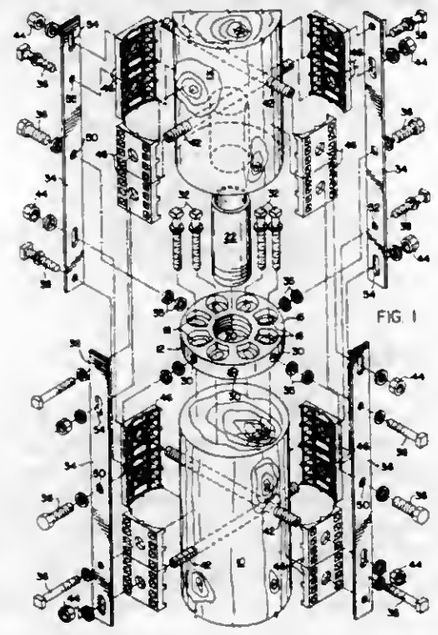


FIG. 1

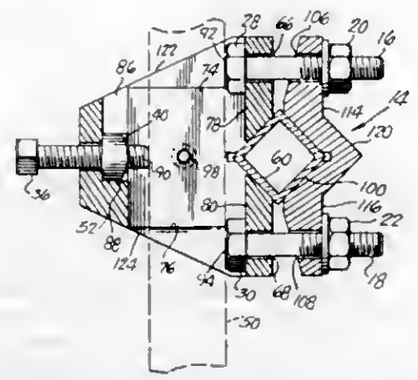
means passing through said apertures for attaching said plate to the end portion of one of said pole members; strap members positioned vertically along the outer surfaces of said pole members and said plate and fastening means for securing said straps to said pole members and said plate to form a unified pole structure.

4,032,245

AGRICULTURAL EQUIPMENT CLAMP

Henry C. Woodruff, Phoenix, Ariz., assignor to Gramor Machine Company, Tolleson, Ariz.

Filed July 9, 1976, Ser. No. 703,847
Int. Cl.² F16B 7/00
U.S. Cl. 403—385 **15 Claims**



1. An agricultural equipment clamp, which comprises:

a unitary body having means for seating a tool shank and first means integrally formed thereon for seating a tool bar transversely to said tool shank;

a unitary cap having integrally formed therein second means for seating said tool bar at a position opposite to said first means and first aperture means located near the ends of said cap for receiving means for securing said clamp about said tool bar;

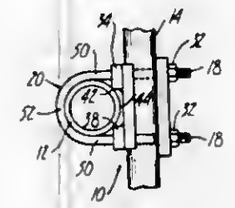
wherein said tool shank seating means comprises said means for securing said clamp about said tool bar.

4,032,246

CLAMP

William A. Waara, Detroit, Mich., assignor to Visi-Trol Engineering Company, Detroit, Mich.

Filed May 10, 1976, Ser. No. 684,872
Int. Cl.² F16B 7/04
U.S. Cl. 403—390 **3 Claims**



1. For use in combination with a pair of elongated cylindrical members crossing each other at a predetermined angle, a clamp for clamping said members together at their point of intersection, said clamp comprising:

a base disposed between the elongated members at their point of intersection, said base having a first pair of spaced and parallel bar members having a rectangular cross-sectional shape, and a second pair of spaced and parallel bar members having a rectangular cross-sectional shape, said second bar members disposed at said predetermined angle relative to the first pair of spaced and parallel bar members so that a portion of each of said second bar members overlaps and is secured to each of said first bar members, said first and second bar members of said base forming a channel on each side of said base, wherein each of said channels is adapted to receive one of said elongated members therein and wherein the spacing between the pairs of bar members is less than the diameter of the corresponding received cylindrical member,

a fastener having a pair of space and parallel first legs and a second leg disposed across one end of said first legs, said first legs of said fastener being disposed through receiving apertures in said base so that one of said elongated members is entrapped between the second leg of said fastener and said base,

a bar having apertures for receiving the first legs of said bolt member therethrough so that the other elongated member is entrapped between said bar and said base, and

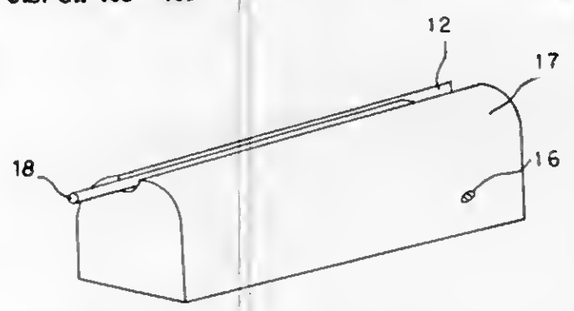
means for securing the first legs of the fastener to said bar.

4,032,247

LOCKABLE WEDGE

Kenneth G. Carter, 175 Virginia, Salt Lake City, Utah 84103

Filed Aug. 16, 1976, Ser. No. 714,594
Int. Cl.² F16B 2/14
U.S. Cl. 403—409 **10 Claims**



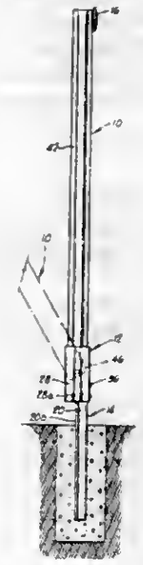
1. A lockable wedge for wedging two parts together in a manner that the wedge cannot be easily dislodged comprising a metal wedge member having a forward face and a rear face, said rear face being vertically thicker than said forward face, and an upper bearing surface tapering from the top of the forward face to the top of the rear face, said upper surface having a longitudinal groove therein extending from a position near said rear face to a position near said forward face, said longitudinal groove intersecting a substantially vertical tubular hole near said rear face, said groove and tubular hole adapted to receive a rod member having one short end bent at a substantially right angle to the remainder of the rod.

4,032,248

ARTICULATED HIGHWAY DELINEATOR POST

Alfred P. Parduhn, 14501 Wilson Road, Oklahoma City, Okla. 73110, and Waldo E. Cecil, P.O. Box 5314, Arlington, Tex. 76011

Filed Nov. 18, 1976, Ser. No. 742,856
Int. Cl.² E01F 9/00
U.S. Cl. 404—10 **22 Claims**



20. A highway delineator post structure comprising:

an elongated ground post having, in cross-section:

a U-shaped central portion; and

a pair of flanges projecting in opposite directions from said U-shaped central portion;

a slotted tubular sleeve including:

a first wall;

a longitudinally slotted wall opposite said first wall; and

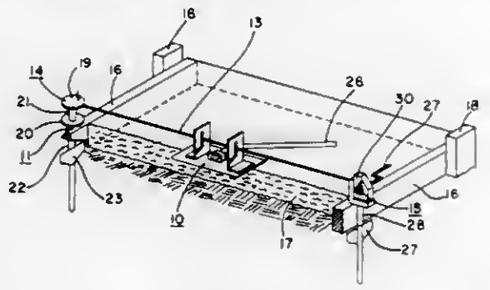
a pair of spaced, longitudinally lobed side walls joining said first wall and said longitudinally slotted wall, said lobed walls each having a lobe projecting outwardly from said tubular sleeve, and each slidingly receiving one of the flanges of said ground post;

means interlocking said sleeve in telescoping engagement with said ground post with said flanges in said interior channels;

a polygonally cross-sectioned elongated indicator support post having an end portion telescoped into said sleeve, and extending in axial alignment with said ground post; and

means pivotally engaging said sleeve and said indicator support post for pivotation of the indicator support post about a horizontal axis, and for extension of the support post, upon pivotation from the pivotal axis thereof, through the slot in said slotted wall.

4,032,249
APPARATUS FOR GROOVING CONCRETE
Louis DeVitis, Millstone Road, Perrineville, N.J. 08835
Filed Nov. 12, 1976, Ser. No. 737,441
Int. Cl.² E01C 23/02
U.S. Cl. 404—89 7 Claims

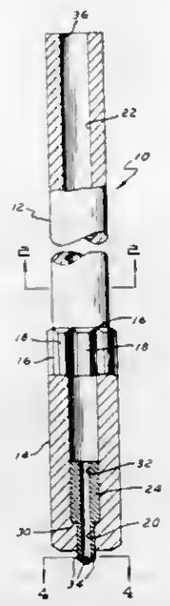


1. In apparatus for grooving wet mortar or the like, the combination comprising:

A guide assembly comprising a cable extending between a drum assembly and a ratchet assembly wherein said drum and ratchet assemblies include spacer means for mounting said cable a predetermined height above said mortar and said ratchet assembly includes means for tensioning said cable so as to form a guide wire; and

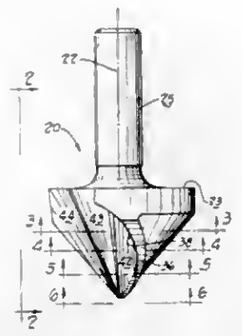
a float assembly comprising float means for imparting a groove to said mortar when slid across the surface thereof and track means for slidably engaging said cable.

4,032,250
REAMER CONSTRUCTION
John A. Lavallee, Hatfield, Mass., assignor to Lavallee & Ide, Inc., Chicopee, Mass.
Filed Mar. 17, 1976, Ser. No. 667,687
Int. Cl.² B23B 51/06
U.S. Cl. 408—59 4 Claims



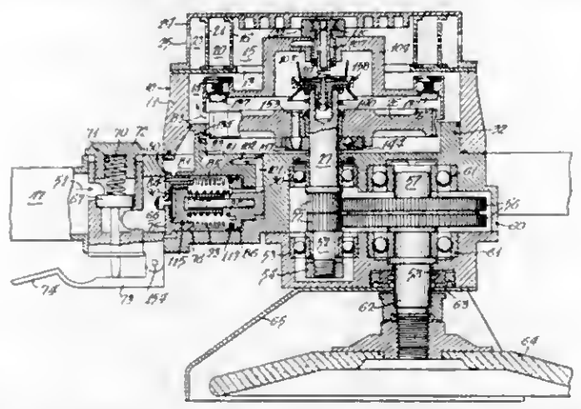
1. In a reamer comprising a shank and a cutting portion adjacent one end thereof, the improvement which comprises a pilot hole axially disposed in said shank in the cutting portion end thereof, a fluid passage axially disposed throughout the remainder of said shank communicating with said pilot hole, and fluid dispersing means disposed in said fluid passage and having a portion thereof extending through said pilot hole to a point outside of said shank said dispersing means being freely and wholly displaceable into said shank.

4,032,251
COUNTERSINKING AND DEBURRING TOOL
Thomas Anthony Ribich, Cleveland, Ohio, assignor to The Weldon Tool Company, Cleveland, Ohio
Filed May 5, 1975, Ser. No. 574,389
Int. Cl.² B23B 51/10
U.S. Cl. 408—199 16 Claims



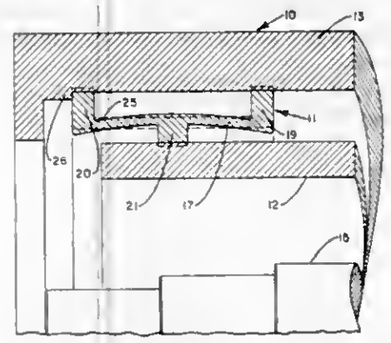
1. A countersinking tool having an axis of rotation and comprising a shank portion, a cutting portion integrally connected to said shank portion and including a generally tapered body having a generally conically shaped reference surface, wall means extending generally radially into said tapered body and defining a curved cutting face wall, said curved cutting face wall extending substantially on the arc of a circle, a relieved land surface extending to and meeting said cutting face wall to define a curved cutting edge, said curved cutting edge located substantially on said conically shaped reference surface of said tapered body, a lateral support member located generally diametrically opposed to said curved cutting edge, said lateral support member having a curved support surface with only a portion thereof located substantially on said conically shaped reference surface of said tapered body, said tapered body being recessed rotatively ahead of said cutting edge to said lateral support member and rearwardly of said cutting edge to said lateral support member, and a chip breaking wall integrally connected to said tapered body and extending transverse to said cutting face wall.

4,032,252
PRESSURE GAS ENGINE
Aldo F. Ceresa, Boynton Beach, Fla., assignor to Hollymatic Corporation, Park Forest, Ill.
Filed June 10, 1976, Ser. No. 694,893
Int. Cl.² F01B 25/06
U.S. Cl. 415—25 6 Claims



1. A pressure gas engine, comprising: a rotor having energy conversion means thereon for converting dynamic gas pressure to power; gas passage means to said energy conversion means; control means for said pressurized gas comprising a valve seat in said gas passage and a force movable valve movable toward and away from said seat to control and meter the gas flow through said passage, said force movable valve comprising an expansible and retractable bellows having a hollow interior and a chamber surrounding the bellows in which the bellows is located; first gas flow means for diverting a portion of said pressurized gas to the interior of said bellows; second gas flow means for diverting a portion of said pressurized gas to the chamber surrounding said bellows; a pressurized gas vent passage means leading from said bellows interior and including a vent valve seat; a movable vent valve member movable into and away from engagement with said vent valve seat for metering gas flow through said vent passage; centrifugally responsive means rotatable by said rotor for moving the vent valve member toward said vent valve seat on increasing speeds of said rotor and away from said seat on decreasing speeds, said centrifugally responsive means comprising a spring member having a weighted centrifugally responsive portion arranged at an angle to said vent valve member for urging the valve member toward vent closing position on outward centrifugally responsive movement of said angled portion under increasing centrifugal forces; and a mounting member rotatable with said centrifugally responsive member and including means thereon for supporting the said angled spring member at maximum speeds for preventing damage thereto due to excessive centrifugal forces.

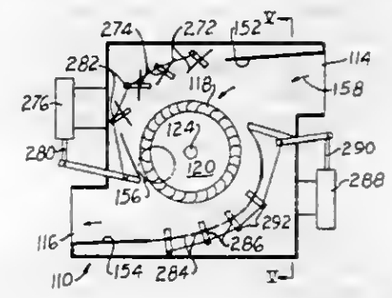
4,032,253
COMPENSATING RING FOR A ROTARY MACHINE
Robert G. Ryncosky, Jeannette, and Alexander A. Carroll, Greensburg, both of Pa., assignors to Carrier Corporation, Syracuse, N.Y.
Filed Sept. 11, 1975, Ser. No. 612,392
Int. Cl.² F01D 25/26
U.S. Cl. 415—136 2 Claims



1. In a rotary machine having an inner casing coaxially aligned within an outer casing to provide an annular space therebetween, the space being pressurized under operating conditions whereby the adjacent walls of the two casings are moved apart due to thermal growth and pressure expansion, the improvement comprising

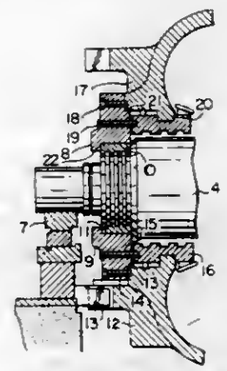
a centering ring positioned within the annular space for supporting the two casings in coaxial alignment about a common axis as the casings move apart, the ring including an annular axial extending resilient beam coaxially aligned with the casings, two end members supporting the beam in a deflected condition therebetween whereby the end members are securely seated in holding contact against one of the adjacent casing walls, the beam being arranged to react uniformally when unloaded in a direction towards the other adjacent casing wall, and an annular reaction pad centrally located along the axial length of the beam on a side opposite to that upon which the beam is seated upon the end members and being arranged to move into holding contact against said other adjacent wall casing to deliver a uniform holding force thereupon to hold the two casings in centered alignment as they move away from each other during periods of thermal growth and pressure expansion.

4,032,254
REVERSIBLE CROSS FLOW BLOWER
Erwin John H. Bentz, Washington, and Paul Julius Staebler, Dunlap, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.
Filed Oct. 20, 1975, Ser. No. 623,888
Int. Cl.² F04D 5/00
U.S. Cl. 415—54 7 Claims



1. In a transverse flow blower having a housing defining an inlet and an outlet, a drum shaped impeller having a plurality of curved blades mounted thereon, said housing comprising a generally rectangular duct having inlet and outlet ends and a housing drum, said housing drum defined by a pair of cylindrically shaped side wall portions joined by a pair of disks so as to define an interior space enclosing said impeller, means rotatably mounting said impeller with respect to said housing so that rotation thereof causes flow of fluid from said inlet to said outlet, said means for rotatably mounting said impeller comprising an elongated shaft and support bearings, and bearings on said shafts rotatably mounting said housing drum relative to said inlet and outlet ends whereby rotation of said housing drum approximately 180° causes said shrouds to be repositioned approximately 180° for fluid flow reversal, means in said housing drum defining volute walls comprising a pair of curved shrouds, each one of said shrouds being mounted on a respective one of said of cylindrically shaped sidewalls and means for reversing the direction of fluid flow while maintaining the direction of rotation of said impeller, said means comprising power means for rotating the housing drum and thereby said volute walls approximately 180°, said power means comprising a hydraulic cylinder attached to one of said ends and a rod actuator connected to said housing drum for selective rotation thereof about said shaft by said power means.

4,032,255
TURBINE ROTOR HOLDING DEVICE
Nobuyuki Iizuka; Yasuhiko Otawara, and Satoshi Ninomiya, all of Hitachi, Japan, assignors to Hitachi, Ltd., Japan
Filed Feb. 3, 1975, Ser. No. 546,808
Claims priority, application Japan, Feb. 6, 1974, 49-14464
Int. Cl.² F01D 25/24; B65D 85/68
U.S. Cl. 415—219 R 8 Claims



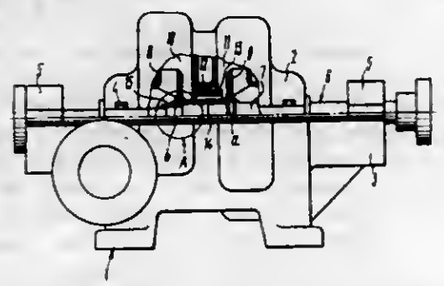
1. A device for holding a turbine rotor of a steam turbine of

the type having turbine wheels provided on a turbine rotor, a turbine casing through which, at the end portions thereof, the turbine rotor extends, and bearing means mounted at the turbine rotor; the improvement comprising means for holding the turbine rotor including an inner ring, an outer ring for supporting said inner ring, said inner ring being provided with a surface complementary to a portion of the turbine rotor constituting a steam leakage preventing means disposed between the location of said bearing means and the turbine casing so as to protect said stream leakage preventing means when fitted thereon; and fastener means for securing said outer ring to the turbine casing and adapted to be removed during operation of the steam turbine, whereby the turbine rotor can be directly supported on the turbine casing when said bearing means are not mounted in place.

4,032,256
CENTRIFUGAL PUMP

Viktor Arsentievich Tatkov, prospekt Tsiolkovskogo, 67 kv. 9, and Nikolai Nikolaevich Letov, ulitsa Transportnaya, 105, kv. 81, both of Novokuznetsk, Kemerovskol oblasti, U.S.S.R.

Filed Nov. 14, 1975, Ser. No. 632,169
Int. Cl.² F04D *17/08*
U.S. Cl. 415—198.1 **4 Claims**



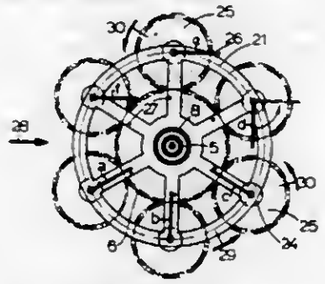
1. In a centrifugal pump having a casing, a shaft mounted in said casing, impellers mounted on said shaft in a fixed position relative to each other and secured on the shaft for rotation therewith and spacer means on said shaft between said impellers for engaging said impellers to hold the same said shaft at the points of mounting of said impellers bas tapered surfaces whose apices face each other, the mating surfaces of said impellers also being tapered, at least one of the tapered surfaces of said shaft being formed by a busbing on said shaft, and means mounting said bushing on said shaft with the provision for axial movement in operation in order to press the impellers against the corresponding tapered surfaces of the shaft.

4,032,257
MILL, PARTICULARLY WINDMILL

Hendrik Antoon Lorentz de Haas, Loenersloot, Netherlands, assignor to B.V. vuro vorr Wetenschappelijke en Techische Ontwerpen Wto, Breukelen, Netherlands

Filed Dec. 9, 1975, Ser. No. 639,173
Claims priority, application Netherlands, Dec. 11, 1974, 7416097
Int. Cl.² F03D *3/06*
U.S. Cl. 416—117 **15 Claims**

1. A windmill, intended to be driven by a flow of fluid, comprising
- a stationary frame having a central axis;
- a vane rotor rotatably mounted in said frame coaxially with said central axis;
- a plurality of vane shafts rotatably mounted in said vane rotor in a circular array about said central axis;
- a plurality of vane members each fixedly secured to one of said vane shafts for rotation therewith with respect to said vane rotor, each vane member having at least a major portion thereof extending to one side of its associated vane shaft;
- a plurality of vane stop means on said vane rotor each associated with one of said plurality of vane members for defining an operating position of each vane member in engagement with its associated stop means whereby, when orienting the mill in a flow of fluid with said frame axis perpendicular to the direction of flow, said fluid flow will swing some of said plurality of vane members about their vane shafts to their operating positions to drive said vane rotor and will tend to swing the remaining vane members to a position parallel to said flow;



- an annular member fixedly secured to said frame coaxially with said central axis, said annular member comprising a circular gear track; and
- a plurality of gear means supported by said vane rotor and coupled to one of said plurality of vane shafts, respectively, each of said gear means including a unidirectional free-wheel clutch means, and each of said gear means engaging said circuar gear track, the transmission ratio between each gear means and said gear track being greater than one.

4,032,258
BLADED ROTOR FOR FLUID FLOW MACHINES

Leonard Stanley Snell, Alveston, England, assignor to Rolls-Royce (1971) Limited, England

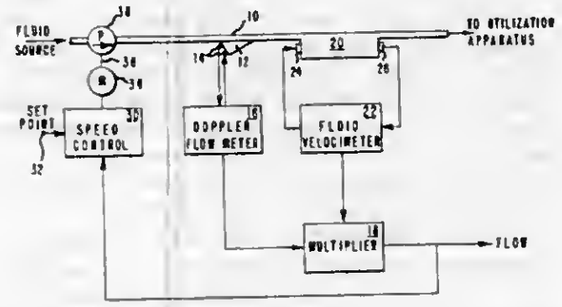
Filed June 9, 1975, Ser. No. 585,406
Claims priority, application United Kingdom, June 26, 1974, 28299/74
Int. Cl.² F01D *5/30*
U.S. Cl. 416—193 A **4 Claims**

1. A bladed rotor for fluid flow machines comprising a single disc, an annular array of blade support elements situated radially outwardly and spaced from the peripbery of the disc, the elements being elongate in a direction across said periphery, each element having end portions overhanging the respective sides of the disc, a web extending between each said element and the disc, each web also extending generally transversely to the plane of the disc and having near the periphery of the disc two portions extending radially along the respective sides of the disc, said webs and said portions thereof being a single integral whole with the disc, each blade having a root portion comprising two parallel portions disposed at opposite sides of the associated blade support element, the confronting surfaces of the parallel portions each have a recess, and the blade support element has lateral projections engaging the recesses to support a blade against radially outward movement.

4,032,259
METHOD AND APPARATUS FOR MEASURING FLUID FLOW IN SMALL BORE CONDUITS

Alvin E. Brown, Claremont, Calif., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 8, 1976, Ser. No. 647,497
Int. Cl.² F04B *49/00*; **G01F** *1/66*
U.S. Cl. 417—43 **6 Claims**

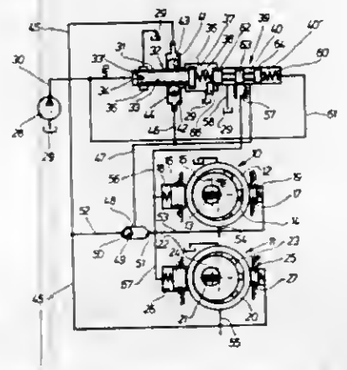


1. A meter for measuring fluid flow rate in a small bore conduit comprising, in combination,
- a Doppler effect flowmeter secured to said conduit for providing a flow signal related to fluid flow rate in said conduit but which varies as a function of sound speed in said fluid,
- a static chamber, having a flow cross-section significantly larger than the flow cross-section of said conduit, connected in series with said conduit,
- a fluid velocimeter cooperating with said static chamber for generating a sound speed signal related to the speed of sound in said fluid,
- and multiplier means for multiplying said flow signal by said sound speed signal to correct said flow signal for sound speed.

4,032,260
HYDRAULIC CONTROL DEVICE

Paul Bosch, Ludwigsburg, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Feb. 4, 1976, Ser. No. 655,215
Claims priority, application Germany, Feb. 12, 1975, 2505778
Int. Cl.² F04B *1/06*; **F16D** *31/02*
U.S. Cl. 417—216 **23 Claims**

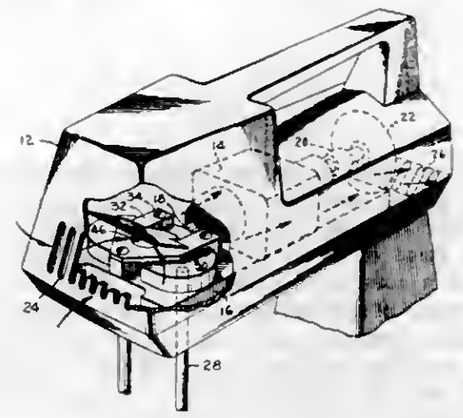


1. A device for protecting a drive from excess loading conditions, comprising a housing; a pressure-responsive control slide mounted for movement relative to said housing; transporting means for transporting fluid, said transporting means being connected to a drive so as to normally load the latter and having adjusting means for controlling the quantity of fluid transported by said transporting means; means for generating a pressure force which is indicative of the rpm of the drive at respective normally loaded conditions and which is operative for moving said control slide towards respective positions each of which corresponds to one of said normally loaded conditions; means for securing said control slide in said respective positions when said drive is subjected to loads in excess of said respective normally loaded conditions; and safety valve means including a valve member movable in response to excess loads relative to said control slide, after the latter has been secured in said respective positions by said securing means, between switching positions in which said adjusting means is operative to adjust the quantity of fluid transported by said transporting means.

4,032,261
BEARING STRAP AND COOLER

Bhim S. Madan, Brockport, N.Y., assignor to General Electric Company, Bridgeport, Conn.

Filed May 13, 1976, Ser. No. 685,731
Int. Cl.² F04B *17/00*, *39/06*; **F16C** *37/00*
U.S. Cl. 417—366 **4 Claims**



1. In a motor driven household mixer having a housing around a rotary motor in a plastic frame and having front and rear bronze bearing assemblies, a fan adjacent the rear and a beater gear box adjacent the front assembly, an improved bearing strap and cooler for said front assembly comprising,
- vents in the housing adjacent the gear box;
- a generally H-shaped one-piece bearing strap;
- means securing one leg of the H to the frame deforming said leg around the bearing;
- the other leg being bent out of the plane of the H and opening towards the vents;
- said other leg extending across the entire bearing width; whereby air moved by said fan is funneled by said bent leg towards the entire bearing cooling it and past the other leg cooling it.

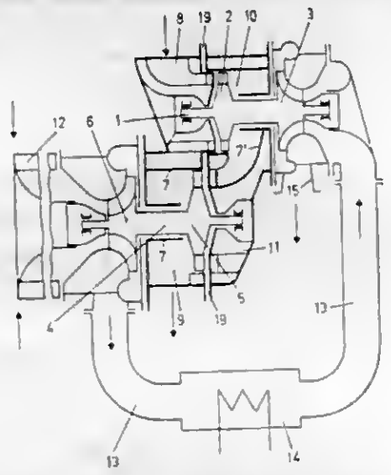
4,032,262
HOUSING ARRANGEMENT FOR A TWO-STAGE EXHAUST-GAS TURBOCHARGER

Gottlieb Zehnder, Kirchdorf, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Dec. 16, 1975, Ser. No. 641,305
Claims priority, application Switzerland, Dec. 18, 1974, 16879/74
Int. Cl.² F04B *17/00*; **F02B** *33/44*; **F01D** *25/24*
U.S. Cl. 417—409 **7 Claims**

1. A two-stage exhaust-gas turbocharger for internal combustion machines comprising at least two turbochargers, each said turbocharger comprising a shaft, and a compressor and an exhaust-gas turbine each mounted in axially spaced relationship on said shaft, a first one of said turbochargers operating as a high pressure stage and a second one of said turbochargers operating as a low pressure stage, means associated with

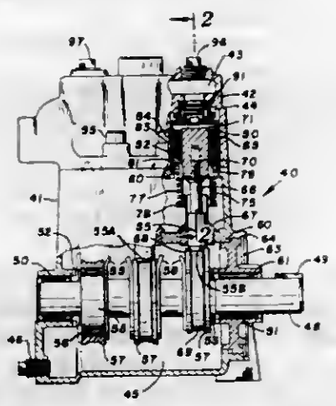
said two-stage exhaust-gas turbocharger for forming a path for compressed air with said compressors in said high pressure stage and said low pressure stage located in the path of said compressed air, said compressor in the low pressure stage of said turbocharger being located ahead of said compressor in the high pressure stage of said turbocharger in the flow path of the compressed air, said turbine in said low pressure stage of said turbocharger being located downstream of said turbine in said high pressure stage of said turbocharger relative to the flow of exhaust-gas through said two-stage exhaust-gas turbocharger, said shafts in each of said turbochargers disposed in laterally spaced parallel relation, said high pressure stage of said turbocharger having an exhaust gas outlet and said low pressure stage of said turbocharger having an exhaust-gas inlet, and a common housing for said turbine in said high pressure stage of said turbocharger and for said turbine in said low pressure stage of said turbocharger with said common housing including the exhaust-gas outlet for said high pressure stage of said turbocharger and the exhaust-gas inlet for said low pressure stage of said turbocharger.



4,032,263
PUMP WITH COAXIAL INLET AND OUTLET VALVE ARRANGEMENT

Ramon Pareja, Minneapolis, Minn., assignor to Lear Siegler, Inc., Santa Monica, Calif.

Filed Sept. 25, 1975, Ser. No. 616,553
Int. Cl.² F04B 11/00; F16K 17/26
U.S. Cl. 417—539 4 Claims



1. Unitary inlet and outlet valve means for controlling flow of fluids to and from a pumping chamber having alternate suction and pressure cycles and comprising:

a. housing means including a generally cylindrical sleeve body member with an inlet at one end and a flow chamber at the opposed end thereof and having an annular flange extending outwardly from said sleeve body member and generally enclosing said flow chamber, a bore formed within said sleeve body member and extending axially therethrough and a counterbore formed within said sleeve body member and terminating along an annular shoulder; with said flow chamber being disposed within said annular flange, and with said annular flange having spaced apart radially inwardly extending portions at opposed axial ends of said flow chamber and including first and second annular base surfaces with said first annular base surface being at the end of said housing means adjacent said flow chamber and forming one end wall thereof;

b. a first annular groove formed around the periphery of said counterbore at a point axially spaced from said flow chamber toward said inlet and having a first generally resilient snap-ring means received therewithin with the inner edge of said snap-ring means extending inwardly from said counterbore to form a first annular base pad;

c. a poppet valve seated against said annular shoulder, a cup-shaped spider means having radially outwardly extending arms seated upon the upper end of said first snap-ring means, a first valve spring disposed within said counterbore with one end of said first valve spring being seated against said spider means and the opposed end against the inner surface of said poppet valve;

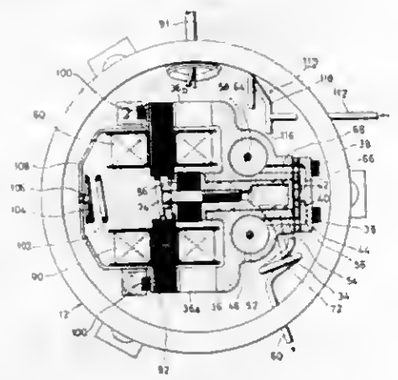
d. said annular flange having a plurality of bores formed through a second annular base surface opposed from said first annular base surface, with said bores being in communication with said flow chamber adjacent the lower end of said first snap-ring means, an annular valve ring disposed coaxially about the outer periphery of said sleeve body member and seated against the upper surface of said flange to seal said flange bores;

e. a second annular groove formed about the outer periphery of said sleeve body member, a second snap-ring means disposed within said second annular groove and having a portion extending radially outwardly of said sleeve body member to form a second annular base pad, and second valve spring means being disposed and compressed between said second annular base pad and said annular valve ring.

4,032,264
CLOSED-TYPE ELECTROMAGNETIC COMPRESSOR

Shiro Takahashi, Tokyo, Japan, assignor to Man Design Co., Ltd., Tokyo, Japan

Filed Dec. 10, 1975, Ser. No. 639,377
Int. Cl.² F04B 17/04
U.S. Cl. 417—417 7 Claims



1. A closed-type electromagnetic compressor for use in a cooling system, said compressor comprising:

a substantially enclosed casing containing a first reservoir of lubricating oil;

a main body portion mounted in said casing, said main body portion including a cylindrical chamber adapted to receive a piston section of an armature assembly for reciprocating movement along a pumping axis;

a stator core assembly including a plurality of magnetic poles defining a magnetic field space there between, said magnetic field space being dimensioned so as to allow free reciprocating movement of said armature assembly along said pumping axis when said stator core assembly is in operational engagement with said main body portion;

means for causing reciprocation of said armature assembly along said pumping axis including means for periodically energizing said stator core assembly so as to periodically generate a magnetic field within said magnetic field space;

means for lubricating said piston portion of said armature assembly as it reciprocates within said cylindrical chamber, said lubricating means including a first vertically aligned tube having an intermediate portion coupled to and communicating with a second return tube through which a refrigerant gas is circulated, said first tube having an upper opening positioned above the level of said oil in said oil reservoir and a lower opening positioned below the level of said oil in said first oil reservoir, a second oil reservoir formed in said main body portion at a position just below said upper end opening of said first tube and sufficiently close to a compressed refrigerant gas discharge chamber formed in said main body portion to heat said oil in said second oil reservoir and thereby cause refrigerant gases in said heated oil to be removed therefrom, said lubricating means further including means for guiding said heated oil from said hollow reservoir to said piston portion of said armature assembly;

means for joining a mating face of said stator core to a mating face of said main body portion;

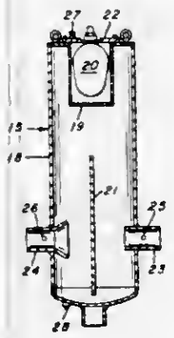
a first plurality of fitting seats formed on said mating face of said stator core assembly symmetrically about said pumping axis, each of said first plurality of fitting seats being formed along an arc of a circle which is coaxial with said pumping axis;

a second plurality of fitting seats formed on said mating face of said main body portion symmetrically about said pumping axis, each of said second plurality of fitting seats being formed along an arc of a second circle which is coaxial with said pumping axis, the shapes and positions of said fitting seats being chosen such that each of said first plurality of fitting seats precisely engages a differrent one of said second plurality of fitting seats whereby the central axis of said cylindrical chamber and said magnetic field space are both maintained in a position coaxial with said pumping axis.

4,032,265
SUCTION STABILIZER FOR RECIPROCATING PUMPS AND STABILIZING METHOD

John E. Miller, Dallas, Tex., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed July 19, 1974, Ser. No. 489,971
Int. Cl.² F04B 11/00; F16L 55/04
U.S. Cl. 417—540 9 Claims



1. The combination, with a reciprocating pump which has suction and discharge sides and a given displacement per revolution of its drive, and a source of liquid, of a suction stabilizer comprising:

a tank having an inlet connected to said source and an outlet connected to the suction side of said pump;

a flexible resilient bladder within said tank adapted to be inflated with gas;

a cage having perforate walls within said tank adjacent an end wall thereof and confining said bladder against wobbling; and

means for changing the direction of flow of liquid as the liquid passes through the tank and thus separating entrained gases from the liquid;

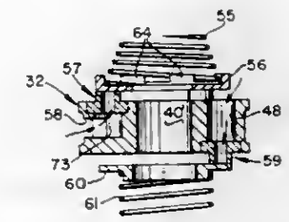
the ratio of the tank volume to the pump displacement per revolution being at least about ten to one;

the ratio of the tank volume to the bladder volume when inflated being at least about four to one.

4,032,266
VALVE ASSEMBLY FOR RECIPROCATING DOWNHOLE PUMPS

George K. Roeder, P.O. Box 4335, Odessa, Tex. 79760

Filed Apr. 16, 1976, Ser. No. 677,537
Int. Cl.² F04B 39/10; F16K 21/04
U.S. Cl. 417—571 8 Claims



1. In a hydraulically actuated, downhole pump assembly having an engine which reciprocatingly drives a production pump piston within a pump barrel, with the pump piston being connected to the engine by a connecting rod, the combination with said pump piston and rod of a valve device which controls the flow of production fluid into and out of the pump barrel;

said valve device being a main body having the form of a circular bub, said main body having an upper and a lower face which are opposed respective to one another and spaced apart by a sidewall of said main body; a central, marginal, circumferentially extending portion of said sidewall being reduced in diameter to form an annulus about said main body; an axial bore for sealingly receiving the rod therethrough in a reciprocating manner, and a plurality of circumferentially spaced passageways extending through the main body such that the axial centerline thereof is parallel to and radially spaced from the axial centerline of said axial bore;

means forming a standoff exhaust valve seat on said lower face at the end of each said passageway; a closure means for each said seat, means by which said closure means is resiliently biased into abutting engagement concurrent with the free end of each said seat;

means forming a plurality of circumferentially spaced intake ports which include a counterbore which extends parallel to said radially spaced passageways and extend only partially through said main body and then radially outward into communication with said annulus, the axial centerline of said counterbore being aligned along a circumference which intersects the axial centerline of said passageways, with one said port being located between any two adjacent passageways;

the radially outwardly directed portion of said ports being a segment of a cylinder which has a diameter three times greater than the diameter of said counterbore, with the outer circumferential wall of said cylinder intersecting the axial centerline of said counterbore, and the height of said cylinder being one third the thickness of said circular hub; and with the axial centerline of said cylinder being

located along a line drawn from the axial centerline of said axial bore and said counterbore; and,

means forming a standoff intake valve seat on said upper face at the end of said counterbore; a closure means for each said valve seat, means by which said closure means is resiliently biased into abutting engagement concurrent with the free end of each of the last said seats.

4,032,267

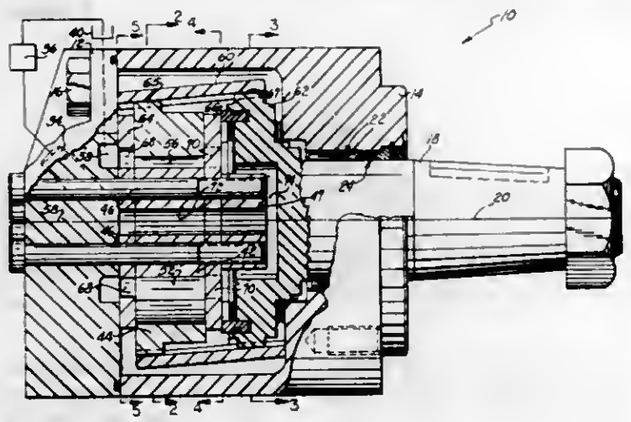
GEROTOR MOTOR WITH A STATIONARY INNER MEMBER AND A ROTATING AND ORBITING OUTER MEMBER

Laurence Lockhart Miller, West Lafayette, Ind., assignor to TRW Inc., Cleveland, Ohio

Filed Nov. 17, 1975, Ser. No. 632,520

Int. Cl.² F01C *1/02*, *17/02*; F03C *3/00*; F16D *3/18*

U.S. Cl. 418—61 B **10 Claims**



1. A hydraulic motor comprising an elongated output member, bearing means supporting said output member for rotational movement about a central axis, a series of expansible and contractable fluid pockets formed by a gearset having an internally toothed outer member and an externally toothed inner member, said internally toothed outer member having a central axis and having orbital motion with respect to said output member central axis and rotational movement about its central axis and being guided in such movement by the meshing teeth of said inner and outer member, valve means for directing fluid into certain of said pockets to effect expansion thereof and for directing fluid out of contracting pockets to thereby effect rotational and orbital movement of said outer member, a tubular member drivingly coupling said output member to said outer member to effect rotation of said output member upon orbital and rotational movement of said outer member, said tubular member comprising an elongated body having an axial passageway therethrough, one end of said tubular member having a drive connection with said outer member at a plurality of locations circumferentially spaced around the central axis of the outer member, and the other end of said tubular member having a drive connection with said output member at a plurality of locations circumferentially spaced around said central axis of said output member, said drive connection between the outer member and said tubular member enabling orbital and rotational movement of said tubular member to occur with said outer member and rocking movement of said tubular member to occur relative to said outer member, and said drive connection between said output member and said tubular member effecting rotation of said output member upon orbiting and rotational movement of the end of said tubular member connected to said outer member and enabling rocking movement of the tubular member to occur relative to said output member.

4,032,268

ROTARY PISTON ENGINE

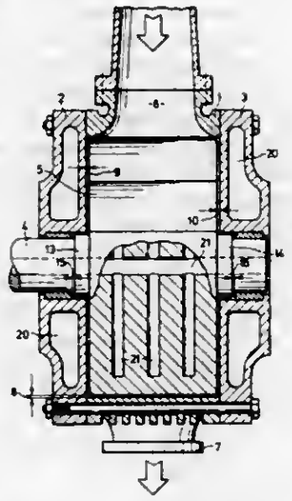
Felix Wankel, Lindau, Germany, assignor to Wankel GmbH, Berlin, Germany

Filed Mar. 5, 1975, Ser. No. 555,501

Claims priority, application Germany, Mar. 7, 1974, 2411004

Int. Cl.² F04C *27/00*

U.S. Cl. 418—91 **10 Claims**



1. In a rotary piston engine having a housing closed at its ends by first and secood end plates, a rotor mounted on a shaft within said housing, said shaft being journalled in and extending through one of said end plates, said rotor being spaced from said housing and said end plates by means of radial and axial gaps, respectively, the improvement comprising:

means for decreasing said radial and axial gaps with increasing engine temperature and increasing said gaps with decreasing engine temperature to prevent seizing of said engine upon cooling.

4,032,269

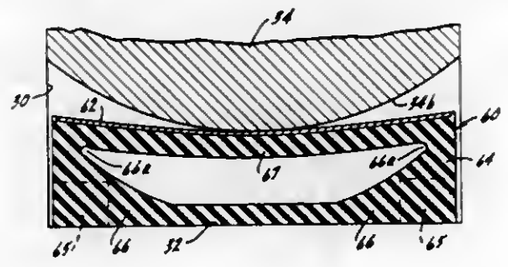
ROTARY VANE COMPRESSOR WITH VANE EXTENSION MEANS OF IMPROVED DESIGN

Rajesh N. Sheth, Mount Prospect, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed May 28, 1976, Ser. No. 691,060

Int. Cl.² F04C *29/00*; F16F *3/08*

U.S. Cl. 418—266 **3 Claims**



1. In a rotary compressor including a cylindrical rotor having a plurality of extensible vanes received in complementary vane slots, the improvement comprising: means defining a convex edge on the radially inner portion of said vanes, and a resilient element engageable with said convex edge, said resilient element having an intermediate section normally spaced from the bottom of said vane slots and adapted to flex downwardly upon engagment by said vane, said intermediate section supported by pier sections joined through means defining a concave edge adapted to receive said intermediate section when downwardly flexed.

4,032,270

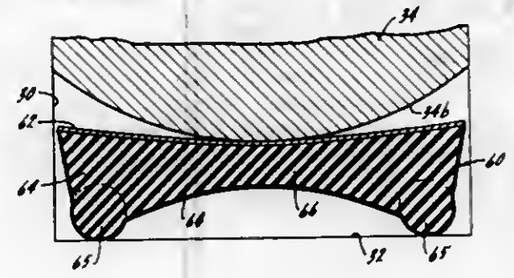
ROTARY VANE COMPRESSOR WITH IMPROVED VANE EXTENSION MEANS

Rajesh N. Sheth, Mount Prospect, and Raymond L. Guzy, Morton Grove, both of Ill., assignors to Borg-Warner Corporation, Chicago, Ill.

Filed May 28, 1976, Ser. No. 691,061

Int. Cl.² F04C *29/00*; F16F *3/08*

U.S. Cl. 418—266 **4 Claims**



1. In a rotary compressor of the type including a cylindrical rotor having a plurality of extensible vanes received in complementary vane slots and a resilient element engageable with the radially inner portion of said vanes and adapted to flex downwardly upon engagement by said vane, said resilient element being a composite structure comprising a metal spring member engageable by the radially inner portion of said vanes, an elastomeric element bonded thereto and a wear surface on said elastomeric element formed of a stretch fabric.

4,032,271

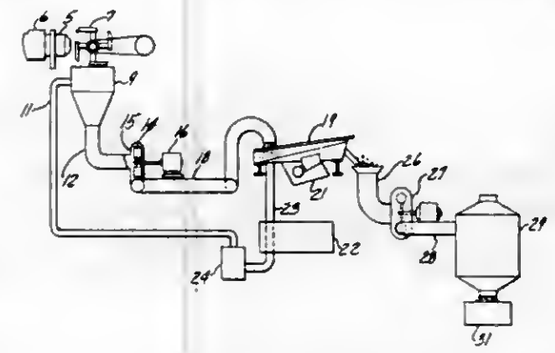
HOT PELLET TRANSFER APPARATUS

Joseph Gasior, Bloomfield, N.J., assignor to Midland-Ross Corporation, Cleveland, Ohio

Filed Nov. 3, 1975, Ser. No. 628,067

Int. Cl.² B22D *23/08*

U.S. Cl. 425—10 **6 Claims**



1. Apparatus for processing hot thermoplastic pelletized material comprising:

pelletizing means for producing a stream of separated hot mutually-adhereable pellets of said material, and directing said stream in a downward path;

funnel means defining an interior upwardly diametrically expanding funnel surface terminating in a top opening of a size adapted to receive said stream of said pellets;

first liquid-conducting means for directing liquid in a stream aligned tangentially with an upper part of said funoel surface;

supply means associated with said liquid-conducting means for effecting a rate of discharge and direction of liquid from said liquid-conducting means which maintains a spirally descending fully-contiguous sheet of liquid substantially covering said surface;

said funnel surface terminating in a bottom opening of sufficient size and said apparatus comprising means for withdrawing the resulting slurry comprising said sheet of liquid and any pellets suspended therein to effect such prompt drainage of the slurry from the funnel means as to maintain said sheet of liquid along said surface without substantial pile up of liquid at the bottom of the surface.

4,032,272

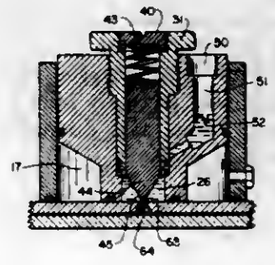
WINDSHIELD REPAIR DEVICE

Richard E. W. Miller, 3216 NE. 13 St., Apt. 7, Pompano Beach, Fla. 33062

Filed June 16, 1976, Ser. No. 696,719

Int. Cl.² B32B *35/00*; B29F *5/00*

U.S. Cl. 425—12 **11 Claims**



1. A device for repairing a pockmark in a pane of safety glass with a transparent, low-viscosity, highly-penetrating, liquid sealant comprising means for sealing off a first given area of said safety glass around said pockmark; means for evacuating the sealed portion of said first given area; means for sealing off a second given area of said safety glass, around said pockmark, within first given area; means for applying said liquid sealant to the sealed portion of said secood given area, to fill the voids in said pockmark; means for filling said sealed portion of said first given area with air to release said device from the surface of said safety glass; means for transforming said liquid sealant to a transparent solid material; and means for leveling and polishing said transparent solid material around said pockmark to render said pockmark invisible.

4,032,273

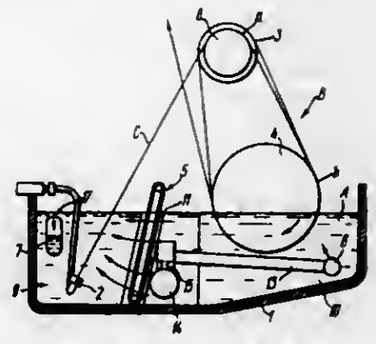
APPARATUS FOR SPINNING ARTIFICIAL FILAMENT

Ivan Viktorovich Gritskov, ulitsa Sverdlova, 10, kv. 2; Pavel Anatolievich Butyagin, ulitsa Sovetskaya, 39/1, kv. 6, both of Cherkassy; Ivan Gavrilovich Shimko, ulitsa Rudnevol, 4/13, kv. 24, Moscow; Evsei Moiseevich Mogilevsky, Kutuzovsky prospekt, 17, kv. 9, Moscow; Igor Petrovich Baksheev, proezd Shokalskogo, 153, kv. 140, Moscow; Georgy Georgievich Finger, ulitsa Matveevskaya, 4, korpus 2, kv. 21, Moscow; Ljudmila Sergeevna Scherbakova, prospekt Kosmonavtov, 27, korpus 2, kv. 104, Leningrad; Nina Timofeevna Butkova, ulitsa Sovetskaya, 39/1, kv. 6, Cherkassy, and Lev Grigorievich Kaller, ulitsa Krasilovskaya, 5/2, kv. 10, Kiev, all of U.S.S.R.

Filed Jan. 22, 1976, Ser. No. 651,246

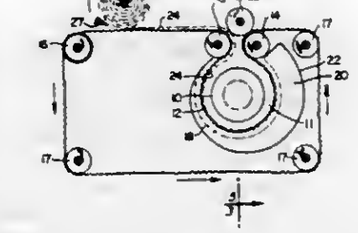
Int. Cl.² D01D *3/00*, *5/06*

U.S. Cl. 425—67 **5 Claims**



1. An apparatus for spinning artificial filaments comprising: a reservoir for spinning solution; a spinneret; filament-for-

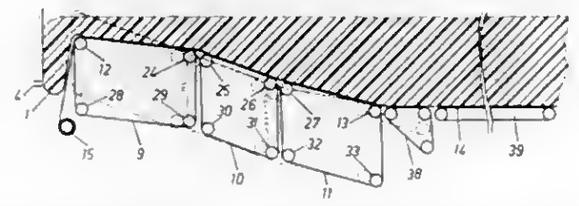
warding means for forwarding a filament, said filament-forwarding means being arranged with respect to said reservoir for forwarding a filament along a path part of which is submerged in the spinning solution; a partition mounted in said reservoir between the spinneret and said part of said path, said partition being permeable for the spinning solution and dividing the reservoir into a spinning zone and a complete recovery zone, said partition filtering the spinning solution during passing thereof from the complete recovery zone to the spinning zone, the spinneret being mounted in the spinning zone, whereas said part of said path is located in the complete recovery zone, whereby the filaments forwarded by said forwarding means are subjected to complete recovery; a supply collector for feeding the spinning solution into said reservoir, said supply collector being mounted in the complete recovery zone; and a discharge collector for discharging the spinning solution passing from the complete recovery zone through said partition into the spinning zone, said discharge collector being arranged in the spinning zone.



4,032,274
LINEAR APPARATUS FOR HIGH SPEED PRODUCTION OF AIR-LAID NON-WOVEN WEBS
Marion Frank Troy, Hinsdale, and Ewald Albert Kamp, Chicago, both of Ill., assignors to Union Carbide Corporation, New York, N.Y.
Division of Ser. No. 436,615, Jan. 25, 1974, Pat. No. 3,966,858. This application Mar. 10, 1976, Ser. No. 665,529
Int. Cl.² B28B *5/02;* **B29C** *13/00;* **B29D** *7/00*
U.S. Cl. 425—83 **13 Claims**

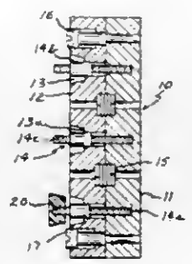
1. Apparatus for producing a non-woven fibrous web comprising: a flexible, endless foraminous belt; drive means for causing continuous longitudinal movement of said belt; guide means engaging said belt to cause it to form a closed substantially enveloping loop while maintaining a uniform profile across the belt width; supply means for providing a stream of fibers suspended in a fluid; spinner means connected to said supply means and positioned inside the arc formed by the looped belt for directing a fiber-containing fluid stream toward the interior surface of said arc section of said belt uniformly across the width of said belt around a substantial portion of the circumference of said arc section of said belt; said spinner means comprising a rotatable member having the plurality of arcuate channel openings spaced along its length and around its periphery, each of said arcuate channel openings communicating with a separate conduit extending parallel to the axis of the central shaft of said rotatable member from said arcuate channel opening to an end of said rotatable member where said conduit receives a portion of the fiber-containing stream from said supply means; and exhaust means mounted in coaxial relationship with at least a portion of the outer circumference of the arc section of said belt to apply suction through said belt for the purpose of promoting rapid deposit of fibers on said interior surface of said arc of said belt while removing said fluid through said belt.

4,032,275
DEVICE FOR THE CONTINUOUS PRODUCTION OF A STRAND OF FOAMED MATERIAL
Johann Schwab, Vienna; Maternus Gluck, Linz-Hart; Egon Kratochvil, Maria Enzersdorf, and Peter Kitzmantel, Vienna, all of Austria, assignors to Semperit Aktiengesellschaft, Vienna, Austria
Filed Dec. 4, 1975, Ser. No. 637,658
Claims priority, application Switzerland, Dec. 9, 1974, 16308/74; Nov. 5, 1975, 14258/75
Int. Cl.² B29D *27/00*
U.S. Cl. 425—89 **13 Claims**



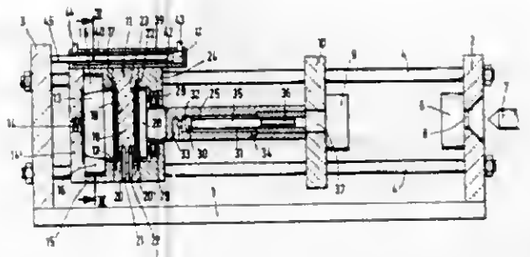
1. In a device for the continuous production of a strand of foamed material including an overflow vessel for the foamable mixture, said overflow vessel having end walls defining the width thereof, a downwardly inclined foaming track at the outlet of the overflow vessel, a horizontal curing track positioned downstream and spaced from the overflow vessel and foaming track and lateral conveyors arranged adjacent each lateral side of the foaming track, the improvement comprising said overflow vessel including means operatively associated with said overflow vessel for adjusting the width thereof, an elastic membrane connected adjacent the end walls of the overflow vessel, said membrane being extensible between said end walls as the width of said overflow vessel is adjusted, means operatively associated with said foaming track for adjusting the width of said foaming track and a flexible web connected adjacent the lateral sides of the foaming track, said web being extensible between said lateral sides as the width of said foaming track is adjusted.

4,032,276
CAST EJECTOR
Roger W. Mercer, 1340 Arlington Drive, Fairborn, Ohio 45324
Division of Ser. No. 550,109, Feb. 13, 1975, Pat. No. 3,975,489. This application Feb. 10, 1976, Ser. No. 656,916
Int. Cl.² B29D *1/00;* **B29C** *1/16*
U.S. Cl. 425—123 **1 Claim**



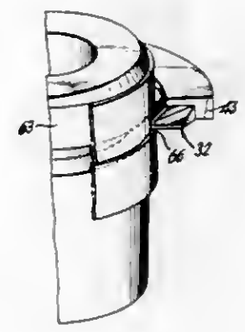
1. Apparatus for casting one or more articles, such as a plastic, threaded dental cast ejector button, each with an internally threaded opening and comprising; a mold device having a flat plate member means including a movably-mounted, top plate member incorporating one or more mold cavities for receiving therein the material to be cast in a plastic flow form; a fixedly-mounted, base plate member mounting an externally-threaded, rigid support and mold-modifying rod element for each of said mold cavities and disposed in adjustable and removably-mounted relation on said base plate member below said top plate member and each having a vertically-oriented top rod end portion extending into and projecting upwardly through a centrally disposed opening in the bottom of each of said mold cavities formed in said top plate member; first, resilient interconnecting means disposed between said fixed base plate member and said movable top plate member, and normally holding said top plate member in an upper, spaced-apart relation and open position relative to said base plate member; second, rigid interconnecting means constituting said rod members and each incorporating a first, lower, threaded rod end portion fixed and threadedly enlarged in vertically-upright relation to and on said base plate member to thereby provide the said adjustable and removably-mounted relation thereto, a second, centrally-disposed, non-threaded rod portion enlarged to be slidably engaged in relatively snug-fit relation in the said bottom opening in each of said mold cavities, and a third, upper, threaded, rod end constituting the said top rod end portion normally disposed in substantially centered relation within the respective mold cavity when said top plate member is in the said upper open position relative to said base plate member to thereby form the said internally threaded opening in each of said casted articles; and manually-controlled means comprising a hand-operated clamping device for repositioning said top plate member downwardly into a closed position against said base plate member to thereby automatically remove each of said casted articles from the respective mold cavity and simultaneously completely expose it to view above the mold cavity for its subsequent manual removal by the unscrewing thereof from the respective third, upper, threaded, rod end portion.

4,032,277
INJECTION MOLDING MACHINE WITH HYDRAULICALLY OPERATED CLOSURE DEVICE
Joachim Linde, Leiselheim, and Wolfgang Spith, Lahr, both of Germany, assignors to Klockner-Werke AG, Duisburg, Germany
Filed Nov. 5, 1975, Ser. No. 629,080
Claims priority, application Germany, Nov. 13, 1974, 2453697
Int. Cl.² B29F *1/06*
U.S. Cl. 425—591 **8 Claims**



1. In an injection molding machine, a combination comprising a stationary frame including a support plate, a stationary platen spaced from said support plate, and a plurality of axially parallel rods interconnecting said support plate and stationary platen; a movable platen mounted on said rods for axial movement; means for interchangeably mounting parts of a split injection mold having a given axial dimension on said platens for opening and closing said mold; guide means including a guide housing mounted on said rods intermediate said support plate and movable platen for joint movement with the latter, and a membrane plate rigidly connected to said guide housing and having one side facing said support plate and another side facing said movable platen; means for jointly moving said guide means and movable platen to and from a position in which said mold having said dimension is closed; means for arresting said movable platen in said position, including a plurality of clamping jaws mounted on said guide housing for displacement into and out of clamping contact with said rods, a clamping cone mounted on said guide housing at said one side of said membrane for axial displacement and engaging said jaws, a membrane interposed between said one side and said cone and sealingly connected to said membrane plate to define a pressure space therewith, and meaas for admitting pressurized medium into said space to act on said membrane and deflect the same against said cone to thereby displace the latter and thus said jaws engaged thereby into said clamping contact; means for injecting moldable material under pressure into said closed mold so that said mold parts are urged apart and a separating force acts on said movable platen; and means for counteracting said separating force independently of said arresting means, including a pressure plate rigid with said movable platen and arranged at said other aide of said membrane plate, an additional membrane interposed between said other side and said pressure plate and sealingly connected to said membrane plate to define an additional pressure space therewith, and means for admitting pressurized medium into said additional space to exert a force on said additonal membrane and via the same on said pressure plate, which force at least equals said separating force, whereby said arresting means arrests said mold in the closed position thereof and said counteracting means independently maintains said mold in said closed position.

4,032,278
SEALING AND SHEARING MEMBER IN A PLASTIC RESIN BLOW MOLDING MACHINE
Ernest O. Kuenzig, Glen Head, and Frank L. Pennino, Farmingdale, both of N.Y., assignors to Forest Mechanical Products Corporation, Kew Gardens, N.Y.
Filed Mar. 2, 1976, Ser. No. 663,124
Int. Cl.² B29C *17/07*
U.S. Cl. 425—525 **6 Claims**



1. In a blow molding machine in which a plastic resin parison is extruded in tubular form along an axis from an extruder around a vertically aligned blow tube and in which said blow tube delivers compressed air to expand the parison to form against the internal walls of a two-part separable mold when the separable mold is in its closed position, said mold being positioned beneath said extruder along the axis of the blow tube and having open and closed positions, the mold having a separable two-part top neck portion, said blow tube carrying a cylindrical blow pin having a cylindrical shoulder portion and a cylindrical shear portion, said blow pin being movable vertically upwards to aid in severing the parison after the mold parts are closed;

a plastic resin severing and closure device removably affixed at said top neck portion of each of said two mold parts and separable along with said mold parts, said device in cooperation with the blow pin severing the parison and providing an air-tight seal between the mold and the parison when the separable mold is in its closed position;

said severing and closure device comprising two base members, each base member being fixed to a top neck portion of one mold part and being operable to hold a top seal insert and a bottom shear insert fixedly in respect to the mold part, each base member being in the approximate form of a one-half ring and having a flat surface generally

perpendicular to said axis and having a flange portion extending generally perpendicularly from said flat portion, said flange portion being operable to align said top seal insert and said shear insert with respect to said axis, said base members being of a heat conductive metal alloy;

two top seal inserts each removably fixed to a base member and each in the form of a generally flat member and being approximately a one-half ring, each of said seal inserts being mounted such that an inner edge is close to but not touching said shoulder of said blow pin when the mold parts are closed in order to compress but not shear said parison and thereby to seal and permit blow pressure within said parison, said seal inserts being of heat hardened steel;

means removably affixing each of said seal inserts on one of said base members so that they are separable along with said mold parts;

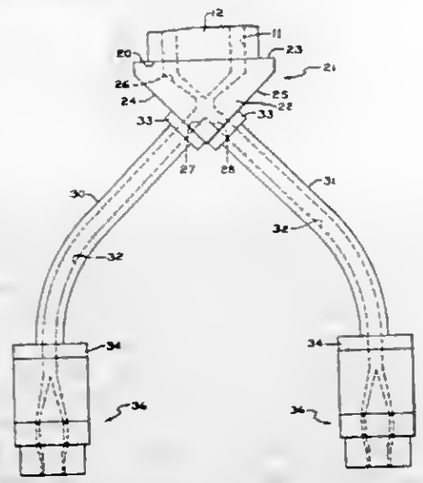
two bottom shear inserts separable along with said mold parts, each bottom shear insert being in the form of a generally flat member and being approximately a one-half ring member, each of said shear inserts having an inner face which meets in a shearing action against said shear portion of said blow pin to shear the parison when the blow pin is moved vertically upwards, each of said shear inserts having an inner edge with an inner diameter which is less than the inner diameter of said inner edge of said seal inserts; each of said shear inserts being of heat-hardened steel; and

means removably affixing each of said shear inserts on one of said seal inserts and touching the flange portion of one of said base members.

4,032,279
EXTRUSION ADAPTER

Heung Tai Kim, Avon Lake, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Sept. 8, 1975, Ser. No. 611,396
Int. Cl.² B29D *23/04*
U.S. Cl. 425—382 R **6 Claims**

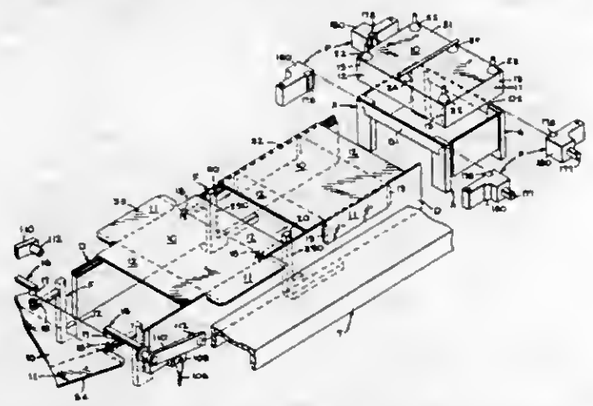


1. In combination with an extruder, an adapter apparatus for splitting an extrudate from said extruder as a single extrudato into at least a pair of separate extrudates comprising non-sectioned single piece adapter block attached to said extruder having a first planar surface, said first planar surface having an inlet opening for abutting connection to extruder for said opening receiving melt therefrom, said block having at least two non-coplanar surfaces, an outlet opening in each of said non-coplanar surfaces with said outlet opening used for directing extrudate therefrom, a single passageway extending from said inlet opening into said block, at least a pair of passageways interconnecting said outlet openings with said single passageway, and all of said openings being circles.

4,032,280
FABRICATION OF BOX PARTS FROM PLASTIC MATERIAL

Frederick D. Roberts, Chalfont, Pa., assignor to FMC Corporation, San Jose, Calif.

Division of Ser. No. 570,903, April 23, 1975, Pat. No. 3,977,307. This application Apr. 19, 1976, Ser. No. 678,332
Int. Cl.² B31B *1/26*
U.S. Cl. 425—383 **11 Claims**

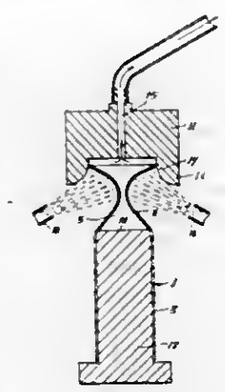


1. Apparatus for forming plastic box parts form corner notched blanks which have main panels, side panels and end panels having tabs; said apparatus comprising laterally spaced longitudinal die sets for folding the end panels, longitudinally spaced transverse die sets in longitudinal alignment with said longitudinal die sets for folding the side panels, anvils at the ends of said transverse die sets, tab folders having end panel clamps for cooperation with said anvils, said tab folders having combined solvent applicator and tab folder bars for folding said tabs, means for supplying solvent to said applicator bars, and means for feeding blanks along said die sets; the improvement wherein the tab engaging faces of said solvent applicator bars are formed with a plurality of vertical grooves, said solvent supplying means having means for directing solvent to the upper ends of said grooves, for flowing solvent down along said grooves.

4,032,281
THERMOPLASTIC TUBULAR CONTAINER FORMING APPARATUS

Oscar Rakovsky, 37 Avenue Duquesne, Paris 7, France

Filed Dec. 26, 1974, Ser. No. 536,469
Claims priority, application France, Feb. 4, 1974, 74.04746; May 31, 1974, 74.19869
Int. Cl.² B29C *17/02*; B29D *23/00*
U.S. Cl. 425—392 **13 Claims**



1. Apparatus for the manufacture of a tubular product of thermoplastics material, said product comprising an end face and a tubular skirt extending therefrom, the apparatus comprising:

a mandrel, having a free end, for receiving a length of tubular thermoplastic material sleeved thereon with an end portion adjacent one end of said length of material projecting beyond said free end of said mandrel such that, in the operating position of said mandrel, at least a major part of the said projecting end portion of said length is otherwise unsupported and is disposed in and surrounded by a free space;

heating means located in operative relationship to said mandrel for supplying heat into said free space to heat said otherwise unsupported end portion of said length;

constrictor means, located in operative relationship to said mandrel, for uring the heated and otherwise unsupported end portion inwardly to effect constriction thereof while preserving said free space;

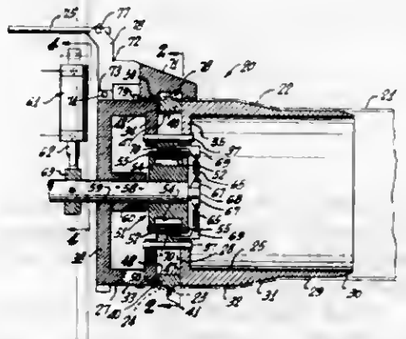
a cap initially disposed adjacent to and spaced from said end portion of said tubular material;

and means, operative after said constriction of said heated end portion, for relatively moving said cap and said mandrel from a first, inoperative position in which said cap is spaced from said free end of said mandrel to a second, operative position adjacent to said free end wherein said cap is urged into engagement with said heated end portion to cause moulding of the material thereof between said cap and said free end to form the end face of the tubular product.

4,032,282
APPARATUS FOR FORMING BELLS ON PLASTIC TUBES

Clyde E. Wilson, and Robert D. Nicoson, both of Brazil, Ind., assignors to Wilson-Tek Corporation, Brazil, Ind.

Continuation-in-part of Ser. Nos. 400,165, Sept. 24, 1973, abandoned, and Ser. No. 512,230, Oct. 14, 1974, abandoned. This application Aug. 5, 1975, Ser. No. 602,128
Int. Cl.² B28B *7/30*
U.S. Cl. 425—393 **22 Claims**



1. Apparatus for forming bells on plastic tubes of a first preselected inside diameter by enlarging the ends of the tubes to a larger preselected diameter, and also forming an internal annular seal-receiving groove in each such bell, said apparatus comprising:

an elongated mandrel of circular cross-section comprising front and rear mandrel elements disposed in coaxial relation with the adjacent ends of said elements spaced apart to provide a continuous gap between the elements;

said front mandrel element having a free end portion with an outer surface of said first preselected diameter and also having a beveled free end, the opposite end portion of said front element having an outside surface of said larger preselected diameter and joined to said free end portion by an intermediate portion of progressively increasing outside diameter, and said rear element having an outer surface of said larger preselected diameter;

internal annular flanges on said mandrel elements on opposite sides of said gap;

angularly spaced supporting pins extending longitudinally of said mandrel across said gap and each fixed at its opposite ends to the respective internal flanges on said elements, thereby to support said front element on said rear element;

core means disposed in said gap and comprising first and second sets of core sections each having a contoured outside surface of arcuate cross-section, the core sections of said first set alternating with the core sections of said second set around said mandrel and having inwardly converging sides, and the core sections of said second set having inwardly diverging sides disposed in sliding camming engagement with said converging sides, and also having generally arcuate and conves inner end surfaces disposed radially inwardly beyond the sections of said first set, said inner end surfaces having central dwell recesses in the central portions thereon;

said core sections being movable outwardly in said gap to an expanded condition in which said outside surfaces extend beyond the mandrel surfaces of said larger diameter and form a raised annular bead of preselected contour for forming said seal-receiving groove in a plastic tube, and being movable inwardly to a collapsed condition in which said core sections are retracted into said mandrel;

each of said core sections having at least one generally radial guide slot therein, said supporting pins extending through said slots with close sliding fits to guide said core sections for in and out radial movement;

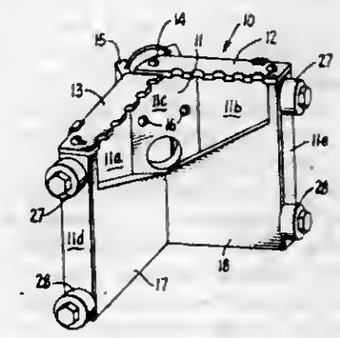
opposed annular abutment means on one of said flanges and on the adjacent side of said core means limiting outward movement of said core sections and determining said expanded condition;

and actuating means for expanding and retracting said core means, said actuating means comprising a rotary drive shaft coaxial with said mandrel and extending into said rear section from the rear end thereof, a spider in said gap coaxially mounted on said shaft for rotation therewith and having angularly spaced arms equal in number to the number of second core sections, adjacent arms of said spider being separated by arcuate recesses for receiving said inner end surfaces when said core sections are retracted, rollers mounted on the ends of said arms, means for selectively rotating said shaft back and forth through a selected angular increment to move said rollers along said inner end surfaces from corresponding ends thereof to the dwell portions and back, and spring means yieldably urging said core sections toward the retracted position, said dwell portions being shaped to prevent forcing of said rollers back along said inner end surfaces by external forces on said core sections.

4,032,283
EXTERIOR CORNER TOOL

Eugene R. Johnson, Burlingame, and Morris F. Mower, Santa Clara, both of Calif., assignors to Bliss & Laughlin Ind., Inc., Oak Brook, Ill.

Filed Mar. 8, 1976, Ser. No. 664,583
Int. Cl.² B05C *17/10*
U.S. Cl. 425—458 **6 Claims**



1. A corner tool for applying mastic material to an external

corner formed by two surfaces which come together at approximately 90°, said tool comprising:

container means defining a cavity that is open in two convergent and substantially perpendicular planes and having surfaces in each of said planes that converge peripherally of said cavity and come together at an internal corner, said container means including a pair of slotted screed plates that extend substantially perpendicular to each other and transverse relative to said corner; and means for positioning said container means relative to an external corner of approximately 90° to maintain said slotted plates in contact with two surfaces forming the external corner while positioning the cavity of said tool in open-spaced relationship to the surface; whereby mastic material introduced into said cavity may be applied simultaneously to the surfaces on either side of the external corner through said slotted screed plates.

4,032,284

DIE ASSEMBLY

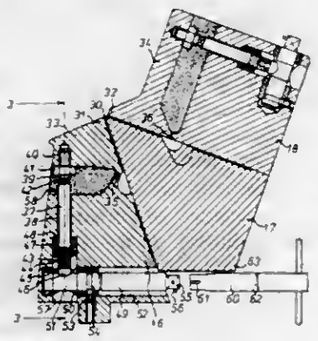
René Leonard Vermeylen, Heist op den Berg, and Jozef Jan Onghena, Heverlee, both of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed May 29, 1975, Ser. No. 581,916

Claims priority, application United Kingdom, June 6, 1974, 25216/74

Int. Cl.² B29F *3/04*

U.S. Cl. 425—466 **6 Claims**



1. In an extrusion die assembly comprising two bodies defining a slot terminating in an elongated slot-like orifice and defined by two lips carried by said bodies, adjustment means operatively associated with one of said bodies for adjusting the position of said one body relative to the other for varying the width of such slot, the improvement wherein said adjustment means comprises a plurality of rods each having one extremity in threadwise engagement with said one body and disposed in mutually spaced relation in a row extending substantially parallel with the length of said orifices, each of said rods being axially displaceable for exerting on said one body a force tending to move such body relative to the other body to vary the orifice width, each of said rods being mounted for rotation and including exteriorly accessible means for rotating the same to adjust the initial axial position of said rod and thus the initial width of said slot, and, for each such axially displaceable rod, a rotatable rod arranged with its axis intersecting the axis of said displaceable rod, said rotatable rod having a portion of its peripheral wall extending eccentrically of the rod axis with said eccentric wall portion in abutment with the free end of the corresponding displaceable rod and means on an axially spaced portion of each rotatable rod which is accessible exteriorly of the assembly for rotating the same and thereby controllably displace said displaceable rod by engagement with said eccentric wall portion, each said displaceable rod having at its free end a separate extension connected to the remainder of the rod for independent rotation, the end face of said extension being arcuately shaped for engagement over substantially the entirely of said face with said eccentric wall portion.

4,032,285

METHOD AND APPARATUS FOR THE AUTOMATIC CONTROL OF THE AIR RATIO OF A COMBUSTION PROCESS

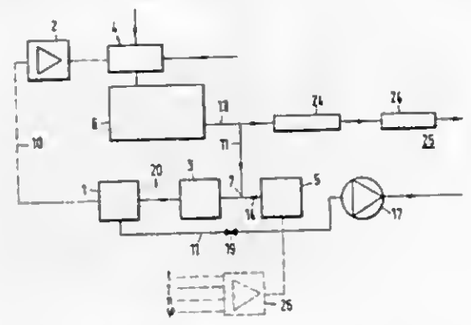
Franz Josef Rohr, Absteinach, and Hubert Holick, Lampertheim, both of Germany, assignors to Brown, Boveri & Cie. A.G., Mannheim, Germany

Filed Dec. 19, 1975, Ser. No. 642,449

Claims priority, application Germany, Dec. 19, 1974, 2460066

Int. Cl.² F23N *5/10*

U.S. Cl. 431—12 **28 Claims**



1. A method for automatically controlling the air ratio of a combustion process by adjustment of the fuel-air mixture as a function of the air number λ, the air number λ of the exhaust gas being measured with a sensor which is particularly sensitive at an air number of a given magnitude, and the combustion process operating with an air ratio having an air number of a different magnitude of the sensitivity range of said sensor which comprises extracting a hot exhaust gas stream from the combustion process having an air ratio with an air number out of the given sensitivity range of a sensor changing the amount of air in said exhaust gas stream to provide an auxiliary gas stream having an air number in said sensitivity range of said sensor, measuring the air number of said auxiliary gas stream detect the difference from said air number of said given magnitude, and controlling the air ratio of said combustion process to maintain said air number of said auxiliary gas stream at said given magnitude.

4,032,286

GAS COMBUSTION DEVICE WITH SAFETY DEVICE

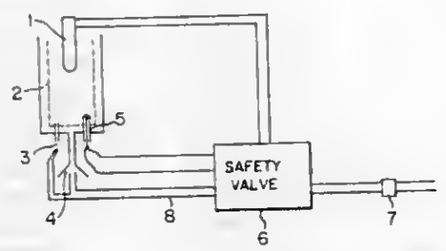
Teruo Kobayashi, Kadoma, and Kazumasa Yamamoto, Kawanishi, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Apr. 14, 1976, Ser. No. 676,816

Claims priority, application Japan, Apr. 18, 1975, 50-47763; May 20, 1975, 50-60739; Oct. 20, 1975, 50-126690

Int. Cl.² F23N *5/24*

U.S. Cl. 431—76 **6 Claims**



1. A gas combustion device with a safety device characterized by the provision of

a. a combustible gas sensor comprising a calcined body made of a solid ion conductive, electrolyte material, and porous electrodes attached to both surfaces of said calcined body,

b. a pilot burner sensor including a thermocouple which creates an electromotive force (e.m.f.) in response to the detection of heat of combustion flames of said gas combustion device, and

c. a safety valve connected in a gas supply line for said gas combustion device and operable in response to both the outputs from said combustible gas sensor and said pilot burner sensor.

4,032,287

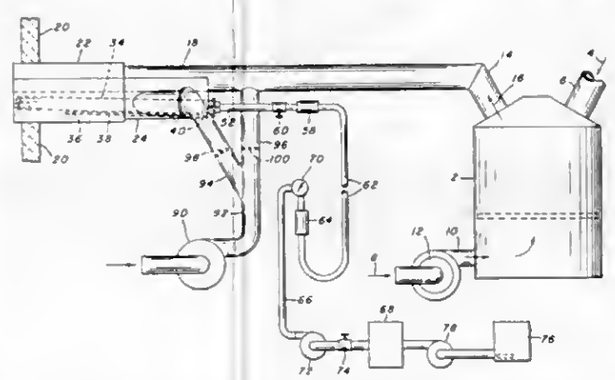
COMBINATION BURNER

Kenneth J. Blum, Hudson, N.Y.; Floyd Dodson, Ross Township, Allegheny County, Pa.; Robert P. Jarrett, Livingston Township, Columbia County, and Norman T. Ravnsborg, Claverack, both of N.Y., assignors to United States Steel Corporation, Pittsburgh, Pa.

Filed June 16, 1975, Ser. No. 587,442

Int. Cl.² F23C *5/28, 1/10, 1/12*

U.S. Cl. 431—175 **6 Claims**



1. A burner for burning solid pulverized and fluid fuels singly or in combination comprising:

a burner pipe adapted for burning a pulverized fuel carried in suspension in its primary air,

a burner chamber fixed with respect to the burner pipe mounted generally parallel to and adjacent the burner pipe,

a burner housing tube mounted for longitudinal movement within the burner chamber,

a fluid burner nozzle mounted inside the housing tube,

means for clamping the burner housing tube in position with respect to the burner chamber,

a source of fluid fuel,

means connecting the source of fluid fuel to the nozzle,

a source of primary air for the fluid fuel,

an outlet conduit from the source of primary air for the fluid fuel,

a first branch conduit connecting the outlet conduit to the burner pipe,

a second branch conduit connecting the outlet conduit to the burner chamber, and

control means in each branch conduit for controlling the flow of air from the source of air for the fluid fuel through each branch conduit.

4,032,288

ROOFING SHINGLE MINERAL FILLER HEATER

Kenneth J. Numerowski, Chicago, Ill., assignor to U.I.P. Engineered Products Corporation, Elk Grove Village, Ill.

Filed Oct. 16, 1975, Ser. No. 622,850

Int. Cl.² F27D *1/08, 17/00*

U.S. Cl. 432—189 **7 Claims**

1. An assembly for heating mineral filler prior to combining the filler with a heated liquid asphalt for coating roofing shingles, said assembly comprising:

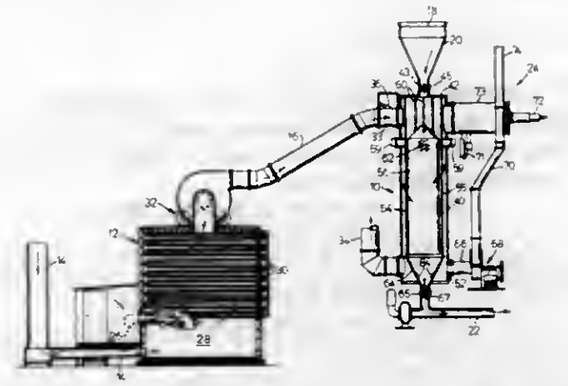
a mineral filler heater,

a thermal oxidizing means for heating fume emissions to remove hydrocarbons,

means connecting said oxidizing means to said heater for directing the high temperature fume emissions from the thermal oxidizing means to said filler heater,

a first burner in said directing means for maintaining the fume emissions at a predetermined temperature,

a regenerating system connected to said filler heater for reheating discharge gases and redirecting the higher temperature discharge gases into the inlet to the filler heater,



a second burner in said regenerating system to maintain said recycled gas at a predetermined minimum,

means continuously moving mineral filler through said filler heater,

and means for selectively connecting one of said thermal oxidizing means and regenerating system to said filler heater.

4,032,289

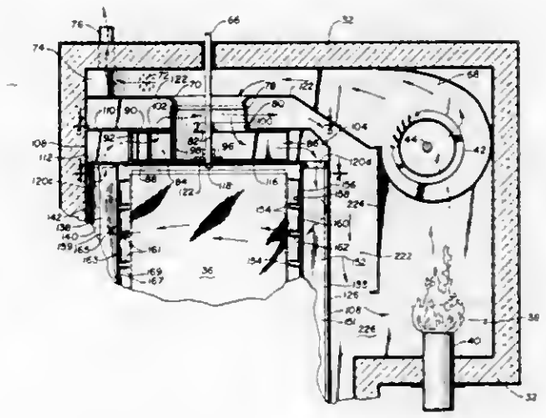
CONVECTION OVEN

David E. Johnson, Minneapolis, and Terrance E. Polsfuss, Clear Lake, both of Minn., assignors to Despatch Industries, Inc., Minneapolis, Minn.

Filed Sept. 8, 1975, Ser. No. 610,981

Int. Cl.² F27B *5/16*

U.S. Cl. 432—200 **17 Claims**



16. A convection oven comprising a stationary oven chamber for receiving goods to be treated, conduit means including at least two pairs of separate duct means having respective openings into the oven chamber distributed about the chamber periphery with the openings of each pair disposed at opposite sides of the chamber; and rotatable rotor means sequentially delivering gaseous treating medium to the duct means for delivery of the medium into the oven chamber from sequential duct openings, and providing simultaneous with-

drawal of the heating medium from ducts opposed from the delivery ducts.

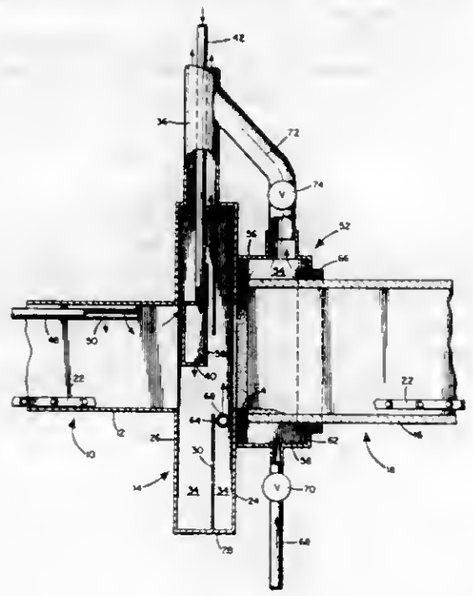
4,032,290

HIGH TEMPERATURE FURNACE MUFFLE

Martin I. Soderlund, Westborough, and R. Chester Pray, Acton, both of Mass., assignors to BTU Engineering Corporation, North Billerica, Mass.

Filed May 24, 1976, Ser. No. 689,554
Int. Cl.² F27B 5/18, 5/02
U.S. Cl. 432—200 10 Claims

1. A high temperature furnace comprising:
a first furnace section having a metal muffle;
a second furnace section having a quartz muffle and disposed adjacent to said first section;
sealing means surrounding an end of said quartz muffle confronting said metal muffle and including a peripheral chamber joined to the quartz muffle and to a confronting surface of said metal muffle by porous gasket means; and
means coupled to said peripheral chamber and operative to introduce sealing gas at predetermined pressure into the peripheral chamber to cause controlled leakage of the



sealing gas from said chamber through the porous gasket means to prevent leakage of gas in the quartz muffle.

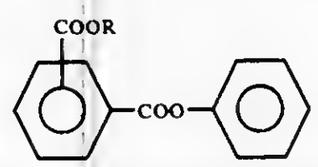
4,032,291

PHENYL PHTHALATE CARRIERS IN DYEING AND PRINTING SYNTHETIC FIBERS

Kurt Adolf Dellian, Greensboro, N.C., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jan. 12, 1976, Ser. No. 648,333
Int. Cl.² D06P 5/04; C09B 9/00
U.S. Cl. 8—34 18 Claims

1. In a process for coloring a hydrophobic fibrous material with a disperse or vat dyestuff with the aid of a carrier, the improvement wherein the carrier comprises a compound of the formula



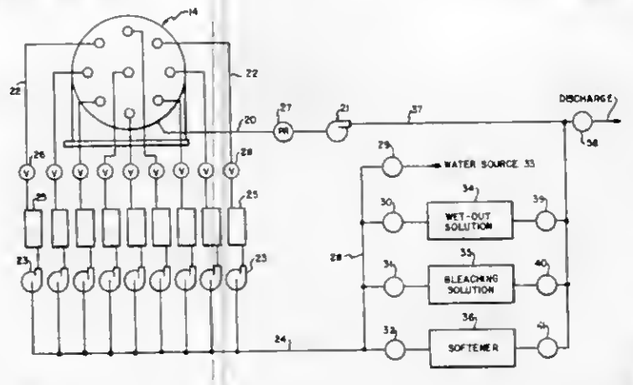
wherein R is alkyl of 1 to 12 carbon atoms, benzyl or phenyl or mixtures thereof.

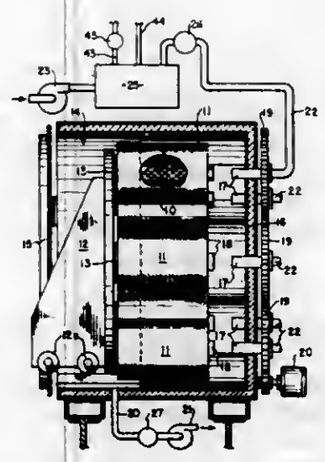
4,032,292

METHOD AND APPARATUS FOR BLEACHING AND RELATED PROCESSING OF GREIGE CLOTH

Donald K. Jones, Pottstown, Pa., assignor to Cluett, Peabody & Co., Inc., New York, N.Y.

Filed Nov. 8, 1974, Ser. No. 522,014
Int. Cl.² D06L 3/02, 3/04
U.S. Cl. 8—111 6 Claims





1. A method for bleaching fabric in batches, comprising the steps of
a. forming the fabric into batches;
b. placing the batches in a pressure vessel;
c. supplying pressurized treating fluid directly to said batches; the improvements characterized by the steps of
d. dividing said treating fluid supply into individual portions for each said batch;
e. pressurizing each individual portion for each individual batch;
f. after said pressurizing step, heating each said pressurized portion;
g. after said heating step, passing each heated pressurized portion individually into said pressure vessel and through one of said individual batches;
h. adjusting separately the individual pressurization of each individual pressurized portion to provide uniformity of flow through said batches;
i. withdrawing said treating fluid from said pressure vessel; and
j. continuously circulating said withdrawn treating fluid through said dividing, pressurizing, heating and passing steps until said fabric is treated.

4,032,293

PREPARATION OF STABLE STRONG BASE CELLULOSIC ANION EXCHANGERS WITH RED-OX POTENTIALS

Dorothy M. Perrier; Ruth R. Benerito, both of New Orleans, and Richard H. Steele, Metairie, all of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Sept. 9, 1974, Ser. No. 504,646
Int. Cl.² D06M 13/10, 13/46; G01N 31/04
U.S. Cl. 8—129 16 Claims

1. A process for preparing a textile with strong base quaternary ammonium cellulose groups associated with reducing anions, the process comprising:
a. immersing a diethylaminoethyl fibrous cellulose of about 2.6% nitrogen content in a 20% methanolic solution of methyl iodide,
b. refluxing the immersed fibrous material for about 5 hours to obtain a fibrous monoquaternary cellulosic derivative, the methyl iodide adduct of DEAE-cellulose,
c. rinsing the adduct in absolute methanol to remove all unreacted reagent, and
d. treating the product of (c) with a 20% dimethyl formamide solution of sodium borohydride for about 7 hours at room temperature to yield a textile containing about 2.6% nitrogen and 1.17% boron, which product being insoluble in dimethylformamide but dispersible in water.

4,032,294

METHOD FOR VAPOR PHASE TREATING GARMENTS

Richard D. Thompson, Cincinnati, Ohio; Douglas Thompson, Salt Lake City, and Micheal G. Beeley, Logan, both of Utah, assignors to McGraw-Edison Company, Elgin, Ill.

Filed Feb. 1, 1974, Ser. No. 438,587
Int. Cl.² D06M 13/14
U.S. Cl. 8—116.4 10 Claims

1. A process for vapor phase treating garments, each having cellulosic or natural protein fibers therein and being supported in a substantially wrinkle-free condition on a form, with moisture, formaldehyde, and sulfur dioxide, comprising:
a. grouping such garments into first and subsequent batches each consisting of a plurality of garments and each being of substantially the same size;
h. indexing the defined first batch of garments to a first area of isolation and holding it there to introduce moisture into such garments;
c. indexing the defined first batch of garments then to a second area of isolation and holding it there to subject such garments to formaldehyde and sulfur dioxide vapors;
d. indexing the defined first batch of garments next to a third area of isolation and holding it there to heat and dry such garments;
e. indexing the defined first batch of garments thereafter to a fourth area of isolation and holding it there to vapor clean the garments and remove formaldehyde odor therefrom;
f. indexing the defined first batch of garments lastly from

the fourth area of isolation for concluding the process; and

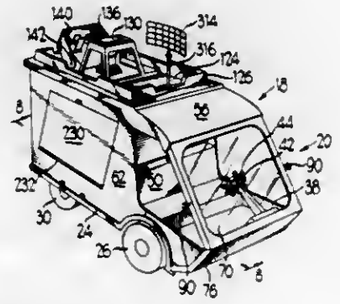
g. performing the steps of the above subparagraphs *a*, *b*, *c*, *d*, *e*, and *f* sequentially on the subsequent batches of garments, whereby the process is carried out simultaneously and progressively in steps on the separate batches of garments alternately being indexed relative to and being held at the respective areas of isolation, so that when a given batch of garments is in a particular one of said areas of isolation, the subsequent batches are in the preceding areas of isolation.

4,032,295

TOY VEHICLE FOR USE WITH A FIGURE TOY

Burton C. Meyer, Downers Grove, and Robert K. Allen, Hinsdale, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed Feb. 19, 1976, Ser. No. 659,366
Int. Cl.² A63H 17/12
U.S. Cl. 46—202 **21 Claims**



1. A toy vehicle, comprising:

a frame;

a plurality of rotatably mounted wheels on the frame for rollingly supporting the vehicle on a suitable surface;

a front windshield pivotally mounted at its top to the frame for movement between closed and open positions relative thereto;

biasing means for constantly urging the windshield in an upward direction about its pivotal mounting on the frame toward the open position; and

a lower front portion pivotally mounted to the frame below the windshield, said lower front portion being movable between a first position in engagement with the windshield defining said closed position and a second position pivoted downwardly from said first position to define said open position for gaining access to an interior cab portion of the vehicle.

4,032,296

ELECTROLYTIC CONDUCTIVITY DETECTOR SYSTEM

Randall C. Hall, West Lafayette, Ind., assignor to Purdue Research Foundation, West Lafayette, Ind.

Division of Ser. No. 425,116, Dec. 17, 1973, Pat. No. 3,934,193. This application Jan. 12, 1976, Ser. No. 648,517
Int. Cl.² G01N 27/42, 31/08, 31/12
U.S. Cl. 23—253 PC **11 Claims**

1. An electolytic conductivity detector for gas chromatography, said detector comprising:

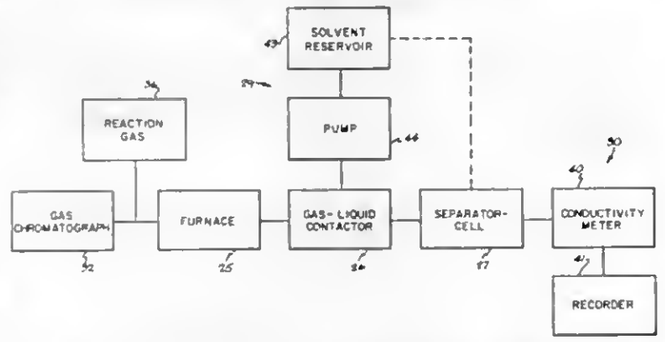
compound supply means for providing as an output therefrom compounds to be tested in the form of eluant gases;

forming mans for receiving said eluant gases from said compound supply means and forming therefrom conductivity supporting inorganic gaseous molecules;

solvent supply means for supplying an aqueous or organic solvent;

contactor means for mixing substantially immediately upon contact gaseous molecules received from said forming means with said solvent from said solvent supply means to form a mixture thereof;

separator means for receiving said mixture from said contactor means and substantially immediately separating said mixture into liquid and gas phases; and



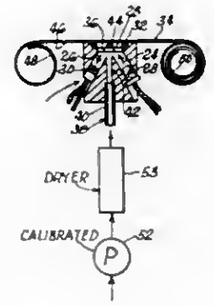
measuring means for receiving said liquid phase from said separator means and measuring the conductivity of said liquid phase.

4,032,297

POLLUTION MONITORING APPARATUS

Norman A. Lyshkow, Chicago, Ill., assignor to Combustion Equipment Associates, Inc., Stanford, Conn.

Continuation of Ser. No. 479,227, June 14, 1974, abandoned. This application Sept. 29, 1975, Ser. No. 617,855
Int. Cl.² G01N 21/14, 21/48, 21/30
U.S. Cl. 23—254 E **13 Claims**



1. Apparatus for the detection and/or analysis of pollutant gases in a gas stream comprising a light reflective suface sensitive to a pollutant gas for reaction with the pollutant gas to cause a decrease in the reflectivity, light source means positioned to pass a beam of light angularly onto the surface, light-sensing means positioned to receive light reflected from the surface and means to contact a gas stream containing a pollutant gas with the surface whereby the decrease in light reflectivity indicates the concentration of the pollutant gas in the gas stream and the rate of decrease in light reflectivity indicates the dose rate of the pollutant gas in the gas stream.

4,032,298

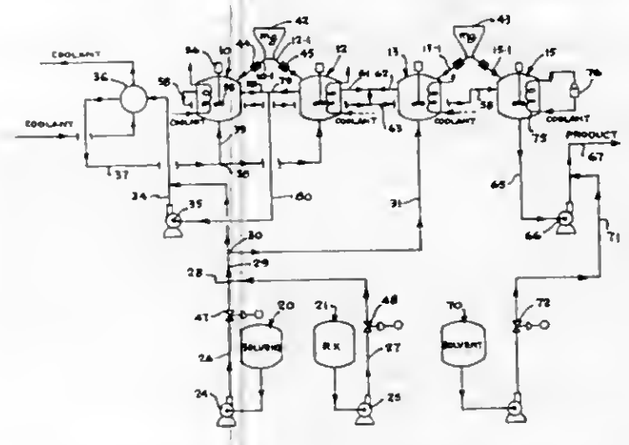
APPARATUS FOR PRODUCTION OF GRIGNARD REAGENT

Guy E. Blackmar, Freeport; Robert C. Wight, Sugarland, and Richard B. Smith, Freeport, all of Tex., assignors to Nalco Chemical Company, Chicago, Ill.

Division of Ser. No. 418,101, Nov. 21, 1973, Pat. No. 3,911,037. This application Dec. 30, 1974, Ser. No. 537,701
Int. Cl.² B01J 8/08; C07F 3/02
U.S. Cl. 23—260 **3 Claims**

1. Apparatus for continuous production of Grignard reagent comprising: a plurality of reaction vessels and a surge product holding vessel, pressurized supply means for constantly introducing into said reaction vessels a mixed stream of an organohalide and solvent under pressure, a supply hopper and

feed means associated therewith positioned above each pair of reaction vessels for adding magnesium in incremental amounts to each of said vessels, overflow conduits each connected at one end to each of said vessels at a predetermined high level to afford escape for a Grignard system overflow product, means for collecting and transmitting the overflow product to said surge product holding vessel, a pump for



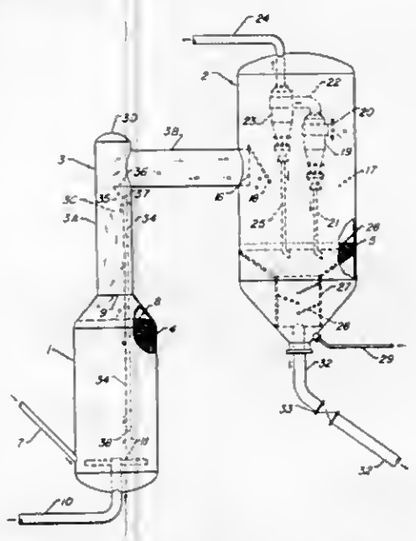
constantly delivering the contents of the holding vessel for storage or use, a heat exchanger, and conduit means connected at one end to at least one of the reaction vessels at a high level considerably above the bottom thereof for receiving a reacting portion of the contents therefrom, said conduit means also being connected for circulating said reacting portion through the heat exchanger and back to said one reaction vessel.

4,032,299

SPENT CATALYST REGENERATION APPARATUS WITH INTERNAL REGENERATED-CATALYST RECYCLE MEANS

Richard P. Pulak, Palatine, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 429,422, Dec. 28, 1973, Pat. No. 3,953,175. This application Mar. 15, 1976, Ser. No. 667,247
The portion of the term of this patent subsequent to Apr. 27, 1992, has been disclaimed.
Int. Cl.² B01J 8/08, 8/18, 37/14
U.S. Cl. 23—288 B **4 Claims**



1. An apparatus for oxidizing coke on spent catalyst which comprises in combination:

a. a spent-catalyst receiving chamber for containing a dense-phase fluidized bed of catalyst having a spent catalyst inlet means and a fresh-regeneration gas inlet means connected thereto to allow passage of spent catalyst and fresh regeneration gas respectively into said chamber and having a regenerated-catalyst/regeneration-gas outlet means connected thereto to allow passage of regenerated catalyst and regeneration gas from said chamber;

b. a transfer conduit positioned above said spent-catalyst receiving chamber and having a substantially vertical portion and a substantially horizontal portion in interconnection with said vertical portion, said vertical portion extending above said horizontal portion and having an inlet connected to the regenerated-catalyst/regeneration-gas outlet means and said horizontal portion extending into the side of a hereinafter described regenerated-catalyst receiving chamber and being provided with an outlet means into said chamber whereby regenerated catalyst and regeneration gas are carried from said spent-catalyst receiving chamber in admixture to said regenerated-catalyst receiving chamber, said portions of said transfer conduit being of sufficient internal volume to permit CO oxidation and transfer of the heat of combustion to said catalyst therein;

c. an internal regenerated-catalyst recycle means, having an inlet means in the transfer conduit and an outlet means in the spent-catalyst receiving chamber, to allow passage of a portion of regenerated catalyst from the transfer conduit to the spent-catalyst receiving chamber; and,

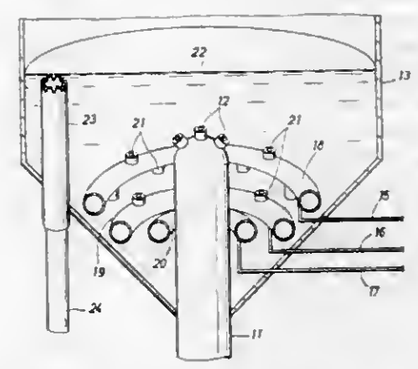
d. a regenerated-catalyst receiving chamber for containing a dense-phase bed of regenerated catalyst, said chamber having a regenerated-catalyst outlet means and a spent-regeneration-gas outlet means connected thereto to allow passage of regenerated catalyst and spent regeneration gas from said chamber.

4,032,300

OXYGEN-CONTAINING GAS DISTRIBUTION APPARATUS EMPLOYED IN FLUIDIZED BED REGENERATION OF CARBON-CONTAMINATED CATALYSTS

Wesley A. Parker; John E. Gwyn, and Glenn R. McCullough, all of Pasadena, Tex., assignors to Shell Oil Company, Houston, Tex.

Division of Ser. No. 574,188, May 5, 1975, Pat. No. 3,974,091, which is a continuation-in-part of Ser. No. 501,514, Aug. 29, 1974, abandoned. This application Apr. 9, 1976, Ser. No. 675,419
Int. Cl.² B01V 8/24, 23/90
U.S. Cl. 23—288 B **4 Claims**



1. An oxygen-containing gas distribution apparatus for introduction of at least a portion of the oxygen-containing gas required for fluidization and burn-off of carbon deposits of a fluidized bed of carbon-contaminated hydrocarbon conversion catalyst contained in a regeneration chamber, which comprises one or more manifold members substantially horizontally disposed at the lower end of said regeneration chamber in fluid communication with a source of pressured oxygen-containing gas and having connected thereto in fluid communication a plurality of gas discharge nozzles through which

oxygen-containing gas is passed into contact with the dense catalyst phase, characterized in that each gas discharge nozzle is substantially cylindrical in shape having an upstream portion and a downstream portion with a transition portion connecting the upstream and downstream portions wherein said upstream portion is attached to said manifold member, which discharge nozzles are restricted in internal cross-sectional area in its upstream portion and expanded in the internal cross-sectional area of its downstream portion such that a) the numerical ratio of the difference between the diameter of the downstream portion and the diameter of the upstream portion divided by the length of the downstream portion taken in the direction of gas flow does not exceed 0.18 and b) the ratio of the internal diameter of the upstream portion to its length taken in direction of gas flow does not exceed 1.67.

4,032,301

COMPOSITE METAL AS A CONTACT MATERIAL FOR VACUUM SWITCHES

Heinrich Hassler, Wendelstein; Horst Kippenberg, Nurnberg-Welherhaus, and Horst Schreiner, Nurnberg, all of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Continuation-in-part of Ser. No. 503,461, Sept. 5, 1974. This application May 6, 1976, Ser. No. 683,690
Int. Cl.² B22F 3/00
U.S. Cl. 428—567 11 Claims

1. A composite inclusion metal for vacuum switches comprising a mixture of copper as a first metal component in an amount from about 35% to 60% by volume of said composite inclusion metal, a second metal component selected from the group consisting of iron and nickel and a getter component selected from the group consisting of chromium, titanium and zirconium; wherein at least one of said second or getter components is embedded in said copper to form a heterogeneous microstructure with only isolated bridge formations existing between finely-distributed inclusions, said composite inclusion metal being formed by cold-pressing a mixture of said copper, said second metal component and said getter component to form a molding with a porosity of less than 30% by volume, sintering the molding at a temperature below the melting point of the lowest melting component of said mixture in a protective gas or vacuum, and hot-densifying the molding at a temperature below the melting point of the lowest melting component down to a residual porosity of less than 2% by volume.

4. A composite inclusion metal for vacuum switches comprising a mixture of copper or nickel as a first component in an amount of from 35 to 60% by volume of said composite, a second metal component consisting of aluminum wherein said second component is embedded in said first component to form a heterogeneous microstructure with only isolated bridge formations existing between finely-distributed inclusions, said composite inclusion metal being formed by cold-pressing a mixture of said components to form a molding with a porosity of less than 30% by volume, sintering the molding at a temperature below the melting point of the lowest-melting component of said mixture in a protective gas or vacuum and hot densifying the molding at a temperature below the melting point of the lowest-melting component down to a residual porosity of less than 2% by volume.

10. A composite inclusion metal of a mixture of copper and chromium wherein said copper is present in an amount of from 35 to 60% by volume, said chromium being embedded in said copper to form a heterogeneous microstructure with only isolated bridge formations existing between finely-distributed inclusions, said composite inclusion metal being prepared by mixing the copper and chromium in powder form, cold-pressing the mixture to form a molding with a porosity of less than 30% by volume, sintering the molding in a protective gas or vacuum, the sintering temperature being in the range of from above the melting temperature of said copper to a temperature not exceeding 100° C above said melting temperature, and hot densifying the molding at a temperature below the melting point of the copper down to a residual porosity of less than 2% by volume.

4,032,302

CARBIDE ENRICHED HIGH SPEED TOOL STEEL

Hideki Nakamura, Yasugi, and Kingo Kiyonaga, Yonago, both of Japan, assignors to Hitachi Metals, Ltd., Japan

Filed Dec. 16, 1975, Ser. No. 641,236
Claims priority, application Japan, Dec. 23, 1974, 49-146820
Int. Cl.² C22C 33/02
U.S. Cl. 75—240 14 Claims

1. A high speed tool steel enriched with at least 24% of carbides in the quenched state, which consists essentially of, by weight, 0.62 – 3.95% of carbon, 24 – 50% of a tungsten equivalent that is the sum of the content of tungsten and twice the content of molybdenum, 3.0 – 5.0% of chromium, 1.0 – 10.0% of vanadium, 5 – 15% of cobalt and the balance consisting essentially of iron and impurities and which is produced by a powder metallurgical process that includes preparing an alloy powder and compacting of the powder, said carbides including the MC and M_4C type carbides.

4,032,303

FUEL COMPOSITIONS CONTAINING ESTERS AND ESTER-TYPE DISPERSANTS

Casper John Dorer, Jr., Lyndhurst, and Clark Ober Miller, Willoughby Hills, both of Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio

Filed Oct. 1, 1975, Ser. No. 618,658
Int. Cl.² C10L 1/18
U.S. Cl. 44—70 9 Claims

1. A fuel composition comprising:
a major amount of
A. a normally liquid fuel and, dissolved therein,
the combination of:
B. about 50–500 parts by weight, per million parts of component A, of at least one ester selected from the group consisting of
1. esters of polyols containing at least 3 hydroxy groups and C_{3-12} aliphatic monocarboxylic acids, and
2. esters, containing about 30–80 carbon atoms, of an alkanol and an alkyl-based succinic or alkenyl-based succinic acid; and
C. about 80–400 parts, per million parts of component A, of at least one oil-soluble, nitrogen-free dispersant which is an ester of a polyhydric alcohol and a carboxylic acid which has within its molecular structure a substantially saturated aliphatic hydrocarbon-based radical containing at least about 30 carbon atoms.

4,032,304

FUEL COMPOSITIONS CONTAINING ESTERS AND NITROGEN-CONTAINING DISPERSANTS

Casper John Dorer, Jr., Lyndhurst, and Clark Ober Miller, Willoughby Hills, both of Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio

Filed Sept. 3, 1974, Ser. No. 502,593
Int. Cl.² C10L 1/22
U.S. Cl. 44—70 19 Claims

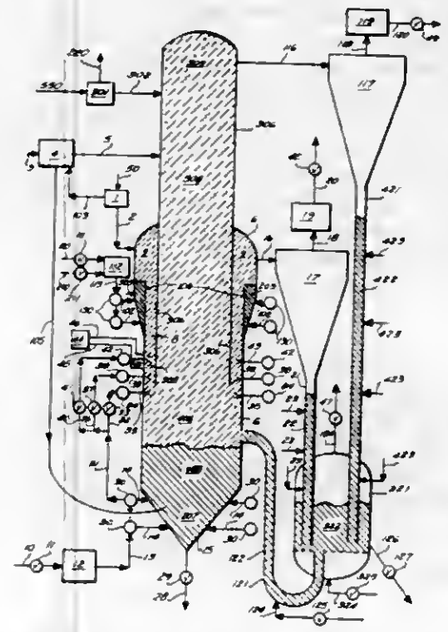
1. A fuel composition comprising a major amount of (A) a normally liquid fuel and a minor dispersant amount of the combination of; (B) at least one liquid ester of a C_{10-30} alkanol and an alkyl succinic or alkenyl succinic acid in which the alkyl or alkenyl group contains about 10–20 carbon atoms; and (C) an oil soluble nitrogen-containing dispersant having within its molecular structure a substantially saturated aliphatic hydrocarbon-based radical having at least about 50 carbon atoms.

4,032,305

TREATING CARBONACEOUS MATTER WITH HOT STEAM

Arthur M. Squires, 245 W. 104 St., New York, N.Y. 10025

Filed Oct. 7, 1974, Ser. No. 513,037
Int. Cl.² C10J 3/54, 3/56
U.S. Cl. 48—73 6 Claims



1. A process for gasifying carbonaceous matter by treatment with hot steam to yield a fuel gas containing hydrogen, carbon monoxide, and methane, comprising:
a. fluidizing granular carbonaceous material in a first fluidized bed extending continuously from substantially the bottom to substantially the top of a first space, and wherein said bed is maintained at a temperature between about 1,400° and 1,900° F;
b. supplying carbonacious matter to said bed, and wherein said matter is selected from the group consisting of coals, cokes, lignites, asphalt, coal tar, heavy coker tars, bitumens, petroleum resudua, Gilsonite, and kerogen, and wherein said granular carbonaceous material originates from said carbonaceous matter and includes fine particulate material;
c. supplying a gas comprising primarily steam as fluidizing gas to the bottom of said first bed and thereby converting at least a part of said carbonaceous matter by its endothermic reaction with steam to a fuel gas containing hydrogen, carbon monoxide, and methane;
d. fluidizing granular carbonaceous material also originating from said carbonaceous matter in a second fluidizing bed extending continuously from substantially the bottom to the top of a second space, and wherein said second space is annular in shape and is concentrically disposed within and alongside the upper portion of first space, the top of said second space being open to said first space at a selected elevation between top and bottom of said first space, so that said second fluidized bed is contiguous with said first bed at said selected elevation and gas leaving said second bed acts as a part of the fluidizing gas to the region of said first bed above said selected elevation, and wherein the combined rate of flow of said gas leaving said second bed and of fluidizing gas in said first bed reaching said selected elevation from below is sufficient to maintain a fast fluidized condition of said fine particulate material in said region of said first bed;
e. supplying a gas containing oxygen as fluidizing gas to said second bed, thereby sustaining combustion of said granular carbonaceous material in said second bed and generating heat that passes by conduction into said first bed;
f. withdrawing gas together with said fine particulate material from substantially the top of said first space and said second space;
g. substantially separating said withdrawn gas from said withdrawn fine particulate material;
h. discharging said gas;
i. feeding said separated fine particulate material into a third fluidized bed wherein said fine particulate material is maintained in the slow fluidized condition; and
j. feeding said separated fine particulate material from said third fluidized bed into said first fluidized bed at a rate sufficient to maintain a fast fluidized zone in said region of said first bed above said selected elevation.

5. Apparatus for conducting endothermic reactions of carbonaceous matter in a treatment by contact with hot steam, comprising:
a. a vessel;
b. a vertical annular partition means connected at its upper and thereof to the interior wall of said vessel and forming a central first space and an annular second space within said vessel said first space extending from the bottom of said partition to the top of said vessel, and wherein the bottoms of said spaces are open to a third space within said vessel and subposed beneath said first and second spaces, and a fourth space subposed beneath and in communication with said third space;
c. means connected to said first space and said fourth space for feeding a carbonaceous matter into said vessel;
d. means for establishing in said first space a hot fluidized bed of particulate matter including fine particles and originating from said carbonaceous matter;
e. means for establishing hot fluidized beds in said second and third spaces of particulate matter originating from said carbonaceous matter, and wherein said means for establishing hot fluidized beds in said first, second, and third spaces include means for introducing gas comprising primarily steam as a fluidizing gas to substantially the bottom of said third space;
f. means for introducing a hot gas into said first space at a selected elevation of said first space, and wherein said means for introducing a gas comprising primarily steam and said means for introducing a hot gas are capable of sustaining rates of said introductions such as to maintain a rate of flow of fluidizing gas in the region of said first space above said selected elevation sufficient to establish a fast fluidized bed of said fine particles in said region;
g. means for withdrawing and separating gas and fine particles from the top of said second space;
h. means for withdrawing and separating gas and fine particles from the top of said first space;
i. pipe means for each of said separating means for discharging said separated gas; and
j. means for conducting said separated particles from said separating means (g) and (h) into said third space at a rate of flow sufficient to establish a fast fluidized bed zone of said paricles in said third space.

4,032,306

ISOTOPE SEPARATION BY PHOTODISSOCIATION OF VAN DER WAAL'S MOLECULES

Yuan T. Lee, Berkeley, Calif., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Mar. 8, 1976, Ser. No. 664,858
Int. Cl.² B01J 1/10
U.S. Cl. 55—17 12 Claims

1. A method for separating isotopes by photo-induced dissociation of molecules of a Van der Waal's complex represented by A-B wherein A is a molecular species in which an element is present in a plurality of isotopes, ^1A representing those molecules of A containing a first such isotope and ^2A representing those molecules of A containing a second such isotope and B is a species different from A and capable of being bound to A by Van der Waal's forces, the molecules of ^1A in $^1A.B$ being capable of absorbing radiation in a given spectral region and being vibrationally excited thereby to a significantly

oxygen-containing gas is passed into contact with the dense catalyst phase, characterized in that each gas discharge nozzle is substantially cylindrical in shape having an upstream portion and a downstream portion with a transition portion connecting the upstream and downstram portions wherein said upstream portion is attached to said manifold member, which discharge nozzles are restricted in internal cross-sectional area in its upstream portion and expanded in the internal cross-sectional area of its downstream portion such that a) the numerical ratio of the difference between the diameter of the downstream portion and the diameter of the upstream portion divided by the length of the downstream portion taken in the direction of gas flow does not exceed 0.18 and b) the ratio of the internal diameter of the upstream portion to its length taken in direction of gas flow does not exceed 1.67.

4,032,301

COMPOSITE METAL AS A CONTACT MATERIAL FOR VACUUM SWITCHES

Heinrich Hassler, Wendelstein; Horst Kippenberg, Nurnberg-Weiherhaus, and Horst Schreiner, Nurnberg, all of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Continuation-in-part of Ser. No. 503,461, Sept. 5, 1974. This application May 6, 1976, Ser. No. 683,690
Int. Cl.² B22F 3/00
U.S. Cl. 428—567 **11 Claims**

1. A composite inclusion metal for vacuum switches comprising a mixture of copper as a first metal component in an amount from about 35% to 60% by volume of said composite inclusion metal, a second metal component selected from the group consisting of iron and nickel and a getter component selected from the group consisting of chromium, titanium and zirconium; wherein at least one of said second or getter components is embedded in said copper to form a heterogeneous microstructure with only isolated bridge formations existing between finely-distributed inclusions, said composite inclusion metal being formed by cold-pressing a mixture of said copper, said second metal component and said getter component to form a molding with a porosity of less than 30% by volume, sintering the molding at a temperature below the melting point of the lowest melting component of said mixture in a protective gas or vacuum, and hot-densifying the molding at a temperature below the melting point of the lowest melting component down to a residual porosity of less than 2% by volume.

4. A composite inclusion metal for vacuum switches comprising a mixture of copper or nickel as a first component in an amount of from 35 to 60% hy volume of said composite, a second metal component consisting of aluminum wherein said second component is embedded in said first component to form a heterogeneous microstructure with only isolated bridge formations existing between finely-distributed inclusions, said composite inclusion metal being formed by cold-pressing a mixture of said components to form a molding with a porosity of less than 30% by volume, sintering the molding at a temperature below the melting point of the lowest-melting component of said mixture in a protective gas or vacuum and hot densifying the molding at a temperature below the melting point of the lowest-melting component down to a residual porosity of less than 2% by volume.

10. A composite inclusion metal of a mixture of copper and chromium wherein said copper is present in an amount of from 35 to 60% by volume, said chromium being embedded in said copper to form a heterogeneous microstructure with only isolated bridge formations existing between finely-distributed inclusions, said composite inclusion metal being prepared by mixing the copper and chromium in powder form, cold-pressing the mixture to form a molding with a porosity of less than 30% by volume, sintering the molding in a protective gas or vacuum, the sintering temperature being in the range of from above the melting temperature of said copper to a temperature not exceeding 100° C above said melting temperature, and hot densifying the molding at a temperature below the melting point of the copper down to a residual porosity of less than 2% by volume.

4,032,302

CARBIDE ENRICHED HIGH SPEED TOOL STEEL

Hideki Nakamura, Yasugi, and Kingo Kiyonaga, Yonago, both of Japan, assignors to Hitachi Metals, Ltd., Japan

Filed Dec. 16, 1975, Ser. No. 641,236
Claims priority, application Japan, Dec. 23, 1974, 49-146820
Int. Cl.² C22C 33/02
U.S. Cl. 75—240 **14 Claims**

1. A high speed tool steel enriched with at least 24% of carbides in the quenched state, which consists essentially of, by weight, 0.62 – 3.95% of carbon, 24 – 50% of a tungsten equivalent that is the sum of the content of tungsten and twice the content of molybdenum, 3.0 – 5.0% of chromium, 1.0 – 10.0% of vanadium, 5 – 15% of cobalt and the balance consisting essentially of iron and impurities and which is produced by a powder metallurgical process that includes preparing an alloy powder and compacting of the powder, said carbides including the MC and M_6C type carbides.

4,032,303

FUEL COMPOSITIONS CONTAINING ESTERS AND ESTER-TYPE DISPERSANTS

Casper John Dorer, Jr., Lyndhurst, and Clark Ober Miller, Willoughby Hills, both of Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio

Filed Oct. 1, 1975, Ser. No. 618,658
Int. Cl.² C10L 1/18
U.S. Cl. 44—70 **9 Claims**

1. A fuel composition comprising:
a major amount of
A. a normally liquid fuel and, dissolved therein,
the combination of:
B. about 50–500 parts by weight, per million parts of component A, of at least one ester selected from the group consisting of
1. esters of polyols containing at least 3 hydroxy groups and C_{8-18} aliphatic monocarboxylic acids, and
2. esters, containing about 30–80 carbon atoms, of an alkanol and an alkyl-based succinic or alkenyl-based succinic acid; and
C. about 80–400 parts, per million parts of component A, of at least one oil-soluble, nitrogen-free dispersant which is an ester of a polyhydric alcohol and a carboxylic acid which has within its molecular structure a substantially saturated aliphatic hydrocarbon-based radical containing at least about 30 carbon atoms.

4,032,304

FUEL COMPOSITIONS CONTAINING ESTERS AND NITROGEN-CONTAINING DISPERSANTS

Casper John Dorer, Jr., Lyndhurst, and Clark Ober Miller, Willoughby Hills, both of Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio

Filed Sept. 3, 1974, Ser. No. 502,593
Int. Cl.² C10L 1/22
U.S. Cl. 44—70 **19 Claims**

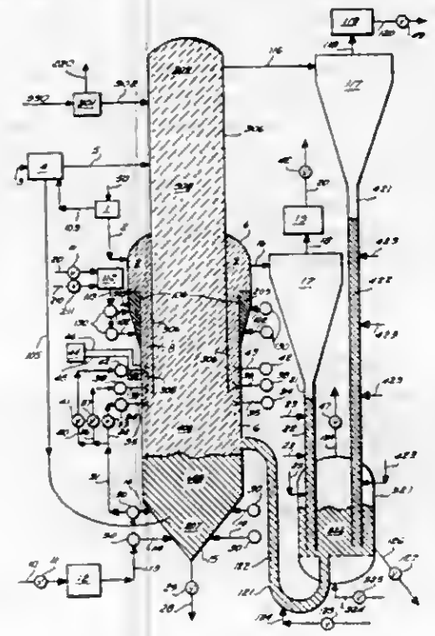
1. A fuel composition comprising a major amount of (A) a normally liquid fuel and a minor dispersant amount of the combination of; (B) at least one liquid ester of a C_{10-30} alkanol and an alkyl succinic or alkenyl succinic acid in which the alkyl or alkenyl group contains about 10–20 carbon atoms; and (C) an oil soluble nitrogen-containing dispersant having within its molecular structure a substantially saturated aliphatic hydrocarbon-based radical having at least about 50 carbon atoms.

4,032,305

TREATING CARBONACEOUS MATTER WITH HOT STEAM

Arthur M. Squires, 245 W. 104 St., New York, N.Y. 10025

Filed Oct. 7, 1974, Ser. No. 513,037
Int. Cl.² C10J 3/54, 3/56
U.S. Cl. 48—73 **6 Claims**



1. A process for gasifying carbonaceous matter by treatment with hot steam to yield a fuel gas containing hydrogen, carbon monoxide, and methane, comprising:
a. fluidizing granular carbonaceous material in a first fluidized bed extending continuously from substantially the bottom to substantially the top of a first space, and wherein said bed is maintained at a temperature between about 1,400° and 1,900° F;
b. supplying carbonacious matter to said bed, and wherein said matter is selected from the group consisting of coals, cokes, lignites, asphalt, coal tar, heavy coker tars, bitumens, petroleum resudua, Gilsonite, and kerogen, and wherein said granular carbonaceous material originates from said carbonaceous matter and includes fine particulate material;
c. supplying a gas comprising primarily steam as fluidizing gas to the bottom of said first bed and thereby converting at least a part of said carbonaceous matter by its endothermic reaction with steam to a fuel gas containing hydrogen, carbon monoxide, and methane;
d. fluidizing granular carbonaceous material also originating from said carbonaceous matter in a second fluidizing bed extending continuously from substantially the bottom to the top of a second space, and wherein said second space is annular in shape and is concentrically disposed within and alongside the upper portion of first space, the top of said second space being open to said first space at a selected elevation between top and bottom of said first space, so that said second fluidized bed is contiguous with said first bed at said selected elevation and gas leaving said second bed acts as a part of the fluidizing gas to the region of said first bed above said selected elevation, and wherein the combined rate of flow of said gas leaving said second bed and of fluidizing gas in said first bed reaching said selected elevation from below is sufficient to maintain a fast fluidized condition of said fine particulate material in said region of said first bed;
e. supplying a gas containing oxygen as fluidizing gas to said second bed, thereby sustaining combustion of said granular carbonaceous material in said second bed and generating heat that passes by conduction into said first bed;
f. withdrawing gas together with said fine particulate material from substantially the top of said first space and said second space;
g. substantially separating said withdrawn gas from said withdrawn fine particulate material;
h. discharging said gas;
i. feeding said separated fine particulate material into a third fluidized bed wherein said fine particulate material is maintained in the slow fluidized condition; and
j. feeding said separated fine particulate material from said third fluidized bed into said first fluidized bed at a rate sufficient to maintain a fast fluidized zone in said region of said first bed above said selected elevation.

5. Apparatus for conducting endothermic reactions of carbonaceous matter in a treatment by contact with hot steam, comprising:
a. a vessel;
b. a vertical annular partition means connected at its upper and thereof to the interior wall of said vessel and forming a central first space and an annular second space within said vessel said first space extending from the bottom of said partition to the top of said vessel, and wherein the bottoms of said spaces are open to a third space within said vessel and subposed beneath said first and second spaces, and a fourth space subposed beneath and in communication with said third space;
c. means connected to said first space and said fourth space for feeding a carbonaceous matter into said vessel;
d. means for establishing in said first space a hot fluidized bed of particulate matter including fine particles and originating from said carbonaceous matter;
e. means for establishing hot fluidized beds in said second and third spaces of particulate matter originating from said carbonaceous matter, and wherein said means for establishing hot fluidized beds in said first, second, and third spaces include means for introducing gas comprising primarily steam as a fluidizing gas to substantially the bottom of said third space;
f. means for introducing a hot gas into said first space at a selected elevation of said first space, and wherein said means for introducing a gas comprising primarily steam and said means for introducing a hot gas are capable of sustaining rates of said introductions such as to maintain a rate of flow of fluidizing gas in the region of said first space above said selected elevation sufficient to establish a fast fluidized bed of said fine particles in said region;
g. means for withdrawing and separating gas and fine particles from the top of said second space;
h. means for withdrawing and separating gas and fine particles from the top of said first space;
i. pipe means for each of said separating means for discharging said separated gas; and
j. means for conducting said separated particles from said separating means (g) and (h) into said third space at a rate of flow sufficient to establish a fast fluidized bed zone of said paricles in said third space.

4,032,306

ISOTOPE SEPARATION BY PHOTODISSOCIATION OF VAN DER WAAL'S MOLECULES

Yuan T. Lee, Berkeley, Calif., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Mar. 8, 1976, Ser. No. 664,858
Int. Cl.² B01J 1/10
U.S. Cl. 55—17 **12 Claims**

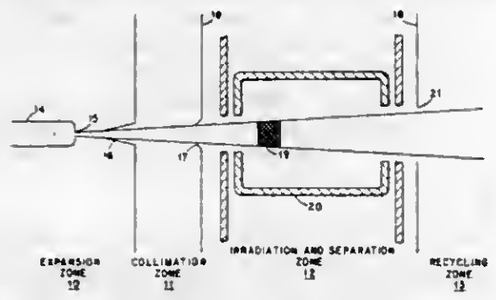
1. A method for separating isotopes by photo-induced dissociation of molecules of a Van der Waal's complex represented by A-B wherein A is a molecular species in which an element is present in a plurality of isotopes, ^1A representing those molecules of A containing a first such isotope and ^2A representing those molecules of A containing a second such isotope and B is a species different from A and capable of being bound to A by Van der Waal's forces, the molecules of ^1A in $^1A.B$ being capable of absorbing radiation in a given spectral region and being vibrationally excited thereby to a significantly

greater degree than the molecules of ^1A in $^1A.B$, which comprises:

forming a beam of molecules of said Van der Waal's complex A.B;

subjecting the beam of Van der Waal's molecules to radiation in the given spectral region, thereby vibrationally exciting the molecules of ^1A in $^1A.B$ and inducing dissociation of the thus excited molecules of $^1A.B$ into products ^1A and B without substantially exciting the molecules of ^1A in $^1A.B$ and without substantially dissociating molecules of $^1A.B$, the excited molecules of $^1A.B$ dissociating with sufficient recoil velocity to substantially deflect the products ^1A and B from the molecular beam; and

recovering the deflected dissociation product substantially enriched in ^1A.

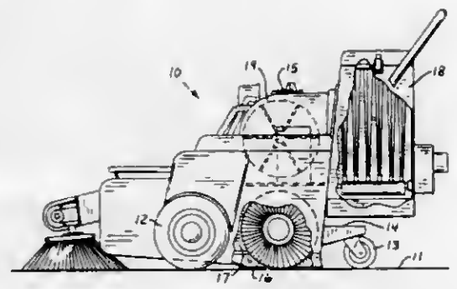


4,032,307

METHOD AND APPARATUS FOR CLEANING FILTER MEANS

George L. Sommerfeld, Minneapolis, Minn., assignor to Tennant Company, Minneapolis, Minn.

Filed Nov. 28, 1975, Ser. No. 636,160
Int. Cl.² B01D 46/04
U.S. Cl. 55—96 20 Claims



1. In dust control apparatus having dust transporting means and including means operatively connected to differential pressure generating means for establishing air flow therethrough; filter means interposed to filter said air flow, the improvement comprising:

a. housing means having opposed filter support means mountably retaining said filter means in a tensioned relationship therebetween, a first port formed in said housing means and defining an air inlet thereto, and a plenum chamber within said housing means in communication with the clean air side of said filter means and a second port formed in said housing means defining a clean air outlet from said plenum chamber, said differential pressure generating means establishing air flow from said inlet, across said filter means and through said plenum-chamber to said outlet;

b. said filter means comprising at least one filter element with said at least one filter element being a generally flexible structure having a longitudinal axis and with a surface thereof being disposed within said plenum chamber;

c. shaker frame means, and means coupling said shaker frame to one end of said at least one filter element in a direction generally along the longitudinal axis of said at least one element;

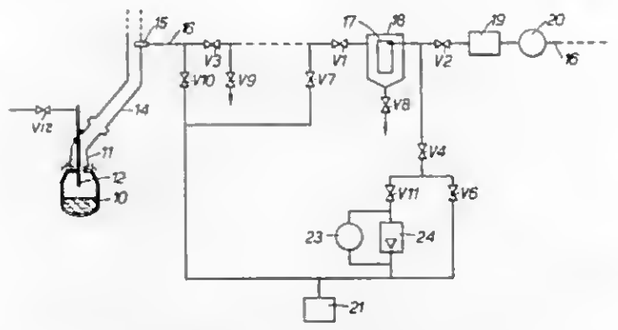
d. stroking means operatively coupled to said shaker frame means for imparting reciprocatory stroking motion to said shaker frame with a component of said stroking motion being generally along the longitudinal axis of said at least one filter element, the stroke length of said stroking means being sufficient to move said shaker frame means toward said filter support means a distance to impart alternate tension and relaxation in said at least one filter element, said stroking means providing stroking motion to said at least one filter element at a frequency selected such that standing wave motion is generated in said at least one filter element with said standing wave being an integral number of one-half wave lengths along the length thereof and with motion in said at least one filter element being at least partially along an axis normal to said longitudinal axis.

4,032,308

FILTERING A GAS STREAM

Robert Lawson, Middlesbrough, and Reginald S. Young, Uxbridge, both of England, assignors to British Steel Corporation, London, England

Filed Oct. 28, 1975, Ser. No. 626,046
Claims priority, application United Kingdom, Oct. 28, 1974, 46431/74
Int. Cl.² B01D 46/04
U.S. Cl. 55—96 6 Claims



1. A method of removing particulate matter from a gas stream having particulate matter suspended therein, comprising passing the gas stream through a filter mounted within a housing having a dirty gas stream inlet and a clean gas stream outlet together with a valve-controlled outlet opening directly to the atmosphere and positioned on the inlet side of the filter, whereby particulate matter is trapped by the filter, and cleaning the filter of trapped particles during an interval in which the passage of the gas stream through said inlet and outlet is stopped; said cleaning comprising pressurising the housing such that both sides of the filter are at the same high pressure, and subsequently releasing the pressure with explosive rapidity directly to the atmosphere through said valve-controlled outlet to thereby shock the accumulated particules from said filter.

4,032,309

PREPARATION OF MICROPOROUS POLYCARBONATE RESIN MEMBRANES

Robert M. Salemme, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 456,970, April 1, 1974, abandoned. This application Apr. 16, 1976, Ser. No. 677,716
Int. Cl.² B01D 13/04, 31/00, 39/16; B29D 27/04
U.S. Cl. 55—158 12 Claims

1. A method for the preparation of porous polycarbonate resin membranes comprising the steps of:

a. preparing a casting solution at room temperature consisting of polycarbonate resin material and a casting solvent composed of one or more good solvents, said casting solution being stable at room temperature,

b. casting a layer of the casting solution so formed on a smooth, clean surface of supporting means,

c. permitting desolvation to occur for a predetermined time interval from said layer,

d. immersing said layer and supporting means in a quenching bath liquid, said quenching bath liquid having the capabilities for dissolving said casting solvent and for causing swelling of the polycarbonate resin content of said layer while being a non-solvent for the polycarbonate resin, said immersion step initiating formation of a microporous membrane by entry of the quenching bath liquid into said layer and exit of casting solvent therefrom.

e. removing said microporous membrane from said quenching bath and

f. removing the remaining casting solvent and quenching bath liquid from said microporous membrane.

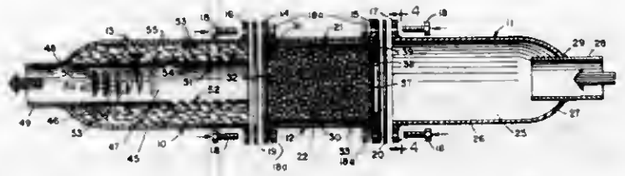
12. The substantially isotropic microporous polycarbonate resin membrane produced by the process of claim 1.

4,032,310

MUFFLER AND EXHAUST GAS PURIFIER FOR INTERNAL COMBUSTION ENGINES

Vincent E. Ignoffo, 7040 W. Newport, Chicago, Ill. 60631

Continuation of Ser. No. 470,180, May 15, 1974, abandoned. This application Nov. 3, 1975, Ser. No. 627,963
Int. Cl.² B01D 50/00
U.S. Cl. 55—276 2 Claims



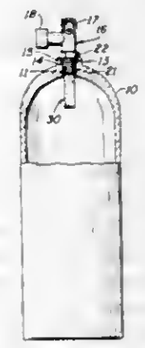
1. An exhaust gas purifier for connection to exhaust gas pipes in a gas exhaust system of an internal combustion engine comprising a shell adapted for axial flow therethrough of exhaust gases from an upstream end to a downstream end of said shell, said shell being axially segmented into an upstream shell segment, a downstream shell segment, and an intermediate shell part embodying at least one intermediate shell segment, said intermediate shell part being between and coaxial with said upstream and downstream shell segments, a tube projecting from the upstream end of said upstream shell segment for connection to one portion of an exhaust pipe of said gas exhaust system, an additional tube extending through said downstream shell segment and projecting from the downstream of said downstream shell segment for connection to another portion of said exhaust pipe of said gas exhaust system, annular flanges on the axial ends of said intermediate part, an annular flange on each of said upstream and downstream shell segments at the respective end of each which is in respective opposing, facing relationship with the annular flanges of said intermediate part, disconnectable fastening means for respective pairs of said flanges which are in said facing relationship to releasably hold said intermediate part and the respective upstream and downstream shell segments together as a unit, a replaceable cartridge with foraminous upstream and downstream end walls and filled with small particles of exhaust gas purifying material, said cartridge substantially filling said intermediate part of said shell, said additional tube providing a tubular core extending axially through said downstream shell segment surrounded by an annular space between said tubular core and said downstream shell segment, fiber glass sound-absorbing means in said annular space, the upstream ends of said annular space and said additional tube being in open communication with the downstream end of said cartridge in said intermediate shell part for flow of exhaust gases from said cartridge into said additional tube and also into said annular space, openings in the tubular wall of said core for flow of exhaust gases from said cartridge both directly through said core and also through said sound-absorbing means and via said openings into said core, and said cartridge being removably mounted in said intermediate shell part by a ring flange gasket mounted on one end of said cartridge and seated between opposed faces of one of said annular flanges of said intermediate part and the flange of one of said shell segments in facing relationship thereto, whereby, upon disconnection of said fastening means, said intermediate part and the cartridge therein may be removed from its position between said upstream and said downstream shell segments without disconnecting said shell segments from their respective portions of said exhaust pipe of the gas exhaust system whereupon said cartridge may be withdrawn immediately from said intermediate part for inspection or replacement of the cartridge.

4,032,311

TANK FILTER

Jack L. Bohmrich; William A. Bowden, Jr., both of Glenview, and Vernon G. Pedersen, Chicago, all of Ill., assignors to Dacor Corporation, Northfield, Ill.

Filed June 1, 1976, Ser. No. 691,389
Int. Cl.¹ B01D 50/00
U.S. Cl. 55—385 C 6 Claims



1. In combination,

a pressurizable vessel having a single inlet-outlet port,

manually operable valve means including a housing having a valve passageway therethrough sealably mounted to said vessel across said port,

said valve means including a tube connected to said passageway and extending through said port into said vessel,

said tube having an open distal end for communicating said valved passageway with the chamber in said vessel,

a tubular filter member comprising a mass of minute fibrous members having surfaces against which particles are held by intermolecular forces of attraction irrespective of the direction of fluid flow therethrough to remove entrained particles from fluid entering and exiting the vessel,

said filter member being positioned over said tube in spaced concentric relationship therewith to provide an annular chamber disposed between said tube and said filter member,

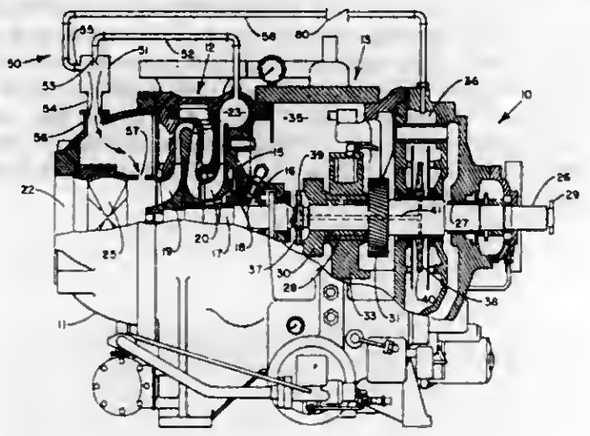
a tubular connector press fitted onto the distal end of said tube and having a laterally extending bole therethrough communicating with the open distal end of said tube for connecting said passageway to said annular chamber, and

end cap means removably secured to said connector and holding said filter member in place over said tube in sealing relationship with said housing.

4,032,312
CENTRIFUGAL COMPRESSOR

Carl M. Anderson, Syracuse, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.

Filed Apr. 16, 1976, Ser. No. 677,584
Int. Cl.² F25B *1/00*; **F01D** *11/00*, *25/16*; **F03B** *11/00*
U.S. Cl. 62—498 **7 Claims**



1. In a centrifugal compressor, as employed in a refrigeration system, of the type having a hermetically sealed housing containing an impeller section and a transmission section separated by a wall through which passes the impeller shaft, the improvement comprising

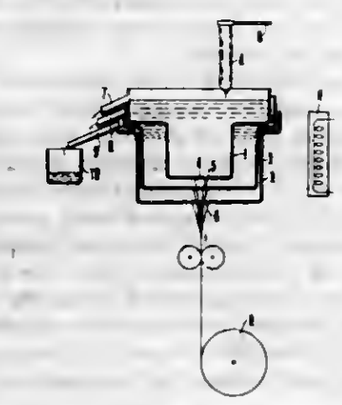
separator means for isolating refrigerant vapor contained within the transmission section, and

pump means operatively connected to the transmission section and being arranged to draw the isolated refrigerant vapor from the transmission whereby the pressure of the atmosphere contained within the transmission section is substantially reduced.

4,032,313
APPARATUS FOR PRODUCING OPTICAL FIBERS BY USING CRUCIBLES

Mitsuhiro Tokuhara, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 650,062, Jan. 19, 1976, abandoned, which is a continuation of Ser. No. 510,712, Sept. 30, 1974, abandoned. This application July 15, 1976, Ser. No. 705,518
Claims priority, application Japan, Oct. 4, 1973, 48-111017
Int. Cl.³ C03B *37/02*
U.S. Cl. 65—1 **2 Claims**



1. An apparatus for producing an optical fiber using crucibles which comprises:

heating means for heating materials to be melted for forming the optical fiber,

a melting unit arranged to be heated by said heating means, said melting unit comprising at least two nested crucibles including an upper crucible and a lower crucible with said upper crucible positioned within said lower crucible, each said crucible comprising a bottom wall and side walls extending upwardly from said bottom wall, said bottom wall of said upper crucible spaced upwardly from said bottom wall of said lower crucible, each of said upper and lower crucibles having an upper end with an opening therein, each of said crucibles being provided with a one-bole spinnerette positioned in said bottom wall thereof, and the spinnerette holes of the crucibles being in vertically spaced alignment,

overflow passage means provided in said side walls of at least one of said crucibles below the upper ends thereof and arranged so that when the molten material contained therein exceeds a predetermined level, the excess portion of the molten material is permitted to overflow therethrough,

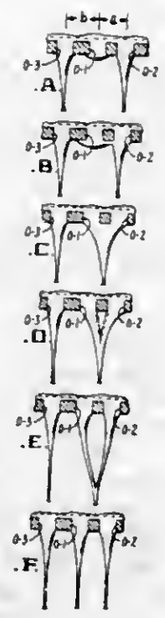
material supply means for supplying the optical fiber materials into the opening of said crucibles in amounts such that excess portions of the molten materials located above the level of said overflow passage means overflow from said overflow passage means during the entire spinning operation, wall means located exteriorly of said crucibles for receiving the overflow of molten materials from said overflow passage means, and

fiber drawing means located below said spinnerette holes and arranged to spin the optical fiber while drawing those portions of the molten materials which outflow through said spinnerette holes.

4,032,314
APPARATUS FOR CONTROLLING FLOODING IN THE DRAWING OF GLASS FIBERS

Charles H. Coggin, Jr., Glendora, Calif., assigoor to Kaiser Glass Fiber Corporation, Azusa, Calif.

Division of Ser. No. 638,526, Dec. 8, 1975, Pat. No. 3,982,915.
This application May 17, 1976, Ser. No. 686,994
The portion of the term of this patent subsequent to Sept. 28, 1993, has been disclaimed.
Int. Cl.³ C03B *37/02*
U.S. Cl. 65—1 **12 Claims**



1. In a glass fiber drawing assembly of the type having a non-tip orifice plate with a flat undersurface through which fibers are drawn, an improved orifice plate for use in the assembly, said plate comprising: a drawing area having a plurality of drawing orifices extending therethrough and a flat undersurface through which said orifices open, said orifices being arranged in paired sets with the orifices within each set being of substantially the same diameter and spaced from one another by a center-to-center distance equal to from 1.2 to 1.45 times said diameter, and the respective sets spaced from one another by a distance greater than the distance between the orifices within the sets, whereby, in the event of the breakage of a fiber being drawn from one of the orifices of a set, the glass supplied to said one orifice will flood to and join the glass being drawn from the other of the orifices in said set prior to flooding to the orifices of other of said sets.

4,032,315
METHOD FOR THE PRODUCTION OF QUARTZ-GLASS OBJECTS BY DRAWING

Gerardus Henricus Antonius Maria van der Steen, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

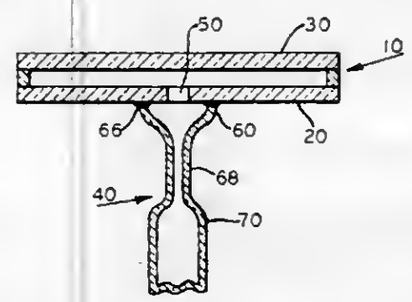
Filed Nov. 10, 1975, Ser. No. 630,535
Claims priority, application Netherlands, Nov. 18, 1974, 7414978
Int. Cl.² C03B *5/16*
U.S. Cl. 65—32 **1 Claim**

1. A method for continuously producing elongated objects of quartz glass which comprises: feeding continuously starting material consisting of silicon dioxide in particle form at a predetermined rate into the upper part of a heated furnace, melting continuously the starting material in the upper, heated zone of the furnace in a gas atmosphere of hydrogen and helium in a ratio by volume of 40–65% of hydrogen to 60–35% of helium and at a melting temperature which is not below 2050° C, heating of the molten material thereafter in the lower zone of the furace by means of a separate heating means to maintain a temperature which is lower than the 2050° C in the molten material and drawing the molten material from the lower zone of the furnace by means of a forming device in the presence of an atomosphere which contains hydrogen in a non-oxidizing carrier gas cooling said material, heating said material to a temperature of between a plurality of days at 800° C and a plurality of minutes at 1400° C in a vacuum or in air and, thereafter heating at a temperature of at least 1600° C for a plurality of minutes.

4,032,316
METHOD OF SEALING A GLASS/TUBULATION TO A PLATE

Bernard Caras, Princeton, N.J., assignor to Burroughs Corporation, Detroit, Mich.

Filed Nov. 26, 1975, Ser. No. 635,736
Int. Cl.³ C03B *29/00*; **C03C** *27/00*
U.S. Cl. 65—41 **4 Claims**

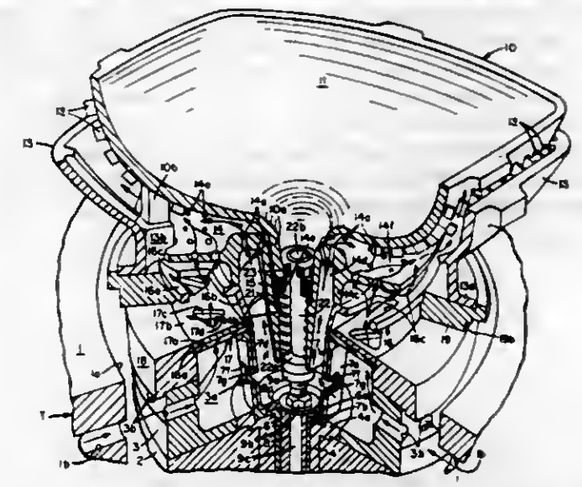


1. The method of forming a gas-filled display panel assembly comprising the steps of forming a glass tube and an apertured base plate of said display panel assembly to which said tube is to be sealed in alignment with said aperture, storing said tube and said plate until they are sealed together and wherein said tube is subject to surface defects being formed therein during storage and handling, vertically supporting said tube in a horizontally disposed carrier, heating said vertically supported tube in said carrier to a predetermined temperature and holding said tube at said temperature at which the surface of said tube flows assisted by the flow of gravity whereby said surface defects are removed and the surface assumes a pristine state, and heat sealing said defect free tube to said apertured base plate.

4,032,317
GLASS FORMING MOLD AND TEMPERATURE CONTROL APPARATUS THEREFOR

Arieh Carmi, Big Flats; Richard A. Potter, Horseheads, and Alan G. Ryder, Elmira, all of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Nov. 15, 1976, Ser. No. 742,286
Int. Cl.² C03B *11/12*
U.S. Cl. 65—161 **8 Claims**



5. In combination with a glass forming mold (10) including a generally bowl-shaped upper portion and a lower central tubular portion (10*a*) and used for forming generally funnel-shaped articles, an apparatus assembly for directing, distributing and selectively controlling flow of cooling fluid about the outer surface of said mold (10) for selective temperature control thereof, such apparatus assembly comprising:

I. a generally annular cooling fluid receiving and guide member (3) embodying an inner annular plenum chamber (3*a*);

II. first adjustable fluid flow control means (7) having a fluid inlet side (7*a*) adjacent the inner limits of said plenum chamber (3*a*) and a fluid outlet side (7*d*);

III. second adjustable fluid flow control means (17) having a fluid inlet side (17*a*) above said plenum chamber (3*a*) and a fluid outlet side (17*b*);

IV. a perforated baffle member (14) embodying a plurality of relative small orifices (14*a*) extending generally vertically therethrough and embodying a second plenum chamber (14*d*) surrounding said tubular portion of said mold (10) and in fluid flow communication with said fluid outlet side (7*d*) of said first fluid flow control means (7) and a main outer plate portion (14*f*) disposed below and spaced from the lower portion of said bowl-shaped portion of said mold (10) and in fluid flow communication with said fluid outlet side (17*b*) of said second fluid flow control means (17); and

V. an enclosure member (13) surrounding the upper portion of said bowl-shaped portion of said mold (10) and spaced from the outer surface thereof to provide a fluid flow path leading from the space between said main portion (14*f*) of said baffle member (14) and said lower portion of said bowl-shaped portion of said mold (10) into the space between the enclosure (13) and said outer surface of said upper portion of said bowl-shaped portion of said mold (10).

4,032,318
COMPOSTING MIXTURE

Donald E. Lovness, Stillwater, Minn., assignor to Judd Ringer Corporation, Eden Prairie, Minn.

Continuation-in-part of Ser. No. 391,074, Aug. 24, 1973, abandoned. This application July 7, 1975, Ser. No. 593,472

Int. Cl.² C05F 9/04

U.S. Cl. 71—9 **9 Claims**

1. A method of facilitating the rapid decomposition of organic matter to be composted, said method comprising:

preparing a mixture of a quantity of microorganisms for digesting the organic material, said microorganisms including both aerobic and anaerobic bacteria, and a quantity of enzymes for breaking down the cell structure of the organic material to enable it to be digested by the microorganisms which is many times that which is inherently otherwise present in organic material to be composted,

including in said mixture a quantity of materials rich in proteins and carbohydrates which quantity is many times the combined quantities of microorganisms and enzymes, said materials being in a proportion to provide a ratio of one to from three to four parts of protein by weight to carbohydrate to facilitate the rapid reproduction of the microorganisms prior to the time that the enzymes have broken down the cell structure of the organic material,

adding said mixture to the material to be composted, and

periodically adding water to the material being composted.

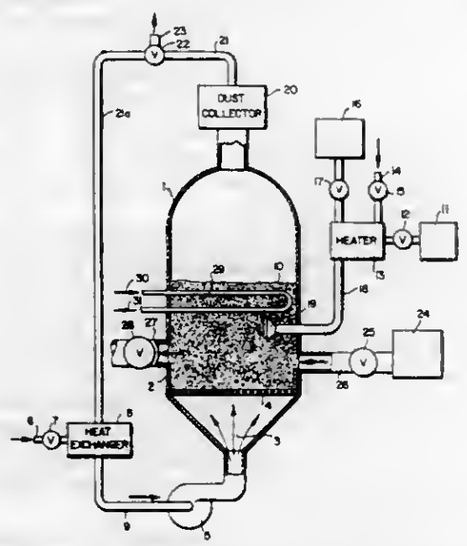
4,032,319
COMPOSITE FERTILIZER AND METHOD FOR ITS MANUFACTURE

Jack Lee Smith; Charles Raymond Crowley, and Roger Benton Hamberger, all of Pocatello, Idaho, assignors to J. R. Simplot Company, Boise, Idaho

Continuation-in-part of Ser. No. 371,439, June 19, 1973, abandoned. This application Oct. 24, 1975, Ser. No. 625,723

Int. Cl.² C05B 7/00

U.S. Cl. 71—34 **10 Claims**



1. A composite fertilizer particle having a fertilizer particle core selected from the group consisting of normal superphosphate, enricbed superphosphate, triple superphosphate, monocalcium phosphate, monoammonium phosphate, diammonium phosphate, and ammonium polyphosphate and a non-uniform, discontinuous particulate water-permeable coating comprising sulfur.

4,032,320
SYNERGISTIC HERBICIDAL MIXTURES OF 4-CHLORO-2-OXOBENZOTHIAZOLIN-3-YLACETIC ACID AND 2-METHOXY-3,6-DICHLOROBENZOIC ACID

Gerald Bertram Lush, Nottingham, England, assignor to The Boots Company Limited, Nottingham, England

Continuation of Ser. No. 314,571, Dec. 13, 1972, abandoned, which is a continuation of Ser. No. 88,988, Nov. 12, 1970, abandoned, which is a continuation of Ser. No. 770,099, Oct. 23, 1968, abandoned. This application Mar. 31, 1975, Ser. No. 563,718

Claims priority, application United Kingdom, Oct. 31, 1967, 49487/67

Int. Cl.² A01N 9/12

U.S. Cl. 71—90 **6 Claims**

1. A herbicidal composition, which is useful in the treatment of Matricaria spp., consisting essentially of an inert carrier and a herbicidally effective amount of an essential synergistic mixture of

a. an alkali metal salt of 4-chloro-2-oxobenzothiazolin-3-ylacetic acid, and

b. an alkali metal salt of 2-methoxy-3,6-dichlorobenzoic acid, the amounts being expressed in terms of the free acid in both instances and the weight proportions of (a) and (b) being from 1-2.5:1.

4,032,321
N,N-DIALKYL-N'-(SUBSTITUTED-5-ISOTHIOAZOLYL)-N'-ACYLUREAS AS HERBICIDES

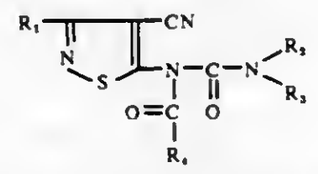
Loren Kenneth Gibbons, Medina, N.Y., assignor to FMC Corporation, Philadelphia, Pa.

Filed June 18, 1976, Ser. No. 697,454

Int. Cl.² C07D 275/02

U.S. Cl. 71—90 **6 Claims**

1. A substituted isothiazolylurea of the formula:



in which R_1, R_2, R_3 and R_4 are straight or branched alkyls of 1 to 4 carbons.

5. An herbicidal composition comprising an herbicidally effective amount of a compound of claim 1 in admixture with an agriculturally acceptable extender.

6. A method of preventing and destroying plant growth which comprises applying to the locus to be protected an herbicidally effective amount of a compound of claim 1.

4,032,322
ISOTHIAZOLYLFORMAMIDINE DERIVATIVES AS HERBICIDES

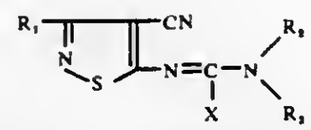
Loren Kenneth Gibbons, Medina, N.Y., assignor to FMC Corporation, Philadelphia, Pa.

Filed June 18, 1976, Ser. No. 697,456

Int. Cl.² C07D 275/02

U.S. Cl. 71—90 **15 Claims**

1. A substituted formamidine of the formula:



in which R_1 is a straight or branched alkyl of 1 to 4 carbons; R_2 and R_3 are alkyl of 1 to 4 carbons; and X is hydrogen, fluorine, chlorine, bromine, or carbonitrile.

14. An herbicidal composition comprising an herbicidally effective amount of a compound of claim 1 in admixture with an agriculturally acceptable extender.

15. A method of preventing and destroying plant growth which comprises applying to the locus to be protected an herbicidally effective amount of a compound of claim 1.

4,032,323
ISOTHIAZOLE DERIVATIVES

David Bottimore, Leigh-on-Sea, England, assignor to May & Baker Limited, England

Continuation of Ser. No. 417,192, Nov. 19, 1973, Pat. No. 3,922,160, which is a division of Ser. No. 241,833, April 6, 1972, abandoned. This application May 19, 1975, Ser. No. 578,870

Claims priority, application United Kingdom, Apr. 7, 1971, 9019/71

Int. Cl.² C07D 275/02

U.S. Cl. 71—90 **16 Claims**

1. An isothiazole of the formula:

wherein R^1 represents a straight or branched-chain alkyl group containing 1 to 3 carbon atoms and R^3 and R^4 which may be the same or different are each methyl or ethyl or a salt of such an isothiazole with an alkali metal or a herbicidally acceptable strong organic base.

5. A selective herbicidal composition for controlling growth of unwanted plants among crop plants which comprises, as active ingredient, an amount effective to control the growth of said unwanted plants without destroying said crop plants of an isothiazole of the formula:

wherein R^1 represents a straight or branched-chain alkyl group containing 1 to 3 carbon atoms and R^3 and R^4 which may be the same or different are each methyl or ethyl or a salt of such an isothiazole with an alkali metal or a herbicidally acceptable strong organic base in association with a compatible herbicidally-acceptable diluent or carrier.

16. A composition according to claim 5 which contains, in addition to the said isothiazole, an insecticide, fungicide, plant growth regulator or fertilizer.

4,032,324
SYNERGISTIC HERBICIDAL COMPOSITION FOR THE CONTROL OF WEEDS

Wilfried Faust, Cologne, and Kurt Westphal, Wuppertal-Vohwinkel, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

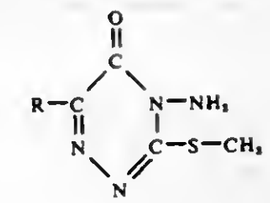
Division of Ser. No. 885,367, Dec. 15, 1969, Pat. No. 3,909,234. This application Apr. 3, 1975, Ser. No. 565,028

Claims priority, application Germany, Dec. 17, 1968, 1815145

Int. Cl.² A01N 9/22

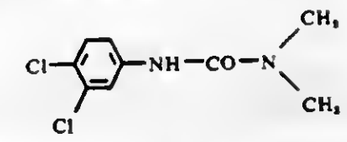
U.S. Cl. 71—93 **7 Claims**

1. A herbicidal composition which consists essentially of a herbicidally effective amount of a combination of either 3-methylmercapto-4-amino-6-isopropyl-1,2,4-triazin-5-one or 3-methylmercapto-4-amino-6-tert.-butyl-1,2,4,-triazin-5-one of the formula



wherein

R represents i-C_3H_7 or t-C_4H_9, with N'-(3,4-dichlorophenyl)-N,N-dimethyl-urea of the formula



in admixture in a ratio by weight of substantially 1:1, and an inert carrier.

4,032,325
METHOD FOR CONTROLLING WEEDS WITH AMINO ACID HIGHER ALKYL ESTERS

Takao Kida, Yokosuka; Hiroshi Mizuno, Yokohama, and Masaru Okutsu, Kawasaki, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

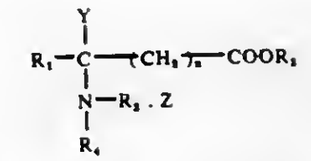
Filed Oct. 15, 1974, Ser. No. 514,745

Claims priority, application Japan, Oct. 19, 1973, 48-118316; Feb. 14, 1974, 49-18050

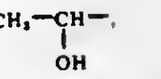
Int. Cl.² A01N 9/22, 9/14, 9/24

U.S. Cl. 71—95 **6 Claims**

1. A method for controlling *Lobelia chinensis* LOUR, *Lindernia procumbens* PHILCOX, *Vandellia Angustifolia* BENTH, *Dopatrium junceum* HAMILT, *Ludwigia prostrata* ROXB., *Rotala indica* KOEHNE, *Elatine triandra* SCHK, *Callitriche Verna L.*, *Monochoria vaginalis* PRESL., *Aneilema Keisak* HASSK., *Echinochloa Oryzicola* VASING, *Spirodela polyrhizo* SCHLEID., *Lemna paucicostata* HEGELM, *Potamogeton distinctus* A. BENN., *Cyperus difformis L*, *Eleocharis acicularis* ROME et SCHULT, *Amaranthus viridis* L., or *Digifaria adscendens* HENR. weeds, which comprises applying to said weeds, or the locus where said weeds are growing or will grow, a herbicidal amount of an active compound selected from the group consisting of acid addition products of higher alkyl esters of amino acids, acid addition salts of N-lower alkyl substitution products of said esters and quaternary ammonium salts of N-lower alkyl substitution products of said esters wherein said active compound is selected from compounds of formula (1)

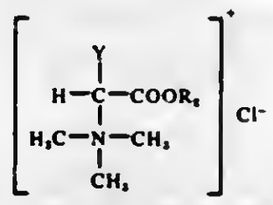

(1)

wherein R_1 is a member selected from the group consisting of a hydrogen atom, alkyl containing 1 to 4 carbon atoms,



R_2 is alkyl containing 8 to 22 carbon atoms, Y is a hydrogen atom or methyl, each of R_3 and R_4 is a member selected from the group consisting of a hydrogen atom and lower alkyl of 1 to 4 carbon atoms, Z is an inorganic or organic acid group selected from the group consisting of hydrochloric acid, acetic acid, p-toluene sulfonic acid, oxalic acid and pyroglutamic

acid, *n* is 0 or an integer of 1 to 5 and, when an integer of 1 to 5, both R_1 and Y are hydrogen atoms, and compounds of formula (2)



(2)

wherein Y and R_3 are the same as defined above.

4,032,326

HERBICIDAL 2-SUBSTITUTED ARYL-4,5,6,7-TETRAHYDRO-2H-ISOINDOLE-1,3-DIONES

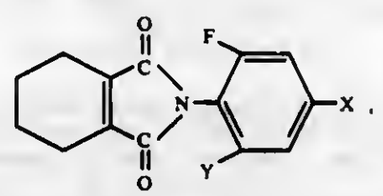
Steven Jerome Goddard, West Grove, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 536,322, Dec. 24, 1974, Pat. No. 4,001,272, which is a continuation-in-part of Ser. No. 502,968, Sept. 3, 1974, abandoned. This application Aug. 26, 1975, Ser. No. 607,895

Int. Cl.² A01N 9/22

U.S. Cl. 71—96 **17 Claims**

1. A composition for the control of undesirable vegetation consisting essentially of a herbicidally effective amount of a compound of the formula



wherein X is Cl, Br or F, and Y is H, and at least one of (a) a surface-active agent and (b) an inert solid or liquid diluent.

4,032,327

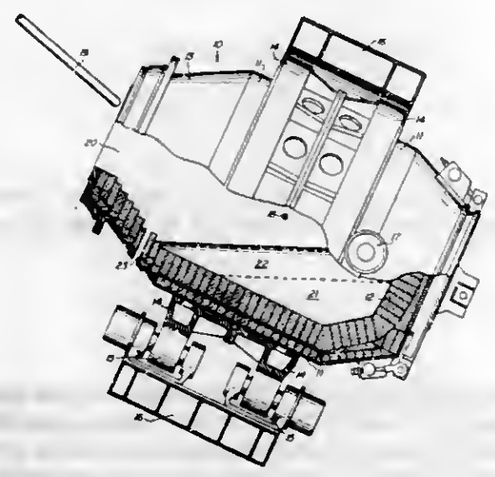
PYROMETALLURGICAL RECOVERY OF COPPER FROM SLAG MATERIAL

John W. Donaldson; Sheree N. Sharma, both of Salt Lake City, Utah, and Nicholas John Themelis, Stamford, Conn., assignors to Kennecott Copper Corporation, New York, N.Y.

Filed Aug. 13, 1975, Ser. No. 604,123

Int. Cl.² C22B 15/00; C21B 3/04

U.S. Cl. 75—72 **6 Claims**



1. A cyclic, two-stage process for recovering essentially all copper values present in molten slag, comprising: (a) subjecting a charge of the molten slag to vigorous agitation in a rotary reactor rotating at a speed of at least about 10 rpm; (b) adding a carbonaceous or hydrogenous reductant to said charge of molten slag in the rotating reactor to reduce magnetite and to produce a high-grade matte, containing at least about 70% copper, and a slag; (c) discontinuing rotation of the reactor, thereby allowing the high-grade matte to separate from the slag, whereby a matte phase and a slag phase are produced from the original charge; (d) recovering the high-grade matte phase from the reactor; (e) subjecting the molten slag phase that remains after the high-grade matte phase has been separated therefrom to vigorous agitation by again rotating the reactor at a speed of at least about 10 rpm; (f) adding an iron sulfide to the molten slag in the reactor, to provide a low-grade copper matte containing from about 20% to about 35% copper and a slag containing from about 0.3% to 0.5% copper, said low-grade matte and slag being intimately mixed by vigorous agitation as the reactor rotates, thereby extracting copper values from the slag; (g) again discontinuing rotation of the reactor, thereby allowing the low-grade copper matte to settle and to separate from the slag, whereby a matte phase are produced from the slag phase of step (c); (h) removing the slag phase of step (g) from the reactor, leaving the low-grade copper matte phase in the reactor; (i) introducing an additional charge of the molten slag into the reactor for mixing with the low-grade copper matte remaining therein from step (h); and repeating steps (a) through (i) on a cyclic basis.

4,032,328

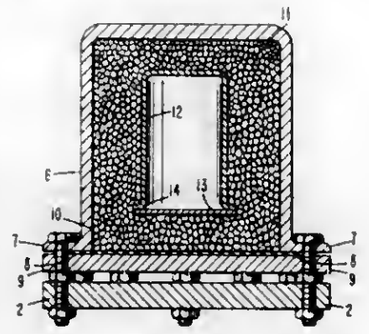
METAL REDUCTION PROCESS

Frank W. Hurd, Northfield, Minn., assignor to University of Minnesota, Inc., Minneapolis, Minn.

Filed Oct. 23, 1975, Ser. No. 625,352

Int. Cl.² G22B 5/00; C22B 53/00

U.S. Cl. 75—84.1 R **12 Claims**



1. A reduction process for the production of a product metal, which includes the step of reacting a reducible metal compound and a reducing metal in a sealed preformed beneficial metal container contained in a sealed outer reaction vessel and spaced from and insulated from the walls of said reaction vessel by means of a relatively inert insulating material, said beneficial metal container comprising the product metal or a metal which forms a useful alloy with said product metal.

4,032,329

METAL REDUCTION PROCESS EMPLOYING METAL SUB-HALIDES

Frank W. Hurd, Minneapolis, Minn., assignor to University of Minnesota, Inc., Minneapolis, Minn.

Filed Feb. 20, 1976, Ser. No. 659,812

Int. Cl.² C22B 34/10

U.S. Cl. 75—84.5 **13 Claims**

1. A reduction process for the production of a product metal selected from the group consisting of titanium, zirconium, tungsten, chromium, hafnium, plutonium and uranium from a sub-halide of said product metal, which includes the step of reacting the product metal sub-halide with an alkali metal reducing metal in a manner such that the temperature of the reaction mixture reaches at least about 975° C, while insulating the reaction mixture from contact with an outer reaction vessel by means of a relatively inert insulating material having a melting point above about the melting point of the reduction halide formed in the reduction reaction.

13. A reduction process for the production of a product metal selected from the group consisting of titanium, zirconium, tungsten, chromium, hafnium, plutonium and uranium from a sub-halide of said product metal, which includes the step of reacting the product metal sub-halide with an alkali metal reducing metal in an inner reaction container in a manner such that the temperature of the reaction mixture reaches at least about 975° C, while insulating the inner reaction container from contact with an outer reaction vessel by means of a relatively inert insulating material having a melting point at or above about the melting point of the reducing metal halide formed in the reduction reaction.

4,032,330

PROCESS FOR RECOVERY OF COPPER

Gerald F. Fountain; Jaime Veloz; Harry R. Dahlberg, and Edward A. Bilson, all of Inspiration, Ariz., assignors to Inspiration Consolidated Copper Company, Morristown, N.J.

Filed June 30, 1976, Ser. No. 701,170

Int. Cl.² C22B 15/08

U.S. Cl. 75—101 R **4 Claims**

1. A process for the leaching and recovery of copper values from copper-containing material which comprises:

vat leaching sulfidic copper ore with an aqueous acidic ferric sulfate leach solution containing at least 10 gpl ferric ion to form a copper-pregnant leach solution containing substantially less than 10 gpl ferric ion and a corresponding increase in ferrous ion concentration,

extracting said leach solution with an extractant selective to copper and non-selective to iron to strip the copper values from said leach solution,

adjusting the acid content of the stripped leach solution to about 10 to 20 gpl,

passing said acidic stripped leach solution through at least one mineral dump containing oxidized copper for a time sufficient to cause reoxidation of ferrous ion to restore the concentration of ferric ion to at least about 10 gpl,

adding sufficient sulfuric acid to the dump off-solution to cause said solution to have an acid concentration of from about 10 to about 20 gpl, and

recycling said acidic ferric sulfate leach solution to the vat leaching operation.

4,032,331

PROCESS FOR CONSERVING QUINOLIC COMPOUNDS IN AN ORGANIC EXTRACTANT COPPER RECOVERY SYSTEM

John N. Gerlach, Burlington, Mass., assignor to Kennecott Copper Corporation, New York, N.Y.

Filed Sept. 3, 1976, Ser. No. 720,416

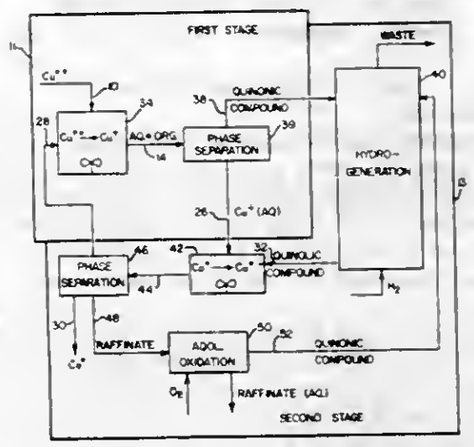
Int. Cl.² C22B 15/12

U.S. Cl. 75—108 **25 Claims**

1. A process for producing metallic coppr from an aqueous copper solution, said process being characterized by the steps of contacting said aqueous solution with a quinolic compound to precipitate metallic copper, said quinolic compound being dissolved in a substantially water immiscible solvent capable of also dissolving the quinonic compound which forms during the reactions, and separating metallic copper from the reaction system, wherein the improvement comprises:

a. oxidizing the water solubilized unreacted quinolic compound which becomes dissolved in the aqueous solution after the precipitation of copper metal to form a water insoluble quinonic compound;

b. recovering the quinonic compound produced in step (a); and



c. reducing the quinonic compound produced in step (b) to the quinonic compound for reuse in the water immiscible solvent.

4,032,332

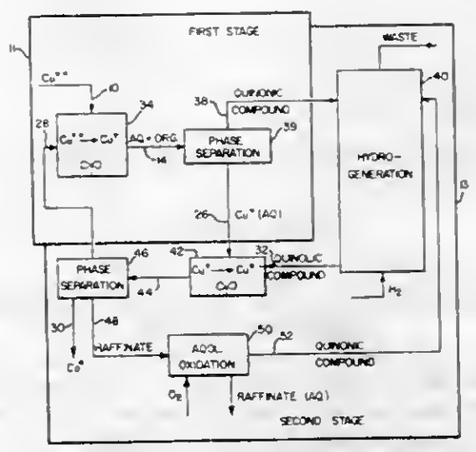
PROCESS FOR INCREASING THE RATE OF COPPER METAL PRODUCTION IN A QUINOLIC EXTRACTION SYSTEM

John N. Gerlach, Burlington, Mass., assignor to Kennecott Copper Corporation, New York, N.Y.

Filed Sept. 3, 1976, Ser. No. 720,415

Int. Cl.² C22B 15/12

U.S. Cl. 75—108 **26 Claims**



1. A process for producing metallic copper from an aqueous copper solution, said process being characterized by the steps of contacting said aqueous solution with a quinolic compound to precipitate metallic copper, said quinolic compound being dissolved in a substantially water immiscible solvent capable of also dissolving the quinonic compound which forms during the reactions, and separating metallic copper from the reaction system, wherein the improvement comprises adding an amount of an ion selected from the group consisting of chloride ions, bromide ions, thiocyanate ions, and mixtures thereof, to said aqueous copper solution in amounts which are effective to increase the rate of copper precipitation.

4,032,333
ROLLED STEEL MATERIALS
Erik Anders Ake Josefsson, Borlange, Sweden, assignor to Stora Kopparbergs Bergslags Aktiebolag, Falun and Granges Aktiebolag, Stockholm, both of Sweden
Filed Dec. 19, 1974, Ser. No. 534,300
Claims priority, application Sweden, Dec. 28, 1973, 7317600
Int. Cl.² C22C *38/06, 38/60*
U.S. Cl. 75—124 1 Claim

1. In a structural article made of a rolled steel, said article being subjected to tensile stress component in a direction perpendicular to the rolled direction of said steel and at least equal to or greater than the predetermined tensile stress component in said rolled direction of said steel material, the improvement comprising said steel having a composition consisting essentially of 0.01 – 0.35% C, up to 1.0% Si, 0.3 – 5% Mn, up to 3% Cr, up to 10% Ni, up to 1% Mo, up to 0.15% Nb, up to 0.15% V, up to 0.6% Cu, 0.005 – 0.1% Al, up to 0.030% N, up to 0.006% B and a normal percentage of iron contaminating elements, about 0.002 – 0.05% by weight of sulfur, and tellurium, in an amount of about 0.002 – 0.009% by weight + about 0.1 times the sulphur content in percent by weight, an amount of silicate bound oxygen in said steel not exceeding about 300 parts per million, and balance iron.

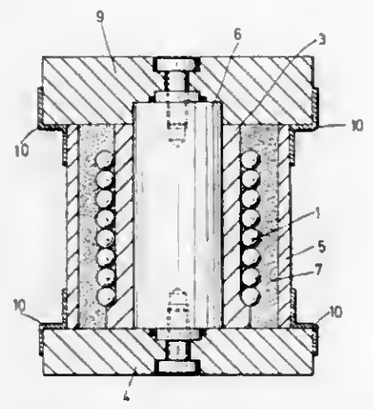
4,032,334
TAPPET METALLURGY
Wayne E. Burk, La Grange, and William B. Hamilton, Batavia, both of Ill., assignors to Stanadyne, Inc., Windsor, Conn.
Filed May 10, 1976, Ser. No. 685,091
Int. Cl.² C22C *38/07*
U.S. Cl. 75—128 C 4 Claims

1. An internal combustion engine component comprising a body having at least a wearing surface formed of chilled high strength alloy cast iron consisting essentially of the following composition:

Element	Percent by Weight
Carbon	3.20–3.70
Silicon	2.00–2.90
Manganese	0.60–1.00
Chromium	1.00–1.80
Nickel	0.40–0.70
Molybdenum	0.80–2.60
Iron (plus minor sulphur, copper & phosphorus elements)	Balance

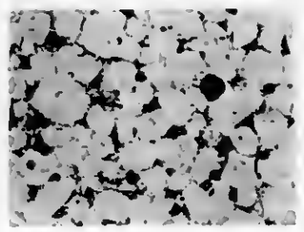
4,032,335
PROCESS FOR MAKING METALLIC, MOLDED COMPOSITE BODIES
Gerhard Zapf, Radevormwald; Lothar Albano-Müller, Schweim; Horst Kiethe, Remscheid, and Rainer Röhlig, Radevormwald, all of Germany, assignors to Sintermetallwerk Krebsoege GmbH, Krebsoge, Germany
Filed Nov. 21, 1975, Ser. No. 634,009
Claims priority, application Germany, Dec. 19, 1974, 2460013
Int. Cl.² B22F *3/16*; F42B *13/48*
U.S. Cl. 75—208 R 8 Claims

1. A process for making molded bodies comprising discrete particles incorporated in a metallic embedding material which comprises:
fixedly positioning said discrete particles to a metallic substrate;
enveloping said discrete particles in a metal powder thereby providing a metallic sheath for said particles;
thereafter isostatically compressing said substrate, together with said metal powder sheath and said discrete particles to produce a molded body; and



sintering said molded body after it has been produced by isostatic compression.

4,032,336
SINTERED LIQUID PHASE STAINLESS STEEL
Orville Reen, Lower Burrell, Pa., assignor to Allegheny Ludlum Industries, Inc., Pittsburgh, Pa.
Division of Ser. No. 542,986, Jan. 22, 1975, Pat. No. 3,980,444. This application June 25, 1976, Ser. No. 699,826
Int. Cl.² B22F *1/00*
U.S. Cl. 75—224 6 Claims

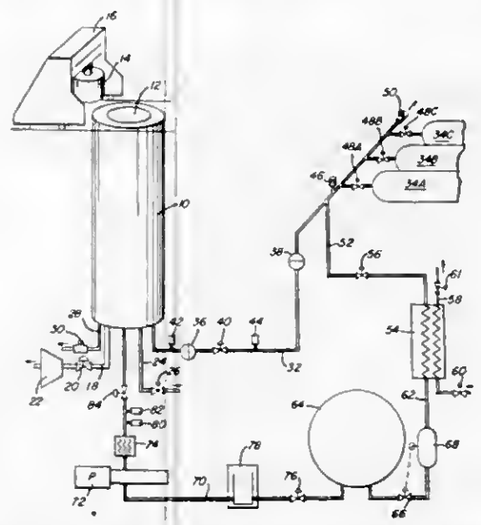


1. A method of making sintered stainless steel having an overall density of at least 98% of full density and a morphology comprised of regions of sintered austenitic stainless steel and regions of solidified liquid phase, which comprises the steps of: subjecting pre-alloyed stainless steel powder consisting essentially of, by weight, up to 0.05% carbon, 22 to 26% chromium, 10 to 24% nickel, 2.7 to 5% molybdenum, 0.1 to 1% boron, up to 2.0% manganese, up to 2.0% silicon, balance iron and residuals, to at least one pressing; and sintering said pressed compact in a substantially non-oxidizing atmosphere at a temperature of from 2250° to 2375° F.

4,032,337
METHOD AND APPARATUS FOR PRESSURIZING HOT-ISOSTATIC PRESSURE VESSELS
Charles B. Boyer, Mount Lebanon, Pa., assignor to Crucible Inc., Pittsburgh, Pa.
Filed July 27, 1976, Ser. No. 709,062
Int. Cl.² B22F *3/00*
U.S. Cl. 75—226 14 Claims

1. In a method for hot-isostatic compacting wherein a gas-pressure vessel is heated and pressurized to levels sufficient for said compacting including the steps of pressurizing said autoclave by the introduction thereto of argon gas to achieve said compacting and exhausting said argon gas from said vessel after compacting, the improvement comprising collecting and storing at least a portion of said argon gas exhausted from said vessel, cooling a portion of said collected and stored argon gas to liquefy said gas to produce liquid argon, pumping said liquid argon to increase the pressure level thereof, and vaporizing said pumped liquid argon to produce argon gas at a further increased pressure level sufficient for said introduction to said vessel to achieve said hot-isostatic compacting.

9. In a method for hot-isostatic compacting wherein a gas-pressure vessel is heated and pressurized to levels sufficient for said compacting including the steps of pressurizing said autoclave by the introduction thereto of argon gas to achieve said compacting and exhausting said gas from said vessel after compacting, the improvement comprising collecting and storing at least a portion of said argon gas exhausted from said vessel, cooling a portion of said collected and stored argon gas by heat exchange with liquid nitrogen to liquefy said argon gas to produce liquid argon, storing said liquid argon, pumping said liquid argon to increase the pressure level thereof, vaporizing a portion of said pumped liquid argon to produce argon gas at a further increased pressure level sufficient for said



introduction to said vessel to achieve said hot-isostatic compacting.

10. In a gas pressure apparatus for hot-isostatic compacting including a high-pressure working chamber adapted to support therein a workpiece for hot-isostatic compacting, means for selectively opening and sealing said chamber for loading and removal of said workpiece, means for heating a workpiece within said chamber, means for introducing argon gas to said chamber and means for exhausting argon gas from said chamber, the improvement comprising means for collecting and storing argon gas exhausted from said working chamber, means for cooling and thereby liquefying argon gas from said collecting and storing means to produce liquid argon, means for increasing the pressure of said liquid argon, means for vaporizing said liquid argon to produce argon gas at a pressure sufficient for hot isostatic compacting of a workpiece within said chamber upon introduction of said gas thereto.

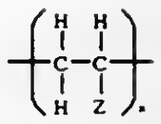
4,032,338
HOLOGRAPHIC RECORDING MEDIUM EMPLOYING A PHOTOCONDUCTIVE LAYER AND A LOW MOLECULAR WEIGHT MICROCRYSTALLINE POLYMERIC LAYER
Robert Allen Gange, Belle Mead, N.J., assignor to RCA Corporation, New York, N.Y.
Continuation of Ser. No. 515,434, Oct. 16, 1974, abandoned, which is a continuation of Ser. No. 309,754, Nov. 27, 1972, abandoned. This application Oct. 8, 1975, Ser. No. 620,749
Int. Cl.² G03G *5/022, 16/00*
U.S. Cl. 96—1.5 3 Claims

1. In a medium for recording and erasing phase holograms in the form of a surface relief pattern consisting essentially of in sequence an electrically conductive substrate, a photoconductive insulating layer and an electrically alterable storage layer, the improvement which comprises employing as the electrically alterable layer a layer consisting essentially of a

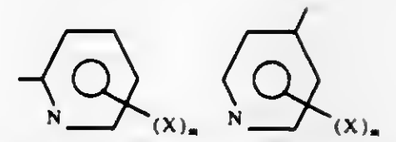
linear, microcrystalline hydrocarbon polymer having a molecular weight in the range from about 300 to about 2000.

4,032,339
PHOTOSENSITIVE COMPOSITION CONTAINING VANADYL PHTHALOCYANINE FOR PHOTOELECTROPHORETIC IMAGING SYSTEMS
Bernard Grushkin, Pittsford; Edward Forest, Rochester, and Leonard M. Carreira, Penfield, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.
Filed May 24, 1976, Ser. No. 689,713
Int. Cl.² G03G *5/06*
U.S. Cl. 96—1.5 6 Claims

1. A composition comprising an insulating carrier liquid having dispersed therein from about 0.1 to about 10 weight percent photoelectrically active vanadyl phthalocyanine pigment and, based upon vanadyl phthalocyanine pigment concentration, about 1 to about 20 weight percent polymer comprising structural units of the formula



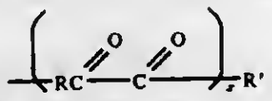
wherein Z is a pendant group of the formula



X is a substituent substantially incapable of withdrawing electrons from the electron rich pyridinyl moiety;
m is a whole number from 0 to 3; and
n is a whole number in excess of 25.
at least some of the polymer present in the composition being intimately associated with at least some of the phthalocyanine pigment present in the composition.

4,032,340
METHOD OF IMPROVING THE SENSITIVITY OF ORGANIC VOLUME PHASE HOLOGRAPHIC RECORDING MEDIA
Allen Bloom, East Windsor; Robert Alfred Bartolini, Trenton, and Herbert Alfred Weaklem, Pennington, all of N.J., assignors to RCA Corporation, New York, N.Y.
Filed Apr. 10, 1975, Ser. No. 566,705
Int. Cl.² G03C *5/04, 1/58*
U.S. Cl. 96—27 H 4 Claims

1. A method of increasing the sensitivity of an organic volume phase holographic recording medium comprising a cured, transparent acrylic polyester polymer containing a soluble α-diketone which is capable of hydrogen atom abstraction with the polyester polymer and has the formula



wherein R and R' independently are selected from the group consisting of methyl, branched-chain alkyl and cyclic hydrocarbon groups wherein the carbon atoms are part of an aromatic or aliphatic ring, and R and R' together can form part of an aromatic or aliphatic ring and *x* is an integer of 1 or 2, said α-diketone being present in an amount sufficient to cause a permanent change in the index of refraction of the medium when illuminated by a spatially modulated coherent light beam having a wavelength corresponding to the absorption band wavelength tail of the α-diketone which comprises:

heating the recording medium to an elevated temperature from about 40° C. upwards during or following the recording to increase the sensitivity.

4,032,341

PATTERN EXPOSURE USING A POLYCHROMATIC LIGHT SOURCE

Katsumi Momose, 555, Nagata-cho, Minami, Yokohama, Kanagawa, and Kazuhisa Okntsu, 2441, Totsuka-cho, Yokohama, Kanagawa, both of Japan

Continuation of Ser. No. 429,904, Jan. 2, 1974, abandoned. This application Nov. 6, 1975, Ser. No. 629,561

Claims priority, application Japan, Jan. 16, 1973, 48-7207

Int. Cl.² G03C *5/04*, *5/00*

U.S. Cl. 96—27 E **7 Claims**

1. An exposure method for exposing a pattern onto a layer of photosensitive material formed on a substrate having a reflective surface, comprising the steps of:

providing an illuminating light source means projecting light having beam components of different wavelength;

placing said photosensitive material layer in a position for receiving an exposure pattern while said layer is spaced from said substrate by an intermediate layer of a light-transmitting material having substantially the same index of refraction as said photosensitive layer and having a thickness of the order of magnitude of the wavelength of the light projected by said light source, and

projecting a beam from said light source through a pattern mask to produce an exposure pattern upon said photosensitive material,

whereby said photosensitive material is disposed in a smoothed-out region of the standing wave pattern produced by light respectively incident on and reflected from said reflective surface of said substrate and is pattern-exposed with a substantially uniform sensitizing energy.

4,032,342

METHOD OF MANUFACTURING A CATHODE RAY TUBE FOR DISPLAYING COLORED PICTURES AND CATHODE RAY TUBE MANUFACTURED ACCORDING TO SAID METHOD

Francis Bernardus Strik, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 24, 1976, Ser. No. 717,195

Claims priority, application Netherlands, Sept. 1, 1975, 7510272

Int. Cl.² G03C *5/00*

U.S. Cl. 96—36.1 **2 Claims**

1. A method of manufacturing a cathode ray tube for displaying coloured pictures and comprising a display screen having a large number of triplets each consisting of three linear areas luminescing in a first, a second and a third colour, respectively, said second colour being present between the first and the third colour, means to generate three electron beams, and a colour selection electrode comprising a large number of substantially parallel slots for assigning each electron beam to luminescent areas of one colour, in which method for providing the luminescent regions of each colour a photosensitive layer is exposed through the colour selection electrode from at least two positions present one on each side of an exposure centre for said colour in such manner that the light beams which pass through two adjacent slots overlap each other on the photosensitive layer and an unexposed area where the luminescent areas of the said colour are provided is formed on the photosensitive layer between the light beams which pass through the same slot, characterized in that during the exposure for providing the luminescent areas of the third colour at the edge of the display screen the photosensitive layer is also exposed from substantially the exposure centre for the first colour and that during the exposure for providing the luminescent areas of the first colour at the edge of the display screen, the photosensitive layer is also exposed from substantially the exposure centre for the third colour.

4,032,343

METHOD FOR PRODUCTION OF ROTATIONALLY SYMMETRIC NON-SPHERICAL OPTICAL ELEMENTS

Reinhold Deml, Munich; Ulrich Greis, Weyarn, and Wilhelm Kapfhammer, Munich, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Feb. 13, 1974, Ser. No. 442,140

Claims priority, application Germany, Mar. 14, 1973, 2307158

Int. Cl.² G03C *5/00*

U.S. Cl. 96—38.3 **7 Claims**

1. A method of producing a rotationally symmetric non-spherical optical element, comprising the steps of rotating a planar, light-sensitive medium in its plane about an axis which extends normal to said plane; providing a source of coherent light; disposing intermediate said source and a major surface of said medium a stationary opaque shield having an opening extending radially from said axis of rotation towards a periphery of said major surface; and directing at least two beams of light from said source towards said surface in such a manner that said beams intersect and form an interference pattern, portions of said pattern being intercepted by said shield and the remaining portion exposing said medium in form of a rotationally symmetric two-dimensional pattern.

4,032,344

POLYSULFONAMIDE VESICULAR BINDERS AND PROCESSES OF FORMING VESICULAR IMAGES

George L. Fletcher, Jr., Pittsford; Stewart H. Merrill, and Carl Kotlarchik, Jr., both of Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

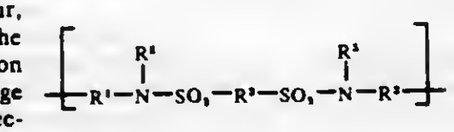
Continuation-in-part of Ser. No. 541,676, Jan. 16, 1975, abandoned. This application Dec. 29, 1975, Ser. No. 645,178

Int. Cl.² G03C *5/24*

U.S. Cl. 96—48 HD **19 Claims**

1. In an imaging element comprising: I) a support, and on the support an admixture of II) a waterinsoluble, thermoplastic, polymeric binder having a permeability constant for gas ranging from about 1×10^{-11} to about 1×10^{-12}, and III) a radiation-decomposable vesiculating agent capable of generating a gas upon imagewise exposure; the improvement wherein the binder is a sulfonamide polymer having in the backbone or pendant therefrom, the moiety $-SO_2-N<$, said polymer having a λmax no greater than about 350 nm in the spectral range of 200 to 750 nm, and at least one repeating unit selected from the group consisting of:

(a)



(b)

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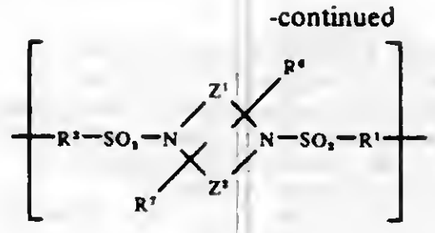
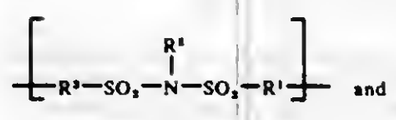
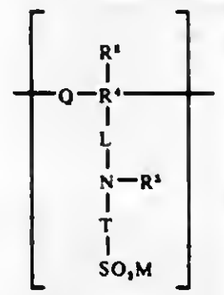


(c)



and

(d)



wherein:

A. R^1 is a member selected from the group consisting of:
1. a substituted or unsubstituted saturated carbocyclic ring containing from 5 to 10 carbon atoms, or a substituted or unsubstituted aromatic ring containing from 6 to 10 carbon atoms in the ring;
2. a substituted or unsubstituted alkylene radical containing from 1 to 10 carbon atoms;
3. an oxycarbonylphenylene radical; and
4. an imino radical;

B. R^3 is a saturated carbocyclic ring containing from 5 to 10 carbon atoms, or a substituted or unsubstituted aromatic ring containing from 6 to 10 carbon atoms;

C. R^2 is a member selected from the group consisting of:
1. an alkyleneoxycarbonylphenylene radical wherein the number of carbon atoms in the alkylene function is from 1 to 5;
2. a carbonylimino radical;
3. in formula (a) only, a nitrogen-carbon bond when R^1 is other than an oxycarbonylphenylene or an imino radical; and
4. an α-iminocarbonyl -carbonylalkylene radical when R^1 is an imino radical and R^1 and R^3 are each connected to a nitrogen atom;

D. Z^1 and Z^2 are the same or different, and are each the atoms necessary to complete a heterocyclic group;

E. R^6 and R^7 are the same or different and can be a hydrogen atom or a methyl radical joined to one of the carbon atoms of Z^1 or Z^2;

F. R^4 is an alkylene radical containing from 1 to 5 carbon atoms or an isophthalate or terephthalate radical;

G. R^5 is methyl or a hydrogen atom;

H. L is a member selected from the group consisting of a carbon-nitrogen bond, a phenyl linked in the ortho or para positions, and carbonyl;

I. M is a member selected from the group consisting of $-NH_2$, an alkyl radical containing from 1 to 10 carbon atoms, and a methyl-substituted or unsubstituted aryl radical containing from 6 to 10 carbon atoms;

J. Q is an alkylene radical containing from 2 to 5 carbon atoms when R^4 is isophthalate or terephthalate and otherwise is a chemical bond; and

K. T is either 1) a substituted or unsubstituted saturated carbocyclic ring containing from 5 to 10 carbon atoms, or substituted or unsubstituted aromatic ring containing from 6 to 10 carbon atoms in the ring, (2) a substituted or unsubstituted alkylene radical containing from 1 to 10 carbon atoms, or 3) a nitrogen-to-sulfur bond when M is other than $-NH_2$;

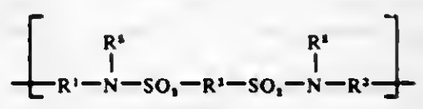
L. the substituents of said substituted aromatic ring of (A) 1), (B), and (K) being selected from the group consisting of:
1. an alkyl radical containing from 1 to 4 carbon atoms;
2. a halogen atom;
3. a phenyl radical;
4. an acyl radical or an alkoxy radical the alkyl portion of which has from 1 to 4 carbon atoms; and
5. an alkylthio radical; and

M. the substituents of said substituted alkylene radical of (A) 2) and (K) being selected from the group consisting of:
1. an alkyl radical containing from 1 to 4 carbon atoms, and
2. a phenyl radical.

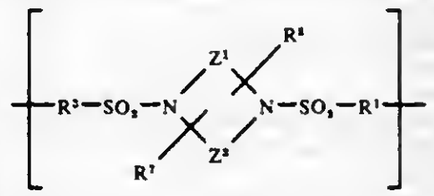
16. A dry process for forming a photographic image, comprising the steps of:

a. imagewise-exposing a radiation-sensitive photographic element containing, on a support, an admixture of a decomposable radiation-sensitive vesiculating agent capable of generating a gas upon exposure to activating radiation, and a polymeric binder having as a repeating unit one which includes the linkage $>N-SO_2-$ as a portion of the backbone of the polymer or as a pendant moiety and is selected from the group consisting of

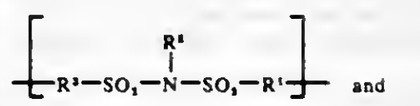
(a)



(b)

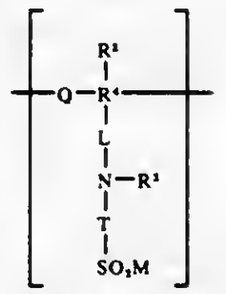


(c)



and

(d)



wherein

A. R^1 is a member selected from the group consisting of:
1. a substituted or unsubstituted saturated carbocyclic ring containing from 5 to 10 carbon atoms, or a substituted or unsubstituted aromatic ring containing from 6 to 10 carbon atoms in the ring;
2. a substituted or unsubstituted alkylene radical containing from 1 to 10 carbon atoms;
2. an oxycarbonylphenylene radical; and
4. an imino radical;

B. R^3 is a saturated carbocyclic ring containing from 5 to 10 carbon atoms, or a substituted or unsubstituted aromatic ring containing from 6 to 10 carbon atoms;

C. R^2 is a member selected from the group consisting of:
1. an alkyleneoxycarbonylphenylene radical wherein the number of carbon atoms in the alkylene function is from 1 to 5;
2. a carbonylimino radical;
3. in formula (a) only, a nitrogen-carbon bond when R^1 is

other than an oxycarbonylphenylene or an imino radical; and

4. an α-iminocarbonyl-ω-carbonylalkylene radical when R^1 is an imino radical and R^1 and R^2 are each connected to a nitrogen atom;

D. Z^1 and Z^2 are the same or different, and are each the atoms necessary to complete a heterocyclic group;

E. R^6 and R^7 are the same or different and can be a hydrogen atom or a methyl radical joined to one of the carbon atoms of Z^1 or Z^2;

F. R^4 is an alkylene radical containing from 1 to 5 carbon atoms or an isophthalate or terephthalate radical;

G. R^5 is methyl or a hydrogen atom;

H. L is a member selected from the group consisting of a carbon-nitrogen bond, a phenyl linked to the unit in the ortho positions, and carbonyl;

I. M is a member selected from the group consisting of $-NH_2$, an alkyl radical containing from 1 to 10 carbon atoms, and a methyl-substituted or unsubstituted aryl radical containing from 6 to 10 carbon atoms;

J. Q is an alkylene radical containing from 2 to 5 carbon atoms when R^4 is isophthalate or terephthalate and otherwise is a chemical bond; and

K. T is a substituted for unsubstituted saturated carbocyclic ring containing from 5 to 10 carbon atoms, or a substituted or unsubstituted aromatic ring containing from 6–10 carbon atoms in the ring; a substituted or unsubstituted alkylene radical containing from 1 to 10 carbon atoms, or a nitrogen-to-sulfur bond when M is other than $-NH_2$;

L. the substituents of said substituted aromatic ring of (A) 1), (B), and (K) being selected from the group consisting of:

1. an alkyl radical containing from 1 to 4 carbon atoms;
2. a halogen atom;
3. a phenyl radical;
4. an acyl radical or an alkoxy radical the alkyl portion of which has from 1 to 4 carbon atoms; and
5. an alkylthio radical; and

M. the substituents of said alkylene radical of (A) 2) and (K) being selected from the group consisting of:

1. an alkyl radical containing from 1 to 4 carbon atoms; and
2. a phenyl radical; and

b. developing the exposed element by heating it to a temperature and for a time sufficient to force the gas bubbles formed by the photodecomposition of the agent to expand to form a visible image.

4,032,345

SILVER HALIDE MATERIALS CONTAINING PHOTOGRAPHIC COLOR COUPLERS WITH ISOTHIOCYANATO GROUPS

Kozo Inouye; Yukio Yokota; Akio Okumura; Seiiti Kubodera, and Keisuke Shiba, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Aug. 1, 1975, Ser. No. 601,567

Claims priority, application Japan, Aug. 2, 1974, 49-88677

Int. Cl.² G03C 7/00, 1/40

U.S. Cl. 96—55 **12 Claims**

10. A method of forming a color photographic image comprising developing an exposed silver halide photographic material with a developer containing an aromatic primary amine developing agent in the presence of a color coupler of the formula (I)

$$A-N=C=S \qquad (I)$$

wherein A represents an image forming coupler residue containing a naphthol nucleus, a phenol nucleus, a 5-pyrazolone nucleus, or a pyrazolobenzimidazole nucleus and the -N=C=S group is bonded to the coupling position of the nucleus.

4,032,346

SILVER HALIDE EMULSION CONTAINING TWO-EQUIVALENT MAGENTA COUPLER

Nobuo Furutachi; Kotaro Nakamura; Minoru Yamada, and Atsuaki Arai, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed July 31, 1975, Ser. No. 600,655

Claims priority, application Japan, Aug. 1, 1974, 49-88417

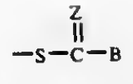
Int. Cl.² G03C 7/00, 1/40

U.S. Cl. 96—56.5 **14 Claims**

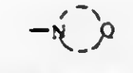
1. A photographic silver halide emulsion containing a two-equivalent magenta coupler, said coupler being capable of forming a magenta color image upon coupling reaction with an oxidation product of an aromatic primary amine developing agent, represented by the following general formula (I)

(I)

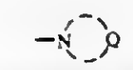
wherein (A) represents a residue of a 5-oxo-2-pyrazoline magenta color forming coupler or a residue of a pyrazolo-[1,5-a]-benzimidazole magenta color forming coupler;



represents a group which is substituted for one hydrogen atom of the active methylene group in the coupler A; Z represents an oxygen atom or a sulfur atom; B represents a — Y group, a — D — Y group or a



group; D represents an oxygen atom or an — NR — group; R represents a hydrogen atom, an alkyl group or an aryl group; Y represents an alkyl group, an aryl group or a heterocyclic group; and Q in the



group represents the non-metallic atoms necessary to form a 5-membered or 6-membered nitrogen-containing heterocyclic ring, such atoms consisting of at least one carbon atom and of one or more nitrogen, oxygen or sulphur atoms.

4,032,347

2-EQUIVALENT ACYLACETAMIDE YELLOW FORMING COUPLERS WITH 2,6-DIOXO-7-PURINYL COUPLING OFF GROUP

Raphael Karel Van Poucke, Berchem; Marc Willem Ailliet, Kontich; Leo August Van Wijnsberghe, 's-Gravenwezel, and Gaston Jacob Benoy, Edegem, all of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

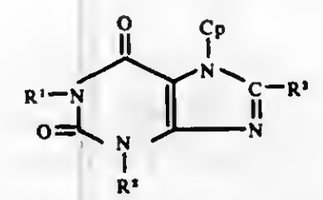
Filed Nov. 25, 1975, Ser. No. 635,064

Claims priority, application United Kingdom, Jan. 3, 1975, 314/75

Int. Cl.² G03C 7/00, 1/40

U.S. Cl. 96—56.5 **15 Claims**

13. Method of producing coloured photographic images in a photographic light-sensitive silver halide material which comprises exposing the material and developing it with an aromatic primary amino colour developing agent in the presence of a 2-equivalent yellow forming ketomethylene colour coupler wherein the colour coupler carries at the active methylene group a 2,6-dioxo-7-purinyl group in its oxo- or enol form and has the formula:



wherein:

Cp represents a yellow forming open-chain acylacetamide coupler residue linked through the active methylene group,

each of R^1 and R^2, which may be the same or different, represents hydrogen, an alkyl group, or an aryl group, and

R^2 represents hydrogen, an alkyl group, an aryl group, a hydroxy group, an alkoxy group, an amino group, a mercapto group, an alkylthio group, a carboxy group, an alkoxycarbonyl group or a carbamoyl group.

4,032,348

METHOD FOR FORMING PHASE HOLOGRAMS

Keishiro Kido; Masayoshi Tsubol, and Noboru Arai, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

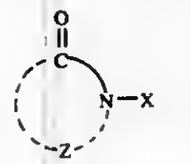
Filed Oct. 30, 1975, Ser. No. 627,316

Claims priority, application Japan, Oct. 30, 1974, 49-125036

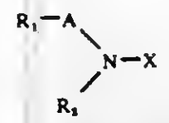
Int. Cl.² G03C 5/32, 5/04

U.S. Cl. 96—60 R **11 Claims**

1. A method for producing a phase hologram by bleaching a silver image of an amplitude hologram formed on a light sensitive silver halide photographic material, wherein said amplitude hologram is produced by exposing a light sensitive silver halide photographic material to reference and object beams of electromagnetic radiation to which the silver halide photographic is sensitive, developing the exposed material and fixing the developed material and wherein said bleaching is conducted using a bleaching solution containing one or more N-halogeno compounds represented by the following general formulae (I) and (II)



(I)



(II)

wherein X represents a halogen atom, SCN or CN; Z represents the atoms necessary for forming a five- or six-membered ring which may be condensed with another ring; A represents a carbonyl or sulfonyl group; and R_1 and R_2 represent an alkyl group, aryl group or alkoxyl group.

4,032,349

HIGH MOLECULAR WEIGHT MERCAPTO COMPOUND IN COLOR DIFFUSION TRANSFER PROCESSING COMPOSITION

Seiki Sakanoue; Motohiko Tsubota; Yoshiharu Fuseya; Keiichi Adachi, and Tadao Shishido, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed June 25, 1975, Ser. No. 590,523

Claims priority, application Japan, June 26, 1974, 49-72995

Int. Cl.² G03C 1/40, 7/00, 5/54

U.S. Cl. 96—77 **12 Claims**

1. A color diffusion transfer photographic material which comprises: (a) a light-sensitive element containing at least one silver halide emulsion layer having a dye image-providing material associated therewith; (b) an image-receiving element capable of imagewise fixing said dye image-providing material as a result of exposure and development of the silver halide emulsion layer; and (c) a processing composition capable of causing development of said silver halide emulsion layer and containing a mercapto compound having a molecular weight of about 230 or higher, said mercapto compound being a compound represented by the following general formula (I) or (II):

$$R^1-SH \qquad (I)$$

$$R^2-SH \qquad (II)$$

wherein R^1 represents an alkyl group having 14 to 32 carbon atoms or an aralkyl group having 15 to 32 carbon atoms, which can be substituted with a halogen atom, a nitro group, a carboxy group, a sulfo group, a cyano group, an alkoxy group, or an aryloxy group; R^2 represents a 3 - to 6 - membered carbocyclic group, a 3 - to 6-membered heterocyclic group containing at least one carbon atom and 1 to 5 atoms other than carbon atoms, or a B-A-group, and said carbocyclic group or hetero cyclic group can form a fused ring group and can be substituted with a halogen atom, a nitro group, a carboxy group, an aliphatic hydrocarbyl group having 1 to 32 carbon atoms, a monocyclic or bicyclic fused aryl group having 6 to 32 carbon atoms, an amido group having up to 32 carbon atoms, a carbamoyl group having up to 32 carbon atoms, an alkoxy group having up to 32 carbon atoms, or an aryloxy group having up to 32 carbon atoms; and, B represents the same alkyl group, aryl group, or heterocyclic group as defined with respect to R^1 to R^2; and A represents a carbonyl group, a thiocarbonyl group, or a carboxymethylene group, with the proviso that when A represents a carbonyl group or a thiocarbonyl group, B does not represent an amido group, a carbamoyl group or a carbonyl group with at least one of said light-sensitive element, said image-receiving element and said processing composition containing a developing agent for the silver halide which is a benzenoid developing agent capable of forming a quinoid structure upon being oxidized.

4,032,350

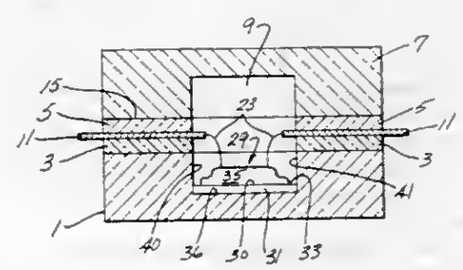
PRINTING PASTE VEHICLE, GOLD DISPENSING PASTE AND METHOD OF USING THE PASTE IN THE MANUFACTURE OF MICROELECTRONIC CIRCUITRY COMPONENTS

Bernard Greenstein, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 340,200, March 12, 1973, abandoned. This application June 12, 1975, Ser. No. 586,786

Int. Cl.² C09D 5/24

U.S. Cl. 106—1 **24 Claims**



1. In an improved gold dispensing paste composition comprising a vehicle, and a solids component including gold, the improvement wherein said paste composition comprises:

A. about 75–25% by weight of said vehicle and said vehicle comprises in weight percent about ;

1. 83–94% of an organic solvent consisting essentially of an admixture of diethylene glycol monobutyl ether

acetate and polypropylene glycol having an average molecular weight of about 400 present together in said admixture,

2. 2–3% of an organic binding agent consisting essentially of N-4 to N-200 ethyl cellulose or mixtures thereof, and
3. 6–9% of an organic thixotrope consisting essentially of hydrogenated castor oil; and

B. about 25–75% by weight of said solid component uniformly dispersed in suspension in said vehicle and said solids component possesses a specific gravity greater than the specific gravity of said fluid vehicle at temperatures in the temperature range of 40°–60°C. comprises in weight percent about;

1. 2–6% of a particulate glass binder selected from the glass composition group consisting essentially of lead-zinc borate and lead borosilicate glass compositions, and
2. 98–94% of a gold powder; and wherein said paste composition possesses a fineness of less than 20 microns and a viscosity of about 1,300,000–1,700,000 cps at about 25° C.

22. A solid particle dispensing paste composition possessing a viscosity of about 1,300,000–1,700,000 cps at about 25° C. and including:

A. about 25–75% by weight of a vehicle comprising:

1. about 83–94% by weight of an organic solvent consisting essentially of an admixture of diethyelene glycol monobutyl ether acetate and polypropylene glycol having an average molecular weight of about 400 present together in said admixture,
2. about 2–3% by weight of an organic binding agent consisting essentially of N-4 to N-200 ethylcellulose or mixtures thereof, and
3. about 6–9% by weight of an organic thixotrope consisting essentially of hydrogenated castor oil; and

B. about 25–75% by weight of solid particles possessing a specific gravity greater than the specific gravity of said vehicle at temperatures in the temperature range of 40°–60° C. and consisting essentially of:

1. powdered glass binder selected from the glass composition group consisting essentially of lead-zinc borate and lead borosilicate glass compositions, and
2. powdered noble metal.

4,032,351

RARE EARTH CERAMIC FOR FREQUENCY CONVERSION OF RADIATION

Francois F. Auzel, 39 Avenue Port Royal des Champs, 78320 Le Mesnil St. Denis, France; Denise M. Morin, 44, rue de Goubmiers, 94130 Nogent-Sur-Marne, France, and Dario C. Pecile, 17, Boulevard Andre, 93250 Villemomble, France

Continuation-in-part of Ser. No. 491,485, July 24, 1974, abandoned. This application Jan. 19, 1976, Ser. No. 649,966

Int. Cl.² C03C 3/22; C09K 11/08

U.S. Cl. 106—39.6 6 Claims

1. A rare earth ceramic having a microcrystal phase buried in a glassy phase for the conversion of radiation in the near-infrared band from about 0.85 to 1.06 μm into visible light, comprising a mixture of lead fluoride PbF_2, ytterbium oxide Yb_2O_3, at least one glass-forming oxide of an element selected from the group consisting of B_2O_3, SiO_2, P_2O_5, GeO_2, TeO_2 and at least one compound of a rare earth doping element chosen as a function of the desired emission colour, selected from the group consisting of

a compound containing thulium ions Tm^{3+} for a blue emission mixture;

a compound containing erbium ions Er^{3+} for a green emission mixture;

a compound containing holmium ions Ho^{3+} for a green emission mixture;

a compound containing erbium ions Er^{3+} for a red emission mixture,

whereby the oxygen ions from the oxides are exclusively located in the glassy phase while ytterbium and the rare earth doping element are exclusively located in the microcrystal phase.

4,032,352

BINDER COMPOSITION

Wolfgang B. Pietsch, Charlotte, N.C., assignor to Midrex Corporation, Charlotte, N.C.

Filed May 3, 1976, Ser. No. 682,418

Int. Cl.² C09J 1/02

U.S. Cl. 106—78 12 Claims

1. A binder composition for mineral ores and metallized particulate material consisting essentially of

from about 2 to about 40 percent pitch,

from about 15 to about 35 percent of the group consisting of hydrated lime, moist mill scale, and mixtures thereof,

from about 15 to about 30 percent liquid sodium silicate; and up to 50 percent water

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4,032,353

LOW POROSITY AGGREGATE-CONTAINING CEMENT COMPOSITION AND PROCESS FOR PRODUCING SAME

Frank J. Ball, Charleston; David V. Braddon, Charleston Heights, and Lynden J. Stryker, Mount Pleasant, all of S.C., assignors to Westvaco Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 569,986, April 2, 1975, Pat. No. 3,960,582. This application May 24, 1976, Ser. No. 689,513

The portion of the term of this patent subsequent to June 1, 1993, has been disclaimed.

Int. Cl.² C04B 7/35

U.S. Cl. 106—90 20 Claims

1. A low porosity, aggregate-containing cement composition comprising;

a. a hydraulic cement having a fineness above about 2,000 $cm.^2/gm.$ without gypsum,

b. alkali bicarbonate in an amount at least 0.1% by weight based on dry ground cement,

c. a lignin selected from the group consisting of alkali metal lignosulfonate, alkaline earth metal lignosulfonate, ammonium lignosulfonate, alkali metal salt of sulfonated lignin, alkaline earth metal salt of sulfonated lignin and ammonium salt of sulfonated lignin in an amount of at least 1.0% by weight based on dry ground cement, and

d. said aggregate-containing cement composition having been made at a water-to-cement ratio between 0.4 and 0.15.

4,032,354

SURFACE-COATING COMPOSITIONS CONTAINING CALCIUM SALT LOSS-OF-DRY INHIBITORS AND A METHOD OF PREPARING SAME

Irene A. E. Fraser, Toronto, Canada, assignor to Tenneco Chemicals, Inc., Saddle Brook, N.J.

Filed Oct. 20, 1975, Ser. No. 623,881

Claims priority, application Canada, Nov. 25, 1974, 214559

Int. Cl.² C09D 3/26

U.S. Cl. 106—260 23 Claims

1. A surface-coating composition that comprises an oxidizable, organic, film-forming resinous vehicle and from 0.5% to 5.0%, based on the weight of the vehicle, of a loss-of-dry inhibitor, said loss-of-dry inhibitor being a suspension of finely-divided calcium hydroxide in a solution containing at least one calcium salt of a monocarboxylic acid selected from the group consisting of salts of branched-chain aliphatic monocarboxylic acids having 6 to 14 carbon atoms, salts of cycloaliphatic monocarboxylic acids having 6 to 10 carbon atoms, and mixtures thereof in an inert, non-polar organic solvent, said loss-of-dry inhibitor containing from 5% to 25% by weight of finely-divided calcium hydroxide and having a total calcium content of 5% to 20% by weight.

4,032,355

BITUMINOUS COMPOSITION

Alexander McLaughlin, Meriden, Conn., and Adnan A. R. Sayigh, North Haven, Conn. (by Anne B. Sayigh, conservatrix), assignors to The Upjohn Company, Kalamazoo, Mich.

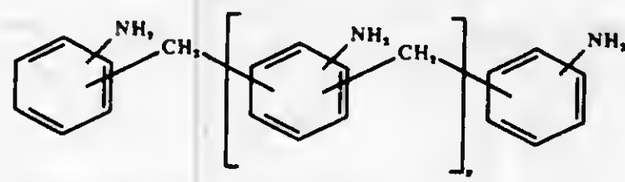
Filed Nov. 14, 1975, Ser. No. 631,823

Int. Cl.² C08L 95/00

U.S. Cl. 106—273 N 7 Claims

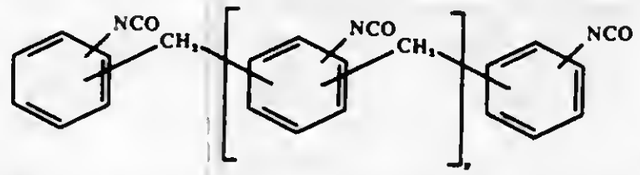
1. A bituminous composition having an elevated softening point said composition consisting essentially of the product obtained by treating bitumen, in the molten state at a temperature of from about 100° C to about 200° C and in the absence of solvent, with a combination of:

a. an amine selected from the class consisting of aliphatic monoamines having from 10 to 20 carbon atoms, inclusive, and aromatic polyamines selected from the class consisting of arylene diamines having 6 to 12 carbon atoms in the arylene radical and polyamines having the structure



wherein Y is 0 or a number having an average value from 0 to 1; and

b. an isocyanate selected from the class consisting of aliphatic monoisocyanates having from 10 to 20 carbon atoms, and aromatic polyisocyanates selected from the class consisting of arylene diisocyanates having 6 to 12 carbon atoms in the arylene radical and polyisocyanates having the structure



wherein Y is 0 or a number having an average value from 0 to 1 provided that, in any instance in which the amine component (a) is aliphatic the isocyanate component (b) is aromatic; and provided further that amine component (a) is employed in an amount within the range of 0.25 to 3.0 equivalents per equivalent of the isocyanate component (b) and the total weight of amine component (a) plus isocyanate component (b) is from about 1 to about 10 weight percent of said bitumen.

4,032,356

COMPOSITION FOR PREVENTING ADHESION OF DAMP EARTH ON METAL SURFACES

Ruscho Panayotov Hadjiiliev; Maria Ivanova Todorova, both of Stara Zagora; Tzvetan Obretenov Georgiev, Sofia; Kubrat Vassilev Naydenov, Stara Zagora; Dinko Mihaylov Jechev, Village Konyovo, beside Sliven; Yanka Bogdanova Staneva, and Irina Valcheva Hadjiiliева, both of Stara Zagora, all of Bulgaria, assignors to Mnipki "Mtaprojekt", Sofia, Bulgaria

Filed Nov. 24, 1975, Ser. No. 634,538

Int. Cl.² C07G 17/00; C09K 3/00

U.S. Cl. 106—287 R 3 Claims

1. A new composition of matter for preventing the adhesion of ore-containing earth on metal surfaces of ore transport carriages for mining applications, consisting of 80–85% by weight of at least one resinous oleous liquid having a boiling point in the range of 140°–160° C, a freezing point of about −20° C, and a specific weight of 0.95–1.00, the liquid being formed as a by-product of the generation of cyclohexanon from phenol during the manufacture of caprolactam, and the remainder by weight of a substance selected from the group consisting of at least one heavy xylene fraction and at least one condensed, highly aromatic oil produced as a by-product of oil refining.

4,032,357

EASY DISPERSING ALKALI BLUE POWDER AND PROCESS FOR MANUFACTURE

Thomas C. Rees, Park Forest South, and Robert J. Flores, Alsip, both of Ill., assignors to The Sherwin-Williams Company, Cleveland, Ohio

Filed Mar. 3, 1976, Ser. No. 663,600

Int. Cl.² C08K 5/17

U.S. Cl. 106—288 Q 17 Claims

1. A substantially anhydrous, free-flowing alkali blue pigmentary composition, the pigmentary particles thereof coprecipitated with at least one aqueous alkaline soluble organic dispersant of the anionic class, said coprecipitated dispersant containing at least eight carbon atoms and insoluble in water, said coprecipitated pigmentary particles and dispersant combination further admixed with a water-insoluble organic hydrophobic oil phase of a quantity sufficient to substantially reduce hydrophilic aggregation of said coprecipitate during drying by water removal.

4,032,358

PRODUCING GLASS FIBER CONTAINING EPOXY RESIN ADHESIVE FILMS

Amir Hussain, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sept. 22, 1976, Ser. No. 725,538

Claims priority, application Germany, Oct. 8, 1975, 2545149

Int. Cl.² C08K 5/07

U.S. Cl. 106—311 4 Claims

1. In an improved method for the production of glass fiber epoxy resin adhesive films, the step of dissolving the hardener dicyandiamide in a solvent comprised of diacetone alcohol and water.

4,032,359

REMOVAL OF ALUMINIUM RICH COATINGS FROM HEAT RESISTING ALLOYS

Maurice Fisher; Michael Kruger, and Terence Walter Maber, all of Bristol, England, assignors to Rolls-Royce (1971) Limited, Great Britain

Filed Aug. 4, 1975, Ser. No. 601,930

Claims priority, application United Kingdom, Aug. 8, 1974, 34760/74

Int. Cl.² C23F 1/00; C23G 1/02

U.S. Cl. 134—3 5 Claims

1. A method of removing an aluminide coating from a component made of a material based on an element selected from the group consisting of nickel and cobalt, comprising the step of

immersing said component in a solution consisting essentially of, by volume:

Nitric Acid	50–70% (Sp. Gr. 1.42)
Sulfuric Acid	25–50% (Sp. Gr. 1.84)
Water	Remainder (if any).

5. The method of claim 1 comprising the further step of removing said component from said solution after a predetermined time, and

immersing said component in a further solution consisting essentially of, by volume:

Ferric Chloride Solution	75–90% (Sp. Gr. 1.3)
Sulfuric Acid	5–20% (Sp. Gr. 1.84)
Hydrofluoric Acid	3–7% (60% w/w).

4,032,360

METHOD OF REMOVING IRON SULFIDE AND SLUDGE FROM METAL SURFACES

Thomas L. Sharp, 715 Nenana St., Houston, Tex. 77035

Division of Ser. No. 508,674, Sept. 23, 1974, Pat. No. 4,003,856. This application Mar. 17, 1976, Ser. No. 667,626
Int. Cl.² B08B 3/08
U.S. Cl. 134—3 2 Claims

1. A method of removing iron sulfide and sludge from interior surfaces in an oil system which comprises adding to the effluent of the oil system for onstream treatment an effective iron sulfide and sludge removing amount of a composition comprising:

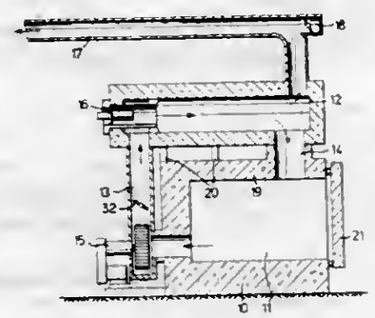
a. from about two to about fifteen percent by weight of a high molecular weight linear diamine derived from a higher fatty acid containing from 12 to 30 carbon atoms;
b. from about three to about twenty percent by weight of acetic acid;
c. from about 20 to about 50 percent by weight of a low molecular weight ketone ether solvent containing from four to eight carbon atoms;
d. from about 1 to about 15 percent by weight of an alcohol solvent selected from aliphatic alcohols containing up to six carbon atoms and diacetone alcohol; and
e. from about 20 to about 50 percent by weight of a heavy aromatic naphtha solvent having a specific gravity of 0.885 to 0.970 and a boiling point within the range of 160°–220° C.

4,032,361

METHOD AND APPARATUS FOR CONTROLLED SEPARATION OF SUBSTANCES BY HEATING

Hans Georg Eriksson; Karl Gösta Sjöberg, both of Finspang, and Karl Börje Löfgren, Vasteras, all of Sweden, assignors to Granges Essem Aktiebolag, Vasteras, Sweden

Filed Mar. 24, 1976, Ser. No. 670,171
Claims priority, application Sweden, Mar. 25, 1975, 7503476
Int. Cl.² B08B 5/00
U.S. Cl. 134—19 14 Claims



1. Method for controlled separation of substances by heating, including the steps of:

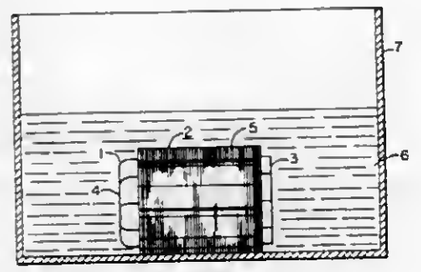
a. introducing a material from which one or more substances are to be separated into a closed oven chamber;
b. introducing into the oven chamber a gas which has been heated to a temperature sufficient to evaporate one or more of the substances to be separated, and containing insufficient oxygen to permit substantial burning in the oven chamber;
c. extracting the heated gas together with the evaporated substances from the oven chamber to create a depressed pressure in the oven chamber;
d. forcing the extracted gas to a combustion chamber;
a. burning the evaporated substance in the combustion chamber;
f. recirculating a portion of the gas passing through the combustion chamber to the oven chamber as the gas introduced in step (b) and back to the combustion chamber in accordance with step (d), for continuous heating; and
g. diverting a portion of the gas from the combustion chamber to the atmosphere.

4,032,362

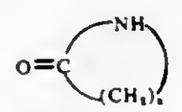
METHOD OF STRIPPING THERMOSET POLYMERS WITH MOLTEN LACTAMS

Leonard E. Edelman, Penn Hills, Pa., assignor to Westingbouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 23, 1975, Ser. No. 643,720
Int. Cl.² B08B 3/08
U.S. Cl. 134—38 9 Claims



1. A method of removing a thermoset polymer deposited on an article comprising immersing the article in a molten compound having the general formula



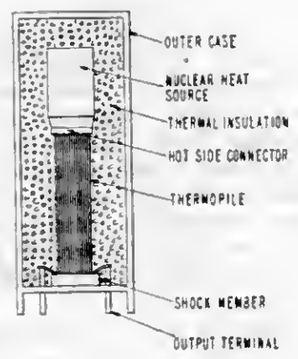
where n is an integer from 5 to 7.

4,032,363

LOW POWER HIGH VOLTAGE THERMOPILE

Valvo Raag, Mountain View, Calif., assignor to Syncal Corporation, Sunnyvale, Calif.

Filed Jan. 27, 1975, Ser. No. 544,363
Int. Cl.² H01V 1/30
U.S. Cl. 136—211 14 Claims



1. A method of manufacturing a thermopile using silicon-germanium alloys comprising the steps of sawing n- and p-type silicon-germanium alloy materials into parallelepipeds, cutting the n- and p-type silicon-germanium alloy parallelepipeds into slices, surface finishing both large faces of each slice so that both of the large faces of each slice are parallel to each other, cleaning the slices, coating at least one large face of each slice with a glass powder, the glass having a softening point above the intended operational temperature of the thermopile, a high resistivity, and a linear thermal expansion coefficient which approximately matches that of the silicon-germanium alloy, sintering each glass-coated slice at a temperature close to the softening temperature of the glass to locally bond the glass powder particles to each other and to the slice, stacking each glass-coated slice with another slice so that a glass layer occurs between the two silicon-germanium alloy slices to form a sandwich stack, heating each sandwich stack to a temperature at which the glass bonds the two slices together with an intermediate glass layer, surface finishing at least one of the outer, large faces of each heat-bonded sandwich stack down to the point that the total sandwich stack has a predetermined desired thickness, covering at least one face of each surface-finished sandwich stack with glass powder, stacking a plurality of the glass powder-covered individual sandwich stacks in a predetermined arrangement of conductivity types depending upon the type of thermopile desired to form a first seal assembly, heating this first seal assembly until the intermediate glass layers fuse and hold the silicon-germanium alloy layers together, slicing this fused structure perpendicularly to the laminations to produce a laminate structure, and interconnecting the ends of the laminated silicon-germanium elements of opposite conductivity types to form a thermopile having a predetermined voltage and power output.

14. A method of manufacturing a thermopile using silicon-germanium aloys comprising the steps of sawing n- and p-type silicon-germanium alloy material into parallelepipeds, cutting the n- and p-type silicon-germanium alloy parallelepipeds into slices, surface finishing both large faces of each slice so that both of the large faces of each slice are parallel to each other, cleaning the slices, coating one large face of each slice with an insulator, the insulator having a high resistivity, bonding the insulator to the slice, surface finishing the outer, uncoated large face of each bonded, insulator coated slice down to the point that the slice has a predetermined desired thickness, stacking a plurality of the insulator covered individual slices so that the slices are separated from one another by a layer of the insulator between them and in a predetermined arrangement of conductivity types depending upon the type of thermopile desired to form a first seal assembly, bonding this first seal assembly so that the intermediate insulator layers hold the silicon-germanium alloy layers together, and interconnecting the ends of at least a portion of the laminated silicon-germanium elements of opposite conductivity types to form a thermopile having a predetermined voltage and power output.

4,032,364

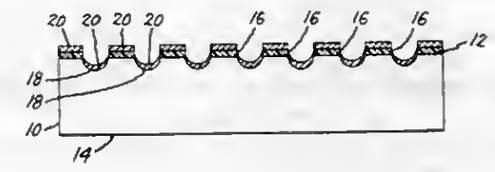
DEEP DIODE SILICON CONTROLLED RECTIFIER

Thomas R. Anthony, and Harvey E. Cline, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 554,172, Feb. 28, 1975, Pat. No. 3,988,768, which is a continuation of Ser. No. 411,004, Oct. 30, 1973, abandoned. This application May 3, 1976, Ser. No. 682,499
Int. Cl.² H01L 21/225
U.S. Cl. 148—1.5 37 Claims

1. A process for making a semiconductor device comprising

a. selecting a body of semiconductor material having a predetermined level of resistivity, a predetermined type conductivity and two major opposed surfaces which are, respectively, the top and bottom surfaces thereof, at least one of the major surfaces having a preferred planar crystal orientation which is one selected from the group consisting of (100), (110), and (111), and a vertical axis of the body being substantially aligned parallel with a first axis of the crystal structure which is substantially perpendicular to at least the major surface having the preferred planar orientation;
b. vapor depositing a first array of metal wires having a selected configuration on the major surface of the body having a preferred crystal planar orientation, the metal comprising at least one material suitable for imparting to a portion of the body a predetermined type conductivity and a predetermined level of resistivity, each wire being oriented substantially parallel with a preferred second crystal axis of the material of the body;
c. heating the body and the array of metal wires to a predetermined elevated temperature sufficient to form an array of liquid wires of metal-rich semiconductor material on the surface of the body;
d. establishing a temperature gradient in the body substantially perpendicular to the two opposed major surfaces, the major surface having the array of liquid wires being at the lower temperature;
e. migrating the first array of metal wires by thermal gradient zone melting entirely through the body from the major surface of lower temperature to the major surface of higher temperature substantially parallel with the first crystal axis to form a lamellar body of semiconductor material of at least one group of two integral pairs of first and second regions of alternate and opposite type conductivity and to form a P-N junction between each mutual pair of regions of opposite type conductivity, the first region of one pair and the second region of the second pair each having a surface area comprising, respectively, one of the two major opposed surfaces of the body, the first and third regions of each group having a first type conductivity and the second and fourth regions of each group having a second, and opposite, type conductivity;



f. affixing a first electrical contact to a surface area of the first region of the group;
g. affixing a second electrical contact to a surface area of the fourth region of the group, and
h. affixing a third electrical contact to a surface area of one of the second and third regions of the group.

4,032,365

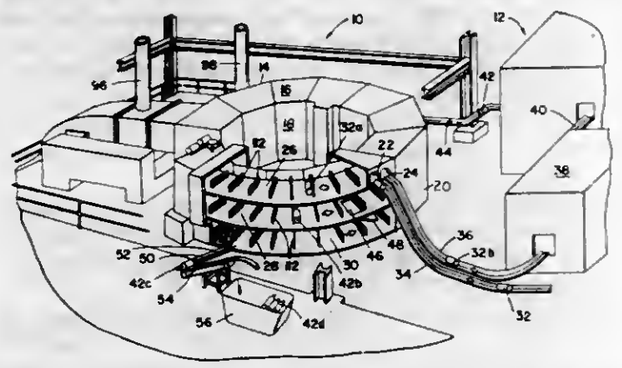
WARM FORM COOLING AND HEAT RECOVERY TUNNEL

Francis H. Brickmont, Pittsburgh, Pa., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed May 5, 1976, Ser. No. 683,434
Int. Cl.² C21D 1/34, 7/13
U.S. Cl. 148—12 R 9 Claims

1. A method of controlling the temperature of a warm-formed workpiece formed by warm forming a slug at an initial preheat temperature to a workpiece form at a higher post-form temperature comprising transferring heat from said

workpiece to said slug, thereby cooling said workpiece and heating said slug so that the heat energy generated in the



warm-forming operation is effectively conserved and is used to preheat said slug.

4,032,366

GRAIN-ORIENTED SILICON STEEL AND PROCESSING THEREFOR

Edward G. Choby, Jr., Pittsburgh, Pa., assignor to Allegheny Ludlum Industries, Inc., Pittsburgh, Pa.

Filed May 23, 1975, Ser. No. 580,449
Int. Cl.² C22B *33/00*; H01F *1/04*
U.S. Cl. 148—31.5 **7 Claims**

1. As an article of manufacture, grain-oriented silicon steel having a cube-on-edge orientation and a cured coating thereon, said coating having been essentially of from 4 to 30% phosphate ion, 0.3 to 6% magesium ion, 5 to 34% colloidial silica, 0.15 to 6% hexavalent chromium, balance water; said cured coating placing said steel in tension, said tension being at least 800 psi.

4,032,367

CORROSION RESISTANT STEELS

William Henry Richardson, Datchet, and Prodyot Guha, High Wycombe, both of England, assignors to Langley Alloys Limited, Slough, England

Continuation-in-part of Ser. No. 625,849, Oct. 28, 1975, abandoned. This application Oct. 8, 1976, Ser. No. 730,936
Claims priority, application United Kingdom, Oct. 28, 1974, 46430/74
Int. Cl.² C22C *38/42*
U.S. Cl. 148—38 **1 Claim**

1. A corrosion resistant high strength steel, which has a ferritic/austenitic microstructure consisting of 40 to 60% austenite grains embedded in a ferrite matrix being substantially free of precipitated particles of other phases, the steel consisting of the following elements in proportion by weight:

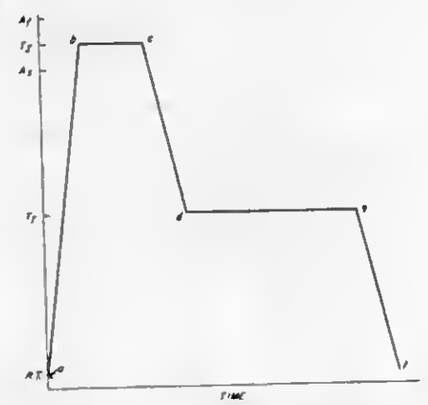
Chromium	26.5% – 30%	by weight
Nickel	7.4% – 14%	by weight
Molybdenum	2.0% – 5%	by weight
Copper	0.5% – 5%	by weight
Silicon	0.2% – 2%	by weight
Manganese	0.2% – 4%	by weight
Carbon	0.01% – 0.1%	by weight
Nitrogen	0.1% – 0.3%	by weight
Iron	Balance or remainder	

4,032,368

INTERCRITICAL-CYCLE ANNEALING

Raymond A. Grange, Washington Township, Westmoreland County, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 295,391, Oct. 5, 1972, abandoned. This application Feb. 13, 1975, Ser. No. 549,631
Int. Cl.³ C21D *1/00*
U.S. Cl. 148—134 **8 Claims**



1. A method for the annealing of hypoeutectoid steels which exhibit an A_r–A_f region greater than about 100° F, which comprises,

a. holding said steel at an intercritical temperature for a time sufficient to form a microstructure containing about 30–50% austenite and 70–50% ferrite, and

b. cooling said steel to a temperature within the range (T_T–50° F) to (T_T + 50° F) at a rate, in °F/min., which is equal to or greater than T_f–T_T/60, in which T_T is a temperature wherein the ending line of I-T diagram for said steel exhibits a minimum in time, and in which T_f=A_r +A_f/2,

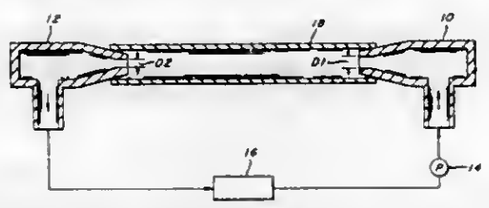
c. holding the steel within said temperature range for a time sufficient to transform all said austenite, in order that no martensite will be present on cooling to ambient temperature.

4,032,369

METHOD FOR QUENCHING FERROUS TUBING TO ACHIEVE FULL HARDENING WITHOUT QUENCH CRACKING

Chester F. Jatczak, and Richard W. Brown, both of North Canton, Ohio, assignors to The Timken Company, Canton, Ohio

Filed Feb. 2, 1976, Ser. No. 654,601
Int. Cl.² C21D *9/08*
U.S. Cl. 148—143 **5 Claims**



1. A method for bringing a quenching medium into contact with both the inner and outer wall surfaces of heated metallic tubing during a quench cycle, which comprises the steps of initially introducing a quenching liquid into the interior of the tubing from an entrance end and pressurizing the same by restricting its flow at the exit end of the tube whereby, throughout the entire quench cycle, the quenching liquid will uniformly contact the entire inner wall surface of the tubing,

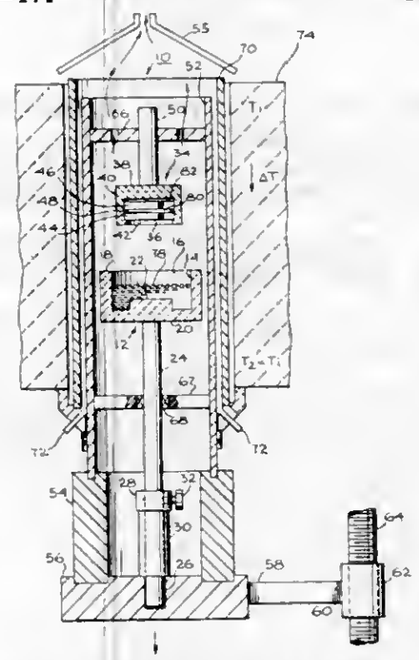
and thereafter bringing the outer surface of the tubing into contact with a quenching liquid.

4,032,370

METHOD OF FORMING AN EPITAXIAL LAYER ON A CRYSTALLINE SUBSTRATE

Herbert F. Mataré, Los Angeles, Calif., assignor to International Audio Visual, Inc., Van Nuys, Calif.

Filed Feb. 11, 1976, Ser. No. 657,173
Int. Cl.² H01L *21/208*
U.S. Cl. 148—171 **20 Claims**



1. An improved method of forming an epitaxial layer of crystalline semi-conductive material on a crystalline substrate, said method comprising:

a. contacting and wetting a clean selected crystalline substrate with a controlled thickness of selected molten melt to form a sandwich, said melt comprising a saturated solution of selected semi-conductive materials capable of forming desired semi-conductive junctions with said substrate, said contacting and wetting being carried out while shielding said sandwich from contamination;

b. maintaining said shielding while subjecting said sandwich to heat treatment comprising controlled progressive lowering of temperature of said sandwich while maintaining said melt molten and said substrate cooler than said melt until depositon of the desired epitaxial layer on said substrate is effected; and

c. recovering the semi-conductive product.

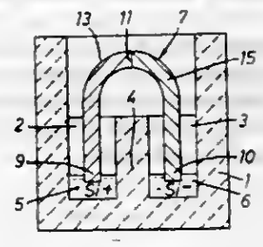
4,032,371

METHOD OF MAKING A THERMO-ELEMENT

Niels Lervad Andersen, Nordborg, Denmark, assignor to Danfoss A/S, Nordborg, Denmark

Filed Apr. 14, 1976, Ser. No. 676,737
Claims priority, application Germany, Apr. 30, 1975, 2519338
Int. Cl.² H01L *21/208*
U.S. Cl. 148—171 **10 Claims**

1. A method of making a thermo-element of the type having two sections of different thermo-electric properties connected in series comprising the steps of forming a porous base body with interconnected pores, introducing a molten p-type conductor material into said pores of one of said sections, and



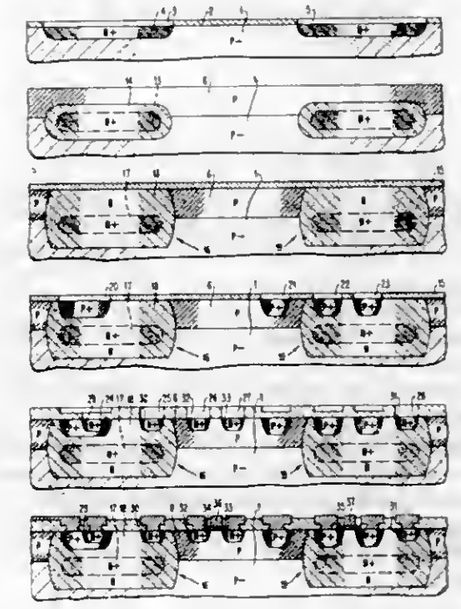
introducing a molten n-type conductor material into said pores of the other of said sections.

4,032,372

EPITAXIAL OUTDIFFUSION TECHNIQUE FOR INTEGRATED BIPOLAR AND FIELD EFFECT TRANSISTORS

Madhukar B. Vora, Beacon, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 138,161, April 28, 1971, abandoned. This application Sept. 10, 1975, Ser. No. 612,140
The portion of the term of this patent subsequent to Mar. 27, 1990, has been disclaimed.
Int. Cl.² H01L *21/225*, *21/20*, *21/76*
U.S. Cl. 148—175 **7 Claims**



1. A method for making monolithic semiconductor devices comprising the steps of:

Providing a semiconductor substrate of one conductivity type,

introducing two impurities of different diffusion rates and of the other conductivity type into said substrate through each of a plurality of desired surface locations,

the concentration of the impurity having the lower diffusion rate being greater than the concentration of the impurity having the higher diffusion rate,

forming an epitaxial layer of semiconductor material on said substrate and over said locations, said expitaxial layer being of the same conductivity type as said substrate,

heating said epitaxial layer and said substrate to outdiffuse said higher diffusion rate impurity completely through said epitaxial layer to reach the surface of said epitaxial layer opposite the interface between said epitaxial layer and said substrate,

forming at one of said desired surface locations a bipolar

transistor wholly within the region of said epitaxial layer through which said higher diffusion rate impurity has outdiffused completely through said expitaxial layer to reach said surface of said epitaxial layer opposite said interface,

said higher diffusion rate impurity forming the collector of said bipolar transistor and the other of said impurities forming the subcollector of said bipolar transistor, and

forming an insulated gate field effect transistor in said epitaxial layer outside said region.

4,032,373

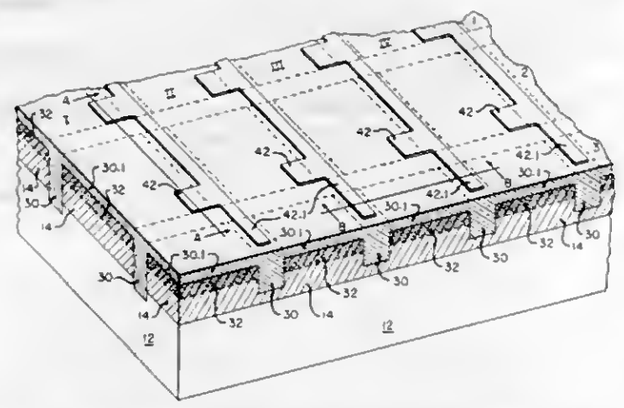
METHOD OF MANUFACTURING A DIELECTRICALLY ISOLATED SEMICONDUCTIVE DEVICE

Tuh-Kai Koo, Colorado Springs, Colo., assignor to NCR Corporation, Dayton, Ohio

Filed Oct. 1, 1975, Ser. No. 618,717

Int. Cl.² H01L *21/223*

U.S. Cl. 148—175 **7 Claims**



1. A method of forming dielectrically isolated islands in a semiconductor body comprising the steps of:

selecting a semiconductor wafer of a given conductivity-type;

providing one surface of the wafer with a layer of epitaxial semiconductor material of an opposite conductivity-type;

forming a first set of parallel regions of electrically insulating material extending completely through the epitaxial layer;

forming a second set of parallel regions of electrically insulating material crossing the first set of regions and extending only partially through the epitaxial layer; and

forming circuit components in the islands of the epitaxial layer isolated by said regions of electrically insulating material.

4,032,374

CINNAMIC ACID CONTAINING PYROTECHNIC SMOKE COMPOSITION

Bernard E. Douda, Bloomfield, and John E. Tanner, Jr., Bloomington, both of Ind., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 22, 1976, Ser. No. 725,606

Int. Cl.² C06B *45/10*

U.S. Cl. 149—19.8 **5 Claims**

1. A non-toxic smoke composition comprised, by weight, of

between 45.5 parts and 75.5 parts of cinnamic acid,

between 5.5 parts and 12.5 parts of sugar,

between 13 parts and 29 parts of potassium chlorate,

between 4 parts and 10.5 parts of sodium bicarbonate,

between 2 parts and 5 parts of diatomite silica, and

between 2 parts and 5 parts of a binder.

4,032,375

BLASTING COMPOSITION CONTAINING CALCIUM NITRATE AND SULFUR

Daniel A. Wasson, Salt Lake City, Utah, assignor to Ireco Chemicals, Salt Lake City, Utah

Filed Jan. 20, 1975, Ser. No. 542,280

Int. Cl.² C06B *33/14*

U.S. Cl. 149—41 **14 Claims**

1. A blasting composition comprising inorganic oxidizer salt which is partially or completely dissolved in a liquid fluid phase and which includes calcium nitrate in an amount of at least about 20% by weight based upon the total composition; solid or liquid fuel or both; thickener; and at least about 3% by weight sulfur, which functions as a sensitizer in combination with the calcium nitrate.

4,032,376

EXPLOSIVE COMPOSITION WITH TELLURITE GELLING AGENT

Kåre Ragnvald Fossan, Nora, and Gunnar Olof Ekman, Gyttorp, both of Sweden, assignors to Nitro-Nobel A.B., Gyttorp, Sweden

Filed Apr. 22, 1976, Ser. No. 679,240

Claims priority, application Sweden, Apr. 29, 1975, 7504939

Int. Cl.² C06B *31/30*

U.S. Cl. 149—60 **9 Claims**

1. In an explosive composition that is first in fluid form and then gels into a paste at a predetermined rate, which explosive composition comprising an oxidant, a combustible, water, a gelling agent, and a gelling promoter, wherein the improvement comprises: said gelling agent being selected from the group consisting of a tellurite, a mixture of a tellurite and a chromate, and a mixture of a tellurite and a bichromate.

4,032,377

METHOD FOR THE PRODUCTION OF HIGH-PURITY TRIAMINOTRINITROBENZENE

Theodore M. Benziger, Santa Fe, N. Mex., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed July 19, 1976, Ser. No. 706,403

Int. Cl.² C06B *25/04*; C07C *79/10*

U.S. Cl. 149—105 **3 Claims**

1. In a method for preparing sym-triaminotrinitrobenzene which comprises nitration of 1,3,5-trichlorobenzene to 1,3,5-trichloro-2,4,6-trinitrobenzene followed by amination to sym-triaminotrinitrobenzene, the improvement which comprises, in the amination step, adding sufficient water to the solvent for the 1,3,5-trichloro-2,4,6-trinitrobenzene that the byproduct ammonium chloride formed during the amination is rendered at least semideliquescent.

4,032,378

METHOD OF FORMING PATTERN ROLL

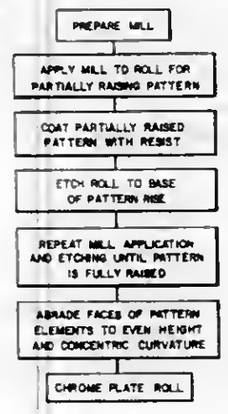
James L. McDonald, and Christian Toussieux, both of Charlotte, N.C., assignors to Consolidated Engravers Corporation, Charlotte, N.C.

Division of Ser. No. 522,785, Nov. 11, 1974, Pat. No. 3,993,532. This application Sept. 3, 1976, Ser. No. 720,204

Int. Cl.² C23F *1/02*

U.S. Cl. 156—645 **4 Claims**

1. The method of forming a pattern roll for use in opposition to a sonic horn for fusing heat responsive material interposed therebetween, which method comprises preparing a mill for a predetermined pattern of discrete horn opposing elements projecting from a base rib, applying said mill to a roll body for partially raising said pattern at the roll body surface, coating the partially raised pattern with a resist and etching the roll body to the base of the pattern rise, and then repeating the mill application and etching steps until the predetermined pattern is fully raised at the roll body surface.


PREPARE MILL
APPLY MILL TO ROLL FOR PARTIALLY RAISING PATTERN
COAT PARTIALLY RAISED PATTERN WITH RESIST
ETCH ROLL TO BASE OF PATTERN RISE
REPEAT MILL APPLICATION AND ETCHING UNTIL PATTERN IS FULLY RAISED
ABRADE FACES OF PATTERN ELEMENTS TO EVEN HEIGHT AND CONCENTRIC CURVATURE
CHROME PLATE ROLL

4,032,379

NITRIC ACID SYSTEM FOR ETCHING MAGNESIUM PLATES

David L. Czirr, Cresskill, N.J., and Harry Kroll, Warwick, R.I., assignors to Philip A. Hunt Chemical Corporation, Palisades Park, N.J.

Division of Ser. No. 441,342, Feb. 11, 1974, Pat. No. 3,935,118, which is a continuation-in-part of Ser. No. 337,879, March 5, 1973, abandoned. This application Oct. 31, 1975, Ser. No. 627,765

Int. Cl.² B41C *1/00*

U.S. Cl. 156—659 **33 Claims**

1. A method for etching bare areas of a magnesium plate, other portions of which are covered with an etch-resist pattern, said method comprising directing against the surface of said plate, in a direction having a substantial component perpendicular to said surface, an etching liquid including

I. a strong inorganic acid,

II. at least one liquid fatty monocarboxylic acid having from 6 to 26 carbon atoms which is substantially nonreactive with the inorganic acid,

III. at least one organophosphonic acid,

IV. at least one alkylaryl sulfonic acid,

V. at least one surfactant or coupling agent, and

VI. water.

4,032,380

METHOD OF JOINING OF INSULATED HIGH-VOLTAGE CABLES

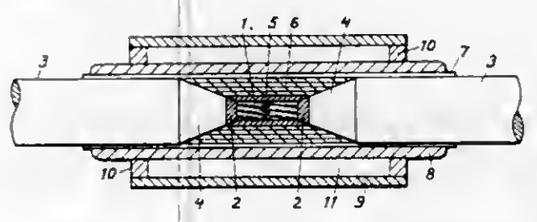
Gotthard Valentin Olsson, Spanga, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Continuation of Ser. No. 457,572, April 3, 1974, abandoned. This application Jan. 19, 1976, Ser. No. 650,375

Claims priority, application Sweden, Apr. 13, 1973, 7305335

Int. Cl.² B21F *15/02*

U.S. Cl. 156—49 **3 Claims**



1. A method of joining two lengths of cables having a central conductor surrounded by an inner layer of semi-conducting material which is in turn surrounded by an outer layer of solid polymer material, said method comprising the steps of stripping an end of each cable down to the central conductor whereby an end portion of each central conductor is exposed and the layer of semi-conducting material and layer of solid polymer material taper to form two frusto-conically shaped insulation ends; fixed by joining in a smooth abutting relationship the end portions of the central conductors; winding tape of semi-conducting material about the stripped end portions of the central conductors and in contact with the taper of the inner layer of semi-conducting material so as to form thereupon a first layer of semi-conducting material having substantially the same thickness as the inner layer of semi-conducting material on the cable whereby there is a smooth uniform transition from the inner layer of one cable to the inner layer of the other cable; then wrapping a tape of vulcanizable insulation material about the layer of semi-conducting material and the tapered portion of the outer layers so as to form a second layer substantially flush with the peripheral outline of the cable insulation; positioning against the formed second layer a plurality of axially extending metal strips, the metal strips longitudinally spanning and peripherally surrounding the formed second layer to form a third layer which is axially rigid; wrapping circumferentially around the third layer of metal strips an elastic element which lies pressure directed radially inward on the metal strips; removably jacketing said third layer with beating means; heating the layer of insulation tape to a temperature and for a period of time for causing vulcanization of the insulation tape forming the second layer; removing the heating means when vulcanization is completed; and finally removing the elastic element and the metal strips.

4,032,381

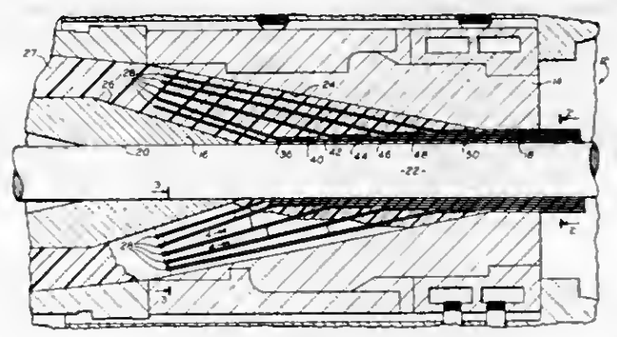
EXTRUDED SOLID DIELECTRIC HIGH VOLTAGE CABLES WITH MULTI-LAYER INSULATION

George S. Eager, Jr., Upper Montclair, and David W. Riley, Plainfield, both of N.J., assignors to General Cable Corporation, Greenwich, Conn.

Division of Ser. No. 466,081, May 1, 1974, abandoned. This application Apr. 25, 1975, Ser. No. 571,551

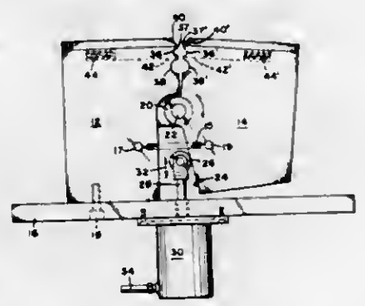
Int. Cl.² H01B *7/02*

U.S. Cl. 156—51 **4 Claims**



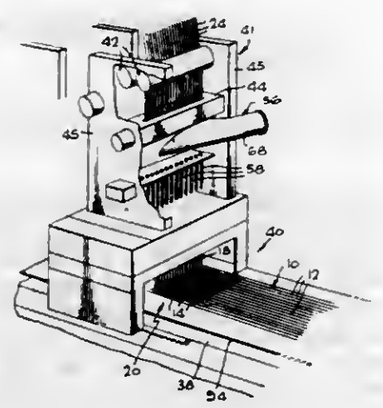
1. The method of raising the electrical breakdown stress in volts per mil of thickness of the insulation on a cable which comprises applying the insulation to a cable core in a single extruder through which the cable core passes and as a plurality of successive layers of the same composition insulating material superimposed over one another to a predetermined total radial thickness of the insulation, the successive layers being formed by breaking up the mass of insulating material in the extruder into a plurality of separate streams, and extruding the separate streams as said plurality of successive layers around the cable core, and supplying said layers by simultaneous extrusion and at temperatures that cause the layers to fuse to one another free of voids at the interfaces of the successive layers.

4,032,382
METHOD AND APPARATUS FOR SPLICING THERMOPLASTIC MONOFILAMENT MATERIAL BY HIGH FREQUENCY VIBRATORY ENERGY
Edward G. Obeda, Brookfield, Conn., assignor to Branson Ultrasonics Corporation, New Canaan, Conn.
Filed Nov. 15, 1976, Ser. No. 742,019
Int. Cl.² B32B 5/26
U.S. Cl. 156—73.2 11 Claims



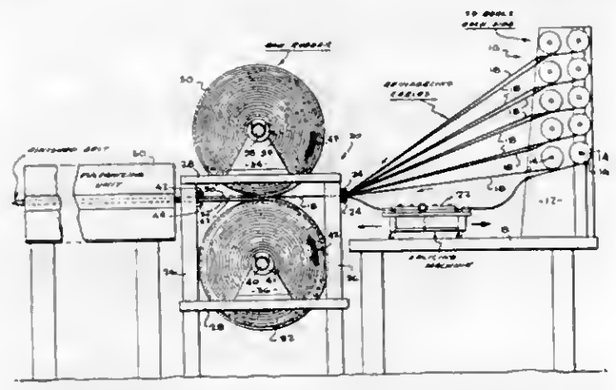
1. A method of splicing two thermoplastic monofilaments by high frequency vibratory energy to provide a single filament of predetermined cross sectional area comprising the steps of:
disposing two thermoplastic monofilaments in overlapped relation in a support having forming means and an adjoining flash receiving cavity means;
applying high frequency vibratory energy to the monofilaments in the region of overlap for softening the respective monofilaments and urging thermoplastic material in excess of the predetermined cross sectional area into the flash receiving cavity;
removing the vibratory energy;
urging the two monofilaments while in the forming means and softened state into intimate contact with one another and the monofilament facing wall of the forming means for causing a splice having said predetermined cross sectional area, and
removing the splice from the support.

4,032,383
FIBER INSERTION DEVICE FOR CONTINUOUS 3D FOAMING MACHINE AND METHOD
William B. Goldsworthy, Palos Verdes, and Harald E. Karlson, Santa Monica, both of Calif., assignors to McDonnell Douglas Corporation, Long Beach, Calif.
Filed Nov. 4, 1975, Ser. No. 628,802
Int. Cl.² B32B 5/20
U.S. Cl. 156—79 18 Claims



1. A method of forming three-dimensional fiber reinforced foam insulation which comprises forming an array of layers of fibers, each said layer consisting of spaced X fibers extending in a longitudinal direction and spaced Y fibers extending in a transverse direction, and forming openings between adjacent X-Y fibers in said layers, providing tubes positioned above said array, providing additional tubes below said first mentioned tubes, inserting said additional tubes into said openings of said array, inserting Z fibers into said first mentioned tubes, blowing said Z fibers by air from said first mentioned tubes into said additional tubes in said array, withdrawing said additional tubes from said array, leaving said Z fibers inserted in said array to form an X-Y-Z matrix and foaming an insulation material through said matrix.

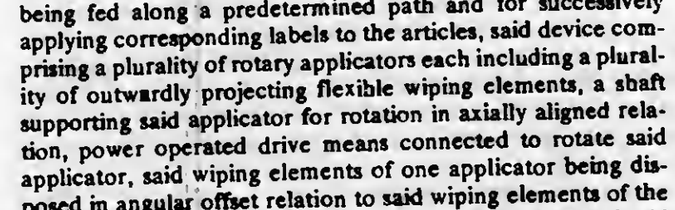
4,032,384
METHOD OF MAKING A CONVEYOR BELT
David A. Rauscher, Columbia, S.C., assignor to Cable Conveyor Systems, Inc., Columbia, S.C.
Filed Jan. 8, 1976, Ser. No. 647,312
Int. Cl.² B29H 7/22; F16G 3/10; G03D 15/04
U.S. Cl. 156—137 11 Claims



1. A method of fabricating a conveyor belt having continuous loops of reinforcing cable embedded in a loop of rubber material comprising the steps of:
a. feeding first and second elongated webs of raw rubber from first and second web supply means into facing abutting relationship;
b. concurrently feeding a plurality of parallel cable members equal to the desired number of continuous loops of reinforcing cable to and between said first and second webs of raw rubber to provide an unbonded sandwich array in which said cable members extend between said webs substantially parallel to the axes of said webs;
c. guiding a predetermined length of said sandwich array into vulcanizing means and subsequently activating said vulcanizing means for a given time period to effect curing and bonding of said first and second webs of predetermined length of said sandwich array to provide a section of unitary cable reinforced belt; and
d. concurrently effecting the spliced junction of the trailing end of selected ones of said cable members to the forward end of a next succeeding cable during selected ones of said given time periods while said vulcanizing means is activated so that the cable splices are spaced apart longitudinally along the length of the belt from the next adjacent splice on any of the other cables by a length substantially in excess of said predetermined length.

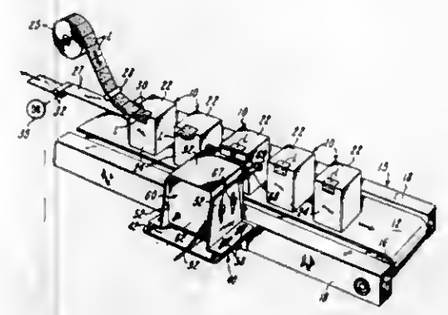
4,032,385
METHOD OF MAKING AN ADDRESS MASTER CARD SET
Eduard C. Petry, Hopkins, and John R. Stielow, Minneapolis, both of Minn., assignors to Speedaddress, Inc., Minneapolis, Minn.
Filed Apr. 26, 1976, Ser. No. 680,035
Int. Cl.² B32B 31/00
U.S. Cl. 156—252 3 Claims

1. A method for making address master card sets which comprise an address master card and a removably attached sheet with a hectographic carbon coating positioned adjacent to an address imprint area of said card, said method comprising the steps of:
unrolling a continuous strip of sheet material from a first roll of flexible sheet material coated on one side with two continuous bands of hectographic carbon coating, said bands being located on either side of a centerline of said strip;
punching a plurality of generally rectangular shaped holes in said strip, each of said holes being located along the centerline thereof and being spaced from adjacent holes by a distance corresponding to the width of said address master card;



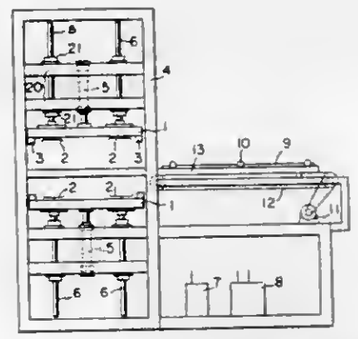
applying a continuous strip of adhesive tape with its adhesive coated side adjacent to the uncoated side of said strip of sheet material along said centerline, said adhesive tape completely covering said plurality of holes;
slitting said strip of sheet material and said tape along said centerline;
cutting said strip of sheet material into individual sheets having a width corresponding to the width of said address master card;
aligning each of said individual sheets with one of said address master cards with the hectographic carbon coating positioned adjacent to said address imprint area of said card; and
pressing said individual sheet and adhesive tape in the vicinity of said holes to bond said sheet to said card.

4,032,386
DEVICE FOR APPLYING LABELS TO ARTICLES
Ronald P. J. Fleet, Landing, N.J., assignor to Monarch Marking Systems, Inc., Dayton, Ohio
Continuation of Ser. No. 512,727, Oct. 7, 1974, abandoned.
This application July 26, 1976, Ser. No. 708,531
Int. Cl.² B29C 17/00
U.S. Cl. 156—475 10 Claims



1. An improved device for receiving a succession of articles being fed along a predetermined path and for successively applying corresponding labels to the articles, said device comprising a plurality of rotary applicators each including a plurality of outwardly projecting flexible wiping elements, a shaft supporting said applicator for rotation in axially aligned relation, power operated drive means connected to rotate said applicator, said wiping elements of one applicator being disposed in angular offset relation to said wiping elements of the other said applicator, and means supporting said shaft and said applicators for adjustment relative to both the height and width of the articles being fed along said path for conveniently accommodating articles of different sizes and configurations.

4,032,387
WELDING APPARATUS
Masamichi Sugiyama, Isehara; Ryuzo Ebina, Tokyo; Minoru Tanaka, Kawasaki; Ikuo Sukekawa, Yokohama, and Susumu Sawada, Machida, all of Japan, assignors to Mitsubishi Kasei Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Sept. 8, 1975, Ser. No. 611,550
Claims priority, application Japan, Sept. 12, 1974, 49-105288
Int. Cl.² B30B 15/06, 15/34
U.S. Cl. 156—497 9 Claims



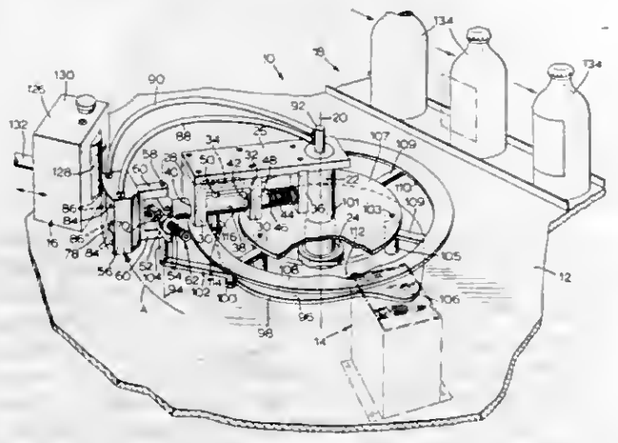
1. In welding apparatus of the class comprising a pair of opposed pressing boards, means to move said pressing boards toward and away from each other for receiving therebetween superposed articles to be welded together, a heated platen for heating the surfaces of said articles, means for reciprocating said heated platen between an operative position defined between said pressing boards and an inoperative position defined outside of the area between said pressing boards, a holding mechanism for holding said articles to be welded upon the opposing surfaces of said pressing boards, and spacer means for defining predetermined gaps between said heated platen and said pressing boards, the improvement comprising:
said spacer means is mounted upon either one or both of said pressing boards and said heated platen and has a height smaller than the thickness of the article to be welded so that the surface layer of said article having a thickness equal to the difference between the thickness of said article and the height of said spacer is fused by said heated platen; and
said holding mechanism comprises suction disc means made of resilient material and connected to a source of vacuum, and disposed in a recess of said pressing board, and spring means is provided for biasing said suction disc so as to normally protrude beyond the inner surface of said pressing head, yet when said suction disc is actuated so as to attract said article to be welded and said pressing board is actuated toward said platen, said suction disc is retracted into said recess against the biasing force of said spring means.

4,032,388
TRANSFER MECHANISM
Leon Tucker Dunning, 911 Bond St., Sarnia, Ontario, Canada
Filed Nov. 19, 1975, Ser. No. 633,166
Int. Cl.² B65C 9/10, 9/14
U.S. Cl. 156—568 9 Claims

1. In a labelling device having a frame, a label storage station, a glue applicator station, and a label applicator station circumferentially spaced from one another about a central axis of said frame, said label storage station having a label storage magazine opening inwardly thereof for storing a plurality of labels in a face-to-face relationship, a label transfer device comprising,
a. a main body member mounted on said frame for rotation about said central axis,
b. at least one arm member slidably mounted on said main body member and projecting radially from said main

body member, each said arm member having a longitudinal axis projecting radially from said central axis of said main body member, and each said arm member being slidable with respect to said main body member in a direction along said longitudinal axis,

c. a head pivotably mounted on each arm member for movement about a secondary axis parallel to said central axis, said secondary axis being located on said logitudinal axis of said arm member, said head having an outer surface which is curved in the plane of rotation of said head about said central axis, said head being rotatable with said main body member with said outer surface disposed in a path passing through said label storage, glue applicator and label applicator stations, said outer face having a leading edge disposed in the direction of rotation of said main body member and a trailing edge disposed in the opposite direction,



d. first guide means for guiding said head to pivot about said secondary axis to angularly incline said head to a first position as it approaches said label storage station in which said trailing edge of said head is disposed radially outwardly of said leading edge whereby said trailing edge is the first portion of said head to engage a label in said storage station, said first guide means being adapted to cause said head to pivot about said secondary axis from said first position to a second position in which said leading edge is disposed radially outwardly of said trailing edge whereby said outer surface is rocked about said secondary axis during movement of said head through said label storage station, and

e. means for securing said label to said outer surface of said head as it moves through said label storage station to be transferred thereby to said labelling station.

4,032,389

APPARATUS FOR AUTOMATICALLY CONTROLLING CRYSTAL GROWTH

Gordon Charles Joyce, Malvern, England, assignor to National Research Development Corporation, London, England

Filed Mar. 31, 1975, Ser. No. 563,443

Claims priority, application United Kingdom, Mar. 29, 1974, 14167/74

Int. Cl.² B01J *17/18*; **H05B** *5/06*

U.S. Cl. 156—601 **4 Claims**

1. Apparatus for automatically controlled crystal growth comprising:

a container for containing a melt of crystallisable material,

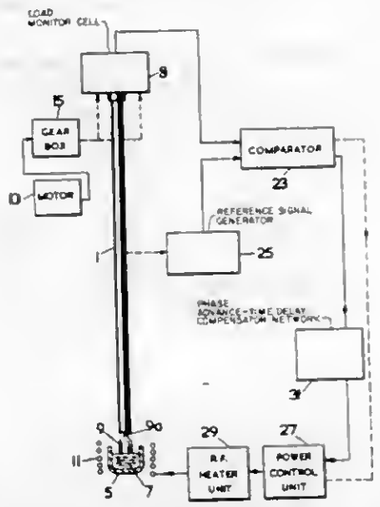
an electrical heater for heating said material to establish a melt of said material,

means for supplying electrical power to energize said heater,

means for pulling a crystal from said melt when established,

a monitor arrangement for monitoring a function of a physical property of the growing crystal related to the cross-section of the crystal including means for monitoring the weight of the crystal,

a comparator for comparing said function with its expected value to derive a control signal from any difference between said function and its expected value,



a feedback loop from said comparator to said means for supplying power to apply said control signal to adjust said power, and

means for advancing the phase of changes in said control signal to compensate for delay in the transfer of heat from said heater to the interface between said melt and said growing crystal.

4,032,390

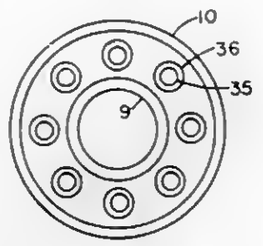
PLURAL CRYSTAL PULLING FROM A MELT IN AN ANNULAR CRUCIBLE HEATED ON BOTH INNER AND OUTER WALLS

Dale W. Rice, Horseheads, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Division of Ser. No. 445,630, Feb. 25, 1974, Pat. No. 3,961,905. This application Sept. 18, 1975, Ser. No. 614,429

Int. Cl.² B01J *17/18*

U.S. Cl. 156—608 **3 Claims**



1. An improved method of growing and pulling a plurality of crystalline articles from a melt of an inorganic, crystalline material including the steps of establishing a temperature controlled melt of the inorganic crystalline material in a crucible, contacting the melt with a plurality of crystal seeds, and withdrawing the seeds at a rate not exceeding the rate of crystal growth thereon wherein the improvement comprises

establishing the melt in an annular crucible having a generally U-shaped cross-section including an inner annular wall and an outer annular wall, disposing the crystal seeds in a circumferentially spaced arrangement within the crucible

simultaneously heating the crucible inner annular wall and the outer annular wall, and

maintaining a substantially uniform radial temperature distribution in the melt between the inner annular wall and the outer annular wall.

4,032,391

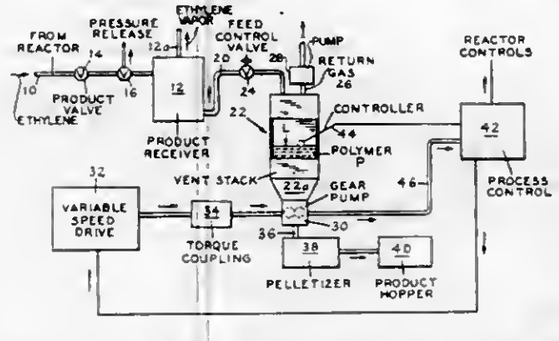
LOW ENERGY RECOVERY COMPOUNDING AND FABRICATING SYSTEMS FOR PLASTIC MATERIALS

Isaac Moked, New Brunswick; Richard H. Handwerk, Somerville, and Walter R. Marshall, Bloomfield, all of N.J., assignors to Union Carbide Corporation, New York, N.Y.

Filed Sept. 3, 1975, Ser. No. 609,947

Int. Cl.² B01D *1/00, 1/28*; **F01C** *1/18*

U.S. Cl. 159—47 R **7 Claims**



1. In a process for the production of polymer wherein a liquid polymer melt and entrained volatile monomer are delivered from a reactor to a product receiver for partial flashing of the volatile monomer the improvement comprising the steps of transferring the polymer from the bottom of said product receiver to the top of a vent stack; flashing the remaining volatile monomer from the melt in the vent stack; discharging said polymer melt from the bottom of the vent stack into the inlet of a gear pump having a pair of horizontal, intermeshing, rotating gears; directing the melt between said gears with the use of a pair of opposed cylindrical surfaces whose elements are parallel to the gear axes, said surfaces extending below the plane of the gear axes and each surface defining with its proximate gear axis a decreasing hydraulic radius toward the bottom pump discharge; discharging pressurized melt from the intermeshing gears through an outlet having a width corresponding to the gear width and a length corresponding to the tooth height of said gears, respectively, while providing a seal between each gear and the pump housing adjacent the outlet; sensing and maintaining the level of liquid in said stack to provide a pressure head above said gear pump.

4,032,392

METHOD OF INCREASING THE FREENESS OF ASBESTOS SLURRIES

Frank J. Koller, Jr., Lancaster, Pa., assignor to Armstrong Cork Company, Lancaster, Pa.

Filed Aug. 6, 1976, Ser. No. 712,148

Int. Cl.² D21F *11/00*

U.S. Cl. 162—155 **5 Claims**

1. In a method of making beater-saturated asbestos sheets by forming a slurry of asbestos fibers in water, precipitating a synthetic non-film-forming organic binder in particulate form on said fibers to form a slurry of coated fibers, draining said slurry of coated fibers and forming a product therefrom, the improvement in controlling said draining comprising adding to the slurry of coated fibers a film-forming secondary binder of poly(vinylidene chloride) or copolymers thereof wherein said synthetic, non-film-forming organic binder and said film-forming secondary binder of poly(vinylidene chloride) or copolymers thereof are first blended in a ratio of about 85:15 to 75:25 and added to said slurry of asbestos fibers in water.

4,032,393

FIRE RETARDANT WEBS AND INTERNAL TREATMENT THEREFOR

Franz J. Alfels, and Raymond W. Goldsmith, both of Lockport, N.Y., assignors to The Upson Company, Lockport, N.Y.

Filed Apr. 5, 1976, Ser. No. 673,388

Int. Cl.² D21F *13/00, 13/02*; **D21J** *1/04, 1/16*

U.S. Cl. 162—159 **15 Claims**

1. A process for the internal treatment of cellulosic webs to impart improved fire retardancy thereto, comprising the steps of:

a. admixing cellulosic fibers and an effective quantity of a fire-retardant filler of hydrated aluminum oxide particles;

b. consolidating the admixture into a self-sustaining web comprises of a physical admixture of discrete aluminum oxide particles and cellulosic fibers; and.,

c. compressing said web to impart improved fire retardancy characteristics thereto;

wherein said hydrated aluminum oxide particles are added to be present in the range of from about 27% to about 36% based upon the weight of said web, and wherein the compressing step provides a force of from about 300 to about 700 pounds per linear inch to yield an ultimate density of said web in the range of from about 38 to about 52 pounds per cubic foot.

8. The process of claim 1, further comprising the step of laminating a plurality of said webs to form a construction board.

9. A cellulosic web having improved fire retardancy characteristics comprised of a compressed, intimate physical admixture of discrete cellulosic fibers and an effective quantity of discrete fire-retardant hydrated aluminum oxide particles, wherein said aluminum oxide particles comprise from about 27% to about 36% of the weight of the web, said web having a density in the range of from about 38 to about 52 pounds per cubic foot.

13. A laminated construction board comprised of a plurality of the webs of claim 9.

4,032,394

METHOD OF MAKING WET-PRESSED FIBERBOARD OF HIGH RESISTANCE TO BENDING

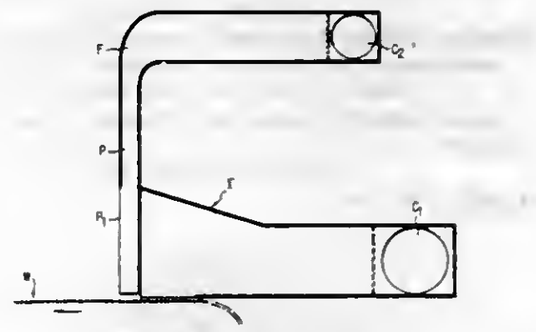
Ernst Ludvig Back, Vikbyvagen 42, S-181 43 Lidingo, Sweden

Filed May 20, 1975, Ser. No. 579,243

Claims priority, application Sweden, May 20, 1974, 7406675

Int. Cl.² D21H *3/36, 5/02*

U.S. Cl. 162—164 R **11 Claims**



1. In a method of manufacturing wet-pressed fiber board material of uniform thickness in which a layer of fiber-water suspension is prepared, said layer being de-watered and pressed to form a coherent flat sheet, the improvement comprising distributing said fiber-water suspension over the surface of said layer in a manner such that the pressed board product contains strip-like surface portions which extend in at least one direction of the borizontal plane of the sheet, said strip-like surface portions having varying densities, whereby the finished board has a higher resistance to bending than a

homogeneous sheet having substantially the same average density.

4,032,395

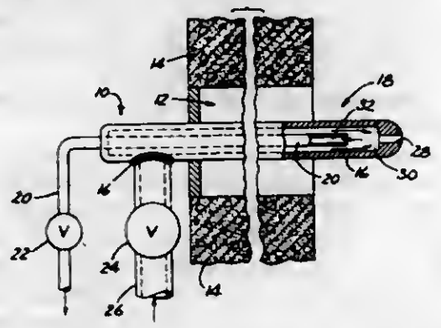
FUEL LEAK DETECTION APPARATUS FOR GAS COOLED NUCLEAR REACTORS

Richard D. Burnette, San Diego, Calif., assignor to General Atomic Company, San Diego, Calif.

Filed Oct. 7, 1974, Ser. No. 512,531

Int. Cl.² G21C 17/02

U.S. Cl. 176—19 LD **9 Claims**



1. Apparatus for use in the detection of gaseous radioactive iodine in the gaseous coolant of a nuclear reactor comprising:

elongated probe means extending through a penetration of a reactor vessel to the gaseous coolant stream, said elongated probe being sealed to prohibit leakage of said coolant from between said probe and the penetration;

said probe means having an outer generally cylindrically shaped wall, a conduit means positioned inside of said outer wall and defining a first passage adapted to communicate gaseous coolant therethrough, the area between said conduit means and said outer wall providing a second passage, said inner conduit means terminating adjacent the end of said probe means so as to define a reservoir, the outer wall of said probe means having an orifice therein for selectively communicating gaseous coolant from said stream to said reservoir in response to the relative pressures on opposite sides of said orifice;

valve means adapted to selectively open and close said first and second passages to permit flow therethrough;

said conduit means having an iodine absorption bed located therein adjacent the reservoir.

4,032,396

PRESSURIZED-WATER REACTOR EMERGENCY CORE COOLING SYSTEM

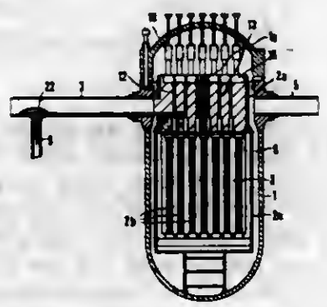
Wolfgang Braun, Buckenhof, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Mar. 28, 1974, Ser. No. 455,913

Claims priority, application Germany, Mar. 30, 1973, 2316007

Int. Cl.² G21C 9/00, 15/00

U.S. Cl. 176—38 **7 Claims**



1. A pressurized-water reactor comprising a pressure vessel having a lower portion and an upper portion, a core in said lower portion, coolant inlet and outlet connections opening through said upper portion, a core barrel surrounding said core and extending upwardly to above said connections and forming a coolant descent space opening from and extending from said inlet connection downwardly to below said barrel and the barrel internally forming a substantially open space above said core and opening to said outlet connection, a main coolant loop having a cold leg connected to said inlet connection and a hot leg connected to said outlet connection, said loop and pressure vessel normally containing circulating pressurized-water coolant for said core; and an emergency core cooling system for said reactor for use in the event of a loss-of-coolant accident; wherein the improvement comprises said system having emergency means for supplying emergency cooling water from a volume of such water under pressure in the event of said accident, and spray means for spraying at least a portion of said emergency cooling water from said supply substantially throughout said open space above said core to form a large-area spray screen of said emergency cooling water in said open space said spray means comprising a single nozzle for ejecting a portion of said emergency cooling water in the form of a high velocity jet into said open space, said nozzle being directed horizontally through the wall of said vessel into said open space and wherein control rod guide tubes extend upwardly from said core and said open space is formed between and around said guide tubes, said nozzle ejecting said jet against at least one of said guide tubes.

4,032,397

BURST SHIELD CONTAINMENT FOR NUCLEAR REACTOR AND METHOD OF OPERATING SAME

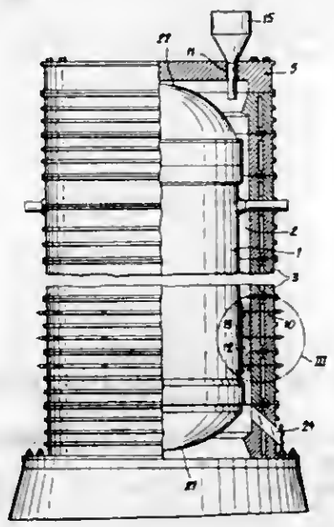
Burkhard Beine, Tonisvorst, and Franz Schilling, Kempen, both of Germany, assignors to Siempelkamp Giesserei AG, Krefeld, Germany

Filed Apr. 18, 1975, Ser. No. 569,157

Claims priority, application Germany, Apr. 19, 1974, 2419033

Int. Cl.² G21C 11/00, 9/00

U.S. Cl. 176—38 **8 Claims**



1. A method of operating a nuclear reactor having a nuclear reactor core spacedly surrounded by a burst shield consisting of a multiplicity of stacked cast iron cylinder sections, comprising the step of:

filling the space between said core and said burst shield with an incompressible fluent medium in the form of a flowable particulate solid to eliminate any free burst path between said core and said shield and to distribute burst forces uniformly to said shield;

removing said fluent medium for inspection of said space, said space being filled with said flowable particulate solid by the steps of:

forming a partition in said space set outwardly from said core by a distance at least sufficient to enable thermal expansion of said core as it is brought to operating temperature;

introducing said particulate solid between said partition and said shield in a relatively cool state of said reactor core;

bringing said reactor core to operating temperature; and

thereafter displacing said partition into contact with said core and thereby eliminating any free burst path between said core and said shield.

4,032,398

NUCLEAR REACTOR FUEL SUB-ASSEMBLIES

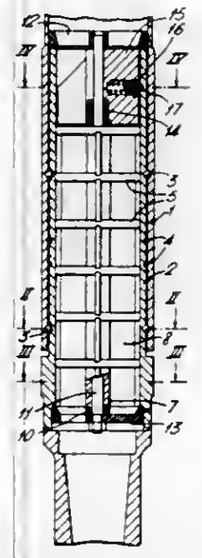
Andrew Cross, Lymm; Anthony Randle Lunt, Warrington, and Joseph Brian Doherty, Cheadle, all of England, assignors to United Kingdom Atomic Energy Authority, England

Filed May 3, 1976, Ser. No. 682,591

Claims priority, application United Kingdom, May 7, 1975, 19171/75

Int. Cl.² G21C 3/00

U.S. Cl. 176—43 **3 Claims**



1. A nuclear reactor fuel sub-assembly comprising:

a tubular wrapper for conducting coolant flow,

a bundle of spaced fuel pins within the tubular wrapper, and

variable flow restriction means disposed in a region of the sub-assembly which is upstream of the fuel pins with respect to coolant flow, the restriction means comprising means defining a plurality of discrete axially extending ducts for coolant flow, a series of spaced flow restrictors within the ducts, the restrictors of each duct being arranged to offer a different restriction to fluid flow than the restrictors in the other ducts, and a valve member for directing coolant flow through a selected one of the ducts.

4,032,399

INTEGRATED FAST REACTOR OF THE LIQUID METAL COOLED TYPE

Jean Defaachy, St-Michel-sur-Orge, and Claude Malaval, Antony, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

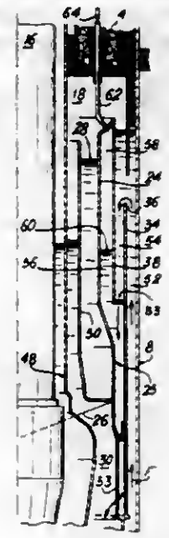
Filed Nov. 13, 1975, Ser. No. 631,601

Claims priority, application France, Nov. 14, 1974, 74.37575

Int. Cl.² G21C 15/02

U.S. Cl. 176—62 **6 Claims**

1. A nuclear reactor comprising a main vessel, a reactor core within said main vessel, fuel assemblies in said core, a support structure in said main vessel supporting said fuel assemblies, a liquid metal coolant in said core which flows upwardly through said fuel assemblies and exiting said core as hot metal coolant, primary heat exchangers in said main vessel receiving said hot coolant from said core, cold liquid metal coolant exiting from said heat exchanges into an intervessel space in a bottom zone of said main vessel, a primary enclosing said vessel core and separating said intervessel space from the zone containing said hot metal coolant, pumps in said intervessel space withdrawing said cold liquid metal from said intervessel space and reinjecting said cold liquid metal under pressure into a lower portion of said fuel assemblies, a circuit for cooling said main vessel supplied with a fraction of said cold liquid metal, said coolant circuit including on one side



said main vessel and a flow reversing baffle plate, said flow reversing baffle plate comprising a first shell within said main vessel said coolant circuit including on the other side at the top portion of said main vessel said flow reversing baffle plate and a counter baffle, said counter baffle comprising a second shell which surrounds said primary vessel, said first shell surrounding said second shell, an annular chamber above said cold liquid metal between said second shell and said primary vessel and an inert gas in said annular chamber forming a gas/liquid metal interface chamber at a pressure such that the gas/liquid metal interface within said chamber is located below the top of said flow reversin baffle plate.

4,032,400

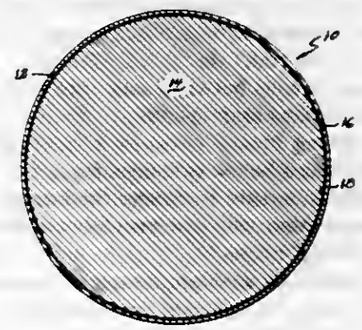
NUCLEAR REACTOR FUEL ELEMENT WITH VANADIUM GETTER ON CLADDING

Carl E. Johnson, Elk Grove Village, and Kenneth G. Carroll, La Grange, both of Ill., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Feb. 17, 1976, Ser. No. 658,805

Int. Cl.² G21C 3/06

U.S. Cl. 176—67 **5 Claims**



1. A nuclear fuel element comprising:

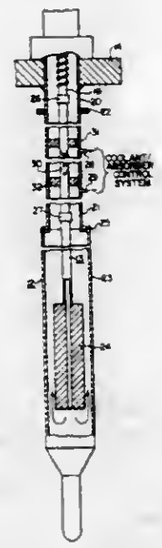
a tubular shaped outer metallic cladding having an inner surface and sealed ends, the cladding having walls 10 to 15 mils thick;
a thin layer of vanadium as an oxygen getter bonded to the inner surface of the cladding to form an integral member; and
a central core of actinide fuel material disposed within the cladding, said core being movable relative to the cladding.

4,032,401

COMBINED SOLID AND LIQUID SYSTEM FOR CONTROLLING NUCLEAR REACTORS

Reinhard Froelich, Scottdale, and Howard W. Yant, Greensburg, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 267,812, June 30, 1972. This application Aug. 2, 1974, Ser. No. 494,431
Int. Cl.² G21C 7/22
U.S. Cl. 176—86 R 8 Claims



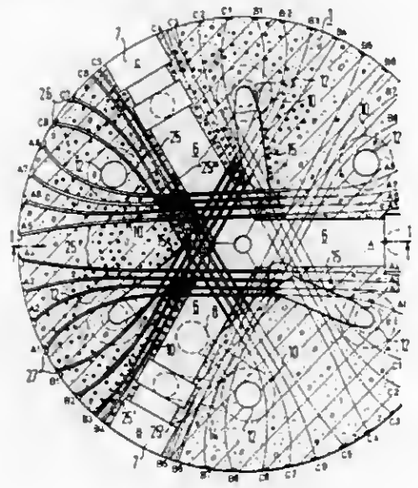
1. A control and shutdown system for a nuclear reactor, said nuclear reactor comprising a vessel, a vessel closure head, a nuclear core in said vessel, a coolant liquid circulating system for circulating a first cooling liquid into and out of said vessel for cooling said nuclear core, said control system comprising:
a. control rod drive mechanism affixed to said head,
b. an elongated hollow control rod enclosure stationary during reactor operation extending vertically downward from said mechanism through said head and said core and being closed at its bottom,
c. a control rod shaft cooperatively associated with said mechanism for selected vertical positioning within said enclosure, said shaft having a hollow portion and openings in said shaft for receiving a fluid into said hollow portion,
d. a control rod comprised of a solid neutron absorbing material removably coupled to the bottom of said shaft and having a fluid passageway therethrough in fluid communication with said hollow portion and extending to the bottom of said rod,
e. first sealing means between said enclosure and said shaft positioned above said openings,
f. second sealing means between said enclosure and said shaft positioned below said openings,
g. means affixed to said enclosure for inletting a liquid into the region within said enclosure between said first and second sealing means,
h. means affixed to said enclosure for outletting a liquid from the region within said enclosure below said second sealing means, and
i. means connecting said inletting and outletting means for selectively circulating a neutron absorber liquid and a second reactor coolant liquid through said shaft, said rod, and said enclosure, said connecting means forming a closed flow loop isolated from the flow of said first cooling liquid, said neutron absorber liquid serving to shut down said nuclear reactor, and said second reactor coolant serving to remove heat generated within said control rods.

4,032,402

CYLINDRICAL PRESTRESSED CONCRETE TANK FOR A NUCLEAR POWER PLANT

Malcolm Horner, Wolviston, England; Alija Hodzic, and Dirk Haferkamp, both of Mannheim, Germany, assignors to Hochtemperatur-Reaktorbau GmbH, Cologne, Germany and Taywood Engineering Limited,, Southall, United Kingdom

Filed May 4, 1976, Ser. No. 683,074
Int. Cl.² G21C 13/04
U.S. Cl. 176—87 13 Claims



1. A cylindrically shaped prestressed concrete pressure tank for a nuclear reactor power plant in which a gas-cooled high-temperature reactor is used with at least one heat utilization circuit including a turbine, a compressor and heat exchange apparatus, said tank having a vertically extending cylindrical axis, an upper and a lower end each extending transversely of the cylindrical axis and an outer surface extending approximately concentrically about the cylindrical axis betwen the upper and lower ends, said tank forming a reactor chamber concentric to the cylindrical axis and spaced inwardly from the upper end, the lower end and the vertically extending outer surface of said tank, compartments enclosed within said tank and spaced from said reactor chamber for receiving the components of the heat utilization circuit and connecting piping between the reactor and the components, wherein the improvement comprises that said compartments includes a plurality of horizontally extending first compartments located below said reactor chamber and above the lower end of said tank for receiving a gas turboset, a plurality of vertically extending second compartments arranged in a circle concentric to said cylindrical axis and spaced outwardly from said reactor chamber and inwardly from the vertical outer surface of said tank, a plurality of vertically extending third compartments arranged in a circle concentric to the cylindrical axis of said tank with the circle having a greater diameter than the concentric circle of said second compartments, means for prestressing said tank including vertically disposed tensioning elements extending in the axial direction of said tank and generally horizontally disposed tensioning elements extending transversely of the axial direction, said generally horizontally disposed tensioning elements including first and second horizontally disposed tensioning element with said first tensioning element located approximately at the vertical height of said plurality of first compartments and extending chordally across said tank in the general direction of the axis of said first compartments, with one said set associated with each of the plurality of said first compartments, said first tensioning elements in each of the sets extending for a major portion of its length along a rectilinear chordal path approximately parallel with the axial direction of said first compartment with which it is associated, and said second tensioning elements encircling said outer surface of said tank above and below the vertical range of said tank in which said at least one first compartment is located.

4,032,403

PROCESS FOR THE PRODUCTION OF SACCHARIFIED STARCH PRODUCTS WHEREIN MALTOSE IS THE PREDOMINANT CONSTITUENT

Shuzo Sakai, and Naoto Tsuyama, both of Okayama, Japan, assignors to Kabushiki-Kaisha Hayashibara Seibutsukagaku Kenkyujo, Okayama, Japan

Filed July 10, 1975, Ser. No. 594,680
Claims priority, application Japan, July 17, 1974, 49-81949; Nov. 7, 1974, 49-128638
Int. Cl.² C12D 13/02
U.S. Cl. 195—31 R 4 Claims

1. A process for improving maltose purity of saccharified starch products, comprising:
subjecting a starch hydrolysate with a 50% or more maltose purity to the action of an enzyme with a maltotriase decomposing activity versus maltose-decomposing activity ratio of 100 or higher, an optimal pH range from about 5.0 to 7.0, and optimal temperature range from about 45° to 55° C, a stable pH range of about 4.5 to 10.0, a stable temperature range not higher than 55° C, maltotriose decomposing activity several times higher than starch decomposing activity and substantially no dextrinogenic activity.

2. In a process for saccharifying starch products in which starch products are hydrolyzed to a maltose content of 50% or more, the improvement whereby maltose purity is increased, comprising:
subjecting said starch hydrolyzate to the action of an enzyme with a maltotriose-decomposing activity versus maltose-decomposing activity ratio of 100 or higher, an optimal pH range from about 5.0 to 7.0, and optimal temperature range from about 45° to 55° C, a stable pH range of about 4.5 to 10.0, a stable temperature range nto higher than 55° C, maltotriose decomposing activity several times higher than starch decomposing activity and substantially no dextrinogenic activity.

4,032,404

FERMENTATION PROCESS FOR PRODUCING APRAMYCIN AND NEBRAMYCIN FACTOR V'

Koji Tomita, Kawasaki; Hiroshi Tsukiura, Mitaka, and Hiroshi Kawaguchi, Tokyo, all of Japan, assignors to Bristol-Myers Company, New York, N.Y.

Filed July 14, 1976, Ser. No. 705,210
Int. Cl.² C12D 9/00, 9/14
U.S. Cl. 195—80 R 22 Claims

1. A microbiological process for the preparation of an aminoglycoside antibiotic mixture comprising apramycin and nebramycin factor V' which comprises cultivating a strain of *Streptoalloteichus hindustanus* having the identifying characteristics of A.T.C.C. 31217, 31218 or 31219 under submerged aerobic conditions in an aqueous medium containing assimilable sources of carbon and nitrogen until a substantial amount of said antibiotic mixture is produced by said organism in said culture medium.

14. A process for the preparation of tobramycin which comprises
a. culturing a nebramycin factor V'-producing strain of *Streptoalloteichus hindustanus* having the identifying characteristics of A.T.C.C. 31217, 31218 or 31219 under submerged aerobic conditions in an aqueous medium containing assimilable sources of carbon and nitrogen until a substantial amount of antibiotic activity is produced by said organism in said culture medium;
b. recovering the antibiotic mixture produced in step (a) from the culture medium;
c. subjecting said antibiotic mixture to base catalyzed hydrolysis to convert the nebramycin factor V' component to tobramycin; and
d. separating tobramycin from the antibiotic mixture of step (c) by chromatography over a cation exchange resin.

4,032,405

METHOD FOR PRODUCING CACAO BUTTER SUBSTITUTE

Chuji Tetsumi, Sakai; Yukio Hashimoto, Izumiotsu; Masahiko Terashima, and Takahai Matsuo, both of Osaka, all of Japan, assignors to Fuji Oil Company, Ltd., Osaka, Japan

Filed Apr. 16, 1976, Ser. No. 677,844
Claims priority, application Japan, Apr. 17, 1975, 50-47253
Int. Cl.² C12D 13/08
U.S. Cl. 195—82 5 Claims

1. A method for producing a cacao butter substitute, which comprises cultivating a *Rhodosporidium toruloides* microorganism capable of producing fats and oils rich in 1,3-disaturated-2-unsaturated triglycerides under an aerobic condition, collecting the resultant cells, and isolating a mixture containing fats and oils rich in 1,3-disaturated-2-unsaturated triglycerides from the cells.

4,032,406

DOPAMINE-β-HYDROXYLASE DETERMINATION METHOD

Lloyd E. Weeks, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Dec. 4, 1975, Ser. No. 637,805
Int. Cl.² G01N 31/14
U.S. Cl. 195—103.5 R 6 Claims

1. The method of determining dopamine-β-hydroxylase (DβH) activity in blood serum or plasma comprising reacting a sample of said blood serum or plasma with a DβH-specific substrate selected from the group consisting of dopamine and tyramine in the presence of a reaction medium saturated with air or oxygen and comprising ascorbate and fumarate and measuring the uptake of said oxygen with an oxygen-sensing electrode.

4,032,407

TAPERED BED BIOREACTOR

Charles D. Scott, and Charles W. Hancher, both of Oak Ridge, Tenn., assignors to The United States of America as represented by the United States Energy Research & Development Administration, Washington, D.C.

Filed Feb. 24, 1976, Ser. No. 660,902
Int. Cl.² C12B 1/00
U.S. Cl. 195—127 7 Claims

1. An apparatus for carrying out biologically catalyzed reactions, comprising:
a vertically oriented conically-shaped column having an inlet and an outlet disposed from one another along the longitudinal axis of said column, said conically-shaped column diverging at an angle of 0.5°–2° from said axis, said inlet communicating with a section of lesser cross sectional area than said outlet;
a particulate support material within said column; and
a biological catalyst comprising a living microorganism attached to said particulate support.

4,032,408

PROCESS OF PREPARING 3-OXO-PREGNA-4,17(20)-DIEN-21-CARBOXYLIC ACID AND ESTERS WITH MYCOBACTERIUM

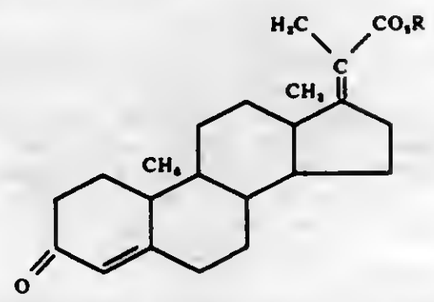
James Jiu, Morton Grove, Ill., and William J. Marsheck, Harbor Beach, Mich., assignors to G. D. Searle & Co., Chicago, Ill.

Division of Ser. No. 573,030, April 30, 1975, Pat. No. 3,994,933. This application Aug. 4, 1976, Ser. No. 711,655

Int. Cl.² C12D *13/02*

U.S. Cl. 195—51 S 2 Claims

1. A process for preparing a compound of the formula



wherein R is hydrogen or methyl comprising fermenting fucosterol, cholesterol, stigmasterol, sitosterol, campesterol and mixtures thereof with Mycobacterium sp. NRRL B-8054 in a suitable growth medium and isolating said compounds.

4,032,409

SEALING DEVICE FOR A COKE OVEN DOOR

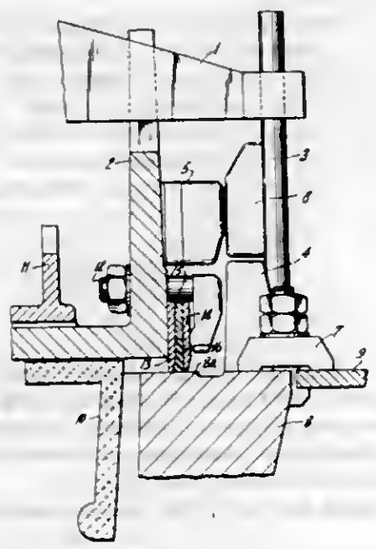
Johannes Knappstein, Recklinghausen; Heinrich Tewes, Essen, and Robert Wolkowski, Gelsenkirchen-Horst, all of Germany, assignors to Firma Carl Still and Ruhrkohle AG, both of, Germany

Filed June 11, 1975, Ser. No. 585,819

Claims priority, application Germany, June 14, 1974, 2428698

Int. Cl.² C10B *25/16*

U.S. Cl. 202—248 5 Claims



1. A sealing device for sealing a coke oven door to a door frame, comprising first and second spaced apart metal sealing blades having respective substantially aligned sealing edges adapted to extend outwardly from the edge of the door and abut against the frame in sealing engagement, a metal spacer between said first and second sealing blades having an outer edge spaced inwardly from the sealing edges of said first and second sealing blades, clamping means for mounting said first and second sealing blades and said spacer on a coke oven door, and an elastic sealing strip of a mineral fiber between said first and second sealing blades and having an outer elastic sealing edge substantially in alignment with said blade sealing edges and also abutting tightly against said frame in sealing engagement therewith.

4,032,410

DISTILLING COLUMN

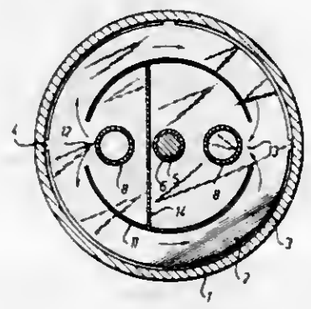
Bernhard Kuxdorf, Bruhl; Herbert Plische, Erftstadt; Heinz Erpenbach, Surth, and Wernfried Riechmann, Bruhl-Vochem, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Apr. 20, 1976, Ser. No. 678,651

Claims priority, application Germany, Apr. 26, 1975, 2518661

Int. Cl.² B01D *3/20*

U.S. Cl. 202—158 3 Claims



1. A distillation column comprising a vertical elongated housing, said housing having a plurality of serially arranged distilling trays vertically spaced apart from each other therein, said plurality of trays being free of attachments to the inner wall of said housing forming an annular slit between said inner wall and said trays, said plurality of trays being centrally traversed by an aligning rod, said rod being concentrically surrounded by a sleeve between each pair of adjacent trays, each of said trays having a downpipe eccentrically passed therethrough forming a liquid outlet of the accompanying tray and a liquid inlet of the next following tray; distillation column wherein said trays are provided around their peripheries with a plurality of spacers spaced from each other at equal distances around the peripheries of said trays, said spacers bearing against the inner wall of said housing forming said annular slit substantially uniform in width and being interrupted by said spacers; an annular insert arranged concentrically to said rod is secured to each of said trays so as to form a chamber surrounding the liquid inlet and the liquid outlet of the respective tray, said insert having a first aperture in the range of said liquid inlet and a second aperture in the range of said liquid outlet; and a partition plate is asymmetrically secured to the insert dividing said chamber into a first compartment containing the liquid inlet and a second compartment containing the liquid outlet and the aligning rod, whereby the liquid conveyed to each of said trays is forced to flow from the liquid inlet compartment through the first aperture between said insert and the inner wall of said housing thereby to come in contact with vapor matter ascending through said slit, and then through the second aperture into the second compartment to run off via said downpipe.

4,032,411

PROCESS FOR THE PREPARATION OF ETHYLENE DIAMINE HAVING LOW WATER CONTENT

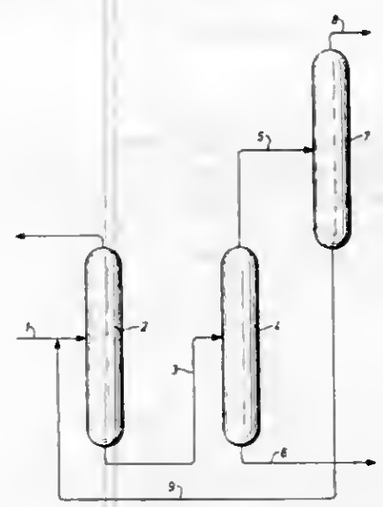
Jan Tore Tornquist, and Karl Goran Dahlberg, both of Stenungsund, Sweden, assignors to Berol Kemi AB, Stenungsund, Sweden

Continuation-in-part of Ser. No. 448,317, March 5, 1974, abandoned. This application June 13, 1975, Ser. No. 586,780

Claims priority, application Sweden, Mar. 7, 1973, 7303229

Int. Cl.² B01D *3/34*

U.S. Cl. 203—14 9 Claims



1. A process for the removal of water from a mixture of ethylene diamine and water, and for the preparation of ethylene diamine having a water content below the azeotropic equilibrium water content of ethylene diamine and water, which comprises vaporizing off water without formation of any azeotrope from a mixture comprising ethylene diamine, water and a nonazeotroping distillation adjuvant selected from the group consisting of piperazine, diethylene triamine, hydroxyethyl ethylene diamine, aminoethyl piperazine, and mixtures of said adjuvants, in an amount within the weight ratio range from about 2:8 to about 9:1 of distillation adjuvant: ethylene diamine, sufficient to permit vaporization of water from the ethylene diamine without formation of any azeotrope; and then distilling off and recovering as distillate ethylene diamine containing an amount of water less than said azeotropic equilibrium water content.

4,032,412

PROCESS FOR OPTIMAL PRESSURE CONTROL IN A MULTI-STAGE EVAPORATION UNIT

Alfred Hoppe, Frankfurt am Main, and Walter Geistert, Hamburg, both of Germany, assignors to Deutsche Texaco Aktiengesellschaft, Hamburg, Germany

Division of Ser. No. 425,431, Dec. 17, 1973, Pat. No. 3,894,915, which is a continuation of Ser. No. 165,621, July 23, 1971, abandoned. This application Jan. 30, 1975, Ser. No. 545,681

Int. Cl.² B01D *3/42*, *1/26*

U.S. Cl. 203—22 2 Claims

1. A method for controlling pressure of vapor effluent in a high pressure vapor line from a high pressure evaporator to a tank in a multi-stage evaporator unit for increased efficiency thereof comprising,

a. passing a fresh liquid feed in a supply line to a multi-stage evaporator until through a first preheating heat exchanger,

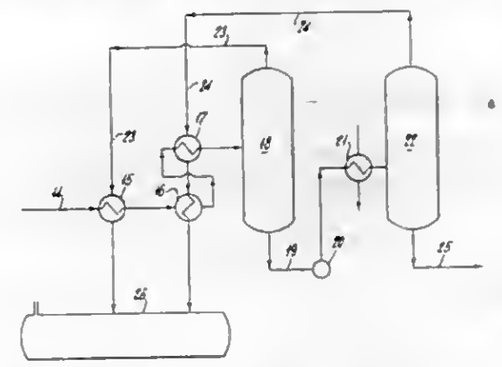
b. passing the fresh liquid feed from the first heat exchanger to a second shell-and-tube heat exchanger in series with the first heat exchanger,

c. passing the fresh liquid feed through the shell of the second heat exchanger,

d. passing the fresh liquid feed from the second heat exchanger to a third shell-and-tube heat exchanger in series with the second heat exchanger,

e. passing the fresh liquid feed through the tubes of the third heat exchanger to the multi-stage evaporator unit,

f. passing the vapor effluent in a high pressure vapor line from the multi-stage evaporator unit first through the shell of the third heat exchanger for condensing a portion of the vapor into a condensate, and



g. passing both the condensate and remaining vapor from the third heat exchanger into the tubes of the shell-and-tube second heat exchanger for condensing the remaining vapor in the latter tubes for increasing resistance to flow in the second heat exchanger for maintaining pressure in the high pressure vapor line and to increase the temperature of the fresh liquid feed to the multi-stage evaporator unit for increased efficiency.

4,032,413

ELECTROPLATING BATH AND METHOD FOR THE ELECTRODEPOSITION OF BRIGHT ALUMINUM COATINGS

Richard Dotzer, Nurnberg; Hans-Georg Hauschildt, Erlangen, both of Germany; Enno Todt, deceased, late of Erlangen, Germany; by Susanne Todt, legal heir, and by Ruth Katharina Todt, legal heir, both of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Nov. 12, 1975, Ser. No. 630,950

Claims priority, application Germany, Nov. 13, 1974, 2453830

Int. Cl.² C25D *3/02*, *3/44*

U.S. Cl. 204—14 N 12 Claims

1. An aluminum electroplating bath comprising an aprotic oxygen- and water-free organo-aluminum electrolyte medium and at least one additive containing a brightener selected from the group consisting of a sulfonamide, sulfonimide, carbimide and mixtures thereof.

4,032,414

ELECTROPLATING DEVICE AND METHOD FOR THE PARTIAL PLATING OF TWO-ROW PIN STRIPS

Johan Helder, Brugge, Belgium; Karl Holzinger, Munich, Germany; Gerd Guegel, Berlin, Germany; Heinz Liebler, Berlin, Germany, and Wolfgang Pernegger, Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Dec. 1, 1975, Ser. No. 636,427

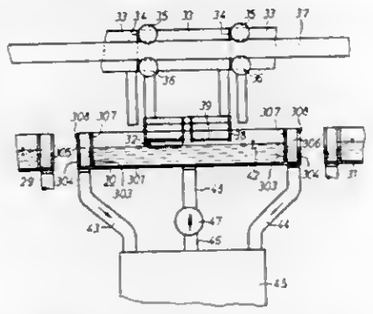
Claims priority, application Germany, Dec. 20, 1974, 2460694

Int. Cl.² C25D *5/02*, *5/08*, *17/06*, *17/28*

U.S. Cl. 204—15 10 Claims

1. In an electroplating device utilizing an electrically conductive contacting and transfer carriage for the detachable positioning and movement of items which are to be electroplated, the device including at least one treatment bath positioned along a line of transit followed by the carriage, the end walls of the treatment bath containing slots for passage of the

items detachably carried by the carriage, the improvement of said carriages being equipped with electrically conductive enclampment bars adapted to receive two-row pin strips detachably thereon, the carriages being articulated together forming an endless chain moving through a closed loop, electric circuit means in operative contact with the enclampment bars for at least a portion of said loop, an automatic pin strip loading device positioned at one point along said loop, said loading device effective to load pin strips onto said enclampment bars in a position to be treated by said treatment bath upon movement of the carriages around said loop, said pin strips held on said enclampment bars by a friction press fit with the pins on one side of each of the strips in electrically conductive engagement with an enclampment bar and an automatic stripper device positioned at a point along said loop on an opposite side of said treatment bath from said loading device in the direction of movement of the carriages, the stripper device effective to remove pin strips from said enclampment bars.



4,032,415

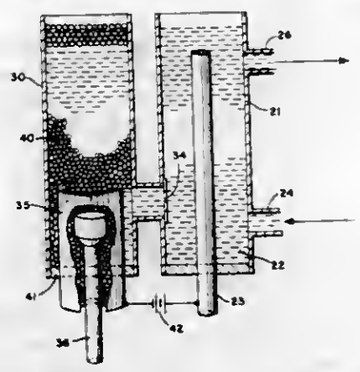
METHOD FOR PROMOTING REDUCTION OXIDATION OF ELECTROLYTICALLY PRODUCED GAS

Frederick W. Sanders, Chillicothe, Ohio, assignor to The Mead Corporation, Dayton, Ohio

Division of Ser. No. 498,084, Aug. 16, 1974, Pat. No. 3,996,118, which is a division of Ser. No. 252,285, May 11, 1972, Pat. No. 3,849,278. This application Sept. 30, 1976, Ser. No. 728,152

Int. Cl.² C25B 4/02, 1/26

U.S. Cl. 204—78 3 Claims



1. In a method of conducting electrolytic reactions by contacting an anode and cathode with an aqueous electrolyte and imposing a current flow from one electrode to the other through the electrolyte thereby producing chlorine gas at the anode, the improvement comprising:

a. positioning a fixed static bed of solid particles selected from the group consisting of carbon particles, activated carbon particles, and platinized compound particles, in a fixed, static condition adjacent the anode so as to receive the chlorine gas electrolytically produced at the anode,

b. introducing a second gas capable of reducing said chlorine gas directly into said fixed static bed of solid particles without disrupting the non-turbulent condition of said fixed static bed, and

c. introducing an aqueous solution into contact with said solid particles, said solid particles being essentially inert with respect to said chlorine gas, said second gas, said aqueous solution, and the reaction product of said reaction and each solid particle being wetproofed by treatment with a substance not wetted by said aqueous solution in order to effectively promote the non-electrolytic reduction of said chlorine gas.

4,032,416

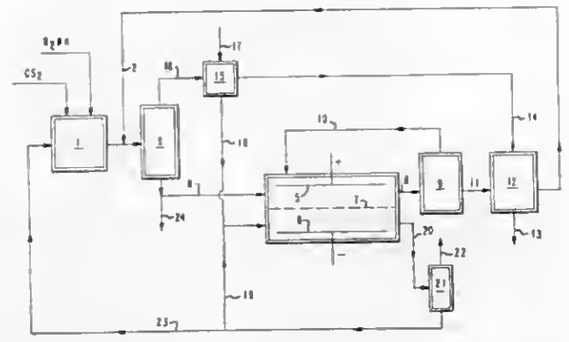
ELECTROLYTIC OXIDATION PROCESS

Leonard Harry Cutler, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 10, 1976, Ser. No. 665,550

Int. Cl.² C25B 3/02, 11/04

U.S. Cl. 204—79 15 Claims



1. A process for the electrolytic oxidation of a dialkyldithiocarbamate to a tetraalkylthiuram disulfide, said process comprising

1. introducing a catholyte and an anolyte to an electrolytic cell divided into a cathode compartment and an anode compartment separated from each other by a cationic membrane capable of resisting migration of hydroxyl ions under process conditions, the active anode surfaces being shiny platinum; the anolyte being an aqueous solution of an alkali metal dialkyldithiocarbamate, and the catholyte being a dilute aqueous alkali solution;

2. connecting the anode and the cathode to a direct current source of a high enough voltage to provide a current density sufficient to effect oxidation of the dialkyldithiocarbamate to tetraalkylthiuram disulfide; and

3. recovering the tetraalkylthiuram disulfide from the anode compartment.

4,032,417

ELECTROLYTIC PROCESSES

John A. Peterson, Niagara Falls, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed Sept. 3, 1974, Ser. No. 502,478

Int. Cl.² C25B 1/34, 11/08, 11/10

U.S. Cl. 204—98 10 Claims

1. In a method of electrolyzing aqueous metal chloride solutions, wherein chlorine is liberated at the anode, the improvement consisting essentially of using as said anode, a composite structure comprising a valve metal substrate, a coating thereon of an oxide bronze, and an outer coating of a noble metal oxide selected from the group consisting of an oxide of platinum, iridium, rhodium, palladium, ruthenium, and osmium and mixtures thereof.

4,032,418

METHOD OF INTRODUCING IMPURITIES INTO A SEMICONDUCTOR

Jovan Antula, 19, Trappentreu St., Munich, Germany (D-8000)

Filed July 7, 1975, Ser. No. 593,486

Claims priority, application Germany, Jan. 16, 1975, 2501621

Int. Cl.² C25D 11/00

U.S. Cl. 204—130 11 Claims

1. A method for doping a surface zone of a doped semiconducting material with an impurity material to provide a junction (p-n or p-p⁺or p-n⁺) within the doped semiconductor material

comprising the steps of

contacting a surface portion of said doped semiconducting material with a liquid containing ions of said impurity material, at the temperature of below 60° C to form a doped semiconductor-material - ion containing liquid interface;

placing an electrode connected to one terminal of a d-c source within said liquid and connecting the opposite polarity terminal of the d-c source to another surface portion of said doped semiconducting material;

and forming a depletion layer to permit migration of ions thereinto from said ion containing liquid through said interface and thus form said junction by applying a d-c voltage from said source to said terminal and hence across said doped semiconducting material - ion-containing liquid interface, said voltage having a polarity and magnitude to form the zone of depleted charge carriers in the semi-conductor material adjacent the surface in contact with the electrolyte and to accelerate said ions from said ion containing liquid into said doped semi-conducting material.

4,032,419

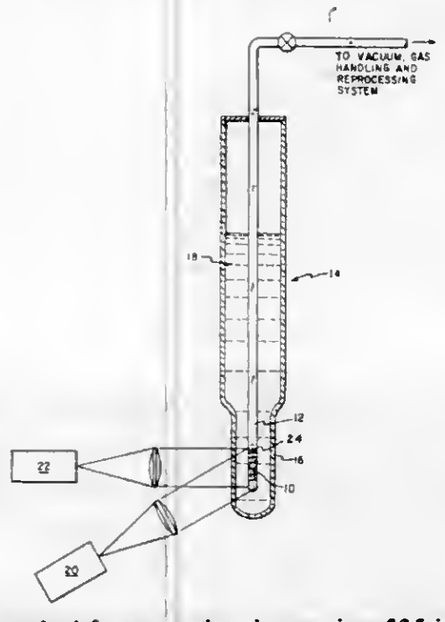
METHOD AND APPARATUS FOR SEPARATING URANIUM ISOTOPES

Elliot R. Bernstein, Princeton, N.J., assignor to Research Corporation, New York, N.Y.

Filed June 11, 1975, Ser. No. 585,809

Int. Cl.² B01J 1/10

U.S. Cl. 204—157.1 R 14 Claims



1. A method for separating the uranium-235 isotope-bearing molecules having a first energy excitation level from the uranium-238 isotope-bearing molecules having a second energy excitation level higher or lower than said first excitation energy level in a uranium compound comprising the steps of irradiating said uranium compound in the crystalline form of the solid phase at a first predetermined frequency which excites the uranium-235 isotope-bearing molecules but not the uranium-238 isotope-bearing molecules, and irradiating said uranium compound in the crystalline form of the solid phase with a second radiation source at a second predetermined frequency which dissociates or ionizes the uranium-235 isotope-bearing molecules from said uranium compound in the crystalline form of the solid phase but does not ionize or dissociate the uranium-238 isotope-bearing molecules from said uranium compound.

4,032,420

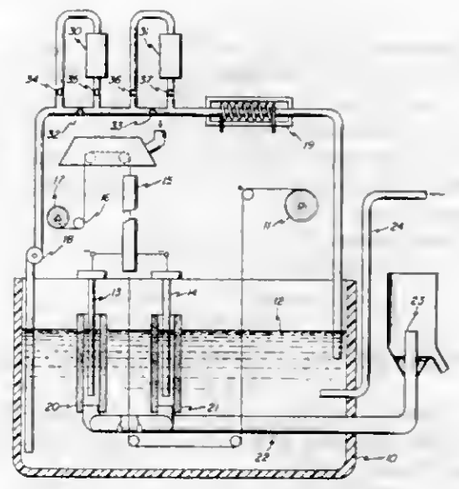
METHOD OF RESTORING OR MAINTAINING AN ELECTROCOATING BATH

Edith M. Boldebuck, Schenectady, and Catherine W. Joyoson, Alplaus, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 17, 1975, Ser. No. 641,624

Int. Cl.² C25D 13/24

U.S. Cl. 204—181 7 Claims



1. A method of restoring a polyamide acid salt electrocoating bath, which is incapable of providing an electrodeposit having at least 15% solids, which has deteriorated over a shelf period of at least several days at ambient temperature, to produce a polyamide acid salt electrocoating composition capable of providin, an electrodeposit with greater than 15% by weight solids, or maintaining an electrocoating bath which is being used continuously to electrocoat an aluminum or copper conductor under ambient conditions, which comprises contacting the polyamide acid salt bath with an anion exchange resin for time sufficient to reduce, or maintain the excess non-neutralized carboxylic acid of the polyamide acid salt to less than 0.45 meq of titratable carboxylic acid, per gram of polyamide acid salt, where the anion exchange resin has a cross-link density sufficient to contain from about 50–70% by weight water based on the total weight of water and dry weight of resin.

4,032,421

CLEANING OF FLUE GAS APPARATUS

Claus Fabricius, Allerod, Denmark, assignor to Guldager Electrolyse International & Cie, Basel, Switzerland

Filed Dec. 1, 1975, Ser. No. 636,602

Claims priority, application Denmark, Dec. 3, 1974, 6264/74

Int. Cl.² C23F 13/00

U.S. Cl. 204—196 4 Claims

1. An apparatus for cleaning flue gas comprising:

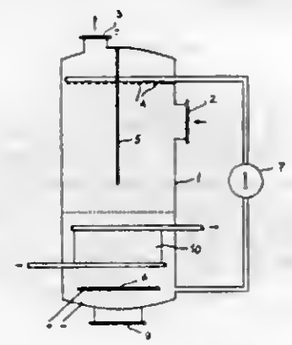
a conductive metal receptacle gas-washer including gas inlet means and gas outlet means establishing a path for flue gas to travel through the receptacle;

a plurality of nozzles arranged within an upper region of

said receptacle in a position for spraying flue gas traveling from said inlet means to said outlet means;

conduit means for providing communication between a lower region of said receptacle and said nozzles;

pumping means provided in said conduit means and operable to transport water from said lower region of said receptacle to said nozzles through said conduit means;



electrolytic circuit means for treating suspensions in the lower region of said receptacle to render the suspensions noncorrosive, and comprising said conductive receptacle as a cathode and an anode disposed in said receptacle at the lower region thereof above its bottom, immersed in water, said anode and cathode being connected to a DC source; and

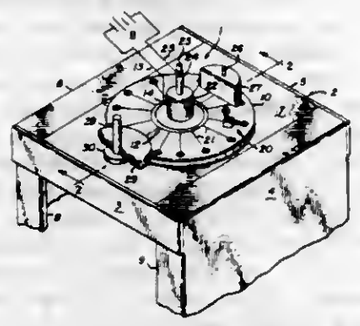
discharge means for removing sludge from the lower region of said receptacle.

4,032,422

APPARATUS FOR PLATING SEMICONDUCTOR CHIP HEADERS

John P. Ross, Cupertino, and Carl E. Bernardi, San Jose, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed Oct. 3, 1975, Ser. No. 619,368
Int. Cl.² C25D *5/02, 5/08, 17/28*
U.S. Cl. 204—224 R **10 Claims**



1. An apparatus for plating the die-attach areas of a plurality of semiconductor chip headers comprising:

a plurality of cavities, each of said cavities being adapted for supporting one of said plurality of headers in an inverted position therein;

means forming a sealing member disposed in each of said cavities, said sealing member having a central hole, said hole having a diameter corresponding to the diameter of said die-attach areas;

means for clamping headers against said sealing members such that said sealing members provide a fluid-tight seal about said die-attach areas;

means for jetting plating fluid containing a metal through said hole in said sealing members and against said die-attach areas while said headers are clamped against said sealing members; and

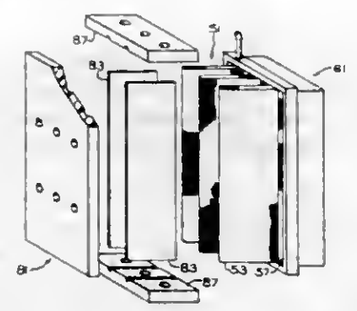
means for causing a current to flow between said jetting means and said headers while said plating fluid is being jetted against said die-attach areas for plating said die-attach areas with said metal.

4,032,423

METHOD OF ASSEMBLING A BIPOLAR ELECTROLYZER

Hugh Cunningham, Corpus Christi, Tex., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed June 9, 1976, Ser. No. 694,505
Int. Cl.² C25B *1/34, 9/02, 13/00, 13/04*
U.S. Cl. 204—254 **11 Claims**



1. In a method of assembling a diaphragm cell having a cathode unit containing a plurality of fingered cathodes, and an anode unit containing a plurality of metal extending outwardly from the anode unit, said method comprising the steps of bringing the cathode unit into contact with a slurry, depositing a diaphragm from the slurry onto the fingered cathodes, removing the cathode unit from the slurry, and assembling the anode unit and the cathode unit whereby to form an electrolytic cell having the anodes thereof interleaves between the cathodes thereof, the improvement comprising:

providing a barrier between a pair of cathodes during diaphragm deposition on said cathodes; and

assembling the anode and cathode units to form a diaphragm cell.

6. In a method of assembling a diaphragm cell having a cathode unit containing a plurality of fingered cathodes, and an anode unit containing a plurality of metal anodes extending outwardly from the anode unit, each of said anodes being formed of a pair of metal sheets, said method comprising the steps of bringing the cathode unit into contact with a slurry, depositing a diaphragm from the slurry onto the fingered cathodes, removing the cathode unit from the slurry, and assembling the anode unit and the cathode unit whereby to form an electrolytic cell having the anodes thereof interleaved between the cathodes thereof, the improvement comprising:

joining the anode sheets together with an acidified sodium chloride brine leachable joint at the end spaced from the anode unit; and

assembling the anode and cathode units to form a diaphragm cell.

4,032,424

ELECTRICAL CURRENT BREAKER FOR FLUID STREAM

Edward J. Peters, Chardon, and Wayne P. Zeman, Richmond Heights, both of Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio

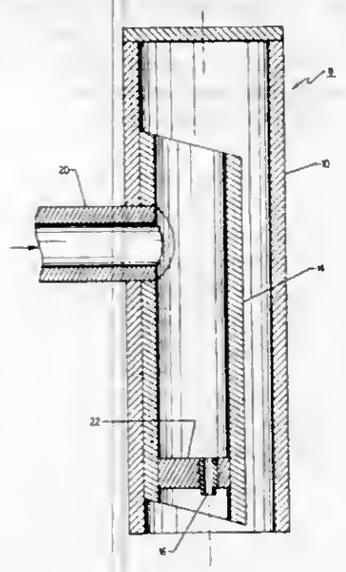
Filed Dec. 22, 1975, Ser. No. 643,182
Int. Cl.² C25B *1/16, 1/26, 9/00*
U.S. Cl. 204—258 **4 Claims**

1. Apparatus for interrupting the passage of electrical current along a mixed stream of gas and liquid, which comprises:

a. an outer enclosure;

b. an inner receiver of smaller cross-section supported totally within the outer enclosure for receiving a flow of mixed gas and liquid, having an open top and a closed bottom with an orifice therein;

c. means for introducing a flow of gas and liquid into the inner receiver, whereby the gas and liquid introduced into the inner receiver are allowed to separate, the gas flowing out the open top of the receiver into the outer enclosure



and the liquid flowing out through the orifice where it falls vertically and separates into individual drops;

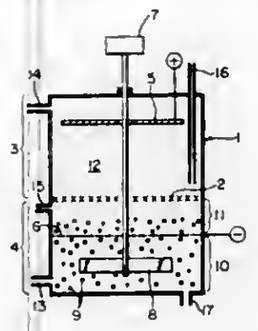
d. means connected to the outer enclosure for collecting and removing the separated gas and liquid.

4,032,425

ELECTROLYTIC CELL FOR USE IN HYDROELECTROMETALLURGY

Hiroshi Kametani, Tokyo, Japan, assignor to National Research Institute for Metals, Tokyo, Japan

Filed Sept. 27, 1976, Ser. No. 726,956
Claims priority, application Japan, Sept. 30, 1975, 50-117146
Int. Cl.² C25B *9/00;* **C25D** *17/00;* **C25C** *7/00*
U.S. Cl. 204—261 **4 Claims**



1. An electrolytic cell for use in the continuous hydroelectrometallurgical production of a metal by the electrolytic deposition of the metal on the surface of suspended seed particles of pure metal comprising

a. a vertical cylindrical cell comprising an upper anode zone including a horizontal anode and a lower cathode zone including a horizontal network cathode, said network cathode partitioning the cathode zone into an upper and a lower part,

b. a stirrer disposed below said network cathode for agitating the electrolyte to maintain the seed paticles contained therein in a suspended state within said cathode zone,

c. an inlet for charging into the cathode zone the electrolyte and the seed particles on which surface the metal is to be electrolytically deposited from the electrolyte,

d. an outlet for discharging from the anode zone the spent electrolyte,

e. an outlet for discharging and recovering from the cathode zone the enlarged metal particles which have grown by the aforesaid electrolytic deposition of the metal on the surface of the seed particles, and

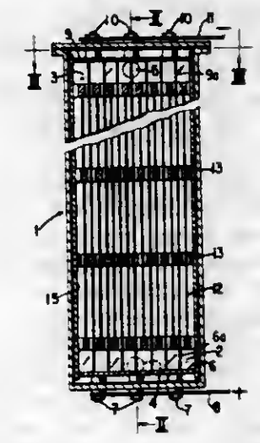
f. means for passing an electric current between the anode and the network cathode.

4,032,426

ELECTROLYSIS CELLS

Oronzio de Nora, Milan, Italy; Vittorio de Nora, Nassau, Bahamas, and Placido M. Spaziante, Milan, Italy, assignors to Oronzio de Nora Impianti Elettrochimici S.p.A., Milan, Italy

Filed Oct. 15, 1974, Ser. No. 514,762
Claims priority, application Italy, Oct. 30, 1973, 30709/73
Int. Cl.² C25B *1/24*
U.S. Cl. 204—268 **7 Claims**



1. A vertical diaphragmless bipolar electrolyzer comprising a vertical housing provided with a lower electrically neutral electrolyte inlet chamber, an upper electrically neutral electrolyte outlet chamber to keep turbulence within the electrolysis zone to a minimum, a plurality of electrically non-conductive and electrolyte inert divider elements disposed horizontally in the housing and having a cross-section substantially equal to the housing cross-section to form a plurality of chambers therebetween, a plurality of bipolar electrodes passing through said divider elements and being evenly spaced about the housing cross-section with the anode portions and cathode portions extending the same distance from the respective divider elements and interleaved respectively with the cathode portions and anode portions of adjacent groups of electrodes, means in the divider elements allowing smooth upward flow of the electrolyte from one chamber to the next higher chamber and means to impress an electric current on the electrolyzer.

4,032,427

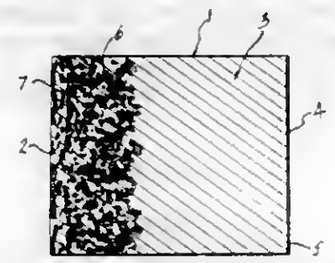
POROUS ANODE SEPARATOR

Igor V. Kadija, Cleveland, Tenn., assignor to Olin Corporation, New Haven, Conn.

Filed Nov. 3, 1975, Ser. No. 627,995
Int. Cl.² C25B *11/06, 13/04*
U.S. Cl. 204—283 **15 Claims**

1. An anode separator comprising a porous plate of a valve metal selected from the group consisting of titanium, tantalum and niobium, said porous plate having a face, a back and an interior structure, said face having an electrochemically active coating selected from the group consisting of a platinum group metal, a platinum group metal oxide and mixtures thereof, said back and a portion of said interior having an electrochemically non-active barrier layer comprising a mixture of an oxide of titanium, tantalum or niobium and a ceramic oxide

selected from the group consisting of silicon oxide, aluminum oxide, magnesium oxide, calcium oxide, and mixtures thereof,



wherein said portion is at least 10 percent of said interior structure.

4,032,428

LIQUEFACTION OF COAL

George C. Johnson, Princeton, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Jan. 28, 1976, Ser. No. 653,070
Int. Cl.² C10G *1/06*
U.S. Cl. 208—8 6 Claims

1. In a process for the liquefaction of coal, the improvement which comprises admixing comminuted coal with a thermally stable organic solvent having a boiling point in the range between about 450° and 950° F; heating the admixture at a temperature between about 500° and 900° F for a period of time sufficient to solubilize substantially the coal and form a slurry of a homogeneous liquefaction phase and a solids phase of ash and residual coal; thereafter passing the said slurry through a filter bed zone to separate the liquefaction phase from the solids phase, wherein said filter bed comprises crushed raw coal; and recovering the liquefaction phase as an effluent from the filter bed zone.

4,032,429

COAL LIQUEFACTION PROCESS USING AN ALUMINUM PHOSPHATE SUPPORTED CATALYST

Donald C. Cronauer, Gibsonia, and William L. Kehl, Indiana Township, Allegheny County, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Nov. 28, 1975, Ser. No. 635,917
Int. Cl.² C10G *1/08*
U.S. Cl. 208—10 11 Claims

1. In a process for the liquefaction of coal in a reaction zone in the presence of a solvent having hydrogen transfer properties and hydrogen and solid supported catalyst containing a hydrogenation component under coal liquefaction conditions, the improvement which comprises utilizing a catalyst support comprising an amorphous aluminum phosphate.

4,032,430

PROCESS FOR PRODUCING CARBON FIBERS FROM MESOPHASE PITCH

Irwin Charles Lewis, Lakewood, Ohio, assignor to Union Carbide Corporation, New York, N.Y.

Filed Dec. 11, 1973, Ser. No. 423,717
Int. Cl.² C10C *1/00*
U.S. Cl. 208—39 3 Claims

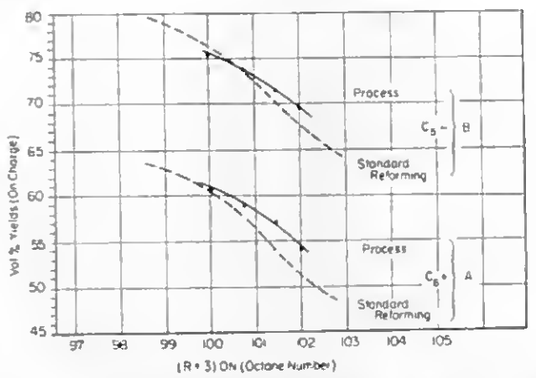
1. A process for producing a mesophase pitch which comprises heating a carbonaceous pitch at a temperature of from 350° to 450° C. for a time sufficient to produce a mesophase content of from 40 percent by weight to 90 percent by weight while subjecting the pitch to a pressure of less than 100 millimeters Hg during formation of the mesophase.

4,032,431

SHAPE SELECTIVE NAPHTHA PROCESSING

Paul B. Weisz, Yardley, Pa., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 747,646, July 25, 1968, abandoned, Continuation-in-part of Ser. No. 547,608, May 4, 1966, Pat. No. 3,395,094. This application July 16, 1970, Ser. No. 66,537
The portion of the term of this patent subsequent to July 30, 1985, has been disclaimed.
Int. Cl.² C10G *37/00*
U.S. Cl. 208—62 4 Claims



1. The process for upgrading naphtha so as to produce a product enriched in aromatics which comprises:
   a. contacting a charge naphtha in the presence of hydrogen with a reforming catalyst to yield hydrocarbon products;
   b. passing hydrocarbon products of said reforming step in admixture with hydrogen in contact with a catalyst mixture comprising:
      1. a shape selective crystalline aluminosilicate hydrocracking catalyst having a silica to alumina ratio of at least 3.0, a pore size of about 4.5 to 6 Angstrom units and having hydrogenation/dehydrogenation activity, and
      2. s reforming catalyst.

4,032,432

CONVERSIONS OF HYDROCARBONS

Hartley Owen, Belle Mead, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Aug. 28, 1975, Ser. No. 608,595
Int. Cl.² C10G *37/06*
U.S. Cl. 208—70 5 Claims

1. A method for converting hydrocarbons in the presence of a heterogenous catalyst mix comprising a relatively large pore faujasite crystalline zeolite mixed with a smaller pore crystalline zeolite selected from the group consisting of erionite and mordenite crystalline zeolites which comprises, passing a relarively high boiling hydrocarbon feed of at least gas oil boiling range in admixture with said heterogenous catalyst mix upwardly through a first hydrocarbon conversion zone at an elevated cracking temperature within the range of 900° to 1200° F and a hydrocarbon residence time in the reaction zone up to 15 seconds but sufficient to form hydrocarbon conversion products thereof, separating said catalyst mix from said hydrocarbon conversion products, separating said conversion products into a C_6 and lower boiling fraction, a gasoline fraction and a higher boiling fraction including heavy cycle oil, recovering the separated gasoline and higher boiling fractions, contacting the separated C_6 and lower boiling components with a portion of said heterogenous catalyst mix separated from hydrocarbon conversion products of said first conversion zone at a temperature within the range 550° to 900° F at a space velocity in the range of 0.25 to 13 promoting at least one of olefin oligmerization, polymerization and olefin cyclization, and separately recovering products of said C_6 and lower boiling products upgrading separately from said high boiling hydrocarbon conversion operation.

4,032,433

HYDROREFINING ASPHALTENIC PETROLEUM CHARGE STOCKS

Larry W. Petri, Arlington Heights, and John E. Conway, La Grange, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed Apr. 30, 1976, Ser. No. 681,988
Int. Cl.² C10G *13/04, 23/02;* B01J *35/10*
U.S. Cl. 208—112 9 Claims

1. A process for hydrorefining an asphaltenic hydrocarbonaceous charge stock containing at least one contaminant from the group of sulfurous compounds, and nitrogenous compounds, which process comprises reacting said charge stock with hydrogen at hydrorefining conditions including a pressure above about 1000 psig. and a temperature selected to convert sulfurous and nitrogenous compounds into hydrogen sulfide, ammonia and hydrocarbons, and at least a portion of said charge stock into lower-boiling liquid hydrocarbons, and in contact with a catalyst having a carrier material prepared by a method which comprises:
   a. admixing a peptizing agent, a surfactant and a water-insoluble, particulate organic polymer with a powdered refractory inorganic oxide, said organic polymer being characterized by a particle size of from about 1 to about 200 microns;
   b. extruding the resulting mixture; and,
   c. drying and calcining the extrudate product at a temperature effective to decompose said organic polymer.

4,032,434

CONVERSION OF HYDROCARBONS WITH A SUPERACTIVE ACIDIC BIMETALLIC CATALYTIC COMPOSITE

Richard E. Rausch, Mundelein, Ill., assignor to UOP Inc., Des Plaines, Ill.

Division of Ser. No. 423,606, Dec. 10, 1973, Pat. No. 3,948,804. This application Jan. 19, 1976, Ser. No. 650,484
The portion of the term of this patent subsequent to July 10, 1990, has been disclaimed.
Int. Cl.² C10G *35/08*
U.S. Cl. 208—139 16 Claims

1. A process for converting a hydrocarbon which comprises contacting the hydrocarbon at hydrocarbon conversion conditions with a catalytic composite comprising a combination of a platinum group component, a tin component and a halogen component with a porous carrier material; werein the metallic components are present in amounts sufficient to result in the composite containing on an elemental basis, about 0.01 to about 2 wt. % platinum group metal and about 0.01 to about 5 wt. % tin; wherein the tin component is uniformly dispersed throughout the porous carrier material in a particle size which is less than 100 Angstroms in maximum dimension; wherein substantially all of the platinum group component is present as an elemental metal; wherein substantially all of the tin component is present in an oxidation state above that of the elemental metal; and wherein the amount of the halogen component, on an elemental basis, contained in the composite is defined by the following equation:

$$\text{wt.\% halogen} = (K_1)(SA) + (K_2)(K_3)(M_{Sn})$$

where
K_1 is about 0.004 to about 0.006 wt. % Halogen/M^2/g
K_2 is about 3 to about 5 atoms of halogen/atoms of tin
K_3 is the gram atomic weight of the halogen
M_{Sn} is moles of tin contained in the composite per 100 g. of composite
SA is the surface area of the carrier material in M^2/g.

4,032,435

HYDRODESULFURIZATION OF PETROLEUM RESIDUUM UTILIZING A CARBON-SUPPORTED CATALYST

Joseph Lawrence Schmitt, Jr., Bethel, and George Augustus Castellion, Stamford, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 540,936, Jan. 14, 1975, Pat. No. 3,997,473, which is a continuation-in-part of Ser. No. 408,356, Oct. 23, 1973, abandoned. This application Sept. 22, 1976, Ser. No. 725,599
Int. Cl.² C10G *23/02*
U.S. Cl. 208—216 5 Claims

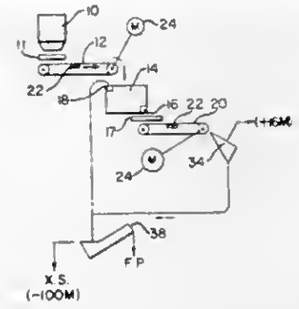
1. A process for the hydrodesulfurization of petroleum residuum comprising contacting said residuum at elevated temperature and pressure with hydrogen in the presence of a catalyst composition consisting essentially of a carbon support carrying at least 10 and up to about 20 weight percent of a first metal selected from tungsten and molybdenum and from about 2 to 10 weight percent of a second metal selected from cobalt and nickel, said percentages being expressed as the metal oxide contents based on the weight of said support and said metals being substantially in the form of their sulfides, said catalyst composition having a surface area in the range of about 200–800 square meters per gram, a pore volume of about 0.25 to 1.3 cubic centimeters per gram so as to base an average pore radius of at least about 25 angstrom units, and a compacted bulk density in the range of about 0.3 to 0.8 gram per cubic centimeter.

4,032,436

PARTICLES SIZING

Kenneth I. Johnson, 19 Torreyside Road, Brockton, Mass. 02401

Filed Oct. 23, 1975, Ser. No. 625,253
Int. Cl.² B07B *1/00*
U.S. Cl. 209—1 5 Claims



1. Method of classifying particles of variegated sizing comprising the steps of,
   feeding a throughput flow of the particles at a rate (F), divert part of throughput at a rate (G) to a calibrated coarse size selective device and eliminating particles in excess of the calibrated gross size at a first rate (H),
   feeding the combination of resultant (G)–(H) flow and (F)–(G) flow to a calibrated fine size selected device at a known rate and eliminating particles below said fine size at a known rate (XS),
   and controlling the rates (G) and (XS) for a given rate (F) to achieve a desired sieve analysis and fineness modulus of resultant product flow at a rate of (F)–(H)–(XS) including control of particle sizes at levels intermediate said coarse and fine size calibrations,
   the control being implemented in accordance with the finished product describing equation:

$$I = \frac{(N)\ \theta Z + (N-1)\ \theta_2 Z_2 \ldots (N-N+1)\ \theta_N Z_N}{\theta_1 Z_1 + \theta_2 Z_2 \ldots \theta_N Z_N}$$

where t is desired fineness modulus divided by the decimal fraction equivalent, with respect to desired finished product tp, of the remainder after diverting fine size flow (XS), (N) is the number of significant size cuts in the desired sieve analysis, θ, $\theta_2 \ldots \theta_N$ are the decimal fractions of feed of each size in a series starting from coarsest size represented by θ, and finest size by said θ_N and Z_1, $Z_2 \ldots Z_N$ are fractional remainder coefficients of removal at the various sizes.

4,032,437

FECAL EXAMINATION DEVICE

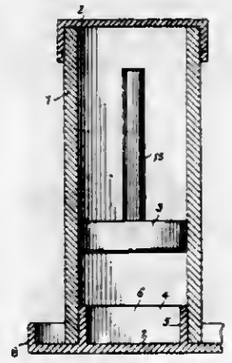
Robert J. Greenwald, 4771 N. Federal Highway, Pompano Beach, Fla. 33064

Continuation-in-part of Ser. No. 150,357, June 7, 1977, abandoned, which is a continuation-in-part of Ser. No. 255,857, May 22, 1972, Pat. No. 3,819,045. This application Mar. 26, 1974, Ser. No. 455,016

The portion of the term of this patent subsequent to June 25, 1991, has been disclaimed.

Int. Cl.² B03B 7/00

U.S. Cl. 209—17 **2 Claims**



1. A fecal examining process for detecting the presence of parasite material in feces, comprising providing cup means for receiving and transporting a sample of feces to be examined, providing a tube, open at both its ends, constructed and arranged to be tightly fitted to said cup means so that when so fitted the cup means closes one end of said tube and serves as a base for said tube whereby liquid diluent can then be poured into the other end of the tube to mix with the feces and be retained in the tube by the presence of said cup means, placing a sample of the feces to be examined in said cup means, then fitting said tube to said cup means, pouring liquid diluent into said tube to mix with the feces sample in said cup means, and permitting parasite material to float upward in said tube, through liquid diluent of higher density than said parasite material, to a collecting surface.

4,032,438

METHOD AND APPARATUS FOR ULTRASONICALLY REMOVING CONTAMINANTS FROM WATER

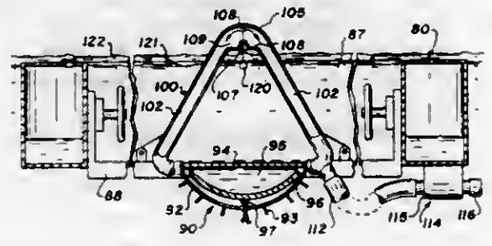
John N. Koblanski, Vancouver, Canada, assignor to Ocean Ecology Ltd., Edmonton, Canada

Filed Sept. 19, 1975, Ser. No. 615,114

Int. Cl.² B01D 37/00

U.S. Cl. 210—19 **9 Claims**

1. A method of removing a contaminating substance floating on a body of water comprising the steps of mounting a transducer having a predetermined focal region on a floating structure, controlling the buoyancy of the floating structure to locate the focal region of the transducer near the interface between the contaminating substance and the surface of the water, electrically energizing the transducer to generate high frequency sound waves radiating upwardly through the water, and entrapping a portion of the contaminating substance



spurted above the surface of the water by the focused sound waves.

4,032,439

EFFLUENT TREATMENT PROCESS

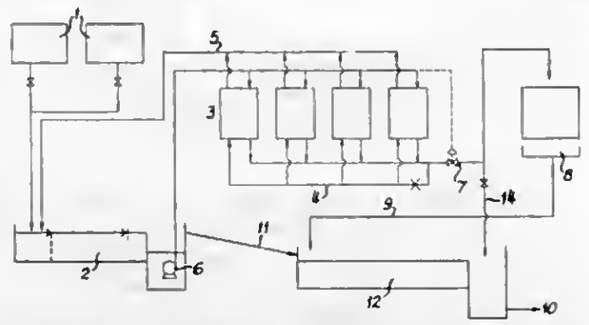
Guy Franklin Oldham, London, England, assignor to The British Petroleum Company Limited, London, England

Continuation of Ser. No. 535,181, Dec. 23, 1974, abandoned. This application Mar. 18, 1976, Ser. No. 668,078

Claims priority, application United Kingdom, Jan. 3, 1974, 00264/74

Int. Cl.² C02C 5/10

U.S. Cl. 210—17 **6 Claims**



1. A method for treating effluent water contaminated with petroleum and petroleum products containing oil and suspended solids to produce a clarified effluent water having a level of oil below about 5 mg/litre and a low level of BOD comprising the following sequential steps:

a. passing said contaminated effluent water to a gravity separator where insoluble oil and solids are separated from the aqueous phase;

b. passing the resulting oil and solids depleted aqueous phase effluent through a sand filter to remove unseparated insoluble oil and solids from the aqueous phase effluent and to obtain a resulting aqueous effluent suitable for effective passage through a biological percolating filter;

c. passing said resulting aqueous effluent through a biological percolating filter to reduce the BOD thereof to the desired low level thereby obtaining said clarified effluent water;

d. periodically stopping the flow of the aqueous phase effluent through the sand filter before insoluble oil passes therethrough and backwashing the sand filter to remove suspended oil therefrom.

4,032,440

SEMIPERMEABLE MEMBRANE

Hirotsugu Yasuda, Durham, N.C., assignor to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Nov. 18, 1975, Ser. No. 633,140

Int. Cl.² B01D 31/00, 13/00

U.S. Cl. 210—23 H **14 Claims**

1. A process for preparation of a composite semipermeable membrane comprising: (1) positioning a porous support in an atmosphere comprising a polymerizable admixture of (a) an organic monomer from the group consisting of acetylene, ethylene, allene, benzene, pyridine and furfurylamine and (b) an inorganic monomer consisting of water or a mixture of water with nitrogen or carbon monoxide, said admixture being in vapor form, and (2) subjecting said admixture to the influence of electromagnetic energy of a frequency of about 50 Hz to 3000 mHz to produce an electric glow discharge, thereby causing copolymerization of the monomers and deposition of the resulting copolymer as a film on the surface of the support.

4,032,441

METHOD FOR RECLAIMING USED HYDRAULIC FLUID

G. Eugene Larkin, 2598 W. 4900 S., Roy, Utah 84067, and Richard H. Buchi, 849 E. 300 South, Bountiful, Utah 84010

Filed June 30, 1976, Ser. No. 701,280

Int. Cl.² B01D 17/02

U.S. Cl. 210—63 R **1 Claim**

1. A method for reclaiming used and contaminated petroleum base aircraft-operational, hydraulic fluids which consist of the following sequential steps:

a. maintaining said contaminated fluid in a settling reservoir for a period of time sufficient to remove heavy particulate matter.

b. aerating said settled fluid by passing chemically dried air through the fluid;

c. adding an antifoaming agent together with only supplemental amounts of antioxidant, antiwear and corrosion inhibiting agents to said aerated fluid, said amounts being sufficient to reconstitute the fluid such that it possesses substantially the same characteristics as the unused fluid;

d. filtering fine particulate matter from the aerated fluids; and

e. drawing off the reclaimed hydraulic fluid for distribution to suitable storage containers.

4,032,442

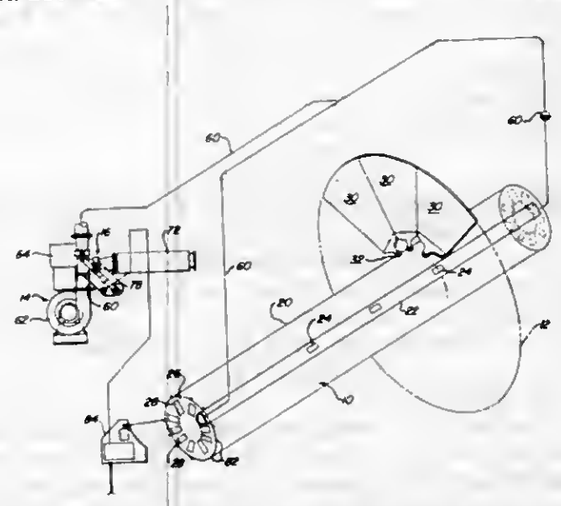
BY-PASS AND SYNCHRONIZED BLOW SYSTEM AND METHOD FOR ROTARY VACUUM FILTERS

C. Lynn Peterson, Salt Lake City, Utah, assignor to Peterson Filters and Engineering Company, Salt Lake City, Utah

Filed Nov. 21, 1975, Ser. No. 633,966

Int. Cl.² B01D 23/24

U.S. Cl. 210—82 **23 Claims**



1. A rotary vacuum filter of the type having a plurality of filter segments of the drum or the disc type, a continuously rotating face plate with a plurality of circularly positioned ports which are connected through communication passages in a central core member to the filter segments, a stationary blow port in a stationary bridge plate, fixedly mounted in a sliding operative relation to the rotating face plate, such that as the face plate rotates, individual valve ports on the face plate alternately slide past the stationary blow port forming openings of changing size between the face plate and the blow port, and allowing an air stream to be directed from the blow port to the individual valve port, through the communication passages to the filter segment, comprising:

airstream control means for supplying a stream of air from a pressure pumping means directly to the blow port, in a first operative condition of said airstream control means, and, alternatively to the atmosphere in a second operative condition of said airstream control means, and

automatic positioning means for automatically positioning the airstream control means in the first operative condition as soon as the rotating face plate has rotated a valve port in position with the blow port, such that a relatively unrestricted opening exists between the blow port and the valve port, said control means and said automatic positioning means, operatively connected in such a manner as to minimize velocity head losses otherwise caused by permitting the airstream to pass througb a relatively restricted opening between the blow port and the valve port.

13. A method of blowing filter segments in a rotary vacuum filter with a relatively constant, high-volume, low-pressure airstream wherein rotation of the rotary vacuum filter causes a periodic opening and closing of valve ports through which communication with filter segments to be blown is achieved, comprising the steps of:

connecting the airstream directly through a valve port after an initial periodic opening through the valve port occurs and at a time when a relatively unrestricted opening through the valve port occurs, disconnecting the airstream relative to the valve port and,

bypassing the airstream to the atmosphere after blowing the filter segments and before the next succeeding blow of any of the filter segments.

17. A system for blowing filter segments of a rotary vacuum filter of the type having a plurality of filter segments of the drum or the disc type, a continuously rotating face plate with a plurality of circularly positioned ports which are connected through communication passages in a central core member to the filter segments, a stationary blow port in a stationary bridge plate, fixedly mounted in a sliding operative relation to the rotating face plate, such that as the face plate rotates, individual valve ports on the face plate alternately slide past the stationary blow port forming openings of changing size between the face plate and the blow port, and allowing an air stream to be directed from the blow port to the individual valve port, through the communication passages to the filter segment, comprising:

a source of compressed air;

an air duct directly connecting the air source to the blow port;

a by-pass means in the air duct for automatically conducting the air from the air source to the atmosphere when open and for allowing the air stream from the air source to be conducted to the blow port when closed,

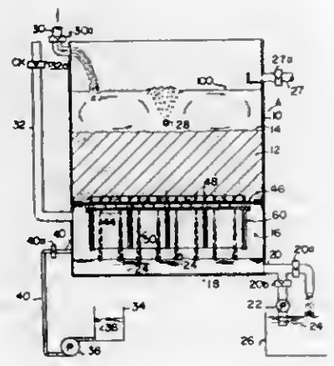
synchronizing means for signaling the occurrence of a relatively unrestricted opening between the blow port and a valve port, and means for causing the by-pass means to assume a closed position upon provision of the signal by the synchronizing means, said by-pass means, said synchronizing means and said means for causing, operatively connected in such a manner as to minimize velocity head losses otherwise caused by permitting the airstream to pass through a relatively restricted opening between the blow port and the valve port.

4,032,443

REMOVAL OF GREASE AND OIL FROM PARTICULATE BED GRANULES BY BACKWASHING WITH A DETERGENT

David S. Ross, Lorain, Ohio, assignor to Sterling Drug Inc., New York, N.Y.

Filed Jan. 29, 1976, Ser. No. 653,384
Int. Cl.² B01D 23/24
U.S. Cl. 210—82 19 Claims



1. Apparatus for the removal of grease and oil film from granular media surfaces in waste water filters comprising a filter, said filter includng a tank having a lower portion, a filter bed of particulate material within said tank above said lower portion, said filter bed having an upper surface,

an underdrain structure in the tank adjacent said lower portion and under said bed, an underdrain cavity within said lower portion coextensive with the underdrain structure, means for draining from the underdrain cavity filtered effluent after said filtered effluent has passed through said bed, means for forcing backwashing liquid into the underdrain cavity,

means for forcing a predetermined quantity of cleaning solution into the underdrain cavity.

means to intermittently energize said liquid forcing means to hydraulically disturb said bed of particulate material in contact with cleaning solution,

means to stop said liquid forcing means for a predetermined soak time, and

means to initiate a predetermined backwash cycle following a predetermined number of liquid forcing cycles and respective soak periods.

12. The method of removing oil and grease film from the granular surfaces of particulate media for filtering waste water in a waste filter wherein a filter bed is provided with an underdrain cavity including the steps of

a. forcing a predetermined quantity of a chemical cleaning agent into the underdrain cavity,

b. forcng a backwashing liquid into the underdrain cavity and up through the filter bed to substantially inundate the bed,

c. stopping the flow of backwashing liquid for a predetermined period,

d. hydraulically disturbing said bed of particulate material in contact with said liquid cleaning solution by forcing additional backwashing liquid into said underdrain cavity,

e. stopping the flow of backwashing liquid for a predetermined soaking period,

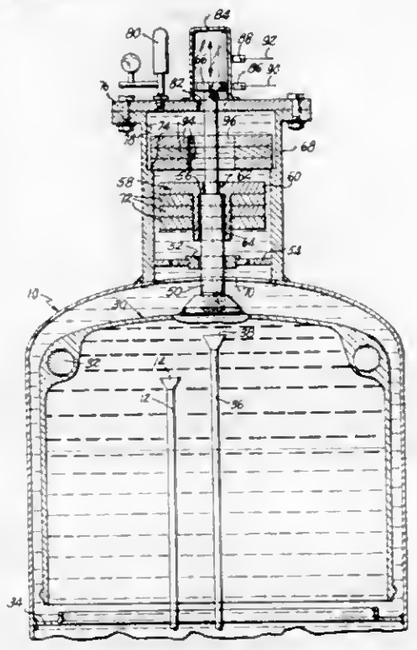
f. and initiating a predetermined backwash cycle following a predetermined number of cycles including steps d and e.

4,032,444

GRAVITATIONAL SEPARATOR FOR MIXTURES OF IMMISCIBLE LIQUIDS OF DIFFERENT DENSITIES

David A. Wright, and Chester H. Walters, both of St. Louis, Mo., assignors to National Marine Service, Inc., St. Louis, Mo.

Filed Aug. 29, 1975, Ser. No. 608,905
Int. Cl.² B01D 17/02
U.S. Cl. 210—86 11 Claims



1. In a system for detecting the accumulation of a predetermined quantity of less dense fluid within a gravitational separator for immiscible liquids of different densities, including a tank containing a reaction member normally disposed beneath a layer of higher density liquid undergoing separation when the separator is operating and wherein said reaction member is initially counterbalanced to be barely negatively buoyant in the liquid of higher density, said reaction member being normally subjected to the upward floating force of accumulated less dense liquid floating in the more dense liquid during separator operation, the improvement comprising: a housing in communication and assembled with the tank; a first mass of predetermined weight located within the tank and housing assembly, and connected to said reaction member, said first mass contributing at least in part to the negative buoyancy of said reaction member; a second mass of predetermined weight also located within the tank and housing assembly and normally supported from beneath by the separator structure; means for enabling said reaction member to raise said second mass along with said first mass only upon the accumulation of a predetermined quantity of less dense liquid in the tank, such accumulation creating a predetermined upward flotation force on the reaction member; and remote sensing means outside the tank and housing assembly physically unconnected to the second mass for detecting when the reaction member has raised the second mass.

4,032,445

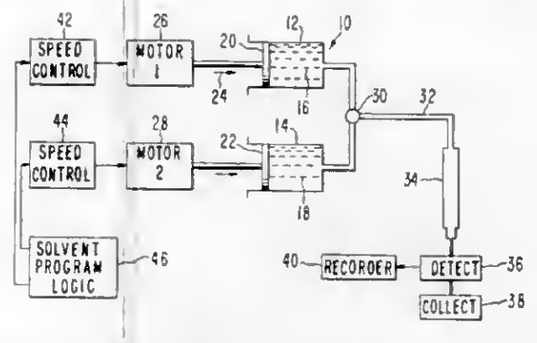
LIQUID CHROMATOGRAPHY PUMPING SYSTEM WITH COMPENSATION MEANS FOR LIQUID COMPRESSIBILITY

Miner N. Munk, Walnut Creek, Calif., assignor to Varian Associates, Palo Alto, Calif.

Filed Nov. 10, 1975, Ser. No. 630,400
Int. Cl.² B01D 15/08
U.S. Cl. 210—103 6 Claims

1. In a liquid chromatography system of the type including a chromatographic column, a reservoir for a slightly compressible liquid mobile phase, positive displacement pumping means cooperating with said reservoir for pumping said liquid phase from said reservoir along a flow path to and through said chromatographic column, and means for driving said pumping means at a pre-selected velocity; the improvement, which enables maintenance of a constant flow through said column in the presence of a flow resistance change in said column, comprising:

pressure control means in the flow path between said reservoir and said column, said pressure control means comprising means for providing an adjustable flow resistance



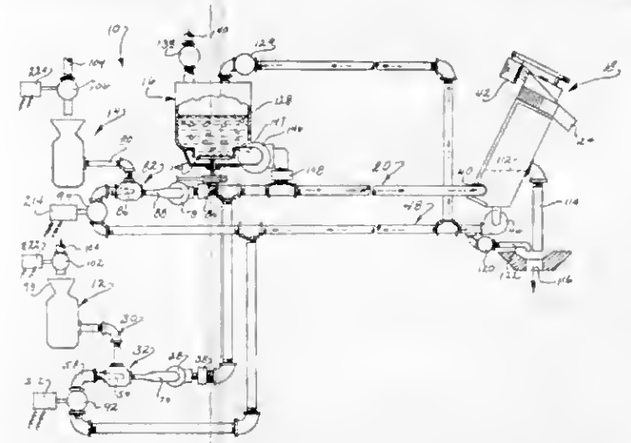
in said flow path, means for detecting the pressure in said flow path, and means responsive to the pressure detected by said pressure detecting means for adjusting the value of said flow resistance so as to maintain a substantially constant pressure at said reservoir, whereby to preclude flow rate changes that would otherwise arise from expansion or contraction of said liquid phase in consequence of the compressibility thereof.

4,032,446

WASTE MATERIAL HANDLING SYSTEM

Blaine Monroe Miller, Jr., Malvern, Pa., assignor to Hobart Corporation, Troy, Ohio

Filed May 5, 1976, Ser. No. 683,475
Int. Cl.² B01D 35/00; C02C 3/00; B02C 23/08
U.S. Cl. 210—152 11 Claims



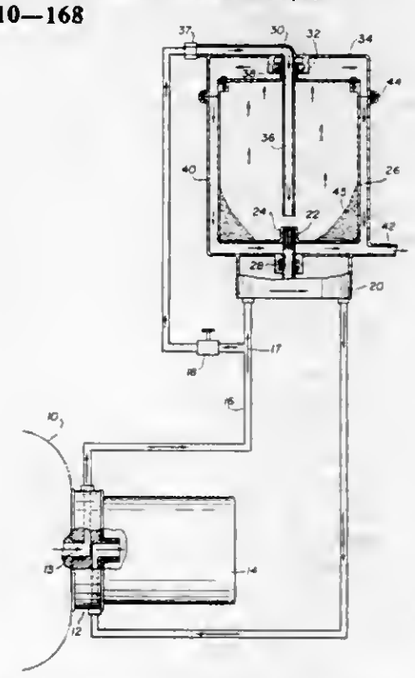
1. A waste material handling system comprising press means for extracting water from a slurry of waste material, a plurality of spaced apart waste food disposer units for forming waste food materials into a slurry of waste material, first conduit means connected in fluid communication with said press means and said waste food disposer units for conducting waste material slurry discharged from each of said waste food disposer units to said press means, a plurality of check valve means each of which is connected with said first conduit means at a location adjacent an associated one of said waste food disposer units for blocking the flow of liquid in said first conduit means in a direction toward the associated one of said waste food disposer units and for enabling liquid to flow in said first conduit means in a direction away from the associated one of said waste food disposer units, and a plurality of slurry flow promoting means connected with said first conduit means at a location adjacent an associated one of said waste food disposer units for promoting a flow of waste material slurry from the associated one of said waste food disposer units to said press means.

4,032,447

OIL CLEANING SYSTEM COMPRISING AN ENGINE BLOCK ADAPTER AND CENTRIFUGAL CLEANING MEANS

Robert J. Douglass, Tolleson, Ariz., assignor to The Raymond Lee Organization, Inc., New York, N.Y.

Filed Jan. 19, 1976, Ser. No. 650,570
Int. Cl.² F01M 11/02
U.S. Cl. 210—168 2 Claims



1. An oil cleaning system, comprising:

an adapter mounted on an engine block in communication with the oil outlet of said engine block, and a standard oil filter, mounted directly on said adapter,

a pipe connected to the adapter for carrying oil to a valve,

a hydraulic motor connected to the pipe, said motor having means for returning oil through the adapter so as to pass the oil through the standard oil filter,

an oil inlet connected to the valve and passing through a cover into a centrifugal drum, said valve functioning to distribute oil flow from said adapter, between said oil outlet and said hydraulic motor,

the cover sealably mounted to a housing,

means for rotatably supporting an upper end of the centrifugal drum attached to the cover and surrounding the inlet pipe,

a drive shaft extending from the hydraulic motor engaging a bottom surface of the centrifugal drum and supported by a bearing at a bottom of the housing to rotate the centrifugal drum,

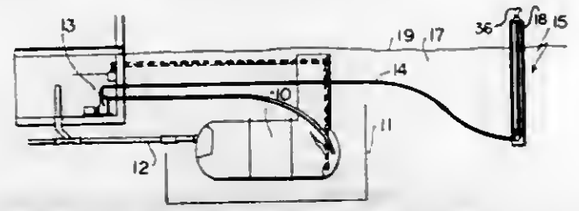
an outlet from the centrifugal drum at an upper surface of the centrifugal drum thereof to permit oil to leave the centrifugal drum and pass along a wall of the housing to an outlet from the housing, and

means of returning the oil to the engine from the outlet from the housing.

4,032,448
SEALED SEWAGE EJECTOR ASSEMBLY

David Martens, Winnipeg, Canada, assignor to D. Martea's Manufacturing Company Ltd., Winnipeg, Canada

Continuation-in-part of Ser. No. 522,050, Nov. 8, 1974, abandoned. This application Dec. 22, 1975, Ser. No. 646,441
Int. Cl.² B01D 21/24
U.S. Cl. 210—170 12 Claims



1. A sewage effluent ejector assembly connected to a sewage system which includes a septic tank, a pump operatively connected to said septic tank and a conduit extending from said pump to said assembly; said assembly comprising in combinationa standpipe, the upper end of said standpipe being above ground when installed, means sealably connecting the associated conduit to adjacent the lower end of said standpipe, said means including a fluid collecting component sealably secured within said standpipe adjacent the lower end thereof, said fluid collecting component comprising a collector member in the form of a hollow, truncated inverted cone, having an aperture therein and having means sealably connecting the associated conduit to said component and communicating with the interior thereof, a discharge pipe located substantially concentrically within said standpipe, and a sewage ejector nozzle assembly on the lower end of said discharge pipe, said sewage ejector nozzle assembly including an intake lower end, a venturi component and a discharge upper end, said intake lower end being situated within said aperture of said collector member of said fluid collector component and detachably and sealably communicating with said means sealably connecting the associated conduit to said fluid collecting component, the upper end of said discharge pipe extending through the upper end of said standpipe whereby said sewage discharge pipe and said sewage ejection nozzle assembly can be engaged and disengaged from said fluid collecting component, and air entry means communicating between atmosphere and the interior of said standpipe.

4,032,449
SKIMMER FOR A BODY OF LIQUID WITH FLOATING SOLIDS

Erik V. M. De Visser, and Karel I. Ghyselen, both of De Pinte, Belgium, assignors to S.A. Texaco Belgium N.V., Brussels, Belgium

Filed Mar. 24, 1976, Ser. No. 669,775
Int. Cl.² E02B 15/04
U.S. Cl. 210—173 4 Claims

1. A skimmer for use on a body of liquid subject to having solid matter floating on the surface thereof, comprising in combination

a circular edged weir formed by the upper edge of a funnel immersed in said body of liquid,

means for supporting said funnel with said weir at an adjustable depth beneath the surface of said body of liquid, and

dynamic means for breaking up solids having greater than a predetermined size and tending to be carried over said weir edge, comprising

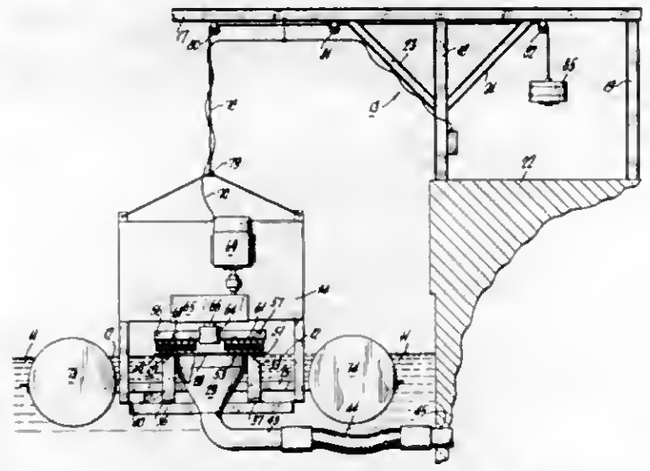
a first set of spaced teeth mounted on a pair of diametrically situated stationary supports relative to said funnel,

said teeth extending vertically upward from said supports,

said supports extending radially relative to said weir edge and being situated adjacent to said surface of the body of liquid, and

a second set of spaced teeth mounted on a complementary pair of diametrically situated rotatable supports extending radially in a concentric manner relative to said first set supports,

said second set of teeth extending vertically downward and radially between said first set, and

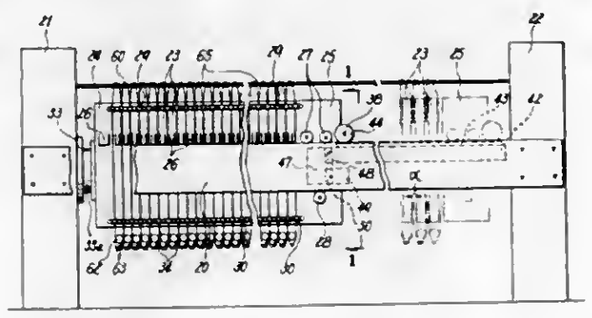


conduit means connected to the bottom of said funnel for carrying off the skimmed fluids.

4,032,450
FILTER PRESS

Akitoshi Iwatani, Marugame, Japan, assignor to Ishigaki Kiko Co., Ltd., Tokyo, Japan

Filed July 17, 1975, Ser. No. 596,613
Claims priority, application Japan, Dec. 24, 1974, 49-2478; Jan. 27, 1975, 50-11756
Int. Cl.² B01D 25/00
U.S. Cl. 210—230 2 Claims



1. A filter press comprising:

a. front and rear spaced movable heads disposed in face-to-face relation;

b. a plurality of movable frame members which are arranged between said movable heads so that the frame members may be advanced and retracted;

c. connecting means for connecting said movable frame members and movable heads so that the frame members may be separted to give definite intervals therebetween;

d. at least one filter cloth disposed between each two adjacent movable frame members and supported so that the cloth may be moved;

e. driving means for moving said filter cloth;

f. hydraulic cylinder means associated with one of said movable heads so that the said movable head may be advanced and retracted for tightening and separating said movable frame members;

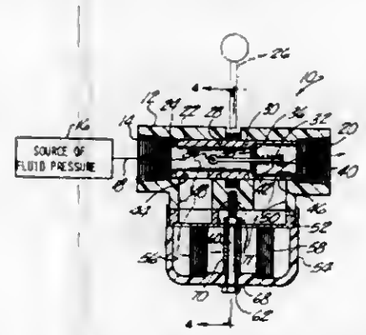
g. driving means for advancing and retracting the other movable head between a most retracted position and a predetermined advanced position; and

h. restraining means for releasably restraining said other movable head at said predetermined advanced position, said restraining means including at least one fixed stopper means fixedly arranged laterally outwardly of said movable frame members and at least one movable stopper means which is supported by said other movable head so that it may be moved laterally outwardly from the movable frame members so as to engage said fixed stopper means.

4,032,451
FILTER DEVICE WITH ROTATABLE BYPASS VALVE

Nils O. Rosaen, 3774 Quarton Road, Bloomfield Hills, Mich. 48013

Filed Mar. 31, 1975, Ser. No. 563,802
Int. Cl.² B01D 29/00
U.S. Cl. 210—232 5 Claims



1. A fluid filter device comprising:

body means having a cylindrical bore formed therethrough wherein one axial end of said bore forms the fluid inlet for the device while the other axial end of said bore forms the fluid outlet for the device,

said body means having a filter chamber, said filter chamber having a filter chamber inlet which fluidly communicates with said bore and a filter chamber outlet which fluidly communicates with said bore at a position axially spaced from said filter chamber inlet,

a filter disposed in said filter chamber and adapted to filter fluid passing from said filter chamber inlet to said filter chamber outlet;

an elongated cylindrical valve member disposed in said bore and rotatable in said bore between a first and a second rotational position, said valve member having a first and second transverse opening formed therethrough in an axially spaced relationship so that when said valve member is in said first rotational position, said first and second transverse openings respectively register with the filter chamber inlet and the filter chamber outlet to open fluid flow through said filter chamber while when said valve member is in said second rotational position said first and second transverse openings are out of registration with said filter chamber inlet and filter chamber outlet to close fluid flow through said filter chamber,

a handle secured to and extending transversely from said valve member at a point intermediate said first and second transverse openings for rotating said valve member between said first and said second rotational positions,

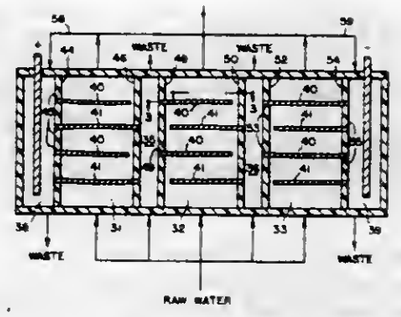
said body means including a body and a cover member disposed on the body to form said filter chamber, fastener means threadably mounted on the body and connected to the cover to ordinarily prevent its removal from the body, the fastener means being removable from the body in a motion in which the fastener means engages the cover to remove it from the body, and

the cover member having an opening for receiving the fastener means, the cover opening being slightly larger than the fastener means to permit air flow through said cover opening into the filter chamber when said fastener means is being removed from said body.

4,032,452
ELECTRICALLY REGENERATED ION EXCHANGE SYSTEM

Thomas A. Davis, Vestavia Hills, Ala., assignor to Sybron Corporation, Rochester, N.J.

Filed Nov. 13, 1975, Ser. No. 631,841
Int. Cl.² B01D 57/00
U.S. Cl. 210—243 17 Claims



14. An electrically regenerated ion exchange system comprising:

an anode compartment and a cathode compartment;

a first demineralization compartment positioned intermediate said anode and cathode compartments and adjacent to said anode compartment;

a second demineralization compartment positioned intermediate said anode compartment and said cathode compartment and adjacent to said cathode compartment;

at least one waste compartment between said first and said second demineralization compartments;

said first demineralization compartment containing a plurality of elongated cation exchange members having first ends extending towards said anode compartment and second ends exposed to a waste compartment positioned between said first and second demineralization compartments and adjacent to said first demineralization compartment, and a plurality of elongated anion exchange members having first ends that are exposed to said anode compartment and second ends that extend towards but are not exposed to said waste compartment adjacent to said first demineralization compartment;

said second demineralization compartment containing a plurality of elongated anion exchange members having first ends extending towards said cathode compartment and second ends exposed to a waste compartment positioned between said first and second demineralization compartments and adjacent to said second demineralization compartment, and a plurality of elongated cation exchange members having first ends that are exposed to said cathode compartment and second ends that extend towards but are not exposed to said waste compartment adjacent to said second demineralization compartment.

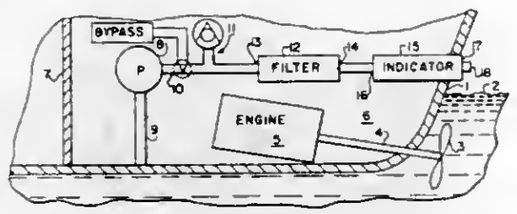
4,032,453
OIL-WATER SEPARATOR

Vito S. Pedone, Box 2733, Arlington, Va. 22202

Division of Ser. No. 492,168, July 26, 1974, Pat. No. 3,913,513. This application May 15, 1975, Ser. No. 577,895
Int. Cl.² B01D 39/04
U.S. Cl. 210—266 7 Claims

1. A filter for removing oil from water and discharging filtered water free from oil, comprising: a housing having an inlet and an outlet for the liquid; fluid distribution means within said housing for directing the fluid along a predetermined path between said inlet and said outlet; filter particles substantially completely filling said housing; a first mass of said particles, within said housing and in said path, having a size within a predetermined range and being of an expanded open pore oleophilic and hydrophobic rigid synthetic resin; a second mass of said particles, within said housing and in said

path spaced in the direction of flow from said first mass, of a size within a range substantially less than the range of said first mass of particles, and being of expanded open pore olephilic and hydropbobic rigid synthetic resin; said smaller sized second mass of particles being interposed within said path between said larger sized particles and said outlet, so that said larger sized mass of particles will constitute means to distribute the fluid transversely of the path for even distribution and said smaller sized second mass of particles will constitute



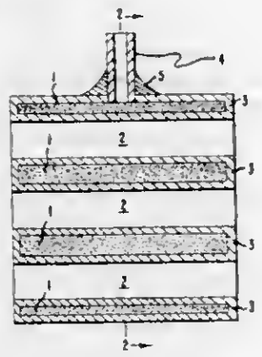
means to efficiently remove the oil from the water while passing the water; porous means interposed in said fluid path between said smaller sized second mass of particles and said discharge means with a plurality of through passages smaller than said smaller sized particle range of said second mass for passing the filtered water and blocking the passage of said smaller sized particles; and the particles of each of said first and second masses contain cut and uncut expanded resin cells, with the uncut cells being generally spherical and the cut cells being generally truncated spheres with undistorted open ends.

4,032,454

PERMSELECTIVE MEMBRANE APPARATUS WITH POROUS SUPPORT

Fred Wayne Hoover, Wilmington, Del., and Robert Earl Roberts, Kennet Square, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 31, 1972, Ser. No. 240,260
Int. Cl.² B01D *31/00*
U.S. Cl. 210—323 R **10 Claims**



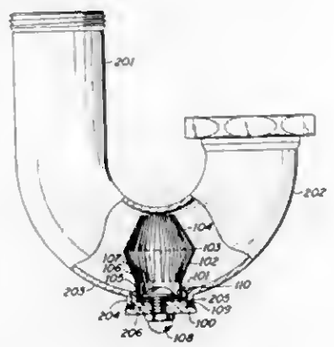
1. Apparatus for separating the components of a fluid mixture by means of pressure and a permselective membrane, which apparatus comprises
a fluid-tight shell having
a fluid feed inlet,
a fluid concentrate outlet, and
a permeate outlet,
and containing at least one element spaced away from the interior surface of the shell, said element comprising
a body
of porous material
with multiple passages therethrough,
a membrane
selectively permeable to the components of the fluid mixture and supported by at least a portion of the surface of the passages,
a conduit
in fluid communication with the porous body and the permeate outlet and in fluid-tight relation to the membrane, and
a non-permeable coating on all surfaces of the porous body not supporting the membrane or providing fluid communication between the porous body and the conduit.

4,032,455

TRAPS FOR SINKS, LAUNDRY TUBS AND THE LIKE

Howard D. Kale, 6529 Gulfside Drive, Longboat Key, Fla. 33577

Filed June 14, 1976, Ser. No. 696,071
Int. Cl.² B01D *29/36*
U.S. Cl. 210—435 **3 Claims**



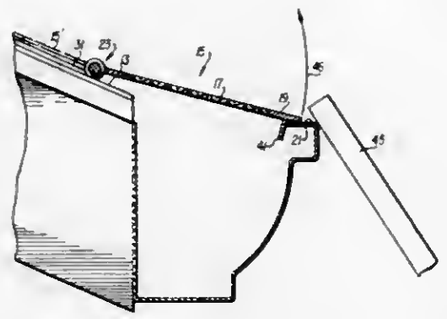
1. A blocking member for a trap for use in connection with sinks, laundry tubs and the like, said trap having a dip portion with the bottom wall of said dip portion having an opening, and a plug for closing said opening; said blocking member comprising a supporting toroid adapted to be received by said plug, plurality of flexible fingers vertically depending from and held in spaced apart relationship on said toroid each of said flexible fingers tapering outwardly from said supporting toroid to a point chosen such that corresponding positions on said plurality of flexible fingers define a circle having a diameter corresponding approximately to the interior diameter of a trap and tapering inwardly from that point to a dimension such that the tips of the plurality of flexible fingers in combination define a second circle having a diameter approximately equal to the diameter of said supporting toroid, and means for attaching said blocking means to said plug.

4,032,456

FLIP-UP GUTTER SHIELD

William E. Berce, 2703 Westmoreland Road, Charlottesville, Va. 22901

Filed Feb. 26, 1976, Ser. No. 659,056
Int. Cl.² B01D *23/00;* **E04D** *13/04*
U.S. Cl. 210—474 **11 Claims**



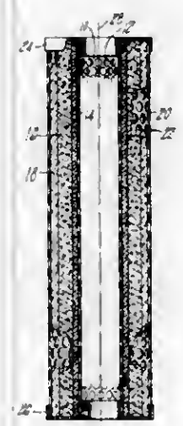
1. A gutter shield of the type comprising an elongated mesh cover positionable over a gutter, said mesh cover having a first side adjacent and parallel to a roof and a second side adjacent and parallel to the outer edge of said gutter, said gutter shield further comprising:
hinge means attached to said first side of said mesh cover and fixed to said roof such that said mesh cover may be swung from a first position covering said gutter to a second position away from said gutter, said mesh cover being totally independent of said gutter in said second position, thereby permitting servicing of said gutter without interference from said mesh cover; and
guide means attached to and extending from said second side of said mesh cover, said guide means extending adjacent said outer edge of said gutter and comprising a plurality of needle-like projections extending downward from said second side of said mesh cover to serve as position guide means for said second side of said mesh cover, such that said second side is positioned over but not beyond said outer edge, thereby permitting the positioning of a ladder against said gutter without interfering with the movement of said mesh cover.

4,032,457

PLURAL STAGE FILTER CARTRIDGE WHEREIN AT LEAST ONE STAGE COMPRISES PULVERIZED PARTICULATE MATERIAL

Robert W. Matchett, Suffield, Conn., assignor to Fibredyne, Inc., Suffield, Conn.

Filed June 4, 1975, Ser. No. 583,749
Int. Cl.² B01D *25/04, 25/16*
U.S. Cl. 210—489 **18 Claims**



1. A multiple phase filter cartridge including:
a first fibrous filtering stage, said first filtering stage being of substantially constant thickness throughout the length thereof;
at least a second fibrous filtering stage surrounding said first stage, said second filtering stage being of substantially constant thickness throughout the length thereof, said first and second fibrous filtering stages serving as successive filtering phases for fluid passing througb said first and second filtering stages with said second stage being upstream of said first stage in the direction of fluid flow through the filter cartridge, said second filtering stage including fibrous material of fiber diameter greater than the fiber diameter of the fibrous material of said first filtering stage, said second filtering stage having greater permeability when compared to said first filtering stage and having a specific gravity sufficiently low to enable depth filtration therethrough, said fibrous material of said first filtering stage ranging in diameter from 0.1 to 25 microns and said fibrous material of said second filtering stage ranging in diameter from 5 to 100 microns;
the fibers of each of said filtering stages being selected from the group consisting of up to 50% cellulose fibers, 20% to 90% polymer fibers and 10 to 30% glass fibers;
discrete particles of pulverized chemically active material of 40 mesh or smaller in size, dispersed throughout one of said filtering stages; said particles being bonded to said fibers by a resin binder; the weight of said binder not exceeding 10 wt. % relative to the weight of said fibers of said one stage,
each of said stages being of sufficient thickness such as to enable fluid flow in an essentially normal direction through the combined stages; and
a discharge flow passage in said filter cartridge to receive and discharge fluid after passing through said filtering stages.

13. An inline filter including:
casing means having axially aligned fluid inlets and outlets; and
a multiple phase filter cartridge in said casing means, said filter cartridge including:
at least first and second fibrous filtering stages within said casing means, said first and second fibrous filtering stages serving as successive filtering phases for fluid passing therethrough;
said first filtering stage including an annular layer of substantially constant thickness of fibrous material of fiber diameter less than the fiber diameter of the fibrous material of said second filtering stage and being of lesser permeability than the second filtering stage;
said second filtering stage surrounding said first filtering stage and including an annular layer of substantially constant thickness of fibrous material of fiber diameter greater that the fiber diameter of the fibrous material of the first filtering stage and being of lower permeability than said first filtering stage and having a specific gravity sufficiently low to enable depth filtration therethrough, said second filtering stage being upstream in the direction of fluid flow from said first filter stage;
said fibrous material of said first filtering stage ranging in diameter from 0.1 to 25 microns and said fibrous material of said second filtering stage ranging in diameter from 5 to 100 microns;
the fibers of each of said filtering stages being selected from the group consisting of up to 50% cellulose fibers, 20 to 90% polymer fibers, and 10 to 30% glass fibers;
each of said filtering stages being of sufficient thickness such as to enable fluid flow in an essentially normal direction to the combined stages;
one of said filtering stages having discrete particles of pulverized chemically active material of 40 mesh smaller in size, disbursed throughout said one filtering stage; said particles being bonded to said fibers by a resin binder; the weight of said binder not exceeding 10 wt. % relative to the weight of said fibers of said one stage,
a central flow passage in said filter cartridge to receive and discharge fluid after passing through said filtering stage; and
means connecting said central flow passage to said outlet of said casing means.

4,032,458

PRODUCTION OF 1,4-BUTANEDIOL

Stone D. Cooley, Houston; Robert P. Arganbright, Seabrook; William G. Bowman, Pasadena, and James D. Henery, Houston, all of Tex., assignors to Petro-Tex Chemical Corporation, Houston, Tex.

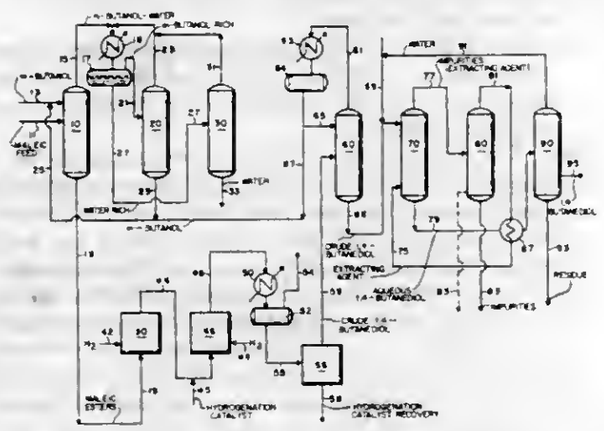
Filed Aug. 8, 1975, Ser. No. 602,993
Int. Cl.² C07C *29/00*
U.S. Cl. 260—635 D **5 Claims**

1. A process for the production of 1,4-butanediol from a maleic acid-containing feedstock, which process comprises the steps of:
a. contacting the maleic acid-containing feedstock with a monohydric alkanol having from 2 to about 10 carbon atoms in an esterification-dehydration zone comprising a pressure distillation column wherein the maleic acid-containing feedstock is distilled in the presence of the monohydric alkanol thereby forming an overhead vapor prod-

uct comprising an azeotrope of water and the monohydric alkanol and a bottoms product having an acid number of 1.0 mg KOH/g. or less comprising the monohydric alkanol and the dialkyl ester of maleic acid,

b. contacting the bottoms product from the esterification-dehydration zone with hydrogen at elevated temperature and pressure in the presence of a copper chromite hydrogenation catalyst in a first hydrogenation zone thereby to hydrogenate the ethylenic unsaturation present in the bottoms product from the distillation zone,

c. contacting the product from the first hydrogenation zone in a second hydrogenation zone with hydrogen in the presence of a copper chromite hydrogenation catalyst



thereby to reduce the dialkyl esters to a product comprising 1,4-butanediol and monohydric alkanol,

d. introducing the product from the second hydrogenation zone to a catalyst recovery zone wherein the copper chromite hydrogenation catalyst is recovered,

e. introducing the product obtained from the catalyst recovery zone to a light ends recovery zone wherein there is recovered an overhead product comprising the monohydric alkanol and the more volatile impurities and a bottoms product comprising crude 1,4-butanediol and the less volatile impurities, and recovering 1,4-butanediol from said bottoms product of the light ends recovery zone.

4,032,459

LUBRICATING COMPOSITIONS CONTAINING HYDROGENATED BUTADIENE-ISOPRENE COPOLYMERS

Ronald K. Crossland, and David J. St. Clair, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Jan. 29, 1976, Ser. No. 653,330

The portion of the term of this patent subsequent to June 22, 1993, has been disclaimed.

Int. Cl.² C10M 1/32

U.S. Cl. 252—51.5 A **8 Claims**

1. An improved lubricating oil composition comprising a major proportion of a hydrocarbon lubricating oil, a pour point depressing amount of a pour point depressant, and a viscosity index improving amount of a viscosity index improver, the improvement wherein said viscosity index improver comprises a hydrogenated copolymer of butadiene and isoprene wherein the weight ratio of butadiene to isoprene is between about 10:90 and 70:30 and from about 20 to about 55% of the precursor copolymer units are in the 1,4-configuration and wherein the olefinic bonds are substantially saturated during hydrogenation, the average molecular weight being between about 40,000 and about 225,000.

4,032,460

INHIBITION OF SCALE DEPOSITION IN HIGH TEMPERATURE WELLS

Horst E. Zilch, Yorba Linda, and Paul W. Fischer, Whittier, both of Calif., assignors to Union Oil Company of California, Brea, Calif.

Filed Oct. 28, 1975, Ser. No. 625,814

Int. Cl.² C02B 5/06; C23F 15/00

U.S. Cl. 252—8.55 B **10 Claims**

1. A method for inhibiting the formation of scale from hot aqueous fluids having a temperature of about 400° F. and above, which comprises adding to the hot aqueous fluid a scale-inhibiting amount of a scale inhibitor comprising a water-soluble organic compound selected from the group consisting of thiourea, hexamethylenetetramine, dimethylsuccinate and the amide reaction products of unsubstituted saturated aliphatic dicarboxylic acids containing from about 2 to about 10 carbon atoms tartaric acid, or citric acid with unsubstituted saturated aliphatic primary and secondary amines having from about 2 to about 8 carbon atoms, propane- (1,3) -diamine, 3-dimethylaminopropylamine, 3-diethylaminopropylamine, hydroxylated amine derivatives selected from the group consisting of monoethanolamine, diethanolamine, and aminoethanolamine or saturated nitrogen-containing heterocyclic compounds selected from the group consisting of piperidine, pyrrolidine, piperazine, morpholine and 2,6-dimethylmorpholine.

4,032,461

PHOSPHORUS AND SULFUR CONTAINING AMIDES AND THIOAMIDES AS LUBRICATING OIL ADDITIVES AND LUBRICATING OIL COMPOSITIONS CONTAINING SAME

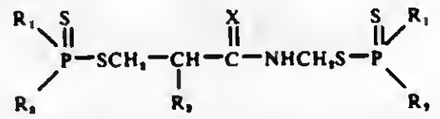
Donald Irvin Hoke, Chagrin Falls, Ohio, assignor to The Lubrizol Corporation, Cleveland, Ohio

Filed Sept. 6, 1974, Ser. No. 503,892

Int. Cl.² C10M 1/48

U.S. Cl. 252—46.7 **28 Claims**

1. A lubricating composition comprising a major proportion of a lubricating oil and from about 0.1% to about 20% by weight of the composition of at least one additive corresponding to the formula:



wherein each R_1 and R_2 is, independently, a member selected from the group consisting of hydrocarbyl, hydrocarbyloxy and hydrocarbylthio; R_3 is a member selected from the group consisting of hydrogen, halogen, lower alkyl, halogen substituted lower alkyl, lower alkoxy substituted lower alkyl, lower alkylthio substituted lower alkyl, nitro-substituted lower alkyl, hydroxy-substituted lower alkyl and mercapto-substituted lower alkyl; and X is a member selected from the group consisting of oxygen and sulfur.

4,032,462

LUBRICATING OIL ADDITIVE COMPOSITION

Bruce W. Hotten, Orinda, and John M. King, San Rafael, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed May 24, 1976, Ser. No. 689,615

Int. Cl.² C10M 1/38, 1/54

U.S. Cl. 252—49.7 **10 Claims**

1. An additive composition for use in lubricating oils comprising:

1. an oil-soluble antioxidant selected from sterically hindered phenols and thiophenols, aromatic amines and

2. an oil-soluble antimony compound of the formula

$(R)_3Sb$ or $(R)_3Sb{\rightarrow}X$

wherein each R is independently hydrocarbyl and X is oxygen or sulfur.

4,032,463

LIQUID DEVELOPER FOR USE IN ELECTROSTATIC PHOTOGRAPHY AND PREPARATION OF SAME

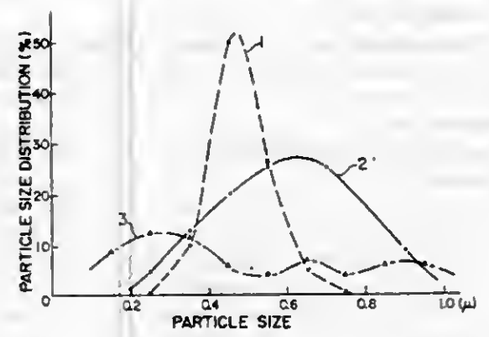
Toshiyuki Kawanishi, and Norimasa Sohmiya, both of Tokyo, Japan, assignors to Kabushiki Kaisha Ricoh, Tokyo, Japan

Continuation-in-part of Ser. No. 436,638, Jan. 25, 1974, abandoned, which is a continuation-in-part of Ser. No. 328,964, Feb. 2, 1973, abandoned. This application Apr. 12, 1976, Ser. No. 676,055

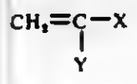
Claims priority, application Japan, Feb. 4, 1972, 47-12189

Int. Cl.² G03G 9/12

U.S. Cl. 252—62.1 L **5 Claims**

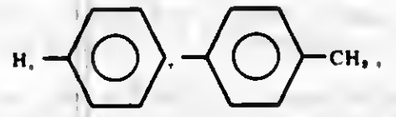


1. A liquid developer for use in electrostatic photography comprising toner particles dispersed in a petroleum aliphatic hydrocarbon solvent having a solubility parameter of from 7.0 to 7.5; said toners having a mean particle size of from 0.2 to 0.8 μ, and a particle size distribution such that about 90% of the particles are in the particle size range of from 0.3 to 0.6 μ; said toners comprising at least one pigment together with a mixture of Polymer A and Copolymer B, Polymer A having a molecular weight of from 10,000 to 200,000, Copolymer B having a molecular weight of from 5,000 to 30,000 and a solubility parameter of from 7.5 to 8.7, the weight ratio of Polymer A to Copolymer B being from 0.1:1–20:1, said Polymer A being a homopolymer or a copolymer containing monomers represented by the general formula



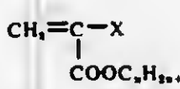
I:

wherein X represents H or CH_3, and Y represents



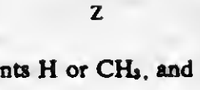
$COOH$, $COOC_nH_{2n+1}$ (wherein n is an integer ranging from 9 to 20), $-CH{=}CH_2$;

said Copolymer B containing monomers represented by the general formulas



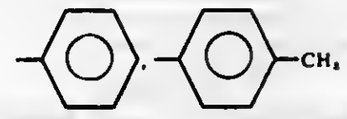
II:

wherein X represents H or CH_3, and n is an integer ranging from 6 to 20; and



III:

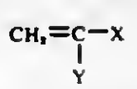
wherein X represents H or CH_3, and Z represents



or $COOC_nH_{2n+1}$ (wherein n is an integer ranging from 1 to 5); the molar ratio of Formula III/Formula II being 50–95:50–5.

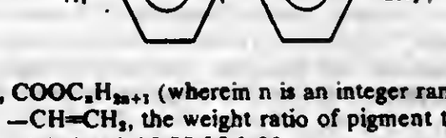
3. A process for the production of a liquid developer containing dispersed toner particles having a mean particle size of from 0.2 to 0.8 μ, and a particle size distribution such that about 90% of the particles are in the size range of from 0.3 to 0.6 μ for use in electrostatic photography which comprises the steps of:

1. Mixing a pigment and a Polymer, A, in a solvent having a solubility parameter of from 7.0 to 7.5 being a petroleum aliphatic hydrocarbon solvent containing up to 25% by weight of an aromatic hydrocarbon, said Polymer A having a molecular weight of from 10,000 to 200,000 and being a homopolymer or a copolymer containing monomers represented by the general formula



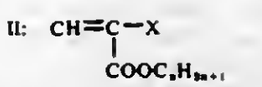
I:

wherein X represents H or CH_3, and Y represents



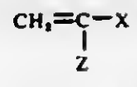
$COOH$, $COOC_nH_{2n+1}$ (wherein n is an integer ranging from 9 to 20), $-CH{=}CH_2$, the weight ratio of pigment to solvent to Polymer A being 3-15:55-95:1-30;

2. Mixing the product of Step 1 with Copolymer B, said Copolymer B having a molecular weight of from 5,000 to 30,000 and a solubility parameter from 7.5 to 8.7, the weight ratio of Polymer A to Copolymer B being from 0.1:1–20:1, said Copolymer B containing monomers represented by the general formulas



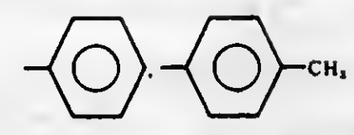
II:

wherein X represents H or CH_3, and n is an integer ranging from 6 to 20; and



III:

wherein X represents H or CH_3, and Z represents



or $COOC_nH_{2n+1}$ (wherein n is an integer ranging from 1 to 5), the molar ratio of Formula III/Formula II being 50–95:50–5, and

3. Dispersing the product from Step 2 in a petroleum aliphatic hydrocarbon solvent having a solubility parameter of from 7.0 to 7.5.

4,032,464
CREAMY NAIL LACQUER REMOVER
Jack J. Mausner, East Hills, N.Y., assignor to Helena Rubinstein, Inc., New York, N.Y.
Filed Jan. 14, 1976, Ser. No. 649,195
Int. Cl.² C11D *1/32, 3/43, 3/48*
U.S. Cl. 252—89 R 5 Claims

1. A creamy composition for removing nail lacquer consisting essentially of at least about 0.01% by weight of a chelating agent selected from the group consisting of the disodium salt of ethylene diamine tetraacetic acid and calcium sodium diacetate, about 1.0% by weight of propylene glycol or glycerine humectant, 0.1% by weight of 2-hydroxy-4-methoxy-benzophenone-5-sulfonic acid, 0.05% by weight of a collagen-derived protein-fatty acid condensation product, about 0.05% by weight of the palmitate of vitamins A and D, and about 0.5% by weight of a carboxy vinyl polymer dispersed in about 70–90% by weight of acetone thickened with a thickening agent selected from the group consisting of methyl cellulose, ethyl cellulose, gum arabic and a hydroxypropyl cellulose and neutralized with about 0.2–1.0% by weight of triamylamine.

4,032,465
PRODUCTION OF DETERGENT COMPOSITIONS
Herbert Edward Bauer, Saddle Brook, N.J.; Bertus Goossens, Vlaardinger, Netherlands; Theodorus Joannes Kock, Heenvliet, Netherlands, and Johannes Laurentius Cornelis Manders, Roosendaal, Netherlands, assignors to Lever Brothers Company, New York, N.Y.
Filed Jan. 27, 1976, Ser. No. 652,946
Claims priority, application United Kingdom, Feb. 3, 1975, 4547/75
Int. Cl.² C11D *11/02, 3/06*
U.S. Cl. 252—135 15 Claims

1. A process for making a spray dried powdered detergent composition containing a carboxymethyloxysuccinate salt detergency builder, at least one detergent compound and an alkali metal silicate, comprising the steps of,
a. forming an aqueous detergent slurry containing dispersed carboxymethyloxysuccinate and said detergent compound said detergent compound being selected from the group consisting of anionic, nonionic, zwitterionic and amphoteric detergents;
b. adding alkali metal silicate to the aqueous slurry after the addition thereto of the carboxymethyloxysuccinate salt, wherein the alkali metal oxide to silicon dioxide ratio of said silicate is about 1:1 to about 1:2.5;
c. maintaining the water content of the slurry at not less than about 40 percent by weight of the final slurry formulation;
d. maintaining the slurry temperature at not less than 76° C subsequent to the addition of the carboxymethyloxysuccinate salt thereto; and
e.spray drying the detergent slurry,
the amount of the carboxymethyloxysuccinate salt being from about 10 percent to about 60 percent, the amount of the detergent compound being about 5 percent to about 40 percent and the amount of the alkali metal silicate being about 3 percent to about 12 percent by weight of the final detergent composition.

4,032,466
ACID CLEANER AND PROCESS FOR DISPOSAL THEREOF
Joseph V. Otrhalek, Dearborn; Gilbert S. Gomes, Southgate, and Robert E. Gaasser, Wyandotte, all of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.
Filed Apr. 16, 1976, Ser. No. 677,554
Int. Cl.² C23G *1/02, 1/08, 1/36*
U.S. Cl. 252—136 8 Claims

1. A thickened acid cleaner concentrate composition consisting essentially of:
1. a strange aqueous inorganic acid in an amount from about 5 to about 78 weight percent,
2. an organic acid selected from the group consisting of oxalic, tartaric, citric acid and mixtures thereof in an amount from about 1 to about 6 weight percent,
3. a nonionic surfactant in an amount from about 7 to about 23 weight percent,
4. an anionic surfactant in an amount from about 1 to about 7 weight percent,
5. a flocculating agent containing bivalent iron, trivalent iron or trivalent aluminum in soluble form in acid solution and in an amount of from about 1 to about 12 weight percent, and
6. water in an amount from about 75 to about 12 weight percent;
all weight percents being based on the total composition, provided that the said nonionic surfactant and the said anionic surfactant when taken together constitute from about 10 to about 30 weight percent of said composition and said nonionic surfactant constitutes from about 75 to about 90 weight percent of the combined weight percent of nonionic and anionic surfactants.

4,032,467
AZEOTROPES OF 1,2-DICHLORO-1,1,2-TRIFLUOROETHANE
William Milton Hutchinson, deceased, late of Bartlesville, Okla. (by Florence M. Hutchinson, executrix), assignor to Phillips Petroleum Company, Bartlesville, Okla.
Division of Ser. No. 610,812, Sept. 5, 1975, Pat. No. 4,002,573, which is a division of Ser. No. 396,814, Sept. 13, 1973, Pat. No. 3,940,342. This application May 27, 1976, Ser. No. 690,808
Int. Cl.² C11D *7/50, 7/30;* C23G *5/02*
U.S. Cl. 252—162 2 Claims

1. A substantially constant boiling admixture of (A) 1,2-dichloro- 1,1,2-trifluoroethane and (B) dichloromethane which at substantially atmospheric pressure is characterized as about 88.6 weight percent (A) and about 11.4 weight percent (B).

4,032,468
HYDROLYTICALLY STABLE URETHANE FOAM PRECURSORS
Kenneth Treadwell, Rahway, and Melvin H. Gitlitz, Edison, both of N.J., assignors to M & T Chemicals Inc., Greenwich, Conn.
Continuation-in-part of Ser. No. 534,490, Dec. 19, 1974, abandoned. This application Sept. 13, 1976, Ser. No. 722,523
Int. Cl.² C08G *18/18, 18/20, 18/24, 18/32*
U.S. Cl. 252—182 3 Claims

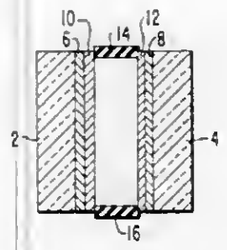
1. A hydrolytically stable precursor for preparing flexible or rigid cellular polyurethanes, said precursor consisting essentially of 100 parts by weight of a polyalkylene polyol, between 0.5 and 5 parts of water, between 0.05 and 0.5 parts of a foaming catalyst, between 0.05 and 2 parts of a silicone surfactant and between 0.05 and 0.5 parts of a gel catalyst, said gel catalyst being selected from the group consisting of organotin compounds of the formulae R_aSnX_{4-a}, R_2SnO and $(R_2Sn)_2O$ wherein R is CH_3— or CH_3OCH_2—, X is selected from the group consisting of the chlorine, bromine and iodine

atoms and radicals of the formula —$OOCCH_3$ or —$OOCCH_2CH_3$ and *a* is the integer 2 or 3.

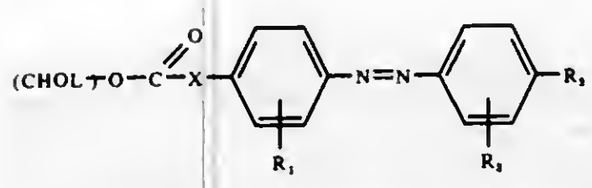
4,032,469
PELLETED SULFUR COMPOSITIONS
Henning Bartzsch, Hannover, Germany, assignor to Kali-Chemie Aktiengesellschaft, Hannover, Germany
Division of Ser. No. 401,502, Sept. 27, 1973, Pat. No. 3,979,316. This application May 25, 1976, Ser. No. 689,858
Claims priority, application Germany, Sept. 27, 1972, 2247371
Int. Cl.² C08K *3/30;* C09K *3/00*
U.S. Cl. 252—182 7 Claims

1. A pelleted sulfur composition consisting essentially of particles of sulfur which include a substantial proportion of carbon-disulfide-insoluble sulfur particles together with a binder consisting essentially of a rubber plasticizing oil containing an amount equivalent to between 0.5 and 10% of the weight of the pelleted composition of an anionic or nonionic surfactant, the amount of the plasticizing oil being equivalent to between 10 and 60% by weight of the pelleted composition.

4,032,470
ELECTRO-OPTIC DEVICE
Allen Bloom, East Windsor, and Ling Kong Hung, Edison, both of N.J., assignors to RCA Corporation, New York, N.Y.
Filed Dec. 22, 1975, Ser. No. 642,728
Int. Cl.² C09K *3/34;* G02F *1/13*
U.S. Cl. 252—299 16 Claims



1. In an electro-optic device comprising a nematic liquid crystal composition between two electrodes, the improvement wherein the nematic liquid crystal composition comprises a nematic liquid crystal having dissolved therein a liquid crystal dye of the formula



wherein (CHOL) represents a cholesteryl radical, X can be O or NH; R_1 can be hydrogen, hydroxy, methyl, fluoro or chloro; R_2 can be hydrogen, —NO_2, —CN, —$N(alkyl)_2$, alkylcarbonato, alkanoyloxy, alkyl or alkoxy; and R_3 can be hydrogen, methyl, fluoro or chloro, in such amounts that a change in the optical density of the colored nematic liquid crystal composition is produced as a function of voltage applied to said nematic liquid crystal composition.

4,032,471
PROCESS FOR PREPARING YTTRIUM OXIDE AND RARE EARTH METAL OXIDE PHOSPHORS
George W. Luckey, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Continuation-in-part of Ser. No. 544,465, Jan. 27, 1975, abandoned, which is a continuation-in-part of Ser. No. 376,757, July 5, 1973, abandoned. This application Feb. 11, 1976, Ser. No. 657,350
Int. Cl.² C09K *11/46*
U.S. Cl. 252—301.4 R 14 Claims

1. A process of preparing a phosphor having improved x-ray speed which consists essentially of an oxide of an element selected from the group consisting of yttrium, gadolinium, and lanthanum, activated by at least one different rare earth metal activator selected from the group consisting of europium, terbium, gadolinium, and dysprosium, comprising:
heating a mixture of salts of said element and said activator in an oxygen-containing atmosphere to form said phosphor; and in a subsequent heating step
heating said phosphor in a hydrogen-containing mildly reducing atmosphere at an elevated temperature and for a period of time which are sufficient to effect an increase in the X-ray speed of said phosphor, compared to the speed without such subsequent heating step, of at least about 15%.

4,032,472
MANUFACTURE OF ALUMINA SOL
Kenneth R. McCallister, Shreveport, La., assignor to UOP Inc., Des Plaines, Ill.
Filed Jan. 7, 1976, Ser. No. 647,231
Int. Cl.² B01J *13/00*
U.S. Cl. 252—313 R 5 Claims

1. In the manufacture of an alumina sol containing combined chloride or fluoride and from about 13 to about 15 wt. % aluminum wherein metallic aluminum is digested in hydrochloric or hydrofluoric acid, the improvement which comprises first digesting sufficient solid alumina particles in hydrochloric or hydrofluoric acid to provide from about 5 to about 25 wt. % of the aluminum content of the sol product, and thereafter digesting metallic aluminum therein to provide the required remaining amount of aluminum, said hydrochloric or hydrofluoric acid being employed in an amount to provide a sol containing combined chloride or fluoride in from about a 0.5 to about a 2.0 atom ratio with the aluminum content thereof.

4,032,473
WATER-BASED DEFOAMER COMPOSITIONS
Roald K. Berg, Milwaukee, and Douglas S. Smalley, Portland, both of Oreg., assignors to Associated Chemists, Inc., Portland, Oreg.
Filed June 4, 1975, Ser. No. 583,651
Int. Cl.² B01D *19/04*
U.S. Cl. 252—358 6 Claims

1. A water-based additive for controlling foaming in aqueous systems, consisting of a stable aqueous emulsion containing as the disperse phase, about 20–30% by weight of a composition comprising:
a. about 25 to 55 parts by weight of a water insoluble mineral hydrocarbon,
b. about 25 to 45 parts by weight of a normally solid fatty acid diamide,
c. about 1.0 to 7.5 parts by eight of hydrophobic silica particles, and
d. about 8 to 16 parts by weight of a non-ionic emulsifier wherein said emulsifier is a stearyl alcohol ethoxylate, and said emulsifier has an HLB of about 9 to 10.

4,032,474

PROCESS FOR THE FLUORIDING OF A CATALYST

Frans Goudriaan, and Pieter B. Kwant, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Apr. 5, 1976, Ser. No. 673,519
Claims priority, application Netherlands, Apr. 18, 1975, 7504620
Int. Cl.² B01J 27/12
U.S. Cl. 252—441 8 Claims

1. A process for the fluoriding of a catalyst with an organic fluorine compound in a liquid distillate hydrocarbon in the presence of hydrogen wherein a fixed bed of catalyst particles is fluorided in-situ at a temperature of 100°–400° C, a pressure of 5–200 bar, a space velocity of 0.5–5 liters of stream of liquid distillate hydrocarbon per liter of catalyst per hour and a hydrogen/said stream of liquid ratio of 200–2000 Nl/L with the use of a constant or variable fluorine slip through the catalyst bed combined or not combined with a positive temperature gradient over the bed, provided that

a. the average fluorine slip (S_A) amounts to at least 10%w,
b. the temperature gradient (G) amounts to at most 30° C,
c. the products of S_A (in %w) and G (in °C) amounts to at most 1000,
d. a constant fluorine slip which on average amounts to less than 40%w is accompanied by a temperature gradient of at least $300/S_A$,
e. a constant fluorine slip which on average amounts to at least 40%w but less than 50%w is accompanied by a temperature gradient of at least $\frac{3}{4}$ $(50-S_A)$ and
f. 0.5–15 parts by weight of fluorine per 100 parts by weight of carrier are applied to the catalyst.

4,032,475

HYDROCARBON CONVERSION WITH A SELECTIVELY SULFIDED ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE

H. Peter G. Knapik, Brookfield, and Frank H. Adams, La Grange Park, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed Dec. 8, 1975, Ser. No. 638,798
Int. Cl.² B01J 27/04
U.S. Cl. 252—439 12 Claims

1. A selectively sulfided acidic catalytic composite comprising a halogenated porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group metal, about 0.1 to about 5 wt. % cobalt, about 0.01 to about 5 wt. % tin and about 0.1 to about 3.5 wt. % halogen; wherein the platinum group metal, catalytically available cobalt, and tin are uniformly dispersed throughout the porous carrier material; wherein substantially all of the platinum group metal is present in the elemental metallic state; wherein substantially all of the tin is present in the form of tin oxide; and wherein substantially all of the catalytically available cobalt is present in a sulfided state.

4,032,476

GRANULAR ACTIVATED CARBON MANUFACTURE FROM SUB-BITUMINOUS COAL MIXED WITH CONCENTRATED INORGANIC ACID WITHOUT PITCH

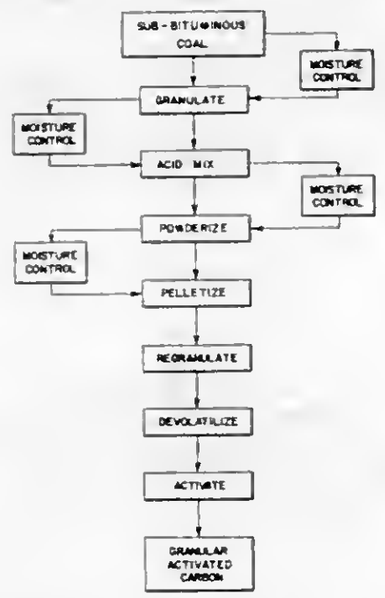
Hari N. Murty, Grand Island, N.Y., assignor to The Carborundum Company, Niagara Falls, N.Y.

Filed June 11, 1975, Ser. No. 585,931
Int. Cl.² B01J 21/18; C01B 31/08, 31/10, 31/14
U.S. Cl. 252—444 23 Claims

1. A process for making granular activated carbon comprising: forming granules from sub-bituminous coal; treating the granules by mixing with not less than about 1 and not more than about 10% by weight of concentrated inorganic acid selected from the group consisting of H_2SO_4, H_3PO_4, HCl and mixtures thereof at a concentration of at least about 50% by weight without the addition of a carbonaceous binder; reducing the treated granules to form powder of more than about 65% by weight −325 mesh and having a moisture, including acid, content of not less than about 10 and not more than about 30% by weight; compressing the powder to form pellets; reducing the pellets to reform granules; devolatilizing the reformed granules, without charring, by heating directly to and at a temperature higher than the charring temperature in an oxygen-free atmosphere; and activating the devolatilized granules by heating to and at a temperature higher than the devolatilizing temperature in an atomsphere containing a gaseous activating agent in order to produce a overall yield of granular activated carbon of about 25 to about 35% by weight, dry coal.

2. Granular activated carbon made by the process of claim 1.

20. A process for making granular activated carbon and comprising: forming granules from sub-bituminous coal; treating the granules by mixing with about 5% by weight of concentrated inorganic acid selected from the group consisting of



H_2SO_4, H_3PO_4, HCl and mixtures thereof at a concentration of at least about 75% by weight, without the addition of a carbonaceous binder; reducing the treated granules to form powder of more than about 65% by weight −325 mesh and having a moisture, including acid, content of about 15 to about 25% by weight; compressing the powder to form pellets; reducing the pellets to reform granules; devolatilizing the reformed granules, without charring, by heating directly to a temperature of about 450° C at a rate of about 300° C/hour in an oxygen-free atmosphere of N_2 and the volatiles and by maintaining the devolatilizing temperature for a time of about 1 hour; and activating the devolatilized granules by heating to a temperature of about 800 to about 900° C in an atmosphere of N_2 and steam and by maintaining the activating temperature for a time of about 4 to about 5 hours; in order to produce an overall yield of granular activated carbon of about 25 to about 35% by weight, dry coal.

4,032,477

METHOD OF ENHANCING THE ELECTRON YIELD DURING PHOTOIONIZATION OF A SENSIBILIZER

Michael Grätzel, Berlin, Germany, assignor to Hahn-Meitner-Institut fur Kernforschung Berlin GmbH, Berlin, Germany

Filed Mar. 18, 1976, Ser. No. 668,291
Claims priority, application Germany, Mar. 27, 1975, 2513746
Int. Cl.² B01J 1/10
U.S. Cl. 252—501 6 Claims

1. In a method of generating electrons by irradiation of a sensibilizer with light in the presence of water, the improvement which comprises a hydrophobic organic polymer having repeating anionic groups present as a separate phase having an electron-repelling surface in contact with said water, said polymer containing said sensibilizer.

4,032,478

PERFUME COMPOSITIONS CONTAINING P-MENTHANE-8-THIOL-3-ONE

Dietmar Lamparsky, Wangen-Dubendorf, and Peter Schudel, Grut near Wetzikon, both of Switzerland, assignors to Givaudan Corporation, Clifton, N.J.

Division of Ser. No. 69,485, Sept. 9, 1970, abandoned. This application Mar. 22, 1974, Ser. No. 453,608
Claims priority, application Switzerland, Sept. 10, 1969, 13748/69
Int. Cl.² A61K 7/46; C11B 9/00
U.S. Cl. 252—522 2 Claims

1. A perfume composition comprising as one of its olfactory ingredients an olfactible amount of pure synthetically-produced p-menthane-8-thiol-3-one having an n_D^{20} of about 1.495 and boiling within the range from about 74° – 75° C. under 0.1mm. of mercury pressure.

4,032,479

CURED OR UNCURED RUBBER COMPOSITION CONTAINING HOMOPOLYMERS OR COPOLYMERS OF EPIHALOHYDRINS

Yukinari Bunnomori; Nobuo Yamada, both of Amagasaki, and Tetsuya Nakata, Ibaraki, all of Japan, assignors to Osaka Soda Co., Ltd., Osaka, Japan

Filed June 18, 1976, Ser. No. 697,344
Claims priority, application Japan, Jan. 16, 1976, 51-4290
Int. Cl.² C08G 65/32
U.S. Cl. 260—2 A 3 Claims

1. A cured or uncured rubber composition comprising

a. 100 parts by weight of a rubber component about 1 to 100% by weight of which consists of an epihalohydrin homopolymer, a copolymer of an epihalohydrin with at least one other epihalohydrin, or a copolymer of an epihalohydrin with at least one comonomer selected from the group consisting of epoxide compounds and dicarboxylic acid anhydrides,
b. about 0.5 to about 10 parts by weight of a salt of 1,8-diazabicyclo(5,4,0)undecane-7 with a compound having one carboxyl group and at least one ethylenically unsaturated linkage,
c. about 1 to about 20 parts by weight of an organic peroxide, and
d. about 1 to about 20 parts by weight of a metal compound selected from the group consisting of oxides of metals of group II of the periodic table, hydroxides of metals of group II, carbonates of metals of group II, silicates of metals of group II, phosphites of metals of group II, carboxylic acid salts of metals of group II, oxides of metals of group IVa of the periodic table, basic carbonates of metals of group IVa, basic carboxylic acid salts of metals of group IVa, basic sulfites of metals of group IVa, basic phosphites of metals of group IVa, and basic sulfates of metals of group IVA.

4,032,480

METHOD OF PRODUCING LINEAR POLYETHYLENIMINE

David Solomonovich Zhuk, ulitsa Vavilova, 44, korpus 4, kv. 172; Petr Alexandrovich Gembitsky, Leningradsky prospekt, 104, korpus 3, kv. 299, and Anatoly Ivanovich Chmerin, Volkovskaya ulitsa, 3, kv. 54, all of Moscow, U.S.S.R.

Filed July 11, 1975, Ser. No. 595,215
Int. Cl.² C08F 22/02; C08G 73/06
U.S. Cl. 260—2 EN 4 Claims

1. A method of producing linear polyethylenimine, comprising polymerization of nitrogen-containing heterocyclic compounds selected from the group consisting of ethylenimine and oligomers thereof, viz. dimer, trimer and linear tetramer, at a temperature within the range of from 40 to 55° C in the presence of cationic catalysts selected from the group consisting of hydrochloric acid, sulphuric and chloric acid, ammonium salts of hydrochloric acid and chloric acid, dichloropropane and dichloropropanol and taken in an amount ranging from 0.1 to 1.0 mol.% per each elementary unit; said polymerization in mass being conducted until a conversion ratio of ethylenimine cycles of 10 to 25% is reached; thereafter, the resulting polymerization mixture is cooled to a temperature within the range of from 5 to 25° C, added with water at a weight ratio between water and the polymerization mixture ranging from 1:2.5 to 2.5:1 and maintained at a temperature within the range of from 5° to 25° until completion of the polymerization process to obtain a heterogeneous polymerization mixture containing linear polyethlenimine crystallohydrate as a precipitate; said precipitate is separated from the heterogeneous polymerization mixture and dehydrated by drying in vacuum at a temperature within the range of from 40° to 100° C.

4,032,481

HEAT STABILIZERS FOR EXPANDABLE STYRENE POLYMERS

Walter O. Pillar, Monroeville, Pa., assignor to ARCO Polymers, Inc., Philadelphia, Pa.

Filed Jan. 30, 1976, Ser. No. 653,688
Int. Cl.² C08J 9/22
U.S. Cl. 260—2.5 FP 10 Claims

1. In a process for making styrene polymer particles less flammable by impregnating the polymer particles by heating in aqueous suspension in the presence of an organic halogen compound known to impart reduced flammability to styrene polymer particles and a blowing agent at temperatures greater that 100° C., the improvement comprising adding, prior to impregnation, about 0.2 to 4.0 percent by weight of a thermal stabilizer system for the organic halogen compound; said stabilizer system consisting essentially of a mixture of:

a. 0.06–1.2 percent by weight of barium nonylphenoxide;
b. 0.02–0.4 percent by weight of cadmium 2-ethylhexanoate;
c. 0.02–0.4 percent by weight of tricresyl phosphite;
d. 0.07–1.40 percent by weight of epoxidized soybean oil; and
e. 0.03–0.60 percent by weight of 2,2-bis [p-(1,2-epoxypropoxy phenyl] propane,

wherein the sum of (a), (b) and (c) is equal to the sum of (d) and (e), and all percents are based on the weight of styrene polymer particles; whereby the polymer molecular weigbt is not degraded during the impregnation process.

4,032,482

PROCESS FOR PRODUCING CHELATING RESIN AND PRODUCT PRODUCED THEREBY

Masafumi Moriya, Tokyo; Kazuo Hosoda, Hoya; Makoto Takai, Chiba, and Shiro Mano, Iruma, all of Japan, assignors to Miyoshi Yushi Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 20, 1975, Ser. No. 560,174
Claims priority, application Japan, Mar. 25, 1974, 49-32485; Feb. 12, 1975, 50-16903
Int. Cl.² C08G 30/14
U.S. Cl. 260—2.2 R 27 Claims

1. A process for producing a spherical cured resin comprising the steps of:

1. preparing a solution of 38 to 90 weight percent of a prepolymer by a poly addition reaction of:
   a. a poly-N-substituted polyamine,
   b. a poly-N-substituted polyalkylene imine, or
   c. a mixture of (a) and (b),

with an epoxy compound having at least two vicinal epoxy groups, said prepolymer obtained by a polyaddition reaction of (a), (b) or (c) with an equal epoxy equivalent of said vicinal epoxy compound to mole number of active hydrogen atoms, optionally in the presence of a curing agent;

2. forming an aqueous suspension of the thus-prepared prepolymer of step (1) in an aqueous solution of a water-soluble high polymer or a non-ionic surfactant, wherein the weight ratio of prepolymer solution to aqueous solution is 1:1.93 to 1:7.87, and curing the prepolymer in said aqueous solution;

said poly-N-substituted polyamine, poly-N-substituted polyalkylene imine or mixtures thereof having a structure in which an active hydrogen atom bonded to a nitrogen atom of a corresponding polyamine or polyalkylene imine is replaced by a group selected from the group consisting of a cyanoalkyl radical, alkali metal salts of a carboxyalkyl group, and alkyl esters of a carboxyalkyl group, and in which at least two of the active hydrogen atoms bonded to nitrogen atoms remain.

4,032,483

MANUFACTURE OF POLYURETHANES FROM BARK

Seymour Hartman, Mahopac, N.Y., assignor to Champion International Corporation, Stamford, Conn.

Filed Apr. 20, 1976, Ser. No. 678,471
Int. Cl.² C08G 18/14, 18/00; C08H 5/04; C08L 99/00
U.S. Cl. 260—2.5 AM 10 Claims

1. In a process for the production of rigid compositions in which polyisocyanate is reacted with polyol to produce polyurethane, the improvement comprising employing bark or bark components as the polyol.

4,032,484

FIRE-RETARDANT POLYURETHANE COMPOSITION

Heinz Schulze, and Howard P. Klein, both of Austin, Tex., assignors to Texaco Development Corporation, New York, N.Y.

Filed Jan. 19, 1976, Ser. No. 650,393
Int. Cl.² C08G 18/46, 18/50, 5/34
U.S. Cl. 260—2.5 AJ 8 Claims

1. A fire-retardant polyurethane which is the reaction product of an amino polyether polyol or an amino polyester polyol and an organic polyisocyanate formed in the presence of 2,4,5-tribromoimidazole as a fire-retardant chemical.

2. The polyurethane of claim 1 which is in a foam form having been prepared by reacting said amino polyol and said polyisocyanate in presence of a blowing agent.

4,032,485

POLYURETHANE FOAMS BASED ON MIXED ITACONIC ACID POLYESTERS

Koji Onoda, Tokyo; Atsuyuki Matsumoto, Tokorozawa; Hiroshi Ogawara, Matsudo, and Akira Nishimura, Kokubunji, all of Japan, assignors to Miyoshi Yushi Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 27, 1975, Ser. No. 553,726
Int. Cl.² C08G 18/14, 18/42
U.S. Cl. 260—2.5 AN 28 Claims

1. In a process for preparing a durable elastic polyurethane foam by reacting a polyol with an organic polyisocyanate and a blowing agent, the improvement comprising including an effective amount of a polymer-polyol consisting of a polymer resulting from the radical polymerization through a reactive double bond of a polyester prepared by reacting an acid component containing itaconic acid alone or itaconic acid together with up to 88/140 of at least one other dibasic acid selected from the group consisting of succinic acid, adipic acid, sebacic acid and phthalic acid based on the total weight of the itaconic acid and said other dibasic acid with a polyol having a molecular weight of at least 2,000 and also having the general formula $R[(OR')_nOH]_m$ in which R represents a polyol residue having at least three reactive hydrogen atoms, R' represents ethylene or propylene, n is an integer from 30 to 100 and m is an integer from 3 to 6, in the raio of one mole of the average molecular weight of said acid component to one to six moles of said polyol.

4,032,486

ADHESIVES TACKIFIED WITH PHENOL-DIENE-OLEFIN ADDUCTS HAVING NUMBER AVERAGE MOLECULAR WEIGHT BETWEEN ABOUT 600 TO 6000

Ramsis Gobran, Roseville, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Oct. 23, 1973, Ser. No. 408,592
The portion of the term of this patent subsequent to Aug. 24, 1993, has been disclaimed.
Int. Cl.² C08L 7/00; C09J 3/12
U.S. Cl. 260—4 AR 12 Claims

I. A tacky adhesive composition comprising

1. 5 to 200 parts by weight phenol-diene-olefin resin having a number average molecular weight between about 600 and about 6000, said resin being produced by first reacting about 2 moles of a phenol with about 1 mole of non-conjugated diene, and then reacting 1 to 4 moles of olefin with the reaction product, both reactions being carried out in an inert atmosphere, in the presence of a Friedel-Crafts catalyst, and at a temperature in the range of about 20° C to 180° C, wherein said phenol has at least 2 ortho and/or para positions free for reaction, and wherein said olefin is selected from the group consisting of styrene, α-methylstyrene, chlorostyrene, vinyltoluene, t-butylstyrene, hexene-1, hexene-2, octene-1, 2-ethylhexene-1, indene, cylohexene, methyl vinyl ether, isobutyl vinyl ether, allyl propyl ether, methyl cinnamate, dimethyl fumarate, N-vinylpyridine, N-vinylpyrrolidone, and N-vinylcarbazole, and
2. about 100 parts by weight of a rubbery material selected from the group consisting of natural rubber and cis-polybutadiene.

4,032,487

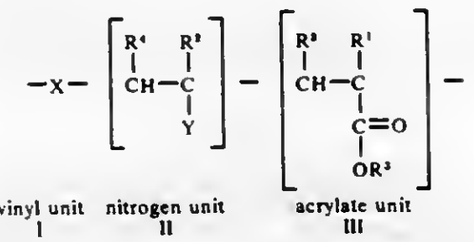
AQUEOUS ACRYLATE-EPOXY SILANE CROSSLINKER ADHESIVE DISPERSION COMPOSITION

Peter Spiros Columbus, Whitestone, N.Y., assignor to Borden, Inc., Columbus, Ohio

Continuation-in-part of Ser. No. 453,245, March 21, 1974, abandoned. This application Apr. 12, 1976, Ser. No. 676,046
Int. Cl.² C08L 1/28
U.S. Cl. 260—17 R 12 Claims

1. An aqueous adhesive dispersion composition of pH of 8 to 12 containing 25 to 75% by weight of water having dispersed therein reaction product of A and B, as defined below:

A. a water insoluble binder polymer having the following structural formula:



vinyl unit I nitrogen unit II acrylate unit III

where R^1 and R^2, which can be same or different are selected from H, lower-alkyl groups of 1 to 4 carbon atoms, halogens, $-CH_2COOR$, $-COOR$, and $-CH_2COOH$ groups where R is a lower alkyl group of 1 to 8 carbon atoms;

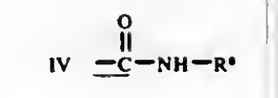
R^3 is selected from H and lower alkyl groups of 1 to 8 carbon atoms, at least or portion of R^3 radical being H to give free carboxyl groups;

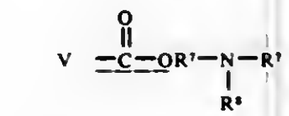
R^4 and R^5, which can be same or different, are selected from H, —COOH and —COOR groups, where R is as defined above;

X is derived from copolymerizable vinyl monomers and is different from the acrylate unit III;

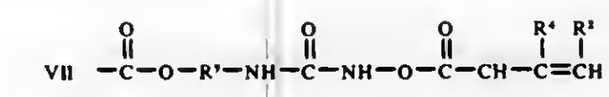
Y is a nitrogen-containing radical of unit II which is derived from a nitrogen-containing monomer;

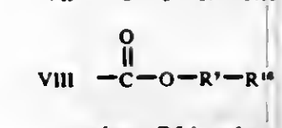
radical Y is selected from the following radicals:

IV 

V 

VI

VII 

VIII 

where R^6 is selected from H, $-R^7$ NR^8 and $-R^7OH$;

R^7 and R^8 being same or different lower alkyl radicals of 1 to 5 carbon atoms;

R^9 is a heterocyclic nitrogen-containing group selected from substituted ethylene urea groups;

R^{10} is a heterocyclic nitrogen-containing group selected from pyridyl groups; and

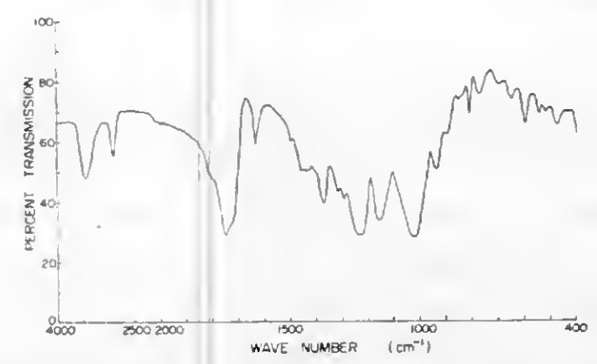
B. an effective amount, to effect crosslinking of the binder polymer, of a silane containing both alkoxy and epoxy functionalites.

4,032,488

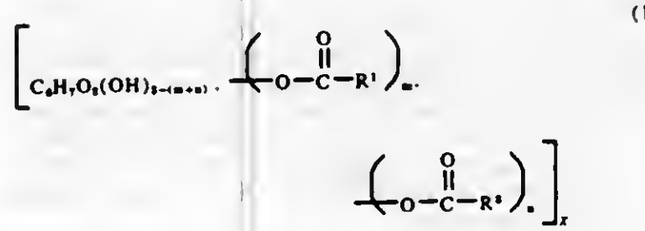
DEXTRAN ESTER-OLEFIN COMPOUND COPOLYMER AND PROCESS FOR PREPARING SAME

Shusaburo Kokkoku, Gifu, and Yasuhiko Onishi, Inazawa, both of Japan, assignors to Meito Sangyo Kabushiki Kaisha, Nagoya, Japan

Filed Oct. 3, 1975, Ser. No. 619,178
Int. Cl.² C08L 5/02
U.S. Cl. 260—17.4 GC 8 Claims

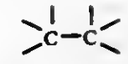


1. A dextran ester-olefin compound copolymer comprising a unit derived from a dextran ester of the following formula (1)



(1)

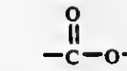
wherein R^1 is a C_2–C_{18} organic radical having the



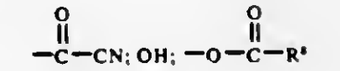
bond derived from the >C=C< bond of an unsaturated acid, R^2 is a C_1–C_{18} alkyl radical, m is a positive number having a value of $0<m\quad 3$, n is a positive number having a value of $0\quad n<3$, with the proviso that $m+n<3$, and x is a positive number having a value of 5 or more; and a unit derived from a polymerizable olefin compound of the following formula (2)

(2)

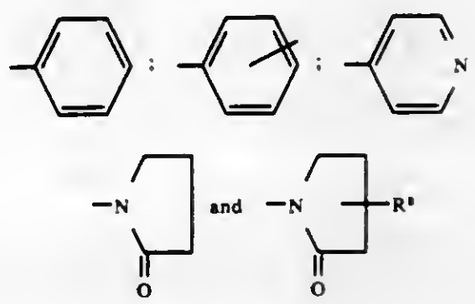
wherein R^3, R^4 and R^5 are each selected from the group consisting of hydrogen and CH_3 and R^6 is a member of the group consisting of



[where R^7 is a member of the class consisting of hydrogen, C_1–C_{18} alkyl radicals, cyclohexyl radical, lower alkyl-substituted cyclohexyl radical, C_1–C_8 hydroxyalkyl radicals, $-N(R^{10})_2$ where the two R^{10}'s which may be the same or different are members of the group consisting of hydrogen and a C_1–C_4 alkyl radical, C_1–C_8 aminoalkyl radicals, C_1–C_8 dialkylaminoalkyl radicals, glycidyl radical, tetrahydrofuran radical, lower alkyl-substituted tetrahydrofuran radical, benzyl radical and $(CH_3CH_2O)_yCH_2CH_2OH$ radical where y is a positive integer from 1 to 10];



where R^8 is a C_1–C_8 alkyl radical;



where R^9 is a lower alkyl radical.

4,032,489

BUTYL GLAZING COMPOSITION

Hilmar Haverstreng, Sao Paulo, Brazil, assignor to USM Corporation, Boston, Mass.

Filed June 24, 1975, Ser. No. 589,697
Claims priority, application Germany, July 4, 1974, 2432496
Int. Cl.² C08L 51/00, 93/00
U.S. Cl. 260—27 BB 4 Claims

1. A bot melt sealant consisting essentially of at least 30% by weight of butyl-rubber, from 25% to 45% by weight of tackifying resin, from 20% to 40% by weight of finely divided

filler and sufficient of a styrene/butadiene/styrene block copolymer or of styrene/isoprene/styrene block copolymer to provide 0.5 to 10% by weight copolymer in the sealant.

4,032,490

WAX COMPOSITIONS FOR FLAME RETARDANT ELECTRICAL INSULATION COATINGS

Takao Murata; Nobutaka Nakamura, and Tateo Goto, all of Fujieda, Japan, assignors to Sumitomo Durez Company, Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 524,304, Nov. 15, 1974, abandoned. This application Oct. 10, 1975, Ser. No. 621,458
Int. Cl.² C08L 91/00
U.S. Cl. 260—28 P 6 Claims

1. In an electrical insulating composition comprising a microcrystalline wax, a halogenated organic flame retardant, and a synthetic resin, the improvement wherein the insulating composition contains as a flame retardant tribromophenol alkyl ether which has a decomposition temperature above about 200° C and which has a melting point of about 70° C to about 150° C in a proportion of about 10 to about 200 percent by weight of the wax and as the synthetic resin a thermoplastic resin selected from the group consisting of phenolic resins, alkyl-phenolic resins, alkyl-benzene resins, terpene resins, cumarone resins, guanamine resins, and alicyclic saturated hydrocarbon resins, said thermoplastic resin having a melting point of about 70° C to about 150° C and is present in a proportion of about 10 to about 50 percent by weight of said wax.

4,032,491

ROOFING COMPOSITION AND RESULTING PRODUCT

William Emil Schoenke, Dallas, Tex., assignor to Butler-Schoenke Roofing Specialties, Inc., Dallas, Tex.

Continuation-in-part of Ser. No. 408,153, Oct. 19, 1973, abandoned. This application June 6, 1975, Ser. No. 584,656
Int. Cl.² C08L 91/00
U.S. Cl. 260—28.5 AS 13 Claims

1. In a fluid, curable roofing composition which is free from terminally-reactive diolefin polymer and from a curing or vulcanization agent and which comprises an intimate admixture of elastomer and asphalt, the improvement wherein:

a. the elastomer is in the form of a midblock B of an A-B-A block copolymer wherein each end block A is a polymer block of a polymerized vinyl aromatic monomer and the midblock B is a polymer block of polymerized aliphatic hydrocarbon monomer, the polymerized aliphatic hydrocarbon monomer having at most a proportion of olefinic unsaturation which is significantly less than that of a polydiene or of a polymerized mixture of dienes,
b. the block copolymer is in solution in a solvent,
c. the asphalt has a softening point of from about 100° to about 175° F,
d. the weight percent of A-B-A block copolymer is from about 60 to about 95 percent and
e. the weight percent of asphalt is from about 40 to about 5 percent, the respective weight percents being based on the total amount of A-B-A block copolymer and asphalt in the roofing composition.

4,032,492

HOT MELT CONTAINER CLOSURE SEALANT

Paul A. Englund, St. Paul, and James A. Collins, North Oaks, both of Minn., assignors to H. B. Fuller Company, St. Paul, Minn.

Filed Feb. 25, 1976, Ser. No. 661,269
Int. Cl.² C08L 91/00
U.S. Cl. 260—28.5 A 5 Claims

1. A hot melt composition comprising an intimate admixture of the following components:

a. 15–45% by weight of a hydrocarbon wax;
b. 5–35% by weight of a rubbery block co-polymer said block co-polymer comprising at least one A-B-A unit, the A blocks of said A-B-A unit comprising repeating vinyl arene units and the B block comprising a rubbery ethylene-butylene or butadiene polymer;
c. 20–45% by weight of an essentially hydrocarbon oil;
d. 1–8% by weight of a liquid silicone which is essentially non-toxic; and
e. up to 30% by weight of a resinous thermoplastic polymer containing vinyl arene units; said hot melt composition being substantially homogeneous in the molten phase and being deformable thermoplastic solid which is lubricitous and generally tack-free at the surfaces at temperatures below 65° C.; said hot melt composition being flowable at temperatures below 320° C.

4,032,493

ORIENTED FILM OF STEREOREGULAR POLYPROPYLENE COMPOSITION

Miguel Pascual, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Continuation of Ser. No. 601,754, Aug. 4, 1975, abandoned. This application Sept. 3, 1976, Ser. No. 720,326
Int. Cl.² C08L 23/00
U.S. Cl. 260—28.5 A 4 Claims

1. A film of a compatible blend of (1) stereoregular polypropylene, (2) a hydrocarbon wax selected from the group consisting of (a) paraffin waxes having a melting point of 100° F. to 155° F., (b) microcrystalline waxes having a melting point of 150° F. to 200° F. and (c) Fischer Tropsch waxes having a melting point of 180° F. to 220° F., and (3) a hydrogenated hydrocarbon polymer having a drop softening point above about 70° C., an average molecular weight of at least 500, and an iodine value less than 50, said hydrocarbon wax being present in the amount of 0.4 to 5% by weight of the polypropylene and said hydrogenated hydrocarbon polymer being present in the amount of 1 to 60% based on the weight of the polypropylene, said film possessing improved printability with low surface tension inks as compared to a film made from a blend of ingredients (1) and (3) alone.

4,032,494

LIQUID SILOXANES AS ADDITIVES FOR CURABLE POLYESTER MOULDING COMPOSITIONS CONTAINING VINYL ACETATE POLYMER AND UNSATURATED MONOMER

Robert Ray Gentry, Saint Albans, W. Va., assignor to Union Carbide Corporation, New York, N.Y.

Filed Mar. 3, 1976, Ser. No. 663,454
Int. Cl.² C08L 67/06
U.S. Cl. 260—29.1 SB 24 Claims

1. A curable molding composition containing:

a. a polyester resin that is suitable for use in molding and which comprises the reaction product of an olefinically unsaturated dicarboxylic acid or anhydride and a polypol;
b. an olefinically unsaturated monomer that is copolymerizable with said polyester resin;
c. a vinyl acetate polymer having a molecular weight within the range of from about 10,000 to about 250,000; and
d. a liquid siloxane, wherein the liquid siloxane is employed in said curable molding composition in an amount sufficient to reduce the water absorption of the cured composite produced by curing said curable molding composition, said amount being within the range of from about 0.5 to about 10 weight percent, based on weight of said vinyl acetate polymer.

4,032,495

WATER-REPELLENT AND OIL-REPELLENT COMPOSITIONS BASED ON FLUORINE COMPOUND

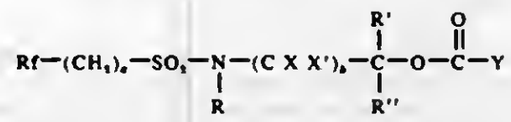
Jean Perronin, Chantilly, and André Louis Dessaint, Nogent sur Oise, both of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

Continuation of Ser. No. 339,668, March 9, 1973, abandoned. This application Jan. 2, 1976, Ser. No. 645,979
Claims priority, application France, Mar. 10, 1972, 72.08366
Int. Cl.² C08L 27/12; C08F 214/18
U.S. Cl. 260—29.6 F 19 Claims

1. Mixture comprising:

I. An aqueous dispersion of a copolymer (A) consisting essentially of in interpolymerized form:

1. 30% to 99% by weight of one or more monomers of the formula:

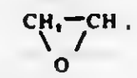


(I)

in which Rf represents a perfluoro straight or branched alkyl group containing from 1 to 20 carbon atoms, *a* is a whole number between 2 and 20 inclusive, R represents a hydrogen atom or an alkyl group containing 1 to 10 carbon atoms, a cycloalkyl group containing 5 to 12 carbon atoms, an hydroxyalkyl group containing 2 to 4 carbon atoms or an aryl group unsubstituted or substituted by an alkyl radical containing 1 to 6 carbon atoms, R′, R″, X and X′ are the same or different and represent hydrogen atoms or alkyl groups containing 1 to 4 carbon atoms, *b* is a whole number between 1 and 4 inclusive, and Y represents the residue from removal of a carboxyl group of an alkenemono- or -di-carboxylic acid or a monoalkyl ester of such a dicarboxylic acid;

2. Up to 70% by weight of one or more compounds containing at least one polymerizable ethylene linkage and no perfluoro groups; and

3. Up to 10% by weight of one or more monomers different from the compounds of (A) (2) and containing an ethylene linkage and at least one reactive group, said reactive group being an OH, NH_2, NH-alkyl, COOMe, SO_3H,



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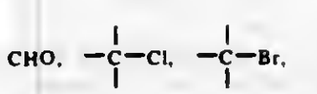


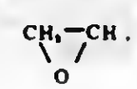
$-SO_2-CH=CH_2$ or $-NH-CO-CH=CH_2$ group; and

II. An aqueous dispersion of a copolymer (B) different from copolymer (A) and consisting essentially of in an interpolymerized form:

1. 1% to 70% by weight of one or more monomers of formula (1),

2. 30% to 99% by weight of one or more compounds containing at least one polymerizable ethylene linkage and no perfluoro groups; and

3. 0% to 10% by weight of one or more monomers different from the compounds of (B)(2) and containing an ethylene linkage and at least one reactive group, said reactive group being an OH, NH_2, NH-alkyl, COOMe, SO_3H,



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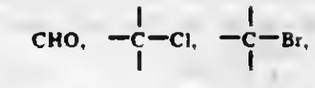


$-SO_2-CH=CH_2$ or $-NH-CO-CH=CH_2$ group; and wherein said mixture contains an aqueous dispersion of a copolymer (A) containing a large proportion of said perfluoro alkyl groups with an aqueous dispersion of a copolymer (B) containing a relatively small proportion of perfluorinated groups,

the weight of one or more monomers of the formula (I) contained in the copolymer (A) being greater than that of one or more monomers of the formula (1) contained in the copolymer (B).

4,032,496

AQUEOUS COATING COMPOSITIONS CONTAINING A POLYLIGAND SOLUTION POLYMER

Frank Russell Spencer, Morris, and Edwin Ralph Kolodny, Stamford, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed July 29, 1975, Ser. No. 600,178
Int. Cl.² C08L 33/02
U.S. Cl. 260—29.6 TA 5 Claims

1. A coating composition comprising water and from about 10–20 weight percent of (a) a polyligand polymer, prepared by free radical polymerization in solution in a water soluble organic solvent having a boiling point of at least 150° C., of from about 10–15% by weight of methacrylic acid, 60–70% by weight of methyl methacrylate and 20–25% by weight of butyl acrylate, said polymer having an intrinsic viscosity in the range of 0.06 to <0.2 and saponified, at least in part, with (b) aqueous ammonia in an amount sufficient to provide at least an equivalent of ammonia per carboxyl group in said polymer (NH_4^+/COO^-) of at least 1% and (c) a metal fugitive complexing agent capable of undergoing ligand transfer with carboxyl groups in the polymer, selected from zinc ammonium formate, acetate and carbonate, in an amount sufficient to provide a zinc content based on solids content of from about 0.17 to 1.65%.

4,032,497

METHOD AND APPARATUS FOR REMOVAL OF UNREACTED MONOMER FROM SYNTHESIZED HIGH POLYMER LATEX

Kunizoh Kidoh; Hideki Wakamori, and Kamizo Iimura, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed July 15, 1975, Ser. No. 596,062
Claims priority, application Japan, July 19, 1974, 49-83676
Int. Cl.² C08L 27/06
U.S. Cl. 260—29.6 R 8 Claims

1. A method for the removal of unreacted monomers from a polymer latex comprising:

providing a hollow cylinder inclined at a gradient of 1/100 to 1/10 with respect to the horizontal plane;
rotating said hollow cylinder;
introducing the polymer latex into the top of said rotating cylinder; and
introducing a moisture-containing gas into said rotating cylinder for contact with the latex.

4,032,498

FLAME-RETARDANT PLASTICIZERS FOR POLYVINYL CHLORIDE

Franz-Josef Dany, Erftstadt; Joachim Wortmann, Turnich; Peter Münch, and Hartfrid Vollmer, both of Erftstadt, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

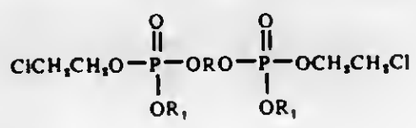
Filed Oct. 21, 1975, Ser. No. 624,545

Claims priority, application Germany, Oct. 24, 1974, 2450949

Int. Cl.² C08K *5/52*

U.S. Cl. 260—30.6 R **18 Claims**

1. A flame-retardant composition consisting essentially of polyvinyl chloride and a plasticizer therefor of the formula



in which R stands for an alkylene radical or a halogen-substituted alkylene radical having from 2 to 6 carbon atoms, a $-CH_2CH_2-O-CH_2CH_2-$radical, a phenylene or an alkyl or halogenoalkyl-substituted diphenylenemethane radical, and R_1 stands for a branched or unbranched alkyl radical having from 6 to 18 carbon atoms.

4,032,499

METHOD FOR PREPARING MODIFIED POLYSILOXANES

Franz-Heinrich Kreuzer, and Manfred Wick, both of Munich, Germany, assignors to Consortium fur Elektrochemische Industrie GmbH, Munich, Germany

Filed Jan. 31, 1975, Ser. No. 545,958

Claims priority, application Germany, Feb. 7, 1974, 2405828

Int. Cl.² C08K *5/05*

U.S. Cl. 260—33.4 SB **7 Claims**

1. A method for preparing modified organopolysiloxanes which comprises contacting an organopolysiloxane in which the organic groups connected to the silicon atoms are selected from the group consisting of monovalent hydrocarbon radicals, halogenated monovalent hydrocarbon radicals and cyanoalkyl radicals with a monomer having aliphatic unsaturation in the presence of a free radical initiator and an inert liquid having a boiling point up to 100° C. at 760 mm Hg (abs.) in which the inert liquid is present in an amount of from 2 to 20 percent by weight based on the total weight of the organopolysiloxane, monomer and free radical initiator and is a nonsolvent at the polymerization temperature for the organopolysiloxane and the polymers obtained from the polymerization and the weight ratio of the organopolysiloxane to monomer is from 10:90 to 90:10.

4,032,500

CURABLE SEALANT TWO-COMPONENT COMPOSITION CONTAINING BUTYL RUBBER DERIVED FROM ISOOLEFIN AND OPEN-CHAIN CONJUGATED DIOLEFIN

Russell William Koch, Hartville, and Arthur Eugene Oberster, North Canton, both of Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio

Filed Mar. 22, 1976, Ser. No. 668,880

Int. Cl.³ B60C *5/14, 21/08;* **C08K** *5/01;* **C08L** *75/04*

U.S. Cl. 260—33.6 AQ **9 Claims**

1. A curable and solventless sealant composition consisting essentially of a mixture of (a) a mixture of about 100 parts low molecular weight elastomeric isocyanate terminated prepolymer, said prepolymer having from about 3.5 to about 4.5% NCO content, from about 250 parts to about 400 parts medium process oil, said oil having a Brookfield viscosity at 22° C. of about 10 to 500 cps, and from about 50 parts to about 70 parts low molecular weight uncured butyl rubber having a Staudinger molecular weight of 5,000 to 15,000, and, (b) a mixture of from about 150 parts to about 250 parts low molecular weight polyol having a molecular weight of from 400 to 5,000, said polyol having about 0.8 milliequivalent per gram hydroxyl, from about 40 to about 65 parts low molecular weight uncured butyl rubber having a Staudinger molecular weight of 5,000 to 15,000, from about 225 to about 275 parts of a medium process oil as in (a) and from about 0.1 to about 10.0 parts catalyst for the reaction of said prepolymer and said polyol, said (a) and said (b) being mixed together in a volume ratio of from about 1.0 to 1.0.

4,032,501

DRY-BLENDABLE SOLUTION RUBBER POWDERS AND PROCESS

Donald Norman Schulz, Hartville, Ohio, assignor to The Firestone Tire & Rubber Company, Akron, Ohio

Filed July 11, 1975, Ser. No. 594,985

Int. Cl.² C08K *3/04, 5/01*

U.S. Cl. 260—33.6 AQ **2 Claims**

1. Process for preparing homogeneous, storage-stable, dry-blendable, hydrocarbon solution non-polar rubber powder having a DSV from about 1.5 to about 7.0 (100 parts) containing carbon black, said process being carried out by sequentially (1) grinding carbon black (60–90 phr) in water (2) mixing at a temperature of 20°–100° C., the composition resulting from said (1) with a hydrocarbon solution of rubber, about 5–25% (w/w), to form a liquid two phase dispersion of (a) hydrocarbon, solvent, carbon black, and rubber, and (b) water; (3) stripping the liquid dispersion of said (2) of solvent by adding, at a rate of between about 360–1270 g./min., said dispersion to vigorously stirred hot water (85–120° C.) in the presence of at least one foam inhibiting surfactant selected from the group consisting of (a) nonionic polyether alcohols with blocked terminal hydroxyl group (0.01–5.0 phr), and, (b) cationic tetraalkylammonium salts having more than 25 carbon atoms in the cation of said salt (0.01–5.0 phr), to produce powder, (4) drying said powder to produce a homogeneous, clean and free-flowing powder having a mean particle size from 0.8 to 1.5 mm., with about one-half of said particles having a particle size greater than 1.0 mm.

4,032,502

ORGANOSILOXANE COMPOSITIONS FOR LIQUID INJECTION

Chi-Long Lee; Ollie W. Marko, both of Midland, and Jay R. Schulz, Bangor Township, Bay Count, all of Mich., assignors to Dow Corning Corporation, Midland, Mich.

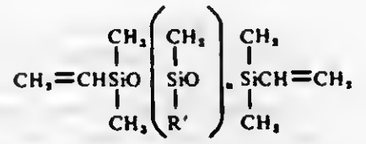
Filed Oct. 10, 1975, Ser. No. 621,432

Int. Cl.³ C08L *83/04*

U.S. Cl. 260—37 SB **11 Claims**

1. A curable composition suitable for use in a method of liquid injection molding of elastomeric articles, consisting essentially of

a. 100 parts by weight of an essentially linear polydiorganosiloxane fluid copolymer having two siloxane-bonded vinyl groups per molecule and having the average formula



wherein from 25 to 75 percent of all R' groups are 3,3,3-trifluoropropyl and the remaining R' groups are methyl and *n* has an average value such that the viscosity of (a) has a value of from 500 to 10,000 centistokes at 25° C.,

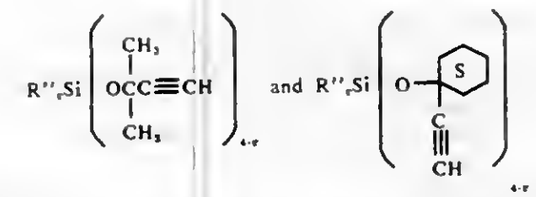
b. an organosiloxane, soluble in (a) and consisting essentially of

i. a polyorganosiloxane consisting essentially of $H(CH_3)_2SiO_{1/2}$ units and units selected from the group consisting of $QSiO_{3/2}$ units and $SiO_{4/2}$ units, there being from 3 to 10 inclusive silicon-bonded hydrogen atoms per molecule of (i), Q is 3,3,3-trifluoropropyl, phenyl or an alkyl group having 1 to 6 inclusive carbon atoms and the ratio of the total number of $SiO_{4/2}$ units and $QSiO_{3/2}$ units to $H(CH_3)_2SiO_{1/2}$ units in (i) has an average value of from 0.25 to 0.75 and,

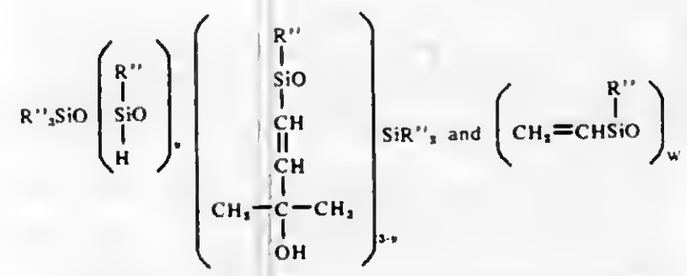
ii. a polydiorganosiloxane consisting essentially of $H(CH_3)_2SiO_{1/2}$ units and R''_2SiO units, wherein each R'' methyl, ethyl, phenyl, or 3,3,3-trifluoropropyl, there being two silicon-bonded hydrogen atoms per molecule of (ii) and an average of from 3 to 10 silicon atoms per molecule of (ii), the amounts of (i) and (ii) being sufficient to provide a total of from 0.75 to 3.0 silicon bonded hydrogen atoms in (b) for every silicon-bonded vinyl group in the composition and from 0 to 1 inclusive silicon-bonded hydrogen atom in (ii) for every silicon-bonded hydrogen atom in (i),

c. a platinum-containing catalyst, soluble in (a) and providing at least 1 part by weight of platinum for every 1 million parts by weight of the composition,

d. an effective amount of a platinum catalyst inhibitor selected from the group consisting of acetylenic silanes of the formulae



and olefinic siloxanes of the formulae



wherein R'' is, independently, methyl, ethyl, phenyl or 3,3,3-trifluoropropyl, *u* is an integer from 1 to 2 inclusive, *v* is an integer from 0 to 2 inclusive and *w* is an integer from 3 to 6 inclusive, and

e. at least 5 parts by weight of a reinforcing silica filler having a surface area of at least 50 square meters per gram and having the surface thereof treated with an organosilicon compound to prevent appreciable crepe-aging of the curable composition; said curable composition having a Standard Injection Rate of greater than 100 grams per minute at 25° C. a Standard Cure Time of less than 100 seconds at 121° C., a Standard Pot Life of greater than 10 hours at 25° C., and when heated at 150° C. for 15 minutes and at 200° C. for 8 hours, will cure to an elastomeric material characterized by a tensile strength greater than 42 kg./sq.cm., and elongation at break greater than 300 percent and a tear strength greater than 7 kg./cm.

4,032,503

PROCESS FOR THE MANUFACTURING OF STYRENE DERIVATIVES, NEW STYRENE DERIVATIVES AND THEIR USE AS OPTICAL BRIGHTENERS

Géza Kormány, Allschwil; Guglielmo Kabas, Aesch; Hans Schläpfer, and Adolf Emil Siegrist, both of Basel, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

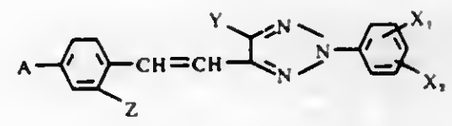
Filed Aug. 6, 1975, Ser. No. 601,884

Claims priority, application Switzerland, Aug. 14, 1974, 11110/74

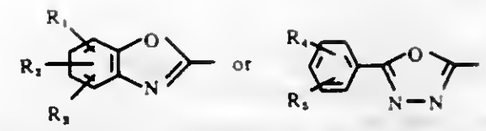
Int. Cl.² C08K *5/35*

U.S. Cl. 260—40 P **13 Claims**

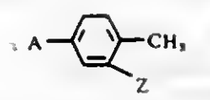
1. Process for the manufacture of styrene compounds of the formula



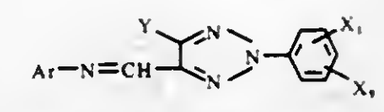
wherein A denotes one of the ring systems



and wherein R_1 denotes hydrogen, alkyl with 1 to 8 carbon atoms, cyclohexyl, phenylalkyl with 1 to 3 carbon atoms in the alkyl part, phenyl, alkoxy with 1 to 4 carbon atoms, or chlorine, or, conjointly with R_3, denotes alkylene with 3 or 4 carbon atoms, R_2 denotes hydrogen or alkyl with 1 to 4 carbon atoms or, conjointly with R_1, denotes alkylene with 3 or 4 carbon atoms, R_3 denotes hydrogen or methyl, R_4 denotes hydrogen, m-methyl, alkyl with 2 to 8 carbon atoms, phenyl, alkoxy with 1 to 4 carbon atoms, or chlorine, or, conjointly with R_5, denotes a fused benzene ring, R_5 denotes hydrogen or chlorine or, conjointly with R_4, denotes a fused benzene ring, X_1 denotes hydrogen, alkyl with 2 to 4 carbon atoms, alkoxy with 1 to 4 carbon atoms or chlorine, X_2 denotes hydrogen or chlorine, Y denotes hydrogen, chlorine, alkyl with 1 to 4 carbon atoms or phenyl and Z denotes hydrogen or chlorine, which comprises reacting a methyl compound of the formula



with a Schiff's base of the formula



wherein Ar denotes an aromatic radical, in dimethylformamide in the presence of a strongly basic alkali metal compound, the reaction mixture being irradiated, at least initially, with UV light.

4,032,504

X-RAY OPAQUE FILLER USEFUL IN DENTAL AND MEDICAL RESTORATIVE COMPOUNDS

Henry L. Lee, Jr., Pasadena, and Jan A. Orlowski, Altadena, both of Calif., assignors to Lee Pharmaceuticals, South El Monte, Calif.

Continuation of Ser. No. 401,810, Sept. 28, 1973, abandoned. This application Dec. 19, 1974, Ser. No. 534,374
Int. Cl.² C09K 3/00; C08K 7/14
U.S. Cl. 260—42.18 10 Claims

1. An X-ray opaque filler for synthetic resin compositions comprising from about 5% to about 35% by weight of particulate barium glass having a refractive index of from about 1.7 to about 2.0 and from about 95 to about 65% by weight of an X-ray transparent particulate filler material having a refractive index which closely approximates the refractive index of the synthetic resin composition to be filled.

4,032,505

2,4-DIHYDROXYDIPHENYL SULFOXIDE

Dwight William Chasar, Northfield, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Nov. 2, 1976, Ser. No. 737,955
Int. Cl.² C08K 5/41; C07C 39/12
U.S. Cl. 260—45.8 N 8 Claims

1. 2,4-Dihydroxydiphenyl sulfoxide.

2. A composition comprising a polyolefin and a stabilizing amount of 2,4-dihydroxydiphenyl sulfoxide.

4,032,506

FLAME RETARDANT POLYCARBONATE COMPOSITION

Victor Mark, Evansville, Ind., assignor to General Electric Company, Pittsfield, Mass.

Continuation-in-part of Ser. No. 429,128, Dec. 28, 1973, Pat. No. 3,953,396. This application Mar. 26, 1976, Ser. No. 670,678
Int. Cl.² C08K 5/16
U.S. Cl. 260—45.9 R 12 Claims

1. A flame retardant aromatic carbonate polymer composition comprising in admixture an aromatic carbonate polymer and a minor amount of a metal salt of substituted and unsubstituted sulfonic acids of mixtures of monomeric and polymeric aromatic ethers, and polymeric aromatic ethers wherein said metal salts thereof are selected from the group consisting of alkali metals and alkali earth metals, and mixtures of these metal salts, and said substituent on the metal salt of the substituted sulfonic acids of aromatic ethers is selected from the group consisting of electron withdrawing radicals and mixtures of electron withdrawing radicals.

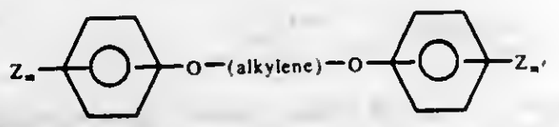
4,032,507

PLASTIC COMPOSITIONS

Arnold L. Anderson, Alma, Mich., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Filed Feb. 8, 1973, Ser. No. 330,809
The portion of the term of this patent subsequent to Apr. 5, 1994, has been disclaimed.
Int. Cl.² C08L 25/06
U.S. Cl. 260—45.75 R 15 Claims

1. A plastic composition comprising a polystyrene and a flame retardant, said flame retardant consisting of a compound having the formula



wherein (a) Z is bromine; (b) m and m' are independent and are integers having a value of from 1 to 5; and (c) alkylene is a straight or branched chain alkylene group having from one to six carbon atoms.

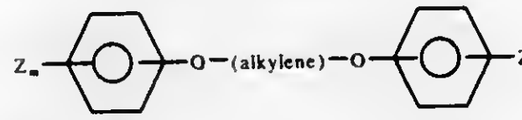
4,032,508

PLASTIC COMPOSITIONS

Arnold L. Anderson, Antioch, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 330,809, Feb. 8, 1973. This application Sept. 12, 1975, Ser. No. 612,740
The portion of the term of this patent subsequent to Apr. 5, 1994, has been disclaimed.
Int. Cl.² C08L 25/04
U.S. Cl. 260—45.75 R 20 Claims

1. A plastic composition comprising a three component system consisting of (1) polystyrene polymer, (2) a bisphenoxy compound, which functions as a flame retardant for said composition, having the formula



wherein (a) Z is bromine; (b) m and m' are independent and are integers having a value of 5 and (c) alkylene is a straight chain carbon group having from one to six carbon atoms, and (3) a flame retardant enhancing agent.

4,032,509

FIRE RETARDANT STYRENIC TERPOLYMER COMPOSITIONS

Yoon C. Lee, Springfield, Mass., assignor to Monsanto Company, St. Louis, Mo.

Filed Dec. 29, 1975, Ser. No. 644,493
Int. Cl.² C08K 3/22, 3/38, 5/06
U.S. Cl. 260—45.75 B 9 Claims

1. A molding composition comprising:

A. from 48 to 94 percent by weight based on the total weight of the molding composition of a polymer which is the interpolymerization product of:

1. from 55 to 90 percent by weight of a styrene monomer;
2. from 5 to 25 percent by weight of a maleic anhydride monomer; and
3. from 5 to 20 percent by weight of a brominated monomer selected from the group consisting of bromophenyl acrylates, bromophenyl methacrylates, bromoneopentyl acrylate and bromoneopentyl methacrylates, with the proviso that the amount of bromine in the polymer is at least 3 percent by weight;

B. from 3 to 12 percent by weight based on the total weight of the molding composition of a metal oxide;

C. from 3 to 25 percent by weight based on the total weight of the molding composition of a smoke suppressant which is selected from the group consisting of smoke suppressing hydrates, carbonates and borates; and

D. from 0 to 15 percent by weight of a brominated aromatic fire retardant additive.

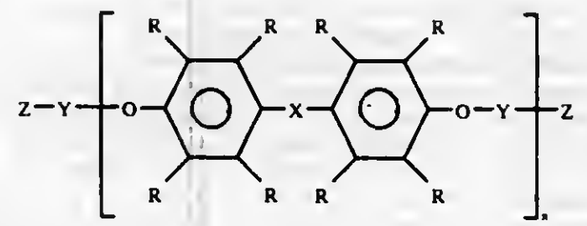
4,032,510

NOVEL POLYCARBON STABILIZERS

Joseph C. Floyd, Baytown, Tex., and Doo A. Plaok, Sarnia, Canada, assignors to Exxon Research and Engineering Company, Linden, N.J.

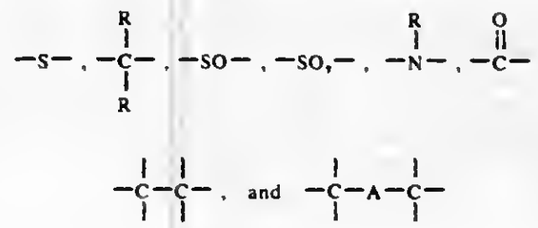
Continuation-in-part of Ser. No. 597,245, July 18, 1975, abandoned, which is a continuation-in-part of Ser. No. 441,457, Feb. 11, 1974, abandoned. This application Aug. 5, 1976, Ser. No. 711,705
Int. Cl.² C08J 3/20
U.S. Cl. 260—45.85 S 26 Claims

1. A composition of matter having the following structural formula:



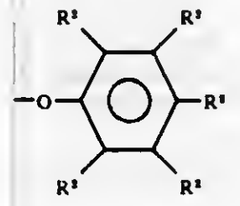
wherein:

1. R is selected from the group consisting of —H, C_1–C_{16} alkyl groups, and an aryl group;
2. X is selected from the group consisting of



wherein A is a C_1–C_{16} alkylene or an arylene group;

3. Y is —C—;
4. Z is selected from the group consisting of



wherein R^3 is —H or a C_1–C_{16} alkyl group, and O—R^3 wherein R^3 is a C_1–C_{16} alkyl group; and

5. n is a value ranging from 1 to about 15.

4,032,511

PROCESS FOR THE PRODUCTION OF PHENOL SILICATE COMPOUNDS AND THEIR CONDENSATION PRODUCTS

David H. Blount, 5450 Lea St., San Diego, Calif. 92105

Continuation-in-part of Ser. No. 555,078, March 3, 1975, abandoned. This application Mar. 31, 1976, Ser. No. 672,559
Int. Cl.² C08G 77/04
U.S. Cl. 260—46.5 R 16 Claims

1. The process for the production of phenol silicate compounds and their resinous products by the following steps:

a. mixing about equal parts by weight of silicic acid and a phenol compound;
b. adding an alkali catalyst equal to 1 to 10% by weight of silicic acid and phenol compound;
c. heating said mixture to just below the boiling point of the phenol compound for 15 to 100 minutes while agitating, thereby
d. producing a granular phenol silicate compound.

4,032,512

PROCESS FOR THE PREPARATION OF POLYPHENYLENE ETHERS AT ELEVATED PRESSURE

James G. Bennett, and Glenn D. Cooper, both of Delmar, N.Y., assignors to General Electric Company, Pittsfield, Mass.

Continuation-in-part of Ser. No. 401,985, Oct. 1, 1973, abandoned. This application Apr. 1, 1975, Ser. No. 564,127
Int. Cl.² C08G 65/44
U.S. Cl. 260—47 ET 11 Claims

1. In a process for the preparation of a high-molecular weight polyphenylene ether having a degree of polymerization of at least 50 by oxidatively coupling a monovalent phenol having substitution in at least the two ortho positions and hydrogen or halogen in the para position using oxygen, a cupric halide and a primary or secondary amine catalyst as an oxidizing agent, the improvement which consists of carrying out the oxidation in a closed system with oxygen at a pressure between 25 and 300 psig.

4,032,513

PROCESS OF PRODUCING ALKENYLPHENOL POLYMERS

Hiroshi Fujiwara; Asao Takahashi, and Motomu Miyamoto, all of Soka, Japan, assignors to Maruzen Oil Co. Ltd., Osaka, Japan

Filed Mar. 30, 1976, Ser. No. 671,927
Int. Cl.² C08G 33/10; C07C 39/18; C08K 5/16
U.S. Cl. 260—47 UA 10 Claims

1. A process of producing an alkenylphenol polymer which comprises cationically polymerizing an alkenylphenol in the presence of a nitrile using a cationic polymerization initiator, wherein said nitrile is a saturated aliphatic mononitrile or an aromatic nitrile having a boiling point below about 200° C at 760 mm Hg and the concentration of the alkenylphenol monomer in said nitrile solution is from about 1 to about 50% based on the weight of said nitrile.

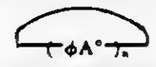
4,032,514

OXYALKYLATED CYCLIC PHENOL-ALDEHYDE RESINS AND USES THEREFOR

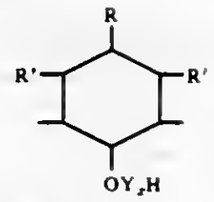
Rudolf S. Buriks; Allen R. Fauke, and Franklin E. Mange, all of St. Louis, Mo., assignors to Petrolite Corporation, St. Louis, Mo.

Continuation-in-part of Ser. No. 172,917, Aug. 18, 1971, abandoned. This application May 13, 1976, Ser. No. 686,094
Int. Cl.² C08G 8/12, 8/28
U.S. Cl. 260—51 EP 6 Claims

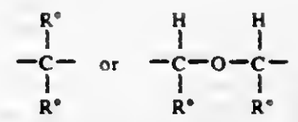
1. An oxyalkylated, thioalkylated or aminoalkylated infusible cyclic phenol-aldehyde resin having a melting point above 300° C. and the idealized formula



where n is 4 to 16, 100 is



where A° is



and the A°s are the same or different, R is alkyl, alkenyl, aryl, cycloalkyl, heterocyclic, alkaryl, aralkyl, halo, alkoxy or phenoxy and the Rs are the same or different, R' is hydrogen, alkyl, alkenyl, aryl, cycloalkyl, heterocyclic, alkaryl, aralkyl, halo, alkoxy or phenoxy and the R's are the same or different, Y is AO, AS, Al or combinations or mixtures thereof, x is 1 to about 2000, AO being alkylene oxide, arylene oxide, alkarylene oxide, cycloalkene oxide or combinations or mixtures thereof, AS being alkylene sulfide, Al being alkyleneimine, l being NR'' where R'' is hydrogen, alkyl, cycloalkyl, aryl, aralkyl or alkaryl, and R° is hydrogen, alkyl, aryl, cycloalkyl,

alkaryl, aralkyl or heterocyclic and the R°s are the same or different.

4,032,515
CURABLE RESORCINOL TERMINATED UREA-FORMALDEHYDE RESINS

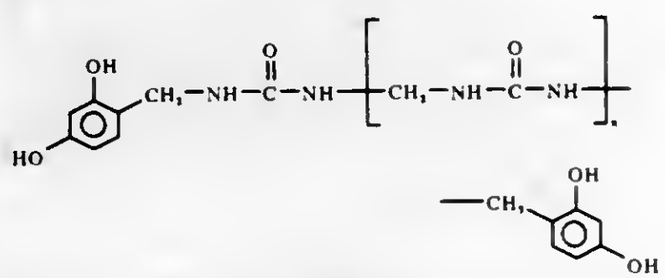
Elizabeth A. Blommers, Monroeville, and Roy H. Moult, Murrysville, both of Pa., assignors to Koppers Company, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 520,784, Nov. 4, 1974, abandoned, which is a continuation of Ser. No. 304,113, Nov. 6, 1972, abandoned. This application July 24, 1975, Ser. No. 598,728

Int. Cl.² C08G *14/08, 12/12, 12/40*

U.S. Cl. 260—70 R **6 Claims**

1. An adhesive comprising a resorcinol terminated urea-formaldehyde resin having the general formula:



where $\eta = 0$ to 10, said resin being cured under neutral or alkaline conditions by reacting it with a formaldehyde.

4,032,516
METHOD OF MAKING POLYURETHANE POWDER

John J. McGarr, Beverly, Mass., assignor to USM Corporation, Boston, Mass.

Continuation-in-part of Ser. No. 358,476, May 9, 1973, Pat. No. 3,917,741, which is a continuation-in-part of Ser. No. 263,658, June 16, 1972, Pat. No. 3,817,886, which is a continuation-in-part of Ser. No. 278,611, Aug. 7, 1972, Pat. No. 3,787,525. This application July 17, 1975, Ser. No. 596,816

The portion of the term of this patent subsequent to Jan. 22, 1991, has been disclaimed.

Int. Cl.² C08G *18/08*

U.S. Cl. 260—77.5 AA **9 Claims**

1. The method for preparing polyurethane resins directly in finely divided form from reaction of a first liquid reactant comprising at least one organic polyisocyanate with a second liquid reactant comprising at least one organic compound containing at least two groups having active hydrogen to form a solid reaction product, said first reactant being employed in amount relative to the amount of said second reactant to give a molar ratio of active hydrogen to —NCO in the range of from about 0.85:1 to about 1.5:1, said method comprising emulsifying said reactants with the aid of an organic polymeric surfactant as fine droplets of said first reactant and fine droplets of said second reactant in a continuous phase comprising an organic liquid inert to and less polar than said reactants an in which said reactants and said solid reaction product are substantially insoluble, said surfactant being present in amount of from about 0.1% to about 10% on the weight of emulsified insoluble liquid reactants, reacting said emulsified reactants by reaction between the droplets of said first reactant and droplets of said second reactant emulsified in said inert organic liquid under conditions of vigorous agitation to form fine particles of said polyurethane separable from said inert liquid by settling, and separating said particles from said inert liquid, the molecules of said polymeric surfactant having an average molecular weight of at least about 2,000, and having polar groups which associate with the surface of said droplets of emulsified insoluble reactants and with particles of said solid reaction product and less-polar groups which are solvated by the said inert organic liquid, the quantity and the balance of polar to less-polar groups of said surfactant relative to the polarities of said inert organic liquid, said insoluble emulsified reactants and said reaction product providing that the total association of less polar groups with said inert organic liquid is greater than the total association of the polar groups with said emulsified insoluble reactants and with said solid reaction product by an amount to ensure that said inert liquid will be the external phase, but is less than the amount which would interfere with formation of a fine emulsion of the insoluble liquid reactants in said inert organic liquid, coordinating (a) the intensity of said agitation; (b) the quantity and the balance of polar to less-polar groups of said surfactant in said emulsion and (c) the polarities of said inert liquid organic liquid, said emulsified insoluble liquid reactants and said reaction product to form a fine emulsion in which at least about 95% by weight of the droplets of said emulsified liquid reactants will be in the range of from 1 to 300 microns in diameter so that the particles of reaction product will settle, the association of said surfactant with said reaction product holding said surfactant on the surface of said particles of reaction product to impede agglomeration of said particles.

4,032,517
PHOSPHORUS-CONTAINING COPOLYAMIDES AND FIBERS THEREOF

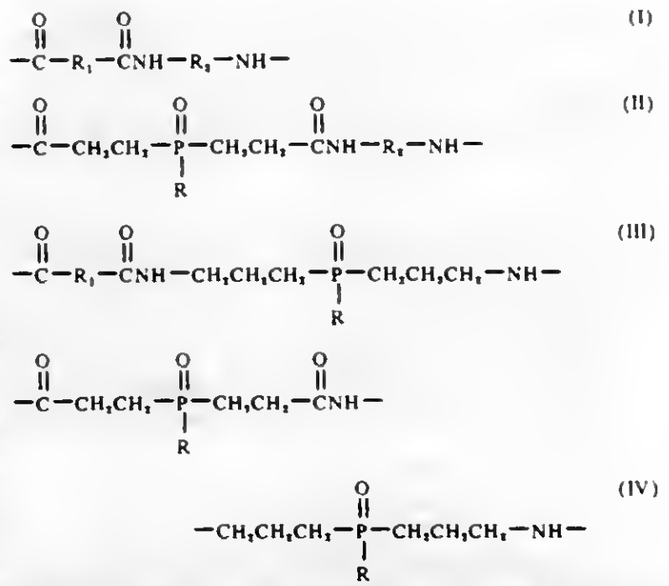
Oscar A. Pickett, Jr., Pensacola, and John W. Stoddard, Gulf Breeze, both of Fla., assignors to Monsanto Company, St. Louis, Mo.

Filed July 22, 1975, Ser. No. 598,505

Int. Cl.² C08G *69/26, 69/42*

U.S. Cl. 260—78 R **8 Claims**

1. A fiber-forming copolyamide consisting essentially of recurring units selected from the group consisting of



wherein R_1 and R_2 each represents a polymethylene radical having from 4 to 12 carbon atoms, and R represents an alkyl having from 1 to 4 carbon atoms, wherein successive R, R_1 and R_2 radicals when present in the polymer units may be the same or different and wherein the copolyamide contains a sufficient amount of units selected from units (ii) to (IV) to provide a copolyamide containing between about 0.5 and about 7.5% by weight of phosphorus as an integral part of its polymer chain.

4,032,518
SULFONAMIDE COMPOUNDS AND POLYMERS DERIVED THEREFROM

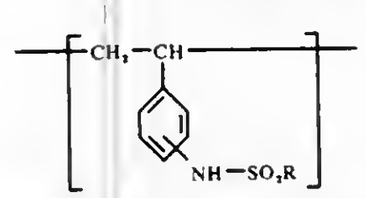
Carl Kotlarchik, Jr.; Louis M. Minsk, and George L. Fletcher, Jr., all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 16, 1975, Ser. No. 541,678

Int. Cl.² C08F *28/00*

U.S. Cl. 260—79.3 M **13 Claims**

1. A polymer having as at least one repeating unit:



wherein R is selected from the group consisting of alkyl containing from 1 to 10 carbon atoms and aryl containing from 6 to 10 carbon atoms, said polymer having a molecular weight of about 800,000 to about 1,200,000 and an inherent viscosity at 25° C at a concentration of 0.25 gram of polymer per deciliter of solution in N,N-dimethylformamide of from 1 to 1.9.

4,032,519
DIAZACYCLOBUTANES

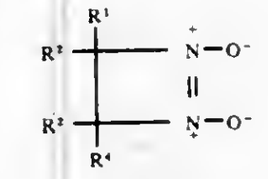
Edwin F. Ullman, Atherton, Calif., assignor to Syva Company, Palo Alto, Calif.

Continuation of Ser. No. 416,142, Nov. 15, 1973, abandoned, which is a continuation-in-part of Ser. No. 358,758, May 9, 1973, Pat. No. 3,953,444, which is a continuation-in-part of Ser. No. 196,724, Nov. 8, 1971, abandoned. This application May 1, 1975, Ser. No. 573,647

Int. Cl.² C07D *229/00*

U.S. Cl. 260—239 A **3 Claims**

1. A compound of the formula:



wherein R^{1-4} are the same or different and are monovalent aliphatic hydrocarbon radicals of from 1 to 12 carbon atoms of from 0 to 1 site of ethylenic unsaturation.

4,032,520
SYNTHESIS OF CYCLOPENTANOL

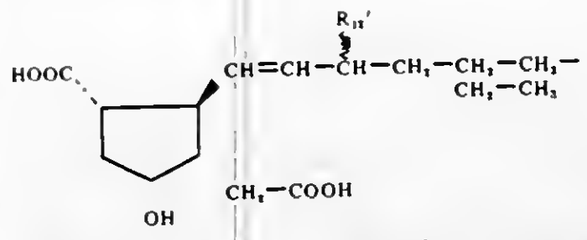
Frank Kienzle, 3 Bruonmattstrasse, Therwil, Switzerland, and Perry Rosen, 26 Sunset Drive, North Caldwell, N.J. 07006

Division of Ser. No. 381,322, July 20, 1973, abandoned, which is a continuation-in-part of Ser. No. 300,633, Nov. 25, 1972, abandoned. This application Sept. 10, 1975, Ser. No. 611,957

Int. Cl.² C07C *177/00*

U.S. Cl. 260—240 R **2 Claims**

1. A compound of the formula



wherein R_{12}' is hydroxy or tetrahydropyranyloxy, benzyloxy, benzhydryloxy, trialkylsilyloxy, α-lower alkoxy-lower alkyloxy, 4-methoxy-5,6-dihydro-2H-pyranyloxy or trityloxy or enantiomers or racemates thereof.

4,032,521
CEPHALOSPORIN PHOSPHONIC ACID, SULFONIC ACID AND SULFONAMIDE COMPOUNDS

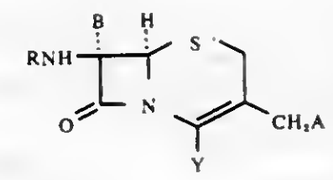
Burton G. Christensen, Metuchen, and Ronald W. Ratcliffe, Matawan, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 319,946, Dec. 29, 1972, abandoned. This application Nov. 8, 1973, Ser. No. 410,831

Int. Cl.² C07D *501/38, 501/26;* **A61K** *31/545*

U.S. Cl. 260—243 C **9 Claims**

1. The compound having the structure:



wherein:

B is hydrogen or methoxy; A is selected from the group consisting of amino, acetamido, carbamoylamino, N,N-dimethylamino, N-(2-chloroethyl)amino, 5-cyanotriazol-1-yl, 4-methoxycarbonyltriazol-1-yl, pyridinium, 3-methylpyridinium, 4-methylpyridinium, 3-chloropyridinium, 3-bromopyridinium, 3-iodopyridinium, 4-carbamoylpyridinium, ; 4-(N-carbomethoxycarboxymethyl)pyridinium, 4-(hydroxymethyl)pyridinium, 4-(trifluoromethyl)pyridinium, quinolinium, picolinium and lutidinium;

R is an acyl radical of the formula:

wherein

R^2 is hydrogen, chloro, bromo, fluoro, amono, guanidino, phosphono, hydroxy, tetrazolyl, carboxyl, sulfo, or sulfamino; R^3 is cyano, substituted or unsubstituted: phenyl, phenylthio, furyl, thienyl, thiazolyl, isothiazolyl, tetrazolyl, oxadiazolyl, and thiadiazolyl, wherein the ring substituent on R^2 is selected from the group consisting of chloro, bromo, fluoro, carboxymethyl, guanidino, guanidinomethyl, carboxyamidomethyl, aminomethyl, nitro, methoxy and methyl; and Y is a radical of the formula $PO(OH)_2$, PO(OH) (OR'') wherein R'' is lower-alkyl of 1–6 carbon atoms; SO_2 (OH); or SO_2NH_2; and non-toxic, pharmaceutically acceptable salts and esters.

4,032,522
2-PYRAZINYL-TRIFLUOROMETHYLIMIDAZOLES AND A METHOD FOR THEIR PREPARATION

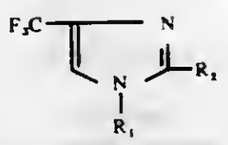
John J. Baldwin, Lansdale, and Frederick C. Novello, Berwyn, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 456,102, March 29, 1974, abandoned, which is a division of Ser. No. 265,016, June 21, 1972, Pat. No. 3,818,014, which is a continuation-in-part of Ser. No. 885,362, Dec. 15, 1969, abandoned. This application Sept. 5, 1975, Ser. No. 610,904

Int. Cl.² C07D *241/04, 403/04*

U.S. Cl. 260—250 BN **3 Claims**

1. A compound of the formula:



and the nontoxic pharmacologically acceptable salts thereof; wherein R_1 is hydrogen, lower alkyl or monohydroxy-C_2-C_3 alkyl, and R_2 is pyrazinyl or mono-methoxy substituted pyrazinyl.

4,032,523

4-AMINO (OR HALO OR HYDROXY OR HYDRAZINO)-2-(PYRIDINYL)PYRIMIDINES

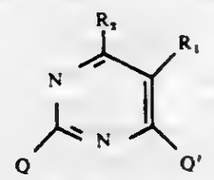
George Y. Lesher, and Baldev Singh, both of East Greenbush, N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 555,067, March 3, 1975. This application July 23, 1976, Ser. No. 708,195

Int. Cl.² C07D *401/04*

U.S. Cl. 260—256.4 N **10 Claims**

1. A compound of the formula



where Q is 4- or 3- or 2-pyridinyl or 4- or 3- or 2-pyridinyl having one or two lower-alkyl substituents or N-oxide thereof, Q' is hydroxy, halo, hydrazino or amino, R_1 is hydrogen, lower-alkyl or cyano, and R_2 is hydrogen, lower-alkyl, hydroxy or halo.

4,032,524

1-CARBAMOYL-5-FLUOROURACIL DERIVATIVES

Shoichiro Ozaki, Kamakura, and Haruki Mori, Yokohama, both of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

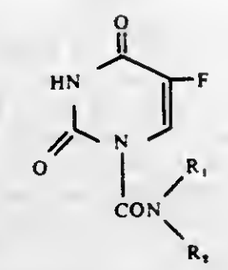
Continuation-in-part of Ser. No. 555,445, March 5, 1975, abandoned. This application Sept. 24, 1976, Ser. No. 726,196

Claims priority, application Japan, Apr. 26, 1974, 49-46617

Int. Cl.² C07D *239/10*

U.S. Cl. 260—256.4 C **6 Claims**

1. A 1-carbamoyl-5-fluorouracil represented by the formula



wherein R_1 represents methyl, ethyl, phenyl or cyclohexyl and R_2 represents hydrogen or is the same as R_1.

4,032,525

DIBENZ[b,f]OXEPIN DERIVATIVES

Max Gerecke; Emilio Kyburz, both of Reinach, Switzerland, and Jean-Pierre Kaplan, Le Plessis Robinson, France, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

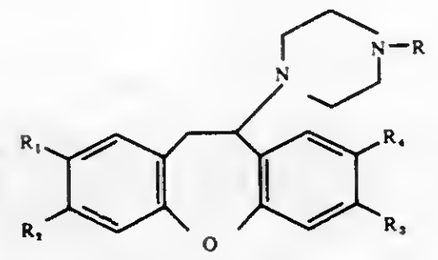
Filed Dec. 18, 1974, Ser. No. 534,033

Claims priority, application Switzerland, Jan. 4, 1974, 62/74; Nov. 20, 1974, 15369/74

Int. Cl.² C07D *403/04*

U.S. Cl. 260—268 TR **18 Claims**

1. A compound of the formula



wherein R is lower alkenyl, lower alkynyl, cyano-lower alkyl of 3–7 carbon atoms, hexadecanoyloxypropyl or hydroxy-lower alkynyl alkyl; one of R_1 and R_2 is hydrogen and the other is halogen, lower alkyl, lower alkoxy, lower alkylthio, trifluoromethyl or hydroxy; and one of R_2 and R_4 is hydrogen and the other is hydrogen, halogen, lower alkyl, lower alkoxy, lower alkylthio, trifluoromethyl or hydroxy, or a pharmaceutically acceptable acid addition salt thereof.

4,032,526

1,2-DIMETHYL-3 OR 5-PIPERAZINYL-PYRAZOLIUM SALTS

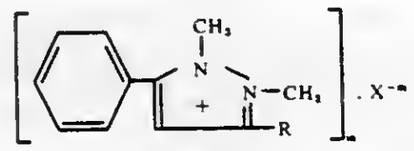
Barrington Cross, Rocky Hill, and Bryant Leonidas Walworth, Pennington, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 619,093, Oct. 2, 1975, Pat. No. 3,988,348, which is a division of Ser. No. 558,610, March 14, 1975, Pat. No. 3,941,881. This application June 2, 1976, Ser. No. 692,069

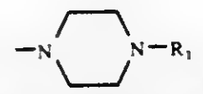
Int. Cl.² C07D *231/38*

U.S. Cl. 260—268 H **3 Claims**

1. A compound having the formula:



wherein R is a moiety represented by the structure:



wherein R_1 is hydrogen or methyl; X is an anion having a charge of from 1 to 3, and is selected from the group consisting of chloride, bromide, iodide, acetate, sulfate, hydrogen sulfate, methyl sulfate, benzene sulfonate, p-toluene sulfonate, nitrate, phosphate, carbonate, perchlorate, tetrafluoroborate; and *m* is an integer from 1 to 3.

4,032,527

PHENYLJULOLIDINYLPHTHALIDES

Nathan N. Crounse, Cincinnati, and Paul J. Schmidt, Sharonville, both of Ohio, assignors to Sterling Drug Inc., New York, N.Y.

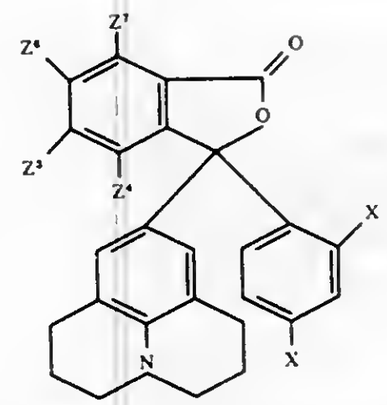
Continuation-in-part of Ser. No. 314,443, Dec. 12, 1972. This application Nov. 27, 1974, Ser. No. 527,757

Claims priority, application Canada, Dec. 5, 1973, 187401

Int. Cl.² C07D *215/38*

U.S. Cl. 260—287 P **6 Claims**

1. 3-(2-X-4-X-Phenyl)-3-(9-julolidinyl)-4-Z^4-5-Z^5-6-Z^6-7-Z^7-phthalide of the formula



wherein:

X is dialkylamino wherein alkyl is non-tertiary alkyl of one to four carbon atoms;

Z^4 is hydrogen or halo;

Z^5 is hydrogen or halo; or non-tertiary alkyl of one to four carbon atoms, nitro, amino or dialkylamino wherein alkyl is non-tertiary alkyl or one to four carbon atoms when Z^4, Z^6 and Z^7 are each hydrogen;

Z^6 is hydrogen or halo; or non-tertiary alkyl of one to four carbon atoms, nitro, amino or dialkylamino wherein alkyl is non-tertiary alkyl of one to four carbon atoms when Z^4, Z^5 and Z^7 are each hydrogen; and

Z^7 is hydrogen or halo.

4,032,528

1,4-SUBSTITUTED-QUINOLIN-2(1H)-ONES AS CNS AGENTS

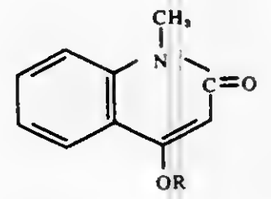
Goetz E. Hardtmann, Morristown, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Continuation-in-part of Ser. No. 454,070, March 25, 1974, abandoned, which is a continuation-in-part of Ser. No. 303,099, Nov. 2, 1972, abandoned, and Ser. No. 392,082, Aug. 27, 1973, abandoned. This application Sept. 18, 1975, Ser. No. 614,377

Int. Cl.² A61K *31/47*

U.S. Cl. 260—289 R **4 Claims**

1. A compound of the formula:



wherein R is alkyl of 4 to 6 carbon atoms.

4,032,529

AMINOMETHANOBENZAZOCINE INTERMEDIATES

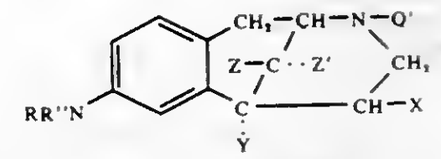
Mark P. Wentland, North Greenbush, and Noel F. Albertson, Schodack, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 507,965, Sept. 20, 1974, Pat. No. 3,957,973. This application Nov. 24, 1975, Ser. No. 634,355

Int. Cl.² C07D *221/26*

U.S. Cl. 260—293.54 **21 Claims**

1. 1,2,3,4,5,6-Hexahydro-3-Q'-8RR''N-5-X-6-Y-11-Z-11-Z'-2,6-methano-3-benzazocine having the formula



wherein:

Q' is hydrogen, benzyl, propyl, isobutyl, neopentyl, allyl, 2-methyl-2-propenyl, 2-chloro-2-propenyl, cis-3-chloro-2-propenyl, cis-3-chloro-2-butenyl, trans-3-chloro-2-butenyl, propargyl, cyclopropylmethyl or (2,2-dichlorocyclopropyl)methyl;

R is hydrogen or methyl;

R'' is formyl, acetyl, propionyl, butyryl, isobutyryl, benzoyl or cyclopropanecarbonyl;

X is hydrogen, methyl or ethyl;

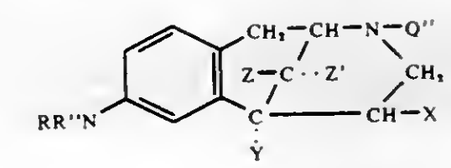
Y is hydrogen, methyl, ethyl, propyl, allyl or phenyl;

Z is hydrogen, methyl, ethyl or hydroxy; and

Z' is hydrogen, methyl or ethyl;

or an acid addition salt thereof.

10. 1,2,3,4,5,6-Hexahydro-3-Q''-8RR''N-5X-6-Y-11-Z-11Z'-2,6-methano-3-benzazocine having the formula



wherein:

Q'' is formyl, acetyl or Q* wherein Q* is propionyl, isobutyryl, pivaloyl, acryloyl, 2-methylacryloyl, 2-chloroacryloyl, cis-3-chloroacryloyl, cis-3-chlorocrotonoyl, trans-3-chlorocrotonoyl, propiolyl, cyclopropanecarbonyl or 2,2-dichlorocyclopropanecarbonyl;

R is hydrogen or methyl;

R'' is formyl, acetyl, propionyl, butyryl, isobutyryl, benzoyl or cyclopropanecarbonyl;

X is hydrogen, methyl or ethyl;

Y is hydrogen, methyl, ethyl, propyl, allyl or phenyl;

Z is hydrogen, methyl, ethyl or hydroxy; and

Z' is hydrogen, methyl or ethyl.

4,032,530

CERTAIN PLEUROMUTILINS

Helmut Egger, and Helmuth Reinshagen, both of Vienna, Austria, assignors to Sandoz Ltd., Basel, Switzerland

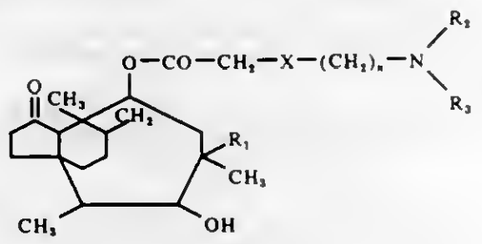
Division of Ser. No. 427,514, Dec. 26, 1973, Pat. No. 3,919,290, which is a continuation-in-part of Ser. No. 294,642, Oct. 3, 1972, abandoned. This application Aug. 21, 1975, Ser. No. 606,430

Claims priority, application Switzerland, Oct. 5, 1971, 14450/71; Oct. 5, 1971, 14451/71; May 25, 1972, 7740/72; May 25, 1974, 7738/72; May 25, 1972, 7739/72

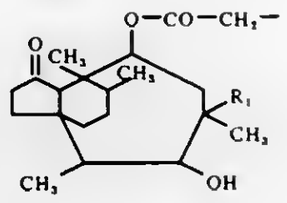
Int. Cl.² C07D *295/14*

U.S. Cl. 260—293.56 **9 Claims**

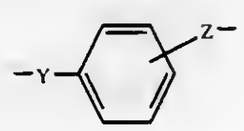
1. A compound of the formula:



wherein
R_1 is ethyl or vinyl,
n is an integer from 2 to 5,
X is sulphur,



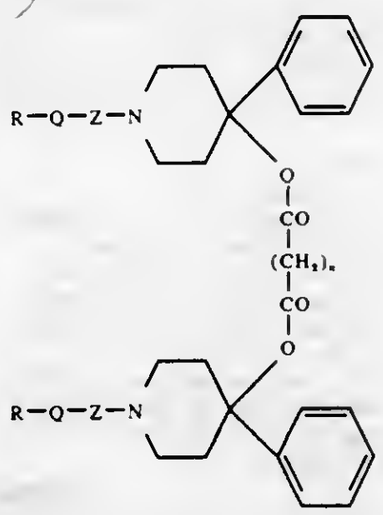
or $=N\text{-}R_4'$,
wherein
Y and Z are both sulphur, or one of Y and Z is oxygen and the other is sulphur, and
R_4' is hydrogen or



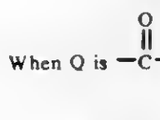
wherein
R_1 is as defined above, and
R_2 and R_3 together with the nitrogen atom are piperidino, or a pharmaceutically acceptabe salt thereof.

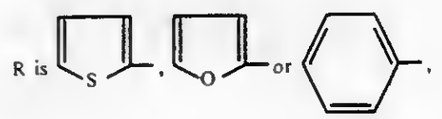
4,032,531
PIPERIDINE DERIVATIVES
William R. Hydro, Bel Air, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.
Filed Dec. 3, 1969, Ser. No. 882,757
Int. Cl.² C07D *211/06*
U.S. Cl. 260—293.64 **7 Claims**

4. Compounds of the following formula



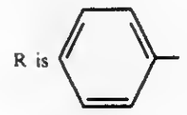
-continued

When Q is  ,

R is  ,

Z is alkylene group of 1 to 4 carbon atoms
n is a whole number from 1 to 4;

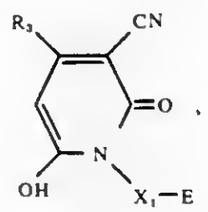
When Q is $-CH=$, Z is $(=)CH-CH_2-$,
Q is $-OCH_2-$, Z is $-CH_2-CH_2-$

R is 

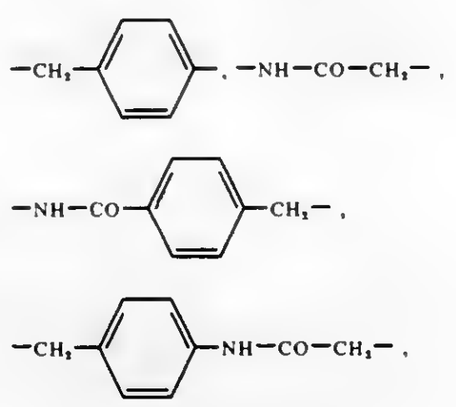
n is a whole number from 1 to 4.

4,032,532
1-AMINOALKYLENE-3-CYANO-4-METHYL-6-HYDROXY-1,2-DIHYDROPYRID-2-ONES
Hermann Burkhard, Neu-Allschwil; Roland Entschel, and Willy Steinemann, both of Basel, all of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland
Continuation-in-part of Ser. No. 824,297, May 13, 1969, abandoned. This application Mar. 1, 9173, Ser. No. 337,167
Claims priority, application Switzerland, Aug. 13, 1968, 12136/68
Int. Cl.² C07D *211/00, 213/00, 401/00, 471/00*
U.S. Cl. 260—294.9 **26 Claims**

1. A compound of the formula



wherein
R_3 is alkyl of 1 to 12 carbon atoms, phenyl or benzyl,
X_1 is straight or branched chain alkylene of 1 to 12 carbon atoms,



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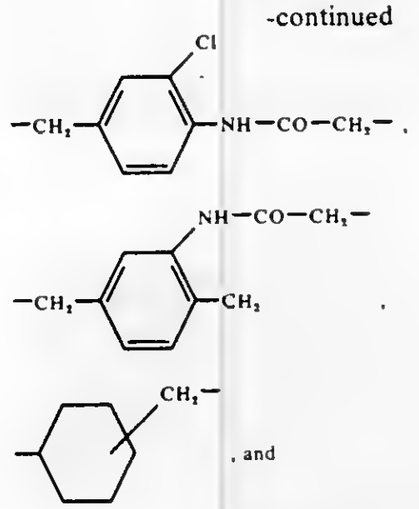
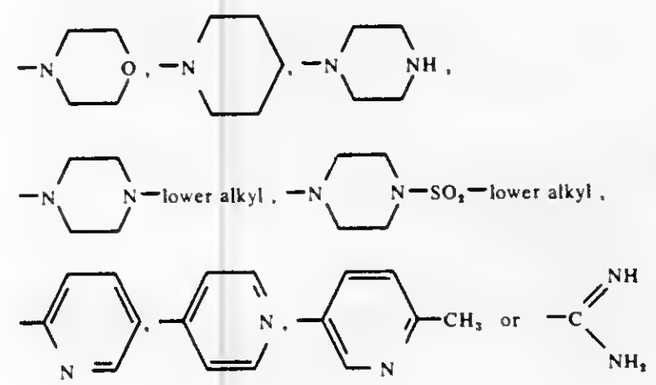
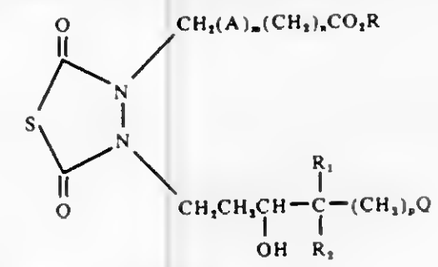


E is amino, lower alkylamino, dilower alkylamino, lower hydroxyalkylamino, lower dihydroxyalkylamino, lower cyanoalkylamino, N-lower alkyl-N-lower cyanoalkylamino, dilower hydroxyalkylamino, dilower cyanoalkylamino,



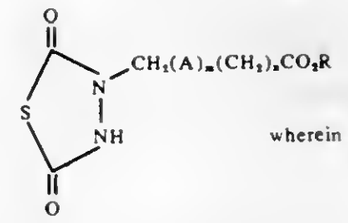
4,032,533
3,4-DISUBSTITUTED-1,3,4-THIADIAZOLINE-2,5-DIONES
Richard Merrill Scribner, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.
Filed Feb. 19, 1976, Ser. No. 659,511
Int. Cl.² C07D *285/10*
U.S. Cl. 260—302 D **16 Claims**

1. A compound having the formula



in which
A is CH=CH, CH ≡ C or phenylene;
R is H, alkali metal, alkyl or cycloalkyl of up to 10 carbons, $NHC(CH_2OH)_3$ or $NR_3R_4R_5R_6$ in which
R_3 is H,
R_4, R_5 and R_6 individually are H, alkyl of 1–4 carbons or hydroxyalkyl of 2–4 carbons with the proviso that the total number of carbon atoms in R_4, R_5 and R_6 does not exceed 10;
m is 0 or 1;
n is 2 to 6;
p is 90 to 6;
R_1 and R_2 individually are H, F or CH_3; and
Q is H, CH_3, CF_2CH_3 or CF_3.

13. A compound of the formula



wherein
A is CH=CH, C ≡ C or phenylene;
m is 0 or 1;
n is 2 to 6; and
R is H, alkali metal, alkyl or cycloalkyl of up to 10 carbons, $NHC(CH_2OH)_3$ or $NR_3R_4R_5R_6$ in which
R_3 is H;
R_4, R_5 and R_6 individually are H, alkyl of 1–4 carbons, or hydroxyalkyl of 2–4 carbons with the proviso that the total number of carbon atoms in R_4, R_5 and R_6 does not exeed 10.

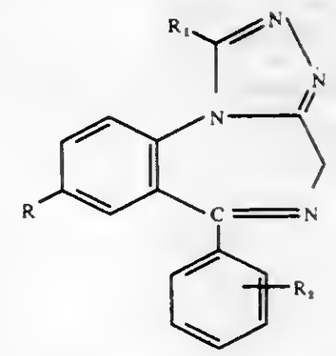
4,032,534
CERTAIN 2-(2-THIOETHYL)THIAZOLIDINE-4-CARBOXYLIC ACIDS
Marc X. Chodkiewicz, Feucherolles, France, assignor to Ferlus-Chimie S.A., Cournon D'Auvergne, France
Continuation of Ser. No. 451,410, March 15, 1974, abandoned. This application Jan. 28, 1976, Ser. No. 653,093
Claims priority, application France, Mar. 22, 1973, 73.10266
Int. Cl.² C07D *277/06*
U.S. Cl. 260—306.7 C **8 Claims**

1. 2-[2-(Carboxymethylthio)ethyl]thiazolidine-4-carboxylic acid.

6. 2-[2-(Methylthio)ethyl]thiazolidine-4-carboxylic acid.

4,032,535
TRIAZOLOBENZODIAZEPINES
Rodney Ian Fryer, North Caldwell, and Armin Walser, West Caldwell, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.
Continuation of Ser. No. 419,563, Nov. 28, 1973, abandoned. This application Aug. 18, 1976, Ser. No. 715,606
Int. Cl.² C07D *487/14*
U.S. Cl. 260—308 R **2 Claims**

1. A compound of the formula



wherein R is —NHOH; R_1 signifies hydrogen or lower alkyl; R_2 signifies hydrogen or halogen;
and the pharmaceutically acceptable acid addition salts thereof.

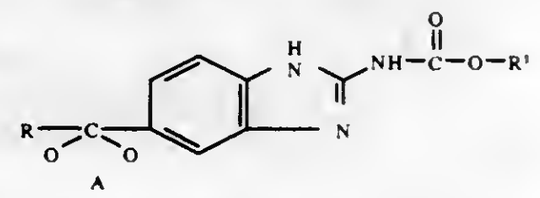
4,032,536

(1H-BENZIMIDAZOL-2-YL)CARBAMATES

Alfons H. M. Raeymaekers, Beerse, and Jozef H. L. Van Gelder, Tielen, both of Belgium, assignors to Janssen Pharmaceutica N.V., Beerse, Belgium

Filed July 22, 1976, Ser. No. 707,750
Int. Cl.² C07D *405/08, 405/14*
U.S. Cl. 260—309.2 **7 Claims**

1. A (1H-benzimidazol-2-yl)carbamate of the formula:



A

wherein:
R is a member selected from the group consisting of phenyl, halophenyl and 2-thienyl;
R^1 is lower alkyl; and
A is an alkylene chain having the formula:

wherein *n* is in integer of from 0 to 1 inclusive, and R^2, R^3, R^4 and R^5 are each independently selected from the group consisting of hydrogen and lower alkyl.

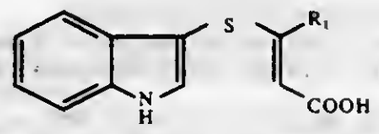
4,032,537

INDOLOTHIOPYRONES

Richard E. Brown, East Hanover, N.J., assignor to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 468,349, May 9, 1974, Pat. No. 3,971,806. This application May 10, 1976, Ser. No. 684,618
Int. Cl.² C07D *209/04*
U.S. Cl. 260—326.12 R **5 Claims**

1. A compound of the formula III:



III

wherein R_1 represents hydrogen, lower alkyl or aryl.

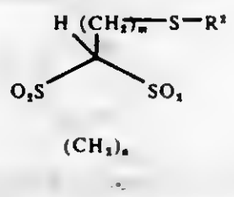
4,032,538

1,3-DISULFONYLCYCLOALKANE

Richard B. Greenwald, Lexington, Mass., assignor to Polarold Corporation, Cambridge, Mass.

Division of Ser. No. 535,205, Dec. 23, 1974, Pat. No. 3,958,992. This application Feb. 2, 1976, Ser. No. 654,290
Int. Cl.² C07D *339/08*
U.S. Cl. 260—327 M **9 Claims**

1. A compound of the formula



wherein R^2 is a hydrocarbon radical containing up to 20 carbon atoms selected from alkyl, aryl, alkaryl and aralkyl, said hydrocarbon radical being unsubstituted or substituted with a solubilizing group selected from —COOH, —SO_3H, —OH and —NR_1R_2 wherein R_1 and R_2 each is selected from hydrogen and lower alkyl containing 1 to 4 carbon atoms, *m* is a whole number 0, 1, 2, 3, 4 or 5 and *n* is a whole number 3, 4 or 5.

4,032,539

COLORING OF ORGANIC MATERIALS WITH ASYMMETRIC THIOINDIGOID COMPOUNDS

Michihiro Tsujimoto, Tachikawa; Tsutomu Nishizawa, Kamakura, and Ichiro Okubo, Hachioji, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Division of Ser. No. 573,102, April 30, 1975, Pat. No. 3,960,479. This application Dec. 16, 1975, Ser. No. 641,287
Claims priority, application Japan, May 9, 1974, 49-50686
The portion of the term of this patent subsequent to June 1, 1993, has been disclaimed.
Int. Cl.² C09B *7/00*
U.S. Cl. 260—331 **9 Claims**

1. Asymmetric thioindigoid compounds having the formula:

wherein R is a hydrogen atom or lower alkyl group; R' is a member selected from the group consisting of
1. a hydrogen atom,
2. halogen atoms,
3. lower alkyl groups,
4. lower alkoxy groups,
5. a sulfonamide group, the amide group of which may be substituted with a member selected from the group consisting of
   i. lower alkyl groups which may be substituted with
      a. a hydroxyl group,
      b. lower alkoxy group or
      c. cyano group,
   ii. a cyclohexyl group,
   iii. aralkyl groups and
   iv. a phenyl group which may be substituted with
      a. a lower alkyl group,
      b. chlorine atom or
      c. lower alkoxy group, and
6. aryl sulfonate groups, the aryl group of which may be substituted with
   i. a halogen atom,
   ii. lower alkyl group or
   iii. lower alkoxy group;

R'' is a hydrogen atom or methyl group; and X is an oxygen atom or sulfur atom.

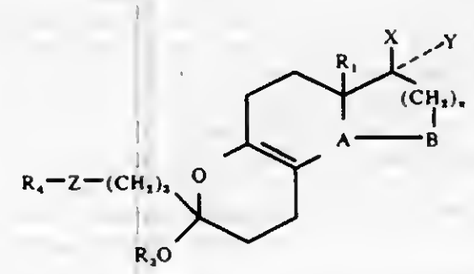
4,032,540

BENZOPYRAN DERIVATIVES

Ulrich Eder; Gerhard Sauer; Gregor Haffer; Jürgen Ruppert, and Rudolf Wiechert, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

Division of Ser. No. 367,509, June 6, 1973, Pat. No. 3,962,280. This application Mar. 5, 1976, Ser. No. 664,316
Claims priority, application Germany, June 8, 1972, 2228473; June 8, 1972, 2228475
Int. Cl.² C07D *317/44*
U.S. Cl. 260—340.5 **14 Claims**

1. A benzopyran of the formula



wherein -A-B- is >CH-CH_2— or >CH=CH-; *n* is the integer 1 or 2; R_1 R_2 each are lower alkyl; X is hydroxy, acyloxy wherein acyl is the acyl radical of a hydrocarbon carboxylic acid of 1–10 carbon atoms optionally substituted by phenyl or alkoxy of 1–10 carbon atoms optionally substituted by phenyl; Y is H or X and Y collectively are oxo; Z is arylene dioxy methylene; and R_4 is lower alkyl.

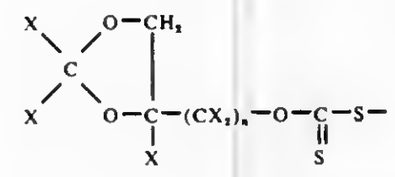
4,032,541

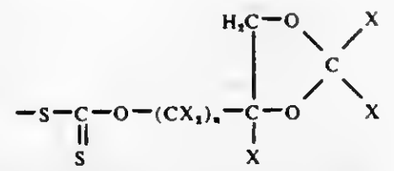
XANTHOGEN DISULPHIDES WITH FUNCTIONAL GROUPS

Rudolf Mayer-Mader, and Wilhelm Göbel, both of Cologne, Germany, assignors to Bayer Aktiengesellschaft, Germany

Division of Ser. No. 570,098, April 21, 1975, which is a division of Ser. No. 440,014, Feb. 6, 1974, Pat. No. 3,926,912. This application Sept. 20, 1976, Ser. No. 724,288
Claims priority, application Germany, Feb. 10, 1973, 2306610; May 23, 1973, 2352937
Int. Cl.² C07D *317/00*
U.S. Cl. 260—340.9 **2 Claims**

1. An xanthogen disulphide of the formula





wherein X may be the same or different and is selected from the group consisting of hydrogen, alkyl having 1 to 6 carbon atoms, phenyl, naphthyl, benzyl, chlorine, bromine and iodine and each *n* is an integer of from 1 to 20.

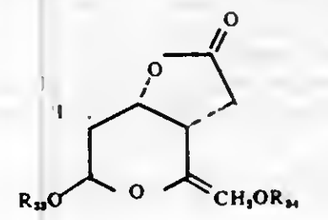
4,032,542

4α,6-DIHYDROXY-5-IODO-2β-ARYLOXYMETHYL-3α-TETRAHYDROPYRANOACETIC ACID γ-LACTONE, 6-ALKYL ETHERS

Robert C. Kelly, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Apr. 14, 1976, Ser. No. 676,895
Int. Cl.² C07D *493/04*
U.S. Cl. 260—343.6 **2 Claims**

1. A thromboxane intermediate of the formula



wherein R_{34} is an arylmethyl hydroxy-hydrogen replacing group selected from the group consisting of
a. benzyl,
b. benzyl substituted by one to five alkyl of one to four carbon atoms, inclusive, chloro, bromo, iodo, fluoro, nitro, phenylalkyl of 7 to 12 carbon atoms, inclusive,
c. benzhydryl,
d. benzhydryl substituted by one to ten alkyl of one to four carbon atoms, inclusive, chloro, bromo, iodo, fluoro, nitro, phenylalkyl to 7 to 12 carbon atoms, inclusive,
e. trityl, and
f. trityl substituted by one to 15 alkyl of one to four carbon atoms, inclusive, chloro, bromo, iodo, fluoro, nitro, phenylalkyl of 7 to 12 carbon atoms, inclusive;

and wherein R_{33} is alkyl of one to 5 carbon atoms, inclusive.

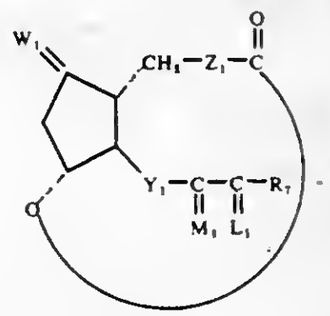
4,032,543

PG-TYPE 1,11-LACTONES

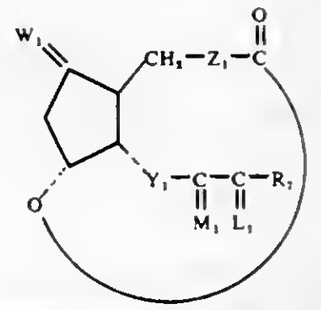
Gordon L. Bundy, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 589,724, June 23, 1975, abandoned. This application Mar. 29, 1976, Ser. No. 670,523
Int. Cl.² C07D *313/00, 321/00;* **A01N** *9/28*
U.S. Cl. 260—343.2 F **47 Claims**

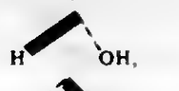
1. A prostaglandin-type, 1,11-lactone of the formula



or



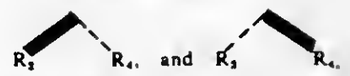
wherein W_1 is



or

wherein L_1 is

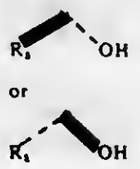
or a mixture of



wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the

same or different, with the proviso that one of R_3 and R_4 is fluoro, only when the other is hydrogen or fluoro;

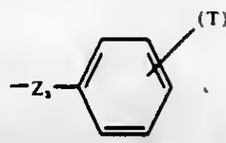
wherein M_1 is



or

wherein R_6 is hydrogen or methyl;

wherein R_7 is $-(CH_3)_m-CH_3$, wherein m is one to 5, inclusive, cis-CH=CH-CH_2-CH_3, or

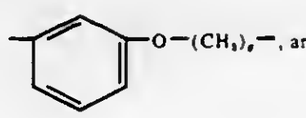


wherein T is chloro, fluoro, trifluoromethyl, alkyl of one to 3 carbon atoms, inclusive, or alkoxy of one to 3 carbon atoms, inclusive, the various T's being the same or different, s is zero, one, 2, or 3, and Z_3 is oxa or methylene, with the proviso that not more than two T's are other than alkyl, and the further proviso that Z_3 is oxa only when R_3 and R_4 are hydrogen or methyl, being the same or different;

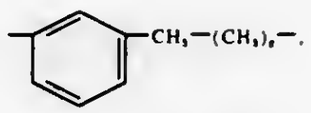
wherein Y_1 is trans-CH=CH-, $-CH_2CH_2-$, cis-CH=CH-, or $-C \equiv C-$; and

wherein Z_1 is

1. cis-CH=CH-CH_2-$(CH_2)_g$-CH_3-,
2. cis-CH=CH-CH_2-$(CH_2)_g$-CF_3-,
3. cis-CH_2-CH=CH-$(CH_2)_g$-CH_2-,
4. -$(CH_2)_3$-$(CH_2)_g$-CH_2-,
5. -$(CH_2)_3$-$(CH_2)_g$-CF_2-,
6. -CH_2-O-CH_2-$(CH_2)_g$-CH_2-,



(7)



(8)

wherein g is 1 to 3, inclusive.

4,032,544

3-CYANO-4-HYDROXY COUMARIN DERIVATIVES

Frank Peter Doyle, Leatherhead; Barrie Christian Charles Cantello, Horsham; Derek Richard Buckle, Redhill; and Harry Smith, Mapleburst, all of England, assignors to Beecham Group Limited, England

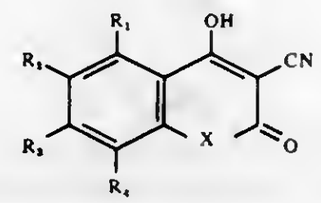
Division of Ser. No. 572,226, April 28, 1975, Pat. No. 4,012,407. This application June 28, 1976, Ser. No. 700,512

Claims priority, application United Kingdom, May 4, 1974, 19721/74

Int. Cl.² C07D *311/06*

U.S. Cl. 260—343.2 R **17 Claims**

1. A compound of the formula



or a pharmaceutically acceptable, nontoxic salt thereof or hydrate thereof, wherein R_1, R_2, R_3 and R_4 are each hydrogen, halogen, alkyl of 1 to 6 carbon atoms or alkoxy of 1 to 6 carbon atoms or any adjacent two of the groups R_1, R_2, R_3, R_4 taken together with the carbon atoms to which they are joined complete a carbocyclic ring unsubstituted or substituted by one or more members selected from the group consisting of halogen, alkyl of 1 to 6 carbon atoms or alkoxy of 1 to 6 carbon atoms, and X is an oxygen atom, provided that the groups R_1, R_2, R_3 and R_4 are not all simultaneously hydrogen atoms.

4,032,545

PHTHALIDES AND NAPHTHALIDES

Alan L. Borror, Lexington, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Division of Ser. No. 617,300, Sept. 29, 1975, which is a continuation-in-part of Ser. No. 446,732, Feb. 28, 1974, Pat. No. 3,941,807, which is a continuation-in-part of Ser. No. 108,662, Jan. 21, 1971, abandoned. This application Nov. 5, 1976, Ser. No. 739,118

Int. Cl.² C07D *311/92, 307/88*

U.S. Cl. 260—343.2 R **10 Claims**

2. A compound of the formula:

wherein A is selected from

wherein R^1 is selected from hydrogen, alkoxy containing 1 to 3 carbon atoms and alkyl containing 1 to 3 carbon atoms; R^2 is selected from hydrogen, hydroxy, carboxy, sulfonamido, sulfamoyl, o-hydroxyphenyl, bis-trifluoromethylcarbinol, methoxy, alkyl containing 1 to 16 carbon atoms; R^3 is selected from hydrogen, alkoxy containing 1 to 18 carbon atoms and alkyl containing 1 to 3 carbon atoms; R^4 is selected from hydrogen, hydroxy and carboxy; R^5 is selected from hydrogen and alkoxy containing 1 to 18 carbon atoms; and X represents the carbon atoms necessary to complete a ring-closing moiety selected from phthalide, unsubstituted or substituted in the 4- or 7-position with carboxy, and naphthalide, unsubstituted.

4,032,546

BIS(BENZIL) TYPE COMPOUNDS CONTAINING ONE OR TWO FURAN MOIETIES

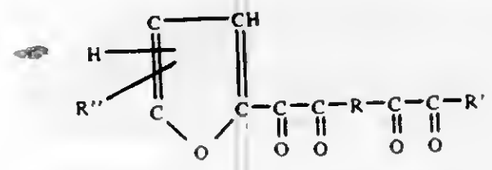
Robert J. Jones, Hermosa Beach, and Michael K. O'Rell, Manhattan Beach, both of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Continuation-in-part of Ser. No. 411,512, Oct. 31, 1973, abandoned. This application May 12, 1975, Ser. No. 576,827

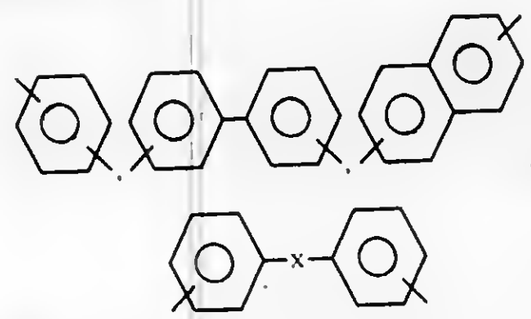
Int. Cl.² C07D *307/46*

U.S. Cl. 260—347.2 **1 Claim**

1. A bis(benzil) compound of the formula:

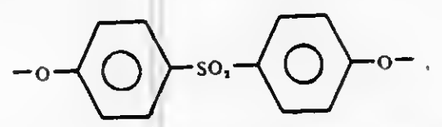


wherein R is a difunctional aromatic radical selected from the group consisting of

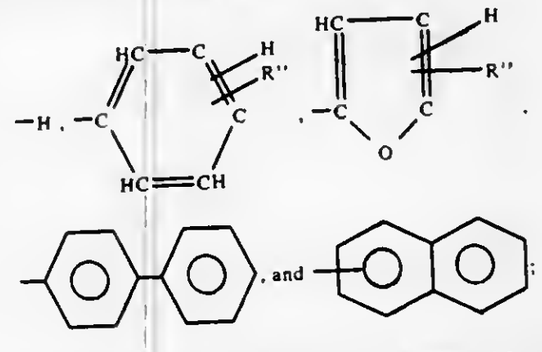


, and

where X is —S—, —O—, $-SO_2-$, —CO—,



$-CH_2-$, $-C_2H_4-$, and $-C_3H_6-$; R′ is a monofunctional radical selected from the group consisting of



and R″ is a monofunctional radical which is selected from the group consisting of —H, $-CH_3$, $-C_2H_5$, $-C_3H_7$, and $-C_4H_9$.

4,032,547

QUINONE ALKIDE SYNTHESIS SYSTEM

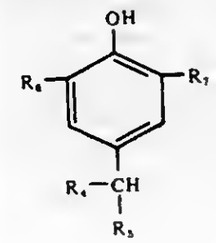
John D. Bacha, Monroeville, and Joseph S. Matthews, O'Hara Township, County of Allegheny, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Feb. 23, 1976, Ser. No. 660,718

Int. Cl.² C07C *49/64*

U.S. Cl. 260—396 N **11 Claims**

1. A process for preparing quinone alkides from the corresponding phenols which comprises contacting in aqueous solution at pH above 7 a phenol with a minor amount of a soluble iron cyanide salt in the range of about 0.01 mole to 1.0 mole per mole of phenol, a significant amount of a soluble persulfate salt in the range of about 0.1 mole to 1.5 moles per mole of phenol and a base said phenol having the formula:



wherein R_6 and R_7 are either alike or different, members selected from the group of

wherein R_1, R_2 and R_3 are either alike or different, members selected from the group consisting of hydrogen, straight or branched chain alkyl moieties having from 1 to 11 carbon atoms; phenyl and alkyl substituted phenyl moieties having up to 9 carbon atoms; alicyclic hydrocarbon moieties having from 3 to 6 carbon atoms; and wherein R_4 and R_5 are either alike or different, members selected from the group consisting of hydrogen, straight or branched chain alkyl moieties having from 1 to 18 carbon atoms, phenyl and alkyl substituted phenyl moieties having up to 9 carbon atoms, and alicyclic hydrocarbon moieties having from 3 to 6 carbon atoms, and the molar ratio of iron cyanide salt to persulfate salt being from about 0.02 to about 0.9.

4,032,548

PROCESS FOR PREPARING 1,4-NAPHTHOQUINONE

Manfred Martin, Cologne, and Gerhard Scharfe, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed July 9, 1975, Ser. No. 594,486

Claims priority, application Germany, Aug. 2, 1974, 2437221

Int. Cl.² C07C *49/66*

U.S. Cl. 260—396 R **2 Claims**

1. Process for preparing 1,4-naphthoquinone by reacting naphthalene with molecular oxygen in the gas phase in the presence of a catalyst consisting essentially of vanadium oxide, potassium sulphate and silicic acid which comprises, prior to the reaction of naphthalene with oxygen, treating the catalyst with molecular oxygen at 300 to 400° C in the presence of water vapor and in the absence of organic compounds and immediately thereafter passing a gas mixture consisting essentially of nitrogen, oxygen, water vapor, carbon dioxide and naphthalene over the pretreated catalyst at temperatures of 300° to 400° C and pressures from 3 to 8 atmospheres.

4,032,549

REACTIVE LIQUID POLYAMIDES FROM AMINE RESIDUES

Hubert J. Sharkey, and Robert Allan Winstel, both of Cincinnati, Ohio, assignors to Emery Industries, Inc., Cincinnati, Ohio

Filed Mar. 29, 1976, Ser. No. 671,325

Int. Cl.² C09F *5/00*; C07D *295/00*

U.S. Cl. 260—404.5 **9 Claims**

1. A liquid reactive polyamide composition having an amine value less than 200 and a 100° C viscosity in the range 1–80 poise comprising the reaction product of:

a. 70 to 100 equivalent percent of an amine residue obtained from the process for the hydrogenation of adiponitrile to hexamethylene diamine and containing 60 to 90 weight percent 1,2-diaminocyclohexane, 4–20 weight percent 2-methylpentamethylenediamine, 4 to 10 weight percent 2-(aminomethyl)-cyclopentylamine and up to 7 weight percent other nitrogen-containing by-products;

b. 70 to 100 equivalent percent of a polybasic acid which is a branched or straight-chain, aliphatic or cycloaliphatic acid having 18 to 72 carbon atoms and 2 to 4 carboxyl groups;

c. 0 to 30 equivalent percent of a branched or unbranched, aliphatic or cycloaliphatic mono- or dicarboxylic acid containing 2 to 28 carbon atoms; and
d. 0 to 30 equivalent percent of a mono- or polyfunctional aliphatic or aromatic amine containing 2 to 20 carbon atoms of heterocyclic amine selected from the group consisting of morpholine, piperazine, aminoethylpiperazine, 1,4-piperazine-bispropylamine, 1,3-di(4-piperidyl)-propane, 1,4-di(4-picridyl)butane, 1,2-di(4-piperidyl)ethane, N-aminoethylpiperazine and N-aminopropylpiperazine.

4,032,550

PROCESS FOR THE PRODUCTION OF ESTERS

John F. White, and Jerome C. Bertrand, both of Cincinnati, Ohio, assignors to Emery Industries, Inc., Cincinnati, Ohio

Filed Nov. 26, 1975, Ser. No. 635,468
Int. Cl.² C09F 5/08, 7/10; C11C 3/00
U.S. Cl. 260—410.6 **12 Claims**

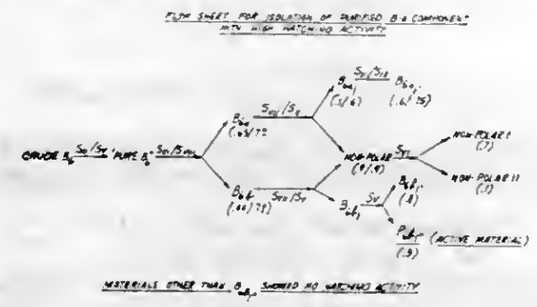
1. A process for the batch, continuous or semicontinuous preparation of carboxylic acid esters by direct esterification of a carboxylic acid or anhydride with an alcohol or by ester interchange of a carboxylic acid ester with another carboxylic acid ester, an alcohol or carboxylic acid which method comprises heating the reactants in a liquid state at a temperature between 100° C and 300° C in the presence of at least 0.005 weight percent, based on the reactants, of an immobilized supported transition metal catalyst containing from about 3 to 60 weight percent of a transition metal selected from Groups IVb, Vb and VIb, said transition metal being present on and bound to a support matrix by bridging oxygen linkages as a polymeric cross-linked network wherein the transition metal atoms are bonded to each other by bridging oxygen linkages.

4,032,551

METHOD OF OBTAINING NEUTRAL LIPID MATERIAL USED AS A HATCHING AGENT FOR SUGAR BEET NEMATODE

James D. Willett, Moscow, and Luther Michael Cheek, Genesee, both of Idaho, assignors to Research Corporation, New York, N.Y.

Division of Ser. No. 442,857, Feb. 15, 1974, Pat. No. 3,956,485. This application Jan. 7, 1976, Ser. No. 647,202
Int. Cl.³ L11B 1/10; A01N 9/02, 9/08
U.S. Cl. 260—412.4 **1 Claim**


FLOW SHEET FOR ISOLATION OF TERPENOID & A COMPONENT WITH HIGH HATCHING ACTIVITY
CRUDE
WAX
NON POLAR I
NON POLAR II
(ACTIVE MATERIAL)
MATERIALS OTHER THAN C_{29} SHOWED NO HATCHING ACTIVITY

1. A method of obtaining a neutral lipid material from sugar beet plants, said neutral lipid material evidencing hatching activity with respect to the cyst of sugar beet nematodes which comprises extracting macerated sugar beet with a selective solvent selected from the group consisting of methanol and chloroform or a mixture thereof to dissolve or extract lipid material therefrom and chromatographically fractionating the resulting extracted lipid material to separate a terpenoid-containing neutral lipid material, the terpenoid contained in said neutral lipid material having a molecular weight of about 255, about 410 or about 435.

4,032,552

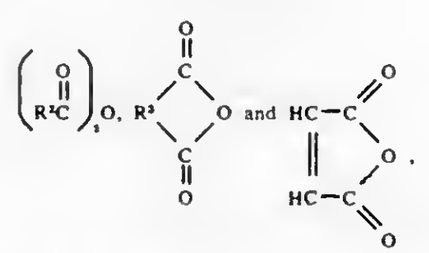
ONE STEP METHOD FOR PREPARING NON-STOICHIOMETRIC DIORGANOTIN CARBOXYLATES USING A SOLID PHASE REACTION

Robert Daily Dworkin, Old Bridge, and Adam Joseph Ejk, Piscataway, both of N.J., assignors to M & T Chemicals Inc., Greenwich, Conn.

Filed June 12, 1975, Ser. No. 586,252
Int. Cl.² C07F 7/22; C08K 100; C11C 1/00
U.S. Cl. 260—414 **6 Claims**

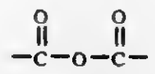
1. A method for preparing non-stoichiometric diorganotin carboxylates exhibiting reduced odor, said method employing a solid phase reaction that does not generate any by-products and consisting essentially of

1. intimately blending a finely divided solid diorganotin oxide of the formula R_2^1SnO and a finely divided solid carboxylic acid anhydride exhibiting a formula selected from the group consisting of



wherein the particle size of the diorgano tin oxide and carboxylic acid anhydride is uniformly small and does not exceed 0.063 inch (0.16 cm.) and wherein from 1.1 to 6 moles of said diorganotin oxide are present for every mole of said carboxylic acid anhydride;

2. maintaining the temperature of the resultant mixture at between ambient and 100° C. for a period of time sufficient to form said non-stoichiometric diorganotin carboxylate; R^1 represents an alkyl radical containing between 1 and 20 carbon atoms, a cycloalkyl, aryl, alkaryl or aralkyl radical wherein the alkyl residue of said alkaryl or aralkyl residue contains between 1 and 12 carbon atoms, R^2 represents an alkyl radical containing between 12 and 20 carbon atoms, an aryl, alkaryl or aralkyl radical wherein the alkyl residue of said alkaryl or aralkyl radical contains between 1 and 12 carbon atoms, R^3 is selected from the group consisting of alkylene radicals containing between 2 and 12 carbon atoms, 1,2-cycloalkenyl and o-phenylene radicals, wherein the carbon atoms of the



radical are bonded to adjacent carbon atoms of said alkylene radical.

4,032,553

ALUMINIUM HYDRIDE OLIGOMER DERIVATIVES AND PROCESS FOR THE PREPARATION THEREOF

Giovanni Dozzi; Giovanni Perego, both of Milan, and Carlo Busetto, Padova, all of Italy, assignors to Snam Progetti S.p.A., Milanese, Italy

Filed July 1, 1975, Ser. No. 592,247
Claims priority, application Italy, July 1, 1974, 24662/74
Int. Cl.² C07F 5/06
U.S. Cl. 260—448 R **3 Claims**

1. A compound of the formula of FIG. 1 wherein R is tert-butyl.

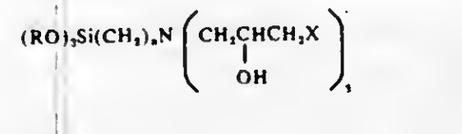
4,032,554

COUPLING AGENT FOR FIBROUS GLASS SUBSTRATES

Richard G. Adams, Montclair, and Stephen B. Sello, Cedar Grove, both of N.J., assignors to J. P. Stevens & Co., Inc., New York, N.Y.

Division of Ser. No. 412,943, Nov. 5, 1973, abandoned. This application Feb. 2, 1976, Ser. No. 654,324
Int. Cl.² C07F 7/10, 7/18
U.S. Cl. 260—448.8 R **2 Claims**

1. A compound of the formula



wherein
R is alkyl of 1 to 5 carbon atoms,
X is chlorine or bromine, and
n is an integer of 1 to 4.

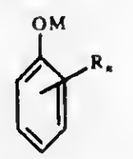
4,032,555

PROCESS FOR THE CARBOXYLATION OF ORGANIC SUBSTRATES WITH CARBON DIOXIDE

Giorgio Bottaccio; Gian Paolo Chiusoli; Enzo Alneri; Marcello Marchi, and Giulio Lana, all of Novara, Italy, assignors to Montedison Fibre S.p.A., Milan, Italy

Filed Mar. 24, 1976, Ser. No. 670,010
Claims priority, application Italy, Mar. 28, 1975, 21816/75
Int. Cl.² C07C 51/15, 59/32, 59/36, 121/66
U.S. Cl. 260—465 D **5 Claims**

1. A process for the carboxylation of organic substrates or reactants containing at least one active hydrogen atom, and selected from the class consisting of ketones, esters, nitroparaffins and nitriles, by reaction with CO_2 and alkaline phenates in an organic medium, characterized in that the reaction is conducted in the presence of an alkaline phenate in an organic medium which is at least a partial solvent for the phenate, and selected from the class consisting of tetrahydrofurane, dioxane, tetrahydropyran, ethyl acetate, propylenecarbonate, triethylamine, N-methylmorpholine, a picoline, a lutidine, 2-methyl-5-ethyl-pyridine, and sulpholane, and at a temperature between about 40° and 60° C; the alkaline phenate being selected from the class consisting of the Li, Na, K salts of phenols of the general formula:



wherein R is hydrogen or an alkyl or an alkoxy group, linear or branched, having up to 20 carbon atoms, or a phenyl group, n varies from 1 to 5, and M is Li, Na or K.

4,032,556

METHANATION OF GASES

Reginald George Sinclair Banks, Solihull, England, assignor to The Gas Council, London, England

Continuation of Ser. No. 307,141, Nov. 16, 1972, abandoned. This application Nov. 13, 1974, Ser. No. 523,410
Claims priority, application United Kingdom, Nov. 23, 1971, 54823/71; July 12, 1972, 32599/72
Int. Cl.² C07C 27/06
U.S. Cl. 260—449 M **2 Claims**

1. A method for the production of a fuel gas by methanation of a gas comprising contacting a gas produced by the hydrogenation of liquid hydrocarbon feedstocks with a hydrogenation gas at high temperature, said gas containing methane, ethane, carbon monoxide, carbon dioxide, and hydrogen, with a hydrogenation catalyst selected from the group consisting of nickel-alumina-silica, nickel magnesia, nickel-chromia, nickel-urania-alumina, nickel silica and cobalt silica at elevated pressure and at an elevated temperature such that hydrogenation of carbon oxides present in the reactants is substantially complete at a temperature below that necessary for the hydrogenation of ethane.

4,032,557

PROCESS FOR PREPARING ORGANOSILOXANES

Helmut Spörk, Altötting; Rudolf Strasser, Burghausen; Rudolf Riedle, Burghausen; Wolfgang Jacques, Burghausen, and Johann Waas, Burghausen, all of Germany, assignors to Wacker-Chemie GmbH, Munich, Germany

Filed Apr. 26, 1976, Ser. No. 680,309
Claims priority, application Germany, May 15, 1975, 2521742
Int. Cl.² C07F 7/08, 7/18
U.S. Cl. 260—448.2 E **6 Claims**

1. An improved process for preparing organosiloxanes and alkyl halides by introducing an organohalosilane and alkanol having from 1 to 2 carbon atoms into a reactor containing at least one layer of packing material which is maintained at a temperature of from 60° to 150° C to form an aqueous phase containing organosiloxanes, and thereafter separating the organosiloxanes from the aqueous phase, the improvement which comprises (1) recycling into the reactor from 1 to 6 liters of the aqueous phase for each mol of the organohalosilane introduced into the reactor and (2) reacting the organosiloxanes separated from the aqueous phase with from 2 to 10 percent by weight based on the weight of the organosiloxanes with the same organohalosilane used in the initial reaction.

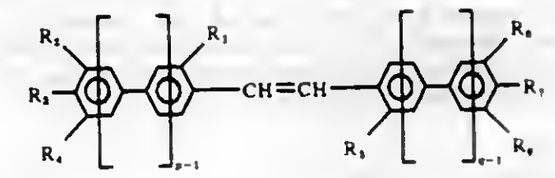
4,032,558

PARA-PHENYL STILBENE DERIVATIVES

Fritz Fleck, Bottmingen; Hans Kitti, Riehen, and Salvatore Valenti, Bottmingen, all of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

Continuation of Ser. No. 316,448, Dec. 19, 1972, abandoned. This application July 16, 1975, Ser. No. 596,287
Int. Cl.² C07C 121/64, 121/75
U.S. Cl. 260—465 H **4 Claims**

1. A compound of the formula,



in which
R_1 and R_3 are each hydrogen, nitrile or methyl,
R_2, R_3, R_4, R_6, R_7 and R_8 are each hydrogen, fluorine, chlorine, methyl, methoxy, alkenyl of 2 to 4 carbon atoms, or nitrile, and
p and *q* are integers from 1 to 3, with the provisos that the total of *p* and *q* is 4, 5 or 6,
the total of *p* and *q* and the number of nitrile substituents is at least 5, and at least 1 of R_1, R_2, R_5 and R_7 is nitrile.

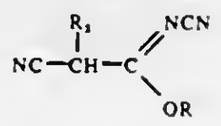
4,032,559

N,2-DICYANOACETIMIDATES

John M. McCall, and Joseph J. Ursprung, both of Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed July 28, 1975, Ser. No. 599,912
Int. Cl.² C07D 121/16
U.S. Cl. 260—465.5 R **3 Claims**

1. A compound of the formula



wherein

R is selected from the group consisting of alkyl of one to six carbon atoms, inclusive, and cycloalkyl of five to seven carbon atoms, inclusive;

R_2 is selected from the group consisting of hydrogen, alkyl of one to six carbon atoms, inclusive, alkenyl of two to six carbon atoms, inclusive, cycloalkyl of five to eight carbon atoms, substituted or unsubstituted with one to three alkyl groups, said alkyl group having from one to three carbon atoms, inclusive, alkyl being the same or different if two or three alkyl groups, and phenylalkyl wherein alkyl is from one to six carbon atoms, inclusive.

4,032,560

OXA PHENYLENE PROSTAGLANDIN ANALOGS

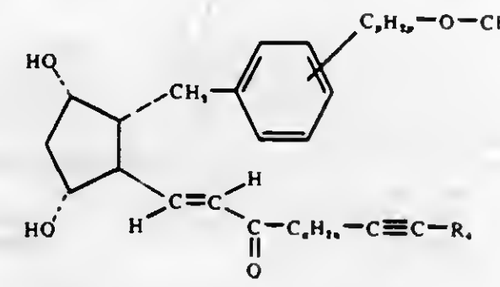
Douglas R. Morton, Jr., Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 604,159, Aug. 13, 1975, Pat. No. 3,997,566, which is a continuation-in-part of Ser. No. 552,707, Feb. 24, 1975, abandoned, which is a continuation-in-part of Ser. No. 488,295, July 12, 1974, abandoned. This application July 26, 1976, Ser. No. 708,406

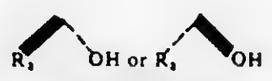
Int. Cl.² C07C 69/76

U.S. Cl. 260—473 G **3 Claims**

1. An optically active compound of the formula



or a racemic mixture of that compound and the enantiomer thereof, wherein C_aH_{2a} is alkylene of 1 to 4 carbon atoms, inclusive, wherein C_pH_{2p} represents a valence bond or alkylene of 1 to 4 carbon atoms, inclusive, with 1 or 2 carbon atoms in the chain between the phenylene ring and —O—; wherein Q is



wherein R_2 is hydrogen or alkyl of 1 to 4 carbon atoms, inclusive; wherein R_4 is alkyl of 1 to 4 carbon atoms, inclusive, substituted with zero, 1, 2, or 3 fluoro; and wherein R_1 is hydrogen, alkyl of 1 to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with 1, 2, or 3 chloro or alkyl of 1 to 4 carbon atoms, inclusive.

4,032,561

17-PHENYL-18,19,20-TRINOR-CIS-4,5-DIDEHYDRO-PGF$_{1\alpha}$ COMPOUNDS

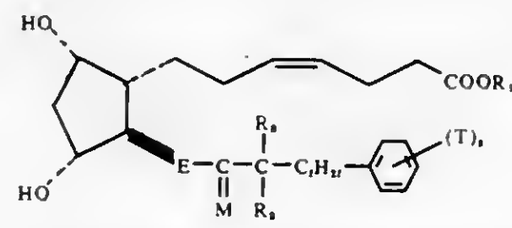
Barney J. Magerlein, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed May 27, 1975, Ser. No. 580,747

Int. Cl.² C07C 69/76

U.S. Cl. 260—473 A **7 Claims**

1. An optically active compound of the formula:



or a racemic form of that compound and the enantiomer thereof,

wherein R_1 is hydrogen or alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one, 2 or 3 chloro or alkyl of one to 4 carbon atoms, inclusive;

wherein M is R_2 OH or R_2 OH, wherein R_2 is hydrogen, methyl, or ethyl;

wherein E is trans—CH=CH— or $-CH_2CH_2-$;

wherein R_8 is hydrogen and R_9 is hydrogen, methyl, or fluoro, or wherein R_8 and R_9 are both methyl or both fluoro, with the proviso that neither of R_8 and R_9 is methyl when R_2 is methyl or ethyl;

wherein C_fH_{2f} represents a valence bond or alkylene of one to 9 carbon atoms, inclusive, with one to 6 carbon atoms, inclusive, between $-CR_8R_9-$ and the ring;

wherein T is alkyl of one to 4 carbon atoms, inclusive, fluoro, chloro, trifluoromethyl, or $-OR_2$, wherein R_2 is alkyl of one to 4 carbon atoms, inclusive and wherein s is zero, one, 2, or 3 with the proviso that not more than 2 T's are other than alkyl; including alkanoates of 2 to 8 carbon atoms, inclusive, and pharmacologically acceptable salts thereof when R_1 is hydrogen.

4,032,562

3,5-DIALKYL-4-HYDROXYPHENYLALKANOIC ACID ESTERS OF POLYALKYLENE GLYCOLS

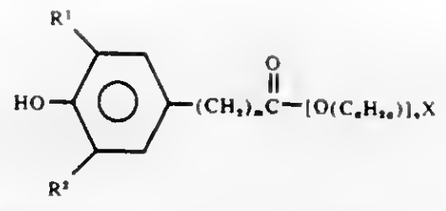
Martin Dexter, Briarcliff Manor; John D. Spivack, Spring Valley, and David Herbert Steinberg, Bronx, all of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 521,107, Nov. 5, 1974, abandoned, which is a continuation of Ser. No. 402,492, Oct. 1, 1973, abandoned, which is a continuation-in-part of Ser. No. 159,020, July 1, 1971, abandoned. This application Oct. 24, 1975, Ser. No. 625,414

Int. Cl.² C07C 69/76

U.S. Cl. 260—473 S **4 Claims**

1. A compound of the formula



wherein each of R^1 and R^2 is a (lower) alkyl group of from one to four carbon atoms;

X is hydroxy or alkoxy containing from 1 to 2 carbon atoms; and

a is an integer of from 2 to 6,

n has a value of from 3 to 8,

m is 1 or 2.

4,032,563

PROCESS FOR THE RECOVERY OF HIGH PURITY DIESTERS OF TEREPHTHALIC OR ISOPHTHALIC ACIDS

Jon J. Harper, Naperville; Antonio E. Navarrete, Downers Grove, both of Ill., and Richard J. Thomas, Huntington Beach, Calif., assignors to Standard Oil Company, Chicago, Ill.

Filed Sept. 2, 1975, Ser. No. 609,193

Int. Cl.² C07C 69/80, 69/82

U.S. Cl. 260—475 R **23 Claims**

1. In a process for the production of a lower alkyl diester of a phenylene dicarboxylic acid in an esterification zone wherein reaction product from said zone is cooled thus rendering a mass of lower alkyl diester and mother liquor containing impurities characterized as high boiling organics and methyl esters of carboxybenzaldehyde and toluic acid, wherein an improvement comprises:

1. Oxidation treatment of mother liquor with molecular oxygen at a temperature in the range of from about 180° to about 250° C. to form a product termed oxidized mother liquor and return of part of said oxidized mother liquor to the esterification zone;
2. Evaporation treatment of another part of said oxidized mother liquor to effect production of low boiling overhead product and high boiling bottoms product containing said high boiling organics;
3. Return of overhead product to the esterification zone and removal of high boiling bottoms product from the process.

4,032,564

ESTERS OF CYCLOPROPYLALKANOLS

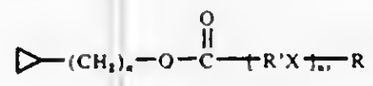
Clive A. Henrick, and Gerardus B. Staal, both of Palo Alto, Calif., assignors to Zoecon Corporation, Palo Alto, Calif.

Continuation-in-part of Ser. No. 504,223, Sept. 9, 1974, abandoned. This application Jan. 29, 1976, Ser. No. 653,401

Int. Cl.² C07C 69/67, 69/73, 149/20

U.S. Cl. 260—481 R **8 Claims**

1. Compounds selected from those of formula I



wherein,

R is alkyl of one to eighteen carbon atoms, alkenyl of two to eighteen carbon atoms, or alkynyl of two to eighteen carbon atoms;

R′ is methylene or ethylene;

X is oxygen or sulfur;

n is an odd integer between one and thirteen; and

n′ is one, two, or three;

with the proviso that each compound contains at least twelve carbon atoms in the molecule.

4,032,565

CROSS-LINKABLE COMPOUNDS

David John Kilpatrick, Leeds; Trevor Shaw, Ilkley, and David Malcolm Lewis, Otley, all of England, assignors to I.W.S. Nominee Company Limited, London, England

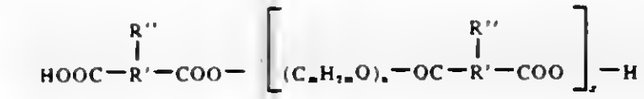
Filed July 22, 1974, Ser. No. 490,669

Claims priority, application United Kingdom, July 27, 1973, 35882/73; July 27, 1973, 35883/73; July 27, 1973, 35884/73

Int. Cl.² C07C 149/20

U.S. Cl. 260—481 R **6 Claims**

1. A compound having the structural formula:



wherein R′ is an alkylene group; R″ is a thiol group; x is at least 1; $C_mH_{2m}O$ is a straight chain oxyalkylene group; *n* is greater than 1, and *m* is at least 3.

4,032,566

OMEGA-CARBOMETHOXYPERFLUOROALKYLENE OXIDE IODIDES

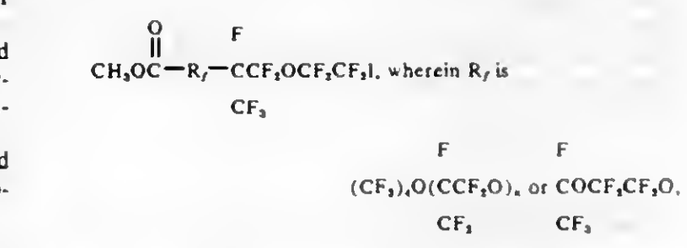
Theodore Psarras, Gainesville, Fla., and Christ Tamborski, Dayton, Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Sept. 4, 1975, Ser. No. 610,471

Int. Cl.² C07C 69/66

U.S. Cl. 260—484 R **4 Claims**

1. Fluorinated ethers having the following formula:



where *n* is zero to 10, inclusive.

4,032,567

TRIIODOISOPHTHALIC ACID MONOAMINO ACID AMIDES, PROCESS FOR THE PREPARATION THEREOF, AND USE THEREOF AS X-RAY CONTRAST MEDIA

Erich Klieger; Wolfgang Beich, and Eberhard Schroder, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

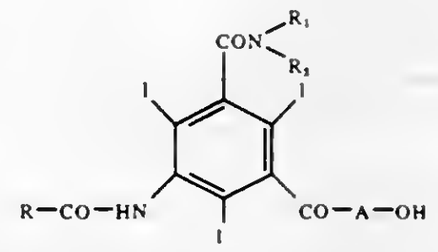
Division of Ser. No. 331,110, Feb. 9, 1973, Pat. No. 3,953,501. This application Mar. 3, 1975, Ser. No. 555,043

Claims priority, application Germany, Feb. 16, 1972, 2207950

Int. Cl.² C07C 101/68

U.S. Cl. 260—519 **9 Claims**

1. A triiodoisophthalic acid monoamino acid amide of the formula



where A is a divalent amino lower alkanoyl linked to the carboxyl group via the amino acid nitrogen;

R is alkyl, hydroxyalkyl or alkoxyalkyl of 1–6 carbon atoms;

R_1 and R_2 are each hydrogen, alkyl of 1–6 carbon atoms or hydroxyalkyl of 2–6 carbon atoms, or R_1 and R_2 together with the nitrogen atom to which they are bonded form a 5 to 7 member heterocyclic ring which can contain a further oxygen or nitrogen hetero atom:

and the physiologically acceptable salts thereof.

4,032,568
PRODUCTION OF 2-HYDROXYNAPHTHALENE-3-CARBOXYLIC ACID
Hans-Juergen Quadbeck-Seeger, and Helmut Hoch, both of Ludwigshafen, Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany
Continuation of Ser. No. 476,151, June 3, 1974, abandoned.
This application Sept. 24, 1975, Ser. No. 616,446
Claims priority, application Germany, June 23, 1973, 2332064
Int. Cl.² C07C 51/15
U.S. Cl. 260—520 A 4 Claims

1. A process for the production of 2-hydroxynaphthalene-3-carboxylic acid which comprises heating β-naphthol and an aqueous solution of potassium hydroxide and of sodium hydroxide in a molar ratio of said respective hydroxides in the range of 0.02:1 to 0.5:1 to produce a mixture of sodium β-naphtholate and potassium β-naphtholate containing 0.02 to 0.5 mol of potassium β-naphtholate per mol of sodium β-naphtholate, in a first stage to a temperature of at least 180° C. in the absence of a solvent, then reacting said heated mixture of said naphtholates in a second stage at a temperature of at least 180° C. with carbon dioxide to form a mixture of the sodium and potassium salts of 2-hydroxynaphthalene-3-carboxylic acid, and acidifying said salts to convert them into 2-hydroxynapthalene-3-carboxylic acid.

4,032,569
PROCESS FOR CONVERTING CYCLOHEXANE TO ADIPIC ACID
Anatoli Onopchenko, Monroeville, and Johann G. D. Schulz, Pittsburgh, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.
Filed July 14, 1975, Ser. No. 595,374
Int. Cl.² C07C 51/20
U.S. Cl. 260—533 C 10 Claims

1. A process for converting cyclohexane to adipic acid in a system consisting essentially of cyclohexane, an aliphatic monobasic acid solvent, cobaltic ions and molecular oxygen, which comprises subjecting cyclohexane to oxidation with oxygen in the presence of cobaltic ions in an aliphatic monobasic acid having only primary and secondary hydrogen atoms and having two to eight carbon atoms, wherein at least about 25 millimols of cobalt are present per mol of cyclohexane, while maintaining a temperature of about 85° to about 105° C. and an oxygen partial pressure of at least about 150 pounds per square inch absolute for a period of about 0.5 to about 3 hours.

4,032,570
PROCESS FOR CONVERTING BUTANE TO ACETIC ACID
Johann G. D. Schulz, Pittsburgh, Pa., and Richard Seekircher, North Bay, Canada, assignors to Gulf Research & Development Company, Pittsburgh, Pa.
Continuation-in-part of Ser. No. 196,732, Nov. 8, 1971, abandoned, which is a continuation-in-part of Ser. No. 821,096, May 1, 1969, abandoned. This application July 23, 1975, Ser. No. 598,426
Int. Cl.² C07C 51/20
U.S. Cl. 260—533 R 9 Claims

1. A liquid-phase process for converting butane to a product predominating in acetic acid which comprises contacting butane with a gas containing molecular oxygen in the presence of a lower fatty acid and a cobalt compound soluble in the reaction mixture in amounts corresponding to about 0.5 to about 20 percent by weight of cobalt, based on said lower fatty acid, at a temperature of about 200° to about 250° F., said cobalt compound being the effective catalyst employed and containing solely cobalt as the metallic component, while maintaining in the reaction zone all of the components of the reaction mixture, including the water of reaction, throughout the reaction period until termination of the reaction.

4,032,571
MANUFACTURE OF 2-AMINO-3,5-DINITROBENZAMIDE
Hans-Juergen Quadbeck-Seeger, Bad Duerkheim, and Dieter Schneider, Edingen, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany
Filed Apr. 18, 1975, Ser. No. 569,270
Claims priority, application Germany, May 8, 1974, 2422239
Int. Cl.² C07C 102/02
U.S. Cl. 260—558 A 4 Claims

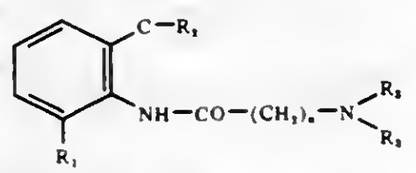
1. A process for the manufacture of 2-amino-3,5-dinitrobenzamide which comprises nitrating at −20° C to 80° C isatoic anhydride dissolved in an inert organic solvent with an acid mixture consisting of 85–100% strength nitric acid and oleum, said acid mixture containing 0.5 to 20 moles of sulfur trioxide per mole of nitric acid, to produce 3,5-dinitroisatoic anhydride, allowing the reaction mixture to separate into an organic phase and an acid phase containing the 3,5-dinitroisatoic anhydride, adding 20–30% strength aqueous ammonia to the resultant acid phase in an amount of 9 to 25 moles of ammonia per mol of isatoic anhydride, and reacting the ammonia and the acid phase to produce a high yield of 2-amino-3,5-dinitrobenzamide.

4,032,572
METHOD FOR CONCENTRATING AN ACRYLAMIDE AQUEOUS SOLUTION
Shiro Asano, Yokohama; Kiyotaka Yoshimura, Mobara; Ryoji Tsuchiya, Kamakura, and Tadatoshi Honda, Yokohama, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan
Continuation-in-part of Ser. No. 529,450, Dec. 4, 1974, abandoned, which is a continuation-in-part of Ser. No. 311,830, Dec. 4, 1972, Pat. No. 3,917,693. This application Dec. 3, 1975, Ser. No. 637,416
Claims priority, application Japan, Dec. 6, 1971, 46-97895
The portion of the term of this patent subsequent to Nov. 4, 1992, has been disclaimed.
Int. Cl.² C07C 103/08
U.S. Cl. 260—561 N 8 Claims

1. Method for concentrating acrylamide aqueous solutions obtained from catalytic hydration comprising concentrating the acrylamide aqueous solution by evaporating the water content thereof while maintaining the said solution on contact with from 0.1 to 30 moles of air per mole of water being evaporated at a temperature of between 55° and 120° C and a pressure of between 200 and 1470 mmHg.

4,032,573
ORTHO-ACYLATED ANILIDE DERIVATIVES AND SALTS THEREOF
Shinichi Kaneko, deceased, late of Kobe, Japan (by Michio Kaneko, legal representative); Tsuyoshi Kobayashi, Mino, Japan; Yoshiaki Takebayashi; Shigeho Inaba, both of Takarazuka, Japan, and Hisao Yamamoto, Nishinomiya, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan
Continuation-in-part of Ser. No. 369,621, June 13, 1973, abandoned. This application Feb. 19, 1976, Ser. No. 659,197
Int. Cl.² C07C 103/50
U.S. Cl. 260—562 N 6 Claims

1. An anilide compound of the formula:



wherein R_1, R_2 and R_3 are each C_{1-3} alkyl; and n is 1 or 2, and the non-toxic salts thereof.

4,032,574
PRODUCTION OF POLYETHERPOLYOLS USEFUL IN PREPARING RIGID POLYURETHANE FOAMS
Akizo Keshi, Takatsuki; Katsuhisa Kodama, Nishinomiya; Ichiro Takemura, Takatsuki; Yoshihiko Tairaka, Sakai, and Kunio Yoshinaga, Ikeda, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan
Filed Sept. 25, 1975, Ser. No. 616,898
Claims priority, application Japan, Oct. 7, 1974, 49-115799
Int. Cl.² C07C 93/04, 93/06, 93/08, 93/12
U.S. Cl. 260—570 D 10 Claims

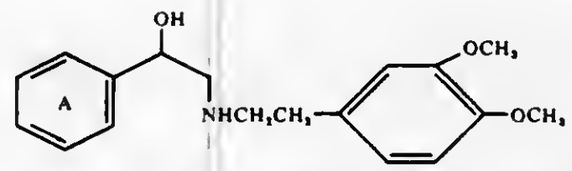
1. A method for producing a polyetherpolyol consisting essentially of reacting

A. compounds containing active hydrogen atoms, one third by weight to all of which is a reaction product obtained by reacting the distillation residue obtained in the distillation process of a crude organic diisocyanate produced by phosgenation of the corresponding organic diamine with
1. at least a member selected from the group consisting of water, aliphatic alcohols having 1 to 10 carbon atoms and alkanolamines having 1 to 6 carbon atoms and
2. a monoalkanolamine having 2 to 4 carbon atoms at a temperature ranging from 100° to 250° C with

B. at least a member selected from the group consising of ethylene oxide and propylene oxide.

4,032,575
BENZYLALCOHOL AMINE DERIVATIVES
Muneyoshi Ikezaki, Ageo; Nobuo Ito, Tokyo; Yasushi Okazaki, Tokyo; Masao Hoshiyama, Tokyo; Taku Nagao, Ageo, and Hiromichi Nakajima, Yono, all of Japan, assignors to Tanabe Seiyaku Co., Ltd., Osaka, Japan
Filed Oct. 1, 1975, Ser. No. 618,355
Int. Cl.² C07C 91/22
U.S. Cl. 260—570.6 3 Claims

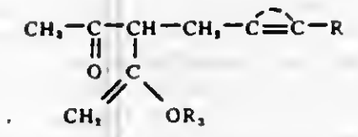
1. A compound of the formula:



wherein Ring A is 4-hydroxyphenyl or a pharmaccutically acceptable acid addition salt thereof.

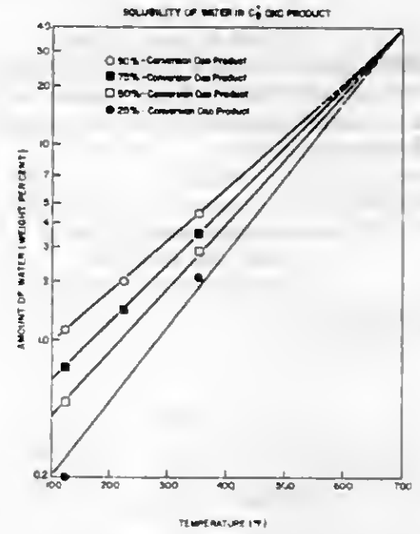
4,032,577
UNSATURATED KETONES
George Buchi, Cambridge, Mass., assignor to Hoffmann-La Roche Inc., Nutley, N.J.
Division of Ser. No. 547,688, Feb. 6, 1975, Pat. No. 3,935,440, which is a division of Ser. No. 158,080, June 29, 1971, Pat. No. 3,884,970. This application Apr. 28, 1976, Ser. No. 680,949
Int. Cl.² C07C 49/24
U.S. Cl. 260—594 3 Claims

1. A compound of the formula:



wherein R is hydrogen, lower alkenyl or lower alkyl; R_3 is lower alkyl, and the dotted bond can be optionally hydrogenated.

4,032,578
PROCESS FOR THE MANUFACTURE OF ALDEHYDES AND HDA AND OTHER ALCOHOLS BY ALDOL CONDENSATION
Charles G. Savini, Warren, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.
Continuation-in-part of Ser. No. 547,475, Feb. 6, 1975, abandoned, which is a continuation of Ser. No. 317,615, Dec. 22, 1972, abandoned. This application Jan. 7, 1976, Ser. No. 647,150
Int. Cl.² C07C 47/02, 45/00, 29/14
U.S. Cl. 260—601 R 8 Claims


SOLUBILITY OF WATER IN C5 OXO PRODUCT
○ 90% - Conversion Oxo Product
■ 75% - Conversion Oxo Product
□ 50% - Conversion Oxo Product
● 25% - Conversion Oxo Product
AMOUNT OF WATER (WEIGHT PERCENT)
TEMPERATURE (°F)

1. An aldolization process which comprises contacting an aldehyde-containing feed with a catalyst, in an amount ranging from about 0.01 to about 3 weight percent based on the aldehyde-containing feed, selected from the group consisting of hydroxides, soaps, alkoxides and phenoxides of Groups I-A and II-A metals, quaternary ammonium hydroxides and choline in the presence of water in an amount substantially within the solubility limit of the aldehyde-containing feed at a temperature ranging from about 300° F. to about 1,000° F. to achieve a uniphase aldolization mixture.

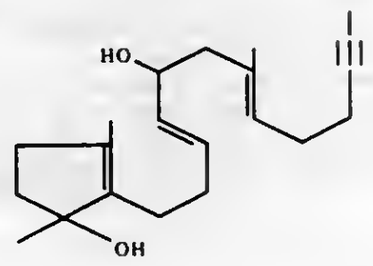
7. A process for producing an aliphatic alcohol which comprises:

a. contacting an aldehyde-containing feed with a catalyst, in an amount ranging from about 0.01 to about 3 weight percent based on the aldehyde-containing feed, selected from the group consisting of hydroxides, soaps, alkoxides and phenoxides of Groups I-A and II-A metals, quaternary ammonium hydroxides and choline in the presence of water in an amount substantially within the solubility limit of the aldehyde-containing feed at a temperature ranging from about 300° F. to about 1000° F. to achieve a uniphase aldolization mixture; and, thereafter,

b. hydrogenating the aldol product produced in (a) above under conventional conditions and using conventional catalysts to produce said aliphatic alcohol.

4,032,579
11-SUBSTITUTED STEROIDS AND INTERMEDIATES
William S. Johnson, Portola Valley, Calif., assignor to The Board of Trustees of Leland Stanford Junior University, Stanford, Calif.
Filed Apr. 28, 1975, Ser. No. 572,379
Int. Cl.² C07C 35/06
U.S. Cl. 260—617 R 1 Claim

1. A compound of the formula:



4,032,580

ANTI-INFLAMMATORY 1-PHENYL-2,3-BUTADIEN-1-OLS, METHODS OF USE AND COMPOSITIONS CONTAINING SAME

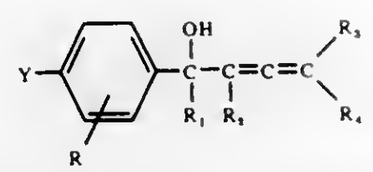
Eugene E. Galantay, Liestal, Switzerland, assignor to Sandoz, Inc., E. Hanover, N.J.

Division of Ser. No. 405,478, Oct. 11, 1973, Pat. No. 3,929,902, which is a continuation-in-part of Ser. No. 219,129, Jan. 19, 1972, abandoned. This application Sept. 18, 1975, Ser. No. 614,538

Int. Cl.² C07C *33/06*

U.S. Cl. 260—618 D 19 Claims

1. A compound of the formula



wherein

R is a hydrogen atom, or halo having an atomic weight of from about 19 to 80;

R_1 is a hydrogen atom or alkyl of 1 to 3 carbon atoms;

R_3 is a hydrogen atom or methyl; and

R_2 and R_4 are, independently, a hydrogen atom or alkyl of 1 to 3 carbon atoms, provided that at least one of R_3 and R_4 is a hydrogen atom when R_2 is methyl;

Y is bromo, iodo, isobutyl, tert. butyl, cyclohexyl, or cyclohexenyl.

18. The method of treating inflammation in an mammal which comprises administering to said mammal an inflammation relieving amount of a compound of claim 1.

19. A pharmaceutical composition useful for the treatment of inflammation in mammals compriising an inflammation relieving amount of a compound of claim 1 and a pharmaceutically acceptable carrier.

4,032,581

METHOD FOR SEPARATION OF M- OR P-CRESOL

Akira Tasaka, Takatsuki; Hirokazu Hosaka, Hirakata, and Iwao Dobgane, Ashiya, all of Japan, assignors to Sumitomo Chemical Company, Limited, Japan

Filed July 3, 1975, Ser. No. 592,935

Claims priority, application Japan, July 12, 1974, 49-80662

Int. Cl.² C07C *39/06*, *37/22*

U.S. Cl. 260—621 B 22 Claims

1. A method for obtaining m- or p-cresol in a high purity from a mixture comprising m- and p-cresols having a composition outside the two compositions which give respectively the eutectic points inherent to the mixture, which comprises (1) applying a pressure of about 300 to about 10,000 atmospheres and a temperature of about 0° to about 100° C. to the mixture charged to a first pressure-zone, thereby separating said mixture into a crystal fraction containing either m- or p-cresol and a liquid fraction, whereby the elevated pressure causes the melting points of the m-cresol and p-cresol to be raised above that obtained under atmospheric pressure, (2) transferring said liquid fraction to a second pressure-zone kept under a lower pressure than that of the first pressure-zone, said lower pressure being sufficient to enable transfer of the liquid fraction from said first pressure-zone to said second pressure-zone, (3) liquefying the crystal fraction remaining in the first pressure-zone by raising the temperature and (4) discharging the liquefied crystal fraction out of the first pressure-zone.

4,032,582

METHOD OF OBTAINING PRIMARY ALCOHOLS WITH STRAIGHT CHAINS FROM C_4 HYDROCARBON CUTS

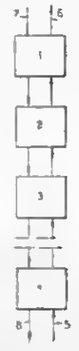
Emile Trebillon, Neuilly-sur-Seine, France, assignor to Rhone-Poulenc Industries, Paris, France

Filed June 24, 1976, Ser. No. 699,339

Claims priority, application France, June 27, 1975, 75.20253

Int. Cl.² C07C *29/00*, *31/32*

U.S. Cl. 260—632 D 12 Claims



1. A method of preparing primary alcohols virtually all with a straight chain in which the molecular proportions are distributed on both sides of a medium centered at 8 to 16 carbon atoms, comprising the stages in sequence of preparing tri-n-butylaluminum, fixing ethylene on the butylaluminum to an average chain length of C_8 to C_{16}, oxidizing with a gas containing oxygen, and hydrolyzing in a mixture of aliphatic primary alcohols, characterized in that a C_4 hydrocarbon cut is reacted with activated aluminum and hydrogen at a temperature within the range of 80°–220° C and at a pressure within the range of 20–250 bars, the cut containing 0 to 95% by weight of 1-butene, 0 to 75% by weight of 2-butene, with the proviso that the sum of 1-butene and 2-butene represents at least 15% by weight, 4 to 75% by weight of isobutene and 0 to 66% by weight of butene and isobutene, thus giving a mixed organic aluminum compound essentially comprising a mixture of butylaluminums:

normal	al - $CH_1—CH_2—CH_2—$
iso	al - $CH_3—CH(CH_3)—$
with or without secondary	al - $CH(CH_3)—CH_2—CH_3$

wherein al represents one-third gram-atom of aluminum in the combined state, the dibutylaluminum monohydride concentration present in the organic aluminum compound of the reaction medium being adjusted during this operation to between 20 and 80 **l molar %, the organic aluminum compound is then submitted to a reaction in which the isobutyl and secondary butyl groups which may be present are displaced by reaction at a temperature within the range of** 80°–180° C and a pressure within the range of 1–50 bars absolute by the butene in a C_4 hydrocarbon cut comprising 15 to 95% by weight of 1-butene, 0 to 75% by weight of 2-butene, 4 to 70% by weight of isobutene and 0 to 66% by weight of butane and isobutane, in at least two reaction zones arranged in series and

fed in counter-current flow with the said mixture of butylaluminum isomers on the one hand and with the C_4 hydrocarbon cut, on the other hand.

4,032,583

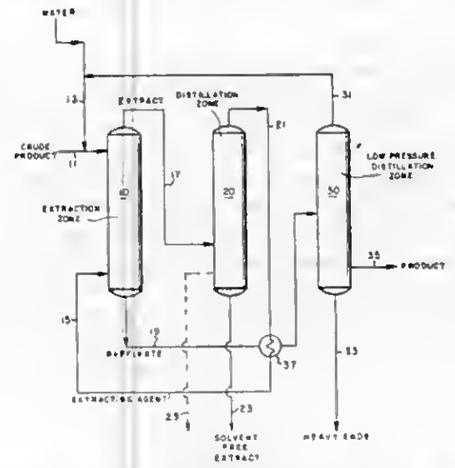
PURIFICATION OF 1,4-BUTANEDIOL

Robert P. Arganbright, Seabrook, and William G. Bowman, Pasadena, both of Tex., assignors to Petro-Tex Chemical Corporation, Houston, Tex.

Filed Aug. 8, 1975, Ser. No. 602,986

Int. Cl.² C07C *29/24*

U.S. Cl. 260—637 R 9 Claims



1. In a process for recovering 1,4-butanediol in high purity from a mixture comprising 1,4-butanediol in admixture with minor amounts of one impurities selected from the group of dibutyl succinate, dibutyl fumarate, dibutyl maleate, γ-hydroxybutyraldehyde, dibutyl butoxy succinate and γ-butyrolactone, the improvement which comprises

a. adding water to said mixture in an amount to produce an aqueous 1,4-butanediol-containing mixture having from about 5 to about 75 weight percent water,

b. intimately contacting said aqueous 1,4-butanediol-containing mixture in an extraction zone with a hydrocarbon extracting agent selected from the group of alkanes of from 6 to about 10 carbon atoms, aromatic hydrocarbons of from 6 to about 10 carbon atoms, and mixtures thereof, in an amount such that the volumetric ratio of the aqueous 1,4-butanediol-containing mixture to the hydrocarbon extracting agent is from about 5:1 to about 1:5,

c. allowing the contacted aqueous 1,4-butanediol-containing mixture and the hydrocarbon extracting agent to separate whereby there is formed an extract phase containing the bulk of said impurities and an aqueous 1,4-butanediol-containing raffinate of reduced impurity content,

d. recovering said extract phase from said extraction zone,

e. recovering said raffinate from said extraction zone,

f. introducing said raffinate into a distillation zone operated at reduced pressure and recovering substantially pure 1,4-butanediol from a lower portion of the distillation zone.

4,032,584

STABILIZED METHYLENE CHLORIDE

Mazin R. Irani, Tarrytown, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Filed May 3, 1976, Ser. No. 682,284

Int. Cl.² C07C *17/42*

U.S. Cl. 260—652.5 R 3 Claims

1. A stabilized methylene chloride composition consisting essentially of methylene chloride and mixed amylenes in amounts varying from about 0.01% to about 2.5% by weight, propylene oxide in amounts varying from about 0.01% to about 2% by weight, butylene oxide in amounts varying from about 0.1% to about 0.75% by weight, and tertiary butylamine in amounts varying from about 1 ppm to about 0.01% by weight, of the methylene chloride.

4,032,585

1-ETHYL-CYCLOOCTADIENE-1,5

Günther Wilke, and Paul Heimbach, both of Mulheim (Ruhr), Germany, assignors to Studiengesellschaft Kohle m.b.H., Mulheim (Ruhr), Germany

Continuation of Ser. No. 463,087, April 22, 1974, Pat. No. 3,929,921, which is a division of Ser. No. 109,949, Jan. 26, 1971, Pat. No. 3,849,506, which is a continuation of Ser. No. 843,220, July 18, 1969, Pat. No. 3,586,727, and Ser. No. 845,901, July 29, 1969, Pat. No. 3,629,347, and Ser. No. 845,904, July 29, 1969, abandoned, which is a continuation-in-part of Ser. No. 582,775, Sept. 27, 1966, abandoned. This application June 9, 1975, Ser. No. 585,287

Claims priority, application Germany, Sept. 29, 1965, 1493221

The portion of the term of this patent subsequent to Nov. 19, 1991, has been disclaimed.

Int. Cl.² C07C *13/26*

U.S. Cl. 260—666 A 1 Claim

1. 1-ethyl-cyclooctadiene-1,5 having a boiling point$_{16}$ of 76° C and n_D^{20} of 1.4900.

4,032,586

DEHYDROCYCLIZATION WITH AN ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE

John C. Hayes, Palatine, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 663,417, March 3, 1976, which is a division of Ser. No. 475,691, June 3, 1974, Pat. No. 3,960,709, which is a continuation-in-part of Ser. No. 391,428, Aug. 24, 1973, abandoned, which is a division of Ser. No. 225,634, Feb. 11, 1972, Pat. No. 3,775,301, which is a division of Ser. No. 839,086, July 3, 1969, abandoned. This application July 6, 1976, Ser. No. 702,830

Int. Cl.² C07C *15/02*

U.S. Cl. 260—673 21 Claims

1. A method for dehydrocyclizing a dehydrocyclizable hydrocarbon comprising contacting the hydrocarbon at dehydrocyclization conditions with an acidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum or palladium, about 0.01 to about 2 wt. % rhodium, about 0.01 to about 5 wt. % germanium and about 0.1 to about 3.5 wt. % halogen; wherein the platinum or palladium, rhodium and germanium are uniformly dispersed throughout the porous carrier material; wherein substantially all of the platinum or palladium and rhodium are present in the elemental metallic state; and wherein substantially all of the germanium is present in an oxidation state above that of the elemental metal.

4,032,587

DEHYDROCYCLIZATION WITH AN ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE

George J. Antos, Arlington Heights, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 574,222, May 5, 1973, Pat. No. 3,959,121. This application Apr. 26, 1976, Ser. No. 680,268

The portion of the term of this patent subsequent to May 25, 1993, has been disclaimed.

Int. Cl.² C07C *5/22*

U.S. Cl. 260—673.5 27 Claims

1. A method for dehydrocyclizing a dehydrocyclizable hydrocarbon comprising contacting the hydrocarbon at dehydrocyclization conditions with an acidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group

metal, about 0.05 to about 5 wt. % cobalt, about 0.01 to about 5 wt. % indium and about 0.1 to about 3.5 wt. % halogen; wherein the platinum group metal, catalytically available cobalt and indium are uniformly dispersed throughout the porous carrier material; wherein substantially all of the platinum group metal is present in the elemental metallic state; wherein substantially all of the indium is present in an oxidation state above that of the elemental metal; and wherein substantially all of the catalytically available cobalt is present in the elemental metallic state or in a state which is reducible to the elemental metallic state under dehydrocyclization conditions or in a mixture of these states.

4,032,588
PROCESS FOR PREPARING 2,6,10,15,19,23-HEXAMETHYLTETRACOSANE

Kenichi Tomita, Yokohama; Toshiaki Shibuya; Suzuko Kobiba, both of Tokyo, and Kazuo Itoi, Kurashiki, all of Japan, assignors to Shiseido Co., Ltd., Japan

Filed Feb. 4, 1975, Ser. No. 546,990
Claims priority, application Japan, Feb. 24, 1974, 49-16316
Int. Cl.² C07C 9/00, 11/00
U.S. Cl. 260—676 R 2 Claims

1. A process for preparing 2, 6, 10, 15, 19, 23-hexamethyltetralosane, comprising the steps of:

a. preparing diacetylene dialcohol (i) by reacting at least one ketone selected from the group consisting of 6, 10-dimethylundecan-2-one, 6, 10-dimethylundeca-3, 9-dien-2-one, 6, 10-dimethylundeca-5, 9-dien-2-one, 6, 10-dimethylundeca-5, 10-dien-2-one and 6, 10-dimethylundeca-3, 5, 9-trien-2-one with acetylene in liquid amonia in the presence of metallic sodium under reflux of liquid ammonia condition and then subjecting the reaction product to the oxidative coupling in the presence of cuprous chloride at room temperature while blowing oxygen thereinto or (ii) by reacting said ketone with diacetylene in liquid ammonia in the presence of at least one metal selected from the group consisting of metallic sodium and metallic lithium under reflux of liquid ammonia condition;

b. hydrocracking the diacetylene with hydrogen in the presence of a nickel catalyst.

4,032,589
DEHYDROGENATION CATALYST AND PROCESS

Robert G. Wall, Pinole, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Mar. 17, 1975, Ser. No. 559,288
Int. Cl.² C07C 5/18
U.S. Cl. 260—683.3 6 Claims

1. A process for dehydrogenating a C_2 to C_{20} alkane or mixtures thereof which comprises contacting the alkane with a catalyst comprising 0.1 to 1 weight percent platinum, 0.1 to 1 weight percent chromium, and 0.1 to 1 weight percent lithium and an alumina support, wherein the dehydrogenation is carried out under conditions including a temperature between 850° and 1250° F, a liquid hourly space velocity between 1 and 40, and a hydrogen to alkane molar ratio between 0.5 and 20.

4,032,590
OLIGOMERIZATION OF ETHYLENE

David Robert Burnham, Runcorn, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Aug. 18, 1975, Ser. No. 605,506
Claims priority, application United Kingdom, Aug. 29, 1974, 37774/74
Int. Cl.² C07C 3/10
U.S. Cl. 260—683.15 D 12 Claims

1. A process for the oligomerisation of ethylene in which the ethylene is contacted with a catalyst which is the reaction product of a weak field ligand complex of a metal of Group VIII of the Periodic Table and an inorganic oxide support material which contain other elements to impart sufficient Bronsted acidity to said support to displace at least one of the ligands attached to the said Group VIII metal, in the presence of a hydrocarbyl of a metal of Groups I to III of the Periodic Table.

4,032,591
PREPARATION OF ALPHA-OLEFIN OLIGOMER SYNTHETIC LUBRICANT

Barrett L. Cupples, Franklin Township, Allegheny County, and William J. Heilman, Allison Park, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Nov. 24, 1975, Ser. No. 634,624
Int. Cl.² C07C 5/24, 5/18
U.S. Cl. 260—683.65 6 Claims

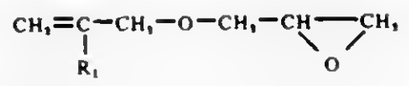
1. The process for skeletally isomerizing a liquid alpha-olefin oligomer comprising the trimer, tetramer, pentamer or mixtures thereof of a normal 1-olefin selected from 1-octene, 1-decene, 1-dodecene or a mixture thereof prepared by the cationic oligomerization of said 1-olefin which comprises introducing the liquid alpha-olefin oligomer into the top of a column packed with pellets of a metallic hydrogenation catalyst in the presence of hydrogen at a pressure and a temperature suitable for hydrogenation and permitting the liquid oligomer to trickle through said catalyst bed over the surface of said catalyst, whereby the liquid is substantially present in said column as a thin film on said catalyst pellets.

4,032,592
METHOD FOR THE PREPARATION OF A MODIFIED CRYSTALLINE PROPYLENE POLYMER

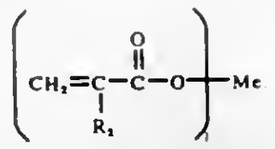
Sadahide Ogihara, Fujisawa; Yoichi Nakamura, Yono, and Osamu Fukui, Toyonaka, all of Japan, assignors to UBE Industries, Ltd., Ube, Japan

Filed Feb. 27, 1975, Ser. No. 553,439
Claims priority, application Japan, Mar. 15, 1974, 49-29193
Int. Cl.² C08F 255/04
U.S. Cl. 260—827 24 Claims

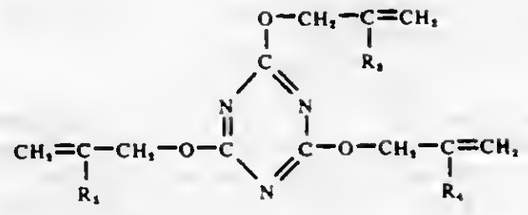
1. A method for the preparation of modified propylene polymers usable as bonding material, from a crystalline propylene polymer consisting of random and block copolymers of 2 to 15% by weight of ethylene and a balance of propylene and mixtures of 80% by weight or more of the above-mentioned copolymer and a balance of a high density polyethylene, comprising the steps of: uniformly admixing said crystalline propylene polymer with a modifying composition consisting of at least one organic peroxide, and a modifying agent consisting of γ-methacryloyloxypropyl trimethoxysilane and at least one ethylenically unsaturated organic compound selected from the group consisting of the formulae (I) through (V):



(I),



(II),



(III),

(IV),

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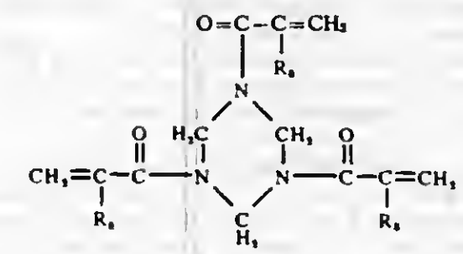
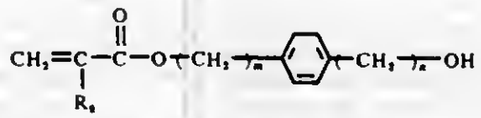


or



(V)

wherein R_1 through R_9 respectively represent a hydrogen atom or methyl radical, Me represents a metal atom in Groups I, II, III and VIII in the Periodic Table, *l* represents an integer corresponding to the valence of the metal atom Me, and *m* and *n* each represent 0 or 1, and heating the above admixture at a temperature lower than the thermal decomposing point but not lower than the melting point of said crystalline propylene polymer.

4,032,593
CURABLE RESIN COMPOSITIONS

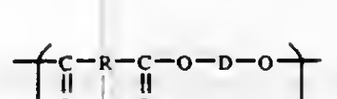
Hiroshi Samejima, Ibaragi, Japan, assignor to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

Filed July 11, 1975, Ser. No. 595,304
Claims priority, application Japan, July 12, 1974, 49-79862; May 6, 1975, 50-53156
Int. Cl.² C08L 63/00
U.S. Cl. 260—835 9 Claims

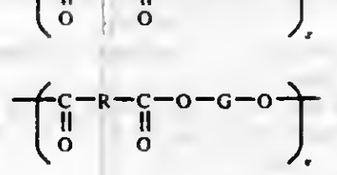
1. A curable epoxy resin composition comprising

a. a polyepoxide compound containing at least two 1,2-epoxy groups per molecule,

b. 1 to 10% by weight, based on the polyepoxide compound (A) of an aromatic copolyester having a weight average molecular weight of 10,000 to 100,000 and composed of recurring units of formula (I) and recurring units of formula (II)



(I)



(II)

wherein R is a residue resulting from the removal of carboxyl groups from an aromatic dicarboxylic acid; D is a residue resulting from the removal of hydroxyl groups from a glycol containing 2 to 15 carbon atoms; G is a residue resulting from the removal of the terminal hydroxyl group from a long-chain poly(alkylene oxide) glycol having a number average molecular weight of 350 to 6,000; and $x/x + y$ is from 0.2 to 0.8,

c. a curing agent for the polyepoxide compound (A).

4,032,594
POLYMERIC STABILIZERS FOR POLYVINYL CHLORIDE RESIN

Joseph Serratore, and William L. Clayton, both of Sarnia, Canada, assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed June 10, 1975, Ser. No. 585,485
Int. Cl.² C08G 49/04
U.S. Cl. 260—837 PV 6 Claims

1. A polyvinyl chloride composition comprising

a. about 1 to 50 parts per 100 parts of polyvinyl chloride resin of a graft terpolymer of ethylene, propylene and an unsaturated epoxy monomer selected from the group consisting of glycidyl methacrylate, glycidyl acrylate, allyl glycidyl ether, vinyl glycidyl phthalate and allyl glycidyl phthalate and wherein the unsaturated epoxy monomer is grafted onto an ethylene/propylene polymer backbone; and

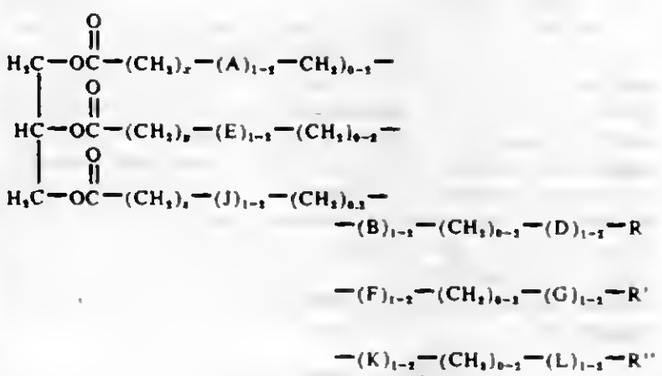
b. a polyvinyl chloride resin, wherein said composition has improved thermal stability and a glass transition temperature equal to or greater than the glass transition temperature of the polyvinyl chloride resin.

4,032,595
ANTISTATIC AGENTS

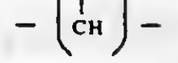
Ian Stuart Fisher, and James Eric McIntyre, both of Harrogate, England, assignors to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 428,314, Dec. 26, 1973, abandoned. This application Aug. 5, 1975, Ser. No. 601,978
Claims priority, application United Kingdom, Jan. 12, 1973, 1733/73
Int. Cl.² C08K 5/11
U.S. Cl. 260—857 PE 12 Claims

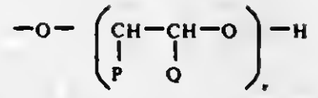
1. A synthetic polymer mixture containing a minor proportion of at least one reaction product of (a) a compound of the formula:



wherein *x*, *y* and *z* are integers of from 1 to 22; R,R′ and R″ are C_nH_{2n+1}, where *n* is an integer from 1 to 23; A, B, D, E, F, G, J, K and L are selected from



and —(CH=CH)—
where M is selected from



and H, where P and Q are selected from methyl and H, and *v* is an integer greater than 0; provided that at least one of A, B,

D, E, F, G, J, K and L is other than —(CH=CH)—, at least one M is other than hydrogen, and the sum of *v* is equal to a value between 10 and 500, with (b) an ester of oxalic acid or of malonic acid, the molecular ratio of (b) to (a) being at least 2:1.

4,032,596

CURE ACCELERATORS FOR PEROXYKETAL INITATED POLYESTER RESINS

Melville W. Uffner, Glen Mills, and Burton D. Beitchman, Springfield, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Oct. 20, 1976, Ser. No. 734,295
Int. Cl.² C08L *67/06*
U.S. Cl. 260—862 **17 Claims**

1. A curable polyester mixture comprising:
a. an unsaturated polyester of a dihydric alcohol and an alpha-beta ethylenically unsaturated dicarboxylic acid,
b. ethylenically unsaturated copolymerizable monomer,
c. free radical initiating diperoxyketal, and
d. an organic quaternary ammonium chloride in amount effective to accelerate free radical initiation of said diperoxyketal, said quaternary compound being soluble in the mixture.

4,032,597

THERMOPLASTIC RESIN COMPOSITION

Tanoshi Yamagoshi, Nihama; Minoru Terakawa, Saijyo; Aiki Shirahata, Nihama; Sadao Sekiguchi, Nihama; Saburo Mishiba, Nihama; Takeshi Shimamura, Nihama, and Shigeru Tajima, Ashiya, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Continuation of Ser. No. 319,233, Dec. 29, 1972, abandoned. This application Mar. 25, 1975, Ser. No. 561,986
Claims priority, application Japan, Dec. 29, 1971, 47-3102
Int. Cl.² C08L *9/02, 51/08*
U.S. Cl. 260—876 R **14 Claims**

1. A thermoplastic resin composition having excellent transparency, impact strength, weatherability and gas screening effects comprising (1) a graft copolymer which is produced by polymerizing a vinyl cyanide monomer and an unsaturated carboxylic acid ester monomer in the presence of a gummy copolymer produced by polymerizing 10 to 60 parts by weight of a conjugated diolefinic monomer, 5 to 60 parts by weight of at least one vinyl cyanide monomer and 5 to 90 parts by weight of at least one unsaturated carboxylic acid ester monomer in admixture with (2) a resinous copolymer of a vinyl cyanide monomer and an unsaturated carboxylic acid ester monomer.

4,032,598

PROCESS FOR PURIFYING HALOGENATED ALKENYLPHENOL POLYMERS

Hiroshi Fujiwara; Asao Takahashi, both of Soka, and Ken Suzuki, Saitama, all of Japan, assignors to Maruzen Oil Co. Ltd., Osaka, Japan

Filed Apr. 26, 1976, Ser. No. 680,628
Int. Cl.² C08L *23/00, 9/00*; C08F *6/00*; C08J *3/00*
U.S. Cl. 260—878 R **19 Claims**

1. A process of purifying a halogenated alkenylphenol polymer which comprises treating the halogenated alkenylphenol polymer with an aqueous solution of at least one basic compound selected from the group consisting of an alkali metal hydroxide, an alkali metal carbonate, an alkali metal hydrogen carbonate, an alkylamine and ammonia, wherein the amount of said basic compound is about 1/100 to about 20 equivalents per phenol nucleus in the polymer, such process being carried out at a temperature no lower than about 0° C. for about 1 to about 5 hours to thereby dissolve the polymer in the aqueous solution of the basic compound.

4,032,599

HYDROPHILIC COPOLYMERS

Phillip William Cordrey, London, and Wiktor Mikuckl, Thames Ditton, both of England, assignors to Contact Lenses (Manufacturing) Limited, London, England

Continuation-in-part of Ser. No. 245,398, April 19, 1972, abandoned. This application Dec. 9, 1974, Ser. No. 530,570
Claims priority, application United Kingdom, Apr. 20, 1971, 10186/71
Int. Cl.² C08L *33/12*
U.S. Cl. 260—885 **11 Claims**

1. A hydrophilic copolymer obtained by forming a polymerization reaction mixture consisting essentially of (A) N-vinyl-2-pyrrolidone, (B) methyl methacrylate, (C) at least one cross-linking agent having at least two olefinic double bonds in its molecule and (D) an ethylene oxide-propylene oxide block copolymer having a molecular weight in the range of from at least about 1000 to not more than about 6000, the molar ratio of (A) : (B) being from about 6:1 to about 1:1, the amount of (C) being from about 0.2 to about 5% by weight based on the weight of (A) plus (B), and the amount of (D) being from about 0.25% to not more than 10% by weight based on the sum of the weights of (A) plus (B) plus (C), polymerizing said polymerization reaction mixture at a temperature of from 35° to 50° C until the monomers have gelled and then raising the temperature to 50° to 60° C and completing the polymerization at the latter temperature and thereby obtaining the hydrophilic copolymer.

4,032,600

RESIN FORMULATION FOR ROTATIONAL MOLDING AND SHAPED STRUCTURES

John L. MacAdams, Schaumburg, Ill.; William C. L. Wu, Pittsford, N.Y., and Richard S. Joyner, DesPlaines, Ill., assignors to Chemplex Company, Rolling Meadows, Ill.

Continuation-in-part of Ser. No. 506,271, Sept. 16, 1974, abandoned, which is a division of Ser. No. 327,577, Jan. 29, 1973, abandoned. This application Mar. 24, 1976, Ser. No. 670,082
Int. Cl.² C08L *23/08*
U.S. Cl. 260—897 B **10 Claims**

1. A blend of polymers especially suitable for the rotational molding of shaped structures, comprising: a three component blend of (1) 60–80 wt.% of a member of a first class consisting of high density polyethylene and high density ethylene-alkene copolymers containing 4 or 6 carbon atoms in the alkene group with (2) 5–20 wt.% of a member of a second class consisting of ethylene-propylene essentially random copolymer and an essentially random terpolymer of ethylenepropylene monomer in which the monomer is selected from the group consisting of 1,4-hexadiene, 5-ethylidine-2-norbornene and 5-methylene-2-norbornene, and (3) 5–30 wt.% of a copolymer of ethylene-vinyl acetate for a total of 100%.

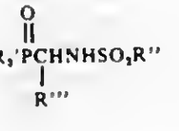
4,032,601

PROCESS FOR THE PRODUCTION OF SULFONAMIDE PHOSPHONATES

Gail H. Birum, Kirkwood, Mo., assignor to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 386,255, Aug. 6, 1973, abandoned. This application Aug. 18, 1975, Ser. No. 605,694
Int. Cl.² C07F *9/40*
U.S. Cl. 260—969 **3 Claims**

1. Process for the production of:



where

R' is aryl, aryloxy or chloroalkyloxy of 2 to 10 carbon atoms,
R'' is alkyl, aryl, haloaryl, or alkaryl of 1 to 15 carbon atoms, where the aryl halogen is bromine, chlorine or fluorine, and
R''' is hydrogen, alkyl, alkenyl or aryl of 1 to 15 carbon atoms and substituted aryl forms wherein the substituent is fluorine, bromine, chlorine, hydroxyl, alkyloxy or mixtures of such substituents, which comprises heating a mixture containing $R_2'POR$, R'''CHO and H_2NSO_2R'' where R is aryl or chloroalkyl of 2 to 10 carbon atoms, in the presence of an acid catalyst selected from the group consisting of boron trifluoride etherate, acetic acid, propionic acid, butyric acid and benzoic acid.

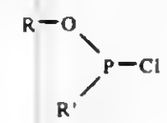
4,032,602

PROCESS FOR THE PRODUCTION OF PHOSPHITE CHLORIDES

Zdenek Mazour, Frenkendorf, and Helmo Brunetti, Reinach, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

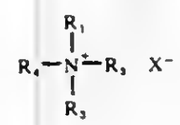
Filed Sept. 29, 1975, Ser. No. 617,779
Int. Cl.² C07F *9/20*
U.S. Cl. 260—972 **10 Claims**

1. A process for the production of phosphite chlorides of the formula I



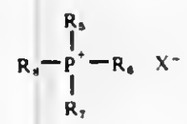
(I)

wherein
R represents C_1–C_{18} alkyl, phenyl or phenyl mono-, di- or tri-substituted by C_1–C_{18} alkyl, C_1–C_{18} alkoxy or halogen with the total number of carbon atoms for more than one alkyl or alkoxy group not being greater than 18, and
R' represents OR or chlorine, wherein R has the definition given above which comprises reacting phosphorus trichloride with a symmetrical trialkyl- or tri(substituted) phenyl phosphite that is present in the amount necessary for the formation of the phosphite chlorides of formula I at a temperature of between 15° C and 75° C and in the presence of a hydrous quaternary compound of nitrogen or of phosphorus, respectively, of the formula II



(II)

wherein
R_1 represents C_1 –C_{18} -alkyl, C_7–C_9-phenylalkyl or C_6–C_{10}-aryl,
R_2 represents C_1–C_{12}-alkyl or C_7–C_9-phenylalkyl,
R_3 represents C_1–C_{12}-alkyl or C_7–C_9-phenylalkyl,
R_4 represents C_1–C_4-alkyl, and
X represents chlorine or bromine, whereby the radicals R_1 and R_2 together can also represent a pentamethylene group and of the formula III



(III)

wherein
R_5 represents C_1–C_{18} alkyl or phenyl,
R_6, R_7 and R_8 each independently represent C_1–C_8 alkyl or phenyl, and
X represents chlorine or bromine.

4,032,603

PRODUCTION OF PHOSPHORUS OXY COMPOUNDS

Johannes Kaschuba, Odenthal-Gloebusch, and Manfred Ernst, Leverkusen, both of Germany, assignors to Bayer Aktiengeselischaft, Leverkusen, Germany

Filed Jan. 23, 1976, Ser. No. 651,985
Claims priority, application Germany, Feb. 22, 1975, 2507730
Int. Cl.² C07F *9/11, 9/32, 9/40, 9/53*
U.S. Cl. 260—990 **6 Claims**

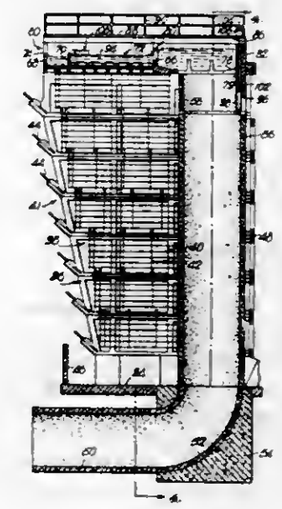
1. A process for the purification of a phosphorus oxy compound selected from the group consisting of phosphoric, phosphonic and phosphinic acid esters and phosphine oxides containing impurities comprising phosphorus compounds of an intermediate valency stage, comprising mixing the impure phosphorus oxy compounds with an oxidizing agent, subsequently reacting the mixture with at least one of water and an alcohol, and separating the purified phosphorus oxy compound.

4,032,604

HOT WATER SUPPLY AND DISTRIBUTION STRUCTURE FOR COOLING TOWERS

Graham Charles Parkinson, London, England, and Homer E. Fordyce, Kansas City, Mo., assignors to The Marley Cooling Tower Company, Mission, Kans.

Continuation-in-part of Ser. No. 286,341, Sept. 5, 1972, Pat. No. 3,880,964. This application Apr. 17, 1975, Ser. No. 568,891
The portion of the term of this patent subsequent to Apr. 29, 1992, has been disclaimed.
Int. Cl.² B01F *3/04*
U.S. Cl. 261—111 **9 Claims**



1. In combination with a crossflow cooling tower provided with a fill assembly having respective air inlet and outlet faces with inner and outer fill portions therebetween for serial passage of air therethrough, hot liquid supply and distribution structure comprising:
horizontally adjacent, inner and outer hot liquid distribution basins respectively overlying said inner and outer fill portions for receiving and distributing hot liquid to be cooled to respective portions;
first liquid supply means located inwardly of said inner distribution basin and adjacent thereto;
means for supplying hot liquid from said first liquid supply means to said adjacent inner distribution basin which includes structure permitting said hot liquid to overflow from said first liquid supply means to said inner distribution basin only after the liquid level within said first liquid supply means reaches a predetermined level; and
second liquid supply means extending between and inter-

communicating said first liquid supply means and outer distribution basin for delivery of hot liquid to the latter, said second liquid supply means being in communication with said first liquid supply means at a level therein below said predetermined level.

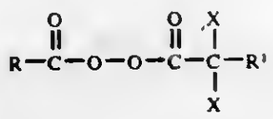
4,032,605

ALPHA-HALO SUBSTITUTED DIACYL PEROXIDES

Donald W. Wood, Concord, Calif., assignor to Argus Chemical Corporation, Brooklyn, N.Y.

Continuation-in-part of Ser. No. 675,360, Oct. 16, 1967, Pat. No. 3,652,681. This application Dec. 6, 1971, Ser. No. 205,387
Int. Cl.² C07C *179/14*
U.S. Cl. 260—610 D **12 Claims**

1. An asymmetrical diacyl peroxide of from six to 20 carbon atoms of the formula:



wherein

X is hydrogen, chlorine or bromine, at least one X being chlorine or bromine;

R^1 is saturated aliphatic hydrocarbon of from two to 10 carbon atoms, having from zero to five branches along the chain; and

R is a saturated aliphatic or aromatic organic radical of from one to eleven carbon atoms and from zero to three heteroatoms and composed solely of carbon, hydrogen, oxygen as oxy and halogen of atomic number nine to 35, with the proviso that R has at least one atom of oxygen or halogen, when R^1 is straight chain.

4,032,606

METHOD FOR PRODUCING SOLID-POROUS RUBBER ARTICLES

Anatoly Vasilievich Solomatin, ulitsa Novatorov, 40, korpus 4, kv. 140, Moscow; Anatoly Grigorievich Evseev, smena, NIIRP, 4, kv. 66, Moskovskol oblasti Zagorsk; Ardalion Nikolaevich Ponomarev, p/o Chernogolovka, ulitsa Tretya, 2, kv. 3; Viktor Semenovich Oskin, p/o Chernogolovka, ulitsa Pervaya, 1, kv. 6, both of Moskovskaya ohlast, Noginsky raion, and Viktor Lvovich Talroze, Vorobievskoe shosse, 11, kv. 21, Moscow, all of U.S.S.R.

Filed Sept. 17, 1974, Ser. No. 506,797
Int. Cl.² B29D *27/00*; C08C *19/00*
U.S. Cl. 264—22 **2 Claims**

1. A process for the production of a composite cellular elastomeric article of unitary structure having preselected solid portions and selected cellular portions which comprises the steps of;

a. forming into a blank, an elastomeric composition having a chemical blowing agent incorporated therein;

b. irradiating said blank in said preselected portions from a source of cross-linking ionizing radiation, so that cross-linking is effected thereby in said preselected portions by varying the penetrating capacity, intensity and character of said ionizing radiation to said preselected portions;

c. heating said entire blank including both said radiated preselected portions and the un-radiated selected portions to temperatures above that which said blowing agent decomposes, to thereby foam said blank, in said selected portions while maintaining said cross-linked irradiated portions in substantially solid or no-cellular form.

4,032,607

PROCESS FOR PRODUCING SELF-BONDED WEBS OF NON-WOVEN CARBON FIBERS

David Arthur Schulz, Fairview Park, Ohio, assignor to Union Carbide Corporation, New York, N.Y.

Filed Sept. 27, 1974, Ser. No. 510,128
Int. Cl.² B29C *6/00, 25/00*; D01F *9/12*
U.S. Cl. 264—29.3 **19 Claims**

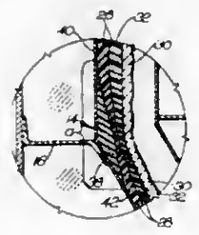
1. A process for producing self-bonded webs of non-woven carbon fibers which comprises spinning carbonaceous pitch fiber from a nonthixotropic carbonaceous pitch having a mesophase content of from 40 percent by weight to 90 percent by weight, which mesophase content, under quiescent conditions, forms homogenous bulk mesophase having large coalesced domains; disposing staple lengths of the spun fiber in intimately contacting relationship with each other in a non-woven fibrous web; heating the web produced in this manner in an oxidizing atmosphere for a time sufficient to thermoset the surfaces of the fibers of the web to an extent which will allow the fibers to maintain their shape upon heating to more elevated temperatures but insufficient to thermoset the interior portions of the fibers; heating the web containing the externally thermoset fibers under compressive pressure in an oxygen-free atmosphere to a temperature sufficiently elevated to cause the mesophase pitch in the unoxidized interior portions of the fibers to undergo liquid flow and exude through the surfaces of the fibers and contact the surfaces of the adjacent fibers; and further heating the web to a carbonizing temperature in an oxygen-free atmosphere to produce a carbon body wherein the fibers are bonded to each other by infusible carbon bonds.

4,032,608

CRYOGENIC LIQUID CONTAINMENT METHOD

Theodore C. Zinniger, Livermore, and Phillip J. Burke, San Jose, both of Calif., assignors to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.

Division of Ser. No. 487,959, July 12, 1974, Pat. No. 3,927,788. This application Aug. 22, 1975, Ser. No. 607,086
Int. Cl.² B29D *27/00*
U.S. Cl. 264—46.6 **5 Claims**



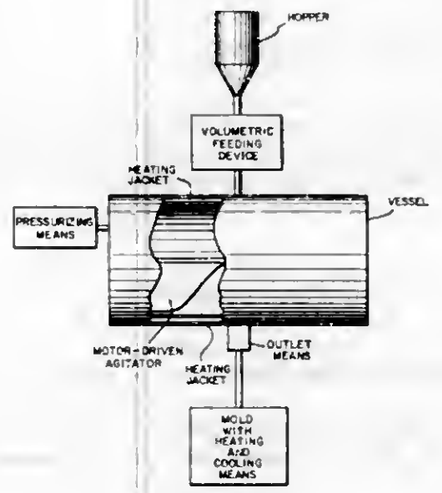
1. A method of insulating the corner section of a cryogenic liquid containment structure comprising the steps of packing a selected amount of a given filler material against a pair of converging walls in the area of the intersection of the walls of the said structure, thereafter progressively spraying selected portions of the surfaces of the converging walls adjacent their point of intersection as well as the previously packed filler material with an insulating cryogenic thermosetting polyurethane foam materials of a selected density and cell formation to produce at least one rigid insulating layer of the foam material and while spraying said foam material in place and allowing it to be cured in situ effecting a smaller build up and less thickness of the foam material in the area of the previously packed filler material and wall surface convergence than on the wall surfaces adjacent thereto with the thinner section of the foam material insulating layer having a thickness that can be as much as one-third less than that of the thickest section of the said foam material insulating layer while providing a load transfering hinge in the said layer.

4,032,609

METHOD FOR PRE-EXPANDING AND MOLDING EXPANDABLE THERMOPLASTIC POLYMER PARTICLES

Stuart B. Smith, Chelmsford, Mass., assignor to Foster Grant Co., Inc., Leominster, Mass.

Continuation-in-part of Ser. No. 288,230, Sept. 11, 1972. This application July 22, 1975, Ser. No. 598,509
Int. Cl.² B29D *27/00*
U.S. Cl. 264—53 **9 Claims**



1. A method of mold expandable thermoplastic polymer particles containing a blowing agent comprising:

a. inserting a measured amount of the particles into a vessel;

b. heating the particles in a substantially dry atmosphere within said vessel to a temperature high enough to soften the polymer particles and volatize the blowing agent, the heat applied by conduction through the walls of the vessel and radiation therefrom and causing partial expansion of the particles;

c. agitating the particles within said vessel at all times during the heating thereof in a manner so that the particles are repeatedly wiped by an agitator within said vessel against the walls thereof and then returned toward the center of said vessel;

d. subjecting the particles while in their heat softened state to a super atmospheric pressure with a substantially dry gaseous medium after a predetermined period of heating in said vessel the pressure being adequate to substantially prevent further expansion of the particles to obtain the desired generally uniform density thereof;

e. removing the particles from said vessel with the aid of the gaseous medium under pressure which carries said particles out of the closed vessel when an exit opening is provided for the particles.

f. conveying the heated partially expanded particles to a mold and filling the mold therewith and;

g. heating the particles in the mold to effect the further expansion and fusion of the particles into the desired molded article;

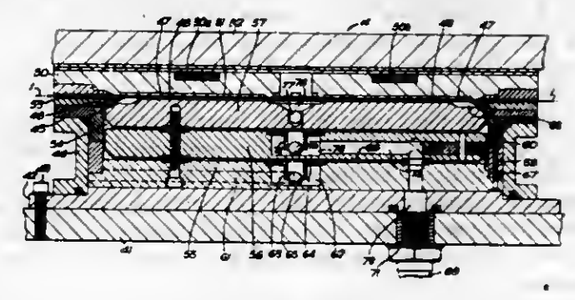
The temperature of the particles being continuously maintained above the boiling-point of the blowing agent within said particles at all time subsequent to the partial expansion of the particles in said vessel up to the final expansion and fusion of the particles within the mold.

4,032,610

MANUFACTURE OF CONTOURED RECORDS

Basil Harry Royston Spiller, and Alan Phillipson, both of London, England, assignors to Decca Limited, London, England

Continuation of Ser. No. 520,166, Nov. 1, 1974, which is a division of Ser. No. 331,203, Feb. 9, 1973, Pat. No. 3,860,382. This application Mar. 26, 1976, Ser. No. 670,842
Claims priority, application United Kingdom, Feb. 23, 1972, 8427/72; Oct. 17, 1972, 47703/72
Int. Cl.² B29D *17/00*
U.S. Cl. 264—107 **6 Claims**



1. A method of making contoured records comprising the steps of:

disposing a sheet of thin thermoplastics material between a support and one side of a thin, flexible, heat conductive, contoured matrix;

heating the region of the sheet adjacent the matrix uniformly by distributing relatively hot hydraulic fluid under pressure evenly to the periphery of a narrow circular pressure chamber of which one broad wall is enstituted by a thin, flexible, heat conductive diaphragm disposed adjacent the other side of the matrix, and providing a radial even flow of the fluid towards an outlet provided in the center of the chamber;

impressing the contours of the matrix on said sheet by increasing the pressure of said even radial flow of fluid through the chamber whereby said region of the sheet is pressed against the support; and

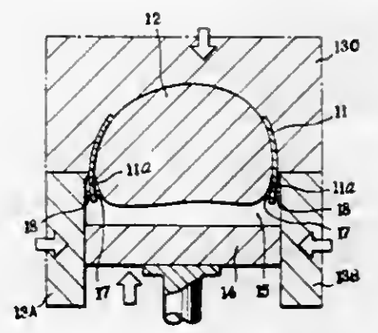
cooling the impressed region of the sheet by providing a radial even flow of relatively cold hydraulic fluid through the chamber from the periphery to the central outlet thercof.

4,032,611

METHOD OF MANUFACTURING A FOOTWEAR

Tatsuo Fukuoka, No. 3, 3-Ban, 2-Chome, Shin-Minami-Fukushima, Tokushima, Japan

Filed July 28, 1975, Ser. No. 599,325
Claims priority, application Japan, Apr. 30, 1974, 50-53034
Int. Cl.² B29F *1/00*; B29C *6/04*
U.S. Cl. 264—244 **2 Claims**



1. In a method for manufacturing a footwear comprising the steps of placing in a mold assembly having male and female molds a preformed section of appropriate material forming a

part of the footwear in such a manner that a portion of the preformed section is within a molding cavity for molding another section of the footwear, injecting molding material into the cavity to thereby integrally connect the preformed section with the molding material, the improvement comprising supporting a peripheral portion of the preformed material away from the molding surfaces of the male and female molds by a plurality of pairs of projections which extend outwardly from the surfaces of the male and female molds to provide a space between the peripheral portion of the preformed material and the molding surface of each of the male and female molds, each pair of projections being spaced from the other pairs of projections and including a first projection extending from the surface of the male mold and a second projection extending from the surface of the female mold and aligned with the first projection, whereby the molding material which is injected into the cavity forms a layer of mold material between the peripheral portion of the preformed material and each of the male and female molds to securely connect the preformed material to the molding material, and holes are formed in the mold material by the projections which extend from the outer surface of the mold material to the preformed material.

4,032,612

METHOD AND A DEVICE FOR PRODUCING A PLATE-LIKE STRUCTURAL ELEMENT

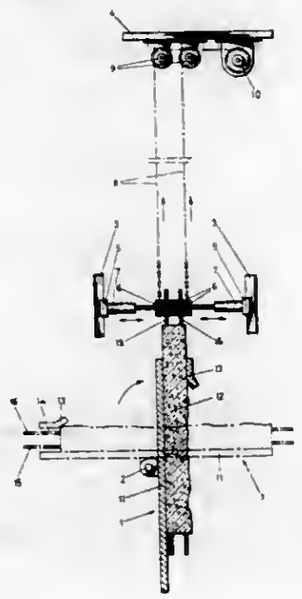
Hendrik Krekel, Dillenburgstraat 93, Breda, Netherlands

Filed May 20, 1974, Ser. No. 471,298

Claims priority, application Netherlands, May 21, 1973, 7307077

Int. Cl.² B28B *13/05*

U.S. Cl. 264—259 5 Claims



1. A method for the manufacture of a plate-like structural element from a cement mortar, including the steps of providing a flat mould having a length, width and thickness approximately corresponding to the length, width and thickness of the plate-like structural element, providing at least one reinforcement of metal rods, a perforated plate or synthetic resin rods extending over substantially the entire surface of the mould and projecting beyond said mould at one side thereof, said one side comprising an opening defining the ultimate width and thickness of the structural element, arranging said mould in a horizontal position, filling the mould with said mortar, thereafter positioning the mould in a vertical position with said one side facing upwardly, exerting a pulling force in a vertically upward direction on the parts of the reinforcement projecting beyond the mould to pull the entire reinforcement with the mortar adhering thereto vertically out of the mould through said opening before said mortar hardens thereby exposing said mortar and removing external support from the sides of said element and allowing the structural element to harden outside the mould while being vertically suspended with its reinforcement, whereby said mould is ready for immediate reuse.

4,032,613

REMOVAL OF IRON FROM ALUMINUM NITRATE

Lawrence E. Schultze, Sparks; Donald J. Bauer, Reno, and Judith A. Eisele, Verdi, all of Nev., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Dec. 9, 1975, Ser. No. 639,024

Int. Cl.² C01F *7/66*

U.S. Cl. 423—112 2 Claims

1. A process for removal of iron from a concentrated aqueous aluminum nitrate solution, containing about 50 to 56.8 weight percent of aluminum nitrate, consisting of contacting said solution with an extractant from the group consisting of tri-n-butyl phosphate and a solution of about 25 to 90 percent of tri-n-butyl phosphate in an inert diluent, the weight ratio of tri-n-butyl phosphate to aluminum nitrate being about 0.05:1 to about 1:1, whereby the iron is extracted into said extractant.

4,032,614

PROCESS FOR THE DISPOSAL OF ALKALI METALS

Leroy C. Lewis, Arco, Idaho, assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Oct. 20, 1975, Ser. No. 624,030

Int. Cl.² C01D *1/04*

U.S. Cl. 423—179 6 Claims

1. A method for disposing of alkali metals by forming a solid waste for storage comprising:

a. preparing an aqueous disposal solution of at least 55 weight percent alkali metal hydroxide;

b. heating the alkali metal to melting temperature to form a feed solution;

c. spraying the molten feed solution into the disposal solution, the alkali metal reacting with the water in the disposal solution in a controlled reaction producing alkali metal hydroxide, hydrogen and heat, thereby forming a solution of alkali metal hydroxides;

d. adding water to the solution in amounts sufficient to maintain the concentration of alkali metal hydroxides in the solution at 70 to 90 weight percent and to maintain the temperature of the solution at about the boiling point; and

e. removing and cooling the alkali metal hydroxide solution thereby forming a solid waste for storage.

4,032,615

METHOD FOR THE SAFE DISPOSAL OF ALKALI METAL

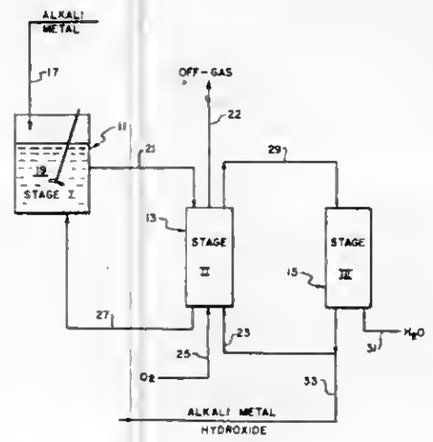
Terry R. Johnson, Wheaton, Ill., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Jan. 27, 1976, Ser. No. 651,981

Int. Cl.² C01D *104*

U.S. Cl. 423—179 5 Claims

1. In a method for disposing of molten alkali metal by converting it to alkali metal hydroxide, the improvement comprising dissolving said alkali metal within a melt of a metal selected from the group consisting of lead, bismuth, tin, antimony, cadmium, indium, and alloys of these materials; contacting said melt with a molten salt including hydroxide of said alkali metal and with a gas including oxygen to convert said alkali metal to an alkali metal monoxide dissolved within said salt; separating said salt containing alkali metal monoxide from said melt; and contacting said salt a gas containing H_2O to convert said alkali metal monoxide to alkali metal hydroxide



whereby hydrogen evolution is nearly eliminated and heat of reaction is evolved in a plurality of reaction steps.

4,032,616

PROCESS FOR THE PRODUCTION OF SODIUM BICARBONATE FROM DIAPHRAM CELL LIQUORS

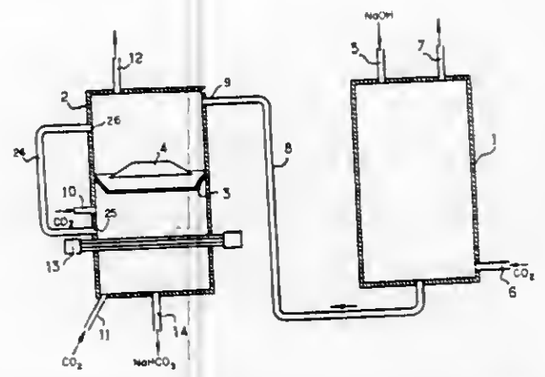
Andre Artur, and Charles Meniere, both of Laneuveville Devant Nancy, France, assignors to Rhone-Poulenc Industries, Paris, France

Filed May 13, 1975, Ser. No. 577,120

Claims priority, application France, May 22, 1974, 74.17783; Feb. 28, 1975, 75.06290

Int. Cl.² C01D *7/07*

U.S. Cl. 423—190 8 Claims



1. A continuous method for obtaining sodium bicarbonate as crystals of a size to enable easy separation by filtration by the treatment with CO_2 of sodium chloride electrolysis diaphragm cell liquor containing sodium hydroxide and sodium chloride, comprising

in a first zone treating the cell liquor with a carbon dioxide containing gas in an amount to convert sodium hydroxide to a neutral sodium carbonate which remains in solution;

in a second zone subjecting the solution from the first zone to the action of a carbon dioxide containing gas to precipitate a portion of the sodium carbonate as sodium bicarbonate while maintaining the maximum temperature in said second zone below 70° C;

passing the suspension obtained from the second zone to a third zone whereby bicarbonation is completed by the action of a carbon dioxide containing gas, and cooling the suspension to a final temperature of no more than 45° C; and

finally separating the precipitated sodium bicarbonate, which includes the step of recycling a part of the suspension from the third zone back into the second zone.

4,032,617

BIS(3,5-DIFLUOROSALICYLALDEHYDE)ETHYLENEDIIMINE-Co^{+2} COMPOUND AND USE

Walter A. Gay, Cheshire, Conn., assignor to Olin Corporation, New Haven, Conn.

Filed Dec. 3, 1975, Ser. No. 636,905

Int. Cl.² B01D *53/34*; C07F *15/06*

U.S. Cl. 423—219 2 Claims

1. The compound bis(3,5-difluorosalicylaldehyde)ethylenediimine-Co^{+2}.

2. In an oxygen absorbing-desorbing process wherein a chelate is used which absorbs oxygen and upon heating desorbs oxygen, the improvement comprising using as a chelate the compound of claim 1.

4,032,618

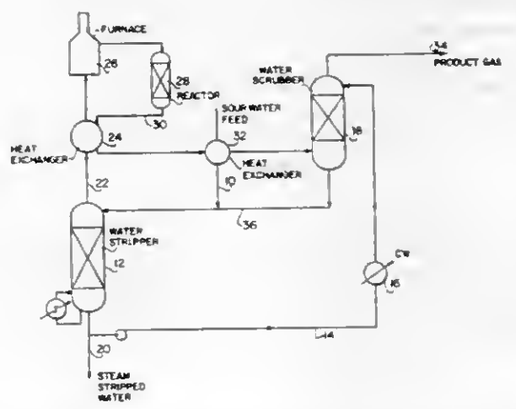
CONVERSION OF AMMONIA INTO HYDROGEN AND NITROGEN BY REACTION WITH A SULFIDED CATALYST

Charles W. Matthews, Denver, Colo., assignor to The United States Energy Research and Development Administration, Washington, D.C.

Filed May 11, 1976, Ser. No. 685,484

Int. Cl.² C01B *21/00*, *1/00*, *4/00*, *6/00*

U.S. Cl. 423—351 1 Claim



1. In a process for the removal of NH_3 and other contaminants including HCN, COS, CO_2 and H_2S from a coal gasification process wherein said contaminants are contained in water as a liquid waste stream, and wherein said waste stream is stripped with steam to provide a gas stream containing said contaminants and a stripped water stream, the improvement comprising

heating said gas stream containing said contaminants to a temperature of about 700° to 1000° F.;

passing said heated gas stream into contact with a catalyst of cobalt molybdenum sulfide to convert a portion of the NH_3 contained therein to N_2 and H_2;

passing said heated gas stream in heat exchange relationship first with said gas stream to initiate said heating step and then with said liquid waste stream to cool said heated gas and to heat said liquid waste prior to its introduction into the steam stripping step;

scrubbing said gas stream with a first part of said stripped water stream to remove the unconverted portion of said NH_3 therefrom into a scrub water stream;

combining said scrub water stream containing the unconverted NH_3 with said liquid waste stream and steam stripping said combined stream to provide said gas stream containing contaminants and said stripped water stream; and

discharging a second part of said stripped water stream and the scrubbed gas including said other contaminants from said process.

4,032,619

PROCESS FOR THE PREPARATION OF CYANOGEN CHLORIDE

Roy Joseph Laran, Greenwell Springs, La.; H. Paul Loftin, Barrington, R.I., and Daniel C. McIntyre, Baton Rouge, La., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jan. 15, 1976, Ser. No. 649,179
Int. Cl.² C01B 21/18
U.S. Cl. 423—379 3 Claims

1. In a process for the preparation of gaseous cyanogen chloride by a procedure involving reaction of hydrogen cyanide with chlorine in the presence of water with formation of a by-product hydrogen chloride at a concentration of about 10 to 25% by weight, the improvement which comprises converting by chlorination ammonium chloride formed through acid-catalyzed hydrolysis of cyanogen chloride and admixed with the hydrogen chloride by-product to nitrogen trichloride under pressure and at elevated temperature and decomposing the nitrogen trichloride to nitrogen and chlorine thermally or by U.V. radiation.

4,032,620

PROCESS FOR PREPARING DICYAN

Takeru Onada, Yokohama, and Shinpei Tomita, Komae, both of Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 594,655, July 10, 1975, abandoned. This application Jan. 13, 1977, Ser. No. 758,994
Claims priority, application Japan, July 18, 1974, 49-82411
Int. Cl.² C01C 3/00
U.S. Cl. 423—384 8 Claims

1. A process for preparing dicyan characterized by reacting prussic acid and molecular oxygen in gaseous phase at reaction temperatures of 150° to 650° C in the presence of a solid catalyst comprising palladium and at least one of tellurium and antimony.

4,032,621

PREPARATION OF HYDROGEN FLUORIDE WITH LOW LEVELS OF ARSENIC, IRON AND SULFITE

Geoffrey Walsh Meadows, Kennett Square, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 24, 1975, Ser. No. 634,438
Int. Cl.² C01B 7/22
U.S. Cl. 423—488 6 Claims

1. A process for the preparation of pure anhydrous hydrogen fluoride with lower impurities which comprises sequentially contacting anhydrous hydrogen fluoride containing impurities selected from the group consisting of arsenic, iron and sulfite at ambient temperature with (a) more than the stoichiometric amount of an oxidizing agent selected from the group consisting of alkali metal permanganates and alkali metal dichromates to oxidize the impurities to the non-volatile species; (b) at least a stoichiometric amount based on the amount of unreacted oxidizing agent present of a heavy metal free reducing agent selected from the group consisting of alkali metal percarbonates, alkali metal perborates and hydrogen peroxide to reduce the unreacted oxidizing agent; and (c) distilling the resulting mixture and recovering a high purity anhydrous hydrogen fluoride with decreased impurities.

4,032,622

METHOD OF CONCENTRATING SULFURIC ACID USING A BOILER OF IMPROVED CAST IRON

Helmold von Plessen, Kelkheim, Taunus, and Grete Petrich, Liederbach, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Continuation of Ser. No. 557,573, March 12, 1975, abandoned. This application Oct. 27, 1976, Ser. No. 736,079
Claims priority, application Germany, Mar. 14, 1975, 2412353
Int. Cl.² C22C 37/10
U.S. Cl. 423—531 2 Claims

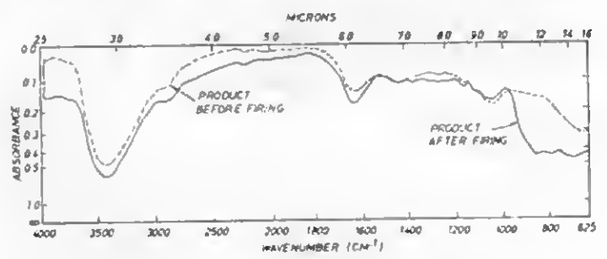
1. In a process for concentrating sulfuric acid, using a concentrator the improvement wherein the sulfuric acid concentrator has therein sulfuric acid and the concentrator is of gray cast iron which consisting essentially from 2.5 to 3.7% by weight of carbon, 0.2 to 1.6% by weight of silicon, 0.6 to 2.5% by weight of copper, 0 to 0.2% by weight of phosphorous, 0 to 3.5% by weight of nickel, balance iron.

4,032,623

HYDROPEROXY GROUP-CONTAINING ALUMINUM COMPOUND AND METHOD OF MAKING THE SAME

George G. Merkl, 46 Sunset Court, Haworth, N.J. 07641

Continuation-in-part of Ser. No. 331,766, Feb. 12, 1973, abandoned. This application Aug. 16, 1976, Ser. No. 714,829
The portion of the term of this patent subsequent to July 13, 1993, has been disclaimed.
Int. Cl.² C01F 7/00, 7/02
U.S. Cl. 423—582 9 Claims



1. A method of forming a hydroperoxy-group containing aluminum product which comprises:

contacting and reacting at room temperature or below, and in the substantial absence of water, (a) an activated metal comprising aluminum of a purity of at least 99.9% by weight, permeated with a liquid metal selected from mercury, gallium and gallium/indium alloys, with (b) a liquid comprising:

i. hydrogen peroxide in

ii. a liquid organic compound having no multiple carbon-to-carbon bonds and which is non-reactive with said activated metal under the conditions of the reaction.

9. The product prepared by the process of claim 1 having the infrared spectra shown for the product before firing in FIG. 3.

4,032,624

PROCESS FOR PREPARING PURE SILVER CHROMATE FOR ELECTROCHEMICAL CELLS

André Lecerf, Pace, France, assignor to Saft-Societe des Accumulateurs Fixes et de Traction, Romainville, France

Continuation of Ser. No. 612,454, Sept. 11, 1975, abandoned, which is a continuation of Ser. No. 397,918, Sept. 17, 1973, abandoned. This application Sept. 15, 1976, Ser. No. 723,586
Claims priority, application France, Sept. 26, 1972, 72.34056
Int. Cl.² C01G 37/14
U.S. Cl. 423—595 15 Claims

1. A process of preparing silver chromate of greater than 99.5% purity for use as a positive active material in an electrochemical generator having a lithium negative electrode and a non-aqueous electrolyte comprising reacting concentrated chromate and silver salt solutions in the presence of a concentrated bichromate solution to yield said silver chromate, at least said chromate solution being added progressively into the bichromate solution in such a manner as to maintain the pH thereof at a value which prevents precipitation of silver oxide.

4,032,625

BONE-SEEKING TECHNETIUM-99M COMPLEX

Gopal Subramanian, Manlius, and John Gilmore McAfee, Fayetteville, both of N.Y., assignors to Research Corporation, New York, N.Y.

Division of Ser. No. 368,473, June 11, 1973, which is a continuation-in-part of Ser. No. 263,171, June 15, 1972, abandoned. This application Mar. 26, 1975, Ser. No. 562,099
Int. Cl.² A61K 29/00, 43/00; C07F 13/00
U.S. Cl. 424—1 3 Claims

1. A bone-seeking composition comprising a solution of technetium-99m-tin-methylene diphosphonate complex or technetium-99m-tin-1-aminoethane-1,1-diphosphonate complex in an aqueous medium suitable for intravenous administration.

4,032,626

REAGENT AND METHOD FOR TBG ASSAY

Frank B. Ward, Painted Post, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed June 30, 1976, Ser. No. 701,193
Int. Cl.² G01N 33/00; A61K 39/00
U.S. Cl. 424—1 11 Claims

1. A method of determining the concentration of thyroxine binding globulin is a fluid sample, the method comprising the steps of:

A. incubating the sample with

i. a composite comprising antibodies to thyroxine binding globulin immobilized on an insoluble carrier material, the incubation being under conditions, and with composite quantity sufficient to complex substantially all thyroxine binding globulin in the sample onto the antibodies of the composite; and

ii. a quantity of radiolabeled thyroxine in a quantity sufficient to complex with at least a portion of the thyroxine binding globulin complexed to the antibodies of the composite;

B. separating the composite and materials complexed thereto from unbound radiolabeled thyroxine;

C. counting the radioactivity of the separated composite or the remaining radiolabeled thyroxine; and

D. correlating the count of step (C) with a standard curve relating concentrations of thyroxine binding globulin to counts of the type determined by step (C).

7. A reagent for determining the concentration of thyroxine binding globulin in a fluid sample, the reagent being an immunochemical composite comprising antibodies to thyroxine binding globulin attached to the surfaces of an essentially water insoluble carrier material.

4,032,627

TOOTH WHITENING COSMETIC COMPOSITION

Joseph T. Suchan, Freehold, and Vincent A. Burell, Bloomsbury, both of N.J., assignors to Koh-I-Noor Rapidograph, Inc., Bloomsbury, N.J.

Continuation-in-part of Ser. No. 347,102, April 2, 1973, abandoned. This application Aug. 6, 1975, Ser. No. 602,604
Int. Cl.² A61K 7/22
U.S. Cl. 424—54 8 Claims

1. A non-toxic tooth whitening composition consisting essentially of the following component solutions:

A. a first component comprising zinc oxide, approximately 6.3 percent; ammonium hydroxide, approximately 17.1 percent; ammonium carbonate, approximately 11.3 percent; with the balance water;

B. a second component comprising said first component as approximately 9.85 percent; a 70% solution of a mucilaginous bodying material, capable of functioning as a film forming agent, in isopropyl alcohol approximately 39.4 percent; methyl cellulose approximately 1.5 percent; with the balance ethanol; said second component comprising 70 percent of the total composition;

C. a third component comprising; said second component as approximately 70 percent; a non-toxic yellow food dye solution, approximately 15 percent; titanium dioxide, approximately 4 percent; with the balance ethanol.

4,032,628

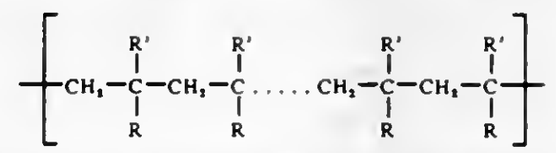
COSMETIC EMULSION COMPOSITIONS INCLUDING BLOCK POLYMER EMULSIFIERS

Christos Papantoniou, Epinay-sur-Seine, and Rose-Marie Handjani, Paris, both of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France

Continuation of Ser. No. 294,923, Oct. 4, 1972, abandoned, which is a continuation-in-part of Ser. No. 131,810, April 6, 1971, abandoned. This application Nov. 5, 1975, Ser. No. 628,906
Claims priority, application France, Oct. 6, 1971, 71.36878; Apr. 7, 1970, 70.60676
Int. Cl.² A61K 7/00, 7/02, 7/021
U.S. Cl. 424—63 14 Claims

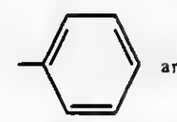
1. A cosmetic composition in the form of a cream, a color base or a milk comprising an emulsion of an oil phase and a water phase emulsified with an emulsifying agent, wherein said oil is selected from the group consisting of animal oil, vegetable oil, hydrocarbon oil and mixtures thereof and wherein said emulsifying agent consists essentially of at least one block polymer containing:

A. at least one lipophilic sequence of the formula



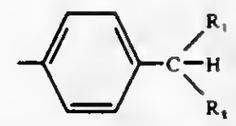
wherein R' is selected from the group consisting of hydrogen and methyl, and wherein when R' is hydrogen, R is selected from the group consisting of:

(a)



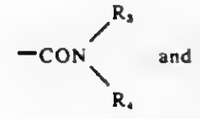
and

(b)



and wherein when R' is methyl, R is selected from the group consisting of

(c)



and

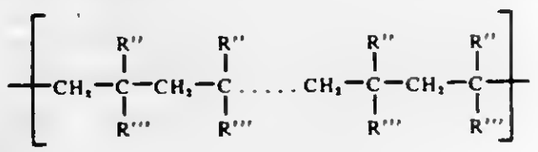
d. — COO R_5

and wherein

R_1 and R_2, each independently, represent a member selected from the group consisting of hydrogen and alkyl having 1 to 4 carbon atoms,

R_3 is alkyl containing 6 to 18 carbon atoms,

R_4 is selected from the group consisting of methyl and ethyl, and R_5 is lauryl, and (b) at least one hydrophilic sequence of the formula



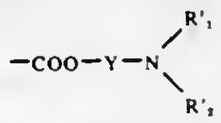
wherein

R''' is selected from the group consisting of hydrogen and methyl, and wherein when R''' is methyl,

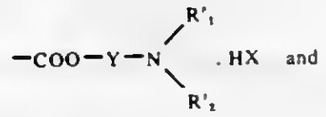
R'' is selected from the group consisting of

a. — COOH

(b)



(c)

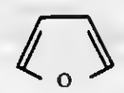


and

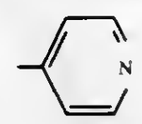
d. — C N

when R''' is hydrogen, R'' is selected from the group consisting of

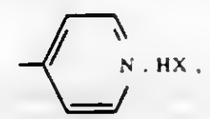
(e)



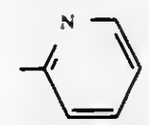
(f)



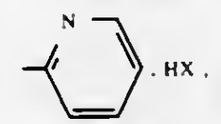
(g)



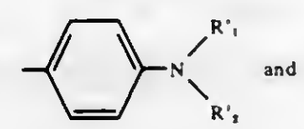
(h)



(i)

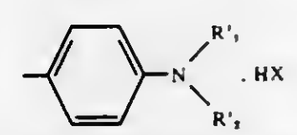


(j)



and

(k)



R'_1 and R'_3, each independently selected from the group consisting of hydrogen and lower alkyl having 1 to 4 carbon atoms,

Y is selected from the group consisting of a saturated hydrocarbon chain having 2–4 carbon atoms and a hydrocarbon chain having 2–4 carbon atoms interrupted by a heteroatom selected from the group consisting of oxygen and sulfur, and

HX represents a mineral or organic acid selected from the group consisting of hydrochloric acid, hydrobromic acid, lactic acid and acetic acid.

4,032,629

SKIN TREATING AGENT CONTAINING POLYALDEHYDOPOLYCARBOXYLATE POLYMERS AND PROCESS

Rainer Osberghaus, Dusseldorf-Urdenbach, Germany, assignor to Henkel & Cie G.m.b.H., Dusseldorf-Holthausen, Germany

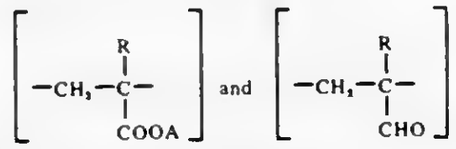
Filed Jan. 28, 1975, Ser. No. 544,810

Claims priority, application Germany, Apr. 20, 1974, 2419046

Int. Cl.² A61K *31/74, 31/78*

U.S. Cl. 424—78 **10 Claims**

1. A cosmetic composition for maintaining a certain hygroscopicity for the protection of the skin of warm-blooded animals consisting essentially of an emulsion selected from the group consisting of oil-in-water and water-in-oil, having a pH between 5 and 7 and containing an emulsifier, water, from 1 to 20% by weight of at least one polyaldehydopolycarboxyl polymer having a polymer chain containing substantially units selected from the group consisting of



wherein A is a member selected from the group consisting of hydrogen, alkali metal, ammonium, lower alkyl ammonium and lower alkylolammonium and R is a member selected from the group consisting of hydrogen and alkyl having from 1 to 6 carbon atoms, said units being present in any order in said polymer chain, said polyaldehydopolycarboxyl polymer having a ratio of —COOA groups to C=O groups of from 0.5:1 to 16:1 and a degree of polymerization of from 3 to 100, and the remainder inert cosmetic excipients.

4,032,630

SKIN TREATING AGENT CONTAINING POLYHYDROXYPOLYCARBOXYLATE POLYMERS AND PROCESS

Rainer Osberghaus, Dusseldorf-Urdenbach; Wilfried Umbach, Langenfeld; Christian Gloxhuber, Haan, and Siegfried Braig, Hilden, all of Germany, assignors to Henkel & Cie G.m.b.H., Dusseldorf-Holthausen, Germany

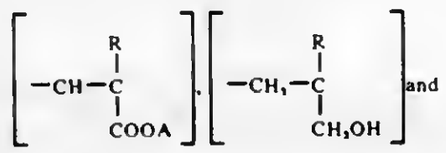
Filed Jan. 28, 1975, Ser. No. 544,813

Claims priority, application Germany, Jan. 29, 1974, 2404046

Int. Cl.² A61K *31/78*

U.S. Cl. 424—81 **13 Claims**

1. A cosmetic moisturizing composition for the care and protection of the skin of warm-blooded animals consisting essentially of an emulsion adjusted to a pH between 5 and 7 containing an emulsifier, from 1 to 20% by weight of at least one polyhydroxypolycarboxyl polymer having a polymer chain containing from 55 to 100% of first units selected from the group consisting of



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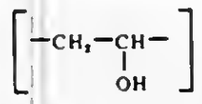
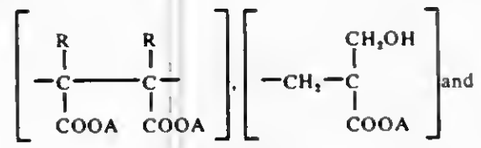
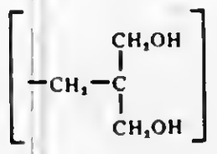


and from 0 to 45% of second units selected from the group consisting of



and



wherein A is a member selected from the group consisting of hydrogen, alkali metal, ammonium, lower alkyl ammonium and lower alkylolammonium and R is a member selected from the group consisting of hydrogen and alkyl having from 1 to 6 carbon atoms, said units being present in any order in said polymer chain, said polyhydroxypolycarboxyl polymer having a ratio of —COOA groups to —OH groups of from 0.5:1 to 16:1 and a degree of polymerization of from 3 to 200; and the remainder inert cosmetic excipients, said emulsion being selected from the group consisting of oil-in-water emulsions and water-in-oil emulsions.

4,032,631

MIXTURE OF ANTIBIOTICS PRODUCED BY NEW SPECIES OF MICROMONOSPORA

Walter D. Celmer, New London; Walter P. Cullen, East Lyme; Charles E. Moppett, Mystic; John R. Oscarson, Groton; John B. Routien, Lyme, all of Conn.; Riichiro Shibakawa, and Junsuke Tone, both of Aichi, Japan, assignors to Pfizer Inc., New York, N.Y.

Filed Dec. 19, 1975, Ser. No. 642,296

Int. Cl.² A61K *35/74*

U.S. Cl. 424—120 **4 Claims**

1. Antibiotic substance Compound 42,752 which is soluble in chloroform, methylisobutyl ketone, dimethylsulfoxide and dimethylformamide; moderately soluble in methanol and ethanol; and insoluble in hexane, heptane and water; has absorption maxima in dioxane in the ultraviolet light region of the spectrum at 264, 324 and 500 mμ with $E_{1cm}^{1\%}$ values of 345, 265 and 20, respectively; has the average composition by weight of 61.11% carbon, 5.58% hydrogen, 3.81% nitrogen and 29.50% oxygen (by difference); and when pelleted in KBr exhibits characteristic absorption in the infrared region at the following wavelengths in microns: 3.00, 3.42, 5.82, 6.00, 6.14, 6.20, 6.37, 6.62, 7.25, 7.58, 7.82, 8.92, 9.22, 9.75, 10.00, 10.75, 11.55 and 13.65.

4,032,632

MIXTURE OF ANTIBIOTICS PRODUCED BY NEW SPECIES OF STREPTOSPORANGIUM

Walter D. Celmer, New London; Walter P. Cullen, East Lyme; Charles E. Moppett, Mystic; John B. Routien, Lyme; Mark T. Jefferson, Waterford, all of Conn.; Riichiro Shibakawa, Handa, and Junsuke Tone, Chita, both of Japan, assignors to Pfizer Inc., New York, N.Y.

Filed July 23, 1976, Ser. No. 708,181

Int. Cl.² A61K *35/74*

U.S. Cl. 424—121 **3 Claims**

2. Antibiotic substance Compound 43,334 which is soluble in methanol, ethanol, chloroform, ethyl acetate, acetone and methylisobutyl ketone; insoluble in hexane, heptane and water; has absorption maxima in methanol in the ultraviolet light region of the spectrum at 240, 280 and 307 nm with $E_{1cm}^{1\%}$ values of 95, 47 and 26, respectively; has the average composition by weight of 60.63% carbon, 6.87% hydrogen, 10.42% nitrogen and 22.08% oxygen (by difference); has an optical rotation of $\alpha_D - 73°$ (c = 1.0, methanol); and in chloroform solution exhibits characteristic absorption in the infrared region at the following wavelengths in microns: 2.95, 3.05, 3.12, 3.45, 5.79, 6.02, 6.13, 6.70, 7.04, 8.03, 8.92, 9.10 and 11.02.

4,032,633

POLYPEPTIDES

Harold Gregory, Macclesfield, and Beryl Margaret Preston, Knutsford, both of England, assignors to Imperial Chemical Industries Limited, London, England

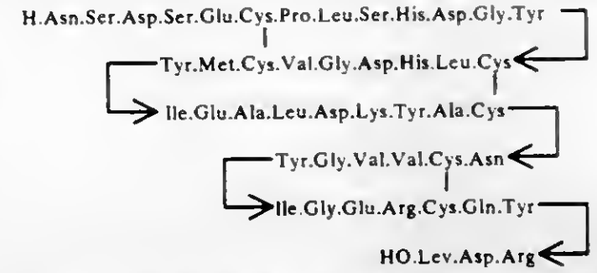
Filed Aug. 18, 1975, Ser. No. 605,299

Claims priority, application United Kingdom, Sept. 11, 1974, 39599/74

Int. Cl.² A61K *37/00*

U.S. Cl. 424—177 **5 Claims**

1. The polypeptide of the formula:



or its reduction product in which the cystine residues are reduced to cysteine residues.

5. A method of inhibiting the secretion of acidic gastric juice in warm blooded animals which comprises administering to said animal an effective amount of a polypeptide or reduction product as defined in claim 1.

4,032,634

O,O-DIALKYL-O-(1-PHENYL-2-CARBALKOXYVINYL)-THIONOPHOSPHORIC ACID ESTERS AND INSECTICIDAL AND ACARICIDAL COMPOSITIONS AND METHOD OF USE THEREOF

Wolfgang Hofer; Fritz Maurer; Hans-Jochem Riebel; Rolf Schroder, all of Wuppertal; Paul Uhrhan, Cologne; Bernhard Homeyer, Leverkusen; Wolfgang Behrenz, Overath-Steinenbrueck, and Ingeborg Hammann, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

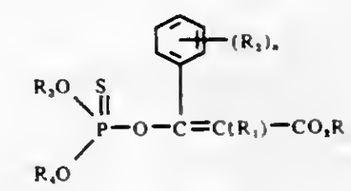
Filed Aug. 11, 1976, Ser. No. 713,738

Claims priority, application Germany, Aug. 20, 1975, 2537047

Int. Cl.³ A01N *9/36*; C07F *9/165, 9/18*

U.S. Cl. 424—212 **10 Claims**

1. An O,O-dialkyl-O-(1-phenyl-2-carbalkoxyvinyl)-thionophosphoric acid ester of the formula



in which

R, R_2 and R_4, each independently is alkyl with 1 to 6 carbon atoms,

R_1 is hydrogen or methyl,
R_2 is alkyl, alkoxy or alkylthio each with 1 to 4 carbon atoms, cyano, halogen or phenyl, and
n is 1, 2, 3, 4 or 5.

9. A method of combating insects or acarids which comprises applying to the insects or acarids, or to a habitat thereof, an insecticidally or acaricidally effective amount of a compound according to claim **1**.

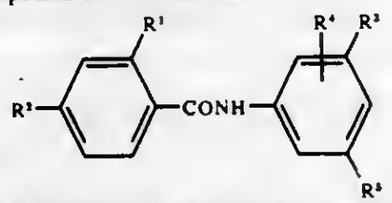
4,032,635

PHARMACEUTICAL METHOD FOR THE THERAPY OF IMMUNE DISEASES

Hamao Umezawa; Tomio Takeuchi, both of Tokyo; Akira Takamatsu, Yokohoma, and Shunro Mori, Fujisawa, all of Japan, assignors to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai, Japan

Filed Feb. 24, 1976, Ser. No. 660,731
Claims priority, application Japan, June 12, 1975, 50-71629
Int. Cl.² A61K *31/60*
U.S. Cl. 424—230 **12 Claims**

1. The method for chemotherapeutically treating immune diseases and disorders which comprises administering to a living animal a pharmaceutical composition to suppress the immune response comprising an effective amount of a suppressing compound of the formula



wherein R^1 is hydroxy; R^2 is hydrogen, chlorine, fluorine, trifluoromethyl or lower alkyl; R^3 and $R^3$are hydrogen, fluorine, bromine, chlorine, nitro, or lower alkyl and R^4 is substituted at either the 2′ or 4′ position and is hydroxyl or lower alkoxy with 1 to 4 carbon atoms and lower alkyl as used herein being a straight or branched chain saturated hydrocarbon with 1 to 4 carbon atoms in combination with a pharmaceutically acceptable nontoxic carrier.

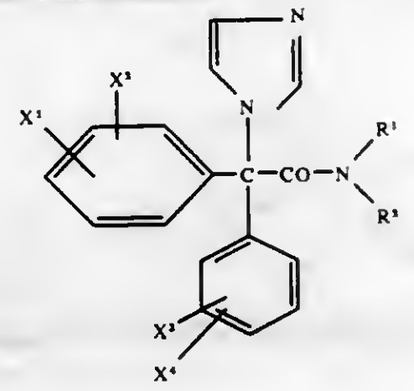
4,032,636

IMIDAZOLYLACETIC ACID AMIDES, THEIR PRODUCTION, ANTIMYCOTIC COMPOSITIONS COMPRISING SAID COMPOUNDS AND THEIR USE AS ANTIMYCOTIC AGENTS

Jurgen Wenzelburger; Karl Heinz Buchel; Manfred Piempel, and Werner Meiser, all of Wuppertal, Germany, assignors to Bayer Aktiengesellschaft, Germany

Division of Ser. No. 594,195, July 9, 1975, which is a division of Ser. No. 400,263, Sept. 24, 1973, Pat. No. 3,950,354. This application Jan. 22, 1976, Ser. No. 651,419
Claims priority, application Germany, Sept. 26, 1972, 2247187
Int. Cl.² A61K *31/54*
U.S. Cl. 424—246 **28 Claims**

1. A pharmaceutical composition useful for treating mycotic infections in humans and animals which comprises an antimycotically effective amount of an imidazolylacetic acid amide of the formula:



or a pharmaceutically acceptable nontoxic salt thereof wherein
R^1 and R^2, together with the nitrogen atom to which they are attached form a saturated 6-membered heterocyclic ring containing a $-SO_2-$ moiety, said heterocyclic ring being otherwise unsubstituted or substituted by alkyl of 1 to 4 carbon atoms or phenyl, and
X^1, X^2, X^3 and X^4 are the same or different and are each hydrogen or halogen;
in combination with a pharmaceutically acceptable, nontoxic, carrier.

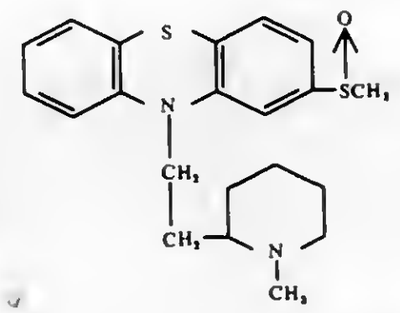
4,032,637

METHOD OF PROMOTING SLEEP

René Spiegel, Basel, Switzerland; John H. Gogerty, Randolph Township, N.J.; Dieter M. Loew, Bottmingen, Switzerland, and Phillip L. Eden, Whippany, N.J., assignors to Sandoz Ltd., Basel, Switzerland and Sandoz, Inc., E. Hanover, N.J.

Continuation of Ser. No. 399,076, Sept. 20, 1973, abandoned. This application Oct. 31, 1974, Ser. No. 519,570
Claims priority, application Switzerland, Sept. 26, 1972, 14031/72
Int. Cl.² A61K *31/54*
U.S. Cl. 424—247 **5 Claims**

1. A method of promoting sleep in animals, which comprises administering to an animal suffering from insomnia a sleep promoting effective dose of 10-[2-(1-methyl-2-piperidyl)ethyl]-2-methylsulphinylphenothiazine of formula:



in free base form or in pharmaceutically acceptable acid addition salt form thereof.

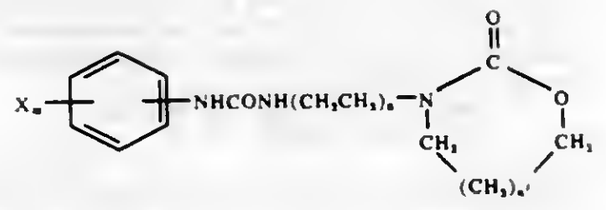
4,032,638

HETEROCYCLIC UREAS

Edward Koon Wah Wat, Wilmington, Del., assignor to E. I. Du Poot de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 518,871, Oct. 29, 1974, abandoned, which is a division of Ser. No. 354,871, April 25, 1973, abandoned. This application Apr. 3, 1975, Ser. No. 564,836
Int. Cl.² A01N *9/00, 9/22;* **C07D** *265/00, 273/00*
U.S. Cl. 424—248.54 **11 Claims**

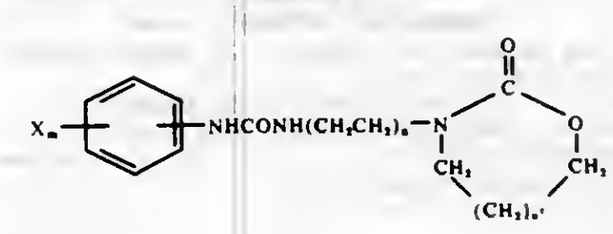
1. A compound of the formula



in free base form or in pharmaceutically acceptable acid addition salt form thereof.

wherein
X = F[,Cl] or OCH_3;
m = 0, 1 or 2; and
n and *n*′ each = 0 or 1.

8. A composition to protect plants against atmospheric ozone comprising an amount sufficient to protect plants against said ozone of a compound of the formula



wherein
X = F[,Cl,] or OCH_3;
m = 0, 1 or 2; and
n and *n*′ each = 0 or 1 and a suitable carrier therefor.

4,032,639

2,3,4,4a-TETRAHYDRO-1H-PYRAZINO[1,2-a]QUINOXALIN-5(6H)-ONES AND DERIVATIVES THEREOF FOR RELIEVING HYPERTENSION

Meier E. Freed, Paoli, and John R. Potoski, Spring City, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed Mar. 22, 1976, Ser. No. 668,872
Int. Cl.² A61K *31/505*
U.S. Cl. 424—251 **12 Claims**

1. A method for relieving hypertension in warm-blooded animals which comprises administering to an animal in need thereof a hypotensive effective amount of a compound selected from the group consisting of:
2,3,4,4a-tetrahydro-1H-pyrazino[1,2-a]quinoxalin-5(6H)-one;
2,3,4,4a-tetrahydro-6-methyl-1H-pyrazino[1,2-a]quinoxalin-5(6H)-one;
2,3,4,4a-tetrahydro-9-methoxy-1H-pyrazino[1,2-a]quinoxalin-5(6H)-one;
7-chloro-2,3,4,4a-tetrahydro-1H-pyrazino[1,2-a]quinoxalin-5(6H)-one;
8-chloro-2,3,4,4a-tetrahydro-1H-pyrazino[1,2-a]quinoxalin-5(6H)-one;
9-chloro-2,3,4,4a-tetrahydro-1H-pyrazino[1,2-a]quinoxalin-5(6H)-one;
2,3,4,4a-tetrahydro-8-trifluoromethyl-1H-pyrazino[1,2-a]quinoxalin-5(6H)-one;
2,3,4,4a-tetrahydro-9-methyl-1H-pyrazino[1,2-a]quinoxalin-5(6H)-one;
7-fluoro-2,3,4,4a-tetrahydro-1H-pyrazino[1,2-a]quinoxalin-5(6H)-one;
8-fluoro-2,3,4,4a-tetrahydro-1H-pyrazino[1,2-a]quinoxalin-5(6H)-one; and
9-fluoro-2,3,4,4a-tetrahydro-1H-pyrazino[1,2-a]quinoxalin-5(6H)-one.

4,032,640

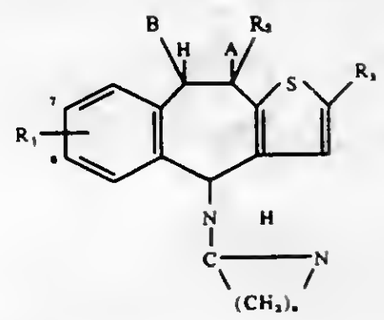
4H-BENZO[4,5]CYCLOHEPTA[1,2-B]THIOPHENES

Jean-Michel Bastian, Therwil, Switzerland, assignor to Sandox Ltd., Basel, Switzerland

Filed June 9, 1976, Ser. No. 694,152
Claims priority, application Switzerland, June 16, 1975, 7762/75
Int. Cl.² C07D *409/12*
U.S. Cl. 424—263 **21 Claims**

1. A compound of formula I,

-continued



wherein
R_1 is hydrogen, halogen of atomic number from 9 to 35, alkyl of 1 to 4 carbon atoms, or alkoxy of 1 to 4 carbon atoms,
R_2 is hydrogen or alkyl of 1 to 4 carbon atoms,
R_3 is hydrogen, chlorine, or alkyl of 1 to 4 carbon atoms,
either A and B are each hydrogen or together a single bond, and
n is a whole number from 3 to 7, in the form of free base or in the form of a pharmaceutically acceptable acid addition salt thereof.

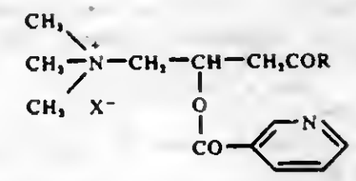
4,032,641

NICOTINOYL CARNITINE DERIVATIVES

Ichiro Chibata, Suita; Munetsugu Miyoshi, Nishinomiya; Kohki Takashima, Sbiki, and Shoji Moriya, Takarazuka, all of Japan, assignors to Tanabe Seiyaku Co., Ltd., Osaka, Japan

Filed June 9, 1976, Ser. No. 694,363
Int. Cl.² A61K *31/455;* **C07D** *213/55, 213/56*
U.S. Cl. 424—266 **13 Claims**

1. A compound of the formula:



wherein R is lower alkoxy, benzyloxy or amino and X is an anionic residue of a pharmaceutically acceptable acid, or a pharmaceutically acceptable acid addition salt of said compound.

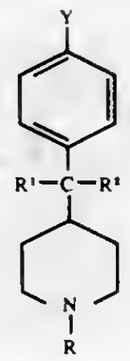
4,032,642

1-SUBSTITUTED-4-BENZYLPIPERIDINES

Robert Louis Duncan, Jr., and Robert Frederick Boswell, Jr., both of Richmond, Va., assignors to A. H. Robins Company, Incorporated, Richmond, Va.

Division of Ser. No. 531,832, Dec. 11, 1974, Pat. No. 3,956,296. This application Jan. 27, 1976, Ser. No. 652,683
Int. Cl.² A61K *31/445*
U.S. Cl. 424—267 **34 Claims**

1. A pharmaceutical composition useful for its sedative and tranquilizing effects comprising
a. 1 to 200 mg. of a compound selected from the group consisting of a 1-substituted-4-benzylpiperidine of the formula



wherein;

R is selected from the group consisting of p-fluorobenzoylpropyl, p-acetyl-o-methoxyphenoxypropyl, carbamoyl, N-lower-alkylcarbamoyl, N,N-dilower-alkylcarbamoyl, N-phenylcarbamoyl, N-(m-trifluoromethylphenyl)carbamoyl, N-(ω-morpholino)lower-alkylcarbamoyl, N-[ω-(2-pyridyl)lower-alkyl]carbamoyl, 2-hydroxy-3-(o-methoxyphenoxy)propyloxycarbonyl, 2-carbamoylethyl or 4-(p-fluorobenzoyl)piperidinoethyl,

R^1 is selected from the group consisting of hydrogen or hydroxy,

R^2 is selected from the group consisting of phenyl, p-fluorophenyl, m-trifluoromethylphenyl or cyclohexyl,

Y is selected from the group consisting of hydrogen or fluorine,

with the proviso that when Y is hydrogen and R^2 is phenyl, R is other than p-fluorobenzoylpropyl, and a pharmaceutically acceptable acid addition salt of a basic compound thereof, and

b. a pharmaceutically acceptable carrier therefor.

4,032,643

NOVEL THIAZOLE DERIVATIVES

Andre Poittevin, Vaires-sur-Marne, and Vesperto Torelli, Maisons-Alfort, both of France, assignors to Roussel-UCLAF, Paris, France

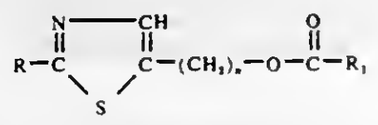
Filed Feb. 2, 1976, Ser. No. 654,630

Claims priority, application France, Feb. 14, 1975, 75.04627; Dec. 12, 1975, 75.38063

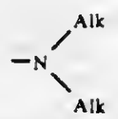
Int. Cl.² C07D 277/22

U.S. Cl. 424—270 **15 Claims**

1. A compound selected from the group consisting of a thiazole of the formula



wherein R is alkyl of 1 to 5 carbon atoms and R_1 is selected from the group consisting of $-NH_2$, $-NH$-AlK,



phenylamino and diphenylamino, AlK is alkyl of 1 to 4 carbon atoms and *n* is an integer from 1 to 6 and their non-toxic, pharmaceutically acceptable acid addition salts.

8. A hypolipemiant composition comprising a hypolipemically effective amount of at least one compound of claim 1 and a pharmaceutical carrier.

9. A method of inducing hypolipemic acitivity in warm-blooded animals comprising administering to warm-blooded animals a hypolipemically effective amount of at least one compound of claim 1.

4,032,644

ISOXAZOLYL BENZOIC ACIDS

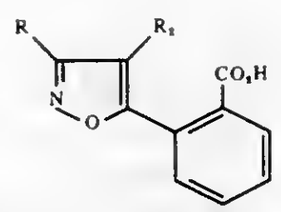
Jeffrey Nadelson, Lake Parsippany, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Filed Dec. 29, 1975, Ser. No. 645,023

Int. Cl.² C07D 263/32; A61K 31/42

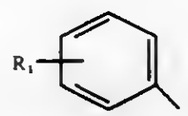
U.S. Cl. 424—272 **6 Claims**

1. A compound of the formula



where

R represents t-butyl or R_1



and

R_1 represents hydrogen, fluoro or chloro, lower alkyl having 1 to 4 carbon atoms, or lower alkoxy having 1 to 4 carbon atoms, and

R_2 represents hydrogen or straight chain lower alkyl having 1 to 4 carbon atoms

or a pharmaceutically acceptable salt thereof.

6. A method of treating lipidemia which comprises administering to a mammal in need of said treatment a hypolipidemic effective amount of a compound of claim 1.

4,032,645

INJECTABLE METRONIDAZOLE COMPOSITION

Yie W. Chien, Skokie, and Dianne M. Jefferson, Chicago, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Filed June 19, 1975, Ser. No. 588,211

Int. Cl.² A61K 31/415

U.S. Cl. 424—273 **4 Claims**

1. An injectable metronidazole composition having 500–650 mg./10 ml. metronidazole in a solvent system comprising:

25–35% v/v N,N-dimethylacetamide
40–60% v/v ethanol
10–30% v/v aqueous buffer

or

15–25% v/v N,N-dimethylacetamide
40–60% v/v ethanol
10–30% v/v aqueous buffer

and including one of the following:

1–5% w/v nicotinamide
5–15% v/v propylene glycol
5–15% v/v 2,2-dimethyl-1,3-dioxolane-4-methanol

said aqueous buffer maintaining the pH of the injectable metronidazole composition at 5.0–7.5.

4,032,646

PYRAZOL-5-ONES

Elke Möller; Karl Meng, both of Wuppertal; Egbert Wehinger, Nevlges, and Harald Horstmann, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

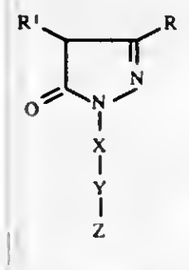
Division of Ser. No. 459,407, April 9, 1974, Pat. No. 3,949,083. This application Sept. 4, 1975, Ser. No. 610,150

Claims priority, application Germany, Apr. 17, 1973, 2319281

Int. Cl.² A61K 31/415

U.S. Cl. 424—273 **37 Claims**

1. A pharmaceutical composition useful for effecting diuresis and saluresis and for treating hypertension in humans and animals which comprises a diuretically effective amount, a saluretically effective amount or an antihypertensive amount of a pyrazol-5-one of the formula:



or a pharmaceutically acceptable nontoxic salt thereof wherein

R is amino

R^1 is lower alkyl, alkenyl of 2 to 4 carbon atoms phenyl or benzyl unsubstituted or nuclear substituted by 1 or 2 of the same or different substituents selected from the group consisting of lower alkyl, lower alkenyl, lower alkoxy, lower alkenoxy, halogen, nitro, cyano and trifluoromethyl;

X is methylene or methylene wherein 1 hydrogen atom is substituted by lower alkyl

Y is a direct bond; and

Z is phenyl or naphthyl unsubstituted or nuclear substituted by:

a. 3 halogens;

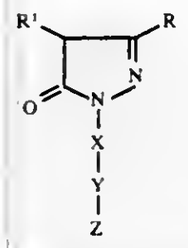
b. 1 or 2 of the same or different substituents selected from the group consisting of halogen, trifluoromethyl, lower alkyl, lower alkenyl, lower alkoxy, lower alkenoxy, cycloalkyl of 5 to 7 carbon atoms and cycloalkenyl of 5 to 7 carbon atoms;

c. nitro; and

d. nitro and 1 or 2 of the same or different substituents selected from the group consisting of lower alkyl, lower alkenyl, lower alkoxy, halogen, and trifluoromethyl,

in combination with a pharmaceutically acceptable nontoxic inert diluent or carrier.

20. A method of effecting diuresis or saluresis or treating hypertension in humans and animals which comprises administering to a human or animal in need thereof a diuretically effective amount, a saluretically effective amount or an antihypertensive amount of a compound of the formula:



or a pharmaceutically acceptable nontoxic salt thereof wherein

R is amino;

R^1 is lower alkyl, alkenyl of 2 to 4 carbon atoms or phenyl or benzyl unsubstituted or nuclear substituted by 1 or 2 of the same or different substituents selected from the group consisting of lower alkyl, lower alkenyl, lower alkoxy, lower alkenoxy, halogen, nitro, cyano and trifluoromethyl;

X is methylene or methylene wherein 1 hydrogen atom is substituted by lower alkyl;

Y is a direct bond; and

Z ia phenyl or naphthyl unsubstituted or nuclear substituted by:

a. 3 halogens;

b. 1 or 2 of the same or different substituents selected from the group consisting of halogen, trifluoromethyl, lower alkyl, lower alkenyl, lower alkoxy, lower alkenoxy, cycloalkyl of 5 to 7 carbon atoms and cycloalkenyl of 5 to 7 carbon atoms;

c. nitro; and

d. nitro and 1 or 2 of the same or different substituents selected from the group consisting of lower alkyl, lower alkenyl, lower alkoxy, halogen, and trifluoromethyl

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4,032,647

SUBSTITUTED THENOYLACETIC ACID AND ESTERS

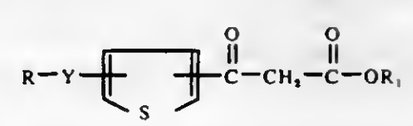
Roger Alan Parker, Cincinnati, Ohio, assignor to Richardson-Merrell Inc., Wilton, Conn.

Filed June 16, 1975, Ser. No. 587,117

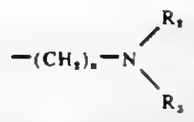
Int. Cl.² A01N 9/00; C07D 333/16

U.S. Cl. 424—275 **12 Claims**

1. A compound selected from the formula:



wherein Y is selected from oxygen and divalent sulfur; R is selected from a straight or branched saturated hydrocarbon chain containing from 10 to 20 carbon atoms and a straight or branched unsaturated hydrocarbon chain containing from 10 to 20 carbon atoms and from 1 to 4 double bonds; R_1 is selected from hydrogen, a straight or branched lower alkyl chain of from 1 to 6 carbon atoms, benzyl, phenethyl, and the group



wherein *n* is the integer 2 or 3; R_2 is selected from a straight or branched lower alkyl chain of from 1 to 4 carbon atoms; R_3 is selected from hydrogen and a straight or branched lower alkyl chain of from 1 to 4 carbon atoms with the proviso that when R_3 is hydrogen, R_2 is alkylcarbonyl and pharmaceutically acceptable salts thereof.

4,032,648

METHOD AND COMPOSITIONS CONTAINING THIOCHROMAN COMPOUNDS FOR TREATING CARDIAC RHYTHM DISORDERS

Charles Malen, Fresnes, and Michel Laubie, Vaucresson, both of France, assignors to Science Union et Cie, Suresnes, France

Division of Ser. No. 130,010, March 31, 1971, Pat. No. 3,960,891. This application Apr. 22, 1976, Ser. No. 679,343

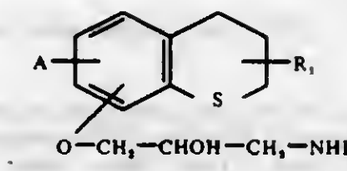
Claims priority, application United Kingdom, Apr. 6, 1970, 16118/70

Int. Cl.² A61K 31/38

U.S. Cl. 424—275 **14 Claims**

1. A pharmaceutical composition suitable for use in the treatment of disorders of cardiac rhythm, containing as active principle at least one compound selected from the group consisting of:

a. (3-amino-2-hydroxy propyloxy) thiochromans of the formula



wherein:

A is selected from the group consisting of hydrogen and halogen;

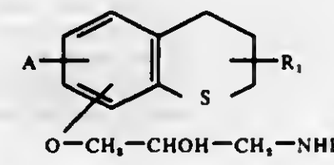
R_1 is selected from the group consisting of hydrogen and lower alkyl containing from 1 to 5 carbon atoms inclusive; and

R_2 is selected from the group consisting of linear and branched lower alkyl containing from 1 to 5 carbon atoms inclusive and cyclo lower alkyl containing from 3 to 6 carbon atoms inclusive; and having the (3-amino-2-hydroxy propyloxy) group bonded to the thiochroman in the 6,7 or 8 position; and

b. physiologically tolerable acid addition salts thereof, in an amount effective for said purpose, together with a suitable pharmaceutical carrier therefor.

7. A method of treating a living animal body afflicted with a disorder of the cardiac rhythm comprising the step of administering to such animal body an amount of a compound selected from the group consisting of:

a. (3-amino-2-hydroxy propyloxy) thiochromans of the formula



wherein:

A is selected from the group consisting of hydrogen and halogen;

R_1 is selected from the group consisting of hydrogen and lower alkyl containing from 1 to 5 carbon atoms inclusive; and

R_2 is selected from the group consisting of linear and branched lower alkyl containing from 1 to 5 carbon atoms inclusive and cyclo lower alkyl containing from 3 to 6 carbon atoms inclusive; and having the (3-amino-2-hydroxy propyloxy) group bonded to the thiochroman in the 6,7 or 8 position; and

b. physiologically tolerable acid addition salts thereof, which is effective for alleviation of said condition.

4,032,649

2,3-DIHYDRO-2,2-DIMETHYL-7-BENZO[b]THIENYL N-METHYLCARBAMATE AND USE AS AN INSECTICIDE

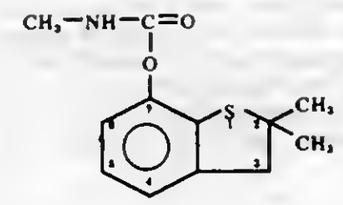
Gary M. Singerman, Allegheny County, Pa., assignor to Gulf Oil Corporation, Pittsburgh, Pa.

Filed Nov. 12, 1975, Ser. No. 631,009

Int. Cl.² C07D *333/64*

U.S. Cl. 424—275 **3 Claims**

1. The insecticidal compound 2,3-dihydro-2,2-dimethyl-7-benzo[b]thienyl N-methylcarbamate having the structural formula



4,032,650

METHOD OF TREATING FATIGUE BY ADMINISTERING A GULONIC ACID SALT

Jean Louis Molle, Villeurbanne St. Georges, and Jean Christian Boch, Neris les Bains, both of France, assignors to A.E.C. Societe de Chimie Organique et Biologique, Paris, France

Division of Ser. No. 544,572, Jan. 27, 1975, Pat. No. 3,973,031, which is a division of Ser. No. 396,803, Sept. 13, 1973, Pat. No. 3,910,960. This application June 3, 1976, Ser. No. 692,509

Claims priority, application France, Sept. 15, 1972, 72.32896

Int. Cl.² A61K *31/335*

U.S. Cl. 424—278 **2 Claims**

1. Method for the treatment of fatigue in a person, which comprises administering to the person an effective amount of calcium diacetone-2-ketogulonate.

4,032,651

3,3a,6,6a-TETRAHYDROFURO[3,4-b]FURAN DERIVATIVES AND ANTI-ULCER COMPOSITION CONTAINING THEM

David Cecil Aldridge; Graham Charles Crawley, and Colin John Strawson, all of Macclesfield, England, assignors to Imperial Chemical Industries Limited, London, England

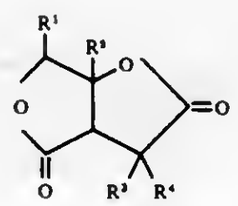
Filed Sept. 11, 1975, Ser. No. 612,531

Claims priority, application United Kingdom, Sept. 27, 1974, 42040/74

Int. Cl.² C07D *493/04*

U.S. Cl. 424—279 **4 Claims**

1. A 3,3a,6,6a-tetrahydrofuro[3,4-b]furan-2,4-dione of the formula:



wherein R^1 is hydrogen, an alkyl radical of from 1 to 10 carbon atoms or a phenyl radical; R^3 and R^2 are hydrogen; and R^4 is a radical of the formula R^5SCH_2 - wherein R^5 is a benzyl radical or a phenyl radical optionally bearing one or two substituents selected from halogen atoms, alkyl and alkoxy radicals each of from 1 to 4 carbon atoms, and carboxylic acid radicals.

2. A pharmaceutical composition for internal use for the treatment of gastric or duodenal ulcers which comprises as active ingredient an effective amount of a compound according to claim 1 and a pharmaceutically-acceptable carrier.

4. A method for the treatment of duodenal or gastric ulcers in warm-blooded animals, which comprises administering to the said animal an effective amount of a composition as claimed in claim 1.

4,032,652

SUBSTITUTED 2H-PYRAN-2,6(3H)-DIONE DERIVATIVES, PHARMACEUTICAL COMPOSITIONS COMPRISING SUCH DERIVATIVES AND METHODS OF INHIBITING THE ANTIGEN-ANTIBODY REACTION

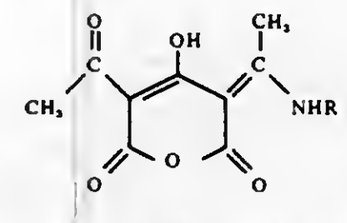
Lawrence W. Chakrin, Haddonfield, N.J.; Kenneth M. Snader, Hatboro, Pa., and Chester R. Willis, Kingston, British W. Indies, assignors to SmithKline Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 570,896, April 23, 1975, abandoned, which is a continuation-in-part of Ser. No. 492,640, July 29, 1974, abandoned. This application Apr. 30, 1976, Ser. No. 682,001

Int. Cl.² A61K *31/35*; C07D *309/20*

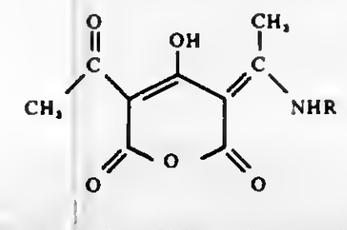
U.S. Cl. 424—283 **21 Claims**

1. A pharmaceutical composition for inhibiting the symptoms of asthma comprising a nontoxic pharmaceutical carrier or diluent and an amount sufficient to produce said inhibition of a compound represented by the formula:



wherein R is lower alkyl, straight or branched chain, of from 3 to 6 carbon atoms, phenyl, halophenyl, hydroxyphenyl, methoxyphenyl, alkanoyloxyphenyl, the alkanoyl moiety having from 2 to 7 carbon atoms, carbamoyloxyphenyl, N-methylcarbamoyloxyphenyl, N-benzylcarbamoyloxyphenyl, N,N-dimethylcarbamoyloxyphenyl, p-mercaptophenyl, aminophenyl, alkanoylaminophenyl, the alkanoyl moiety having from 2 to 5 carbon atoms, carboxymethyleneoxyphenyl or ureidophenyl, or a monoor di-alkali metal salt of said compound.

11. A compound represented by the formula:



wherein R is lower alkyl, straight or branched chain, of from 3 to 6 carbon atoms, hydroxyphenyl, alkanoyloxyphenyl, the alkanoyl moiety having from 2 to 7 carbon atoms, carbamoyloxyphenyl, N-methylcarbamoyloxyphenyl, N-benzylcarbamoyloxyphenyl, N,N-dimethylcarbamoyloxyphenyl, p-mercaptophenyl, aminophenyl, alkanoylaminophenyl, the alkanoyl moiety having from 2 to 5 carbon atoms, carboxymethyleneoxyphenyl, or ureidophenyl, or a mono-or di-alkali metal salt of said compound.

4,032,653

MIX SUITABLE FOR USE IN SEAMS BETWEEN CARBON BLOCKS

M. Benjamin Dell, Pittsburgh, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Division of Ser. No. 449,592, March 11, 1974. This application Jan. 19, 1976, Ser. No. 650,174

Int. Cl.² C25B *11/12*

U.S. Cl. 204—294 **8 Claims**

1. A method of using a mix consisting essentially of calcined carbon aggregate, binder in the form of coal tar pitch or petroleum pitch, and only solvents having boiling points of from 150° to 350° C, said solvents consisting essentially of at least one compound selected from the group consisting of aromatic hydrocarbons having only saturated side chains, the solvent being present in an amount sufficient to render the mix capable of being tamped while the mix is at room temperature, said method comprising tamping the mix into the bottom of an electrolytic cell while the mix is at room temperature, and then bringing the cell to operating temperature.

4,032,654

WATER-SOLUBLE, LIQUID CONCENTRATES OF S-METHYL-[(METHYL-CARBAMOYL)OXY]-THIOACETIMIDATE AND METHYL N',N'-DIMETHYL-N-[(METHYL-CARBAMOYL)OXY]-1-THIOOXAMIMIDATE

Claude Corty, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 484,308, June 28, 1974, abandoned. This application Nov. 20, 1975, Ser. No. 633,838

Int. Cl.² A01N *9/00*

U.S. Cl. 424—298 **7 Claims**

1. An insecticidal and nematocidal composition of matter comprising (a) S-methyl-[(methylcarbamoyl)oxy]-thioacetimidate, and (b) methyl N',N'-dimethyl-N-[(methylcarbamoyl)oxy]-1-thiooxamimidate in a solvent, said solvent selected from solvent systems consisting of methanol/water containing from 0 to 70 weight percent water, acetone/water containing from about 0 to 70 weight percent water, and cyclohexanone/cyclohexanol/-methanol/water containing from about 20–92 weight percent cyclohexanone and cyclohexanol provided at least about 35% of this component is cyclohexanone, about 3–25 weight percent methanol and at least about 5 weight percent water, the ratio of (a) to (b) being 2:1 to about 1:2½, said composition having a pH of about 2.8 to 3.2.

4,032,655

PHENYLGUANIDINES USEFUL AS ANTHELMINTIC AGENTS

Heinrich Kölling, Haan; Herbert Thomas, Wuppertal-Elberfeld; Arno Widdig, Blecher, and Hartmund Wollweber, Wuppertal-Elberfeld, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

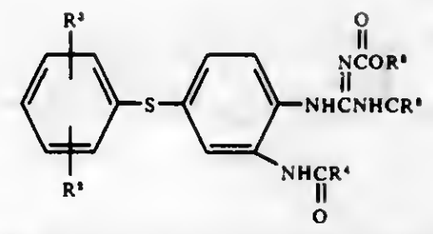
Division of Ser. No. 572,224, April 28, 1975, Pat. No. 3,993,682. This application June 7, 1976, Ser. No. 693,414

Claims priority, application Germany, May 15, 1974, 2423579

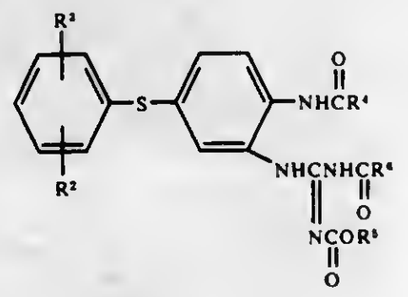
Int. Cl.² A61K *31/27*, *31/155*

U.S. Cl. 424—300 **13 Claims**

1. A pharmaceutical composition for anthelmintic use in humans and other animals comprising an anthelmintically effective amount of a compound selected from the group consisting of an N-(4-phenylthio-2-amidophenyl)guanidine of the formula:



and an N-(5-phenylthio-2-amidophenyl)guanidine of the formula:



wherein

R_4 is alkyl of 1 to 6 carbon atoms, cycloalkyl of 3 to 10 carbon atoms, alkoxy of 1 to 6 carbon atoms, phenyl, phenylalkyl of 7 to 12 carbon atoms, alkoxyalkyl of 2 to 12 carbon atoms, phenoxyalkyl of 7 to 12 carbon atoms, amino, alkylamino of 1 to 6 carbon atoms, or dialkylamino wherein each alkyl group contains 1 to 6 carbon atoms;

R^5 is alkyl of 1 to 6 carbon atoms, alkenyl of 2 to 6 carbon atoms or alkynyl of 2 to 6 carbon atoms; and

R^6 is hydrogen, alkyl of 1 to 6 carbon atoms, cycloalkyl of 3 to 10 carbon atoms, alkenyl of 2 to 6 carbon atoms, alkynyl of 2 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms, alkenyloxy of 2 to 6 carbon atoms, alkynyloxy of 2 to 6 carbon atoms, phenyl, phenylalkyl of 7 to 12 carbon atoms, phenoxyalkyl of 7 to 12 carbon atoms, alkoxyalkyl of 2 to 12 carbon atoms, or alkoxyalkoxy of 2 to 12 carbon atoms;

each of R^2 and R^3 independent of the other is hydrogen, halogeno, alkyl of 1 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms, alkylthio of 1 to 6 carbon atoms, trifluoromethyl, alkanoyl of 1 to 6 carbon atoms, amino, alkanoylamino of 1 to 6 carbon atoms or carbalkoxy of 2 to 7 carbon atoms,

in combination with a pharmaceutically acceptable carrier.

4,032,656

AROMATIC PROSTAGLANDIN DERIVATIVES

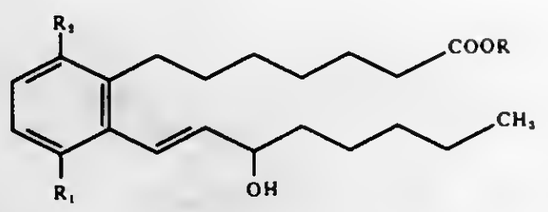
William G. Groves, Blue Bell; Bernard Loev, Broomall, and Carl D. Perchonock, Philadelphia, all of Pa., assignors to SmithKline Corporation, Philadelphia, Pa.

Filed Nov. 21, 1975, Ser. No. 634,094

Int. Cl.² C07C 69/76

U.S. Cl. 424—308 2 Claims

1. A pharmaceutical composition in dosage unit form having antiprostaglandin activity comprising a chemical compound of the formula:



in which:

R is hydrogen or lower alkyl; and R_1 and R_2 are hydrogen or lower alkoxy of from 1 to 3 carbon atoms;

and a pharmaceutical carrier.

4,032,657

HALOACETANILIDES AS MICROBICIDAL ACTIVE SUBSTANCES

Hans Moser, Magden, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

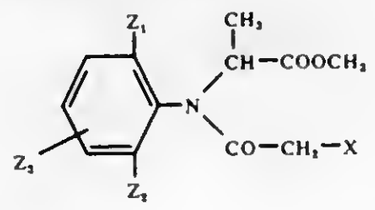
Filed March 27, 1975, Ser. No. 562,741

Claims priority, application Switzerland, Apr. 1, 1974, 4510/74; Aug. 23, 1974, 11521/74; Aug. 23, 1974, 11522/74

Int. Cl.² A01N 9/20; C07C 101/447

U.S. Cl. 424—309 28 Claims

1. A compound of formula I



(I)

wherein

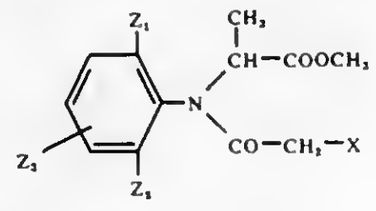
Z_1 represents methyl or chlorine,

Z_2 represents chlorine or bromine,

Z_3 represents hydrogen or C_1–C_3-alkyl, and

X represents fluorine, chlorine, bromine or iodine.

16. A fungicidal composition containing as active substance a fungicidally effective amount of a compound of formula I



(I)

wherein

Z_1 represents methyl or chlorine,

Z_2 represents chlorine or bromine,

Z_3 represents hydrogen or C_1–C_3-alkyl, and

X represents fluorine, chlorine, bromine or iodine, together with a suitable carrier therefor.

4,032,658

ALKANOLAMINE DERIVATIVES

Laszlo Beregi, Boulogne; Pierre Hugon, Ruell-Malmaison; Jacques Duhault, Chatou, and Michelle Boulanger, Marly le Roi, all of France, assignors to Science-Union et Cie, Suresnes, France

Filed Apr. 23, 1975, Ser. No. 570,876

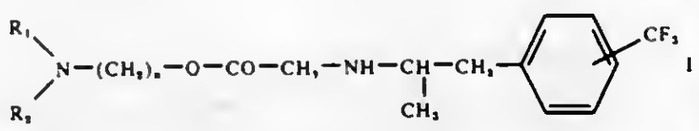
Claims priority, application United Kingdom, Apr. 30, 1974, 18838/74

Int. Cl.² C07C 101/04

U.S. Cl. 424—309 6 Claims

1. A compound selected from the group consisting of:

A. alkanolamine derivatives and their optical isomers of formula I:



I

wherein:

n is 2 or 3 and

R_1 and R_2 are each lower-alkyl having 1 to 4 carbon atoms inclusive, and

B. physiologically tolerable acid addition salts thereof.

6. A method of treating a living animal body afflicted with obesity, atheroma, or other metabolic disease requring weight reduction or regulation, comprising the step of administering to said living animal body an amount of a compound of claim 1 which is effective for such purpose.

4,032,659

METHOD OF VIRAL CHEMOPROPHYLAXIS

Charles Paul Hegarty, Radnor, and Helen C. Pietryk, Havertown, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 808,989, March 20, 1969, abandoned. This application June 26, 1975, Ser. No. 590,536

Int. Cl.² A61K 31/175, 31/22, 31/40

U.S. Cl. 424—323 10 Claims

1. A method of controlling a virus infection in a host suffering from a virus infection in which the virus is a member of the class consisting of Herpes simplex, Vaccinia, Influenza A (PR8), Influenza A_1 (Ann Arbor), Influenza A_2 (Taiwan), Influenza B (Mass.), Influenza B (Maryland), Mengo, Columbia SK polio, and Neurovaccinio comprising orally administering to the animal host from 250 picograms to 250 micrograms per kilogram of host body weight of a compound is selected from the class consisting of:

A. 2-Butanone, thiosemicarbazone

B. 3-Pentanone, thiosemicarbazone

C. 2-Pentanone, thiosemicarbazone

D. Acetone, thiosemicarbazone

E. Acetoacetic acid, ethylester, thiosemicarbazone

F. Cyclohexanone, thiosemicarbazone

G. Cyclobutanone, thiosemicarbazone

H. 2-Indanone, thiosemicarbazone

I. 2-Indanone, 4-allylthiosemicarbazone

J. Cyclopentanone, o-tolylthiosemicarbazone

K. Adamantyl thiosemicarbazide

L. Thiosemicarbazide

M. Methisazone

N. Semicarbazide

and the pharmaceutically acceptable acid addition salts thereof.

4,032,660

ACETOXIME DERIVATIVES AND PROCESS FOR PREPARING THE SAME

Georges Marcel Taillandier; Jean-Louis Alain Benoit-Guyod, both of Grenoble; André Louis Boucherle, Corenc-Montfleury; Pierre Luc Eymard, Fontaine, and Madeleine Broll, Grenoble, all of France, assignors to Labaz, Paris, France

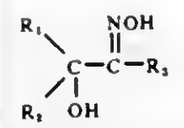
Filed June 5, 1975, Ser. No. 584,176

Claims priority, application France, June 25, 1974, 74.22033

Int. Cl.² A61K 31/15

U.S. Cl. 424—327 5 Claims

1. A method for treating anxiety and convulsive states of the central nervous system in a subject in need of such treatment comprising administering to the said subject 200 to 1000 milligrams per 60 kilograms of body weight per day of at least one acetoxime derivative of the formula:



wherein R_1, R_2 and R_3, which may be the same or different, each represent a branched-or straight-chain alkyl group having from 1 to 4 carbon atoms or R_1 and R_2, when they are taken together, represent with the carbon atom to which they are attached, a cyclohexyl group.

4,032,661

CYCLIC SULPHOXIDES AND SULPHONES HAVING A PHYSIOLOGICAL COOLING ACTION ON THE HUMAN BODY

David G. Rowsell, Staines, and David J. Spring, Datchet, both of England, assignors to Wilkinson Sword Limited, London, England

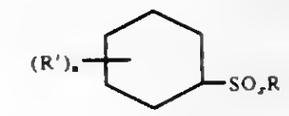
Filed July 20, 1973, Ser. No. 381,096

Claims priority, application United Kingdom, July 20, 1972, 33994/72

Int. Cl.² A61K 31/10

U.S. Cl. 424—337 2 Claims

1. In a manufactured consumer product for topical application to the human body, comprising a topically administrable carrier, and, as adjuvants in said carrier, i} an antiseptic or perfume or both, and ii} a compound capable of stimulating the cold receptors of the nervous system of the surface tissues of the body when brought into contact therewith by topical application of the said product, the improvement which comprises using as said cold receptor stimulating compound, an effective amount of a cold receptor stimulating sulfoxide or sulfone of the formula:



where

R is C_1–C_5 alkyl;

R′ is C_1–C_5 alkyl;

n is 1 or 2;

the total number of carbon atoms provided by R and all the R′ groups is from 2–12 inclusive; and

x is 1 or 2.

4,032,662

METHOD FOR THE TREATMENT OF CONTACT ALLERGIC DERMATITIS

Idabelle K. Mannear, Montrose, Pa., assignor to Idabelle K. Mannear; Charles H. Mannear, both of Montrose; George W. Kanarr and Ruth A. Kanarr, both of Shavertown, all of, Pa., part interest to each

Filed Jan. 5, 1976, Ser. No. 646,728

Int. Cl.² A61K 31/12

U.S. Cl. 424—331 7 Claims

1. A method for the treatment of a patient afflicted with contact allergic dermatitis which comprises topically applying acetone to the affected areas of the skin of said patient.

4,032,663

PROCESS FOR USING CELL WALL-LYSING ENZYMES

Reisuke Kobayashi, Shizuoka; Hironari Sato; Kiyoshi Takita, both of Shimizu, and Nobuo Toyama, Miyazaki, all of Japan, assignors to Kumiai Chemical Industry Co., Ltd., Tokyo, Japan

Division of Ser. No. 522,304, Nov. 8, 1974, Pat. No. 3,969,189, which is a continuation of Ser. No. 314,933, Dec. 14, 1972, Pat. No. 3,890,198. This application Apr. 9, 1976, Ser. No. 675,448

Claims priority, application Japan, Dec. 14, 1971, 46-100700; Jan. 27, 1972, 47-9486

Int. Cl.² A23B 7/00; C12B 1/00

U.S. Cl. 426—51 9 Claims

5. In a foodstuff or drink containing an enzyme complex incorporated therein in an amount sufficient to dissolve the cells of bacteria or fungi otherwise capable of causing microbial spoilage of said foodstuff or drink, the improvement wherein said enzyme complex consists essentially of a powdery complex enzyme isolated from Pellicularia culture me-

dia, capable of lysing cell walls and having the following characteristics:

a. being active to lyse the cell walls of living cells and dead cells of *Aspergillus niger*, *Penicillium steckii*, *Saccaromyces cerevisiae*, *Candida utilis*, *Candida albicans*, *Candida lipolitica*, *Lentinus edodes*, *Bacillus subtilis*, *Lactobacillus lactis* and *Chlarella*;

b. having cell wall-lysing activities stable in a pH range of 3 to 9, the optimum pH being in the range of 5 to 7;

c. said cell wall-lysing activities being optimal in a temperature range of 30° or 40 ° C., but the optimum temperature varying depending on the nature of the microorganisms of which cells are to be lysed;

d. said cell wall-lysing activities being stable in a low temperature range but rapidly inactivated at a temperature of higher than 50° C.;

e. said cell wall-lysing activities being inhibited by the presence of Mn^{++}, Ni^{++} or Zn^{++};

f. exhibiting the enzymatic activities of cellulase and β-1,3-glucanase at an optimum temperature of 40°–50° C. and an optimum pH of 5.0, chitinase at an optimum temperature of about 35° C. and an optimum pH of 4.0–5.5, protease, hemicellulase and amylase; and

g. consisting essentially of component enzymes each having a molecular weight of at least 50,000.

4,032,664

FRIED FORMED CHIP

Verne E. Weiss, Wayzata; Glenn M. Campbell, and Gerald L. Wilson, both of, Minneapolis, all of Minn., assignors to General Mills, Inc., Minneapolis, Minn.

Division of Ser. No. 355,260, April 27, 1973, Pat. No. 3,935,322. This application Jan. 19, 1976, Ser. No. 650,326

Int. Cl.² A23L *1/12*

U.S. Cl. 426—76 **4 Claims**

1. A chip-type snack food product comprising a length of a ribbon including a series of uniformly-shaped interconnected fried chips, each of said interconnected chips having opposed arcuate peripheral edges, and said series of interconnected chips having narrow interconnecting portions spaced along the length of said ribbon.

4,032,665

SIMULATED BONE

Timothy Allen Miller, Ferguson, Mo., and Carlo J. Hansen, Waterloo, Ill., assignors to Ralston Purina Company, St. Louis, Mo.

Division of Ser. No. 395,479, Sept. 10, 1973, which is a continuation-in-part of Ser. No. 174,569, Aug. 24, 1971, abandoned. This application May 15, 1975, Ser. No. 577,811

Int. Cl.² A23G *1/00*

U.S. Cl. 426—104 **3 Claims**

1. A simulated bone containing 5–12% moisture and about 5% but less than 7% fat and having a structural matrix consisting essentially of a matrix of substantially unpuffed, farinaceous and proteinaceous ingredients, said simulated bone having been prepared by drying a dough composition containing 50–75% by weight farinaceous material, a proteinaceous material, 5–15% fat and 15–45% moisture, whereby the simulated bone has a shear value of not less than 250 pounds and a substantially white color which falls within the following range as measured on a Gardner Color Difference Meter using a White color standard Plate No. XL-10

White to Black	70 to 90
Red	−1.0 to 3.0
Yellow	15.0 to 30.0

4,032,666

METHOD OF MANUFACTURING EDIBLE SOY PROTEIN-CONTAINING, DRIED MEAT PRODUCT

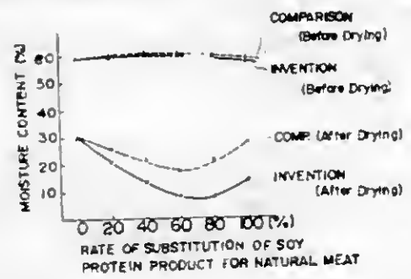
Shizuo Obata, Kashiwara; Yukiomi Yamato, and Hitoshi Taniguchi, both of Osaka, all of Japan, assignors to Fuji Oil Company, Ltd., Japan

Filed Feb. 14, 1975, Ser. No. 550,049

Claims priority, application Japan, Feb. 18, 1974, 49-19731

Int. Cl.² A23B *4/04*

U.S. Cl. 426—242 **7 Claims**



1. A method of manufacturing an edible soy protein-containing, dried meat product, which comprises mixing a fibrous soy protein product of fibril structure having a random orientation, obtained by heating an aqueous slurry of a sufficiently reactive protein material at a temperature of at least 165° F under a pressure of about 50 p.s.i.g. and extruding the heated slurry through an orifice to produce said fibrous product, with a natural meat in an amount such that about 40 to 80% of the total weight of natural meat and soy protein is soy protein heat-treating the mixture of said fiber soy protein product and said natural meat at not less than 60° C for 5 to 30 minutes under atmospheric pressure and drying the heat-treated mixture to a moisture content of not greater than 10% whereby the dried mixture possesses increased swellability and texture when hydrated.

4,032,667

METHOD FOR COATING CONFECTIONERY ARTICLES WITH CHOCOLATE

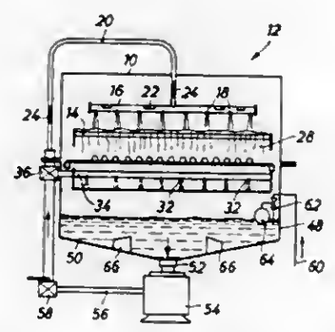
Walter Kreuter, Norderstedt, Germany, assignor to Kreuoha AG, Zug, Switzerland

Continuation of Ser. No. 445,533, Feb. 25, 1974, abandoned. This application May 5, 1976, Ser. No. 683,047

Claims priority, application Germany, Feb. 28, 1973, 2309822

Int. Cl.² A23G *1/00, 3/00*

U.S. Cl. 426—306 **5 Claims**



1. In a method for coating confectionery articles with a tempered chocolate, comprising the steps of feeding a current of precrystallized, molten tempered chocolate onto a veil plate to produce a downwardly descending substantially pressure-free film of molten chocolate under gravitational force, passing the confectionery articles to be coated through said film, collecting unused chocolate and recirculating said unused chocolate to said current, the improvement consisting of pressurizing said current prior to its being fed to said veil plate to an overpressure of at least one atmosphere and subjecting the current to a brief high shear stress by forcing the current by the aid of said overpressure through at least one nozzle onto said veil plate in said feeding step.

4,032,668

EXPANSION PROCESS FOR THE PRODUCTION OF INSTANT GRITS

Benjamin Bostick Jones, Savannah, Ga.; Richard John Karrasch, Sterrett, and Stephen Wallace Eitel, Birmingham, both of Ala., assignors to The Jim Dandy Company, Birmingham, Ala.

Filed Jan. 30, 1975, Ser. No. 545,754

Int. Cl.² A23L *1/168*

U.S. Cl. 426—449 **4 Claims**

1. A process for treating grits to produce a quickcooking product, which possesses a texture and taste comparable to ordinary cooked grits as well as good rehydration qualities, consisting essentially of:

a. preparing an initial product of grits by reducing said grits to a fine mesh;

b. mixing said initial product with from about 15–40% by weight of water, steam or mixtures thereof;

c. gelatinizing the resulting mixture by heating said mixture under high mechanical pressure in the presence of superheated water at a temperature ranging from 100° to 250° F for a period of time sufficient to completely gelatinize the grits therein without significant dextrinization;

d. releasing the pressure on the mixture to produce an expanded grit product having a moisture content of about 15 to 40%;

e. drying the expanded grit produced at a temperature from about 160° to about 200° F to a final moisture content of less than about 12%; and

f. comminuting the expanded grit product to a size finer than 12 mesh whereby a quick-cooking product is obtained.

4,032,669

CHEESE PRODUCT AND PROCESS FOR PRODUCTION

Joseph Jerome Peters, Timber Trails; Antonio Toag Villanueva, Marysville, and Robert Samuel Keller, Columbus, all of Ohio, assignors to Societe d'Assistance Technique pour Produits Nestle S.A., Lausanne, Switzerland

Continuation-in-part of Ser. No. 454,416, March 25, 1974, abandoned. This application Dec. 20, 1974, Ser. No. 534,722

Int. Cl.² A23C *19/12*

U.S. Cl. 426—573 **10 Claims**

1. An edible product in the form of granules and comprising natural cheese dispersed within an aqueous gel matrix of Xanthomonas colloid and locust bean gum, said edible product being stabilized with from 5 to 30% by weight of said natural cheese of a firming agent selected from the group consisting of casein and an edible caseinate salt, said edible product having the firm, physical consistency of said natural cheese.

4,032,670

VARIABLE COATING FEED

Walter B. Warning, Sr., Chicago, and Walter B. Warning, Jr., Schaumburg, both of Ill., assignors to Airprint Systems, Inc., Elk Grove Village, Ill.

Division of Ser. No. 562,679, March 27, 1975. This application July 30, 1976, Ser. No. 710,285

Int. Cl.² B05D *1/04*

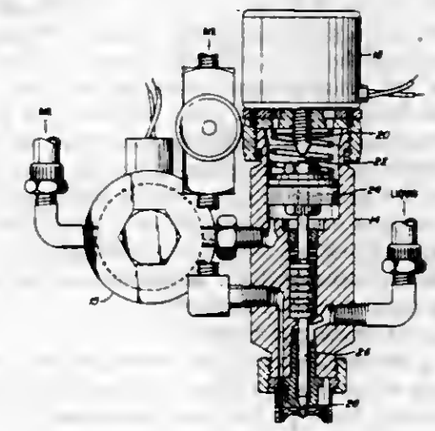
U.S. Cl. 427—8 **3 Claims**

1. A method of controlling the operation of a device for applying liquid in a predetermined pattern to a moving surface, comprising the steps of

mounting a liquid applying device in a fixed position along the path of travel of said surface and controlling liquid feed through a discharge orifice of said device by a needle valve operatively associated with a motor driven adjustable stop spaced from said valve,

feeding liquid from said device to said surface as it moves thereby,

generating a signal having a value related to the speed at which said surface passes said applying device and



wherein said signal is in the form of an electric pulse for each predetermined incremental movement of surface, and

controlling the motor drive of said adjustable stop in response to the value of said signal to thereby vary the rate at which liquid is fed from said liquid applying device.

4,032,671

METHOD OF FORMING ART PRODUCT

Robert W. Hyde, Rte. 1, Box 236, Crystal River, Fla. 32629

Filed June 28, 1976, Ser. No. 700,165

Int. Cl.² B05D *1/36, 1/38, 3/14, 5/06*

U.S. Cl. 427—14 **18 Claims**

1. A method of producing a display item comprising the steps of:

a. forming a plate for said display item from a material capable of bearing an electrostatic charge;

b. applying a liquid electroresponsive pigment bearing material to a surface of said plate;

c. placing an electrostatic charge on said plate;

d. allowing said material to disperse on said surface in response to said charge; and

e. drying said dispersed material on said plate.

4,032,672

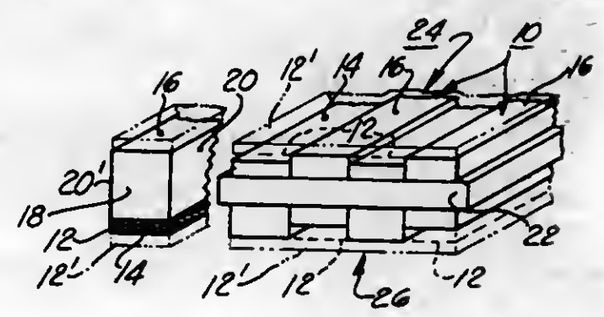
METHOD FOR COATING PARTS

Harold E. McCormick, Ballwin, Mo., assignor to Ramsey Corporation, St. Louis, Mo.

Filed Aug. 5, 1975, Ser. No. 602,110

Int. Cl.² B05D *3/12, 1/08*

U.S. Cl. 427—34 **12 Claims**



1. A method of coating respective faces of a plurality of parts having a face, a back and sides wherein said sides are

configured for assembly in abutting side-by-side relationship which comprises the steps of:

assembling the parts in abutting side-by-side relationship with a first group of parts having their faces facing in one direction, and a second group of parts having their faces facing in the opposite direction so as to form a first coating surface defined by the faces of the first group of parts and the backs of the second group of parts, and a second coating surface defined by the faces of the second group of parts and the backs of the first group of parts, the faces of the first group of parts being recessed with respect to the backs of the second group of parts, and the faces of the second group of parts being recessed wth respect to the backs of the first group of parts, said parts being assembled so that each part of said first group of parts is succeeded in order by one of said second group of parts,

applying a hardenable continuous coating to the first coating surface and applying a hardenable continuous coating to the second coating surface,

allowing the coating to harden,

reducing the thickness of the coating applied to the first coating surface sufficiently to remove substantially all of the coating from the backs of the second group of parts and expose the backs thereof while leaving a residual coating on the recessed faces of the first group of parts, and

reducing the thickness of the coating on the second coating surface sufficiently to remove substantially all of the coating from the backs of the first group of parts and expose the backs thereof while leaving a residual coating on the recessed faces of the second group of parts.

4,032,673

METHOD FOR APPLYING AN ORGANIC COATING ONTO AN INORGANIC COATED STEEL SHEET

Siegfried H. Schroeter, Schenectady, N.Y.; Jon VanWlokle, Dalton, and Carroll B. French, Lenox, both of Mass., assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 444,859, Feb. 22, 1974, Pat. No. 3,924,022. This application Sept. 19, 1975, Ser. No. 614,793

Int. Cl.² B05D *3/06*

U.S. Cl. 427—54 8 Claims

1. A substantially pollution-free method for uniformally improving the surface resistivity of oriented steel strip having an inorganic material as a surface insulating coating to produce an oriented steel strip-inorganic coating-organic resin composite capable of providing an average Franklin test reading of from 0.1 to 0 amperes at a pressure of up to 300 psi, which comprises,

1. **treating the oriented steel strip with a UV curable solventless epoxy organic resin to a thickness of up to** 0.2 mil, and
2. **passing the treated oriented steel strip through an irradiation curing zone at a rate of up to** 600 feet per minute, using an irradiation flux sufficient to effect the cure of the solventless epoxy organic resin to an organic resin hardness capable of being tested by the above-described Franklin test,

where said UV curable epoxy organic resin is characterized by having a viscosity of up to 3,000 centipoises at 25° C, and is a mixture comprising by weight

A. from 30 to 99% of a cycloaliphatic epoxy compound,

B. from 1 to 70% by weight of an oxirane containing organic material substantially free of cycloaliphatic radicals having a viscosity of less than 3,000 centipoises at 50° C and a molecular weight of less than 1,000, and

C. from 0.5 to 5% by weight of an onium salt,

where the sum of (A), (B) and (C) is 100%, and said onium salt has the formula,

$$[Y]^{j+}[MD_k]^{-(k-s)}$$

where M is a metal or metalloid, and D is a halogen radical, Y is a cation selected from the class consisting of

$$[(R)_a(R^1)_b Q]^{+} [(R)_c(R^2)_d(R^3)_e X]^{+} [(R)_f(R^4)_g(R^5)_h X]^{+}$$

where R is a monovalent aromatic organic radical, R^1 is a divalent aromatic organic radical, R^2 is a monovalent organic aliphatic radical selected from alkyl, cycloalkyl and substituted alkyl, R^3 is a polyvalent organic radical forming a heterocyclic or fused ring structure selected from aliphatic radicals and aromatic radicals, R^4 is a monovalent organic aliphatic radical selected from alkyl, alkoxy, cycloalkyl and substituted derivatives thereof, R^5 is a polyvalent organic radical forming an aromatic heterocyclic or fused ring structure with Z, Q is a halogen radical, X is a Group V*l*a element selected from sulfur, selenium and tellurium, Z is a Group V*a* element selected from N, P, As, Sb and Bi, *a* is a whole number equal to 0 or 2, *b* is a whole number equal to 0 or 1, the sum of $a + b$ is equal to 2 or the valence of Q, c is a whole number equal to 0 or 3, *d* is a whole number equal to 0 to 2 inclusive, *e* is a whole number equal to 0 or 1, where the sum of $c + d + e$ is a value equal to 3 or the valence of X, *f* is a whole number equal to 0 to 4 inclusive, *g* is a whole number equal to 0 to 2 inclusive, and *h* is a whole number equal to 0 to 2 inclusive and the sum of $f + g + h$ is a value equal *to* 4 or the valence of Z,

$j = k - n$

n = valence of M and is an integer equal to 2 to 7 inclusive, and

k is >n and is an integer having a value up to 8,

where said irradiation curable solventless epoxy organic resin is capable of providing with 10C hydrocarbon oil, an interfacial tension reading of from 30–49/cm in accordance with ASTM D971-50 (1970).

4,032,674

MAGNETIC MEMORY STRUCTURE AND METHOD OF MAKING THE SAME

Masaya Hirabayashi, Kyoto, and Hiromasa Enjo, Gamo, both of Japan, assignors to Kyoto Ceramic Co., Ltd., Kyoto, Japan

Continuation of Ser. No. 265,457, June 30, 1972, abandoned. This application Jan. 14, 1975, Ser. No. 540,968

Int. Cl.² B05D *5/12*

U.S. Cl. 427—130 13 Claims

1. A method of manufacturing a magnetic memory structure characterized in that the method comprises the steps of applying a mixed aqueous solution of the respective water-soluble salts of iron and cobalt to a substrate of alumina ceramics, drying said solution and heating said solution to between 200 to 500° C to thermally decompose the respective salts in the solution thereby to deprive the solution of its water so as to form a film of oxides of iron and cobalt on said substrate, said mixed aqueous solution being mixed at a stoichiometrical rate so that said film on said substrate is represented by a general formula $Co_{(1-x)}Fe_{(2+x)}O_4$ (wherein $-0.2 \leqq x \leqq 0.3$), sintering said film at temperatures approximately below 1300° C to subject said oxides to thermochemical reactions thereby forming a solid cobalt-based spinel type ferrite film on said substrate.

4,032,675

METHOD FOR PRODUCING COATED ELECTRICAL STEEL SHEETS HAVING EXCELLENT PUNCHABILITY, WELDABILITY, ELECTRICAL INSULATION AND HEAT RESISTANCE

Toshio Irie, Chiba; Toshikuni Tanda, Akashi; Tomoyuki Ichi, Ashiya, and Toshio Sadayori, Chiba, all of Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan

Filed Oct. 14, 1975, Ser. No. 621,740

Claims priority, application Japan, Oct. 15, 1974, 49-117646

Int. Cl.² B05D *3/02, 5/12, 7/14*

U.S. Cl. 427—126 13 Claims

1. A method for producing coated electrical steel sheets having excellent punchability, weldability and insulation characteristics comprising applying on an electrical steel sheet, a treating dispersion obtained by compounding:

a. a resin emulsion which separates agglomerated particles having an average particle diameter of 3–40 microns when compounded in an aqueous solution containing chromic acid;

b. a resin compatible with an aqueous solution containing chromic acid; and

c. an aqueous solution containing chromic acid so that the total amount of non volatile matter of both the resins is 5–150 parts by weight per one hundred parts of chromic acid by weight expressed as CrO_3 with the amount of the resin emulsion being at least one part by weight of the total weight amount of the resin and resin emulsion and said resin emulsion provides at least 5% by weight of the total amount of the non volatile matter of the resin and the resin emulsion; and baking the thus treated steel sheets.

4,032,676

N-POLYHYDROXYALKYL-AMINO ACIDS, THEIR MANUFACTURE AND SKIN TREATING AGENTS CONTAINING THE SAME

Arnold Heins, Hilden; Hinrich Moller, Dusseldorf-Benrath, and Rainer Osberghaus, Dusseldorf-Urdenbach, all of Germany, assignors to Henkel & Cie G.m.b.H., Dusseldorf-Holthausen, Germany

Filed Dec. 20, 1974, Ser. No. 534,805

Claims priority, application Germany, Dec. 24, 1973, 2364525

Int. Cl.² A61K *31/415*

U.S. Cl. 424—273 30 Claims

1. A cosmetic moisturing composition for the care and protection of the skin of warm-blooded animals consisting essentially of an emulsion adjusted to a pH between 5 and 7 containing an emulsifier, from 2% to 20% by weight of at least one N-polyhydroxyalkyl-amino acid compound selected from the group consisting of (1) acids of the formula

$$HOOC-R_1-NH-\underset{\displaystyle (CHOH)_n-H}{\underset{|}{CH}}-(CHOH)_m-R_2$$

wherein R_1 is $-CHR_3-$, wherein R_3 is a member selected from the group consisting of hydrogen, alkyl having 1 to 6 carbon atoms, hydroxyalkyl having 1 to 6 carbon atoms, mercaptoalkyl having 1 to 6 carbon atoms, methylthioalkyl having 1 to 6 carbon atoms in the alkyl, aminoalkyl having 1 to 6 carbon atoms, polyhydroxyalkylaminoalkyl having the formula

$$-(CH_2)_p-NH-\underset{\displaystyle (CHOH)_n-H}{\underset{|}{CH}}-(CHOH)_m-R_2$$

where *p* is an integer from 1 to 6, and *m*, *n* and R_2 have the following assigned values, carboxyalkyl having 1 to 6 carbon atoms in the alkyl, guanidinoalkyl having 1 to 6 carbon atoms in the alkyl, polyhydroxyalkylguanidinoalkyl having the formula

$$-(CH_2)_p-NH-\overset{\displaystyle NH}{\overset{\|}{C}}-NH-\underset{\displaystyle (CHOH)_n-H}{\underset{|}{CH}}-(CHOH)_m-R_2$$

where *p* has the above-assigned values and *m*, *n* and R_2 have the following assigned values, ureidoalkyl having 1 to 6 carbon atoms in the alkyl and glyoxalinoalkyl having 1 to 6 carbon atoms in the alkyl, R_2 is a member selected from the group consisting of $-CH_2OH$ and $-COOH$, m is an integer 3 or 4, and *n* is 0, or, when *m* is 3 and R_2 is $-CH_2OH$, *n* is 1, (2) alkali metal salts thereof, (3) ammonium salts thereof and (4) lower alkylammonium and lower alkylol ammonium salts thereof, and the remainder inert cosmetic excipients, said emulsion being selected from the group consisting of oil-in-water emulsions and water-in-oil emulsions.

4,032,677

METHOD OF FORMING A COATING OF A RUBBER OR A SYNTHETIC RESIN HAVING AN EVEN THICKNESS ON THE EXTERNAL SURFACE OF A TUBULAR TEXTILE JACKET

Eiji Ichioka, and Yurifumi Harada, both of Osaka, Japan, assignors to Ashimori Kogyo Kabushiki Kaisha, Osaka, Japan

Filed June 12, 1973, Ser. No. 369,290

Claims priority, application Japan, June 12, 1972, 47-58446

Int. Cl.² B05D *1/18*

U.S. Cl. 427—358 23 Claims

1. In a method of forming a coating having a uniform thickness on the external surface of a tubular jacket wherein the tubular jacket is conveyed through a coating liquid bath and drying zone and maintained in a substantially circular cross-sectional shape at least for a distance from the point where the coating is applied to the tubular jacket to a point where the coating attached to the external surface of the jacket solidifies, the improvement which comprises inserting into the inner space of the tubular jacket a flexible, self-rotatable, endless, double tubing expanding member, said expanding member continually turning on itself, inside out and outside in, as a result of being in frictional contact with the inside surface of the tubular jacket so that the outside surface of the expanding member is moving in the same direction as the inside surface of the tubular jacket and the inside surface of the expanding member is moving in the opposite direction to its outside surface thereof.

4,032,678

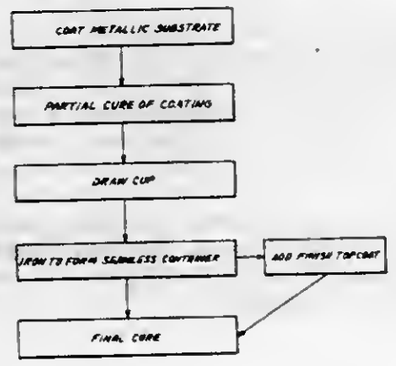
COATED SHEET METAL AND METHOD OF FORMING PRODUCTS THEREFROM

Guido A. Perfetti, and Henry Darlington, both of Bethlehem, Pa., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.

Continuation-in-part of Ser. No. 505,302, Sept. 12, 1974, abandoned. This application Aug. 11, 1975, Ser. No. 603,462

Int. Cl.² B22D 51/26

U.S. Cl. 427—388 A **15 Claims**



1. In a process for drawing and ironing a coated metallic sheet into seamless containers, the method which consists essentially of the steps of:

a. providing a metallic sheet,

b. applying a coating of thermosetting organic material to the surface of the metallic sheet, and

c. subjecting the coating of thermosetting organic material to a temperature for a time to effect a cure of the coating in the range of between about 1% and about 75% MEK insoluble residue, which cure provides a bond between the coating and the metallic sheet and a coating with sufficient extensibility to draw and iron the coated metallic sheet into a seamless container without further treatment of the coating.

4,032,679

STICKER

Katumi Aoyagi, Chofu, Japan, assignor to Shiro Kojima, Tokyo, Japan, a part interest

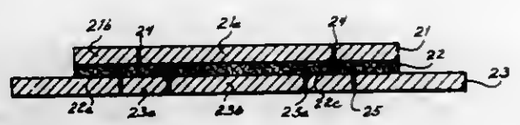
Division of Ser. No. 355,211, April 27, 1973, Pat. No. 3,925,585. This application Nov. 22, 1974, Ser. No. 526,401

Claims priority, application Japan, Apr. 27, 1972, 47-42528

The portion of the term of this patent subsequent to Dec. 9, 1992, has been disclaimed.

Int. Cl.² B32B 3/16

U.S. Cl. 428—42 **4 Claims**



1. A sticker, comprising:

a sheet having a layer of pressure sensitive adhesive disposed thereon and substantially covering a surface thereof, the sheet having a dividing line defining an inner sheet clipping portion and, around the same, an annular portion of the sheet, and enabling dividing the sheet into these portions pursuant to application of an imprint to the sheet which after said dividing correlates the inner and annular portions; and

a detachable release paper temporarily attached to the layer of adhesive and having parting lines surrounding one another to define and enable mutual separation of inner, intermediate and outer parts of the release paper, the intermediate part underlying the dividing line of the sheet,

thereby facilitating separate application of the inner and annular portions to different articles.

4,032,680

CONSTRUCTION MEMBER

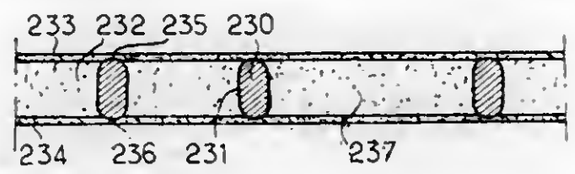
Francois Allard, 34 Avenue Leclerc, 59 Douai, France

Continuation of Ser. No. 373,775, June 26, 1973, which is a continuation-in-part of Ser. No. 163,297, July 16, 1971, Pat. No. 3,791,912. This application July 14, 1975, Ser. No. 595,689

Claims priority, application France, July 22, 1970, 70.27047; Jan. 15, 1971, 71.01277; June 27, 1972, 72.23232

Int. Cl.² B32B 3/26

U.S. Cl. 428—119 **12 Claims**



1. A flat construction element comprising a core of expanded resin foam material having opposite surfaces, a plurality of parallel metallic members regularly distributed in said core, said members each having a height equal to the thickness of said core, a cover layer on each of the surfaces of said core, each said cover layer being constituted of hardened resin in contact with the associated surface of the core and with said metallic members along the external surface thereof, and a layer of hardened resin interposed between the metallic members and said core.

4,032,681

POROUS REFLECTIVE FABRIC

Nelson Jonnes, Stillwater, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 21, 1975, Ser. No. 569,795

Int. Cl.² B32B 7/00

U.S. Cl. 428—253 **14 Claims**

1. A porous reflective fabric comprising a resiliently stretchable base fabric and an originally continuous vapor-deposited reflective layer less than about one micrometer thick adhered to the base fabric by a layer of adhesive material and leaving the base fabric with sufficient drapability that a sample supported by a person's forefinger will collapse around his fist; said reflective and adhesive layers having an extensive network of minute fractures communicating with interstices in the base fabric whereby said reflective fabric has a porosity sufficient for extended comfortable wearing of a garment that incorporates the fabric.

4,032,682

MAGNETIC RECORDING ELEMENT AND METHOD FOR MAKING SAME

Claude Jeanine Masson, Paris, France, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed July 17, 1975, Ser. No. 596,924

Claims priority, application France, July 30, 1974, 74.26355

Int. Cl.² B05D 5/12; B32B 5/16

U.S. Cl. 428—309 **12 Claims**

1. A magnetic recording element comprising a support coated on one of its surfaces with at least one magnetic layer comprised of a dispersion of magnetizable particles in resinous binder, said binder comprising a single copolymer of vinyl acetate and vinyl chloride, or a mixture of copolymers of vinyl acetate and vinyl chloride of different compositions, or a mixture of a copolymer of vinyl acetate and vinyl chloride with polyvinyl butyral, or a mixture of polyvinylidene chloride-acrylonitrile copolymer with a copolymer of vinyl acetate and vinyl chloride, or at least one cellulose acetobutyrate composition, or a mixture of copolymer of vinyl acetate and vinyl chloride with a copolymer of vinyl chloride and methyl acrylate; said at least one magnetic layer having a porous structure and comprising fine particles of said binder with interstices included between particles, and said elements exhibiting a transverse incurvature of not more than 4 mm across a 35 mm wide strip thereof.

3. A method for making a magnetic recording element comprising:

preparing a dispersion of magnetizable particles in a solution of resinous binder consisting essentially of at least one copolymer of vinyl acetate and vinyl chloride, or at least one cellulose acetobutyrate composition, or a mixture of a copolymer of vinyl acetate and vinyl chloride with either polyvinyl butyral or with a copolymer of vinylidene chloride and acrylonitrile or with a copolymer of vinyl chloride and methyl acrylate, dissolved in a solvent system comprising butanol and either methylene chloride, acetone, or methyl ethyl ketone;

coating said dispersion on a substrate; and

causing said solvents to evaporate, leaving a magnetic layer having a porous structure on said substrate.

4,032,683

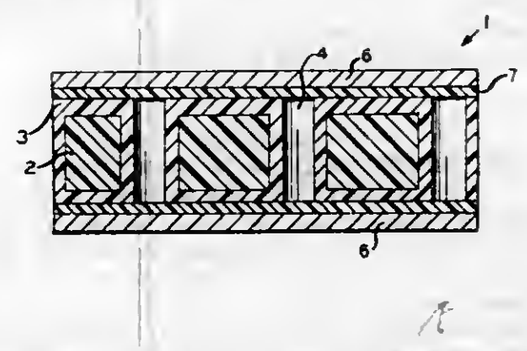
STRUCTURAL MEMBER AND METHOD OF MAKING SAME

Harold D. Coale, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sept. 27, 1976, Ser. No. 727,318

Int. Cl.² B32B 3/26

U.S. Cl. 428—315 **14 Claims**



1. A heat resistant article of reinforced plastic comprising:

a. a structural member comprised of cellular poly(phenylene sulfide) and at least one reinforcing filler with said poly(phenylene sulfide) being at least partially cured and is in an amount of at least about 20 weight percent of the member; and

b. a coating on said member, said coating is at least partially comprised of poly (phenylene sulfide) and is at least partially cured.

4,032,684

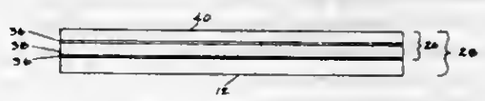
LAMINATED BACKING STRUCTURE FOR COMPOSITE LITHOGRAPHIC PLATE

Richard Harry Dunnington; Carl Michael Vigilanco, and Wilkens, George Rudolph, all of Winston-Salem, N.C., assignors to RJR Archer, Inc., Winston-Salem, N.C.

Filed Sept. 10, 1976, Ser. No. 722,246

Int. Cl.² B32B 27/08, 27/10

U.S. Cl. 428—332 **4 Claims**



1. A laminated backing structure for a composite lithographic plate comprising a metal sheet and a backing structure which laminated backing structure comprises:

a. bonding layer consisting essentially of a thermoplastic resin bondable to the back of a lithographic grade metal sheet under the influence of heat and pressure;

b. an intermediate filler layer of a normally solid flexible organic polymeric material, which layer is resistant to water, ink and grease to provide a selected thickness to said backing structure;

c. an outer interleaving layer of a thermoplastic or thermosetting organic polymer having a smooth non-suff surface which does not adhere to the metal surface of a metal surfaced lithographic plate under ambient conditions, and which does not become tacky under the conditions necessary to bond the bonding layer (a) to a lithographic metal sheet;

said layers being bonded together to form a coherent laminated structure.

4,032,685

ARTIFICIAL HAIR

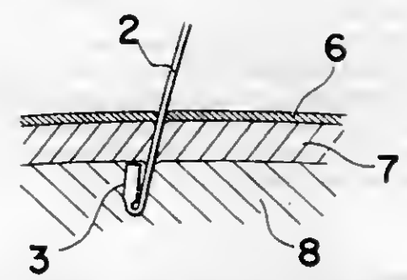
Shiro Yamada, No. 31-8, Koboyama, Kobo-cho, Chiryu, Aichi, Japan

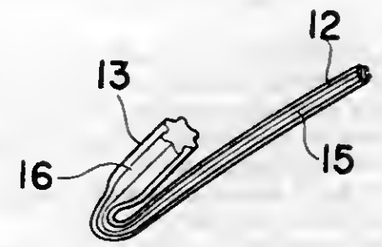
Filed June 3, 1976, Ser. No. 692,305

Claims priority, application Japan, Aug. 1, 1975, 50-105798[U]

Int. Cl.² A41G 5/00; D01D 5/12

U.S. Cl. 428—399 **9 Claims**





1. An artificial hair having a hair portion of diameter substantially the same as that of natural hair constituted essen-

tially of a monofilament of thermoplastic resin having a corollaceous cross-section, and an elongated root portion integrally formed at one end of the monofilament and having a corollaceous cross-section larger than that of said hair portion, said elongated root portion being of length to render said root portion totally implantable in the skin while aligned largely perpendicular to the plane of the skin.

8. A method of preparing artificial hair constituted essentially of a monofilament of thermoplastic resin having a corollaceous cross-section and a root formed at one end of the monofilament having a corollaceous cross-section larger than that of the monofilament proper which comprising:

melt-spinning a thermoplastic resin by a spinning nozzle having a star-shaped cross-section thereby obtaining a monofilament of corollaceous cross-section,

drawing strongly said monofilament in a drawing process, cutting said drawn monofilament to a suitable length and heating instantaneously one end of said cut piece of monofilament at a softening temperature of said plastics thereby obtaining the root having a corollaceous cross-section with approximately the same diameter as that of the undrawn monofilament.

4,032,686

ARTICLES COATED WITH A CURED COMPOSITION OF HYDROXY(POLYALKYLENECARBONYLOXY)ALKYLENEOXAZOLIDINE AND A POLYISOCYANATE

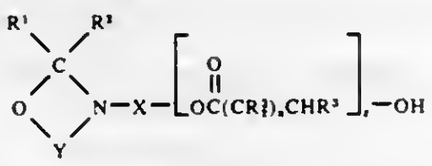
William D. Emmons, Huntingdon Valley, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 569,739, April 21, 1975, which is a division of Ser. No. 425,007, Dec. 14, 1973, Pat. No. 3,912,691. This application Oct. 7, 1976, Ser. No. 730,568

Int. Cl.² C08G 18/34, 18/38, 18/46

U.S. Cl. 428—425 5 Claims

1. An article of manufacture comprising a substrate having thereon a coating of a cured composition of an oxazolidine of the formula:



wherein R' is hydrogen, mononuclear aryl, aralkyl or alkyl; R² is hydrogen or alkyl or R' and R² are joined together with the carbon atom to which they are attached to form cycloalkyl; R³ is hydrogen, alkyl, cycloalkyl, alkoxy or mononuclear aryl; R', R² and R³ may be substituted with halo, lower alkoxy, hydroxy, amino or nitro; Y is unsubstituted or substituted lower alkylene; X is substituted or unsubstituted lower alkylene; *n* is an integer of at least 3, and *z* is an integer of 1–50 and a polyfunctional isocyanate.

4,032,687

TRANSFERABLE COLOR CHANGEABLE APPLIQUE

James R. Hornsby, Jr., Orlando, Fla., assignor to Funstuf, Inc., Orlando, Fla.

Filed Dec. 12, 1975, Ser. No. 640,184

Int. Cl.² C09K 3/34

U.S. Cl. 428—1 1 Claim

1. A transferable color changeable applique comprising:

a base sheet having an upper and a lower surface;

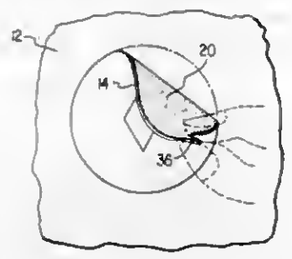
an adhesive layer disposed along said lower surface of said base sheet to enable said applique to be removably affixed to a supporting surface;

a layer of liquid crystalline material disposed along said upper surface of said base sheet;

said liquid crystalline material having characteristics of selective light scattering to exhibit color changes in response to temperature changes; and

indicia means disposed adjacent to and in contact with said liquid crystalline layer and surrounded by said liquid crystalline material;

a transparent layer disposed upon said liquid crystalline



material to allow visual observation of the color changes in said liquid crystalline layer; and

a removable backing sheet removably attached to said adhesive layer.

4,032,688

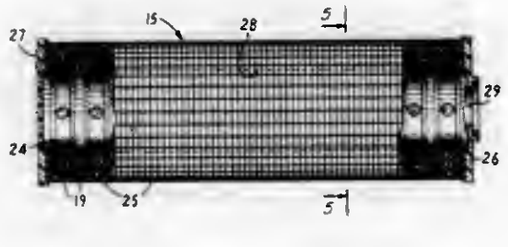
SEAMLESS TUBULAR NONWOVEN WEBS AND FILTERS THEREOF

David B. Pall, Roslyn Estates, N.Y., assignor to Pall Corporation, Glen Cove, N.Y.

Division of Ser. No. 393,688, Aug. 31, 1973, Pat. No. 3,933,557. This application May 12, 1975, Ser. No. 576,502

Int. Cl.² B01D 29/10

U.S. Cl. 428—36 8 Claims



1. A spirally wound tubular filter element comprising a seamless tubular nonwoven web comprising a generally spirally wound flexible layer of unbonded attenuated randomly-oriented heterogeneously intertwined spun fibers substantially all of which are less than 10 μ in diameter and inn discrete lengths, the layer having an open area of at least 70%, and being held together solely because of the randomly oriented heterogeneous intertwining of the spun fibers, the web being wound spirally on a longitudinally slotted tubular core, the inner end of the interior of the spirally wound flattened cylinder being in fluid flow connection with the slot, and having its opposed sides held apart by a foraminous spacer member for fluid flow within the cylinder to or from the slot.

4,032,689

CONSTRUCTION LAMINATE OF PLASTIC FOAM BETWEEN PAPER SHEETS

Frederick M. Johnson; James R. Brown, and Rex L. Reitz, all of Austin, Tex., assignors to Insulex, Inc., Austin, Tex.

Continuation-in-part of Ser. No. 528,040, Nov. 29, 1974, abandoned. This application Oct. 14, 1975, Ser. No. 621,668

Int. Cl.² B32B 5/18, 3/16; B63B 5/24; E04C 5/07

U.S. Cl. 428—55 12 Claims

1. A construction element comprising:

a first face layer of settable resin impregnated glass fiber cloth;

an intermediate stiffening member bonded to said first face layer comprising a laminate of:

a. a flexible top sheet;

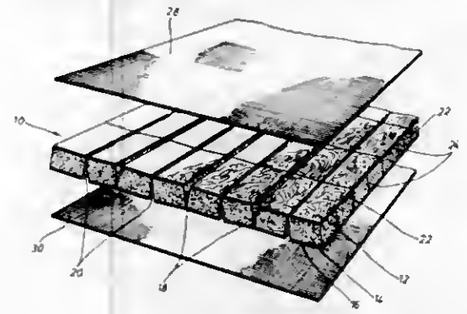
b. an intermediate foam layer bonded to said top sheet; and,

c. a flexible bottom sheet bonded to said intermediate foam layer on the side opposite said top sheet; said laminate having:

i. a first series of spaced slits extending through said top sheet and intermediate foam layer but not through said bottom sheet;

ii. a second series of spaced slits parallel to said first series of spaced slits and extending through said bottom sheet and intermediate form layer but not through said top sheet;

iii. a third series of spaced slits perpendicular to said first and second series of spaced slits, said third series



of spaced slits extending through said top sheet and intermediate foam layer but not through said bottom sheet; and,

iv. a fourth series of spaced slits parallel to said third series of spaced slits and extending through said bottom sheet and intermediate foam layer but not through said top sheet;

said fourth series of spaced slits being offset from said third series of spaced slits; and,

a second face layer of settable resin impregnated glass fiber cloth bonded to said intermediate stiffening member;

said settable resins being in the set state.

4,032,690

THERMOSENSITIVE RECORDING MATERIAL

Isao Kohmura, Nagaokakyo; Yukio Tahara, Takasago; Kiyoshi Futaki, and Hiroshi Tange, both of Nagaokakyo, all of Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan

Filed Jan. 24, 1975, Ser. No. 544,007

Int. Cl.² B41M 5/18; B32B 9/06

U.S. Cl. 428—263 19 Claims

1. A thermosensitive recording material composed of a coating composition applied as a single layer on a paper, synthetic resin film or textile cloth support, which coating composition comprises (a) a chromogenic compound, (b) an organic acid which melts or vaporizes at room temperature or higher and reacts with the chromogenic compound to develop color, (c) a water-soluble binder containing a carboxyl group and having a softening point of 200° C. or higher, (d) an infusible filler, (e) a metal salt of a higher fatty acid, and (f) a wax, the weight ratio of (a) to (b) being from 1/1 to 1/20, the amount of (c) being 15 to 50% by weight based on the total solids content of the composition, the amount of (d) being 30 to 300% by weight based on the total weight of (a) and (b), the total amount of (e) and (f) being 10 to 200% by weight based on the total amount of (a) and (b), the weight ratio of (e) to (f) being from 1/10 to 10/1, said recording material having a Bekk surface smoothness of 100 to 500 seconds.

4,032,691

RECORDING MATERIAL

Keishirō Kido; Satoru Honjo, and Masamichi Sato, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Mar. 21, 1975, Ser. No. 560,770

Claims priority, application Japan, Mar. 22, 1974, 49-32338

Int. Cl.² B32B 3/26

U.S. Cl. 428—304 3 Claims

1. A recording material which comprises a support having thereon a highly thermally insulating porous resin layer and a metal, dye or synthetic resin which is thermally deformed, foams, colors, discolors, sublimes, evaporates, or becomes transparent, translucent or opaque when exposed to radiation having a high energy density.

4,032,692

PROCESS FOR ADHESIVE BONDING AND COATING

Hans-Walter Birnkraut, Oberhausen, and Werner Kluy, Bochum-Stiepel, both of Germany, assignors to Ruhrchemie Aktiengesellschaft, Oberhausen, Germany

Division of Ser. No. 487,182, July 10, 1974, Pat. No. 3,971,690. This application Jan. 14, 1976, Ser. No. 649,154

Claims priority, application Germany, Jan. 10, 1974, 2400978

Int. Cl.² B32B 17/10; B05D 5/10

U.S. Cl. 428—442 6 Claims

1. A process for coating a material which consists essentially of applying to said material a laminar terpolymer comprising about 70 to 90 parts by weight of ethylene, about 0.5 to 10 parts by weight of an ethylenically unsaturated carboxylic acid amide, there being only hydrogen on the amide nitrogen; and about 0.5 to 20 parts by weight of an ethylenically unsaturated carboxylic acid ester, the sum of said parts by weight being about 100; and heating the terpolymer to a temperature sufficient to cause it to melt, thereby bonding said terpolymer to said material.

6. A process for coating a material which consists essentially of applying to said material a molten terpolymer comprising about 70 to 90 parts by weight of ethylene, about 0.5 to 10 parts by weight of an ethylenically unsaturated carboxylic acid amide, there being only hydrogen on the amide nitrogen, and about 0.5 to 20 parts by weight of an ethylenically unsaturated carboxylic acid ester, the sum of said parts by weight being about 100.

4,032,693

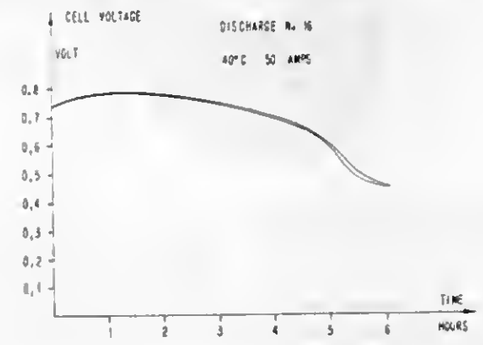
PROCEDURE TO STABILIZE AN IRON AIR BATTERY

Olle Birger Lindstrom, Taby, Sweden, assignor to AB Olle Lindstrom, Taby, Sweden

Filed Aug. 27, 1976, Ser. No. 718,326

Int. Cl.² H01M 8/18

U.S. Cl. 429—17 10 Claims



1. In a process for stabilizing an iron-air battery, which battery comprises one or more cells including a positive electrode which contains at least one of the metals cobalt, nickel,

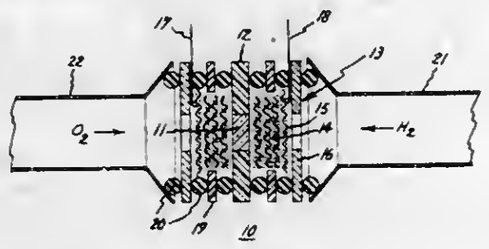
and silver for the reduction of oxygen during discharge and development of oxygen during charge, an alkaline electrolyte, and a negative electrode which contains electrochemically active iron, the process including the step of adding a sulphur-containing -containing compound to the electrolyte, the improvement comprising the step of adding sulphur-containing compound which forms free sulfide ions in said electrolytc, said compound being added in an amount sufficient to yield at least about 10 and up to about 1,000 parts per million by of sulphur in said compound per million parts by weight of active iron material.

4,032,694

FUEL CELL WITH HYDRONIUM BETA-ALUMINA ELECTROLYTE

Robert R. Dubin, Ballston Lake, and Walter L. Roth, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Aug. 26, 1976, Ser. No. 717,896
Int. Cl.² H01M 8/10
U.S. Cl. 429—33 4 Claims



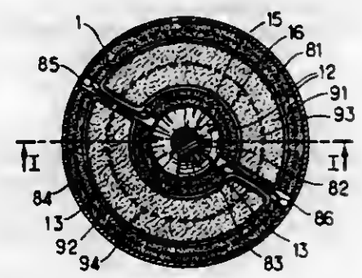
1. A gaseous fuel cell comprising a solid doped hydronium beta-alumina electrolyte which is positioned between and in direct electrical contact with a pair of gas permeable, electronically conductive electrodes, and means for supplying a hydrogen containing fuel gas containing water vapor to one of said electrodes and means for supplying an oxygen oxidant gas to the other end of said electrodes.

4,032,695

CYLINDRICAL ELECTRIC CELL

Jean Colbion, Tresses, France, assignor to Saft-Societe des Accumulateurs Fixes et de Traction, Romainville, France

Filed June 9, 1976, Ser. No. 694,438
Claims priority, application France, June 30, 1975, 75.20496
Int. Cl.² H01M 4/00
U.S. Cl. 429—94 10 Claims



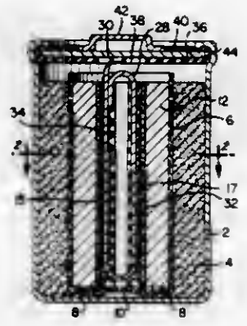
1. A cylindrical electric cell comprising a metallic casing containing a plurality of parallel connected concavo-convex elementary units each of which is trough-shaped and dimensioned to extend over a portion of the arc of a cylinder, the elementary units being juxtaposed within the casing to define a substantially complete cylinder, terminals for said cell, electrical connections between electrodes of the elementary units and the terminals of the cell, each elementary unit comprising a pair of relatively thin negative electrode parts, separator material and a relatively thick, trough-shaped, positive electrode, said positive electrode being tightly sandwiched in the radial direction with interleaved separator material between inner and outer relatively thin, trough-shaped, negative electrode parts of said pair, said parts being electrically interconnected, and means for expanding said units radially outwardly toward said casing.

4,032,696

DISCRETE ANODE BODIES FOR USE IN VARIOUS CYLINDRICAL CELL SYSTEMS

Lewis Frederick Urry, Columbia Station, Ohio, assignor to Union Carbide Corporation, New York, N.Y.

Filed Feb. 18, 1976, Ser. No. 659,167
Int. Cl.² H01M 6/14
U.S. Cl. 429—101 8 Claims



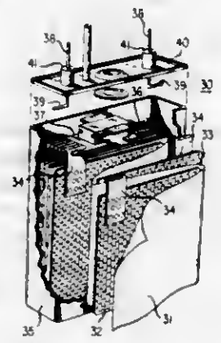
1. An electrochemical cell comprising a container; a cathode collector disposed within said container; a porous separator disposed within and in surface contact with said cathode collector; an anode in the form of at least two discrete bodies disposed within said separator; means for biasing said anode bodies radially outward against said separator which in turn contacts the cathode collector; and a liquid active reducible cathode-electrolyte disposed within said container.

4,032,697

METHODS OF PRODUCING ELECTRODES FOR ALKALINE BATTERIES

Richard Lawrence Beauchamp, Basking Ridge; Dean William Maurer, Berkeley Heights, and Thomas Denis O'Sullivan, Summit, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Continuation-in-part of Ser. No. 471,674, May 20, 1974, abandoned. This application Nov. 7, 1975, Ser. No. 630,031
Int. Cl.² H01M 4/26
U.S. Cl. 429—222 13 Claims



1. A process for the fabrication of cadmium electrodes for batteries in which the cadmium electrodes are made by impregnating a nickel plaque by a series of steps comprising
a. wetting the porous nickel plaque in a solution which contains cadmium cations with the solution having an acidic pH,
b. precipitating the cadmium ions in the form of a cadmium-ion compound from the solution in the porous nickel plaque

characterized in that

prior to impregnating the nickel plaque, the nickel plaque is first wetted with a water-containing solution and then air-oxidized in the temperature range between 200° and 500° C for a time period between 1 minute and 5 hours so as to passivate the nickel plaque against acidic attack during impregnation.

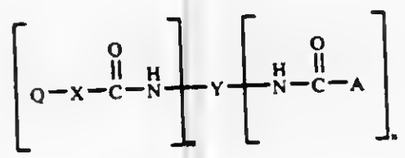
4,032,698

POLYMERIC MATERIALS WITH SUBSTITUTED UREA END GROUPS

Thomas A. Ashe, Kansas City, Mo., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 329,152, Feb. 2, 1973, abandoned, which is a continuation-in-part of Ser. No. 133,452, April 12, 1971, abandoned, which is a continuation-in-part of Ser. No. 39,534, May 21, 1970, abandoned. This application Oct. 29, 1975, Ser. No. 626,754
Int. Cl.² C08F 20/18
U.S. Cl. 526—14 9 Claims

1. A polymeric material represented by the structure



where

Q is a resinous polymeric or copolymeric segment of
a. an ester of acrylic acid or methacrylic acid with an alkanol of 1–18 carbon atoms;
b. styrene or acrylonitrile;
c. a vinyl ester whose ester moiety contains 2–18 carbon atoms; or
d. a vinyl ether;

X is the residue of a chain transfer agent;

Y is the residue of a di-, tri-, or tetraisocyanate radical after removal of isocyanate groups;

A is the residue of a basic radical which, as an entity before reaction, has a pk_a value of 5–14, or a salt thereof; and

m and *n* are 1, 2 or 3, the total not exceeding 4, provided that when *n* is 2 or 3, only one of A need be as defined.

4,032,699

FLUID RESISTANT TERPOLYMER COMPOSITIONS

Arthur C. West, III, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Sept. 15, 1975, Ser. No. 613,225
Int. Cl.² C08F 214/22
U.S. Cl. 526—18 5 Claims

1. A flucrinated terpolymer curable to a fluid resistant elastomer consisting essentially of 55 to 70 mol percent vinylidene fluoride, 25 to 40 mol percent hexafluoropropene and 1 to 8 mol percent chlorotrifluoroethylene to a total of 100 mol percent.

4,032,700

PROCESS FOR THE PREPARATION OF AMINATED POLYMERS USEFUL AS ADDITIVES FOR FUELS AND LUBRICANTS

Won R. Song, Maplewood; John Brooke Gardiner, Mountainside, and Lawrence James Engel, Green Brook Township, all of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 373,511, June 25, 1973. This application Sept. 15, 1975, Ser. No. 613,052
Int. Cl.² C08F 8/26; C08G 8/32
U.S. Cl. 526—43 9 Claims

1. A method for preparing an oil-soluble, sludge dispersing, aminated copolymer, said aminated copolymer having a molecular weight in the range of about 1000 to 500,000 Mn, and containing about 0.02 to about 2.0 wt. % nitrogen, based on the weight of said aminated copolymer, comprising the steps of solution brominating a terpolymer having an olefinic double bond in a hydrocarbon moiety which is pendant to the backbone chain of carbon atoms with a brominating agent to incorporate from about 0.1 to 10 wt. % viscinally substituted bromine in said pendant hydrocarbon moiety, said terpolymer comprising ethylene, a C_3 to C_{18} straight or branched chain α-olefin and a C_5 to C_{14} acyclic or alicyclic non-conjugated diolefin, said solution brominating step being carried out at a temperature of from 0° to 100° C.; and thereafter aminating said brominated terpolymer with a C_1 to C_{36} amine containing 1 to 12 amine groups by reacting said amine with said brominated terpolymer until from about 10 to 100 mole percent of the bromine content of said terpolymer is replced by amination groups, said reacting being carried out at a temperature in the range of about 20° C. to about 150° C. and for a period of from 0.1 to 10 hours.

4,032,701

CONTINUOUS METHOD FOR PRODUCING A DRY, SOLID POLYACRYLAMIDE

John Hughes, Arlington Heights, Ill., assignor to American Colloid Company, Skokie, Ill.

Filed Sept. 5, 1975, Ser. No. 610,547
Int. Cl.² C08F 2/00, 120/00, 120/56
U.S. Cl. 526—88 5 Claims

1. A process for producing dry, solid, polyacrylamide which comprises forming an aqueous mixture consisting essentially of from 60 to 80%, by weight, of acrylamide and from 20 to 40%, by weight, of water; heating said aqueous mixture to a temperature of between about 50° C and 100° C to form a one phase liquid aqueous composition; depositing, separately on a moving surface (1) said aqueous one phase liquid and (2) a catalytically effective amount of an aqueous solution of a water soluble polymerization catalyst for acrylamide, in such a manner so as to form a mixture of said one phase aqueous liquid and said aqueous solution, said surface being heated to a temperature of between about 50° C and the charring point of acrylamide whereby the acrylamide exothermically polymerizes to form polyacrylamide thereby causing all of the water to evaporate and forming a dry, solid polyacrylamide and removing said polyacrylamide from said surface.

4,032,702

PRODUCTION OF SURFACE ACTIVE MATERIAL

Kenneth James, Reading, England, assignor to Tate & Lyle Limited, London, England

Filed Oct. 15, 1975, Ser. No. 622,495
Claims priority, application United Kingdom, Oct. 17, 1974, 45122/74; Apr. 18, 1975, 16222/75
Int. Cl.² C07H 13/06
U.S. Cl. 536—119 16 Claims

1. A process for the preparation of a surface active material comprising reacting solid particulate sucrose with at least one alkyl ester of a fatty acid having 1 to 6 carbon atoms in the alkyl moiety and at least 8 carbon atoms in the fatty acid

and silver for the reduction of oxygen during discharge and development of oxygen during charge, an alkaline electrolyte, and a negative electrode which contains electrochemically active iron, the process including the step of adding a sulphur-containing -containing compound to the electrolyte, the improvement comprising the step of adding sulphur-containing compound which forms free sulfide ions in said electrolyte, said compound being added in an amount sufficient to yield at least about 10 and up to about 1,000 parts per million by of sulphur in said compound per million parts by weight of active iron material.

4,032,694

FUEL CELL WITH HYDRONIUM BETA-ALUMINA ELECTROLYTE

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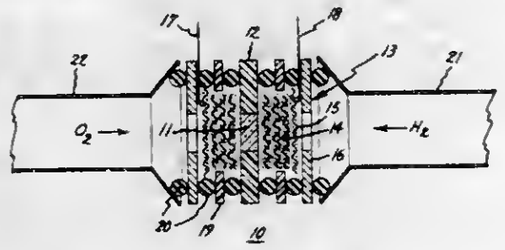

1. A gaseous fuel cell comprising a solid doped hydronium beta-alumina electrolyte which is positioned between and in direct electrical contact with a pair of gas permeable, electronically conductive electrodes, and means for supplying a hydrogen containing fuel gas contalning water vapor to one of said electrodes and means for supplying an oxygen oxidant gas to the other end of said electrodes.

4,032,695

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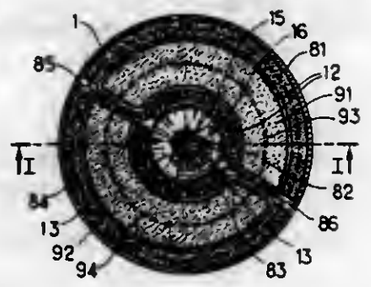

1. A cylindrical electric cell comprising a metallic casing containing a plurality of parallel connected concavo-convex elementary units each of which is trough-shaped and dimensioned to extend over a portion of the arc of a cylinder, the elementary units being juxtaposed within the casing to define a substantially complete cylinder, terminals for said cell, electrical connections between electrodes of the elementary units and the terminals of the cell, each elementary unit comprising a pair of relatively thin negative electrode parts, separator material and a relatively thick, trough-shaped, positive electrode, said positive electrode being tightly sandwiched in the radial direction with interleaved separator material between inner and outer relatively thin, trough-shaped, negative electrode parts of said pair, said parts being electrically interconnected, and means for expanding said units radially outwardly toward said casing.

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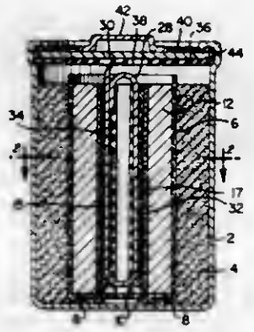

1. An electrochemical cell comprising a container; a cathode collector disposed within said container; a porous separator disposed within and in surface contact with said cathode collector; an anode in the form of at least two discrete bodies disposed within said separator; means for biasing said anode bodies radially outward against said separator which in turn contacts the cathode collector; and a liquid active reducible cathode-electrolyte disposed within said container.

4,032,697

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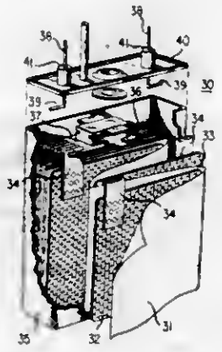

1. A process for the fabrication of cadmium electrodes for batteries in which the cadmium electrodes are made by impregnating a nickel plaque by a series of steps comprising
a. wetting the porous nickel plaque in a solution which contains cadmium cations with the solution having an acidic pH,
b. precipitating the cadmium ions in the form of a cadmium-

ion compound from the solution in the porous nickel plaque
characterized in that
prior to impregnating the nickel plaque, the nickel plaque is first wetted with a water-containing solution and then air-oxidized in the temperature range between 200° and 500° C for a time period between 1 minute and 5 hours so as to passivate the nickel plaque against acidic attack during impregnation.

4,032,698

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Int. Cl.² C08F 20/18
U.S. Cl. 526—14 9 Claims

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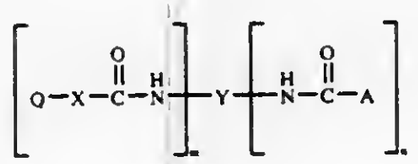

where
Q is a resinous polymeric or copolymeric segment of
a. an ester of acrylic acid or methacrylic acid with an alkanol of 1–18 carbon atoms;
b. styrene or acrylonitrile;
c. a vinyl ester whose ester moiety contains 2–18 carbon atoms; or
d. a vinyl ether;
X is the residue of a chain transfer agent;
Y is the residue of a di-, tri-, or tetraisocyanate radical after removal of isocyanate groups;
A is the residue of a basic radical which, as an entity before reaction, has a pk_a value of 5–14, or a salt thereof; and
m and *n* are 1, 2 or 3, the total not exceeding 4, provided that when *n* is 2 or 3, only one of A need be as defined.

4,032,699

FLUID RESISTANT TERPOLYMER COMPOSITIONS

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Filed Sept. 15, 1975, Ser. No. 613,225
Int. Cl.² C08F 214/22
U.S. Cl. 526—18 5 Claims

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4,032,700

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Int. Cl.² C08F 8/26; C08G 8/32
U.S. Cl. 526—43 9 Claims

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4,032,701

CONTINUOUS METHOD FOR PRODUCING A DRY, SOLID POLYACRYLAMIDE

John Hughes, Arlington Heights, Ill., assignor to American Colloid Company, Skokie, Ill.

Filed Sept. 5, 1975, Ser. No. 610,547
Int. Cl.² C08F 2/00, 120/00, 120/56
U.S. Cl. 526—88 5 Claims

1. A process for producing dry, solid, polyacrylamide which comprises forming an aqueous mixture consisting essentially of from 60 to 80%, by weight, of acrylamide and from 20 to 40%, by weight, of water; heating said aqueous mixture to a temperature of between about 50° C and 100° C to form a one phase liquid aqueous composition; depositing, separately on a moving surface (1) said aqueous one phase liquid and (2) a catalytically effective amount of an aqueous solution of a water soluble polymerization catalyst for acrylamide, in such a manner so as to form a mixture of said one phase aqueous liquid and said aqueous solution, said surface being heated to a temperature of between about 50° C and the charring point of acrylamide whereby the acrylamide exothermically polymerizes to form polyacrylamide thereby causing all of the water to evaporate and forming a dry, solid polyacrylamide and removing said polyacrylamide from said surface.

4,032,702

PRODUCTION OF SURFACE ACTIVE MATERIAL

Kenneth James, Reading, England, assignor to Tate & Lyle Limited, London, England

Filed Oct. 15, 1975, Ser. No. 622,495
Claims priority, application United Kingdom, Oct. 17, 1974, 45122/74; Apr. 18, 1975, 16222/75
Int. Cl.² C07H 13/06
U.S. Cl. 536—119 16 Claims

1. A process for the preparation of a surface active material comprising reacting solid particulate sucrose with at least one alkyl ester of a fatty acid having 1 to 6 carbon atoms in the alkyl moiety and at least 8 carbon atoms in the fatty acid

moiety, in the presence of a basic trans-esterification catalyst, at a temperature from 110° to 140° C, at atmospheric pressure without intentionally distilling alcohol by-product and in the absence of any solvent.

4,032,703

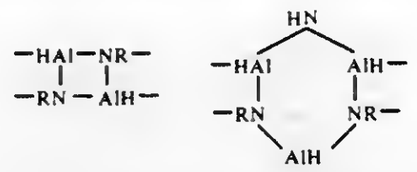
PROCESS FOR THE POLYMERIZATION OF UNSATURATED COMPOUNDS

Salvatore Cucinella, and Alessandro Mazzei, both of San Donato Milanese, Italy, assignors to Snam Progetti S.p.A., Milan, Italy

Filed July 1, 1975, Ser. No. 592,249
Claims priority, application Italy, July 1, 1974, 24659/74
Int. Cl.² C08F *4/64, 4/68, 4/60, 36/08*
U.S. Cl. 526—163 **5 Claims**

1. Process for the polymerization of compounds containing at least one olefinic unsaturation characterized in that the reaction is carried out in the presence of a catalyst system consisting of a transition metal compound together with an aluminum hydride derivative selected from

a. oligomer N-alkyliminoalanes consisting of a variety of four and/or six atom rings of the type



in which R is an aliphatic, cycloaliphatic or aromatic hydrocarbon radical, joined to one another to give high purity cage tridimensional structures having the composition $(HAl\text{-}NR)_n$ in which R has the aforesaid meanings n is an integer lower than or equal to 10, and the hydridge hydrogens may be also partially substituted by halogen atoms; and

b. aluminum hydride ring condensed mono - or poly-cyclic oligomer derivatives having the general formula

$$(XAlNR)_x(XYAl)_y(NHR)_z$$

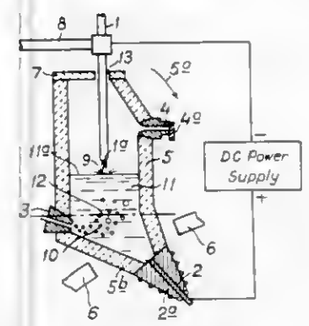
in which R is an aliphatic, cycloaliphatic, or aromatic hydrocarbon radical; X and Y, the same or different, ar hydride hydrogen and/or halogen atoms directly bound to aluminum, the number of halogen atoms being lower than $x+2y$ and the different therefrom consisting of hydride hydrogen atoms; the $x+y$ sum is an integer lower than or equal to 10, y being an integer other than zero; x and y do not necessarily refer to repeated imine or amine unities having the same composition, based on the meansing of X and Y.

4,032,704

METHOD AND APPARATUS FOR TREATING A METAL MELT

Sven Einar Stenkvist, Vasteras, Sweden, assignor to Asea Aktiebolag, Vasteras, Sweden

Filed Sept. 17, 1975, Ser. No. 614,214
Claims priority, application Sweden, Sept. 20, 1974, 7411831
Int. Cl.² H05B *7/20*
U.S. Cl. 13—10 **6 Claims**



1. A convertor for treating a metal melt by injecting into the melt a material which does not add heat to the melt during the injecting, comprising a vertically elongated vessel for containing the melt and which tilts between substantially vertical and substantially horizontal positions, said vessel having a top which can be open for charging the vessel with the melt, and a side having a tap hole and which is downward when the vessel is in its said horizontal position for tapping the melt, said vessel having a lower portion and a nozzle pointing into this lower portion for said injecting, said lower portion having an electric power connector therein and which is contacted by the melt and said vessel having an electric arc heating electrode depending through its top for heating the melt by an electric arc, said heating electrode being adapted to be powered by DC fed through said power connector and melt and the heating electrode via said arc.

4,032,705

CONSUMABLE ELECTRODE FURNACE CRUCIBLES

Patrick J. Wooding, Moorestown, N.J., assignor to Wooding Corporation, Moorestown, N.J.

Filed Sept. 24, 1975, Ser. No. 616,365
Int. Cl.² F27D *1/12*
U.S. Cl. 13—32 **9 Claims**

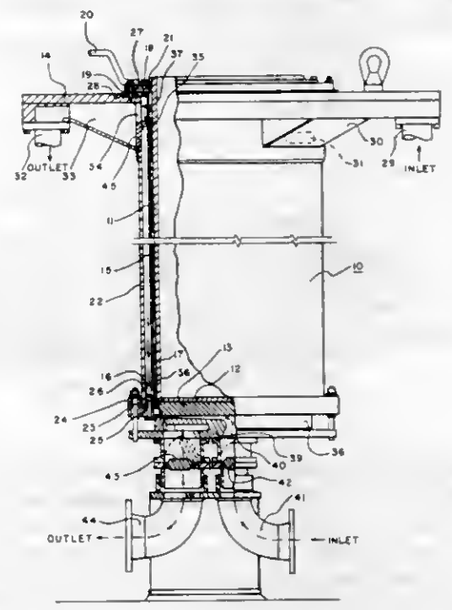
1. A crucible used in a consumable electrode furnace comprising:

an electrically conductive crucible body;

a crucible jacket disposed coaxially with the crucible body;

an electrically conductive water guide disposed coaxially with and between the jacket and the crucible body; and

means electrically interconnecting the lower portion of the crucible body to the lower portion of the water guide and electrically insulating the remainder of the water guide from the crucible body, whereby the water guide provides



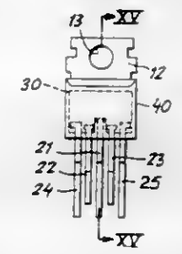
a return coaxial conductive path during operation of the furnace.

4,032,706

RESIN-ENCASED MICROELECTRONIC MODULE

Raimondo Paletto, Milan, Italy, assignor to SGS-ATES Componenti Elettronici S.p.A., Milan, Italy

Filed Sept. 23, 1974, Ser. No. 508,951
Claims priority, application Italy, Sept. 26, 1973, 29390/73
Int. Cl.² H05K *5/06*
U.S. Cl. 174—52 PE **4 Claims**



1. A microelectronic module comprising:

a sheet-metal plate with an upper and a lower face;

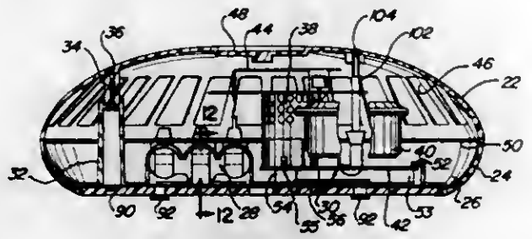
a semiconductive chip supported on the upper face of said plate;

a set of conductive tongues including a central tongue conductively and mechanically secured to said plate, a pair of intermediate tongues flanking said central tongue, and a pair of outer tongues flanking said intermediate tongues, said intermediate and outer tongues being connected to respective terminals of said chip; and

a resinous body encasing said chip and three sides of said plate while leaving the lower face thereof exposed, said tongues being partly imbedded in said body and having portions projecting generally parallel to one another from a side of said body, said projecting portions being alternately bent upwardly and downwardly outside said body to increase the spacing of their free ends;

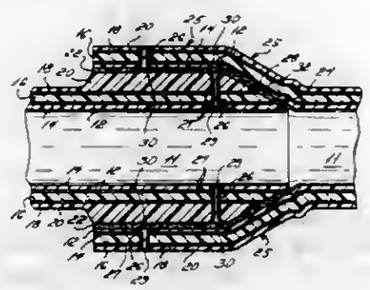
said plate having an edge confronting said tongues and forming an upwardly open median recess, said central tongue having a downwardly bent encased extremity received in said recess, said intermediate tongues having T-shaped encased ends offset from said encased extremity, said outer tongues having outwardly pointing L-shaped encased ends offset from said T-shaped ends.

4,032,707
HOUSING FOR BATTERY-OPERATED DEVICE
John M. Trenary, Fort Collins, Colo., assignor to Teledyne Industries, Inc., Fort Collins, Colo.
Filed Feb. 9, 1976, Ser. No. 656,313
Int. Cl.² H05K 5/00
U.S. Cl. 174—52 R 14 Claims



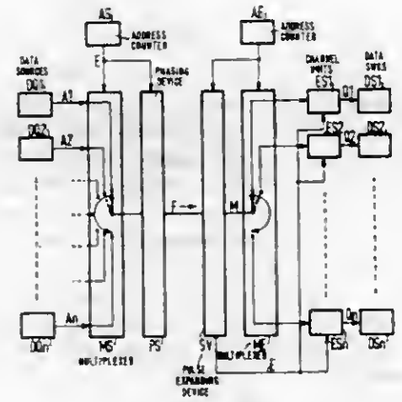
1. In a housing for containing electrical components of a battery-operated device, the improvement comprising:
a transverse wall forming a part of said housing;
means defining at least one opening in said wall;
means defining in one surface of said wall adjacent to said and a support web suspended from said wall in a position spaced from and opposite said opening, the surface of said web facing said wall including means defming a second succession of cavities each sized to seat a battery and aligned with a respective cavity in said first succession so as to captivate such a battery therebetween.

4,032,708
HIGH VOLTAGE ELECTRICAL TRANSMISSION LINE AND CONDUIT THEREFOR AND METHOD OF MAKING SAME
Jonas Miedney, 3504 Woodward St., Oceanside, N.Y. 11572
Filed Mar. 1, 1976, Ser. No. 662,960
Int. Cl.² H01R 5/00
U.S. Cl. 174—84 R 12 Claims



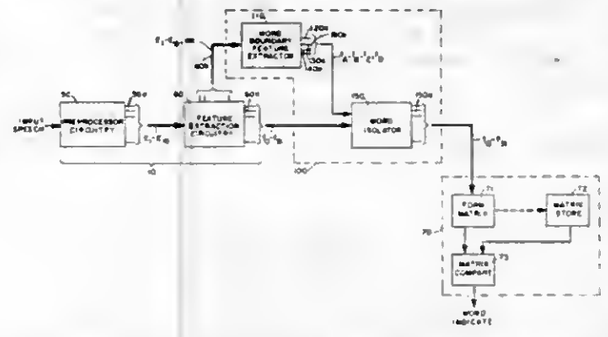
1. In combination, an end-to-end operative arrangement of hollow pipes for housing a high voltage transmission line or the like, each pipe comprising an improved insulator tube containing at least one electrically conductive coaxial layer in said insulator tube serving as an electrostatic shield, said insulator tube of adjacent pipes being disposed in telescoped relation with an optimum minimum clearance therebetween to facilitate said telescoping, said clearance being bounded on one side by an inner surface of an outer insulator tube and on the other side by said outer surface of an inner insulator tube, radially oriented electrically conductive elements in said insulator tubes in electrical contact with said electrostatic shields thereof and communicating with said clearance, and an electrically conductive adhesive in said clearance in contact with said bounding surfaces of said insulators and in contact with said radially oriented conductors, whereby said adhesive simultaneously completes said adhesive interconnection of said insulations of said adjacent pipe and also establishes the electrical continuity between said electrostatic shields of adjacent ones of said insulator tubes.

4,032,709
CIRCUIT ARRANGEMENT FOR LENGTHENING A STOP ELEMENT AT THE RECEIVER IN A CHARACTER-FRAME-GOVERNED TIME DIVISION MULTIPLEX DATA TRANSMISSION SYSTEM
Konrad Reisinger, Zornedlng, and Ludwig Holzl, Sauerlach, both of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany
Filed Mar. 19, 1976, Ser. No. 668,520
Claims priority, application Germany, Mar. 20, 1975, 2512303
Int. Cl.² H04L 5/00
U.S. Cl. 178—50 4 Claims



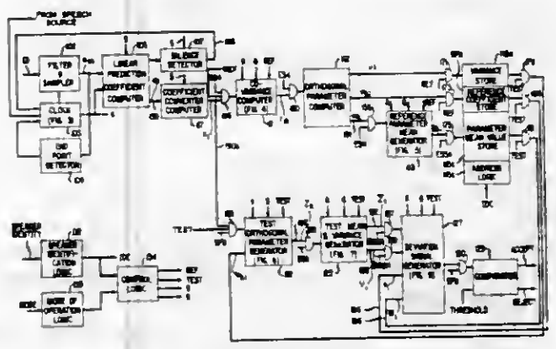
1. In a character frame governed time division multiplex (t.d.m.) data transmission system wherein a t.d.m. signal is transmitted via a transmission link to a receiver multiplexer having outputs connected, respectively, to channel units, the outputs of said channel units being connected, respectively, to data sinks, the improvement comprising:
a stop element lengthening apparatus centrally interposed in the received t.d.m. signal path between said transmission link and said receiver multiplexer for producing a timing signal and sequentially coupling said timing signal to said channel units, and for coupling information portions of the data signals to said channel units, the channel units, respectively, being triggered by said timing signal, the stop element lengthening apparatus comprising:
means for generating a sequence of sampling pulses occurring substantially in the centers of the signal components of the received t.d.m. data signals, each said sampling pulse corresponding to a respective signal component,
first counter means connected to receive said sampling pulses as counting pulses,
gate means for emitting a blocking signal when, during the duration of said sampling pulses, a start element of the data signal is indicated and a predetermined count is reached or exceeded by said first counter means,
second counter means connected to receive said blocking signal as a counting signal and including resetting means operable responsive to the exceeding of said predetermined count,
third counter means connected to receive said sampling pulses as counting pulses and
means for producing said timing signal when said second and third counter means register equal counts.

4,032,710
WORD BOUNDARY DETECTOR FOR SPEECH RECOGNITION EQUIPMENT
Thomas B. Martin, Delran; Marvin B. Herscher, Cherry Hill, and Robert B. Cox, Cinnaminson, all of N.J., assignors to Threshold Technology, Inc., Delran, N.J.
Filed Mar. 10, 1975, Ser. No. 556,633
Int. Cl.² G10L 1/00
U.S. Cl. 179—1 SA 11 Claims



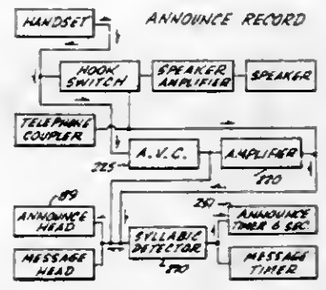
1. In an apparatus which recieves acoustic input, said input including words spoken in isolation, and performs recognition functions on said words, said apparatus including means for generating feature signals indicative of feature characteristics in the received input and means for comparing the feature signals which occur during determined time boundaries with stored features corresponding to words in a vocabulary; an improved system for detecting word boundaries, comprising:
a. means responsive to said input for generating a first feature signal indicative of the presence of speech-like sounds which meet a first selection criterion;
b. means for storing the feature signals which occur during the presence of said first feature signal;
c. means responsive to said input for generating a second feature signal indicative of the presence of speech-like sounds which meet a second selection criterion; and
d. means for determining the substantially last occurrence of said second feature signal among the stored feature signals, the end boundary of an input spoken word being determined as a function of said last occurrence.

4,032,711
SPEAKER RECOGNITION ARRANGEMENT
Marvin Robert Sambur, Randolph Township, Morris County, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed Dec. 31, 1975, Ser. No. 645,520
Int. Cl.³ G10L 1/00
U.S. Cl. 179—1.5 B 31 Claims



1. A speaker recognition system comprising means for forming a set of reference prediction parameter signals from a prediction anaylsis of the utterances of an identified speaker, means responsive to said reference prediction parameter signals for generating a prescribed set of reference coefficient signals adapted to transform said reference prediction parameter signals into a set of signals representative of the identity of said identified speaker, means jointly responsive to said reference prediction parameter signals and said reference coefficient signals for generating a set of first signals characteristic of the identity of said identified speaker, means for forming a set of test prediction parameter signals from a prediction analysis of the utterances of an unknown speaker, means jointly responsive to said reference coefficient signals generated for said identified speaker and said test prediction parameter signls generated for said unknown speaker for producing a prescribed set of second signals characteristic of an hypothesized identity of the unknown speaker with reference to said identified speaker, and means for comparing said prescribed set of first signals with said prescribed set of second signals to verify said hypothesized identity of said unknown speaker as said identified speaker.

4,032,712
TELEPHONE ANSWERING DEVICE WITH SEPARATE ANNOUNCEMENT ERASE AND PLAYBACK CONTROL TIMING PERIODS
Kenneth A. Catto, and Harold R. Burt, both of Beauertum, Oreg., assignors to Data Time, Inc., Portland, Oreg.
Continuation of Ser. No. 408,641, Oct. 23, 1973, abandoned, which is a division of Ser. No. 308,970, Nov. 24, 1972, Pat. No. 3,833,186. This application Apr. 25, 1975, Ser. No. 571,808
Int. Cl.³ H04M 1/64; G11B 15/02
U.S. Cl. 179—6 R 2 Claims



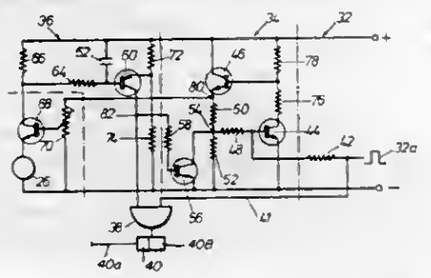
1. In a telephone answering device having an announcement tape, a first system for erasing an old announcement on the tape and for recording thereon a replacement announcement fed into the system, and a second system for playing back the tape and reproducing an announcement recorded thereon, the improvement comprising
means in the first system responsive to the termination of the replacement announcement for erasing the tape for a predetermined time interval after the replacement announcement has terminated, and
means in the second system for terminating playing back of the tape a predetermined time interval after the announcement has concluded, which interval is shorter than the first-mentioned time interval.

4,032,713
RECORDING TAPE CONTROL ARRANGEMENT FOR TELEPHONE ANSWERING APPARATUS
Paul Fahlenberg, Baierbrunn, Germany, assignor to Compur - Electronic Gesellschaft mit beschraenkter Haftung, Munich, Germany
Filed Mar. 14, 1975, Ser. No. 558,295
Claims priority, application Germany, Apr. 4, 1974, 2416374
Int. Cl.² H04M 1/64
U.S. Cl. 179—6 R 11 Claims

1. A circuit arrangement for use in a telephone answering apparatus responsive to ringing signals from a telephone company line and having a magnetic tape and a magnetic tape drive system, said circuit arrangement comprising:
detecting means for detecting said ringing signals;

first means for first effecting a drive to completely rewind said magnetic tape in response to the detected ringing signals from the telephone company line;

second means for producing a signal indicating that said magnetic tape is completely rewound; and



third means for effecting a forward play of said magnetic tape in response to a simultaneous occurrence of a ringing signal and said indicating signal.

4,032,714

PCM TIME DIVISION MULTIPLEX COMMUNICATION NETWORK WITH DIGITAL SUBSCRIBER STATIONS

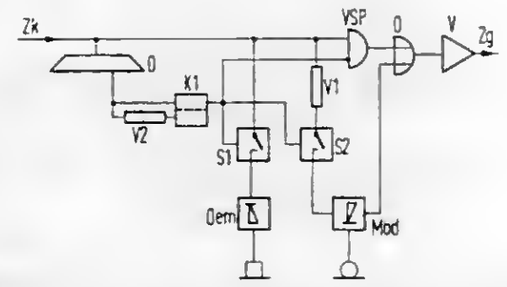
Alfred Mattern, Grobenzell, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed June 25, 1976, Ser. No. 699,957

Claims priority, application Germany, June 27, 1975, 2528840

Int. Cl.² H04J *3/06*

U.S. Cl. 179—15 BA **16 Claims**



8. A PCM time division multiplex communication network having a central processing office and a plurality of digital subscriber stations comprising:

means within the central processing office for generating an information signal, said information signal containing a special code word prefixed to the PCM data, whereby said special code word is used to designate a particular subscriber station intended for acceptance of the PCM data, said information signal further containing a PCM data portion having a special signal characteristic comprising bits which have widths clearly defined by jumps of set physical quantities, whereby said special signal characteristic is used to derive directly the timing signal of the designated subscriber station;

means within each subscriber station for retransmitting information signals which are not intended for said subscriber station, whereby said information signal is retransmitted without modification;

decoder means within each subscriber station for actuating said subscriber station in response to an information signal intended for said subscriber station, whereby said decoder means is responsive to the special code word of said information signal;

demodulation means within each subscriber station for demodulating the PCM data portion of said information signal, whereby the timing signal for said demodulation means is derived directly from said special signal characteristic of the PCM data portion of said information signal;

modulation means within each subscriber station for generating the output signal of said subscriber station, whereby said modulation means uses the PCM data portion of the information signal as a carrier bit group for the output signal of said subscriber station.

4,032,715

CIRCUIT ARRANGEMENT OF A STEREO-HUNTING DEVICE IN A STEREO DECODER

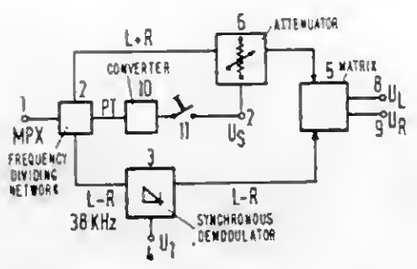
Dietmar Mallon, Zorneding, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Feb. 20, 1976, Ser. No. 659,944

Claims priority, application Germany, Mar. 13, 1975, 2511079

Int. Cl.² H04H *5/00*

U.S. Cl. 179—15 BT **3 Claims**



1. In a stereo receiving apparatus of the type which receives a stereo transmission having a pilot tone component and sum signal and difference signal components of two reproduction signals, and in which the sum signal and difference signal components are fed in respective channels to and are converted in a matrix operating with sum and difference formation to form the reproduction signals, and in which only the sum signal is present in the case of a mono-received signal, the improvement therein comprising:

control signal means for receiving the pilot tone signal and operable to produce a control signal in response to the absence of the pilot tone signal; and an attenuator interposed in the sum signal channel, said attenuator including a control input connected to said control means and operable to block the sum channel in response to said control signal.

4,032,716

MEASUREMENT OF NOISE IN A COMMUNICATION CHANNEL

Edgar Robert Allen, Stanmore, England, assignor to The Post Office, London, England

Filed May 23, 1975, Ser. No. 580,349

Claims priority, application United Kingdom, May 30, 1974, 24013/74

The portion of the term of this patent subsequent to June 17, 1992, has been disclaimed.

Int. Cl.² H04J *1/16*

U.S. Cl. 179—15 BF **7 Claims**

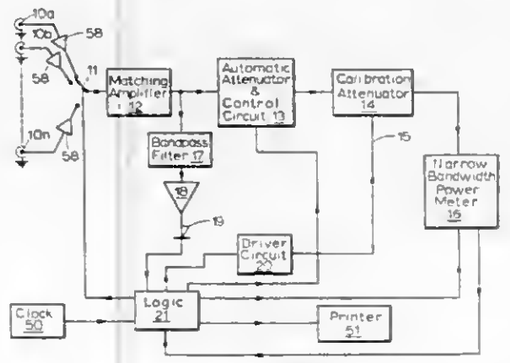
1. Apparatus for assessing the noise performance of a FDM (frequency division multiplex) communications link over which a FDM signal is transmitted, said link over which a FDM signal is transmitted, said apparatus comprising:

a. input terminal means for extracting a small fraction of the FDM signal,

b. first automatic attenuator means controlled by a first feed back loop and connected to an output of said input terminal means for attenuating said FDM signal to a predetermined level over a broad bandwidth,

c. bandwidth limiting means connected via a second automatic attenuator means to an output of said first automatic attenuator means for passing a bandwidth located within a communications channel, and

d. power measuring means connected to an output of said bandwidth limiting means, including said automatic attenuator means for measuring a noise signal at an output of said bandwidth limiting means.



4,032,717

CIRCUIT ARRANGEMENT FOR A CONTINUOUS ADJUSTMENT OF THE BASE WIDTH IN A STEREO DECODER

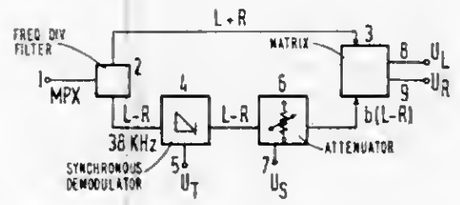
Dietmar Mallon, Zorneding, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Feb. 26, 1976, Ser. No. 661,766

Claims priority, application Germany, Mar. 13, 1975, 2511026

Int. Cl.² H04H *5/00*

U.S. Cl. 179—15 BT **5 Claims**



1. In a stereo decoder of the type in which received multiplex signal is split into a sum signal and a difference signal of two reproduction signals and are fed through a sum signal channel and a difference signal channel, respectively, to respective sum signal and difference signal inputs of a sum and difference matrix which is responsive thereto to form the reproduction signals, the improvement therein comprising:

a circuit arrangement for continuously adjusting the base width including control signal means for deriving a control signal in accordance with the signal strength of the received signal; and

attenuator means interposed in the difference signal channel, said attenuator means having a control input connected to said control signal means and operable in response to said control signal to control the attenuation of the difference signal.

4,032,718

FOUR-WIRE INTEGRABLE HYBRID

John Francis O'Neill, Boulder, Colo., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 19, 1976, Ser. No. 687,622

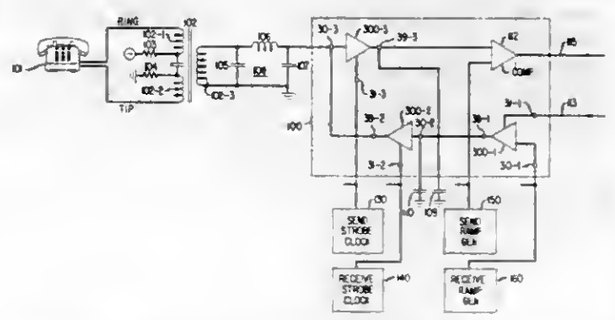
Int. Cl.² H04J *3/02*

U.S. Cl. 179—15 AA **13 Claims**

1. In a port circuit for a time-sampled switching system having a low-pass filter, the combination comprising:

a first high input impedance transmission path including means for periodically passively sampling voltages transmitted through said filter in one direction; and

a second transmission path having low output impedance coupled to said filter for applying thereto discrete current impulses at intervals substantially equal to the reciprocal of twice the cut-off frequency of said filter.



4,032,719

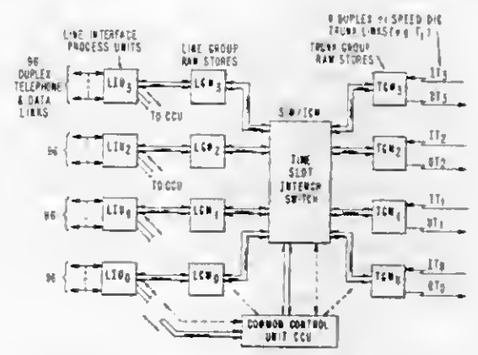
MODULAR SLOT INTERCHANGE DIGITAL EXCHANGE

Herman Blasbalg, Raleigh, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed June 26, 1975, Ser. No. 590,547

Int. Cl.² H04J *6/02;* **H04Q** *11/04*

U.S. Cl. 179—15 AS **15 Claims**



1. Common control digital switch apparatus for variably handling signals in digital form between locally accessible line multiples and time slot channels of locally accessible time divided digital trunk links comprising:

slot interchange storage switching means having time interchangeable randomly accessible line slot and trunk slot buffer storage spaces of different capacity, said spaces being subject to variably paired interchange association;

first means for passing information representational signals between said line slot spaces and selectively associated lines in respective said line multiples;

second means for passing information representational signals between said trunk slot spaces and selectively associated real time slot channels on said trunk links; and

common control means linked to said first and second means and said interchange storage means for variably establishing paired interchange associations of line slot and trunk slot spaces in random order, thereby effectively providing for remote signaling communication relative to said lines via randomly associated channels of said trunk links.

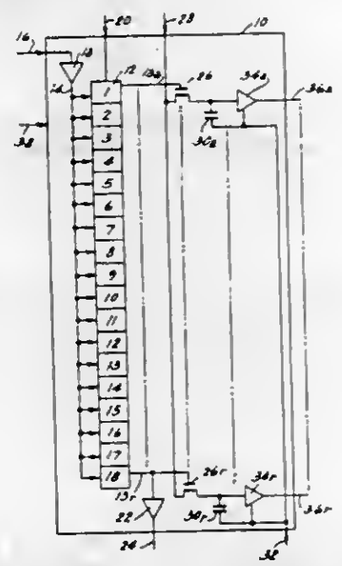
4,032,720
INTEGRATED DEMULTIPLEXING CIRCUIT WITH CONTINUOUSLY VARIABLE OUTPUTS

Eugene S. Morez, Morton Grove, and Douglas R. Moore, Vernon Hills, both of Ill., assignors to Norlin Music, Inc., Lincolnwood, Ill.

Continuation-in-part of Ser. No. 444,028, Feb. 20, 1974, Pat. No. 3,902,397, which is a continuation of Ser. No. 323,247, Jan. 12, 1973, abandoned. This application June 19, 1975, Ser. No. 588,331

Int. Cl.² H04J *3/04*

U.S. Cl. 179—15 A **14 Claims**



1. A demultiplexing circuit for providing a plurality of output channels having continuously variable outputs, comprising a shift register having a plurality of stages, means for operating a first stage of said shift register, clock means connected with said shift register for causing said operated stage to propagate down the length of said shift register, a plurality of switches, means connecting each of said switches individually to a single stage of said shift register, each of said switches being operated when its associated stage is operated, means collectively connecting said switches to a source of an analog input signal, a plurality of sample-and-hold means, one for each of said switches, and means individually connecting said switches to said sample-and-hold means, whereby said sample-and-hold means manifests a voltage corresponding to the instantaneous voltage of said analog input signal at the time when its associated switch is operated.

4,032,721
STORED PROGRAM LOGIC SYSTEM USING A COMMON EXCHANGE CIRCUIT

Pierre Anizan, Paris, France, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

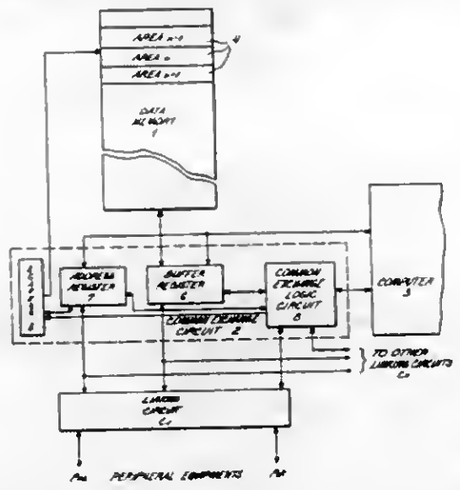
Continuation-in-part of Ser. No. 532,775, Dec. 16, 1974, abandoned, which is a continuation of Ser. No. 444,975, Feb. 22, 1974, abandoned, which is a continuation of Ser. No. 324,794, Jan. 18, 1973, abandoned, which is a continuation of Ser. No. 190,043, Oct. 18, 1971, abandoned. This application Dec. 29, 1975, Ser. No. 645,272

Claims priority, application France, Oct. 22, 1970, 70.38221

Int. Cl.² H04Q *3/54*

U.S. Cl. 179—18 ES **1 Claim**

1. A stored program logic system for use with a plurality of peripheral equipments comprising: a data memory (1) having a plurality of addressed fields (4) for storing processable data, a common exchange means including scanning means (5) for selecting fields of said data memory, an exchange address register (7) for storing the address of the field to be selected by said scanning means, an exchange buffer register (6) connected to said data memory for receiving data from or transferring data to said data memory and exchange control (8) means for controlling the reception and transmission of addresses and data by said register; a linking means for interfacing the peripheral equipments with said common exchange means including a linking address register (13) connected to said exchange address register for receiving and storing an address therefrom or transferring thereto an address stored in said linking address register, a linking circuit register (12) connected to said exchange buffer register for receiving and storing data therefrom and for transferring thereto data stored in said linking circuit register, said linking circuit register being connectable to peripheral equipments for receiving data



therefrom and transferring data thereto, and linking control means (14) for controlling the transmission and reception of addresses and data by said registers; and a computer, said computer comprising means for processing data (15, 16, 17, 19), a computer address register means (25) connected to said exchange address register for receiving and storing addresses therefrom and transferring thereto addresses stored in said exchange address register, computer buffer register means (26, 27) for receiving data from and transferring data to said exchange buffer register, and computer control means for controlling the transmission and reception of addresses and data by said register means.

4,032,722
TELEPHONE DIALING ARRANGEMENT FOR CALLING A SINGLE PARTY

David Charles Antony Connolly, Shildon, and Robert Andrew Stevenson, Newton Aycliffe, both of England, assignors to The General Electric Company Limited, London, England

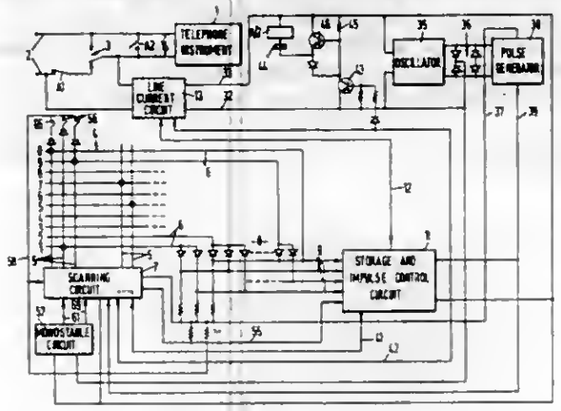
Filed Apr. 29, 1975, Ser. No. 572,934

Claims priority, application United Kingdom, Apr. 30, 1974, 18927/74

Int. Cl.³ H04M *1/272*

U.S. Cl. 179—18 BB **9 Claims**

1. Telephone apparatus which is for connection over line wires to an automatic exchange and which has provision for supplying trains of dial impulses to enable a speech connection to be made through the exchange to only a single predetermined party, said telephone apparatus comprising a telephone instrument having a handset, a plurality of passive means each storing in preset manner a coded representation of the number of impulses of one of said trains, active electronic storage means, scanning means to scan said passive means to cause the numbers corresponding to the representations stored by the passive means to be written one at a time into the active electronic storage means, conversion means to cause trains of impulses to be generated in respect of the numbers stored by said storage means, and a single manually operable means upon operation of which said storage means, said scanning means and said conversion means are brought into use to generate the trains of impulses subsequent to a call



having been initiated by lifting the handset of the telephone instrument.

4,032,723
CORDLESS TELEPHONE SYSTEM

Luis Esteban Mendoza, 1806 Smokewood Ave., Fullerton, Calif. 92631

Filed Feb. 24, 1976, Ser. No. 661,017

Int. Cl.² H04Q *7/04*

U.S. Cl. 179—41 A **3 Claims**

1. A cordless, two-way telephone system, including:
a base station and
a mobile unit;
said base station including a first radio transmitter designed to operate in the range of 1.7 Mhz and a first radio receiver operable in the range of 27 Mhz;
said first radio transmitter including:
a power supply, a power cord coupled to said power supply and having at least first and second electrical conductors for connecting said power supply to a source of a.c. power, the length of said first conductor in said power cord being less than one-eighth of a wavelength in said range of 1.7 Mhz, said first conductor being maintained above ground potential, for signals in said 1.7 Mhz range, at its end coupled to said power supply,
a source of modulatable R-F signals connected to said power supply and powered thereby; and an antenna coil coupled to said source of R-F signals, said antenna coil having first and second terminals;
first means coupling said first terminal of said antenna coil to said first conductor, only, of said power cord;
an antenna conductor spaced from said first and second conductors and having a length substantially less than one-eighth wavelength in said range of 1.7 Mhz;
second means coupling said second terminal of said antenna coil to one end of said antenna conductor;
said mobile unit including a second radio transmitter and a second radio receiver;
said second radio receiver including a ferrite rod antenna, a first detector coupled to said ferrite rod antenna for producing I-F signals when said ferrite rod antenna is in the R-F field from said first radio transmitter;
indicator means for indicating when the signal from said base station is below a level which permits communication between said base station and said mobile unit, said indicator means including rectifying means coupled to said first detector for rectifying the I-F signals therefrom, switching means responsive to the absence of adequate output from said rectifying means to enter a conducting state, a source of operating voltage, and an out-of-communication indicator connected between said source of operating voltage and said switching means and responsive to the conducting state of said switching means to emit light.

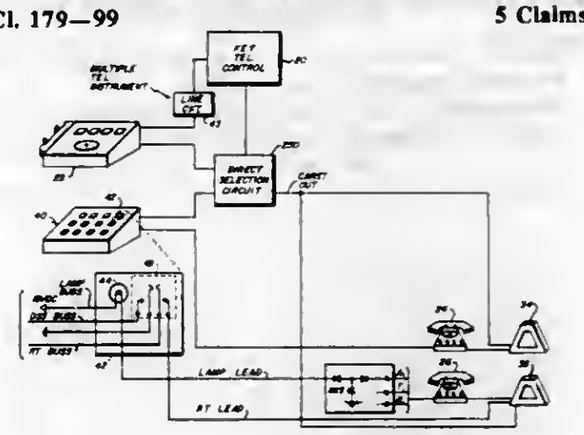
4,032,724
DIRECT STATION SELECTION CIRCUIT

Coy Edwin Matheny, Fulton, Ky., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Aug. 11, 1975, Ser. No. 603,327

Int. Cl.² H04M *1/72*

U.S. Cl. 179—99 **5 Claims**



1. A direct station selection apparatus adapted for use in a key telephone system in which at least one station of the system is equipped with an audio receiver in addition to the speaker of the station telephone instrument, comprising a second station having means associated with said second station for directly connecting the second station to the audio receiver at the one station regardless of the condition of the one station as busy or idle, means responsive to the direct connection for initiating an audio signal for transmission to the additional audio receiver and to the station instrument of said one station, and means responsive to said connection for automatically placing on hold any telephone line in communication with said second station.

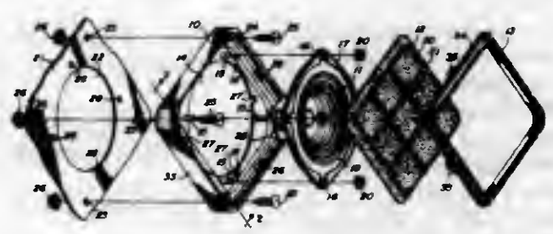
4,032,725
SPEAKER MOUNTING

Paul Dean McGee, Medinah, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Sept. 7, 1976, Ser. No. 721,010

Int. Cl.² H04R *1/02*; **G12B** *9/04*

U.S. Cl. 179—146 R **9 Claims**



1. Apparatus for mounting a speaker having a cone on a

panel having an aperture provided to receive the speaker cone, said apparatus comprising:

a base having an opening formed to receive said speaker cone and having a raised peripheral flange;

first fastening means for fastening the base to the panel;

second fastening means for fastening the speaker to the base;

a speaker cover dimensioned to fit within the base raised peripheral flange and having a peripheral flange portion;

a resilient retainer positioned within the base and engaging the speaker cover peripheral flange portion; and

locking means formed between the resilient retainer and the raised peripheral portion of the base, said locking means for releasably coupling the resilient retainer and base.

4,032,726

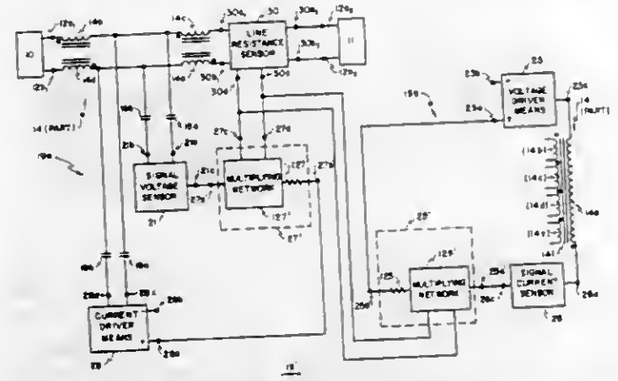
REPEATER FOR TRANSMISSION LINES OF DIFFERING LENGTHS

Charles W. Chambers, Jr., Amherst, Ohio, assignor to Lorain Products Corporation, Lorain, Ohio

Division of Ser. No. 560,257, March 20, 1975, Pat. No. 3,989,907. This application July 8, 1976, Ser. No. 703,556

Int. Cl.² H04B *3/16*

U.S. Cl. 179—170 G **8 Claims**



1. In an apparatus for modifiying the transmission characteristics of a telephone transmission line, the combination of:

means for generating a control signal proportional to the a-c losses of the transmission line;

shunt impedance simulating means for generating an impedance simulating current which varies in accordance with the signal voltage across the transmission line, the shunt impedance simulating means including first control signal responsive means for causing the magnitude of the impedance simulating current to vary directly with the product of the control signal and the signal voltage;

series impedance simulating means for generating an impedance simulating voltage which varies in accordance with the signal current through the transmission line, the series impedance simulating means including second control signal responsive means for causing the magnitude of the impedance simulating voltage to vary directly with the product of the control signal and the signal current;

means for applying a signal which varies in accordance with the signal voltage across the transmission line to the shunt impedance simulating means;

means for applying a signal which varies in accordance with the signal current through the transmission line to the series impedance simulating means;

means for applying the impedance simulating current in shunt with the transmission line; and

means for applying the impedance simulating voltage in series with the transmission line.

4,032,727

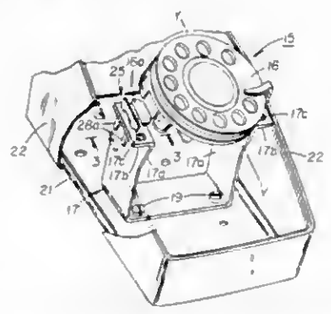
RELEASABLY LOCKED MOUNTING ASSEMBLY FOR TELEPHONE DIALS

William S. Burns, Jr., Shreveport, La., assignor to Western Electric Company, Inc., New York, N.Y.

Filed Jan. 2, 1976, Ser. No. 646,296

Int. Cl.² H04M *1/02*

U.S. Cl. 179—178 **23 Claims**



1. A mounting assembly for releasably supporting a telephone dial, the latter including a pair of mounting tabs extending from the opposite sides thereof, within a housing, comprising:

dial support means secured within said housing, and having at least a pair of spaced structural extensions formed with openings therein;

a pair of resilient mounting elements seated within selected ones of said openings, each element including a generally U-shaped section with a pre-formed bight that provides opposed leg portions with an outward taper therebetween, said leg portions, when forced a short distance toward each other upon being seated within an associated, area-restricting opening, bear against opposed walls of the latter, one leg portion of each U-shaped section also being formed to terminate in a pair of spaced and laterally extending support shoulders adapted to rest upon one surface of an associated one of said structural extensions, with other leg portion being formed with an offset, beveled shoulder located so as to inherently be spring-biased, as a result of said pre-formed bight, against the other surface of said associated structural extension and, thereby effect the reliable positioning and releasable locking of the resilient element thereto, said one leg portion also having at least an associated integral end section that is formed with at least one fastening means-receiving aperture, and

fastening means extending through said apertures for respectively securing said mounting elements to said dial mounting tabs, whereby said dial is releasably mounted, through said elements, on said support means.

4,032,728

PUSH BUTTON SWITCH

Jürgen Oelsch, Braunschweig, Germany, assignor to Olympia Werke AG, Wilhelmshaven, Germany

Filed Dec. 10, 1975, Ser. No. 639,607

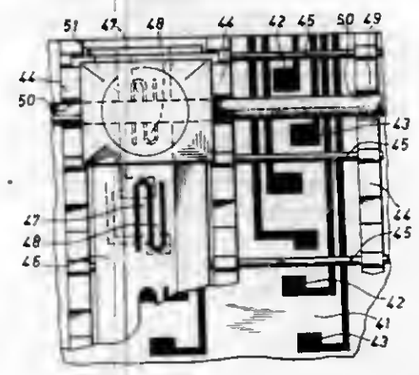
Claims priority, application Germany, Dec. 20, 1974, 2460485

Int. Cl.² H01H *13/70, 1/06, 21/02*

U.S. Cl. 200—5 A **25 Claims**

1. A push button switch mounted on a conductor-carrying insulator plate and having a push button to which an external operating force can be applied; an electrically conducting, resilient switch element including a movable contact means and arranged on the plate within the operating range of the push button for effecting a transmission of the operating force from the push button to the switch element; at least one fixed contact carried by the plate; the switch element having a normal position which it assumes and maintains when no operating force is exerted thereon by the push button; in the normal position the movable contact means being out of engagement with the fixed contact; the switch element having an operating position which it assumes in snap action motion and maintains when the operating force exerted thereon by the push button reaches a certain magnitude; in the operating position the movable contact means being in engagement with the fixed contact; the improvement wherein said switch element being constituted by a planar sheet member having

a. a central zone including two parallel bounding edges and carrying said movable contact means; and



b. strip-like legs integral with said central zone and extending from said edges towards said plate at an inclination with respect to said central zone that is greater than 90°; said legs being positioned on said plate at conductor-free portions thereof.

11. A push button switch as defined in claim 1, wherein there are provided a plurality of switch elements disposed in a spaced, coplanar arrangement; said switch elements being formed from and attached to a single sheet plate member to constitute therewith a one-piece structure; each of the plurality of switch elements forming part of an independently operable push button switch.

4,032,729

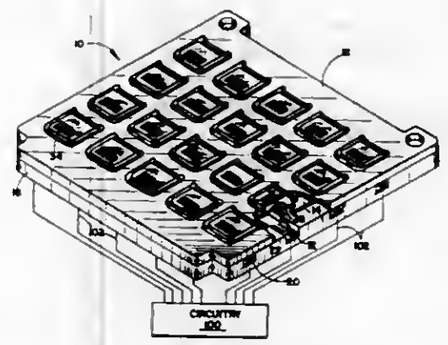
LOW PROFILE KEYBOARD SWITCH HAVING PANEL HINGED ACTUATORS AND CANTILEVERED BEAM SNAP ACTING CONTACTS

Clayton W. Knistinen, La Habra, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Dec. 21, 1973, Ser. No. 427,173

Int. Cl.² H01H *13/26;* **R41J** *5/00;* **G06C** *7/02*

U.S. Cl. 200—5 A **13 Claims**



1. A keyboard switch assembly comprising:

at least one elongated stationary lower contact member;

at least one elongated upper contact member;

said upper contact member having a substantially concave configuration;

a housing including a base member and a cover member;

said cover member engaging said base member;

said base member having at least one groove for securing said lower contact member;

said base member including ridges adjacent each groove for supporting said upper contact member transferse to said lower contact member;

said ridges having indentations along at least one wall thereof;

each upper contact member having at least one movable section which is supported at one end as a cantilevered beam;

said movable section being aligned with an associated indentation; and

key means supported by said cover member for selectively forcing said movable section to buckle at the supported end thereof over the associated indentation and causing the end of said movable section to make electrical contact with said lower contact member.

4,032,730

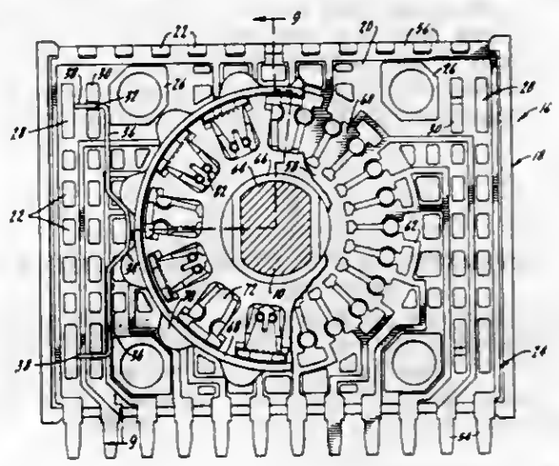
ROTARY SWITCH HAVING A STATOR WITH A CONDUCTIVE MATRIX

Bernard J. Golbeck, Crystal Lake; Raymond F. Lewandowski, Mount Prospect, and Maurice E. Kennedy, Crystal Lake, all of Ill., assignors to Oak Industries Inc., Crystal Lake, Ill.

Filed Mar. 29, 1976, Ser. No. 671,510

Int. Cl.² H01H *19/08*

U.S. Cl. 200—11 DA **20 Claims**



1. A rotary switch including a stator, a rotor and shaft for said rotor,

said stator having a non-conductive support member and a complex conductive matrix positioned on one side thereof, said matrix and support member having respective and cooperating openings and projections for positioning said matrix on said support member, terminals on said matrix,

said complex conductive matrix including a plurality of crossing, independent, conductive sections integrally joined to form a network of lines extending in different directions toward the periphery of said matrix,

said rotor having a plurality of pockets with contact members positioned in at least one of said pockets and arranged for electrical contact with portions of said matrix.

4,032,731

PUSH-PULL SWITCH FOR USE IN AN ELECTRONIC WATCH

Maurice Cyril Bryceland, Dover, N.J., assignor to Waldman Corporation, Parsippany, N.J.

Filed Jan. 20, 1976, Ser. No. 650,716

Int. Cl.² H01H *15/24, 13/52*

U.S. Cl. 200—16 B **8 Claims**

1. A push-pull switch comprising

a. a housing having an axial bore and an internal chamber connected to the bore;

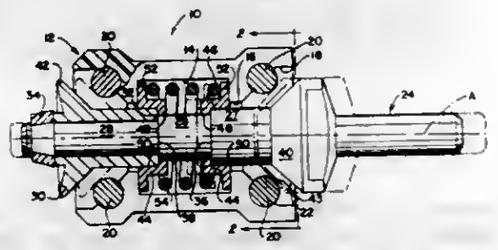
b. metallic contact means at each axial end of the housing;

c. a stem axially displaceable in the bore between first and second terminal positions and having a pair of spaced

shoulders defining a central stem portion of reduced diameter;

d. a pair of spaced metallic contact means on the stem for respectively engaging the cosntact means at one end of the housing or the other depending upon whether the stem is in its first or second terminal position; and

e. means including a pair of washers in said chamber and a single spring resiliently deflectable upon axial displacement of the stem from a central position at which the



contact means of the stem are spaced from the contact means of the housing, the spring serving to bias the stem into said central position, each washer having an aperture that slidably receives the reduced portion of the stem, the single spring being interposed between the washers for urging them apart and into engagement with opposite sides of the chamber, the shoulders on the stem being respectively engaged with the washers when the latter respectively engage the opposite sides of the chamber.

4,032,732

OPERATING HANDLE FOR AN ENCAPSULATED SWITCHING APPARATUS

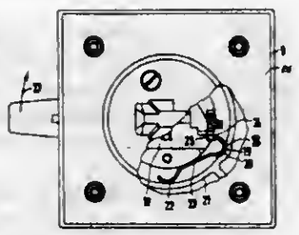
Heinz Homberg, and Kurt Franke, both of Amberg, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

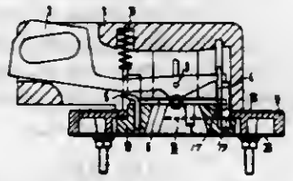
Filed June 5, 1975, Ser. No. 584,010

Claims priority, application Germany, June 6, 1974, 2427314

Int. Cl.² H01H 9/20

U.S. Cl. 200—50 A **4 Claims**





1. In an operating handle for an encapsulated switching apparatus including a housing having a door and a stationary switching shaft, said handle being fastened to said door of said housing in a switched-on position of the apparatus by means of a spring-loaded, shiftable locking plate, said plate being shifted against the force of a loading spring in a switched-off position of said apparatus into a position in engagement with a stop member for releasing said switching shaft from said locking plate, wherein the improvement comprises said stop member being formed by a resilient detent spring disposed within said operating handle, the restraining force of which can be overcome by an operating force applied to said handle.

4,032,733

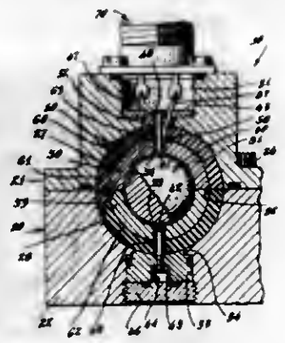
OMNIDIRECTIONAL INERTIA SWITCH

Daniel Thomas Meisenheimer, Jr., 404 Longmeadow Road, Orange, Conn. 06477

Filed Oct. 6, 1975, Ser. No. 620,064

Int. Cl.² H01H 35/14

U.S. Cl. 200—61.45 R **10 Claims**



1. An omnidirectional inertia switch for sensing inertial loads on an object comprising:

A. a member having a spherical surface, said member mounted stationary with respect to the object on which inertial loads are to be sensed;

B. a spherical seismic mass adapted to be positioned concentrically with respect to the spherical surface of said stationary member;

C. a deformable elastomeric suspension member surrounding said spherical seismic mass and supporting it concentrically with respect to the spherical surface of said stationary member, said suspension member having substantially uniform deformability about said spherical seismic mass; and

D. means for sensing contact between said spherical seismic mass and the spherical surface of said stationary member, whereby the application of an inertial load on the object causes relative movement of said spherical seismic mass toward the spherical surface of said stationary member, and if the inertial load is sufficiently large, causes contact therebetween.

4,032,734

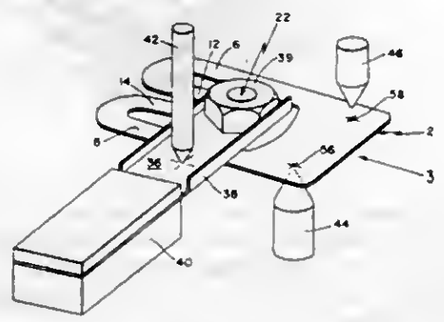
SNAP-ATING MECHANISMS

Hadley K. Burch, Pittsfield, Vt., assignor to B/K Patent Development, Inc., Highland Park, Ill.

Continuation of Ser. No. 418,372, Nov. 23, 1973, abandoned, which is a continuation-in-part of Ser. No. 360,393, May 14, 1973, abandoned. This application May 16, 1975, Ser. No. 578,148

Int. Cl.² H01H 13/36

U.S. Cl. 200—67 DA **10 Claims**



1. In a snap-acting mechanism comprising a snap-acting generally planar blade of resilient material including a pair of outer legs, a pair of inner legs extending between said outer legs, and connecting portions each connecting said legs into a unitary structure, said connecting portions defining, for each of said pairs of legs, an unstressed leg separation; means for maintaining one of said pairs of legs with a separation different from said unstressed separation, thereby to stress said blade and bias a portion thereof in a direction transverse to the plane of said blade; support means supporting the inner legs; and movable actuator means for causing the blade to snap from a first position of stability to a second position of stability;

the improvement comprising

first fixed stop means on the support disposed to the side of the blade that is in the direction of actuating movement of said actuator means, and positioned to engage the blade when the latter is in its first position of stability but to be spaced apart from the blade when the latter is in its second position of stability;

second fixed stop means on the support non-coaxial with the first stop fixed stop means, disposed to the other side of the blade, and positioned to be spaced apart from the blade when the latter is in its first position of stability but engaging the blade when the latter is in its second position of stability.

4,032,735

CONTACT UNIT

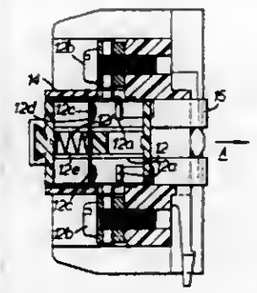
Edmund Morton Butterworth, Bedford, England, assignor to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed Aug. 7, 1975, Ser. No. 602,922

Claims priority, application United Kingdom, Aug. 29, 1974, 37776/74

Int. Cl.² H01H 67/02

U.S. Cl. 200—68 **6 Claims**



1. An add-on contact unit for an electromagnetic switching device operable between a deenergized, spring biased first postion and an energized second position, said add-on contact unit comprising, in combination:

actuating means positively coupled to the actuator of said switching device;

a plurality of contact sets operated by said actuating means, at least one contact set being normally closed when said switching device is in said first position;

contact pressure springs for each contact set operating between said contact set and said actuating means, said contact pressure spring of said normally closed contact set and said spring biasing said switching device to said first position providing parallel, oppositely disposed spring forces; and

means retaining said actuator means and said switching device in said first position against the bias of said contact pressure spring for said normally closed contact set and against the operating force of said switching device upon energization until the latter force exceeds a threshold value.

4,032,736

GAS-PRESSURIZED ELECTRICAL SWITCH WITH CURRENT-GENERATED MAGNETIC FIELD FOR ASSISTING ARC EXTINCTION

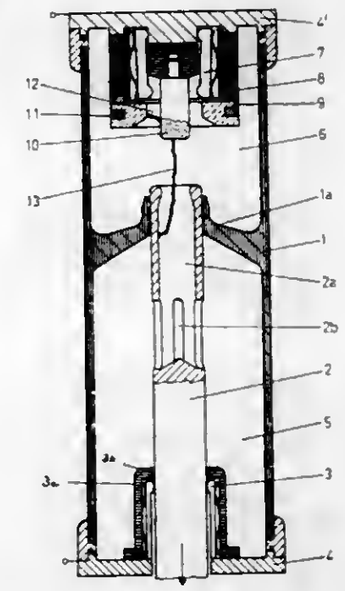
Stanislas Ruffieux, Baden, and Ekkehard Schade, Wettingen, both of Switzerland, assigeors to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Aug. 6, 1975, Ser. No. 602,185

Claims priority, application Switzerland, Aug. 20, 1974, 11323/74

Int. Cl.¹ H01H 33/18

U.S. Cl. 200—147 R **5 Claims**



1. In a gas pressurized electrical switch with a current generated magnetic field for assisting arc extinction the combination comprising a casing forming a quenching enclosure, said casing being provided with a transverse wall dividing the interior thereof into a pair of closed quenching chambers, a pressurized arc quenching gas filling said chambers, a longitudinally movable contact member located centrally in a first one of said chambers and which includes a nozzle pipe projecting through said transverse wall into the other quenching chamber, a stationary annular contact member mounted in said other quenching chamber opposite the nozzle pipe of said movable contact member for engagement therewith, the part of said nozzle pipe located in said first quenching chamber including openings through the wall which establish a communication between said quenching chambers, a stationary electrically conductive pin located centrally within said stationary contact member and electrically insulated therefrom, said pin being spaced radially from said stationary contact member so as to provide for passage therebetween of the nozzle pipe of said movable contact member, a magnetic-field producing coil surrounding said annular contact member and having one end thereof electrically connected to the same terminal member on said switch to which said stationary contact member is connected so as to carry the switch current after said contact members have disengaged, and an annular electrode electrically connected to the other end of said coil and which surrounds and is spaced from said pin, whereby following initial disengagement of said nozzle pipe from said stationary contact member a first arc is established between said annular electrode and said pin and a second arc is established from said pin to the internal surface of said nozzle pipe thereby effecting current flow through said coil and production of a magnetic field inducing rotation of said first arc and heating of said gas in said other chamber to increase its pressure and effect an arc extinguishing gas flow therefrom through said nozzle pipe and into said first chamber.

4,032,737

CONTACT SYSTEM FOR HIGH-VOLTAGE POWER CIRCUIT BREAKERS

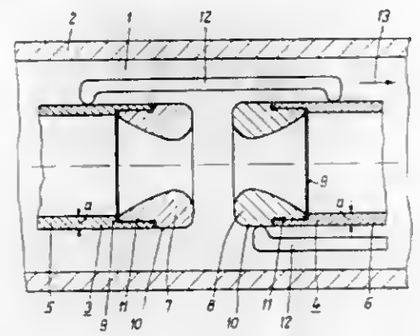
Peter Hubse; Heiner Marin; Harald Kurzmaon, and Marion Henry, all of Berlin, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Sept. 19, 1974, Ser. No. 507,629

Claims priority, application Germany, Oct. 5, 1973, 2350702

Int. Cl.² H01H 33/00, 1/02

U.S. Cl. 200—148 R 6 Claims



1. In a contact system for a highvoltage circuit breaker of the compressed-gas type or the like, the contact system defining a gap which is blasted with the gas to quench an arc drawn thereacross when the breaker is switched to the open position, the contact system having at least one hollow, nozzle-shaped contact piece defining one end of the gap when the breaker is switched to the open position, the contact piece including an electrically conductive tubular member made of cold work-hardened copper, the tubular member having an end portion, and a nozzle-shaped body made of graphite, the nozzleshaped body being cold press-fitted into the tubular member at the end portion thereof so as to be beld in surrounding engagement thereby in a friction-tight manner wherein the improvement comprises making said tubular member of a low alloy copper having a silver content in the range of from 0.025 to 0.25 percent.

4,032,738

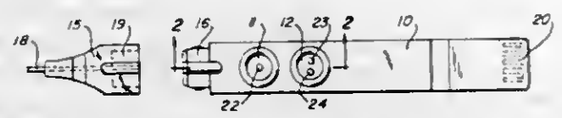
ELECTRO-SURGICAL INSTRUMENT

Janet M. Esty, Boulder, and Charles E. Taylor, Evergreen, both of Colo., assignors to Neomed Incorporated, Boulder, Colo.

Filed May 15, 1975, Ser. No. 571,508

Int. Cl.² H01H 13/08

U.S. Cl. 200—157 14 Claims



1. Apparatus for providing an interface between an electro-surgical electrode and an electro-surgical generator which apparatus is manually manipulable as a surgical instrument comprising:

an electrically insulating housing having generally rectangular cross-section formed by a pair of elongated substantially flat rigid surfaces between a pair of sidewalls with narrow cross-sectional dimensions relative to said flat rigid surfaces, one of said flat rigid surfaces having at least one bore extending therethrough in proximity to one end of said housing and each said bore being outwardly encircled by an upright cylindrical wall terminating in inwardly turned shoulders,

means at one end of said housing for receiving a shank of an electro-surgical electrode,

at least one pair of electrical contact points arranged internally to said housing in underlying relation to said bore,

a momentary switch assembly including a hollow peripheral sidewall, a flexible cap enclosing one end of said peripheral sidewall and electrical circuit completing means, said peripheral sidewall being retained in sealing engagement internal to said housing bore and said upright cylindrical wall, said cap having a cross-section which is outwardly arcuate relative to the exterior of said housing for permitting inward coaxial movement thereof without imparting inward collapsing forces to said peripheral sidewall, said electrical circuit completing means being responsive to movement of said cap in inward coaxial relation to said peripheral wall for completing electrical contact between said pair of electrical contact points, said flexible cap having sufficient material memory for withdrawing said electrical circuit completing means from said pair of electrical contact points in the absence of application of an inward axial force thereto, and

means extending longitudinally through said housing from the other end thereof for coupling the electro-surgical generator with said shank receiving means and said pair of electrical contact points for establishing operational electrical communication therebetween, whereby said housing is manually usable with the feel of a passive surgical instrument while permitting manual selection of electro-surgical functions.

4,032,739

SUPPORTING STRUCTURE FOR LEAF SPRING CONTACT ASSEMBLY

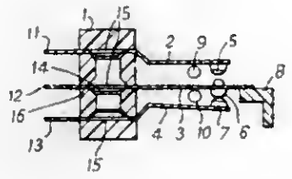
Holger Nicolaisen, and Finn Schnoor Andersen, both of Nordborg, Denmark, assignors to Danfoss A/S, Nordborg, Denmark

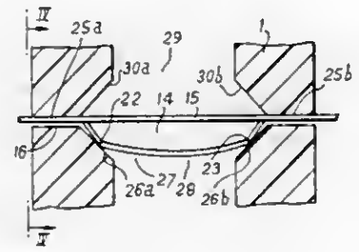
Filed Oct. 9, 1975, Ser. No. 620,872

Claims priority, application Germany, Oct. 28, 1974, 2451135

Int. Cl.² H01H 1/26

U.S. Cl. 200—283 3 Claims





1. A contact switch assembly comprising an insulated contact carrier having a U-shaped portion with spaced apart walls, a slot extending transversely through said walls, mutually facing recesses formed in said walls on at least one side of said slot, said recesses having oppositely inclined surfaces, a leaf spring contact in said slot having an attached resiliently hinged flap extending at an acute angle relative to the plane of said leaf spring contact, said flap having sharp corners at opposite ends thereof which dig into said inclined surfaces of said recesses to hold said flap in resilient biasing engagement with said inclined surfaces of said carrier to hold said leaf spring contact firmly in an inserted position.

4,032,740

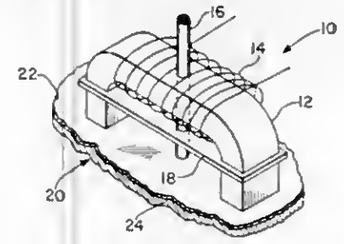
TWO-LEVEL TEMPERATURE CONTROL FOR INDUCTION HEATING

Eugene Mittelmann, Chicago, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Apr. 7, 1975, Ser. No. 566,003

Int. Cl.² H05B 5/04

U.S. Cl. 219—10.77 11 Claims



1. An induction heating and temperature responsive control apparatus in combination including an inverter circuit, an induction core unit, including a generally U-shaped ferromagnetic core with an exciter winding wrapped thereabout and in operative connection with the inverter circuit and means integrated with the core to monitor the surface temperature of a workpiece as it is heated by virtue of the magnetic circuit formed with the workpiece by the core, further including means responsive to the temperature, monitoring means for automatically controlling the output of the inverter so as to stop the supply of temperature inducing current to the core at a predetermined surface temperature of the workpiece, said means controlling the output including means for automatically and successively controlling the inverter to maintain a first predetermined temperature for a predetermined time period followed by a subsequent period of operation to increase the temperature to a second temperature level and maintain said second temperature level.

4,032,741

REAMING DEVICE FOR MACHINING BY ELECTRO-EROSION

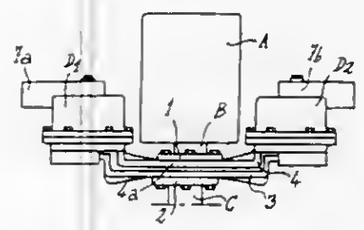
Pierre Braudeau, Paris, and Alfred Marié Aime Maillet, Versailles, both of France, assignors to Carel Fouche Languepin, Paris, France

Continuation-in-part of Ser. No. 546,885, Feb. 4, 1975, abandoned. This application Apr. 1, 1976, Ser. No. 672,615

Claims priority, application France, Feb. 13, 1974, 74.04869

Int. Cl.² B23P 1/08

U.S. Cl. 219—69 V 4 Claims



1. A reaming device for an electro-erosion machine, said machine comprising a machining head to control the advance of an electrode by means of a spindle toward a workpiece, said device having means to impart, in planes perpendicular to the direction of said advance, a reciprocal orbital movement according to a lateral circular translational motion of adjustable radius of curvature to two respective members relative to each other, one of said members being moved and the other remaining laterally stationary, said two members comprising a support member of the electrode and a support member of the workpiece, said device comprising at least two mechanisms which are synchronous and have the same orientation, one of them at least being moved by a motor, each of said mechanisms comprising a frame rigidly secured to said stationary support member and an eccentric pivot rotatably mounted in a bearing of said moving support member so as to form therewith a crank-rod assembly, the crank arm length of all those mechanisms being the same, each of said mechanisms being further provided with respective control means responsive to a common signal of pulses transmited and applied by electromagnetic means to synchronously vary said crank arm length, thereby to adjust the radius of curvature without having to stop the machine.

4,032,742

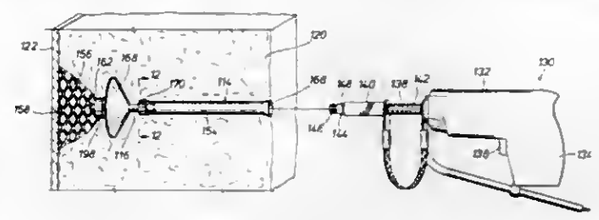
STUD WELDING GUN AND METHOD OF OPERATION

Gary R. Kendrick, and Robert A. Sauder, both of Emporia, Kans., assignors to Sauder Industries, Inc., Emporia, Kans.

Continuation-in-part of Ser. No. 484,624, July 1, 1974, abandoned. This application Sept. 24, 1975, Ser. No. 616,187

Int. Cl.² B23K 9/20

U.S. Cl. 219—99 28 Claims



1. Apparatus for attaching to a relatively stationary object a stud assembly having a relatively fixed portion and a movable portion movable between a first position and a second position, said apparatus comprising:

welding terminal means for conducting an electrical current through a stud assembly having a relatively fixed portion and a movable portion movable between a first and a second position, said welding terminal means being operable to weld the relatively fixed portion of the stud assembly to a stationary object;

engagement means defined by said welding terminal means for engaging the movable portion of the stud assembly;

displacement means for displacing said engagement means when said engagement means engages the movable portion of the stud assembly to move the movable portion of the stud assembly from the first position to the second position;

torque control means for controlling a torque imposed on the stud assembly by said engagement means when said displacement means displaces said engagement means; and

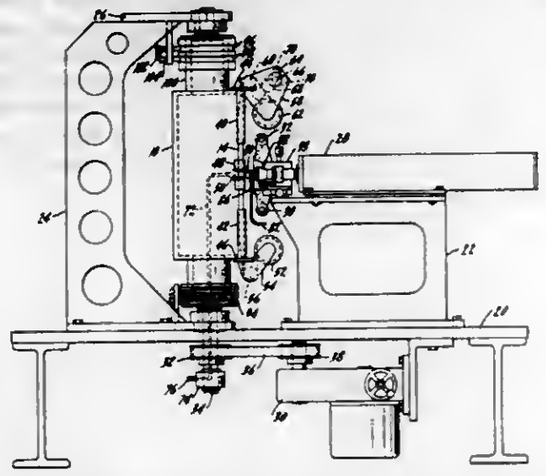
force control means for controlling a normal force imposed on the stud assembly by said engagement means when said engagement means engages the movable portion of the stud assembly.

4,032,743

LASER MICROPERFORATOR

Arthur R. Erbach, Des Plaines; Allen R. Franck, Glen Ellyn; Dennis L. Mukee, and Wilhelm E. Schmitt, both of Schaumburg, all of Ill., assignors to Marvel Engineering Company, Chicago, Ill.

Filed June 27, 1975, Ser. No. 590,868
Int. Cl.² B23K 26/00
U.S. Cl. 219—121 LM 17 Claims



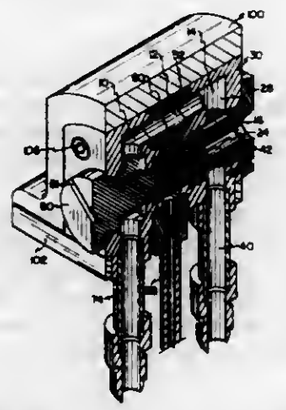
1. A method of forming rows and columns of closely spaced micron sized holes in thin foil strips including the steps of:
positioning a plurality of foil strips in lengthwise in a direction parallel to the axis of and along the periphery of a continuously rotating generally cylindrical member,
intermittently activating a plurality of stationary lasers positioned adjacent said cylindrical member as it and the foil strips rotate,
periodically moving the foil strips in a direction parallel to the cylindrical member axis between periods that the lasers are active to effect the formation of holes in said foil strips.

4,032,744

GAS STABILIZED PLASMA GUN

Robert G. Coucher, Salt Lake City, Utah, assignor to EPPCO, Salt Lake City, Utah

Continuation-in-part of Ser. No. 337,005, March 1, 1973, Pat. No. 3,851,140. This application Nov. 20, 1974, Ser. No. 525,341
Int. Cl.² B23K 9/00
U.S. Cl. 219—121 P 4 Claims



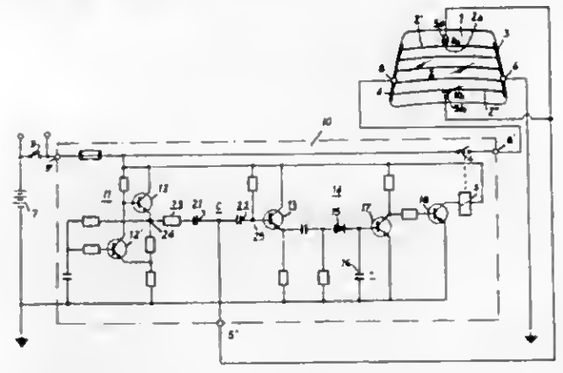
4. A method for cooling a cathode in a plasma producing device having a gas distribution ring circumscribing said cathode for introducing a plasma producing gas into said plasma producing device whereby a major portion of said plasma producing gas is introduced as a linear flow component and a minor portion is introduced as a helical flow component circumscribing said linear flow component, comprising introducing a liquid coolant into said plasma producing device to cool said cathode in a manner such that the tip of said cathode is just below its melting temperature, the mid or center section of said cathode is at or near its oxidation temperature and the base of the cathode is below its oxidation temperature.

4,032,745

CONTROL SYSTEM FOR VEHICLE WINDOW HEATER

Sergio Roselli, Pisa, Italy, assignor to Saint-Gobain Industries, Neuilly-sur-Seine, France

Filed Apr. 17, 1975, Ser. No. 568,997
Claims priority, application France, Apr. 19, 1974, 74.13650
Int. Cl.² H05B 1/02; E06B 7/12
U.S. Cl. 219—203 7 Claims



1. Apparatus for heating a vehicle window comprising a heating grid for said window, a switch for connection of said grid to a source of electrical energy, an oscillator and a signal detector, a signal circuit for coupling the output of said oscillator to the input of said signal detector, said signal circuit having a DC voltage component at at least one point thereof, a humidity detector having a pair of spaced apart conductors disposed on the window, one of said conductors being connected directly to a point of said heating grid which is at different DC voltages when said switch is opened and closed respectively, coupling means for AC coupling the other conductor of said pair to said signal circuit to control the amplitude of oscillations supplied from said oscillator to said signal detector in response to variation of the impedance between said conductors, said coupling means including capacitor means for providing DC isolation between said humidity detector and any DC voltage component in said signal circuit, and means responsive to the output of said signal detector for actuating said switch.

4,032,746

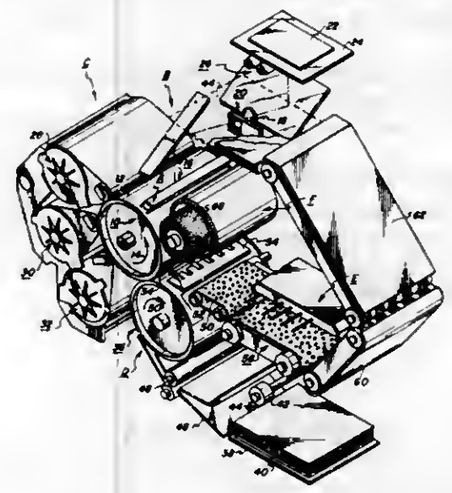
CONTROL SYSTEM FOR A FUSING APPARATUS

Howard J. Barsell, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 10, 1975, Ser. No. 630,470
Int. Cl.² H05B 1/02
U.S. Cl. 219—216 10 Claims

1. A control system for regulating the thermal energy produced by a first heat source and a second heat source cooperating therewith, including:
first control means, responsive to the deviation between the measured temperature in the region of the first heat source and a pre-selected temperature reference, for regulating the phase of the voltage applied to the first heat source and second heat source maintaining the RMS voltage applied thereto substantially at a pre-selected level; and
second control means, responsive to the deviation between the measured temperature in the region of the first heat source and the measured temperature in the region on the

second heat source, for regulating the phase of the voltage applied to the first heat source and second heat



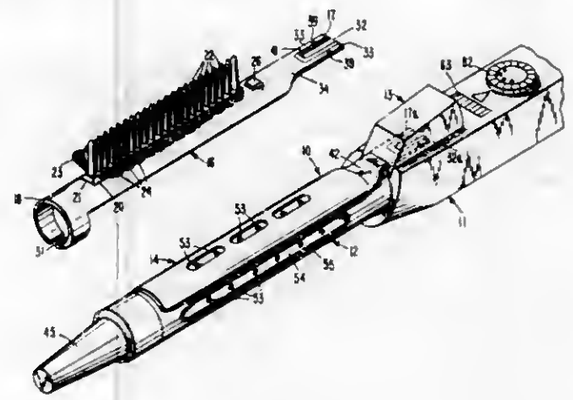
source maintaining the RMS voltage applied thereto substantially at a pre-selected level.

4,032,747

THERMAL HAIR STYLING APPLIANCE HAVING INTERCHANGEABLE ATTACHMENTS

Raymond W. Kunz, Monroe, Conn., assignor to Clairol Incorporated, New York, N.Y.

Filed Nov. 12, 1975, Ser. No. 631,323
Int. Cl.² H05B 1/02; A45D 1/04, 2/36; B25G 3/18
U.S. Cl. 219—222 11 Claims



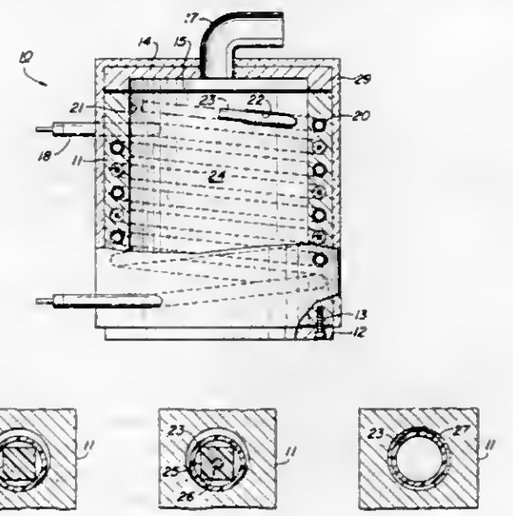
1. A hair treating device comprising:
a tubular barrel extending along an axis, said tubular barrel having first and second ends and defining a heating chamber therein;
heating means disposed in said tubular barrel;
vapor generating means disposed in said tubular barrel and energized by said heating means;
a hair treating section of said tubular barrel along which heat and vapor are transmitted to the hair;
a housing attached to said first end of the tubular barrel, said housing forming a handle;
a readily detachable hair styling attachment cooperating with said tubular barrel in styling the hair, said attachment including a longitudinally extending open slot in one end thereof and a pair of notches disposed adjacent said one end of the attachment;
an operating button;
means for mounting said operating button in said handle and adjacent to the first end of said tubular barrel, said mounting means mounting said operating button to both slide and pivot relative to said handle and said tubular barrel; and
coupling means included in said operating button for detachably securing said attachment thereto, wherein the coupling means includes:
a land within said button;
at least one projecting means extending from the land toward the tubular barrel, said projecting means including an enlarged head portion spaced from said land a distance greater than the thickness of the attachment; and
a leaf spring retained on said projecting means by said head portion, wherein said leaf spring includes a pair of detents having oppositely sloping ramps which converge to an apex, and wherein said attachment is held between the leaf spring and the land with the projecting means received in the slot of the attachment and the apexes of the detents received in the notches of the attachment in order to detachably couple the attachment to the button, so that the attachment may be removed from the button by pulling the attachment away from the button and coupled to the button by pushing the attachment toward the button.

4,032,748

SCALE DEPOSIT REMOVAL ARRANGEMENT FOR ELECTRIC WATER HEATERS AND VAPORIZERS

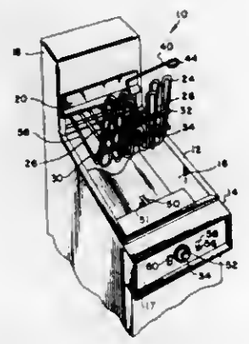
William Vischer, Palatine; Orest A. Kozinczuk, Chicago, and Robert J. Sbulz, Brookfield, all of Ill., assignors to Innovative Process Equipment, Inc., Palatine, Ill.

Filed Oct. 10, 1975, Ser. No. 621,304
Int. Cl.³ F24H 1/16; F22B 1/28; F28G 5/00
U.S. Cl. 219—275 10 Claims



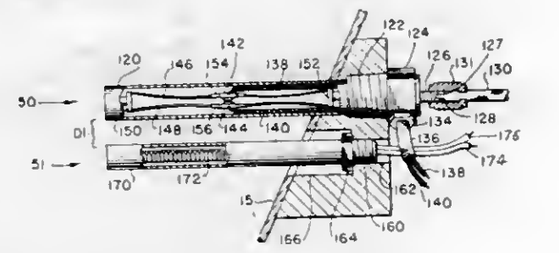
1. A heat exchanger for heating water containing dissolved solids, comprising in combination
metallic heat transfer means having a guide passageway therethrough,
means for heating said heat transfer means,
a plastic tube having a coefficient of thermal expansion substantially greater than that of said heat transfer means,
said tube having a water inlet at one end and a fluid outlet at the other end,
said tube being coaxially disposed within said passageway in heat transfer relationship therewith,
said tube being sufficiently smaller in external cross-section than the internal cross-section of said passageway and being movable in said passageway with at least one end of said tube extending freely from one end of said passageway so that said tube may expand independently of said heat transfer means in both length and cross-sectional area,
whereby expansion and contraction of said tube dislodges salt crystals deposited on the interior wall thereof.

4,032,749
FRYING APPARATUS WITH COMPENSATED THERMOSTAT
George M. Price, Shreveport, La., assignor to The Frymaster Corporation, Shreveport, La.
Division of Ser. No. 465,918, May 1, 1974, Pat. No. 3,911,250.
This application Aug. 8, 1975, Ser. No. 603,009
Int. Cl.² F27D *11/02*
U.S. Cl. 219—442 5 Claims



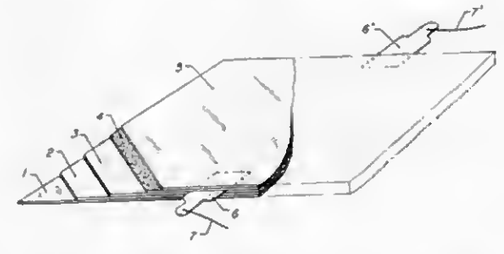
1. In a deep fat frying system having a frypot for containing cooking oil and electrically operated heating coils in said frypot pivotally attached to said housing to rotate upward to a cleaning position, thermal control apparatus for regulating the temperature of said heating coils comprising:
an electrical thermostat mounted separate from said heating coils and in electrical communication with said coils for maintaining said cooking oil at a predetermined temperature by alternately switching said coils off and on, and
an electrical biasing heater in electrical communication with said heating coils and mounted adjacent said thermostat for heating said thermostat when said coils are switched on to simulate to said thermostat the temperature of said cooking oil contiguous to said coils.

4,032,750
FLAT PLATE HEATING UNIT WITH FOIL HEATING MEANS
Bohdan Hurko, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.
Filed Mar. 26, 1976, Ser. No. 670,702
Int. Cl.² H05B *3/68*
U.S. Cl. 219—464 9 Claims



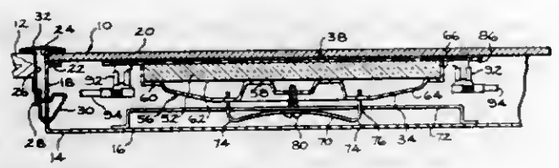
1. A flat plate surface heating unit comprising:
an upper utensil-supporting cover plate of heat-conductive material;
a thin flexible layer of dielectric heat-conductive material positioned against the underside of the cover plate but not bonded thereto;
resistive foil means adhesively bonded to the underside of the dielectric layer by a high-temperature inorganic binder;
a support pad of dielectric non-heat-conductive material positioned beneath the foil means;
a reinforced reflector pan firmly supporting the dielectric pad;
and constant pressure means supported with respect to the cover plate and applying upward pressure against the reflector pan to assure good contact and thermal coupling between the resistive foil means through the thin dielectric layer to the cover plate.

4,032,751
RADIANT HEATING PANEL
Karl J. Youtsey, Chicago, Ill., and Richard G. Sarazin, Onalaska, Wis., assignors to Universal Oil Products Company, Des Plaines, Ill.
Filed Apr. 21, 1975, Ser. No. 569,898
Int. Cl.² H05B *3/02*
U.S. Cl. 219—538 8 Claims

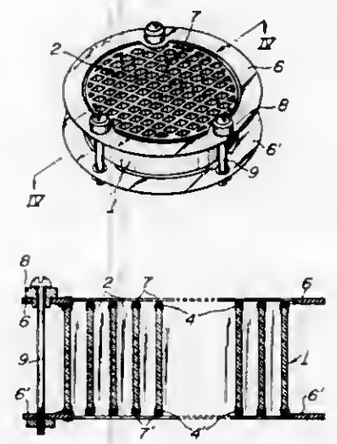


1. A composite heating member to provide directional heat radiation that is formed of a plastic laminate material incorporating a semiconductive layer, which comprises, a rigid plastic laminate structure formed from at least one layer of matrix reinforced substrate material and a resin coating on said material, a semiconductive carbonaceous pyropolymer having a conductivity of from about 10^{-8} to about 10^{2} inverse ohm-centimeters bonded with a high surface area refractory inorganic oxide support selected from the group consisting of silica, alumina, and mixtures of silica and alumina incorporated as a layer to at least one side of said layer of substrate material, a heat reflective layer incorporated in a position to be to one side of said pyropolymer on said substrate material, and current supply means to spaced apart portions of said layer of conductive carbonaceous pyropolymer to provide electrical resistance heating therein which will be subject to reflection and radiation by said heat reflective layer of the composite member.

4,032,752
HEATING ELEMENTS COMPRISING A PTC CERAMIC ARTICLE OF A HONEYCOMB STRUCTURE COMPOSED OF BARIUM TITANATE
Akira Ohmura, Nagoya, and Shigetaka Wada, Kuwana, both of Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan
Filed Aug. 23, 1976, Ser. No. 716,713
Claims priority, application Japan, Sept. 3, 1975, 50-106033
Int. Cl.² H05B *3/08*
U.S. Cl. 219—541 11 Claims

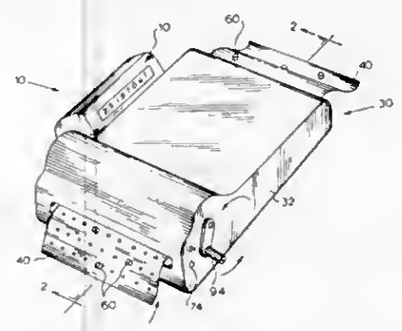


1. A heating element comprising a ceramic article of a honeycomb structure having a positive temperature coefficient of electrical resistance and composed of barium titanate in which a pair of ohmic electrodes consisting mainly of silver as a metallic component and having a surface resistivity of the electrode per se of not more than 10 mΩ/cm² are provided on both end surfaces of the ceramic article of the honeycomb structure provided with a multiplicity of parallel channels



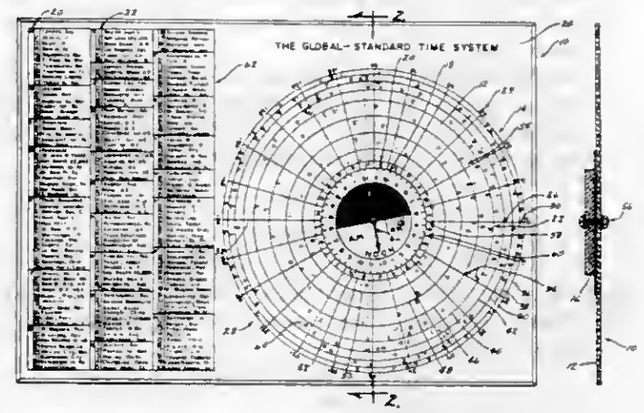
extending therethrough and an electrically insulating and thermostable coating is applied on said ohmic electrodes.

4,032,753
PROGRAMMING APPARATUS
Stanley J. Lieberman, 1560 Glencoe Road, Winter Park, Fla. 32789
Filed Apr. 19, 1976, Ser. No. 678,182
Int. Cl.² G06K *15/18, 7/04, 19/06*
U.S. Cl. 235—61.6 M 12 Claims



1. An apparatus for programming a hand-held, electronic calculator of the type having depressible-key numerical and programming inputs, said programming apparatus comprising in combination:
tape storage means having a matrix of rows and columns thereon;
command means for coupling to said tape storage means at an intersection of one of said rows and said columns, thereby storing a particular programming command thereon;
actuator means coupled between said tape storage means and said depressible keys of said calculator for actuating said depressible keys responsive to said command means;
a frame for receiving therein said calculator and for providing registration between said tape storage means, said command means, said actuator means and said depressible keys; and
motive means coupled to said frame for moving said tape storage means, and said command means coupled thereto, relative to said actuator means for sequentially actuating said depressible keys, whereby said electronic calculator is programmed.

4,032,754
GLOBAL TIME SYSTEM
Roy R. Ageton, Conrad, Iowa 50621
Filed Feb. 23, 1976, Ser. No. 660,373
Int. Cl.² G06C *27/00*
U.S. Cl. 235—78 R 1 Claim



1. A global time system for determining the time at one location on the earth with respect to another location on the earth where the time is known, consisting of:
first disc divided into twenty-four equal sections by twenty-four lines radially extending from the center of said first disc, said lines representing lines of longitude spaced 15° apart, each of said twenty-four sections representing a different time zone;
nine circles concentrically disposed about the center of said first disc in progressively decreasing spaced relationship from the center of said first disc outward, each of said circles representing lines of latitude spaced 10° apart;
a plurality of geographic spaces formed between adjacent line of longitude and latitude, said geographic spaces having a width of 15° longitude and a length of 10° latitude;
a plurality of longitude numbers spaced around said first disc and indicating the respective longitudes of said twenty-four lines;
a time disc rotatably mounted at the center to the center of said first disc, the outside edge thereof having twent-four hour marks thereon, each of said hour marks being equally spaced from each adjacent mark, the marks on each half of said time disc being consecutively numbered from one to twelve for designating the twenty-four hours of the day, said time disc further having twenty-four half-hour marks centered between adjacent hour marks;
a pair of oppositely opposed arrows extending outwardly from the center of said time disc and dividing said time disc in half, one half representing A.M. hours and the other half representing P.M. hours;
said time disc having a darkened portion, one edge of which passes through the center of said time disc and extends perpendicular to said arrows, said darkened portion representing nighttime hours;
said time disc having a lightened portion opposite from said darkened portion and representing daylight hours;
means for rotatably mounting said time disc to said first disc;
twenty-four reference symbols located on said first disc adjacent to the outside edge of said time disc, one of said reference symbols being located in each of said twenty-four sections;
Consecutively numbered identification symbols within each of said twenty-four sections, each identification symbol representing a specific geographic location on the earth within the time zone represented by said section and disposed within said geographic space according to the

actual longitude and latitude of the specific geographic location;

a forward dot located in front of said identification symbol for indicating that the geographic location represented by said identification symbol lies in the Northern Hemisphere;

a rearward dot located behind said identification symbol for indicating that the geographic location represented by said identification symbol lies in the Southern Hemisphere; and

a geographic chart located at one side of said first disc and listing specific geographic locations arranged by said reference symbols of said twenty-four sections and said consecutively numbered identification symbols.

4,032,755
PROCESS CONTROL APPARATUS

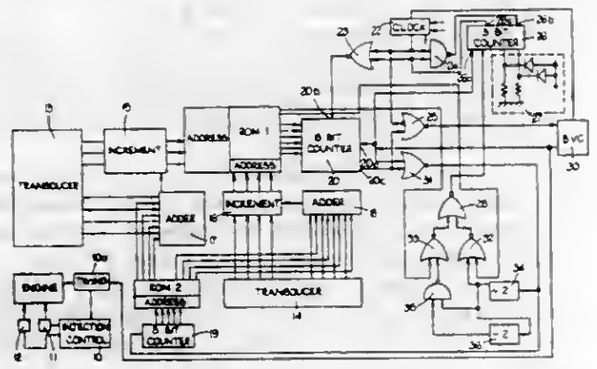
Nicholas John Bard, Birmingham, and Malcolm Williams, Solihull, both of England, assignors to The Lucas Electrical Company Limited, England

Filed June 16, 1975, Ser. No. 586,968

Claims priority, application United Kingdom, June 18, 1974, 26870/74

Int. Cl.² H03K *21/30*

U.S. Cl. 235—92 CC **4 Claims**



1. Process control apparatus for producing a pulse length modulated output, modulated in accordance with two different input parammeters, and comprising a digital memory unit which produces an *n*-bit digital output signal dependent upon two independent digital input signals, an *m*-bit digital programme counter (where *m* is less than *n*) that is clocked cyclically and programmable by the *m* most significant bits of the digital output signal of the digital memory unit, a clock pulse source, a gate controlling admission of clock pulses cyclically to the counter, a delay circuit connected to control said gate and a sampling circuit connected to the *n* - *m* least significant bit or bits of the memory unit to vary the delay introduced by said delay circuit in accordance with said least significant bit or bits during alternate cycles of the counter, the output pulse length being determined by the sum of said delay and the time taken to clock the counter from the count programmed by the *m* most significant bits to a predetermined count.

4,032,756
TACAN-DME IDENTITY DETECTOR

Maurice Leon Jean Jezo, Cedar Grove, N.J., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Aug. 14, 1975, Ser. No. 604,759

Int. Cl.² G01S *1/44*; **H03K** *21/36*

U.S. Cl. 235—92 PB **11 Claims**

1. An apparatus for extracting identity information from a Tacan signal wherein said identity information consists of marks and spaces and wherein said Tacan signal includes group reference signals, said marks comprising a predetermined number of adjacent group reference signals having therebetween a plurality of regularly spaced Tacan pulse pairs comprising:

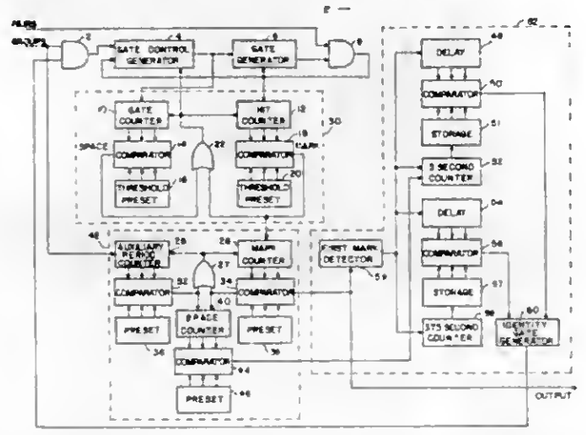
means for sampling said Tacan signal at predetermined sample intervals after each of said group reference signals, said means for sampling comprising:

first means for receiving said group reference signals;

second means for receiving said pulse pairs;

trigger means coupled to said first and second receiving means for generating trigger signals in response to said group reference signals and pulse pairs; and

means responsive to said trigger signals for generating a plurality of regularly spaced gating signals;



means for indicating a hit when one of said regularly spaced pulse pairs is present during said sample interval;

a mark counter;

means for incrementing said mark counter when the ratio of hits to sample intervals between adjacent group reference signals equals a preselected value; and

means for declaring a mark when the ratio of the contents of said mark counter to the total number of group reference signals equals a preselected value and for declaring a space when the ratio of the contents of said mark counter to the total number of group reference signals is less than said preselected value.

4,032,757
CONTROL APPARATUS

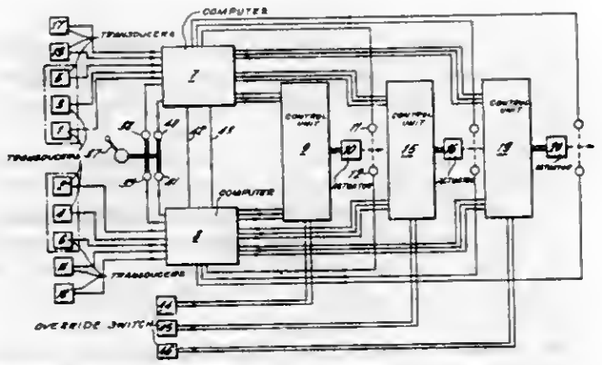
Edward Stuart Eccles, Bishops Cleeve, near Cheltenham, England, assignor to Smiths Industries Limited, London, England

Filed Sept. 19, 1974, Ser. No. 507,514

Claims priority, application United Kingdom, Sept. 24, 1973, 44636/73

Int. Cl.² G06F *15/46*, *11/08*

U.S. Cl. 235—150.2 **8 Claims**



1. Control apparatus comprising:

two inter-connected control lanes for providing nominally-identical outputs for control of an output parameter, each said control lane comprising computer means for deriving the control output of the subject lane,

means for supplying a first signal in accordance with an input parameter to the said computer means,

and means for supplying a second signal in accordance with a demanded value of said output parameter to said computer means,

said computer means being programmed to perform a control program in which the value of the said first signal supplied in the subject lane is compared with the value of the said first signal supplied in the other lane to determine whether the two values are in accord with one another and to provide a derived value of the input parameter dependent upon the said two values if they are in accord with one another and otherwise to provide said derived value as the value of said first signal supplied in the subject lane, and said control program including computation of the said control output of the subject lane in dependence upon difference between the said derived value of the input parameter and the value corresponding to said second signal supplied to the computing means;

and means for detecting discrepancy between the control outputs of the two lanes to provide manifestation thereof.

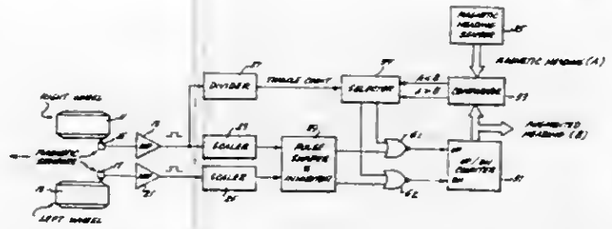
4,032,758
COMPENSATED VEHICLE HEADING SYSTEM

Richard W. Lewis, Derby, Kans., assignor to The Boeing Company, Seattle, Wash.

Filed Nov. 5, 1975, Ser. No. 629,119

Int. Cl.² G06F *15/50*; **B62D** *5/00*

U.S. Cl. 235—150.2 **16 Claims**



1. A compensated vehicle heading system for use with a land vehicle including at least one undriven wheel, said compensated vehicle heading system comprising:

a magnetic heading sensor for magnetically sensing the heading of a vehicle and generating a first heading signal in accordance therewith;

a vehicle dynamic heading sensor for sensing changes in the direction of a vehicle by sensing the dynamic movement of the vehicle and generating a second heading signal in accordance therewith, said vehicle dynamic heading sensor including a first rotation sensing means for sensing the rotation of said at least one undriven wheel;

comparison means connected so as to receive said first and second heading signals for comparing said first and second heading signals and generating an output denoting whether or not said signals are different, and, if so, which signal is greater; and,

control means connected to said comparison means and to said vehicle dynamic heading sensor for increasing or decreasing the magnitude of said second heading signal in accordance with the output of said comparison means so as to move said second heading signal toward said first heading signal.

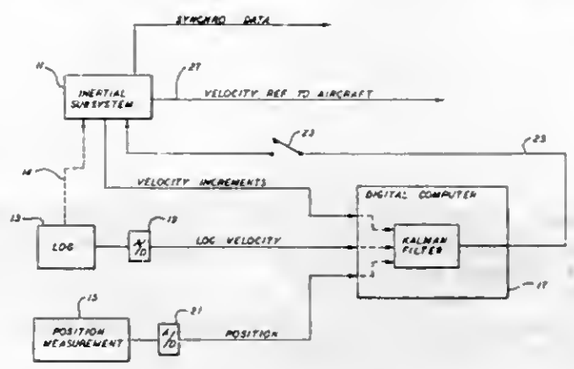
4,032,759
SHIPBOARD REFERENCE FOR AN AIRCRAFT NAVIGATION SYSTEM

Boris Danik, North Caldwell, N.J., assignor to The Singer Company, Little Falls, N.J.

Filed Oct. 24, 1975, Ser. No. 625,429

Int. Cl.² G06F *15/50*

U.S. Cl. 235—150.25 **10 Claims**



1. A method of rapidly aligning aircraft inertial platforms installed in aircraft located aboard an aircraft carrier which changes its location with time, said aircraft carrier thereby having a state vector containing as elements at least the velocity of said aircraft carrier and its position, comprising the steps of:

a. installing a low-accuracy aircraft type inertial reference system on the aircraft carrier, said system including an inertial subsystem and a Kalman filter, said inertial subsystem providing as outputs quantities representing the velocity of the aircraft carrier,

b. installing means on the aircraft carrier providing updating information regarding the state vector of the aircraft carrier to said Kalman filter;

c. providing as a velocity reference to the aircraft the velocity outputs of the inertial subsystem of said inertial reference system;

d. updating said inertial subsystem of said inertial reference system from said Kalman filter at intervals of the order of magnitude of two hours and never while providing a velocity reference to an aircraft.

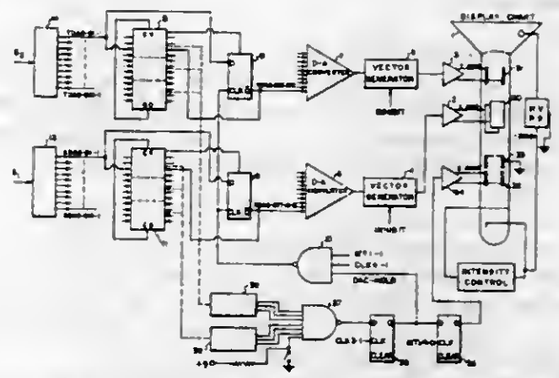
4,032,760
PHOSPHOR PROTECTION FOR X-Y LOOPS

William T. Quarton, and Peter R. Lowe, both of Englewood, Colo., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 22, 1975, Ser. No. 624,905

Int. Cl.² G06G *7/28*; **G06F** *3/14*

U.S. Cl. 235—151 **11 Claims**



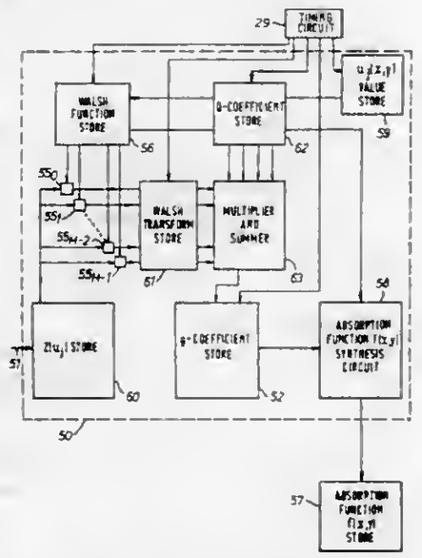
1. Apparatus selectively responsive to successive digital representations of changing data values including means to compare the digital representation of a data value with the digital representation of a preceding data value to produce a digital output signal representative of the incremental differ-

ence between said data values, and means responsive to said incremental difference signal to inhibit the response of said apparatus to those data values when said incremental difference is less than a predetermined value and to restore said response of said apparatus to said data values when the cumulative value of said incremental difference is equal to or greater than said predetermined value.

4,032,761
TOMOGRAPHY

Bernard Joseph Mayo, Beaconsfield, and John Edward Best, South Stoke, near Reading, both of England, assignors to E M I Limited, Hayes, England

Filed Oct. 9, 1975, Ser. No. 621,027
Claims priority, application United Kingdom, Oct. 11, 1974, 44049/74; Nov. 23, 1974, 50840/74
Int. Cl.² G03B *41/16*
U.S. Cl. 235—151.3 **1 Claim**



1. A method of operating on electrical signals, each indicative of a line integral of absorption suffered by penetrating radiation, on traversing a respective beam path through a slice disposed cross-sectionally of a body under examination so as to produce a representation of the absorption coefficient, with respect to said radiation, at each of a plurality of locations distributed over said slice; the beam paths comprising a set of substantially parallel paths at each of a plurality of angular orientations relative to the body; the method comprising the steps of:

a. convolving the signals relating to a first set of said paths each with a plurality of values of Walsh functions of different sequency to produce a plurality of convolved signals of respective sequencies, each containing contributions from the signals relating to each beam path in said first set.

b. forming the scalar product of each convolved signal with a respective series of coefficients each determined by a first sequency factor which is constant throughout the series and is of the same sequency as the relevant convolved signal and a second sequency factor which is different for each coefficient of the series,

c. storing said scalar products in a coefficient store,

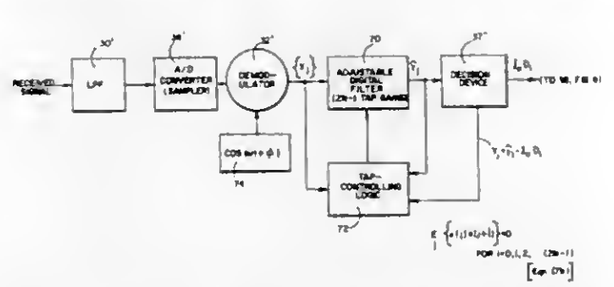
d. repeating the method steps (a), (b) and (c) for the signals relating to the other sets of beam paths, and

e. inverting the products stored in said coefficient store in dependence upon respective values of Walsh transform functions to evaluate said absorption coefficients.

4,032,762
ADJUSTABLE DIGITAL FILTER FOR HIGH SPEED DIGITAL TRANSMISSION SYSTEM

Michael A. Caloyannides, Placentia, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 7, 1975, Ser. No. 620,532
Int. Cl.² H04B *1/10, 3/04*
U.S. Cl. 235—152 **30 Claims**



1. An adjustable digital filter for use in a digital data transmission and receiving system for digitally filtering and equalizing a received data signal supplied to the filter as digital data samples x_j at twice the baud rate of data transmission and including successive, alternating integer-baud and half-baud samples, comprising:

a plurality of successive delay stages for storing successive said digital data samples,

a corresponding plurality of adjustable tap gain means respectively associated with said plurality of delay stages, each receiving the samples currently stored in the respectively associated delay stages and a corresponding tap gain control as inputs thereto, and producing as an output thereof the product of the inputs thereto,

meas for summing the outputs of said tap gain means and producing a filtered and equalized output sample y_j in each baud interval for the corresponding integer baud sample x_j,

means responsive to each sample y_j for generating a corresponding estimated value l_oD_j representing an estimate of the value of a correctly equalized and filtered output sample y_j,

means responsive to said summing means and also responsive to said estimated value generating means for generating an error signal $Y_j = Y_j - l_oD_j$,

first means for adjusting the tap gain control inputs to each of the adjustable tap gain means associated with said delay stages storing integer baud samples of said succession of samples, as a function of said error signal Y_j and said digital data samples x_j, and

second means for adjusting the tap gain control inputs to each adjustable tap gain means associated with a delay stage storing half-integer baud samples of said succession of samples as a function of the adjustment by said first adjusting means to the tap gain control input to the adjustable tap gain means associated with at least one integer baud sample storing delay stage respectively corresponding thereto.

4,032,763
PRODUCTION OF PSEUDO-RANDOM BINARY SIGNAL SEQUENCES

Ekkehard Glitz, Backnang, Germany, assignor to Licentia Patent-Verwaltungs-GmbH, Frankfurt am Main, Germany

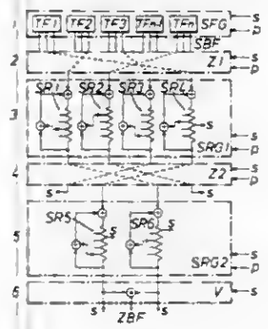
Filed Oct. 30, 1975, Ser. No. 627,312
Claims priority, application Germany, Oct. 31, 1974, 2451711
Int. Cl.² G06F *1/00*
U.S. Cl. 235—152 **19 Claims**

1. Method for producing a pseudo-random binary signal sequence having a long period duration utilizing at least one feedback-connected shift register having an original sequence of operation which is influenced by a first binary signal sequence fed into the shift register in a manner to interfere with the original sequence of operation, comprising the steps of:

producing a plurality of such first binary signal sequences and causing such sequences to differ from one another;

feeding a selected one of the binary signal sequences as an operating sequence interfering signal to at least one input of the shift register by means of an electronically controllable associator circuit receiving the binary signal sequences and connected to at least one input of the shift register; and

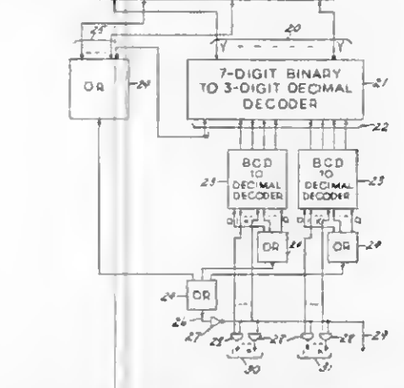
varying the connections effected by the associator circuit by at least one of: a setting program signal; and a control signal derived from binary signal sequences produced during the production of the psuedo-random sequence.



4,032,764
MEANS AND METHOD FOR GENERATING PERMUTATIONS OF A SQUARE

John E. Savage, 65 Humboldt Ave., Providence, R.I. 02906

Filed Dec. 1, 1975, Ser. No. 636,810
Int. Cl.² G06F *1/02*; G07C *15/00*
U.S. Cl. 235—152 **2 Claims**

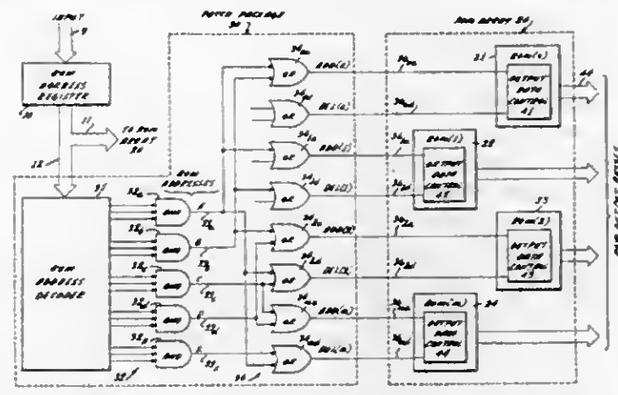


1. A device for generating permutations of a square having k^2 subsquares by generating values of the pairs (i,j) where both i and j are greater than or equal to 1 and equal to or less than k, comprising: a basic generator including a maximal length shift-register having a series of inputs corresponding to the characteristic polynomial $h(x) = x^n + h_{n-1}x^{n-1} + h_{n-2}x^{n-2} + \ldots + h_1 x + h_0$, said register having the properties that when initialized with any binary n-tuple other than 0 it will cycle through 2^n-1 different states before returning to said n-tuple; a binary to decimal decoder having at least a 7 digit binary input recieivng the output of said maximal length shift-register, and at least a 3 digit decimal output in binary coded decimal form; first and second binary coded decimal to decimal decoders receiving the output of 2 of said 3 digit output, a first OR gate receiving the output of the remaining third and other of said at least 3 digit output; and second and third OR gates receiving the outputs, respectively, from said first and second binary coded decimal to decimal decoders, a fourth OR gate receiving the output of said first, second and third OR gates such that the output of the same is zero only when all inputs to said second and third OR gates are zero; and a plurality of AND gates sensing the output of said fourth OR gate and outputs of both of said first and second binary to decimal decoders; said AND gates having a 1 output denoting an integer between 1 and k.

4,032,765
MEMORY MODIFICATION SYSTEM

Jeffrey Earl Epstein, Laverne, and Gary Victor Ruby, Pasadena, both of Calif., assignors to Burroughs Corporation, Detroit, Mich.

Filed Feb. 23, 1976, Ser. No. 660,519
Int. Cl.² G11C *29/00*; G06F *11/00*
U.S. Cl. 235—153 AM **9 Claims**



1. In a system for modifying the data output of the data in a specified bit-space of memory storage, the combination comprising:

a. a read only memory store of addressable data-bit locations;

b. means for recognition of address locations of data having contents which are desired to be modified;

c. means for providing an ADD bit or a DELETE bit control signal to the output data accessed from said address locations having contents to be modified, said means for providing a control signal being activated by said means for recognition upon detection of an address involving a data-bit location whose data content is to be modified;

d. an Output-data Control Circuit for receiving control signals from said means and ADD bit or a DELETE bit signal, said Output-data Control Circuit including:

d1. an input line carrying data derived from a selected bit-space of said memory store;

d2. logic modifying means on said input line capable of modifying the data-bit derived from said bit-space;

d3. said logic means being responsive to a control signal from said means for providing an ADD or DELETE bit control signal;

e. and wherein said Output-data Control Circuit provides a logic modifying means for each output line from each bit location in memory which may be desired to be modified;

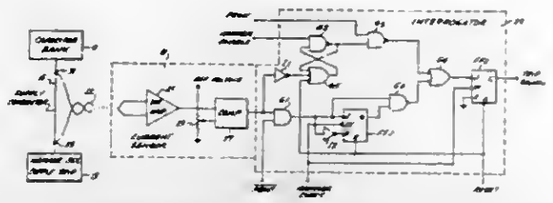
f. said means for recognition includes address lines wired to a plurality of AND gates, each of said AND gates wired for signal activation upon the presense of a specifically known address signal addressing a specified memory store location which is desired to be modified, whereby activation of a specified AND gate will initiate said means by providing a control signal.

4,032,766

WIDE RANGE CURRENT FLOW FAULT DETECTOR

Lee E. Hughes, Bellevue; John L. Marshall, Renton, and Dieter Doring, Seattle, all of Wash., assignors to Tally Corporation, Kent, Wash.

Filed May 17, 1976, Ser. No. 686,880
Int. Cl.² G06F 11/00; H02H 3/38
U.S. Cl. 235—153 AS 16 Claims



9. In a line printer wherein: (1) power suitable for energizing one or more selectively enableable hammer coils simultaneously flows from a power supply to all hammer coils selectively enableable via an electrical conductor; (2) a print enable signal and its complement switch from non printing to printing states just prior to the selective enablement of said hammer coils; and, (3) a hammer clock pulse occurs subsequent to the selective enablement of said hammer coils, the improvement comprising a wide range current flow fault detector for detecting the occurrence of current flow through said electrical conductor when said print enable signal and its complement are in printing states and the absence of current flow during other intervals when said print enable signal and its complement are in non printing states, said wide range current flow fault detector comprising:

A. a current sensor for receiving a current related voltage input and providing an output indicative of whether said current related voltage denotes a current above or below a predetermined minimum level, said current sensor including a two state output circuit having a pair of input terminals for receiving a voltage related to the magnitude of current flow through an electrical conductor, one of said states occurring when the voltage received by said pair of input terminals indicates that the magnitude of the current flow through said electrical conductor is above said predetermined minimum level and the other state occurring when the voltage received by said pair of input terminals indicates that the magnitude of the current flow through said electrical conductor is below said predetermined minimum level;

B. electrical connection means for connecting said pair of input terminals of said two state output circuit to spaced points lying along said electrical conductor; and,

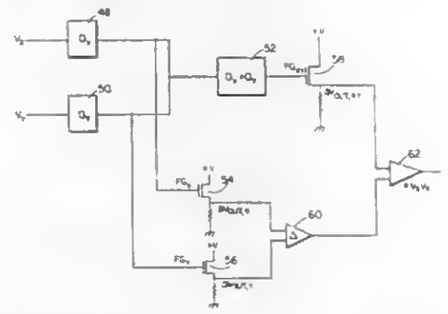
C. an interrogator connected to the output of said current sensor for selectively interrogating the output of said current sensor, said interrogator producing a two state fault indicating output, one of said states being a no fault state denoting the presence of current flow through said electrical conductor above said predetermined minimum level when said point enable signal and its complement are in printing states or the absence of current flow above said predetermined minimum level and the other of said states being a fault state indicating the absence of current flow through said electrical conductor above said predetermined minimum level or the presence of current flow through said electrical conductor above said predetermined minimum level when said print enable signal and its complement are in non printing states.

4,032,767

HIGH-FREQUENCY CCD ADDER AND MULTIPLIER

Isaac Lagnado, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 26, 1976, Ser. No. 661,689
Int. Cl.² G06G 7/16; H03K 5/159
U.S. Cl. 364—862 13 Claims



11. A multiplier comprising:

first means for receiving input voltages V_X and V_Y, for converting V_X and V_Y into charge quantities Q_X and Q_Y and for forming the sum $Q_X + Q_Y$; and

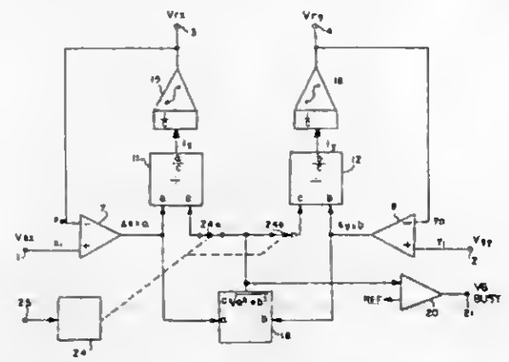
second means operably coupled to said first means for receiving said charge quantities Q_X, Q_Y and $Q_X + Q_Y$ and for forming the product $K V_X V_Y$ therefrom, where K is a constant.

4,032,768

CONSTANT VELOCITY VECTOR GENERATOR

Michael Lawrence Rieger, Beaverton, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Oct. 24, 1975, Ser. No. 625,609
Int. Cl.² G06G 7/22
U.S. Cl. 235—197 11 Claims



1. A system for converting a pair of substantially simultaneous step voltages to a pair of linear ramp voltages at a constant rate, comprising:

means for comparing said pair of step voltages to said ramp voltages and producing a pair of difference currents i_a and i_b therefrom;

means responsive to said difference currents for producing a current i_c which may be defined mathematically as $i_a^2 + i_b^2$;

means for producing a pair of substantially constant currents which may be defined mathematically as i_a/i_c and i_b/i_c respectively; and

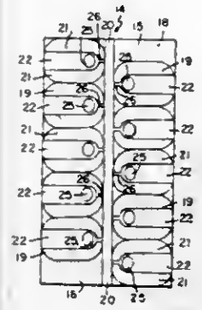
means for integrating said constant currents to product said ramp voltages.

4,032,769

PHOTOFLASH LAMP ARRAY WITH WEB HINGE

Donald W. Hartman; Donald E. Armatrong, and Emery G. Audesse, all of Williamsport, Pa., assignors to GTE Sylvania Incorporated, Montoursville, Pa.

Filed Aug. 21, 1975, Ser. No. 606,388
Int. Cl.² G03B 15/02; F21V 7/00
U.S. Cl. 240—1.3 16 Claims



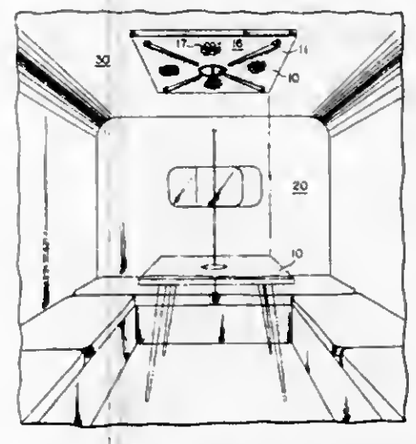
1. A multiple reflector system for a photo-flash lamp array comprising a pair of complementary strip-like thin-walled reflector panels each having a row of side-by-side cavities in its front side formed with reflecting surfaces defining individual lamp reflectors, and a channeled web joining said reflector panels and having two substantially parallel fold lines extending the length of said web, said channeled web providing a spring-hinged support for said reflector panels.

4,032,770

PORTABLE TABLE AND LAMP FIXTURE

Gloria Astrid Millette, Detroit, Mich., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Dec. 9, 1975, Ser. No. 639,215
Int. Cl.² F21V 33/00; A47B 97/00
U.S. Cl. 240—4 2 Claims



1. A combination light fixture and table assembly, which in a first position may be hung from a ceiling against the ceiling to serve as a source of illumination, and in a second position may be supported on foldable legs on a floor to serve both as a table and as a source of illumination, comprising

a table unit formed of a table top joined on its underside to foldable legs,

said table top fitted with a lamp unit that is fixed to the table top in a through opening in the said table top,

said lamp unit formed of

a top plate that is mounted to said table top in said opening so that the upper surface of the said top plate forms a continuation of the surface of the table top, and

a shell that extends below the lower surface of said table top, with said top plate and said shell enclosing an interior chamber in which an electric light bulb socket is fixed, with

said top plate and said shell each formed of light transmitting material so that a light bulb mounted in the socket casts light above the table and below the table,

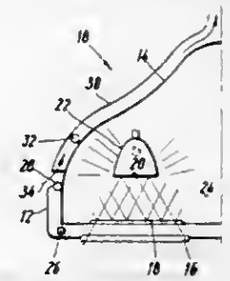
said socket connected to a flexible electric cable that extends through the said top plate, which cable serves as the means to suspend the assembly from a ceiling in said first position.

4,032,771

SURGICAL OPERATING LAMP

Karl F. Ilzig, Hanau, Germany, assignor to Original Hanau Quarzlampen GmbH, Hanau, Germany

Continuation of Ser. No. 435,796, Jan. 23, 1974. This application Apr. 24, 1975, Ser. No. 571,321
Claims priority, application Germany, Feb. 6, 1973, 2305664
Int. Cl.² A61G 13/00
U.S. Cl. 240—1.4 7 Claims



1. In a suspended surgical lamp having a hollow annular lighting body including a transversely extending lower surface, a plurality of light sources within said lighting body facing said lower surface, said lighting body having transparent portions at positions aligned with respective light sources in its lower surface to allow passage of visible light from said sources, an individual first visible light reflector disposed about each of said light sources to reflect visible light rays towards said transparent portions of said lower surface and to transmit infrared radiation therethrough, second infrared reflectors which are transparent to visible light positioned between said light sources and said transparent portions to reflect infrared rays emanating from said light source away from said transparent portions, the improvement wherein said lighting body further comprises concentric inner and outer bell shaped members surrounding all of said light sources and facing said transverse lower surface, said inner bell shaped member being joined at its periphery to said annular lighting body to form with said transverse surface a closed chamber and absorbing infrared radiation from said first and second reflectors, said outer bell shaped member having upper and lower openings facing said inner bell shaped member and being spaced from said inner bell shaped member to form a chimney such that said lower opening allows air to enter between said inner and outer bell shaped members for convection flow upwardly therebetween by absorbing heat from said inner bell shaped member, for discharge from said upper opening to maintain said outer bell shaped member relatively cool.

4,032,772

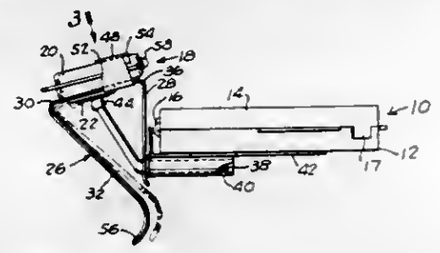
LIGHT ATTACHMENT FOR A COMPACT

John A. Mowbray, Satellite Beach, Fla., assignor to Agostino Orlando, Taylor, Mich.

Filed July 12, 1976, Ser. No. 704,306
Int. Cl.² A45C 15/06
U.S. Cl. 240—6.45 R 14 Claims

1. A light attachment for a compact comprising a support adapted to be secured to the body portion of a compact of the type having a hinged cover with a mirror on the inner face thereof, an arm on said support, a flashlight having a generally

flat mounting face, said flashlight having a depressible switch button on said face which when depressed energizes the light, said arm having a resiliently flexible leg thereon, said leg having an aperture therein, said flashlight being mounted on



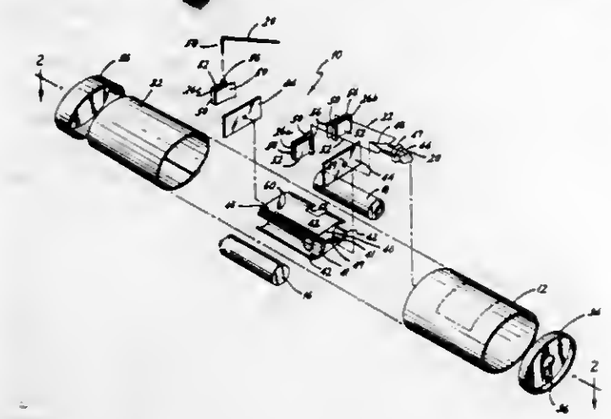
said leg with the switch button registering with said aperture and a rigid switch actuator on said arm projecting toward and terminating directly adjacent said switch button whereby when said leg is flexed toward said actuator said switch button is depressed to energize the light.

4,032,773

FLASHLIGHT

Richard L. Halliday, Jr., Fountainville; Robert R. Anderson, Dublin, and Richard L. Halliday, Doylestown, all of Pa., assignors to Halliday & Co., Inc., Doylestown, Pa.

Filed Dec. 18, 1975, Ser. No. 642,013
Int. Cl.² F21L 7/00
U.S. Cl. 240—10.4 R **11 Claims**



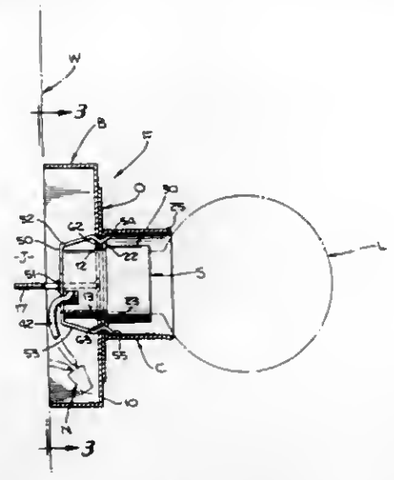
1. A flashlight comprising a housing having a generally flexible side wall, a battery retaining member in said housing including resilient arm members removably retaining a pair of batteries in spaced-apart relationship, said battery retaining member being made of an insulating material, a light bulb including housing, first and second conductor means carried on said battery retaining member adjacent said one end of said housing, each of said first and second conductor means being in contact with one of said leads and with one of said batteries, a third conductor means carried on said battery retaining member adjacent the other end of said housing, said third conductor means being in contact with a conductive switch wire and with one of said batteries, said switch wire extending along said battery retaining member and being adjacent said side wall of said housing, said switch wire terminating adjacent to an exposed conductive surface of the other of said batteries and being normally spaced therefrom, whereby when said side wall of said housing is pressed said switch wire contacts said exposed conductive surface of said other battery completing a circuit between said batteries and said light bulb.

4,032,774

SNAP-TOGETHER LIGHT FIXTURE

Edward Spicer, 11631 Don Alicia Place, Studio City, Calif. 91604

Filed June 25, 1976, Ser. No. 699,947
Int. Cl.² F21S 1/02, 3/02, 5/00
U.S. Cl. 240—73 LD **5 Claims**



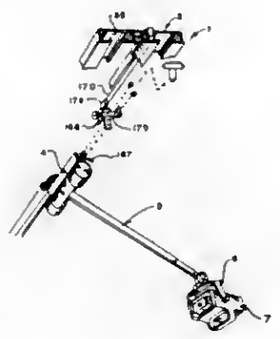
4. A snap-together light fixture including a bulb receiving socket having associated spring means for releasably locking the socket in a support, a metal cup for receiving and enclosing the socket, and a base member adapted to fit upon a wall or ceiling, the cup and base member cooperatively supporting the socket by means of openings through which the socket extends, while the spring means of the socket releasably grasps the edges of the openings for holding all three parts together.

4,032,775

ILLUMINATION SYSTEM

Mitchell Bobrick, Redondo Beach, Calif.; Murray L. Quin, St. Louis, and Morris M. Buzan, St. Charles, both of Mo., assignors to Emerson Electric Co., St. Louis, Mo., a part interest

Division of Ser. No. 496,879, Aug. 12, 1974, Pat. No. 3,936,671. This application Oct. 24, 1975, Ser. No. 625,586
Int. Cl.² F21S 1/00
U.S. Cl. 240—73 R **11 Claims**



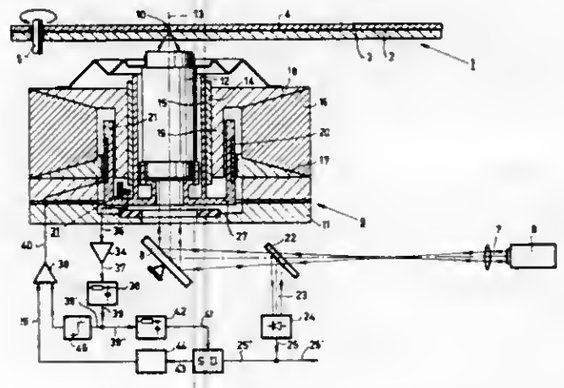
1. In an illumination system for a medical facility, wherein a carriage track is mounted overhead and a carriage is mounted for movement along said carriage track, said carriage track extending from near a reference wall to a point distant from said reference wall, the improvement comprising said carriage track having spaced parallel ledges, said carriage having a plurality of wheels revolvably mounted on said carriage and resting upon said ledges, and a boom mount supported by said carriage and depending below said track; a boom swingably mounted in said boom mount; a lamp supported by said boom; electrical conductors carried by said boom and extending into said boom mount; a multiconductor-strip ribbon conductor disposed in a channel defined in part by one ledge of said track, said ribbon conductor being oriented with broad surfaces perpendicular to said ledge, and being of a length greater than the lengthwise travel of said carriage, said ribbon conductor being flexible and being doubled back intermediate its ends, said ribbon conductor being electrically connected at one of its ends to a source of current and at its other end to said electrical conductors carried by said boom.

4,032,776

AUTOMATIC OPTICAL FOCUSSING SYSTEM

Gerard Eduard van Rosmalen, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 23, 1976, Ser. No. 660,659
Claims priority, application Netherlands, Jan. 16, 1976, 7600423
Int. Cl.² G01J 1/20
U.S. Cl. 250—201 **8 Claims**



1. An automatic optical focussing system for an apparatus for reading an information track on an information plane of a reflecting record carrier of the type comprising a radiation source means for providing a radiation beam

an optical focussing device for focussing the radiation beam to a read spot in a focussing plane and comprising a frame, an electrically controllable objective means provided with lenses which is axially movable relative to the frame in the direction of its optical axis for varying the position of the focussing plane, bearing means for mounting the objective so as to be movable relative to the frame, and electrodynamic drive means comprising at least one control coil for controlling the coarse position of the focussing plane, and means for causing the objective to oscillate at a high frequency in an axial direction, so that a high frequency oscillation about the coarse position of focussing plane is obtained,

a radiation detection responsive to the radiation beam, which has been modulated and reflected by the information track, for producing a detection signal depending on the position of the focussing plane relative to the information plane and

a control circuit means for producing a control signal which depends on the detection signal and for applying said control signal to the control coil of the optical focussing device,

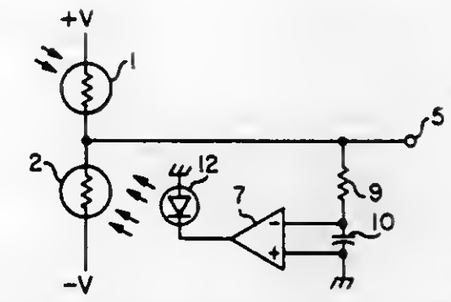
the improvement comprising at least one resilient element connecting the objective to an oscillation-compensation element which is axially movable relative to the objective, the objective together with the oscillation-compensation element and the resilient element constituting a mechanical resonant system which oscillates with a high frequency.

4,032,777

PHOTOMERIC MONITORING DEVICE

Robert Earl McCaleb, 5704 NE. 36th Ave., Portland, Oreg. 97211

Filed Mar. 29, 1976, Ser. No. 671,057
Int. Cl.² H01J 39/12
U.S. Cl. 250—214 B **11 Claims**



1. A photometric monitoring sytem, comprising:

first transducer means for receiving light from a monitored light source and generating an electrical signal in response to a change thereof;

amplifier means responsive to said electrical signal for controlling the intensity of a reference light source;

second transducer means coupled to said first transducer means for receiving light from said reference light source and cancelling at least a portion of said electrical signal in response thereto; and

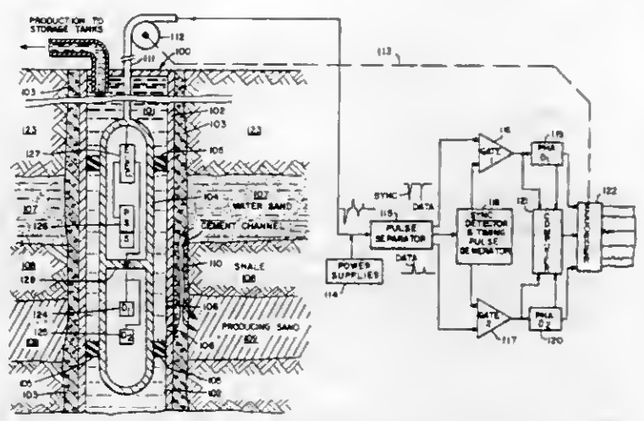
utilization means responsive to said electrical signal for providing an indication of said change of monitored light.

4,032,778

BEHIND CASING WATER VOLUME FLOW RATE MEASUREMENT USING GAMMA RAY SPECTRAL DEGRADATION

Hans J. Paap; Dan M. Arnold; Ward E. Schultz, and Harry D. Smith, Jr., all of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Filed Nov. 3, 1975, Ser. No. 628,169
Int. Cl.² G01V 5/00
U.S. Cl. 250—266 **12 Claims**



1. A method for measuring the location, linear flow rate, and volume flow rate of undesired water flow behind well casing in a producing well, comprising the steps of:

a. locating a well tool sized and adapted for passage through a well bore and having a source of high energy neutrons at least some of which have sufficient energy to cause the nuclear reaction O^{16} (np) N^{16} and at least two gamma ray detectors longitudinally spaced from said source and each other in a well bore at a depth to be investigated;

b. irradiating the borehole environs with high energy neutrons from said source;

c. detecting at said detectors gamma rays resulting from the decay of the unstable isotope N^{16} comprising a portion of

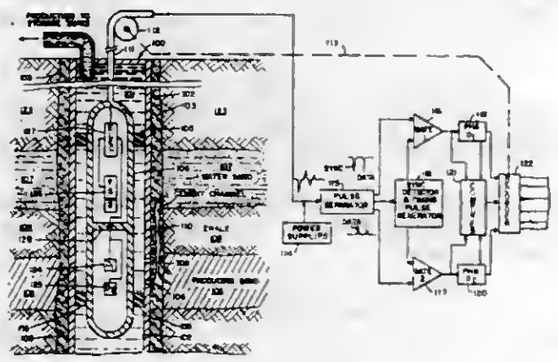
any undesired behind casing flow present and generating count signals representative thereof;
d. separating said count signals from at least one of said detectors into at least two separate energy dependent signals related to the energy of the gamma rays causing said signals and generating a ratio signal representative of the ratio of the at least two separate energy dependent signals;
e. combining said count signals from said detectors according to a first predetermined relationship to derive an indication of the linear flow rate of undesired behind casing water flow in a preferred direction;
f. generating from said ratio signal according to a second predetermined relationship an indication of the radial distance from said at least one detector to the undesired behind casing water flow; and,
g. combining said indication of linear flow rate and said indication of radial distance according to a third predetermined relationship to derive an indication of the volume flow rate of the undesired behind casing flow.

4,032,779

BEHIND CASING WATER VOLUME FLOW RATE MEASUREMENT USING CONCENTRIC GAMMA RAY DETECTORS

Dan M. Arnold, and Hans J. Paap, both of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Filed Nov. 3, 1975, Ser. No. 628,170
Int. Cl.² G01V 5/00
U.S. Cl. 250—266 10 Claims



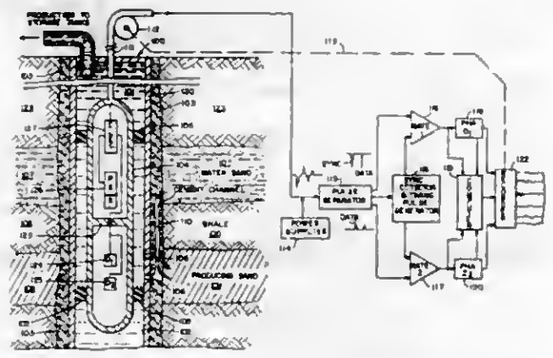
1. A method for measuring the location, linear flow rate and volume flow rate of undesired water flow behind well casing in a producing well, comprising the steps of:
a. locating a well tool sized and adapted for passage through a well bore and having a source of fast neutrons at least some of which have sufficient energy to cause the nuclear reaction O (n,p) N and at least two gamma ray detectors longitudinally spaced from said source and each other, at least one of said detectors comprising an inner cylindrical detector and an outer cylindrical shell detector coaxially aligned with said inner detector, in a well bore at a depth to be investigated;
b. irradiating the borehole invirons with fast neutrons from said source;
c. detecting at said longitudinally spaced detectors gamma rays resulting from the decay of the unstable isotope N16 comprising a portion of any undesired behind casing flow present and generating count signals representative thereof;
d. separating said count signals from said inner detector and said outer detector into separate signals and generating a ratio signal representative thereof;
e. combining said count signals from said longitudinally spaced detectors according to a first predetermined relationship to derive an indication of the linear flow ratc of undesired behind casing water flow in a preferred direction;
f. generating from said ratio signal according to a second predetermined relationship an indication of the radial distance from said inner detector to the undesired water flow behind the casing; and
g. combining said linear flow rate indication and said radial distance indication according to a third predetermined relationship to derive an indication of the volume flow rate of the undesired behind casing flow.

4,032,780

BEHIND CASING WATER FLOW DETECTION USING CONTINUOUS OXYGEN ACTIVATION

Hans J. Paap; Dan M. Arnold, and Harold E. Peelman, all of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Filed Nov. 3, 1975, Ser. No. 628,174
Int. Cl. G01v 5/00
U.S. Cl. 250—266 16 Claims



1. A method for locating and determining the linear flow rate and direction of undesired water migration behind casing in a cased well borehole producing well fluid through casing perforations, comprising the steps of:
a. locating a well tool having a source of high energy neutrons at least some of which having sufficient energy to cause the nuclear reaction O^{16} (n,p) N^{16} and at least two gamma ray detectors longitudinally spaced from said source and each other to a position adjacent above or below the perforations;
b. irradiating the borehole environs with high energy neutrons from said source;
c. detecting at each of said detectors gamma rays primarily caused by the decay of the unstable isotope nitrogen 16 and generating signals representative thereof;
d. combining said signals according to a predetermined relationship to derive an indication of the direction and linear flow rate of any elemental oxygen nuclei comprising undesired fluid flow in a preferred direction behind the well casing at said adjacent position; and
e. cstimating the radial distance from the detector locations of such undesired fluid flow and combining said distance and said linear flow rate indication according to a second predetermined relationship to provide an indication of the volume flow rate of such undesired flow.

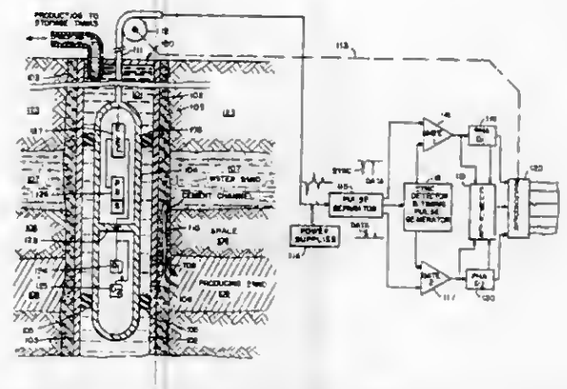
4,032,781

WELL FLUID PRODUCTION PROFILING USING AN OXYGEN ACTIVATION FLOW METER

Dan M. Arnold, Houston, Tex., assignor to Texaco Inc., New York, N.Y.

Filed Nov. 3, 1975, Ser. No. 628,175
Int. Cl.² G01V 5/00
U.S. Cl. 250—266 8 Claims

1. A method for locating and measuring the entry of undesired water cut through casing perforations into a known size cased well borchole having multiple sets of longitudinally spaced perforations for the production of fluids from formations communicating with the well bore through the perforations, comprising the steps of:
a. locating a well tool having a source of high energy neutrons having sufficient energy to cause the nuclear reaction $O^{16}(n,p)N^{16}$ and at least two gamma ray detectors longitudinally spaced from said source and each other to a position adjacent a set of perforations whose fluid flow condition is to be investigated;
b. repetitively irradiated the borehole environs with bursts of high energy neutrons from said source;
c. detecting subsequent to each neutron burst at each of said detectors gamma rays caused by the decay of the unstable isotope nitrogen 16 and generating signals representative thereof;



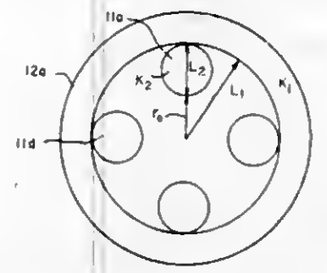
d. combining said representative signals according to a first predetermined relationship to derive an indication of the linear flow rate of any elemental oxygen nuclei comprising the produced fluid flow from the set of perforations being investigated; and
e. combining the known inside casing cross sectional area with said indication of linear flow rate according to a second predetermined relationship to derive an indication of the volume flow rate of an elemental oxygen nuclei comprising the produced fluid from the set of perforations being investigated.

4,032,782

TEMPERATURE STABLE MULTIPOLE MASS FILTER AND METHOD THEREFOR

Ronald D. Smith, Bovingdon, England; William J. Fles, Portola Valley, Calif.; John R. Reeher, Los Gatos, Calif., and Michael S. Story, Los Gatos, Calif., assignors to Finnigan Corporation, Sunnyvale, Calif.

Filed June 4, 1976, Ser. No. 692,846
Int. Cl.² H01J 39/34
U.S. Cl. 250—292 5 Claims



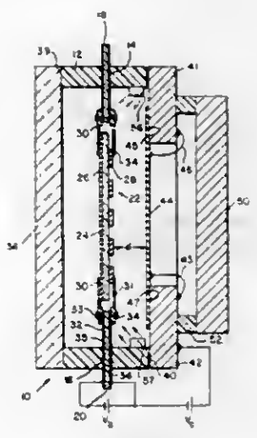
1. A method of maintaining R_o constant over a wide temperature range in a multipole mass filter having rods and a rod mounting means comprising the following steps: determining the theoretical ratio of thermal coefficients of expansion of said rods and said rod mounting means to maintain R_o constant with reference to a specific mass filter construction; selecting rods and rod mounting means respectively having thermal coefficient of expansion substantially matching said theoretical ratio; and affixing said rods to said mounting means.

4,032,783

PYROELECTRIC RADIATION SENSOR AND IMAGING DEVICE UTILIZING SAME

Nobuo John Koda, Vista, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Continuation-in-part of Ser. No. 584,805, June 9, 1975, abandoned. This application May 21, 1976, Ser. No. 688,666
Int. Cl.² H01J 31/49
U.S. Cl. 250—333 11 Claims



1. In combination, an infrared sensor including:
a. a pyroelectric substrate having first and second major surfaces,
b. a layer of conductive infrared radiation absorbing material on said first major surface, and
c. a metallic grid including discrete grid lines disposed on said second major surface and exposing predefined discrete areas of said second major surface, whereby upon the application of a predetermined bias voltage between said layer of conductive material and said grid and the receipt of both predetermined constant photon energy by said second major surface and infrared radiation by said first major surface, said substrate develops open circuit voltages between discrete lines of said metallic grid which alter the electric field patterns adjacent said grid and, in turn, control the quantity of photo-electrons released from said grid and available for acceleration to a remote target.

4,032,784

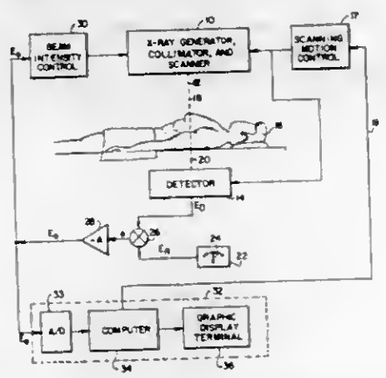
METHOD AND APPARATUS FOR EXAMINING A BODY BY A BEAM OF X-RAYS OR OTHER PENETRATING RADIATION

Leonard G. Rich, West Hartford, Conn., assignor to The Gerber Scientific Instrument Company, South Windsor, Conn.

Filed Aug. 4, 1975, Ser. No. 601,308
Int. Cl.² G01J 1/42
U.S. Cl. 250—355 19 Claims

1. A system for examining a body by a beam of penetrating radiation, said system comprising:
means for providing a collimated beam of penetrating radiation and for moving said beam relative to a body to be examined to cause it to have a succession of different straight line paths passing through said body,
a detector for detecting the intensity of said beam after passage through said body and for producing a corresponding detected intensity signal,
means responsive to said detected intensity signal for varying the emitted intensity of said beam to maintain said detected intensity signal at an essentially constant value,
means for providing an output signal having a value corresponding to the value of said emitted intensity of said beam, and

means utilizing said output signal as a source of information



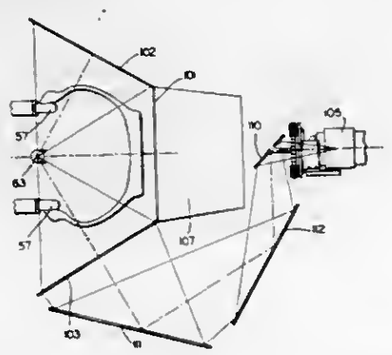
about the transmissivity of said body along each of said different straight line paths.

4,032,785

TIRE INSPECTION MACHINE PRESENTING AN X-RAY IMAGE OF THE ENTIRE WIDTH OF THE TIRE

Donald T. Green, Mentor, Ohio, and Edward de Benedetti, San Jose, Calif., assignors to United States Steel Corporation, Pittsburgh, Pa.

Filed Mar. 28, 1974, Ser. No. 455,544
Int. Cl.² G01N 23/00
U.S. Cl. 250—358 T 9 Claims



1. An X-ray inspection system for a pneumatic tire, comprising:

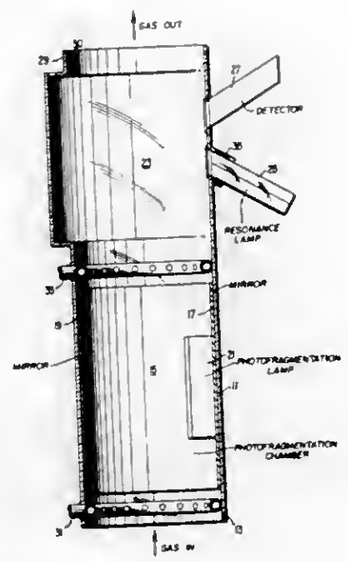
a. a support for a tire,
b. means for stepwise rotation of a tire on the support,
c. a plurality of fluorescent screens extending essentially around the entire width, from bead to bead, of the outside of a sector of a tire on the support,
d. at least one X-ray source,
e. means for directing X-rays from the X-ray source to each fluorescent screen in turn through the wall of the said sector of a tire on the support to form essentially adjoining shadow pictures of different parts of the sector of the tire on the several fluorescent screens,
f. a video camera,
g. means for exposing the video camera to each fluorescent screen in turn through paths of essentially equal optical length to produce a sequence of electronic images of the said adjoining shadow pictures,
h. means for transferring the several electronic images in the video camera in turn to adjacent positions in a storage device, to produce an essentially complete composite image of the said sector of a tire, and
i. means for displaying the said composite image as a still picture on a monitor.

4,032,786

METHOD OF USING RESONANCE ATOMIC SCATTERING OF RADIATION TO MEASURE GASEOUS SPECIES

Robert A. Young, Loretto, Canada, assignor to Xonics, Inc., Van Nuys, Calif.

Continuation of Ser. No. 562,221, March 26, 1975, abandoned. This application Apr. 2, 1976, Ser. No. 672,974
Int. Cl.² G01J 1/42
U.S. Cl. 250—373 13 Claims



1. A device for measuring gaseous species comprising a scattering chamber;

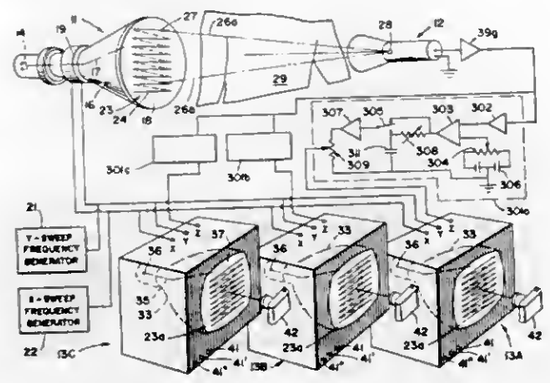
a resonance lamp illuminating said chamber;
a detector for measuring the scattered light within said chamber;
conduit means for delivering said gaseous species to said chamber;
a photofragmentation chamber within said conduit for selectively decomposing said gaseous species; and
means for adding gaseous species to the gas in said conduit.

4,032,787

METHOD AND APPARATUS PRODUCING PLURAL IMAGES OF DIFFERENT CONTRAST RANGE BY X-RAY SCANNING

Richard D. Albert, 317 Hartfurd Road, Danville, Calif. 94526

Continuation-in-part of Ser. No. 481,954, June 24, 1974, Pat. No. 3,949,229. This application Apr. 5, 1976, Ser. No. 673,908
Int. Cl.² G03B 41/16
U.S. Cl. 250—402 10 Claims



1. Apparatus for simultaneously producing plural radiographic images of a subject comprising:

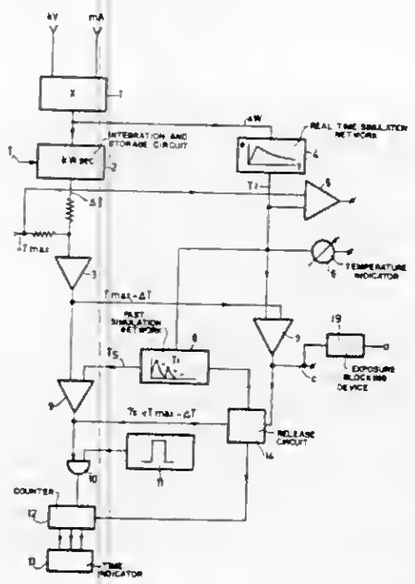
a scanning X-ray source having a broad target plate and an electron gun for directing an electron beam towards said target plate and having electron beam deflection means for sweeping said electron beam along said target plate in a first direction in reponse to a first sweep signal and a means for sweeping said electron beam in a second orthogonal direction in response to a second sweep signal to establish a moving origin point of X-rays on said target plate which sweeps through a raster pattern thereon,
an X-ray detector spaced apart from said source whereby said subject may be disposed therebetween, said detector having an active radiation sensitive area which is substantially smaller than said raster pattern and having means for producing X-ray count signals in response to X-rays which impinge on said radiation sensitive area,
a plurality of X-Y display devices each having a screen and means for producing a point of light thereon and having means for sweeping said point of light in a first direction in response to a first sweep signal and means for sweeping said point of light in a second orthogonal direction in response to a second sweep signal and means for warying the intensity of said point of light in response to an intensity signal,
a first sweep frequency generator coupled to said X-ray source and to each of said display devices to supply said first sweep signal to each thereof,
a second sweep frequency generator coupled to said X-ray source and each of said display devices to supply said second sweep signal thereto, and
a plurality of signal processing circuits, each being connected to said X-ray detector and to an associated separate one of said display devices to supply said intensity signal to said associated one of said display devices, said signal processing circuits having means for establishing a different predetermined intensity signal range for each said display devices in response to output signals from said detector.

4,032,788

CIRCUIT ARRANGEMENT FOR SUPERVISING THE LOADING OF AN X-RAY TUBE

Peter Stege, Hamburg, and Bernd Hermeyer, Henstedt-Ulzburg, both of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 3, 1975, Ser. No. 546,394
Int. Cl.² H05G 1/30
U.S. Cl. 250—414 14 Claims



1. In an x-ray diagnostic apparatus, a circuit for supervising the loading of an x-ray tube comprising, means for forming a first signal which is dependent on the x-ray tube anode temperature T_t and which controls an indication device,

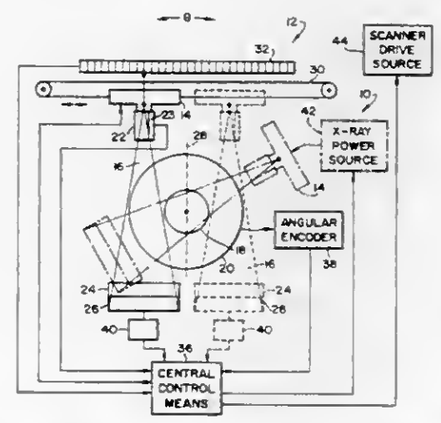
a. a circuit arrangement for forming a second signal which corresponds to the maximum allowed temperature (T_{max}) of the tube anode minus a temperature value (ΔT) which is dependent on an anticipated exposure load of the x-ray tube,
b. a fast simulation network for providing an output signal T_s indicative of the accelerated simulation of the anode temperature, means for applying said first signal to the fast simulation network at the beginning of each simulation cycle,
c. a time measuring device for measuring the time expiring between the beginning of a simulation cycle and the instant at which the output signal (T_s) of the fast simulation network becomes smaller than the second signal, and
d. an indication device controlled by the time measuring device.

4,032,789

MEANS FOR CONTROLLING OPERATION OF POWER SOURCES ASSOCIATED WITH AN AXIAL TOMOGRAPHIC SYSTEM

Samuel Thomas Workman, Los Gatos, Calif., assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.

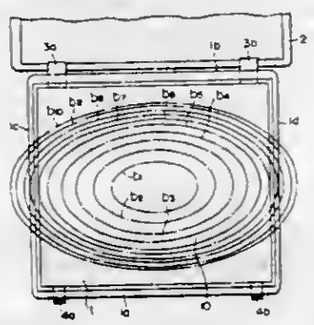
Filed Oct. 28, 1975, Ser. No. 625,806
Int. Cl.² G03B 41/16
U.S. Cl. 250—445 T 22 Claims



1. An axial tomographic system including scanner means for collecting a plurality of sets of data corresponding to the transmission or absorption of one or more beams of penetrating radiation through a planar slice of an object to be examined, said scanner means including one or more power sources associated therewith, said scanner means adapted to automatically return to the "off" condition during scanning operation if not maintained in the "on" condition; means for activating said scanner means to establish an "on" condition to thereby enable scanning operation to occur; and control means including means to measure one or more system parameters when said scanner means is in the "on" condition and to determine if the measured parameters are within predetermined limits therefor, and means for maintaining said "on" condition only if said control means is properly operational and all measured system parameters are within the predetermined limits therefor, said means for maintaining the "on" condition including means to send a series of periodic operation-maintaining signals to each of said power sources, said operation-maintaining signals being sent only if said control means is properly operational and all measured system parameters are within the predetermined limits therefor, whereby, if said control means is not operational or any measured system parameter is outside the predetermined limits therefor, said power sources are automatically electrically isolated from the units driven

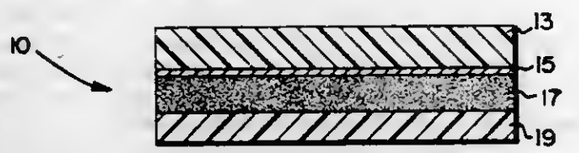
thereby due to failure of said power sources to receive an operation-maintaining signal from said signal-sending means.

4,032,790
X-RAY FILM CARTRIDGE
Takeshi Nakamura, Minami-ashigara, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan
Filed May 3, 1976, Ser. No. 682,400
Claims priority, application Japan, May 12, 1975, 50-63466; Jan. 30, 1976, 51-9291
Int. Cl.² A61B 6/00; G03B 41/16
U.S. Cl. 250—480 4 Claims



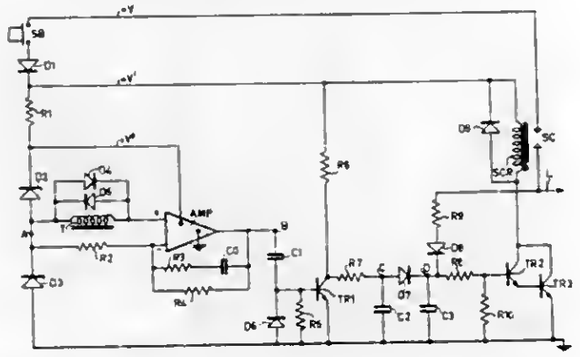
1. An X-ray film cartridge comprising in combination: a rectangular cartridge body having a front wall, pair of side walls and a back wall; a rectangular cover hinged at one side thereof to the back wall of said body by means of a pair of hinge means; a pair of latch means provided at one side of said cover opposite to the hinged side, said latch means being manually operable to be moved from a latching position to a released position; a pair of slots provided in the front wall of the body to be engaged with said latch means of the cover; a cushion pad made of elastic material attached to the inner surface of the cover; an intensifying sheet attached to the surface of the cushion pad; and a second intensifying sheet attached to an inner surface of the body; wherein the improvement comprising a number of holes provided in said cushion pad and a convex part provided in said cover, said convex part of the cover being convex to the inside and having a contour represented by concentric elliptical contour lines whose center is located at the center of the rectangular cover.

4,032,791
FLUORESCENT SCREEN AND METHOD OF MAKING
Vincent Cbiola, and Sixdeniel Faria, both of Towanda, Pa., assignors to GTE Sylvania Incorporated, Stamford, Conn.
Filed June 16, 1976, Ser. No. 696,799
Int. Cl.² G01T 1/00
U.S. Cl. 250—483 8 Claims



1. A fluorescent screen comprising:
a plastic film support layer having a first thickness;
a reflectance layer of vapor-deposited aluminum on said support layer and having a second thickness, the ratio of thicknesses of said support layer to said reflectance layer within the range of from about 7:1 to about 24:1;
a flexible layer of a fluorescent material dispersed in an organic polymeric binder, said flexible layer located on said reflectance layer and having a third thickness, the ratio of thicknesses of of said flexible layer to said reflectance layer within the range of from about 4:1 to about 22:1.

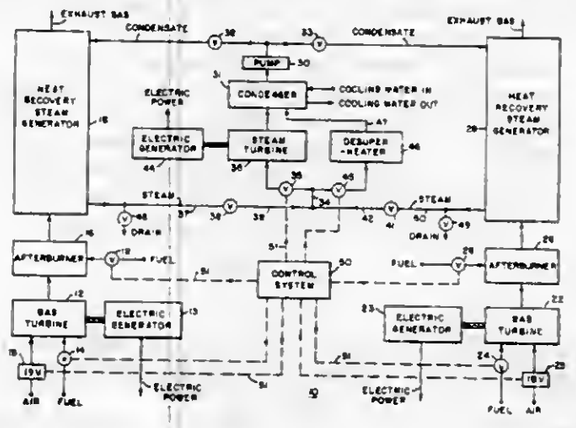
4,032,792
AUTOMOTIVE STARTER LOCKOUT SYSTEM
Derek John Parkyn, Westerham, and Alexander Hendrich Francis Keulemao, Horley, both of England, assignors to U.S. Philips Corporation, New York, N.Y.
Filed Apr. 23, 1975, Ser. No. 570,617
Int. Cl.² F02N 11/00
U.S. Cl. 290—37 R 11 Claims



1. A starter motor lockout system for an internal combustion engine comprising, a starter switch, a transducer arranged to cooperate with a toothed annular member which is rotatable with the engine for detecting rotational movement of the engine to produce an alternating electric output signal whose frequency is a function of the speed of rotation of the engine, delay means including a capacitor, a semiconductor switch responsive to said electric output signal and coupled to said capacitor to control the mean charge thereon, means connecting said capacitor in a charging circuit while the starter switch is operated, the capacitor being connected periodically in a discharging circuit by the semiconductor switch at a rate determined by the frequency of said alternating electric output signal, a semiconductor output stage which is operative to energise a starter relay only when the mean charge on said capacitor has a predetermined value, which value is not attained for a predetermined time period after the starter switch has been operated with the engine at rest due to the time constant of the charging circuit, said relay being effective upon energisation thereof to close contacts to complete an energising circuit that supplies current to the starter motor, and a latching circuit for maintaining the semiconductor output stage operative while the starter switch is operated.

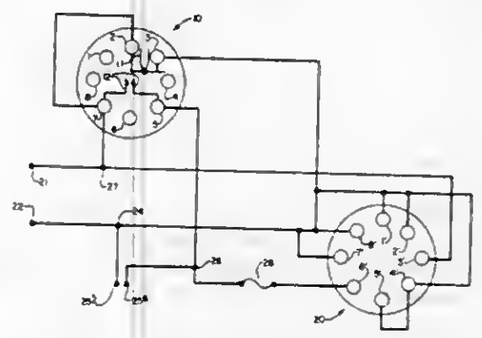
4,032,793
MANUAL/AUTOMATIC SYSTEM FOR SYNCHRONIZING MULTIPLE TURBINES IN A COMBINED CYCLE ELECTRIC POWER PLANT
Robert Uram, East Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Aug. 8, 1974, Ser. No. 495,713
Int. Cl.² F02C 9/04; F01K 23/00
U.S. Cl. 290—40 C 14 Claims

1. A combined cycle electric power plant comprising at least one gas turbine, means for generating steam in response to heat energy from said gas turbine, a steam turbine driven by steam supplied to it from said steam generating means, an electric generator driven by each of said turbines, means for controlling the operation of said turbines and steam generating means, said controlling means including a speed control for said gas turbine and a speed control for said steam turbine, means for regulating the field voltage of each of said generators during its startup, circuit breaker means for connecting each of said generators to a power system line, means for generating signals representing each generator voltage and frequency and each line voltage and frequency, an operator station having an automatic/manual synchronization selector switch and means for generating speed change and voltage change demand signals for each turbine-generator when it is selected for manual synchronization, means responsive to said voltage and frequency signals for automatically generating voltage change and turbine speed change outputs for implementation by the associated ones of said turbine speed controls and said field voltage regulating means when an automatic synchronization signal is generated by said selector switch and the associated generator is being sychronized,



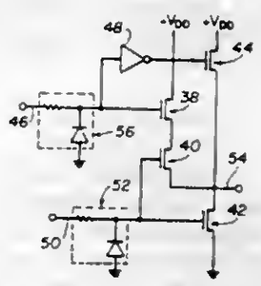
means for automatically generating a breaker close signal for each breaker means during synchronization of the associated generator on voltage and speed matches in the automatic synchronization mode, means for uncoupling the automatic synchronizing control paths and for coupling the speed and voltage change demand signals from said operator station to the selected turbine-generator when a manual synchronization signal is generated by said selector swtich, and means for generating a closing signal from the operator station for the breaker means associated with the generator selected for manual synchronization.

4,032,794
TELEVISION LOCKING MECHANISM
Robert P. Meade, 3419 42nd St., Metairie, La. 70001
Filed Sept. 19, 1975, Ser. No. 614,837
Int. Cl.² H01H 7/06
U.S. Cl. 307—326 9 Claims



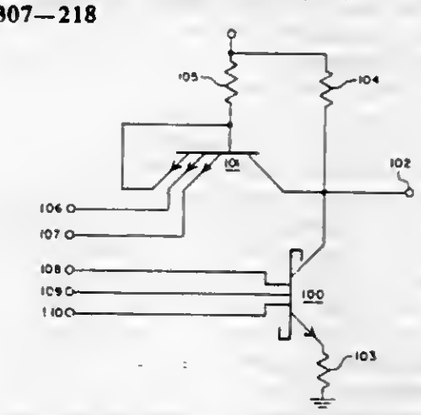
1. A locking mechanism for an appliance including a cabinet housing operational circuitry responsive to electric power supplied on an input power cord from an external source, comprising means for preventing an electrical connection between said operational circuitry and said input power cord after said input power cord has been disconnected from an external power source for a pre-set period of time, including time delay relay means for providing an electrical connection between said operational circuitry and said input power cord for energization of said circuitry within a pre-set period of time after said input cord is connected to said external source, switch means connected to said time delay relay means for electrically connecting said external power source to said time delay relay means, and removable plug means adapted to activate said switch means.

4,032,795
INPUT BUFFER
Robert R. Hale, Rancho Santa Fe, Calif., assignor to Solitron Devices, Inc., Tappan, N.Y.
Filed Apr. 14, 1976, Ser. No. 676,722
Int. Cl.² H03K 19/08, 19/40
U.S. Cl. 307—205 7 Claims



1. A signal processing circuit controlling output voltage comprising:
a series of field effect transistors including first and second such transistors of one conductivity type connected to a third such transistor of differing conductivity across a power source;
a fourth field effect transistor connected between said third such transistor and the power source in parallel with said first and second such transistors;
means to provide a control signal to said first field effect transistor and an inverted signal thereof to said fourth field effect transistor;
means to provide a data signal to said third of such transistors and to the second field effect transistor; and
means to provide an output of said circuit from the connection of said first and second such transistors to the power source from said fourth field effect transistor to said third field effect transistor.

4,032,796
LOGIC DOT-AND GATE CIRCUITS
David E. Fulkerson, Minnetonka, Minn., assignor to Honeywell Inc., Minneapolis, Minn.
Continuation-in-part of Ser. No. 497,018, Aug. 13, 1974, Pat. No. 3,970,866. This application Mar. 26, 1976, Ser. No. 670,811
Int. Cl.² H03K 19/08, 19/22
U.S. Cl. 307—218 7 Claims



1. A circuit for performing logical functions including a "DOT--AND" function, said circuit comprising:
a non-inverting bipolar transistor having a non-inverting transistor base, a non-inverting transistor collector and a plurality of non-inverting transistor emitters therein, said non-inverting transistor emitters, including a first non-

inverting transistor emitter, being inputs to receive signals from sources of signals excepting those said non-inverting transistor emitters which are directly connected to said non-inverting transistor base including a second non-inverting transistor emitter so connected;

an inverting bipolar transistor having an inverting transistor collector, inverting transistor emitter and a plurality of inverting transistor bases therein, said inverting transistor bases being inputs to receive signals from source of signals, said inverting transistor collector being directly connected to said non-inverting transistor collector; and

a first resistor connected between said non-inverting transistor base and a first terminal means adapted for connection to a voltage source, whereby a logic gate circuit capable of performing said "DOT--AND" function is provided.

4,032,797

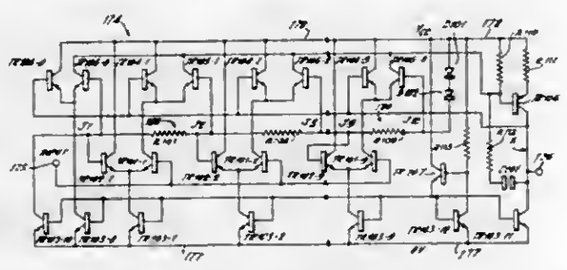
QUANTISING CIRCUIT

Eric Metcalf, Ropley, and Paul Nicholas Loewenstein, Camberley, both of England, assignors to The Solartron Electronic Group Limited, Farnborough, England

Filed Aug. 6, 1975, Ser. No. 602,482

Int. Cl.² H03K 4/02; G06G 7/12; H03B 19/00

U.S. Cl. 307—227 **14 Claims**



1. A quantising circuit for quantising an input voltage, comprising:

means for generating a set of predetermined voltages, each predetermined voltage being higher than the preceding one in the set;

a plurality of voltage level responsive circuits each connected to receive the input signal and a respective one of said predetermined voltages and each being operative to change from a first state to a second state as the input voltage passes through a level of equality with the respective predetermined voltage in a given direction;

an output circuit for producing an output voltage; and

a plurality of amplifier circuits each having a first input connected to receive a respective one of said predetermined voltages, a second input connected to receive said output voltage in a negative feedback sense, and an output coupled to the input of the output circuit, each amplifier circuit being rendered operative by a respective one of said voltage level responsive circuits when the input voltage lies between the respective predetermined voltage received by that voltage level responsive circuit and the next successive predetermined voltage in said given direction, and each amplifier circuit, when operative, constituting a voltage follower circuit which maintains the output voltage substantially equal to the respective voltage at the first input of the amplifier circuit, whereby the output circuit produces an output voltage which can take only a respective one of a plurality of substantially discrete levels in dependence on the magnitude of the input voltage.

14. In a quantising circuit for quantising an input voltage, said quantising circuit including means for generating a set of predetermined voltages, each predetermined voltage being higher than the preceding one in the set, a plurality of voltage level responsive circuits each connected to receive the input signal and a respective one of said predetermined voltages and each being operative to change from a first state to a second state as the input voltage passes through a level of equality with the respective predetermined voltage in a given direction, and an output circuit responsive to said voltage level responsive circuits for producing an output voltage which can take only a respective one of a plurality of substantially discrete levels in dependence on the magnitude of the input voltage; the improvement comprising:

a plurality of amplifier circuits each having a first input connected to receive a respective one of said predetermined voltages, a second input connected to receive said output voltage in a negative feedback sense, and an output coupled to the input of the output circuit, each amplifier circuit being rendered operative by a respective one of said voltage level responsive circuits when the input voltage lies between the respective predetermined voltage received by that voltage level responsive circuit and the next successive predetermined voltage in said given direction, and each amplifier circuit, when operative, constituting a voltage follower circuit which maintains the output voltage substantially equal to the respective voltage at the first input of the amplifier circuit.

4,032,798

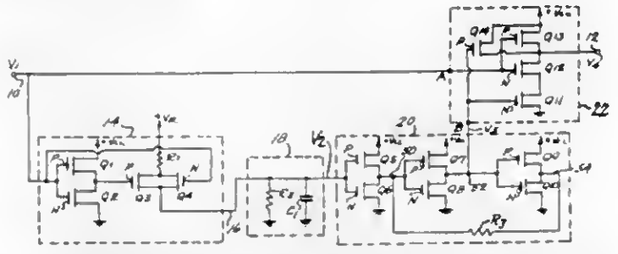
LOW CUTOFF DIGITAL PULSE FILTER ESPECIALLY USEFUL IN ELECTRONIC ENERGY CONSUMPTION METERS

Miran Milkovic, Scotia, N.Y., assignor to General Electric Company

Division of Ser. No. 505,799, Sept. 13, 1974. This application Nov. 14, 1975, Ser. No. 631,968

Int. Cl.² H03K 9/06, 3/286

U.S. Cl. 307—233 R **14 Claims**



1. A digital electrical pulse filter which provides output electrical pulses directly corresponding to input electrical pulses when the input pulses have a repetition rate greater than a predetermined repetition rate and which provides no output pulses when the input pulses have a repetition rate less than said predetermined repetition rate, said filter comprising:

logic gate means having a first input connected to respond to said input electrical pulses, a second input and an output for providing said output electrical pulses only when enabled by an enabling signal applied to said second input;

energy storage and dissipation means connected for short term storage and eventual dissipation at a predetermined rate of electrical energy applied thereto and for providing an averaged signal representing the amount of energy stored at any given time;

a source of electrical energy;

switch means including a pair of complementary C-MOS active switch elements having opposite polarities connected between said source and said energy storage and dissipation means, said switch elements being controlled by said input electrical pulses to provide input pulses of energy to said energy storage and dissipation means corresponding to the occurrences of said input electrical pulses whereby the value of said averaged signal corresponds to the repetition rate of said input electrical pulses; and

trigger circuit means connected to receive said averaged signal and to provide said enabling signal to the second input of said logic gate only during the time when said averaged signal exceeds a predetermined threshold value corresponding to said predetermined repetition rate.

4,032,799

AUTOMATIC GAIN CONTROL CIRCUIT

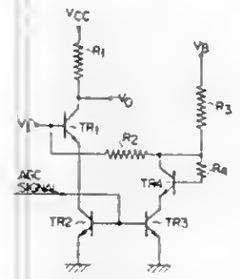
Takashi Sugimoto, Yokohama, and Yoshio Wada, Tokyo, both of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Tokyo, Japan

Filed Mar. 2, 1976, Ser. No. 663,155

Claims priority, application Japan, Mar. 5, 1975, 50-26037

Int. Cl.² H03K 1/14

U.S. Cl. 307—264 **6 Claims**



1. An automatic gain control circuit comprising a first transistor whose base is connected to receive an input signal and whose collector is connected to receive a first source voltage through a first resistor; a second transistor whose collector is connected to the emitter of the first transistor, whose emitter is grounded and whose base is connected to receive an automatic gain control signal; a third transistor whose base is connected to the base of the second transistor, and whose emitter is grounded; a fourth transistor whose emitter is connected to the collector of the third transistor, whose collector is connected to receive a second source voltage through a second resistor and whose base and collector are connected to each other; and a third resistor connected between the base of the first transistor and the collector of the fourth transistor.

4,032,800

LOGIC LEVEL CONVERSION SYSTEM

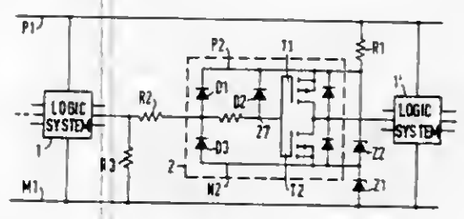
Walter Dröscher; Kurt Winter, both of Vienna, Austria, and Werner Meier, Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Apr. 7, 1975, Ser. No. 565,678

Claims priority, application Germany, Apr. 8, 1974, 2417054

Int. Cl.² H03K 17/00

U.S. Cl. 307—296 A **6 Claims**



1. In an arrangement in which two logic systems, having different logic level excursions, one having a large excursion and requiring a higher supply voltage and the other having a smaller excursion and requiring a lower supply voltage, are interfaced with each other, the logic system having a higher supply voltage being supplied with a reference potential M1 and a potential P1, the improvement comprising:

a. a series circuit including first and second series zener diodes and a resistor coupled between the potential P1 and the reference potential M1, the resistor having its free end coupled to the potential P1;

b. a first line from the junction point of said resistance and said series zener diodes providing a potential P2 and a second line from the junction between said series zener diodes providing a reference potential N2 for said logic system requiring a lower supply voltage; and

c. wherein said two logic systems have their inputs and outputs connected together through circuits not including level converters.

4,032,801

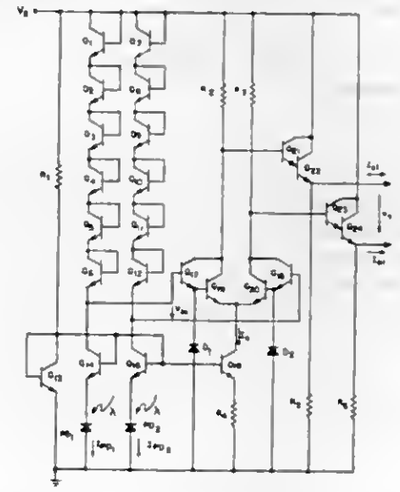
ELECTROMAGNETIC RADIATION INTENSITY COMPARATOR APPARATUS

David E. Fulkerson, Minnetonka, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 10, 1975, Ser. No. 621,315

Int. Cl.² G03B 7/08, 3/00; H03F 3/45

U.S. Cl. 307—311 **13 Claims**



1. A photodiode array comparator for comparing electromagnetic radiation intensities occurring between portions of an array of photodiodes over a range of electromagnetic radiation intensities, said comparator providing a precise comparison indication of intensity differences occurring at said array portions when said intensity differences are relatively small but providing a limited comparison range to limit said comparison indication of said intensity differences when said intensity differences are relatively large, said comparator comprising:

a first portion and a second portion of said photodiode array;

a first comparator circuit comprising:

a first photodiode, as a part of said first array portion, providing a first photodiode output current and a second photodiode, as a part of said second array portion, providing a second photodiode output current substantially matched to said first photodiode output current when said first and second photodiodes are operating in similar conditions, said first photodiode output current being substantially linearly related to whatever electromagnetic radiation intensity occurs at said first photodiode within said range of electromagnetic radiation intensities and said second photodiode output current being substantially linearly related to whatever electromagnetic radiation intensity occurs at said second photodiode within said range of electromagnetic radiation intensities,

a first voltage regulator means to bias said first and second photodiodes at an operating point of approximately zero volts,

first and second current translators, electrically connected to said first and second photodiodes, respectively, providing first and second current translator output currents, respectively, which are substantially matched with one another when said first and second current translators are in similar opeating conditions, said first current translator output current being substantially linearly related to said first photodiode output current and said second current translator output

current being substantially linearly related to said second photodiode output current, and

first and second electrical loads, electrically connected to said first and second current translators, respectively, providing first and second load output voltages, respectively, which are substantially matched when said first and second electrical loads are in similar operating conditions, said first load output voltage being substantially logarithmically related to said first current translator output current and said second load output voltage being substantially logarithmically related to said second current translator output current; and

a first differential amplifier having (i) a first differential amplifier output, (ii) a first differential amplifier input of high impedance electrically connected to said first load to respond to said first load output voltage, and (iii) a second differential amplifier input of high impedance electrically connected to said second load to respond to said second load output voltage, said first differential amplifier providing a first differential amplifier output signal at said first differential amplifier output which is substantially linearly related to differences between said first and second load output voltages for said first and second load output voltage differences being sufficiently small but which tends to provide one or more first output limit signals when said first and second load voltage differences are sufficiently large whereby said first differential amplifier output signal is limited in magnitude to a range defined at least in part by said first output limit signals.

4,032,802

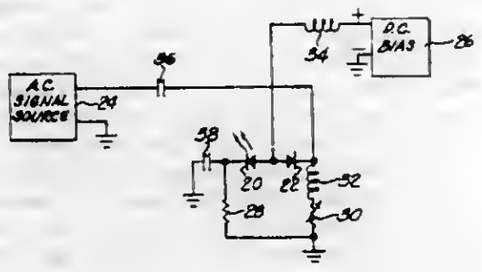
REDUCTION OF INTERMODULATION

Jing Jong Pan, and Milton Phillip Arnold, both of Melbourne, Fla., assignors to Harris Corporation, Cleveland, Ohio

Filed Feb. 9, 1976, Ser. No. 656,160

Int. Cl.² H03K *3/42*

U.S. Cl. 307—311 **7 Claims**



1. A low distortion opto-electronic light source for use with a signal source generating an A.C. signal and comprising,

semiconductor light source means,

compensating means having a voltage dependent capacitance characteristic substantially similar to that of said light source means,

biasing means for applying a biasing current through said light source means and said compensating means, and

connecting means for connecting said light source means and said compensating means in anti-series across said signal source and in parallel across said biasing means.

4,032,803

HAND TOOL FOR CREATING AND APPLYING ULTRASONIC VIBRATION

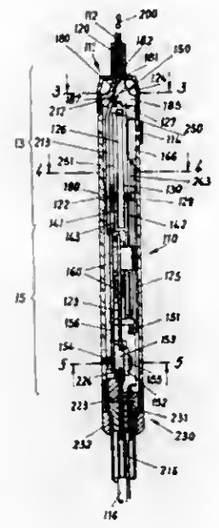
Walter Dürr, Bissingen, and Mathias Müller, Oberstenfeld, both of Germany, assignors to Dürr-Dental KG., Germany

Continuation-in-part of Ser. No. 459,164, April 8, 1974, abandoned, which is a continuation of Ser. No. 288,880, Sept. 13, 1972, abandoned. This application Apr. 12, 1976, Ser. No. 676,009

Claims priority, application Switzerland, Aug. 28, 1972, 012680/72

Int. Cl.² H01L *41/04*

U.S. Cl. 310—8.1 **22 Claims**



1. A hand tool for creating and applying ultrasonic vibration, especially for dental, medical and cosmetic use, comprising:

a. handle means comprising a tubular casing of slender elongate form to facilitate holding and manipulation of the hand tool by a user, said casing having a forward end and a rearward end,

b. a piezoelectric vibratory element mounted in said casing for vibrational movement therein, said element comprising an elongate bar of piezoelectric material extending longitudinally in a forward portion of said casing,

c. a vibratable work-tip disposed forwardly of the forward end of said casing and means coupling said work-tip with said piezoelectric vibratory element to transmit vibration from said element to said work-tip,

d. signal generating means disposed in a rearward portion of said casing, said signal generating means comprising an oscillator for generating an alternating electrical signal of ultrasonic frequency, said generating means being spaced from and mechanically vibrationally insulated from said piezoelectric vibratory element in said forward portion of said casing,

e. circuit means wholly within said casing for electrically connecting said signal generating means with said piezoelectric vibratory element to apply said ultrasonic alternating electric signal to said piezoeleetric vibratory element and thereby excite said element into ultrasonic vibration and by such vibration to produce ultrasonic vibration of said work-tip, said circuit means comprising flexible leads from said signal generating means to said piezoelectric vibratory element to provide electrical connection but mechanical vibrational insulation between said generating means and said vibratory element,

f. electrical conductor means electrically connected with said signal generating means and extending from the rearward end of said casing for supplying low voltage direct current to said signal generating means in said casing, and

g. fluid supply means comprising flexible fluid conduit means extending from the rearward end of said casing to a fluid supply, and fluid passage means extending longitudinally through said casing from said fluid conduit means at the rearward end of the casing to the forward end of the casing to deliver fluid to said work-tip, said fluid passage means comprising a rearward portion to heat receiving relation to said signal generating means to cool the same, a forward portion in heat receiving relation to said vibratory element to cool the same, and a flexible intermediate portion between said rearward portion and said forward portion to provide continuity of said fluid passage means while providing mechanical vibrational insulation between said vibratory element and said signal generating means.

4,032,804

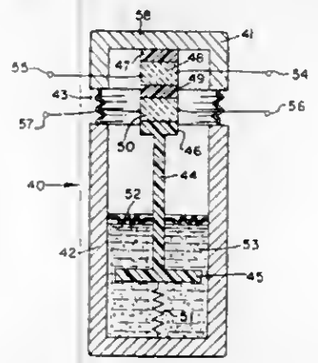
ULTRASENSITIVE DIFFERENTIAL RELAY CONFIGURATION

Gilbert F. Wagner, 1709 Pebble Beach Drive, Vienna, Va. 22180

Filed June 22, 1976, Ser. No. 698,657

Int. Cl.² H01L *41/04*

U.S. Cl. 310—8.3 **14 Claims**



1. An ultrasensitive relay configuration comprising:

a relay container having a first end and a second end;

a contact secured to said first end of said container inside said container;

a contact arm housed inside said container, said contact arm having a first end and a second end;

a damping disc secured to said second end of said contact arm;

a spring having a first end secured to said damping disc and a second end secured to said second end of said container inside said container, said spring urging said first end of said contact arm into contact with said contact;

a viscous fluid stored in said container adjacent said second end of said container, said viscous fluid surrounding said spring, said damping disc and a portion of said contact arm between said damping disc and said first end of said contact arm; and

a flexible diaphram secured inside said container, said flexible diaphram surrounding said contact arm above the level of said viscous fluid and sealing said viscous fluid in the area of said container adjacent said second end of said container.

4,032,805

ELECTRICAL PULSE GENERATOR FOR REMOTE READING METER

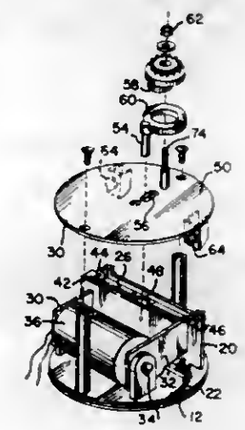
John R. Hereford, New Haven, Mo., assignor to Gamon-Calmet Industries, Inc., Florence, Ky.

Filed Sept. 18, 1975, Ser. No. 614,369

Int. Cl.² H02K *35/00*

U.S. Cl. 310—15 **10 Claims**

1. A remote generating unit comprising a magnetizable core, a coil wound around said core and having output terminals, a pivot plate, rotating mechanical drive means, a spring member mounted only on said pivot plate, said pivot plate being movable between a first position in which said pivot plate closes a magnetic circuit including said magnetizable core, and a second position in which said pivot plate opens said magnetic circuit, said rotating mechanical drive means applying a force directly to said spring member to cause said pivot plate to move from said first position to said second position upon rotation of said mechanical drive means.



4,032,806

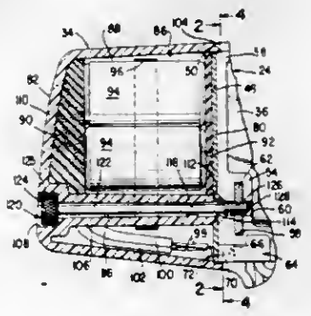
BATTERY POWERED POWER TOOLS

Robert West Seely, Easley, S.C., assignor to The Singer Company, New York, N.Y.

Filed Feb. 2, 1976, Ser. No. 654,330

Int. Cl.² H02K *7/14*

U.S. Cl. 310—50 **6 Claims**



1. A power tool having a motor powered by a battery pack comprising:

a. a housing having one portion for journaling the motor and another portion for carrying the battery pack;

b. plug and socket means separately carried on each of the housing portions and detachably connectable to each other to place the battery pack in circuit with the motor;

c. connecting means including a nut carried in the motor portion of the housing, and a screw carried by the battery portion of the housing and adapted to be mechanically connected to the nut to join the housing portions, and the plug and socket means operatively together;

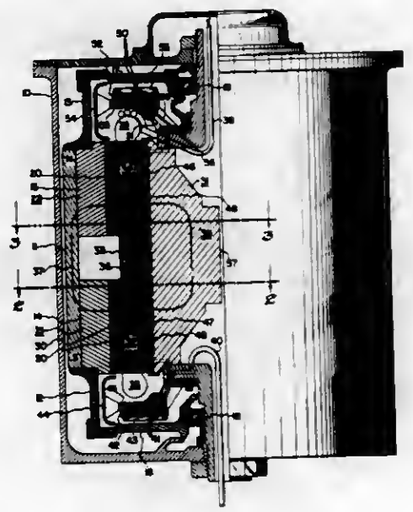
d. the screw having a longitudinal shank intermediate and en enlarged head at one end, and a threaded section at the other end;

e. a longitudinal aperture formed in the battery portion of the housing;

f. a necked-down portion formed in the aperture of a cross-sectional area larger than the shank, and smaller than the head and threaded section of the screw, whereby upon the screw being forced through the neck-down portion of the aperture the screw will remain normally entrapped therein by the neck-down portion with the screw free to rotate in the aperture;

g. the motor portion of the housing having two interconnected clamshell members;
h. a recess formed in each of the clamshell members in alignment with each other; and,
i. the nut disposed in the recesses to be held non-rotatively therein upon the clamshell members being interconnected.

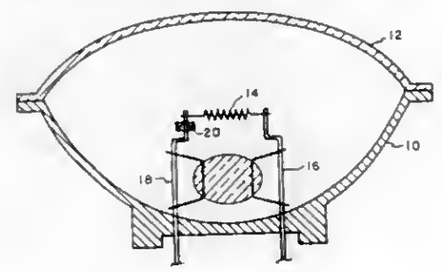
4,032,807
INSIDE-OUT MOTOR/ALTERNATOR WITH HIGH INERTIA SMOOTH ROTOR
Elke Richter, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.
Filed Jan. 6, 1976, Ser. No. 646,970
Int. Cl.² H02K 31/00
U.S. Cl. 310—178 20 Claims



1. A homopolar inductor motor/alternator comprising:
a stator yoke;
an excitation field winding encircling the mid-axial region of said stator yoke;
first and second stacks of stator laminations encircling said stator yoke on either axial side of said excitation field winding;
a plurality of stator windings situated in axially-directed slots formed by said first and second stacks of stator laminations;
an inner rotor ring encircling each stack of said stator laminations and rotatable thereabout, each said rotor ring comprising alternate magnetic poles and nonmagnetic regions; and
an outer rotor ring encircling, and bonded to, each inner rotor ring, said outer rotor ring comprising a high strength magnetic material.

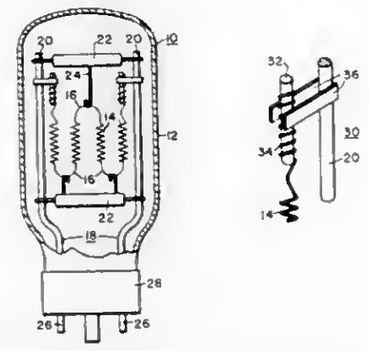
4,032,808
ELECTRIC INCANDESCENT LAMP
Werner Kischio, Aachen-Orsbach, Germany, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Apr. 2, 1976, Ser. No. 673,271
Claims priority, application Germany, Apr. 12, 1975, 2516102
Int. Cl.² H01J 61/24
U.S. Cl. 313—178 1 Claim

1. An electric incandescent lamp which comprises: a closed envelope; two conductive members extending through said envelope; a filament connected between said members and



disposed within said envelope; and an oxygen getter, said oxygen getter being phosphorthionitride (PHNS).

4,032,809
TANTALUM CARBIDE OR TANTALUM-ALLOY CARBIDE FILAMENT MOUNTING AND METHOD
Richard Corth, East Orange, N.J., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Mar. 21, 1966, Ser. No. 535,835
Int. Cl.³ H01J 1/16, 19/06; H01K 1/04; H01J 1/88
U.S. Cl. 313—344 6 Claims

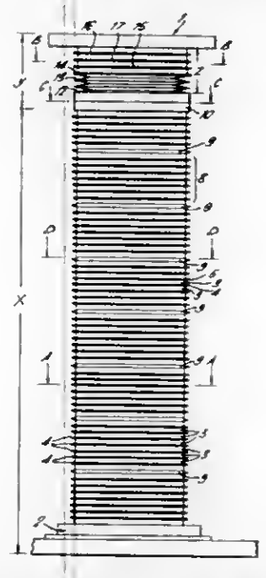


1. A combination connection for mechanically supporting and electrically connecting a coiled elongated incandescible filament principally comprising tantalum carbide to a main filament support and electrical connection means, said connection comprising:
a. a relatively thick elongated member principally comprising tantalum carbide;
b. a coiled end extension of said elongated filament coil snugly overfitting at least a part of said relatively thick elongated member, the inner surface of the overfitted turns of said end extension coil welded to said relatively thick elongated member; and
c. said relatively thick elongated member electrically connected to and mechanically supported by said main filament support and electrical connection means.

4,032,810
ELECTROSTATIC ACCELERATORS
Derek Anthony Eastham, Macclesfield, and Thomas Joy, Handforth, both of England, assignors to Science Research Council, London, England
Filed Sept. 5, 1975, Ser. No. 610,763
Claims priority, application United Kingdom, Sept. 10, 1974, 39514/74
Int. Cl.² H05H 5/00
U.S. Cl. 313—360 11 Claims

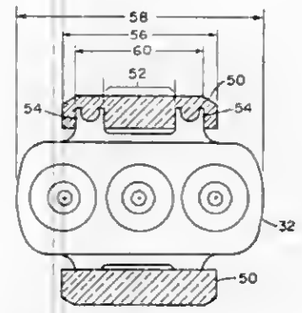
1. An accelerating tube for an electrostatic particle accelerator comprising a plurality of conductive metal ring-shaped electrodes and ring-shaped insulators bonded together alternately, an electrical resistor chain external to the tube, and interconnections between each electrode and the resistor chain, the resistor values being such that, in response to an

electrical potential applied across the tube, a potential gradient exists along the tube, the tube having an axial portion thereof decoupled from said gradient, said axial portion being defined between a pair of spaced ring-shaped electrodes con-



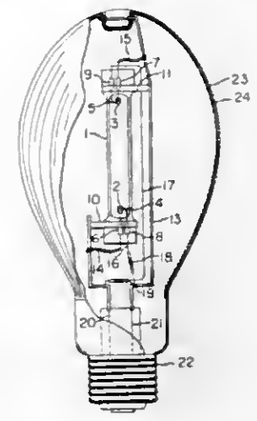
nected into the resistor chain by resistor values imparting equal potentials to said pair of electrodes, and a particle trapping means between said pair of spaced electrodes constituted by electrode means bearing a reverse bias potential with respect to the potential gradient.

4,032,811
UNITIZED IN-LINE ELECTRON GUN HAVING IMPROVED SUPPORT STRUCTURE
James W. Schwartz, Deerfield; Norman F. Giola, Lombard, and Franklyn P. Gautier, Oak Park, all of Ill., assignors to Zenith Radio Corporation, Glenview, Ill.
Filed Dec. 18, 1975, Ser. No. 642,049
Int. Cl.² H01J 29/51
U.S. Cl. 313—417 6 Claims



1. For use in a color television cathode ray tube, a unitized, in-line electron gun; that is, a gun generating three co-planar electron beams and having beam-forming and beam-shaping electrodes common to the three beams, said electrodes being supported as a coherent unit in spaced tandem succession along the gun's central axis by claws on the electrodes embedded in two elongated axially oriented structural beads positioned on opposite sides of the electrodes; that is, on opposite sides of the beam plane, at least one of said electrodes having on each side thereof at least one pair of widely spaced, relatively narrow claws integrally formed with the electrode, and lying respectively in planes transverse to the gun axis, with said claws embedded at widely spaced points on the glass bead to enhance the lateral stability of the electrodes, once embedded in the beads, to promote the establishment and maintenance of parallelism, precise spacing, and aperture concentricity of adjacent ones of said electrodes.

4,032,812
FLUORESCENT HIGH-PRESSURE MERCURY-VAPOR LAMP
Yoshichika Kobayashi, Ibaraki; Hidezoh Akutsu, Ashiya, and Katsuaki Iwama, Suita, all of Japan, assignors to Matsushita Electronics Corporation, Osaka, Japan
Filed Feb. 17, 1976, Ser. No. 658,375
Claims priority, application Japan, Feb. 19, 1975, 50-21216
Int. Cl.² H01J 61/12
U.S. Cl. 313—487 3 Claims



1. A high-pressure mercury-vapor lamp of the type comprising an arc tube capable of the emission of both visible and ultraviolet light, an outer tube enclosing said arc tube, and a phosphor coating applied over the inner surface of said outer tube and consisting essentially of two kinds of phosphors, characterized in that one of said two phosphors is a red light emitting phosphor selected from the group consisting of
europium-activated yttrium-vanadate and
europium-activated yttrium-vanadate-phosphate; and the other phosphor emits blue-green light and consists of
bivalent europium- and manganese-activated barium-magnesium-aluminate having the following formula

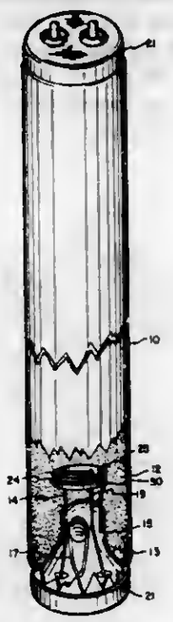
$$Ba_{1-x}Mg_{z-y}Al_2O_{z+3z/2}: Eu_xMn_y$$

where $0.03 \leq x \leq 0.4$, $0.01 \leq y \leq 0.6$ and $12 < z < 20$.

4,032,813
FLUORESCENT LAMP WITH REDUCED WATTAGE CONSUMPTION HAVING ELECTRODE SHIELD WITH GETTER MATERIAL
Joel Shurgan, Washington Township, Bergen County, and Donald P. Northrop, Glen Rock, both of N.J., assignors to Duro-Test Corporation, North Bergen, N.J.
Continuation-in-part of Ser. No. 498,552, Aug. 19, 1974, abandoned. This application June 24, 1975, Ser. No. 589,664
Int. Cl.² H01J 61/10, 61/16, 61/44, 61/26
U.S. Cl. 313—492 7 Claims

1. An energy saving fluorescent lamp for use with an existing ballast system designed for operation at a predetermined magnitude input voltage with a standard wattage rating fluorescent lamp, said energy saving fluorescent lamp comprising an envelope having a phosphor on the internal wall thereof, an electrode for emitting electrons and collecting ions at each end of the envelope, leads for connecting the electrodes to the existing ballast as source of electric current to energize the same, an ionizable mercury medium within said envelope, a fill gas in said envelope consisting essentially of krypton in the range of from about 75% to 90% and neon in the range from about 25% to 10%, an electrically conductive means insulated from the electrical connection to the electrodes surrounding each of said electrodes, and a getter material in said envelope for scavenging gas impurities, said fill gas and electrodes cooperating to start said lamp at a voltage at least 10% below said predetermined magnitude and to ionize the mercury to operate said lamp to produce light output when connected to

said ballast and consuming at least about 10% less energy than the standard wattage rating fluorescent lamp for which the ballast system was designed, the loss in light output produced



by the lamp being less than the light output which would be lost if the standard lamp were operated at the corresponding reduced energy consumption.

4,032,814

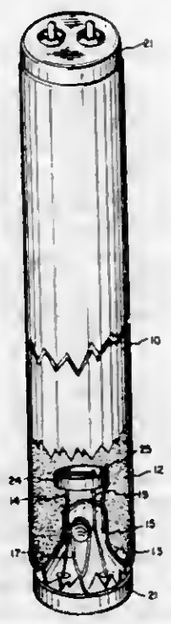
FLUORESCENT LAMP WITH REDUCED WATTAGE CONSUMPTION

Joel Shurgan, Washington Township, Bergen County, and Donald P. Northrop, Glen Rock, both of N.J., assignors to Duro-Test Corporation, North Bergen, N.J.

Continuation of Ser. No. 498,552, Aug. 19, 1974, abandoned. This application Oct. 3, 1975, Ser. No. 619,172

Int. Cl.² H01J *61/10, 61/16, 61/44*

U.S. Cl. 313—492 **5 Claims**



1. An energy saving fluorescent lamp for use with an existing ballast system designed for operation at a predetermined magnitude input voltage with a standard wattage rating fluorescent lamp, said energy saving fluorescent lamp comprising an envelope having a phosphor on the internal wall thereof, an electrode for emitting electrons and collecting ions at each end of the envelope, leads for connecting the electrodes to the existing ballast as the source of elecric current to energize the same, an ionizable mercury medium within said envelope, a fill gas in said envelope consisting essentially of krypton in the range of from about 75 to 90% and neon in the range from about 25 to 10%, and an electrically conductive means insulated from the electrical connections to the electrodes surrounding each of said electrodes, said fill gas and electrodes cooperating to start said lamp at a voltage at least 10% below said predetermined magnitude and to ionize the mercury to operate said lamp to produce light output when connected to said ballast and consuming at least about 10 percent less energy than the standard wattage rating fluorescent lamp for which the ballast system was designed, the loss in light output produced by the lamp being less than the light output which would be lost if the standard lamp were operated at the corresponding reduced energy consumption.

4,032,815

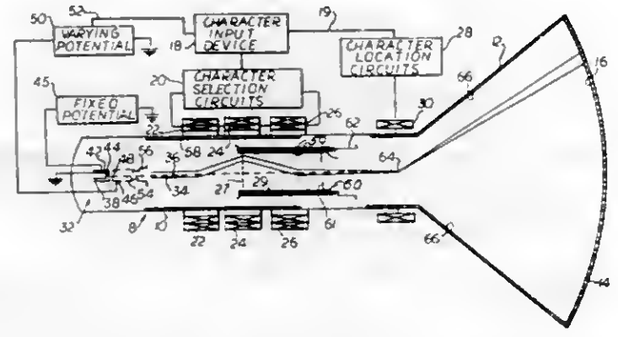
COLLIMATED BEAM ELECTRON GUN SYSTEM FOR SHAPED BEAM CATHODE RAY TUBE

Dan Joseph Haflinger, Rancho Santa Fe, Calif., assignor to Stromberg Datagraphix Inc., San Diego, Calif.

Filed Nov. 4, 1975, Ser. No. 628,805

Int. Cl.² H01J *29/46, 29/56*

U.S. Cl. 315—14 **14 Claims**



1. For use in a shaped beam cathode ray tube system in which an electron beam is accelerated along an axial path in a cathode ray tube and directed to an electron beam stencil for shaping the beam into predetermined characters, an electron gun system for generating a high current, collimated beam of electrons directed along an axial path in the tube, said electron gun system comprising:

a cathode having an electron emitting surface for emitting free electrons;

a collimating electrode adjacent said cathode and having a central aperture for passing the free electrons;

means for applying a potential to said collimating electrode substantially fixed relative to the potential of said cathode;

a control electrode axially spaced from said collimating electrode in the direction of the beam and having a central aperture axially aligned with the aperture in said collimating electrode;

means for applying to said control electrode a control potential relative to said catbode which varies alternatively between a cut-off potential and a relatively positive potential acting in conjunction with said fixed potential to establish between the cathode and the aperture in said control electrode an electric field for accelerating the free electrons in a beam along the axial path, said electric field being substantially axial over at least a central portion of the electron beam so as to collimate the electrons at least in a central portion of the beam from the cathode through the aperture in said control electrode.

4,032,816

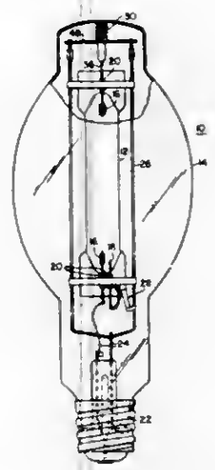
SAFETY SWITCH WHICH RENDERS HID LAMP INOPERATIVE ON ACCIDENTAL BREAKAGE OF OUTER ENVELOPE

Ferdinand Rokosz, Pompton Plains, N.J., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 609,138, Aug. 29, 1975, abandoned. This application Jan. 16, 1976, Ser. No. 649,775

Int. Cl.² H01J *7/44, 13/46, 17/34*; **H01K** *1/62*

U.S. Cl. 315—73 **7 Claims**



1. In combination with a high-intensity discharge lamp comprising an elongated radiation-transmitting arc tube which is enclosed by and supported within a light-transmitting protective envelope which is opaque to short wavelength ultraviolet radiations, said arc tube enclosing a discharge-sustaining filling and having electrodes operatively positioned therein proximate the ends theteof, electrical lead-in means sealed through said arc tube and connected to said electrodes, electrical adaptor means affixed to the outer surface of said protective enevelope to facilitate electrical connection of said lamp to a source of electrical power, and electrical conductor means electrically connecting said electrical adaptor means to said electrical lead-in means, the improvement which comprises:

a. a make-and-break switch means included in series circuit arrangement with said electrical conductor means, said switch means including an electrical contact member having an open position in which said switch means is electrically nonconductive and said electrical contact member also having a closed position in which said switch means is electrically conductive, a spring urging said electrical contact member to the open position, and said electrical contact member being movable to the closed position against the resilient force of said spring;

b. positioning means within said protective envelope for maintaining said switch means in predetermined position within said protective enevelope, and a mechanical contact member of said positioned switch means pressing against the inner surface of said protective envelope to maintain said electrical contact member in said closed electrically conductive position against the resilient force of said spring; whereby breakage of said protective envelope will permit said electrical contact member to move to said open electrically nonconductive position under the resilient force of said spring to render said lamp inoperative.

4,032,817

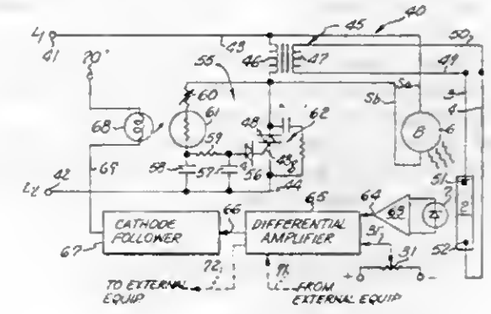
WIDE RANGE POWER CONTROL FOR ELECTRIC DISCHARGE LAMP AND PRESS USING THE SAME

Abraham W. Richmond, West Melbourne, Fla., assignor to Harris Corporation, Cleveland, Ohio

Filed Dec. 12, 1974, Ser. No. 532,172

Int. Cl.² H05B *37/02*

U.S. Cl. 315—149 **14 Claims**



1. A power supply for controlling the application of power to an arc discharge lamp, comprising:

a transformer having a primary winding adapted to be connected to A.C. power lines and a secondary winding adapted to be connected across said lamp;

A.C. power supply control means connected to said primary winding for supplying A.C. voltages from the A.C. lines to said lamp through said transformer of sufficient amplitude to ionize the gas in said lamp so that said lamp fires and controlling the level of A.C. power supplied to said lamp from said A.C. lines, said control means being responsive to a control signal for varying the amount of power supplied to said lamp in dependence upon the value of said control signal;

feedback means comprising sensor means positioned to receive radiation emitted from said lamp to provide an output signal having a value dependent upon the intensity of said radiation and, hence, upon the amount of power supplied to said lamp, and means for comparing said signal with a reference indicative of desired lamp output intensity and providing an error signal having a value in dependence upon any difference therebetween;

means for supplying said control signal of a value dependent on said error to said A.C. power supply control means for controlling the A.C. power supplied to said lamp; and

means for varying said reference for controlling the A.C. power supplied to said lamp in such a manner that the output intensity of said lamp is adjustable over a substantial portion of its range of output intensity without extinguishing.

4,032,818

UNIFORM CURRENT LEVEL CONTROL FOR DISPLAY PANELS

Stephen J. C. Chan, San Diego, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Filed Nov. 10, 1975, Ser. No. 630,198

Int. Cl.² H05B *41/14*

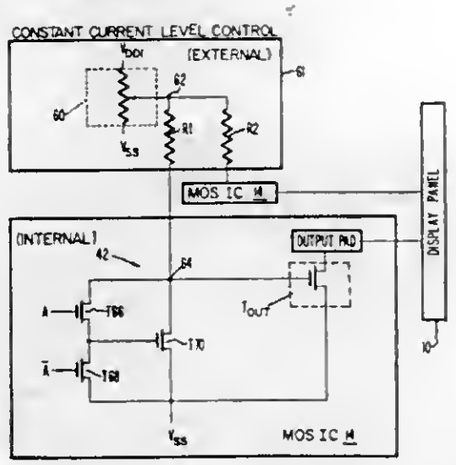
U.S. Cl. 315—169 R **4 Claims**

1. In a system for driving display panels having a plurality of rows for displaying alphanumeric characters, said system including a plurality of MOS integrated circuit chips, one each for driving each character row; the improvement comprising a current level control for maintaining uniform brightness in each of the character rows regardless of various characteristics between the chips, said current level control comprising:

a plurality of MOS integrated circuit chips, one each for driving a character row in the display panel;

each chip having an output transistor coupled to display devices in its respective character row, said output

transistor having a source region, gate region, and drain region;
a second transistor on the same integrated circuit chip as said output transistor, said second transistor having a source region, gate region, and drain region,
third and fourth transistors on the chip each having a source region, gate region, and drain region;
said drain region of said second transistor, the drain region of said third transistor, and the gate region of said output transistor being coupled to a common first node;
said source region of said third transistor and the drain region of said fourth transistor being coupled to the gate region of said second transistor;
said source regions of said second, fourth, and output transistors being coupled to a common second node;
a variable voltage source;



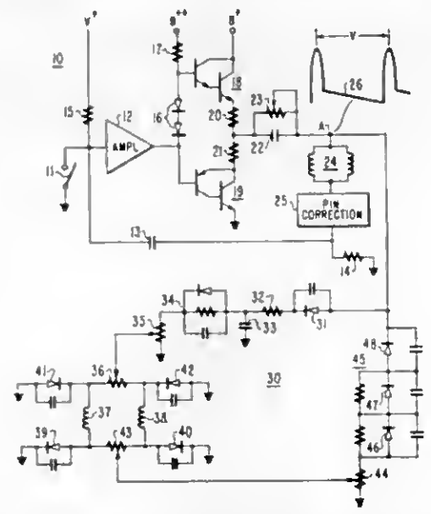
a plurality of reference resistors, one each for each chip; each resistor being of equal value and being coupled between said voltage source and the first node on its respective chip;
said third transistor, when turned on, providing a turn on voltage to the gate of said second transistor having the same potential as the drain thereof;
said second transistor providing a current path through its drain and source region thereby producing a voltage between said drain and source regions as a function of current flow, said current flow being a function of the characteristics of the respective chip; and
said voltage between the drain and source of said second transistor providing a voltage at the gate of its respective output transistor which will maintain uniform current flow in the output transistors of all of said chips thereby providing uniform brightness in each character row of the display panel regardless of various characteristics between the chips.

4,032,819
RASTER CENTERING CIRCUIT

Michael Lee Henley, Indianapolis, and Lawrence Edward Smith, Noblesville, both of Ind., assignors to RCA Corporation, New York, N.Y.

Filed July 30, 1975, Ser. No. 600,511
Int. Cl.² H01J *29/54*
U.S. Cl. 315—398 **3 Claims**

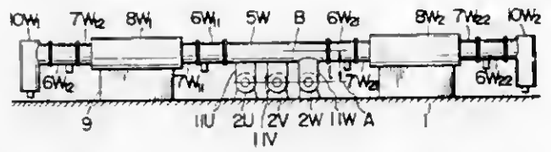
1. A raster centering circuit, comprising:
a deflection amplifier;
a coupling capacitor and a deflection winding serially coupled to an output terminal of said amplifier, said amplifier operated such that there is always a direct current voltage of a first fixed polarity across said coupling capacitor;
a convergence circuit including oppositely poled unidirectional current conducting devices coupled in parallel with said deflection winding, loading said deflection winding such that there is a direct current of a first polarity in said winding during each trace portion of a deflection cycle; and
a direct current circuit coupled in parallel with said coupling capacitor and responsive to said direct current voltage of a first fixed polarity for controlling a direct current of a second polarity in said winding thereby controlling the net direct current in said winding.



4,032,820
HORIZONTAL DOUBLE PLANE HIGH VOLTAGE SWITCHING ASSEMBLY

Kazuaki Oishi; Seizo Nakano, both of Hitachi, and Shouetu Suda, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Japan

Filed May 5, 1975, Ser. No. 574,328
Claims priority, application Japan, May 6, 1974, 49-54675; June 12, 9174, 49-65934; June 19, 1974, 49-70700
Int. Cl.² H02B *1/04*
U.S. Cl. 361—333 **12 Claims**

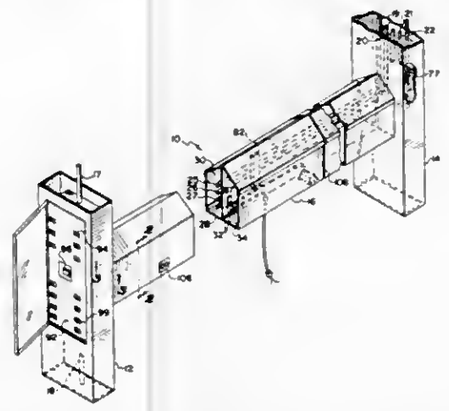


1. A gas insulated power switch-gear apparatus comprising:
at least one circuit breaker including a cylindrical tank filled with an insulating quenching gas having its axis substantially parallel with a foundation of the apparatus and spaced with a predetermined distance from said foundation, and at least one breaker section electrically insulated and supported within said tank along said axis;
at least one gas insulated feeding bus bar including a feeding conductor and a sheath filled with an insulating gas and having said feeding conductor insulatingly supported therein;
at least one gas insulated main bus bar including a main conductor and a sheath filled with an insulating gas and having said main conductor insulatingly supported therein; and
at least one gas insulated disconnecting switch arranged within a sheath filled with an insulating gas having two terminals, one connected with said circuit breaker and the other connected with said main bus bar through said feeding bar;
wherein said gas insulated feeding bus bar and said gas insulated disconnecting switch are disposed on the extension of said axis of said tank, and said gas insulated main bus bar is spaced from said foundation with a distance different from said predetermined distance and disposed substantially in parallel with said foundation and at right angles to said axis and its extension.

4,032,821
UTILITY DISTRIBUTION CONSOLE

William Kelser, St. Louis, Mo., assignor to McGraw-Edison Company, Elgin, Ill.

Filed Apr. 2, 1976, Ser. No. 673,065
Int. Cl.² H02B *1/06*
U.S. Cl. 361—334 **1 Claim**



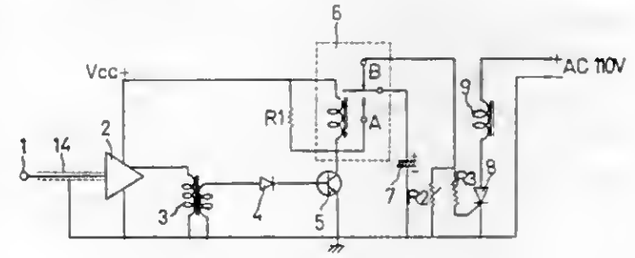
1. A utility distribution console, comprising the combination of a pair of tubular risers, a tubular beam and means connecting the beam at its ends to and between the spaced risers; said risers each having interconnected wall structure defining at least one vertically oriented enclosed compartment and said beam having interconnected wall structure defining at least two horizontally oriented enclosed compartments, and said wall structure having openings interconnecting one compartment of the beam with the compartment of one riser and interconnecting the other compartment of the beam with the compartment of the other riser; utility transmission means in each riser compartment and the corresponding beam compartment, means providing exposed outlet connections at selected locations spaced along the beam for each of the utility transmission means, means for providing in-the-field connections of the utility to each riser utility transmission means, a control panel in one of the risers and a plurality of control elements in the panel, and means routing the utility transmission means in a series connection through the control elements in the panel and only then to the selected beam output connections respectively, to provide centralized control of the corresponding utility for all of said beam output connections at the control panel.

4,032,822
ELECTROMAGNETIC FLUSH CONTROL SETUP IN FLUSH TOILET

Yee Kyar Un, No.9, Alley 559, Section 2, Fu-Hsin S. Road, Taipei, China /Taiwan

Filed Dec. 18, 1975, Ser. No. 641,894
Int. Cl.² H01H *47/32*
U.S. Cl. 361—205 **3 Claims**

1. An electromagnet flush control setup for use in a flush toilet comprising:
an inducing terminal made of conductive metal;
an amplifier for amplifying a signal induced in said inducing terminal;
a transformer having a primary and a secondary winding, said primary winding connected to the output of said amplifier;
a rectifier having a first end connected to said secondary winding;
a transistor having a base lead connected to the second end of said rectifier, whereby said transistor is biased to an on state by the presence of a signal at said inducing terminal;
a D.C. power source;
a relay connected in series with said D.C. source and said transistor, whereby said transistor being in an on state causes said relay to move from a first position to a second position;
a capacitor connected to be charged by said D.C. source when said relay is in said second position;
an SCR having its gate connected to said capacitor when said relay is in said first position;
an A.C. power source;

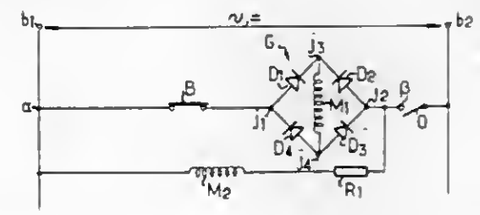


an electromagnet coil connected in series with said A.C. source and said SCR, whereby said capacitor discharges through said SCR when said relay moves back to said first position, causing said SCR to conduct and energize said coil;
flush means activated by said coils to flush the toilet, whereby the presence of a human body on the toilet provides said signal in the inducing terminal and thereby causes said capacitor to be charged, and the termination of said signal causes said coils to be energized and the toilet to be flushed.

4,032,823
SUPPLY CIRCUIT FOR ELECTROMAGNETS

Jacques Arvisenet, La Celle St Cloud; Jean-Pierre Guery, Poissy; Jacques Olifant, Ruell-Malmaison, and Christian Thomas, Poissy, all of France, assignors to La Telemecanique Electrique, France

Filed Oct. 21, 1975, Ser. No. 624,514
Claims priority, application France, Oct. 28, 1974, 74.35952
Int. Cl.² H01H *47/04*
U.S. Cl. 361—194 **7 Claims**



1. In an electromagnet structure: a magnetic circuit including a stationary magnetic member and a further magnetic member which is movable to an attracted position with respect to the stationary magnetic member; an attracting coil associated with said magnetic circuit for moving said further member to its attracted position when the attracting coil is energized; a holding coil associated with said magnetic circuit for maintaining said further member in its attracted position when the holding coil is energized; bridge rectifier means for converting AC voltage from a source to DC voltage and applying the DC voltage across said attracting coil, said bridge rectifier means comprising first, second, third and fourth diodes, the catodes of the first and second diodes being electrically coupled to one end of the attracting coil and the anodes of the third and fourth diodes being electrically coupled to the other end of said attracting coil; switching means connecting one terminal of the voltage source to the anode of the first diode and to the cathode of the third diode, the anode of

the second diode and the cathode of the third diode being connected to the other terminal of the voltage source; the said switching means being in the open state when the said further member is in its attracted position, one end of the holding coil being electrically coupled to the said one terminal of the voltage source and means connecting the other end of the holding coil to the anode of the second diode and the cathode of the third diode.

4,032,824

VARIABLE-SPEED 3-PHASE DRIVE

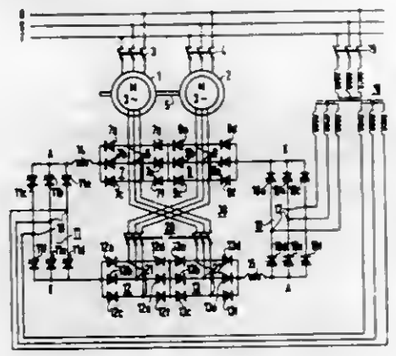
Harald Elger, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Dec. 15, 1975, Ser. No. 640,958

Claims priority, application Germany, Dec. 20, 1974, 2460639

Int. Cl.² H02D *7/36*

U.S. Cl. 318—45 **3 Claims**



1. A variable-speed three-phase drive for use with a three-phase network, said drive comprising:

first and second asynchronous motors each adapted to be connected to said network and each having a slip ring rotor;

first and second uncontrolled rectifiers, each of said rectifiers having a DC terminal connected to a DC terminal of the other and each having three-phase terminals connected to the rotor of a different one of said motors;

third and fourth uncontrolled rectifiers, each of said rectifiers having a DC terminal connected to a DC terminal of the other and each having three-phase terminals;

first and second inverters each having three-phase terminals adapted to be connected to said network, said first inverter having DC terminals which are connected with respective DC terminals of said first and said third uncontrolled rectifiers and said second inverter having DC terminals which are connected with respective DC terminals of said second and fourth uncontrolled rectifiers, whereby said first and second inverters and said first and second and said third and fourth uncontrolled rectifiers form a ring circuit;

and switch means for connecting together the three-phase terminals of the two uncontrolled rectifiers connected to the respective anode sides of said first and second inverters and for connecting together the three-phase terminals of the two uncontrolled rectifiers connected to the respective cathode sides of said first and second inverters.

4,032,825

COMMUTATING OSCILLATOR AND CURRENT-LIMITER FOR SOLID STATE SWITCHING CIRCUITS

Robert G. Kilmo, Parma, Ohio, assignor to Cleveland Machine Controls, Inc., Cleveland, Ohio

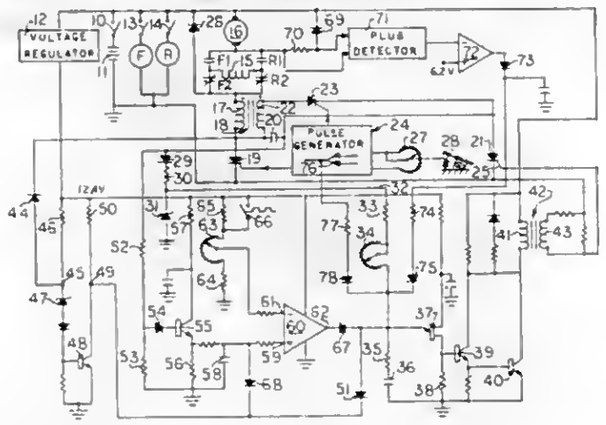
Filed Oct. 28, 1975, Ser. No. 626,501

Int. Cl.² H02P *5/16*

U.S. Cl. 318—139 **20 Claims**

1. In a system for controlling the power delivered to a load from a source of direct current and including a main silicon controlled rectifier through which load current can flow, a pulse generator for repeatedly gating the main silicon controlled rectifier into conduction at a controlled rate, a commutating capacitor which repeatedly charges to a commutating voltage, and a commutating silicon controlled rectifier which when gated into conduction will connect the commutating capacitor across the main silicon controlled rectifier, the improvement comprising:

a. means responsive to conduction of said main slicon con-



trolled rectifier for charging said commutating capacitor with said commutating voltage,

b. means responsive to the presence of a commutating charge on said commutating capacitor for producing a regulated voltage,

c. timing means actuated by said regulated voltage and having a time period,

d. means responsive to actuation of said timing means for gating the commutation silicon controlled rectifier into conduction at the end of said time period.

4,032,826

CIRCUIT ARRANGEMENT FOR PHASE-ALIGNMENT OF A SERVO DRIVE FOR A ROTARY SYSTEM

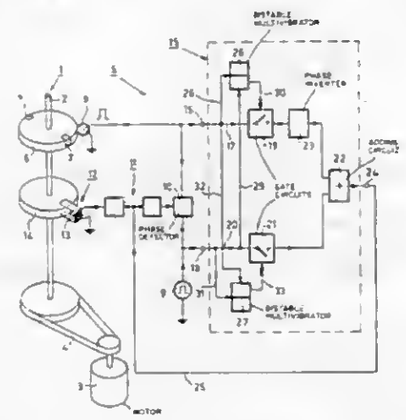
Uwe Jahnke, and Friedrich Sommer, both of Vienna, Austria, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 6, 1975, Ser. No. 619,847

Claims priority, application Austria, Oct. 16, 1974, 8302/74

Int. Cl.² H02P *5/50*

U.S. Cl. 318—314 **4 Claims**



1. Circuit arrangement for phase-alignment of a servo drive for a rotary system, of the type wherein a speed control circuit including a phase detector which is controlled by an actual signal and a desired signal of which phase detector the output signal is applied to a correction element for correcting the speed of the rotary system via a transmission path which is provided for further processing of this signal, the actual signal and the desired signal being available as pulse-shaped signals,

whose respective pulses appear alternately in the desired condition of the system, the improvement comprising two gate circuits each comprising an input, an an output and at least one control input, a first signal path, a second signal path, the pulse-shaped actual signal being applied to the input of the first gate circuit via said first signal path, and the pulse-shaped desired signal being applied to the input of the second gate circuit via said second signal path, means for applying each pulse of the output signals from said first and second gate circuits to the transmission path in phase opposition, and a bistable multivibrator having a first input connected to the pulse-shaped actual signal and having a second input connected to the pulse-shaped desired signal, said bistable multivibrator providing a control signal depending on the timesequence of the pulses of the actual signal and of the desired signal, and means for applying said control signal to the control input of each gate circuit, whereby said control signal opens that gate circuit whose input signal contains more than one pulse between two consecutive pulses in the input signal of the other gate circuit.

4,032,827

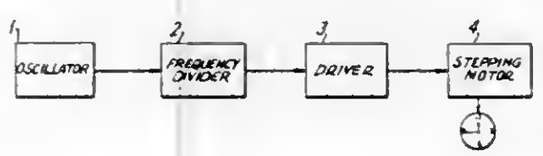
DRIVER CIRCUIT ARRANGEMENT FOR A STEPPING MOTOR

Eduard Dobratz, Pfinztal-Berghausen, and Herbert Schwartz, Wurmberg, both of Germany, assignors to Timex Corporation, Waterbury, Conn.

Filed Mar. 15, 1976, Ser. No. 666,807

Int. Cl.² G04C *3/04*

U.S. Cl. 318—696 **10 Claims**



1. An apparatus for providing drive pulses to a stepping motor to correspond indexing to the number of control pulses generated by a control circuit, the apparatus comprising:

means connected to the stepping motor for generating an index-step signal in response to each index-step of the stepping motor;

drive pulse generator means connected to the stepping motor for initiating a drive pulse to the stepping motor in response to a control pulse and terminating the drive pulse in response to a corresponding index-step signal;

means responsive to the control pulses and the index-step signal for generating an inhibit signal in response to the presence of any index-step signals and the absence of a corresponding number of control pulses, the inhibit signal being removed following the corresponding number of control pulses; and

means connected to the drive pulse generator means being responsive to the inhibit signal for inhibiting at least one drive pulse to the stepping motor.

4,032,828

BATTERY BACK-UP SYSTEM FOR ELECTROMAGNETS

Fred A. Strobl, and Felix Di Legge, both of Chicago, Ill., assignors to Korhumel Industries, Inc., Chicago, Ill.

Filed Apr. 12, 1976, Ser. No. 676,533

Int. Cl.² H02J *9/00;* **H01F** *7/20*

U.S. Cl. 320—39 **7 Claims**

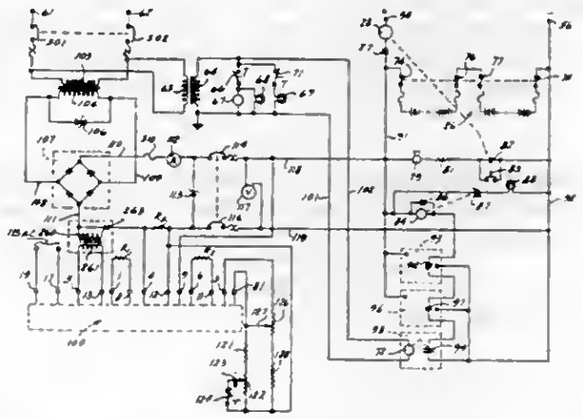
1. A battery back-up system for an electric magnet comprising:

a main power source connected to said magnet through a magnet controller,

a battery means,

a unilateral current means connected between said battery means and said magnet such that if the voltage from said main power source drops below the battery voltage power will be supplied from said battery to said magnet,

including a battery charger and controls connected to said battery, and including a current sensing means connected between said battery and said magnet and a first warning device connected to said current sensing means to give a warning when current is supplied to said magnet from said battery, and means for preventing re-energization of



said magnet after said main power source voltage falls outside of a voltage range between preset maximum and minimum voltages and means maintaining said magnet energized by said battery means until it has been unloaded under the condition where said magnet was energized by said main power source and said main power source voltages falls out of said range after the magnet has been energized.

4,032,829

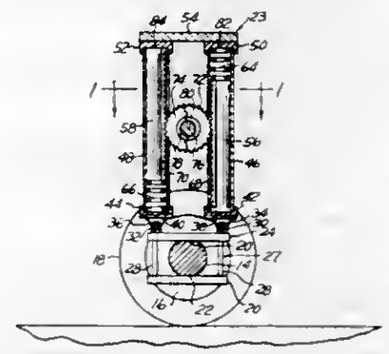
ROAD SHOCK ENERGY CONVERTER FOR CHARGING VEHICLE BATTERIES

Harold E. Schenavar, 18696 Inkster Road, Detroit, Mich. 48240

Filed Aug. 22, 1975, Ser. No. 607,032

Int. Cl.² B60K *25/10;* **B60L** *11/00*

U.S. Cl. 320—61 **2 Claims**



1. A road shock energy converter for charging storage batteries aboard a vehicle having a chassis with axles carrying ground wheels, said converter comprising

an axle coupling adapted to be secured to one of the axles,

a horizontal rotatable shaft adapted to be journalled in the vehicle chassis,

a first upstanding reciprocatory-to-rotary motion transformer including an elongated rack housing operatively connected to said coupling, a rack shorter than said rack housing slidably mounted therein for reciprocation relatively thereto, a pinion meshing with said rack, a unidirectional clutch drivingly connecting said pinion to said shaft whereby said motion transformer is responsive to the intermittent and irregular rectilinear thrusts received thereby from pavement irregularities by way of said axle

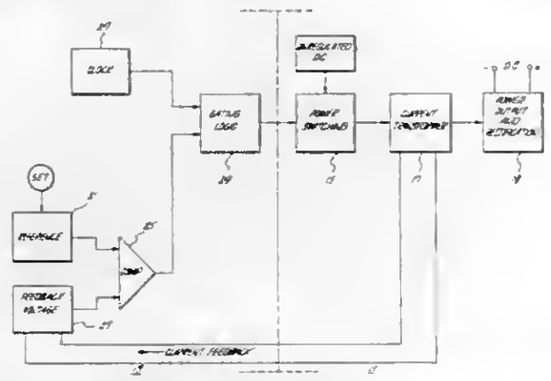
coupling to impart correspondingly intermittent and irregular and unidirectional torque thrusts to said shaft;
said shaft being operatively connected to driven relationship to said clutch,
a flywheel drivingly connected to said shaft for rotation unitarily therewith and thereby smoothing out the effects of said itermittent and irregular torque thrusts upon said shaft and consequently rendering more nearly regular and continuous the rotation of said shaft,
and an electric current generator drivingly connected to said shaft and having current output conductors adapted to be electrically connected in recharging relationship to storage batteries of the same or accompanying vehicle.

4,032,830

MODULAR CONSTANT CURRENT POWER SUPPLY

Carlos Ernesto Buonavita, South Pasadena, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Filed July 3, 1975, Ser. No. 593,070
Int. Cl.² H02M *3/335*
U.S. Cl. 363—25 **15 Claims**



1. A power supply for converting an unregulated D.C. voltage level to a desired constant current output comprising:
transforming means having input means for converting an A.C. signal supplied to said input means to a D.C. level;
power switching means for modulating said unregulated D.C. voltage level to produce an A.C. current waveform exhibiting successive ramps and connected to supply said A.C. current waveform to said input means of said transforming means;
means for developing a control voltage waveform comprising successive ramps proportional to those of said A.C. current waveform;
means for producing a reference voltage level and for setting said level such that each said control voltage ramp proportional to said A.C. current waveform normally crosses said reference level when said desired current output is produced; and
means for actuating said power switching means only for those intervals during which a said control voltage ramp does not exceed said reference level to control said A.C. current waveform such that a deviation from said desired constant current output level is corrected.

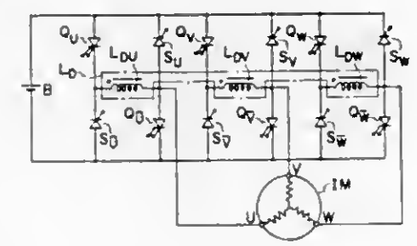
4,032,831

INVERTER APPARATUS

Akira Nabae; Takeo Shimamura; Ichirou Shimizu, all of Yokohama, and Ryoichi Kurosawa, Tokyo, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Nov. 24, 1975, Ser. No. 635,156
Int. Cl.² H02M *7/00*
U.S. Cl. 363—2 **10 Claims**

1. Inverter apparatus comprising a source of direct current, a plurality of parallel branch circuits connected across said source, each branch circuit including a pair of serially connected controllable switching elements, a plurality of semiconductor elements connected in parallel opposition with respective controllable switching elements, an alternating current load connected to the junctures between said pair of serially connected controllable switching elements, a D.C. reactor connected between said source of direct current and said alternating current load, means connected across said D.C. reactor for preventing attenuation of the current flowing through said D.C. reactor, and a source of control pulses for



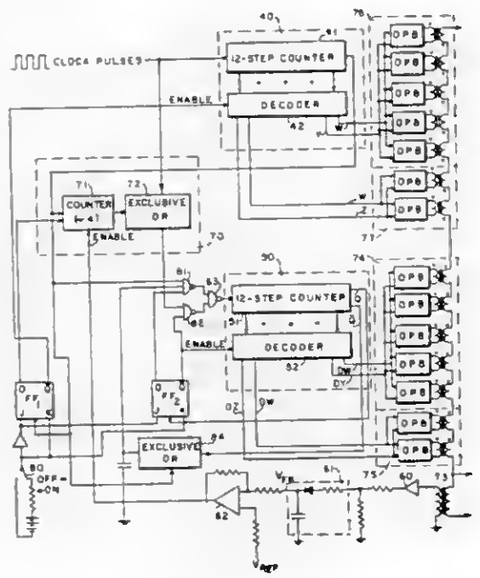
rendering ON respective controllable switching elements in a predetermined sequence each for a 120° interval of the output alternating current, said source of control pulse including means for chopping the current flowing through each controllable switching element at a predetermined modulation frequency for the former or latter 60° interval of said 120° interval.

4,032,832

DC TO AC INVERTER WITH UNREGULATED INPUT AND REGULATED OUTPUT

Frank Donald Miller, Thousand Oaks, Calif., assignor to Bunker Ramo Corporation, Oak Brook, Ill.

Filed July 14, 1975, Ser. No. 595,486
Int. Cl.² H02P *13/20*
U.S. Cl. 363—43 **16 Claims**



1. A DC to AC inverter for an unregulated DC voltage source comprising
two stepped waveform generating means connected to said source, each stepped waveform generating means being capable of delivering from said source one half the total desired voltage amplitude in the form of phase displaced, digitally controlled, stepped waveforms that approach a sine wave, each of said waveform generating means comprising a source of clock pulses at a substantially constant frequency and a step counter responsive to said clock pulses for timing said steps;
means for additively combining said stepped waveforms to produce an output voltage,

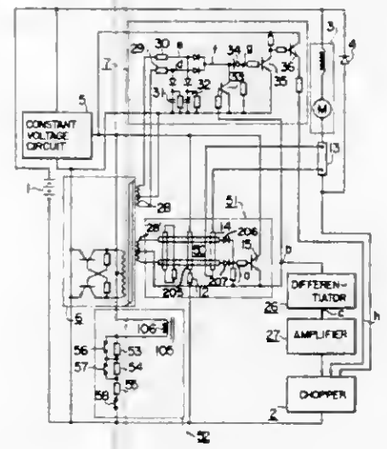
means for sensing said output voltage and producing a feedback signal proportional to its amplitude,
means for comparing said feedback signal with a reference signal to produce an error signal proportional to the difference therebetween, and
means responsive to said error signal for inhibiting said clock pulses from reaching the step counter of one of said two-stepped waveform generating means, thereby phase shifting the stepped waveform of one stepped waveform generating means relative to the other to reduce said error signal.

4,032,833

CHOPPER CONTROL DEVICE

Masahiko Ibamoto, and Hisakatsu Kiwaki, both of Katsuta, Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 27, 1975, Ser. No. 544,269
Claims priority, application Japan, Feb. 6, 1974, 49-14454
Int. Cl.² H02M *7/44*; **H02P** *13/18*
U.S. Cl. 363—78 **6 Claims**



1. A chopper control device for controlling a duty cycle of a chopper, said device comprising a magnetic phase shifter having an iron core arrangement, said magnetic phase shifter including a control winding and a feedback winding each being wound around a portion of said iron core arrangement, the output of said magnetic phase shifter being utilized to provide a gate signal for controlling the duty cycle of said chopper, wherein said device further comprises means associated with said iron core arrangement of said magnetic phase shifter for applying an external magnetic field thereto, and means for regulating the intensity of the external magnetic field.

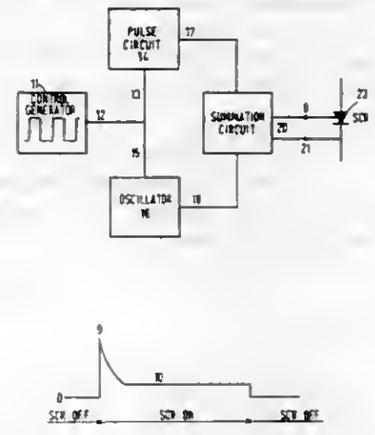
4,032,834

METHOD FOR TRIGGERING A CONTROLLED RECTIFIER AND FOR KEEPING IT CONDUCTIVE AND A GENERATOR FOR THAT PURPOSE

Hans Mogens Beierholm, Augustenborg, Denmark, assignor to Danfoss A/S, Nordborg, Denmark

Continuation of Ser. No. 403,341, Oct. 3, 1973, abandoned. This application Apr. 2, 1975, Ser. No. 564,269
Claims priority, application Denmark, Oct. 24, 1972, 5253/72
Int. Cl.² H02M *7/48*
U.S. Cl. 363—128 **2 Claims**

1. A circuit for controlling the supply of current to an inductive load, the circuit comprising: a controlled rectifier, of the type having a control electrode and a main current path, said inductive load being connected in series with said main current path; control generator means having an output; pulse generator means and signal generator means each having an input connected to said output of said control generator means, and each having an output; said pulse generator means further comprising a capacitor, means for charging said capacitor, a pulse transformer and means controlled by said generator means for discharging said capacitor through said pulse transformer; summing means having an input connected to said outputs of said pulse generator means and said signal generator means, and an output connected to said controlled rectifier; said pulse generator means being operative to supply to said control electrode via said summing means a short duration pulse of relatively large amplitude with high transconductance per unit of time to cause said main current path to become conducting and current to start to flow in said



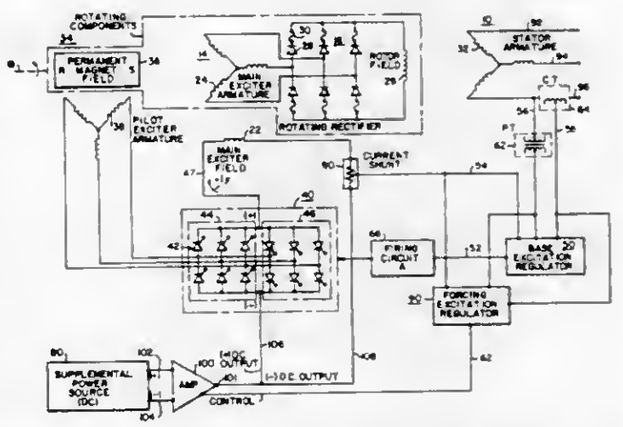
inductive load; and said signal generator means being operative to supply to said control electrode via said summing means a train of discrete pulses of relatively small amplitude, said supply of pulses being maintained at least until a predetermined current is flowing in said main current path and in said inductive load; and said circuit further comprising delay means connected between said output of said control generator means and said input of said signal generator means to delay supply of said pulse train to said control electrode until the amplitude of said short duration pulse is falling towards the amplitude of the pulses forming said train.

4,032,835

BRUSHLESS EXCITER SUPPLEMENTAL CEILING EXCITATION SYSTEM

Leonard W. Finnell, Forest Hills; Sigrud R. Petersen, North Huntingdon, and Dale I. Gorden, North Versailles, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 15, 1976, Ser. No. 666,813
Int. Cl.² H02P *9/14*
U.S. Cl. 322—86 **14 Claims**



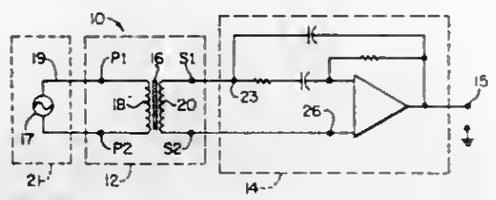
1. In a synchronous generator of the type having a rotating field winding turned by a prime mover, and wherein direct current excitation for said field winding is derived from said

prime mover by an exciter system including a pilot exciter having a permanent magnet rotor turned by said prime mover to permit operation of said generator at a first power output level which corresponds to a base mode of operation, the combination with said exciter system of a controlled source of direct current interconnected with said excitation system to supplement the excitation supplied to said rotating field winding to permit operation of said generator at a second power level which corresponds with a forcing mode of operation, and means operable to derive a control signal proportional to a predetermined function of the excitation applied to said field winding and of the power output of said generator, said controlled source being connected to receive said control signal and being operable to control said supplemental excitation in response to a predetermined function of said control signal.

4,032,836
TRANSFORMER CIRCUIT

Thomas A. O. Gross, Lincoln, Mass., assignor to The Gillette Company, Boston, Mass.

Filed Nov. 28, 1975, Ser. No. 636,108
Int. Cl.² H03H 11/00
U.S. Cl. 323—6 4 Claims

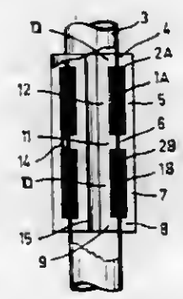


1. A transformer circuit comprising:
a transformer having a magnetic core with primary windings having first and second terminals and secondary windings having first and second terminals disposed on said core and presenting a complex impedance at said terminals of said secondary windings; and
impedance simulating means coupled to said terminals of said secondary windings for simulating a discrete element having a frequency dependent magnitude selected to resonate at a predetermined frequency with said transformer impedance at said secondary windings, whereby said transformer circuit attenuates signals at undesired frequencies.

4,032,837
CURRENT TRANSFORMER

Kalevi Panu, Vaasa, Finland, assignor to Oy Stromberg AB, Helsinki, Finland

Filed Feb. 10, 1976, Ser. No. 656,967
Claims priority, application Finland, Feb. 18, 1975, 750445
Int. Cl.² H01F 40/06
U.S. Cl. 323—6 4 Claims

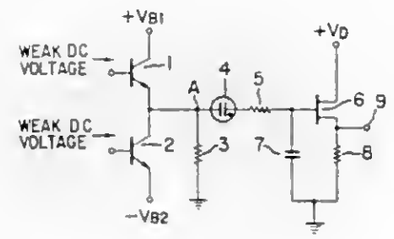


1. A current transformer comprising:
a tubular main insulator,
at least two first windings (either primary or secondary windings) arranged around the main insulator,
at least two second windings (either secondary or primary windings) arranged inside the main insulator preferably opposite corresponding first windings so that the pairs of windings formed in this way are, in the direction of the axis of the main insulator, at a distance from each other, whereby the primary windings are connected in series, and
a magnetic circuit related to each pair of windings, comprising a first core portion that surrounds each first winding and the main insulator from the outside and has yoke portions, and a second core portion covering each second winding and the main insulator from the inside and has yoke portions,
wherein subsequent core portions have common intermediate yoke portions and the primary windings are arranged so as to magnetize both cores in the same direction.

4,032,838
DEVICE FOR GENERATING VARIABLE OUTPUT VOLTAGE

Shunji Minami, Moriguchi; Takehide Takemura, and Shunzo Oka, both of Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Dec. 14, 1973, Ser. No. 424,905
Claims priority, application Japan, Dec. 30, 1972, 47-128493; Dec. 20, 1972, 47-147214[U]
Int. Cl.² G05F 3/12
U.S. Cl. 323—19 12 Claims



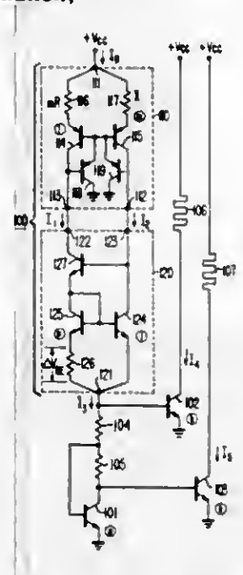
10. A circuit for providing a variable control voltage, comprising means providing positive and negative voltages, a first terminal, first and second switching devices connected to apply said positive and negative potentials respectively to said first terminal, said first and second switching devices having control terminals whereby said positive and negative potentials can be selectively applied to said first terminal, an MOS field effect transistor, a neon tube and a resistor serially connected between said first terminal and the gate of said field effect transistor, said positive and negative potentials being greater than the threshold voltage of said neon tube, a nonpolarized capacitor connected between the gate of said field effect transistor and ground potential, a source of drain potential connected to the drain electrode of said field effect transistor, and an output resistor connected between the source of said field effect transistor and ground potential.

4,032,839
CURRENT SCALING CIRCUITS

Adel Abdel Aziz Ahmed, Annandale, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Jan. 2, 1976, Ser. No. 646,387
Claims priority, application United Kingdom, Aug. 26, 1975, 35173/75
Int. Cl.² G01K 7/00; G05F 3/08
U.S. Cl. 323—19 25 Claims

1. In combination:
an input transistor and an output transistor, each having base and emitter electrodes with a base-emitter junction therebetween and each having a collector electrode, both arranged for operation at substantially the same absolute temperature T;
first and second resistances in substantially fixed ratio with each other despite change in their operating temperatures, said first resistance being serially connected with the base-emitter junction of a first of said input and output transistors to form a first series combination, said first series combination being connected in parallel with the base-emitter junction of the second of said input and said output transistors to form a first parallel combination;
means responsive to said absolute temperature T for applying a potential proportional to T across said second resistance to cause a first current flow therethrough;
means responsive to said first current for supplying a second current, which is a substantially constant factor times said first current and is applied as an input current to said first parallel combination;

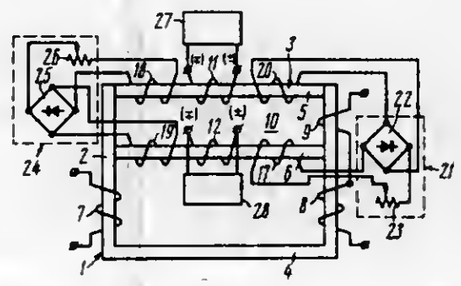


means for applying direct-coupled collector-to-base feedback to said input transistor to self-bias said input transistor, including a direct coupling of the collector electrode of said input transistor to the base electrode of said first transistor, for causing substantially the entire said input current to flow through said first resistance and through the collector-to-emitter path of said input transistor, developing a potential drop across said first resistance, which potential drop is proportional to T and determines the difference between the base-emitter potentials of said input and output transistors; and
means for utilizing the collector current flow of said output transistor as an output current, which output current is in substantially fixed proportion to said input current despite changes in T.

4,032,840
ADJUSTABLE TRANSFORMER

Vladimir Konstantinovich Lebedev, ulitsa Engelsa 25, kv. 12; Vladimir Alexandrovich Troitsky, ulitsa Bratislavskaya 8, kv. 86, and Semen Arefievich Kalinnikov, Brest-Litovsky prospekt 17, kv. 61, all of Kiev, U.S.S.R.

Filed July 17, 1975, Ser. No. 596,747
Int. Cl.³ G05F 1/14
U.S. Cl. 323—48 7 Claims

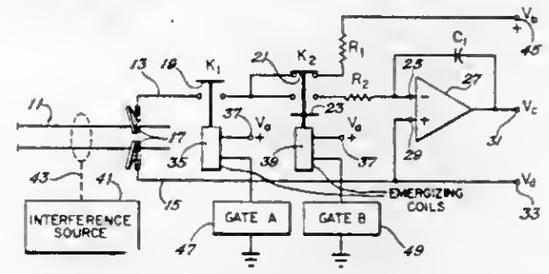


1. An adjustable transformer comprising: a core having limbs and two yokes; at least one of said yokes comprising two parallel-connected controlled magnetic circuits, said magnetic circuits being in the form of closed magnetic conductors and comprising controlled yokes; primary and secondary power windings mounted on said limbs; a supplemental section of turns of at least one of said power windings arranged between said controlled yokes; a control circuit; bias windings disposed on said controlled yokes and connected to said control circuit; said bias windings ensuring magnetic switching of said supplemental section of turns of said power winding, said magnetic switching being a movement of said supplemental section of turns of said power winding in and out of the open-circuit magnetic flux field of said disconnectable transformer.

4,032,841
METHOD AND APPARATUS FOR MEASURING THE CAPACITANCE OF TELEPHONE CABLE PAIRS

Gary H. Knippelmier, Round Rock, Tex., assignor to A. P. C. Industries, Inc., Austin, Tex.

Filed Nov. 28, 1975, Ser. No. 636,309
Int. Cl.² G01R 27/26
U.S. Cl. 324—60 CD 6 Claims



1. Apparatus for measuring the capacitance of telephone cable pairs, comprising:
a. means for charging through a charging resistance a selected cable pair, the capacitance of which is to be measured, to a first predetermined voltage;
b. means for discharging said cable pair through a discharge resistance from said first predetermined voltage to a second predetermined voltage;
c. said charging resistance being substantially equal to said discharge resistance, and the discharge time being substantially equal to a period of an interference frequency to be rejected;
d. means for integrating the discharge current, whereby there is produced an output voltage which is a substantially linear function of the capacitance of said selected cable pair.

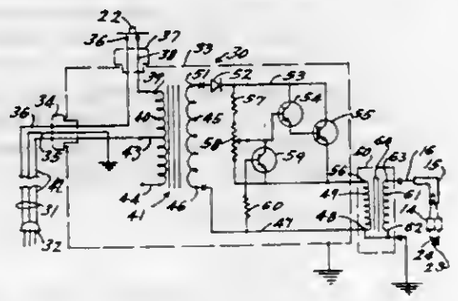
4,032,842
SPARK PLUG TESTER IGNITION SYSTEM

Sam J. Green, Temperance, Mich., and Richard E. Callahan, Toledo, Ohio, assignors to Champion Spark Plug Company, Toledo, Ohio

Filed Jan. 28, 1976, Ser. No. 653,092
Int. Cl.² F02P 17/00
U.S. Cl. 324—15 10 Claims

1. In a spark plug test fixture, an improved power supply for applying high voltage pulses to a spark plug comprising, in combination, a transformer having primary and secondary windings, means for connecting said primary winding to a source of alternating current, a half wave rectifier, an electronic switch, an ignition coil having primary and secondary windings, means for connecting said ignition coil secondary winding to such spark plug, means connecting said transformer secondary winding, said rectifier, said electronic switch and said ignition coil primary winding in a closed series circuit whereby, when said electronic switch is closed, half cycles of a predetermined polarity are applied from said transformer secondary winding through said diode and said elec-

tronic switch to said ignition coil primary winding, and means for periodically opening said electronic switch to establish a



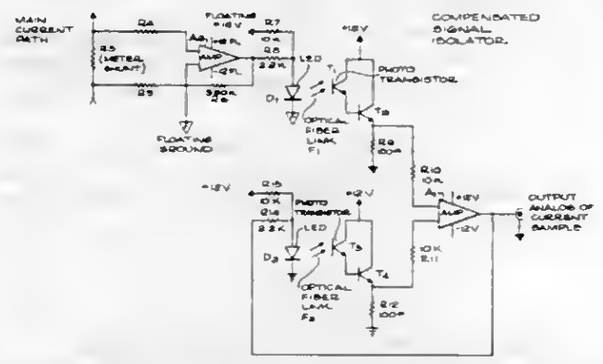
high voltage across said ignition coil secondary winding for application to such spark plug.

4,032,843

COMPENSATED SIGNAL ISOLATOR

Richard S. Loucks, Northridge, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed June 21, 1976, Ser. No. 698,128
Int. Cl.² G01R *31/00*
U.S. Cl. 324—96 **12 Claims**



1. A device for monitoring an electrical parameter associated with a common-mode voltage, said device generating an analog signal independent of said common-mode voltage and representing said electrical parameter at a remote location, comprising:

a sensor responsive to said electrical parameter to provide a first electrical signal as a first function thereof;

first means comprising a first optically coupled isolator responsive to said first electrical signal for generating a second signal representative of said first signal at a remote location independent of said common-mode voltage;

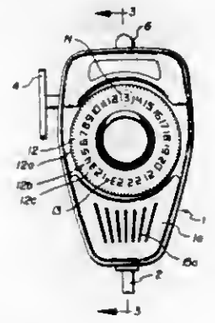
and second means responsive to said second signal including a second optically coupled isolator substantially identical to said first isolator, said second isolator being connected in a feedback arrangement within said second means in a manner compensating said second signal for variations in the transfer function of said first isolator.

4,032,844

COMBINATION MICROPHONE, SPEAKER, AND CONTROL UNIT FOR A RADIO TRANSCEIVER

Kazuyoshi Imazeki, Tokyo, Japan, assignor to General Research of Electronics, Inc., Tokyo, Japan

Filed Dec. 22, 1975, Ser. No. 643,485
Claims priority, application Japan, Dec. 28, 1974, 50-4318[U]
Int. Cl.² H01B *1/38*
U.S. Cl. 325—15 **15 Claims**



1. A combination transducer and control unit adapted to be coupled by a multi-conductor cable to a separate radio transceiver chassis which is capable of transmitting and receiving a plurality of radio signals at preselected frequencies, comprising: a housing of a size which is conveniently held by one hand; a multi-conductor cable secured to said housing and adapted to electrically connect said combination unit to said radio transceiver chassis; multi-position switch means mounted in said housing and connected to said cable, said switch means being operable to select individually said preselected frequencies; illuminated channel indicating means mounted on said housing and responsive to said switch means for indicating the frequency to which said transceiver is turned; an electromechanical transducer mounted in said housing and connected to said cable transmit/receive switch means mounted on said housing and coupled to said cable and said transducer for selectively enabling said transceiver to transmit or receive said radio signals; and volume control means mounted on said housing and coupled to said cable and said transducer for varying the amplitude of the audio frequency electrical signals produced by said transceiver; said frequency-selecting switch means, transmit/receive switch means, and volume control means each being located on said housing so as to be operable by the finger of the same hand of the operator which is holding the unit.

4,032,845

SURFACE WAVE COMMUNICATION SYSTEM

Lester C. Via, Falls Church, Va., assignor to Automation Industries, Inc., Silver Spring, Md.

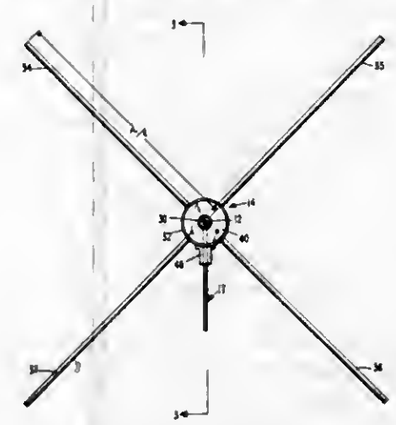
Filed June 19, 1975, Ser. No. 588,459
Int. Cl.² H01B *1/38*; H04B *1/04*
U.S. Cl. 325—16 **5 Claims**

1. In a surface wave communication system, a length of transmission line for carrying electromagnetic eneergy in the form of surface waves between two communication stations, at least one of which bas a, dispenser means for paying out and taking up said transmission line, and means for transmitting and receiving electromagnetic signal energy, the improvement comprising:

coupler means having a first end and a second end and including an inner, substantially cylindrical conductor and an outer, substantially cylinder conductor, said inner and outer conductors being coaxial and substantially coextensive;

wave open circuit and wave short circuit support means located at said first and second ends, respectively, of said coupler means mounting said inner conductor coaxially on said outer conductor and allowing electromagnetic wave energy to pass through substantially only said first end of fsaid coupler means;

means including a central aperture extending axially through said inner conductor for slidably mounting said coupler means on said transmission line, said inner conductor being contiguous to and circumferentially surrounding said transmission line to allow said transmission



line to pass freely therethrough, whereby the dispenser means can pay out or take up said transmission line through said coupling means; and

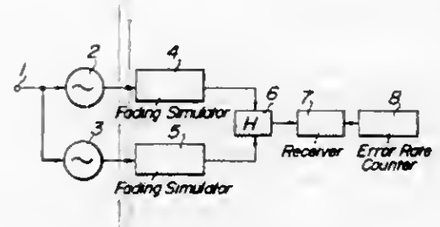
coaxial conductor means electrically connecting said transmitting and receiving means to the midpoint of said coupler means whereby said signal energy is coupled between said transmission line and said transmitting and receiving means by way of said first end of said coupler means.

4,032,846

DIGITAL MOBILE COMMUNICATION SYSTEM AND METHOD

Kenkichi Hirade, Yokosuka; Takeshi Hattori, Yokohama, and Hiromi Wasai, Kashiwa, all of Japan, assignors to Nippon Telegraph and Telephone Public Corporation, Tokyo, Japan

Filed Oct. 8, 1975, Ser. No. 620,622
Claims priority, application Japan, Oct. 9, 1974, 49-116412
Int. Cl.² H04H *3/00*
U.S. Cl. 325—54 **4 Claims**



1. In a digital mobile communications system of the type wherein the same transmission signal is simultaneously transmitted in each of a plurality of transmission zones on a common standard carrier whose frequency is located within a single radio channel bandwidth for all of the transmission zones in the system, and wherein adjacent transmission zones overlap, the improved method of transmission comprising choosing first and second nominal center carrier frequencies for two adjacent transmission zones, respectively, which overlap, such that the difference between said first and second carrier frequencies is a value between $\Delta f\min$ and $\Delta f\max$, such value being very small compared to the standard carrier frequency, and being selected to achieve a predetermined minimum error rate of reception in the overlapped zone, and wherein the following relationships are satisfied:

$$fi - fio \quad \Delta fsi;$$
$$fj - fjo \quad \Delta fsj;$$

and

$$\Delta f\min \quad \Delta fij \quad \Delta f\max;$$

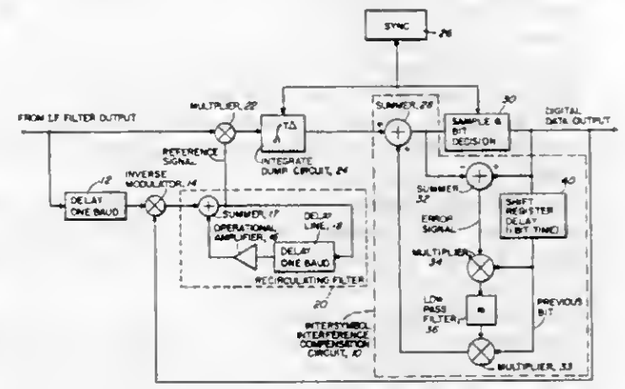
where Δfij is the frequency shift between said first and second frequencies having respective nominal center frequencies fio and fjo, instantaneous center frequencies fi and fj, and allowable frequency fluctuations Δfsi and Δfsj.

4,032,847

DISTORTION ADAPTER RECEIVER HAVING INTERSYMBOL INTERFERENCE CORRECTION

Manfred G. Unkauf, Franklin, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Jan. 5, 1976, Ser. No. 647,261
Int. Cl.² H03K *9/00*
U.S. Cl. 325—323 **21 Claims**



17. The method comprising the steps of:

producing a signal representing the integral of detected received signals, said received signals comprising a series of pulses, each of said pulses representing a discrete digital state;

producing an output signal representing the discrete digital states of said received signals;

producing an error signal representing the difference between said output signal and said signal representing said integral of detected received signals; and

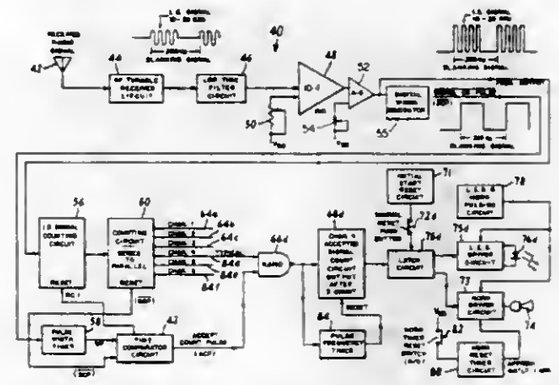
producing a correcting signal in response to said error signal.

4,032,848

RECEIVER FOR A CODED ELECTRONIC SECURITY SYSTEM

Frank J. Shaughnessy, Hartford, Conn., assignor to The Stanley Works, New Britain, Conn.

Filed July 31, 1975, Ser. No. 600,901
Int. Cl.² H04B *1/16*
U.S. Cl. 325—325 **14 Claims**



1. A receiver, usable in an electronic security system which includes at least one transmitter for selectively transmitting a pulse coded signal comprising a series of transmissions, repeated at a selected transmission repetition frequency, each transmission having a selected duration and comprising a

plurality of pulses at a selected pulse repetition frequency, comprising:

a. means for receiving and demodulating said signal to obtain a first digital signal comprising digital pulses at said selected pulse repetition frequency;

b. a digital counter for counting the number of pulses in said first digital signal during a predetermined time interval and providing an output representative of the range of said pulse repetition frequency;

c. indicator means, responsive to said counter output, for indicating that a signal has been received which contains pulses having a pulse repe5titlon frequency within a predetermined range;

d. a digital signal generator responsive to said first digital signal, for providng a scond digita signal, said digital signal generator providing a continuous output pulse as long as said first digital signal has a pulse repetition frequency which exceeds a fist selected frequemncy, said first selected frequency being lower than said pulse repetition frequency and higher than said transmission repetition frequency, whereby said second digital signal comprises pulses at said transmission repetition frequency and having said selected duration

e. first inhibiting means, responsive to said second digital signal, for inhibiting said indicating means if said pulse duration of said second digital signal is less than said predetermined time interval; and

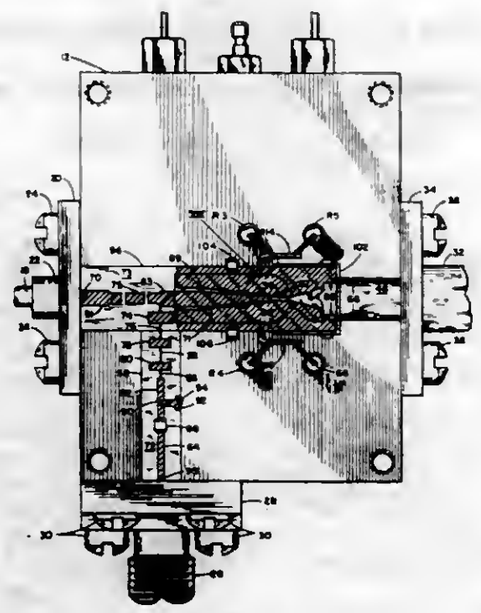
f. second inhibiting means, responsive to said second digital signal and said counter output, for inhibiting said indicating means if the repetition frequency of said second digital signal or said counter output is less than a second selected frequency.

4,032,849

PLANAR BALANCED MIXER/CONVERTER FOR BROADBAND APPLICATIONS

Ulrich H. Gysel, Mountain View, and Ashok K. Gorwara, San Jose, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 1, 1976, Ser. No. 719,884
Int. Cl.² H04B 1/26
U.S. Cl. 325—446 **8 Claims**



1. A millimeter wave single balanced mixer comprising:

a metallic housing;

an RF input port formed in said metallic housing comprised of a section of waveguide having first and second broadwalls;

a first microwave integrated circuit card disposed within said section of waveguide;

said card including a dielectric substrate having a metallized surface, a waveguide to slotline transition formed on said substrate and having a first end juxtapose to said RF port, a slotline transmission section disposed in said surface operably coupled to said waveguide to slotline transition, a coplanar waveguide section formed in said surface and operably coupled to said slotline section, and bandpass filter means formed in said surface and operably coupled to said coplanar waveguide section and having a terminal for connection to a local oscillator input;

a second microwave integrated circuit card disposed within said metallic housing comprised of a low-pass filter having a first terminal operably coupled to said bandpass filter means and having a second terminal adapted for providing an IF output;

said coplanar waveguide section including first and second transmission channels formed in said metallized surface; and

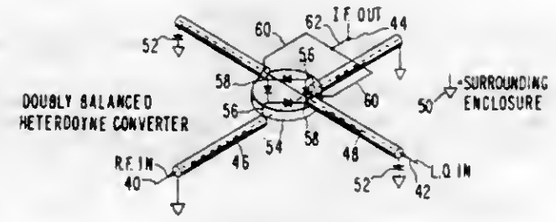
first and second diodes connected across said first and second transmission channels, respectively, juxtapose to said slotline section.

4,032,850

COAXIAL BALUN WITH DOUBLY BALANCED HETERODYNE CONVERTER

Joseph Caldwell Hill, N. Billerica, Mass., assignor to Varian Associates, Palo Alto, Calif.

Filed Jan. 12, 1976, Ser. No. 648,065
Int. Cl.² H04B 1/26; H03D 7/14; H02M 5/20
U.S. Cl. 325—446 **8 Claims**



6. A heterodyne converter comprising a conductive enclosure, a first coaxial line leading into said enclosure at one location thereon and extending within said enclosure to a wall opposite said one location, a second coaxial line leading into said enclosure at another location thereon and extending to a wall opposite said other location, the outer conductor of each coaxial line having an electrical discontinuity in the form of an annular gap within said enclosure at a point therein spaced from the entrance of such line into said enclosure, a first pair of balanced lines being connected across said annular gap in said first coaxial line, a second pair of balanced lines being connected across said annular gap in said second coaxial line, a diode bridge positioned within said enclosure, said first and second pairs of balanced lines being connected to opposite corners of said bridge, and means for supplying a heterodyned output signal from said bridge.

4,032,851

COMPLEMENTARY SYMMETRY FET MIXER CIRCUITS

Merle Vincent Hoover, Flemington, N.J., assignor to RCA Corporation, New York, N.Y.

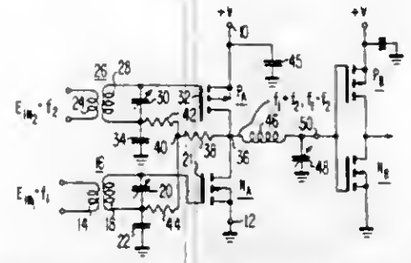
Filed May 7, 1976, Ser. No. 684,405
Int. Cl.² H04B 1/28
U.S. Cl. 325—451 **9 Claims**

1. A mixer circuit comprising, in combination:

two terminals between which an operating voltage may be applied;

two field effect transistors of complementary conductivity types, each having an input electrode, an output electrode, a conduction path between these electrodes, and a control electrode, said two paths being connected to one another at their output electrodes, and said two paths being connected in series between said terminals;

means for quiescently biasing both control electrodes to quiescently operate both transistors in the linear region of their operating range;



means for applying a signal at a frequency f_1 between the control and input electrodes of said first transistor;

means for applying a signal at a frequency f_2 between the control and input electrodes of said second transistor; and

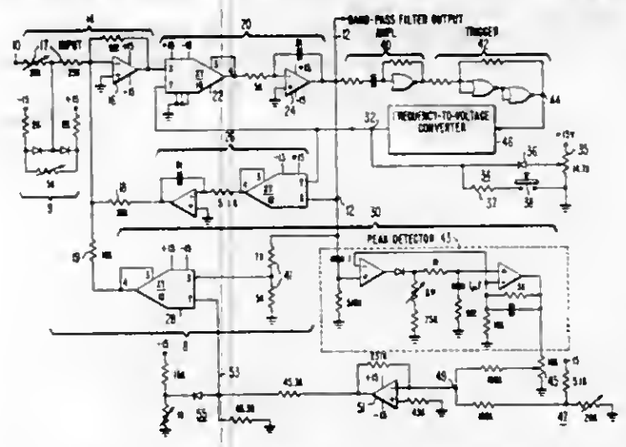
a circuit output terminal connected to said output electrodes for supplying signals at a sum frequency $(f_1 + f_2)$ and a difference frequency $(f_1 - f_2)$.

4,032,852

FILTER WHICH TRACKS CHANGING FREQUENCY OF INPUT SIGNAL

Leonard Robin Hulls, Marblehead, and Stephen Clow Hadden, Cambridge, both of Mass., assignors to RCA Corporation, New York, N.Y.

Filed Jan. 2, 1976, Ser. No. 646,389
Int. Cl.² H03B 1/04
U.S. Cl. 328—167 **4 Claims**



1. A band-pass filter having a frequency pass band which tracks the changing frequency of an input signal, comprising

a voltage-controlled filter including a signal input terminal, a signal output terminal and a frequency control terminal,

a frequency-to-voltage converter coupled from said signal output terminal to said frequency control terminal to cause the pass band frequency of the filter to track the frequency of the input terminal signal, and

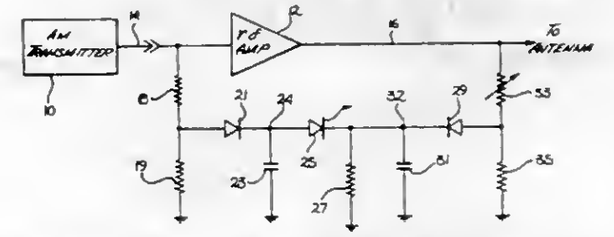
means coupled from said signal output terminal to said signal input terminal to cause the Q of the filter to vary in an inverse relation with the amplitude of the input signal.

4,032,853

OVERDRIVE DETECTOR FOR RADIO FREQUENCY AMPLIFIER

Eugene B. Hibbs, Jr., 1206 Fernside Drive, La Canada, Calif. 91001

Filed Oct. 28, 1976, Ser. No. 736,385
Int. Cl.² G01R 19/00
U.S. Cl. 330—2 **11 Claims**



1. A circuit for detecting the overdriving of a radio frequency amplifier comprising:

a first detection means coupled to the input of said amplifier for providing a first potential, which potential is a function of the input signal to said amplifiers;

a second detection means coupled to the output of said amplifier for providing a second potential, which potential is a function of the output signal from said amplifier;

threshold means coupled between said first and second potentials for providing a current path when the difference between said first and second potential exceeds a predetermined voltage;

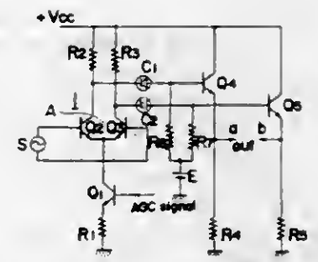
whereby current in said threshold means provides an indication of the overdriving of said amplifier.

4,032,854

AMPLIFICATION AND GAIN CONTROL CIRCUIT

Seiji Miyamoto, Yao, Japan, assignor to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Mar. 12, 1976, Ser. No. 666,509
Claims priority, application Japan, Mar. 12, 1975, 50-33833[U]
Int. Cl.² H03G 3/30
U.S. Cl. 330—29 **5 Claims**



1. In an amplification circuit for receiving alternating current input signals, said circuit comprising at least one amplifying element and at least one output circuit, for coupling said amplification circuit to a subsequent stage through which an amplified output is supplied to said subsequent stage, and a gain control means to control said amplification circuit to maintain the amplitude of said amplified output within a certain range, an amplification and gain control circuit which includes at least one capacitive semiconductor junction means having one end connected to an output electrode said amplifying element and the other end connected to a constant voltage source through a resistor, said constant voltage source applying a reverse bias to said semiconductor junction means and also applying a D.C. bias to said subsequent stage wherein said semiconductor junction means prevents variations in D.C. voltage in the amplification circuit from being applied to said subsequent stage, and wherein the capacitance of said semiconductor junction means is decreased upon actuation of said

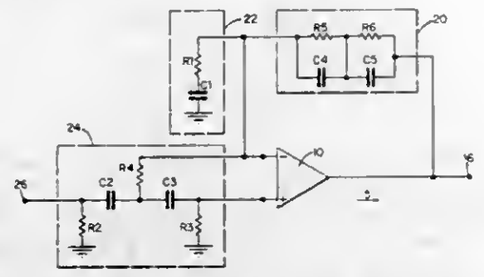
gain control means to decrease gain by said amplification circuit whereby attenuation of the output of said amplification circuit is enhanced.

4,032,855

PHONOGRAPH PREAMPLIFIER NETWORK WITH INFRASONIC CUTOFF RESPONSE

Tomlinson M. Holman, II, Cambridge, Mass., assignor to Advent Corporation, Cambridge, Mass.

Filed Oct. 28, 1976, Ser. No. 736,404
Int. Cl.³ H03F *1/34, 3/04*
U.S. Cl. 330—31 **6 Claims**



1. An audio signal preamplifier network having a preamplifier input terminal for coupling to a magnetic phonograph cartridge, and having a preamplifier output terminal, comprising:

A. a high gain amplifier having inverting and non-inverting input terminals and an output terminal, said input terminals being characterized by relatively high impedance, and said amplifier output terminal being coupled to said preamplifier output terminal,

B. equalization feedback network coupled between said amplifier output terminal and said inverting terminal,

C. an RC filter network characterized by a single real axis pole and including a first resistor, R1, and first capacitor, C1, coupled in series between said inverting input terminal and a reference potential,

D. an input filter feedback network characterized by a pair of off-axis complex poles, and including second and third capacitors, C2 and C3, respectively, coupled in series between said preamplifier input terminal and said non-inverting input, a second resistor, R2, coupled between said preamplifier input terminal and said reference potential, a third resistor, R3, coupled between said non-inverting terminal and said reference potential, and a fourth resistor, R4, coupled between said inverting terminal and the junction between said second and third capacitors,

wherein said RC filter and input filter feedback networks are adapted to control the infrasonic frequency response of said preamplifier network whereby said preamplifier network is characterized by an 18dB per octave roll-off response at frequencies below a predetermined infrasonic frequency and a relatively flat response at frequencies in a predetermined range adjoining and above said predetermined infrasonic frequency.

4,032,856

DRIFT COMPENSATED AMPLIFIER, PARTICULARLY FOR MEASURING SIGNALS

Heinz-Dieter Goldner, Schwalbach, Taunus, Germany, assignor to Hartmann & Braun Aktiengesellschaft, Frankfurt am Main, Germany

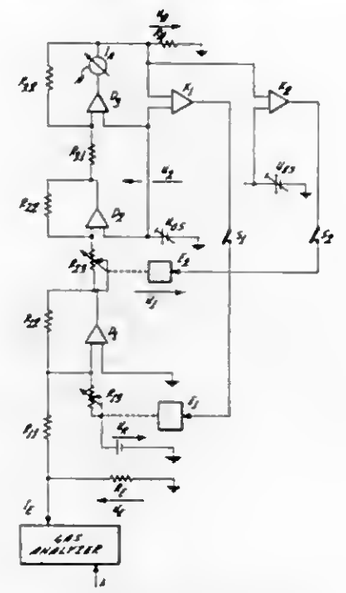
Filed Nov. 10, 1975, Ser. No. 630,335
Claims priority, application Germany, Nov. 13, 1974, 2453720
Int. Cl.² H03F *3/45*
U.S. Cl. 330—69 **13 Claims**

9. A drift compensated amplifier comprising a first differential amplifier connected to receive the measuring signal and having an input circuit which includes a first adjustable bias;

a second differential amplifier with adjustable gain, having one input connected to receive the output of the first differential amplifier, the second differential amplifier having an output circuit;

a second bias connected to the other input of the second differential amplifier;

first circuit means connected to the output circuit of the second amplifier and operating the first adjustable bias so that for a first particular measuring signal the output of



the second differential amplifier is determined exclusively by the second bias while the gain circuit has zero volts so that the output of the second differential amplifier is independent from the adjusted gain; and

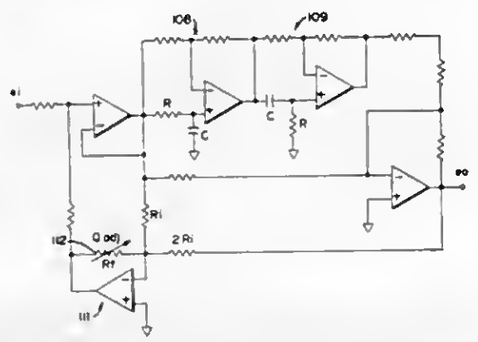
second circuit means connected to the output circuit of the second amplifier and operating the gain so that for a second particular measuring signal the second differential amplifier has a second particular output.

4,032,857

FILTER CIRCUIT

Jack G. S. Lum, Sunnyvale, Calif., assignor to Sound Technology, Inc., Campbell, Calif.

Division of Ser. No. 509,118, Sept. 25, 1974, Pat. No. 3,940,715. This application Oct. 29, 1975, Ser. No. 626,761
Int. Cl.² H03F *1/00*
U.S. Cl. 330—151 **12 Claims**



11. Bandpass filter means comprising first and second series connected all pass phase shifter means, said first phase shifter means shifting the phase of a signal of a predetermined frequency +90° and said second phase shifter means shifting the phase of said signal −90° whereby a 0° shift is provided, said filter means shifting signals offset from said predetermined frequency a different degree, and having an input for receiving said signal and an output at which said signal is shifted 180° in

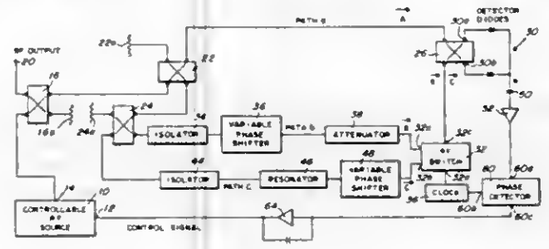
phase, and means for directly summing said input to said output.

4,032,858

AUTOMATIC FREQUENCY CONTROL SYSTEM

Robert Norman Hargis, Wheaton, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed June 3, 1976, Ser. No. 692,698
Int. Cl.² H03B *3/04*
U.S. Cl. 331—9 **14 Claims**



1. An automatic frequency control system for maintaining a controllable oscillator at a center frequency f_0 comprising:

a detector means having a pair of inputs and an output;

a first coupling circuit means for coupling the oscillator signal to the first detector input;

a second coupling circuit means having a predetermined transfer characteristic selected responsive to the first coupling circuit;

a third coupling circuit means comprising a resonant component tuned to f_0;

switching means for alternately coupling the oscillator signal through the second and third coupling circuits to the second detector input; and

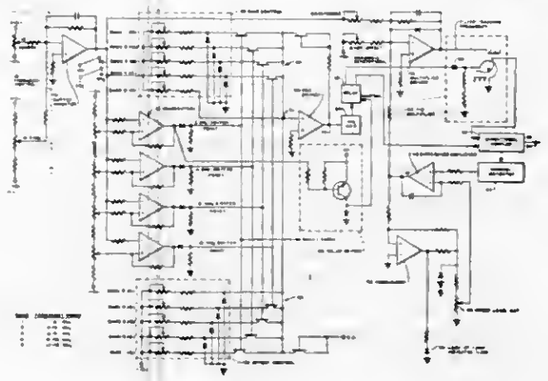
processing means for processing the detector AC output and controlling the oscillator in response thereto.

4,032,859

1 TO 18 GHZ MICROWAVE SIGNAL GENERATOR

Marvin L. Ryken, Ventura, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 2, 1976, Ser. No. 719,780
Int. Cl.² H03B *19/00*
U.S. Cl. 331—53 **10 Claims**



1. A wideband microwave signal generator having stable frequency adjustment and leveled output power across its frequency range comprising:

a. frequency control means for generating a variable DC voltage signal across a predetermined voltage range;

b. means for producing a microwave signal having a series of frequency swings across a first predetermined frequency range as said variable DC voltage is varied across said predetermined voltage range;

c. multiplier means for generating harmonics from said microwave signal and filtering selected harmonics in response to a filter tracking voltage to produce a microwave output signal;

d. means for varying offset and gain of said variable DC voltage to produce said filter tracking voltage;

e. means for comparing output power of said microwave output signal with a desired power level signal to generate a difference voltage signal;

f. means for applying said difference voltage signal to said means for varying offset and gain of said variable DC voltage to vary said filter tracking voltage until the output power level of said microwave output signal matches said desired power level;

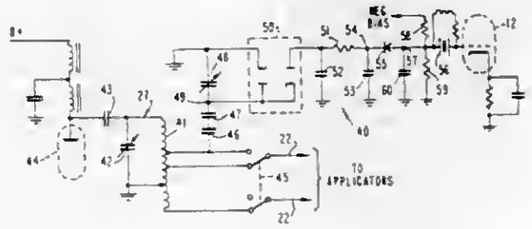
g. means for limiting said difference voltage signal to cause said multiplier means to track over only a second predetermined range of frequencies.

4,032,860

RADIO FREQUENCY POWER GENERATOR HAVING ADJUSTABLE STABILIZED OUTPUT LEVEL AND FAIL-SAFE CONTROL CIRCUITS

Harry H. LeVeen, 800 Poly Place, Brooklyn, N.Y. 11209

Filed July 11, 1975, Ser. No. 595,095
Int. Cl.³ A61N *1/40*; H02H *7/20*; H03B *3/02*
U.S. Cl. 331—63 **1 Claim**



1. In a system for applying radio frequency electrical power of selectable level to a load which includes:

a radio frequency electrical signal source having an input circuit and an output circuit for generating a radio frequency electrical signal in said output circuit, the amplitude of said signal in said output circuit being a function of the amplitude of a control signal applied to said input circuit, radio frequency power amplifier means having an input circuit and an output circuit for generating a radio frequency electric signal in said output circuit of said amplifier means having a power level which is a function of the amplitude of a radio frequency signal applied to said input circuit of said amplifier means, and said output circuit of said signal source being coupled to said input circuit of said amplifier means, the improvement in which said output circuit of said amplifier means is coupled to said input circuit of said signal source through a negative feedback servo loop including sensing means connected to said output circuit of said amplifier means for sensing the radio frequency power level in said output circuit of said amplifier means, said sensing means including manually operated control means and being connected to said input circuit of said signal source for connecting a portion of the sensed output level as a control signal for said signal source, said portion being controlled by said control means, and a high voltage supply connected to an external power source, means connecting said high voltage supply to said signal source, current sensitive means in said connecting means responsive to an increase therein above a preselected maximum to interrupt the connection between said external power source and said high voltage supply to disable said high voltage supply.

4,032,861
LASER DEVICE FOR ALTERING SURFACES IN ACCORDANCE WITH GIVEN PATTERNS

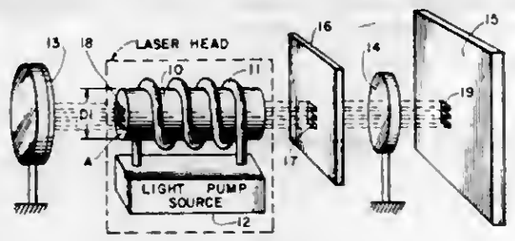
Larry R. Rothrock, Poway, Calif., assignor to Union Carbide Corporation, New York, N.Y.

Continuation of Ser. No. 416,236, Nov. 15, 1973, abandoned, which is a continuation of Ser. No. 226,548, Feb. 15, 1972, abandoned, which is a continuation of Ser. No. 51,798, July 2, 1970, abandoned. This application July 16, 1975, Ser. No. 596,262

The portion of the term of this patent subsequent to Apr. 18, 1989, has been disclaimed.

Int. Cl.² H01S 3/08

U.S. Cl. 331—94.5 C **9 Claims**



1. A laser device for altering the surface of a target material disposed at a fixed position exterior to said laser device to define a given pattern on said surface comprising, in combination:

a. a high gain laser material and means for optically pumping said laser material;

b. first and second end mirror means defining a resonant optical cavity for laser radiation from said laser material, said first end mirror means being optically flat or the equivalent of optically flat and substantially 100% reflective for laser radiation without changing the cross-sectional area of said radiation at the point it leaves one end of said laser material and returns to said one end, said second end mirror means being optically flat and partially transmissive to couple the laser radiation out of said optical cavity; and

c. a mask having cut-out portions defining a given pattern, said mask being positioned in said optical cavity such that only cross-sectional portions in said laser material which are congruent with each other and similar to said given pattern are stimulated to emit output laser radiation, whereby said exterior target surface may be radiated by said output laser radiation to thereby effect physical alteration of said surface similar to said given pattern.

4,032,862
HIGH POWER ELECTRODELESS GAS ARC LAMP FOR PUMPING LASERS

David A. Huchital, Trumbull, and George N. Steinberg, Westport, both of Conn., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.

Continuation-in-part of Ser. No. 442,976, Feb. 14, 1974, Pat. No. 3,909,736. This application June 17, 1975, Ser. No. 587,670

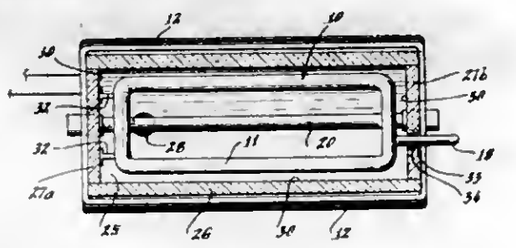
Int. Cl.² H01S 3/092

U.S. Cl. 331—94.5 P **14 Claims**

1. An electrodeless cw arc lamp for pumping a laser comprising:

a radiation transparent lamp envelope in the form of a closed loop having a continuous bore, a major axis and a minor axis, the bore diameter being in the range of from about 1 to about 10 mm, said envelope containing an inert ionizable gas at a cold pressure of from about 0.5 to about 20 atmospheres, said major axis of the loop corresponding substantially to the length of the laser rod to be pumped by the lamp;

a coil surrounding said lamp envelope with no portion thereof being disposed between said envelope and the laser rod to be pumped thereby, said coil being adapted to receive an RF current and produce a flux in response thereto, said coil being disposed so that said lamp envelope is in the flux; and



mounting means for positioning a laser rod adjacent said lamp envelope with the rod extending in a direction substantially the same as said major axis of said loop so that light from the tube will impinge directly on a laser rod positioned by said mounting means.

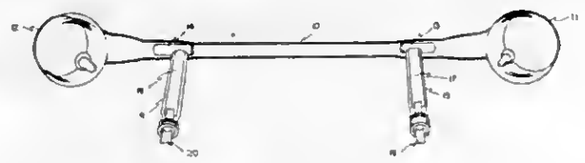
4,032,863
METAL VAPOR LASER TUBE

Daniel E. Altman; Gliddon J. Barstow, and Myer Geller, all of San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 19, 1976, Ser. No. 678,264

Int. Cl.² H01S 3/03

U.S. Cl. 331—94.5 D **6 Claims**



1. A metal vapor laser tube comprising:

an enclosure having an elongate major axis and containing an amount of a metallic element,

said enclosure being of an electrically non-conductive material selected for its ability to withstand elevated temperatures and having at least one window aligned with said major axis and capable of transmitting energy at the wavelength of laser emission of said metallic element;

two electrodes disposed at opposite ends within said enclosure in coaxial alignment with said major axis of said enclosure;

an extension proximate to each electrode and orthogonally disposed relative to said major axis of said enclosure;

an electrical conductor connected to each electrode and sealed within substantially the entire length of each extension,

said electrical conductor being of strip configuration and having a substantially elongate elliptical cross-section; and

a terminal connected to each said electrical conductor and extending from the external sealed end of each extension for connection to a source of electrical energy.

4,032,864
ELECTRONIC CIRCUIT HAVING A MISFET AS AN AMPLIFYING ELEMENT

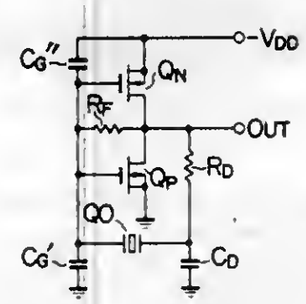
Osamu Yamashiro, Kodaira, and Yoshikazu Hatsukano, Hachioji, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Feb. 13, 1976, Ser. No. 658,067

Claims priority, application Japan, Feb. 28, 1975, 50-24014

Int. Cl.² H03B 5/36; H03F 3/16

U.S. Cl. 331—116 R **4 Claims**



1. An electronic circuit comprising an amplifier circuit including:

input and output terminals;

a power voltage terminal;

a ground terminal;

at least on insulated gate field effect transistor as an amplifying element, said field effect transistor having its gate, drain and source connected to said input, output and ground terminals respectively;

a bias resistor provided between said input and output terminals; and

first and second capacitive elements series-connected between said power voltage terminal and said ground terminal, a divided voltage of a power voltage determined by said first and second capacitive elements being selected to be equal to a bias voltage determined by said bias resistor, said divided voltage being applied to said input terminal.

2. An electronic circuit comprising an oscillation circuit including:

an amplifier circuit having at least one insulated gate field effect transistor as an amplifying element, input and output terminals, and a bias resistor provided between said input and output terminals, said field effect transistor having its gate connected to said input terminal, its drain connected to said output terminal and its source grounded;

positive feedback means for coupling an output signal of said amplifier circuit to the input side thereof, said positive feedback means having an inductive element connected between said input and output terminals, a first capacitive element one end of which is connected to said input terminal and the other end of which is grounded, and a second capacitive element one end of which is connected to said output terminal and the other end of which is grounded; and

a third capacitive element connected between a power voltage terminal and said input terminal for dividing a power voltage in cooperation with said first capacitive element, a divided voltage of said power voltage determined by a ratio between the capacitances of said first and third capacitive elements being selected to be equal to a bias voltage determined by said bias resistor.

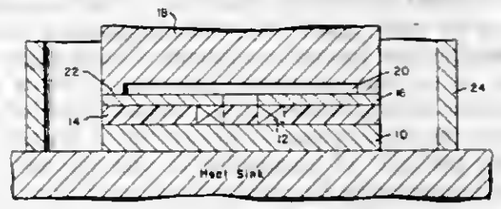
4,032,865
RADIAL IMPEDANCE MATCHING DEVICE PACKAGE

Robert S. Harp, Westlake Village, and Kenneth J. Russell, Thousand Oaks, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Mar. 5, 1976, Ser. No. 664,346

Int. Cl.² H01P 1/16, 5/10, 1/04; H03B 9/12

U.S. Cl. 333—21 R **16 Claims**



1. An active transmission line structure for transforming the relatively low impedance of a semiconductor device to a high impedance suitable for coupling to external microwave circuitry, including, in combination:

a. an active semiconductor device having an annular configuration with first and second opposed surfaces,

b. a first metal layer adjacent said first device surface and extending radially therefrom,

c. a second metal layer disposed on said second device surface and having a radial dimension which is substantially coextensive with a corresponding radial dimension of said first metal layer, and

d. a non-conducting wave propagating material between said first and second metal layers and adjacent said semiconductor device, and forming with said first and second metal layers a radial transmission line for transforming the relatively low impedance of said semiconductor device to a predetermined higher impedance at a predetermined radial distance away from said semiconductor device, whereby said radial transmission line may be connected at or near its periphery to other higher impedance microwave circuits and with good impedance matching characteristics.

4,032,866
LOW LOSS FREQUENCY RESPONSE CORRECTIVE NETWORK

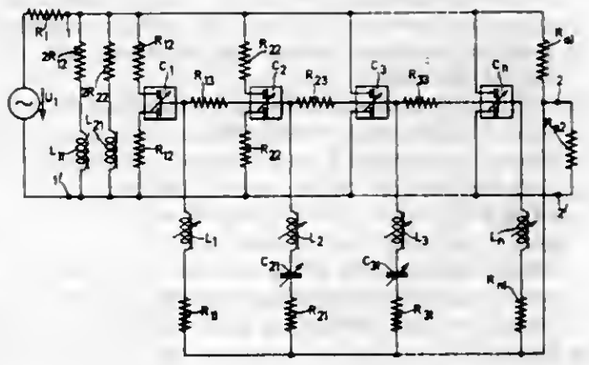
Hans-Joachim Schmidt, Nurnberg, Germany, assignor to Tekade Felten & Guilleaume Fernmeldeanlagen GmbH, Nurnberg, Germany

Filed Mar. 12, 1976, Ser. No. 666,229

Claims priority, application Germany, Mar. 22, 1975, 2512805

Int. Cl.² H03H 7/10, 7/16, 7/38; H04B 03/14

U.S. Cl. 333—28 R **16 Claims**



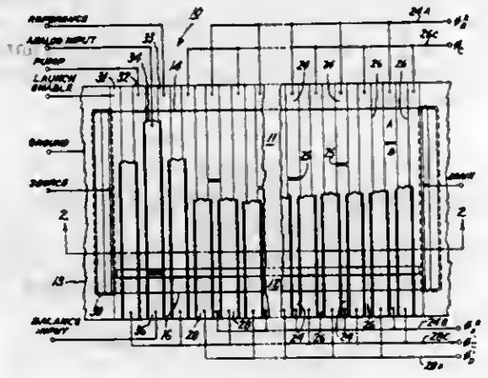
1. A corrective equalizer network for obtaining a desired attenuation versus frequency characteristic, comprising a source having output terminals; a plurality of nonactive stages each having an input for receiving input signals from the

source, an output for supplying output signals to a load, and adjustable reactance elements intermediate the respective input and output of every stage, one of said reactance elements being a differential capacitor having two stator plate input terminals connected across the output terminals of the source, and a rotor plate output terminal operatively connected to the load; means for tuning at least one of the adjustable reactance elements of each stage so as to set every stage to be resonant at different frequencies of the frequency spectrum of the input signals; and means for adjusting at least one of the adjustable reactance elements of each stage independently from other adjustable reactance elements of every other stage so as to selectively vary the amplitude of at least a selected one of the respective frequencies of the spectrum for altering the level of attenuation at said selected one frequency, whereby the output signals supplied to the load have the desired attenuation versus frequency characteristic for the entire frequency spectrum.

4,032,867
BALANCED TRANSVERSAL FILTER

William E. Engeler, and Richard D. Baertsch, both of Scotia, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Sept. 2, 1975, Ser. No. 609,415
Int. Cl.² H03H 7/28; H03K 5/159; H01L 29/78, 27/10
U.S. Cl. 333—70 T **8 Claims**

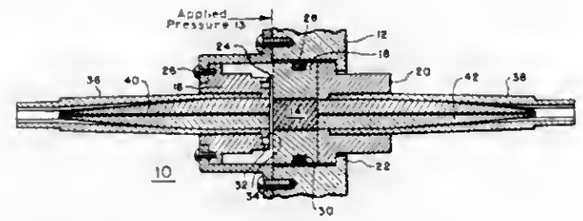


1. A transversal filter comprising
a substrate of semiconductor material including a first channel portion adjacent a major surface of said substrate and a second channel portion adjacent said major surface,
a group of electrodes insulatingly overlying each of said channel portions,
said group of electrodes forming with said substrate a portion of a first charge transfer shift register over said first channel portion and a portion of a second charge transfer shift register over said second channel portion,
each of said electrodes having a split over said first channel portion dividing each of said electrodes over said first channel portion into a first part and a second part, the portion of each of said electrodes overlying said second channel portion constituting a third part thereof,
a first conductive line connected to the first parts of said electrodes,
a second conductive line connected to the second parts of said electrodes,
the capacitance of the first parts of said electrodes being equal to the sum of the capacitances of the second and third parts of said electrodes.

4,032,868
MULTIMODAL HIGH PRESSURE WAVEGUIDE WINDOW

Ronald E. Trudeau, Goshen, Mass., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 5, 1976, Ser. No. 683,590
Int. Cl.² H01P 1/16, 1/08, 1/30, 5/08
U.S. Cl. 333—98 P **4 Claims**

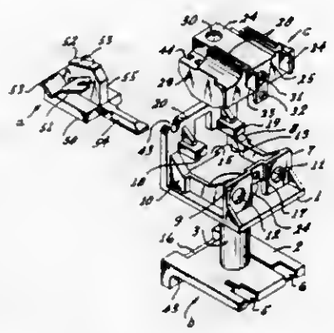


1. A multimodal microwave waveguide window for traversing a metal barrier comprising:
a hollow input taper section having a first and a second end portion, said first end portion having a rectangular cross-section and said second end portion having a circular cross-section.
a cylindrical silica window coupled to said second end portion;
a hollow output taper section having a first and a second end portion, said first end portion having a rectangular cross-section, said second end portion being contiguously disposed against said cylindrical window;
a first pair of "duck-billed" shaped tapers disposed in said input taper for precluding rotation of RF energy;
a second pair of "duck-billed" shaped tapers disposed in said hollow output taper section also for precluding rotation of RF energy;
a quarter wave transforming means disposed between said input taper and said waveguide window for matching impedance between said hollow input taper section and the cylindrical window.

4,032,869
RELAY WITH PIVOTING ARMATURE

Bernhard Dietrich, Eichenau, and Anton Happach, Munich, both of Germany, assignors to Schaltbau Gesellschaft m.b.H., Munich, Germany

Filed Feb. 24, 1976, Ser. No. 660,918
Claims priority, application Germany, Apr. 15, 1975, 2516535
Int. Cl.² H01H 67/02
U.S. Cl. 335—132 **4 Claims**



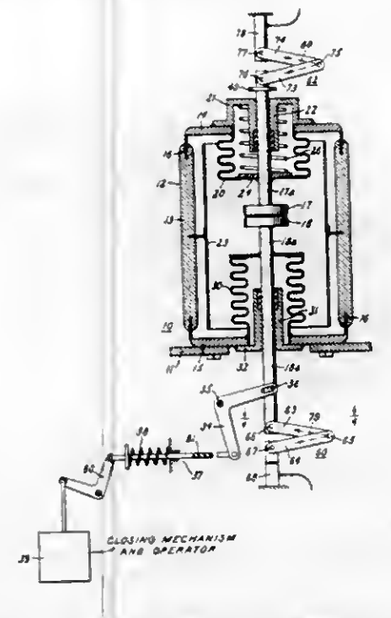
1. In a relay with pivoting armature and first and second contact means cooperating with the armature, a two part support structure comprising:
a coil carrier with a rectangular flange from which extends wall means with apertures for receiving the first set of contacts, the wall means having guide surfaces for support of pivot motion of the armature; and

a head piece being fastened to said carrier adjacent said flange having apertures for receiving the second set of contacts, further having partition means extending towards said flange, the head piece having outside wall means with holders for magnets, which if placed in the holders provide for magnetic blowing.

4,032,870
ELECTRIC CIRCUIT BREAKER WITH ELECTROMAGNETIC-ASSIST MEANS FOR OPPOSING MAGNETIC CONTACT-SEPARATING FORCES

John A. Oppel, Aldan, and Virgel E. Phillips, Springfield, both of Pa., assignors to General Electric Company, Philadelphia, Pa.

Filed Sept. 15, 1975, Ser. No. 613,656
Int. Cl.² H01H 3/42
U.S. Cl. 335—195 **14 Claims**

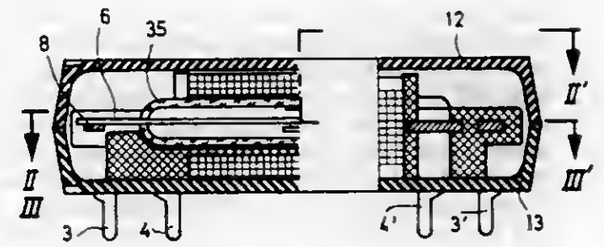


1. An electric circuit breaker comprising:
a. a first contact rod and a first contact fixed thereto,
b. a second contact rod and a second contact fixed thereto, said second contact being movable into engagement with said first contact to close said circuit breaker and movable out of engagement with said first contact to open the circuit breaker and interrupt the circuit therethrough, said second contact remaining in engagement with said first contact while said circuit breaker is in its fully closed position,
c. means for movably mounting said first contact for movement with said second contact: (i) following initial engagement of said contacts during the final portion of closing motion of said contact and (ii) during the initial portion of opening motion of said second contact,
d. first electromagnetic-assist means coupled through said first contact rod to said first contact for developing while said contacts are engaged a magnetic force on said first contact which varies directly in accordance with the current through said contacts and which urges said first contact toward said second contact,
e. second electromagnetic-assist means coupled through said second contact rod to said second contact for developing while said contacts are engaged a magnetic force on said second contact which varies directly in accordance with the current through said contacts and which urges said second contact toward said first contact,
f. and means for blocking motion of said first contact with said second contact after said initial opening motion of said second contact and for preventing during subsequent opening motion of said second contact the transmission of force from said first electromagnetic-assist means to said second contact.

4,032,871
CARRIER FOR CIRCUIT ELEMENTS HAVING CONTACT-MAKING TERMINALS

Hans Sauer, Deisenhofen, Germany, assignor to Hans Sauer, Deisenhofen, Germany and Matsushita Electric Works Ltd., Osaka, Japan, a part interest to each

Filed July 31, 1975, Ser. No. 600,805
Claims priority, application Germany, Feb. 17, 1975, 2506626
Int. Cl.² H01H 9/02
U.S. Cl. 335—202 **14 Claims**

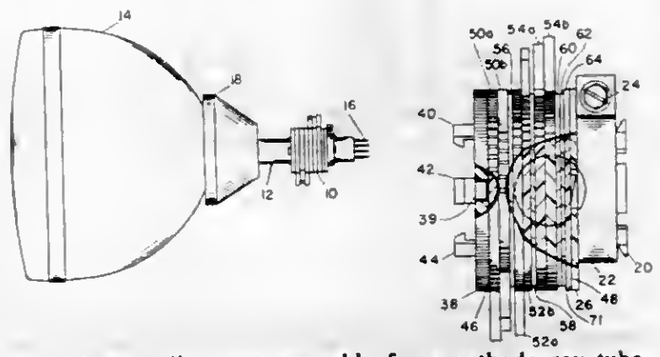


1. A carrier for circuit elements comprising:
a. a frame member of insulating material having terminals embedded therein;
b. said terminals having interior portions for connection to circuit elements within the carrier and exterior portions emerging from opposite sides of the frame member in a single plane;
c. two housing caps mounted on the frame member to enclose the frame member and circuit elements; and
d. said frame member having support surfaces provided on the frame member for the housing caps, the edges of the housing caps contacting said support surfaces and said edges and support surfaces constructed to fit into each other in a stepped manner.

4,032,872
BEAM ADJUSTMENT ASSEMBLY FOR A CATHODE RAY TUBE

Jerrold Kerwin Kratz, and Edward Walter Christensen, II, both of Indianapolis, Ind., assignors to RCA Corporation, New York, N.Y.

Filed Oct. 21, 1975, Ser. No. 624,634
Int. Cl.² H01F 7/00
U.S. Cl. 335—212 **6 Claims**



1. A beam adjustment assembly for a cathode ray tube comprising:
supporting means including a nonmagnetic supporting member having a central aperture for receiving the neck of said tube and a first resilient nonmagnetic collar having cam receiving means and first and second tabs and being in a plane substantially perpendicular to the axis of the neck of the tube; said supporting means further including captivating means for providing a surface substantially

parallel to said first collar and substantially a first distance therefrom;

clamping means positioned on said supporting member for enabling the prevention of movement of said supporting member relative to said tube;

means positioned adjacent said supporting member and between said first collar and said capativating means and having a central aperture therein for receiving the neck of said tube, for providing a plurality of magnetic pole regions adjacent said central aperture thereof to produce magnetic fields in said central aperture; and

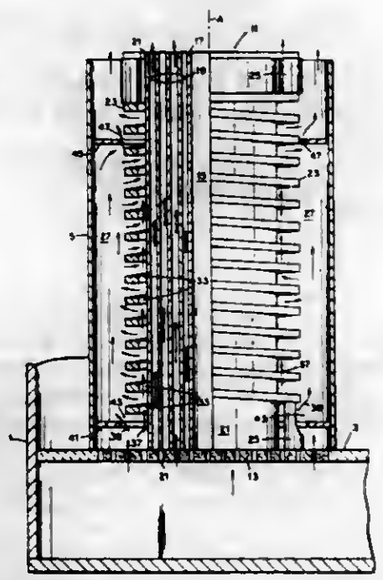
a second nonmagnetic collar having a central aperture therein for receiving the neck of said tube, having camming means and third and fourth tabs, and being positioned between said first collar and said means positioned adjacent said supporting member and in a plane parallel with said first collar, said camming means of said third collar operating in conjunction with said cam receiving means of said first collar for enabling said captivating means and said third collar to provide first forces on said means positioned adjacent said supporting member when said first and third tabs are rotatably aligned and second forces on said means positioned adjacent said supporting member when said second and fourth tabs are rotatably aligned, thereby providing for control of the degree of restraint of the movement of said means postioned adjacent said supporting member relative to said supporting member by alternately applying forces to said first and third tabs and to said second and fourth tabs.

4,032,873

FLOW DIRECTING MEANS FOR AIR-COOLED TRANSFORMERS

Philip A. Jallouk, Oak Ridge, Tenn., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed May 21, 1976, Ser. No. 688,871
Int. Cl.² H01F 27/08
U.S. Cl. 336—57 2 Claims



1. In a system including a transformer having an axis and means for circulating cooling fluid through passages in said transformer extending in the general direction of said axis, said transformer including an inner winding, an outer winding having openings between turns, and an intermediate electrically non-conductive barrier all in nested relation about said axis, said barrier defining with said outer winding an annular axial passage of substantially constant width, an end of said passage constituting an entrance for a first annular stream of said cooling fluid, the improvement comprising:

an electrically non-conductive imperforate tube encompassing said winding to form therewith an axially extending annular chamber for conveying an axially flowing stream of said cooling fluid, said chamber having a width in the range of from 4 to 25 times the width of said axial passage, and

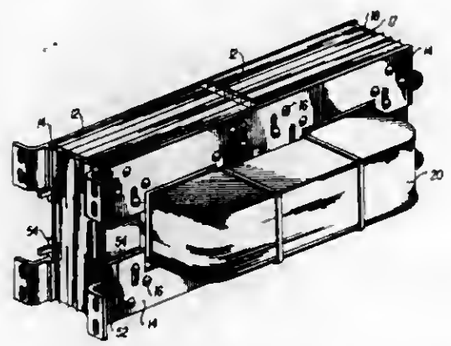
a baffle mounted within said chamber for defining with said outer winding an annular opening for cooling-fluid flow, said opening having a hydraulic diameter approximately equal to the hydraulic diameter of said passage.

4,032,874

REACTOR CORE

Henry W. Kudlacik, and Robert L. Winchester, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Aug. 26, 1975, Ser. No. 607,761
Int. Cl.² H01F 27/26
U.S. Cl. 336—60 6 Claims



1. A laminated air-gap core for a high current reactor comprising:

a. first and second respective oppositely disposed pairs of core legs forming a rectangle, each of said core legs being of a trapezoidal shape so as to define with adjacent legs a plurality of diagonal air gaps devoid of any solid spacers at respective corners of said rectangle;

b. a pair of end plates disposed along opposite sides of each of said first oppositely disposed pair of core legs and extending at right angles therefrom so as to partially extend along the sides of each of said second pair of oppositely disposed core legs and extending across the gaps defined by adjacent core legs and engaging the planar edges of said core legs in flat abutting frictional relationsbip;

c. each of said core legs comprising:

c_1. a plurality of very thin ferromagnetic laminations having said trapezoidal shape and being of a flat planar configuration both before assembly into said core and after assembly and compression therein;

c_2. a plurality of thick planar non-magnetic spacer members having substantially the same shape as said end plates interposed at regular intervals within said core engaging said laminations in flat abutting frictional relationship and separating said laminations of said core legs into a plurality of lamination groups, said spacer members operating to change the pattern of shear-resisting forces applied between said laminations during operation of said reactor so as to reduce the maximum shear-resisting forces between any lamination and any adjacent planar surface by a factor equal to the number of lamination groups created by the interpositioning of said spacer members;

d. means applying a substantially uniform compressive force to each of said first pair of oppositely disposed pair of core legs to apply to the laminations and spacer members thereof a compressive force sufficient to compress said laminations without deformation of the same, said compressive force being sufficient to apply frictional forces between said laminations, said end plates and said spacer members to resist the maximum shear force caused by electrical phenomena during operation of said reactor aid tending to close or deform said air gaps;

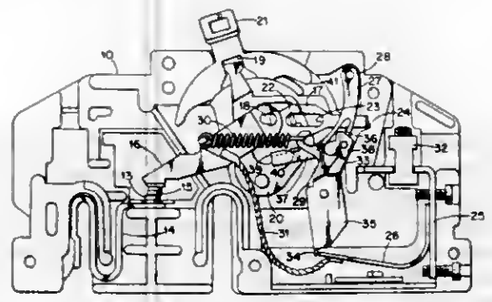
e. means applying a substantially uniform compressive force to each of said second pair of oppositely disposed pair of core legs to apply thereto a compressive force sufficient to establish without deformation of said laminations an equivalent frictional force as is applied to each of said first oppositely disposed pair of core legs.

4,032,875

CIRCUIT BREAKER

Harold E. Beltary, Rio Piedras, P.R., assignor to Caribe Circuit Breaker Co., Inc., San Juan, P.R.

Filed May 27, 1976, Ser. No. 690,664
Int. Cl.² H01H 73/24
U.S. Cl. 337—70 5 Claims



1. A circuit breaker including in combination

a housing of insulating material;

a fixed contact mounted in said housing;

actuating means including a manually movable handle mounted in said housing;

a contact carrier with a movable contact thereon, said contact carrier pivotally engaging said actuating means at a pivot point;

a trip arm pivotally mounted in said housing;

a contact opening arm having one end pivotally mounted on said trip arm;

an overcenter spring connected between said contact carrier and said trip arm;

said actuating means, contact carrier, and overcenter spring forming an overcenter arrangement for closing said contacts when the spring is on one side of said pivot point and for opening said contacts when the spring is on the other side of said pivot point;

said pivot point being in a position with the spring on the one side thereof when said handle is placed in a first position, and being in a position with the spring on the other side thereof when said handle is placed in a second position while said trip arm is in a set position;

an overcurrent latch mechanism engaging said trip arm and maintaining said trip arm in the set position with said spring urging said trip arm toward a tripped position when said contacts are closed; and

a load terminal mounted in said housing;

said overcurrent latch mechanism including a current responsive member connected in circuit between the movable contact and the load terminal;

said overcurrent latch mechanism being operative to disengage said trip arm in response to a predetermined current condition in said current responsive member releasing said trip arm for movement to the tripped position;

movement of the trip arm to the tripped position moving the spring to the other side of said pivot point whereby said overcenter arrangement tends to cause said contacts to open;

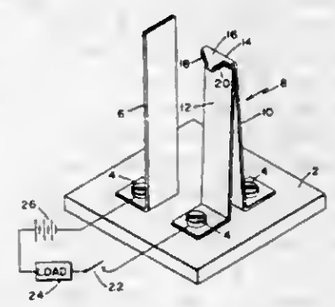
said trip arm forcing the other end of said contact opening arm against the contact carrier during movement of the trip arm to the tripped position to cause opening of said contacts.

4,032,876

AMBIENT-COMPENSATED CIRCUIT BREAKER

Lyndon W. Burch, Boston, Mass., assignor to B/K Patent Development, Inc., Highland Park, Ill.

Filed Oct. 3, 1975, Ser. No. 619,218
Int. Cl.² H01H 71/16
U.S. Cl. 337—75 20 Claims



1. An electrical circuit breaker comprising:

a base;

a first metal strip member having first and second end portions and being mounted on the base by said first end portion, the second end portion including a first electrical contact part, and the second end portion with its electrical contact part being resiliently biased to move from a first latched position to a second unlatched position;

a second metal strip member mounted on the base and comprising at least one pair of divergent legs having their upper ends joined together and their lower ends spread apart to form a triangle on the base, said lower ends being fixed on the base to maintain the divergence of said legs; the upper end portion of at least one of said legs including a second electrical contact part, the second electrical contact part being adapted to latch with and be in electrical engagement with the first electrical contact part when in the first latched position;

said first and second contact parts being electrically open when the first member is in its second unlatched position;

means for moving said second end from its second unlatched position into said first latched position in which said contact parts are electrically engaged; and

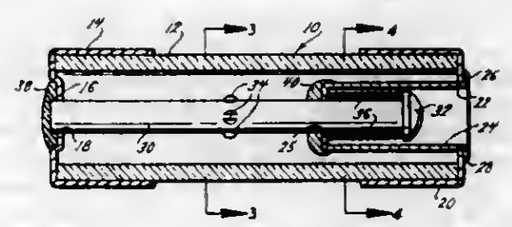
means for making electrical circuit connections to the first end of the first member and to the lower end of said one of the divergent legs.

4,032,877

PROTECTOR FOR ELECTRIC CIRCUITS

Craig L. McAlister, deceased, late of Florissant, Mo. (by George Roxton McAlister, executor), assignor to McGraw-Edison Company, Elgin, Ill.

Filed May 3, 1976, Ser. No. 682,649
Int. Cl.² H01H 71/20, 37/76
U.S. Cl. 337—148 13 Claims



1. A circuit-controlling device which can be incorporated into an electric circuit to open said electric circuit whenever the temperature of said circuit-controlling device reaches a

predetermined value and which comprises a housing, a first terminal adjacent one end of said housing, a second terminal adjacent the other end of said housing, and elongated recess in said first terminal, said first terminal having an opening in the inner end of said recess, said second terminal having an opening therein, an elongated current-conducting member which is disposed within said housing and which remains un-fused throughout the operation of said circuit-controlling device and throughout the opening of said electric circuit whenever the temperature of said circuit-controlling device reaches said predetermined value, said elongated current-conducting member having a portion thereof normally lodged within said opening at said inner end of said recess in said first terminal, said elongated current-conducting member having another portion thereof extending from said opening at said inner end of said recess in said first terminal to said opening in said second terminal and having one end of said other portion lodged within said opening in said second terminal, said elongated current-conducting member having a further portion thereof extending from said opening at said inner end of said recess in said first terminal into said recess in said first terminal, a spring which biases all portions of said elongated current-conducting member for movement relative to said housing and thereby biases said end of said other portion of said elongated current-conducting member for movement away from said opening in said second terminal to open said electric circuit and also biases said further portion of said elongated current-conducting member for movement outwardly of said recess in said first terminal and hence for movement from a normally-retracted position toward an extended position, a mass of heat softenable material which normally provides a mechanical connection, and normally helps provide an electrical bond, between said other portion of said elongated current-conducting member and said second terminal, and a second mass of heat softenable material which normally provides a mechanical connection, and normally helps provide an electrical bond, between the first said portion of said elongated current-conducting member and said first terminal, said masses of heat softenable material and said elongated current-conducting member holding said electric circuit closed as long as the temperature of said circuit-controlling device does not exceed said predetermined value, both of said masses of heat softenable material responding to a temperature above said predetermined value to soften and thereby permit said spring to move all portions of said elongated current-conducting member axially relative to said housing and thereby move said other portion of said elongated current-conductint member away from said second terminal to open said electric circuit and also to move said further portion of said elongated current-conducting member to said extended position.

4,032,878

CARTRIDGE FUSE CARRIER ASSEMBLY

Pierluigi Ranzanigo, Brescia, Italy, assignor to Bassani S.p.A., Milan, Italy

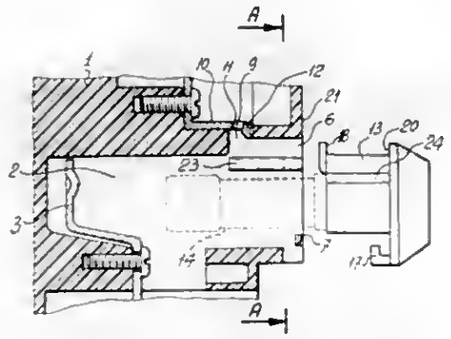
Continuation-in-part of Ser. No. 456,278, March 29, 1974, Pat. No. 3,936,787. This application Jan. 22, 1976, Ser. No. 651,394

Claims priority, application Italy, Feb. 6, 1975, 19996/75; May 30, 1973, 24840/73

Int. Cl.² H01H *85/14*

U.S. Cl. 337—228 **8 Claims**

1. A cartridge fuse carrier assembly comprising: a housing; first and second connection terminals for connecting the assembly into an electrical circuit; a recess in the housing for receiving a cartridge fuse; a first contact member in the recess and having an electrical connection with the first terminal; an insulating cap for closing the recess, to secure the cartridge fuse therein; a second contact member in the housing and having an electrical connection with the second terminal; an electrically conducting member carried by the cap for cooperating with a first end member of the cartridge fuse, to provide an electrical connection between the first end member of the cartridge fuse and the second contact member; and engagement means on the cap co-operable with the housing for securing the cap at the opening of the recess, by displacement of the cap carrying the cartridge fuse in the axial direction of the recess whereby a second end member of the fuse is brought into abutment against said first contact member, and then displacement of the cap in a second rectilinear direction transverse with respect to the axial direction of the recess to bring the engagement means into the cap-securing position, an internal surface of the recess and a surface of the cap which in the cap-secured position lies adjacent said surface of the



recess providing a co-operable rib and groove arrangement, with the rib and the groove being displaced relative to each other transversely of the axial direction of the recess, when the cap is at the end of said axial displacement, by a distance at least substantially equal to the extent of said second rectilinear movement of the cap whereby when the cap is axially introduced into the recess the rib and the groove are not engaged with each other but when said second rectilinear movement is effected the rib and the groove engage into each other with a snap action.

4,032,879

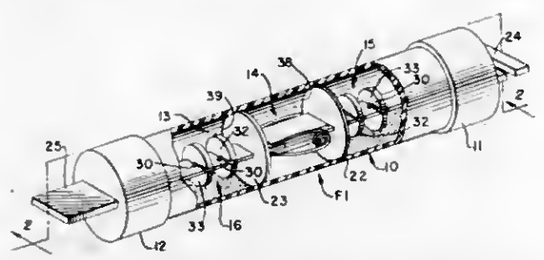
CIRCUIT-PROTECTING FUSE HAVING ARC-EXTINGUISHING MEANS

Elmer J. Monagan, Jamestown, N.Y., assignor to Teledyne, Inc., Los Angeles, Calif.

Filed Nov. 18, 1975, Ser. No. 632,951

Int. Cl.² H01H *85/38*

U.S. Cl. 337—278 **19 Claims**



1. A circuit-protecting fuse, comprising: an insulating housing having a longitudinal axis and having electrically conductive connector means on opposite ends thereof to connect the fuse in an electrical circuit; at least one short circuit section in said housing, connected in electrically conductive relationship at opposite ends thereof with the connector means, said short circuit section having at least one area defining a heat-generating fusible link; a non-conducting arc blocking member of a material which produces a deionizing gas when heated to a predetermined temperature positioned at said fusible link in close proximity thereto and covering substantially only the fusible link to block laterally of the longitudinal axis of the housing any arc which tends to form under an overload condition of predetermined magnitude in a circuit in which said fuse is connected, whereby the fusible link melts and vaporizes, and the heat thus produced causes the arc blocking member to generate an amount of deionizing gas to extinguish any arc which forms at the vaporized section; and closure means sealed on the ends of the housing to contain the deionizing gas whereby any arc which forms is quickly extinguished.

4,032,880

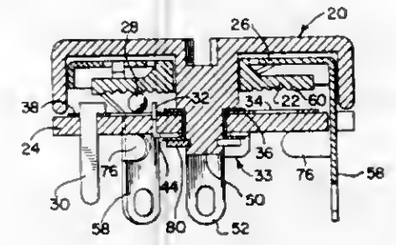
ELECTRICAL DEVICE

Aldo Di Michele, Chicago; John D. Gallas, Roselle, and Frank W. Grimm, Chicago, all of Ill., assignors to Drestech Corporation, Chicago, Ill.

Filed Mar. 8, 1976, Ser. No. 664,707

Int. Cl.² H01C *10/28*

U.S. Cl. 338—157 **12 Claims**



1. In an electrical device including at least one first terminal, at least one second terminal, a movable contact, and spaced-apart conductors connected to the respective terminals, said movable contact bridging the opposed conductors to complete a circuit between the first and second terminals, said movable contact comprising a conductive ball engaging the surface of one of said conductors; and said other conductor being mounted for rotation relative to said one conductor, the improvement wherein the surface of said one conductor is substantially smooth, said other conductor comprising a drive means for said ball, a grooved path defined by said other conductor, said path extending around the axis of rotation of the other conductor and deviating radially relative to said axis, said ball being held on said grooved path, and means for rotating said other conductor whereby said ball rolls on said surface in response to movement of the other conductor, the path of movement over said surface being controlled by said grooved path.

4,032,881

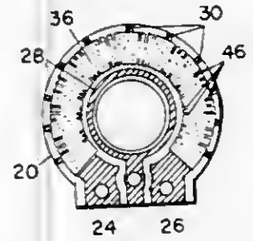
RESISTANCE ELEMENT WITH IMPROVED LINEARITY AND METHOD OF MAKING THE SAME

Delbert Lowell Singleton, Riverside, Calif., assignor to Bourns, Inc., Riverside, Calif.

Filed Feb. 6, 1976, Ser. No. 656,039

Int. Cl.² H01C *10/00*

U.S. Cl. 338—195 **10 Claims**



1. In a potentiometer having an insulative substrate, a resistance element deposited thereon, a collector, a wiper means electrically connecting said element and collector, and termination means associated respectively with said element and collector, wherein the improvement comprises:

resistance adjusting means for trimming said resistance element including a plurality of spaced conductive pads fixedly distributed along said substrate in intimate electrical contact with said resistance element, each of said pads presenting a contact area for a trimming probe, and

said resistance element being trimmed to predetermined resistance values between each of said pads.

4,032,882

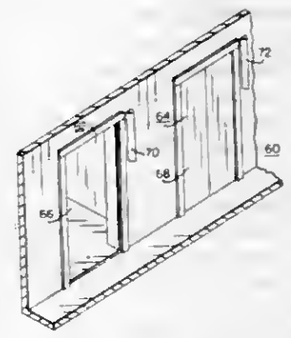
ELEVATOR SYSTEM

Alan F. Mandel, Pittsburgh, Pa.; Louis M. Capuano, Westfield; Theodore E. Frask, Wayne, both of N.J., and Denis E. Bedel, Pittsburgh, Pa., assignors to Westingbouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 17, 1976, Ser. No. 658,931

Int. Cl.² G08B *5/36*

U.S. Cl. 340—19 R **19 Claims**



1. An elevator system, comprising: a building having a plurality of floors,

an elevator car mounted for movement in said building to serve the floors,

control means for selecting the service direction in which said elevator car will proceed from a floor it is serving,

and display means having an array of electrically energizable elements,

said display means including pattern selection means responsive to said control means,

said pattern selection means selectively energizing said elements while said elevator car is serving a floor to provide a predetermined sequence of at least three different patterns which visually indicate the selected service direction.

4,032,883

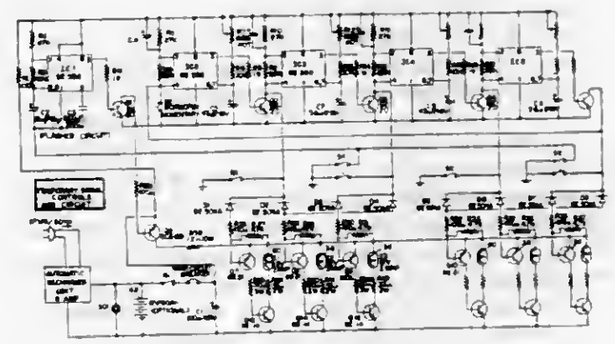
PORTABLE TRAFFIC SIGNAL

Prestoo H. Gibson, 129 Anarece Ave., Auburndale, Fla. 33623

Continuation-in-part of Ser. No. 483,770, June 27, 1974, and a continuation-in-part of Ser. No. 582,935, Juoe 2, 1975. This application Dec. 5, 1975, Ser. No. 637,882

Int. Cl.² B60Q *1/00*; **G08G** *1/00*

U.S. Cl. 340—41 A **1 Claim**



1. A portable traffic signal comprising:

a. a cabinet having a box-like configuration with a top portion (34), an oblong vertical lamp means assembly

(24) in said cabinet, said lamp means assembly (24) including a base (25) and a telescoping support (28), a cover (30) and a handle (32) so that the assembly (24) may be extended and retracted, said cover when retracted assuming a position substantially co-planer with said top portion (34);

b. a pair of red, amber and green signal lamp means (36, 38, 40) with double lens before each lamp means disposed in said lamp assembly, one pair over the other and so disposed that each lamp means of one pair directs light signals in a direction which is substantially at right angles to the other signals emitted by the other lamp means, one lamp means of each pair of the red, amber and green lamp means constituting a first set, the other lamp means of each pair of red, amber and green lamp means constituting a second set;

c. a lamp circuit including first and second wires, the three lamp means (36, 38, 40) of the first set being in parallel between said wires in sequence, the three lamp means of the second set being likewise in parallel between said wire in the same sequence, said first and second sets therefore forming six parallel circuits, a bias resistor in each parallel circuit and lamp driving transistor means (Q13, Q14, Q15) with diodes (D1 through D8) in each parallel circuit said bias resistors and lamp driving transistor means being in series with said lamp means;

d. a timing circuit coupled to each lamp means including third and fourth wires, first, second, third, fourth and fifth integrated circuits, (IC2, -3, -4, -5) between said third and fourth wires, each integrated circuit being a six-pin timing module including an output pin, a timing RC circuit in parallel with and coupled to each of said integrated circuits, said first integrated circuit being a flasher circuit, first, second, third, fourth and fifth gate transistor means, one being coupled to each integrated circuit output pin and a plurality of said lamp driver transistors via first through eight diodes (D1 through D8); and,

e. DC lead lines for connecting powe across said first, second, third and fourth wires, a first on-off switch in said lead lines, a switching transistor (Q6) and a first power circuit resistor (R1) to said third and fourth wires and a second power circuit resistor (R50) to said first and second wires, a second switch in said timing circuit which is normally opened but will start the timing cycle when momentarily closed, third through sixth switches (S3 through S6) one being connected to each of said second, third, fourth and fifth transistor gate means (Q2 through Q5), whereby,

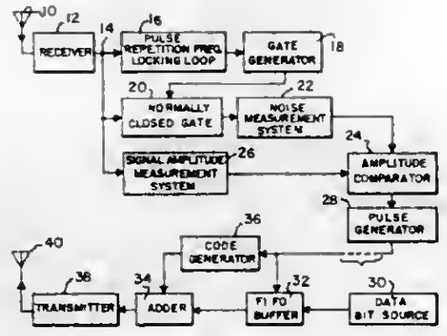
f. when the on/off switch is closed, DC power is applied to the circuit via the switching transistor and the power circuit resistors (Q1, R1 and R50) with the fourth and sixth switchea open, the first integrated circuit (IC1) is lifted above ground leaving the output pin thereof positive into the gate of its gate transistor (Q1), acting as an inverter/amplifier, the collector goes negative into the base of the switching transistor (Q6) acting as an inverter/switch driving the collector positive, turning on the power to the lamp drivers and lamp means through the power circuit resistor (R50), momentarily closing second switch (S2) will pull pin four to ground and pin two toward ground, pin four resetting the second integrated circuit (IC2) and pin two triggering this integrated circuit to start timing, upon releasing the second switch (S2), the circuit will start the timing cycle, driving pin three positive into the base of its gate transistors (Q2) acting as an inverter amplifier, driving its collector negative through diodes (D1 and D2) into the lamp driver transistors turning on the first and second lamp means (I1, I2), the second gate collector going negative and pulls that third integrated circuit (IC3) pin four to ground and pin two towards ground, resetting and triggering the third integrated circuit (IC3), as long as the second gate transistor (Q2) collector and pin 4 remain at ground potential, third integrated circuit (IC3) is off and not timing, but, as soon as the timing cycle of the second integrated circuit is ended, pin 3 goes negative and second gate transistor (Q2) goes positive, the third integrated circuit (IC3) starts timing, pin 3 goes positive, the next transistor (Q4) collector goes negative through diodes (D3, D4), first lamp means (I1) goes off and third lamp means (I3) comes on but second lamp means (I2) remains on via a fourth diode (D4) being connected to the anode of second diode (D2), said on/off timing cycles carrying on until switched off.

4,032,884

ADAPTIVE TRUNK DATA TRANSMISSION SYSTEM

Frank S. Gutleber, Little Silver, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 24, 1976, Ser. No. 660,967
Int. Cl.² G08C 25/00
U.S. Cl. 340—146.1 E **7 Claims**



1. In a data transmission system employing a tropospheric scatter communications link as a communications medium, apparatus comprising:

first means for measuring a propagation characteristic of said communications link to determine the error rate thereof; and

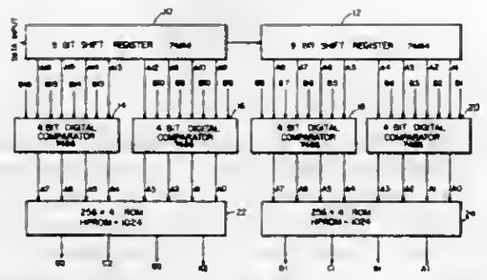
second means continuously operative in connection with said first means to interrupt transmission of data in real time via said tropospheric scatter link when said measured propagation characteristic is indicative of an error rate of said link in excess of a predetermined value, said second means including means for delaying the transmission of the interrupted data to be transmitted until said measured propagation characteristic is indicative of an error rate not in excess of said predetermined value.

4,032,885

DIGITAL CORRELATOR

Albert Roth, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 1, 1976, Ser. No. 662,794
Int. Cl.² H03K 5/18
U.S. Cl. 340—146.1 AX **9 Claims**



1. A digital correlator comprising:

a. shift register means for receiving input data words,

b. digital comparator means having first inputs connected to the outputs of said shift register and second inputs for receiving an input reference word for comparing the pattern of bits of said data words with the pattern of bits of said reference word and providing 0 outputs for bits that match and ones for bits that are mismatched,

c. first read only memory means coupled to the output of said digital comparison means for generating a coded binary number equal to the number of ones outputted from said comparison means,

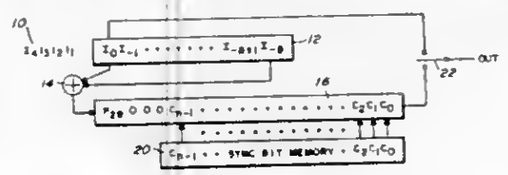
d. second read only memory means connected to the output of said first read only memory means and having a plurality of output signals representing the number of errors detected in the comparison of said data word with said reference word.

4,032,886

CONCATENATION TECHNIQUE FOR BURST-ERROR CORRECTION AND SYNCHRONIZATION

John En, Palatine, and Albert Joseph Leitich, Chicago, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 1, 1975, Ser. No. 636,472
Int. Cl.² G06F 11/12
U.S. Cl. 340—146.1 AQ **12 Claims**



1. In a digital communication system, an encoder comprising:

means for encoding an information bit stream and producing a data bit stream, said data bit stream comprising a predetermined number of reference level bits, said data bit stream further comprising a predetermined number n of sync bits; said encoder further comprising concatenation means for replacing n of said reference level bits with said sync bits.

4,032,887

PATTERN-RECOGNITION SYSTEMS HAVING SELECTIVELY ALTERABLE REJECT/SUBSTITUTION CHARACTERISTICS

David C. Roberts, Rochester, Minn., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 374,612, June 28, 1973, abandoned.
This application Nov. 29, 1974, Ser. No. 528,377
Int. Cl.² G06K 9/00
U.S. Cl. 340—146.3 ED **8 Claims**

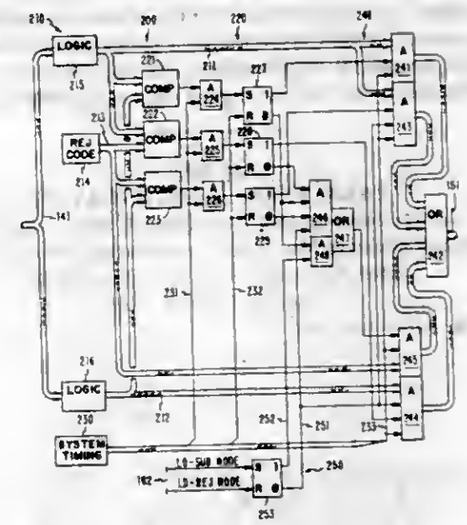
1. In a pattern-recognition system having a detector for converting an input pattern into electrical signals, means for selectively altering the reject/substitution characteristics of said system, comprising:

a plurality of recognition means having inputs coupled in parallel to said detector for producing a plurality of mutually independent recognition codes each representing an identity of said input pattern;

comparison means coupled to said recognition means, for producing comparison signals indicative of the relationship of said recognition codes to each other and to a reject code;

control means for receiving a plurality of reject/substitution mode signals; and

output gating means coupled to both said comparison means and to said control means, for selecting among one



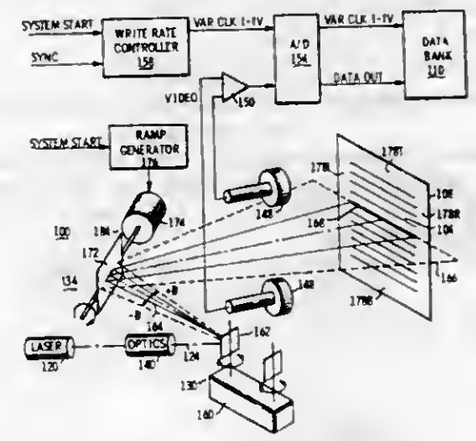
of said recognition codes and said reject code in response both to said comparison signals and to said mode signals.

4,032,888

NONLINEAR SCAN DRIVE READER WITH VARIABLE CLOCK CORRECTION

Douglas Wright Broyles, San Jose, and Troy Cecil Stark, Campbell, both of Calif., assignors to The Singer Company, Binghamton, N.Y.

Filed Dec. 15, 1975, Ser. No. 640,362
Int. Cl.² G06K 9/00
U.S. Cl. 340—146.3 F **15 Claims**



1. A scanner for reading record data from a record medium by scanning the record medium with an energy beam to provide a digital data output flow with a nonlinear bit density, comprising:

a mechanical oscillator means having a sinusoidal displacement characteristic;

energy-directing means responsive to the sinusoidal displacement of the oscillator means for causing the energy beam to scan in a predetermined pattern across the record medium causing the energy of the beam to become modulated by the record data at a modulation density directly proportional to the scanning velocity of the energy beam;

energy sensor means for detecting the modulated energy for providing a correspondingly modulated analog signal;

analog to digital means responsive to the modulated analog signal for providing a correspondingly modulated digital data output flow having a flow rate directly proportional

to the relative scan motion between the energy beam and the record medium; and

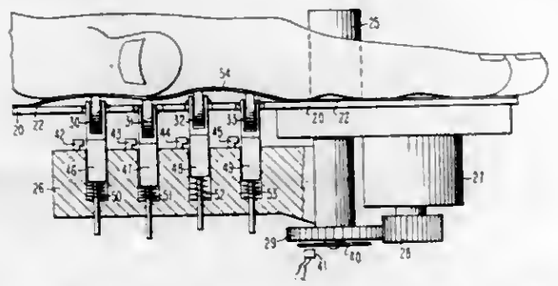
controller for providing a variable clock to accompany the digital data output flow having a series of predetermined constant pulse frequencies for predetermined segments of the sinusoidal displacement for approximately matching the clock rate to the digital data output flow rate.

4,032,889

PALM PRINT IDENTIFICATION

Ernie George Nassimbene, Los Gatos, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed May 21, 1976, Ser. No. 688,802
Int. Cl.² G06K 9/00
U.S. Cl. 340—146.3 E **11 Claims**



1. Apparatus for characterizing an individual based upon the spacing of at least two preselected lines on a human palm, comprising

scanning probe means translatable with respect to a scan line and in contact with a surface of said palm;

said scanning probe means including transducer means for generating output signals representative of the pattern of skin lines along said scan line; and

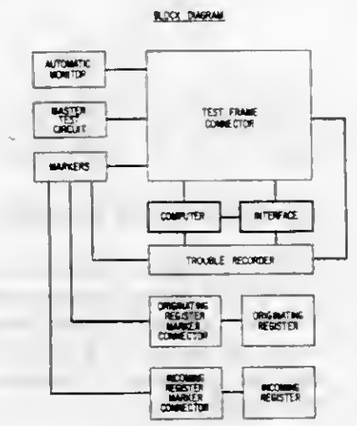
transducer means responsive to the movement of said scanning probe means normal to said scan line for generating output signals representative of the gross surface profile of the palm along said scan line.

4,032,890

ARRANGEMENT FOR CONTROLLING SEIZURE OF A CONNECTOR

Lester Ray Gilfilleo, Columbus, Ohio; Edward Nicholas Shipley, Holmdel, N.J., and Ray Keith Zies, Reynoldsburg, Ohio, assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 16, 1976, Ser. No. 696,748
Int. Cl.² H04M 3/22; H04Q 9/00
U.S. Cl. 340—147 C **17 Claims**



1. An arrangement for controlling seizure of a connector, wherein a connector seizure circuit is provided for recognizing an attempt to effect normal seizure of the connector, and wherein the seizure circuit is responsive to a recognized normal seizure attempt to permit normal seizure, the arrangement comprising:

A. means independent of the seizure circuit for registering an attempt to effect special seizure of the connector;

B. special means rendered effective by the registering means, while a special seizure attempt is registered therein, for detecting a normal seizure attempt while preventing recognition thereof by the seizure circuit;

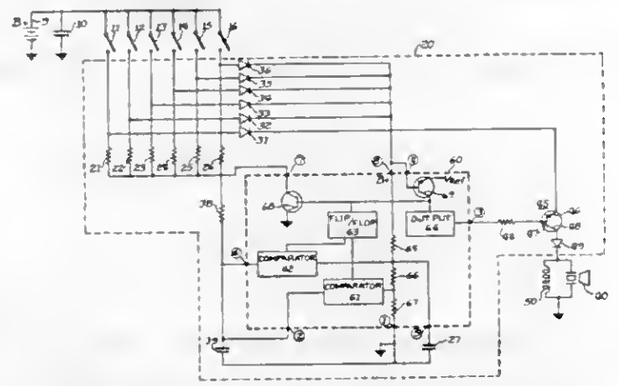
C. and, means controlled by the effective special means, incident to detection of a normal seizure attempt, to remove the registration from the registering means so as to allow normal seizure attempt recognition by the seizure circuit.

4,032,891

SIGNAL TRANSMITTER USING AN ACTIVE THICK FILM SUBSTRATE

Robert R. Podowski, Elmhurst, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

Division of Ser. No. 592,582, July 2, 1975. This application Sept. 2, 1976, Ser. No. 719,761
Int. Cl.² G08B 3/00
U.S. Cl. 340—148 **3 Claims**



1. An active thick circuit having connection terminals and adapted for use in a portable transmitter for producing a plurality of output signals of different frequency in response to closure of a corresponding plurality of external switches comprising:

a nonconductive substrate;

integrated circuit pulse means on said substrate;

a plurality of resistors deposited on said substrate and connected between said terminals and said pulse means;

a plurality of diodes on said substrate and connected between said terminals and said pulse means; and

a timing circuit including a capacitor cooperating with said resistors for adjusting the pulse rate of said pulse means in accordance with the operation of said external switches.

4,032,892

SEMICONDUCTOR SPEECH CHANNEL SWITCH

Mitsuo Matsuyama, Yokohama, and Shinzi Okuhara, Fujisawa, both of Japan, assignors to Hitachi, Ltd., Japan

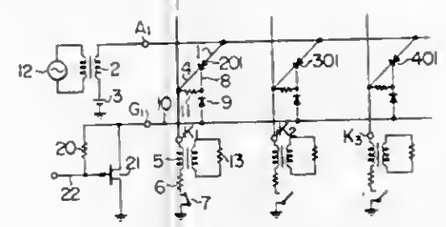
Filed Dec. 22, 1975, Ser. No. 642,719
Claims priority, application Japan, Dec. 27, 1974, 49-148619
Int. Cl.² H04Q 3/50
U.S. Cl. 340—166 R **10 Claims**

1. In a semiconductor speech path switch arrangement for selectively connecting a transmitting circuit, which is connected to a prescribed row line of a matrix made up of m rows and n columns of signal transmission lines where m is an integer and n is an integer greater than 1, to a receiving circuit connected with one of the column lines of signal transmission lines, said arrangement including

an mxn matrix of PNPN switching elements, each element having an anode connected to a respective row line, a

cathode connected to a respective column line, and a control gate for receiving a control signal to render said element conductive to interconnect the row line and the column line to which said element is connected and thereby provide a signal transmission path from a transmitting circuit through said matrix to a receiving circuit, and

a number m of control gate lines respectively connected through diodes to the control gate of the m rows of said PNPN switching elements, by way of which said control signal is applied to control gate of the PNPN switching elements;



the improvement comprising

switching means, connected to each respective control gate line and having respective input terminals to which control signals are applied, for coupling a respective control signal to a respective control gate line to thereby render a selected switching element conductive only during the application of a control signal to a respective input terminal, and for otherwise providing a low impedance shunt path for signals appearing on a respective control gate line away from the diodes connected to the control gates of a respective row of switching elements.

4,032,893

RECONFIGURABLE DATA BUS

Donald Martin Moran, Burnsville, Minn., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Jan. 23, 1976, Ser. No. 651,770
Int. Cl.² H04J 3/14; H04Q 9/00
U.S. Cl. 340—166 R **8 Claims**

1. A reconfigurable data bus transmission system for electrically reconfiguring the data bus structure established by the physical interconnections of a network of physically fixed digital data buses interconnecting a plurality of digital nodal communication devices, comprising in combination:

A. a plurality of digital data buses;

B. a plurality of digital nodal communication devices adapted to be coupled to selected ones of said digital data buses;

C. a plurality of digital reconfigurable data bus modules, one for each of said plurality of digital nodal communication devices, adapted to be connected intermediate to said digital data buses and said digital nodal communication devices, each of said digital reconfigurable data bus modules including:

a. at least one set of bus communication ports capable of receiving and transmitting digital information to and from said digital data buses,

b. a set of device communication ports capable of digital data communication to and from said digital nodal communication device, and

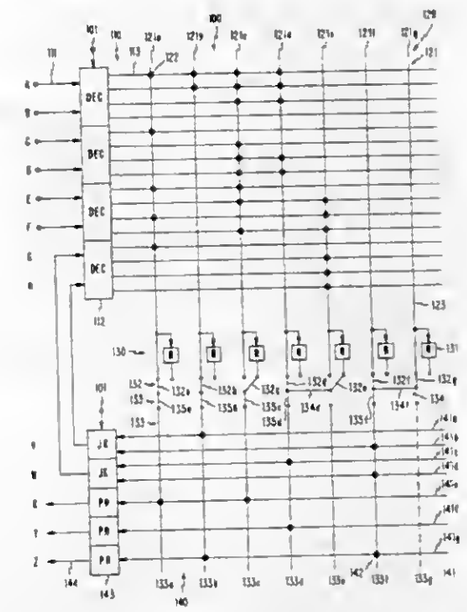
c. a switching means capable of the simultaneous and independent establishment of a plurality of connections, each of said connections consisting of the switching of data between at least one of said set of bus communication ports and said set of device communication ports.

4,032,894

LOGIC ARRAY WITH ENHANCED FLEXIBILITY

Robert Russell Williams, Rochester, Minn., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed June 1, 1976, Ser. No. 691,807
Int. Cl.² H03K 19/08; H04Q 9/00
U.S. Cl. 340—166 R **6 Claims**



1. In a programmable logic array chip including a search array for providing a set of search signals on respective ones of a plurality of output columns, said output columns being selectively connectable to a plurality of input rows, and a read array for providing a set of output signals on a plurality of output rows, said output rows being selectively connectable to a plurality of input columns,

the improvement comprising:

a complement array having means for providing both true and complement forms of each of said search signals, and having means for selectively coupling one of said forms of each of said search signals to said input columns.

4,032,895

ELECTRONIC DATA PROCESSING COMPUTER

Lucio Lanza, Milan, and Francesco Giovanni Vecchio, Catania, both of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Filed Aug. 14, 1975, Ser. No. 604,575
Claims priority, application Italy, Aug. 21, 1974, 69573/74
Int. Cl.² G06F 13/00, 9/16, 9/20; G11C 7/00
U.S. Cl. 364—200 **19 Claims**

1. In an electronic computer comprising:

a first memory for recording instructions and data to be processed;

a second memory having microinstructions recorded therein;

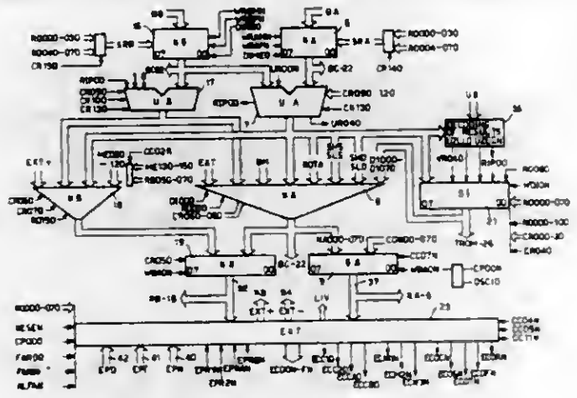
first addressing means receptive of an instruction from said first memory for addressing said second memory to provide a succession of microinstructions associated with the received instruction;

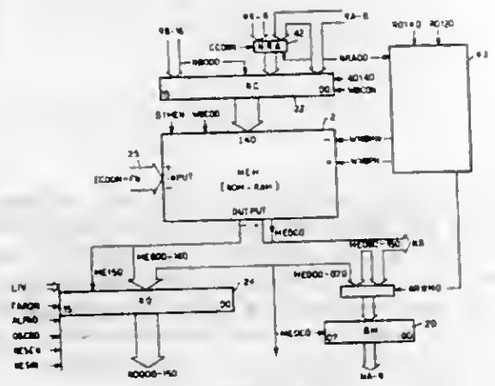
a third memory having a plurality of bit words stored therein, each word including a first and a second group of signals;

second addressing means receptive of a microinstruction from said second memory for addressing said third memory to provide at least one word associated with the received microinstruction;

processing means receptive of data from said first memory for processing same and including operation control means controlled by the signals of the first group for performing logic and arithmetic operations on said data

according to the signals of said first group and a plurality of registers having means controlled by the signals of the second group for effecting the selective connection of each to the input and to the output of said operation control means and to said first memory for reading micro-instructions stored therein and to said second memory for





reading instructions and data and for storing the results of said operations; and

means controlled by the signals of the second group including timing means for transmitting in succession said second group of signals to said registers for timing the transfer of data and operation results between said operation control means, said registers and said memories.

4,032,896

MICROPROCESSOR HAVING INDEX REGISTER COUPLED TO SERIAL-COUPLED ADDRESS BUS SECTIONS AND TO DATA BUS

Thomas H. Bennett; Earl F. Carlow, both of Scottsdale; Anthony E. Kouvoussis, Phoenix, all of Ariz.; Rodney H. Orgill; Charles Peddle, both of Norristown, Pa., and Michael F. Wiles, Phoenix, Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

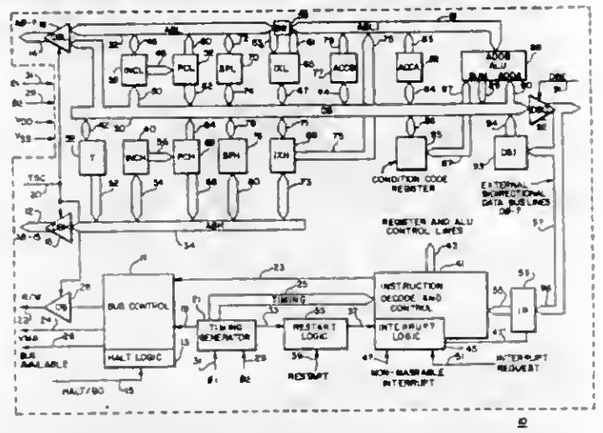
Division of Ser. No. 519,150, Oct. 30, 1974. This application Sept. 17, 1975, Ser. No. 614,032

Int. Cl.² G06F 9/20

U.S. Cl. 364—200 **1 Claim**

1. A method of operating a processor comprising the steps of:

1. storing first information representative of a first address in a first register and transmitting said first information to a first bus to effect addressing a first memory location represented by said first address, said first bus being an address bus;
2. transmitting said first information representative of said first address by means of said first bus to an arithmetic means and temporarily retaining said first information in said arithmetic means;
3. modifying said retained first information by means of said arithmetic means during said addressing of said first location to obtain second information representative of a second address;
4. reading information from or writing information into said first memory location by means of a data bus, depending on whether a read operation or a write operation is to be executed;
5. transmitting said second information to said first register;
6. transmitting said second information to said first bus from said first register to effect addressing a second memory location represented by said second information;



7. transmitting said first information from said first bus to a second bus by means of switching means coupling said first and second buses during said addressing of said first location; and
8. performing an arithmetic operation on said first information on said second bus and third information present on said data bus prior to said transmitting of said second information to said first bus.

4,032,897

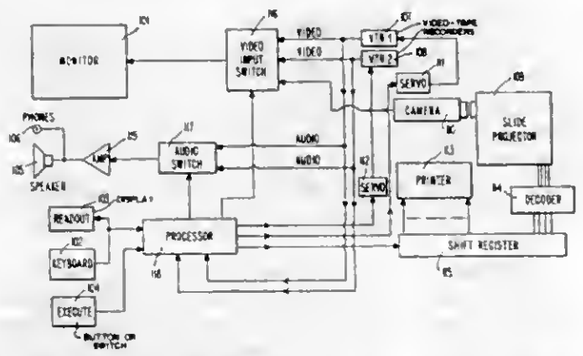
INTERACTIVE AUDIOVISUAL DISPLAY SYSTEM

Charles K. Pooley, Van Nuys, Calif., assignor to National Board of Medical Examiners, Philadelphia, Pa.

Filed Nov. 18, 1975, Ser. No. 632,976

Int. Cl.² G06F 1/00; G11B 15/18

U.S. Cl. 364—900 **21 Claims**



1. An interactive audiovisual display system comprising:

videotape means for storing a plurality of video segments, randomly accessible for display, each segment being identified with a code corresponding to the position of the segment on a tape relative to a predetermined datum position on said tape;

means for displaying to the user a plurality of options corresponding respectively to select ones of said segments;

user selection means for designating a preferred option from said plurality of options presently displayed;

a source of coded control signals, said singals including frames of data associated respectively with the options presented the user by said means for displaying, each frame including the identification of the location of a select segment to be next executed at said videotape means in response to user selection of the option associated with said each frame; and

control means responsive to said user selection means and to said source of coded signals, said control means being responsive to the location identification from the frame associated with the preferred option, for controlling said videotape means to advance the tape from its present location to said location identification, said control means including means for monitoring the instantaneous speed and location of the tape while advancing, and means for varying the acceleration rate of the tape in response to the relative magnitudes of the instantaneous tape speed and the distance to go to said location identification.

4,032,898

INTERFACE CONTROL UNIT FOR TRANSFERRING SETS OF CHARACTERS BETWEEN A PERIPHERAL UNIT AND A COMPUTER MEMORY

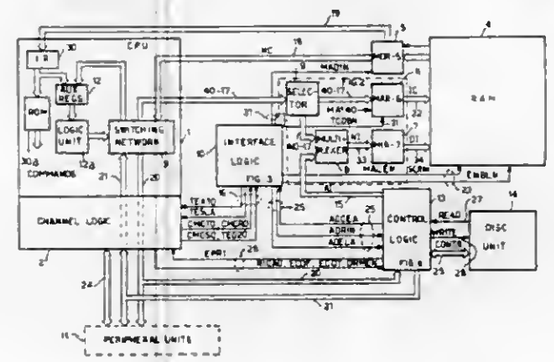
Giorgio Grigoletti, Milan, Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Filed Dec. 10, 1975, Ser. No. 639,402

Claims priority, application Italy, Mar. 6, 1975, 67565/75

Int. Cl.² G06F 3/00

U.S. Cl. 364—200 **5 Claims**



1. An electronic computer comprising:

a working memory for recording instructions and data;

a central processing unit for executing the instructions recorded in said memory, said instructions comprising input/output instructions;

a peripheral unit for writing and reading information on a recording carrier; and

a peripheral interface comprising:

a control unit actuated by control signals generated by said processing unit by decoding said input/output instructions for controlling the transfer of sets of information characters of predefined length between said working memory and said peripheral unit, said control unit including a control circuit for generating a first command signal when a set of characters is ready to be transferred;

a first channel for connecting said peripheral unit to said working memory by way of a connecting network including said central processing unit;

a second channel for connecting said peripheral unit directly to said working memory;

and switching means controlled by said control unit for transferring the first character of said sets over said first channel to the working memory and the remaining characters of the set over said second channel to said working memory, said switching means including means for connecting said first channel normally to said working memory and to actuate the connection of said second channel to said working memory.

4,032,899

APPARATUS AND METHOD FOR SWITCHING OF DATA

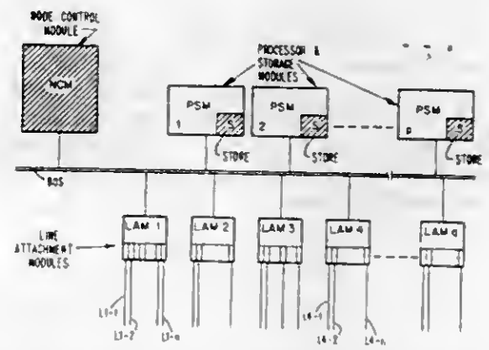
Christian Jakob Jenny, Thalwil, and Karl Albert Kuemmerle, Siebnen, both of Switzerland, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 19, 1976, Ser. No. 650,473

Claims priority, application Switzerland, May 5, 1975, 5781/75

Int. Cl.² G06F 15/16

U.S. Cl. 364—200 **12 Claims**



1. For switching data in store-and-forward mode, between any two of a multiplicity of ports, a plurality of switching processor modules each variously connectible with any of said ports and each characterized in that it comprises:

means allocatable for storing data in packet units subject to variably delayed forward retransmission;

means for allocating said storing means in response to requests for allocation;

means for designating packet storage allocations of said storing means and forward scheduling assignments of said modules relative to said ports, and routing information;

input transfer means for transferring data from any port, relative to which the respective module has been assigned packet storage responsibility, to a location in the respective storing means designated by said designating means;

means for developing and exchanging supervisory information with other said modules relative to: a) the status of packet storage in the storing means of the respective and other modules; and b) the status of availability, for forward transfers, of certain of said ports for which the respective module has exclusive assignment for forward scheduling and of others of said multiplicity of ports for which the other modules have exclusive assignments for forward scheduling; and

output transfer means for forward transferring each data packet stored in the respective storing means to a said port designated by said routing information designated by said designating means when the designated port is indicated to be available by availability status information provided by operation of said developing and exchanging means.

4,032,900

APPARATUS FOR DISTINGUISHING HEADING INFORMATION FROM OTHER INFORMATION IN AN INFORMATION PROCESSING SYSTEM

Toshio Kashio, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Nov. 6, 1975, Ser. No. 629,563

Claims priority, application Japan, Nov. 15, 1974, 49-131645

Int. Cl.² G06F 3/00, 7/10

U.S. Cl. 364—200 **3 Claims**

1. Apparatus for controlling information transmitted to a processing device, comprising:

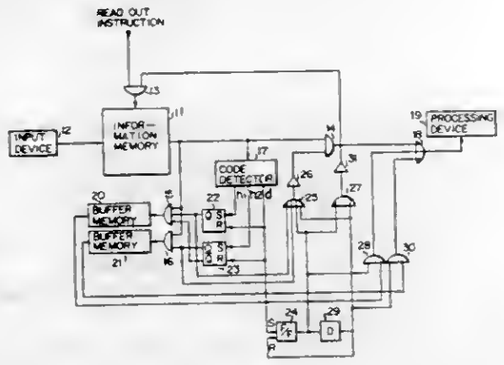
a. means (12) for inputting information, said information comprising in series arrangement a heading information positioning code, a heading information inserted immedi-

ately after said heading information positioning code, a body information, and a body information positioning code inserted immediately after said body information, said body information being formed of one or more detail information group each of which includes a plurality of item information;

b. input information memory means 11 for storing the information from said inputting means (12);

c. judgment means (17) coupled to said input information memory means (11) for distinguishing between the heading information and detail information groups, said judgment means (17) detecting that positioning code inserted before the respective information which is read out from said input information memory means;

d. buffer memory means (20,21) coupled to said iput information memory means (11) and to said judgment means (17) for storing in turn heading information read out from said input information memory means in response to the heading information positioning code detected by said judgment means;



e. means (22,23,25,26,14) coupled at least to said information memory means (11) and to said buffer memory means (20,21) for prohibiting the heading information from being transmitted to a processing device while said heading information is being read out from said input information memory means;

f. means (24,29,28,30) coupled to said judgment means (17) for temporarily inhibiting the detail information from being transmitted when said detail information positioning code is detected by said judgment means and for enabling the reading out of the heading information from said buffer memory means for transmission to said processing device; and

g. means (24,29,27,31,25,26,14) coupled to said judgment means (17) for reading out the detail information from said input information memory means when the handling information is read out from said buffer memory means, to form at least one unit record information comprised of a detail information group preceded by the heading information.

4,032,901

SYSTEM FOR STORING AND RETRIEVING INFORMATION AT THE MOLECULAR LEVEL

Cyrus Levinthal, 435 Riverside Drive, New York, N.Y. 10025

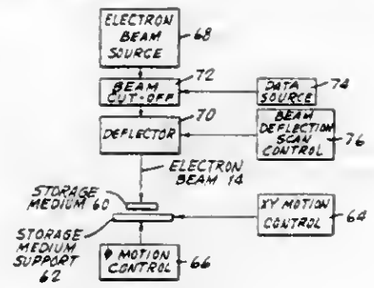
Continuation-in-part of Ser. No. 549,450, Feb. 12, 1975. This application June 4, 1975, Ser. No. 583,554

Int. Cl.² G11C 13/00, 13/02

U.S. Cl. 340—173 NC **11 Claims**

1. An information storage medium comprising:

a substantially continuous layer of particles comprising an array of bit storage units, each bit storage unit being less than a few thousand Angstroms in size and each pair of adjacent bit storage units being spaced from each other by no more than up to a few thousand Angstroms, each unit comprising several particles of a material modifiable when irradiated by a focused electron beam without thereby modifying bit storage units adjacent thereto, and each bit storage unit storing one bit of information; and



means for supporting the layer of particles and the bit storage units thereof.

4,032,902

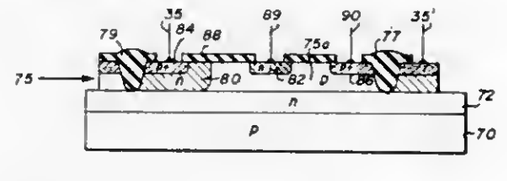
SEMICONDUCTOR MEMORY CELL CIRCUIT AND STRUCTURE

William H. Herndon, Sunnyvale, Calif., assignor to Fairchild Camera and Instrument Corporation, Mountain View, Calif.

Filed Oct. 30, 1975, Ser. No. 627,444

Int. Cl.² G11C 11/44

U.S. Cl. 340—173 FF **9 Claims**



t. A memory cell circuit comprising:

a. a word line;

b. a pair of bit lines;

c. first and second transistor means, each having a collector terminal, an emitter terminal, and a base terminal, said first and second emitter terminals being coupled to said word line, said first base terminal coupled to a first of said pair of bit lines, and said second base terminal coupled to the other of said pair of bit lines; and

d. a bistable circuit means including third and fourth transistor means, each having a collector terminal, an emitter terminal, and a base terminal, said third base terminal being coupled to both said first and fourth collector terminals, said third emitter terminal coupled to both said first base terminal and said first of said pair of bit lines, said fourth base terminal being coupled to both said second collector terminal and said third collector terminal, and said fourth emitter terminal being couple to said second base terminal and said other of said pair of bit lines, whereby said bistable circuit means assumes one stable state upon the application of a voltage on one bit line, and assumes another stable state upon the application of a voltage on the other bit line.

4,032,903

CHARGE INJECTION DEVICE ARRAYS

Paul Kessler Weimer, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Feb. 13, 1976, Ser. No. 657,888

Int. Cl.² G11C 11/40

U.S. Cl. 340—173 R **7 Claims**

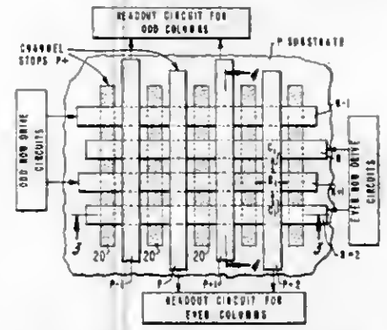
1. The combination of:

an array of charge injection devices arranged in columns and rows, each device comprising a portion of a row conductor insulated from and electrically coupled to a semiconductor substrate, and a portion of a column conductor which crosses and thereby overlaps the edges of

the row conductor and which is insulated from both the row conductor an substrate but which is electrically coupled to the substrate in the region thereof adjacent to the column conductor;

means for applying an operating voltage to one set of alternate row conductors of said array, of a polarity to cause potential wells to form in the substrate, each such alternate row conductor receiving said operating voltage for a period sufficient to cause the collection of photo-induced charge carriers for a period approximately equal to the duration of one field of an interlaced frame;

means for applying a voltage for creating a potential barrier in the substrate, to the row conductors on each side of any row conductor receiving an operating voltage, during



the time that operating voltage is being applied to that row conductor, and in the case of an end row conductor receiving an operating voltage, for applying a voltage for creating a potential barrier in the substrate to the row conductor adjacent to said end row conductor during the time that operating voltage is being applied to said end row conductor; and

means for then reversing the roles played by the row conductors, that is, by applying an operating voltage in the manner stated above, to the other set of alternate row conductors of the array, and applying a voltage for creating a potential barrier to the one set of alternate conductors for causing the collection of photo-induced charge carriers to be scanned during the second field of an interlaced frame.

4,032,904

MEANS FOR REFRESHING AC STABLE STORAGE CELLS

Kevin Lee Anderson, Winooski, and Luis Maria Arzubi, Colchester, both of Vt., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed July 9, 1975, Ser. No. 594,382

Int. Cl.² G11C 7/00

U.S. Cl. 340—173 DR **4 Claims**

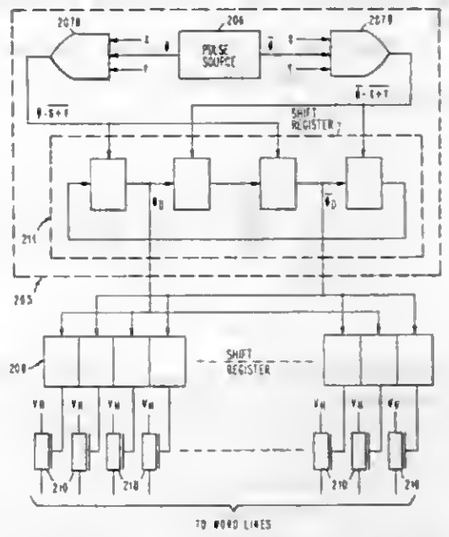
1. An electronic data storage array including a plurality of storage cells which require periodic refreshing, means for generating phase pulses, and primary shifting means responsive to said phase pulses for circulating a 1 level signal at a shift rate determined by the frequency of said pulses; wherein said means for generating phase pulse comprises:

a pulse generator for generating a train of pulses that is asynchronous with the cycle time of the storage array;

pulse combining means responsive to said pulse generator for altering said train of pulses in a predetermined manner; and

auxiliary shifting means responsive to said pulse combining means for circulating a 1 level signal at a shift rate determined by the frequency of the output of said pulse combining means;

said auxiliary shifting means being connected to said primary shifting means for providing said phase pulses thereto.



4,032,905

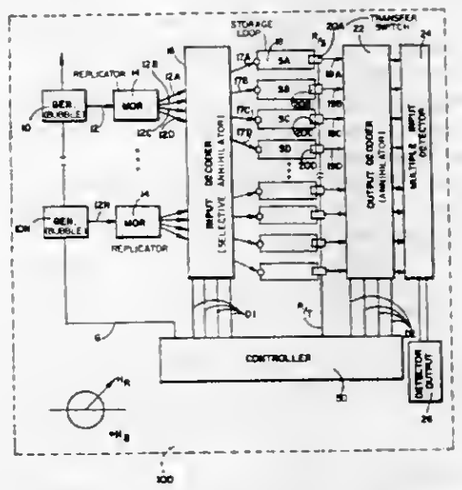
BUBBLE DOMAIN CIRCUIT ORGANIZATION

Thomas T. Chen, Yorba Linda, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Sept. 18, 1975, Ser. No. 614,401

Int. Cl.² G11C 11/02

U.S. Cl. 340—174 TF **22 Claims**



1. A device for magnetic bubble domains comprising:

a magnetic sheet having propagation paths in which said domains can be propagated;

generator means for selectively producing said domains;

replicator means for splitting said domains from said generator means into a plurality of new domains which are applied to different propagation paths;

storage means for storing said domains;

input decoder means for selectively transferring said new domains from said replicator means to said storage register means;

detector means for detecting said domains;

switch means associated with said storage means for selectively transferring said domains from said storage means and said detector means; and

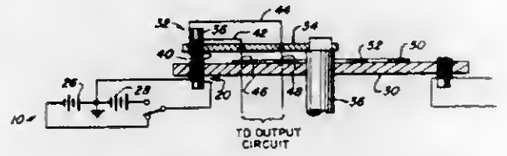
output decoder means for selectively transferring said domains from said switch means to said detector means.

4,032,906

CONDITION SAMPLING AND INDICATING SYSTEM

Lewis B. Jackson, Jr., 135-1 S. Highland Ave., Ossining, N.Y. 10562

Filed July 21, 1975, Ser. No. 597,463
Int. Cl.² G08C 19/00
U.S. Cl. 340—196 **10 Claims**



1. A system for sensing, sampling and indicating the state of each of a plurality of electrical circuit elements comprising:

a plurality of circuit elements each being capable of assuming a plurality of discrete states;

a plurality of first circuit means each electrically connected to a different one of said plurality of circuit elements for sensing the state thereof and for assuming a condition indicative of said sensed state;

each of said first conduit means including inductive sensor means and a source of d.c. potential connected between one of said circuit elements and said inductive sensor means for providing a first current through said inductive sensor means when said circuit element is in one of its discrete states and providing a second current through said inductive sensor means when said circuit element is in a second of its discrete states;

said inductive sensor means assuming a first condition in which a first magnetic field is produced in response to said first current and assuming a second condition in which a second magnetic field is produced in response to said second current;

second circuit means for sampling said first circuit means and for producing a plurality of electrical sampling signals, each having a characteristic representative of said condition and thereby of the sensed state of one of said circuit elements; and

means for sequentially coupling said second circuit means to each of said plurality of first circuit means for effecting said samping thereof;

whereby the state of each of said circuit elements is represented hy said characteristic of a corresponding one of said sampling signals.

4,032,907

REMOTE ALARM MONITORING AND CIRCUIT CONTROL SYSTEM

Danny J. Young, Tyler, Tex., assignor to James W. Fair, Tyler, Tex., a part interest

Filed Aug. 8, 1975, Ser. No. 603,013
Int. Cl.² G08B 19/00
U.S. Cl. 340—213 R **14 Claims**

1. An alarm monitoring and control system adapted to be connected to a source of power comprising: one or more control stations each having

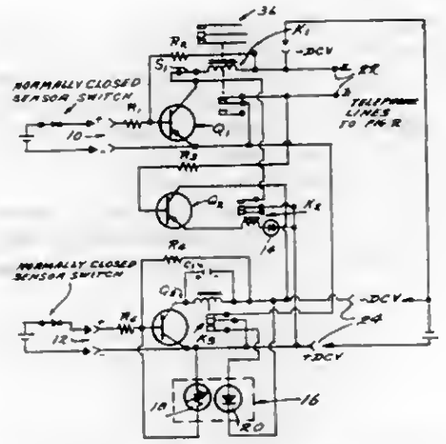
first and second sensing means for sensing the occurrence of at least first and second events, respectively,

first circuit means connected to said first sensing means for producing a first output signal,

second circuit means connected to said second sensing means for producing a second output signal electrically distinguishable from said first output signal,

third circuit means connected to each of said first and second circuit means for indicating the sensing of said first or second event and

a monitoring station located remotely from said one or more control stations, said monitoring station including monitoring circuit means for receiving said first and second output signals and indicating said first or second event and resetting



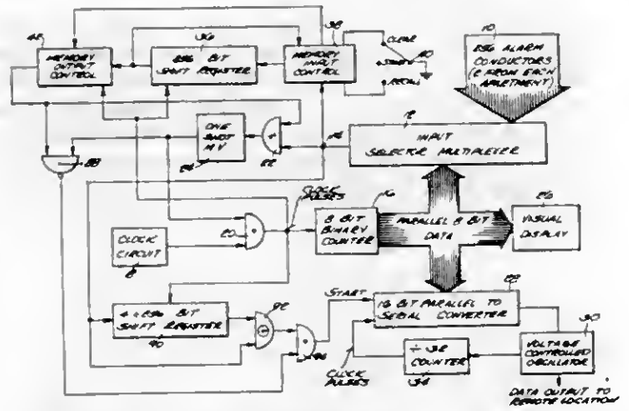
means for resetting at least one of said first and second circuit means following the termination of the event.

4,032,908

SECURITY ALARM SYSTEM

Richard C. Rice, and Barry N. Horn, both of Milwaukee, Wis., assignors to Automated Systems, Inc., Milwaukee, Wis.

Filed July 2, 1975, Ser. No. 592,425
Int. Cl.² G08B 25/00
U.S. Cl. 340—213 R **10 Claims**



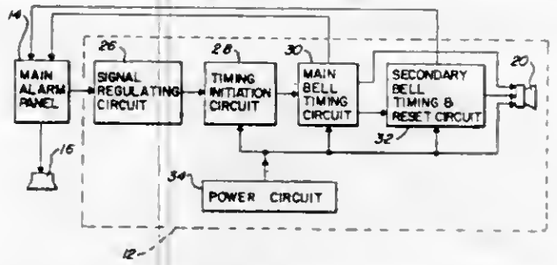
1. In an alarm system having a plurality of alarm conductors each wired to corresponding premises, a multiplexer coupled to said alarm conductors and containing means for connecting the connectors one at a time in sequence to an output terminal of the multiplexer, a binary counter coupled to said multiplexer to cycle the same through its sequence, a clock pulse circuit coupled to said binary counter to drive the same, alarm detector means coupled to the output of said multiplexer for detecting an alarm condition on any one of said alarm conductors, and display means coupled to said alarm detector means for visually identifying the alarm conductor upon which an alarm condition is detected, an alarm memory comprising a shift register coupled to the output of said multiplexer, said shift register having the same number of stages as the number of alarm conductors, said clock pulse circuit being coupled to said shift register to drive the same in synchronism with said multiplexer, the output of said shift register being coupled back to the input thereof to form a recirculating serial memory, and output circuit means coupled between the output of said shift register and the input of said alarm detector means for selectively applying the output of said shift register to the input of said alarm detector means to recall a previous alarm condition on one or more of said alarm conductors.

4,032,909

ARRANGEMENT FOR TESTING AN ALARM SYSTEM AND METHOD

William N. Boyce, Gering, Nebr., assignor to Eugene E. Karsten, Gering, Nebr., a part interest

Filed July 7, 1975, Ser. No. 593,651
Int. Cl.² G08B 19/00
U.S. Cl. 340—214 **19 Claims**



1. An arrangement for testing an alarm system which includes a main alarm activation circuit and a plurality of remote sensors connected with said circuit such that activation of at least one of said sensors activates said circuit, said alarm activation circuit including means for deactivating the circuit once activated and means for resetting the circuit once activated and subsequently deactivated, said arrangement comprising:

a. first means responsive to the activation of said alarm activation circuit for producing a first signal, said signal being applied to said deactivating means of said circuit for automatically deactivating said circuit;

b. an alarm;

c. second means connected with said first means and with said alarm for activating said alarm in response to said first signal; and

d. third means connected with said second means for deactivating said alarm and for producing a second signal a predetermined period of time after activation of said alarm, said second signal being applied to said resetting means of said alarm activation circuit for automatically resetting said circuit.

4,032,910

MICROWAVE ALARM

David Lipscombe Hollway, Gordon; Peter Ivan Somlo, Killarney Heights; John David Hunter, Carlingford, and Idris Gareth Morgan, Haberfield, all of Australia, assignors to Commonwealth Scientific and Industrial Research Organization, Campbell, Australia

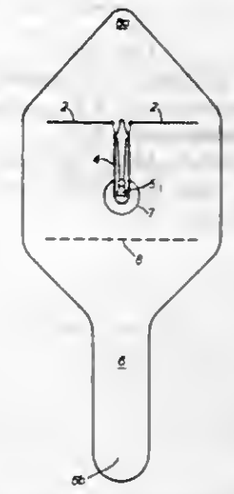
Filed Aug. 5, 1975, Ser. No. 602,056
Claims priority, application Australia, Aug. 5, 1974, 8418/74
Int. Cl.² G08B 21/00
U.S. Cl. 340—224 **6 Claims**

1. A microwave alarm device comprising:

a. a rigid body member,

b. a microwave receiving antenna secured to said body member to prevent relative movement between the body member and said antenna, and between elements of the antenna itself, and

c. a non-linear alarm indicator secured to the body member and connected to the antenna or energization by microwave power received thereby, said non-linear alarm indicator comprising a hot carrier diode connected across the antenna, a trigger circuit connected across the hot carrier diode and comprising a silicon controlled rectifier and a potential divider circuit connected to the control electrode of the rectifier and across the hot carrier diode, and a passive indicator device connected to said trigger circuit for activation thereby to produce a distinct alarm



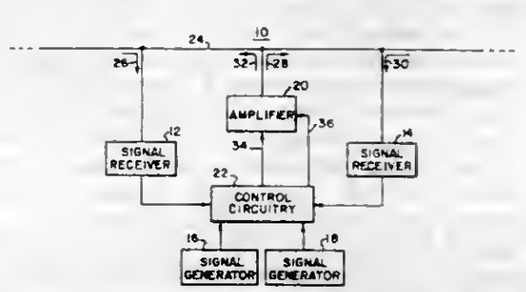
signal at a predetermined signal level delivered by the diode and antenna combination.

4,032,911

SIGNAL REPEATER FOR POWER DISTRIBUTION LINE COMMUNICATION SYSTEMS

Waymon A. Melvin, Jr., Raleigh, N.C., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 26, 1976, Ser. No. 661,594
Int. Cl.² H04M 11/04
U.S. Cl. 340—310 A **4 Claims**



1. A signal repeater suitable for use with power distribution line communication systems, said repeater comprising:

a signal amplifier coupled to a power distribution line, said amplifier having a signal input line;

first and second signal receivers coupled to the distribution line, said first receiver providing a first output signal when receiving a first predetermined signal from the distribution lime and said second receiver providing a second output signal when receiving a second predetermined signal from the distribution lime;

first and second signal generators;

a bistable latch circuit having first and second input terminals and first and second output terminals; and

first and second transmission gates each having signal input, signal output, and control input lines, with the signal input lines of the first and second transmission gates respectively coupled to the first and second signal generators, with the signal output lines of the first and second transmission gates coupled to each other and to the signal input line of the signal amplifier, and with the control input lines of the first and second transmission gates respectively coupled to the first and second output terminals of the latch circuit;

said first and second input terminals of said latch circuit being respectively coupled to the first and second receivers so that a first output signal from the first receiver sets the latch circuit in a condition which turns on the first

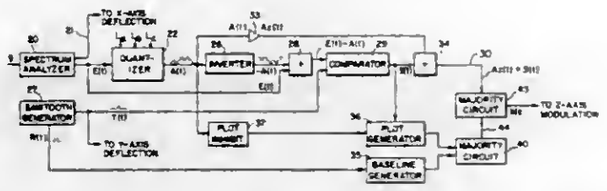
transmission gate if the latch circuit has not already been set in a condition to turn on the second transmission gate.

4,032,912

INTENSITY MODULATED DISPLAY SYSTEM

David E. Wood, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Oct. 3, 1974, Ser. No. 511,813
Int. Cl.² G06F 3/14
U.S. Cl. 340—324 A 7 Claims



1. A system for displaying a continuously variable analog input signal having variations of three independent parameters, comprising:

a. input means for receiving said input signal to be displayed;

b. display means coupled to said input means for displaying said input signal as a final signal upon a two-dimensional surface having a pair of mutually orthogonal parameter axes, a first one of said axes corresponding to an entire range of allowable values of a first one of said parameters and the remaining one of said axes having a range corresponding to a submultiple of the total allowable value range of another parameter;

c. first means responsive to said input signal for providing a quantized signal having one of a multiplicity of discrete levels including a zero level, said quantized signal being provided at said zero level when said input signal has an amplitude between zero and a lowest one of said multiples of the total range of said another parameter, said quantized signal having sequentially greater discrete amplitudes of said multiplicity of levels of said another parameter for said input signal exceeding sequentially greater multiples of said total range submultiple;

d. second means for providing a difference signal proportional to the difference between said input signal and said quantized signal;

e. local signal generating means for providing a periodically varying comparative signal, each period of said comparative signal being associated with substantially a single value of said first parameter and

f. comparator means for generating an additional signal whenever said difference signal exceeds said comparative signal;

g. third means for applying said additional signal to said display means to vary the intensity thereof to cause those areas of the displayed final signal that correspond to portions of said another parameter of said input signal exceeding successively greater ones of the multiplicity of levels of said quantized signal to have successively greater intensities for each value of said first parameter; and

h. fourth means for applying another signal to said display means to cause the boundary between successive portions of said display having different intensities to be formed as a curve in accordance with the amplitude of said another parameter of said input signal relative to said quantized signal level to indicate the incremental value of said another parameter of said input signal relative to the general level thereof;

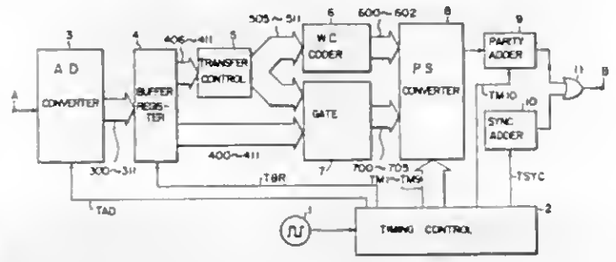
i. one of a succession of said two-dimensional surfaces being generated in a sequential manner for each sequential value of a remaining one of said three parameters to display the variation thereof in accordance with the variation in the first and another parameters.

4,032,913

CODING EQUIPMENT PROVIDING COMPRESSED CODE

Masami Okamura, Musashino; Fumio Aoki, Yokohama; Yoshihiro Sano, Katsuta; Jun-ichi Makino, Hitachi; Yoshiteru Miki, Hitachi; Hiroshi Sasaki, Hitachi, and Kazuo Seo, Hitachi, all of Japan, assignors to Hitachi, Ltd. and The Tokyo Electric Power Co., Inc., both of, Japan

Filed Apr. 9, 1974, Ser. No. 459,386
Claims priority, application Japan, Apr. 9, 1973, 48-39483
Int. Cl.² H03K 13/02
U.S. Cl. 340—347 AD 4 Claims



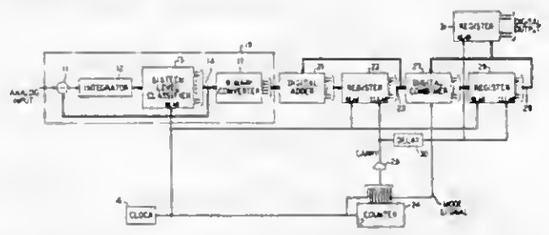
1. A coding equipment for encoding a physical quantity comprising analog-digital converting means for converting the physical quantity to a digital code signal, said analog-digital converting means including discriminator means having comparator means for discriminating whether the physical quantity is larger than a predetermined value or not, selecting means for selecting one of a plurality of predetermined different reference values in accordance with the output of said discriminating means, means for determining a weight for the digits of the digital code signal, said comparator means comparing the physical quantity with a value which is a function of the selected reference value and a weight which is predetermined depending on the position of each of the digits constituting the digital code signal, and compressing means for determining the position of the most significant digit in said digital code signal and for compressing said digital code signal in dependence on the position of the most significant digit in said digital code signal.

4,032,914

ANALOG TO DIGITAL CONVERTER WITH NOISE SUPPRESSION

James Charles Candy, Convent Station, and Yau-Chau Ching, Morganville, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 23, 1976, Ser. No. 679,774
Int. Cl.² H03K 13/175
U.S. Cl. 340—347 AD 9 Claims



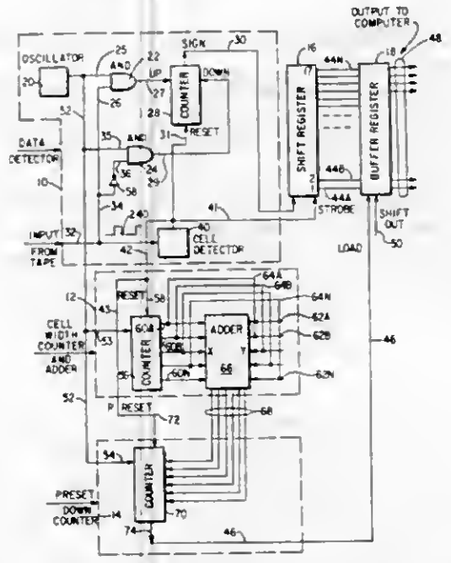
1. In a digital message transmission system having a direct feedback coder producing an encoded replica of an input signal, said coder including quantizing means having multiple levels and the encoded replica including first code groups of a first plurality of digital bits, a converter for changing the encoded replica to a pulse code modulated signal of high signal resolution including second code groups of several digital bits, said converter comprising first accumulating means for receiving each of the first code groups and producing an output signal indicative of a running sum of a predetermined plurality of the received code groups, second accumulating means connected to receive the output signal and summing the negative of same for one portion of said predetermined plurality and summing the positive of same for another portion of said predetermined plurality to produce a net sum wherein the successive outputs of said coder during the one portion are included in the net sum an increasing number of times and the successive outputs of said coder during the other portion are included in the net sum a decreasing number of times, and output means coupled to said second accumulating means and producing the pulse code modulated signal wherein each second code group is indicative of one net sum produced by one predetermined plurality.

4,032,915

SPEED-TOLERANT DIGITAL DECODING SYSTEM

John L. Shanks; Randol R. Read, both of, Tulsa, and John W. Supernaw, Broken Arrow, all of Okla., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed July 23, 1975, Ser. No. 598,314
Int. Cl.² H04L 3/00
U.S. Cl. 340—347 DD 1 Claim



1. A pulse-width signal-decoding system into which a signal passes, said signal comprising a plurality of adjacent cells, each defined at the ends by a rapid transition of a signal amplitude in a first direction and at some intermediate point by a rapid transition of the signal amplitude in a second and opposite direction, comprising:

a. data-detecting means for examining each cell to produce a logical 1 or a logical 0, depending only on whether said intermediate point occurs in one or the other half width between said ends of each cell;

b. sync-cell detector means for examining each cell to detect the presence of a sync cell (defined as being of at least approximately double normal cell width) and producing an unloading pulse therefrom;

c. shift register means coupled to said data-detecting means for temporary separate adjacent storage of the adjacent data bits comprising said logical 1s and said logical 0s detected by said data-detecting means;

d. a buffer register coupled to said shift register; and

e. means responsive to said unloading pulse from said sync-cell detector, at the occurrence of a sync cell, to load said shift register into said buffer register:

wherein said data-detecting means comprises:

a. up-down counter means having an up input, a down input, an output indicating the sign of the count, and a reset terminal;

b. an oscillator;

c. a signal input line;

d. a first AND gate with output connected to said up input, one input connected to said oscillator, and the second input connected to said signal input line;

e. a second AND gate and an inverter, said second AND gate with output connected to said down input, one input connected to said oscillator, and the second input connected through said inverter to said signal input line;

f. said output of said up-down counter connected to said shift register means; and

g. cell-detector means connected to said input signal line for producing a cell edge signal at the start of each cell, the output of said cell detector being connected to said reset terminal of said up-down counter and to a shift input of said shift register:

and wherein said sync-cell detector means comprises:

a. a cell-width counter having an input terminal connected to said oscillator, a reset terminal connected to said cell detector means, and a plurality of output leads for representing the count as a multibit binary number;

b. a binary adder means having a first plurality of input terminals, a second plurality of input terminals, and a plurality of output terminals, said first input terminals connected systematically to the corresponding output of said cell-width counter, said second inputs being systematically connected to said first inputs at terminals, each one less than the corresponding said first plurality of terminals, in a way to represent a binary number of one-half the value of the number on said first input terminals, whereby the signal on said output terminals represents 1.5 times that on said output leads of said cell-width counter;

c. a preset downcounter having a plurality of input leads, connected systematically to the corresponding said plurality of output leads of said adder means and a down count input connected to said oscillator;

d. means connected to said downcounter and to the cell detector means to preset it to the number represented by said adder output at the occurrence of a cell edge signal; and

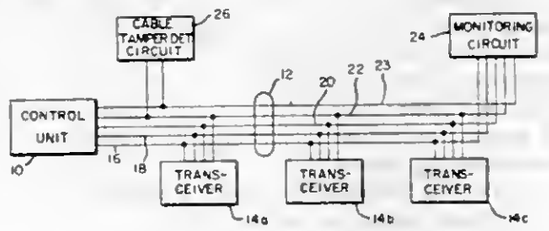
e. output means connected to said downcounter to indicate when its said count is 0, said count of 0 being an indication of detection of a sync cell.

4,032,916

INTRUSION ALARM CABLE SUPERVISION SYSTEM

Aaron A. Galvin, Lexington; James B. Edson, Concord, and James O. C. Bean, Boston, all of Mass., assignors to American District Telegraph Company, New York, N.Y.

Filed May 27, 1975, Ser. No. 581,131
Int. Cl.² G08B 29/00
U.S. Cl. 340—409 8 Claims



1. For use in an intrusion alarm system having a control unit and at least one transceiver interconnected in parallel to a single multiconductor cable having a transmitter line, a receiver line, a tamper line, and a ground line, a first end of said cable being connected to said control unit, a cable supervision system comprising:

a monitoring circuit coupled to the second end of said cable remote from said control unit and including:

a first circuit connected to the transmitter line and operative to monitor at least one signal condition thereon;

a second circuit connected to the receiver line and operative to monitor a signal condition thereon; and

a third circuit connected to the tamper and ground lines and providing a predetermined impedance only under proper signal conditions sensed on said cable by said first and second circuits;

detector means at the first end of said cable opposite to said monitoring circuit connected to said tamper and ground lines and operative to detect a change in said predetermined impedance; and

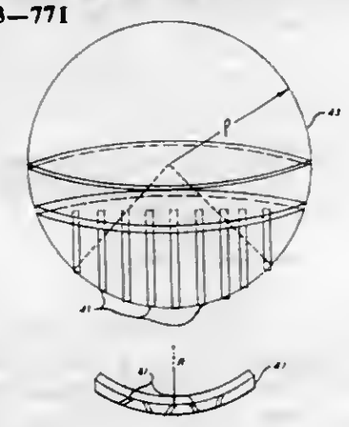
alarm means coupled to said detector means and operative to provide an output signal indication of an alarm condition when the detected change in impedance exceeds a predetermined threshold level.

4,032,917

SYNTHESIS TECHNIQUE FOR CONSTRUCTING CYLINDRICAL AND SPHERICAL SHAPED WAVE GUIDE ARRAYS TO FORM PENCIL BEAMS

Edward Chin, Rego Park, N.Y., and Leonard Schwartz, Montville, N.J., assignors to The Singer Company, Little Falls, N.J.

Filed Aug. 21, 1975, Ser. No. 606,445
Int. Cl.² H01Q 13/10
U.S. Cl. 343—771 2 Claims



1. A method of constructing a slotted wave guide structure having unequal slot spacings such that the structure will generate a pencil beam, comprising a plurality of closely adjacent wave guide elements all of which are end fed from a common feed wave guide which is fed at a single point so as to permit the antenna to conform to a regular geometric curved surface comprising the steps of:

a. arranging the plurality of wave guide elements in a shape to cover the curved surface but so as to cover no more than one half thereof;

b. determining the required phase function of each wave guide element in the antenna to result in an in phase condition at a phase plane which has a normal vector parallel to the desired pencil beam peak;

c. plotting the phase functions so determined with respect to length along each wave guide element;

d. plotting on the same plot therewith the running phase inside said wave guide element;

e. finding the points of intersection of said running phase lines and said phase functions; and

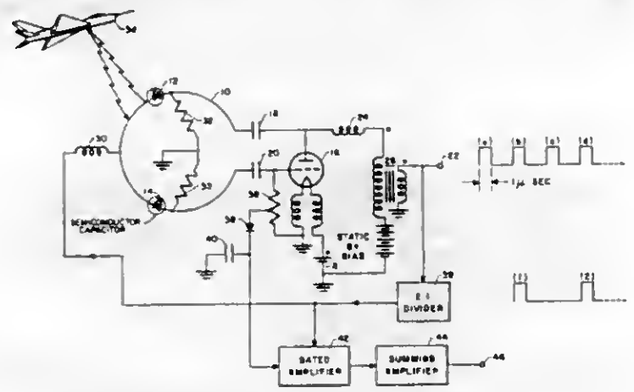
f. cutting slots at the distance along the wave guide corresponding to said points of intersection in each of said wave guide elements.

4,032,918

DUAL CHANNEL RADIO FREQUENCY FUZING SYSTEM

George F. Masin, Anaheim, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 30, 1964, Ser. No. 364,893
Int. Cl.² F42C 13/04
U.S. Cl. 343—7 PF 5 Claims



1. In a dual-channel radio frequency fuzing system the combination comprising:

a. an oscillator circuit including a loop antenna tank circuit adapted to operate at a first predetermined frequency in response to a first modulating signal having a first repetition rate,

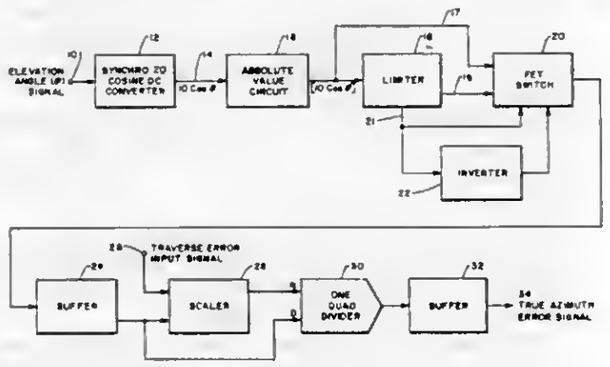
b. circuit means coupled to the tank circuit of said oscillator for causing said oscillator to operate at a second predetermined frequency in response to a modulating signal derived from said first modulating signal and having a repetition rate different than said first repetition rate.

4,032,919

DEVICE FOR SECANT CORRECTION OF AZIMUTH DATA IN TRACKING RADARS

Stephen J. Senger, Jamestown, N. Dak., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 11, 1976, Ser. No. 713,454
Int. Cl.² G01S 9/02
U.S. Cl. 343—7.4 6 Claims



1. A device for adjusting traverse error signals in a tracking radar to obtain a true azimuth error signal comprising:

a. means for converting a signal representative of elevation angle of said tracking radar to a signal proportional to the cosine of said elevation angle;

b. means for limiting said signal proportional to the cosine of said elevation angle to a minimum value representative of a maximum elevation angle to produce a correction factor signal;

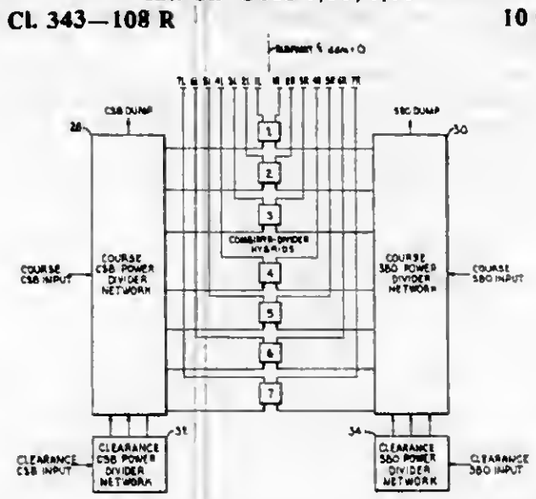
c. means for dividing said traverse error signals by said correction factor signal to obtain said true azimuth error signal.

4,032,920

TWO-FREQUENCY INSTRUMENT LANDING SYSTEM WITH INTEGRAL MONITOR

Edwin J. Martin, Jr., Kansas City, and Akemichi Yamada, Raytown, both of Mo., assignors to Wilcox Electric, Inc., Kansas City, Mo.

Filed Sept. 2, 1975, Ser. No. 609,627
Int. Cl.² G01S 1/16, 1/18
U.S. Cl. 343—108 R 10 Claims



1. In a two-frequency capture-effect instrument landing system, the combination comprising:

means for generating a course signal of a first frequency having a carrier component that includes sidebands and a separate component that includes sidebands only;

means for generating a clearance signal of a second frequency having a carrier component that includes sidebands and a separate component that includes sidebands only;

a single antenna array having a number of pairs of radiating elements symmetrically disposed on opposite sides of a navigational centerline, a portion of said number of pairs constituting a group of element pairs adapted to radiate both course-frequency and clearance-frequency power;

carrier power distribution apparatus receiving said carrier components of said course and clearance signals and having a number of outputs corresponding to said pairs of elements,

said carrier power distribution apparatus including means for effecting unequal power division of the received carrier components and delivering combined course and clearance power at desired relative amplitudes from the outputs thereof corresponding to said group of element pairs and exclusively course power at desired relative amplitudes from the remainder of its outputs;

sideband power distribution apparatus receiving said sidebands only components of said course and clearance signals and having a number of outputs corresponding to said pairs of elements,

said sideband power distribution apparatus including means for effecting unequal power division of the received sidebands only components and delivering combined course and clearance power at desired relative amplitudes from the outputs thereof corresponding to said group of element pairs and exclusively course power from the remainder of its outputs; and

a number of combiner-divider devices, each associated with a corresponding element pair and having a pair of inputs connected with corresponding outputs of said carrier power distribution apparatus and said sideband power distribution apparatus respectively, and a pair of outputs connected with respective elements of the corresponding element pair for feeding the same,

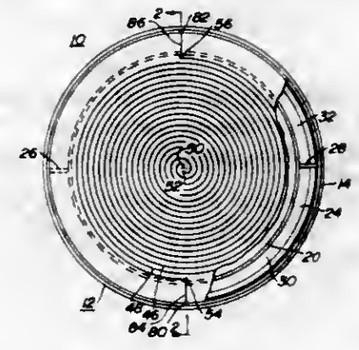
each of said devices being operable to combine the carrier and sidebands only components delivered to its inputs and divide the resultant composite signal equally between the two elements of the pair.

4,032,921

BROAD-BAND SPIRAL-SLOT ANTENNA

Thomas V. Sikina, Jr., Chalfont; Robert H. Schafer, Perkasie, and Robert T. Klopach, Lansdale, all of Pa., assignors to American Electronic Laboratories, Inc., Colmar, Pa.

Filed Sept. 8, 1975, Ser. No. 610,985
Int. Cl.² H01Q 1/38, 13/18
U.S. Cl. 343—730 10 Claims



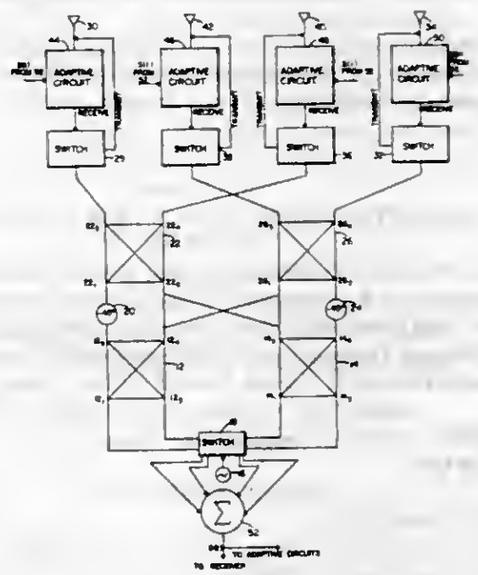
1. A broad-band antenna device having a wide frequency band comprising a variable aperture element, and a fixed aperture element comprising a slot antenna positioned about and electrically coupled to said variable aperture element, the variable aperture element having first and second output points providing balanced output signals with a 180° phase difference, and said slot antenna including first and second slot antenna elements with the first slot antenna element being electrically coupled with the first output point of said variable aperture element and the second slot antenna element being electrically coupled with the second output point of said variable aperture element.

4,032,922

MULTIBEAM ADAPTIVE ARRAY

Joseph H. Provencher, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 9, 1976, Ser. No. 647,828
Int. Cl.³ H01Q 3/26
U.S. Cl. 343—854 6 Claims

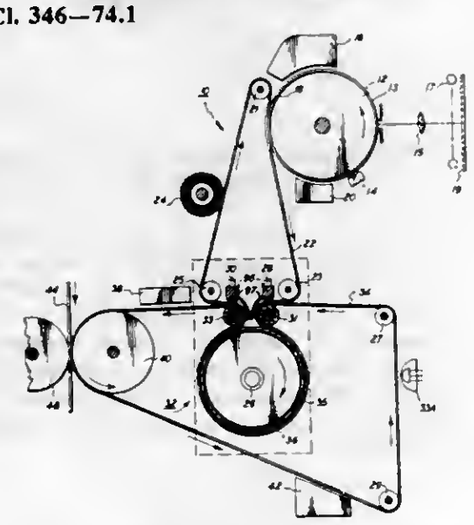


1. A system comprising:

a Butler matrix including at least a plurality of input ports,

a first plurality of hybrid couplers coupled to said input ports, a plurality of phase shifters coupled to said first plurality of hybrid couplers, a second plurality of hybrid couplers coupled to said plurality of phase shifters;
a plurality of antenna elements; and
a plurality of adaptive means, each being coupled between one of said plurality of antenna elements and a corresponding one of said second plurality of hybrid couplers for minimizing the amplitude of an undesired signal received by said one of said plurality of antenna elements to which it is coupled, each adaptive means including means for comparing said received signal with a reference signal to develop an error signal for feedback control.

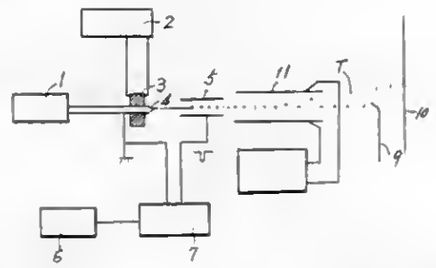
4,032,923
THERMOMAGNETIC IMAGING APPARATUS
Stephen F. Pond, Fairport, and Eugene C. Faucx, West Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.
Filed Nov. 12, 1975, Ser. No. 631,289
Int. Cl.² G11B 5/02; G03G 19/00
U.S. Cl. 346—74.1 **21 Claims**



2. A thermoremanent transfer apparatus for thermomagnetically transferring an image from a slave web onto a master web comprising:
a transparent cylindrical carriage means,
web transport means cooperating with said carriage means for transporting said slave web and said master web into intimate contact around substantially the entire periphery of said carriage means; and
a radiation source located within said carriage means for producing a thermomagnetic transfer of the image from the slave web onto the master web.

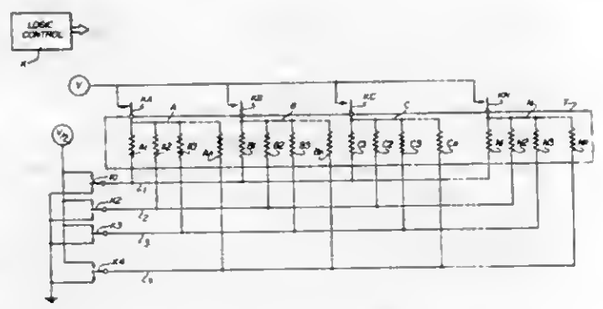
4,032,924
DISTORTION REDUCTION IN INK JET SYSTEM PRINTER
Rikuo Takano, Musashino; Yutaka Obota, Kodaira; Yoichi Yamamoto; Yuji Sumitomo, both of Nara; Toshio Kobayashi, Osaka, and Masahiko Aiba, Nara, all of Japan, assignors to Nippon Telegraph and Telephone Public Corporation and Sharp Kabushiki Kaisha, both of Osaka, Japan
Filed Oct. 30, 1975, Ser. No. 627,377
Claims priority, application Japan, Oct. 31, 1974, 49-126144
Int. Cl.² G01D 15/18
U.S. Cl. 346—75 **2 Claims**

1. In an ink jet system printer of the charge amplitude controlling type for recording characters in a dot matrix pattern by a sequence of charged ink drops, means compensating for the effects of charges on previous ink drops in a sequence on the current charged drops, comprising:
a read only memory (ROM) storing digital character generation output formats;
means controlling said ROM to output a selected character format;
a character generator responsive to said digital character format output from said ROM to produce a step waveform character signal;
dot matrix determining means controlling said character generator to correlate said step waveform character signal to said dot matrix pattern;
storage means receiving said step waveform character pattern and retaining a predetermined significant number of preceding steps from said waveform for each given current step therein;



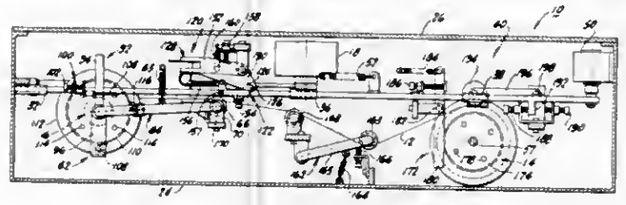
proportioning means transmitting selectively attenuated magnitudes of said significant steps from said storage means;
an adder receiving and summing said attenuated magnitudes to provide a correction signal for a current step in said waveform as a function of said significant number of preceding steps; and
means synchronously adding said correction signal to its corresponding step in said stepped character signal to provide a stepped character output signal compensated for the effects of a predetermined significant number of preceding ink drops for each charged ink drop generated.

4,032,925
DRIVE CIRCUIT FOR THERMAL PRINTING ARRAY
Steven Kos, Ottawa, Canada, assignor to Northern Telecom Limited, Montreal, Canada
Filed May 10, 1976, Ser. No. 684,568
Int. Cl.² G01D 15/10
U.S. Cl. 346—76 R **4 Claims**



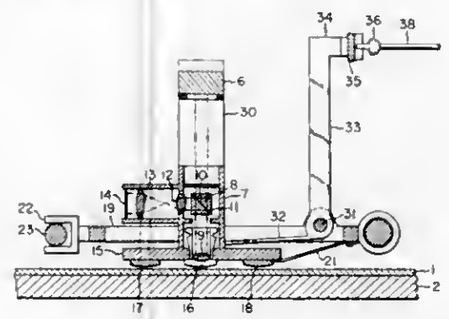
1. In a drive circuit for a thermal printing array having a plurality of thermal resistance elements connected in a matrix of rows and columns;
the drive circuit comprising:
means for connecting a first source of voltage between a single column and selected ones of said rows to heat selected thermal resistance elements connected directly therebetween to printing temperatures;
the improvement comprising:
means for concurrently connecting only the balance of the rows to a second source of voltage intermediate that of said first source, to maintain the balance of the thermal resistance elements in the array below said printing temperatures.

4,032,926
DATA RECORDING INSTRUMENT
George Robert Hale, 2531 Marin Ave., Berkeley, Calif. 94708
Filed May 12, 1976, Ser. No. 685,939
Int. Cl.² G01D 15/04, 15/16, 15/24
U.S. Cl. 346—79 **10 Claims**



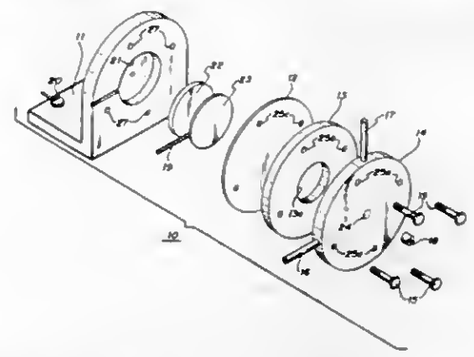
1. A data recording instrument having a recording sheet supply roll and recording sheet take-up roll for charting at least one continuous sensor comprising:
a. rod movable along its axis in both directions,
b. lever means for turning the take-up roll, said rod engaging said lever means thus turning the take-up roll during movement of said rod along its axis, said lever means adjusting the degree of turning of the take-up roll in proportion to the amount of the recording sheet accumulated on the take-up roll,
c. marking means for impressing on the recording sheet the resultant output of at least one continuous sensor, said marking means connected to said rod and activated upon axial movement of said rod,
d. pulsing means for axially moving said rod.

4,032,927
HIGH DENSITY OPTICAL RECORDING APPARATUS
Takeshi Goshima, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan
Continuation of Ser. No. 359,627, May 14, 1973, abandoned. This application Oct. 24, 1974, Ser. No. 517,763
Claims priority, application Japan, May 19, 1972, 47-49688; May 22, 1972, 47-51092
Int. Cl.² G01D 18/00
U.S. Cl. 346—108 **6 Claims**



1. A high density optical recording apparatus comprising:
a recording medium having a light sensitive member on which recording is effected by sensing a beam;
means for producing a coherent beam modulated in accordance with a recording signal to be recorded on said recording medium;
beam splitter means disposed across an optical path of the coherent beam, said beam splitter means dividing the coherent beam into a first beam and a second beam;
an optical lens system for focusing the first beam onto said recording medium to optically write the recording signal in said recording medium;
interference optical means for measuring the clearance between said optical lens system and a surface of said recording medium by an interference fringe pattern, said interference optical means including; optical means for directing at least one of said beams, to wit, the second beam and the first beam which has been reflected by said recording medium and is inverted through said optical lens systems, in such a direction that the two beams are coherent, and a screen for forming an interference fringe pattern by said two beams; and
floating means carrying at least a portion of said optical lens system and said interference optical means, wherein said floating means includes three floating members, and wherein at least one of said floating members floats above the surface of said recording medium by virtue of high air pressure produced at a side of the floating member opposed to the recording medium.

4,032,928
WIDEBAND INK JET MODULATOR
John T. White, Grand Prairie, and Kenneth T. Loveladv, Irving, both of Tex., assignors to Recognition Equipment Incorporated, Dallas, Tex.
Filed Aug. 12, 1976, Ser. No. 713,763
Int. Cl.² G01D 15/18; B23P 15/00
U.S. Cl. 346—140 R **15 Claims**

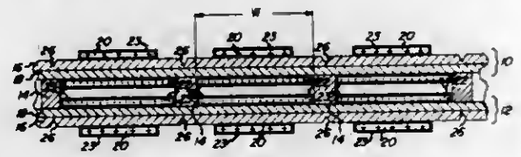


1. A liquid jet modulator for production of ink droplets over a wide band of high operating frequencies, which comprises:
a. a housing having a cylindrical well in one face thereof,
b. a piezoelectric transducer disc seated in said well and conductively contacting the bottom of said well,
c. a disc electrode conductively bonded to the face of said transducer opposite the bottom of said well,
d. a flexible diaphragm closing said well,
e. a disc adjacent said diaphragm having a bore axially aligned with said well, and
f. a plate closing said bore to form a liquid chamber contiguous to said diaphragm and mechanically resonant under ink pressure at a frequency higher than said operating frequency, said plate having an orifice axially aligned with said bore for emitting a stream of liquid from said liquid chamber.

4,032,929
HIGH DENSITY LINEAR ARRAY INK JET ASSEMBLY
Kenneth H. Fischbeck, Dallas, and Richard H. Vernon, Richardson, both of Tex., assignors to Xerox Corporation, Stamford, Conn.
Filed Oct. 28, 1975, Ser. No. 625,987
Int. Cl.² G01D 15/16
U.S. Cl. 346—140 R **21 Claims**

19. In a linear array ink jet assembly: a longitudinally extending housing having a plurality of chambers, each separated from the other by longitudinally spaced wall means; a flexible member spanning said chambers and wall means and operably engaging said wall means to form a seal therebetween; a plurality of spaced-apart actuating means affixed to said flexible member, each of said actuating means being

affixed to respective portions of said flexible member corresponding to a respective chamber; each chamber including a droplet orifice longitudinally located between a respective pair of said wall means; said actuating means and said flexible



member being so constructed and arranged that upon activation of said actuating means, its respective portion of said flexible member will deform to decrease the volume of its respective chamber.

4,032,930

MECHANISM FOR THE APPLICATION AND REMOVAL OF A STYLUS WIRE ON STENCIL MATERIAL TO BE ENGRAVED

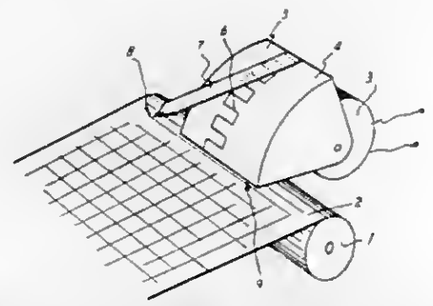
Julio G. Taussig, Grecia 4020, Buenos Aires, Argentina

Filed Sept. 9, 1975, Ser. No. 611,820

Claims priority, application Argentina, Sept. 23, 1974, 255690

Int. Cl.[2] G03G *15/044*, *17/00*

U.S. Cl. 346—163 6 Claims



1. Apparatus for the application and removal of the engraving stylus of a stencil cutter toward and away from sensitive stencil material to be engraved including in combination: an electromagnet having a curved surface, a blade-like support of magnetic material fixed at one end thereof to bend thereabout, the support normally overlying the curved surface of said electromagnet in spaced relation with respect thereto, the free end of the support extending beyond the end of the electromagnet and said stylus used for applying stencil cutting pulses to the stencil material being attached to the free end of said support, said support being drawn into engagement with the curved surface of said electromagnet and bending substantially into conformity with the curved surface upon the energization of the latter, so that said stylus is positioned in contacting engagement with said stencil material positioned adjacent said electromagnet, the free end of said support remaining slightly spaced from said electromagnet to provide a dampening effect to said stylus as the latter passes over said stencil material.

4,032,931

MONEY TRANSFER DEVICE KEYBOARD TERMINAL

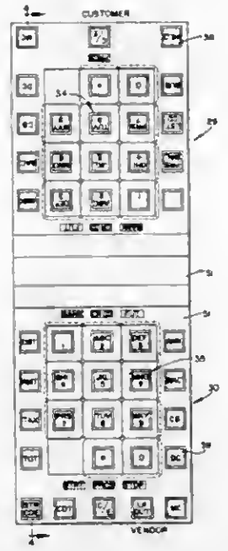
Floyd H. Haker, 6546 Linden Lane, Dallas, Tex. 57230

Filed Dec. 22, 1975, Ser. No. 643,103

Int. Cl.[2] H04Q *3/00*; G06K *15/18*; G06F *3/02*

U.S. Cl. 340—365 R 12 Claims

1. A keyboard terminal for use with a central computer whereby money transactions between a vendor and customer may be electronically completed via the collective keyboard entries made by vendor and customer comprising, first and second discrete keyboards for respective use of vendor and customer, said keyboards extending oppositely from a raised central display device housing discrete displays on respective opposite sides thereof for respective viewing by vendor and customer, each of said first and second keyboards comprising a plurality of function activating keys and a plurality of numeric entry keys, the depressible upper portion of at least each said numeric entry key comprising a visible display means for identifying the associated key function, with said display means being recessed within the associated keyboard surface to limit readability thereof only within a restricted



angular field of view from vertical; said numeric entry keys arranged adjacently to form a predetermined geometric pattern; said numeric entry keys being physically aligned for depression contact of key carried probe means with an underlying connector matrix for generation of a related code word output definitive of that key function; means to realign said key numeric entry functions comprising means for physically moving one or more numeric entry keys in the plane of the keyboard and within the confines of the geometric pattern collectively defined by said numeric entry keys.

4,032,932

AUTOMATIC SHUTTER CONTROLS FOR CAMERAS

Tsukumo Nobusawa, Otzumi, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Japan

Filed May 9, 1975, Ser. No. 576,021

Claims priority, application Japan, May 11, 1974, 49-52487; July 8, 1974, 49-78462; Sept. 25, 1974, 49-110205

Int. Cl.[2] G03D *7/08*

U.S. Cl. 354—23 D 11 Claims

1. In a camera, photo-responsive pulse-generating means for generating a number of pulses in accordance with the logarithmically converted light intensity at an object which is to be photographed, reference pulse-generating means for generating a series of reference pulses at intervals from one reference pulse to the next which become progressively greater, shutter-operating means for opening a shutter of the camera to make an exposure, said shutter-operating means being operatively connected with said photo-responsive pulse-generating means for activating the latter just prior to opening of the shutter and being operatively connected to said reference pulse-generating means for activating the latter simultaneously with opening of the shutter, pulse-responsive means operatively connected with both of said pulse-generating means for receiving from said photo-responsive pulse-generating means the number of pulses generated thereby prior to opening of the shutter and for then receiving pulses from said reference pulse-generating means and for providing an output when the number of pulses received from said reference pulse-generating means has a predetermined relationship with respect to the number of pulses received from said photo-

responsive pulse-generating means, and shutter-closing means operatively connected with said pulse-responsive means for receiving said output therefrom and for responding to said output for closing the shutter.

4,032,933

INDICATION SYSTEM OF A CAMERA

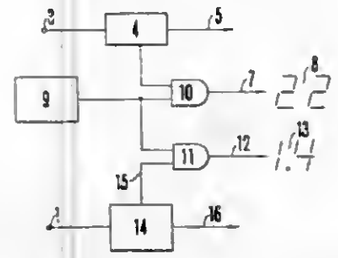
Tadashi Ito, Kanagawa; Masanori Uchidoi, Kawasaki; Tetsuya Taguchi, Kawasaki; Tokuichi Tunekawa, Kanagawa; Hiroshi Aizawa, and Yoshiyuki Takishima, both of Machida, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 3, 1975, Ser. No. 554,901

Claims priority, application Japan, Mar. 4, 1974, 49-25558; Mar. 4, 1974, 49-25559; Mar. 20, 1974, 49-31805; Mar. 20, 1974, 49-31806

Int. Cl.[2] G03B *17/20*

U.S. Cl. 354—23 D 4 Claims



1. An indication system of a camera comprising:
means to measure the brightness of an object;
means to set photographing information;
operating means coupled to said light measuring means and said photographing information setting means for obtaining an exposure value which corresponds to the output of both said means;
analog-digital conversion means coupled to said operating means to generate a digital signal which corresponds to the exposure value, wherein said conversion means has a plurality of detection means for a plural number of steps, one of which is placed in an activated state depending on said exposure value;
a plurality of diode arrays, each one of which is connected respectively to a corresponding one of said detection means;
an indication means connected to said diode arrays to digitally indicate said exposure value;
a pulse generation means; and
an exposure limit signal generation means responsive to said pulse generation means and to the last step of said detection means, wherein said signal generation means generates a signal to control the lighting state of said indication means when the output signals of both said means are supplied to said signal generation means.

4,032,934

AUTOMATIC FOCUSING SYSTEM

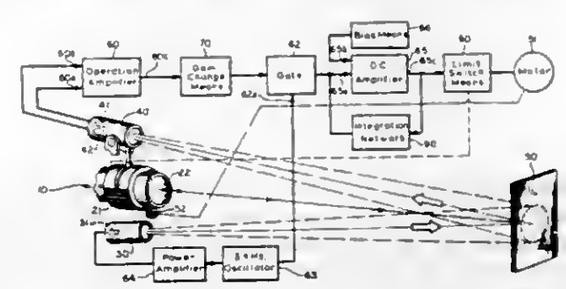
Kenneth L. Hendrickson, 7301 N. Ridge Blvd., Chicago, Ill. 60645, and Robert F. Johnston, 1112 Valley Drive, Wildwood, Ill. 60030

Filed Dec. 26, 1974, Ser. No. 536,666

Int. Cl.[2] G03B *3/10*

U.S. Cl. 354—25 7 Claims

1. In a photographic apparatus having a focusing lens movable along an axis for passing light from a far or near object toward stationary means adapted to align light sensitive media inside the appartus, means for automatically moving the lens toward said stationary means when said object is far, and away from said stationary means when said object is near, comprising:
emission means secured to said apparatus for transmitting a train of light signals toward said object at a constant angle relative to said axis;
movable first and second photoreceptors disposed in spaced relationship in said apparatus; each of said photoreceptors adapted to simultaneously receive at least a portion of said light signals upon reflection thereof from said object, said first and second photoreceptors simultaneously producing, respectively, first and second electrical signals corresponding to the portions of said light signals received;
signal translation means for receiving said electrical signals from said respective photoreceptors and producing a difference signal corresponding to the difference between said electrical signals; said difference signal having a first polarity when said first electrical signal is larger than said second electrical signal, and said difference signal having an opposite polarity when said second electrical signal is larger than said first electrical signal;
mechanical means, responsive to said difference signal for



causing movement of said lens relative to said stationary means in one direction when said difference signal is of said first polarity, and in the opposite direction relative to said stationary means when said difference signal is of said opposite polarity; said mechanical means being further adapted to cause simultaneous movement of said photoreceptors until the portions of said light signals at said photoreceptors are equalized to produce an absolute minimal difference signal indicative of said object being properly focused on by said lens; and
gain means, having a first position for maintaining the amplification of said difference signal, and a second position for raising the amplification of said difference signal; said gain means being set to said first position when said lens is moved past a predetermined point on said axis away from said stationary means, said gain means being set to said second position when said lens is moved past said predetermined point toward said stationary means, whereby the amplitude of said difference signal is automatically increased when focusing on far objects.

4,032,935

EXPOSURE CONTROL FOR PHOTOGRAPHIC APPARATUS

Peter Lermann, Narring; Friedrich Stumpf, Munich, and Gunter Fauth, Unterhaching, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed May 10, 1976, Ser. No. 684,714

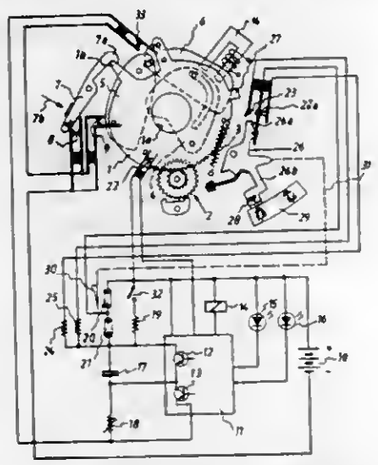
Claims priority, application Germany, May 16, 1975, 2521824

Int. Cl.[2] G03B *7/14*

U.S. Cl. 354—29 11 Claims

1. In a photographic apparatus, an exposure control comprising a diaphragm shutter including a first portion movable from a first position toward one of a plurality of second positions each of which corresponds to a different aperture size whereby such movement of said first portion results in admission of scene light, and a second portion movable from a first position to a second position subsequent to movement of said first portion from said first position to thereby terminate the

admission of scene light; first photosensitive means having a characteristic such as to effect changes in exposure time and aperture size furnished by said shutter within a first range of scene brightnesses; second photosensitive means having a characteristic such as to effect changes in exposure time at a fixed aperture size within a second range of scene brightnesses which is contiguous to said first range; selector means movable between a plurality of positions in each of which said

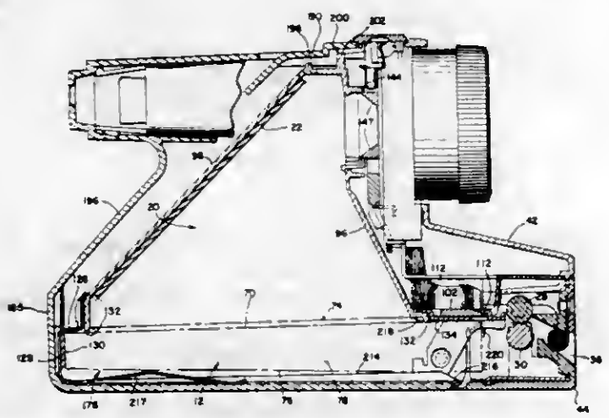


shutter is set to furnish a different maximum aperture size; and means for changing the characteristic of said second photosensitive means to a predetermined extent in response to movement of said selector means so as to insure the transition from the characteristic of said first photosensitive means to the characteristic of said second photosensitive means when said shutter furnishes the maximum aperture selected by said selector means.

4,032,936
PHOTOGRAPHIC APPARATUS HAVING FILM CONTAINER LOCATING STRUCTURE

Bruce K. Johnson, Andover, and Donald H. Hendry, Rockland, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Continuation of Ser. No. 554,779, March 3, 1975, abandoned. This application Mar. 16, 1976, Ser. No. 667,381
Int. Cl.² G03B *19/02*, *17/00*
U.S. Cl. 354—83 **28 Claims**



27. A photographic camera for use with a film container having a substantially rectangular exposure aperture defined by a rectangular projection extending outwardly from the film container, said camera comprising;

a housing section having a bottom wall;

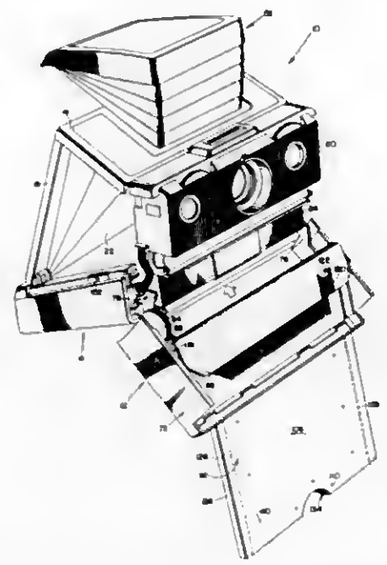
an exposure chamber cone formed of an integrally molded plastic structure and having portions thereof defining an opening, said portions being structured to receive the projection of the film container in substantially lighttight telescoping fashion to align the film container's exposure aperture with said opening of said cone, said housing section and said cone including complementary means for accurately aligning said cone in operative relationship to said housing section with said opening of said cone facing said bottom wall of said housing section, said housing section being structured to provide an opening through which the film container can be slidably inserted into said camera with the film container's exposure aperture facing said opening of said cone; and

means for pressing the film container against said cone when it is operatively positioned within said camera.

4,032,937
FILM UNIT LIGHT SHIELDING ADAPTER FOR PHOTOGRAPHIC APPARATUS

Joseph H. Wright, Marblehead, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Sept. 10, 1975, Ser. No. 612,209
Int. Cl.² G03B *17/50*, *17/26*
U.S. Cl. 354—86 **15 Claims**



1. A film unit light-shielding adapter that is configured to be removably coupled to a photographic apparatus of the type including a housing having a film exit slot therein and means for advancing a film unit along a predetermined path of travel within the housing and through the film exit slot such that at least a part of the film unit is located outside of the apparatus housing, the photographic apparatus also being of the type wherein a side of the film exit slot facing the interior of the housing is accessible to the user, said adapter comprising:

adapter means for operatively receiving a film unit that is advanced along the predetermined path of travel, said adapter means being configured to be readily inserted through the film exit slot, from the interior side thereof, such that a portion of said adapter means is located outside of the apparatus housing;

light blocking means, at least on said portion of said adapter means configured to be located outside of the apparatus housing, for blocking ambient light which otherwise may impinge upon photosensitive portions of that part of the film unit which is adapted to be located outside of the apparatus housing subsequent to the film unit having been advanced along the predetermined path of travel;

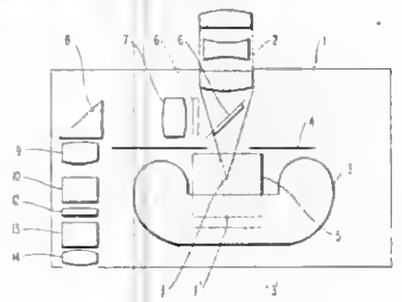
guide means on said adapter means for guiding a film unit, being advanced along the predetermined path of travel, into operative relationship with said adapter means; and

means on said adapter means being releasably engagable with structure of the photographic apparatus for releasably coupling said adapter to the apparatus and for accurately positioning said adapter in operative relation with the apparatus so that said guide means is located in a predetermined relationship with the film unit path of travel.

4,032,938
MINIATURE SINGLE LENS REFLEX CAMERA

Tohru Karikawa, and Koichi Kobayashi, both of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed June 15, 1976, Ser. No. 696,443
Claims priority, application Japan, June 20, 1975, 50-84778[U]
Int. Cl.² G03B *19/12*
U.S. Cl. 354—155 **3 Claims**



1. A miniature single lens reflex camera of the type having, a portion for receiving a film cassette with a picture aperture portion, a slide type shutter positioned in front of said receiving portion, an angled mirror in front of said shutter for directing light from the object to a finder optical system located to one side of said receiving portion, said finder optical system including at least an eyepiece and a focusing lens located optically upstream of said eyepiece, the improvement comprising,

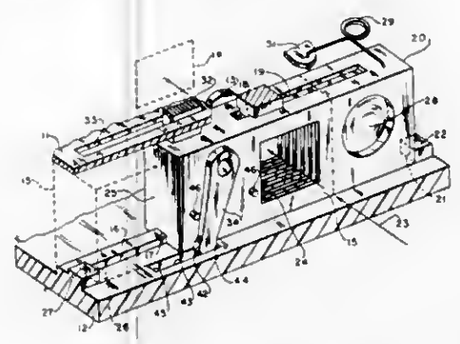
a. a glass block having parallel transparent surfaces positioned in the photographic optical path between said shutter and said picture aperture portion of said film cassette, and

b. the combination of a trapezoidal prism, a right angled prism and an equilateral prism positioned between said focusing lens and said eyepiece in an arrangement to cause the optical path length between said lens and eyepiece to be substantially greater than the physical distance therebetween.

4,032,939
LENS CARRIER DAMPING MEANS

Robert George Elton, Spencerport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 16, 1976, Ser. No. 667,328
Int. Cl.² G03B *3/00*
U.S. Cl. 354—197 **3 Claims**

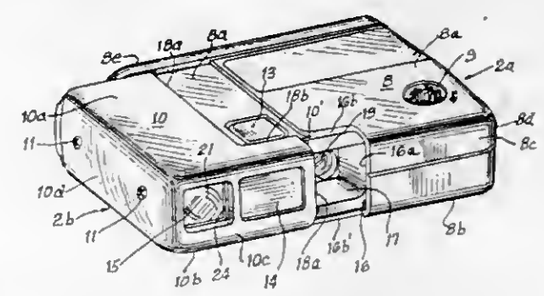


1. In a camera having a lens carrier; a stationary support structure including support means movably supporting said lens carrier; abutment means defining first and second abutment surfaces operatively engageable with said lens carrier to define respective first and second positions thereof; and resilient means adapted to resiliently bias said lens carrier toward at least one of said abutment surfaces with which said lens carrier is then in operative engagement; the improvement comprising: damping means assuming an operative condition during a final portion of the movement of said lens carrier between said two positions to reduce the impact of said lens carrier against the one of said abutment surfaces with which said lens carrier is being brought into operative engagement and assuming an inoperative condition during the initial portion of the movement of said lens carrier between said two positions; said damping means comprising a damping member provided with a cylindrical pivot shaft; bearing means defining a cylindrical bearing bore adapted to receive said pivot shaft with radial clearance between the confronting cylindrical surfaces of said bore and said shaft; a viscous damping fluid located in said radial clearance between said bore and said shaft; and damper rotating means causing pivotal movement of said damping member relative to said bearing means in response to said final portion of the movement of said lens carrier between said two positions.

4,032,940
RETRACTABLE CAMERA

Kwok Yan Chan, Hong Kong, assignor to W. Haking Industries, Ltd., North Point, Hong Kong

Continuation-in-part of Ser. No. 539,986, Jan. 10, 1975, abandoned. This application July 2, 1975, Ser. No. 592,402
Int. Cl.² G03B *13/02*
U.S. Cl. 354—219 **22 Claims**



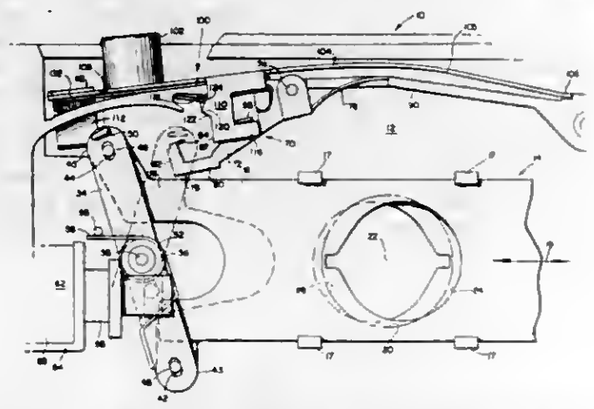
1. In a camera having a main camera section with an objective lens window exposing a light receiving surface for receiving picture-forming light rays which expose the film upon operation of camera shutter mechanism and a manually operable shutter release member, the improvement comprising a viewfinder section having front and rear normally exposed light receiving surfaces which present to the user a view of the scene to be photographed by the camera, said viewfinder section being mounted on said main housing section for movement between a retracted inoperative position, where the main housing section and viewfinder section form an overall assembly of maximum compactness, and an extended position where the viewfinder section is in an operative position to provide a view of the scene to be photographed said main camera section housing dust cover-forming means for providing a dust cover for said front and rear light receiving surfaces of said viewfinder section when said viewfinder section is in said retracted position and for exposing the same when the viewfinder section is in said extended position, and said viewfinder section having means for covering said shutter release member when said viewfinder section is in said retracted position and for exposing the same when the viewfinder section is in said extended position.

4,032,941

LATCHED SHUTTER SYSTEM HAVING AUTOMATIC DELAY OF LATCH RESET

Lawrence M. Douglas, South Easton; Patrick L. Fiselli, Sudbury; Norman D. Staller, Beverly, and Frederick Slavitter, Needham, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Aug. 28, 1975, Ser. No. 608,677
Int. Cl.² G03B 9/08
U.S. Cl. 354—230 9 Claims



1. A photographic exposure control system for a photographic camera, the camera having means for mounting photographic film material at a given focal plane, said system comprising a blade mechanism, means for mounting said blade mechanism for displacement along a given blade path between a blocking arrangement precluding transmission of scene light to the focal plane and an unblocking arrangement defining an aperture value through which scene light is transmitted to the focal plane, drive means actuatable for displacing said blade mechanism between its said arrangements, control means energizeable for actuating said drive means to initially displace said blade mechanism toward its said blocking arrangement and then, after a predetermined time, to displace said blade mechanism to its said unblocking arrangement and back again so as to define an exposure interval during which scene light is transmitted to the focal plane, latching means for precluding displacement of said blade mechanism from its said blocking position, said latching means including a latch member displaceable between a latch position wherein said latch member is located in said blade path and an unlatch position wherein said latch member is displaced from said path, and manually operative means for displacing said latch member to its said unlatch position, for energizing said control means to actuate said drive means, and for subsequently displacing said latch member back to its said latch position, said manually operative means including means for delaying the displacement of said latch member back to its said latch position for a time substantially equal to or exceeding said predetermined time so as to allow escape of the blade mechanism from the latch member as said blade mechanism is displaced toward its said unblocking arrangement to define said exposure interval.

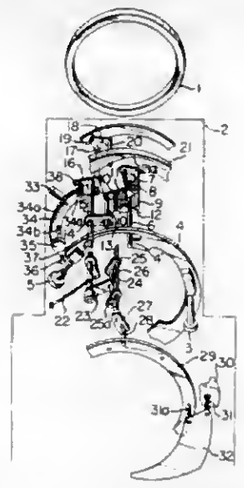
4,032,942

PRESSURE TYPE LENS TUBE FOR SINGLE LENS REFLEX CAMERA FOR INCORPORATION IN A FOLLOW-UP TYPE APERTURE-CONTROLLED CAMERA

Satuya Watanabe, Kawasaki, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed May 23, 1975, Ser. No. 580,523
Claims priority, application Japan, May 31, 1974, 49-61899[U]; May 31, 1974, 49-61900[U]
Int. Cl.² G03B 9/02
U.S. Cl. 354—272 4 Claims

1. A lens tube for a single-lens reflex camera including a shutter mechanism on the camera body and having a plurality of aperture blades normally pressed in the aperture-opening direction, comprising, in combination, an interlocking member operably associated with said aperture blades for their displacement against the pressing force given them when the member is operated, a limiting member for stopping said interlocking member at a position corresponding to a predetermined aperture-setting operation to determine the position of said blades for a desired aperture, a release means provided in interlocked relation with the shutter mechanism to actuate



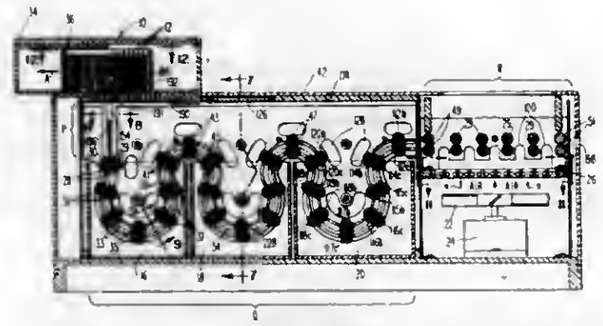
the shutter mechanism, and an operating member operable from the outside of the lens tube to actuate said interlocking member until the interlocking member is stopped by said limiting member during the initial stage of operation and to thereafter operate said release means, said release means being interlocked with said operating member for transmitting a release signal after aperture setting, said interlocking member, limiting member, release means and operating member being positioned in the lens tube.

4,032,943

DENTAL X-RAY FILM PROCESSING SYSTEM

Ernest Zwettler, Los Angeles, Calif., assignor to Pennwalt Corporation, Philadelphia, Pa.

Filed June 19, 1975, Ser. No. 588,562
Int. Cl.² G03D 17/00
U.S. Cl. 354—312 6 Claims



1. In a system for developing a plurality of films including a housing with developer, fixer and rinse tanks and a drying area therein, said housing including a position means receiver disposed for complemental receipt of a position means of a film storage magazine, said housing having a film receipt slot in a top planar surface thereof, a plurality of pairs of tangentially contacting drive rollers within a film guide track formed between two halves of a guide track frame for guiding films from said film receipt slot successively into and out of said developer, fixer and rinse tanks and into said drying area, a roller drive motor, a gear train connecting an output shaft of said roller drive motor to a driven roller of each roller pair, said gear train including a plurality of worm gears mounted on a shaft rotatably connected to said output shaft of said roller

drive motor, three tank gear drives corresponding to said three tanks each connected to one of said worm gears for driving pairs of rollers proximate said tanks, each tank gear drive including a drive gear meshed with one of said worm gears and a plurality of driven idler gears indirectly meshed in series with said drive gear for driving thereby, said pairs of rollers spaced along said film guide track so a leading edge of a film is between a next pair of rollers before a trailing edge has been released by a previous pair of rollers, the improvement comprising: a film storage magazine and a mechanism for sequentially dispensing films from said film storage magazine into said film receipt slot, said film storage magazine including:

a. an openable rectangular box having a sliding door at a first surface thereof, substantially light-tight when said sliding door is closed, a second surface of said box opposite said first surface disposed for contiquous contact with a top surface of said housing during dispensing of films from said magazine into said housing, said box including position means for complemental mating with said position means receiver, said box having first and second slots located in said second surface, said first slot for passage therethrough of film from a film holder within said box, said second slot for insertion therethrough of an index prong from said housing into engagement with teeth of a rack within said box and a third slot in a surface of said box parallel a direction of horizontal movement of said film holder and said rack within said box;
b. a film holder having a plurality of vertical film slots therethrough for receipt of single films, said film holder slideable horizontally within said box,
c. a rack having teeth along a lower surface and having pin recelving vertical slots in a lateral surface;
d. pins extending from fixed positions on a lateral surface of said film holder into said vertical slots of said rack, for preventing horizontal rack movement with respect to said film holder while permitting vertical rack movement with respect to said film holder;
e. a slider attached to said film holder and extending through said third slot in said box, for hand movement of said holder and rack together horizontally within said box;

wherein said first slot is aligned with said film receipt slot for passage of films from said box into said housing when said magazine is positioned on said housing with said position means and said position means receiver in complemental engagement; and said mechanism for sequentially dispensing films from said film storage magazine into said film receipt slot including:

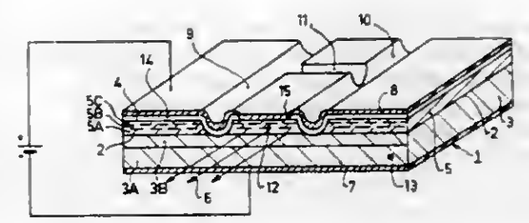
f. an index gear meshed with a gear of one of said tank gear drives for rotation therewith;
g. an index pin extending from a side surface of said index gear, remote from the axis of rotation thereof;
h. a horizontally moveable index tab slideably retained in said housing contacting said index pin as said index pin moves in a circular path, moveable horizontally upon such contact, tab movement for each complete rotation of said index gear being from an initial position to a second position and return, an extended planar portion of said tab forming a slideably moveable shutter door for opening and closing said film receipt slot, an upstanding portion of said tab forming said index prong extending out of said housing and protruding into said openable box through said second slot, having a beveled upper surface to engage any rack tooth which is in position for engagement when said magazine is positioned on said housing with said position means and said position means receiver in complemental engagement, whereby rotation of said index gear produces horizontal movement of said index tab and prong from an initial position to a second position and return, said movement resulting in opening and closing of said film receipt slot and, if said index prong is in engagement with said rack, advancement of said film holder and rack a distance by which contiguous film slots in said film bolder are separated.

4,032,944

SEMICONDUCTOR DEVICE FOR GENERATING INCOHERENT RADIATION AND METHOD OF MANUFACTURING SAME

Teunis van Dongen, and Rodolf Paulus Tijburg, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 15, 1976, Ser. No. 649,479
Claims priority, application Netherlands, Mar. 11, 1975, 7502844
Int. Cl.² H01L 33/00
U.S. Cl. 357—17 18 Claims



1. A semiconductor device for generating incoherent electromagnetic radiation and comprising:

a. a semiconductor body having at least one diode with a p,n junction, said semiconductor body comprising:
   i. a substrate region of first conductivity type,
   ii. a first layer of secondconductivity type that comprises an active part and adjoins both said substrate region and a substantially flat first surface of siad body, and
   iii. a substantially flat second surface that intersects said first surface and said p,n junction substantially at right angles, said substrate region and said first layer forming said p,n junction, said junction being capable when biased in the forward direction, of emitting recombination radiation from said second surface in a direction parallel to said p,n junction, said first surface having a groove which extends from said surface through at least the greater part of thickness of said first layer, at least said active part of said first layer being at least partially bounded by said groove and by said second surface, at least a part of said groove extending substantially parallel to said second surface,
b. connection conductor means associated respectively with said substrate region and said first layer,
c. an electrically insulating disposed over at least a major part of said first surface and comprising a contact window at said active part of said first layer, and
d. an electrically conductive electrode layer present on substantially the whole said first surface and on said insulating layer, said electrode layer adjoining said first layer within said contact window.

4,032,945

LIGHT EMITTING SEMICONDUCTOR DIODE

Mitsuhiro Mori, Kokubunji; Kazuhiro Ito, Tokyo; Makoto Morioka, Tokyo, and Yuichi Ono, Tokyo, all of Japan, assignors to Hitachi, Ltd., Japan

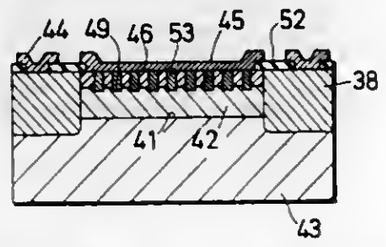
Filed July 30, 1976, Ser. No. 710,307
Claims priority, application Japan, July 30, 1975, 50-91909
Int. Cl.² H01L 33/00, 33/19
U.S. Cl. 357—18 14 Claims

1. A light emitting semiconductor diode comprising:
a first semiconductor region having a first conductivity type and a narrow forbidden band gap,
a second semiconductor region, abutting said first semicon-

ductor region, having the first conductivity type and a low impurity concentration,

a third semiconductor region, abutting said second semiconductor region, having a second conductivity type which is opposite to the first conductivity type,

a first ohmic contact disposed on the surface of said first semiconductor region, which is opposite to the surface thereof abutting said second semiconductor region,



a second ohmic contact on a surface of said third semiconductor region, which is not opposite to the surface thereof abutting said second semiconductor region,

a plurality of holes extending from the outer surface of and through said first semiconductor region toward a p-n junction between said second and third semiconductor regions, which holes are filled with a metal which is both highly reflective and has a high thermal conductivity.

4,032,946

APPARATUS FOR SELLING BETTING TICKETS

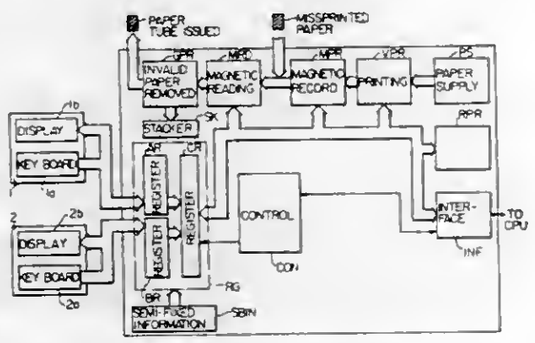
Yuzo Wakatsuki; Masanobu Miyake, both of Tokyo, and Kazuyuki Hano, Kawasaki, all of Japan, assignors to Fujitsu Ltd., Kawasaki and The Japan Racing Association, Tokyo, both of, Japan

Filed Sept. 8, 1976, Ser. No. 721,578

Claims priority, application Japan, Sept. 13, 1975, 50-111237

Int. Cl.² G06F *3/12, 7/38, 15/02, 15/28*

U.S. Cl. 364—900 **14 Claims**



1. An apparatus for use with a central processor in selling betting tickets wherein betting information recorded on an original betting ticket may be altered by said central processor in accordance with operator instructions and a new betting ticket containing altered betting information issued, said apparatus comprising means for reading the betting information from said original betting ticket, means for displaying said betting information, indication means responsive to said operator instructions for providing an output indicating the betting information to be altered, said central processor being responsive to said output of said indication means for altering the betting information so as to provide said altered betting information, and recording means for recording the altered betting information on said new betting ticket.

4,032,947

CONTROLLABLE CHARGE-COUPLED SEMICONDUCTOR DEVICE

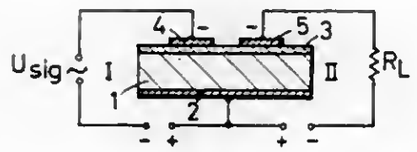
Günther Kesel, and Reinhard Losehand, both of Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Continuation of Ser. No. 297,338, Oct. 13, 1972, abandoned. This application Jan. 2, 1975, Ser. No. 538,124

Claims priority, application Germany, Oct. 20, 1971, 2152293

Int. Cl.² H01L *29/78, 29/48, 27/10, 27/15*

U.S. Cl. 357—24 **12 Claims**



1. A semiconductor arrangement comprising a planar-shaped n- or p- type semiconductor substrate, a first electrode contacting the semiconductor substrate blocking-free on one side thereof, a layer of silicon dioxide not greater than 5000 nm thick covering the other side of said semiconductor substrate, a system of straight-line running electrical conductor paths insulated from each other electrically and defining at least two sets of which divide the surface of the SiO_2 layer into a net-like pattern, a plurality of electrodes coupled electrically to the semiconductor substrate capacitively and arranged on said silicon dioxide layer and arranged into electrode groups, and each adjoining electrode group is separated by electrode-free regions respectively, and in which all electrode groups are similar to each other, and the shortest distance "W" between each of the two electrodes within each individual group is not greater than:

$$W = (U \cdot \epsilon_H / N \cdot e)^{1/2}$$

where, (ϵ_H = dielectricity constant of the semiconductor, U = distance of the Fermi level from the lower band edge in an n-conducting semiconductor, or the upper band edge in a p-conducting semiconductor, respectively, N = net concentration of the doping atoms, and $e = 1.6\ 10^{-19}$ Coulomb), and wherein all electrode groups are arranged in pairs in the same fashion on one grid element of the matrix formed by said straight line electrical conductor paths on said silicon dioxide layer, and the individual electrodes of each individual group are electrically connected on one grid element at a time which forms the conducting path pattern in such a way, that in no electrode group two electrodes are connected to the same conductor path pattern and no two conductor paths are connected with the same electrode and at least a pair of controls wherein each conductor path, and each electrode of each electrode group can be individually addressed when said pair of controls supply voltages and detect current from said electrodes.

4,032,948

SURFACE CHARGE LAUNCHING APPARATUS

William E. Engeler, Scotia, and Jerome J. Tiemann, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 84,666, Oct. 28, 1970, abandoned. This application Feb. 12, 1973, Ser. No. 331,483

Int. Cl.² H01L *27/10, 29/78*

U.S. Cl. 357—24 **2 Claims**

1. Device for introducing levels of charge in surface charge apparatus in accordance with an information bearing signal comprising

a semiconductor substrate of one conductivity type having a surface adjacent portion,

a first conductive member insulatingly overlying said surface adjacent portion of said substrate,

means for applying a first biasing voltage to said first conductive member with respect to said substrate to form a first depletion region in the surface-adjacent portion of said substrate underlying said first conductive member having a surface potential of a first value in the absence of minority carriers in said first depletion region,

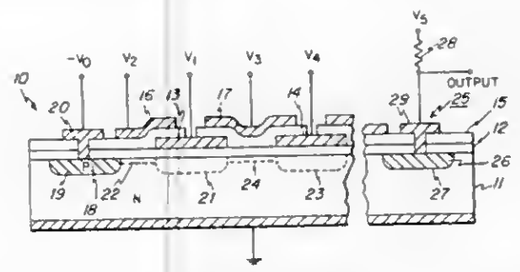
a region of opposite conductivity type in said surface adjacent portion of said substrate spaced from said depletion region,

a barrier region in said substrate between said region of opposite conductivity and said first depletion region,

means for applying a second biasing voltage to said region of opposite conductivity type with respect to said substrate to provide a potential in said region of opposite conductivity type of a second value with respect to said substrate,

the surface potential of said depletion region of said first value being energetic lower than the potential of said second value for minority carriers in said substrate,

a second conductive member insulatingly overlying said barrier region,



means for applying a control voltage between said second conductive member and said substrate for lowering the surface potential of said barrier region to a third value lower than said second value to cause the surface potential of said first depletion region to equilibrate with the potential of said region of opposite conductivity type thereby to establish in said first depletion region a predetermined level of charge dependent on said first and second values of voltage,

a plurality of spaced conductor members insulatingly overlying the surface adjacent portion of said substrate to form an information storage and transfer channel for the transfer of electrical charge along the surface adjacent portion of said substrate,

means for applying periodic phase related voltages to said spaced conductor members to incrementally move charge in said storage and transfer channel,

means for maintaining said first biasing voltage fixed during a period of said phase related voltages,

means for periodically transferring charge introduced in said first depletion region into a depletion region of said storage and transfer channel for transfer therealong.

4,032,949

INTEGRATED CIRCUIT FUSING TECHNIQUE

Robert W. Bierig, Sudbury, Mass., assignor to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 577,805, May 15, 1975, abandoned, which is a continuation of Ser. No. 435,612, Jan. 22, 1974, abandoned. This application Oct. 18, 1976, Ser. No. 733,743

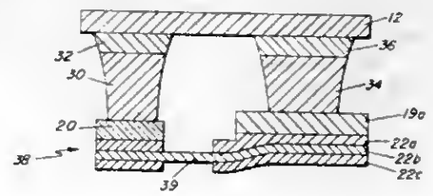
Int. Cl.² H01L *27/02, 23/48, 29/44, 29/52*

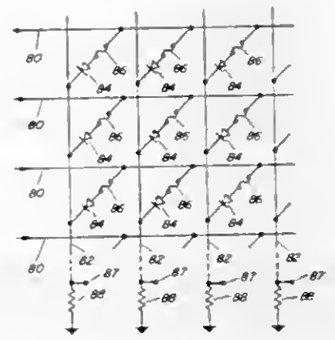
U.S. Cl. 357—51 **20 Claims**

1. In combination:

an integrated circuit substrate having a plurality of conductive regions on at least one surface thereof; and

fuse means upon said surface, said fuse means having first and second terminals and a fusible link, said fusible link being coupled between said first and second terminals, said first and second terminals each forming a portion of at least one of said conductive regions, and said fusible link being suspended between said first and second terminals, said fusible link being substantially coplanar with adjacent portions of said first and second terminals, the





density of current through said fusible link being substantially uniform, and lateral surfaces of said fusible link being separated from any layers of solid material.

4,032,950

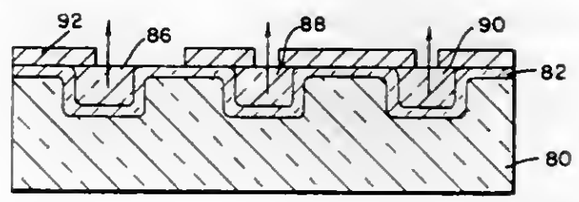
LIQUID PHASE EPITAXIAL PROCESS FOR GROWING SEMI-INSULATING GAAS LAYERS

G. Sanjiv Kamath, Malibu, and Bradley W. Smith, Oxnard, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Division of Ser. No. 530,336, Dec. 6, 1974, Pat. No. 3,994,755. This application Aug. 16, 1976, Ser. No. 714,872

Int. Cl.² H01L *33/00*

U.S. Cl. 357—17 **2 Claims**



1. A gallium arsenide solid state display structure comprising:

a. a gallium arsenide substrate having a plurality of cavities therein,

b. a semi-insulating layer of gallium arsenide covering said cavities, and

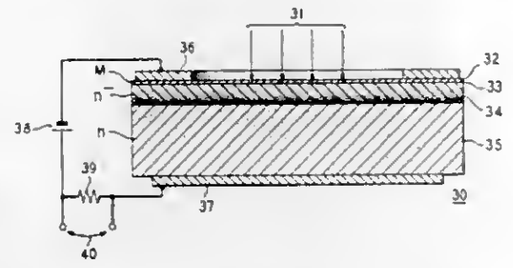
c. a plurality of distinct and electrically isolated gallium arsenide epitaxial islands formed on portions of said semi-insulating layer and coplanar with the other remaining portions of said semi-insulating layer, whereby said structure is comprised of but one inter metallic III-V compound material which is crystallographically, electrically and physically suitable for the construction of monolithic GaAs light emitting displays.

4,032,951

GROWTH OF III-V LAYERS CONTAINING ARSENIC, ANTIMONY AND PHOSPHORUS, AND DEVICE USES

John Christian De Winter, Howell Township, Monmouth County; Robert Edward Nahory, Lincroft, and Martin Alan Pollack, Westfield, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 13, 1976, Ser. No. 676,556
Int. Cl.² H01L 33/00
U.S. Cl. 357—17 17 Claims



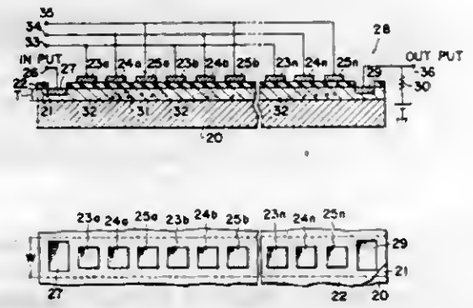
1. An electronic device subassembly article of manufacture comprising a plurality of solid layers, including a first layer of solid material having a surface at least a portion of which is coated with a second layer adhering thereto, said second layer being a crystalline intermixture characterized in that said intermixture has at least one Group III constituent, including gallium, and at least three Group V constituents, including arsenic, antimony and phosphorus, said second layer being such that said crystalline intermixture has an essentially smooth surface accommodating deposition of additional layers of material in said subassembly or in electronic devices incorporating said subassembly in manufacture.

4,032,952

BULK CHARGE TRANSFER SEMICONDUCTOR DEVICE

Shinya Ohba, Kokubunji; Iwao Takemoto, Kodaira, and Masaharu Kubo, Hachioji, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Apr. 3, 1973, Ser. No. 347,426
Claims priority, application Japan, Mar. 7, 1973, 48-26113; Apr. 3, 1972, 47-32655; July 26, 1972, 47-74865; Jan. 16, 1973, 48-6645; Jan. 24, 1973, 48-9521; Feb. 2, 1973, 48-2966; Feb. 2, 1973, 48-2967
Int. Cl.² H01L 29/78
U.S. Cl. 357—24 73 Claims



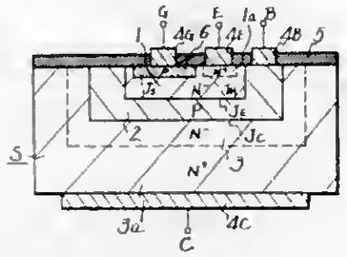
1. A bulk charge transfer semiconductor device comprising:
a substrate;
a semiconductor body wherein majority carriers are to be transferred, disposed on the substrate, which is electrically isolated from the substrate;
a series of electrodes disposed over the semiconductor body while being electrically isolated from the semiconductor body;
means for introducing majority carriers into the semiconductor body, disposed on the semiconductor body, disposed on the semiconductor body adjacent one end of said series of electrodes;
means for detecting said introduced majority carriers, disposed on said semiconductor body adjacent the other end of said series of electrodes; and
means for applying voltages to the electrodes for forming depletion regions within the semiconductor body so that majority carriers are pushed out by said depletion regions toward said detecting means, thereby transferring introduced majority carriers along the semiconductor body; and wherein
the thickness of the semiconductor body is less than the depth of said depletion regions and the width of the semiconductor body, which is the dimension of the semiconductor body perpendicular to the direction in which the majority carriers are transferred, is less than the total length of the width of an electrode in a direction perpendicular to the transit direction of the majority carriers and parallel to the surface of said semiconductor body and twice the depletion width spread from the edges of an electrode toward a direction perpendicular to said transit direction and parallel to the surface of said semiconductor body.

4,032,953

SENSING CIRCUITS

Sadao Suzuki, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Apr. 25, 1975, Ser. No. 571,687
Claims priority, application Japan, May 10, 1974, 49-52108
Int. Cl.² H01L 29/66, 29/74, 27/02; H03K 3/26
U.S. Cl. 357—25 2 Claims



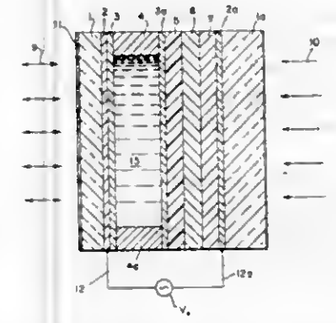
1. A sensing circuit which comprises a four-terminal semiconductor device having a first semiconductor region of one conductivity type, a second semiconductor region of the opposite conductivity type adjacent said first region with a first semiconductor junction therebetween, a third semiconductor region of the same type as said first region adjacent said second region with a second semiconductor junction therebetween, said first and third regions of the semiconductor device having an impurity concentration of substantially the same order of magnitude and a fourth semiconductor region of the same conductivity type as said second region being provided in contact with said first region at a position which is spaced from said first junction by a distance which is smaller than the diffusion distance of the minority carriers forming a potential barrier, a potential source, a bias circuit for said second semiconductor region, a sensing element connected between said fourth and first semiconductor regions, said sensing element having a resistance value dependent upon a given environment condition, a biasing circuit for said first semiconductor region, a load connected between said potential source and said third semiconductor region, and an output terminal connected to said third semiconductor region.

4,032,954

SILICON SINGLE CRYSTAL CHARGE STORAGE DIODE

Jan Grinberg, Los Angeles; Lewis M. Fraas, Malibu; William P. Bleha, Jr., Pacific Palisades, and Paul O. Braatz, Los Angeles, all of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed June 1, 1976, Ser. No. 691,652
Int. Cl.² H01L 27/14
U.S. Cl. 357—30 5 Claims



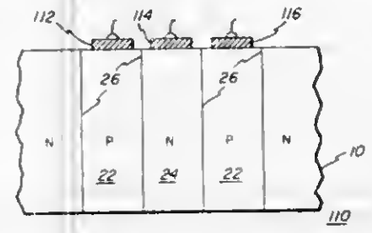
1. A photodiode for an alternating current driven light valve of the type wherein the photocapacitance of a light responsive semiconductor layer of said diode which is supported on a transparent substrate of said valve to receive light transmitted therethrough can be modulated in response to changes in the intensity of such incident light, the improvement in said diode comprising:
a. first and second semiconductor layers forming the rectifying junction of a charge storage photodiode;
b. said first layer being a light responsive single crystal silicon photoconductor the photocapacitance of which can be modulated in response to changes in the intensity of said incident light and said second layer being a semiconductor having a polarity opposite to that of said first layer;
c. said first layer comprising a first region of semiconductor material having a low density of defect centers and a second region of semiconductor material having a higher density of defect centers, said second region being contiguous with said junction and said first region being contiguous with said second region and being exposed to receive said incident light which is effective to generate charge carriers which are stored in said second region and which change the photocapacitive depletion width adjacent said junction to enhance the sensitivity of said diode, the defect centers of said second region of said single crystal silicon first layer forming slow recombination centers.

4,032,955

DEEP DIODE TRANSISTOR

Thomas R. Anthony, and Harvey E. Cline, both of Schenectady, N.Y., assignors to General Electric Company, Scheuectady, N.Y.

Filed Aug. 9, 1976, Ser. No. 712,716
Int. Cl.² H01L 29/72, 29/00, 29/04
U.S. Cl. 357—34 24 Claims



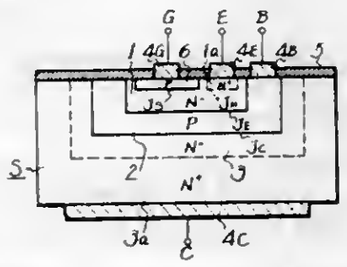
1. A semiconductor transistor comprising
a body of semiconductor material having two opposed major surfaces forming respectively the top and bottom surfaces of the body, a predetermined level of resistivity, a predetermined first type conductivity, a preferred crystal structure and a vertical axis substantially perpendicular to the major opposed surfaces and aligned substantially parallel with a first preferred crystal axis of the material of the body;
at least one of the opposed major surfaces having a predetermined crystal planar orientation which is one selected from the group consisting of (100), (110) and (111);
at least three integral planar-like regions of alternate and opposite type conductivity formed in the body to form, respectively, the collector, the base, and the emitter regions of the transistor;
at least one of the planar-like regions comprising recrystallized semiconductor material of the body having a predetermined type conductivity and a predetermined level of resistivity and so oriented within the body as to be aligned with a second preferred crystal axis of the material of the body;
each of the planar-like regions extending between, and terminating in, the opposed major surfaces of the body, the region having a vertical aligned substantially parallel with the vertical axis of the body and opposed end surfaces, each of which is coextensive with a respective one of the opposed major surfaces;
the recrystallized material is formed in situ by the migration of a melt of metal-rich semiconductor material of the body through the material of the body by thermal gradient zone melting at a predetermined elevated temperature along a thermal gradient substantially parallel with the first preferred crystal axis and the vertical axis of the body and has a predetermined level of concentration of the metal of the melt as determined by the solid solubility limit of that metal in that semiconductor material at that predetermined elevated temperature of migration and the metal is distributed substantially uniformly throughout the entire region;
the metal consisting of at least one dopant impurity material to impart the type conductivity and level of resistivity to the planar region;
a P-N junction formed by the abutting, contiguous surfaces of the material of each of the planar regions and the material of the body, and
each P-N junction being substantially perpendicular to, and exposed at, the major opposed surfaces of the body.

4,032,956

TRANSISTOR CIRCUIT

Hajime Yagi, Tokyo, and Tadaharu Tsuyuki, Isehara, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 427,647, Dec. 26, 1973, abandoned. This application Apr. 17, 1975, Ser. No. 569,309
Claims priority, application Japan, Dec. 29, 1972, 48-551; May 8, 1974, 49-50871; May 9, 1974, 49-51563
Int. Cl.² H01L 29/00, 29/72, 29/747, 27/02
U.S. Cl. 357—37 10 Claims



1. A semiconductor device adapted for providing controlled amplification, comprising:
a. a first semiconductor region of given concentration and

first conductivity type having a first electrode in contact therewith;

b. a second semiconductor region of a second conductivity type opposite to said first type forming a first PN junction with said first region, said second region having a second electrode in contact therewith;

c. a third semiconductor region of first conductivity type forming a second PN junction with said second region which is spaced from said first PN junction by said second region, said third region having a third electrode in contact therewith;

d. a control semiconductor region of second conductivity type forming a third PN junction with said first region which is spaced from said first PN junction by said first region, said control region having a control electrode attached thereto;

e. means connected to said first, second, and third electrodes for applying voltage potentials to said first, second, and third regions, and to forward bias said first PN junction to permit transporting of majority carriers in said first region to said third region;

f. the distance between said first and third junctions being smaller than the diffusion length of the minority carriers in said first region, a current of minority carriers in said first region injected from said third junction being substantially equal to that from said first junction when no voltage potential is applied to said control electrode; and

g. control voltage means connected to said control electrode for applying a voltage potential to said control region for changing said current of injected minority carriers from said third junction;

whereby the current gain of the device is adjustable by the control voltage means.

4,032,957
SEMICONDUCTOR DEVICE

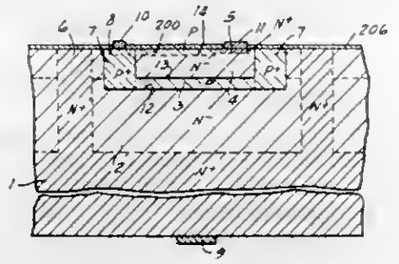
Hajime Yagi, Tokyo, and Tadaharu Tsuyuki, Isehara, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 427,647, Dec. 26, 1973, abandoned. This application Oct. 7, 1975, Ser. No. 620,293

Claims priority, application Japan, Dec. 29, 1972, 48-551; Oct. 31, 1974, 49-125868

Int. Cl.² H01L *29/00, 29/72, 29/747, 27/02*

U.S. Cl. 357—37 **8 Claims**



1. A semiconductor device comprising:

a first semiconductor region of a first conductivity type;

a second semiconductor region of a second conductivity type forming a first P-N junction with said first region;

a third semiconductor region of said first conductivity type forming a second P-N junction with said second region which is spaced from said first P-N junction by said second region;

a fourth semiconductor region of said second conductivity type forming a third P-N junction with said first region which is spaced from said first P-N junction by said first region;

means for biasing said first junction forwardly and transporting the majority carriers in said first region to said third region, said fourth region not being connected to external biasing;

the distance between said first and third junctions being smaller than the diffusion length of minority carriers in said first region; and

the width of said fourth region being selected such that the current of minority carriers in said first region injected from said third junction is substantially equal to that from said first junction.

4,032,958
SEMICONDUCTOR DEVICE

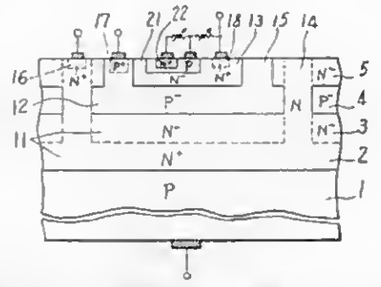
Hajime Yagi, Tokyo, and Tadaharu Tsuyuki, Isehara, both of Japan, assigoors to Sony Corporation, Tokyo, Japan

Continuation of Ser. No. 459,913, April 11, 1974, abandoned, which is a continuation-in-part of Ser. No. 427,647, Dec. 26, 1973, abandoned. This application Oct. 15, 1975, Ser. No. 622,527

Claims priority, application Japan, Dec. 29, 1972, 48-551; Apr. 18, 1973, 48-43881

Int. Cl.² H01L *29/00, 29/747, 27/02, 29/72*

U.S. Cl. 357—37 **5 Claims**



1. A semiconductor device comprising:

a. a first semiconductor region of a first conductivity type;

b. a second semiconductor region of a second conductivity type forming a first PN junction with said first region;

c. a third semiconductor region of said first conductivity type forming a second PN junction with said second region which is spaced from said first junction by said second region;

d. a fourth semiconductor region of said second conductivity type forming a third PN junction with said first region which is spaced from said first PN junction by said first region, the distance between said first and third junctions being smaller than the diffusion length of minority carriers in said first region;

e. means for applying an input signal between said first and second regions and transporting majority carriers in said first region to said third region; and

f. control means connected at least to said fourth region for applying a bias voltage between said first and fourth regions whereby the ratio of current of said majority carriers to input current may be adjusted by changing said bias voltage.

4,032,959
SHIELDED SUPERCONDUCTING INDUCTOR DEVICE

Roger W. Boom; Ronald W. Moses, Jr.; Harold A. Peterson, and Warren C. Young, all of Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed Dec. 18, 1974, Ser. No. 533,852

Int. Cl.² H01L *39/08;* **H01F** *27/36;* **H02J** *15/00*

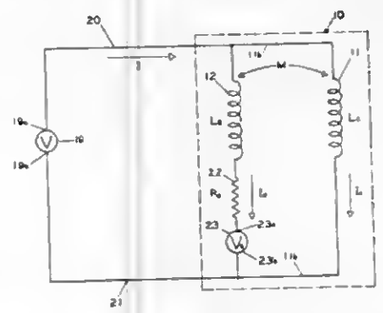
U.S. Cl. 323—44 F **18 Claims**

1. A shielded superconducting inductor device comprising:

a. an inductive coil having at least one turn of conductor, said conductor being composed of a superconducting material;

b. a magnetic shield having at least one turn of normal conducting material, said magnetic shield and said inductive coil being electrically connected together in parallel so as to be mutually aiding; and

c. the self inductance of said magnetic shield being substantially equal to the mutual inductance between said magnetic shield and said inductive coil, substantially all of the time-varying currents impressed on the shielded superconducting inductor device being conducted by said shield and the time-varying current conducted by said superconducting inductor being substantially zero.



4,032,960
ANISOTROPIC RESISTOR FOR ELECTRICAL FEED THROUGHS

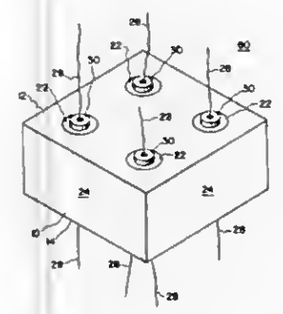
Thomas R. Anthony, and Harvey E. Cline, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jan. 30, 1975, Ser. No. 545,482

The portion of the term of this patent subsequent to Sept. 21, 1993, has been disclaimed.

Int. Cl.² H01L *27/02, 29/04*

U.S. Cl. 357—51 **33 Claims**



1. An anisotropic resistor comprising

A body of single crystal semiconductor material having two major opposed surfaces, forming, respectively, the top and bottom surfaces of the body, a first predetermined level of resistivity, a predetermined first type conductivity, a preferred crystal structure and a vertical axis substantially perpendicular to the major opposed surfaces;

at least one of the opposed major surfaces having a predetermined crystal planar orientation which is one selected from the group consisting of (100), (110) and (111);

at least one electrically conductive channel region disposed in the body, extending between, and terminating in, the two major opposed surfaces and having opposed end surfaces coextensive with the respective major surface of the body in which the end surface is disposed;

the material of each channel region comprising recrystallized material of the body formed in situ by the migration of a melt of metal-rich semiconductor material of the body by thermal gradient zone melting at a predetermined elevated temperature along a thermal gradient, established in a predetermined relationship with the opposed major surfaces and the vertical axis of the body, and having the metal of the melt substantially uniformly distributed throughout the entire channel region as an impurity therein, the level of concentration of the metal of the melt in the recrystallized semiconductor region is determined by the solid solubility limit of that metal in that semiconductor material at that predetermined elevated temperature to import a predetermined second type conductivity and a second predetermined level of resistivity thereto, and

the body and casb channel region functions as an anisotropic resistor feed through when electrical conducting means are affixed to predetermined surface areas of the same.

4,032,961
GATE MODULATED BIPOLAR TRANSISTOR

B. Jayant Baliga, Schenectady; Douglas E. Houston, and Surinder Krishna, both of Ballston Lake, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 515,164, Oct. 16, 1974, Pat. No. 3,979,769. This application Aug. 23, 1976, Ser. No. 716,810

Int. Cl.² H01L *29/66, 29/72, 27/92*

U.S. Cl. 357—57 **12 Claims**

1. A gate modulated bipolar transistor including

an emitter region, at least one collector region, a base region and at least one gate region integral with the base region;

a first region having opposed major surfaces, which are, respectively, the top and bottom surfaces thereof, and a first type conductivity, the first region comprising the base and gate regions;

a second region having opposed major surfaces, which are, respectively, the top and bottom surfaces thereof, and a second and opposite type conductivity, the second region comprising the emitter region;

the top surface of the second region being coextensive with the bottom surface of the first region;

a first P-N junction formed by the contiguous surfaces of the material of the first and second regions of opposite type conductivity;

at least two spaced third regions of second type conductivity disposed in a portion of the top surface of the first region and extending into the first region a distance less than the thickness of the first region, each third region functioning as a collector region and having a top surface coextensive with the top surface of the first region a selected wall surface opposed to a selective wall surface of a mutually adjacent third region thereby defining a gate region therebetween;

a second P-N junction formed by the contiguous surfaces of the material of abutting first and third regions of opposite type conductivity;

the distance between the opposed selective wall surfaces of the spaced collector regions being less than 1.414 times

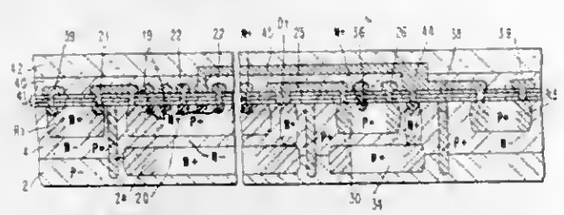
the depletion layer width of the second P-N junction at breakdown of the device;
a fourth region of first type conductivity disposed in a portion of the top surface of each of the gate regions, each fourth region having a top surface coextensive with the top surface of the third regions and the gate regions and a level of resistivity which is less than that of the gate region;
the width of each fourth region is equal to less than 0.828 times the depletion layer width of the second P-N junction at breakdown;
a plurality of first ohmic electrical contacts, each contact is affixed to one of the fourth regions;
a second ohmic electrical contact affixed to the bottom surface of the second region;
a plurality of third electrical contacts, each contact being affixed to one of the third regions, and wherein
when a variable voltage source, operating between predetermined limits, is connected to the first ohmic electrical contact to drive the gate region and reverse bias is applied to the collector region via the third ohmic electrical contacts, an increase in the gate-collector reverse bias decreases the emitter and collector currents and the transistor functions as a negative resistance element, the magnitude of which is modulated by the variable voltage source.

4,032,962

HIGH DENSITY SEMICONDUCTOR INTEGRATED CIRCUIT LAYOUT

John Balyoz, Hopewell Junction; Algirdas Joseph Gruodis, Wappingers Falls; Teh-Sen Jen, Fishkill, and Wadie Faltas Mikhail, Poughkeepsie, all of N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed Dec. 29, 1975, Ser. No. 644,775
Int. Cl.² H01L *23/48, 29/44, 29/52, 29/60*
U.S. Cl. 357—68 **40 Claims**



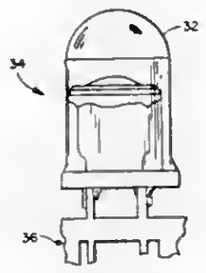
1. An integrated circuit formed in a semiconductor body comprising:
a first device including an elongated impurity region and a set of other regions in said elongated region to form a set of diode junctions;
said elongated region being capable of containing a predetermined maximum number of said other regions;
a second device located adjacent the narrow side of said first device;
a first set of conductors disposed above and insulated from said first device by a first layer of electrically insulative material;
said first set of conductors extending over said elongated region orthogonally with respect to the elongated direction;
means interconnecting selected ones of said set of other regions with selected ones of said first set of conductors;
the number of said other regions so interconnected being less than said predetermined maximum number;
at least one other conductor disposed above and insulated from said first set of conductors by a second layer of electrically insulative material;
said other conductor connected to an impurity region of said second device and extending substantially parallel to said elongated direction.

4,032,963

PACKAGE AND METHOD FOR A SEMICONDUCTOR RADIANT ENERGY EMITTING DEVICE

Gene P. Thome, Scottsdale, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 502,582, Sept. 3, 1974, abandoned. This application May 5, 1976, Ser. No. 683,552
Int. Cl.² H01L *23/28, 23/02, 23/12*
U.S. Cl. 357—72 **2 Claims**



1. Structure for protecting a semiconductor chip capable of emitting radiant energy comprising:
a. a pair of continuous, separated electrically conducting beam leads each having elongated portions and each terminating at their respective same ends in a pair of chip terminal locations angularly disposed to its respective elongated portion;
b. a semiconductor chip electrically coupled to said pair of chip terminal locations;
c. a solid injection molded outer plastic acrylic or polycarbonate housing material having side, top and bottom surfaces surrounding the semiconductor chip and extending downwardly from the semiconductor chip;
d. a plurality of surfaces forming angles with respect to each other comprising substantial portions of said pair of leads and the semiconductor chip located within said outer plastic housing and at least one of said angles being disposed on each of said elongated portions;
e. an encapsulating layer entirely covering the entire semiconductor chip and all said angular surfaces constituted by portions of said pair of leads and the semiconductor chip and extending downwardly at least to the outer plastic housing bottom surface;
f. said encapsulating layer being in direct contact with internal portions of said outer plastic housing for protecting said outer plastic housing from stress releasing chemicals;
g. said encapsulating layer comprising a material more resilient than said outer plastic housing; and
h. said outer plastic housing and said encapsulating layer comprising material for transmitting radiant energy emitted by the semiconductor chip.

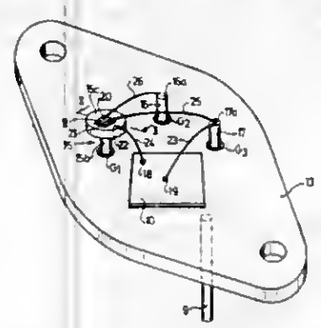
4,032,964

MULTIPLE HYBRID SEMICONDUCTOR STRUCTURE

Karl-Ernst Boeters, Berlin, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Feb. 23, 1976, Ser. No. 660,719
Claims priority, application Germany, Mar. 13, 1975, 2510982
Int. Cl.² H01L *23/02, 23/16*
U.S. Cl. 357—74 **10 Claims**

1. Multiple hybrid semiconductor structure comprising a power semiconductor element (10) and a driver or low-power semiconductor element (11) connected to drive said power element (10);
an apertured base plate (13) to which said power semiconductor element (10) is secured
to provide a heat sink and heat dissipating element therefore;
a combination support carrier and electrical terminal (15) comprising a metallic rotation-symmetrical body (15, 15′) passing through an aperture of the base plate on which the other of said elements (11) is secured;
and an insulating seal (G_1) mechanically securing and electrically insulating the rotation symmetrical support carrier (15, 15′) in, and with respect to the base plate (13) whereby said carrier (15, 15′) will directly support the driver semiconductor element (11) and form a terminal post for the structure which is electrically separate from the base plate (13).

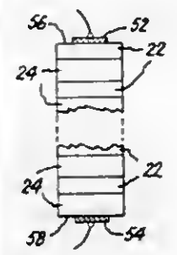


4,032,965

SEMICONDUCTOR VARISTOR EMBODYING A LAMELLAR STRUCTURE

Harvey E. Cline, and Thomas R. Anthony, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 556,740, March 10, 1975, abandoned, which is a continuation of Ser. No. 411,016, Oct. 30, 1973, abandoned. This application Apr. 19, 1976, Ser. No. 678,292
Int. Cl.² H01L *23/32, 29/04, 29/167*
U.S. Cl. 357—76 **20 Claims**



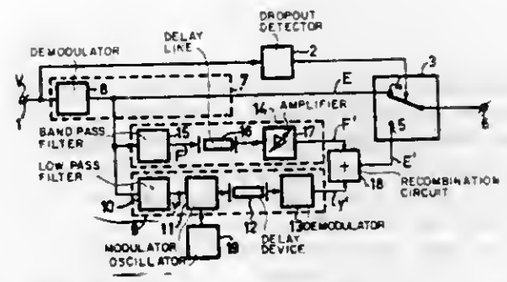
1. A varistor comprising
a body of semiconductor material having two opposed major surfaces forming respectively the top and bottom surfaces of the body, a predetermined level of resistivity, a predetermined first type conductivity, a preferred crystal structure and a vertical axis substantially perpendicular to the major opposed surfaces aligned substantially parallel with a first crystal axis of the semiconductor material of the body;
at least one of the opposed major surfaces having a predetermined crystal planar orientation which is one selected from the group consisting of (100), (110), and (111);
a plurality of spaced planar regions formed in the body, each region consisting of recrystallized semiconductor material of the body having a second and opposite type conductivity and a predetermined level of resistivity and so oriented as to be aligned with a second preferred crystal axis of the material of the body;
each of the spaced planar regions extending between, and terminating in, the opposed major surfaces of the body and oriented substantially perpendicular thereto and having a vertical axis aligned substantially parallel with the vertical axis of the body and the first preferred crystal axis of the material of the body;
the recrystallized material of each spaced planar region is formed in situ by the migration of a melt of metal-rich semiconductor material of the body through the material of the body by thermal gradient zone melting at a predetermined elevated temperature along a thermal gradient aligned substantially parallel with the first preferred crystal axis, and the vertical axis of the body and has a predetermined level of concentration of the metal of the melt therein as determined by the solid solubility limit of that metal in that semiconductor material at that predetermined elevated temperature of migration;
the metal includes at least one dopant impurity material to impart the predetermined type conductivity and predetermined level of resistivity to the recrystallized semiconductor material and the metal is distributed substantially uniformly throughout the material of the region;
a P-N junction formed by the abutting, contiguous surfaces of the material of opposite type conductivity of each of the planar regions and that of the body;
each P-N junction being substantially perpendicular to, and exposed at, the major opposed surfaces of the body;
the spaced planar regions and the material of the body between each pair of planar regions defining a lamellar structure of a plurality of integral diodes arranged in a series electrical circuit relationship, and
electrical contact means affixed to selected surface areas of the body to enable a predetermined number of P-N junctions to be biased and cause the integral diode structure defined by the contact means to function as a varistor when electrical potential is applied thereto.

4,032,966

DROP OUT COMPENSATION DEVICE

George Churchill Kenney, Briarcliff Manor, N.Y., and Adrianus Hulbert Hoogendijk, Eindhoven, Netherlands, assignors to U.S. Philips Corporation and North American Philips Corporation, both of New York, N.Y.

Filed Sept. 10, 1975, Ser. No. 612,251
Claims priority, application Netherlands, May 30, 1975, 7506411
Int. Cl.² H04N *5/76*
U.S. Cl. 358—8 **1 Claim**



1. A drop-out compensation device for compensating for drop-outs in a modulated color television video signal, comprising a first demodulator having an input terminal connected to the input of said compensation device for converting said video signal into a demodulated composite luminance-chroma signal, a first filter means connected to an output of said first demodulator for separating the chroma from said composite demodulated signal, a first delay line connected to an output of said first filter means for delaying said chroma signal by one television line period, a second delay line connected to the input terminal of the compensation device and to the input of said first demodulator for delaying the modulated color television signal by one television line, a second demodulator connected to an output of said second delay line for demodulating said delayed video signal, second filter means connected to an output of said second demodulator for separating said luminance signal from said delayed modulated video signal, a drop-out detector connected to the input of said compensating device for providing a drop-out detection signal, an output

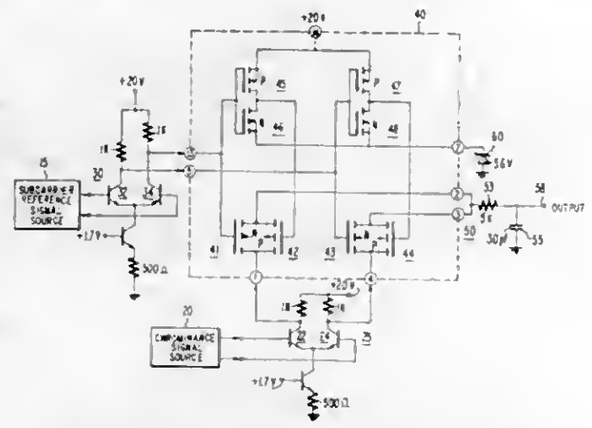
terminal for said compensation device, and an output summing and switching circuit means connected to the output terminal of said compensation device, to the drop-out detector, to the first demodulator, to said first delay line and to said second filter means for providing the output of said first demodulator to said compensation device output terminal in the absence of a drop-out detection signal and for providing a signal corresponding to the sum of the output signals from said first delay line and said second filter means is response to the presence of a drop-out detection signal.

4,032,967

COMPLEMENTARY FIELD EFFECT TRANSISTOR SIGNAL MULTIPLIER

Leopold Albert Harwood, Somerville, N.J., assignor to RCA Corporation, New York, N.Y.

Filed May 28, 1976, Ser. No. 691,205
Int. Cl.² H04N 9/50; H03K 17/56; H03D 3/18
U.S. Cl. 358—23 **10 Claims**



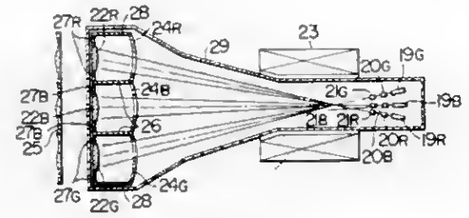
1. Electrical signal multiplier apparatus comprising:
a first pair of parallel coupled, complementary conductivity field effect transistors each having an input electrode and an output electrode defining a conduction path therebetween, and a control electrode for controlling the conductivity of said path;
a second pair of parallel coupled, complementary conductivity field effect transistors each having an input electrode and an output electrode defining a conduction path therebetween, and a control electrode for controlling the conductivity of said last-named path;
means for applying first and second mutually antiphase alternating input signals to one of said input or control electrodes of said first transistor pair and to one of said input or control electrodes of said second transistor pair, respectively; and
means for applying complementary polarity alternating reference switching signals to the other of said input or control electrodes of said first and second transistor pairs to render said transistor pairs respectively conductive and non-conductive in a complementary manner during alternate switching intervals, whereby output signals are provided alternately at said output electrodes of said first transistor pair and at said output electrodes of said second transistor pair representative of the product of said input and switching signals, said product being substantially free of said switching signals and free of junction offset voltage components.

4,032,968

TELEVISION IMAGE PROJECTING SYSTEM

Keisuke Miyoshi, Katano, and Toshitaka Yukumoto, Ibaragi, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Nov. 3, 1975, Ser. No. 628,347
Claims priority, application Japan, Nov. 14, 1974, 49-131698; Nov. 14, 1974, 49-131699; Dec. 19, 1974, 49-147353; Dec. 19, 1974, 49-147354; Dec. 19, 1974, 49-147355; Dec. 19, 1974, 49-147356; Dec. 19, 1974, 49-147357; Dec. 19, 1974, 49-147358; Dec. 19, 1974, 49-147359
Int. Cl.² H04N 9/31
U.S. Cl. 358—60 **20 Claims**



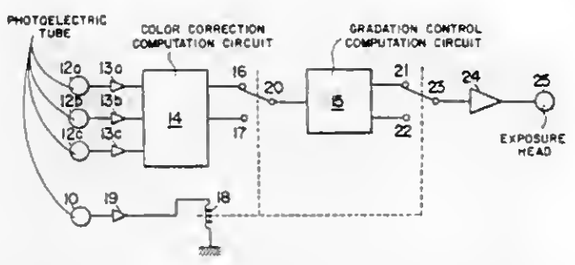
1. A television image projecting system comprising a plurality of projector systems and a cathode ray tube, each of said projector systems including:
a phosphor target at one end of said cathode ray tube for displaying a television image thereon,
an electron gun at the other end of said cathode ray tube for radiating an electron beam onto said phosphor target, and
a Schmidt optical system arranged at the rear of said target and having at least a spherical mirror for projecting the television image on said phosphor target onto a screen located at a distance from said television image projecting system,
all of said phosphor targets, electron guns and spherical mirrors of said plurality of projectors being accommodated in said single common cathode ray tube.

4,032,969

SYSTEM FOR REPRODUCING AND RECORDING A PLURALITY OF COLOR ORIGINALS

Sadao Ueda, 193 Hatakeyama-cho, Imadegawa-agaru, Koromodana-dori, Kamigyo, Kyoto, Japan

Continuation-in-part of Ser. No. 527,594, Nov. 27, 1974, abandoned, which is a continuation of Ser. No. 348,216, April 5, 1973, abandoned. This application June 24, 1976, Ser. No. 699,308
Int. Cl.² G03F 3/08
U.S. Cl. 358—80 **6 Claims**



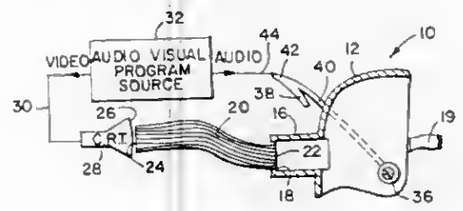
1. A system for reproducing and recording color original pictures by electromechanical and optical scanning comprising a picture scanning device having a scanning field divided into sections, each section being adapted to support an original picture of a group of pictures with the pictures of the group having different characteristics, each original picture of said group being placed into respective sections of the scanning field of the picture scanning device, circuit means for controlling conditions of reproduction, said conditions of reproduction including set values related to the characteristics of said pictures, said circuit means being responsive to respective ones of said sections of said scanning field for setting said conditions of reproduction, and means for controlling said circuit means for changing said set values in synchronism with scanning of said pictures mounted on said sections of said scanning field.

4,032,970

DENTAL MASK

Nina M. Anderson, 5212 Cogswell Road, El Monte, Calif. 91732

Filed July 8, 1976, Ser. No. 703,455
Int. Cl.² H04N 5/64, 5/72
U.S. Cl. 358—93 **1 Claim**



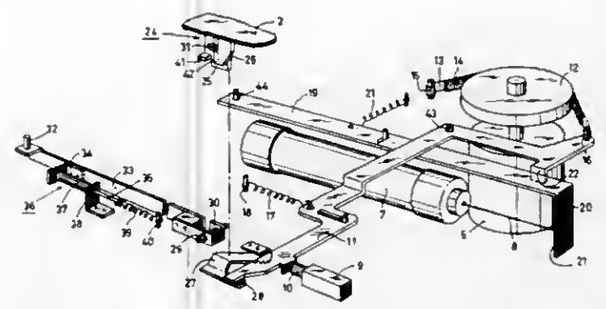
1. A device for occupying the senses of a dental patient during dental work comprising:
a face mask for covering the eyes of the patient, said face mask having an interior surface positioned to be viewed by the patient;
a fiber optic image transmission bundle having one end carried by said surface;
earphones carried by said face mask for covering the ears of the patient; and
an audio visual program source having an audio signal output part for coupling to said earphones and a picture output surface for coupling to the other end of said fiber optic bundle.

4,032,971

VIDEO PLAYER HAVING SAFETY DEVICES ACTUATED BY UNLATCHING

Eduard Camerik, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 3, 1975, Ser. No. 628,092
Claims priority, application Netherlands, Sept. 11, 1975, 7510688
Int. Cl.² H04N 5/76; G11B 17/00
U.S. Cl. 358—128 **9 Claims**



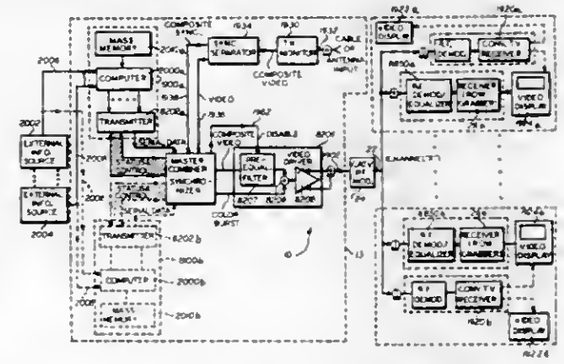
1. A video player for playing back round video disks provided with information tracks which are readable with the aid of a radiation beam, of the type comprising:
a housing,
a cover which is movably connected to the housing and in a playing position covers a video disc which is being played,
latching means for latching the cover in its playing position,
unlatching means for unlatching the cover from its playing position,
a main motor accommodated in the housing for rotating the video disk,
a drive spindle coupled to the main motor for the rotary support of a video disk, and
a radiation source for producing said radiation beam,
first switching means for switching off the main motor,
brake means for braking and bringing the drive spindle to a standstill,
second switching means for extinguishing the radiation beam,
guard means which enter the path of the radiation beam for masking off the radiation beam before it can emerge from the housing and wherein said unlatching means is operatively coupled to at least one of said first and second switching means, said brake means and said guard means.

4,032,972

PIGGY BACK ROW GRABBING SYSTEM

Richard Saylor, Monsey, N.Y., assignor to IDR, Inc., Farmingdale, N.Y.

Filed June 23, 1976, Ser. No. 699,088
Int. Cl.² H04N 5/22, 7/18
U.S. Cl. 358—142 **24 Claims**

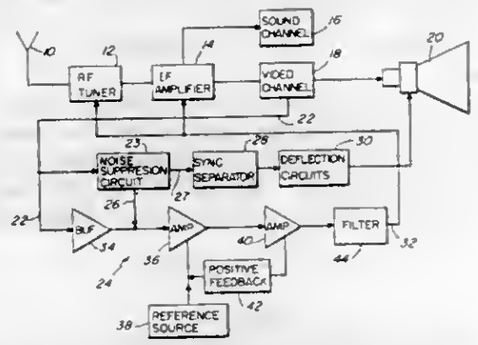


1. A common channel video communication system for providing a television field comprising a plurality of television video scan lines over said common channel, said television field being comprised of both at least one video displayable row of video data characters contained in a pseudo video scan line occupying one of said plurality of television video scan lines and normal television video displayable information occupying the balance of said plurality of television video scan lines; said system comprising means for providing said television video scan lines comprising said normal television video information; means for providing said pseudo video scan line; and means operatively connected to said normal television video information providing means and said pseudo video scan line providing means for combining said normal television video information television video scan lines and said pseudo video scan line for providing said television field over said common channel, said pseudo video scan line providing means comprising means for providing said pseudo video scan line having a television video scan line format and capable of comprising a complete self-contained packet of digital information sufficient to provide said one row as an entire displayable row of video data characters, said displayable one row comprising a plurality of television video scan lines, said pseudo video scan line having an associated transmission time equivalent to said television video scan line, said packet of digital information comprising at least address information for said displayable one row and data information for said displayable characters in said displayable one row, said displayable one row being capable of providing a continuous video display of a selectable grabbed row of video information comprising said video data characters on a video display means from continuously transmittable video information.

4,032,973
POSITIVE FEEDBACK HIGH GAIN AGC AMPLIFIER

William P. Haynes, Bedford, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Filed May 7, 1976, Ser. No. 684,209
Int. Cl.² H04N 5/56; H03F 3/68
U.S. Cl. 358—176 5 Claims



1. In a television receiver having a gain controlled signal receiver for providing a composite video signal, an automatic gain control circuit for providing a gain control signal to the signal receiver comprising:

a. a voltage reference source for providing a voltage representative of a predetermined level at which the synchronizing pulses of the composite video signal are to be controlled,

b. first amplifier means responsive to a signal related to the composite video signal for amplifying the composite video signal, the first amplifier means having a first transistor in a common emitter configuration with the voltage reference source being coupled to the emitter of the first transistor so that the collector of the first transistor provides an output signal representative of the amplified difference between the synchronizing pulse amplitude and the predetermined level,

c. second amplifier means responsive to the output of the first amplifier means for providing current amplification of the composite video signal, the second amplifier means having a second transistor in an emitter follower configuration,

d. positive feedback means for coupling a portion of the output of the second transistor to the first amplifier to establish a virtual ground at the emitter of the first transistor, and

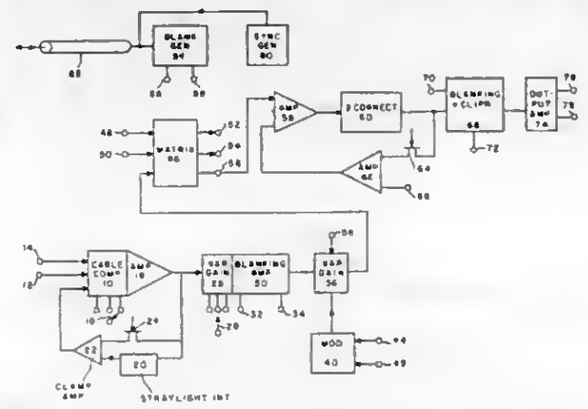
e. filter means connected to the output of the second amplifier means to produce the gain control signal.

4,032,974
VIDEO PROCESSING CIRCUIT

Frederik Johannes Van Roessel, Upper Saddle River, N.J., assignor to North American Philips Corporation, New York, N.Y.

Filed Oct. 20, 1975, Ser. No. 623,591
Int. Cl.² H04N 5/38, 5/04, 5/14
U.S. Cl. 358—186 7 Claims

1. A video processing circuit comprising a cable compensating circuit having a first input means for receiving a video signal, a second input means, and an output, a straylight compensation and clamping circuit having an input coupled to said cable compensation circuit output and an output coupled to said cable compensation circuit second input means, a blanking amplifier having an input direct current coupled to said cable compensating circuit output and an output, a matrix circuit having an input direct current coupled to said blanking amplifier output and an ouput, and a gamma correction and

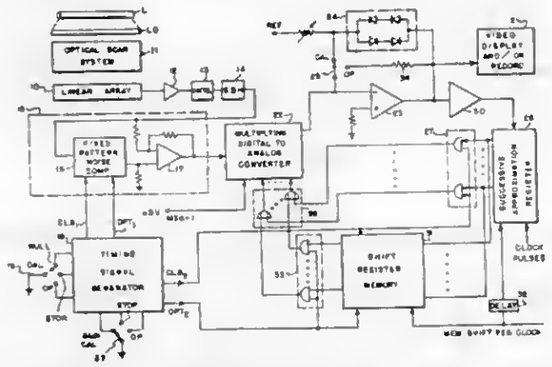


clamping circuit having an input direct current coupled to said matrix circuit output and an output.

4,032,975
DETECTOR ARRAY GAIN COMPENSATION

Richard M. Malueg, Glendora, and Michael J. Meier, Monrovia, both of Calif., assignors to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Feb. 25, 1974, Ser. No. 445,787
Int. Cl.² H04N 3/14, 5/30
U.S. Cl. 358—213 19 Claims



14. A method for normalizing the gain utilized with a detector Di in a detector system employing a plurality of detectors, comprising the steps of:

a. applying a predetermined stimulus Pi to a detector Di of the system;

b. sampling the output signal Bi of the detector while detector Di reacts to the predetermined stimulus;

c. producing a gain determining value from the output Bi of the detector;

d. repeating steps a), b) and c) in order a predetermined number of times for the detector Di of the system and averaging the gain determining values obtained each time those steps are repeated for the detector Di to produce a corresponding average gain determining value for the detector Di;

e). storing the average gain determining value for detector Di;

f). applying a stimulus Ui of unknown magnitude to the detector to produce an output signal Si;

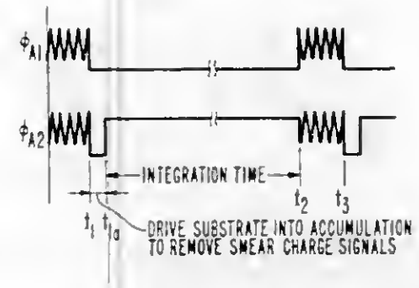
g). recalling the stored average gain determining value for detector Di; and

h). producing a normalized output Si' for detector Di from the recalled gain determining value and the output signal Si.

4,032,976
SMEAR REDUCTION IN CCD IMAGERS

Peter Alan Levine, Trenton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Apr. 16, 1976, Ser. No. 677,755
Int. Cl.² H04N 3/14; H01L 29/78, 31/00
U.S. Cl. 358—213 3 Claims



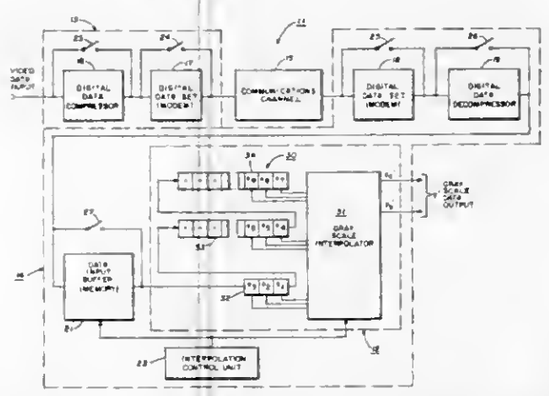
1. In a CCD imager of the type having an imaging region comprising a plurality of columns and a plurality of rows of image sensing locations onto which an image is projected for producing a charge pattern field and in which, after a fixed interval of time the pattern produced is periodically transferred out of the imaging region while the image remains projected thereon, whereby smear charge signals are produced during such transfer, and wherein each transferred pattern is subsequently read-out during a field time, a method for substantially reducing the effect of the smear charge signals comprising the step of:

unconditionally removing the smear charge signals remaining in the imaging region, only once each field time, after each transfer of a charge pattern field out of the imaging region and just prior to the production of the next charge pattern field, during a fixed period which is only a small fixed fraction of said fixed interval of time and whose duration is independent of the image intensity.

4,032,977
GRAY SCALE INTERPOLATION TECHNIQUE

Henry H. J. Liao, Carrollton, Tex., assignor to Xerox Corporation, Stamford, Conn.

Filed June 3, 1976, Ser. No. 692,604
Int. Cl.² H04N 1/40
U.S. Cl. 358—280 26 Claims



1. In a raster scanned imaging system, the improvement comprising an interpolator for receiving expanded gray scale information from quantized data elements of a video input signal, said interpolator including

multi-stage register means having outputs taken from predetermined stages to define a $m \times n$ prediction matrix,

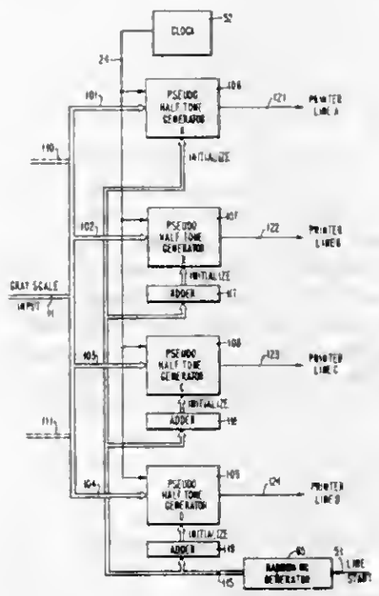
means for serially propogating the data elements of said input signal through the stages of said register means, whereby successive patterns of video input data elements are sequentially entered into said prediction matrix, and

interpolation means coupled to the output of said register means for sequentially predicting gray scale values for successive video output data elements in response to said matrix patterns, the prediction matrix for each of said video output data elements including a spatially corresponding input data element along with vertically and horizontally adjacent input data elements.

4,032,978
PSEUDO HALFTONE PRINT GENERATOR AND METHOD

Kwan Y. Woog, San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 20, 1975, Ser. No. 542,530
Int. Cl.² H04N 1/40, 1/22
U.S. Cl. 358—283 14 Claims



1. Apparatus for generation of pseudo halftone spot patterns for series of print positions, each series forming a print line, for adjacent groups of N said print lines to form ($N \times N$) matrices of print positions, said spot patterns being generated in accordance with pre-established gray scale levels, each of said gray scale levels representing an area greater than one print position, comprising:

an input means including means for supplying said pre-established gray scale levels in digital form sequentially at a repetition rate lower than the incrementing rate of the counting means;

an output;

counting means for incrementing a count by a preselected number N for each print position, said counting means recycling when the count exceeds the square of said number minus 1;

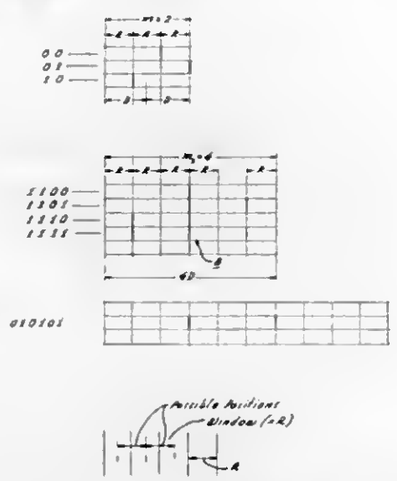
initialization means for initializing the count of said counting means at the beginning of each said print line, said initialization means including a random number generator for selecting said initialization count in digtital form for one of said N print lines and for separately supplying said selected initialization count for each of the remainder of said N print lines, each differing from said selected count by a different predetermined value; and

comparator means connected to said input means and to said counting means for comparing said gray scale level to said count for each said print position and providing a print signal therefor at said output upon said level exceeding said count.

4,032,979
METHOD AND SYSTEM FOR ENCODING AND DECODING DIGITAL DATA

Stephen E. Rice, Del Mar, Calif., assignor to Digital Development Corporation, San Diego, Calif.

Continuation of Ser. No. 318,587, Dec. 26, 1972, abandoned. This application Dec. 27, 1974, Ser. No. 537,121
Int. Cl.² G11B 5/09
U.S. Cl. 360—40 **20 Claims**



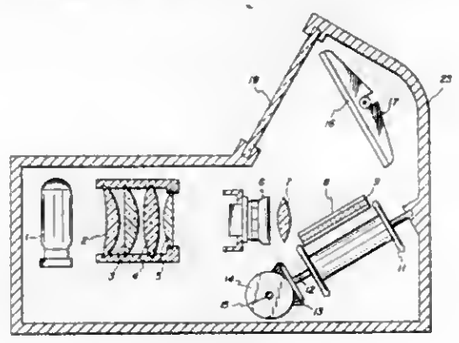
1. In a system for recording digital data on a magnetic storage carrier by means of a transducer, and on a track at a data bit spacing D and for a read resolution R smaller than D but wherein D is not an integral multiple of R, comprising:
- first means including the transducer for recording *m* data bits in a field of particular length;
- second means including the transducer for recording 2*m* data bits in a field of twice the particular length whereby boundary recording of either field is different from mid-field recordation of a field having the length for recording 2*m* data bits;
- the recording as provided by the first and second means establishing less than one transition for each data bit, so that the transitions are apart by a length larger than 1/*m* of the field of particular length and positions for transitions being spaced apart, so that less than 2^m and 2^{2m} different possibilities exist for placing transitions for recording of respectively *m* and 2*m* data bits;
- third means connected to the first and second means and providing to them a train of bi-valued data bits; and
- fourth means connected for operating the first and second means in response to combinations of bit values of *m* data bits, so that for a plurality of different bit value combinations, less than 2^m, the first means is operated, and for at least one other bit value combination of the first *m* of 2*m* data bits, 2*m* data bits are recorded in one of 2^m different patterns.

4,032,980
RECORDED MAGNETIC MEMBER VIEWING APPARATUS

Werner E. L. Haas, Webster, and Gary A. Dir, Fairport, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed July 2, 1976, Ser. No. 702,269
Int. Cl.² G11B 5/02; G05D 25/00; G03B 21/00
U.S. Cl. 360—56 **11 Claims**

1. Latent magnetic image viewing apparatus, comprising:
- a. means for advancing a magnetizable member bearing a latent magnetic image into a detection station; and
- b. at said detection station a magneto-optic cell comprising between two magnetic field permeable substrates, a composition comprising ferrofluid and metal flakes, at least

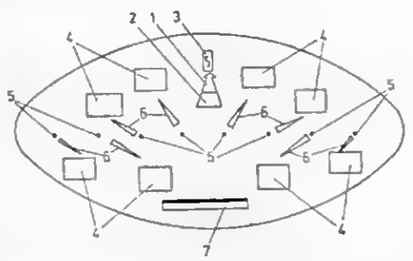


one of said substrates being transparent and providing optical access to said composition.

4,032,981
MULTIPLE SELECTION SOUND REPRODUCING APPARATUS

Victor Victoriano Arguelles, Rio de Janeiro, Brazil, assignor to Pevi Aparelhos S.A., Sao Paulo, Brazil

Filed Oct. 17, 1975, Ser. No. 623,298
Int. Cl.² G11B 15/02, 15/18, 21/08; H04M 17/02
U.S. Cl. 360—69 **8 Claims**

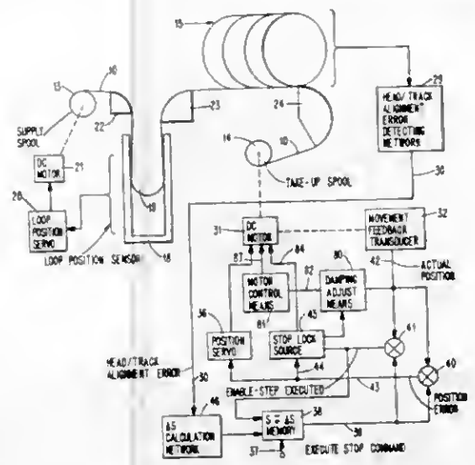


1. A multiple selection sound reproducing apparatus comprising in combination:
- a. a multichannel endless tape having a predetermined number of channels, each having two tracks, each track having a number of different recordings having a common character, and each track having a plurality of transverse control signals separating said recordings,
- b. a tape reproducer having a reproducer head structure with two reproducer coils, amplifier means selectively connectable to either one of said reproducer coils, and a tape drive means;
- c. reproducer head positioning means for positioning said reproducer head in any one of said predetermined number of playing positions;
- d. reproducer coil selector means operable to connect either one of said reproducer coils to said amplifier means;
- e. actuating means to initiate operation;
- f. selector means corresponding to twice the predetermined number of channels on said tape, said selector means made operable by said actuating means, actuation of each of said selector means operates said reproducer head positioning means to position said head in a particular one of said predetermined number of playing positions and operates said reproducer coil selector means to connect a particular one of said reproducer coils to said amplifier means;
- g. detector means to detect said control signals; and
- h. disconnection means to disconnect said motor drive means on detection of a control signal by said detector means.

4,032,982
ADAPTIVE VOLTAGE CONTROL OF MOTOR IN AN INCREMENTING MAGNETIC TAPE TRANSPORT

Nelson K. Arter, and Howard C. Jackson, both of Longmont, Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 29, 1975, Ser. No. 609,131
Int. Cl.² G11B 15/32, 15/58, 15/20
U.S. Cl. 360—74 **16 Claims**

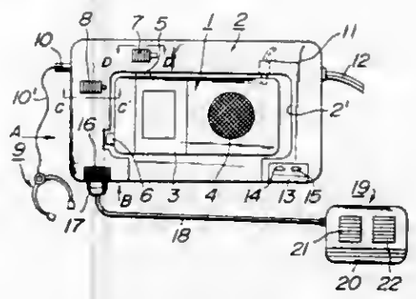


13. A servomechanical system including in combination a motor having an output shaft;
- a movement feedback transducer operably associated with said shaft for providing signals indicative of movements of said shaft;
- control means operably associated with said feedback transducer to generate a signal indicating motor overshoot and/or motor undershoot;
- control means to receive the overshoot and/or undershoot signal and outputting a signal when the overshoot and/or undershoot signal is equal to or greater than a threshold value; and
- means for adjusting the voltage driving the motor when the overshoot and/or undershoot is outside of the threshold value so as to minimize ringing.

4,032,983
ADAPTER FOR USE IN TRANSCRIBERS

Masaaki Sato, No. 13, Terada-Cho, Hachioji, Tokyo, Japan

Continuation of Ser. No. 459,365, April 9, 1974, abandoned. This application Dec. 30, 1975, Ser. No. 645,471
Claims priority, application Japan, Apr. 10, 1973, 48-40983
Int. Cl.² G11B 15/18; H04M 11/00
U.S. Cl. 360—69 **6 Claims**

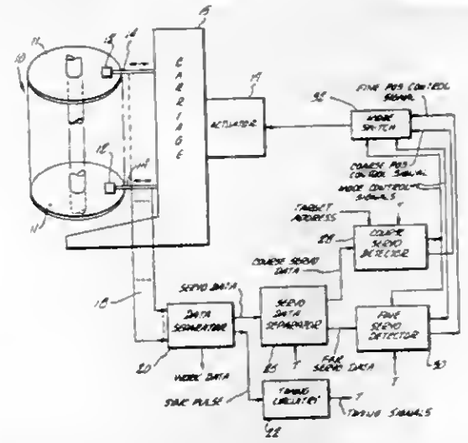


1. An adapter for a self-contained tape recorder for transcribing recorded intelligence, the adapter coacting with the tape recorder to be used conveniently as a transcriber, the tape recorder being provided with a first play button and a first review-cue button, the adapter comprising, in combination:
- a casing having an upper surface, said upper surface being formed with a depressed portion detachably enclosing the tape recorder, said casing having a second play button and a second review-cue button and a power supply energized by an external power source; an exteriorly operable first slide button slidably mounted on the adapter; a main switch connecting said power supply and said external power source, a play switch operatively connected to said power supply, and a channel-shaped elastic block, said first play button being operatively connected through said elastic block to said first slide button; a detachably connected foot switch, a cord having a plug connecting said foot switch, into the adapter, said foot switch being provided with a play pedal and a review-cue pedal, said second play button and said play pedal being operatively connected to said play switch, said play switch having ON and OFF positions, said play switch occupying the ON position upon selective actuation of the play button and the play pedal, said play switch occupying the OFF position upon selective release of said second play button and said play pedal;
- two solenoids enclosed in the adapter, and two actuation switches connected to said solenoids, respectively, each actuation switch being connected to said play switch, said solenoids operatively contacting said first review-cue button when energized upon closure of both the main switch, and said play switch upon operating said first slide button, and by selective actuation of said second play button, and said play pedal, respectively, and selective actuation of said second review-cue button, and of said second review-cue pedal, respectively.

4,032,984
TRANSDUCER POSITIONING SYSTEM FOR PROVIDING BOTH COARSE AND FINE POSITIONING

Jon Bruce Kaser, Thousand Oaks; John Lawrence Von Feldt, Simi Valley, and Ivan Earl Walenta, Westlake Village, all of Calif., assignors to Burroughs Corporation, Detroit, Mich.

Filed Apr. 28, 1975, Ser. No. 572,304
Int. Cl.² G11B 21/10, 5/82
U.S. Cl. 360—77 **23 Claims**



21. A servo system for positioning a transducer means relative to a group of at least three tracks provided on a relatively moving recording medium, said system comprising:
- positioning means for moving said transducer means transversely relative to said tracks;
- a plurality of servo data manifestations recorded in each track comprising a like located reference manifestation and spaced fine servo data manifestations and coarse servo data manifestations precisely located relative to said reference manifestation, said coarse servo data manifestations being recorded in each track so as to constitute a plurality of adjacent cells each having either a first or second value, the cells being respectively aligned for all tracks of each group and being encoded so as to provide:
- a. a different identifying representation for each track of

a group so that each track of the group is identifiable from the coding provided for its respective plurality of adjacent cells; and

b. an encoding sequence chosen for each group of tracks so that the value of only one cell is different on adjacent tracks, said fine servo data manifestations being recorded in each track so that traversal thereof by said transducer means produces detected signals indicative of the positioning of said transducer relative to two adjacent tracks;

first detecting means responsive to the detection by said transducer means of the differently encoded coarse servo data manifestations provided in each track of said group of tracks for controlling said positioning means to provide for coarse positioning of said transducer means to a target track position; and

second detecting means responsive to the detection by said transducer means of said fine servo data manifestations and operable upon completion of the coarse positioning of said transducer means by said first detecting means for controlling said positioning means so as to bring and maintain said transducer means in alignment with said target track position.

4,032,985

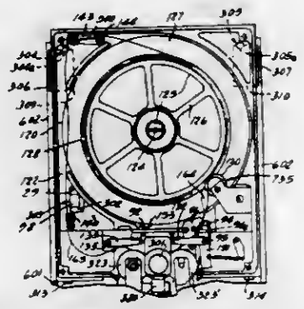
VIDEO TRANSDUCER SYSTEM AND METHOD WITH TAPE DRAG BETWEEN THE REEL AND THE CAPSTAN

Marvin Camras, Glencoe, Ill., assignor to IIT Research Institute, Chicago, Ill.

Continuation-in-part of Ser. No. 346,869, April 2, 1973, which is a continuation-in-part of Ser. No. 282,275, Aug. 21, 1972, Pat. No. 3,849,797. This application Dec. 17, 1974, Ser. No. 533,485

Int. Cl.² G11B *15/43, 15/60, 23/04*

U.S. Cl. 360—93 **9 Claims**



1. In an endless loop cartridge transducer system including a capstan drive for pulling tape along the incoming tape path extending from an inner side of a coil of record tape to the capstan drive and for supplying tape to the outer side of said coil along an outgoing tape path extending from the capstan drive and establishing a relatively isolated tape loop adjacent the capstan drive where the tape motion is relatively steady, a transducer head for scanning cooperation with the record tape at said isolated tape loop, and a tape drag for applying a substantial drag force to the tape at said incoming tape path so as to produce a substantial tape tension at the input side of said capstan drive prior to engagement of the tape with said drive.

4,032,986

SCANNING DEVICE FOR THE RECORDING AND/OR PLAY-BACK OF WIDE-BAND SIGNALS

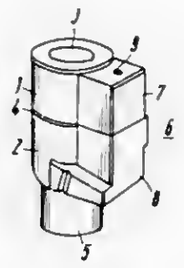
Rudolf Prochnow, Darmstadt-Eberstadt, Germany, assignor to Robert Bosch Fernsehanlagen G.m.b.H., Darmstadt, Germany

Filed Mar. 22, 1976, Ser. No. 669,346

Claims priority, application Germany, Mar. 26, 1975, 2513326

Int. Cl.² G11B *15/60*

U.S. Cl. 360—130 **4 Claims**



1. In a scanning device for recording and/or play-back of wide-band signals from a magnetic tape by the diagonal track method, including a stationary hollow guide drum having two parts spaced apart to define a slot, said drum adapted to receive a magnetic tape engaging less than 360° of the periphery thereof, and a head-wheel carrying at least two magnetic heads and disposed in said drum for the rotation of the magnetic heads transversally to said slot for scanning said magnetic tape which is moved diagonally across said slot, the improvement comprising:

a guide drum holder means having two parts for retaining said two parts of said guide drum in a predetermined alignment;

means fixedly attaching each part of said holer means to a respective part of said guide drum; and

connecting means detachably connecting the parts of said holder means to each other; whereby said holder mans can be disconnected and then connected and the parts of said guide drum will be substantially in the predetermined alignment.

4,032,987

SOUND RECORDING AND REPRODUCING APPARATUS USING A CASSETTE HAVING A CASING MADE OF REFLECTIVE MATERIAL

Franz Singer, Munich; Paul Fahlenberg, Baierbruon, and Rudolf Lang, Grafing Bhf., all of Germany, assignors to Compur-Werk Gesellschaft mit beschrankter Haftung & Co., Munich, Germany

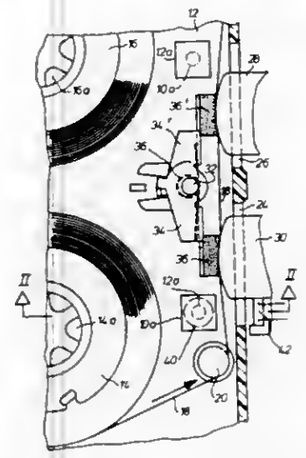
Filed Sept. 16, 1975, Ser. No. 613,861

Claims priority, application Germany, Sept. 25, 1974, 2445751

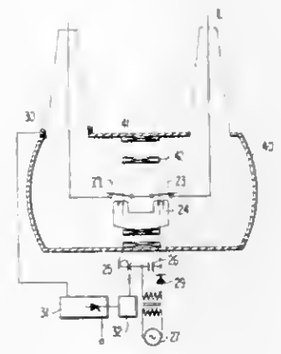
Int. Cl.² G11B *15/18, 15/08, 23/04, 23/34*

U.S. Cl. 360—132 **8 Claims**

1. The combination of a sound recording and reproducing apparatus having a replaceable magnetic tape cassette having rotatable reels therein, said tape having two tracks thereon, each track being utilizable by reversing said cassette, detection means for detecting a specific winding position of the tape using a light utilizing unit which is installed in the apparatus, said light utilizing unit comprising a light emitting means and a light receiving means, said light emitting means being located on one side of said cassette to transmit light in a direction transverse to a plane perpendicular to the axes of rotation of said reels, the casing of said cassette being made of a reflective material, said casing having first and second projections each provided with at least one reflecting surface for reflecting the light beam from said light emitting means to said light receiving means in response to a monitoring of the position of the tape and said first and second projections with their reflecting surfaces being arranged in the cassette casing in symmetrical disposition relative to the reversing plane of the



cassette so that a reflecting surface is made available to the elements of said light utilizing unit in each of the two positions of the cassette.



4,032,988

COMPRESSED GAS FILLED CIRCUIT BREAKER

Nobuaki Kiyokuni, Kawasaki, Japan, assignor to Fuji Electric Company Ltd., Kawasaki, Japan

Filed Jan. 30, 1976, Ser. No. 653,866

Int. Cl.² H02H *3/00*

U.S. Cl. 361—115 **2 Claims**

1. A circuit breaker of the type having a high potential side and a ground side, at least one contact having a movable contact element, at least one corresponding driving coil disposed in the vicinity of said movable contact element, a capacitor for supplying a current to said at least one driving coil by discharging the energy stored therein to drive said movable contact element by an electromagnetic repulsive force acting between said movable contact element and said driving coil, to thereby open said contact, the improvement comprising said capacitor being disposed on said ground side, a transformer having a primary coil disposed on the ground side and connected to said capacitor, and a secondary coil disposed on the high potential side and connected to said driving coil and electromagnetically coupled to said primary coil, said contact, driving coil, primary and secondary coils being located inside a grounded tank filled with a compressed gas having arc suppression properties.

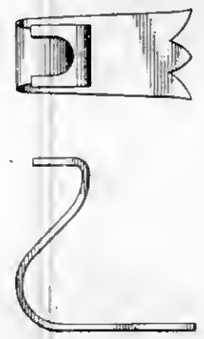
DESIGN PATENTS

GRANTED JUNE 28, 1977

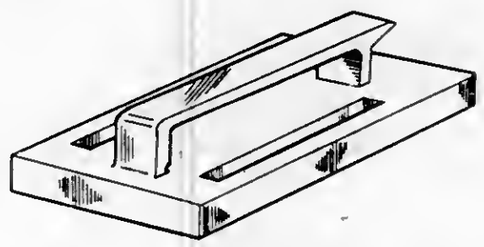
ERRATA

For CLASS	See PATENT NO.
013–024	244,859
013–024	244,860
013–024	244,861
064–011 B	244,862
014–045	244,863
014–073	244,877
024–099	244,878
024–029	244,879
029–008	244,880
028–037	244,881
028–018	244,882

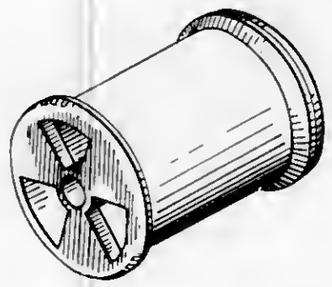
244,806
SHOE PULLER
Barbara Pryor, 2829 W. Lunt, Chicago, Ill. 60645
Filed Dec. 18, 1975, Ser. No. 641,831
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D2—378.2



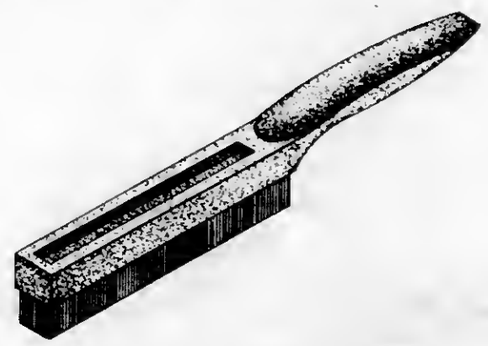
244,807
UNDERWATER BELT AND HOSE CLIP
Thomas J. Bardoni, 459 Poplar, Wyandotte, Mich. 48192, and William Markarian, 5970 Weddel, Taylor, Mich. 48180
Filed July 7, 1975, Ser. No. 593,772
Term of patent 14 years
Int. Cl. D2—*07*
U.S. Cl. D2—400



244,808
PLASTIC SPOOL FOR THREAD OR THE LIKE
Ernest F. Ubermuth, Watertown, Conn., assignor to The Risdon Manufacturing Company, Naugatuck, Conn.
Filed Dec. 15, 1975, Ser. No. 640,544
Term of patent 14 years
Int. Cl. D15—*06*
U.S. Cl. D3—19 A



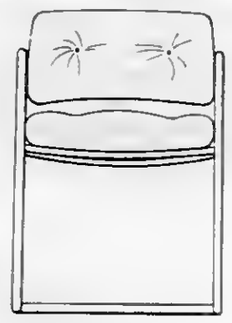
244,809
BRUSH
Joseph A. Graham; Reginal M. Stephenson, and Donald D. Dewar, all of Winnipeg, Canada, assignors to Atlas-Graham Industries Company Ltd., Winnipeg, Canada
Filed Sept. 9, 1975, Ser. No. 611,718
Claims priority, application Canada, July 16, 1975, 160775
Term of patent 14 years
Int. Cl. D4—*02*
U.S. Cl. D4—31



244,810
JEWELRY CADDY
Chad W. Patterson, 619 Twenty-Eighth St., Ogden, Utah 84403
Filed Jan. 12, 1976, Ser. No. 648,183
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—28

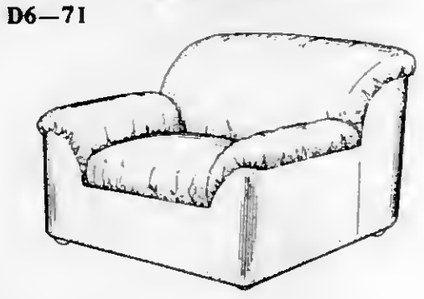
244,811
CHAIR
Jonathan Samuel Sternfield, 247 W. 16th St., New York, N.Y. 10011
Filed July 10, 1975, Ser. No. 594,776
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—56

244,812
CHAIR
Randall P. Buhk, Wyoming, Mich., assignor to Steelcase, Inc., Grand Rapids, Mich.
Filed Sept. 5, 1975, Ser. No. 610,839
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—56

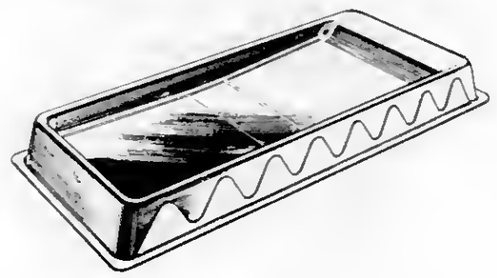


244,813
CHAIR
Randall P. Buhk, Wyoming, Mich., assignor to Steelcase, Inc., Grand Rapids, Mich.
Filed Sept. 5, 1975, Ser. No. 610,841
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—56

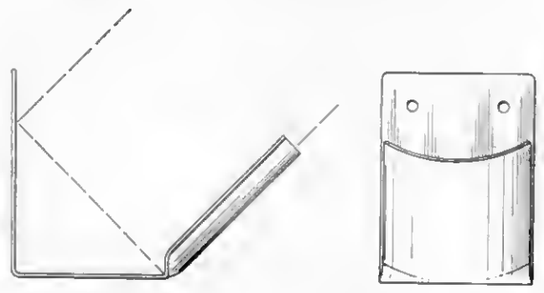
244,814
SEAT
Svante Schoblom, Tranas, Sweden, assignor to Overman AB, Tranas, Sweden
Filed Oct. 15, 1975, Ser. No. 622,511
Claims priority, application Sweden, Apr. 17, 1975, 7500081
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—71



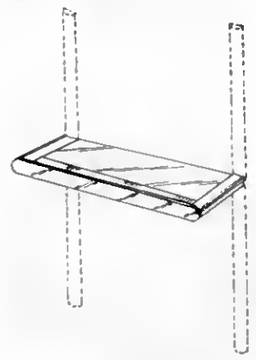
244,815
COT
Bill D. Snow, 3817 Rutledge, Fort Worth, Tex. 76107
Filed Dec. 22, 1975, Ser. No. 643,361
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—79



244,816
HOLDER FOR CYLINDRICAL CONTAINER
Charles William Pierce, Hurricane Harbour, Marathon, Fla. 33050
Filed Dec. 17, 1976, Ser. No. 751,812
Term of patent 3.5 years
Int. Cl. D6—*04*
U.S. Cl. D6—114



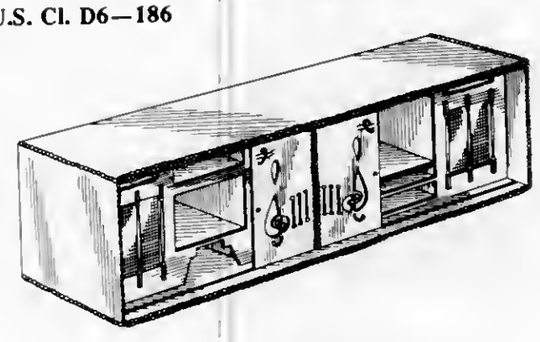
244,817
SHELF FOR A WALL SYSTEM
Janet Schweitzer, New York, N.Y., assignor to The Pace Collection, Inc., New York, N.Y.
Division of Ser. No. 654,537, Feh. 2, 1976, Pat. No. Des. 242,513, which is a division of Ser. No. 436,487, Jan. 25, 1974, Pat. No. Des. 239,225. This application May 14, 1976, Ser. No. 689,351
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—132



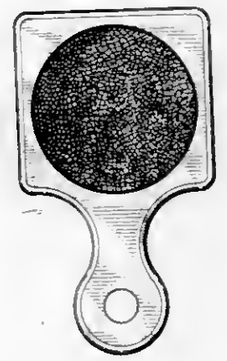
244,818
SHELF FOR A WALL SYSTEM
Janet Schweitzer, New York, N.Y., assignor to The Pace Collection, Inc., New York, N.Y.
Division of Ser. No. 654,537, Feb. 2, 1976, Pat. No. Des. 242,513, which is a division of Ser. No. 436,487, Jan. 25, 1974, Pat. No. Des. 239,225. This application May 14, 1976, Ser. No. 690,606
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—132

244,819
GREENHOUSE POTTING BENCH
Louis J. Christen, Jr., St. Louis, Mo., assignor to Christen Incorporated, St. Louis, Mo.
Filed Oct. 31, 1975, Ser. No. 627,511
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—179

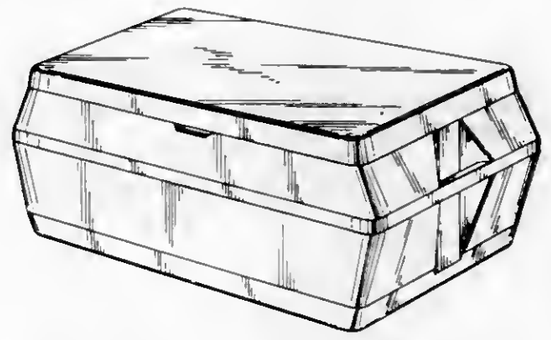
244,820
COMBINED TV, STEREO AND ACCESSORY CABINET
Leroy C. Freeman, 5964 Streamview Drive, San Diego, Calif. 92105
Filed Oct. 24, 1975, Ser. No. 625,589
Term of patent 7 years
Int. Cl. D6—*05*
U.S. Cl. D6—186



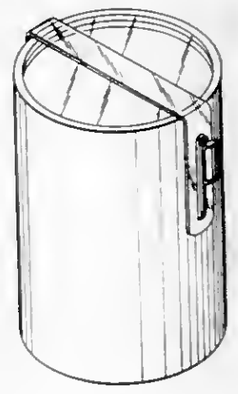
244,821
COASTER
Julie Pomerantz, 230 Fifth Ave., New York, N.Y. 10001
Filed June 30, 1975, Ser. No. 591,599
Term of patent 14 years
Int. Cl. D7—*06*
U.S. Cl. D7—45



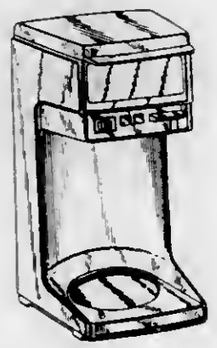
244,822
INSULATED FOOD CHEST
John E. Havely, Winfield; Kenton A. Buss, Oxford; Tony E. Branscum, Winfield, and Kenneth D. Lewis, Winfield, all of Kans., assignors to Gott Mfg. Co., Inc.
Filed Sept. 22, 1975, Ser. No. 615,781
Term of patent 14 years
Int. Cl. D7—*07*
U.S. Cl. D7—77



244,823
ICE BUCKET
Abram L. Lass, 980 King St., Port Chester, N.Y. 10573
Filed Nov. 17, 1975, Ser. No. 632,192
Term of patent 14 years
Int. Cl. D7—*01, 07*
U.S. Cl. D7—78

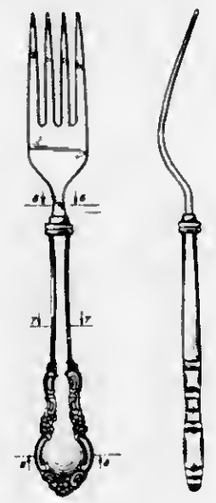


244,824
COFFEEMAKER WATER DISPENSER
Bernard B. Binestein, Des Plaines, Ill., assignor to Sunbeam Corporation, Chicago, Ill.
Filed Apr. 21, 1975, Ser. No. 570,334
Term of patent 14 years
Int. Cl. D7—*02*; D15—*08*
U.S. Cl. D7—85



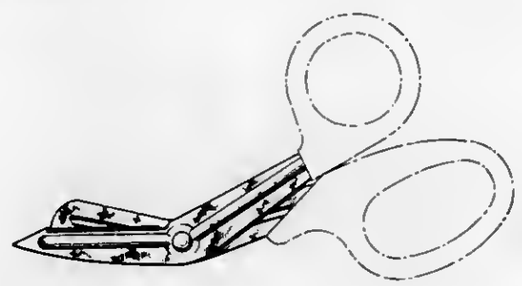
244,825
ARTICLE OF FLATWARE
Robert J. King, Wallingford, Conn., assignor to International Silver Company, Meriden, Conn.
Filed May 3, 1976, Ser. No. 682,357
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137

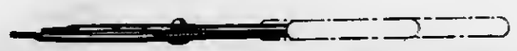
244,826
ARTICLE OF FLATWARE
Robert J. King, Wallingford, Conn., assignor to International Silver Company, Meriden, Conn.
Filed May 3, 1976, Ser. No. 682,358
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137



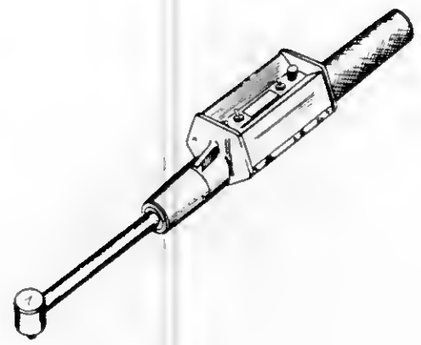
244,827
CLEANING AND DRAINING DEVICE
Bela B. Nevai, Dobbs Ferry, N.Y., assignor to Belaco International Ltd., Dobbs Ferry, N.Y.
Filed Feb. 5, 1976, Ser. No. 655,404
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D7—188

244,828
BLADE ASSEMBLY FOR CUTTING SHEARS
Luigi P. Visco, 4 Paugussett Road, Sandy Hook, Conn. 06482
Filed Sept. 2, 1975, Ser. No. 609,546
Term of patent 14 years
Int. Cl. D8—*01*
U.S. Cl. D8—5

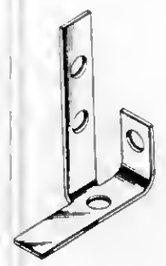




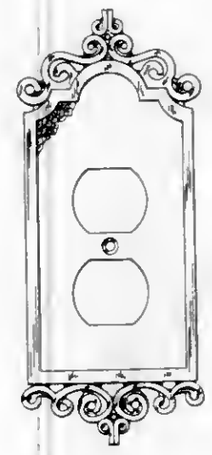
244,829
ELECTRONIC TORQUE WRENCH
Kenneth A. Lehoczky, Livonia, and Thomas C. Rigdon, Plymouth, both of Mich., assignors to GSE, Inc.
Filed June 4, 1976, Ser. No. 693,222
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—24



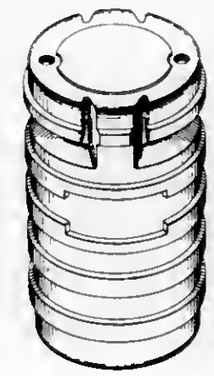
244,830
STOP FOR WINDOWS, DOORS AND THE LIKE
Richard F. Tulak, 274 E. Verdugo Ave., Burbank, Calif. 91502
Filed Mar. 29, 1976, Ser. No. 671,322
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—402



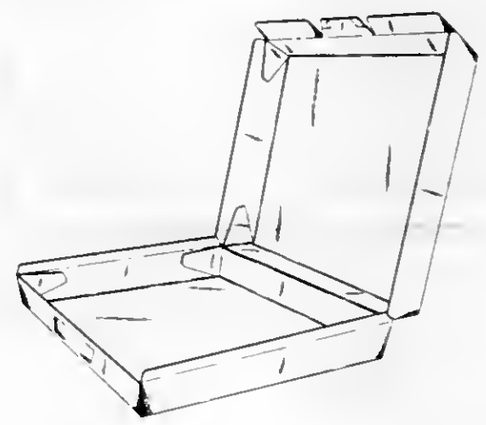
244,831
WALL PLATE
Joan Grieb, New York, N.Y., assignor to General Electric Company, N.Y.
Filed Oct. 20, 1975, Ser. No. 624,193
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—350



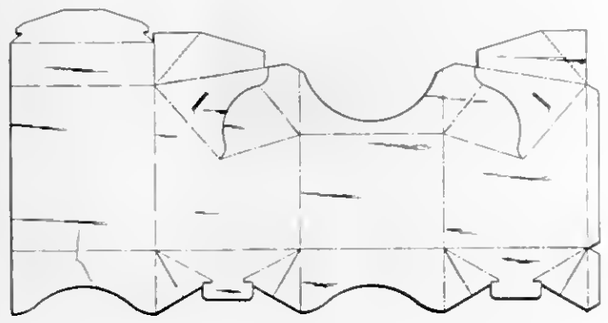
244,832
BARREL
Howard Bryan Carter, Sharon, Canada, assignor to Rosedale Plastics (Containers) Limited
Filed Dec. 1, 1975, Ser. No. 636,814
Term of patent 14 years
Int. Cl. D9—*02*
U.S. Cl. D9—170



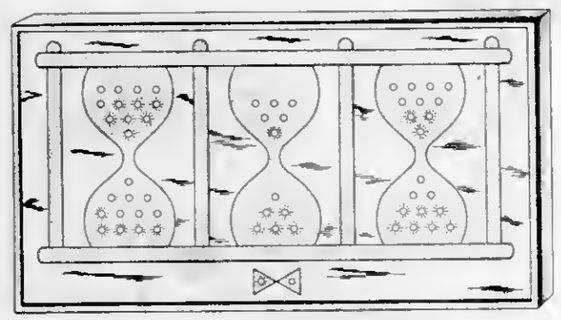
244,833
FOLDING CARTON
Karl Ruoe Persson, Halmstad, Sweden, assignor to Duni-Bila AB, Halmstad, Sweden
Filed Nov. 5, 1975, Ser. No. 629,041
Claims priority, application Sweden, May 5, 1975, 75958
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—235



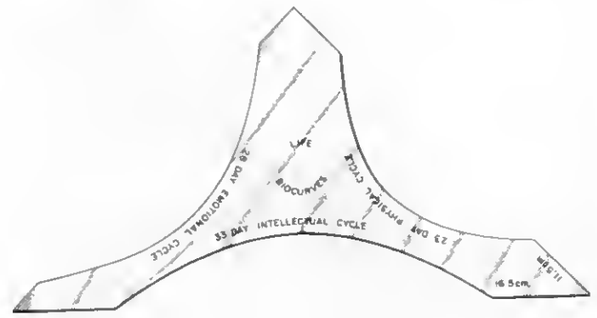
244,834
CARTON BLANK
Wallace E. Hanson, Hampden, Mass., assignor to Champion International Corporation, Stamford, Conn.
Filed Nov. 19, 1975, Ser. No. 633,229
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—245



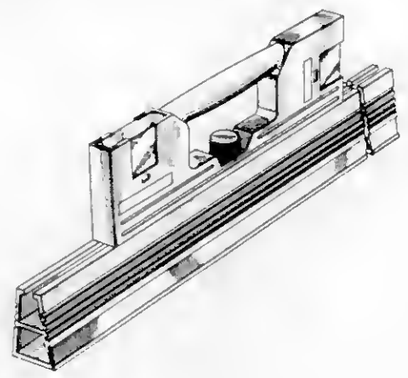
244,835
ELECTRONIC HOUR GLASS CLOCK
Harshadrai D. Sheth, 32522 Jaclynn Drive, Union City, Calif. 94587
Filed Feb. 9, 1976, Ser. No. 656,821
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—15



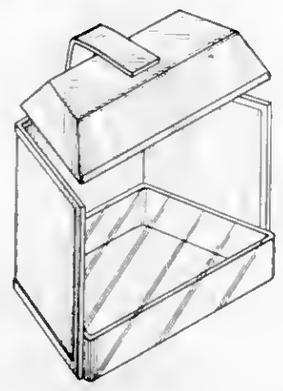
244,836
SINE WAVE TEMPLATE
Bruce H. Stockton, 4665 Moorhead Ave., Boulder, Colo. 80302
Filed Apr. 12, 1976, Ser. No. 676,225
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—64



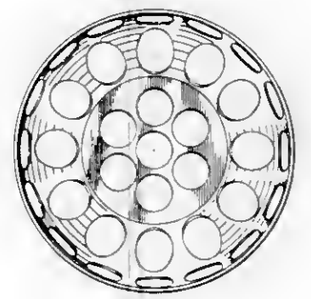
244,837
LEVEL
Hans Kristian Thingstad, and Horst Jürgensen, both of Sodertalje, Sweden, assignors to Libella Tool AB
Filed Apr. 17, 1975, Ser. No. 569,073
Claims priority, application Sweden, Nov. 8, 1974, 741843
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—69

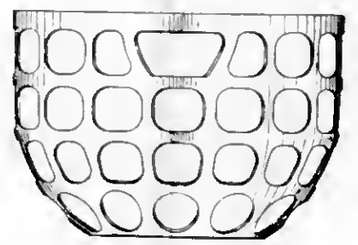


244,838
COMBINED PLANTER AND LIGHT FIXTURE TO BE USED IN FIREPLACES OR THE LIKE
Frank L. LeBreux, 257 Arbor Lane, Bloomingdale, Ill. 60108
Filed Nov. 17, 1975, Ser. No. 632,739
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—144

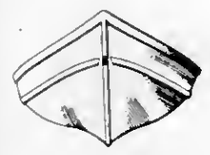


244,839
PLANT BALLING DEVICE
Robert S. Malkin, 257 Park Ave. South, New York, N.Y. 10010
Division of Ser. No. 470,627, April 16, 1975, Pat. No. Des. 239,128. This application Aug. 26, 1975, Ser. No. 622,787
Term of patent 14 years
Int. Cl. D15—*03*, *99*
U.S. Cl. D11—148

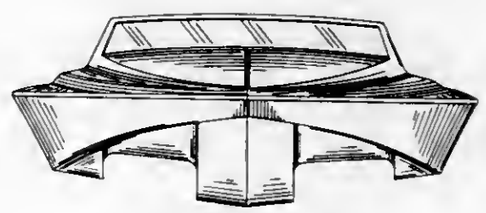




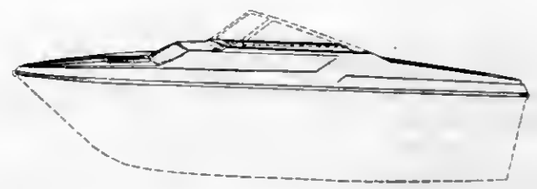
244,840
BOAT
Wilton Stokes, 750 Burch Ave., Winter Garden, Fla. 32787
Filed Oct. 20, 1975, Ser. No. 623,725
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—62



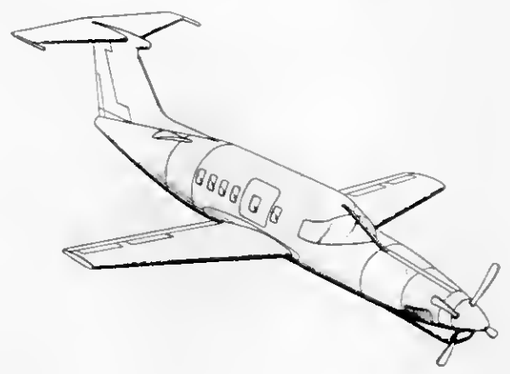
244,841
TUNNEL HULL POWER BOAT
Bruce E. Nescher, 1861 Kashlon, La Habra Heights, Calif. 90631
Filed Apr. 30, 1976, Ser. No. 681,787
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—62



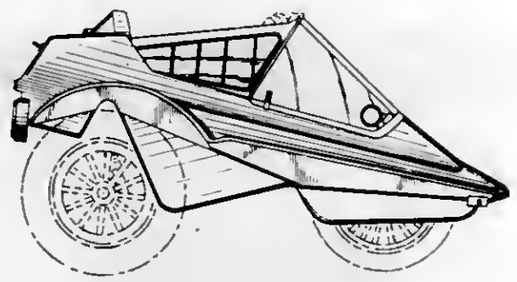
244,842
BOAT DECK OR THE LIKE
Peter C. Granata, Jr., Barrington, Ill., assignor to Classic Boats Inc.
Filed July 30, 1975, Ser. No. 600,308
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—70

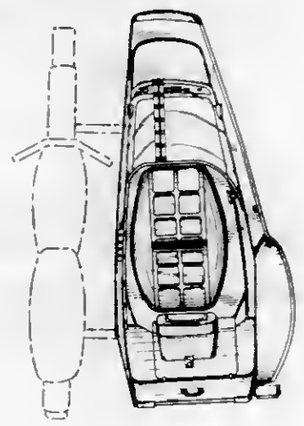


244,843
AIRPLANE
Allen E. Paulson, Van Nuys, Calif., assignor to American Jet Industries, Van Nuys, Calif.
Filed Mar. 22, 1976, Ser. No. 669,196
Term of patent 14 years
Int. Cl. D12—*07*
U.S. Cl. D12—71

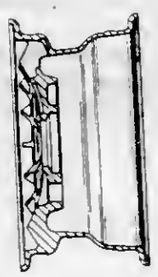


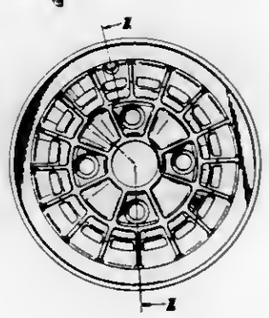
244,844
MOTORCYCLE SIDECAR COACH
Craig W. Vetter, Rantoul, Ill., assignor to Vetter Design Works, Inc., Rantoul, Ill.
Filed Feb. 3, 1975, Ser. No. 546,535
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—116



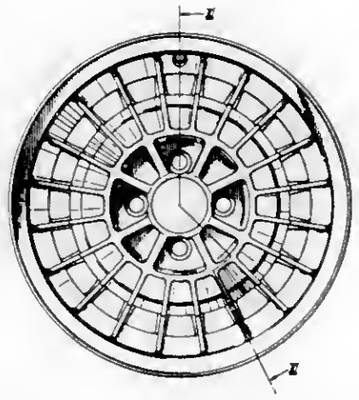


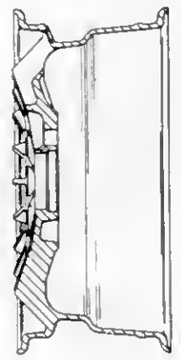
244,845
VEHICLE WHEEL
Richard W. Woodward, Wrotham Heath, England, assigoor to GKN Kent Alloys Limited
Filed Aug. 10, 1976, Ser. No. 713,202
Claims priority, application United Kingdom, Mar. 2, 1976, 974723/76
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—211



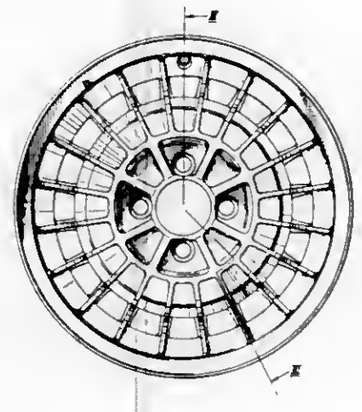


244,846
VEHICLE WHEEL
Richard W. Woodward, Wrotham Heath, England, assignor to GKN Kent Alloys Limited
Filed Aug. 10, 1976, Ser. No. 713,203
Claims priority, application United Kingdom, Mar. 2, 1976, 974722/76
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—211

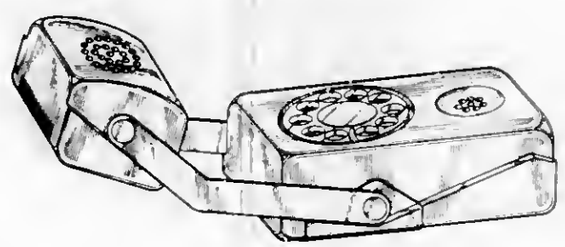




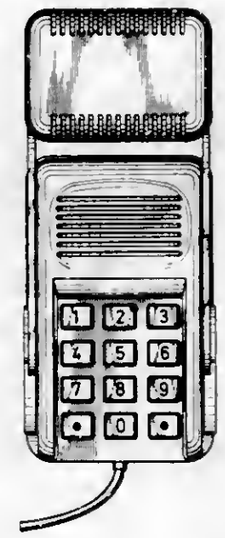
244,847
VEHICLE WHEEL
Richard W. Woodward, Wrotham Heath, England, assignor to GKN Kent Alloys Limited
Filed Aug. 10, 1976, Ser. No. 713,204
Claims priority, application United Kingdom, Mar. 2, 1976, 974724/76
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—211

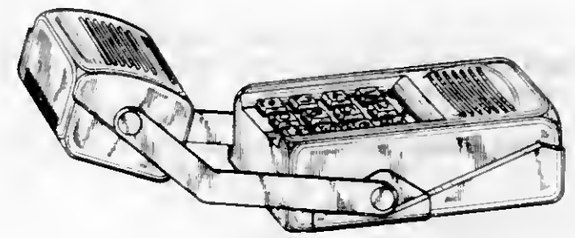


244,848
TELEPHONE SET, OR SIMILAR ARTICLE
Sergio Todeschini, Milan, Italy, assignor to E.T.E. - Electronic Telephone Equipment, S.r.l., Milan, Italy
Filed June 4, 1976, Ser. No. 692,721
Claims priority, application Italy, Feb. 17, 1976, 20699/76
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—56

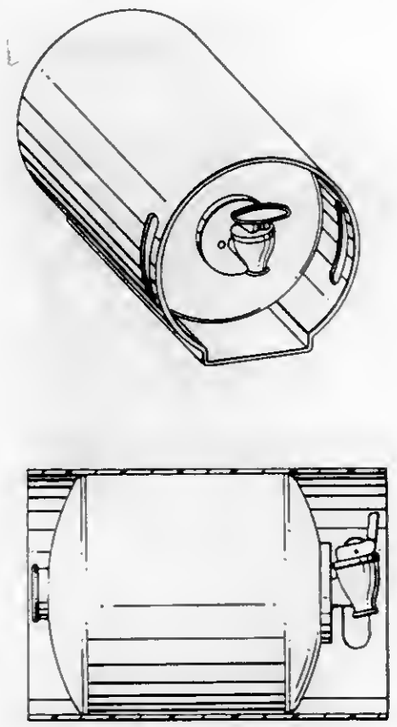


244,849
TELEPHONE SET, OR SIMILAR ARTICLE
Sergio Todeschini, Milan, Italy, assignor to E.T.E. - Electronic Telephone Equipment, S.r.l., Milan, Italy
Filed June 4, 1976, Ser. No. 692,722
Claims priority, application Italy, Feb. 17, 1976, 20699/76
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—56

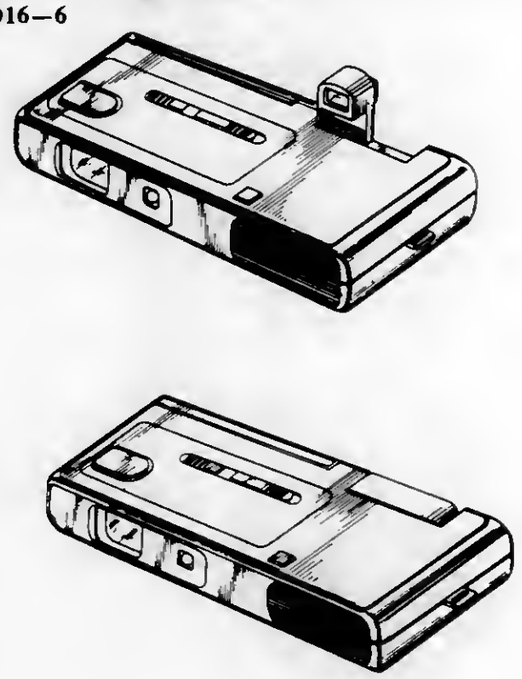




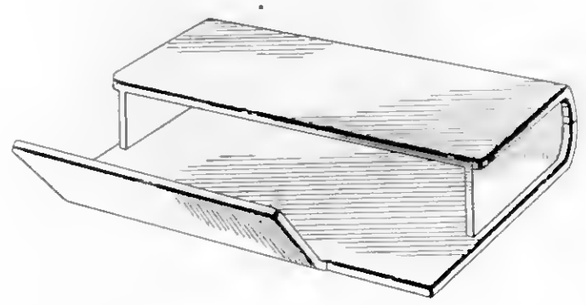
244,850
BEVERAGE DISPENSING CONTAINER OR SIMILAR ARTICLE
Calvin L. Wilson, Richmond, Va., assignor to Reynolds Metals Company, Richmond, Va.
Filed Oct. 21, 1974, Ser. No. 516,764
Term of patent 14 years
Int. Cl. D15—*08*
U.S. Cl. D15—112



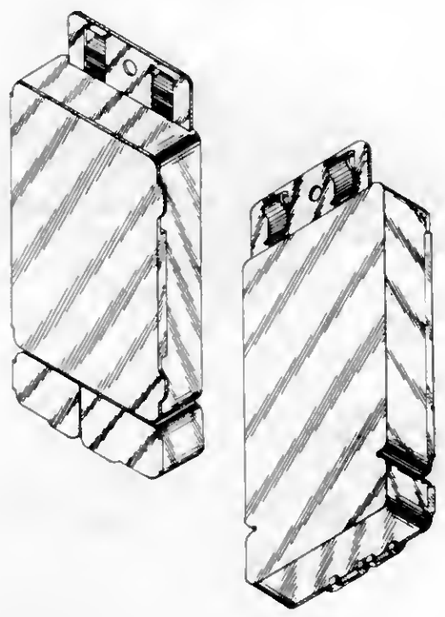
244,851
PHOTOGRAPHIC CAMERA
Kazuo Masuyama, Osaka, Japan, assignor to Sunpack Corporation, Tokyo, Japan
Filed Nov. 25, 1975, Ser. No. 635,035
Claims priority, application Japan, June 2, 1975, 50-2220
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—6



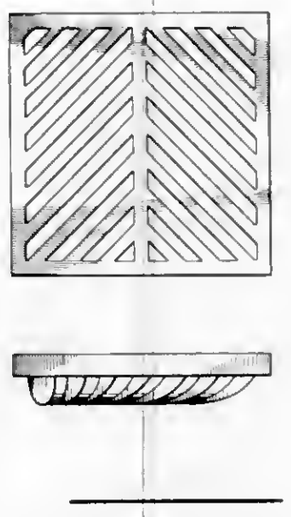
244,852
MEMO PAPER HOLDER
Walter Fieni, Paris, France, assignor to Societe Anonyme Francaise du Ferodo, Paris, France
Filed May 13, 1975, Ser. No. 576,951
Claims priority, application France, Nov. 21, 1974, 74.350
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D19—92



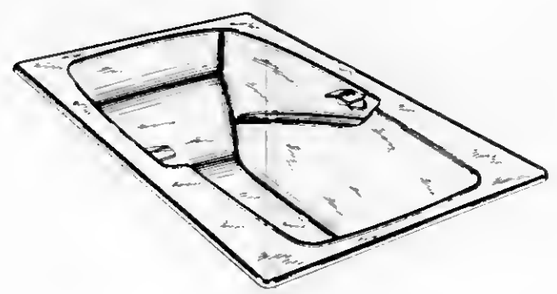
244,853
COMPARTMENTED STORAGE BOX PRIMARILY FOR FISHING LURES
Carl R. Cordell, Jr., 215 Idlewood Drive, Hot Springs, Ark. 71901
Filed Dec. 19, 1975, Ser. No. 642,549
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—14



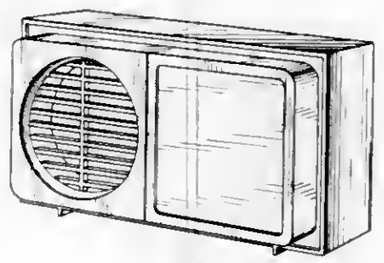
244,854
CATCH BASIN GRATE
Dante A. Salamone, 586 East St., East Weymouth, Mass. 02188
Filed Nov. 18, 1975, Ser. No. 633,079
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—42



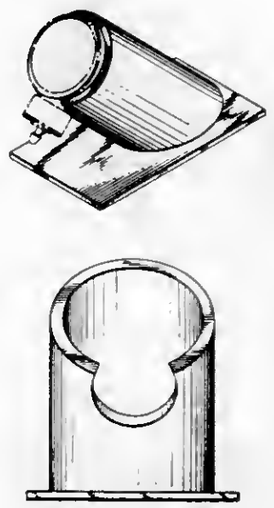
244,855
BATH TUB
Donald W. Doman, Janesville, Wis., assignor to Kohler Co.
Filed Nov. 9, 1973, Ser. No. 414,203
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—55



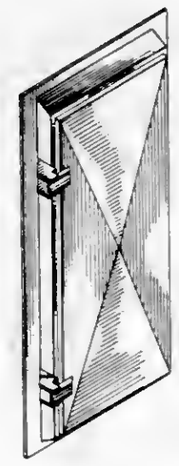
244,856
HOUSING FOR AIR CIRCULATING AND TREATING APPLIANCE
David K. Haufe, Hinsdale, and Gordon Guth, Evanston, both of Ill., assignors to Sunbeam Corporation, Chicago, Ill.
Filed June 20, 1975, Ser. No. 588,869
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—141



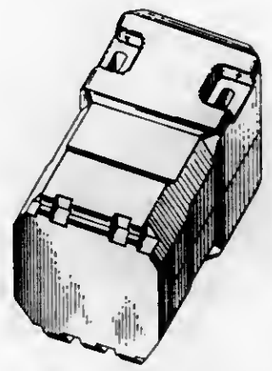
244,857
SPHYGMOMANOMETER STAND
Roger Hayes, 28120 Peacock Ridge Drive, Rancho Palos Verdes, Calif. 90274
Filed July 16, 1976, Ser. No. 705,836
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—21



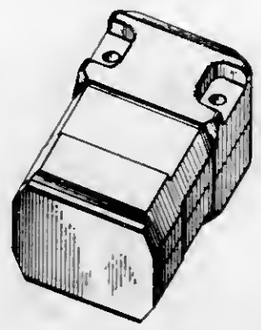
244,858
COMBINED DOOR AND FRAME
Raymond L. Bolender, Sturgis, Mich., assignor to Leland Engineering, Inc., White Pigeon, Mich.
Filed Nov. 26, 1975, Ser. No. 635,622
Term of patent 14 years
Int. Cl. D25—*02*
U.S. Cl. D25—48



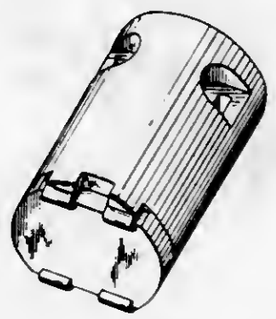
244,859
HOUSING FOR AN ELECTRICAL PLUG
Frank Carmine Jaconette, Trumbull, Conn., assignor to Harvey Hubbell, Incorporated, Orange, Conn.
Filed Jan. 16, 1976, Ser. No. 649,914
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—24



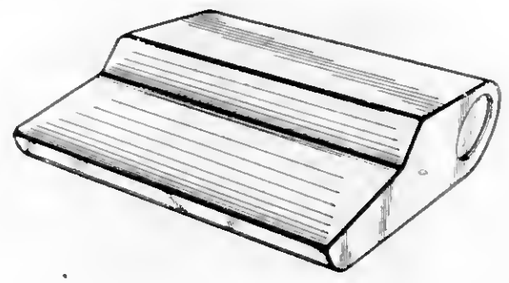
244,860
HOUSING FOR AN ELECTRICAL PLUG
Frank Carmine Jaconette, Trumbull, Conn., assignor to Harvey Hubbell, Incorporated, Orange, Conn.
Filed Jan. 16, 1976, Ser. No. 649,915
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—1 A



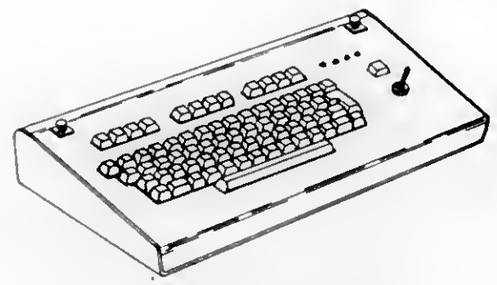
244,861
HOUSING FOR AN ELECTRICAL PLUG
Michael John D'Amato, North Haven, Conn., assignor to Harvey Hubbell, Incorporated, Orange, Conn.
Filed Jan. 16, 1976, Ser. No. 649,916
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—24



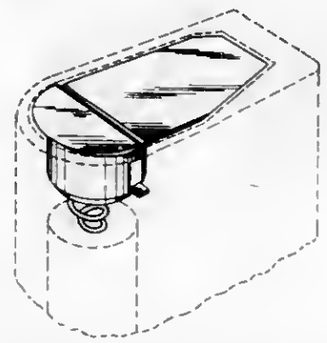
244,862
CASING FOR AN ELECTRONIC CALCULATOR
Barry R. Mathis, Loveland, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.
Filed Sept. 25, 1975, Ser. No. 616,782
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D64—11 B



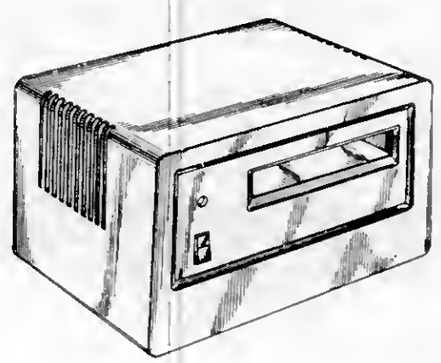
244,863
KEYBOARD MODULE
David Rolfe Smith, Hillsboro, and Richard Ellwood Hansen, Portland, both of Oreg., assignors to Tektronix, Inc.
Filed Apr. 5, 1976, Ser. No. 673,551
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—45



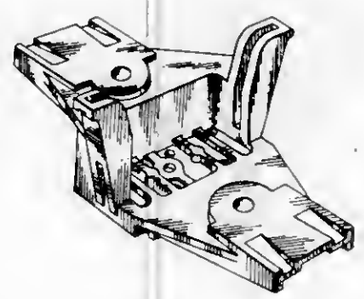
244,864
LIVING HINGE BATTERY COVER FOR ELECTRONIC DEVICE
Donald Leslie William Brooks, Ashtead, England, assignor to Ronson Corporation, Woodbridge, N.J.
Filed Mar. 26, 1976, Ser. No. 670,723
Term of patent 14 years
Int. Cl. D13—*02*; D27—*05*
U.S. Cl. D13—10



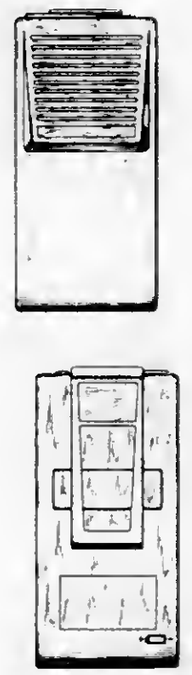
244,865
MAGNETIC TAPE CARTRIDGE TRANSPORT
Collan B. Kneale, and Frank Wilkey, Jr., both of Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Sept. 8, 1975, Ser. No. 611,464
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—6



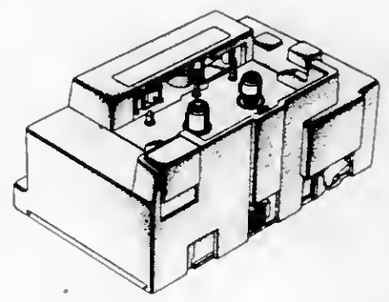
244,866
INSULATOR FOR AN ANTENNA
Franklin Roosevelt DiMeo, Woodbury, and William John Bachman, Mount Laurel, both of N.J., assignors to RCA Corporation, New York, N.Y.
Filed Oct. 14, 1975, Ser. No. 622,260
Term of patent 14 years
Int. Cl. —
U.S. Cl. D14—90



244,867
HOUSING FOR A RADIO RECEIVER
Robert R. Huntington, 4305 Morningside Drive, Lynchburg, Va. 24503, and Henry A. Schaefer, 1219 Cedar Hill Drive, Lynchburg, Va. 24502
Filed Dec. 15, 1975, Ser. No. 640,920
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—68



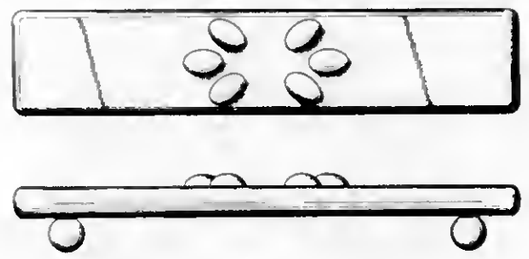
244,868
MICRO-CASSETTE ADAPTER
Yasuo Hattori; Masabiko Sakurada, both of Hachioji, and Kazumi Miyaji, Fuchu, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan
Filed Nov. 24, 1975, Ser. No. 634,830
Claims priority, application Japan, May 28, 1975, 50-21142
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—10



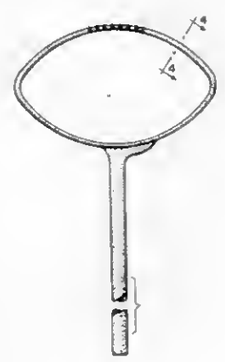
244,869
ANIMAL LEASH
Paul Manley, 5348 27th Ave. S., Minneapolis, Minn. 55417, and Darlene Johnson, 7892 Dunmore Road, St. Paul, Minn. 55119
Filed Sept. 8, 1976, Ser. No. 721,304
Term of patent 3½ years
Int. Cl. D30—99
U.S. Cl. D30—39

244,870
ANIMAL TETHER
John C. Astley, R.R. 1, West Des Moines, Iowa 50265
Filed Sept. 20, 1976, Ser. No. 725,088
Term of patent 14 years
Int. Cl. D30—*09*
U.S. Cl. D30—44

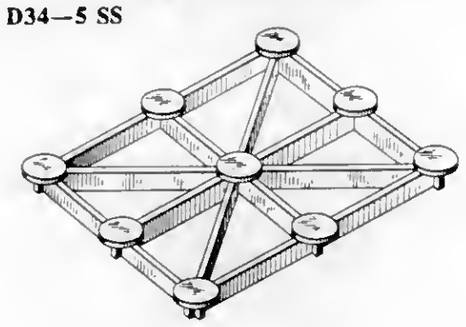
244,871
MASSAGER-EXERCISER FOR NECK AND BACK
Aldo A. Vincenti, 11 Pershing Drive, Plainville, Conn. 06062
Filed Dec. 5, 1975, Ser. No. 638,103
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D24—36



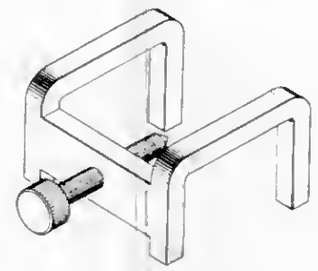
244,872
FOOTBALL HOOP TARGET OR THE LIKE
Charles Wesley Staley, P.O. Box 543, Vinton, Iowa 52349
Filed June 30, 1975, Ser. No. 591,765
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 PP



244,873
ELEVATED PATH-WAY EDUCATIONAL GAME DEVICE
Robert W. Halapin, 34 Regina St., Trumhull, Conn. 06611, and William A. Burley, 10 Shagbark Lane, Woodlake, Woodbury, Conn. 06798
Filed Mar. 9, 1976, Ser. No. 665,324
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS



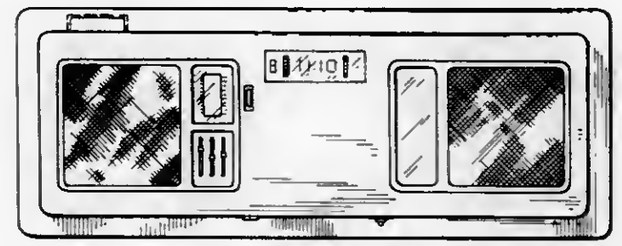
244,874
ATTACHABLE PUTTING GUIDE FOR GOLF PUTTERS
David E. Lombardi, Rte. 2, Box 330, Glen Burnie, Md. 21061
Filed Apr. 28, 1976, Ser. No. 681,283
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 CB



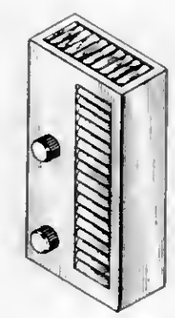
244,875
LAMP
Joseph B. Baca, 739 Inca St., Denver, Colo. 80204
Filed July 24, 1974, Ser. No. 491,566
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20 R

244,876
COMBINED PORTABLE FLUORESCENT AND INCANDESCENT LIGHT
Thomas Zelina, Erie, Pa., assignor to Lighting Systems, Inc., Erie, Pa.
Filed Sept. 16, 1975, Ser. No. 608,055
Term of patent 14 years
Int. Cl. D26—*02*
U.S. Cl. D48—24 R

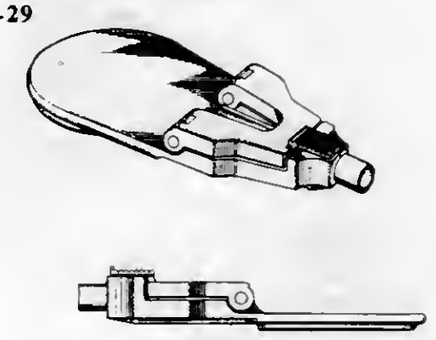
244,877
WALL MOUNTED RADIO, TAPE PLAYER, CLOCK AND DUAL SPEAKER UNIT
John J. McLaughlin, River's Edge Motel, 2700 Absecon Blvd., Atlantic City, N.J. 08401
Filed Nov. 21, 1974, Ser. No. 525,865
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—73



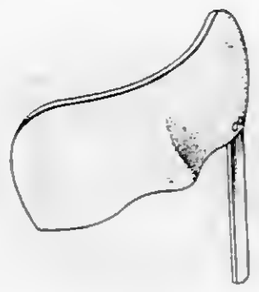
244,878
ELECTRONIC SOUND PRODUCER FOR INDUCING SLEEP OR THE LIKE
Bridget A. Brand, 133 Drexel Road, Ardmore, Pa. 19003
Filed Mar. 1, 1976, Ser. No. 662,600
Term of patent 14 years
Int. Cl. D24—*99*; D26—*05*
U.S. Cl. D24—99



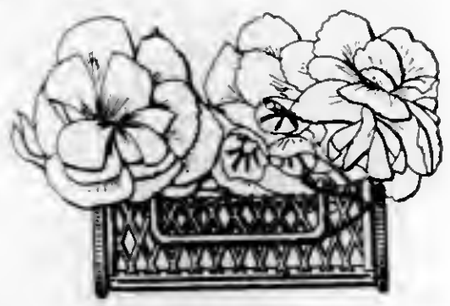
244,879
SPHYGMOMANOMETER SENSOR AND CUFF COUPLING MECHANISM
Joseph J. Manno, La Jolla, Calif., assignor to Ivac Corporation, San Diego, Calif.
Filed Oct. 13, 1976, Ser. No. 731,545
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—29



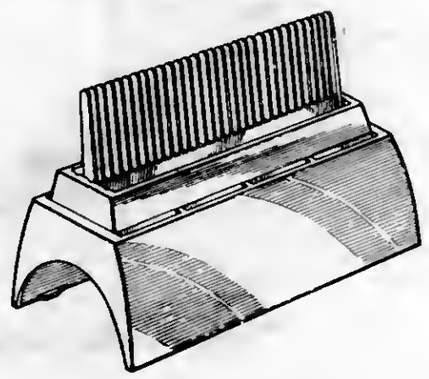
244,880
SPRAY MASK
Barbara J. Terry, 5916 Culview St., Culver City, Calif. 90230
Filed Oct. 29, 1975, Ser. No. 626,856
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D29—8



244,881
COMBINED HAIR ROLLER AND ORNAMENT
Florence Berkowitz, 4063 Bedford Ave., Brooklyn, N.Y. 11229
Filed Jan. 8, 1976, Ser. No. 647,347
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—37

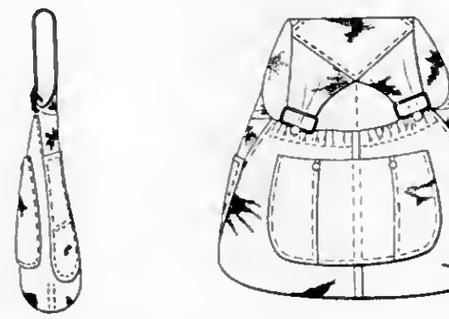


244,882
DRYER ATTACHMENTS
Douglas A. Long, Wilton, and Frederick A. Burke, Riverside, both of Conn., assignors to Clairol Incorporated
Continuation-in-part of Ser. No. 533,398, Dec. 16, 1974, Pat. No. Des. 243,558. This application Nov. 17, 1976, Ser. No. 742,446
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—18



244,883
PURSE HANGER OR SIMILAR ARTICLE
August Rohrmuller, 198-40 32nd Ave., Bayside, N.Y. 11361
Filed July 14, 1975, Ser. No. 595,273
Term of patent 14 years
Int. Cl. D3—*99*
U.S. Cl. D87—2 R

244,884
CARRYALL BAG
Frances E. Dotson, 2706 Villa Maria Road, Bryan, Tex. 77801
Filed Aug. 21, 1975, Ser. No. 606,539
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—3 C



244,885
COIN PURSE
Max D. Pierson, Rte. No. 2, Butler, Ind. 46721
Filed Feb. 4, 1976, Ser. No. 655,158
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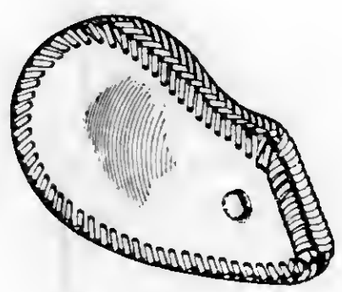

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Cunningham, Hugh, to PPG Industries, Inc. Method of assembling a bipolar electrolyzer. 4,032,423, Cl. 204-254.000.
Cunningham, James L.; and Campbell, Bonnie J., to UOP Inc. Method of making heat transfer tube. 4,031,602, Cl. 29-157.3AH.
Cupples, Barrett L.; and Heilman, William J., to Gulf Research & Development Company. Preparation of alpha-olefin oligomer synthetic lubricant. 4,032,591, Cl. 260-683.650.
Curtis, Gary Martin, to Illinois Tool Works Inc. Preassembled spring washer fastener unit. 4,031,936, Cl. 151-37.000.
Curtis, Sidney, to Thomas Hill Engineering Co. (Hull) Ltd. Devices for rotating articles. 4,031,764, Cl. 74-57.000.
Cutler-Hammer, Inc.: *See—*
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Cutler, Leonard Harry, to Du Pont de Nemours, E. I., and Company. Electrolytic oxidation process. 4,032,416, Cl. 204-79.000.
Czirr, David L.; and Kroll, Harry, to Philip A. Hunt Chemical Corporation. Nitric acid system for etching magnesium plates. 4,032,379, Cl. 156-659.000.
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D. Marten's Manufacturing Company Ltd.: *See—*
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Dacor Corporation: *See—*
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Dahlberg, Karl Goran: *See—*
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Dalling, N. Lawrence: *See—*
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Dally, Don A. Water blocking device. 4,031,676, Cl. 52-102.000.
Dalmau, Juan Salvat, to Salvat Editores, S.A. Sheet turning machine. 4,032,134, Cl. 271-5.000.
Daly, Daniel; Davis, Kenneth Paul; and Boughtflower, Charles Arthur, to Magnatex Limited. Vehicle rear-view mounting arrangement. 4,031,771, Cl. 74-479.000.
Danfoss A/S: *See—*
Andersen, Niels Lervad, 4,032,371.
Beierholm, Hans Mogens, 4,032,834.
Nicolaisen, Holger; and Tandrup, Leif Borge, 4,032,128.
Nicolaisen, Holger; and Andersen, Finn Schnoor, 4,032,739.
Nielsen, Leif, 4,032,070.
Danik, Boris, to Singer Company, The. Shipboard reference for an aircraft navigation system. 4,032,759, Cl. 235-150.250.
Dany, Franz-Josef; Wortmann, Joachim; Munch, Peter; and Vollmer, Hartfrid, to Hoechst Aktiengesellschaft. Flame-retardant plasticizers for polyvinyl chloride. 4,032,498, Cl. 260-30.60R.
Dar, Joseph. Line holders for brick and concrete block laying. 4,031,627, Cl. 33-85.000.
Darlington, Henry: *See—*
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Data Time, Inc.: *See—*
Catto, Kenneth A.; and Burt, Harold R., 4,032,712.
D'Ath, Philip O. Pet dropping pickup device. 4,032,182, Cl. 294-19.00R.
Daum, Daniel E. Board game assembly. 4,032,153, Cl. 273-134.0AT.
Davis, James E. P.; and Omelich, David M., to Puritan-Bennett Corporation. Method and apparatus for determining patient lung pressure, compliance and resistance. 4,031,885, Cl. 128-2.080.
Davis, Kenneth Paul: *See—*
Daly, Daniel; Davis, Kenneth Paul; and Boughtflower, Charles Arthur, 4,031,771.
Davis, Melvin R.; and Howe, Roy G., Jr. Adjustable stilt. 4,032,140, Cl. 272-70.100.
Davis, Pauline Dortch. Table furniture. 4,031,831, Cl. 108-159.000.
Davis, Philip J.; and Sanderford, M. Vincent, to Champion International Corporation. Returnable shipping box for furniture. 4,032,063, Cl. 229-23.00C.
Davis, Thomas A., to Sybron Corporation. Electrically regenerated ion exchange system. 4,032,452, Cl. 210-243.000.
Davis, William F. Method and means for fabricating magazines. 4,032,131, Cl. 270-53.000.
Day, John: *See—*
Carroll, William Michael; and Day, John, 4,032,032.
Day, John H., to McDonnell Douglas Corporation. Ramp with integral toes. 4,032,092, Cl. 244-137.00R.
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DeCastri, Glenn. Night/day rearside view mirror. 4,031,772, Cl. 74-501.00M.
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Deepen Enterprises, Inc.: *See—*
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Defauchy, Jean; and Malaval, Claude, to Commissariat a l'Energie Atomique. Integrated fast reactor of the liquid metal cooled type. 4,032,399, Cl. 176-62.000.
De Groat, Philip M.; and Lewis, Robert A. King pin lock. 4,031,727, Cl. 70-232.000.
de Haas, Hendrik Antoon Lorentz, to B.V. vuro vorr Wetenschappelijke en Techische Ontwerpen Wto. Mill, particularly windmill. 4,032,257, Cl. 416-117.000.
De Jager, Garry. Aircraft anti-theft chock device. 4,031,726, Cl. 70-226.000.
De John, Charles R.; and Heger, Edwin L. Constant flow gas regulator. 4,031,917, Cl. 137-613.000.
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Dell, M. Benjamin, to Aluminum Company of America. Mix suitable for use in seams between carbon blocks. 4,032,653, Cl. 204-294.000.
Dellian, Kurt Adolf, to Ciba-Geigy Corporation. Phenyl phthalate carriers in dyeing and printing synthetic fibers. 4,032,291, Cl. 8-34.000.
DeLuca, Carlo J., to Liberty Mutual Insurance Company. Apparatus for interfacing to anatomic signal sources. 4,031,882, Cl. 128-2.10R.
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De Martini, Joseph. Tire chain applying device. 4,031,939, Cl. 152-213.00R.
Deml, Reinhold; Greis, Ulrich; and Kapfhammer, Wilhelm, to AGFA-Gevaert, A.G. Method for production of rotationally symmetric non-spherical optical elements. 4,032,343, Cl. 96-38.300.
Demole, Edouard P., to Firmenich S.A. Aromatic compositions. 4,031,902, Cl. 131-17.00R.
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Depallorator Corporation Limited: *See—*
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DeSoto, Inc.: *See—*
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De Visser, Erik V. M.; and Ghyselen, Karel I., to S.A. Texaco Belgium N.V. Skimmer for a body of liquid with floating solids. 4,032,449, Cl. 210-173.000.
DeVitis, Louis. Apparatus for grooving concrete. 4,032,249, Cl. 404-89.000.
De Winter, John Christian; Nahory, Robert Edward; and Pollack, Martin Alan, to Bell Telephone Laboratories, Incorporated. Growth of III-V layers containing arsenic, antimony and phospborus, and device uses. 4,032,951, Cl. 357-17.000.
Dexter, Martin; Spivack, John D.; and Steinberg, David Herbert, to Ciba-Geigy Corporation. 3,5-Dialkyl-4-hydroxyphenylalkanoic acid esters of polyalkylene glycols. 4,032,562, Cl. 260-473.00S.
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Dietrich, Ursula, to Deepen Enterprises, Inc. Toothbrush for canines. 4,031,587, Cl. 15-167.00R.
Diggs, Richard E. Tree hedging arrangement. 4,031,695, Cl. 56-237.000.
Digicourse Inc.: *See—*
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Di Michele, Aldo; Gallas, John D.; and Grimm, Frank W., to Drestech Corporation. Electrical device. 4,032,880, Cl. 338-157.000.
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Doi, Nobuo. Mass flowmeter. 4,031,758, Cl. 73-205.00D.
Dolan, Courtney F.; and Ruettinger, Thurman O., to Chrysler Corporation. Coupling apparatus for full time four wheel drive. 4,031,780, Cl. 74-711.000.
Domig, Rene; Morf, Ernst; and Loepfe, Erich, to Aktiengesellschaft Gebrueder Loepfe. Electronic equipment for monitoring yarn travel on a textile machine. 4,031,924, Cl. 139-336.000.
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Dorer, Casper John, Jr.; and Miller, Clark Ober, to Lubrizol Corporation, The. Fuel compositions containing esters and nitrogen-containing dispersants. 4,032,304, Cl. 44-70.000.
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Dotzer, Richard; Hauschildt, Hans-Georg; Todt, Ennu, deceased; by Todt, Susanne, legal heir; and by Todt, Ruth Katharina, legal heir, to Siemens Aktiengesellschaft. Electroplating bath and method for the electrodeposition of bright aluminum coatings. 4,032,413, Cl. 204-14.00N.
Douda, Bernard E.; and Tanner, John E., Jr., to United States of America, Navy. Cinnamic acid containing pyrotechnic smoke composition. 4,032,374, Cl. 149-19.800.
Douglas, Lawrence M.; Finelli, Patrick L.; Staller, Norman D.; and Slavitter, Frederick, to Polaroid Corporation. Latched shutter system having automatic delay of latch reset. 4,032,941, Cl. 354-230.000.
Douglass, Robert J., to Raymond Lee Organization, Inc., The. Oil cleaning system comprising an engine block adapter and centrifugal cleaning means. 4,032,447, Cl. 210-168.000.
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Doyle, Frank Peter; Cantello, Barrie Christian Charles; Buckle, Derek Richard; and Smith, Harry, to Beecham Group Limited. 3-Cyano-4-hydroxy coumarin derivatives. 4,032,544, Cl. 260-343.20R.
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Droscher, Walter; Winter, Kurt; and Meier, Werner, to Siemens Aktiengesellschaft. Logic level conversion system. 4,032,800, Cl. 307-296.00A.
Dubery, Roy Frederick; and Chivrall, Ronald Arther, to Airfix Plastics

Limited. Closure and fastener for trash bins. 4,032,037, Cl. 220-335.000.

Dubin, Robert R.; and Rotb, Walter L., to General Electric Company. Fuel cell with hydronium beta-alumina electrolyte. 4,032,694, Cl. 429-33.000.

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Dufour, Patrick. Hydrogen-oxygen fuel cell for use with internal combustion engines. 4,031,865, Cl. 123-1.00A.

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Dunn, John C. Smoking tube with check valve. 4,031,905, Cl. 131-173.000.

Dunning, Leon Tucker. Transfer mechanism. 4,032,388, Cl. 156-568.000.

Dunnington, Richard Harry; Viglianco, Carl Michael; and Wilkens, George Rudolph, to RJR Archer, Inc. Laminated backing structure for composite lithographic plate. 4,032,684, Cl. 428-332.000.

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Dworkin, Robert Dally; and Ejk, Adam Joseph, to M & T Chemicals Inc. One step method for preparing non-stoichiometric diorganotin carbosylates using a solid phase reaction. 4,032,552, Cl. 260-414.000.

Dwyer, Thomas H. Nestable pot stands. 4,032,097, Cl. 248-146.000.

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Erbach, Arthur R.; Franck, Allen R.; Mulee, Dennis L.; and Schmitt, Wilhelm E., to Marvel Engineering Company. Laser microperforator. 4,032,743, Cl. 219-121.0LM.

Ericson, Eric Asel; and Kaufhold, Frederick Daniel, to General Electric Company. High current electrical joint apparatus. 4,032,207, Cl. 339-75.00M.

Eriksson, Hans Georg; Sjoberg, Karl Gosta; and Lofgren, Karl Borje, to Granges Essem Aktiebolag Fack. Method and apparatus for controlled separation of substances by heating. 4,032,361, Cl. 134-19.000.

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Essilor International Cie Generale d'Optique: *See—*
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Fabricius, Claus, to Guldager Electrolyse International & Cie. Cleaning of flue gas apparatus. 4,032,421, Cl. 204-196.000.

Fahlenberg, Paul, to Compur - Electronic Gesellschaft mit beschraenkter Haftung. Recording tape control arrangement for telephone answering apparatus. 4,032,713, Cl. 179-6.00R.

Fahlenberg, Paul: *See—*
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Farr, Glyn Phillip Reginald, to Girling Limited. Anti-skid hydraulic braking systems for vehicles. 4,032,200, Cl. 303-116.000.

Farrell, Eugene A., to Frink Sno-Plows. Operating and shock cylinder assembly for vehicle underbody scrapers and the like. 4,031,966, Cl. 172-794.000.

Faucz, Eugene C.: *See—*
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Fauke, Allen R.: *See—*
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Faust, Carl Walter; and Smith, Arnold Ray, to Bell Telephone Laboratories, Incorporated. Strand adapter for aerial closures and cable terminals. 4,032,212, Cl. 339-109.000.

Faust, Werner, to Maschinenfabrik Stromag GmbH. Flexible coupling and torque-transmitting member therefor. 4,031,714, Cl. 64-12.000.

Faust, Wilfried; and Westphal, Kurt, to Bayer Aktiengesellschaft. Synergistic herbicidal composition for the control of weeds. 4,032,324, Cl. 71-93.000.

Fauth, Gunter: *See—*
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Fazekas, David Stephen, to International Nickel Company, Inc., The. Drive system. 4,031,778, Cl. 74-571.00L.

Federer, Fritz: *See—*
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Feltner, R. Alan: *See—*
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Fender, C. Leo. Bridge for stringed instruments. 4,031,799, Cl. 84-307.000.

Ferbeck, Daniel; Groznykh, Rene; and de la Ville de Rigne, Patrick, to Engins Matra; and de Dietrich & CIA. Central guide system for vehicles. 4,032,095, Cl. 246-442.000.

Ferlus-Chimie S.A.: *See—*
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Rotier, Donald Jack; and Ferrin, Frank J., 4,031,756.

Fetsch, Joseph T. Two-position school bus seat. 4,032,191, Cl. 297-440.000.

Feuerlein, Peter, to Buss Aktiengesellschaft. Spherical storage tank for gases and liquids and supporting base therefor. 4,031,679, Cl. 52-294.000.

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Fies, William J.: *See—*
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Filan, Alton N.; and Filan, A. LaVerne. Drawbar assembly. 4,032,169, Cl. 280-405.00B.

Filatov, Sergei Alexandrovich: *See—*
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Finnell, Leonard W.; Petersen, Sigrud R.; and Gorden, Dale I., to Westinghouse Electric Corporation. Brushless exciter supplemental ceiling excitation system. 4,032,835, Cl. 322-86.000.

Finnigan Corporation: *See—*
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Fisher, David G.; and Gladden, Robert G., to Dayco Corporation. Engine power take-off system with single belt drive. 4,031,761, Cl. 74-15.630.

Fisher, Ian Stuart; and McIntyre, James Eric, to Imperial Chemical Industries Limited. Antistatic agents. 4,032,595, Cl. 260-857.0PE.

Fisher, Maurice; Kruger, Michael; and Maber, Terence Walter, to Rolls-Royce (1971) Limited. Removal of aluminium rich coatings from heat resisting alloys. 4,032,359, Cl. 134-3.000.

Fitzgerald, William Maurice Bard. Pressurized hydraulic sump system. 4,031,920, Cl. 138-31.000.

Flannelly, William G., to Kaman Aerospace Corporation. Method and apparatus for analyzing a damped structural specimen. 4,031,744, Cl. 73-67.200.

Fleck, Fritz; Kittl, Hans; and Valenti, Salvatore, to Sandoz Ltd. Paraphenyl stilbene derivatives. 4,032,558, Cl. 260-465.00H.

Fleet, Ronald P. J., to Monarch Marking Systems, Inc. Device for applying labels to articles. 4,032,386, Cl. 156-475.000.

Fleigle, Donald Earl, to Black and Decker Manufacturing Company, The. Blade configuration for cordless lawnmower. 4,031,696, Cl. 56-295.000.

Fletcher, George L., Jr.; Merrill, Stewart H.; and Kotlarchik, Carl, Jr., to Eastman Kodak Company. Polysulfonamide vesicular binders and processes of forming vesicular images. 4,032,344, Cl. 96-48.0HD.

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Flynn, Jac B.: Janquart, Jerry C.; and Priese, Werner K., to Hills-McCanna Company. Liquid dispensing unit and system. 4,032,044, Cl. 222-135.000.

FMC Corporation: *See—*
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Foster, James Malcolm: *See—*
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Fountain, Gerald F.; Veloz, Jaime; Dahlberg, Harry R.; and Bilson, Edward A., to Inspiration Consolidated Copper Company. Process for recovery of copper. 4,032,330, Cl. 75-101.00R.
Fowler, John T., to Laitram Corporation, The. Calibration apparatus for automatic magnetic compass correction. 4,031,630, Cl. 33-356.000.
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Frazar, Joseph H., to General Electric Company, Laundry machine improved water temperature control and method. 4,031,911, Cl. 137-3.000.
Freed, Meier E.; and Potoski, John R., to American Home Products Corporation. 2,3,4,4a-Tetrahydro-1H-pyrazino[1,2-a,]quinoxalin-5(6H)-ones and derivatives thereof for relieving hypertension. 4,032,639, Cl. 424-251.000.
French, Carroll B.: *See—*
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Fujiwara, Hiroshi; Takahashi, Asao; and Suzuki, Ken, to Maruzen Oil Co. Ltd. Process for purifying halogenated alkenylphenol polymers. 4,032,598, Cl. 260-878.00R.
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Funk, Richard J. Measuring closure for containers. 4,032,050, Cl. 222-284.000.
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Gentry, Robert Ray, to Union Carbide Corporation. Liquid siloxanes as additives for curable polyester moulding compositions containing vinyl acetate polymer and unsaturated monomer. 4,032,494, Cl. 260-29.1SB.
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Gerlach, John N., to Kennecott Copper Corporation. Process for increasing the rate of copper metal production in a quinolic extraction system. 4,032,332, Cl. 75-108.000.
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Gibbons, Loren Kenneth. Isothiazolylformamidine derivatives as herbicides. 4,032,322, Cl. 71-90.000.
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Gilfillen, Lester Ray; Shipley, Edward Nicholas; and Zies, Ray Keith, to Bell Telephone Laboratories, Incorporated. Arrangement for controlling seizure of a connector. 4,032,890, Cl. 340-147.00C.
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Goddard, Steven Jerome, to Du Pont de Nemours, E. I., and Company. Herbicidal 2-substituted aryl-4,5,6,7-tetrahydro-2H-isoindole-1,3-diones. 4,032,326, Cl. 71-96.000.
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Gray, James R. Insect trap. 4,031,654, Cl. 43-114.000.
Green, Donald T.; and de Benedetti, Edward, to United States Steel Corporation. Tire inspection machine presenting an X-ray image of the entire width of the tire. 4,032,785, Cl. 250-358.00T.
Green, Sam J.; and Callahan, Richard E., to Champion Spark Plug Company. Spark plug tester ignition system. 4,032,842, Cl. 324-15.000.
Greenstein, Bernard, to Owens-Illinois, Inc. Printing paste vehicle, gold dispensing paste and method of using the paste in the manufacture of microelectronic circuitry components. 4,032,350, Cl. 106-1.000.
Greenwald, Richard B., to Polaroid Corporation. 1,3-Disulfonylcycloalkane. 4,032,538, Cl. 260-327.00M.
Greenwald, Robert J. Fecal examination device. 4,032,437, Cl. 209-17.000.
Gregory, Harold; and Preston, Beryl Margaret, to Imperial Chemical Industries Limited. Polypeptides. 4,032,633, Cl. 424-177.000.
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Groner, Carl F., to Eastman Kodak Company. Photoimmobilized electrophoretic recording. 4,032,226, Cl. 355-3.00P.
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Grosseau, Albert, to Societe Anonyme Automobiles Citroen. Transmission devices for motor vehicles. 4,031,977, Cl. 180-77.00R.
Groves, William G.; Loev, Bernard; and Perchonock, Carl D., to SmithKline Corporation. Aromatic prostaglandin derivatives. 4,032,656, Cl. 424-308.000.
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Herndon, William H., to Fairchild Camera and Instrument Corporation. An improved semiconductor memory cell circuit and structure. 4,032,902, Cl. 340-173.0FF.

Herscher, Marvin B.: *See—*
Mertin, Thomas B.; Herscher, Marvin B.; and Cox, Robert B., 4,032,710.

Hess, Richard: *See—*
Shipman, Matthew; Hess, Richard; Keufman, Burton; and Schneider, Bruce H., 4,032,230.

Hibbs, Eugene B., Jr. Overdrive detector for radio frequency amplifier. 4,032,853, Cl. 330-2.000.

Hild, Danny L. Detachable conveyor bucket apparatus. 4,032,001, Cl. 198-711.000.

Hill, David John. Stall control and wear block for recreational skate boards. 4,031,988, Cl. 188-250.00B.

Hill, Joseph Caldwell, to Varian Associates. Coaxial balun with doubly balanced heterodyne converter. 4,032,850, Cl. 325-446.000.

Hilliard Corporation, The: *See—*
Kelchner, Jay Robert, 4,032,107.

Hills-McCanna Company: *See—*
Flynn, Jac B.; Janquart, Jerry C.; and Priese, Werner K., 4,032,044.

Hiltebrandt, Siegfried; and Wurster, Helmut. Surgical instrument for coagulation purposes. 4,031,898, Cl. 128-303.100.

Hines, Clyde A.; and Hines, Clyde C. Cardboard cutter implement. 4,031,616, Cl. 30-2.000.

Hines, Clyde C.: *See—*
Hines, Clyde A.; and Hines, Clyde C., 4,031,616.

Hirabayashi, Masaya; and Enjo, Hiromasa, to Kyoto Ceramic Co., Ltd. Magnetic memory structure and method of making the same. 4,032,674, Cl. 427-130.000.

Hirade, Kenkichi; Hattori, Takeshi; and Wasai, Hiromi, to Nippon Telegraph and Telephone Public Corporation. Digital mobile communication system and method. 4,032,846, Cl. 325-54.000.

Hirt, Peter Klaus; and Switzeny, Kurt, to Pohlig-Heckel-Bleichert Vereinigte Maschinenfabriken Aktiengesellschaft. Safety clamping device for pull-ceble in aerial cableway arrangement. 4,031,830, Cl. 104-223.000.

Hitachi, Ltd.: *See—*
Ibamoto, Masahiko; and Kiwaki, Hisakatsu, 4,032,833.
Iizuka, Nobuyuki; Otawara, Yasuhiko; and Ninomiya, Satoshi, 4,032,255.
Matsuyama, Mitsuo; and Okuhara, Shinzi, 4,032,892.
Mori, Mitsuhiro; Ito, Kazuhiro; Morioka, Makoto; and Ono, Yuichi, 4,032,945.
Ohbe, Shinya; Takemoto, Iwao; and Kubo, Masaharu, 4,032,952.
Oishi, Kazuaki; Nakano, Seizo; and Suda, Shouetu, 4,032,820.
Okamura, Masami; Aoki, Fumio; Sano, Yoshihiro; Makino, Junichi; Miki, Yoshiteru; Sasaki, Hiroshi; and Seo, Kazuo, 4,032,913.
Yamashiro, Osamu; and Hatsukano, Yoshikazu, 4,032,864.

Hitachi Magnetics Corporation: *See—*
Johnson, C. Evan, 4,031,652.

Hitachi Metals, Ltd.: *See—*
Nakamura, Hideki; and Kiyonaga, Kingo, 4,032,302.

Hitchcock Chair Company: *See—*
Lasko, Robert A., deceased; and Miller, Claud T., 4,031,668.

Hobart Corporation: *See—*
Miller, Blaine Monroe, Jr., 4,032,446.

Hoch, Helmut: *See—*
Quadbeck-Seeger, Hans-Juergen; and Hoch, Helmut, 4,032,568.

Hochtemperatur-Reaktorbau GmbH: *See—*
Horner, Malcolm; Hodzic, Alija; and Haferkamp, Dirk, 4,032,402.

Hodzic, Alija: *See—*
Horner, Malcolm; Hodzic, Alija; and Haferkamp, Dirk, 4,032,402.

Hoechst Aktiengesellschaft: *See—*
Dany, Franz-Josef; Wortmann, Joachim; Munch, Peter; and Vollmer, Hartfrid, 4,032,498.
Kurdorf, Bernhard; Pusche, Herbert; Erpenbach, Heinz; and Riechmann, Wernfried, 4,032,410.
von Plessen, Helmold; and Petrich, Grete, 4,032,622.

Hoerner Waldorf Corporetion: *See—*
Dutcher, Daniel P.; and McLaren, Edwin C., 4,032,061.

Hofer, Wolfgeng; Maurer, Fritz; Riebel, Hans-Jochem; Schroder, Rolf; Uhrhan, Paul; Homeyer, Bernhard; Behrenz, Wolfgang; and Hammann, Ingeborg, to Bayer Aktiengesellschaft. O,O-Dialkyl-O-(1-phenyl-2-carbalkoxyvinyl)-thionophosphoric acid esters and insecticidal and acaricidal compositions and method of use thereof. 4,032,634, Cl. 424-212.000.

Hoffmann-La Roche Inc.: *See—*
Buchi, George, 4,032,577.
Fryer, Rodney Ian; and Walser, Armin, 4,032,535.
Gerecke, Max; Kyburz, Emilio; and Kaplan, Jean-Pierre, 4,032,525.

Hoger, Ernst: *See—*
Reinhardt, Horst; and Hoger, Ernst, 4,032,240.

Hoke, Donald Irvin, to Lubrizol Corporation, The. Phosphorus and sulfur containing amides and thioamides as lubricating oil additives and lubricating oil compositions containing same. 4,032,461, Cl. 252-46.700.

Hokkoku, Shusaburo; and Onishi, Yasuhiko, to Meito Sangyo Kabushiki Kaisha. Dextran ester-olefin compound copolymer and process for preparing same. 4,032,488, Cl. 260-17.4GC.

Holick, Hubert: *See—*
Rohr, Franz Josef; and Holick, Hubert, 4,032,285.

Hollaway, Gerald C., Jr.: *See—*
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Hollis, Thomas L., executor: *See—*
Laughlin, William N., deceased; and Hollis, Thomas L., executor, 4,032,126.

Hollway, David Lipscombe; Somlo, Peter Ivan; Hunter, John David; and Morgan, Idris Gareth, to Commonwealth Scientific and Industrial Research Organization. Microwave alarm. 4,032,910, Cl. 340-224.000.

Hollyfield, Clifford G., Jr.: *See—*
Jackson, Allen S., 4,032,002.

Hollymatic Corporation: *See—*
Ceresa, Aldo F., 4,032,252.

Holman, Tomlinson M., II, to Advent Corporation. Phonograph preamplifier network with infrasonic cutoff response. 4,032,855, Cl. 330-31.000.

Holt, Donald G. Quick change in-motion tool chuck. 4,032,163, Cl. 279-37.000.

Holzinger, Karl: *See—*
Helder, Johan; Holzinger, Karl; Guegel, Gerd; Liebler, Heinz; and Pernegger, Wolfgang, 4,032,414.

Holzl, Ludwig: *See—*
Reisinger, Konrad; and Holzl, Ludwig, 4,032,709.

Holzman, Allen L.: *See—*
Humphrey, John M.; and Holzman, Allen L., 4,031,698.

Homan, Gerlof, to Survival Technology, Inc. Safety I. V. injector. 4,031,890, Cl. 128-215.000.

Homberg, Heinz; and Franke, Kurt, to Siemens Aktiengesellschaft. Operating handle for an encapsulated switching apparatus. 4,032,732, Cl. 200-50.00A.

Homeyer, Bernhard: *See—*
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Schroder, Rolf; Uhrhan, Paul; Homeyer, Bernhard; Behrenz, Wolfgang; and Hammann, Ingeborg, 4,032,634.

Honda, Tadatoshi: *See—*
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Honeywell Inc.: *See—*
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Fulkerson, David E., 4,032,801.
Quarton, William T.; and Lowe, Peter R., 4,032,760.
Rotier, Donald Jack; and Ferrin, Frank J., 4,031,756.
Szonntagh, Eugene L., 4,031,606.

Honjo, Satoru: *See—*
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Hoogendijk, Adrianus Huibert: *See—*
Kenney, George Churchill; and Hoogendijk, Adrianus Huibert, 4,032,966.

Hook, Bobby L.: *See—*
Allen, Cloy L.; and Hook, Bobby L., 4,032,171.

Hooker Chemicals & Plastics Corporation: *See—*
Peterson, John A., 4,032,417.

Hooper, Richard G., to United States of America, Air Force. Total water content instrument. 4,031,753, Cl. 73-170.00R.

Hoots, Robert G. Fuel atomizer. 4,031,876, Cl. 123-141.000.

Hoover Ball and Bearing Company: *See—*
Nichols, Dwight E., 4,032,048.

Hoover, Fred Wayne; and Roberts, Robert Earl, to Du Pont de Nemours, E. I., and Company. Permselective membrane apparatus with porous support. 4,032,454, Cl. 210-323.00R.

Hoover, Merle Vincent, to RCA Corporation. Complementary symmetry FET mixer circuits. 4,032,851, Cl. 325-451.000.

Hoppe, Alfred; and Geistert, Walter, to Deutsche Texaco Aktiengesellschaft. Process for optimal pressure control in a multi-stage evaporation unit. 4,032,412, Cl. 203-22.000.

Horn, Barry N.: *See—*
Rice, Richard C.; and Horn, Barry N., 4,032,908.

Horner, Malcolm; Hodzic, Alija; and Haferkamp, Dirk, to Hochtemperatur-Reaktorbau GmbH; and Taywood Engineering Limited. Cylindrical prestressed concrete tank for a nuclear power plant. 4,032,402, Cl. 176-87.000.

Hornsby, James R., Jr., to Funstuf, Inc. Transferable color changeable applique. 4,032,687, Cl. 428-1.000.

Horstmann, Harald: *See—*
Moller, Eike; Meng, Karl; Wehinger, Egbert; and Horstmann, Harald, 4,032,646.

Hosaka, Hirokazu: *See—*
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Hoshiyama, Masao: *See—*
Ikezaki, Muneyoshi; Ito, Nobuo; Okazaki, Yasushi; Hoshiyama, Masao; Nagao, Taku; and Nakajima, Hiromichi, 4,032,575.

Hosoda, Kazuo: *See—*
Moriya, Masafumi; Hosoda, Kazuo; Takai, Makoto; and Mano, Shiro, 4,032,482.

Hotten, Bruce W.; and King, John M., to Chevron Research Company. Lubricating oil additive composition. 4,032,462, Cl. 252-49.700.

Houdaille Industries, Inc.: *See—*
Cady, Percy Luther, 4,031,787.

Houston, Douglas E.: *See—*
Baliga, B. Jayant; Houston, Douglas E.; and Krishna, Surinder, 4,032,961.

Howe, Milton Albert, Jr.: *See—*
Hendricks, David Allen; Howe, Milton Albert, Jr.; Luck, Stephen Royall; Morris, Alfred Ray; and Owen, Dave Leslie, 4,032,038.

Howe, Roy G., Jr.: *See—*
Davis, Melvin R.; and Howe, Roy G., Jr., 4,032,140.

Howell, Eddie P.; and Gant, Orland J., Jr., to Atlantic Richfield Company. Method for the production of minerals. 4,032,194, Cl. 299-4.000.

Hubbard, James H.; and Van Cleave, George W., to International Business Machines Corporation. Toner concentration control apparatus. 4,032,227, Cl. 355-14.000.

Huchital, David A.; and Steinberg, George N., to Perkin-Elmer Corporation, The. High power electrodeless gas arc lamp for pumping lasers. 4,032,862, Cl. 331-94.50P.

Hudault, Gerard: *See—*
Dumas, Daniel; and Hudault, Gerard, 4,031,615.

Huff, Bernice, to Procter & Gamble Company, The. Legless panty. 4,031,568, Cl. 2-406.000.

Hughes Aircraft Company: *See—*
Grinberg, Jan; Fraas, Lewis M.; Bleha, William P., Jr.; and Braatz, Paul O., 4,032,954.
Harp, Robert S.; and Russell, Kenneth J., 4,032,865.
Kamath, G. Sanjiv; and Smith, Bradley W., 4,032,950.
Koda, Nobuo John, 4,032,783.

Hughes, John, to American Colloid Company. Continuous method for producing a dry, solid polyacrylamide. 4,032,701, Cl. 526-88.000.

Hughes, Lee E.; Marshall, John L.; and Doring, Dieter, to Tally Corporation. Wide range current flow fault detector. 4,032,766, Cl. 235-153.0AS.

Hugon, Pierre: *See—*
Beregi, Laszlo; Hugon, Pierre; Duhault, Jacques; and Boulanger, Michelle, 4,032,658.

Huhse, Peter; Marin, Heiner; Kurzmann, Harald; and Henry, Marion, to Siemens Aktiengesellschaft. Contact system for high-voltage power circuit breakers. 4,032,737, Cl. 200-148.00R.

Hull, James S., to Melvin Corporation. Hydrostatic conveyor drive. 4,032,003, Cl. 198-855.000.

Hulls, Leonard Robin; and Hadden, Stephen Clow, to RCA Corporation. Filter which tracks changing frequency of input signal. 4,032,852, Cl. 328-167.000.

Humberger, Roger Benton: *See—*
Smith, Jack Lee; Crowley, Charles Raymond; and Humberger, Roger Benton, 4,032,319.

Humphrey, John M.; and Holzman, Allen L., to United States of America, Navy. Split flow injector for solid fuel ramjets. 4,031,698, Cl. 60-251.000.

Hung, Ling Kong: *See—*
Bloom, Allen; and Hung, Ling Kong, 4,032,470.

Hunter, John David: *See—*
Hollway, David Lipscombe; Somlo, Peter Ivan; Hunter, John David; and Morgan, Idris Gareth, 4,032,910.

Huntley, James R.; and Southard, William Franklin, to Tool Service Engineering Company. Device for assembling picture frames. 4,032,130, Cl. 269-8.000.

Hurd, Frank W., to University of Minnesota, Inc. Metal reduction process. 4,032,328, Cl. 75-84.10R.

Hurd, Frank W., to University of Minnesota, Inc. Metal reduction process employing metal sub-halides. 4,032,329, Cl. 75-84.500.

Hurko, Bohdan, to General Electric Company. Flat plate heating unit with foil heating means. 4,032,750, Cl. 219-464.000.

Hurschman, Alfred A., to Ampoules Corporation. Two-chamber mixing syringe. 4,031,892, Cl. 128-218.00M.

Hurt, John M., Jr. Card grading system. 4,031,636, Cl. 35-48.00A.

Husky Corporation: *See—*
Sutcliffe, Grenville G.; and Dumpis, Janis, 4,031,930.

Hussain, Amir, to Siemens Aktiengesellschaft. Producing glass fiber containing epoxy resin adhesive films. 4,032,358, Cl. 106-311.000.

Hutchinson, Florence M., executrix: *See—*
Hutchinson, William Milton, deceased, 4,032,467.

Hutchinson, William Milton, deceased (by Hutchinson, Florence M., executrix), to Phillips Petroleum Company. Azeotropes of 1,2-dichloro-1,1,2-trifluoroethane. 4,032,467, Cl. 252-162.000.

Hyde, Robert W. Method of forming art product. 4,032,671, Cl. 427-14.000.

Hydro-Tech Corporation: *See—*
Onal, Hasan F.; and Harmon, Clarence R., 4,031,844.

Hydro, William R., to United States of America, Army. Piperidine derivatives. 4,032,531, Cl. 260-293.640.

I.W.S. Nominee Company Limited: *See—*
Kilpatrick, David John; Shaw, Trevor; and Lewis, David Malcolm, 4,032,565.

Ibamoto, Masahiko; and Kiwaki, Hisakatsu, to Hitachi, Ltd. Chopper control device. 4,032,833, Cl. 363-78.000.

Ibanez, Cuitlahuac, to Tecnicas de Riego y Abono, S.A. Injection irrigating process and apparatus. 4,031,833, Cl. 111-7.100.

Ichi, Tomoyuki: *See—*
Irie, Toshio; Tanda, Toshikuni; Ichi, Tomoyuki; and Sadayori, Toshio, 4,032,675.

Ichioka, Eiji; and Harada, Yurifumi, to Ashimori Kogyo Kabushiki Kaisha. Method of forming a coating of a rubber or a synthetic resin having an even thickness on the external surface of a tubular textile jacket. 4,032,677, Cl. 427-358.000.

IDR, Inc.: *See—*
Saylor, Richard, 4,032,972.

Ignoffo, Vincent E. Muffler and exhaust gas purifier for internal combustion engines. 4,032,310, Cl. 55-276.000.

Iida, Noriyosbi: *See—*
Katayama, Hajime; Nitanda, Hiroshi; Nagaoka, Tateki; Kishi, Hirotoshi; Takade, Yousaku; Iida, Noriyoshi; Inuzuka, Tsuneki; and Komiya, Yutaka, 4,032,137.

Iida, Yoshihisa; and Oike, Yozo, to Shinpo Kogyo Kabushiki Kaisha. Speed reduction gear. 4,031,781, Cl. 74-804.000.

Iimura, Kamizo: *See—*
Kidoh, Kunizoh; Wakamori, Hideki; and Iimura, Kamizo, 4,032,497.

IIT Research Institute: *See—*
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Iizuka, Nobuyuki; Otawara, Yasuhiko; and Ninomiya, Satoshi, to Hitachi, Ltd. Turbine rotor holding device. 4,032,255, Cl. 415-219.00R.

Ikezaki, Muneyoshi; Ito, Nobuo; Okazaki, Yasushi; Hoshiyama, Masao; Nagao, Taku; and Nakajima, Hiromichi, to Tanabe Seiyaku Co., Ltd. Benzylalcohol amine derivatives. 4,032,575, Cl. 260-570.600.

Illinois Tool Works Inc.: *See—*
Curtis, Gary Martin, 4,031,936.
Edwards, Bryant, 4,031,832.
Mittelmann, Eugene, 4,032,740.

Ilzig, Karl F., to Original Hanau Quarzlampen GmbH. Surgical operating lamp. 4,032,771, Cl. 240-1.400.

Imai, Hirozo: *See—*
Tanaka, Yoshimasa; Imai, Hirozo; Tsutsumi, Tadao; and Oda, Takeshi, 4,031,617.

Imazeki, Kazuyoshi, to General Research of Electronics, Inc. Combination microphone, speaker, and control unit for a radio transceiver. 4,032,844, Cl. 325-15.000.

Imme, Helmut; and Moser, Werner, to SKF Industrial Trading and Development Company B.V. Method for the production of concentric machine elements. 4,031,734, Cl. 72-368.000.

Immordino, Vincent J., to Display Originals, Inc. Clamping-type bracket. 4,032,101, Cl. 248-225.400.

Imoto, Kazuo, to Texas Instruments Incorporated. Thermally responsive valve having dual operating temperatures. 4,032,071, Cl. 236-101.00E.

Imperial Chemical Industries Limited: *See—*
Aldridge, David Cecil; Crawley, Graham Charles; and Strawson, Colin John, 4,032,651.
Burnham, David Robert, 4,032,590.
Fisher, Ian Stuart; and McIntyre, James Eric, 4,032,595.
Gregory, Herold; and Preston, Beryl Margaret, 4,032,633.

In Situ Technology, Inc.: *See—*
Terry, Ruel C., 4,031,956.

Inaba, Seiuemon; Shimizu, Kanryo; Ito, Kohei; Amemiya, Youichi; and Gamo, Gotaro, to Fujitsu Ltd. Electro-hydraulic pulse motor. 4,031,811, Cl. 91-39.000.

Inaba, Shigeho: *See—*
Kaneko, Shinichi, deceased; Kobayashi, Tsuyoshi; Takebayashi, Yoshiaki; Inaba, Shigeho; and Yamamoto, Hisao, 4,032,573.

Inagaki, Masao: *See—*
Hanaoka, Masanori; and Inagaki, Masao, 4,032,067.

Indian Head Inc.: *See—*
Lukens, Robert T.; and Jaksim, Stanley, 4,031,814.

Ing. C. Olivetti & C., S.p.A.: *See—*
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Grigoletti, Giorgio, 4,032,898.
Lanza, Lucio; and Vecchio, Francesco Giovanni, 4,032,895.

Innovative Process Equipment, Inc.: *See—*
Vischer, William; Kozinczuk, Orest A.; and Shulz, Robert J., 4,032,748.

Inouye, Kozo; Yokota, Yukio; Okumura, Akio; Kubodera, Seiiti; and Shiba, Keisuke, to Fuji Photo Film Co., Ltd. Silver halide materials containing photographic color couplers with isothiocyanato groups. 4,032,345, Cl. 96-55.000.

Inspiration Consolidated Copper Company: *See—*
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Institut National de la Sante et de la Recherche Medicale: *See—*
Henzel, Daniel Georges Christian, 4,031,884.

Insulex, Inc.: *See—*
Johnson, Frederick M.; Brown, James R.; and Reitz, Rex L., 4,032,689.

International Audio Visual, Inc.: *See—*
Matare, Herbert F., 4,032,370.

International Business Machines Corporation: *See—*
Anderson, Kevin Lee; and Arzubi, Luis Maria, 4,032,904.
Arter, Nelson K.; and Jackson, Howard C., 4,032,982.
Balyot, John; Gruodis, Algirdas Joseph; Jen, Teh-Sen; and Mikhail, Wadie Faltas, 4,032,962.
Blasbalg, Herman, 4,032,719.
Busch, Dennis Gene, 4,031,996.
Hubbard, James H.; and Van Cleave, George W., 4,032,227.
Jenny, Christian Jakob; and Kuemmerle, Karl Albert, 4,032,899.
Nassimbene, Ernie George, 4,032,889.
Riseman, Jacob, 4,032,058.
Roberts, David C., 4,032,887.
Schaefer, John O'Neil, 4,031,994.
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Williams, Robert Russell, 4,032,894.
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International Nickel Company, Inc., The: *See—*
Fazekas, David Stephen, 4,031,778.

International Paper Company: *See—*
Cantarella, Victor F.; and Smith, John G., 4,032,006.

International Telephone and Telegraph Corporation: *See—*
Jezo, Maurice Leon Jean, 4,032,756.
Loucks, Richard S., 4,032,843.
Matheny, Coy Edwin, 4,032,724.

Intraco, Inc.: *See—*
Jones, Robert D., 4,031,857.

Inuzuka, Tsuneki: *See—*
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Irani, Mazin R., to Stauffer Chemical Company. Stabilized methylene chloride. 4,032,584, Cl. 260-652.50R.

Ireco Chemicals: *See—*
Wasson, Daniel A., 4,032,375.

Irie, Toshio; Tanda, Toshikuni; Ichi, Tomoyuki; and Sadayori, Toshio, to Kawasaki Steel Corporation. Method for producing coated electrical steel sheets having excellent punchability, weldability, electrical insulation and heat resistance. 4,032,675, Cl. 427-126.000.

Ishigaki Kiko Co., Ltd.: *See—*
Iwatani, Akitoshi, 4,032,450.

Ishikawa, Akira: *See—*
Aoki, Motomu; and Ishikawa, Akira, 4,031,642.

Ishikawa, Masaru; and Kumazawa, Akihiko, to Toyota Jidosha Kogyo Kabushiki Kaisha. Vibration control bush assembly. 4,032,202, Cl. 308-238.000.

Ishikawa, Shoichi, to Kabushiki Kaisha Hasegawa Haguruma. Dual tooth contact type W-N gear. 4,031,770, Cl. 74-462.000.

Ito, Hiroshi, to Tokico Ltd. Mechanical disc brake. 4,031,985, Cl. 188-71.900.

Ito, Kazuhiro: *See—*
Mori, Mitsuhiro; Ito, Kazuhiro; Morioka, Makoto; and Ono, Yuichi, 4,032,945.

Ito, Kohei: *See—*
Inaba, Seiuemon; Shimizu, Kanryo; Ito, Kohei; Amemiya, Youichi; and Gamo, Gotaro, 4,031,811.

Ito, Nobuo: *See—*
Ikezaki, Muneyoshi; Ito, Nobuo; Okazaki, Yasushi; Hoshiyama, Masao; Nagao, Taku; and Nakajima, Hiromichi, 4,032,575.

Ito, Sakumatsu. Roll feeder device for press works. 4,032,056, Cl. 226-154.000.

Ito, Tadashi; Uchidoi, Masanori; Taguchi, Tetsuya; Tunekawa, Tokuichi; Aizawa, Hiroshi; and Takishima, Yoshiyuki, to Canon Kabushiki Kaisha. Indication system of a camera. 4,032,933, Cl. 354-23.00D.

Ito, Takeshi: *See—*
Yamazaki, Nobuo; Ito, Takeshi; Katsurada, Tetsuro; and Habara, Yasuhiko, 4,031,700.

Itoi, Kazuo: *See—*
Tomita, Kenichi; Shibuya, Toshiaki; Koshiba, Suzuko; and Itoi, Kazuo, 4,032,588.

Ivanov, Nikolai Ivanovich: *See—*
Shraiman, Evgenia Isaevna; Shraiman, Isai Beniaminovich; Tsesevich, Eduard Iosifovich; Dobroslavsky, Viktor Leonidovich; Ivanov, Nikolai Ivanovich; and Lebedev, Pavel Pavlovich, 4,031,809.

Ives, Christopher J. M.: *See—*
Wintels, August; and Ives, Christopher J. M., 4,032,115.

Ivey, John Saxon: *See—*
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Iwama, Katsuaki: *See—*
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Iwamoto Seisakusho Company Limited: *See—*
Furuta, Isao; Iwamoto, Shinsuke; Kuga, Hironari; and Chikatsu, Yoshishige, 4,031,746.

Iwamoto, Shinsuke: *See—*
Furuta, Isao; Iwamoto, Shinsuke; Kuga, Hironari; and Chikatsu, Yoshishige, 4,031,746.

Iwatani, Akitoshi, to Ishigaki Kiko Co., Ltd. Filter press. 4,032,450, Cl. 210-230.000.

J. & P. B. Myers Inc.: *See—*
Vereb, William J., 4,032,005.

J. P. Stevens & Co., Inc.: *See—*
Adams, Richard G.; and Sello, Stephen B., 4,032,554.

J. R. Simplot Company: *See—*
Smith, Jack Lee; Crowley, Charles Raymond; and Humberger, Roger Benton, 4,032,319.

J-Tec Associates, Incorporated: *See—*
Colton, Russell F., 4,031,757.

Jackson, Allen S., to Hollyfield, Clifford G., Jr., a part interest. Self-training idler assembly. 4,032,002; Cl. 198-808.000.

Jackson, Howard C.: *See—*
Arter, Nelson K.; and Jackson, Howard C., 4,032,982.

Jackson, Lewis B., Jr. Condition sampling and indicating system. 4,032,906, Cl. 340-196.000.

Jacob, H. John. Nasal septum plug. 4,031,569, Cl. 3-1.000.

Jacques, Wolfgang: *See—*
Spork, Helmut; Strasser, Rudolf; Riedle, Rudolf; Jacques, Wolfgang; and Waas, Johann, 4,032,557.

Jadot, Jean Pierre: *See—*
Coeure, Philippe; Jadot, Jean Pierre; and Peuzin, Jean Claude, 4,032,217.

Jaffa, David, to Precision Screen Machines Inc. Pallet mounting apparatus for screen printing machines. 4,031,825, Cl. 101-126.000.

Jahnke, Uwe; and Sommer, Friedrich, to U.S. Philips Corporation. Circuit arrangement for phase-alignment of a servo drive for a rotary system. 4,032,826, Cl. 318-314.000.

Jaksim, Stanley: *See—*
Lukens, Robert T.; and Jaksim, Stanley, 4,031,814.

Jallouk, Philip A., to United States of America, Energy Research and Development Administration. Flow directing means for air-cooled transformers. 4,032,873, Cl. 336-57.000.

Jaluria, Yogesh: *See—*
Chu, Tze Yao; Jaluria, Yogesh; Lilienthal, Peter Frederick, II; and Wenger, George Michael, 4,032,033.

James Burn Bindings Limited: *See—*
Adams, Sidney George William, 4,031,585.

James, Kenneth, to Tate & Lyle Limited. Production of surface active material. 4,032,702, Cl. 536-119.000.

Janquart, Jerry C.: *See—*
Flynn, Jac B.; Janquart, Jerry C.; and Priese, Werner K., 4,032,044.

Janssen Pharmaceutica N.V.: *See—*
Raeymaekers, Alfons H. M.; and Van Gelder, Jozef H. L., 4,032,536.

Japan Racing Association, The: *See—*
Wakatsuki, Yuzo; Miyake, Masanobu; and Hano, Kazuyuki, 4,032,946.

Japan Synthetic Rubber Co., Ltd.: *See—*
Furuta, Isao; Iwamoto, Shinsuke; Kuga, Hironari; and Chikatsu, Yoshishige, 4,031,746.

Japanese National Railways: *See—*
Matsui, Kazumi; Umemori, Takashi; Shibata, Yutaka; Yamamura, Kinzo; Kimura, Tamisuke; and Kashiwara, Tomokazu, 4,031,990.

Jarmofsky, Doris F., legal representative and heir: *See—*
Jarmofsky, Seymour, deceased; Jarmofsky, Doris F., legal representative and heir; and Jarmofsky, Nancy H., heir, 4,032,215.

Jarmofsky, Nancy H., heir: *See—*
Jarmofsky, Seymour, deceased; Jarmofsky, Doris F., legal representative and heir; and Jarmofsky, Nancy H., heir, 4,032,215.

Jarmofsky, Seymour, deceased; by Jarmofsky, Doris F., legal representative and heir; and by Jarmofsky, Nancy H., heir, to Litton Systems, Inc. Electrical contact for wire and pin with common stop. 4,032,215, Cl. 339-258.00R.

Jarrett, Robert P.: *See—*
Blum, Kenneth J.; Dodson, Floyd; Jarrett, Robert P.; and Ravnsborg, Norman T., 4,032,287.

Jatczak, Chester F.; and Brown, Richard W., to Timken Company, The. Method for quenching ferrous tubing to achieve full hardening without quench cracking. 4,032,369, Cl. 148-143.000.

Jechev, Dinko Mihaylov: *See—*
Hadjiiliev, Ruscho Panayotov; Todorova, Maria Ivanova; Georgiev, Tzvetan Obretenov; Naydenov, Kubrat Vassilev; Jechev, Dinko Mihaylov; Staneva, Yanka Bogdanova; and Hadjiilieva, Irina Valcheva, 4,032,356.

Jefferson, Dianne M.: *See—*
Chien, Yie W.; and Jefferson, Dianne M., 4,032,645.

Jefferson, Mark T.: *See—*
Celmer, Walter D.; Cullen, Walter P.; Moppett, Charles E.; Routien, John B.; Jefferson, Mark T.; Shibakawa, Riichiro; and Tone, Junsuke, 4,032,632.

Jen, Teh-Sen: *See—*
Balyoz, John; Gruodis, Algirdas Joseph; Jen, Teh-Sen; and Mikhail, Wadie Faltas, 4,032,962.

Jenness, Raymond C., to Allis-Chalmers Corporation. Apparatus for equalizing radial load on plurality of pivoted bearing pads. 4,032,199, Cl. 308-73.000.

Jenny, Christian Jakob; and Kuemmerle, Karl Albert, to International Business Machines Corporation. Apparatus and method for switching of data. 4,032,899, Cl. 364-200.000.

Jensen, Robert Eugene, to Brannan, Leonard M., a part interest. Latching mechanism for rear gate of dump vehicle with automatic tilt release. 4,032,192, Cl. 298-23.00A.

Jess, Thurman S., to Baxter Travenol Laboratories, Inc. Air eliminating filter. 4,031,891, Cl. 128-214.00R.

Jezo, Maurice Leon Jean, to International Telephone and Telegraph Corporation. Tacan-dme identity detector. 4,032,756, Cl. 235-92.0PB.

Jim Dandy Company, The: *See—*
Jones, Benjamin Bostick; Karrasch, Richard John; and Eitel, Stephen Wallace, 4,032,668.

Jiu, James; and Marsheck, William J., to G. D. Searle & Co. Process of preparing 3-oxo-pregna-4,17(20)-dien-21-carboxylic acid and esters with mycobacterium. 4,032,408, Cl. 195-51.00S.

Johns-Manville Corporation: *See—*
Lambert, Gerard Lucien, 4,032,011.

Johnson, Ben C., Jr., to Thermon Manufacturing Company. Method of making preinsulated pipe assembly. 4,031,611, Cl. 29-611.000.

Johnson, Bruce K.; and Hendry, Donald H., to Polaroid Corporation. Photographic apparatus having film container locating structure. 4,032,936, Cl. 354-83.000.

Johnson, C. Evan, to Hitachi Magnetics Corporation. Fishing line release mechanism. 4,031,652, Cl. 43-43.120.

Johnson, Carl E.; and Carroll, Kenneth G., to United States of America, Energy Research and Development Administration. Nuclear reactor fuel element with vanadium getter on cladding. 4,032,400, Cl. 176-67.000.

Johnson, David E.; and Polsfuss, Terrance E., to Despatch Industries, Inc. Convection oven. 4,032,289, Cl. 432-200.000.

Johnson, Eugene R.; and Mower, Morris F., to Bliss & Laughlin Ind., Inc. Exterior corner tool. 4,032,283, Cl. 425-458.000.

Johnson, Frederick M.; Brown, James R.; and Reitz, Res L., to Insules, Inc. Construction laminate of plastic foam between paper sheets. 4,032,689, Cl. 428-55.000.

Johnson, George C., to Mobil Oil Corporation. Liquefaction of coal. 4,032,428, Cl. 208-8.000.

Johnson, Kenneth I. Particles sizing. 4,032,436, Cl. 209-1.000.

Johnson, Marilyn M. Nursing garment. 4,031,566, Cl. 2-104.000.

Johnson, Terry R., to United States of America, Energy Research and Development Administration. Method for the safe disposal of alkali metal. 4,032,615, Cl. 423-179.000.

Johnson, William S., to Leland Stanford Junior University, The Board of Trustees of. 11-Substituted steroids and intermediates. 4,032,579, Cl. 260-617.00R.

Johnston, Robert F.: *See—*
Hendrickson, Kenneth L.; and Johnston, Robert F., 4,032,934.

Jones, Allen Jacob, to Agnew, S. J. Roller bearing assembly. 4,032,201, Cl. 308-207.00R.

Jones, Benjamin Bostick; Karrasch, Richard John; and Eitel, Stephen Wallace, to Jim Dandy Company, The. Expansion process for the production of instant grits. 4,032,668, Cl. 426-449.000.

Jones, Claude R., to United States of America, Air Force. Method of, and apparatus for, making visible the flow pattern of a gas. 4,031,759, Cl. 73-432.00R.

Jones, Donald K., to Cluett, Peabody & Co., Inc. Method and apparatus for bleaching and related processing of greige cloth. 4,032,292, Cl. 8-111.000.

Jones, Ferris E. Modular bench seat. 4,032,188, Cl. 297-232.000.

Jones, Lary D.; van Outer, Robert H.; and Kettelson, Ernest S., to Square D Company. Captive fastener assembly. 4,031,935, Cl. 151-41.760.

Jones, Robert D., to Intraco, Inc. Volumetric accumulating device. 4,031,857, Cl. 119-56.00R.

Jones, Robert F.: *See—*
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Jones, Robert J.; and O'Rell, Michael K., to TRW Inc. Bis(benzil) type compounds containing one or two furan moieties. 4,032,546, Cl. 260-347.200.

Jonnes, Nelson, to Minnesota Mining and Manufacturing Company. Porous reflective fabric. 4,032,681, Cl. 428-253.000.

Jordan, Carmel T. Baiting arrangement for rodents. 4,031,653, Cl. 43-61.000.

Jordan, Charles L., to Aluminum Company of America. Method of reforming a can end. 4,031,837, Cl. 113-121.00C.

Josefsson, Erik Anders Ake, to Stora Kopparbergs Bergslags Aktiebolag; and Granges Aktiebolag. Rolled steel materials. 4,032,333, Cl. 75-124.000.

Joy, Herman J., to Cluett, Peabody & Co., Inc. Integrated finishing and compressive preshrinking of a high-shrinkage fabric. 4,031,596, Cl. 26-18.600.

Joy, Thomas: *See—*
Eastham, Derek Anthony; and Joy, Thomas, 4,032,810.

Joyce, Gordon Charles, to National Research Development Corporation. Apparatus for automatically controlling crystal growth. 4,032,389, Cl. 156-601.000.

Joyner, Richard S.: *See—*
MacAdams, John L.; Wu, William C. L.; and Joyner, Richard S., 4,032,600.

Joynson, Catherine W.: *See—*
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Judd Ringer Corporation: *See—*
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Julesz, Bela, to Bell Telephone Laboratories, Incorporated. Stereoscopic technique for detecting defects in periodic structures. 4,032,237, Cl. 356-237.000.

Jureit, John Calvin; Cotten, Howell J.; Castillo, Adolfo; and Leutwyler, Roy, to Automated Building Components, Inc. Apparatus and methods of fabricating wooden frames panels and the like. 4,031,604, Cl. 29-429.000.

Jureit, John Calvin; and Kushner, Benjamin H., to Automated Building Components, Inc. Connector plate. 4,031,803, Cl. 85-13.000.

K and M Rubber Company: *See—*
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Kabas, Guglielmo: *See—*
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Kabushiki Kaisha Hasegawa Haguruma: *See—*
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Kabushiki-Kaisha Hayashibara Selbutsukagaku Kenkyujo: *See—*
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Kabushiki Kaisha Komatsu Seisakusho: *See—*
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Kabushiki Kaisha Ricoh: *See—*
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Kadija, Igor V., to Olin Corporation. Porous anode separator. 4,032,427, Cl. 204-283.000.

Kaesemeyer, Carl W. Electronic tool gage. 4,031,628, Cl. 33-201.000.

Kahn, William J. Instant scaffold and paint can holder. 4,032,100, Cl. 248-211.000.

Kaiser Aluminum & Chemical Corporation: *See—*
Zinniger, Theodore C.; and Burke, Phillip J., 4,032,608.

Kaiser Glass Fiber Corporation: *See—*
Coggin, Charles H., Jr., 4,032,314.

Kaiser, Jordan Ross. Combined container and viewer package for film transparencies. 4,031,641, Cl. 40-63.00A.

Kale, Howard D. Traps for sinks, laundry tubs and the like. 4,032,455, Cl. 210-435.000.

Kali-Chemie Aktiengesellschaft: *See—*
Bartzsch, Henning, 4,032,469.

Kalinnikov, Semen Arefievich: *See—*
Lebedev, Vladimir Konstantinovich; Troitsky, Vladimir Alesandrovich; and Kalinnikov, Semen Arefievich, 4,032,840.

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Gritskov, Ivan Viktorovich; Butyagin, Pavel Anatolievich; Shimko, Ivan Gavrilovich; Mogilevsky, Evsei Moiseevich; Baksheev, Igor Petrovich; Finger, Georgy Georgievich; Scherbakova, Ljudmila Sergeevna; Butkova, Nina Timofeevna; and Kaller, Lev Grigorievich, 4,032,273.

Kaman Aerospace Corporation: *See—*
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Kamath, G. Sanjiv; and Smith, Bradley W., to Hughes Aircraft Company. Liquid phase epitaxial process for growing semi-insulating GaAs layers. 4,032,950, Cl. 357-17.000.

Kametani, Hiroshi, to National Research Institute for Metals. Electrolytic cell for use in hydroelectrometallurgy. 4,032,425, Cl. 204-261.000.

Kamp, Ewald Albert: *See—*
Troy, Marion Frank; and Kamp, Ewald Albert, 4,032,274.

Kanarr, George W.: *See—*
Mannear, Idabelle K., 4,032,662.

Kanarr, Ruth A.: *See—*
Mannear, Idabelle K., 4,032,662.

Kandel, Thomas G. Process for treating pile materials made into electrophotographic toner removal brushes. 4,032,196, Cl. 300-21.000.

Kaneko, Michio, legal representative: *See—*
Kaneko, Shinichi, deceased; Kobayashi, Tsuyoshi; Takebayashi, Yoshiaki; Inaba, Shigeho; and Yamamoto, Hisao, 4,032,573.

Kaneko, Shinichi, deceased (by Kaneko, Micbio, legal representative); Kobayashi, Tsuyoshi; Takebayashi, Yoshiaki; Inaba, Shigeho; and Yamamoto, Hisao, to Sumitomo Chemical Company, Limited. Ortho-acylated anilide derivatives and salts thereof. 4,032,573, Cl. 260-562.00N.

Kanowsky, Vincent C.; and Blanc, Lloyd A., to Allied Upholstery Mfg. Inc. Convertible sofa bed. 4,031,577, Cl. 5-17.000.

Kapfhammer, Wilhelm: *See—*
Deml, Reinhold; Greis, Ulrich; and Kapfhammer, Wilhelm, 4,032,343.

Kaplan, Howard B., to Warwick Electronics Inc. Tone selector circuit with multiplexed tone data transfer. 4,031,786, Cl. 84-1.030.

Kaplan, Jean-Pierre: *See—*
Gerecke, Max; Kyburz, Emilio; and Kaplan, Jean-Pierre, 4,032,525.

Kaplan, Sheldon; Calkins, George B.; Sarnoff, Stanley J.; and Dalling, N. Lawrence, to Survival Technology, Inc. Hypodermic injection device having means for varying the medicament capacity thereof. 4,031,893, Cl. 128-218.00F.

Karaba, Albert M.; Brouwers, Alexander P.; and Pearsall, Thomas J., to Teledyne Industries, Inc. Variable compression ratio piston. 4,031,868, Cl. 123-78.00B.

Karasa, Alvydas Petras; and Markle, Stanley Alan, to Black and Decker Manufacturing Company, The. Chuck key holder. 4,032,160, Cl. 279-1.00K.

Karikawa, Tohru; and Kobayasbi, Koichi, to Asahi Kogaku Kogyo Kabushiki Kaisha. Miniature single lens reflex camera. 4,032,938, Cl. 354-155.000.

Karl, Eric, to Sarah's Family, Inc. Removable water tight base for bong. 4,031,904, Cl. 131-173.000.

Karlson, Harald E.: *See—*
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Karrasch, Richard John: *See—*
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Kartridg Pak Co., The: *See—*
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Kaschuba, Johannes; and Ernst, Manfred, to Bayer Aktiengesellschaft. Production of phosphorus oxy compounds. 4,032,603, Cl. 260-990.000.

Kaser, Jon Bruce; Von Feldt, John Lawrence; and Walenta, Ivan Earl, to Burroughs Corporation. Transducer positioning system for providing both coarse and fine positioning. 4,032,984, Cl. 360-77.000.

Kashio, Toshio, to Casio Computer Co., Ltd. Apparatus for distinguishing heading information from other information in an information processing system. 4,032,900, Cl. 364-200.000.

Kashiwara, Tomokazu: *See—*
Matsui, Kazumi; Umemori, Takashi; Shibata, Yutaka; Yamamura, Kinzo; Kimura, Tamisuke; and Kashiwara, Tomokazu, 4,031,990.

Kassing, Milton O., to Semmelmeyer-Corby Co. Segmented sprocket. 4,031,769, Cl. 74-243.0DR.

Katayama, Hajime; Nitanda, Hiroshi; Nagaoka, Tateki; Kishi, Hirotoshi; Takada, Yousaku; Iida, Noriyoshi; Inuzuka, Tsuneki; and Komiya, Yutaka, to Canon Kabushiki Kaisha. Feed cassette device. 4,032,137, Cl. 271-164.000.

Kato, Shozo; Takahashi, Yutaka; Miyaji, Yorio; Kondo, Naomitsu; and Fukumoto, Mikio, to Sumitomo Chemical Company, Limited; and Kabushiki Kaisha Miyazaki Tekkosho. Article exchanging apparatus. 4,032,020, Cl. 214-1.0BB.

Katsurada, Tetsuro: *See*—
Yamazaki, Nobuo; Ito, Takeshi; Katsurada, Tetsuro; and Habara, Yasuhiko, 4,031,700.

Kaufhold, Frederick Daniel: *See*—
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Kaufman, Burton: *See*—
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Kawaguchi, Hiroshi: *See*—
Tomita, Koji; Tsukiura, Hiroshi; and Kawaguchi, Hiroshi, 4,032,404.

Kawai, Minoro; and Muramatsu, Kenji. Box and method of making the same. 4,032,062, Cl. 229-20.000.

Kawanishi, Toshiyuki; and Sohmiya, Norimasa, to Kabushiki Kaisha Ricoh. Liquid developer for use in electrostatic photography and preparation of same. 4,032,463, Cl. 252-62.10L.

Kawasaki Jukogyo Kabushiki Kaisha: *See*—
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Kawasaki Steel Corporation: *See*—
Irie, Toshio; Tanda, Toshikuni; Ichi, Tomoyuki; and Sadayori, Toshio, 4,032,675.

Kecskemethy, Geza; Tihanyi, Robert; and Virag, Gyorgy, to Muanyagipari Kutato Intezet. Method and control system for batching plural substances and pump system. 4,032,040, Cl. 222-1.000.

Kehl, William L.: *See*—
Cronauer, Donald C.; and Kehl, William L., 4,032,429.

Kehoe, James W., to GAF Corporation. Apparatus for preparing sealed envelope units with messages. 4,031,818, Cl. 93-63.00R.

Keifert, Hibbard G.; and Waters, Frank J., deceased (by Waters, Ethel M., administratrix), to Fansteel Inc. Joint fabrication and method for forming the same. 4,032,243, Cl. 403-272.000.

Kaiser, William, to McGraw-Edison Company. Utility distribution console. 4,032,821, Cl. 361-334.000.

Kelchner, Jay Robert, to Hilliard Corporation, The. Plug valve. 4,032,107, Cl. 251-296.000.

Keller, Albert G.; Nix, Donald F.; and Morrison, Howard J., to Marvin Glass & Associates. Toy pick-up vehicle. 4,031,659, Cl. 46-204.000.

Keller, Robert Samuel: *See*—
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Kelley, John J., to Raymond Lee Organization, Inc., The, a part interest. Dental floss holder and dispenser. 4,031,909, Cl. 132-91.000.

Kelley, John Sherburne: *See*—
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Kelly, Robert C., to Upjohn Company, The. 4α,6-Dihydroxy-5-iodo-2β-aryloxymethyl-3α-tetrahydropyranoacetic acid γ-lactone, 6-alkyl ethers. 4,032,542, Cl. 260-343.600.

Kendrick, Gary R.; and Sauder, Robert A., to Sauder Industries, Inc. Stud welding gun and method of operation. 4,032,742, Cl. 219-99.000.

Kennecott Copper Corporation: *See*—
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Kennedy, Maurice E.: *See*—
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Kenney, George Churchill; and Hoogendijk, Adrianus Huibert, to U.S. Philips Corporation; and North American Philips Corporation. Drop out compensation device. 4,032,966, Cl. 358-8.000.

Kern, Michael F. Tamperproof lock and method. 4,031,730, Cl. 70-419.000.

Kesel, Guenther; and Losehand, Reinhard, to Siemens Aktiengesellschaft. Controllable charge-coupled semiconductor device. 4,032,947, Cl. 357-24.000.

Keshi, Akizo; Kodama, Katsuhisa; Takemura, Ichiro; Tairaka, Yoshihiko; and Yoshinaga, Kunio, to Takeda Chemical Industries, Ltd. Production of polyetherpolyols useful in preparing rigid polyurethane foams. 4,032,574, Cl. 260-570.00D.

Kettelson, Ernest S.: *See*—
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Keuleman, Alexander Hendrich Francis: *See*—
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Khachigian, John. Threading attachment for turning machines. 4,031,584, Cl. 10-89.00H.

Khrapchenkov, Oleg Klrillovich: *See*—
Kogos, Aizik Markovich; Kolchanov, Flegont Andreevich; Gnedov, Adolf Alexeevich; Vinogradov, Valery Alexandrovich; Labkovsky, Mark Abramovich; Filatov, Sergei Alexandrovich; Kolesov, Vladimir Mikhailovich; Khrapchenkov, Oleg Kirillovich; and Semes, Alexandr Nikolaevich, 4,032,076.

Kida, Takao; Mizuno, Hiroahi; and Okutsu, Masaru, to Ajinomoto Co., Inc. Method for controlling weeds with amino acid higher alkyl esters. 4,032,325, Cl. 71-95.000.

Kido, Keishiro; Tsuboi, Masayoshi; and Arai, Noboru, to Fuji Photo Film Co., Ltd. Method for forming phase holograms. 4,032,348, Cl. 96-60.00R.

Kido, Keishiro; Honjo, Satoru; and Sato, Masamichi, to Fuji Photo Film Co., Ltd. Recording material. 4,032,691, Cl. 428-304.000.

Kidoh, Kunizoh; Wakamori, Hideki; and Iimura, Kamizo, to Kureha Kagaku Kogyo Kabushiki Kaisha. Method and apparatus for removal of unreacted monomer from synthesized high polymer latex. 4,032,497, Cl. 260-29.60R.

Kiefer, Hans Walter; Riethmuller, Lothar Herbert; and Spreitzhofer, Ernst Gunther Robert, to Perkin-Elmer Corporation, The. Apparatus for background absorption compensation in spectrophotometers. 4,032,235, Cl. 356-82.000.

Kienzle, Frank; and Rosen, Perry, Synthesis of cyclopentanol. 4,032,520, Cl. 260-240.00R.

Kienzle Uhrenfabriken GmbH: *See*—
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Kiethe, Horst: *See*—
Zapf, Gerhard; Albano-Muller, Lothar; Kiethe, Horst; and Rohlig, Rainer, 4,032,335.

Killen, Robert H., to Wayne D. Steimle. Inertial performance indicator. 4,031,848, Cl. 116-114.0AH.

Kilpatrick, David John; Shaw, Trevor; and Lewis, David Malcolm, to I.W.S. Nominee Company Limited. Cross-linkable compounds. 4,032,565, Cl. 260-481.00R.

Kilroy, Oliver B. Push-pull mining system. 4,032,195, Cl. 299-19.000.

Kim, Heung Tai, to B. F. Goodrich Company, The. Extrusion adapter. 4,032,279, Cl. 425-382.00R.

Kim, Raymond W. H., to Bell & Howell Company. Target assembly for a target practice range. 4,032,146, Cl. 273-105.600.

Kimura, Tamisuke: *See*—
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King, John M.: *See*—
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Kintner, Edwin K. Butterfly valve assembly. 4,032,108, Cl. 251-306.000.

Kinzler, Jack A.; Heffernan, James T.; Fehrenkamp, Leroy G.; and Lee, William S., to United States of America, National Aeronautics and Space Administration. Surface finishing. 4,032,089, Cl. 244-123.000.

Kippenberg, Horst: *See*—
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Kirby Lumber Corporation: *See*—
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Kischio, Werner, to U.S. Philips Corporation. Electric incandescent lamp. 4,032,808, Cl. 313-178.000.

Kishi, Hirotoshi: *See*—
Katayama, Hajime; Nitanda, Hiroshi; Nagaoka, Tateki; Kishi, Hirotoshi; Takada, Yousaku; Iida, Noriyoshi; Inuzuka, Tsuneki; and Komiya, Yutaka, 4,032,137.

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Kittl, Hans: *See*—
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Kitzmantel, Peter: *See*—
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Kiwaki, Hisakatsu: *See*—
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Kiyokuni, Nobuaki, to Fuji Electric Company Ltd. Compressed gas filled circuit breaker. 4,032,988, Cl. 361-115.000.

Kiyonaga, Kingo: *See*—
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Klein, Howard P.: *See*—
Schulze, Heinz; and Klein, Howard P., 4,032,484.

Klenke, Richard J., to American Products, Inc. Grain drill with disk biasing means. 4,031,834, Cl. 111-85.000.

Klieger, Erich; Beich, Wolfgang; and Schroder, Eberhard, to Schering Aktiengesellschaft. Triiodoisophthalic acid monoamino acid amides, process for the preparation thereof, and use thereof as X-ray contrast media. 4,032,567, Cl. 260-519.000.

Klimo, Robert G., to Cleveland Machine Controls, Inc. Commutating oscillator and current-limiter for solid state switching circuits. 4,032,825, Cl. 318-139.000.

Kline, Jan C., to Caterpillar Tractor Co. Heat exchanger system and ducting arrangement therefor. 4,031,953, Cl. 165-166.000.

Klingler, Lawrence R.; and Shook, Daniel E. Lock-protective device. 4,031,719, Cl. 70-56.000.

Klockner-Werke AG: *See*—
Linde, Joachim; and Spath, Wolfgang, 4,032,277.

Klopach, Robert T.: *See*—
Sikina, Thomas V., Jr.; Schafer, Robert H.; and Klopach, Robert T., 4,032,921.

Kluy, Werner: *See*—
Birnkraut, Hana-Walter; and Kluy, Werner, 4,032,692.

Knapik, H. Peter G.; and Adams, Frank H., to UOP Inc. Hydrocarbon conversion with a selectively sulfided acidic multimetallic catalytic composite. 4,032,475, Cl. 252-439.000.

Knapp, Lawrence Robert. Water pipe. 4,031,906, Cl. 131-173.000.

Knappstein, Johannes; Tewes, Heinrich; and Woikowski, Robert, to Carl Still, Firma; and Ruhrkohle AG. Sealing device for a coke oven door. 4,032,409, Cl. 202-248.000.

Knight, Robert K.: *See*—
Sandiford, Burton B.; and Knight, Robert K., 4,031,958.

Knippelmier, Gary H., to A. P. C. Industries, Inc. Method and apparatus for measuring the capacitance of telephone cable pairs. 4,032,841, Cl. 324-60.0CD.

Knoll, Heinz W.: *See*—
Andres, Rudolf; and Knoll, Heinz W., 4,032,174.

Kobayashi, Koichi: *See*—
Karikawa, Tohru; and Kobayashi, Koichi, 4,032,938.

Kobayashi, Reisuke; Sato, Hironari; Takita, Kiyoshi; and Toyama, Nobuo, to Kumiai Chemical Industry Co., Ltd. Process for using cell wall-lysing enzymes. 4,032,663, Cl. 426-51.000.

Kobayashi, Teruo; and Yamamoto, Kazumasa, to Matsushita Electric Industrial Co., Ltd. Gas combustion device with safety device. 4,032,286, Cl. 431-76.000.

Kobayashi, Toshio: *See*—
Takano, Rikuo; Ohota, Yutaka; Yamamoto, Yoichi; Sumitomo, Yuji; Kobayashi, Toshio; and Aiba, Masahiko, 4,032,924.

Kobayashi, Tsuyoshi: *See*—
Kaneko, Shinichi, deceased; Kobayashi, Tsuyoshi; Takebayashi, Yoshiaki; Inaba, Shigeho; and Yamamoto, Hisao, 4,032,573.

Kobayashi, Yoshichika; Akutsu, Hidezoh; and Iwama, Katsuaki, to Matsushita Electronics Corporation. Fluorescent high-pressure mercury-vapor lamp. 4,032,812, Cl. 313-487.000.

Koblanski, John N., to Ocean Ecology Ltd. Method and apparatus for ultrasonically removing contaminants from water. 4,032,438, Cl. 210-19.000.

Koch, Russell William; and Oberster, Arthur Eugene, to Firestone Tire & Rubber Company, The. Curable sealant two-component composition containing butyl rubber derived from isoolefin and open-chain conjugated diolefin. 4,032,500, Cl. 260-33.6AQ.

Kock, Theodorus Joannes: *See*—
Bauer, Herbert Edward; Goossens, Bertus; Kock, Theodorus Joannes; and Mandera, Johannes Laurentius Cornelis, 4,032,465.

Koda, Nobuo John, to Hughes Aircraft Company. Pyroelectric radiation sensor and imaging device utilizing same. 4,032,783, Cl. 250-333.000.

Kodama, Katsuhisa: *See*—
Keshi, Akizo; Kodama, Katsuhisa; Takemura, Ichiro; Tairaka, Yoshihiko; and Yoshinaga, Kunio, 4,032,574.

Kogos, Aizik Markovich; Kolchanov, Flegont Andreevich; Gnedov, Adolf Alexeevich; Vinogradov, Valery Alexandrovich; Labkovsky, Mark Abramovich; Filatov, Sergei Alexandrovich; Kolesov, Vladimir Mikhailovich; Khrapchenkov, Oleg Kirillovich; and Semes, Alexandr Nikolaevich. Apparatus for continuous winding of filament on spools. 4,032,076, Cl. 242-25.00A.

Koh-I-Noor Rapidograph, Inc.: *See*—
Suchan, Joseph T.; and Burell, Vincent A., 4,032,627.

Kohler, William H., to Abex Corporation. Slip/slide detector control circuit. 4,032,197, Cl. 303-96.000.

Kohmura, Isao; Tahara, Yukio; Futaki, Kiyoshi; and Tange, Hiroshi, to Mitsubishi Paper Mills, Ltd. Thermosenaitive recording material. 4,032,690, Cl. 428-263.000.

Koide, Sakae; and Aoki, Shigeo, to Tahara-Shoyei Engineering Co., Ltd. Automatic profiling machine. 4,031,669, Cl. 51-142.000.

Koistinen, Clayton W., to Rockwell International Corporation. Low profile keyboard switch having panel hinged actuators and cantilevered beam snap acting contacts. 4,032,729, Cl. 200-5.00A.

Kojima, Shiro: *See*—
Aoyagi, Katumi, 4,032,679.

Kokosa, Richard A.: *See*—
Cline, Harvey E.; Anthony, Thomas R.; Kokosa, Richard A.; and Wolley, E. Duane, 4,031,607.

Kolchanov, Flegont Andreevich: *See*—
Kogos, Aizik Markovich; Kolchanov, Flegont Andreevich; Gnedov, Adolf Alexeevich; Vinogradov, Valery Alexandrovich; Labkovsky, Mark Abramovich; Filatov, Sergei Alexandrovich; Kolesov, Vladimir Mikhailovich; Khrapchenkov, Oleg Kirillovich; and Semes, Alexandr Nikolaevich, 4,032,076.

Kolesov, Vladimir Mikhailovich: *See*—
Kogos, Aizik Markovich; Kolchanov, Flegont Andreevich; Gnedov, Adolf Alexeevich; Vinogradov, Valery Alexandrovich; Labkovsky, Mark Abramovich; Filatov, Sergei Alexandrovich; Kolesov, Vladimir Mikhailovich; Khrapchenkov, Oleg Kirillovich; and Semes, Alexandr Nikolaevich, 4,032,076.

Koller, Frank J., Jr., to Armstrong Cork Company. Method of increasing the freeness of asbestos slurries. 4,032,392, Cl. 162-155.000.

Kolling, Heinrich; Thomas, Herbert; Widdig, Arno; and Wollweber, Hartmund, to Bayer Aktiengesellschaft. Phenylguanidines useful as anthelmintic agents. 4,032,655, Cl. 424-300.000.

Kolm, Henry H.; and Oberteuffer, John A., to Sala Magnetics, Inc. Vortical flow distributor. 4,032,114, Cl. 259-4.00R.

Kolodny, Edwin Ralph: *See*—
Spencer, Frank Russell; and Kolodny, Edwin Ralph, 4,032,496.

Komaba, Shiro; and Goshima, Yoshitomo, to Canon Kabushiki Kaisha. Feed cassette. 4,032,136, Cl. 271-160.000.

Komarov, Jury Ivanovich; Parshin, Alexei Nikolaevich; and Gorbunova, Ljubov Yakovlevna. Heald frame drive of the shedding motion of wave-type shedding looms. 4,031,927, Cl. 139-436.000.

Komiya, Yutaka: *See*—
Katayama, Hajime; Nitanda, Hiroshi; Nagaoka, Tateki; Kishi, Hirotoshi; Takada, Yousaku; Iida, Noriyoshi; Inuzuka, Tsuneki; and Komiya, Yutaka, 4,032,137.

Kondo, Naomitsu: *See*—
Kato, Shozo; Takahashi, Yutaka; Miyaji, Yorio; Kondo, Naomitsu; and Fukumoto, Mikio, 4,032,020.

Koo, Tuh-Kai, to NCR Corporation. Method of manufacturing dielectrically isolated semiconductive device. 4,032,373, Cl. 148-175.000.

Koppers Company, Inc.: *See*—
Blommers, Elizabeth A.; and Moult, Roy H., 4,032,515.

Korhumel Industries, Inc.: *See*—
Strobl, Fred A.; and Di Legge, Felix, 4,032,828.

Kormany, Geza; Kabas, Guglielmo; Schlapfer, Hans; and Siegrist, Adolf Emil, to Ciba-Geigy Corporation. Process for the manufacturing of styrene derivatives, new styrene derivatives and their use as optical brighteners. 4,032,503, Cl. 260-40.00P.

Kos, Steven, to Northern Telecom Limited. Drive circuit for thermal printing array. 4,032,925, Cl. 346-76.00R.

Koshelev, Nikolai Vasilievich. Hydraulic vibrator for actuator drive. 4,031,812, Cl. 91-224.000.

Koshiba, Suzuko: *See*—
Tomita, Kenichi; Shibuya, Toshiaki; Koshiba, Suzuko; and Itoi, Kazuo, 4,032,588.

Kossoff, George; and Robinson, David Errol, to Commonwealth of Australia, c/o Dept. of Health, The. Ultrasonic ecbogram display. 4,031,743, Cl. 73-67.80R.

Kotlarchik, Carl, Jr.; Minsk, Louis M.; and Fletcher, George L., Jr., to Eastman Kodak Company. Sulfonamide compounds and polymers derived therefrom. 4,032,518, Cl. 260-79.30M.

Kotlarchik, Carl, Jr.: *See*—
Fletcher, George L., Jr.; Merrill, Stewart H.; and Kotlarchik, Carl, Jr., 4,032,344.

Kouvoussis, Anthony E.: *See*—
Bennett, Thomas H.; Carlow, Earl F.; Kouvoussis, Anthony E.; Orgill, Rodney H.; Peddle, Charles; and Wiles, Michael F., 4,032,896.

Kozai, Tetsuo: *See*—
Terayama, Fusaji; and Kozai, Tetsuo, 4,031,980.

Kozinczuk, Orest A.: *See*—
Vischer, William; Kozinczuk, Orest A.; and Shulz, Robert J., 4,032,748.

Kraftwerk Union Aktiengesellschaft: *See*—
Reinhardt, Horst; and Hoger, Ernst, 4,032,240.

Kratochvil, Egon: *See*—
Schwab, Johann; Gluck, Maternus; Kratochvil, Egon; and Kitzmantel, Peter, 4,032,275.

Kratz, Jerrold Kerwin; and Christensen, Edward Walter, II, to RCA Corporation. Beam adjustment assembly for a cathode ray tube. 4,032,872, Cl. 335-212.000.

Krekel, Hendrik. Method and a device for producing a plate-like structural element. 4,032,612, Cl. 264-259.000.

Kreucoha AG: *See*—
Kreuter, Walter, 4,032,667.

Kreuter, Walter, to Kreucoha AG. Method for coating confectionery articles with chocolate. 4,032,667, Cl. 426-306.000.

Kreuzer, Franz-Heinrich; and Wick, Manfred, to Consortium fur Elektrochemische Industrie GmbH. Method for preparing modified polysiloxanes. 4,032,499, Cl. 260-33.4SB.

Krishna, Surinder: *See*—
Baliga, B. Jayant; Houston, Douglas E.; and Krishna, Surinder, 4,032,961.

Krolak, Ronald L.; and Parker, Duane L., to Caterpillar Tractor Co. Cushioned push dozer device. 4,031,968, Cl. 172-801.000.

Kroll, Harry: *See*—
Czirr, David L.; and Kroll, Harry, 4,032,379.

Kruger, Michael: *See*—
Fisher, Maurice; Kruger, Michael; and Maber, Terence Walter, 4,032,359.

Krutsch, John R.: *See*—
Bubley, Henry J.; and Krutsch, John R., 4,031,824.

Kubo, Masaharu: *See*—
Ohba, Shinya; Takemoto, Iwao; and Kubo, Masaharu, 4,032,952.

Kubodera, Seiiti: *See*—
Inouye, Kozo; Yokota, Yukio; Okumura, Akio; Kubodera, Seiiti; and Shiba, Keisuke, 4,032,345.

Kudlacik, Henry W.; and Winchester, Robert L., to General Electric Company, Reactor core. 4,032,874, Cl. 336-60.000.

Kuemmerle, Karl Albert: *See*—
Jenny, Christian Jakob; and Kuemmerle, Karl Albert, 4,032,899.

Kuenzig, Ernest O.; and Pennino, Frank L., to Forest Mechanical Products Corporation. Sealing and shearing member in a plastic resin blow molding machine. 4,032,278, Cl. 425-525.000.

Kuga, Hironari: *See*—
Furuta, Isao; Iwamoto, Shinsuke; Kuga, Hironari; and Chikatsu, Yoshishige, 4,031,746.

Kumazawa, Akihiko: *See*—
Ishikawa, Masaru; and Kumazawa, Akihiko, 4,032,202.

Kumiai Chemical Industry Co., Ltd.: *See*—
Kobayashi, Reisuke; Sato, Hironari; Takita, Kiyoshi; and Toyama, Nobuo, 4,032,663.

Kuntz, Howard W., to Raymond International Inc. Formation of elevated structures. 4,031,687, Cl. 52-742.000.

Kunz, Raymond W., to Clairol Incorporated. Thermal hair styling appliance having interchangeable attachments. 4,032,747, Cl. 219-222.000.

Kupperman, Dennis I.: *See*—
Kupperman, Sam; and Kupperman, Dennis I., 4,031,656.

Kupperman, Sam; and Kupperman, Dennis I., to R B Toy Development Co. Plastic toy integrally formed and molded with a propeller and means for attaching the toy to a support member. 4,031,656, Cl. 46-53.000.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See*—
Kidoh, Kunizoh; Wakamori, Hideki; and Iimura, Kamizo, 4,032,497.

Kurosawa, Ryoichi: *See*—
Nabae, Akira; Shimamura, Takeo; Shimizu, Ichirou; and Kurosawa, Ryoichi, 4,032,831.

Kurzmann, Harald: *See—*
Huhse, Peter; Marin, Heiner; Kurzmann, Harald; and Henry, Marion, 4,032,737.

Kushner, Benjamin H.: *See—*
Jureit, John Calvin; and Kushner, Benjamin H., 4,031,803.

Kutz, Heinrich, to Schloemann-Siemag Aktiengesellschaft. Workpiece manipulator for use in a forging press. 4,031,736, Cl. 72-422.000.

Kusdorf, Bernhard; Pusche, Herbert; Erpenbach, Heinz; and Riechmann, Wernfried, to Hoechst Aktiengesellschaft. Distilling column. 4,032,410, Cl. 202-158.000.

Kwant, Pieter B.: *See—*
Goudriaan, Frans; and Kwant, Pieter B., 4,032,474.

Kyburz, Emilio: *See—*
Gerecke, Max; Kyburz, Emilio; and Kaplan, Jean-Pierre, 4,032,525.

Kyoto Ceramic Co., Ltd.: *See—*
Hirabayashi, Masaya; and Enjo, Hiromasa, 4,032,674.

La Telemecanique Electrique: *See—*
Arvisenet, Jacques; Guery, Jean-Pierre; Olifant, Jacques; and Thomas, Christian, 4,032,823.

Labaz: *See—*
Taillandier, Georges Marcel; Benoit-Guyod, Jean-Louis Alain; Boucherle, Andre Louis; Eymard, Pierre Luc; and Broll, Madeleine, 4,032,660.

Labkovsky, Mark Abramovich: *See—*
Kogos, Aizik Markovich; Kolchanov, Flegont Andreevich; Gnedov, Adolf Alexeevich; Vinogradov, Valery Alexandrovich; Labkovsky, Mark Abramovich; Filatov, Sergei Alexandrovich; Kolesov, Vladimir Mikhailovich; Khrapchenkov, Oleg Kirillovich; and Semes, Alexandr Nikolaevich, 4,032,076.

Lagnado, Isaac, to United States of America, Navy. High-frequency CCD adder and multiplier. 4,032,767, Cl. 364-862.000.

Laitram Corporation, The: *See—*
Fowler, John T., 4,031,630.

Lajovic, Dusan S., to Colgate-Palmolive Company. Dispensing container neck thread protection. 4,032,043, Cl. 222-92.000.

Lambert, Bernard Lucien, to Potain Poclain Materiel (P.P.M.). Construction vehicle having retractable wheels for towing. 4,031,976, Cl. 180-14.00R.

Lambert, Gerard Lucien, to Johns-Manville Corporation. Packaging asbestos fibers. 4,032,011, Cl. 206-386.000.

Lamparsky, Dietmar; and Schudel, Peter, to Givaudan Corporation. Perfume compositions containing p-menthane-8-thiol-3-one. 4,032,478, Cl. 252-522.000.

Lamy, Jean L.: *See—*
Morgan, Charles P.; and Lamy, Jean L., 4,032,094.

Lana, Giulio: *See—*
Bottaccio, Giorgio; Chiusoli, Gian Paolo; Alneri, Enzo; Marchi, Marcello; and Lana, Giulio, 4,032,555.

Landsberger, Kurt. Adjustably mounted superimposable toilet seat. 4,031,575, Cl. 4-239.000.

Lang, Rudolf: *See—*
Singer, Franz; Fahlenberg, Paul; and Lang, Rudolf, 4,032,987.

Langley Alloys Limited: *See—*
Richardson, William Henry; and Guha, Prodyot, 4,032,367.

Lansberry, Delbert B. Target game for rolling missile. 4,032,149, Cl. 273-123.00R.

Lanza, Lucio; and Vecchio, Francesco Giovanni, to Ing. C. Olivetti & C., S.p.A. Electronic data processing computer. 4,032,895, Cl. 364-200.000.

Lapeyre, James M., to Digicourse Inc. Controlled reflection readout for digital displays. 4,032,222, Cl. 350-276.00R.

Laran, Roy Joseph; Loftin, H. Paul; and McIntyre, Daniel C., to Ciba-Geigy Corporation. Process for the preparation of cyanogen chloride. 4,032,619, Cl. 423-379.000.

Larker, Hans; Lundblad, Erik; Lundback, Bertil; and Nilsson, Jan, to ASEA. Method for hydrostatic extrusion of tubes. 4,031,732, Cl. 72-60.000.

Larkin, G. Eugene; and Buchi, Richard H. Method for reclaiming used hydraulic fluid. 4,032,441, Cl. 210-63.00R.

Larned, Thomas A., to United States of America, Air Force. Aircraft seat cushion. 4,031,579, Cl. 5-355.000.

Larsen, Glen D., to Southern Railway Company. Adjustable bracket assembly for a rail car coupler. 4,032,017, Cl. 213-61.000.

Larson, Laverne J., to United States of America, Air Force. Pressurized chaff canister. 4,031,828, Cl. 102-89.00R.

Larsson, Karl H. Adjustable tension spring anchor. 4,032,129, Cl. 267-179.000.

Lasko, Robert A., deceased (by Lasko, Ruth, administratrix); and Miller, Claud T., to Hitchcock Chair Company. Sanding machine for anatomically contoured wooden chair seats and the like. 4,031,668, Cl. 51-137.000.

Lasko, Ruth, administratrix: *See—*
Lasko, Robert A., deceased; and Miller, Claud T., 4,031,668.

Laubie, Michel: *See—*
Malen, Charles; and Laubie, Michel, 4,032,648.

Laubli, Fritz, to Sulzer Brothers Limited. Process and a control system for controlling the exit temperature of vapor flowing through a contact heating surface of a vapor generator. 4,031,863, Cl. 122-479.00R.

Laughlin, William N., deceased; and by Hollis, Thomas L., executor. Shock absorbing apparatus. 4,032,126, Cl. 267-116.000.

Lavallee & Ide, Inc.: *See—*
Lavallee, John A., 4,032,250.

Lavallee, John A., to Lavallee & Ide, Inc. Reamer construction. 4,032,250, Cl. 408-59.000.

Lawson, Richard L. Articulated spray applicator particularly suited for use in cleaning flues and the like. 4,031,910, Cl. 134-167.00C.

Lawson, Robert; and Young, Reginald S., to British Steel Corporation. Filtering a gas stream. 4,032,308, Cl. 55-96.000.

Lear Siegler, Inc.: *See—*
Pareja, Ramon, 4,032,263.

Leasure, Edgar F. Planing attachment for jointers. 4,031,932, Cl. 144-117.00R.

Lebedev, Pavel Pavlovich: *See—*
Shraiman, Evgenia Isaevna; Shraiman, Isai Beniaminovich; Tsesevich, Eduard Iosifovich; Dobroslavsky, Viktor Leonidovich; Ivanov, Nikolai Ivanovich; and Lebedev, Pavel Pavlovich, 4,031,809.

Lebedev, Vladimir Konstantinovich; Troitsky, Vladimir Alexandrovich; and Kalinnikov, Semen Arefievich. Adjustable transformer. 4,032,840, Cl. 323-48.000.

Lecerf, Andre, to Saft-Societe des Accumulateurs Fixes et de Traction. Process for preparing pure silver chromate for electrochemical cells. 4,032,624, Cl. 423-595.000.

Leclerc, Jean-Francois; and Anfossi, Henri, to Service d'Exploitation Industrielle des Tabacs et des Allumettes. Transport device for cylindrical objects rod-shaped, such as cigarettes. 4,032,000, Cl. 198-428.000.

Lecrone, Dale S. Knife mounting unit for roll slicing machine. 4,031,791, Cl. 83-508.200.

Ledet, Charles A., to Baker Oil Tools, Inc. Down hole inhibitor injector. 4,031,955, Cl. 166-183.000.

Lee, Chi-Long; Marko, Ollie W.; and Schulz, Jay R., to Dow Corning Corporation. Organosiloxane compositions for liquid injection. 4,032,502, Cl. 260-37.0SB.

Lee, Henry L., Jr.; and Orlowski, Jan A., to Lee Pharmaceuticals. X-ray opaque filler useful in dental and medical restorative compounds. 4,032,504, Cl. 260-42.180.

Lee, Mary Ellen: *See—*
Sweeney, Doris; and Lee, Mary Ellen, 4,031,578.

Lee Pharmaceuticals: *See—*
Lee, Henry L., Jr.; and Orlowski, Jan A., 4,032,504.

Lee, William S.: *See—*
Kinzler, Jack A.; Heffernan, James T.; Fehrenkamp, Leroy G.; and Lee, William S., 4,032,089.

Lee, Yoon C., to Monsanto Company. Fire retardant styrenic terpolymer compositions. 4,032,509, Cl. 260-45.75B.

Lee, Yuan T., to United States of America, Energy Research and Development Administration. Isotope separation by photodissociation of Van der Waal's molecules. 4,032,306, Cl. 55-17.000.

Leihgeber, Joseph Q. Portable jig for rafter cuts and other angle cuts. 4,031,794, Cl. 83-829.000.

Leitich, Albert Joseph: *See—*
En, John; and Leitich, Albert Joseph, 4,032,886.

Leland, Ragnvald G. Fountain paint roller. 4,032,238, Cl. 401-197.000.

Leland Stanford Junior University, The Board of Trustees of: *See—*
Johnson, William S., 4,032,579.

Lendi, Georges; Ginggen, Serge R.; and Vadi, Gildo, to Tesa S.A. Centering and measuring head for measuring machines. 4,031,632, Cl. 33-178.00R.

Lenne, William, to Essilor International Cie Generale d'Optique. Cams suitable for use in motion transmitting mechanism and motion transmitting mechanism incorporating such cams. 4,031,776, Cl. 74-567.000.

Lentini, Peter S. Tire chock. 4,031,983, Cl. 188-32.000.

Lermann, Peter; Stumpf, Friedrich; and Fauth, Gunter, to AGFA-Gevaert, A.G. Exposure control for photographic apparatus. 4,032,935, Cl. 354-29.000.

Lerner, Jack. Remote volume control plug. 4,032,206, Cl. 339-42.000.

Leroy, Christian Ludovic: *See—*
Leroy, Henri Joseph Marie Adrien; and Leroy, Christian Ludovic, 4,031,588.

Leroy, Henri Joseph Marie Adrien; and Leroy, Christian Ludovic, to Leroy, Henri Joseph Marie Andrien. Broom. 4,031,588, Cl. 15-171.000.

Leroy, Henri Joseph Marie Andrien: *See—*
Leroy, Henri Joseph Marie Adrien; and Leroy, Christian Ludovic, 4,031,588.

Lesher, George Y.; and Singh, Baldev, to Sterling Drug Inc. 4-Aminn (or halo or hydroxy or hydrazino)-2-(pyridinyl)pyrimidines. 4,032,523, Cl. 260-256.40N.

Letov, Nikolai Nikolaevich: *See—*
Tatkov, Viktor Arsentievich; and Letov, Nikolai Nikolaevich, 4,032,256.

Leutwyler, Roy: *See—*
Jureit, John Calvin; Cotten, Howell J.; Castillo, Adolfo; and Leutwyler, Roy, 4,031,604.

LeVeen, Harry H. Radio frequency power generator having adjustable stabilized output level and fail-safe control circuits. 4,032,860, Cl. 331-63.000.

Lever Brothers Company: *See—*
Bauer, Herbert Edward; Goossens, Bertus; Kock, Theodorus Joannes; and Manders, Johannes Laurentius Cornelis, 4,032,465.

Levin, Bernard. Lingual bladed tooth. 4,031,623, Cl. 32-8.000.

Levine, Peter Alan, to RCA Corporation. Smear reduction in CCD imagers. 4,032,976, Cl. 358-213.000.

Levinthal, Cyrus. System for storing and retrieving information at the molecular level. 4,032,901, Cl. 340-173.0NC.

Lewandowski, Raymond F.: *See—*
Golbeck, Bernard J.; Lewandowski, Raymond F.; and Keonedy, Maurice E., 4,032,730.

Lewis, David Malcolm: *See—*
Kilpatrick, David John; Shaw, Trevor; and Lewis, David Malcolm, 4,032,565.

Lewis, Irwin Charles, to Union Carbide Corporation. Process for producing carbon fibers from mesophase pitch. 4,032,430, Cl. 208-39.000.

Lewis, Leroy C., to United States of America, Energy Research and Development Administration. Process for the disposal of alkali metals. 4,032,614, Cl. 423-179.000.

Lewis, Richard W., to Boeing Company, The. Compensated vehicle heading system. 4,032,758, Cl. 235-150.200.

Lewis, Robert A.: *See—*
De Groat, Philip M.; and Lewis, Robert A., 4,031,727.

Liao, Henry H. J., to Xerox Corporation. Gray scale interpolation technique. 4,032,977, Cl. 358-280.000.

Liberty Mutual Insurance Company: *See—*
DeLuca, Carlo J., 4,031,882.

Licentia Patent-Verwaltungs-GmbH: *See—*
Glitz, Ekkehard, 4,032,763.

Lichtenberg, Heinz D.: *See—*
Youmans, Arthur H.; and Lichtenberg, Heinz D., 4,031,750.

Lieberman, Stanley J. Programming apparatus. 4,032,753, Cl. 235-61.60M.

Liebler, Heinz: *See—*
Helder, Johan; Holzinger, Karl; Guegel, Gerd; Liebler, Heinz; and Pernegger, Wolfgang, 4,032,414.

Lightcraft of California: *See—*
Berkenhoff, Hans Peter, 4,032,208.

Lilienthal, Peter Frederick, II: *See—*
Chu, Tze Yao; Jaluria, Yogesh; Lilienthal, Peter Frederick, II; and Wenger, George Michael, 4,032,033.

Lindberg, Gunnar V. Automatic tray loading device. 4,032,027, Cl. 214-16.600.

Lindblad, Stig Martin. Locking device for a safety belt of winding-up type intended for vehicles. 4,032,080, Cl. 242-107.40A.

Linde, Joachim; and Spath, Wolfgang, to Klockner-Werke AG. Injection molding machine with hydraulically operated closure device. 4,032,277, Cl. 425-591.000.

Lindfors, Olov Halvar, to AB Volvo Penta. Device for mounting chassis details onto an automobile body. 4,031,982, Cl. 187-8.590.

Lindner, Heinz, to VEB Wirkmaschinenbau. Patterning apparatus for knitting machines, particularly for manufacturing patterned knitted pile fabrics on crochetting machines. 4,031,717, Cl. 66-84.00R.

Lindon, Thomas Derek: *See—*
Walters, Ronald Bernard; Hamey, Peter Michael; Hammond, John Anthony Gordon; and Lindon, Thomas Derek, 4,031,813.

Lindstrom, Olle Birger, to AB Olle Lindstrom. Procedure to stabilize an iron air battery. 4,032,693, Cl. 429-17.000.

Linscott, Phillip S., Jr., to Sundstrand Corporation. Brazing clip. 4,032,057, Cl. 228-56.000.

Lipfert, Donald Ernest, to Deres Development Corporation. Protective head gear and body equipment. 4,032,127, Cl. 267-151.000.

Little Giant Industries Inc.: *See—*
Spencer, Edward, 4,031,981.

Little, Lester D.: *See—*
Ryckman, William D., Jr.; and Little, Lester D., 4,031,638.

Litton Systems, Inc.: *See—*
Jarmofsky, Seymour, deceased; Jarmofsky, Doris F., legal representative and heir; and Jarmofsky, Nancy H., heir, 4,032,215.

Loepfe, Erich: *See—*
Domig, Rene; Morf, Ernst; and Loepfe, Erich, 4,031,924.

Loev, Bernard: *See—*
Groves, William G.; Loev, Bernard; and Perchonock, Carl D., 4,032,656.

Loew, Dieter M.: *See—*
Spiegel, Rene; Gogerty, John H.; Loew, Dieter M.; and Eden, Phillip L., 4,032,637.

Loewenstein, Paul Nicholas: *See—*
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Lofgren, Karl Borje: *See—*
Eriksson, Hans Georg; Sjoberg, Karl Gosta; and Lofgren, Karl Borje, 4,032,361.

Loftin, H. Paul: *See—*
Laran, Roy Joseph; Loftin, H. Paul; and McIntyre, Daniel C., 4,032,619.

Long Manufacturing Co., Inc.: *See—*
Atkinson, Wallace E., 4,031,724.

Loose, Peter William; and Tamkin, Martyn Ridley, to Gardenia Limited. Food processing machinery. 4,031,821, Cl. 99-643.000.

Lorain Products Corporation: *See—*
Chambers, Charles W., Jr., 4,032,726.

Losehand, Reinhard: *See—*
Kesel, Guenther; and Losehand, Reinhard, 4,032,947.

Loucks, Richard S., to International Telephone and Telegraph Corporation. Compensated signal isolator. 4,032,843, Cl. 324-96.000.

Lovelady, Kenneth T.: *See—*
White, John T.; and Lovelady, Kenneth T., 4,032,928.

Lovell, Walter Carl: *See—*
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Lovness, Donald E., to Judd Ringer Corporation. Composting mixture. 4,032,318, Cl. 71-9.000.

Lowe, Peter R.: *See—*
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Lu, Shau-Zou; and Nowicki, Henry, to GAF Corporation. Reactants addition and concentration control system. 4,031,912, Cl. 137-5.000.

Lubrizol Corporation, The: *See—*
Dorer, Casper John, Jr.; and Miller, Clark Ober, 4,032,303.
Dorer, Casper John, Jr.; and Miller, Clark Ober, 4,032,304.
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Lucas Electrical Company Limited, The: *See—*
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Luchtenberg, Russell O.; and Buchwald, James P., to Thermo Valve Corporation. Thermostatic valve. 4,032,068, Cl. 236-34.500.

Luck, Stephen Royall: *See—*
Hendricks, David Allen; Howe, Milton Albert, Jr.; Luck, Stephen Royall; Morris, Alfred Ray; and Owen, Dave Leslie, 4,032,038.

Luckey, George W., to Eastman Kodak Company. Process for preparing yttrium oxide and rare earth metal oxide phosphors. 4,032,471, Cl. 252-301.40R.

Lukens, Robert T.; and Jaksim, Stanley, to Indian Head Inc. Self-centering spring actuated auxiliary brake mechanism. 4,031,814, Cl. 92-63.000.

Lum, Jack G. S., to Sound Technology, Inc. Filter circuit. 4,032,857, Cl. 330-151.000.

Lundback, Bertil: *See—*
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Lundblad, Erik: *See—*
Larker, Hans; Lundblad, Erik; Lundback, Bertil; and Nilsson, Jan, 4,031,732.

Lunt, Anthony Randle: *See—*
Cross, Andrew; Lunt, Anthony Randle; and Doherty, Joseph Brian, 4,032,398.

Lush, Gerald Bertram, to Boots Company Limited, The. Synergistic herbicidal mixtures of 4-chloro-2-oxobenzothiazolin-3-ylacetic acid and 2-methosy-3,6-dichlorobenzoic acid. 4,032,320, Cl. 71-90.000.

Luth, Claus-Peter, to Macchine Tessili Circolari MATEC S.p.A. of Roma. Electronic system for centrally controlling a plurality of knitting machines. 4,031,718, Cl. 66-154.00A.

Luwa AG: *See—*
Engler, Peter, 4,031,951.

Lyshkow, Norman A., to Combustion Equipment Associates, Inc. Pollution monitoring apparatus. 4,032,297, Cl. 23-254.00E.

M & T Chemicals Inc.: *See—*
Dworkin, Robert Dally; and Ejk, Adam Joseph, 4,032,552.
Treadwell, Kenneth; and Gitlitz, Melvin H., 4,032,468.

Maber, Terence Walter: *See—*
Fisher, Maurice; Kruger, Michael; and Maber, Terence Walter, 4,032,359.

Mabey, Michael David; and Foster, James Malcolm, to Depallorator Corporation Limited. Depalletizers. 4,032,021, Cl. 214-8.50F.

MacAdams, John L.; Wu, William C. L.; and Joyner, Richard S., to Chemplex Company. Resin formulation for rotational molding and shaped structures. 4,032,600, Cl. 260-897.00B.

Macchine Tessili Circolari MATEC S.p.A. of Roma: *See—*
Luth, Claus-Peter, 4,031,718.

MacIntosh, Frank W., to Gas-Fired Products, Inc. Apparatus for loading tobacco in barns. 4,032,023, Cl. 214-16.40R.

Maciolek, Joseph R., to United Technologies Corporation. Automatic gain control for stability augmentation systems. 4,032,083, Cl. 244-17.130.

MacNeil, Peter. Cold air blast wake-up apparatus. 4,031,711, Cl. 62-261.000.

Macronetics, Inc.: *See—*
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Madan, Bhim S., to General Electric Company. Bearing strap and cooler. 4,032,261, Cl. 417-366.000.

Magerlein, Barney J., to Upjohn Company, The. 17-Phenyl-18,19,20-trinor-cis-4,5-didehydro-PGF_1 compounds. 4,032,561, Cl. 260-473.00A.

Magiera, David L., to Wicks & Nemer, P.A. Board game apparatus. 4,032,154, Cl. 273-134.0AT.

Magnatex Limited: *See—*
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Maillet, Alfred Marie Aime: *See—*
Braudeau, Pierre; and Maillet, Alfred Marie Aime, 4,032,741.

Makino, Jun-ichi: *See—*
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Malen, Charles; and Laubie, Michel, to Science Union et Cie. Method and compositions containing thiochroman compounds for treating cardiac rhythm disorders. 4,032,648, Cl. 424-275.000.

Malinski, S. W.; and Mueller, Thomas L., to Malinski, S. W. Concentric contra-rotating bead deflector mechanism for tire mounting apparatus. 4,031,941, Cl. 157-1.170.

Mallon, Dietmar, to Siemens Aktiengesellscheft. Circuit arrangement of a stereo-hunting device in a stereo decoder. 4,032,715, Cl. 179-15.0BT.

Mallon, Dietmar, to Siemens Aktiengesellschaft. Circuit arrangement for a continuous adjustment of the base width in a stereo decoder. 4,032,717, Cl. 179-15.0BT.

Malott, Steve, to Qonaar Corporation. Coin operated electronic parking meter. 4,031,991, Cl. 194-1.00R.
Maluег, Richard M.; and Meier, Michael J., to McDonnell Douglas Corporation. Detector array gain compensation. 4,032,975, Cl. 358-213.000.
Man Design Co., Ltd.: *See—*
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Mandel, Alan F.; Capuano, Louis M.; Frask, Theodore E.; and Bedel, Denis E., to Westinghouse Electric Corporation. Elevator system. 4,032,882, Cl. 340-19.00R.
Manders, Johannes Laurentius Cornelis: *See—*
Bauer, Herbert Edward; Goossens, Bertus; Kock, Theodorus Joannes; and Manders, Johannes Laurentius Cornelis, 4,032,465.
Mange, Franklin E.: *See—*
Buriks, Rudolf S.; Fauke, Allen R.; and Mange, Franklin E., 4,032,514.
Mannear, Charles H.: *See—*
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Mannear, Idabelle K., to Mannear, Idabelle K.; Mannear, Charles H.; Kanarr, George W.; and Kanarr, Ruth A., part interest to each. Method for the treatment of contact allergic dermatitis. 4,032,662, Cl. 424-331.000.
Mannesmannrohren-Werke AG.: *See—*
Schonfeld, Wolfram; Philipps, Armin; and Runkel, Fritz, 4,031,738.
Mano, Shiro: *See—*
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Mansfield, Robin. Electric shaver. 4,031,618, Cl. 30-41.500.
Marchi, Marcello: *See—*
Bottaccio, Giorgio; Chiusoli, Gian Paolo; Alneri, Enzo; Marchi, Marcello; and Lana, Giulio, 4,032,555.
Marechal, Robert Rene, to SICMA - Societe Industrielle et Commerciale de Materiel Aeronautique. Device for actuating a sheathed control cable. 4,031,773, Cl. 74-501.50R.
Marin, Heiner: *See—*
Huhse, Peter; Marin, Heiner; Kurzmann, Harald; and Henry, Marion, 4,032,737.
Mark, Victor, to General Electric Company. Flame retardant polycarbonate composition. 4,032,506, Cl. 260-45.90R.
Markle, Stanley Alan: *See—*
Karasa, Alvydas Petras; and Markle, Stanley Alan, 4,032,160.
Marko, Ollie W.: *See—*
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Marley Cooling Tower Company, The: *See—*
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Maroni, Victor A.; and Van Deventer, Erven H., to United States of America, Energy Research and Development Administration. Hydrogen-isotope permeation barrier. 4,031,921, Cl. 138-140.000.
Marschak, Howard J. Base for an upright for forming a stand or the like. 4,032,098, Cl. 248-165.000.
Marshall, John L.: *See—*
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Marshall, Walter R.: *See—*
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Marsheck, William J.: *See—*
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Martens, David, to D. Marten's Manufacturing Company Ltd. Sealed sewage ejector assembly. 4,032,448, Cl. 210-170.000.
Marti, Heinrich; Zogg, Andreas; and Hardegger, Oskar, to Concast AG. Method and apparatus for changing the secondary cooling during continuous casting of steel. 4,031,946, Cl. 164-89.000.
Martin, Derek Thomas. Constructional elements. 4,032,241, Cl. 403-173.000.
Martin, Edwin J., Jr.; and Yamada, Akemichi, to Wilcox Electric, Inc. Two-frequency instrument landing system with integral monitor. 4,032,920, Cl. 343-108.00R.
Martin, Gilbert Marius Henri: *See—*
Boisrayon, Gerald Marc Albert; and Martin, Gilbert Marius Henri, 4,031,840.
Martin, John Frederick: *See—*
Gilbride, Andrew John; and Martin, John Frederick, 4,031,835.
Martin, Manfred; and Scharfe, Gerhard, to Bayer Aktiengesellschaft. Process for preparing 1,4-naphthoquinone. 4,032,548, Cl. 260-396.00R.
Martin, Thomas B.; Herscher, Marvin B.; and Cox, Robert B., to Threshold Technology, Inc. Word boundary detector for speech recognition equipment. 4,032,710, Cl. 179-1.0SA.
Maruca, Joseph P.: *See—*
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Maruzen Oil Co. Ltd.: *See—*
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Meyer, Burton C.; and Allen, Robert K., 4,032,295.
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Maryland Cup Corporation: *See—*
Epple, Richard R., 4,032,045.
Maschinenfabrik Stromag GmbH: *See—*
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Masin, George F., to United States of America, Navy. Dual channel radio frequency fuzing system. 4,032,918, Cl. 343-7.0PF.
Masson, Claude Jeanine, to Eastman Kodak Company. Magnetic recording element and method for making same. 4,032,682, Cl. 428-309.000.
Matare, Herbert F., to International Audio Visual, Inc. Method of forming an epitaxial layer on a crystalline substrate. 4,032,370, Cl. 148-171.000.
Matchett, Robert W., to Fibredyne, Inc. Plural stage filter cartridge wherein at least one stage comprises pulverized particulate material. 4,032,457, Cl. 210-489.000.
Matheny, Coy Edwin, to International Telephone and Telegraph Corporation. Direct station selection circuit. 4,032,724, Cl. 179-99.000.
Matsui, Kazumi; Umemori, Takashi; Shibata, Yutaka; Yamamura, Kinzo; Kimura, Tamisuke; and Kashiwara, Tomokazu, to Japanese National Railways; Sumitomo Electric Industries, Ltd.; and Sumitomo Rubber Industry, Ltd. Set of current collecting elements used for a current collecting roller. 4,031,990, Cl. 191-63.000.
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Matsumoto, Kimiko: Apparatus for arranging and storing bobbins of yarn or thread. 4,032,013, Cl. 211-13.000.
Matsuo, Masaharu. Apparatus for trimming adhering scrap from a punched cardboard blank. 4,031,816, Cl. 93-36.00A.
Matsuo, Takahal: *See—*
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Matsushita Electric Industrial Co., Ltd.: *See—*
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Minami, Shunji; Takemura, Takehide; and Oka, Shunzo, 4,032,838.
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Matsuyama, Mitsuo; and Okuhara, Shinzi, to Hitachi, Ltd. Semiconductor speech channel switch. 4,032,892, Cl. 340-166.00R.
Mattern, Alfred, to Siemens Aktiengesellschaft. PCM time division multiples communication network with digital subscriber stations. 4,032,714, Cl. 179-15.0BA.
Matthews, Charles W., to United States of America, Energy Research and Development Administration. Conversion of ammonia into hydrogen and nitrogen by reaction with a sulfided catalyst. 4,032,618, Cl. 423-351.000.
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Maude, James Walton. Recliner platform. 4,032,099, Cl. 248-188.200.
Maupin, Roger A. Scrubbing apparatus. 4,032,239, Cl. 401-203.000.
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Mausner, Jack J., to Helena Rubinstein, Inc. Creamy nail lacquer remover. 4,032,464, Cl. 252-89.00R.
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Mayer-Mader, Rudolf; and Gobel, Wilhelm, to Bayer Aktiengesellschaft. Xanthogen disulphides with functional groups. 4,032,541, Cl. 260-340.900.
Mayo, Bernard Joseph; and Best, John Edward, to E M I Limited. Tomography. 4,032,761, Cl. 235-151.300.
Mazour, Zdenek; and Brunetti, Heimo, to Ciba-Geigy Corporation. Process for the production of phosphite chlorides. 4,032,602, Cl. 260-972.000.
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McAlister, George Ruxton, executor: *See—*
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McCabe, Logan D.; and McCabe, Stanley G. Spreader-feeder for flatwork ironer. 4,031,639, Cl. 38-143.000.
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McCallister, Kenneth R., to UOP Inc. Manufacture of alumina sol. 4,032,472, Cl. 252-313.00R.

McCarty, William J., to General Electric Company. Method of forming constriction in tubing. 4,031,745, Cl. 72-367.000.
McCormick, Harold E., to Ramsey Corporation. Method for coating parts. 4,032,672, Cl. 427-34.000.
McCormick, Paul W. Bulk hauling freight car unloading apparatus and method of operation. 4,032,026, Cl. 214-152.000.
McCullough, Glenn R.: *See—*
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McElhoe, Bruce A.; and Tabrah, Joseph G., to Hawaiian Sugar Planterx' Association. Soil irrigation methods and apparatus. 4,032,072, Cl. 239-11.000.
McFadden, Buryl L., Jr., to United States of America, Air Force. Probe system for wind tunnel test section. 4,031,749, Cl. 73-147.000.
McGarr, John J., to USM Corporation. Method of making polyurethane powder. 4,032,516, Cl. 260-77.5AA.
McGee, George S. Screen printer with adjustable screen support and magnetic squeegee means. 4,031,823, Cl. 101-120.000.
McGee, Paul Dean, to Motorola, Inc. Speaker mounting. 4,032,725, Cl. 179-146.00R.
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McNaney, Joseph T. Light optic data handling system. 4,032,220, Cl. 350-161.00W.
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Mendoza, Luis Esteban. Cordless telephone system. 4,032,723, Cl. 179-41.00A.
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Michael, Gerald C.; and McDowell, Murvyn M. Leak detector using mass concentration gauge. 4,031,742, Cl. 73-40.700.
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Cordrey, Philip William; and Mikucki, Wiktor, 4,032,599.
Mikuni-Kogyo Co., Ltd.: *See—*
Ozawa, Shinji, 4,031,870.
Milkovic, Miran, to General Electric Company. Low cutoff digital pulse filter especially useful in electronic energy consumption meters. 4,032,798, Cl. 307-233.00R.
Miller, Alan Leonard; and Ivey, John Saxon, to Borg-Warner Corporation. Method and apparatus for a transmission control system. 4,031,782, Cl. 74-866.000.
Miller, Blaine Monroe, Jr., to Hobart Corporation. Waste material handling system. 4,032,446, Cl. 210-152.000.
Miller, Clark Ober: *See—*
Dorer, Casper John, Jr.; and Miller, Clark Ober, 4,032,303.
Dorer, Casper John, Jr.; and Miller, Clark Ober, 4,032,304.
Miller, Claud T.: *See—*
Lasko, Robert A., deceased; and Miller, Claud T., 4,031,668.
Miller, Frank Donald, to Bunker Ramo Corporation. DC to AC inverter with unregulated input and regulated output. 4,032,832, Cl. 363-43.000.
Miller, John E., to United States Steel Corporation. Suction stabilizer for reciprocating pumps and stabilizing method. 4,032,265, Cl. 417-540.000.
Miller, Laurence Lockhart, to TRW Inc. Gerotor motor with a stationary inner member and a rotating and orbiting outer member. 4,032,267, Cl. 418-61.00B.
Miller, Richard E. W. Windshield repair device. 4,032,272, Cl. 425-12.000.
Miller, Thomas R., to Continental Oil Company. Jet nozzle drilling assembly. 4,031,971, Cl. 175-107.000.
Miller, Timothy Allen; and Hansen, Carlo J., to Ralston Purina Company. Simulated bone. 4,032,665, Cl. 426-104.000.
Millette, Gloria Astrid, to Raymond Lee Organization, Inc., The, a part interest. Portable table and lamp fixture. 4,032,770, Cl. 240-4.000.
Minakawa, Masaaki; and Yoshikawa, Tosbio, to Nissan Motor Co., Ltd. Insulator. 4,032,125, Cl. 267-63.00A.
Minami, Shunji; Takemura, Takehide; and Oka, Shunzo, to Matsushita Electric Industrial Co., Ltd. Device for generating variable output voltage. 4,032,838, Cl. 323-19.000.

Minnesota Mining and Manufacturing Company: *See—*
Gobran, Ramsis, 4,032,486.
Jonnes, Nelson, 4,032,681.
West, Arthur C., III, 4,032,699.

Minsk, Louis M.: *See—*
Kotlarchik, Carl, Jr.; Minsk, Louis M.; and Fletcher, George L., Jr., 4,032,518.

Misawa, Kichiji: *See—*
Fujikawa, Tetsuzo; and Misawa, Kichiji, 4,031,877.

Mishiba, Saburo: *See—*
Yamagoshi, Tanoshi; Terakawa, Minoru; Shirahata, Aiiti; Sekiguchi, Sadao; Mishiba, Saburo; Shimamura, Takeshi; and Tajima, Shigeru, 4,032,597.

Mitsubishi Chemical Industries Ltd.: *See—*
Oneda, Takeru; and Tomita, Shinpei, 4,032,620.

Mitsubishi Kasei Kogyo Kabushiki Kaisha: *See—*
Sugiyama, Masamichi; Ebina, Ryuzo; Tanaka, Minoru; Sukekawa, Ikuo; and Sawada, Susumu, 4,032,387.

Mitsubishi Paper Mills, Ltd.: *See—*
Kohmura, Isao; Tahara, Yukio; Futaki, Kiyoshi; and Tange, Hiroshi, 4,032,690.

Mitsubishi Petrochemical Co., Ltd.: *See—*
Semejima, Hiroshi, 4,032,593.

Mitsui Toatsu Chemicals, Incorporated: *See—*
Asano, Shiro; Yoshimure, Kiyotaka; Tsuchiya, Ryoji; and Honda, Tadatoshi, 4,032,572.
Ozaki, Shoichiro; and Mori, Haruki, 4,032,524.
Tsujimoto, Michihiro; Nishizawe, Tsutomu; and Okubo, Ichiro, 4,032,539.

Mittelmann, Eugene, to Illinois Tool Works Inc. Two-level temperature control for induction heating. 4,032,740, Cl. 219-10.770.

Miyaji, Yorio: *See—*
Kato, Shozo; Takahashi, Yutaka; Miyaji, Yorio; Kondo, Naomitsu; and Fukumoto, Mikio, 4,032,020.

Miyake, Masanobu: *See—*
Wakatsuki, Yuzo; Miyake, Masanobu; and Hano, Kazuyuki, 4,032,946.

Miyamoto, Motomu: *See—*
Fujiwara, Hiroshi; Takahashi, Asao; and Miyamoto, Motomu, 4,032,513.

Miyamoto, Seiji, to Sanyo Electric Co., Ltd. Amplification and gain control circuit. 4,032,854, Cl. 330-29.000.

Miyoshi, Keisuke; and Yukumoto, Toshitaka, to Matsushita Electric Industrial Co., Ltd. Television image projecting system. 4,032,968, Cl. 358-60.000.

Miyoshi, Munetsugu: *See—*
Chibata, Ichiro; Miyoshi, Munetsugu; Takashima, Kohki; and Moriya, Shoji, 4,032,641.

Miyoshi Yushi Kabushiki Kaisha: *See—*
Moriya, Masafumi; Hosoda, Kazuo; Takai, Makoto; and Mano, Shiro, 4,032,482.
Onoda, Koji; Matsumoto, Atsuyuki; Ogawara, Hiroshi; and Nishimura, Akira, 4,032,485.

Mizuno, Hiroshi: *See—*
Kida, Takao; Mizuno, Hiroshi; and Okutsu, Masaru, 4,032,325.

Mnipki "Minprojekt": *See—*
Hadjiiliev, Ruscho Panayotov; Todorova, Maria Ivanova; Georgiev, Tzvetan Obretenov; Naydenov, Kubrat Vassilev; Jechev, Dinko Miheylov; Staneva, Yanka Bogdanova; and Hadjiilieva, Irina Valcheva, 4,032,356.

Mobil Oil Corporation: *See—*
Johnson, George C., 4,032,428.
Owen, Hartley, 4,032,432.
Weisz, Paul B., 4,032,431.

Mogilevsky, Evsei Moiseevich: *See—*
Gritskov, Ivan Viktorovich; Butyagin, Pavel Anatolievich; Shimko, Ivan Gavrilovich; Mogilevsky, Evsei Moiseevich; Baksheev, Igor Petrovich; Finger, Georgy Georgievich; Scherbakova, Ljudmila Sergeevna; Butkova, Nina Timofeevna; and Kaller, Lev Grigorievich, 4,032,273.

Moked, Isaac; Handwerk, Richard H.; and Marshall, Walter R., to Union Carbide Corporation. Low energy recovery compounding and fabricating systems for plastic materials. 4,032,391, Cl. 159-47.00R.

Molle, Jean Louis; and Boch, Jean Christian, to A.E.C. Societe de Chimie Organique et Biologique. Method of treating fatigue by administering a gulonic acid salt. 4,032,650, Cl. 424-278.000.

Moller, Eike; Meng, Karl; Wehinger, Egbert; and Horstmann, Harald, to Bayer Aktiengesellschaft. Pyrazol-5-ones. 4,032,646, Cl. 424-273.000.

Moller, Hinrich: *See—*
Heins, Arnold; Moller, Hinrich; and Osberghaus, Rainer, 4,032,676.

Molnar, Ernest L.: *See—*
Georgia, Edward J.; Eggers, Russell K. H.; and Molnar, Ernest L., 4,031,937.

Molnlycke AB: *See—*
Ronnmark, Per Magnus Lennart, 4,031,896.

Momose, Kataumi; and Okutsu, Kazuhisa. Pattern exposure using a polychromatic light source. 4,032,341, Cl. 96-27.00E.

Monagan, Elmer J., to Teledyne, Inc. Circuit-protecting fuse having arc-estinguishing means. 4,032,879, Cl. 337-278.000.

Monarch Marking Systems, Inc.: *See—*
Fleet, Ronald P. J., 4,032,386.

Money, George G., Sr. Battery carrier. 4,032,181, Cl. 294-16.000.

Monorapid S.A.S. di Camerano Angelo & C.: *See—*
Camerano, Angelo, 4,031,916.

Monsanto Company: *See—*
Birum, Gail H., 4,032,601.
Lee, Yoon C., 4,032,509.
Pickett, Oscar A., Jr.; and Stoddard, John W., 4,032,517.
Weeks, Lloyd E., 4,032,406.

Montedison Fibre S.p.A.: *See—*
Bottaccio, Giorgio; Chiusoli, Gian Paolo; Alneri, Enzo; Marchi, Marcello; and Lana, Giulio, 4,032,555.

Montgomery, W. Leon. Bicycle package transport device. 4,032,166, Cl. 280-204.000.

Moore, Douglas R.: *See—*
Morez, Eugene S.; and Moore, Douglas R., 4,032,720.

Moore, Marvin L.; and Moore, William M. Thermal engine system. 4,031,704, Cl. 60-325.000.

Moore, William M.: *See—*
Moore, Marvin L.; and Moore, William M., 4,031,704.

Moores, Robert Gordon, Jr.; and Walton, Richard Eugene, II, to Black and Decker Manufacturing Company, The. Sharpen twist drills or the like. 4,031,672, Cl. 51-288.000.

Moppett, Charles E.: *See—*
Celmer, Walter D.; Cullen, Walter P.; Moppett, Charles E.; Oscarson, John R.; Routien, John B.; Shibakawa, Riichiro; and Tone, Junsuke, 4,032,631.
Celmer, Walter D.; Cullen, Walter P.; Moppett, Charles E.; Routien, John B.; Jefferson, Mark T.; Shibakawa, Riichiro; and Tone, Junsuke, 4,032,632.

Moran, Donald Martin, to Sperry Rand Corporation. Reconfigurable data bus. 4,032,893, Cl. 340-166.00R.

Morez, Eugene S.; and Moore, Douglas R., to Norlin Music, Inc. Integrated demultiplexing circuit with continuously variable outputs. 4,032,720, Cl. 179-15.00A.

Morf, Ernst: *See—*
Domig, Rene; Morf, Ernst; and Loepfe, Erich, 4,031,924.

Morgan, Charles P.; and Lamy, Jean L., to Rockwell International Corporation. Control of positioning system authority over aircraft control surfaces as a function of surface movement rate. 4,032,094, Cl. 244-194.000.

Morgan, Idris Gareth: *See—*
Hollway, David Lipscombe; Somlo, Peter Ivan; Hunter, John David; and Morgan, Idris Gareth, 4,032,910.

Morhenn, Vera B. Occlusive pessary. 4,031,886, Cl. 128-130.000.

Mori, Haruki: *See—*
Ozaki, Shoichiro; and Mori, Haruki, 4,032,524.

Mori, Mitsuhiro; Ito, Kazuhiro; Morioka, Makoto; and Ono, Yuichi, to Hitachi, Ltd. Light emitting semiconductor diode. 4,032,945, Cl. 357-18.000.

Mori, Shunro: *See—*
Umezawa, Hamao; Takeuchi, Tomio; Takamatsu, Akira; and Mori, Shunro, 4,032,635.

Morin, Denise M.: *See—*
Auzel, Francois F.; Morin, Denise M.; and Pecile, Dario C., 4,032,351.

Morioka, Makoto: *See—*
Mori, Mitsuhiro; Ito, Kazuhiro; Morioka, Makoto; and Ono, Yuichi, 4,032,945.

Morita Pump Kabushiki Kaisha: *See—*
Terayama, Fusaji; and Kozai, Tetsuo, 4,031,980.

Moriya, Masafumi; Hosoda, Kazuo; Takai, Makoto; and Mano, Shiro, to Miyoshi Yushi Kabushiki Kaisha. Process for producing chelating resin and product produced thereby. 4,032,482, Cl. 260-2.20R.

Moriya, Shoji: *See—*
Chibata, Ichiro; Miyoshi, Munetsugu; Takashima, Kohki; and Moriya, Shoji, 4,032,641.

Morris, Alfred Ray: *See—*
Hendricks, David Allen; Howe, Milton Albert, Jr.; Luck, Stephen Royall; Morris, Alfred Ray; and Owen, Dave Leslie, 4,032,038.

Morris, Max O. Corner joint brace characterized by a flexible construction. 4,032,242, Cl. 403-231.000.

Morrison, Howard J.; and Brand, Derek A., to Marvin Glass & Associates. Device for opening and closing of cord operated closures. 4,031,944, Cl. 160-331.000.

Morrison, Howard J.: *See—*
Keller, Albert G.; Nix, Donald F.; and Morrison, Howard J., 4,031,659.

Morse, Harold F. Game board apparatus. 4,032,151, Cl. 273-131.00B.

Morton, Douglas R., Jr., to Upjohn Company, The. Oxa phenylene prostaglandin analogs. 4,032,560, Cl. 260-473.00G.

Moser, Hans, to Ciba-Geigy Corporation. Haloacetanilides as microbicidal active substances. 4,032,657, Cl. 424-309.000.

Moser, Werner: *See—*
Imme, Helmut; and Moser, Werner, 4,031,734.

Moses, Ronald W., Jr.: *See—*
Boom, Roger W.; Moses, Ronald W., Jr.; Peterson, Harold A.; and Young, Warren C., 4,032,959.

Motorola, Inc.: *See—*
Bennett, Thomas H.; Carlow, Earl F.; Kouvoussis, Anthony E.; Orgill, Rodney H.; Peddle, Charles; and Wiles, Michael F., 4,032,896.
En, John; and Leitich, Albert Joseph, 4,032,886.
Gemmell, Frank S.; and Fried, Mark A., 4,031,826.
Hargis, Robert Norman, 4,032,858.
McGee, Paul Dean, 4,032,725.
Nation, Melvin Stanley, 4,032,204.
Thome, Gene P., 4,032,963.

Moult, Roy H.: *See—*
Blommers, Elizabeth A.; and Moult, Roy H., 4,032,515.

Moustakas, Matthew A., to CBS Inc. Fishing game. 4,032,144, Cl. 273-86.00R.

Mowbray, John A., to Orlando, Agostino. Light attachment for a compact. 4,032,772, Cl. 240-6.45R.

Mower, Morris F.: *See—*
Johnson, Eugene R.; and Mower, Morris F., 4,032,283.

Muanyagipari Kutato Intezet: *See—*
Kecskemethy, Geza; Tihanyi, Robert; and Virag, Gyorgy, 4,032,040.

Mueller, Alvin W.; Williams, Robert J.; and Ansel, Robert E., to DeSoto, Inc. Composite baseball bat. 4,032,143, Cl. 273-72.00R.

Mueller, Thomas L.: *See—*
Melinski, S. W.; and Mueller, Thomas L., 4,031,941.

Mulee, Dennis L.: *See—*
Erbach, Arthur R.; Franck, Allen R.; Mulee, Dennis L.; and Schmitt, Wilhelm E., 4,032,743.

Muller-Deisig, Wolfgang; and Brauning, Egon, to Fehlbaum. Ergonomically designed chair. 4,032,190, Cl. 297-353.000.

Muller, Mathias: *See—*
Durr, Walter; and Muller, Mathias, 4,032,803.

Muller, Richard, to Gebr. Hofmann KG. Apparatus for balancing machines for chucking and centering of anaxial bodies of rotation. 4,031,760, Cl. 73-460.000.

Munch, Peter: *See—*
Dany, Franz-Josef; Wortmann, Joachim; Munch, Peter; and Vollmer, Hertfrid, 4,032,498.

Munk, Miner N., to Varian Associates. Liquid chromatography pumping system with compensation means for liquid compressibility. 4,032,445, Cl. 210-103.000.

Muramatsu, Kenji: *See—*
Kawai, Minoro; and Muramatsu, Kenji, 4,032,062.

Murat, Roger; and Glay, Guy, to Societe d'Applications Generales d'Electricite et de Mecanique S A G E M. Printing device. 4,031,992, Cl. 197-1.00R.

Murata, Takao; Nakamura, Nobutaka; and Goto, Tateo, to Sumitomo Durez Company, Ltd. Wax compositions for flame retardant electrical insulation coatings. 4,032,490, Cl. 260-28.00P.

Murnane, Thomas Joseph. Locking device for safety belt. 4,032,081, Cl. 242-107.40B.

Murphy, C. J. Adjustable sharpener for self-sharpening feed chopping knives. 4,031,670, Cl. 51-250.000.

Murty, Hari N., to Carborundum Company, The. Granular activated carbon manufacture from sub-bituminous coal mixed with concentrated inorganic acid without pitch. 4,032,476, Cl. 252-444.000.

Nabae, Akira; Shimamura, Takeo; Shimizu, Ichirou; and Kurosawa, Ryoichi, to Tokyo Shibaura Denki Kabushiki Kaisha. Inverter apparatus. 4,032,831, Cl. 363-2.000.

Nadelson, Jeffrey, to Sandoz, Inc. Isoxazolyl benzoic acids. 4,032,644, Cl. 424-272.000.

Nagao, Taku: *See—*
Ikezaki, Muneyoshi; Ito, Nobuo; Okazaki, Yasushi; Hoshiyama, Masao; Nagao, Taku; and Nakajima, Hiromichi, 4,032,575.

Nagaoka, Tateki: *See—*
Katayama, Hajime; Nitanda, Hiroshi; Nagaoka, Tateki; Kishi, Hirotoshi; Takada, Yousaku; Iida, Noriyoshi; Inuzuka, Tsuneki; and Komiya, Yutaka, 4,032,137.

Nahory, Robert Edward: *See—*
De Winter, John Christian; Nahory, Robert Edward; and Pollack, Martin Alan, 4,032,951.

Nakajima, Hiromichi: *See—*
Ikezaki, Muneyoshi; Ito, Nobuo; Okazaki, Yasushi; Hoshiyama, Masao; Nagao, Taku; and Nakajima, Hiromichi, 4,032,575.

Nakamura, Hideki; and Kiyonaga, Kingo, to Hitachi Metals, Ltd. Carbide enriched high speed tool steel. 4,032,302, Cl. 75-240.000.

Nakamura, Kotaro: *See—*
Furutachi, Nobuo; Nakamura, Kotaro; Yamada, Minoru; and Arai, Atsuaki, 4,032,346.

Nakamura, Nobutaka: *See—*
Murata, Takao; Nakamura, Nobutaka; and Goto, Tateo, 4,032,490.

Nakamura, Takeshi, to Fuji Photo Film Co., Ltd. X-ray film cartridge. 4,032,790, Cl. 250-480.000.

Nakamura, Yoichi: *See—*
Ogihara, Sadehide; Nakamura, Yoichi; and Fukui, Osamu, 4,032,592.

Nakano, Seizo: *See—*
Oishi, Kazuaki; Nakano, Seizo; and Suda, Shouetu, 4,032,820.

Nakata, Tetsuya: *See—*
Bunnomori, Yukinari; Yamada, Nobuo; and Nakata, Tetsuya, 4,032,479.

Nalco Chemical Company: *See—*
Blackmar, Guy E.; Wight, Robert C.; and Smith, Richard B., 4,032,298.

Napper, Jack C.: *See—*
Benavente, Vicente Cruz; and Napper, Jack C., 4,032,189.

Nassimbene, Ernie George, to International Business Machines Corporation. Palm print identification. 4,032,889, Cl. 340-146.30E.

Nation, Melvin Stanley, to Motorola, Inc. Adjustable mounting arrangement for electronic apparatus. 4,032,204, Cl. 312-7.00R.

National Board of Medical Examiners: *See—*
Pooley, Charles K., 4,032,897.

National Marine Service, Inc.: *See—*
Wright, David A.; and Walters, Chester H., 4,032,444.

National Research Development Corporation: *See—*
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National Research Institute for Metals: *See—*
Kametani, Hiroshi, 4,032,425.

National Semiconductor Corporation: *See—*
Ross, John P.; and Bernardi, Carl E., 4,032,422.

Nattefort, Fritz, to Precise Corporation, The. Rotating spindle and tool unit. 4,031,810, Cl. 90-11.00A.

Navarrete, Antonio E.: *See—*
Harper, Jon J.; Navarrete, Antonio E.; and Thomas, Richard J., 4,032,563.

Naydenov, Kubrat Vassilev: *See—*
Hadjiiliev, Ruscho Panayotov; Todorova, Maria Ivanova; Georgiev, Tzvetan Obretenov; Naydenov, Kubrat Vassilev; Jechev, Dioko Mihaylov; Staneva, Yanka Bogdanova; and Hedjiilieva, Irina Valcheva, 4,032,356.

NCR Corporation: *See—*
Koo, Tuh-Kai, 4,032,373.

Nelson, Robert C., to New River Manufacturing Company, Inc. Mobile telescopical articulated cascade conveyor system for mining and automatic self-tramming wheel-mounted conveyor unit therefor. 4,031,997, Cl. 198-301.000.

Neomed Incorporated: *See—*
Esty, Janet M.; and Taylor, Charles E., 4,032,738.

Neri, John E. Sink trap with clean out opening. 4,031,914, Cl. 137-247.510.

Neumann, Henning; and Federer, Fritz, to Metzeler Kautschuk AG. Inflatable boat. 4,031,580, Cl. 9-2.00A.

Neuroth, Robert J. Electric conduit connector. 4,032,178, Cl. 285-162.000.

New River Manufacturing Company, Inc.: *See—*
Nelson, Robert C., 4,031,997.

Newton, Albert Eugene: *See—*
Elliott, Richard Montgomery; Newton, Albert Eugene; and Kelley, John Sherburne, 4,032,046.

NGK Insulators, Ltd.: *See—*
Ohmura, Akira; and Wada, Shigetaka, 4,032,752.

Nichols, Dwight E., to Hoover Ball and Bearing Company. Bin with internal sloping walls. 4,032,048, Cl. 222-185.000.

Nichols, Walter W.: *See—*
Connolly, John E., 4,031,947.

Nicolaisen, Holger; and Tandrup, Leif Borge, to Danfoss A/S. Pivotal bearing for an omega spring. 4,032,128, Cl. 267-159.000.

Nicolaisen, Holger; and Andersen, Finn Schnoor, to Danfoss A/S. Supporting structure for leaf spring contact assembly. 4,032,739, Cl. 200-283.000.

Nicolas, Gerard, to Commissariat a l'Energie Atomique. Method and a device for the interconnection of electronic components. 4,031,612, Cl. 29-625.000.

Nicoson, Robert D.: *See—*
Wilson, Clyde E.; and Nicoson, Robert D., 4,032,282.

Nielsen, Leif, to Danfoss A/S. Thermostatic expansion valve for refrigeration installations. 4,032,070, Cl. 236-92.00B.

Nilson, Sven Arthur John, Jr.: *See—*
Roberts, Raymond P.; and Nilson, Sven Arthur John, Jr., 4,031,675.

Nilsson, Jan: *See—*
Larker, Hans; Lundblad, Erik; Lundback, Bertil; and Nilsson, Jan, 4,031,732.

Ninomiya, Satoshi: *See—*
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Nippon Kogaku K.K.: *See—*
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Nippon Telegraph and Telephone Public Corporation: *See—*
Hirade, Kenkichi; Hattori, Takeshi; and Wasei, Hiromi, 4,032,846.
Takano, Rikuo; Ohota, Yutaka; Yamamoto, Yoichi; Sumitomo, Yuji; Kobayashi, Toshio; and Aiba, Masahiko, 4,032,924.

Nishimura, Akira: *See—*
Onoda, Koji; Matsumoto, Atsuyuki; Ogawara, Hiroshi; and Nishimura, Akira, 4,032,485.

Nishizawa, Tsutomu: *See—*
Tsujimoto, Michihiro; Nishizawa, Tsutomu; and Okubo, Ichiro, 4,032,539.

Nissan Motor Co., Ltd.: *See—*
Aibe, Tsuyoshi; Sugiura, Yoshiaki; and Okada, Yuzuru, 4,032,175.
Asano, Masaharu, 4,031,866.
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Nitro-Nobel A.B.: *See—*
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Nix, Donald F.: *See—*
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Nobusawa, Tsukumo, to Asahi Kogaku Kogyo Kabushiki Kaisha. Automatic shutter controls for cameras. 4,032,932, Cl. 354-23.00D.

Noll, Stanley Darwin; and Delfeld, William F., to Production Experts, Inc. Billet conveyor and turner. 4,032,019, Cl. 214-1.0QG.

Norco, Inc.: *See—*
Metz, Joseph R., 4,031,765.

Norlin Music, Inc.: *See—*
Morez, Eugene S.; and Moore, Douglas R., 4,032,720.

North American Philips Corporation: *See—*
Kenney, George Churchill; and Hoogendijk, Adrianus Huibert, 4,032,966.

Van Roessel, Frederik Johannes, 4,032,974.
Northern Telecom Limited: *See—*
Kos, Steven, 4,032,925.
Northrop, Donald P.: *See—*
Shurgan, Joel; and Northrop, Donald P., 4,032,813.
Shurgan, Joel; and Northrop, Donald P., 4,032,814.
Novello, Frederick C.: *See—*
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Nowicki, Henry: *See—*
Lu, Shau-Zou; and Nowicki, Henry, 4,031,912.
Nubani, Jawdat Ibrahim; and Rysz, Walter Robert, to RCA Corporation. Method of assembling a mount assembly in the neck of a cathode-ray tube. 4,031,597, Cl. 29-25.160.
Numerowski, Kenneth J., to U.I.P. Engineered Products Corporation. Roofing shingle mineral filler heater. 4,032,288, Cl. 432-189.000.
Nuova San Giorgio S.p.A.: *See—*
Roehrich, Christian, 4,031,691.
Nuovo Pignone, S.p.A.: *See—*
Santucci, Nicola, 4,031,925.
N.V. Industrieele Handelscombinatie Holland: *See—*
Van Heijst, Willem J., 4,031,582.
O & K Orenstein & Koppel Aktiengesellschaft: *See—*
Graf, Wilfried, 4,032,016.
O. M. Scott & Sons Company: *See—*
Amerine, James Dalton, 4,032,074.
Oak Industries Inc.: *See—*
Golbeck, Bernard J.; Lewandowski, Raymond F.; and Kennedy, Maurice E., 4,032,730.
Obata, Shizuo; Yamato, Yukiomi; and Taniguchi, Hitoshi, to Fuji Oil Company, Ltd. Method of manufacturing edible soy protein-containing, dried meat product. 4,032,666, Cl. 426-242.000.
Obeda, Edward G., to Branson Ultrasonics Corporation. Method and apparatus for splicing thermoplastic monofilament material by high frequency vibratory energy. 4,032,382, Cl. 156-73.200.
Oberster, Arthur Eugene: *See—*
Koch, Russell William; and Oberster, Arthur Eugene, 4,032,500.
Oberteuffer, John A.: *See—*
Kolm, Henry H.; and Oberteuffer, John A., 4,032,114.
O'Brien, Stephen Michael: *See—*
Drinkard, Gary; Prats, Michael; and O'Brien, Stephen Michael, 4,032,193.
Ocean Ecology Ltd.: *See—*
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Oelsch, Jurgen, to Olympia Werke AG. Push button switch. 4,032,728, Cl. 200-5.00A.
Ogawara, Hiroshi: *See—*
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Ogihara, Sadahide; Nakamura, Yoichi; and Fukui, Osamu, to UBE Industries, Ltd. Method for the preparation of a modified crystalline propylene polymer. 4,032,592, Cl. 260-827.000.
Ohba, Shinya; Takemoto, Iwao; and Kubo, Masaharu, to Hitachi, Ltd. Bulk charge transfer semiconductor device. 4,032,952, Cl. 357-24.000.
Ohmura, Akira; and Wada, Shigetaka, to NGK Insulators, Ltd. Heating elements comprising a PTC ceramic article of a honeycomb structure composed of barium titanate. 4,032,752, Cl. 219-541.000.
Ohota, Yutaka: *See—*
Takano, Rikuo; Ohota, Yutaka; Yamamoto, Yoichi; Sumitomo, Yuji; Kobayashi, Toshio; and Aiba, Masahiko, 4,032,924.
Oike, Yozo: *See—*
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Oishi, Kazuaki; Nakano, Seizo; and Suda, Shouetu, to Hitachi, Ltd. Horizontal double plane high voltage switching assembly. 4,032,820, Cl. 361-333.000.
Oka, Shunzo: *See—*
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Okada, Yuzuru: *See—*
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Okamura, Masami; Aoki, Fumio; Sano, Yoshihiro; Makino, Jun-ichi; Miki, Yoshiteru; Sasaki, Hiroshi; and Seo, Kazuo, to Hitachi, Ltd.; and Tokyo Electric Power Co., Inc., The. Coding equipment providing compressed code. 4,032,913, Cl. 340-347.0AD.
Okazaki, Yasushi: *See—*
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Okutsu, Masaru: *See—*
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Olin Corporation: *See—*
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Tepas, Joseph J., Jr.; and Sangster, Arlon G., 4,032,035.
Olinkraft, Inc.: *See—*
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Olsen, Roderick, Jr.: *See—*
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Olsson, Gotthard Valentin, to Telefonaktiebolaget L M Ericsson. Method of joining of insulated high-voltage cables. 4,032,380, Cl. 156-49.000.
Olympia Werke AG: *See—*
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Onada, Takeru; and Tomita, Shinpei, to Mitsubishi Chemical Industries Ltd. Process for preparing dicyan. 4,032,620, Cl. 423-384.000.
Onal, Hasan F.; and Harmon, Clarence R., to Hydro-Tech Corporation. Dual jet boat pump. 4,031,844, Cl. 115-12.00R.
O'Neill, John Francis, to Bell Telephone Laboratories, Incorporated. Four-wire integrable hybrid. 4,032,718, Cl. 179-15.0AA.
Onghena, Jozef Jan: *See—*
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Onishi, Takanori; and Shiozawa, Ken, to Toyota Jidosha Kogyo Kabushiki Kaisha. Ignition-timing adjusting system for spark-ignition internal combustion engines. 4,031,869, Cl. 123-117.00A.
Onishi, Yasuhiko: *See—*
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Ono, Yuichi: *See—*
Mori, Mitsuhiro; Ito, Kazuhiro; Morioka, Makoto; and Ono, Yuichi, 4,032,945.
Onoda, Koji; Matsumoto, Atsuyuki; Ogawara, Hiroshi; and Nishimura, Akira, to Miyoshi Yushi Kabushiki Kaisha. Polyurethane foams based on mixed itaconic acid polyesters. 4,032,485, Cl. 260-2.5AN.
Onopchenko, Anatoli; and Schulz, Johann G. D., to Gulf Research & Development Company. Prucess for converting cyclohexane to adipic acid. 4,032,569, Cl. 260-533.00C.
Oppel, John A.; and Phillips, Virgel E., to General Electric Company. Electric circuit breaker with electromagnetic-assist means for opposing magnetic contact-separating forces. 4,032,870, Cl. 335-195.000.
O'Rell, Michael K.: *See—*
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Orgill, Rodney H.: *See—*
Bennett, Thomas H.; Carlow, Earl F.; Kouvoussis, Anthony E.; Orgill, Rodney H.; Peddle, Charles; and Wiles, Michael F., 4,032,896.
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Osberghaus, Rainer, to Henkel & Cie G.m.b.H. Skin treating agent containing polyaldehydopolycarboxylate polymers and process. 4,032,629, Cl. 424-78.000.
Osberghaus, Rainer; Umbach, Wilfried; Gloxhuber, Christian; and Braig, Siegfried, to Henkel & Cie G.m.b.H. Skin treating agent containing polyhydroxypolycarboxylate polymers and process. 4,032,630, Cl. 424-81.000.
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BASF Wyandotte Corporation. Acid cleaner and process for disposal thereof. 4,032,466, Cl. 252-136.000.
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Oy Stromberg AB: *See—*
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Ozaki, Shoichiro; and Mori, Haruki, to Mitsui Toatsu Chemicals, Incorporated. 1-Carbamoyl-5-fluorouracil derivatives. 4,032,524, Cl. 260-256.40C.
Ozawa, Shinji, to Mikuni Kogyo Co., Ltd. Fuel charge injection apparatus for internal combustion engines. 4,031,870, Cl. 123-119.00R.
Paap, Hans J.; Arnold, Dan M.; Schultz, Ward E.; and Smith, Harry D., Jr., to Texaco Inc. Behind casing water volume flow rate measurement using gamma ray spectral degradation. 4,032,778, Cl. 250-266.000.
Paap, Hans J.; Arnold, Dan M.; and Peelman, Harold E., to Texaco Inc. Behind casing water flow detection using continuous oxygen activation. 4,032,780, Cl. 250-266.000.
Paap, Hans J.: *See—*
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Pacific Gunsight Company: *See—*
Boschi, Richard C., 4,031,804.
Paletto, Raimondo, to SGS-ATES Componenti Elettronici S.p.A. Resin-encased microelectronic module. 4,032,706, Cl. 174-52.0PE.
Pall Corporation: *See—*
Pall, David B., 4,032,688.
Pall, David B., to Pall Corporation. Seamless tubular nonwoven webs and filters thereof. 4,032,688, Cl. 428-36.000.
Paluck, George. Apparatus for establishing a level plane. 4,031,629, Cl. 33-290.000.
Pan, Jing Jong; and Arnold, Milton Phillip, to Harris Corporation. Reduction of intermodulation. 4,032,802, Cl. 307-311.000.
Panu, Kalevi, to Oy Stromberg AB. Current transformer. 4,032,837, Cl. 323-6.000.
Papantoniou, Christos; and Handjani, Rose-Marie, to Societe Anonyme dite: L'Oreal. Cosmetic emulsion compositions including black polymer emulsifiers. 4,032,628, Cl. 424-63.000.
Papst, Hermann E. R. Dirigible, especially non-rigid dirigible. 4,032,085, Cl. 244-30.000.
Parduhn, Alfred P.; and Cecil, Waldo E. Articulated highway delineator post. 4,032,248, Cl. 404-10.000.
Pareja, Ramon, to Lear Siegler, Inc. Pump with coaxial inlet and outlet valve arrangement. 4,032,263, Cl. 417-539.000.
Parham, J. P. Solar energy conversion plant. 4,031,879, Cl. 126-271.000.
Parker, Duane L.: *See—*
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Parker, Roger Alan, to Richardson-Merrell Inc. Substituted thenoylacetic acid and esters. 4,032,647, Cl. 424-275.000.
Parker, Wesley A.; Gwyn, John E.; and McCullough, Glenn R., to Shell Oil Company. Oxygen-containing gas distribution apparatus employed in fluidized bed regeneration of carbon-contaminated catalysts. 4,032,300, Cl. 23-288.00B.
Parkinson, Graham Charles; and Fordyce, Homer E., to Marley Cooling Tower Company, The. Hot water supply and distribution structure for cooling towers. 4,032,604, Cl. 261-111.000.
Parks, John H., to Caterpillar Tractor Co. Low stress cam roller. 4,031,777, Cl. 74-569.000.
Parkyn, Derek John; and Keuleman, Alexander Hendrich Francis, to U.S. Philips Corporation. Automotive starter lockout system. 4,032,792, Cl. 290-37.00R.
Parshin, Alexei Nikolaevich: *See—*
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Paul, Stanley C.; and Russell, Shelby J. Tattoo etching machine. 4,031,783, Cl. 81-9.220.
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Pedone, Vito S. Oil-water separator. 4,032,453, Cl. 210-266.000.
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Pennwalt Corporation: *See—*
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Perego, Giovanni: *See—*
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Perfetti, Guido A.; and Darlington, Henry, to Bethlehem Steel Corporation. Coated sheet metal and method of forming products therefrom. 4,032,678, Cl. 427-388.00A.
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Perrault, Frederick; and Perrault, Raymond E. Curved bracket adapter. 4,032,096, Cl. 248-73.000.
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Perrier, Dorothy M.; Benerito, Ruth R.; and Steele, Richard H., to United States of America, Agriculture. Preparation of stable strong base cellulosic anion exchangers with red-ox potentials. 4,032,293, Cl. 8-129.000.
Perronin, Jean; and Dessaint, Andre Louis, to Produits Chimiques Ugine Kuhlmann. Water-repellent and oil-repellent compositions based on fluorine compound. 4,032,495, Cl. 260-29.60F.
Persyn, Harvey O., to Ralston Purina Company. Artificial insemination of shrimp. 4,031,855, Cl. 119-2.000.
Perthes, Horst, to Kalle Aktiengesellschaft. Movable copy board for reproduction apparatus. 4,032,232, Cl. 355-75.000.
Peters, Edward J.; and Zeman, Wayne P., to Diamond Shamrock Corporation. Electrical current breaker for fluid stream. 4,032,424, Cl. 204-258.000.
Peters, Joseph Jerome; Villanueva, Antonio Tong; and Keller, Robert Samuel, to Societe d'Assistance Technique pour Produits Nestle S.A. Cheese product and process for production. 4,032,669, Cl. 426-573.000.
Petersen, Sigrud R.: *See—*
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Peterson, C. Lynn, to Peterson Filters and Engineering Company. By-pass and synchronized blow system and method for rotary vacuum filters. 4,032,442, Cl. 210-82.000.
Peterson, Carl R., to Rapidex, Inc. Boring apparatus capable of boring straight holes. 4,031,974, Cl. 175-334.000.
Peterson Filters and Engineering Company: *See—*
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Petri, Larry W.; and Conway, John E., to UOP Inc. Hydrorefining asphaltenic petroleum charge stocks. 4,032,433, Cl. 208-112.000.
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Petty, Preston L. Hand grip. 4,031,775, Cl. 74-551.900.
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Phillips Petroleum Company: *See—*
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Phillips, Ronald Wayne, II, to B. F. Goodrich Company, The. Inflatable emergency equipment deployment device. 4,031,583, Cl. 9-14.000.

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Pint, Moise. Apparatus for computing and metering liquid discharges. 4,032,042, Cl. 222-20.000.

Piche, Ernest. Tenon cutting machine with circular saws. 4,031,933, Cl. 144-198.00R.

Pickering, Harold W.: *See—*
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Pickering, Phillip A.; and Pickering, Harold W. Convertible truck cover. 4,032,186, Cl. 296-100.000.

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Pike, William Floyd. Power operated aspirating hypodermic syringe. 4,031,889, Cl. 128-215.000.

Pillar, Walter O., to ARCO Polymers, Inc. Heat stabilizers for expandable styrene polymers. 4,032,481, Cl. 260-2.5FP.

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Planck, Jane S. Headdress. 4,031,567, Cl. 2-204.000.

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Plempel, Manfred: *See—*
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Poggemiller, Erhard; and Sweet, Ralph. Depth control device for ground working agricultural implements. 4,031,963, Cl. 172-4.000.

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Poly Seal, Inc.: *See—*
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Ponciano, Jose; and Bautista, Thomas S. Aerodynamic sound-emitting amusement device. 4,031,655, Cl. 46-52.000.

Pond, Stephen F.; and Fsucz, Eugene C., to Xerox Corporation. Thermomagnetic imaging apparatus. 4,032,923, Cl. 346-74.100.

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Porter, Robert E. Syringe assembly package. 4,031,895, Cl. 128-272.100.

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Prichard, Evan S., to Challenge-Cook Bros., Incorporated. Mixer attachment for mining vehicles. 4,032,116, Cl. 259-69.000.

Priese, Werner K.: *See—*
Flynn, Jac B.; Janquart, Jerry C.; and Priese, Werner K., 4,032,044.

Prochnow, Rudolf, to Robert Bosch Fernsehanlagen G.m.b.H. Scanning device for the recording and/or play-back of wide-band signals. 4,032,986, Cl. 360-130.000.

Procter & Gamble Company, The: *See—*
Huff, Bernice, 4,031,568.

Production Control Units, Inc.: *See—*
Bruce, Ralph E., 4,032,041.

Production Experts, Inc.: *See—*
Noll, Stanley Darwin; and Delfeld, William F., 4,032,019.

Production Specialties, Inc.: *See—*
Herbert, Gerald P.; McGinn, Ferdinand M.; and Embree, Hugh D., 4,031,954.

Produits Chimiques Ugine Kuhlmann: *See—*
Perronin, Jean; and Dessaint, Andre Louis, 4,032,495.

Promecam Sisson-Lehmann: *See—*
Cailloux, Paul, 4,031,737.

Provencher, Joseph H., to United States of America, Navy. Multibeam adaptive array. 4,032,922, Cl. 343-854.000.

Psarras, Theodore; and Tamborski, Christ, to United States of America, Air Force. Omega-carbomethoxyperfluoroalkylene oxide iodides. 4,032,566, Cl. 260-484.00R.

Pulak, Richard P., to UOP Inc. Spent catalyst regeneration apparatus with internal regenerated-catalyst recycle means. 4,032,299, Cl. 23-288.00B.

Purdue Research Foundation: *See—*
Hall, Randall C., 4,032,296.

Puritan-Bennett Corporation: *See—*
Davis, James E. P.; and Omelich, David M., 4,031,885.

Pusche, Herbert: *See—*
Kuxdorf, Bernhard; Pusche, Herbert; Erpenbach, Heinz; and Riechmann, Wernfried, 4,032,410.

Puttinger, Dietmar; and Fischer, Manfred, to Messerschmitt-Boelkow-Blohm GmbH. Apparatus for ejecting a transport and launching container from a missile launcher. 4,031,805, Cl. 89-1.50G.

Pyzel, Ewald D.; and Codding, Harold E., to Ski Safe Inc. Touring ski boot binding. 4,032,172, Cl. 280-615.000.

Qonaar Corporation: *See—*
Malott, Steve, 4,031,991.

Quadbeck-Seeger, Hans-Juergen; and Hoch, Helmut, to BASF Aktiengesellschaft. Production of 2-hydroxynaphthalene-3-carboxylic acid. 4,032,568, Cl. 260-520.00A.

Quadbeck-Seeger, Hans-Juergen; and Schneider, Dieter, to BASF Aktiengesellschaft. Manufacture of 2-amino-3,5-dinitrobenzamide. 4,032,571, Cl. 260-558.00A.

Quarton, William T.; and Lowe, Peter R., to Honeywell Inc. Phosphor protection for X-Y loops. 4,032,760, Cl. 235-151.000.

Quayle, Jackson C. Pole top extension bracket. 4,032,244, Cl. 403-286.000.

Quin, Murray L.: *See—*
Bobrick, Mitchell; Quin, Murray L.; and Buzan, Morris M., 4,032,775.

R B Toy Development Co.: *See—*
Kupperman, Sam; and Kupperman, Dennis I., 4,031,656.

Raag, Valvo, to Syncal Corporation. Low power high voltage thermopile. 4,032,363, Cl. 136-211.000.

Raeymaekers, Alfons H. M.; and Van Gelder, Jozef H. L., to Janssen Pharmaceutica N.V. (1H-Benzimidazol-2-yl)carbamates. 4,032,536, Cl. 260-309.200.

Rakovsky, Oscar. Thermoplastic tubular container forming apparatus. 4,032,281, Cl. 425-392.000.

Raleigh, Roger W. Adjustable muffler for model aircraft type engines. 4,031,979, Cl. 181-69.000.

Ralston Purina Company: *See—*
Miller, Timothy Allen; and Hansen, Carlo J., 4,032,665.
Persyn, Harvey O., 4,031,855.

Ramsey Corporation: *See—*
McCormick, Harold E., 4,032,672.

Rand, J. Patrick. Inflatable tent. 4,031,674, Cl. 52-2.000.

Rank Xerox Ltd.: *See—*
Williams, Geoffrey C., 4,032,225.

Ranzanigo, Pierluigi, to Bassani S.p.A. Cartridge fuse carrier assembly. 4,032,878, Cl. 337-228.000.

Rapidex, Inc.: *See—*
Peterson, Carl R., 4,031,974.

Rapistan, Incorporated: *See—*
Suzuki, Shin; Uesugi, Masami; and Sekine, Michi, 4,031,998.

Raschke, Josef. Carton handling apparatus. 4,031,817, Cl. 93-44.10R.

Ratcliffe, Ronald W.: *See—*
Christensen, Burton G.; and Ratcliffe, Ronald W., 4,032,521.

Rauch, Keith: *See—*
Stastny, Edwin; Rauch, Keith; and Young, Ronald, 4,031,634.

Rausch, Richard E., to UOP Inc. Conversion of hydrocarbons with a superactive acidic bimetallic catalytic composite. 4,032,434, Cl. 208-139.000.

Rauscher, David A., to Cable Conveyor Systems, Inc. Method of making a conveyor belt. 4,032,384, Cl. 156-137.000.

Raville, Clarence A. Handgun apparatus. 4,031,808, Cl. 89-163.000.

Ravnsborg, Norman T.: *See—*
Blum, Kenneth J.; Dodson, Floyd; Jarrett, Robert P.; and Ravnsborg, Norman T., 4,032,287.

Ravussin, Pierre, to Aleyon Electronique et Physique S.A. Tri dimensional fluid flow sensing device. 4,031,755, Cl. 73-189.000.

Raychem Corporation: *See—*
Evans, Joseph H., 4,032,010.

Raymond International Inc.: *See—*
Kuntz, Howard W., 4,031,687.

Raymond Lee Organization, Inc., The: *See—*
Douglass, Robert J., 4,032,447.
Kelley, John J., 4,031,909.
Millette, Gloria Astrid, 4,032,770.

Raynes, Edward Peter: *See—*
Constant, Jennifer; Shanks, Ian Alexander; and Raynes, Edward Peter, 4,032,219.

Raytheon Company: *See—*
Bierig, Robert W., 4,032,949.
Unkauf, Manfred G., 4,032,847.

RCA Corporation: *See—*
Ahmed, Adel Abdel Aziz, 4,032,839.
Bloom, Allen; Bartolini, Robert Alfred; and Weakliem, Herbert Alfred, 4,032,340.
Bloom, Allen; and Hung, Ling Kong, 4,032,470.
Gange, Robert Allen, 4,032,338.
Harwood, Leopold Albert, 4,032,967.
Henley, Michael Lee; and Smith, Lawrence Edward, 4,032,819.
Hoover, Merle Vincent, 4,032,851.
Hulls, Leonard Robin; and Hadden, Stephen Clow, 4,032,852.
Kratz, Jerrold Kerwin; and Christensen, Edward Walter, II, 4,032,872.
Levine, Peter Alan, 4,032,976.
Nubani, Jawdat Ibrahim; and Rysz, Walter Robert, 4,031,597.
Weimer, Paul Kessler, 4,032,903.

Read, Randol R.: *See—*
Shanks, John L.; Read, Randol R.; and Supernaw, John W., 4,032,915.

Recht, Heinz, to Deutsche Babcock & Wilcox Aktiengesellschaft. Arrangement for reducing the nox content of fluid gases. 4,031,860, Cl. 122-240.00B.

Recognition Equipment Incorporated: *See—*
White, John T.; and Lovelady, Kenneth T., 4,032,928.

Reddy, Thomas J., to Reddy, Thomas J., Trustee. Fuel line evacuation system. 4,032,091, Cl. 244-135.00R.

Reddy, Thomas J., Trustee: *See—*
Reddy, Thomas J., 4,032,091.

Redshaw, Charles G. Spherical Stirling engine. 4,031,703, Cl. 60-519.000.

Reed & Associates, Inc.: *See—*
Reed, Buckley R., 4,031,820.

Reed, Buckley R., to Reed & Associates, Inc. Automatic lifting and lowering mechanism for deep fryers. 4,031,820, Cl. 99-336.000.

Reeher, John R.: *See—*
Smith, Ronald D.; Fies, William J.; Reeher, John R.; and Story, Michael S., 4,032,782.

Reen, Orville, to Allegheny Ludlum Industries, Inc. Sintered liquid phase stainless steel. 4,032,336, Cl. 75-224.000.

Rees, Thomas C.; and Flores, Robert J., to Sherwin-Williams Company, The. Easy dispersing alkali blue powder and process for manufacture. 4,032,357, Cl. 106-288.00Q.

Reid, Floyd F. Door lock. 4,031,725, Cl. 70-107.000.

Reinhardt, Horst; and Hoger, Ernst, to Kraftwerk Union Aktiengesellschaft. Telescopic device. 4,032,240, Cl. 403-108.000.

Reinshagen, Hellmuth: *See—*
Egger, Helmut; and Reinshagen, Hellmuth, 4,032,530.

Reisinger, Konrad; and Holzl, Ludwig, to Siemens Aktiengesellschaft. Circuit arrangement for lengthening a stop element at the receiver in a character-frame-governed time division multiplex data transmission system. 4,032,709, Cl. 178-50.000.

Reiss, Oscar; Brynes, Leon R.; and De Cicco, Frank, to APL Corporation. Safety cap. 4,032,028, Cl. 215-217.000.

Reitz, Rex L.: *See—*
Johnson, Frederick M.; Brown, James R.; and Reitz, Rex L., 4,032,689.

Renirie, Alexis C. M., to Vitatron Medical B.V. Long life cardiac pacer with switching power delivery means and method of alternately delivering power to respective circuit portions of a stimulus delivery system. 4,031,899, Cl. 128-419.0PS.

Renkert, J. Steven, to Metropolitan Industries. Prefabricated building panel and method of making. 4,031,682, Cl. 52-434.000.

Research Corporation: *See—*
Bernstein, Elliot R., 4,032,419.
Subramanian, Gopal; and McAfee, John Gilmore, 4,032,625.
Willett, James D.; and Cheek, Luther Michael, 4,032,551.

Reynolds Metals Company: *See—*
Wilson, Calvin L., 4,032,047.

Rhone-Poulenc Industries: *See—*
Artur, Andre; and Meniere, Charles, 4,032,616.
Trebillon, Emile, 4,032,582.

Rhone-Poulenc-Textile: *See—*
Gaudard, Yves, 4,032,139.

Rhor Industries, Inc.: *See—*
Tantlinger, Keith W., 4,031,677.

Ribich, Thomas Anthony, to Weldon Tool Company, The. Countersinking and deburring tool. 4,032,251, Cl. 408-199.000.

Rice, Dale W., to Corning Glass Works. Plural crystal pulling from a melt in an annular crucible heated on both inner and outer walls. 4,032,390, Cl. 156-608.000.

Rice, Richard C.; and Horn, Barry N., to Automated Systems, Inc. Security alarm system. 4,032,908, Cl. 340-213.00R.

Rice, Stephen E., to Digital Development Corporation. Method and system for encoding and decoding digital data. 4,032,979, Cl. 360-40.000.

Rich, Leonard G., to Gerber Scientific Instrument Company, The. Method and apparatus for examining a body by a beam of X-rays or other penetrating radiation. 4,032,784, Cl. 250-355.000.

Richardson-Merrell Inc.: *See—*
Parker, Roger Alan, 4,032,647.

Richardson, Rolland A., to Canron, Inc. Alert means for a programming system for press brakes or the like. 4,031,731, Cl. 72-37.000.

Richardson, William Henry; and Guhe, Prodyot, to Langley Alloys Limited. Corrosion resistant steels. 4,032,367, Cl. 148-38.000.

Richmond, Abraham W., to Harris Corporation. Wide range power control for electric discharge lamp and press using the same. 4,032,817, Cl. 315-149.000.

Richter, Eike, to General Electric Company. Inside-out motor/alternator with high inertia smooth rotor. 4,032,807, Cl. 310-178.000.

Ricoh Co., Ltd.: *See—*
Tani, Tatsuo, formerly Nishikawa; Tatsumi, Susumu; Tanaka, Mitsuo; Ota, Sakae; and Midorikawa, Akira, 4,032,229.

Rideout, Marvin. Emergency cooling system for air-conditioned vehicles. 4,031,710, Cl. 62-171.000.

Riebel, Hans-Jochem: *See—*
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Schroder, Rolf; Uhrhan, Paul; Homeyer, Bernhard; Behrenz, Wolfgang; and Hammann, Ingeborg, 4,032,634.

Riechmann, Wernfried: *See—*
Kuxdorf, Bernhard; Pusche, Herbert; Erpenbach, Heinz; and Riechmann, Wernfried, 4,032,410.

Riedle, Rudolf: *See—*
Spork, Helmut; Strasser, Rudolf; Riedle, Rudolf; Jacques, Wolfgang; and Wass, Johann, 4,032,557.

Rieger, Michael Lawrence, to Tektronix, Inc. Constant velocity vector generator. 4,032,768, Cl. 235-197.000.

Riethmuller, Lothar Herbert: *See—*
Kiefer, Hans Walter; Riethmuller, Lothar Herbert; and Spreitzhofer, Ernst Gunther Robert, 4,032,235.

Riley, David W.: *See—*
Eager, George S., Jr.; and Riley, David W., 4,032,381.

Rinio, Johannes Augustus. Cable hauling device comprising self clamping jaws. 4,032,110, Cl. 254-76.000.

Riseman, Jacob, to International Business Machines Corporation. Beam-lead integrated circuit structure and method for making the same including automatic registration of beam-leads with corresponding dielectric substrate leads. 4,032,058, Cl. 228-180.00A.

Rising, Orville C.: *See—*
Singh, Kamel; Denny, Thomas A.; Fritz, Daniel P.; and Rising, Orville C., 4,031,610.

RJR Archer, Inc.: *See—*
Dunnington, Richard Harry; Viglianco, Carl Michael; and Wilkens, George Rudolph, 4,032,684.

Robert Bosch Fernsehanlagen G.m.b.H.: *See—*
Prochnow, Rudolf, 4,032,986.

Robert Bosch G.m.b.H.: *See—*
Banzhaf, Werner; Stumpp, Gerhard; and Schielinsky, Gerhard, 4,031,873.
Boeters, Karl-Ernst, 4,032,964.
Bosch, Paul, 4,032,260.

Roberts, David C., to International Business Machines Corporation. Pattern-recognition systems having selectively alterable reject/substitution characteristics. 4,032,887, Cl. 340-146.3ED.

Roberts, Frederick D., to FMC Corporation. Fabrication of box parts from plastic material. 4,032,280, Cl. 425-383.000.

Roberts, Gary F., to Kartridg Pak Co., The. Food product stuffing pump with vacuum line. 4,032,049, Cl. 222-238.000.

Roberts, Raymond P.; and Nilson, Sven Arthur John, Jr. Free standing redecoratable vertical wall or divider. 4,031,675, Cl. 52-36.000.
Roberts, Robert Earl: *See—*
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Robinson, David Errol: *See—*
Kossoff, George; and Robinson, David Errol, 4,031,743.
Robinson, John W., to Kirby Lumber Corporation. Apparatus for reducing the opacity of the emissions from wood dryers. 4,031,631, Cl. 34-235.000.
Rockwell International Corporation: *See—*
Caloyannides, Michael A., 4,032,762.
Chen, Thomas T., 4,032,905.
Henry, Rodney D., 4,032,216.
Koistinen, Clayton W., 4,032,729.
Morgan, Charles P.; and Lamy, Jean L., 4,032,094.
Roeder, George K. Valve assembly for reciprocating downhole pumps. 4,032,266, Cl. 417-571.000.
Roehrich, Christian, to Nuova San Giorgio S.p.A. Device for reinserting the broken yarn in an open end spinning unit. 4,031,691, Cl. 57-34.00R.
Rogers, Jerry W.: *See—*
Henderson, Dewey D.; Rogers, Jerry W.; and Hollaway, Gerald C., Jr., 4,031,768.
Rogers, Peter, to Possum Controls Limited. Page-turners. 4,031,644, Cl. 40-104.00A.
Rogers, William B. Hair curling apparatus. 4,031,907, Cl. 132-40.000.
Rohlig, Rainer: *See—*
Zapf, Gerhard; Albano-Muller, Lothar; Kiethe, Horst; and Rohlig, Rainer, 4,032,335.
Rohm and Haas Company: *See—*
Emmons, William D., 4,032,686.
Rohr, Franz Josef; and Holick, Hubert, to Brown, Boveri & Cie. A.G. Method and apparatus for the automatic control of the air ratio of a combustion process. 4,032,285, Cl. 431-12.000.
Rokoss, Ferdinand, to Westinghouse Electric Corporation. Safety switch which renders hid lamp inoperative on accidental breakage of outer envelope. 4,032,816, Cl. 315-73.000.
Rolls-Royce (1971) Limited: *See—*
Fisher, Maurice; Kruger, Michael; and Maber, Terence Walter, 4,032,359.
Snell, Leonard Stanley, 4,032,258.
Romanoff, Paul Ira. Portable sauna. 4,031,573, Cl. 4-164.000.
Ronnmark, Per Magnus Lennart, to Molnlycke AB. Surgical suction sets. 4,031,896, Cl. 128-276.000.
Roper Corporation: *See—*
Gobin, Donald L., 4,031,694.
Rosaen, Nils O. Filter device with rotatable bypass valve. 4,032,451, Cl. 210-232.000.
Rose, Lloyd E.; and Maruca, Joseph P., to Textron, Inc. Tray type card file. 4,031,645, Cl. 40-68.600.
Roselli, Sergio, to Saint-Gobain Industries. Control system for vehicle window heater. 4,032,745, Cl. 219-203.000.
Rosen, Perry: *See—*
Kienzle, Frank; and Rosen, Perry, 4,032,520.
Ross, David S., to Sterling Drug Inc. Removal of grease and oil from particulate bed granules by backwashing with a detergent. 4,032,443, Cl. 210-82.000.
Ross, Ivan L.: *See—*
Bell, Edward L.; and Ross, Ivan L., 4,031,829.
Ross, John P.; and Bernardi, Carl E., to National Semiconductor Corporation. Apparatus for plating semiconductor chip headers. 4,032,422, Cl. 204-224.00R.
Ross, Sigmund Lance; Shuffman, Oscar, deceased; and Shuffman, Rose, executrix, to Shuffman, Rose, Executrix. Cryothermal manipulation of petroleum spills on water. 4,031,707, Cl. 61-1.00F.
Ross, Warren N., to Tomlinson, Audie B. Backhoe bucket tilt. 4,032,025, Cl. 214-138.00R.
Rossan, Kare Ragnvald; and Ekman, Gunnar Olof, to Nitro-Nobel A.B. Explosive composition with tellurite gelling agent. 4,032,376, Cl. 149-60.000.
Roth, Albert, to United States of America, Navy. Digital correlator. 4,032,885, Cl. 340-146.1AX.
Roth, Walter L.: *See—*
Dubin, Robert R.; and Roth, Walter L., 4,032,694.
Rothmans of Pall Mall Canada Limited: *See—*
Brackmann, Warren A.; and Dilanni, Daniel, 4,031,903.
Rothrock, Larry R., to Union Carbide Corporation. Laser device for altering surfaces in accordance with given patterns. 4,032,861, Cl. 331-94.50C.
Rotier, Donald Jeck; and Ferrin, Frank J., to Honeywell Inc. Ultrasonic air movement and temperature measuring apparatus. 4,031,756, Cl. 73-189.000.
Roussel-UCLAF: *See—*
Poittevin, Andre; and Torelli, Vesperto, 4,032,643.
Routien, John B.: *See—*
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Celmer, Walter D.; Cullen, Walter P.; Moppett, Charles E.; Routien, John B.; Jefferson, Mark T.; Shibakawa, Riichiro; and Tone, Junsuke, 4,032,632.
Rowland-Hill, Edward W., to Sperry Rand Corporation. Concave for an axial flow type combine. 4,031,901, Cl. 130-27.00T.
Rowsell, David G.; and Spring, David J., to Wilkinson Sword Limited. Cyclic sulphoxides and sulphones having a physiological cooling action on the human body. 4,032,661, Cl. 424-337.000.
RTE Corporation: *See—*
Taj, Hatim H., 4,032,205.
Ruby, Gary Victor: *See—*
Epstein, Jeffrey Earl; and Ruby, Gary Victor, 4,032,765.
Ruenzi, Kurt. Apparatus for individually removing sheets from a stack. 4,032,135, Cl. 271-116.000.
Ruettinger, Thurman O.: *See—*
Dolan, Courtney F.; and Ruettinger, Thurman O., 4,031,780.
Ruffieux, Stanislas; and Schade, Ekkehard, to BBC Brown Boveri & Company Limited. Gas-pressurized electrical switch with current-generated magnetic field for assisting arc extinction. 4,032,736, Cl. 200-147.00R.
Ruhrchemie Aktiengesellschaft: *See—*
Birnkraut, Hans-Walter; and Kluy, Werner, 4,032,692.
Ruhrkohle AG: *See—*
Knappstein, Johannes; Tewes, Heinrich; and Woikowski, Robert, 4,032,409.
Runkel, Fritz: *See—*
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Ruppert, Jurgen: *See—*
Eder, Ulrich; Sauer, Gerhard; Haffer, Gregor; Ruppert, Jurgen; and Wiechert, Rudolf, 4,032,540.
Russell, Herman F. Disassemblable article transport, storage and handling truck. 4,032,165, Cl. 280-79.300.
Russell, Kenneth J.: *See—*
Harp, Robert S.; and Russell, Kenneth J., 4,032,865.
Russell, Shelby J.: *See—*
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Ruti Machinery Works Ltd.: *See—*
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Ruti-Te Strake B.V.: *See—*
Gunneman, Paul, 4,031,928.
van Duynhoven, Adrianus Henricus, 4,031,923.
Rutkowski, John L., to Appleton Electric Company. Multiple socket assembly for electrical components. 4,032,209, Cl. 339-91.00R.
Ryckman, William D., Jr.; and Little, Lester D., to General Electric Company. Steam iron water gauge. 4,031,638, Cl. 38-77.200.
Ryder, Alan G.: *See—*
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Ryken, Marvin L., to United States of America, Navy. 1 to 18 GHz microwave signal generator. 4,032,859, Cl. 331-53.000.
Ryncosky, Robert G.; and Carroll, Alexander A., to Carrier Corporation. Compensating ring for a rotary machine. 4,032,253, Cl. 415-136.000.
Rysz, Walter Robert: *See—*
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S. A. Bekaert-Cockerill, N.V.: *See—*
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Safety Research & Engineering Corporation: *See—*
Cook, Edward J., 4,031,845.
Saft-Societe des Accumulateurs Fixes et de Traction: *See—*
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Sahlin International, Inc.: *See—*
Cagle, Harlan R., 4,031,918.
St. Clair, David J.: *See—*
Crossland, Ronald K.; and St. Clair, David J., 4,032,459.
Saint-Gobain Industries: *See—*
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Sakai, Shuzo; and Tsuyama, Naoto, to Kabushiki-Kaisha Hayashibara Seibutsukagaku Kenkyujo. Process for the production of saccharified starch products wherein maltose is the predominant constituent. 4,032,403, Cl. 195-31.00R.
Sakanoue, Seiki; Tsubota, Motohiko; Fuseya, Yoshiharu; Adachi, Keiichi; and Shishido, Tadao, to Fuji Photo Film Co., Ltd. High molecular weight mercapto compound in color diffusion transfer processing composition. 4,032,349, Cl. 96-77.000.
Sala Magnetics, Inc.: *See—*
Kolm, Henry H.; and Oberteuffer, John A., 4,032,114.
Salemme, Robert M., to General Electric Company. Preparation of microporous polycarbonate resin membranes. 4,032,309, Cl. 55-158.000.
Salvat Editores, S.A.: *See—*
Dalmau, Juan Salvat, 4,032,134.
Sambur, Marvin Robert, to Bell Telephone Laboratories, Incorporated. Speaker recognition arrangement. 4,032,711, Cl. 179-1.50B.
Samejima, Hiroshi, to Mitsubishi Petrochemical Co., Ltd. Curable resin compositions. 4,032,593, Cl. 260-835.000.
Samhammer, Clair A.; and Sullivan, James Patrick, to Samsonite Corporation. Lockable zipper closure. 4,031,723, Cl. 70-68.000.
Samsonite Corporation: *See—*
Samhammer, Clair A.; and Sullivan, James Patrick, 4,031,723.
Sanderford, M. Vincent: *See—*
Davis, Philip J.; and Sanderford, M. Vincent, 4,032,063.
Sanders, Art. Web process control apparatus. 4,031,752, Cl. 73-159.000.
Sanders, Frederick W., to Mead Corporation, The. Method for promoting reduction oxidation of electrolytically produced gas. 4,032,415, Cl. 204-78.000.
Sanders, Richard E. Game apparatus. 4,032,148, Cl. 273-120.00R.
Sandiford, Burton B.; and Knight, Robert K., to Union Oil Company of California. Plugging of water-producing zones in a subterranean formation. 4,031,958, Cl. 166-270.000.
Sandoz, Inc.: *See—*
Galantay, Eugene E., 4,032,580.
Hardtmann, Goetz E., 4,032,528.
Nadelson, Jeffrey, 4,032,644.
Spiegel, Rene; Gogerty, John H.; Loew, Dieter M.; and Eden, Phillip L., 4,032,637.
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Burkhard, Hermann; Entschel, Roland; and Steinemann, Willy, 4,032,532.
Egger, Helmut; and Reinshagen, Hellmuth, 4,032,530.
Fleck, Fritz; Kittl, Hans; and Valenti, Salvatore, 4,032,558.
Spiegel, Rene; Gogerty, John H.; Loew, Dieter M.; and Eden, Phillip L., 4,032,637.
Sanford, Arthur Carol. Combination wood and metal truss structure. 4,031,686, Cl. 52-693.000.
Sanford, Lawrence. Method and apparatus for testing and treating well formations. 4,031,957, Cl. 166-264.000.
Sangster, Arlon G.: *See—*
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Sano, Tomoharu: *See—*
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Sano, Yoshihiro: *See—*
Okamura, Masami; Aoki, Fumio; Sano, Yoshihiro; Makino, Junichi; Miki, Yoshiteru; Sasaki, Hiroshi; and Seo, Kazuo, 4,032,913.
Santillo, Derek Vivian Ivor: *See—*
Peden, John Richard; and Santillo, Derek Vivian Ivor, 4,032,161.
Santucci, Nicola, to Nuovo Pignone, S.p.A. Device for cutting the weft in a shuttleless loom having a continuous weft-supply mechanism. 4,031,925, Cl. 139-429.000.
Sanyo Electric Co., Ltd.: *See—*
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Schaming, Edward. Flatness monitoring system for strip material. 4,031,741, Cl. 73-37.700.
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Schenavar, Harold E. Road shock energy converter for charging vehicle batteries. 4,032,829, Cl. 320-61.000.
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Schmidt, Hans-Joachim, to Tekade Felten & Guilleaume Fernmeldeanlagen GmbH. Low loss frequency response corrective network. 4,032,866, Cl. 333-28.00R.
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Song, Won R.; Gardiner, John Brooke; and Engel, Lawrence James, to Exxon Research and Engineering Company. Process for the preparation of aminated polymers useful as additives for fuels and lubricants. 4,032,700, Cl. 526-43.000.
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Tanaka, Yoshimasa; Imai, Hirozo; Tsutsumi, Tadao; and Oda, Takeshi, to Matsushita Electric Works Ltd. Electric shaver with long hair trimmer. 4,031,617, Cl. 30-34.100.

Tanda, Toshikuni: *See—*
Irie, Toshio; Tanda, Toshikuni; Ichi, Tomoyuki; and Sadayori, Toshio, 4,032,675.

Tandrup, Leif Borge: *See—*
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Tange, Hiroshi: *See—*
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Tani, Tatsuo, formerly Nishikawa; Tatsumi, Susumu; Tanaka, Mitsuo; Ota, Sakae; and Midorikawa, Akira, to Ricoh Co., Ltd. Construction of electrophotographic copying machines with a cleaning unit for photosensitive surface. 4,032,229, Cl. 355-15.000.

Taniguchi, Hitoshi: *See—*
Obata, Shizuo; Yamato, Yukiomi; and Taniguchi, Hitoshi, 4,032,666.

Tanimura, Tomihiro. Amusement device. 4,032,141, Cl. 273-1.00L.

Tanner, John E., Jr.: *See—*
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Tantlinger, Keith W., to Rhor Industries, Inc. Floor slab to side wall joint structure for transit vehicle. 4,031,677, Cl. 52-262.000.

Tasaka, Akira; Hosaka, Hirokazu; and Dohgane, Iwao, to Sumitomo Chemical Company, Limited. Method for separation of m- or p-cresol. 4,032,581, Cl. 260-621.00B.

Tate & Lyle Limited: *See—*
James, Kenneth, 4,032,702.

Tatkov, Viktor Arsentievich; and Letov, Nikolai Nikolaevich. Centrifugal pump. 4,032,256, Cl. 415-198.100.

Tatsumi, Chuji; Hashimoto, Yukio; Terashima, Masabiko; and Matsuo, Takahal, to Fuji Oil Company, Ltd. Method for producing cacao butter substitute. 4,032,405, Cl. 195-82.000.

Tatsumi, Susumu: *See—*
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Teuszig, Julio G. Mechanism for the application and removal of a stylus wire on stencil material to be engraved. 4,032,930, Cl. 346-163.000.

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Taylor, Charles E.: *See—*
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Taylor, Michael P.: *See—*
Simons, F. Holmes; and Taylor, Michael P., 4,031,692.

Taylor, Paul H., to Tayco Developments, Inc. Energy absorber unit and energy management system. 4,031,978, Cl. 180-91.000.

Taylor, Robert E., to Taylor, Robert E.; and Schmidt, Aaron M. Container system for garage door opener. 4,032,009, Cl. 206-321.000.

Taywood Engineering Limited.: *See—*
Horner, Malcolm; Hodzic, Alija; and Haferkamp, Dirk, 4,032,402.

Tecnicas de Riego y Abono, S.A.: *See—*
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Tekade Felten & Guilleaume Fernmeldeanlagen GmbH: *See—*
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Teledyne, Inc.: *See—*
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Monagan, Elmer J., 4,032,879.
Wilkes, Thomas Jewel, 4,031,796.

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Trenary, John M., 4,032,707.

Telefonaktiebolaget L M Ericsson: *See—*
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Olsson, Gotthard Valentin, 4,032,380.

Templeton, Charles P. Sand picture frame. 4,031,643, Cl. 40-160.000.

Tennant Company: *See—*
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Tenneco Chemicals, Inc.: *See—*
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Tepas, Joseph J., Jr.; and Sangster, Arlon G., to Olin Corporation. Child-resistant cover for containers. 4,032,035, Cl. 220-318.000.

Terakawa, Minoru: *See—*
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Terayama, Fusaji; and Kozai, Tetsuo, to Morita Pump Kabushiki Kaisha. Braking device for ladder lifter. 4,031,980, Cl. 182-103.000.

Terry, Ruel C., to In Situ Technology, Inc. Method of recovering energy from subsurface petroleum reservoirs. 4,031,956, Cl. 166-261.000.

Tesa S.A.: *See—*
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Testa, James V. Self sealing cap for a collapsible tube. 4,032,051, Cl. 222-492.000.

Testone, Anthony Q., to Statics Inc. Method of making static electricity suppressor with patterned coating. 4,031,599, Cl. 29-25.410.

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Themelis, Nicholas John: *See—*
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Thermon Manufacturing Company: *See—*
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Theurer, Josef, to Franz Plasser Bahnbaumaschinen-Industrie-Gesellschaft m.b.H. Reference system for a track working machine. 4,031,625, Cl. 33-1.00Q.

Thiel, Heinz E. P. Solar heater. 4,031,881, Cl. 126-271.000.

Thomas, Christian: *See—*
Arvisenet, Jacques; Guery, Jean-Pierre; Olifant, Jacques; and Thomas, Christian, 4,032,823.

Thomas, Frank S. Magazine safety and ejector. 4,031,648, Cl. 42-70.00A.

Thomas, Herbert: *See—*
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Thomas Hill Engineering Co. (Hull) Ltd.: *See—*
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Thomas, Lorimer Phillip; and Walker, Robert Harold, to Burlington Industries, Inc. Noise suppression apparatus and method for false-twist texturing machines. 4,031,690, Cl. 57-1.00R.

Thomas, Reta Greenough. Title protector. 4,031,647, Cl. 40-359.000.

Thomas, Richard J.: *See—*
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Thomas, Wesley L. Split bolt and block game. 4,032,155, Cl. 273-156.000.

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Thompson, Geary S. Keyboard for a musical instrument. 4,031,800, Cl. 84-423.000.

Thompson, Richard D.; Thompson, Douglas; and Beeley, Micheal G., to McGraw-Edison Company. Method for vapor phase treating garments. 4,032,294, Cl. 8-116.400.

Thompson, Robert G.; and Gund, Heinz K., to Briggs & Stratton Corporation. Thermostatic automatic choke control for small engines. 4,031,872, Cl. 123-119.00F.

Thompson, Tom H. Disk brake construction having stamped support. 4,031,986, Cl. 188-72.400.

Thoraton-Trump, Walter E. Method for deicing aircraft. 4,032,090, Cl. 244-134.00C.

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Tiemann, Jerome J.: *See—*
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Ting, Wen C. Dental appliance. 4,031,908, Cl. 132-91.000.

Titze, Paul O. Fishing rod holder with automatic hook setter. 4,031,651, Cl. 43-15.000.

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Togei, Ryoiku; Takei, Akira; and Wada, Kunihiko, to Fujitsu Ltd. Process for producing semiconductor memory device utilizing selective diffusion of the polycrystalline silicon electrodes. 4,031,608, Cl. 29-578.000.

Tokico Ltd.: *See—*
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Tokyo Electric Power Co., Inc., The: *See—*
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Tokyo Shibaura Electric Co., Ltd.: *See—*
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Tomita, Kenichi; Shibuya, Toshiaki; Koshiba, Suzuko; and Itoi, Kazuo, to Shiseido Co., Ltd. Process for preparing 2,6,10,15,19,23-hexamethyltetracosane. 4,032,588, Cl. 260-676.00R.

Tomita, Koji; Tsukiura, Hiroshi; and Kawaguchi, Hiroshi, to Bristol-Myers Company. Fermentation process for producing apramycin and nebramycin factor V'. 4,032,404, Cl. 195-80.00R.

Tomita, Shinpei: *See—*
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Trebillon, Emile, to Rhone-Poulenc Industries. Method of obtaining primary alcohols with straight chains from C_4 hydrocarbon cuts. 4,032,582, Cl. 260-632.00D.

Trenary, John M., to Teledyoe Industries, Inc. Housing for battery-operated device. 4,032,707, Cl. 174-52.00R.

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Trost, Wayne C.; Darsie, Burns; and Trumpio, Frank P., to Barber-Colman Company. Vertically arranged triasial weaving machine. 4,031,922, Cl. 139-11.000.

Troy, Marion Frank; and Kamp, Ewald Albert, to Union Carbide Corporation. Linear apparatus for high speed production of air-laid non-woven webs. 4,032,274, Cl. 425-83.000.

Trudeau, Ronald E., to United States of America, Navy. Multimodal high pressure waveguide window. 4,032,868, Cl. 333-98.00P.

Trumpio, Frank P.: *See—*
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Tunekawa, Tokuichi: *See—*
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Tyer, Clarence C., Sr. Multi-chambered scrubber having polygonal cross-section. 4,032,075, Cl. 241-45.000.

Tyler, Darwin A. Fuel vaporizer. 4,031,875, Cl. 123-141.000.

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Ueda, Sadao. System for reproducing and recording a plurality of color originals. 4,032,969, Cl. 358-80.000.

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Yamada, Shiro. Artificial hair. 4,032,685, Cl. 428-399.000.
Yamagoshi, Tanoshi; Terakawa, Minoru; Shirahata, Aiiti; Sekiguchi, Sadao; Mishiba, Saburo; Shimamura, Takeshi; and Tajima, Shigeru, to Sumitomo Chemical Company, Limited. Thermoplastic resin composition. 4,032,597, Cl. 260-876.00R.
Yamamoto, Hisao: *See—*
Kaneko, Shinichi, deceased; Kobayashi, Tsuyoshi; Takebayashi, Yoshiaki; Inaba, Shigeho; and Yamamoto, Hisao, 4,032,573.
Yamamoto, Kazumasa: *See—*
Kobayashi, Teruo; and Yamamoto, Kazumasa, 4,032,286.
Yamamoto, Yoichi: *See—*
Takano, Rikuo; Ohota, Yutaka; Yamamoto, Yoichi; Sumitomo, Yuji; Kobayashi, Toshio; and Aiba, Masahiko, 4,032,924.
Yamamura, Kinzo: *See—*
Matsui, Kazumi; Umemori, Takashi; Shibata, Yutaka; Yamamura, Kinzo; Kimura, Tamisuke; and Kashiwara, Tomokaru, 4,031,990.
Yamashiro, Osamu; and Hatsukano, Yoshikazu, to Hitachi, Ltd. Electronic circuit having a misfet as an amplifying element. 4,032,864, Cl. 331-116.00R.
Yamato, Yukiomi: *See—*
Obata, Shizuo; Yamato, Yukiomi; and Taniguchi, Hitoshi, 4,032,666.
Yamazaki, Nobuo; Ito, Takeshi; Katsurada, Tetsuro; and Habara, Yasuhiko, to Fuji Jukogyo Kabushiki Kaisha. Heat insulating apparatus for exhaust pipe of an internal combustion engine. 4,031,700, Cl. 60-322.000.
Yant, Howard W.: *See—*
Froelich, Reinhard; and Yant, Howard W., 4,032,401.
Yarwood, John C.; Dore, James E.; and Preuss, Robert K., to Swiss Aluminium Ltd. Apparatus and method for in-line degassing and filtration of molten metal. 4,032,124, Cl. 266-218.000.
Yasuda, Hiroki; Sawafuji, Shuji; and Suzuki, Hitoshi, to Fuji Jukogyo Kabushiki Kaisha. Internal combustion engine combustion process. 4,031,867, Cl. 123-32.0ST.
Yasuda, Hirotsugu, to United States of America, Interior. Semipermeable membrane. 4,032,440, Cl. 210-23.00H.
Yokota, Yukio: *See—*
Inouye, Koro; Yokota, Yukio; Okumura, Akio; Kubodera, Seiiti; and Shiba, Keisuke, 4,032,345.
Yoshikawa, Toshio: *See—*
Minakawa, Masaaki; and Yoshikawa, Toshio, 4,032,125.
Yoshimura, Kiyotaka: *See—*
Asano, Shiro; Yoshimura, Kiyotaka; Tsuchiya, Ryoji; and Honda, Tadatoshi, 4,032,572.
Yoshinaga, Kunio: *See—*
Keshi, Akizo; Kodama, Katsuhisa; Takemura, Ichiro; Tairaka, Yoshihiko; and Yoshinaga, Kunio, 4,032,574.
Youmans, Arthur H.; and Lichtenberg, Heinz D., to Dresser Industries, Inc. Apparatus for logging inclined earth boreholes. 4,031,750, Cl. 73-151.000.
Young, Danny J., to Fair, James W., a part interest. Remote alarm monitoring and circuit control system. 4,032,907, Cl. 340-213.00R.
Young, Reginald S.: *See—*
Lawson, Robert; and Young, Reginald S., 4,032,308.
Young, Robert A., to Xonics, Inc. Method of using resonance atomic scattering of radiation to measure gaseous species. 4,032,786, Cl. 250-373.000.
Young, Ronald: *See—*
Stastny, Edwin; Rauch, Keith; and Young, Ronald, 4,031,634.
Young, Warren C.: *See—*
Boom, Roger W.; Moses, Ronald W., Jr.; Peterson, Harold A.; and Young, Warren C., 4,032,959.
Youtsey, Karl J.; and Sarazin, Richard G., to Universal Oil Products Company. Radiant heating panel. 4,032,751, Cl. 219-538.000.
Yukumoto, Toshitaka: *See—*
Miyoshi, Keisuke; and Yukumoto, Toshitaka, 4,032,968.
Zabcik, Clarence John. Automatic sequential dual action sealing system. 4,031,716, Cl. 64-23.000.
Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai: *See—*
Umezawa, Hamao; Takeuchi, Tomio; Takamatsu, Akira; and Mori, Shunro, 4,032,635.
Zapf, Gerhard; Albano-Muller, Lothar; Kiethe, Horst; and Roblig, Rainer, to Sintermetallwerk Krebsoege GmbH. Process for making metallic, molded composite bodies. 4,032,335, Cl. 75-208.00R.
Zedron, Inc.: *See—*
Georgia, Edward J.; Eggers, Russell K. H.; and Molnar, Ernest L., 4,031,937.
Zehnder, Gottlieb, to BBC Brown Boveri & Company Limited. Housing arrangement for a two-stage exhaust-gas turbocharger. 4,032,262, Cl. 417-409.000.
Zeman, Wayne P.: *See—*
Peters, Edward J.; and Zeman, Wayne P., 4,032,424.
Zenith Radio Corporation: *See—*
Podowski, Robert R., 4,032,891.
Schwartz, James W.; Gioia, Norman F.; and Gautier, Franklyn P., 4,032,811.
Zhuk, David Solomonovich; Gembitsky, Petr Alexandrovich; and Chmarin, Anatoly Ivanovich. Method of producing linear polyethylenimine. 4,032,480, Cl. 260-2.0EN.
Ziegler, Gunther; and Frohmader, Sigrun, to Siemens Aktiengesellschaft. Method for the manufacture of a superconductor with a superconductive intermetallic compound consisting of at least two elements. 4,031,609, Cl. 29-599.000.
Ziegler, Joseph, to Pennsylvania Engineering Corporation. Lance seal for converter vessel gas collecting hood. 4,032,119, Cl. 266-158.000.
Zies, Ray Keith: *See—*
Gilfillen, Lester Ray; Shipley, Edward Nicholas; and Zies, Ray Keith, 4,032,890.
Zilch, Horst E.; and Fischer, Paul W., to Union Oil Company of California. Inhibition of scale deposition in high temperature wells. 4,032,460, Cl. 252-8.55B.
Zinniger, Theodore C.; and Burke, Phillip J., to Kaiser Aluminum & Chemical Corporation. Cryogenic liquid containment method. 4,032,608, Cl. 264-46.600.
Zitting, Gordon T., to Poly Seal, Inc. Interference compression seal. 4,032,159, Cl. 277-145.000.
Zoecon Corporation: *See—*
Henrick, Clive A.; and Staal, Gerardus B., 4,032,564.
Zogg, Andreas: *See—*
Marti, Heinrich; Zogg, Andreas; and Hardegger, Oskar, 4,031,946.
Zollinger, Hans; and Honegger, Rolf, to Ruti Machinery Works Ltd. Loom with means for introducing the filling threads by means of a fluid. 4,031,926, Cl. 139-435.000.
Zucker, Edwin, to Xerox Corporation. Multiple range variable magnification reproduction machine using three-dimensional cam. 4,032,231, Cl. 355-60.000.
Zwettler, Ernest, to Pennwalt Corporation. Dental x-ray film processing system. 4,032,943, Cl. 354-312.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 28TH DAY OF JUNE, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Bausch & Lomb Incorporated: *See—*
Burns, Richard H.; and Welker, Helmut, Re. 29,281.
Burns, Richard H.; Hosack, Donald R.; and Welker, Helmut, Re. 29,282.

Burns, Richard H.; and Welker, Helmut, to Bausch & Lomb Incorporated. Measuring apparatus using the moire fringe concept of measurement. Re. 29,281, Cl. 356-169.000.

Burns, Richard H.; Hosack, Donald R.; and Welker, Helmut, to Bausch & Lomb Incorporated. Measuring apparatus using the moire fringe concept of measurement. Re. 29,282, Cl. 356-169.000.

Christini, Theodore Peter; Eustice, Albert Lawrence; and Graham, Arthur Hughes, to Du Pont de Nemours, E. I., and Company. Method for concomitant particulate diamond deposition in electroless plating, and the product thereof. Re. 29,285, Cl. 428-426.000.

Dunham-Bush, Inc.: *See—*
Shaw, David N., Re. 29,283.

Du Pont de Nemours, E. I., and Company: *See—*
Christini, Theodore Peter; Eustice, Albert Lawrence; and Graham, Arthur Hughes, Re. 29,285.

Eustice, Albert Lawrence: *See—*
Christini, Theodore Peter; Eustice, Albert Lawrence; and Graham, Arthur Hughes, Re. 29,285.

Fretwell, Jack W., Jr. Device for launching and dousing light sails such as spinnakers. Re. 29,279, Cl. 114-104.000.

Fukaya, Hirokazu; and Higashiyama, Naotoshi, to Nippon Electric Company, Limited. Power amplifier with a bootstrapped driver stage. Re. 29,286, Cl. 330-26.000.

Graham, Arthur Hughes: *See—*
Christini, Theodore Peter; Eustice, Albert Lawrence; and Graham, Arthur Hughes, Re. 29,285.

Harrington, Richard P.; and Harrington, Russell J. Combination lock. Re. 29,277, Cl. 70-25.000.

Harrington, Russell J.: *See—*
Harrington, Richard P.; and Harrington, Russell J., Re. 29,277.

Higashiyama, Naotoshi: *See—*
Fukaya, Hirokazu; and Higashiyama, Naotoshi, Re. 29,286.

Hosack, Donald R.: *See—*
Burns, Richard H.; Hosack, Donald R.; and Welker, Helmut, Re. 29,282.

McNabney, John C., to Trane Company, The. Air distribution regulator apparatus. Re. 29,280, Cl. 137-625.370.

Nippon Electric Company, Limited: *See—*
Fukaya, Hirokazu; and Higashiyama, Naotoshi, Re. 29,286.

Quintana, Leo J.: *See—*
Shaheen, Joseph M.; and Quintana, Leo J., Re. 29,284.

Rockwell International Corporation: *See—*
Shaheen, Joseph M.; and Quintana, Leo J., Re. 29,284.

Sargent Industries, Inc.: *See—*
Vogel, Rudi Richard, Re. 29,278.

Shaheen, Joseph M.; and Quintana, Leo J., to Rockwell International Corporation. Process for forming interconnections in a multilayer circuit board. Re. 29,284, Cl. 204-15.000.

Shaw, David N., to Dunham-Bush, Inc. Undercompression and overcompression free helical screw rotary compressor. Re. 29,283, Cl. 417-282.000.

Trane Company, The: *See—*
McNabney, John C., Re. 29,280.

Vogel, Rudi Richard, to Sargent Industries, Inc. Waste compacting apparatus. Re. 29,278, Cl. 100-52.000.

Welker, Helmut: *See—*
Burns, Richard H.; and Welker, Helmut, Re. 29,281.
Burns, Richard H.; Hosack, Donald R.; and Welker, Helmut, Re. 29,282.

LIST OF PLANT PATENTEES

Irwin, Lawrence T. Kalanchoe plant. 4,065, 6-28-77, Cl. 68.000.
Irwin, Lawrence T. Kalanchoe plant. 4,066, 6-28-77, Cl. 68.000.
Irwin, Lawrence T. Kalanchoe plant. 4,067, 6-28-77, Cl. 68.000.
Irwin, Lawrence T. Kalanchoe plant. 4,068, 6-28-77, Cl. 68.000.

LIST OF DESIGN PATENTEES

American Jet Industries: *See—*
Paulson, Allen E., 244,843.

Astley, John C. Animal tether. 244,870, 6-28-77, Cl. D30-44.000.

Atlas-Graham Industries Company Ltd.: *See—*
Graham, Joseph A.; Stephenson, Reginal M.; and Dewar, Donald D., 244,809.

Baca, Joseph B. Lamp. 244,875, 6-28-77, Cl. D48-20.00R.

Bachman, William John: *See—*
DiMeo, Franklin Roosevelt; and Bachman, William John, 244,866.

Bardoni, Thomas J.; and Markarian, William. Underwater belt and hose clip. 244,807, 6-28-77, Cl. D2-400.000.

Belaco International Ltd.: *See—*
Nevai, Bela B., 244,827.

Berkowitz, Florence. Combined hair roller and ornament. 244,881, 6-28-77, Cl. D28-37.000.

Bluestein, Bernard B., to Sunbeam Corporation. Coffeemaker water dispenser. 244,824, 6-28-77, Cl. D7-85.000.

Bolender, Raymond L., to Leland Engineering, Inc. Combined door and frame. 244,858, 6-28-77, Cl. D25-48.000.

Brand, Bridget A. Electronic sound producer for inducing sleep or the like. 244,878, 6-28-77, Cl. D24-99.000.

Branscum, Tony E.: *See—*
Havely, John E.; Buss, Kenton A.; Branscum, Tony E.; and Lewis, Kenneth D., 244,822.

Brooks, Donald Leslie William, to Ronson Corporation. Living hinge battery cover for electronic device. 244,864, 6-28-77, Cl. D13-10.000.

Buhk, Randall P., to Steelcase, Inc. Chair. 244,812, 6-28-77, Cl. D6-56.000.

Buhk, Randall P., to Steelcase, Inc. Chair. 244,813, 6-28-77, Cl. D6-56.000.

Burke, Frederick A.: *See—*
Long, Douglas A.; and Burke, Frederick A., 244,882.

Burley, William A.: *See—*
Halapin, Robert W.; and Burley, William A., 244,873.

Buss, Kenton A.: *See—*
Havely, John E.; Buss, Kenton A.; Branscum, Tony E.; and Lewis, Kenneth D., 244,822.

Carter, Howard Bryan, to Rosedale Plastics (Containers) Limited. Barrel. 244,832, 6-28-77, Cl. D9-170.000.

Champion International Corporation: *See—*
Hanson, Wallace E., 244,834.

Christen Incorporated: *See—*
Christen, Louis J., Jr., 244,819.

Christen, Louis J., Jr., to Christen Incorporated. Greenhouse potting bench. 244,819, 6-28-77, Cl. D6-179.000.

Clairol Incorporated: *See—*
Long, Douglas A.; and Burke, Frederick A., 244,882.

Classic Boats Inc.: *See—*
Granata, Peter C., Jr., 244,842.

Cordell, Carl R., Jr. Compartmented storage box primarily for fishing lures. 244,853, 6-28-77, Cl. D22-14.000.

D'Amato, Michael John, to Harvey Hubbell, Incorporated. Housing for an electrical plug. 244,861, 6-28-77, Cl. D13-24.000.

Dewar, Donald D.: *See—*
Graham, Joseph A.; Stephenson, Reginal M.; and Dewar, Donald D., 244,809.

DiMeo, Franklin Roosevelt; and Bachman, William John, to RCA Corporation. Insulator for an antenna. 244,866, 6-28-77, Cl. D14-90.000.

Doman, Donald W., to Kohler Co. Bath tub. 244,855, 6-28-77, Cl. D23-55.000.

Dotson, Frances E. Carryall bag. 244,884, 6-28-77, Cl. D87-3.00C.

Duni-Bila AB: *See—*
Persson, Karl Rune, 244,833.

E.T.E. - Electronic Telephone Equipment, S.r.l.: *See—*
Todeschini, Sergio, 244,848.
Todeschini, Sergio, 244,849.

Fieni, Walter, to Societe Anonyme Francaise du Ferodo. Memo paper holder. 244,852, 6-28-77, Cl. D19-92.000.

Freeman, Leroy C. Combined TV, stereo and accessory cabinet. 244,820, 6-28-77, Cl. D6-186.000.

General Electric Company: *See—*
Grieb, Joan, 244,831.

GKN Kent Alloys Limited: *See—*
Woodward, Richard W., 244,845.
Woodward, Richard W., 244,846.
Woodward, Richard W., 244,847.

Gott Mfg. Co., Inc.: *See—*
Havely, John E.; Buss, Kenton A.; Branscum, Tony E.; and Lewis, Kenneth D., 244,822.

Graham, Joseph A.; Stephenson, Reginal M.; and Dewar, Donald D., to Atlas-Graham Industries Company Ltd. Brush. 244,809, 6-28-77, Cl. D4-31.000.

Granata, Peter C., Jr., to Classic Boats Inc. Boat deck or the like. 244,842, 6-28-77, Cl. D12-70.000.

Grieb, Joan, to General Electric Company. Wall plate. 244,831, 6-28-77, Cl. D8-350.000.

GSE, Inc.: *See—*
Lehoczky, Kenneth A.; and Rigdon, Thomas C., 244,829.

Guth, Gordon: *See—*
Haufe, David K.; and Guth, Gordon, 244,856.

Halapin, Robert W.; and Burley, William A. Elevated path-way educational game device. 244,873, 6-28-77, Cl. D34-5.0SS.

Hansen, Richard Ellwood: *See—*
Smith, David Rolfe; and Hansen, Richard Ellwood, 244,863.

Hanson, Wallace E., to Champion International Corporation. Carton blank. 244,834, 6-28-77, Cl. D9-245.000.

Harvey Hubbell, Incorporated: *See—*
D'Amato, Michael John, 244,861.
Jaconette, Frank Carmine, 244,859.
Jaconette, Frank Carmine, 244,860.

Hattori, Yasuo; Sakurada, Masahiko; and Miyaji, Kazumi, to Olympus Optical Co., Ltd. Micro-cassette adapter. 244,868, 6-28-77, Cl. D14-10.000.

Haufe, David K.; and Guth, Gordon, to Sunbeam Corporation. Housing for air circulating and treating appliance. 244,856, 6-28-77, Cl. D23-141.000.

Havely, John E.; Buss, Kenton A.; Branscum, Tony E.; and Lewis, Kenneth D., to Gott Mfg. Co., Inc. Insulated food chest. 244,822, 6-28-77, Cl. D7-77.000.

Hayes, Roger. Sphygmomanometer stand. 244,857, 6-28-77, Cl. D24-21.000.

Hewlett-Packard Company: *See—*
Mathis, Barry R., 244,862.

Huntington, Robert R.; and Schaefer, Henry A. Housing for a radio receiver. 244,867, 6-28-77, Cl. D14-68.000.

International Business Machines Corporation: *See—*
Kneale, Collan B.; and Wilkey, Frank, Jr., 244,865.

International Silver Company: *See—*
King, Robert J., 244,825.
King, Robert J., 244,826.

Ivac Corporation: *See—*
Manno, Joseph J., 244,879.

Jaconette, Frank Carmine, to Harvey Hubbell, Incorporated. Housing for an electrical plug. 244,859, 6-28-77, Cl. D13-24.000.

Jaconette, Frank Carmine, to Harvey Hubbell, Incorporated. Housing for an electrical plug. 244,860, 6-28-77, Cl. D26-1.00A.

Johnson, Darlene: *See—*
Manley, Paul; and Johnson, Darlene, 244,869.

Jurgensen, Horst: *See—*
Thingstad, Hans Kristian; and Jurgensen, Horst, 244,837.

King, Robert J., to International Silver Company. Article of flatware. 244,825, 6-28-77, Cl. D7-137.000.

King, Robert J., to International Silver Company. Article of flatware. 244,826, 6-28-77, Cl. D7-137.000.

Kneale, Collan B.; and Wilkey, Frank, Jr., to International Business Machines Corporation. Magnetic tape cartridge transport. 244,865, 6-28-77, Cl. D14-6.000.

Kohler Co.: *See—*
Doman, Donald W., 244,855.

Lass, Abram L. Ice bucket. 244,823, 6-28-77, Cl. D7-78.000.

LeBreux, Frank L. Combined planter and light fixture to be used in fireplaces or the like. 244,838, 6-28-77, Cl. D11-144.000.

Lehoczky, Kenneth A.; and Rigdon, Thomas C., to GSE, Inc. Electronic torque wrench. 244,829, 6-28-77, Cl. D8-24.000.

Leland Engineering, Inc.: *See—*
Bolender, Raymond L., 244,858.

Lewis, Kenneth D.: *See—*
Havely, John E.; Buss, Kenton A.; Branscum, Tony E.; and Lewis, Kenneth D., 244,822.

Libella Tool AB: *See—*
Thingstad, Hans Kristian; and Jurgensen, Horst, 244,837.

Lighting Systems, Inc.: *See—*
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Lombardi, David E. Attachable putting guide for golf putters. 244,874, 6-28-77, Cl. D34-5.0CB.

Long, Douglas A.; and Burke, Frederick A., to Clairol Incorporated. Dryer attachments. 244,882, 6-28-77, Cl. D28-18.000.

Malkin, Robert S. Plant balling device. 244,839, 6-28-77, Cl. D11-148.000.

Manley, Paul; and Johnson, Darlene. Animal leash. 244,869, 6-28-77, Cl. D30-39.000.

Manno, Joseph J., to Ivac Corporation. Sphygmomanometer sensor and cuff coupling mechanism. 244,879, 6-28-77, Cl. D24-29.000.

Markarian, William: *See—*
Bardoni, Thomas J.; and Markarian, William, 244,807.

Masuyama, Kazuo, to Sunpack Corporation. Photographic camera. 244,851, 6-28-77, Cl. D16-6.000.

Mathis, Barry R., to Hewlett-Packard Company. Casing for an electronic calculator. 244,862, 6-28-77, Cl. D64-11.00B.

McLaughlin, John J. Wall mounted radio, tape player, clock and dual speaker unit. 244,877, 6-28-77, Cl. D14-73.000.

Miyaji, Kazumi: *See—*
Hattori, Yasuo; Sakurada, Masahiko; and Miyaji, Kazumi, 244,868.

Nescher, Bruce E. Tunnel hull power boat. 244,841, 6-28-77, Cl. D12-62.000.

Nevai, Bela B., to Belaco International Ltd. Cleaning and draining device. 244,827, 6-28-77, Cl. D7-188.000.

Olympus Optical Co., Ltd.: *See—*
Hattori, Yasuo; Sakurada, Masahiko; and Miyaji, Kazumi, 244,868.

Overman AB: *See—*
Schoblom, Svante, 244,814.

Pace Collection, Inc., The: *See—*
Schweitzer, Janet, 244,817.
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Patterson, Chad W. Jewelry caddy. 244,810, 6-28-77, Cl. D6-28.000.

Paulson, Allen E., to American Jet Industries. Airplane. 244,843, 6-28-77, Cl. D12-71.000.

Persson, Karl Rune, to Duni-Bila AB. Folding carton. 244,833, 6-28-77, Cl. D9-235.000.

Pierce, Charles William. Holder for cylindrical container. 244,816, 6-28-77, Cl. D6-114.000.

Pierson, Max D. Coin purse. 244,885, 6-28-77, Cl. D87-3.00B.

Pomerantz, Julie. Coaster. 244,821, 6-28-77, Cl. D7-45.000.

Pryor, Barbara. Shoe puller. 244,806, 6-28-77, Cl. D2-378.200.

RCA Corporation: *See—*
DiMeo, Franklin Roosevelt; and Bachman, William John, 244,866.

Reynolds Metals Company: *See—*
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Rigdon, Thomas C.: *See—*
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Ubermuth, Ernest F., 244,808.

Rohrmuller, August. Purse hanger or similar article. 244,883, 6-28-77, Cl. D87-2.00R.

Ronson Corporation: *See—*
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Rosedale Plastics (Containers) Limited: *See—*
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Sakurada, Masahiko: *See—*
Hattori, Yasuo; Sakurada, Masahiko; and Miyaji, Kazumi, 244,868.

Salamone, Dante A. Catch basin grate. 244,854, 6-28-77, Cl. D23-42.000.

Schaefer, Henry A.: *See—*
Huntington, Robert R.; and Schaefer, Henry A., 244,867.

Schoblom, Svante, to Overman AB. Seat. 244,814, 6-28-77, Cl. D6-71.000.

Schweitzer, Janet, to Pace Collection, Inc., The. Shelf for a wall system. 244,817, 6-28-77, Cl. D6-132.000.

Schweitzer, Janet, to Pace Collection, Inc., The. Shelf for a wall system. 244,818, 6-28-77, Cl. D6-132.000.

Sheth, Harshadrai D. Electronic hour glass clock. 244,835, 6-28-77, Cl. D10-15.000.

Smith, David Rolfe; and Hansen, Richard Ellwood, to Tektronix, Inc. Keyboard module. 244,863, 6-28-77, Cl. D14-45.000.

Snow, Bill D. Cot. 244,815, 6-28-77, Cl. D6-79.000.

Societe Anonyme Francaise du Ferodo: *See—*
Fieni, Walter, 244,852.

Staley, Charles Wesley. Football hoop target or the like. 244,872, 6-28-77, Cl. D34-5.0PP.

Steelcase, Inc.: *See—*
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Buhk, Randall P., 244,813.

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Graham, Joseph A.; Stephenson, Reginal M.; and Dewar, Donald D., 244,809.

Sternfield, Jonathan Samuel. Chair. 244,811, 6-28-77, Cl. D6-56.000.

Stockton, Bruce H. Sine wave template. 244,836, 6-28-77, Cl. D10-64.000.

Stokes, Wilton. Boat. 244,840, 6-28-77, Cl. D12-62.000.

Sunbeam Corporation: *See—*
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Tektronix, Inc.: *See—*
Smith, David Rolfe; and Hansen, Richard Ellwood, 244,863.

Terry, Barbara J. Spray mask. 244,880, 6-28-77, Cl. D29-8.000.

Thingstad, Hans Kristian; and Jurgensen, Horst, to Libella Tool AB. Level. 244,837, 6-28-77, Cl. D10-69.000.

Todeschini, Sergio, to E.T.E. - Electronic Telephone Equipment, S.r.l. Telephone set, or similar article. 244,848, 6-28-77, Cl. D14-56.000.

Todeschini, Sergio, to E.T.E. - Electronic Telephone Equipment, S.r.l. Telephone set, or similar article. 244,849, 6-28-77, Cl. D14-56.000.

Tulak, Richard F. Stop for windows, doors and the like. 244,830, 6-28-77, Cl. D8-402.000.

Ubermuth, Ernest F., to Risdon Manufacturing Company, The. Plastic spool for thread or the like. 244,808, 6-28-77, Cl. D3-19.00A.

Vetter, Craig W., to Vetter Design Works, Inc. Motorcycle sidecar coach. 244,844, 6-28-77, Cl. D12-116.000.

Vetter Design Works, Inc.: *See—*
Vetter, Craig W., 244,844.

Vincenti, Aldo A. Massager-exerciser for neck and back. 244,871, 6-28-77, Cl. D24-36.000.

Visco, Luigi P. Blade assembly for cutting shears. 244,828, 6-28-77, Cl. D8-5.000.

Wilkey, Frank, Jr.: *See—*
Kneale, Collan B.; and Wilkey, Frank, Jr., 244,865.

Wilson, Calvin L., to Reynolds Metals Company. Beverage dispensing container or similar article. 244,850, 6-28-77, Cl. D15-112.000.

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CLASSIFICATION OF PATENTS

ISSUED JUNE 28, 1977

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2
9 4,031,564
78 R 4,031,565
104 4,031,566
204 4,031,567
406 4,031,568

CLASS 3
1 4,031,569
1.912 4,031,570
1.913 4,031,571

CLASS 4
111 4,031,572
164 4,031,573
213 4,031,574
239 4,031,575
251 4,031,576

CLASS 5
17 4,031,577
337 4,031,578
355 4,031,579

CLASS 8
34 4,032,291
111 4,032,292
116.4 4,032,294
129 4,032,293

CLASS 9
2 A 4,031,580
8 P 4,031,582
8 R 4,031,581
14 4,031,583

CLASS 10
89 H 4,031,584

CLASS 11
1 A 4,031,585

CLASS 12
145 4,031,586

CLASS 13
10 4,032,704
32 4,032,705

CLASS 15
104.17 4,031,590
167 R 4,031,587
171 4,031,588
248 R 4,031,589

CLASS 17
1 E 4,031,591
33 4,031,592

CLASS 19
.27 4,031,593

CLASS 23
253 PC 4,032,296
254 E 4,032,297
260 4,032,298
288 B 4,032,299
4,032,300

CLASS 24
20 EE 4,031,594

CLASS 26
18.6 4,031,596

CLASS 29
25.16 4,031,597
25.19 4,031,598
25.41 4,031,599
118 4,031,600
156.8 B 4,031,601
157.3 AH 4,031,602
427 4,031,603
429 4,031,604
460 4,031,605
570 4,031,606
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625 4,031,612
628 4,031,613
630 A 4,031,614
630 R 4,031,615

CLASS 30
2 4,031,616
34.1 4,031,617
41.5 4,031,618
180 4,031,619
262 4,031,621
346.57 4,031,620
392 4,031,622

CLASS 32
8 4,031,623
62 4,031,624

CLASS 33
1 Q 4,031,625
17 R 4,031,626
85 4,031,627
178 R 4,031,632
201 4,031,628
288 4,031,633
290 4,031,629
356 4,031,630

CLASS 34
235 4,031,631

CLASS 35
8 A 4,031,634
20 4,031,635
48 A 4,031,636

CLASS 37
2 R 4,031,637

CLASS 38
77.2 4,031,638
143 4,031,639

CLASS 40
2.2 4,031,640
63 A 4,031,641
68.6 4,031,645
104 A 4,031,644
111 4,031,642
160 4,031,643
359 4,031,646
4,031,647

CLASS 42
70 A 4,031,648
70 F 4,031,649

CLASS 43
12 4,031,650
15 4,031,651
43.12 4,031,652
61 4,031,653
114 4,031,654

CLASS 44
70 4,032,303
4,032,304

CLASS 46
52 4,031,655
53 4,031,656
142 4,031,657
191 4,031,658
202 4,032,295
204 4,031,659
228 4,031,660
249 4,031,661
257 4,031,662

CLASS 47
66 4,031,663

CLASS 48
73 4,032,305

CLASS 49
409 4,031,664
501 4,031,665

CLASS 51
105 R 4,031,667
137 4,031,668
142 4,031,669
250 4,031,670
263 4,031,671
288 4,031,672
385 4,031,673
419 4,031,666

CLASS 52
2 4,031,674
36 4,031,675
102 4,031,676
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285 4,031,678
294 4,031,679
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408 4,031,681
434 4,031,682
536 4,031,683
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653 4,031,685
693 4,031,686
742 4,031,687

CLASS 53
7 4,031,688
370 4,031,689

CLASS 55
17 4,032,306
96 4,032,307
4,032,308
158 4,032,309
276 4,032,310
385 C 4,032,311

CLASS 56
202 4,031,694
237 4,031,695
295 4,031,696

CLASS 57
1 R 4,031,690
34 R 4,031,691
140 R 4,031,692

CLASS 58
33 4,031,693

CLASS 60
39.55 4,031,697
251 4,031,698
282 4,031,699
322 4,031,700
325 4,031,701
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398 4,031,702
519 4,031,703
615 4,031,705
644 4,031,706

CLASS 61
1 F 4,031,707
41 R 4,031,708
106 4,031,709

CLASS 62
171 4,031,710
261 4,031,711
483 4,031,712
498 4,032,312

CLASS 64
2 P 4,031,713
12 4,031,714
15 B 4,031,715
23 4,031,716

CLASS 65
1 4,032,313
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32 4,032,315
41 4,032,316
161 4,032,317

CLASS 66
84 R 4,031,717
154 A 4,031,718

CLASS 70
25 Re.29,277
56 4,031,719
58 4,031,720
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63 4,031,722
68 4,031,723
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226 4,031,726
232 4,031,727
252 4,031,728
380 4,031,729
419 4,031,730

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9 4,032,318
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90 4,032,320
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93 4,032,324
95 4,032,325
96 4,032,326

CLASS 72
37 4,031,731
60 4,031,732
166 4,031,733
367 4,031,745
368 4,031,734
394 4,031,735
422 4,031,736
456 4,031,737
478 4,031,738

CLASS 73
5 4,031,739
15 B 4,031,740
37.7 4,031,741
40.7 4,031,742
67.2 4,031,744
67.8 R 4,031,743
95 4,031,746
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147 4,031,748
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155 4,031,751
159 4,031,752
170 R 4,031,753
188 4,031,754
189 4,031,755
4,031,756
194 VS 4,031,757
205 D 4,031,758
432 R 4,031,759
460 4,031,760

CLASS 74
15.63 4,031,761
4,031,762
50 4,031,763
57 4,031,764
4,031,765
231 J 4,031,766
4,031,767
233 4,031,768
243 DR 4,031,769
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479 4,031,771
501 M 4,031,772
501.5 R 4,031,773
547 4,031,774
551.9 4,031,775
567 4,031,776
569 4,031,777
571 L 4,031,778
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711 4,031,780
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866 4,031,782

CLASS 75
72 4,032,327
84.1 R 4,032,328
84.5 4,032,329
101 R 4,032,330
108 4,032,331
4,032,332
124 4,032,333
128 C 4,032,334
208 R 4,032,335
224 4,032,336
226 4,032,337
240 4,032,302

CLASS 81
9.22 4,031,783
57.39 4,031,784
4,031,785

CLASS 83
140 4,031,787
380 4,031,788
404.2 4,031,789
425.4 4,031,790
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601 4,031,792
788 4,031,793
829 4,031,794

CLASS 84
1.03 4,031,786
1.25 4,031,795
20 4,031,796
291 4,031,798
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423 4,031,800
465 4,031,801
470 4,031,797

CLASS 85
11 4,031,802
13 4,031,803

CLASS 86
23 4,031,804

CLASS 89
1.5 G 4,031,805
1.811 4,031,806
36 K 4,031,807
163 4,031,808

CLASS 90
11 A 4,031,810
11 C 4,031,809

CLASS 91
39 4,031,811
224 4,031,812
433 4,031,813

CLASS 92
63 4,031,814

CLASS 93
33 H 4,031,815
36 A 4,031,816
44.1 R 4,031,817
63 R 4,031,818

CLASS 96
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4,032,339
27 E 4,032,341
27 H 4,032,340
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38.3 4,032,343
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60 R 4,032,348
77 4,032,349

CLASS 98
115 R 4,031,819

CLASS 99
336 4,031,820
643 4,031,821

CLASS 100
52 Re.29,278

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53 4,031,822
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126 4,031,824
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89 R 4,031,828

CLASS 104
172 S 4,031,829
223 4,031,830

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90 4,032,353
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273 N 4,032,355
287 R 4,032,356
288 Q 4,032,357
311 4,032,358

CLASS 108
159 4,031,831

CLASS 111
4 4,031,832
7.1 4,031,833
85 4,031,834

CLASS 112
76 4,031,835

CLASS 113
1 F 4,031,836
121 C 4,031,837

CLASS 114
1 4,031,838
51 4,031,840
67 A 4,031,841
104 Re.29,279
144 C 4,031,842
247 4,031,843
270 4,031,839

CLASS 115
12 R 4,031,844
39 4,031,846

CLASS 116
34 R 4,031,845
65 4,031,847
114 AH 4,031,848
124 L 4,031,849
135 4,031,850

CLASS 118
49.1 4,031,851
52 4,031,852
264 4,031,853
641 4,031,854

CLASS 119
2 4,031,855
51 R 4,031,856
56 R 4,031,857
103 4,031,858
106 4,031,859

CLASS 122
240 B 4,031,860
327 4,031,861
421 4,031,862
479 R 4,031,863

CLASS 123
1 A 4,031,864
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32 EB 4,031,866
32 ST 4,031,867
78 B 4,031,868
117 A 4,031,869
119 A 4,031,871
4,031,873
119 F 4,031,872
119 R 4,031,870
134 4,031,874
141 4,031,875
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195 A 4,031,877

CLASS 125
21 4,031,878

CLASS 126
271 4,031,879
4,031,880
4,031,881

CLASS 128
2.05 R 4,031,884
2.08 4,031,885
2.1 B 4,031,883
2.1 R 4,031,882
130 4,031,886
142 R 4,031,887
145 A 4,031,888
214 R 4,031,891
215 4,031,889
4,031,890
218 F 4,031,893
218 M 4,031,892
268 4,031,894
272.1 4,031,895

276 4,031,896
286 4,031,897
303.1 4,031,898
419 PS 4,031,899
493 4,031,900

CLASS 130

27 T 4,031,901

CLASS 131

17 R 4,031,902
109 B 4,031,903
173 4,031,904
4,031,905
4,031,906

CLASS 132

40 4,031,907
91 4,031,908
4,031,909

CLASS 134

3 4,032,359
4,032,360
19 4,032,361
38 4,032,362
167 C 4,031,910

CLASS 136

211 4,032,363

CLASS 137

3 4,031,911
5 4,031,912
170.1 4,031,913
247.51 4,031,914
529 4,031,915
561 A 4,031,916
613 4,031,917
625.23 4,031,918
625.37 Re.29,280
799 4,031,919

CLASS 138

31 4,031,920
140 4,031,921

CLASS 139

11 4,031,922
97 4,031,923
336 4,031,924
429 4,031,925
435 4,031,926
436 4,031,927
452 4,031,928

CLASS 141

207 4,031,930

CLASS 144

83 4,031,931
117 R 4,031,932
198 R 4,031,933
218 4,031,934

CLASS 148

1.5 4,032,364
12 R 4,032,365
31.5 4,032,366
38 4,032,367
134 4,032,368
143 4,032,369
171 4,032,370
4,032,371
175 4,032,372
4,032,373

CLASS 149

19.8 4,032,374
41 4,032,375
60 4,032,376
105 4,032,377

CLASS 151

37 4,031,936
41.76 4,031,935

CLASS 152

9 4,031,937
209 R 4,031,938
213 R 4,031,939
362 R 4,031,940

CLASS 156

49 4,032,380
51 4,032,381
73.2 4,032,382
79 4,032,383
137 4,032,384
252 4,032,385
475 4,032,386
497 4,032,387
568 4,032,388
601 4,032,389
608 4,032,390
645 4,032,378
659 4,032,379

CLASS 157

1.17 4,031,941

CLASS 159

47 R 4,032,391

CLASS 160

103 4,031,942
330 4,031,943
331 4,031,944

CLASS 162

155 4,032,392
159 4,032,393
164 R 4,032,394

CLASS 164

72 4,031,945
89 4,031,946
114 4,031,947
281 H 4,031,948
283 M 4,031,949

CLASS 165

31 4,031,950
103 4,031,951
104 S 4,031,952
166 4,031,953

CLASS 166

117.5 4,031,954
183 4,031,955
261 4,031,956
264 4,031,957
270 4,031,958
307 4,031,959
317 4,031,960

CLASS 169

47 4,031,961

CLASS 171

8 4,031,962

CLASS 172

4 4,031,963
9 4,031,964
311 4,031,965
794 4,031,966
795 4,031,967
801 4,031,968

CLASS 174

52 PE 4,032,706
52 R 4,032,707
84 R 4,032,708

CLASS 175

65 4,031,969
103 4,031,970
107 4,031,971
263 4,031,972
320 4,031,973
334 4,031,974

CLASS 176

19 LD 4,032,395
38 4,032,396
4,032,397
43 4,032,398
62 4,032,399
67 4,032,400
86 R 4,032,401
87 4,032,402

CLASS 178

50 4,032,709

CLASS 179

1 SA 4,032,710
1.5 B 4,032,711
6 R 4,032,712
4,032,713
15 A 4,032,720
15 AA 4,032,718
15 AS 4,032,719
15 BA 4,032,714
15 BF 4,032,716
15 BT 4,032,715
4,032,717
18 BB 4,032,722
18 ES 4,032,721
41 A 4,032,723
99 4,032,724
146 R 4,032,725
170 G 4,032,726
178 4,032,727

CLASS 180

6.48 4,031,975
14 R 4,031,976
77 R 4,031,977
91 4,031,978

CLASS 181

69 4,031,979

CLASS 182

103 4,031,980
153 4,031,981

CLASS 187

8.59 4,031,982

CLASS 188

32 4,031,983
59 4,031,984
71.9 4,031,985
72.4 4,031,986
75 4,031,987
250 B 4,031,988
299 4,031,989

CLASS 191

63 4,031,990

CLASS 194

1 R 4,031,991

CLASS 195

31 R 4,032,403
51 S 4,032,408
80 R 4,032,404
82 4,032,405
103.5 R 4,032,406
127 4,032,407

CLASS 197

1 R 4,031,992
6.6 4,031,993
70 4,031,994
138 A 4,031,995
176 4,031,996

CLASS 198

301 4,031,997
365 4,031,998
418 4,031,999
428 4,032,000
711 4,032,001
808 4,032,002
855 4,032,003

CLASS 200

5 A 4,032,728
4,032,729
11 DA 4,032,730
16 B 4,032,731
50 A 4,032,732
61.45 R 4,032,733
67 DA 4,032,734
68 4,032,735
147 R 4,032,736
148 R 4,032,737
157 4,032,738
283 4,032,739

CLASS 202

158 4,032,410
248 4,032,409

CLASS 203

14 4,032,411
22 4,032,412

CLASS 204

14 N 4,032,413
15 Re.29,284
4,032,414
78 4,032,415
79 4,032,416
98 4,032,417
130 4,032,418
157.1 R 4,032,419
181 4,032,420
196 4,032,421
224 R 4,032,422
254 4,032,423
258 4,032,424
261 4,032,425
268 4,032,426
283 4,032,427
294 4,032,653

CLASS 206

39.6 4,032,004
45.14 4,032,005
45.19 4,032,006
173 4,032,007
321 4,032,009
345 4,032,010
379 4,032,008
386 4,032,011
574 4,032,012

CLASS 208

8 4,032,428
10 4,032,429
39 4,032,430
62 4,032,431
70 4,032,432
112 4,032,433
139 4,032,434
216 4,032,435

CLASS 209

1 4,032,436
17 4,032,437

CLASS 210

4,032,439
19 4,032,438
23 H 4,032,440
63 R 4,032,441
82 4,032,442
4,032,443
86 4,032,444
103 4,032,445
152 4,032,446
168 4,032,447
170 4,032,448
173 4,032,449
230 4,032,450
232 4,032,451
243 4,032,452
266 4,032,453
323 R 4,032,454
435 4,032,455
474 4,032,456
489 4,032,457

CLASS 211

13 4,032,013
49 R 4,032,014

CLASS 212

49 4,032,016

CLASS 213

61 4,032,017

CLASS 214

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4,032,020
1 QG 4,032,019
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8.5 F 4,032,021
16.4 R 4,032,023
16.6 4,032,027
35 R 4,032,024
138 R 4,032,025
152 4,032,026
767 4,032,015

CLASS 215

217 4,032,028
256 4,032,029

CLASS 219

10.77 4,032,740
69 V 4,032,741
99 4,032,742
121 LM 4,032,743
121 P 4,032,744
203 4,032,745
216 4,032,746
222 4,032,747
275 4,032,748
442 4,032,749
464 4,032,750
538 4,032,751
541 4,032,752

CLASS 220

3.8 4,032,030
85 R 4,032,031
94 R 4,032,032
266 4,032,034
318 4,032,035
324 4,032,036
335 4,032,037

CLASS 221

71 4,032,038
75 4,032,039

CLASS 222

1 4,032,040
14 4,032,041
20 4,032,042
92 4,032,043
135 4,032,044
146 HE 4,032,045
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183 4,032,047
185 4,032,048
238 4,032,049
284 4,032,050
492 4,032,051

CLASS 223

46 4,032,052

CLASS 224

29 B 4,032,054
45 AB 4,032,053

CLASS 226

76 4,032,055
154 4,032,056

CLASS 228

56 4,032,057
180 A 4,032,058
183 4,032,059
200 4,032,033

CLASS 229

14 BA 4,032,060
17 R 4,032,061
20 4,032,062
23 C 4,032,063
55 4,032,064
69 4,032,065

CLASS 233

26 4,032,066

CLASS 235

61.6 M 4,032,753
78 R 4,032,754
92 CC 4,032,755
92 PB 4,032,756
150.2 4,032,757
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152 4,032,762
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4,032,764
153 AM 4,032,765
153 AS 4,032,766
197 4,032,768

CLASS 236

34.5 4,032,067
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46 R 4,032,069
92 B 4,032,070
101 E 4,032,071

CLASS 239

11 4,032,072
142 4,032,073
684 4,031,929
685 4,032,074

CLASS 240

1.3 4,032,769
1.4 4,032,771
4 4,032,770
6.45 R 4,032,772
10.6 R 4,032,773
73 LD 4,032,774
73 R 4,032,775

CLASS 241

45 4,032,075

CLASS 242

25 A 4,032,076
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107.4 B 4,032,081

CLASS 243

19 4,032,082

CLASS 244

17.13 4,032,083
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100 A 4,032,088
123 4,032,089
134 C 4,032,090
135 R 4,032,091
137 R 4,032,092
180 4,032,093
194 4,032,094
214 4,032,087

CLASS 246

442 4,032,095

CLASS 248

73 4,032,096
146 4,032,097
165 4,032,098
188.2 4,032,099
211 4,032,100
225.4 4,032,101
318 4,032,102
421 4,032,103

CLASS 249

114 4,032,104
134 4,032,105

CLASS 250

201 4,032,776
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237 G 4,031,595
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414 4,032,788
445 T 4,032,789
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483 4,032,791

CLASS 251

144 4,032,106
296 4,032,107
306 4,032,108

CLASS 252

8.55 B 4,032,460
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301.4 R 4,032,471
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522 4,032,478

CLASS 254

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138 4,032,113

CLASS 259

4 R 4,032,114
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69 4,032,116
108 4,032,117
122 4,032,118

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2.5 AN 4,032,485
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4 AR 4,032,486
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29.6 TA 4,032,496
30.6 R 4,032,498
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40 P 4,032,503
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837 PV 4,032,594
857 PE 4,032,595
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134 AT 4,032,153
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218 4,032,796
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45 4,032,824
139 4,032,825
314 4,032,826
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6 4,032,836
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19 4,032,838
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60 CD 4,032,841
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CLASS 325

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16 4,032,845
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29 4,032,854
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94.5 C 4,032,861
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70 T 4,032,867
98 P 4,032,868

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278 4,032,879

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41 A 4,032,883
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147 C 4,032,890
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166 R 4,032,892
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173 DR 4,032,904
173 FF 4,032,902
173 NC 4,032,901
173 R 4,032,903
174 TF 4,032,905
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29 4,032,935
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155 4,032,938
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3 P 4,032,226
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60 4,032,231
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78 4,032,833
128 4,032,834

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4,032,900
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248.54 4,032,638
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CLASS 427		CLASS 428		309	4,032,682	CLASS 429		12	4,032,285	CLASS 526	
8	4,032,670	1	4,032,687	315	4,032,683	17	4,032,693	76	4,032,286	14	4,032,698
14	4,032,671	36	4,032,688	332	4,032,684	33	4,032,694	175	4,032,287	18	4,032,699
34	4,032,672	42	4,032,679	399	4,032,685	94	4,032,695	CLASS 432		43	4,032,700
54	4,032,673	55	4,032,689	425	4,032,686	101	4,032,696	189	4,032,288	88	4,032,701
126	4,032,675	119	4,032,680	426	Re.29,285	222	4,032,697	200	4,032,289	163	4,032,703
130	4,032,674	253	4,032,681	442	4,032,692					CLASS 536	
358	4,032,677	263	4,032,690							119	4,032,702

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D2—	378.2	244,806		186	244,820		245	244,834			244,847	D16—	6	244,851		37	244,881
	400	244,807	D7—	45	244,821	D10—	15	244,835	D13—	10	244,864	D19—	92	244,852	D29—	8	244,880
D3—	19 A	244,808		77	244,822		64	244,836		24	244,859	D22—	14	244,853	D30—	39	244,869
D4—	31	244,809		78	244,823		69	244,837			244,861	D23—	42	244,854		44	244,870
D6—	28	244,810		85	244,824	D11—	144	244,838	D14—	6	244,865		55	244,855	D34—	5 CB	244,874
	56	244,811		137	244,825		148	244,839		10	244,868		141	244,856		5 PP	244,872
		244,812			244,826	D12—	62	244,840		45	244,863	D24—	21	244,857		5 SS	244,873
		244,813		188	244,827			244,841		56	244,848		29	244,879	D48—	20 R	244,875
	71	244,814	D8—	5	244,828		70	244,842			244,849		36	244,871		24 R	244,876
	79	244,815		24	244,829		71	244,843		68	244,867		99	244,878	D64—	11 B	244,862
	114	244,816		350	244,831		116	244,844		73	244,877	D25—	48	244,858	D87—	2 R	244,883
	132	244,817		402	244,830		211	244,845		90	244,866	D26—	1 A	244,860		3 B	244,885
		244,818	D9—	170	244,832			244,846	D15—	112	244,850	D28—	18	244,882		3 C	244,884
	179	244,819		235	244,833												

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PATENTS

1 : 4,031,602	4,031,894	4,032,546	4,032,718	4,032,109	4,032,012
4,031,850	4,031,895	4,032,564	4,032,738	4,032,149	4,032,044
4,032,452	4,031,904	4,032,579	4,032,760	4,032,221	4,032,049
3 : 4,032,885	4,031,910	4,032,589	4,032,982	4,032,252	4,032,054
4 : 4,031,784	4,031,937	4,032,605	9 : Re.29,283	4,032,272	4,032,057
4,031,826	4,031,939	4,032,608	4,031,584	4,032,437	4,032,064
4,032,195	4,031,958	4,032,618	4,031,605	4,032,455	4,032,069
4,032,245	4,031,970	4,032,723	4,031,641	4,032,517	4,032,098
4,032,330	4,031,972	4,032,729	4,031,668	4,032,566	4,032,133
4,032,447	4,031,973	4,032,762	4,031,689	4,032,671	4,032,146
4,032,896	4,031,979	4,032,765	4,031,744	4,032,687	4,032,147
4,032,963	4,032,010	4,032,767	4,031,765	4,032,753	4,032,178
5 : Re.29,277	4,032,029	4,032,774	4,031,774	4,032,772	4,032,204
4,031,654	4,032,066	4,032,775	4,031,861	4,032,802	4,032,209
4,031,702	4,032,075	4,032,783	4,031,909	4,032,817	4,032,254
6 : Re.29,284	4,032,087	4,032,787	4,032,035	4,032,883	4,032,269
4,031,566	4,032,092	4,032,789	4,032,052	13 : 4,031,643	4,032,270
4,031,573	4,032,096	4,032,795	4,032,083	4,031,694	4,032,274
4,031,577	4,032,102	4,032,815	4,032,124	4,032,002	4,032,288
4,031,579	4,032,111	4,032,818	4,032,207	4,032,097	4,032,295
4,031,587	4,032,116	4,032,830	4,032,215	4,032,153	4,032,297
4,031,593	4,032,129	4,032,832	4,032,355	4,032,668	4,032,299
4,031,616	4,032,138	4,032,843	4,032,382	15 : 4,031,915	4,032,310
4,031,618	4,032,145	4,032,849	4,032,435	4,032,072	4,032,311
4,031,619	4,032,155	4,032,853	4,032,457	16 : 4,032,319	4,032,334
4,031,623	4,032,163	4,032,857	4,032,496	4,032,551	4,032,357
4,031,634	4,032,164	4,032,859	4,032,617	4,032,614	4,032,400
4,031,648	4,032,168	4,032,861	4,032,631	17 : 4,031,594	4,032,408
4,031,655	4,032,177	4,032,863	4,032,632	4,031,603	4,032,433
4,031,667	4,032,182	4,032,865	4,032,733	4,031,626	4,032,434
4,031,677	4,032,185	4,032,881	4,032,747	4,031,629	4,032,475
4,031,698	4,032,188	4,032,888	4,032,784	4,031,650	4,032,508
4,031,701	4,032,189	4,032,889	4,032,848	4,031,656	4,032,563
4,031,705	4,032,210	4,032,897	4,032,862	4,031,659	4,032,586
4,031,719	4,032,216	4,032,902	06 : : 4,032,918	4,031,664	4,032,587
4,031,723	4,032,220	4,032,905	10 : : 4,031,846	4,031,777	4,032,600
4,031,726	4,032,238	4,032,922	4,032,181	4,031,782	4,032,615
4,031,731	4,032,243	4,032,926	4,032,416	4,031,801	4,032,645
4,031,747	4,032,259	4,032,943	4,032,454	4,031,824	4,032,670
4,031,753	4,032,283	4,032,950	4,032,493	4,031,832	4,032,701
4,031,766	4,032,306	4,032,954	4,032,533	4,031,891	4,032,720
4,031,799	4,032,314	4,032,970	4,032,638	4,031,921	4,032,725
4,031,808	4,032,363	4,032,975	4,032,654	4,031,922	4,032,730
4,031,827	4,032,370	4,032,978	11 : 4,031,567	4,031,936	4,032,740
4,031,844	4,032,383	4,032,979	12 : 4,031,604	4,031,941	4,032,743
4,031,848	4,032,395	4,032,984	4,031,662	4,031,944	4,032,748
4,031,853	4,032,422	8 : 4,031,627	4,031,686	4,031,953	4,032,751
4,031,864	4,032,445	4,031,956	4,031,687	4,031,967	4,032,811
4,031,874	4,032,460	4,032,022	4,031,802	4,031,968	4,032,828
4,031,875	4,032,462	4,032,151	4,031,803	4,031,975	4,032,858
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